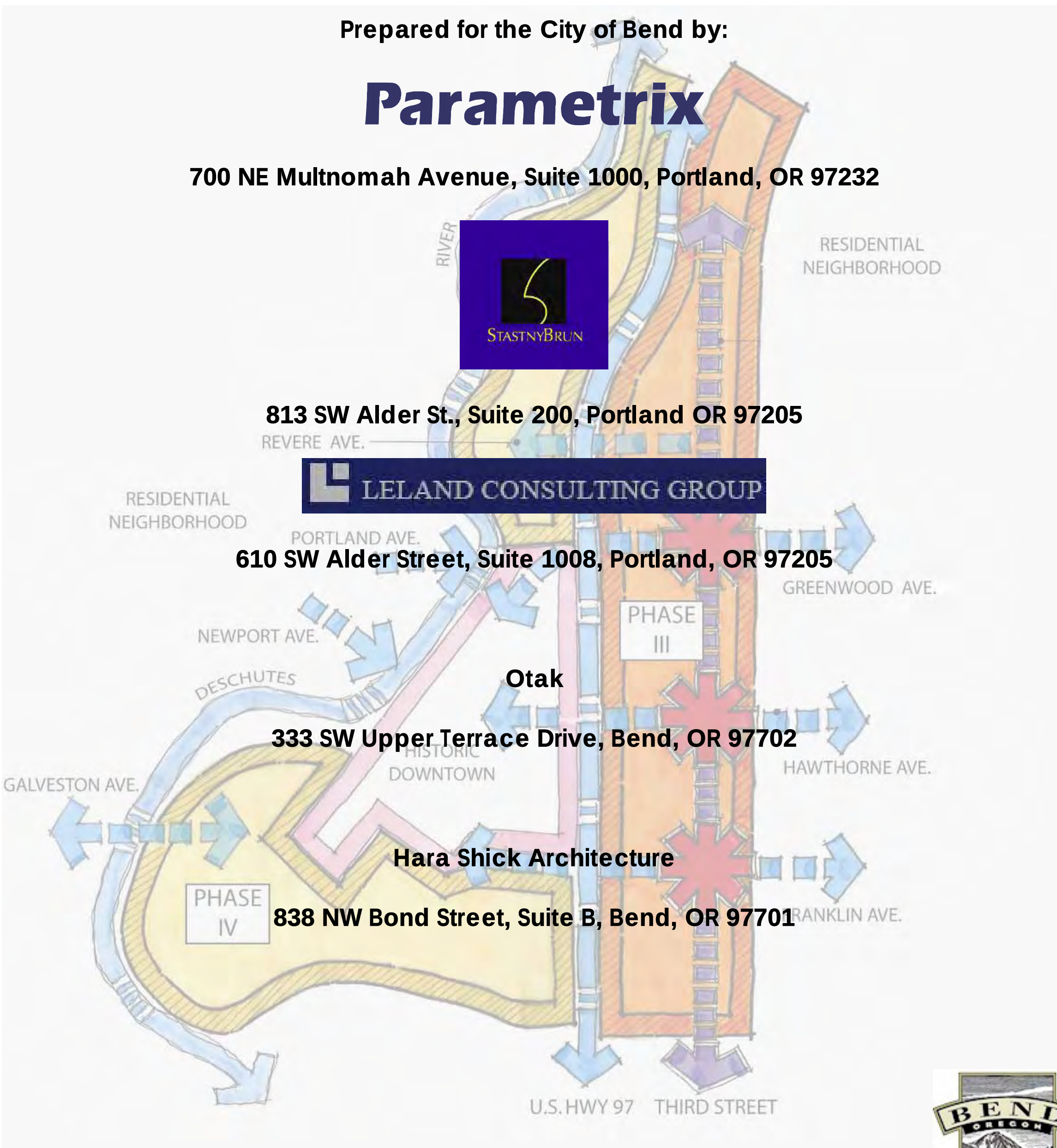
Bend Central Area Plan



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PREFACE

In March 2004, City Council directed staff to begin the process of developing a master concept plan for what is known as the Central Area of Bend in order to prepare for and guide the growth anticipated to occur over the next 20-30 years. The Central Area generally comprises the historic downtown business core area and its surrounding neighborhoods. The Central Area Plan takes a broad view of greater downtown Bend, providing an overall vision and framework for future development, redevelopment, and investment. The Plan addresses the area bounded on the west by the Deschutes River, on the north by Butler Market Road, on the east by Fourth Street, and on the south by the Colorado/Arizona Avenue couplet.

The primary objectives of the Bend Central Area Plan (CAP) are fourfold. First and foremost, the CAP is a central area "*improvement*" plan, one that builds upon the good "bones" of the current Historic Downtown Core area, and upon the sound foundation of community-based planning for the area. Second, the CAP is intended to serve as the "master conceptual plan" for the Central Area, including the identification of central neighborhoods and the Third Street Reinvention. Third, the CAP is intended to correspond with the objectives of the Bend Vision 2030 Plan, as that plan designates Bend's downtown area as a vibrant multi-use area. Finally, the overarching objective of the Plan is to ensure that the Bend Central Area will serve the community and region's future needs for an active, mixed-use urban area.

The CAP aims to provide the blueprint for the evolution and expansion of the Bend Central Area into a vital, vibrant, mixed-use and pedestrian-friendly environment over the next 20-30 years. The CAP summarizes the rationale for, and the evolution of, the conceptual design plan. It identifies development types and "catalyst projects", projects that are needed to jumpstart other development in the area and create a climate for investment. It promotes a multi-modal transportation system and concurrent development that is conducive to the reinvention of the automobile-dominated Third Street commercial strip.

- The opportunities presented by the community's plan for an improved Central Area include:
  - Enabling the evolution of a vital downtown which is unique to the region;
  - Enhancing the value of the Bend's unique character;
  - Unifying vacant, developed, and redevelopable land; investing in transportation improvements;
  - Making the Central Area a desirable place to live, work and play; and
  - Creating a place with a cohesive community atmosphere, unique amenities, and infrastructure that will enable the Bend Central Area to operate independently of surrounding service and employment centers.

Among the challenges in the Bend Central Area is the need to balance increasing levels of traffic congestion, a larger daytime worker population, and changes in existing development due to increased property values. This will be accomplished by efficient transportation improvements, fostering quality redevelopment, and implementing quality design standards. These key elements will contribute to the identity of distinct neighborhood districts in the Central Area, a reinvention of Third Street as a pedestrian friendly boulevard, the preservation of the historic downtown core, and the development of an urban form that is unique to Bend. The plan promotes the development of open spaces throughout the Central Area, and fosters the redevelopment of key intersections of character. Where possible, a connection of green spaces and great streets throughout the plan area will include the dual purpose of managing stormwater. Finally the plan includes establishing an innovative implementation strategy for funding and carrying out the plan.

The Bend Central Area Vision establishes a set of guiding principles that over the next twenty to thirty years will direct future efforts, guide investment decisions, and serve as "measures of success". The Bend Central Area Plan preserves long-term investment opportunities and encourages short-term redevelopment. It is based on the belief that all development and all partners have a responsibility to demonstrate how they support the continued success of Bend's Central Area as well as its redevelopment into a more densely populated downtown area.

INTRODUCTION TO THE PLAN DOCUMENTS

Bend's Central Area Plan is comprised of two major components: The Plan; and its Technical Appendices. A description of these two components is provided below.

THE PLAN: AN OVERVIEW DOCUMENT

The Bend Central Area Plan (CAP) document is a summary statement of the community's vision, direction, and commitment to action for the future of Bend's Central Area over the next 20-30 years. As such, the Plan document *itself* will also be presented as a summary statement, intended to serve as a stand-alone piece that provides:

- An overview of existing conditions within the Central Area;
- The vision, guiding principles and concepts behind the plan;
- The likely future conditions within the area, given projected growth and envisioned future development;
- A framework design concept that organizes and guides future development and the provision of supporting infrastructure;
- An identification of projects, tools and actions appropriate for guiding development and establishing a climate for investment for achieving envisioned growth; and
- An implementation strategy for applying the projects, tools and actions to ensure the plan is carried out, incrementally, over time.

The Central Area Plan communicates the City's public policy objectives for guiding the growth of the area over time. The background information providing the foundation for the community's policy and investment decisions is contained within a series of technical memoranda attached to this document as appendices; these will be summarized or referred to in this overview document.

THE TECHNICAL APPENDICES: THE FOUNDATION

The technical memoranda which comprise the technical foundation for the Plan have been compiled into thirteen (13) appendices. A brief description follows.

Appendix A is a review and update of the Central Area Plan Design Framework developed in earlier stages of the project.

Appendix B is a technical memorandum detailing the current conditions existing in Central Bend with regard to the transportation, infrastructure, land use and regulatory context.

Appendices C, D, and E are technical memoranda detailing the local economy and climate for development, and large scale redevelopment opportunities.

Appendix F is a technical memorandum that evaluates future conditions, twenty to thirty years from now, for transportation and infrastructure under two scenarios: with and without the CAP.

Appendix G is a memorandum that refines the plan's urban design framework based on the evolved community vision for the Bend Central Area and a preliminary Preferred Design Concept Alternative upon which future implementation actions will be undertaken.

Appendix H is a Central Area Plan Implementation Action Memorandum containing recommendations regarding the improvements and changes to the transportation system, land uses and local regulations needed to carry out the Bend vision and framework. The Implementation Action Plan also includes the "catalyst projects" needed to create a climate for investment and to "jumpstart" development, including the recommendation that the City consider and implement an urban renewal district to help pay for public investment projects identified by the plan.

Appendix I is a Financial Toolkit containing various suggestions for implementing the Central Area Plan.

Appendix J contains summaries of stakeholder interviews conducted prior to the first CAP Public Workshop in 2004 as well as stakeholder interviews conducted at the initiation of CAP Part 2.

Appendices K and L contain summaries of the PAC meetings and public workshops held to develop and refine the CAP Framework, and that provided the foundation, direction (and ongoing support).

Appendix M contains recommendations for changes to the City's comprehensive plan, transportation system plan, development code and other tools comprising the local regulatory environment.

Taken together, these appendices provide not only the foundation for the plan, but the tools and recommendations for the community to use to inform future decisions regarding carrying out the plan.

PROJECT OBJECTIVES

INTRODUCTION

Bend, located in the high desert of Central Oregon and surrounded by vistas of the Cascade Mountains, has experienced phenomenal growth in the last decade. Bend is an all-season community, a characteristic that has enticed more migration than most Oregon communities. The greater downtown (the Central Area) is comprised of a number of diverse districts that contribute to an overarching identity for what is considered "Bend", and represents a tapestry of its components. Based upon the connections between these areas, it plays a major role as the economic, social and civic center of the region. Bend serves as the "central city/regional center" and hub for the region bounded by the Columbia River to the north and California to the south along the US 97 corridor. Rapid growth has been a hallmark of this regional center, a trait that is expected to continue for the foreseeable future. With rapid growth come the attendant pressures for protecting what's good, for maintaining and enhancing the current high quality of life, for providing the provision of appropriate supporting infrastructure, and for ensuring that growth occurs according to the community's vision for its future. The area will evolve; the challenge is to ensure that the community is "pro-active" with regard to change, and not reactive.

WHY A CENTRAL AREA PLAN?

In 2004, City Council directed staff to begin preparing a master concept plan for central Bend to provide a broad framework to preserve Bend's character and foster quality growth over the next 20-30 years. The Central Area Plan is composed of three fundamental elements: quality urban design; access and mobility; and development and redevelopment opportunities. These elements are the nexus for maintaining and further developing the area's vibrant character. Each of these elements includes challenges associated with recent and projected rapid growth and must be considered collectively when implementing the Plan. Over the next 20 to 30 years transportation decisions will determine how people access the Central Area and whether the area sustains (and grows) its pedestrian "small town" feel. Quality design guidelines can maintain and encourage a neighborly feel as people naturally gather in public spaces on their way to a variety of activities. Finally, encouraging development appropriate to the envisioned character of each of the Central Area's neighborhoods, and stimulating such development by programming and carrying out key catalyst projects is critical to the successful implementation of this conceptual framework plan.

The Central Area consists of the "greater downtown area": the historic downtown business core area and its surrounding neighborhoods. The CAP builds upon previous studies and activities, takes a broad view of the area, and provides an overall vision and framework for future development, redevelopment, transportation and urban design. It should be noted that due to the availability of funding sources, the CAP effort was conducted in two parts; the first part began as a conceptual master plan for the Historic Downtown Core, and was completed and approved by City Council in December, 2005. In preparing this first part of the CAP, a vision and physical framework concept was prepared for a larger area comprised of the Historic Downtown Core and its surrounding neighborhoods in order to ensure that the focused effort was informed by the larger physical/geographic context in which it functioned. Central Area Plan Part 2 is intended to continue and build upon this initial effort, and address the neighborhoods and areas adjacent to the downtown, with a specific focus on part of the Third Street Corridor.

The primary objectives of the Central Area Plan (CAP) are threefold. First and foremost, the CAP is a downtown improvement plan, one that builds upon the "good bones" of the greater downtown, and that is consistent with the City's sound foundation of community planning. Second, the CAP is intended to serve as the "master conceptual plan" for greater downtown Bend (the Historic Downtown core and its adjacent neighborhoods…the Central Area), as envisioned by the Bend General Plan. Finally, the overarching objective of the CAP is to ensure that greater downtown Bend will continue to grow as a composite of distinct, connected neighborhoods, while maintaining and increasing its role as the economic leader and social focal point of the larger, Central Oregon region. The CAP aims to provide the blueprint for the evolution of Bend's Central Area, and summarizes the rationale for, and evolution of the conceptual framework plan. It identifies the projects and actions that are needed to "jumpstart" other development in the area and create a climate for investment (referred to in this document as "catalyst" projects and actions), and promotes a multi-modal transportation system and concurrent development that is conducive to the planned evolution of the Central Area into a mixed-use urban center with higher densities.

Rather than prepare a series of plan alternatives for analysis and review, the community agreed to use an evolutionary, iterative process in developing the Central Area Plan. The key steps in the development/evolution of the conceptual plan for Central Area include:

- Identification of key urban design, transportation, and development and redevelopment concepts as they pertained to the Central Area;
- Developing a 20-30 year vision of the future…for how the community wished to see the Central Area grow over time; and
- Evolution of a conceptual framework plan through an iterative process that allows refinement and adaptation based on physical and economic analysis of the project area, as well as stakeholder and public input.

The CAP is intended to respect the flexibility of existing residents and property owners regarding the use of their property, while laying the framework for more intensive urbanization. It establishes a framework to guide public and private investment and development, resulting in a cohesive, functional, distinct and attractive assemblage of commercial, residential, and mixed-use urban neighborhoods with good connections between them. Central Area Plan Parts 1 and 2 should be considered as one overall document. Although prepared separately and sequentially, they are consistent with each other. CAP Part 1 can and should be regarded as part of an overall Central Area planning effort, as well as a stand-alone effort guiding development and redevelopment within the Historic Downtown Core.

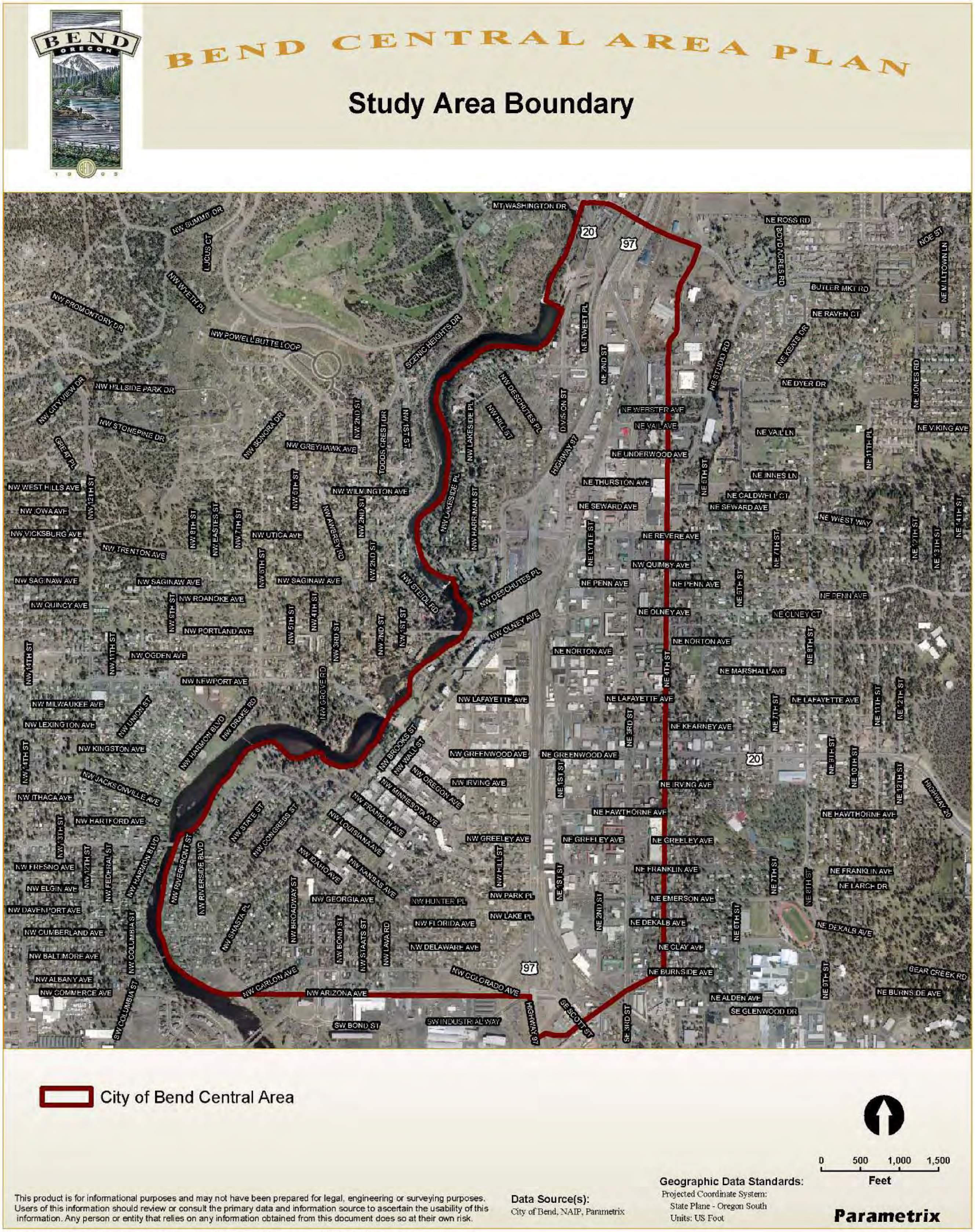
EXISTING PHYSICAL CONTEXT

INTRODUCTION

PROJECT AREA

The Bend Central Area is located within a unique setting, and possesses a transportation network and combination of existing land uses and physical features that present both opportunities and challenges for planning. This section provides an overview of the physical and demographic context for the CAP.

Bend's Central Area is bound by the Deschutes River to the west, Fourth Street to the east, Arizona Avenue to the south and Butler Market Road to the north (see the Study Area Boundary Figure). This area, directly to the east of the "bend" in the Deschutes for which the town is named, is comprised of a diverse array of land uses and activities. On a larger scale, the project area represents the urban center and "central city" for the overall Central Oregon region, and in particular, the mid-point of the Highway 97 Corridor stretching from the Columbia River to the California border.



Analysis by C. Hainey; Analysis Date: Jan-2007; Plot Date: Jan-2007; File Name: CAP_Ortho.mxd

EXISTING ENVIRONMENT

Demographics

Over the past ten years, Bend has been one of the fastest growing cities in Oregon and the country. With an estimated 2005 population of approximately 65,000, Bend is poised to grow to over 100,000 people by 2020. While much of this growth is projected to occur in newly developing areas of the city, there will still be population growth in the Central Area and surrounding neighborhoods. Such growth will support downtown businesses and create a market for infill development. The following tables describe the current and projected populations for Bend.

Table 1. Bend Long-term Population and Employment Projection Summary

Bend	2010	2015	2020	2025	2030
Population	81,242	91,158	100,646	109,389	119,009
5-year Avg. Annual Growth Rate	3.3%	2.3%	2.0%	1.7%	1.7%
Employment	46,602	55,948	62,757	69,566	76,375
5-year Avg. Annual Growth Rate	2.9%	3.7%	2.3%	2.1%	1.9%

Source: Deschutes County, Oregon Employment Department, and Leland Consulting Group

Table 1 shows the average annual growth rate over five-year blocks of time between 2005 and 2030 for population and employment. It demonstrates how the rate of growth is projected to be greatest over the next 5 to 10 years and stabilizing over time.

Household sizes are uniformly smaller throughout the Central Area when compared to Bend as a whole. Approximately three quarters of the households in every district are made up of only one or two people. The median age in the Central Area is also lower than that of the City as a whole—approximately 31 versus 36 years. These trends are typical of central city housing across the country. Singles, couples, single parents, and empty nesters characterize inner urban neighborhoods. In fact, in Bend, over 63 percent of households consist of only one or two people, indicating a large potential market for urban housing dwellers. This is of note from a planning perspective because one of the best tools to sustain the vitality of a downtown is the introduction of urban housing products (condominiums, apartments, town homes). The primary market for urban housing may be singles, married couples without children, empty-nesters, and retirees seeking a maintenance-free lifestyle in close proximity to shopping and restaurants.

The Central Area has a lower level of office and service jobs in than other parts of Bend. This is of particular importance because such jobs are expected to grow at some of the fastest rates of any type in the coming decades. Many professional office and service jobs—especially those in the high-tech sectors—have also been identified by the city as critical "targeted sectors". Many of these jobs will be captured elsewhere in the city—including at Juniper Ridge and in Bend's office and industrial parks—but the Central Area, particularly east of the Parkway has the potential to attract office, service, and high tech businesses as office and service sector businesses have clustered for decades in downtown areas, where clients, project partners, and service providers are densely clustered, and the surrounding environment offers a rich mix of urban amenities. Despite Bend's reputation as a retirement and recreation destination, its median age is 35.9, lower than Oregon's, which was 37.3 in 2005. Bend's population is expected to age slightly over time, reflecting a slow aging of the statewide population during the same period. Specifically, the following table describes the age breakdown in Bend.

Table 2. Demographics in Bend and the Central Area, 2006 Estimates.*

Demographic Category	Bend	Central Area	Down-town	Third St. Corridor	North Nhood	South Nhood
Population	68,136	2,977	291	122	547	2,017
Median Household Income	$50,330	$34,215	$24,406	$24,267	$35,382	$35,819
Household Size**						
1 & 2 person HHs - percent	63.1%	75.6%	76.6%	75.0%	75.3%	75.6%
3 person HHs - percent	16.4%	13.8%	12.0%	13.6%	14.8%	14.0%
4+ person HHs - percent	20.5%	10.7%	11.4%	11.4%	9.8%	10.3%
Median Age	36.3	31.4	30.5	30.5	35.4	30.8
Education (Pop over 25)						
Percent with College Degree	29.4%	34.7%	35.8%	21.0%	19.7%	38.3%
Percent with Advanced Degree	9.3%	16.0%	18.2%	7.0%	7.7%	17.8%
Housing Tenure						
Owner Occupied Housing Units	58.8%	29.4%	26.4%	22.0%	21.3%	32.0%
Renter Occupied Housing Units	34.7%	63.6%	65.9%	68.0%	71.1%	61.3%
Vacant Housing Units	6.4%	7.0%	7.7%	10.0%	7.6%	6.7%

* All figures are 2006 projections from 2000 Census data, except Education, which is 2000 Census data.
** Not all numbers add up to 100 percent due to rounding. Source: ESRI BIS and Leland Consulting Group

Urban Form

The form of a city usually results from a series of incremental decisions and initiatives that are made over time. Bend's Central Area is a product of development decisions based on property ownership and market profiles that have changed, and are still changing, rapidly. The Historic Downtown Core contains buildings that have an incremental texture and feel that harkens back to downtowns of the past. One-, two-, and three-story buildings define a street "wall" that is scaled to the pedestrian, with streets and alleyways that permit light and air to penetrate deep into the circulation spaces. Canyons of steel and concrete do not exist in Bend and are thought to be incongruous with the current scale and texture of the downtown. The spaces in between buildings (public rights-of-way, parks, and green space) were not pre-determined, but are a result of survey platting and parceling. What has, in reality, been a rather haphazard development pattern has resulted in an identifiable and comfortable urban form.

Current development initiatives are pushing the limits of the City's height guidelines for buildings. Vehicular traffic and pedestrian flow co-exist but in many cases, conflicts are more common. New development is incremental and insular, and does not consider how to be a good neighbor and contribute to the total urban fabric. Land costs are high and are requiring developers to maximize the development potential of their parcels. The retail core is vital and active, but seen as vulnerable by some.

Linkages and transitions between the neighborhoods surrounding the Historic Downtown Core lack definition. Character and building scale east of the Parkway is very diverse and without a consistent theme or texture. The southern neighborhoods are an example of a successful blend of housing styles and sizes that lend to an identifiable district. The northern neighborhood has a much greater variety of housing types and scales. Additionally, the lack of a traditional street grid and connectivity within and between neighborhood districts diffuses their "feel" and identity.

The results of Bend's historical, incremental development are similar to those often found in rapidly-growing areas. As mentioned earlier in this document, Bend's Central Area has "good bones". The framework of infrastructure and existence of neighborhoods (even though some suffer from a lack of definition) provide a wealth of opportunity, not severe limitations.

Transportation System

The existing transportation system within the Central Area is built around a "backbone" system of arterial and collector streets. The following is a description of the physical characteristics of streets and highways in the study area.

Roadway and Surface Street Facilities

The Central Area is served by a diverse network of collector and arterial roadways. This network and a summary of existing operations is provided below. More detailed information is provided within the technical memorandum addressing existing conditions, attached as Appendix B to this document.
Two key State facilities serve a prominent role within the Central Area:

- U.S. Highway 20, the Central Oregon Highway, is designated as a Statewide Highway and freight route within the study area. Land uses along this corridor are highly automobile-oriented including retail shopping centers, restaurants, lodging and gas stations. The route functions as a principle arterial with a posted speed of 25 to 45 mph. The roadway has two travel lanes in each direction, a continuous center left-turn lane and no on-street parking.
- U.S. Highway 97 is also known as the Bend Parkway. The Oregon Highway Plan designates the Parkway as a Statewide Expressway and freight route. The Bend Parkway is a controlled access roadway with two travel lanes in each direction and a center median. In the study area, full access interchanges occur at Butler Market Road, Revere Avenue, and Colorado Avenue. Southbound on and off intersection ramps are provided at Lafayette Avenue and Hawthorne Avenue. The Parkway carries the highest level of north/south traffic volumes in the community.

Other major roadway facilities within the Central Area include:

- Wall Street – a north/south minor arterial (and major collector south of Franklin Avenue) that provides for two-way traffic between Revere and Greenwood

Avenues, and one-way southbound traffic between Greenwood and Industrial Way. A single travel lane in each direction is provided in the two-way section and two lanes are provided in the one-way section. Turning lanes are provided at the intersections with Portland and Greenwood Avenues. North of Portland Avenue, Wall Street accesses the Bend Parkway at Revere Avenue.

- Bond Street – a minor arterial (and major collector south of Franklin Avenue)that provides for one-way northbound traffic between Industrial Way and Wall Street approximately one block north of Greenwood Avenue. Two travel lanes are provided for the length of this facility.
- Third Street, a north-south facility classified as a Principal Arterial roadway, is a classic auto oriented (and dominated) commercial strip with retail shopping centers, restaurants, motels, gas stations, and a great number of individual and shared access points. As will be discussed elsewhere in this Plan, one of the CAP's primary recommendations is to "reinvent" and convert this commercial strip into the centerpiece of a new downtown neighborhood (the Bend Central Neighborhood) over time, using a combination of regulation, incentives, partnerships and catalyst projects to do so.
- Portland/Olney Avenue – an east/west street marking the northern boundary of the core area, this facility provides one travel lane in each direction with turning lanes at Wall Street. The facility is classified as a collector west of Wall Street and a minor arterial east of Wall Street. Portland Avenue provides one of the few crossings of the Deschutes River linking the core area with the west side of Bend.
- Greenwood Avenue – this east/west minor arterial street provides two travel lanes in each direction between Wall and Third Streets, and offers a significant connection to the core area from the Third Street/Business Highway 97 corridor (and US 20 to eastern Oregon) and to the west side of Bend via the Newport Bridge. This street is grade-separated from the Burlington Northern Railroad and the Bend Parkway just east of Hill Street. Traffic signals are provided at the intersections with Third, Bond, and Wall Streets.
- Franklin Avenue – this street also provides east/west traffic circulation to/from and through the core area, and offers a single travel lane in each direction. This street is also classified as a minor arterial and connects with Third Street to the east (via a narrow undercrossing of the railroad and the Parkway) and west Bend to the west (via the Galveston Avenue Bridge).

Each of the foregoing has been identified as a "major traffic street," as its primary role is to provide for vehicular circulation in the core area, and to connect to the core with its surroundings. Streets that serve a secondary traffic circulation function as it relates to the core area include:

- The Colorado/Arizona Avenue couplet – classified as minor arterials, these streets provide a connection between the Parkway, the Old Mill District and the core area, as well as linking Third Street and destinations in east Bend with the Colorado Avenue Bridge. The role and function of these streets will be addressed in greater detail in a future phase of the Central Area planning process.
- Oregon/Hawthorne Avenues – these collector streets provide continuous east/west circulation between Wall Street and the Bend Parkway. At-grade right turn in/right turn out ramps with the Parkway at Hawthorne Avenue offer a direct, but limited connection for southbound traffic between the Parkway and the core area.

Portland and Olney Avenues; Newport and Greenwood Avenues; Franklin Avenue and Third Street are envisioned as vital, unique, "great streets", with their own individual identity and mix of uses, serving as critical connections and gateways between the Historic Downtown Core and the Bend Central neighborhood.

The movement of traffic into and out of the Historic Downtown Core Area is constrained by a number of factors including:

- The linear spatial configuration of this area, which limits the number of potential access points at the northern and southern edges.
- The Deschutes River on the west side, which requires that traffic use one of four bridges to travel to/from or through the core area. Running from north to south these include the Portland Avenue Bridge, the Newport Avenue Bridge, the Galveston Avenue Bridge and the Colorado Avenue Bridge (the latter is actually south of the core area but does provide significant access).
- The Bend Parkway and Burlington Northern Railroad on the east side which can be crossed via undercrossings on Greenwood and Franklin Avenues and at grade at Olney Avenue, Revere Avenue and Colorado Avenue.
- Access to and from the Parkway occurs to the north and south of the core area (at Revere and Colorado Avenues), with only limited access and southbound right in/right out access at Lafayette and Hawthorne Avenues.

Traffic operations on the major streets within the core area vary by time of day and location. Congestion problems are presently experienced during most daytime or early evening hours along Wall and Bond Streets throughout the core area, and there are often significant delays at the intersection of Wall Street with Newport/Greenwood Avenue. There is also frequent traffic congestion on Oregon, Minnesota, and Franklin Avenues in the commercial areas. With the level of commercial and business growth anticipated by the Central Area Plan, future traffic growth into and out of the core will likely increase delays and congestion on the undercrossings and bridges that provide major access for the core area.

Congestion currently exists on all the routes leading to downtown. The number of travel lanes and levels of traffic delays at critical intersections along the east/west routes of Greenwood Avenue, Franklin Avenue and Portland/Olney Avenues, and the north/south routes of 3rd and 4th Streets affect access to downtown. Many of these routes accommodate significant amounts of through traffic, as well as traffic with downtown destinations. Revere Avenue is one of the few remaining at-grade railroad crossings in Bend and the close proximity of the Bend Parkway; Division Street and 3rd Street will make a future grade separation very difficult. The Olney Avenue and BNSF Railroad crossing is also at-grade. The BNSF railroad provides a challenge to the future growth and development of the Central Area, as it serves as a major limitation to the consideration of improved east-west connections between Central Area neighborhoods, and a barrier to providing connectivity for all modes of transportation at Greenwood Avenue in particular.

Bicycle and Pedestrian Facilities

The Bend Central Area is well-served with dedicated bicycle lanes, bikeways (shared roadways), multi-use paths, and sidewalks. The City of Bend requires the construction of sidewalks on both sides of new streets. Currently, about 3/4 of the streets in the study area have sidewalks (on at least one side of the street) along the arterial and collector streets. The existing sidewalk system inventory is depicted in Appendix B. Pedestrian crossing signal facilities are provided at some signalized intersections. Pedestrians and bicyclists utilize sidewalks, streets, and other walkways for travel as well as for recreation and exercise, and these facilities have special characteristics that must be considered in planning.

There are a number of constraints to using the existing bicycle or pedestrian system within the study area. Both systems have many gaps where either no facilities or unattractive, unappealing facilities are provided. A key issue for the Central Area Plan is the lack of bicycle connections between the Third Street corridor and the core area. The existing Bend Parkway and BNSF tracks create a substantial barrier to connectivity by non-auto modes. In addition to limited sight distance problems and the need for bicyclists and pedestrians to share these facilities, pedestrian/bicycle facilities on both Greenwood Avenue and Franklin Avenue are narrow, dark and unappealing to the user.

Parking

There are approximately 1700 parking spaces within the Historic Downtown Core. The 2006 construction of the Centennial Parking Plaza, a City parking structure, increased parking capacity within the Historic Downtown Core by over 45% (551 spaces). However, the existing parking supply in this area is currently inadequate for the number of employees, shoppers, tourists, and other Downtown visitors.

Transit System

The City of Bend began offering fixed-route bus service in September, 2006. The service offers seven routes with over 180 stops. Single ride fare, unlimited day passes and monthly passes are available. Bend Area Transit also offers paratransit, door-to-door rides with Dial-a-Ride during all hours that fixed route bus service is operated as well as limited hours on Sunday. Dial-a-Ride is available to eligible riders who have been certified to have a disability that keeps them from riding fixed route and/or are a low-income senior not living near a fixed route.

Infrastructure

The Historic Downtown Core is a largely developed area and has the full range of sewer, water, stormwater, and utilities services available to it. As one of the earlier developed areas within Bend, the Historic Downtown Core's facilities can be generally characterized as inadequate to effectively serve existing development, let alone future intensification and square footage of land uses.

Like the Historic Downtown Core, the Bend Central Area, the Northern Industrial Area, and the Division Commercial Area currently lack the infrastructure capacity to support the development forecasted through the CAP. The City has master plans for sewer, water and stormwater management that identify the improvements needed to address current problems and accommodate proposed development as envisioned by this plan. Additional information regarding Central Area infrastructure may be found in the technical memorandum addressing existing conditions, attached as Appendix B to this document.

Land Use

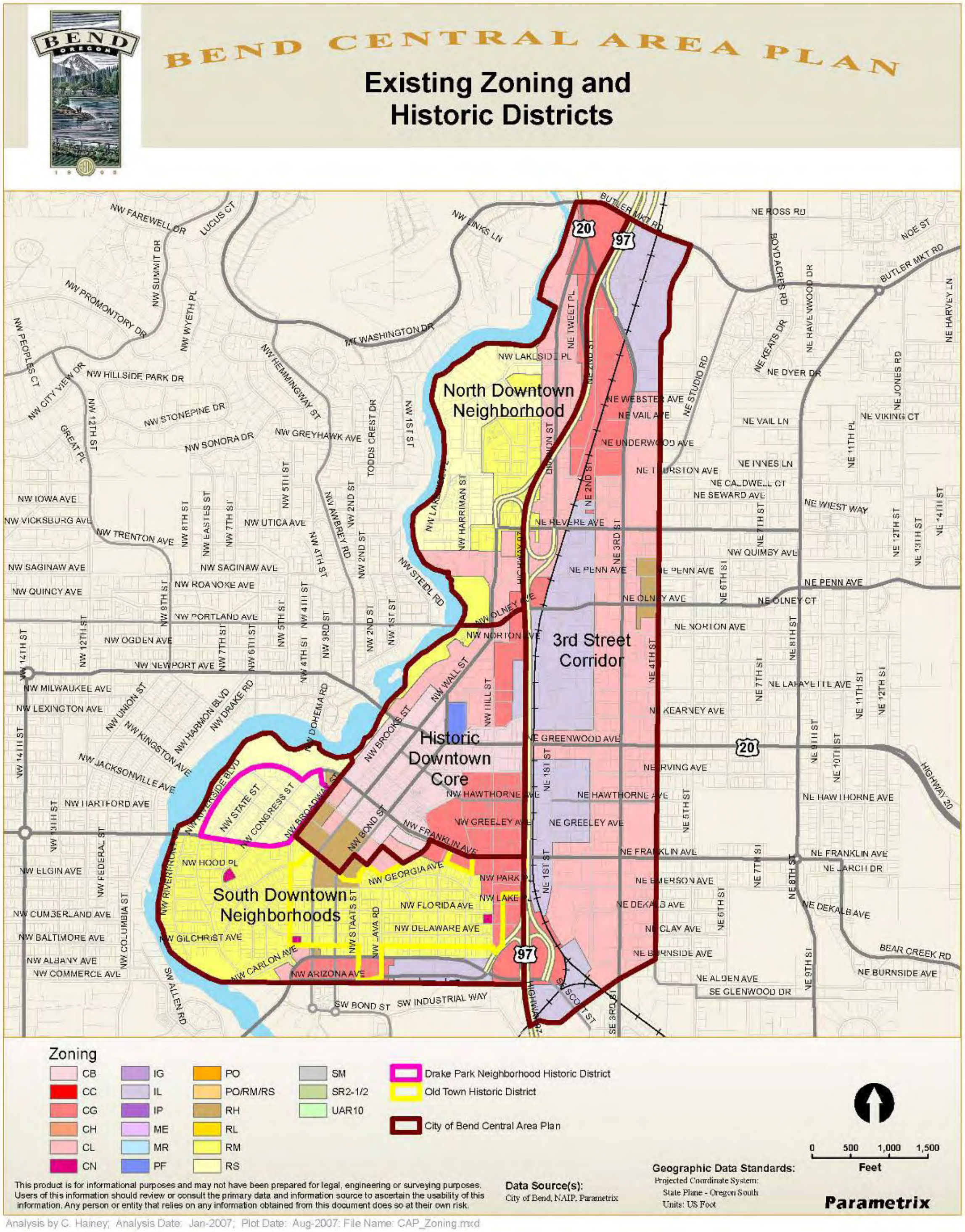
Commercial land uses are predominant in the Central Area and range from boutique retail in the Historic Downtown Core to highway-oriented commercial uses along Third Street. Residential land uses are adjacent to or near commercial uses in much of the Central Area which offers both opportunity for complementing land uses, as well as challenges and conflicts in the areas where commercial related activity and traffic impact residential neighborhoods. Public parks and civic spaces are presently primarily concentrated along the Deschutes River along the western boundary of the study area, and south of Franklin Avenue and the downtown core area. Industrial uses are also prominent in the northeast corner of the study area.

The Central Business District in the historic downtown core area consists primarily of single to two-story retail commercial buildings, however, in recent years taller buildings of up to four or five stories have become more prevalent. Similarly, buildings east of the Parkway are generally single to two-story buildings, but with larger footprints to accommodate light industrial and larger commercial uses. Zoning designations within the Central Area are indicated in Table 3 below and in the map on the following page entitled “Existing Zoning and Historic Districts”. General Plan designations within the Central Area are described in the Existing Conditions Memorandum in Appendix B.

Table 3. Zoning Designations in Central Area District (by acres)

Zone	Third Street Corridor	Historic Downtown Core	North Central Neighborhood	South Central Neighborhoods	Grand Total
Central Business	0	59	0	0	59
Commercial General	47	35	17	30	129
Commercial Limited	172	27	40	4	243
Commercial Neighborhood	0	0	0	1	1
Industrial Light	119	3	0	10	132
Public Facilities	0	3	0	0	3
Residential High Density	5	9	0	6	20
Residential Low Density	0	0	1	0	1
Residential Medium Density	2	6	31	131	170
Residential Standard Density	0	1	52	43	96
Grand Total	345	143	141	225	854

Lot sizes within the Plan Area vary widely. The average lot size in the historic downtown core and the surrounding neighborhoods range between 5,000 and 20,000 square feet. Lot sizes east of the Parkway are larger, ranging from 1 to 2 acre sites on the smaller end and larger sites over 5 acres.



Development and Redevelopment Opportunity

A key part of the Central Area Plan's framework concept is the redevelopment of a few City-owned sites and other, privately-owned sites that are more likely to redevelop due to size, ratio of improvement value to land value, and location. These sites are those that can provide the most leverage for encouraging additional private investment to enhance the Central Area. The following identified sites or opportunities are highly visible and offer the potential to enhance the Historic Downtown Core:

- Civic Neighborhood (City Hall and adjacent parcels)
- Mirror Pond Parking Area
- Workforce Housing (at the Bend Bulletin or similar site)
- Major gateway corners at Third Street and Greenwood Avenue and Third Street and Franklin Avenue.
- Large parcels along Third Street currently occupied by car sales lots.
- Smaller parcels along Hawthorne

Appendices C, D and E address the local economy, the climate for development, and large-scale development opportunities in more detail.

Existing Goals, Policies and Regulations

The City of Bend has had a long-standing partnership with its citizens and a commitment to creating a vibrant downtown. Several recent planning processes have led to the development of plans that impact and guide growth within the Central Area. A partial listing of the key plans and studies that helped form the foundation for the Central Area Plan is summarized below.

Bend Vision 2030

In 2006, the City Council adopted a resolution supporting the recently-developed Vision 2030. Vision 2030 includes goals for a vibrant Downtown that preserves its historic presence while also allowing expansion for new businesses and development. Vision 2030 goals also desire an increase in mixed-use development "along key corridors" that include a mix of residential, commercial, and other uses that promote employment.

The Bend Area General Plan

The Bend Area General Plan was reviewed, updated, and approved in 1998, and includes many goals that capture the quality of life elements important to citizens. While none of the goals directly pertain to the Historic Downtown Core or other particular districts within the Central Area, several goals contain elements that provide relevant direction for this area.

- In 1998, Bend had already begun to experience rapid growth and ensuing physical changes. These changes are reflected in Chapter 5 of the General Plan. Housing Goals identify the need to encourage flexible subdivision designs that both protect the natural environment and promote safety.
- Chapter 9 of the General Plan provides guidance to City decisions to promote community appearance. The General Plan goal "To identify those characteristics

that give the community its individual identity and to preserve and expand those characteristics as growth occurs" is also a critical principle of the Plan. Chapter 9 provides guidelines on how this goal can be implemented in various areas such as residential, commercial, industrial, and along the Deschutes River corridor.

- Chapter 8, Public Facilities and Services, includes policies which are relevant to the Historic Downtown Core. Chapter polices include "Public buildings and facilities should be located so as to provide convenient public use and to provide maximum service for the greatest economy. Governmental offices should locate downtown when practicable." This chapter includes language describing the Heritage Square concept.

Transportation System Plan

The City's currently adopted Transportation System Plan (TSP) addresses the multi-modal transportation system needs for the community, consistent with the adopted comprehensive plan (the Bend Area General Plan), and presents both projects and policies that govern the development and operation of this system. This plan is further supported by specific ordinances, standards and other guidance to address issues related to traffic operating performance, access management, and a functional hierarchy of streets along with right-of-way and street cross-sections for each roadway type. The TSP also establishes a general policy directive for the implementation of specific improvements along most major streets in the city.

Development Code

The City, in conjunction with a citizen's advisory group, recently revised its development code, and adopted it in 2006. This development code update will advance the City's goals of protecting the Central Area. One of the purposes of the development review process is to ensure that all development code requirements for the subject site's zone are met and that required public facilities have adequate capacity, as determined by the City, to serve the proposed use.

The development review process generally applies within all commercial zoning districts, the mixed employment districts, and professional office and non-industrial uses within the light industrial and general industrial zones. This review process addresses landscaping requirements, building setbacks, bicycle and automobile parking, access and circulation, public facilities, and compliance with environmental performance standards. Currently properties within the Central Business District are not subject to the standard design review requirements but are instead required to use the City of Bend's Design and Development Handbook for the CB Zone. Development within the CBD can either meet design standards through administrative review as part of the plan-review process if they meet specific and objective standards, or they can deviate slightly from these standards subject to review and approval by the Planning Commission.

PLANNING PROCESS OVERVIEW

INTRODUCTION

As noted earlier, funding availability necessitated separating the project into phases, with the need for addressing the Historic Downtown Core Area having precedence. Accordingly, the Plan was broken into two parts with the development of Part 1 in 2004 and 2005 and Part 2 in late 2006 and 2007.

In Part 1, citizens and stakeholders participated in the development of an overall vision and statement of guiding principles for the Central Area and its districts. In this initial portion of the Plan, the conceptual future land use and design framework for the Central Area as a whole was defined. This allowed for the focus on the Historic Downtown Core to be informed by the overall area wide context within which it existed and operated.

In Part 2, the City focused upon a conceptual plan and recommended uses, the transportation system and other supporting infrastructure, and a development strategy for the neighborhoods abutting the Historic Downtown Core, with particular attention to the Third Street Corridor. Special attention was paid to the issues of mobility, circulation, and access within and between the districts comprising the Central Area and the balance of the community, and to the impact and compatibility issues that future, higher-density urban land uses might present to the greater downtown neighborhoods.

The following sections will address the process used in developing this vision-driven, outcomes-based Plan, the means employed to secure public and stakeholder involvement, and the process used for making decisions and for arriving at a community-based plan for achieving an envisioned, future Central Area.

ITERATIVE PLANNING PROCESS

In developing the Plan, a phased, iterative process was used to get from current reality to recommendations for the future. Initial research and stakeholder interviews followed by brainstorming and community dialog led to formation of an overall vision for the Central Area. Visioning led to discussion of guiding principles and development of a continually-refined framework concept. This, in turn, led to identification of a desired form for the Central Area and its neighborhoods, as well as key projects and implementing actions. The following sections portray how the City's practice of forward thinking set the stage for the visioning and planning to come.

Three major iterations of the conceptual Central Area Plan for greater downtown Bend were prepared during the course of this planning effort: an initial vision and concept (as part of Bend CAP 1); a refined and expanded concept including Third Street and the surrounding neighborhoods; and a preferred design concept.

Forming the Foundation

Prior to engaging in "looking forward" and envisioning a future set of desired outcomes and guiding principles, it is necessary to have a firm foundation of information, a sense of "where we've been" and "where we're starting from". As noted earlier, federal, state, and local plans and regulations have an impact upon the development of the Central

Area. Talking with citizens, key stakeholder group representatives, Project Advisory Committee members and City staff provided a bit of history with regard to previous efforts, the lay of the land and community perceptions. Finally, an examination of existing conditions associated with land use and development, transportation facilities and services, and the local and regional economic climate as summarized above yielded information on opportunities to pursue, and constraints to avoid.

Outcomes-Based Vision and Guiding Principles

A "vision" is a statement picturing a future, an end-state, of desired outcomes. Too often future plans are prepared on the basis of trying to keep up with a projected trend or scenario. By taking the time to look at current circumstances and resources, and entering into public discussion of desired outcomes for the future, a community can take control of their future by taking actions that are aimed at fulfilling clearly stated objectives. Bend has the culture, the capacity and a history of planning; this provided a natural platform for developing a clear statement about a desired future.

The community and the Project Advisory Committee examined the foundation of information, and painted a picture of how they pictured the future of their greater downtown area, 20 to 30 years in the future. The result of this work is reflected in the upcoming section, "The Plan".

Community Outreach

For any plan to be successful, there must be broad-based citizen and stakeholder input. This facilitates "buy in" and ownership of the Plan. The current effort to develop the Central Area Plan has been citizen-based, and has been led by the City's appointed Downtown Advisory Committee (DAC), the Project Advisory Committee (PAC), and the Central Area Plan Advisory Committee (CAPC).

Downtown Advisory Committee

During CAP, Part 1, the project was aided by the guidance of the DAC, appointed by the City Council. The focus of this group (and of Part 1) was primarily the urban renewal district in the downtown core area. As the DAC completed the urban renewal projects and addressed the issues with which it was charged, the group was disbanded in 2005. The City Council formed a new committee, the Central Area Plan Advisory Committee (CAPC), to look at the broader central area; this group is discussed further, below.

Central Area Plan Committee

In 2006, the Bend City Council formed a new body, the Central Area Plan Advisory Committee (CAPC), for purposes of advising on issues involving Part 2 of the Central Area Plan, and advising Council on downtown issues in general. In addition to advising on Central Area Plan – Part 2, this committee's responsibilities include those of their predecessor, the DAC.

The initial task of the eight-member CAPC was to participate in the development of Part 2 of the Central Area Plan. To do so, the CAPC joined the larger, 28-member, Central Area Plan Project Advisory Committee (PAC), in essence serving as an advisory body embedded within the PAC (described in greater depth in the following section). The CAPC is a long term advisory board that will continue work through implementation of the plan, and have continuing involvement in a broad range of issues that affect the central area and historic downtown core. These may include downtown/peripheral planning issues, specific development projects, urban renewal issues, establishment of special districts, and addressing issues of parking provision and management.

Project Advisory Committee

The Central Area Plan PAC is a body of technical and policy-oriented representatives of agencies, City departments, neighborhood groups, and special interests. Appointed by the City Council, the PAC met regularly to advise City and ODOT staff and the consultant team over an estimated nine-month planning process for preparing Central Area Plan Part 2. As noted above, the PAC includes members of CAPC, one of the City's standing committees.

The PAC includes representatives from a wide variety of public, community, technical and business interests. Meeting every 4 to 6 weeks on average, PAC meetings were open to the public, and the public in attendance was offered the opportunity to participate in discussions and to offer comments and advice. PAC recommendations were arrived at by consensus and efforts were made to find agreement.

The PAC actively participated in the development of all facets of Part 2 of the Plan. In keeping with this direction, PAC meetings were sometimes organized as work sessions with the consulting team hired by the City to facilitate preparation of this Plan. PAC members were encouraged to actively participate in the major public events conducted in support of developing the plan.

Stakeholder interviews

Prior to project kick-off workshops for the first and second parts of the CAP, the public was engaged by interviewing stakeholders from a variety of public and private interests. The goal of these interviews was to identify overall opportunities and challenges in the Central Area, while also collecting information that aided in the study of key issues and the development and refinement of the project's vision and guiding principles. These stakeholders continued to play an important role in the development of the Central Area Plan during committee meetings and through the public and special purpose workshops.

The information gathered through these interviews is summarized in Appendix H and was used to guide the planning of the initial Public Workshops. The questions asked at the workshops were refinements of the questions asked of the stakeholders during the interviews, with the added benefit of visual interaction and group discussion to promote further discovery and refinement of viewpoints.

Public Workshops

Six major public events were held in conjunction with the plan development process beginning with an initial public workshop held in 2004 to develop the vision, guiding principles and plan concept, and to discuss and receive input on the "big ideas" that would eventually be fleshed out into key "catalyst projects" that would create a climate for investment and stimulate development.

The 2004 public visioning workshop was kicked off by a presentation entitled "Sustaining Success: Lessons for a Healthy Central Bend Area." Following the presentation the project's scope and objectives were discussed, and the public was invited to comment on opportunities and challenges facing the Central Area.

Following substantial further work on the plan, the City held a second major public event, a community open house, in April, 2005. This event focused upon sharing the design concepts with the public, and providing an overview of the next steps in completing the plan. At this workshop, public comment was solicited to further refine the concepts generated within the first public workshop.
The next major public involvement opportunity was a workshop held in July, 2005, focusing upon the Historic Downtown Core which featured:

- A presentation of ideas for improving circulation and access to, from, and within the Historic Downtown Core;
- A presentation of ideas and solicitation of input regarding key City-owned "opportunity sites" including the current City Hall site, the parking lots associated with Mirror Pond, and the surface parking lot at Wall Street and Greenwood Avenue; and
- A discussion of the issues of urban form and design within the Historic Downtown Core, including building height, open space, and gateways.

At the beginning of Part 2 of the CAP process, the City of Bend and the Oregon Department of Transportation held a public open house in January, 2007 to inform interested members of the public about the objectives for CAP 2, and to test and confirm the vision for the Central Area developed during Central Area Plan Part 1. In addition, public input was gathered on the three "big ideas" that formed the foundation for the Plan: a revamped "city form"; defined and improved Central Area neighborhoods; and a reinvention of the Third Street corridor and environs.

In May, 2007, a public workshop was held to update the community on the Plan vision, guiding principles and framework concept, and to ask for guidance on refining and implementing the Plan. At this workshop, several scenarios were discussed for improving the transportation system to facilitate the future reinvention of the Third Street corridor, including a "split" couplet along Second and Fourth Streets and transforming Third Street into a boulevard.

A final public workshop was held in September, 2007 to present the final Central Area Plan to the public prior to its presentation to City Council and the Planning Commission for approval.

Decision Making Process

Early in the planning process, the public was recognized as an invaluable resource and planning partner. As indicated above, this was accomplished through interviews with a variety of stakeholders, collaboration with the PAC, and through public workshops on visioning, design, transportation, development, and specific improvements to Third Street. The stakeholder interviews helped provide the foundation for issues that were discussed in the public workshops.

Several ideas and concepts emerged during the public workshops to help form the Central Area vision and lay the foundation for the Plan's framework concept. Following the initial visioning effort, an overall contextual and conceptual framework plan for the Central Area was prepared. Throughout the process, the City Council was briefed; substantial portions of Part 1 of the CAP were approved by Council in late 2005.

In December 2006, the City Council reviewed what they had approved in CAP 1, and discussed the approach planned for CAP 2. A public and stakeholder involvement strategy for the CAP 2 was developed to promote involvement of the wide variety of interests within the Central Area, and focus on the interaction between them. As in the early parts of the CAP, stakeholder interviews and public workshops were held to gain community ideas and input. Meetings with the PAC were held on a regular basis throughout Central Area Plan Part 2; their recommendations were incorporated into the plan and presented to City Council in May of 2007. A joint City Council and Planning Commission Workshop was held to review the draft CAP in June 2007, with final approval of the CAP in the fall of 2007.

The following chapter will focus upon the vision, the guiding principles and the framework conceptual plan that, together, comprise the plan for the overall Central Area and for the individual districts within.

THE PLAN

The types and arrangement of land uses, transportation facilities, public and private sector projects and activities greatly impact the character of a downtown area. The efforts of the Project Advisory Committee and the community at large described in the preceding sections are reflected in the vision, guiding principles, big ideas, and framework concept plan presented below.

FUTURE VISION

Early on in the planning process, the public and Project Advisory Committee worked to develop a vision for Bend's Central area…for what the greater downtown would be like in 20-30 years. In addition, vision statements were also generated for several of the Central Area's neighborhood districts: the Historic Downtown Core; the Third Street corridor; the Greenwood Avenue corridor; and the Bend Central neighborhood. The following area-specific vision statements were generated by the community and approved by the City Council in December, 2005:

The Central Area

> *"The economic leader and social focal point of the region, the Bend Central Area is comprised of several districts with their own distinct identity, character, and unique collection of uses. These districts represent a land use, transportation, and economic system that preserves and enhances the best parts of the Central Area while supporting revitalization where needed. Each district contributes to the overarching identity and overall sense of place for what is "Bend."*

Historic Downtown Core

> *"The community's "public face", Bend's Historic Downtown Core is the heart and soul of the community, serving the traditional role of civic center or town square, and provides its primary park and open space access. It is the cultural, entertainment and specialty retail center of the community, vibrant and active from early in the day through late in the evening."*

Greenwood Avenue Corridor

> *"The Greenwood Avenue Corridor serves as a major gateway to the Historic Downtown Core, and one of the primary connections between Third Street and the Historic Downtown Core area. Parts of the corridor have a historic character, while others have a multi-faceted identity, together boasting a wide range of uses and activities. Greenwood Avenue serves as an attractive boulevard along which the creative class can live, work, entertain, and play – a little "edgy," but safe and accessible to all by a variety of modes of transportation."*

Third Street Corridor

> *"Third Street serves as a model for how a commercial strip can be "reclaimed" and woven back into the fabric of the community: an active and attractive boulevard,*

with a high-quality streetscape and useable public spaces that invite pedestrians, employees, and shoppers into the district. While Third Street still serves as a major north/south corridor, its environment is organized into a series of "rooms" or nodes of activity that add spatial depth and provide definition and identity for certain segments of the corridor, with more intense urban uses between the nodes. These "rooms" or nodes are defined by a series of east/west connections that provide access to the Historic Downtown Core and to neighborhoods to the east."

"Bend Central" Neighborhood

"The Third Street Corridor and the area between it and the Burlington Northern-Santa Fe Railroad is a new, mixed-use, east side downtown neighborhood connecting area residents and other users to Third Street and the Historic Downtown Core. Referred to as "Bend Central", the district supports the Historic Downtown Core's civic, cultural, and retail uses by providing a close-in location accommodating commercial, residential, and other uses demanded by Bend's rapid growth. This stylish, urbane district is characterized by higher density uses and taller structures than found elsewhere in the Central Area. A diversity of housing opportunities for all income levels is balanced with moderate scale employment and retail uses. A fusion of unique greenspace features and civic spaces for area residents provides opportunity for play, relaxation, and interaction within the neighborhood's built environment."

Central Area Neighborhoods – Northern and Southern

Throughout the planning process, residents expressed a desire to preserve the Central Area Neighborhoods as they currently exist. The Central Area Plan addresses the desire to minimize change in these neighborhoods while also acknowledging their relationship to other Central Area districts.

These neighborhoods are characterized by well-established, low to medium-density residential development. While individual visions for these neighborhoods have not been formalized as part of this planning process, the overall Central Area Vision provides for the establishment and / or reinforcement of these areas as distinct districts. It is appropriate that the refinement of these distinct districts include the development of specific visions as part of neighborhood refinement plans with the full involvement of their respective neighborhood residents.

GUIDING PRINCIPLES

To ensure the planning effort was focused toward achieving the vision, the Project Advisory Committee and the broader community developed a set of guiding principles…statements reflecting desired outcomes. The guiding principles, which also served as criteria against which the success of the CAP would be gauged, are as follows:

- Base the plan upon a community-driven vision
- Create and maintain a "sense of place" and reinforce the area's distinct character
- Encourage a mixing of uses in development and activity centers
- Demonstrate density "done right"
- Ensure planning is based upon both current and future market reality
- Create access to and linkage between transportation modes

- Create effective connections between the Historic Downtown Core and adjacent districts
- Incorporate public spaces, pedestrian/bike facilities, and streetscape beautification
- Maximize development and redevelopment opportunities, and create activity centers or nodes of development where appropriate
- Ensure sensitive transitions between Central Area neighborhoods
- Establish an outcomes-oriented development strategy
- Identify and recommend improvements, actions and projects for carrying out the Plan

The Vision and Guiding Principles provided the foundation for developing the successive iterations of the Central Area conceptual plan and the aforementioned Technical Memoranda that accompany this plan.

BIG IDEAS

A substantial number of ideas were generated by the Project Advisory Committee, the public and stakeholder representatives during the course of Plan development. These were then synthesized into three "big ideas" which would then be used to help focus the generation of key "catalyst projects", projects that would create a climate for investment and stimulate development. These three, conceptual, "big ideas" are defined and discussed in more detail within three categories, below:

- Ensuring a Well-Designed and Functional City Form
- Defining, Refining and Connecting Central Area Neighborhood Districts
- Reinventing Third Street

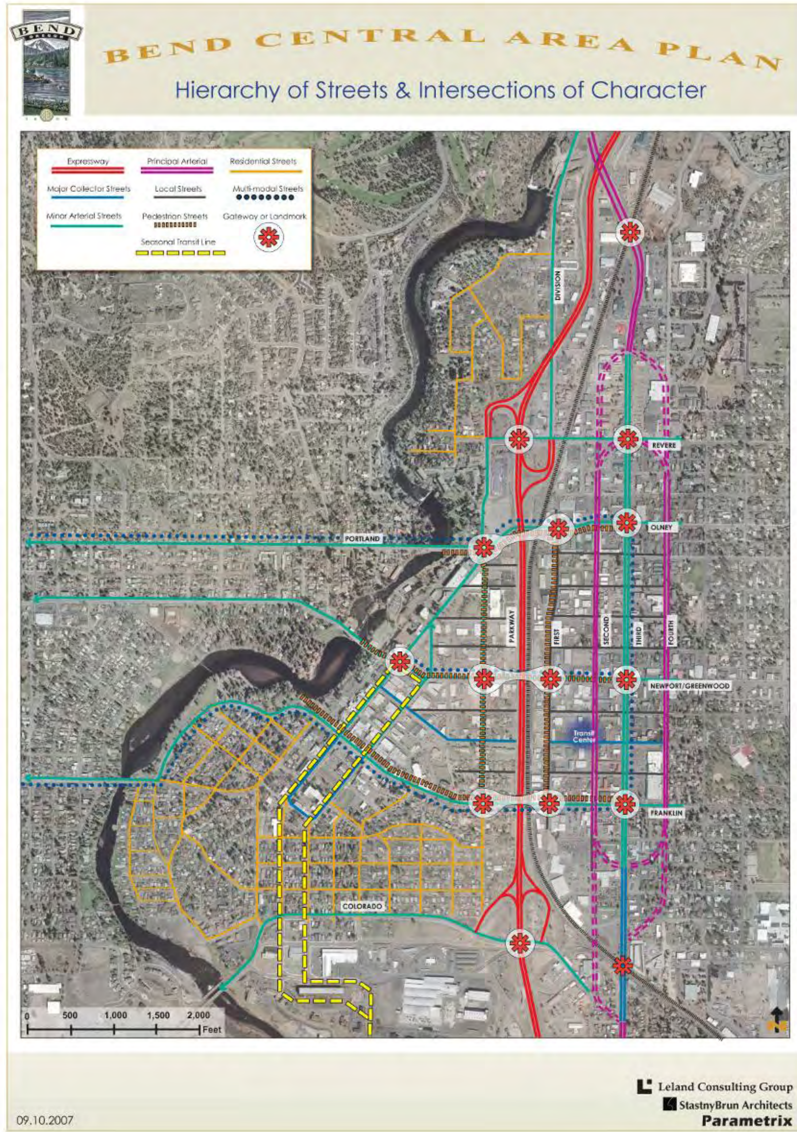
City Form

"City Form" is defined here as the shape, character, spatial organization, design, function and interrelationship between places, people, buildings and infrastructure. Projects, regulations, incentives all work together to help shape the form/function/feel of the envisioned Central Area.

Defined Districts

As areas of the city evolve over time, they can develop a character that can be unique, yet complimentary to adjacent areas. By establishing districts, it is possible to set expectations as to the development/redevelopment of an area and to guide future development to achieve these expectations. As indicated earlier, demands for land and increased density requirements within the Urban Growth Boundary will generate proposals for levels of development (density and height) that have not been seen before in Bend or Central Oregon. By defining districts, the places for density and height can be determined so that the resulting development is complimentary and provides effective transitions to the Historic Downtown Core and neighboring residential areas. In addition, specific or distinctive identities can be strengthened or applied to individual districts, serving to help generate interest or to foster a particular "feel" for the area. Bend's Central Area districts will be discussed in greater detail in this document's section on Central Area Neighborhood Districts, below.

Hierarchy of Streets and Intersections of Character

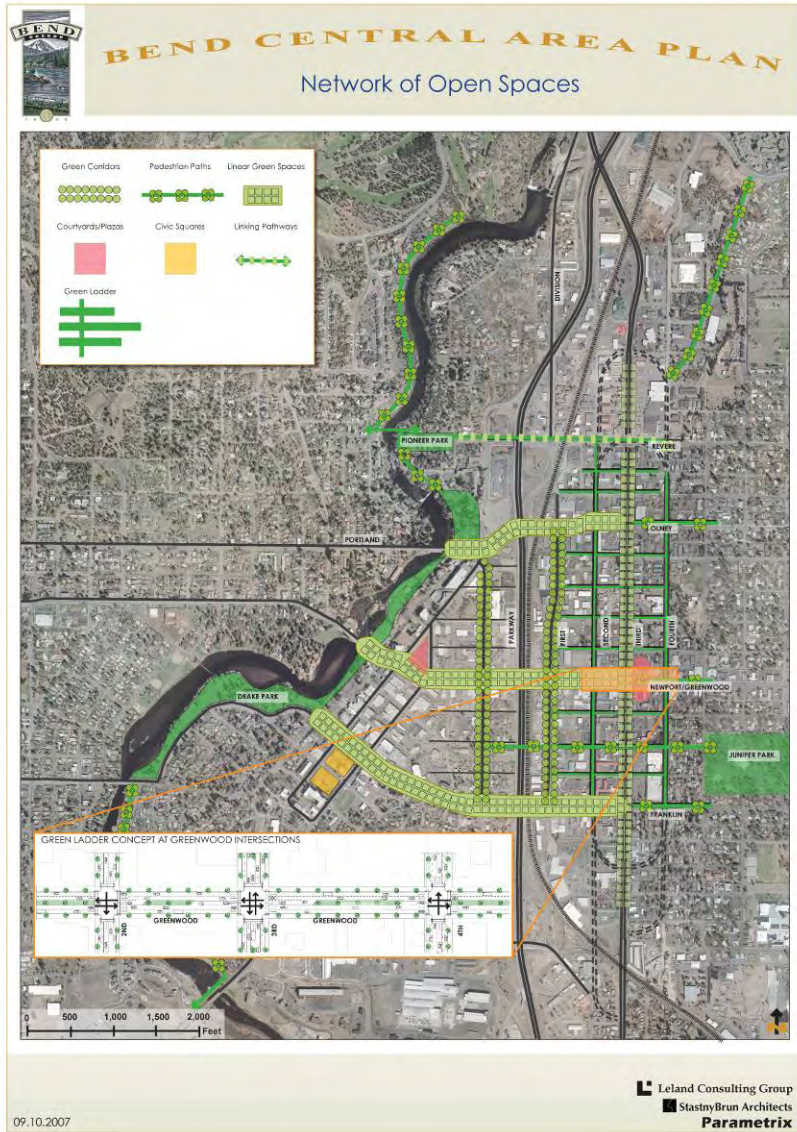


All streets are not equal. A component of an active and diverse urban fabric is streets that are designed to meet certain functional criteria for vehicular circulation, and that also provide for various levels of pedestrian activity, integrate infrastructure for storm water and utilities, and create an ambiance through lighting, streetscape improvements, signage and way-finding assistance. The street is not just the horizontal surface for vehicles and pedestrians. It should be considered as a "linear room" that has a character established by the combination of functional aspects (vehicular and pedestrian), the enclosure of the buildings facing the street, and the street's landscape (streetscape) of greenery, furniture, signage and lighting.

In addition, the intersection of streets may serve as an introduction of the visitor to the city, and should have a greater utility than just "a holder of traffic signals". The Central Area has a number of intersections with great potential to serve as gateways, and to enhance a feeling/sense of "place" or special location, acting in concert with the buildings surrounding them. These can be enhanced through design, public art and other treatments.

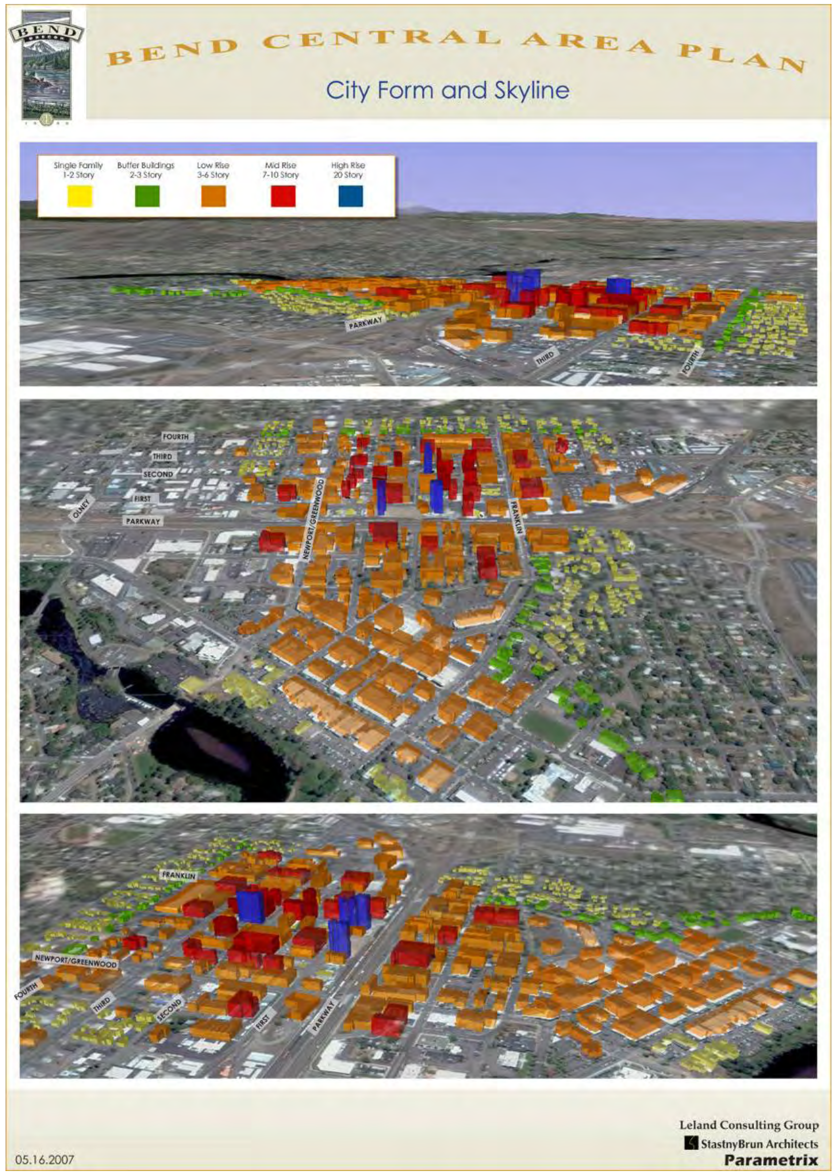
It is important at this time to provide a definition of the term "great street", in that this is a term that is used often within this Plan to discuss a limited number of streets (three in particular) that are envisioned as serving a key role in the Central Area's future. "Great Streets" are defined as those that serve as memorable civic spaces, rather than just as thoroughfares. Great Streets are active, with a dense assemblage of attractive uses along them that generate patronage during the day and into the evening. They may have a particular theme ("restaurant row", entertainment district, etc.), or may feature a lively mix of uses that includes commercial, retail and residential. The common theme here is one of activity…a place to be. Streets such as Greenwood Avenue, Portland/Olney Avenue, Franklin Avenue and Third Street have the potential for becoming inviting pedestrian spaces and activity centers featuring a variety of uses and interesting places.

Network of Open Spaces



The character of Oregon is open space with "islands" of development. The character of Central Oregon has traditionally been low-density, with towns and cities of one and two-story buildings. As our cities grow and evolve, the tendency is to define specific places for open spaces and what the character of each should be. Bend has evolved in a way that already incorporates open space (natural elements) into the fabric of the city. The opportunity presented here is to continue to build upon natural features with a series of spaces of diverse character – some urban, some more naturalistic. The approach that should be taken here to achieve the envisioned character of the Central Area's districts is not "a" park, but parks integrated throughout the urban core; not "just streets", but green streets. The concept being forwarded here is one of connecting a series of diverse and varied open spaces that are developed within the public realm (the space between the curb and the building) combined with courtyards, parks and spaces in private developments. The result: an interconnected network of open spaces that is accessible and flexible with regard to use and capacity.

City Form and Skyline



As development and redevelopment occur, taller buildings will become more the rule than the exception within the greater downtown. Real estate and market analyses conducted for the Central Area have confirmed there is a demand for higher densities in this area. These taller buildings will be both single use as well as mixed use, and the character of each should be uniquely Bend. As the city evolves, the "form" of the city will become more and more important. There will be issues of civic identity and remembrance, views and view corridors, axial relationships and monuments, open space and the "spaces in between"—all will contribute to the scale, texture and grain of the urban fabric.

The uniqueness of the skyline could be a derivation of the natural landscape surrounding which relates the built form to the topography of the land—and the combined effect of land elevation and building height that will define the topography of the skyline. The Urban Design Framework Technical Memorandum in Appendix G offers suggestions of how elevation, building heights and natural views can alter the city's form within the Central Area.

Overarching Consideration

City form is also influenced by design performance guidelines. Performance guidelines describe elements of urban form that must be addressed in ongoing development to achieve the desired Vision. The Guidelines are a methodology to inform developers and designers of the expectations of the city and are described more fully in Appendix G. Guidelines should be performance-oriented and not prescriptive. They address the general look, feel, and function of Bend Central and should be applied to the district as it develops. They create an environment for design excellence to occur, for small actions to have a major cumulative effect, and a mechanism for checking the progress of the Vision implementation. If the Guidelines are properly followed, each and every development increment will contribute to a better-defined and coordinated urban form. These guidelines will aid developers, city officials, and the community in their efforts to achieve the vision for Bend's Central Area.

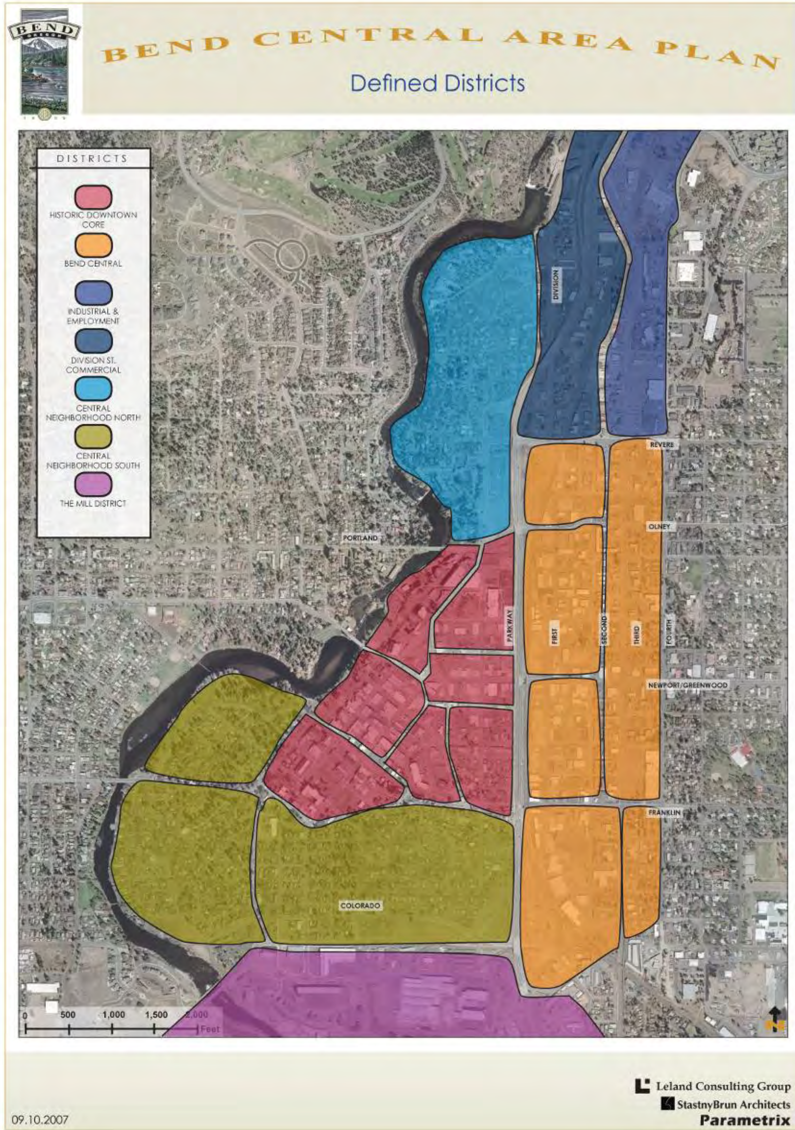
Central Area Neighborhood Districts

The Central Area is comprised of subareas that are envisioned as evolving into distinct neighborhoods, each with its own character and feel. A description of each neighborhood's envisioned character has been prepared, along with an identification of those projects and actions needed to help secure this character and to facilitate the establishment of smooth transitions and connections between them.

Defined Districts

The Bend Central Area Plan identifies six possible distinct neighborhoods. Further refinement of these neighborhoods, including naming and identity strengthening should be further developed as part of the implementation of the CAP. Initial neighborhood identification and possible roles in the Central Area are listed below:

- Historic Downtown Core – This area is preserved as the cultural heart of Bend and through design standards this image is strengthened. Better connections to other parts of the study area and changes to the Central Business District to reflect future development types are key to its continued vibrancy and are addressed through transportation improvements (see Appendices F, G and M).
- Bend Central – This area has the most potential for adding higher density mixed use development. The reinvention of Third Street and creation of a suitable mixed use zone is key to the furthering development of this area. These elements are further described in the future transportation and infrastructure and recommended land use actions memos (Appendices F and M).
- Central Neighborhood North – This neighborhood is very mixed in character and its identity should be strengthened through uniform design guidelines and other mechanisms identified through a neighborhood refinement plan. A key issue for this area is encouraging connectivity with the Historic Downtown Core (see Appendices F, G and M).

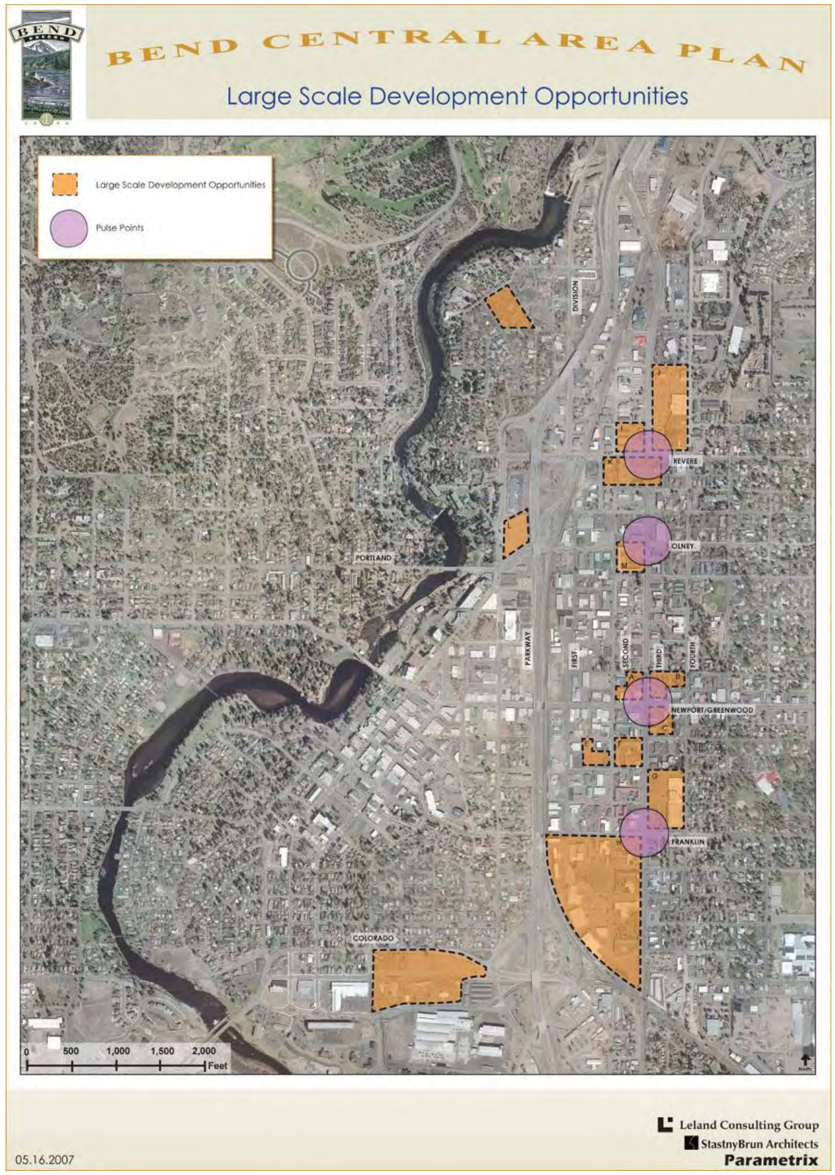


- Central Neighborhoods South – The Central Neighborhoods South are successful and their preservation is a key goal as connectivity to the Old Mill District continues to increase. Transportation elements as identified in Appendix F will aid the continued success of this area.
- Industrial and Employment – This area is seen as a possible receptor for light industrial businesses relocating from Third Street, as well as future micro industries that may develop. Key to this area's development is the creation of a suitable mixed-use zone to allow appropriate flexibility (see Appendix M).
- Division Street Commercial – This area needs to identify and refine its identity. This area became a remnant of a highway commercial strip when the Parkway was built and has since undergone much turnover. An area refinement plan and the introduction of a new zone to encourage appropriate redevelopment could encourage the development of this area as a commercial village for the Central Neighborhood North.

Areas of the city evolve a character that can be unique, yet complimentary to adjacent areas. By establishing or refining neighborhood districts, identities for these areas can strengthen the pride of ownership and inner-connectivity and sets the stage for a sense of "place". This sense of place can be reinforced through simple wayfinding programs that identify neighborhoods and their relationships to surrounding areas. It is possible to set forth expectations as to the development/redevelopment of an area and guide future development. Demands for land and increased density requirements within the Urban Growth Boundary will force levels of development (density, height) that have not been seen in Bend or Central Oregon. By defining districts, the places for density and height can be determined so that the resultant development is complimentary to the Historic Downtown Core and neighboring residential areas.

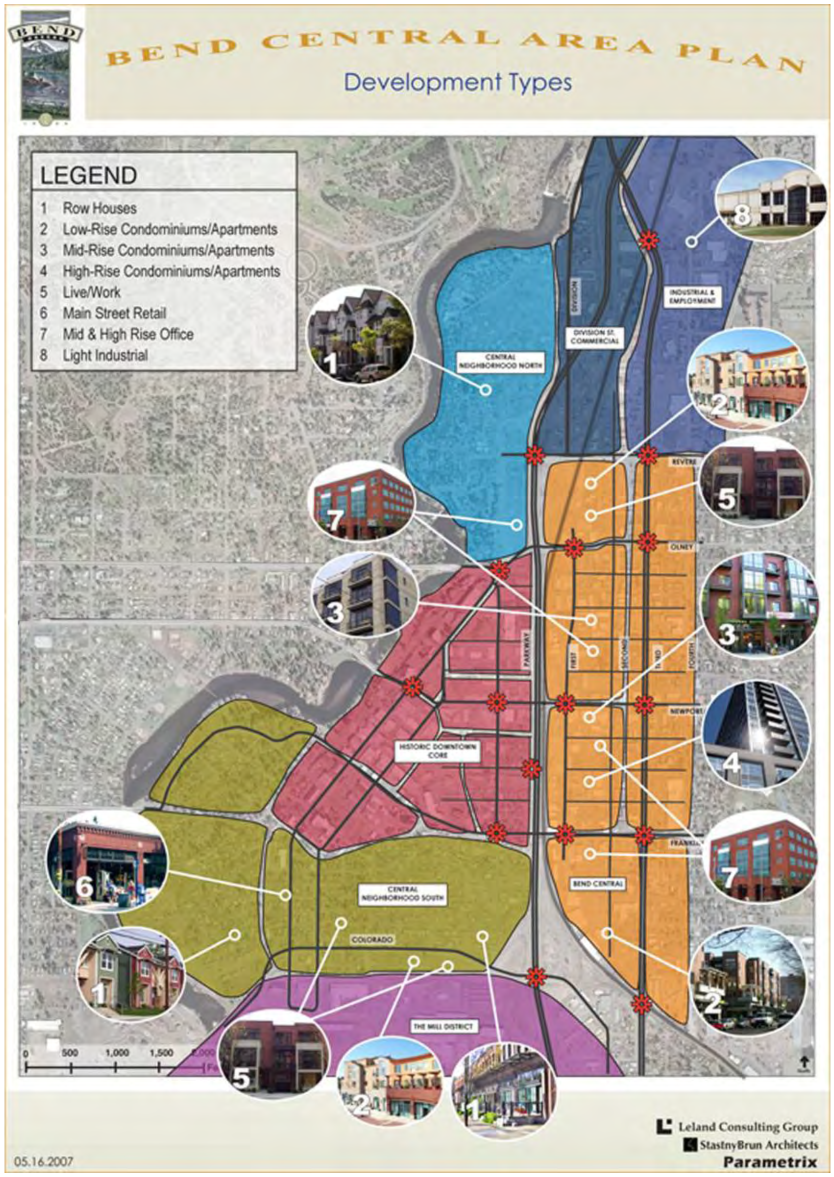
Large Scale Development Opportunities

As mentioned earlier, a key part of the Central Area Plan's framework concept is the redevelopment of a few City-owned sites and other, privately-owned sites that are more likely to redevelop due to size, ratio of improvement value to land value, and location. These sites are those that can provide the most leverage for encouraging additional private investment to enhance the Central Area. Those large scale development opportunities that are highly visible and offer the potential to enhance the Historic Downtown Core are noted on the Large Scale Development Opportunities Figure, and discussed in greater detail in Appendix C.

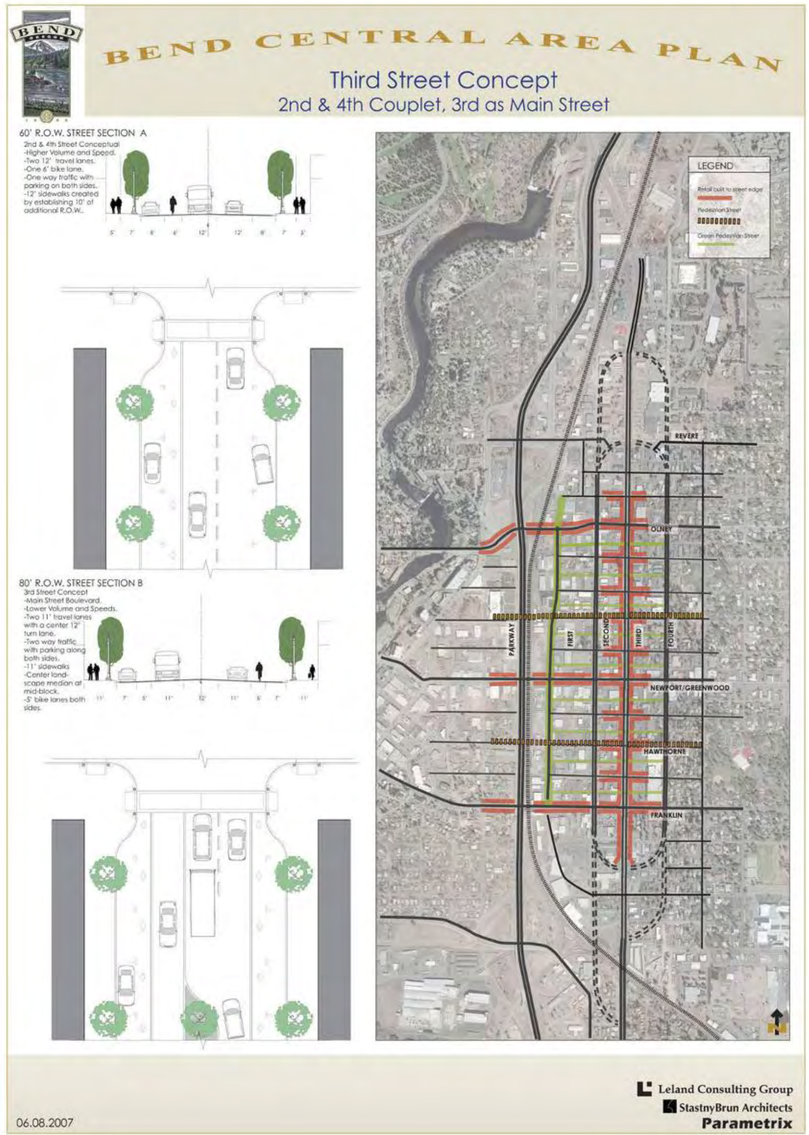


Development Types

In examining the Central Area Neighborhood Districts, thought was given to examples of future, prototypical development types that might be appropriate for different locations within the districts. The purpose of this exercise was to provide the public with a "picture" of what is meant by development at different densities to indicate a feel for what might constitute higher-density, mixed use development at a "Bend-scale". The Development Types Figure presents the scale and potential locations for different development types throughout the Central Area.



Reinventing Third Street



In perhaps the boldest stroke of this Plan, the Third Street auto-dominated commercial strip is proposed to be redeveloped over time as a series of "urban rooms" or centers/pulse points of activity. These centers would feature higher-density mixed-use development in a more pedestrian-friendly setting along a boulevard, with major east-west connections to the Historic Downtown Core via three "great streets": Portland/Olney; Greenwood/Newport; and Franklin Avenue.

The Third Street Corridor from the Parkway on the west to Fourth Street on the east will most likely redevelop in a new form, over time and with the assistance of regulation and incentives, utilizing the land more effectively and efficiently than the current one-story retail buildings and parking lots. This District should have a "brand" or "identity" (Bend Central) with sub-areas of specific character that result from applying the "layers" of the structure discussed under "City Form", above.

Solving transportation congestion problems on Third Street are crucial to its reinvention. According to 2030 traffic projections, Third Street in its current formation will require six lanes' worth of capacity to accommodate peak hour traffic, a scenario that does not lend to an inviting and vibrant pedestrian environment. To address this need in a manner consistent with the Central Area vision and the specific vision for the Third Street corridor, the Plan includes the restructuring of Third Street into a 2-lane, 2-way tree-lined boulevard with on-street parking, bicycle lanes, planter strips, and wide sidewalks fronting active retail opportunities. To achieve this vision for the greater Central Area and for a reinvented Third Street, the current and forecast level of future traffic must be accommodated, while facilitating the identified need for improved east-west connections. This is proposed to be accomplished by turning Second and Fourth Streets into a one-way couplet system that helps focus the movement of traffic, with Third Street becoming a "great street" with pulse-points and centers of higher-density, mixed use development. The Third Street Concept Figure depicts the proposed couplet of Second and Fourth, and Third Street as a 2-lane, 2-way tree-lined boulevard. This concept and the various options examined are discussed in Appendix F (Future Public Facility Capacity Analysis Technical Memorandum).

FRAMEWORK CONCEPT PLAN

As indicated earlier, in developing this Plan, a phased, iterative process was used to get from current reality to recommendations for the future. The Vision led to the generation of Guiding Principles to direct the iterative planning process. These two foundational components fostered the generation of three, conceptual "Big Ideas", which began to flesh out the Plan. This, in turn, led to identification of a desired form for the Central Area and its neighborhoods, as well as key projects and implementing actions. Finally, the vision, principles and ideas have been reflected in an overall Central Area Framework Concept Plan…a spatial representation of how these components fit together.
The overarching, fundamental structuring element of this Central Area Plan can be thought of as a "green ladder". This concept is one that layers a number of elements, including:

- Reorganizing existing key streets and assigning a function and "character" to them (creating a hierarchy of streets).
- Modification of vehicular flows to create a "couplet" of 2nd and 4th Streets to facilitate north/south flows and accommodate future traffic volumes.
- Emphasizing the east/west streets as the "steps" in the ladder providing east/west connectivity between 4th Street and the Parkway.
- Planning for east/west commercial/retail development (pedestrian oriented) along Greenwood, Portland/Olney, and Franklin…three active, mixed-use "great streets" that provide key gateways and critical links to the Historic Downtown Core.
- Transforming Second, Third and Fourth Streets into "green streets" —combining storm water treatment with vehicular flow.
- Establishing intersections as "rooms" that have unique character and orientation/wayfinding based on the intersecting street hierarchy.
- Inventing the entire grid as an "environmental machine" capable of accepting and treating storm water and snow "melt-off".
- Using the ladder as a structure to array land uses and activities to create a new paradigm for the planned transformation of the Third Street Corridor—a new "Bend Central" (BenCen) neighborhood.

This overarching structural element, combined with the components of the city form discussed above (defined districts, hierarchy of streets, intersections of character, a network of open spaces, and city form and skyline) have been combined into a framework-level conceptual plan reflective of the community's expressed vision for the Central Area of the 20-30 years.

As indicated earlier, the Framework Concept Plan was developed in an iterative manner, evolving as the planning process progressed. The Vision led to the generation of Guiding Principles to direct the iterative planning process. These two foundational components led to the generation of three, conceptual "Big Ideas", in tandem, led to the focused identification of key catalyst projects, projects that would create a climate for investment and stimulate development. These projects are discussed below.

CATALYST PROJECTS

The term "catalyst project" is used within this Plan to refer to projects having the ability to substantively alter the development environment in the study area. These projects represent key components of the overall plan, and their development would be expected to serve as a catalyst for development in the study area consistent with that outlined in the plan. A number of catalyst projects were identified with the Project Advisory Committee, and several of these are noted on the Catalyst Projects map.

A brief description of these and other possible catalyst projects and their attendant benefits, is provided in the sections that follow, below. Catalyst projects have been identified in three categories: 1) Transportation; 2) Development and Redevelopment; and 3) Design and Public Spaces. In some instances, a catalyst project may be an idea or a program requiring a refinement study to pin down a concept, a location, a footprint or criteria for subsequent development proposals, or may be a preparatory stage-setting action. Accordingly, in the short description of each catalyst project, the proposed preliminary "set-up" tasks or refinement study is also briefly described.

Transportation

As mentioned above, the Technical Memorandum addressing Future Public Facility Capacity Analysis (Appendix F) presents a number of projects, studies and actions to be undertaken over time to carry out the Central Area Plan. Those projects and actions that should be taken over the next 1 to 5 years to help "jump start" revitalization along the 3rd Street Corridor include:

- Pedestrian improvements under the railroad and the Bend Parkway for Greenwood and Franklin Avenues to add lighting and security, and to improve line of sight. Interim measures to improve flooding problems should also be provided.
- Install a raised and landscaped median along 3rd Street between Greenwood and Franklin Avenues with ADA-compliant pedestrian projects at selected locations.
- Design and build 2nd and 4th Streets to full 70-foot cross-section as identified with the couplet concept, but retain 2-way operations between Greenwood and Franklin Avenues until additional phases of couplet development to the north and south can be completed.
- 3rd Street Corridor Refinement Plan – develop consensus on a preferred concept; lay out linear details of the concept including identification of right-of-way and access needs; prepare detailed cost estimates and an implementation strategy.

Development and Redevelopment

While there are a number of projects, studies and actions to be undertaken over time to carry out the Central Area Plan, those development and redevelopment projects and actions that should be taken over the next few years to help "jump start" envisioned development within the Central Area include the following:

- Bend Bulletin Site – This publicly owned parcel could be redeveloped as a mixed-use housing project, providing workforce housing in close proximity to the downtown jobs base. The City could recruit a developer through a competitive request for qualifications (RFQ) process.

- Hawthorne Avenue Mixed-Use Development – To activate the Railroad District as well as a new Hawthorne Avenue connection, multiple mixed-use developments should be built in the area on opportunity sites. Uses along Hawthorne should include office and housing, with a small amount of ground-floor retail and service uses.
- Redevelopment at 3rd Street and Greenwood Avenue – This project would activate the 3rd Street and Greenwood Avenue gateway, providing a signature building of active retail, office, and/or entertainment uses. While too busy for housing, the high traffic flow could benefit commercial users.
- Structured parking facilities – The scale of development envisioned for the areas west of 3rd Street and east of the Parkway will require structured parking. However, structured parking is difficult to accommodate on smaller parcels and is very expensive. Shared parking structures that can serve multiple adjacent and nearby properties would allow for more efficient use of parking facilities and would reduce the cost of development. A parking district or other mechanism should be formed to ensure that development pays its fair share when parking is not required by each project.
- Relocate auto dealers and light industrial businesses – Relocate existing businesses to new sites in order to free up existing properties for redevelopment. This could include the creation of an auto mall somewhere in Bend, which could be facilitated through a public-private partnership.
- Infill housing between southern central neighborhood and the Old Mill District – This area, generally between Colorado and Arizona is already developing with a mix of housing and retail uses. These uses should continue to be built on remaining vacant land to provide additional close-in housing while also buffering the Old Bend neighborhood from the Old Mill District.
- Infill housing in the northern central neighborhood – Medium-density infill housing in this area would strengthen the residential character of the neighborhood while providing new housing opportunities close to downtown.
- Mirror Pond Parking Area redevelopment - Conduct an interactive and participatory process to determine a future vision for redevelopment of the Mirror Pond Parking Area. Hold community workshops to set goals, identify/evaluate options, and refine a preferred option and course of action for carrying it out.
- City Hall and "Civic Center/Civic Neighborhood" improvements – Prepare master plan for use and design of buildings, parking and open spaces in the Civic Neighborhood. Initiate property acquisition and consolidation, recruit a developer through a competitive request for qualifications (RFQ) process.

Design and Public Spaces

There are several catalyst projects that fall under the category of "design and public space catalysts" that should be taken over the next several years to help "jump start" envisioned development within the Central Area include the following:

- Acquisition of Bend Central Neighborhood Park Sites – Begin securing park, plaza and open space sites within the neighborhood in advance of envisioned development actions. Being able to provide park and open space amenities early on or in conjunction with new development will help establish the desired context for future development.

- Heritage Square/Civic Center Plaza/Space – Consistent with the recommendations within the first phase of the Central Area Plan for focusing civic uses within a "civic neighborhood", develop the concept plan and development criteria for the Civic Neighborhood site, sufficient for preparing and issuing a request for development proposals, establish a development program, and begin acquisition of balance of civic neighborhood properties.
- Franklin and Greenwood Avenue Gateway Design – Establish a public process (and perhaps a design competition) for identifying needed functional and aesthetic improvements, identifying funding sources, and programming improvements.
- Hawthorne Trail (Juniper Park to Hill St.) – Establish a public process to identify desired alignment, features and improvements to link the Historic Downtown Core and the Bend Central neighborhood with Juniper Park. Identify needed improvements early-on, and protect for future construction

As will be noted in the Implementation section of this Plan, initial recommendations for programming and carrying out these components have been provided in the Implementation Technical Memorandum in Appendix K to this summary Plan document.

OTHER IMPLEMENTING PROJECTS AND ACTIONS

In addition to the projects that have been identified as "catalyst projects", those seen as having the potential to help "jumpstart" development and redevelopment activities, there is a number of other projects and actions being recommended to help realize the public policy objectives of this Plan, and its vision. These recommendations fall under several categories:

- Transportation System Improvements
- Code and Regulatory Adjustments
- Developing Funding Sources
- Organizational/Follow-Up Actions

The background behind these recommendations is provided within the Implementation Technical Memorandum contained within the Appendices to this document. A brief summary of these recommended projects and actions are described in the sections that follow.

Transportation System Plan Amendments and System Improvements

Transportation System Plan

The City's currently-adopted Transportation System Plan does not contain all of the transportation elements required to support the CAP Vision.

As noted earlier, a major element of the Central Area Plan is the Reinvention of Third Street, and the introduction of "Great Street" designations. After adoption of the CAP, consideration should be given to amending the City's current Transportation System Plan and Street Standards to accommodate the cross-sections and general streetscape features associated with the desired function of the new street classifications within the Central Area. These include:

- A Principal Arterial that has also been designated as a Great Street (example: Third Street)
- A Minor Arterial that has also been designated as a Great Street (examples: Greenwood, Olney and Franklin)
- Redesignation of Second Street as a Minor Arterial or Major Collector to distribute north/south traffic within the envisioned revitalized corridor.

Recommendations for the reinvention of Third Street include enhancements to the pedestrian and bicycle circulation systems, a refinement study to test and provide the engineering parameters for the proposed Second and Fourth Street couplet, public investment in infrastructure viewed as catalysts to redevelopment, and other transportation projects for the longer term period. Some of these recommendations are listed below. For a more comprehensive list of recommendations, refer to Appendix F Future Public Facility Capacity Analysis Technical Memorandum. A necessary first step in advancing the reinvention of Third Street and the proposed transformation of Second and Fourth Streets into a couplet is undertaking a Third Street Corridor Refinement Plan to lay out the linear and functional details of the couplet concept including identification of right-of-way, access needs, detailed cost estimates, and an implementation strategy. Key issues to be addressed in this study would include:

- Addressing sidewalk, bicycle lane and travel lane widths, on-street parking configuration, property access, signal timing, and pedestrian crossings.
- Resolving the location and design criteria for transitional areas at the northern and southern termini. This could include development of an additional railroad undercrossing at the southern terminus to improve connectivity between the Third Street corridor and the Old Mill District.
- Preparing an implementation strategy that includes refined cost estimates, funding sources, timing and priorities of projects, and an approach to phasing of construction and transitions between two-way and one-way traffic operations.
- Initiating a long-term discussion of a potential redesignation of Highway 20 away from its current alignment along Third Street north of Greenwood Avenue and along Greenwood Avenue to the east of Third Street to a more appropriate location.
- Potentially consider creating a master transportation impact study to help streamline traffic impact analyses for development review in the Central Area. This could make development activity within the Central Area more attractive to and easier for various development interests.

Code and Regulatory Adjustments

The existing Community Development Code, the Bend Area General Plan and their associated ordinances and policies do not allow the flexibility needed to allow for the mix of uses as envisioned in the Central Area Plan. A review of these documents revealed that more direct guidance is needed within the existing regulatory framework to shape the rapidly growing Central Area in accordance with the Central Area Plan and its vision. The following sections summarize the suggestions for improvements needing to be made to the City's land use and development regulations to realize the envisioned evolution of the Central Area. These sections summarize the recommendations contained within Appendix M. Programming considerations are further discussed in the Implementation Strategy section of this summary Central Area Plan document and in the accompanying Implementation Action Plan memorandum (Appendix K).

Bend Area General Plan Recommendations

The Bend Area General Plan was updated by the City in 1998. Much of the Area General Plan is consistent with the Central Area Plan Vision, however there are a few sections to which changes are recommended to ensure consistency between the plans. The recommendations are focused on acknowledging the adopted Central Area Plan districts, recognizing the new characteristics associated with the reinvention of Third Street, increasing flexibility of uses in some areas of the Central Area to include higher density housing, and improving transportation infrastructure to support projected growth.

The recommendations are focused on redefining the Central Business District, as well as emphasizing the new vision of the Bend Central Neighborhoods and Third Street, with a pedestrian friendly multi-modal environment that lends a vibrant multi-functional character. Housing goals will need to be broadened to include higher-density mid and high-rise mixed use developments in the Central Area east of the Parkway.

Any new zone designations or the adoption of a special Central Area Plan Refinement Overlay will need to be included in the Bend Area General Plan text and map, and text should be developed to ensure consistency between Chapters 5, Housing, and 6, The Economy and Lands for Economic Growth and the new zones or overlay.

The General Plan recommendations also allow for consideration of additional funding mechanisms and refinement studies in Chapter 8, Public Facilities and Services. As noted above, this may include recommendations for creating a master transportation impact study to help streamline traffic impact analyses for development review in the Central Area.

Recommendations for changes to the Bend Area General Plan also focus specifically on Chapter 7, *Transportation Systems,* as the Central Area Plan Framework recognizes transportation as the backbone in the implementation of the Plan's vision.

Development Code and Zoning Recommendations

Given the desired characteristics for protecting and enhancing the Historic Downtown Core and an improved central area, and the analysis of what current zoning allows, the plan recommends two options for aligning the development code and zoning with the Central Area Plan vision.

The first option would include establishing two new Central Area mixed-use base zones in Development Code Chapter 2.3. The new mixed-use zones would include a Mixed-Use Central zone which would be applied to the Central Area Plan Bend Central District, and a Mixed-Use Industrial and Employment zone which would be applied to the Central Area Plan Industrial and Employment District. While the City of Bend already has two mixed-use zones that are specifically tailored to meet the needs of other areas in Bend, the two new mixed use zones are proposed to achieve mixed-used development, appropriate for area-specific goals surrounding the reinvention of Third Street and the Industrial and Employment neighborhood district to the north. Prior to adopting these new zones, new text identifying these zones and a revised General Plan map will need to be adopted into the Area General Plan.

The proposed mixed use zones are described below:

- **CAP-MCEN: Bend Central District** – In order to achieve the vision for the Bend Central district east of the Parkway and west of Fourth Street, this new mixed use zone proposes greater density development with a mix of housing and office with retail and entertainment at street level. This zone includes measures to complement a transit center and would encourage a pedestrian friendly environment.
- **CAP-MINEX: Industrial and Employment District** – This zone retains some of the characteristics of the current light industrial zoning but it will also provide for a mixture of live/work spaces (artists lofts, for example), and mixed-employment uses that are vital for micro-enterprises.

A second option is to adopt the Bend Central Area Plan as a special Central Area Plan Refinement Overlay as part of Development Code Chapter 2.7. The refinement plan could "package" several zone changes and specific design standards within the plan to make the area consistent with the Central Area Plan Vision and Framework. The City of Bend already has two mixed-use zones that are can be tailored through design standards to achieve development appropriate to meet area-specific goals surrounding Third Street and the Industrial and Employment neighborhood district to the north. Adoption of a special Central Area Plan Refinement Overlay would also require adoption of new text and map changes to the Area General Plan.

The zones or overlay should guide uses and foster development consistent with the reinvention of Third Street, protect and enhance the Historic Downtown Core through a new and expanded Central Business District, and encourage preservation of industrial land for a variety of uses.

This Plan also recommends the expansion of the area covered by the City's Central Business zone. The expanded area would include all areas referred to by the Central Area Plan as the Historic Downtown Core, as well as commercial districts north to Revere Avenue west of the Bend Parkway, enabling the unification of the "core" of the Central Area through urban design and development.

The plan recommends the addition of standards within the development code that will aid in the development of the Green Ladder and Third Street Reinvention concepts as envisioned by the Central Area Plan. These include recommendations for:

- Pervious paving treatments
- Shared stormwater treatment strategies
- The encouragement of shared parking facilities
- View corridors
- Interconnected open spaces and plazas

Some of these topics are currently addressed in the development code but it is suggested that specific adaptations of these elements be considered for the areas in which new zones or special planned district overlays are recommended.

Design Standards and Design Performance Guidelines

Bend has design standards for commercial and multi-family residential development, as well as any development occurring within the Central Business District zoning designation. Considering these existing standards, it is recommended that specific design standards be adopted for the two new mixed use zones, or incorporated into the Central Area Plan Refinement Overlay to reflect design elements developed through the Central Area Plan process, depending upon which of the aforementioned two options is selected.

In addition to the development of Central Area specific design standards, the plan recommends that a two-track review process should be implemented to aid development flexibility. The Plan recommends that the Central Area Plan Performance Guidelines be refined and adopted as an alternative to design standards in the mixed-use plan areas. The two-track process would allow two review options: 1) adherence to prescriptive design standards; or, 2) demonstrating through a conditional use process that proposed developments meet the intent of the Central Area Plan through the Performance Guidelines.

The plan recommends that the review system for approval of conformance with the Central Area Plan Performance Guidelines include a special review body specifically focused on Central Area issues. Key elements of the Performance Guidelines are summarized in the recommendations contained within Appendix M.

Interim Actions

The plan recommends three interim steps prior to the adoption of new base zones or special planned district overlays:

- Application of design standards or performance guidelines in the proposed districts through a two-track review process
- A city-initiated legislative zone change to Mixed Use for those areas within the new districts that are already designated as Mixed Use by Area General Plan Map.
- Initiate expansion of the Central Business District to include areas as indicated by the Central Area Plan

In order to achieve the Central Area Plan's vision, two new mixed use zones or a special Central Area Plan Refinement Overlay are recommended as mentioned above. However, in the interim period while details for the new mixed use zones or a special planned district overlay are refined and the new zones or overlay put in place, it is recommended that design standards and / or the Bend Central Area Performance Guidelines be implemented as soon as possible in the proposed new districts. Further information on interim land use recommendations can be found in Appendix M.

Measure 37 Impacts

Approved by Oregon voters in 2004, Measure 37 requires waivers of regulations or compensation to property owners if regulations have the effect of reducing a property's value since purchase. This has presented a challenge to every Oregon jurisdiction as they are determining how to address the measure's impacts. Accordingly, the potential "Measure 37 impacts" of the Central Area Plan and its proposed additions/amendments to the City's regulatory measures have yet to be addressed. It is recommended that an impact analysis of this issue be conducted by the City as one of the first actions taken to implement this Central Area Plan. Once Measure 37 issues are addressed, the Plan may need to be revisited if adjustments appear to be required.

Developing Funding Sources

Specific public-improvement projects can come about as a result of local, state and federal grants, private investment and donations, city general fund allocations and other sources of public financing. A variety of funding tools, options and policies were discussed in the process of preparing this Plan, and more detailed information on these is provided in the appendices to this document. Bend has a number of financing tools currently in place, or that can be easily activated to generate revenue. A list of these tools and the activities needing to be pursued to enable the City to generate the level of funding necessary to carry out the range of improvements recommended by this plan is provided in the Technical Memorandum laying out the Financial Tool Kit for Implementation, and summarized in an attachment to this document.

Although the use of urban renewal, a parking district, and a business improvement district (along the to-be-reinvented Third Street Corridor, for example) have potentially the greatest opportunity to generate significant sums of revenue to help provide incentives for development and redevelopment, it should be noted that implementing the recommended Central Area Plan is not reliant upon any one of the above funding sources being available. An effort to investigate, arrange and execute (or make available) the most appropriate package of funding mechanisms, tools and financial incentives should be undertaken early-on in order to maximize potential opportunities.

Organizational/Follow-Up Actions

While there are a number of preliminary, stage-setting, organizational actions needing to be undertaken to help set the City up for successful implementation of the Central Area Plan, there are three actions that are the most compelling, and of the most importance.

- **Central Area Advocacy Office**

  A number of the recommended actions for carrying out this Plan will require focused support from staff. Tasks requiring such support include establishment and maintenance of an urban renewal district, development of Central Area Neighborhood Plans, property owner outreach efforts, property assemblage, project development and administration, housing program development and maintenance, and update/maintenance of a short-term implementation strategy. Among the catalyst projects recommended for approval is the establishment of a Central Area Advocacy Office, charged with carrying out the short-term action plan, and for monitoring and updating the program for implementing the Central Area Plan and its vision.

- **Central Area Plan Action Groups**

  During Plan development, the Central Area Plan Project Advisory Committee worked hard at addressing projects, tools and techniques for carrying out the plan. It is recommended that some form of this committee be appointed and charged with helping to flesh out and carry out the Plan's recommendations in three categories: Funding Sources; Catalyst Projects; Land Use and Neighborhood Planning; and smaller, "Brand Bend" projects (the many, smaller projects that help generate interest and maintain momentum). It is recommended that the Committee organize three "action groups" to advise them and the Council in carrying out the Plan.

- **Funding Workshop**

  The process of developing and carrying out the Central Area Plan and its recommendations has created a window of opportunity for leveraging resources, building upon synergies, and developing partnerships. What is the potential for partnership, and how can various sources of revenue be tapped, or incentives taken advantage of to carry out the projects and ideas envisioned by the Plan? An annual "Developing Partnerships & Funding Downtown's Future" workshop is proposed for the first few years of the Plan's implementation to help stimulate interest, share ideas and information, and to generate and maintain a climate that facilitates investment.

IMPLEMENTATION ACTION PLAN

INTRODUCTION

The Central Area Plan is an action-oriented plan with a 20-30 year horizon, focusing upon the projects and activities needing to be undertaken to carry out a clearly defined vision, a set of guiding principles, and a development/design concept. The CAP will be implemented in pieces, or components, over time. Some actions will be initiated in 2007, others initiated in the years to follow.

HOW WILL THE PLAN BE CARRIED OUT?

As mentioned earlier in this summary Plan document, the Central Area Plan will be implemented in pieces, over time. In the earlier discussion regarding catalyst projects, it was noted that, in many instances, a catalyst project may consist of a project or program requiring a refinement study to pin down a concept, a location, a footprint or criteria for subsequent development proposals. In addition, several of the catalyst projects (and indeed, the implementation and championing of the implementation of this Plan) will require staffing resources to establish programs, develop criteria, and to undertake the preliminary and follow-up tasks to enable projects to move forward (e.g., land assembly, property owner coordination, and etc.). The Central Area Plan also recommends a number of amendments to the City's General Plan and development code (to allow for the type and level of development envisioned by the Plan) and Transportation System Plan to reflect changes in street system classification and the need for new projects. The plan and code amendments recommended through this Plan will be taken up and refined by City staff and coordinated with the appropriate committees. It is anticipated that the recommended changes and the necessary ordinances to codify them will occur over the next year or two, as these are high-priority items, central to setting the stage for carrying out the Plan.

It is anticipated that the City of Bend will begin talking with potential development interests regarding making the Plan a reality. Certain major improvements will be made by the City of Bend through a variety of funding sources, including urban renewal, particularly if a new district is formed. Other improvements will be the responsibility for those proposing specific development activities. One or more of the catalyst projects may come about as a result of "public-private partnerships", a contractual arrangement tailor-made for each situation whereby the public sector authority assigns certain functions or responsibilities to a private developer.

The important point is that the Central Area Plan is a *long-term* plan for the growth and development of the Central Area over the course of the next 20-30 years, in alignment with the vision for the future established by the community of Bend.

INCREMENTAL ACTION PLAN

The Implementation Action Plan being recommended to carry out the CAP focuses on the following:

- Recommended future transportation system improvements and any suggested changes to the City's Transportation System Plan;

- Recommended changes to the City's Comprehensive Plan, zoning code and implementing ordinances;
- Recommended development and community projects important for creating a climate of investment Downtown,
- Recommended sources of funding for CAP-related improvements, and
- Suggested time frame for initiating key actions and projects.

Accordingly, it is recommended that the City review the Central Area Plan on a regularly-scheduled basis, and make amendments as opportunity or changing community and economic circumstances necessitates. Should there be a desire to change the guiding principles or shift the emphasis of a particular project, this plan-update process provides the mechanism for doing so within the context of reviewing the plan as a whole.

For a plan to be the "chart for change" it is intended to be, it must be accompanied by an implementation program…a strategy indicating the appropriate tools, actions and timelines for carrying out the plan. As mentioned earlier, the Technical Memoranda accompanying this summary Plan document contain discussion and recommendations for short and longer-term actions for carrying out the CAP.

As these projects and actions have been presented in Appendix K (along with a summary matrix and an indication of their relative priority…short-term, near-tern, long-range), this discussion will not be repeated here.

Finally, realizing that not everything can be done within a short time frame and that there are other community priorities needing to be addressed, those seen as having the most importance to undertake within the first three years are highlighted within a Short-Term Action Plan (see discussion below).

PROGRAMMING RECOMMENDATIONS

An initial list of recommended actions, next steps and projects has been compiled in the appendices to this summary Plan document. The recommended actions and projects have been categorized and prioritized with regard to relative timing (e.g., 1-3 years, 4-6 years, 7-10 years, and longer-term). This list of actions and suggested programming can be found in Appendix K to this document (Central Area Plan Implementation Action Plan Memorandum).

SHORT-TERM INCREMENTAL IMPLEMENTATION STRATEGY

As mentioned earlier in this summary Plan document, there are many projects and actions recommended for carrying out the Central Area Plan. A rapidly-growing community like Bend has a number of important projects and programs competing for limited time and financial resources. In Appendix K (Implementation Strategy), a summary matrix displaying recommended actions and projects for implementing the Plan over time is provided. In the discussion provided earlier, a subset of this list has been identified as being "catalyst projects"…those projects seen as having the ability to help jumpstart the development and actions envisioned by the Central Area Plan.

Realizing that the City and its planning partners cannot do it all at once, a short-term plan for initiating those actions which are critical to initiating the realization of the Plan and its vision is of utmost importance. The recommended projects and actions within this Short-Term Action Plan must combine visible improvements with the somewhat (initially) "invisible" efforts to set the stage for enabling and encouraging envisioned growth, development and change to occur. This smaller list of high-priority projects is intended to respond to the question of "what is the short list of actions that can be undertaken within the first three years to initiate and demonstrate movement and set the stage for other actions to follow".

The actions contained within this initial short-term plan are presented within three categories: process improvements; projects and actions; and organizational improvements. In order to maintain the value of this summary Plan document as a stand-alone authority, the initially recommended improvements and actions are not provided here; this Action Plan and its list of actions and suggested programming can be found in Appendix K to this document (Central Area Plan Implementation Action Memorandum). The City may wish to revisit this recommended Short-Term Action Plan as opportunities arise, priorities change, or the capacity to undertake additional projects increases.

CONCLUSION

In conclusion, the Bend Central Area Plan represents the community's official framework for guiding the evolution of a rapidly growing greater downtown area over the course of the next 20-30 years. As this Plan represents the expression of the community's vision and desired outcomes for the Central Area and its district neighborhoods, the Plan must be a dynamic and responsive policy framework...one that changes as needed to keep pace of changing community values and external factors, and as opportunities arise. Over time, the Central Area Plan is intended to continue to evolve, serving as the framework for further refinement according to the wishes of the community.

APPENDICES

Appendix A	Memo 1 – Urban Design Framework
Appendix B	Memo 2 – Existing Transportation, Infrastructure and Land Use Conditions
Appendix C	Memo 3 - Large-Scale Development Opportunities
Appendix D	Memo 4 – Economic and Real Estate Analysis for the Central Area
Appendix E	Memo 5 – Redevelopment Framework Refinement
Appendix F	Memo 6 – Future Public Facility Capacity Analysis
Appendix G	Memo 7 – Central Area Plan Framework Refinement
Appendix H	Stakeholder Interview Summaries
Appendix I	PAC Meeting Summaries
Appendix J	Public Workshop Summaries
Appendix K	Central Area Plan Implementation Action Plan Memorandum
Appendix L	Funding Toolkit Memorandum
Appendix M	Land Use Regulatory Recommendations

Technical Memorandum - Urban Design Framework Refinement

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Introduction

The Framework Concept introduced in the first phase of the Central Area Plan depicts the vision to be achieved over the next twenty years. It represents the preferred structure for the area and describes how various urban elements will interact in order to achieve the vision. The Framework Concept encompasses land uses, overall urban form, and circulation issues and is the context within which the Central Area Plan is being addressed. The basic Framework Concept was developed during the first phase of the Bend Central Area Plan and is now being refined and expanded upon for the second phase of the Plan.

Framework Concept

During the first phase of the Bend Central Area Plan, the "Central Area" was defined as the Historic Downtown Core, Greenwood Avenue and Environs, and the Third Street/Railroad District. The Framework Concept addressed these three districts in terms of five key components: great streets, open spaces, gateways, key redevelopment opportunity sites, and key pedestrian links and alleys.

- Great Streets are memorable civic spaces rather than just thoroughfares. Streets such as Greenwood, Franklin and Third have the potential to become inviting pedestrian spaces and activity centers featuring a variety of uses and interesting places.
- Open spaces provide multi-use public spaces. Areas such as Mirror Pond and Drake Park are great examples of open spaces that currently provide both organic and organized gathering spaces. There is a great potential for additional open spaces throughout the Central Area, particularly in linear open spaces in conjunction with boulevards or Great Streets.
- Gateways are welcoming and inviting transitions from one part of the City to another. The Central Area has several opportunities to enhance such gateways, particularly on Greenwood and Franklin Avenues as citizens and tourists enter or exit the Historic Downtown Core.
- Key redevelopment opportunity sites are those public areas that when redeveloped provide the most leverage for encouraging additional private investment to enhance the Central Area. These sites are best used for mixed uses when possible in areas that are highly visible and easily accessible.
- Key pedestrian links and alleys are often parallel to heavier automobile transportation links, and offer interesting and safe pathways to a variety of walking-oriented uses such as shopping and sidewalk cafes. Brooks Alley is a prominent example of an existing key pedestrian link on which other alleys can be modeled.

Overarching Framework Concepts for the Central Area included identifying and building upon Great Streets, enhancing and encouraging pedestrian-friendly environments while facilitating an increasing amount of downtown vehicular traffic, and encouraging development with complementary uses that can collaboratively provide and use public infrastructure facilities (such as parking or plazas).

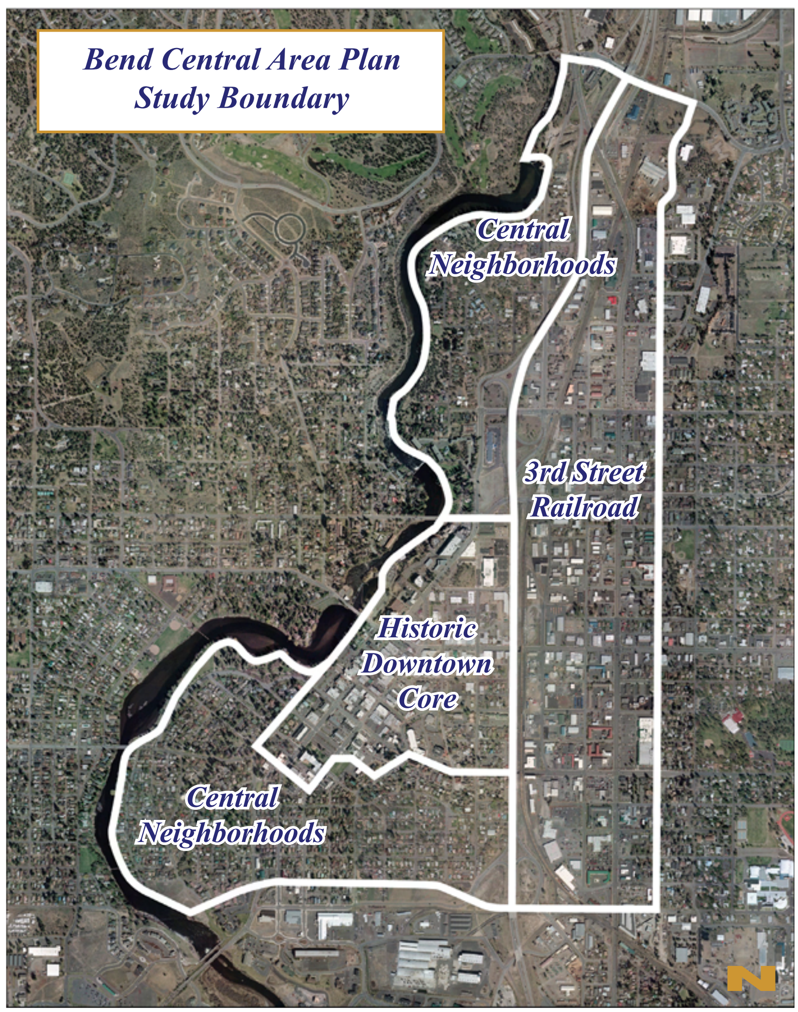
Refining and Expanding the Framework Concept

As the Central Area Plan moves into its second phase, the Framework Concept has been refined to build upon these components and consider adjacent areas within the Central Area.

The refined Framework Concept continues to focus on the Great Streets. Each of these east/west linkages develop a special character of its own and set up the gateways and nodes of development along 3rd Street. The densest building form would occur in the Railroad District, east of the railroad and west of 3rd Street, preserving views to the mountains. Greenways or special streets permeate the dense development and connect the area to the greater system of open space in the Central Area. This system also works to delicately weave development along 3rd Street back into the neighborhood to the east of 4th Street.

Consideration should be given to creating an exciting new identity for the Third Street/Railroad District. "Branding" this area will draw attention to the area by owners, developers and citizens. As a working title, in this technical memorandum, the District is referred to as "Bend Central". Within Bend Central, there are sub-districts and corridors that may have unique characteristics.

The components of the refined Framework Concept are Defined Districts, Hierarchy of Streets, Intersections of Character, System of Open Spaces, City Form and Skyline, and Transitions and Seams. These components address the different character and unique attributes of the distinct areas within the Central Area, how pedestrians and cars will move about, and the connection of open spaces throughout. It addresses the contribution of topography and landmarks and the transition of uses and forms between the districts and adjacent neighborhoods. The Framework Concept also suggests where development could first occur by identifying key pulse points of activity within the Districts. Components of the Framework Concept are not discrete pieces, but rather layers that build upon one another and work together to achieve the vision of the Central Area.



Components of the Framework

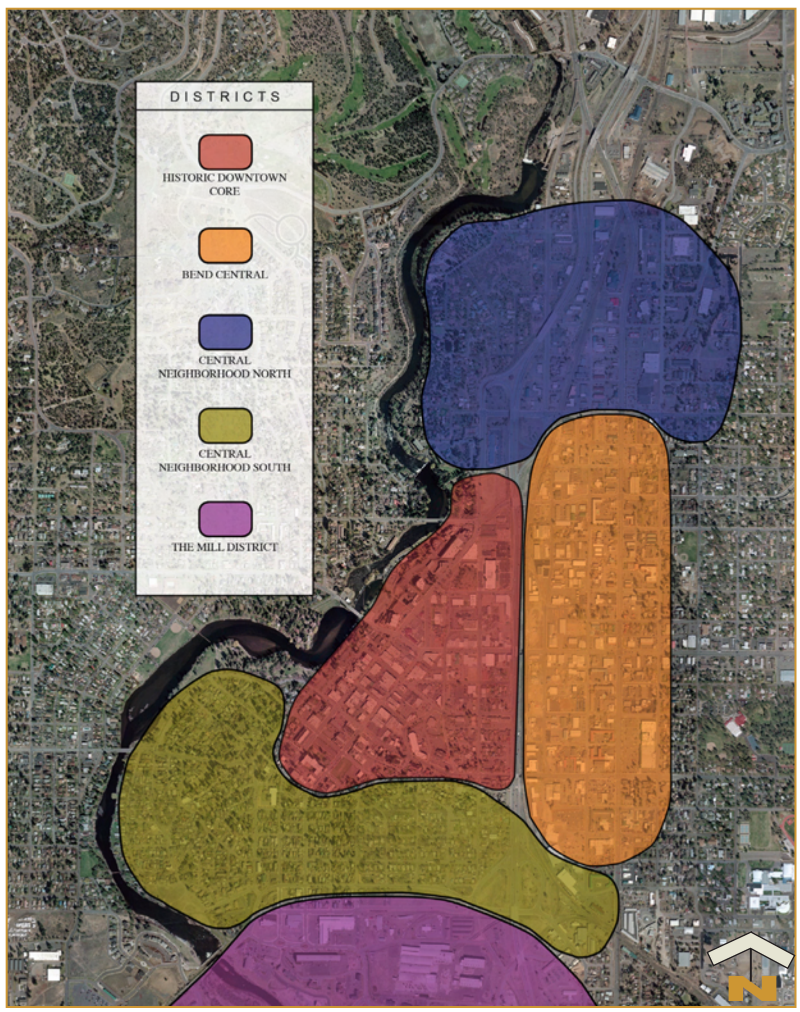
1. Defined Districts

Areas of the city evolve a character that can be unique, yet complimentary to adjacent areas. By establishing districts, it is possible to set forth expectations as to the development/redevelopment of an area and guide future development. Demands for land and increased density requirements within the Urban Growth Boundary will force levels of development (density, height) that have not been seen in Bend or Central Oregon. By defining districts, the places for density and height can be determined so that the resultant development is complimentary to the Historic Downtown Core and neighboring residential areas.

The Third Street Corridor from the Parkway on the west to 4th Street on the east will most certainly redevelop in a new form, utilizing the land more effectively and efficiently than one-story retail buildings and parking lots. This District should have a "brand" or "identity" (Bend Central) with subdivisions of specific character that results from applying the "layers" of the Framework Structure. Also, the evolving districts surrounding Bend Central should be defined as to expectations, edges and transitions.

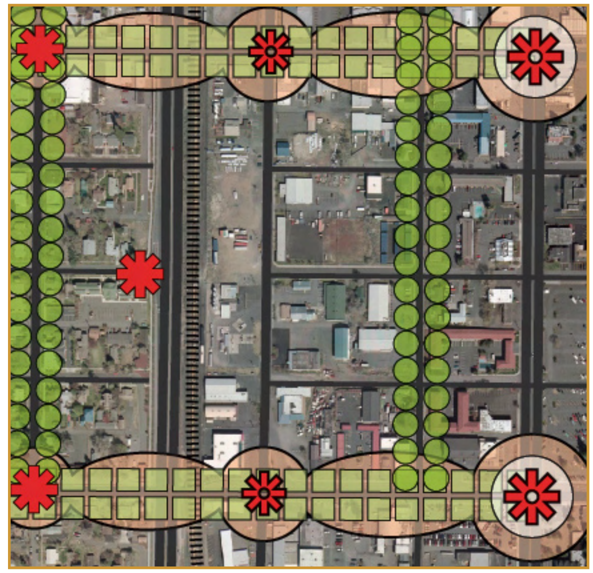
Existing or potential districts within the Central Area and adjacent areas include:

- Historic Downtown Core
- Bend Central w/sub-districts
    - Railroad
    - 2nd Street
    - 3rd Street
    - 4th Street
- Central Neighborhood North
    - Riverfront Neighborhood
    - Division Street Commercial/Industrial Spine
    - 3rd/4th Street Commercial Corridor
- Central Neighborhood South
- The Mill District



2. Hierarchy of Streets

All streets are not equal. A component of an active and diverse urban fabric are streets that are designed to certain functionality criteria for vehicular circulation but also provide for various levels of pedestrian activity, integrate infrastructure for storm water and utilities and create an ambiance through lighting, signage and way-finding. The street is not only the horizontal surface for vehicles and pedestrians. It should be considered as a linear room that has a character established by the combination of functional aspects (vehicular and pedestrians) the enclosure of the buildings facing the street and the landscape of the street (green, furniture, signage, lighting).

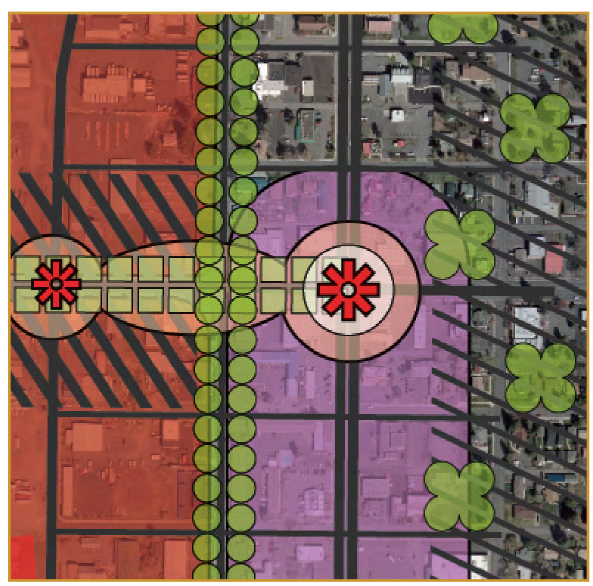


A potential hierarchy might include the following:

- Boulevard
- Vehicle major/pedestrian minor Street
- Pedestrian major/vehicle minor Street
- “Backbone” Street
- Transition Street
- Service Street
- Residential Neighborhood Street

3. Intersections of Character

The meeting of two or more circulation routes/paths should be celebrated. The intersection should be thought of as an outside room and should have greater content than “a holder of traffic signals”. The intersection may serve as an introduction of the visitor to the city, is instrumental in way-finding, and (in the case of Bend Central) identifies the east-west connecting from the principle north-south routes. Buildings surrounding the intersection should define the space but should also be complimentary to each other. Lighting should signal a decision point. Pedestrian and vehicular zones should be delineated to insure safe and secure passage for all. The new tradition of public art in the round-abouts in the new neighborhoods of Bend should be repeated in Bend Central.



Consideration of the intersections might include the following:

- The hierarchy of the streets intersecting
- Gateways to Districts
- The ground surfaces (texture, materials)
- Identity and common language for Intersections in different Districts

4. Network of Open Spaces

The character of Oregon is open space with islands of development. The character of Central Oregon is low-density, with towns and cities of 1-2 story buildings. As our cities grow and evolve, the tendency is to define specific places for open spaces and what the character of each should be. Bend has evolved in a way that already incorporates open space (natural elements) into the fabric of the city. The opportunity is to continue to build upon natural features with a series of spaces of diverse character—some urban, some naturalistic. The approach should not be "A" city square, but many city squares; not "A" park, but parks integrated throughout the urban core; not "Just Streets", but green streets. AND the concept is one of connecting a series of diverse and varied open spaces that are developed within the public realm combined with courtyards, parks and spaces in private development. The result is an interconnected network of open spaces that are accessible and flexible as to use and capacity.

Some elements that might be included in the network include:

- Green corridors integrated with Great Streets
- Pedestrian paths and trails
- Linear green spaces and parks
- Courtyards and plazas
- Civic squares and public rooms
- Pathways linking residential areas to the open space network

5. Transitions and Seams

Cities evolve in sectors. These sectors are a result of public intervention and private response to the intervention. Neighborhoods and clusters of compatible uses build upon the success of prior developments. As each district or sub-district begins to establish its own specific character, the differentiation between parts of the city becomes greater—and the fear of unwanted intrusions (e.g. entertainment venues in single family residential areas) become greater. The interaction between zones or districts should be a product of careful study and consideration. In Bend Central, redevelopment of the 3rd Street corridor is certain. Redevelopment will undoubtedly be of higher density and taller buildings—and be a mix of uses that may or may not include housing. Whatever the eventual development pattern, it will abut a vital residential neighborhood east of 4th Street. The "seam" of 4th Street and the transitions between uses and areas should be addressed to set priorities and methodologies to guide redevelopment activities - with special care given to the transitions into and out of the Central Neighborhoods. "Transitions and seams" occur throughout Bend Central and the larger Central Plan Area.

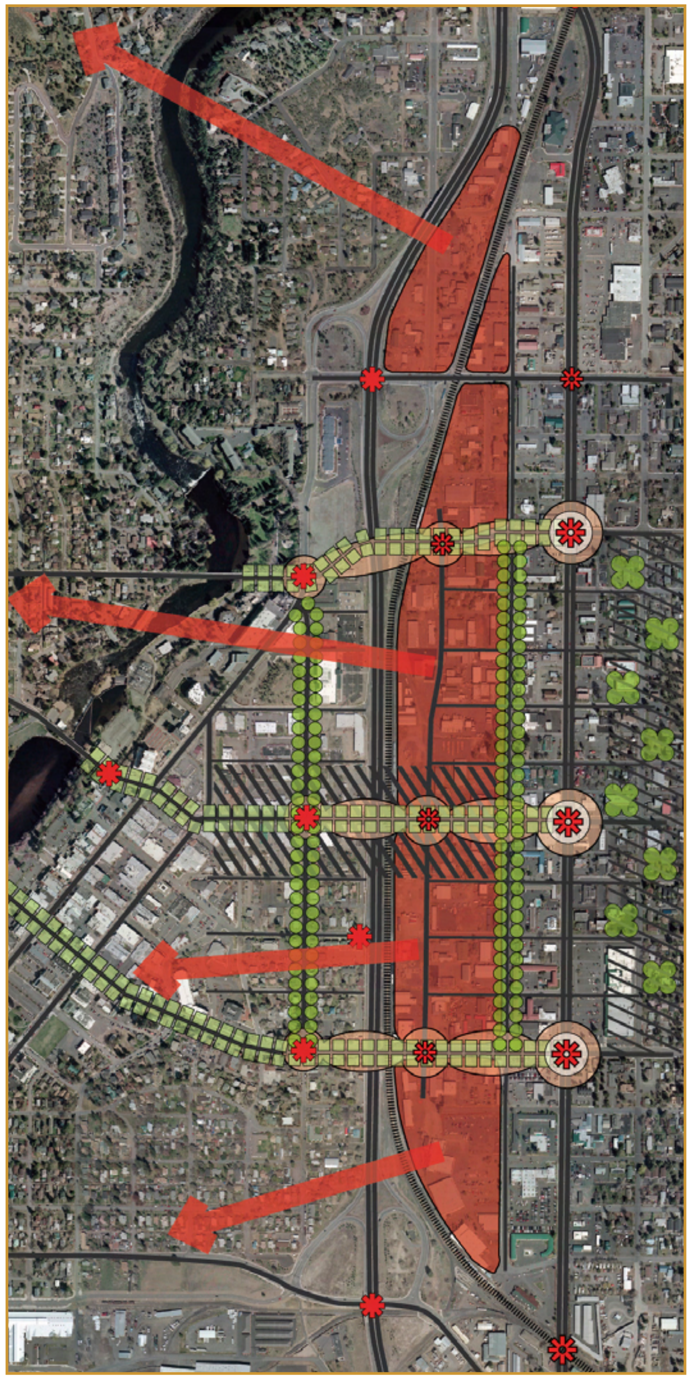
Considerations in these areas include, but are not limited to, the following:

- Height and bulk of buildings
- Use and activity compatibility
- Street character and the pattern of structures and spaces
- Vehicle/pedestrian interface
- Shared open spaces

6. City Form and Skyline

As development and redevelopment occur, taller buildings will become more the rule than the exception. These taller buildings will be single use, as well as mixed use and the character of each should be uniquely Bend. As the city evolves, the "form" of the city will become more and more important. There will be issues of civic identity and remembrance, views and view corridors, axial relationships and monuments, open space and the "spaces in between"—all will contribute to the scale, texture and grain of the urban fabric.

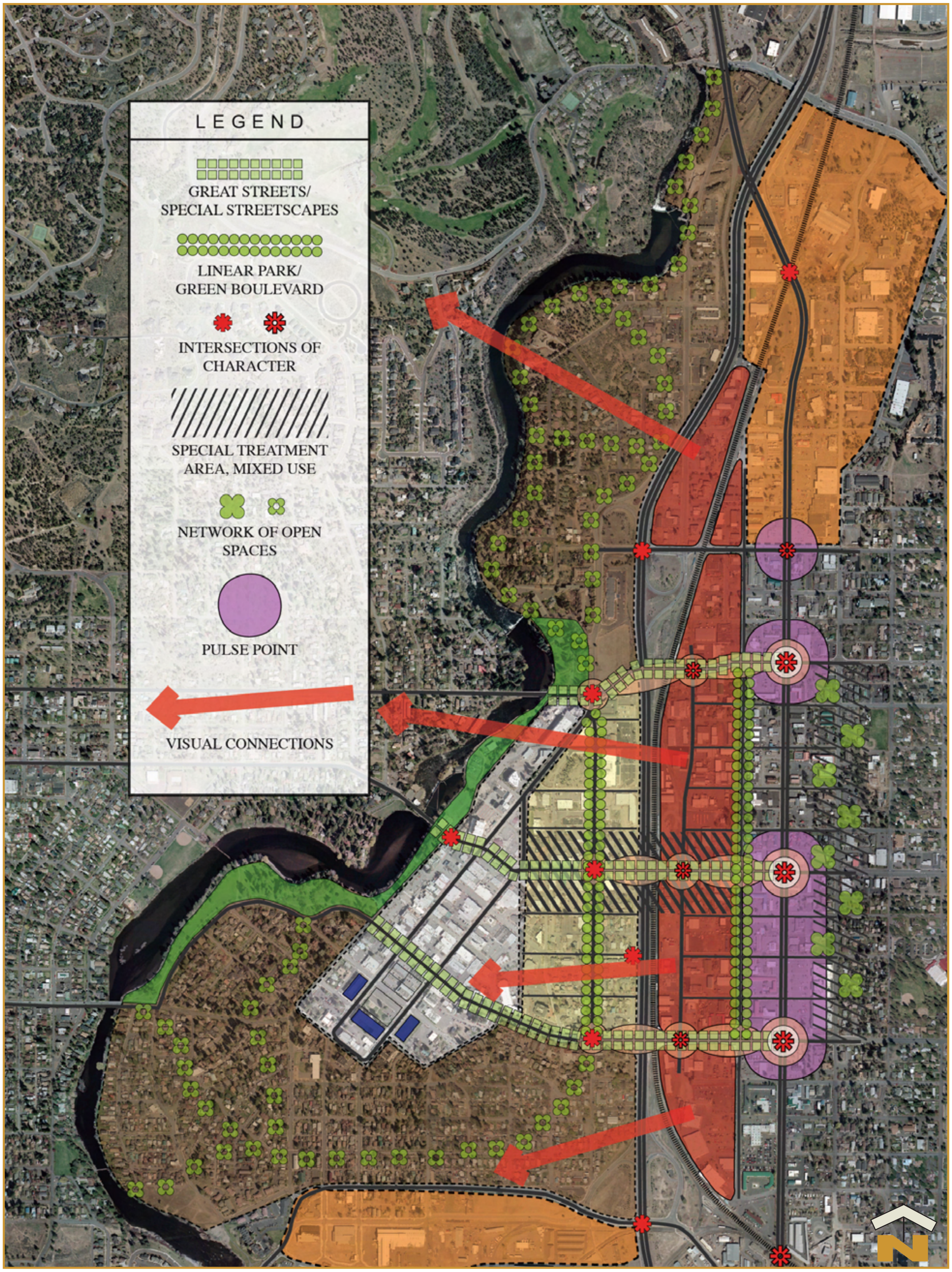
The uniqueness of the skyline could be a derivation of the natural landscape surrounding or it could be more of a conventional form resulting from specific height limitations. Whatever the determination, there should be much discussion about the relationship of built form to the topography of the land—and the combined effect of land elevation and building height that will define the topography of the skyline.



Issues to consider include:

- The "lay of the land" (topography)
- The geologic structure of the underlying land
- Built forms (existing and expected)
- Symbology of form and landmarks
- Contributing fabric
- Icons and remembrances
- The "view from the road"

Refined Framework Concept

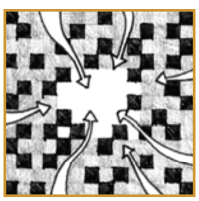


Bend Central Performance Guidelines

These Performance Guidelines describe elements of urban form that must be addressed in ongoing development to achieve the desired Vision. The Guidelines are a methodology to inform developers and designers of the expectations of the city. These are suggested Performance Guidelines that focus on the area indicated as “Bend Central”. As the Central Area planning process continues, these guidelines will be refined and expanded to address the district seams and transitions into the Central Neighborhoods. Similar guidelines would also apply to the Historic Downtown Core and Greenwood Avenue area addressed in the first planning phase.

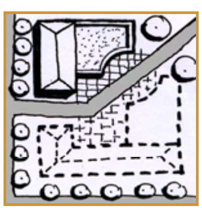
Guidelines should be performance oriented and not prescriptive. They address the general look, feel, and function of Bend Central and should be applied to the district as it develops. They create an environment for design excellence to occur, for small actions to have a major cumulative effect, and a mechanism for checking the progress of the Vision implementation. If the Guidelines are properly followed, each and every development increment will contribute to a better-defined and coordinated urban form. These guidelines guide developers, city officials, and the community in their efforts to achieve the vision for Bend’s Central Area.

Making Bend Central a “New Town In Town”



1.1 Draw People & Activity Into Bend Central

Bend Central is strategically situated to be both a local and regional focal point. Developments should lend themselves to attracting a variety of pedestrian activities in Bend Central with linkages to adjacent neighborhoods and downtown core. Entry points into Bend Central should establish a sense of arrival.



1.2 Encourage Further Development

Buildings and spaces should be designed with future adjacent development as a consideration. Designs should not be “islands,” but should create design opportunities for future abutting development.

1.3 All Seasons City

Building uses and exterior spaces should lend themselves to use throughout all four seasons. Designs should include protected spaces and pathways to enable year-round use by visitors and inhabitants.

1.4 24 Hour / 7 Day City

Developments should foster the idea of extended hours of use throughout the week. Where uses are subject to “business hour” operation, the development should include amenities that provide for external enjoyment of buildings at all times of day.

1.5 Sustainable Design

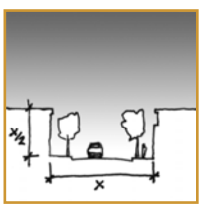
New development should embody current green building techniques wherever possible. Energy efficient design options should be explored as well as alternative building products, which have less impact on the local and world environment. Strive for LEED® (Leadership in Energy and Environmental Design) certification of development.

1.6 Buildings As Good Neighbors

Each building should be designed to fit into, and contribute to the future vision of Bend Central. Each building should enhance the public experience of itself and of the abutting buildings. Undesirable elements of buildings should either be screened or hidden from view.

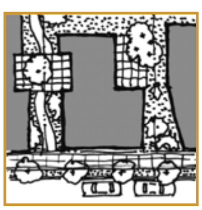
1.7 A Place Of Multiple Activities

When practicable, include multiple uses in building structures, as well as using exterior spaces as extensions of interior uses. Create combinations of public rights of way and open space within blocks to create places that can accommodate multiple activities.



1.8 Scale Of The Street

Building heights adjacent to a street edge should be at least as tall as half the width of the right of way. Existing buildings would improve the street scale with vertical expansion. Street trees can also be used in meeting the height goal. A combination of taller buildings and trees will create the appropriate scale for the street.



1.9 Building Setbacks

A continuous street edge contributes to the pedestrian health of Bend Central. Buildings should front the sidewalk. In addition, buildings placed close to side and rear property lines should be designed with sensitivity to future development on adjacent properties and to potential public spaces within the block.

1.10 Pedestrian Interaction

Buildings and exterior space should foster activity and interaction of citizens at a pedestrian scale. Encourage a variety of uses within walking distance for residents, employees, and visitors. Employ appropriate sidewalk widths and weather protection to encourage use and activity.

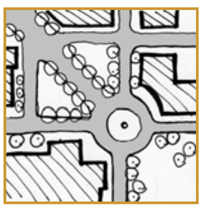
Bend Central Connections

2.1 Visual Linkages

Design interior and exterior spaces that recognize and promote visual linkages to other defining elements, such as monuments, civic spaces, outlooks, water features and other natural and man-made landmarks that orient the user.

2.2 Attraction Of Attractors

Future “attractors” should be located strategically in Bend Central, providing a sense of “this is where it’s happening,” making Bend Central the “new” destination in the city - unique, but complimentary to the Historic Downtown Core and the Mill District.

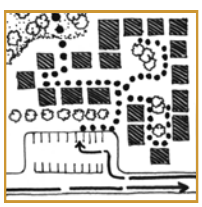


2.3 Axial Relationships And Monuments

Recognize existing and potential axial relationships of places and buildings. In building form, monuments, or in water features, incorporate extensions or terminations of these relationships.

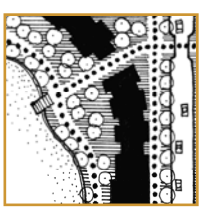
2.4 Places And Connections

Provide a safe, inviting series of interconnected “places”, both interior and exterior to the building structures. Provide linkages to adjacent neighborhoods for pedestrians, bicycles, and automobiles.



2.5 Driving And Parking

In the design of streets and parking areas, functional requirements of vehicular activity should not compromise, but should enhance, the pedestrian environment.

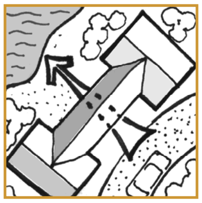


2.6 Pedestrian Opportunities

Integrate pedestrian circulation systems with existing and planned systems, both indoor and outdoor, that connect public rights-of-way and spaces, activities and uses. Design systems to use paving, furniture, and landscaping that are handicap and stroller accessible, convenient to use, and in character with the public improvements.

2.7 Green Streets

Promote creation of "green" streets and surface parking areas utilizing features like permeable paving, solar powered lighting, and native landscaping. City design standards should be flexible to allow designs that have a minimal impact on non-renewable natural resources.



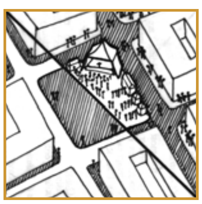
2.8 Connections Through Buildings

Promote design that allows for public interaction between buildings. Encourage pedestrian walkways through and connections between clusters of buildings.

Spaces And Landscapes in Bend Central

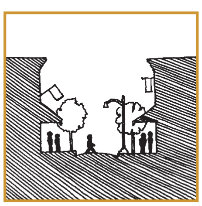
3.1 Civic Rooms

Development of public spaces within and around Bend Central should contribute to the formation of "civic rooms." Within these rooms, specific commercial and public uses, circulation patterns, public art, and cultural recognition shall be encouraged to reinforce the "room" and its linkage to Bend Central and the downtown core.



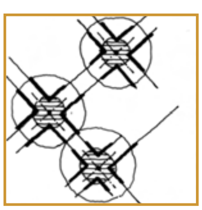
3.2 Areas Of Many Functions

Create pathways, open spaces and enclosed or sheltered public spaces to be flexible and to accommodate a number of functions, whether organized or casual.



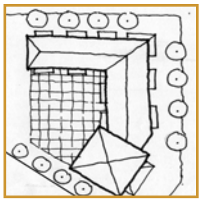
3.3 The Street

Define the street by considering it as a linear room with building faces, landscaping, lighting and signing appropriate to the function of the street and the area of Bend Central it serves. Street trees spaced at no more than 30 feet on center are critical to establishing the character of a street.



3.4 The Intersections

Consider intersections as "rooms" within the city. Maintain vehicular flow requirements while providing safe and convenient pedestrian access. When possible, use the location of building entries, building details, street lighting, and signage to enhance the concept of the intersection as a room.



3.5 Courtyards And Plazas

In private development, design courtyards and plazas that provide a continuity of experience between the inside and outside of the building and between the public and private realm.

3.6 Open Space Defined By Buildings

The spaces in-between buildings should enhance the public experience through building design, form and organization. The character of the spaces in-between will add to the texture and scale of the pedestrian environment.

3.7 Inside And Outside

Ground floor activities in buildings within Bend Central should present an interesting and enticing addition to the pedestrian experience. Exterior walls abutting public rights of way shall have more than 50% of the surface in windows, showcases, displays, art or pedestrian access elements.

3.8 Roofscaping

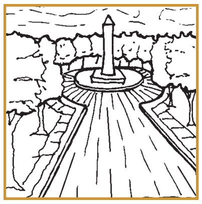
The rooftops of buildings within Bend Central present an opportunity for "green" design and upper level activities. New development should be encouraged to create eco-roofs and/or opportunities for places where activity could enhance the street.

3.9 Street Trees

Selection of trees along street edges should create a unifying canopy for the street. Trees should be chosen to ensure commercial views from the street. Trees with strong vertical shapes should be used sparingly to avoid a discontinuous or "lollipop" appearance.

3.10 Signage

Business identity signs, while conforming to requirements of the sign ordinance, should add to the quality and character of the street. Signs should also relate to the building's character and provide identity and focus for the use. Signs should be readable from vehicular as well as pedestrian views.



3.11 Public Art

Public art can enhance the landscape and provide focus within public spaces. Incorporate public art in strategic locations to create a better visual environment and provide interactive and interpretive experiences for both children and adults. Integrate the design work of artists, with a focus on local artists, into new development.

3.12 Safe Environments

New development and civic improvements should use crime prevention techniques wherever possible. Design options that reduce the opportunity for crime and nuisance activities should be explored, such as “eyes on the street” and the principles of CPTED (Crime Prevention Through Environmental Design), to create a safer environment.

Buildings in Bend Central

4.1 Building Form

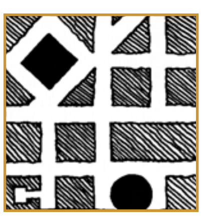
Single-purpose buildings should be treated as “stand-alone” structures with style and size appropriate to use. Mixed-use buildings should be designed to relate contextually to the surrounding buildings.

4.2 Adaptable Design

As Bend Central evolves over time, the market will dictate changes in uses and densities. Design of buildings should consider flexibility in use and density over the life of the building.

4.3 Active Buildings Along Pedestrian Oriented Streets

Where pedestrian oriented streets are identified within Bend Central, active uses should be developed to support them. The street edges should help to reinforce the pedestrian link between focal points or attractors.



4.4 Activate Buildings Along Paths & Linkage Streets

Where possible, maximize use of deep building lots and the alleys. Businesses that do not require high exposure street frontage may develop along improved alleys and open space internal to blocks, giving the most important exposure to retail and businesses requiring street front identity.

4.5 Craft Of Building

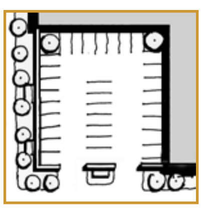
In designing buildings, recognize the "craft of building" as fundamental in creating appropriate building detail. Proportion, attention to detail and quality design should be stressed. Lasting materials are strongly encouraged and the way buildings are assembled contributes to the texture and fabric of Bend Central.

4.6 The Outside Wall

The "outside wall", the building's presentation both to passers-by and to users, should invite participation. Upper levels of buildings facing the street should incorporate decks, balconies or other devices that activate the wall enclosing the street, any open space, pathways, or lanes.

4.7 Building Entrances

Building entrances should support and enhance the pedestrian oriented quality of Bend Central. Design entrances to give identity to buildings and uses therein. Entrances to upper level uses should be located mid-block with corner entrances reserved for retail uses.

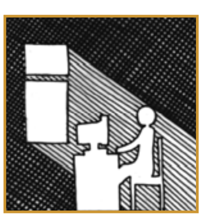


4.8 Parking Relationship To Building

Parking areas and structures are to be integrated into new building designs. Surface parking should be limited to short-term parking along the alleys where possible to maintain an active street-front. Delineate surface parking from pedestrian ways by low vertical screening elements, such as masonry walls, fences or landscaping.

4.9 Service Areas

Since service access and trash holding areas are expected to be in the alley or adjacent to roadways and open spaces, care must be taken to avoid a back-door appearance to the building faces that are adjacent to pedestrian areas and other buildings. Employ screening and landscaping to reduce the visual impact of service areas.



4.10 Interior Environments

Interior design of buildings in Bend Central should recognize the need for quality living and working environments for all its users. Natural lighting and ventilation should be utilized to the maximum extent possible.

Technical Memorandum #2 – Existing Conditions

Prepared for:

The Oregon Department of Transportation
and
The City of Bend

Prepared by:

Parametrix

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333 SW Upper Terrace Drive
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Final – March 28, 2007

First Draft – January 22, 2007

TABLE OF CONTENTS

This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), local government, and State of Oregon funds. The contents of this document do not necessarily reflect views or policies of the State of Oregon.

Introduction

Background

The focus of Part 2 of the Central Area Planning effort is on the area adjacent to Bend's existing downtown core, to the east, north and south. This area includes the Third Street Corridor (formerly designated as US 97 and now designated as Business 97) that runs north-south through the center of Bend. Greenwood and Franklin Avenues connect the Third Street Corridor with the downtown core. With the completion of the Bend Parkway several years ago, 3rd Street carries lower volumes than previously; however, the Bend Parkway acts as a significant barrier separating the downtown core from the study area. A map of the Central Area Plan study area is presented on the following page.

One of the key objectives of the Phase 2 planning process will be to identify improved transportation linkages between the study area and the downtown core, while accommodating significant changes in the character of land uses in the area. Development of the Central Area Plan must result in:

- A detailed list of transportation improvements needed to support planned land uses. In particular, the Central Area Plan must identify needed improvements to arterials, collectors and local streets.
- Changes to both land use and transportation plans within this study area.
- A general indication of issues and/or limitations related to other supporting infrastructure that might constrain land use development within the study area.

In Part 2, special attention will be paid to the issues of mobility, circulation and access within and between the districts comprising the study area, and the balance of the community.

Content of This Memorandum

This memorandum includes a discussion of current land uses and transportation facilities within the study area, and the condition of a broad range of public facilities including streets, sidewalks and bike lanes, transit service, sewer, water, storm drainage and other facilities and services.

Chapter 1 is this Introduction. Chapter 2 presents a summary of existing land uses focusing on both zoning and current land use patterns. Discussion also includes reference to the historic neighborhoods in the Central Plan Area.

Chapter 3 discusses the existing transportation system including streets; traffic volumes and current operations focusing on the identification of deficiencies; sidewalks, bicycle lanes and trails; and existing transit service.

Chapter 4 summarizes the existing, non-transportation infrastructure serving the Central Area. This infrastructure includes public infrastructure such as the water distribution, storm drainage and sewer system facilities, and private infrastructure elements including power, broadband, telephone and natural gas services.

The future transportation system evaluation, including the implications of various elements of the Bend Transportation System Plan will be discussed in the Technical Memorandum #6.

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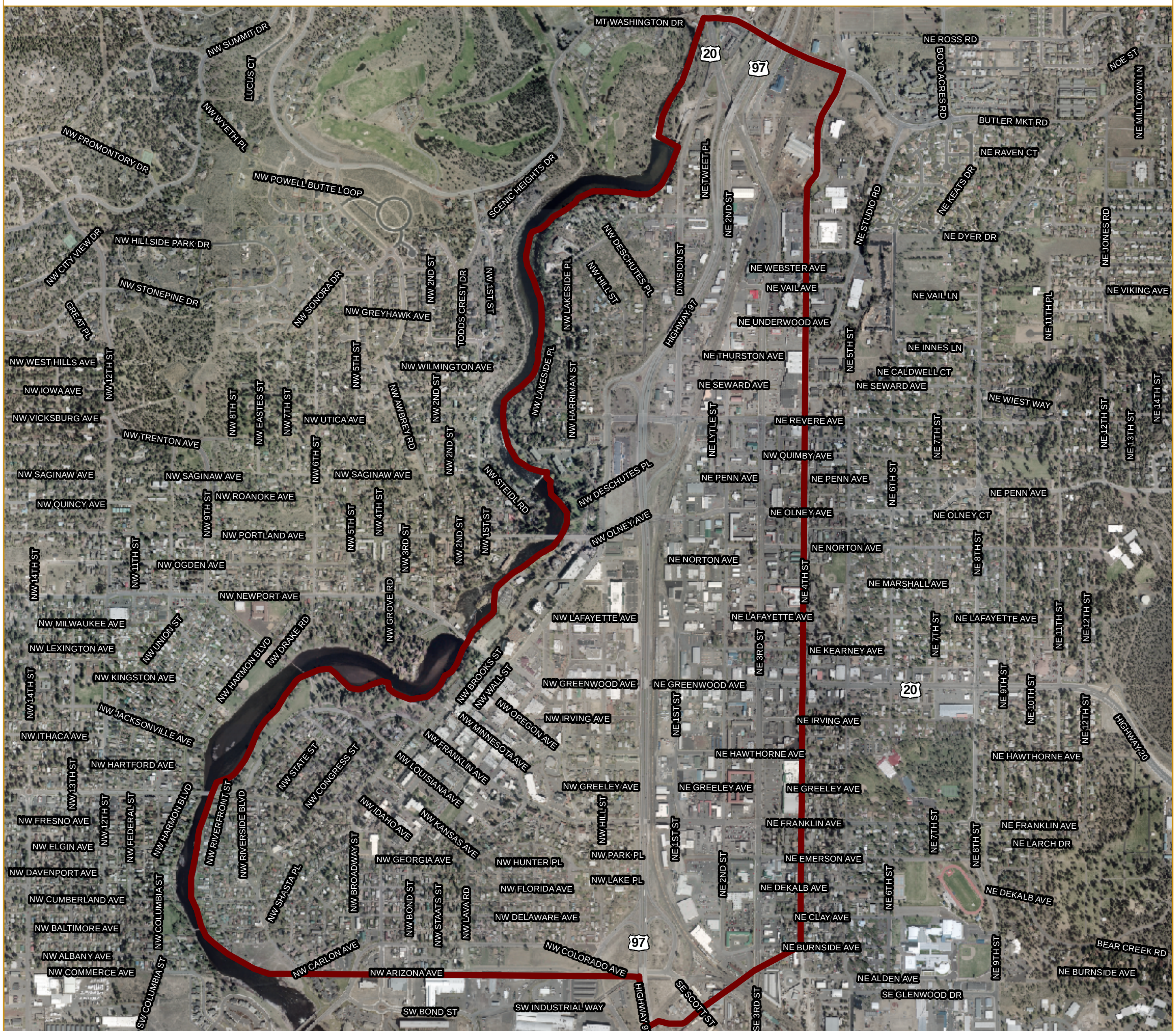
BEND CENTRAL AREA PLAN

Study Area Boundary



City of Bend Central Area

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Feet

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Projected Coordinate System:
State Plane - Oregon South
Units: US Foot

Parametrix

Analysis by C. Hainey; Analysis Date: Jan-2007; Plot Date: Jan-2007: File Name: CAP_Ortho.mxd

Land Use

Introduction

This section summarizes existing land use conditions within the three Bend Central Area Plan Part 2 Districts: Third Street / Railroad District, the Southern Central Neighborhoods, and the Northern Central Neighborhood. An overview of existing zoning designations as well as General Plan designations are provided, including highlights of existing land uses and district characteristics. Zoning designations within the individual Central Area Districts are indicated in the Table 1 below and in the map on the following page entitled “Existing Zoning and Historic Districts”. General Plan designations are provided in Table 2 and in the map entitled “General Plan”.

Table 1. Zoning Designations in Central Area District (by acres)

Zone	Third Street Corridor	Historic Downtown Core	North Central Neighborhood	South Central Neighborhoods	Grand Total
CB	0	59	0	0	59
CG	47	35	17	30	129
CL	172	27	40	4	244
CN	0	0	0	1	1
IL	119	3	0	10	132
PF	0	3	0	0	3
RH	5	9	0	6	20
RL	0	0	1	0	1
RM	2	6	31	131	171
RS	0	1	52	43	96
Grand Total	345	143	141	225	855

Table 2. General Plan Designations in Central Area District (by acres)

Desig-nation	Third Street Corridor	Historic Downtown Core	North Central Neighborhood	South Central Neighborhoods	Grand Total
CB	2	56	0	0	58
CG	15	26	8	40	89
CL	169	28	49	4	250
IG	0	0	0	1	1
IL	45	0	0	0	45
ME	105	0	4	0	109
PF	0	29	6	15	50
RH	9	3	0	18	30
RM	1	0	32	119	152
RS	0	1	42	28	71
Grand Total	346	143	141	225	855

Existing Land Uses, Zoning and General Plan Designations

The Central Area is a diverse composite of land uses, zoning and General Plan designations. Commercial land uses are predominant in the Central Area and range from boutique retail in the Historic Downtown Core to highway oriented commercial uses along 3rd Street. Residential land uses are adjacent to or near commercial uses in much of the Central Area which offers both opportunity for complementing land uses, as well as challenges and conflicts in the areas where commercial related activity and traffic impacts residential neighborhoods. The following sections characterize existing land uses, zoning designations, and general plan designations within each of the Central Area Districts.

Third Street / Railroad District

The Third Street Corridor district is bound by Butler Market Road to the north, 4th Street to the east, the Bend Parkway to the west, and the BNSF railroad overpass to the south. This area is predominantly zoned for commercial and industrial land uses. While new development in commercial zones must adhere to standards concerning allowed uses, building heights, densities, parking, and building setbacks, as well as other standards, much of the commercial and industrial uses in this area were developed before current development code standards were adopted. Because this district is a long linear area, it contains a great variety of development types and character, depending where along the Corridor one focuses. The heavier developed areas are found along 3rd Street where it intersects with the east/west streets of Greenwood Avenue and Franklin Avenue carrying traffic into downtown or across the Deschutes River.

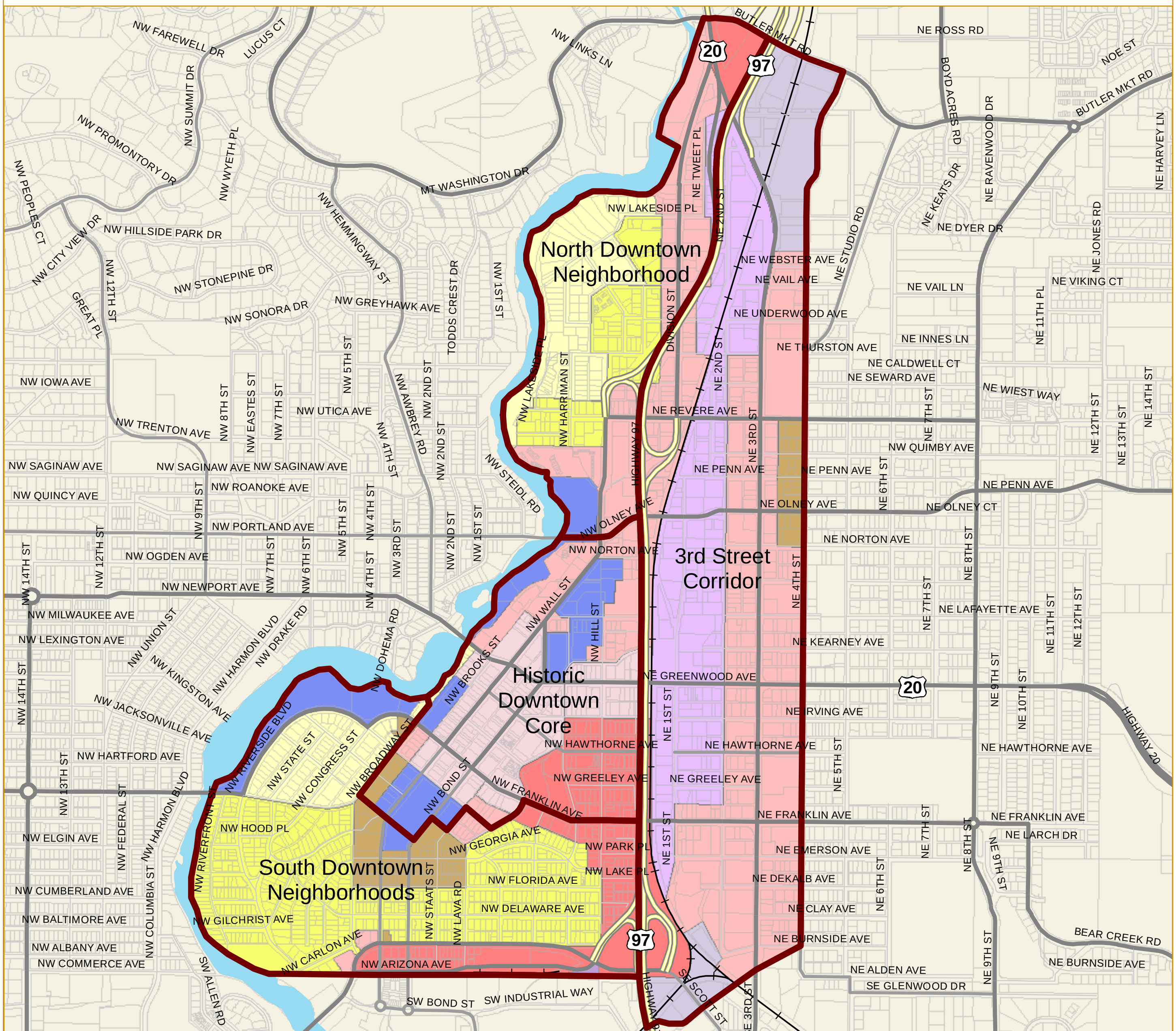
Connectivity between 3rd Street and the other Central Area Districts is hampered by the Parkway and railroad running north and south to the west of 3rd Street. These two major transportation facilities act as a barrier between the districts. Direct access under the Parkway and railroad tracks is restricted primarily to the east/west connections of Greenwood, Franklin, Olney, and Revere Avenues. This limited access has contributed to a concentration of commercial development along these east-west connections. Greenwood Avenue is also designated as US Highway 20 east of 3rd Street. The intersection of Greenwood Avenue and 3rd Street is a key gateway opportunity for this area, as commercial development along Greenwood Avenue is in the early stages of revitalization.

Most of the uses along 3rd Street in this area were designed to handle large volumes of automobile traffic and are set back great distances from the street, behind large surface parking lots. Existing land uses include a large chain grocery store, several automobile lots, fast food restaurants, and other regional highway type businesses. Although the Parkway has relieved much of the 3rd Street traffic, automobile traffic remains a dominant characteristic of this area. The northern part of the Third Street Corridor has easy Parkway access, as it is where 3rd Street and the Parkway converge. It is divided by the railroad tracks which run north and south. Areas along the Third Street Corridor area are generally zoned Limited Commercial (CL) which provides for a wide range of retail, service, and tourist commercial uses in the community along the highway or in new commercial centers. This zoning designation is consistent with 3rd Street’s former designation as US Highway 97 before the Parkway was built, however, the zoning designations along most of 3rd Street and west to the Parkway are inconsistent with the Bend Central Area Plan Framework and do not allow the development flexibility that would support the Central Area Plan Vision.

The Third Street Corridor in the area north of Revere Avenue transitions into a mixture of General Commercial (CG), Light Industrial (IL), and Limited Commercial (CL). The CG district allows a great variety of commercial uses and, like the CL district, is oriented to the highway and providing services to the traveling public, however, it allows larger lot sizes. The IL zone allows a variety of mixed industrial uses ranging from warehouses to research campuses.

BEND CENTRAL AREA PLAN

General Plan



General Plan

CB	CL	IR	PO	RM
CC	IG	ME	PO/RM/RS	RS
CG	IL	MR	RH	SM
CH	IP	PF	RL	URA

City of Bend Central Area Plan

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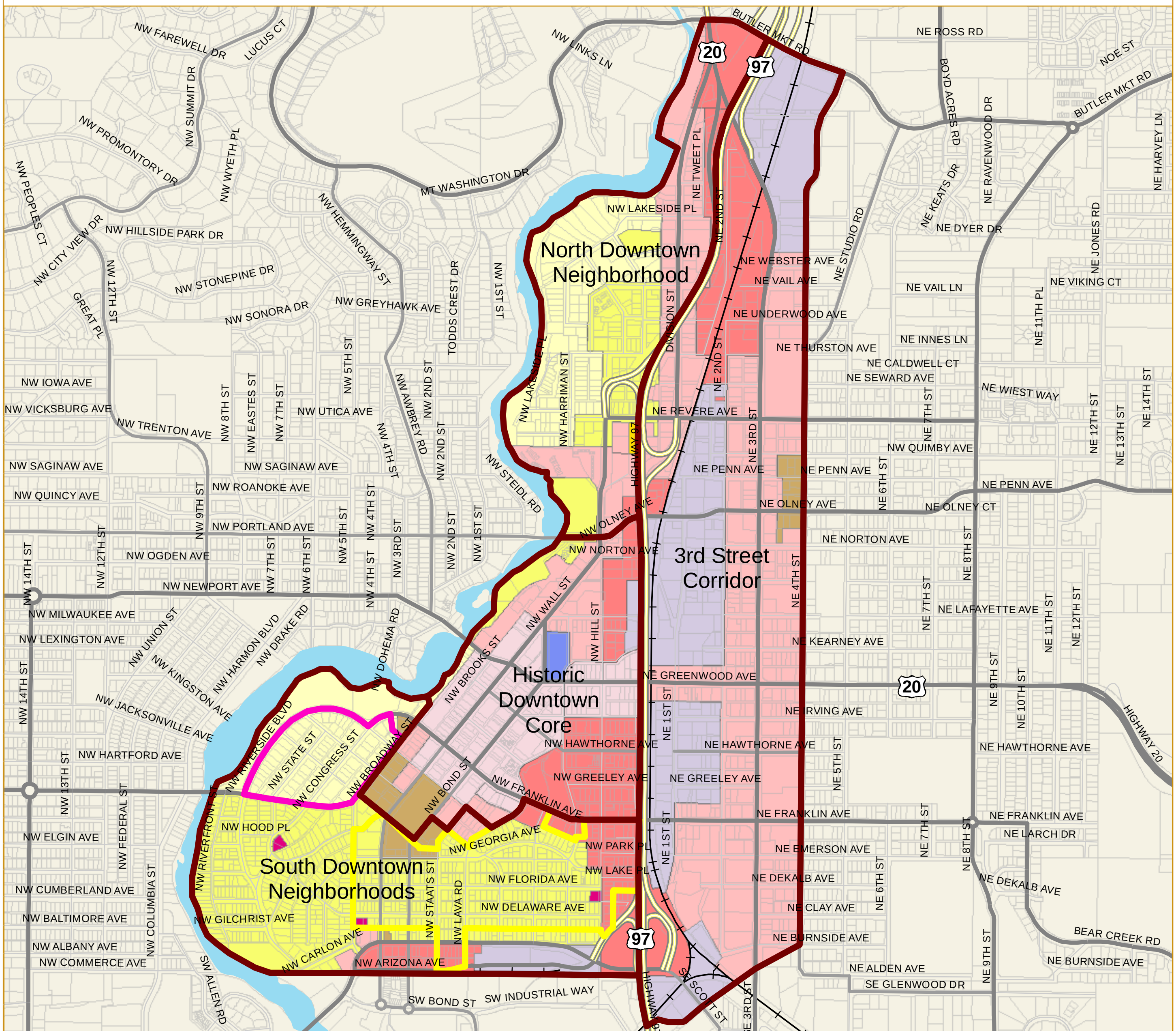
BEND CENTRAL AREA PLAN

Existing Zoning and Historic Districts



Zoning

CB	IG	PO	SM
CC	IL	PO/RM/RS	SR2-1/2
CG	IP	RH	UAR10
CH	ME	RL	
CL	MR	RM	
CN	PF	RS	

Drake Park Neighborhood Historic District

Old Town Historic District

City of Bend Central Area Plan

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Analysis by C. Hainey; Analysis Date: Jan-2007; Plot Date: Feb-2007: File Name: CAP_Zoning.mxd

The general plan designations for this area consist of Light Industrial (IG) and Mixed Employment (ME). Similar to the IG zoning district, the IG general plan designation allows for a mix of heavier commercial and light industrial uses. The ME designation allows a mix of development types including "vertical" and "horizontal" uses. The general plan designations are consistent with the Bend CAP Vision in those areas that are designated ME west of Third Street. Stakeholder interviews have indicated that the burden of applicant initiated zone changes to the ME zone are a potential hindrance to redevelopment in this area. Fulfillment of the CAP Vision may require that the City initiate zone changes in this area. Additionally, this is an opportunity to review the provisions of the ME zone and their suitability in a redeveloped Third Street area. For example, the current ME zone allows heights of 45' and up to 50% lot coverage which would restrict development to a lower density than what is envisioned in the CAP for this area.

The area between 2nd and 4th Streets has been informally referred to as the "Railroad District" and is largely zoned and designated IL with CL along the main east/west connections, Greenwood and Franklin Avenues. Industrial land uses in this area include a lumber yard, a retail heating oil distributor and other large parcel operations which were historically located near the railroad for easy freight services. The Third Street Corridor Area also contains a small amount of Residential High Density (RH) along the western side of 4th Street between Quimby and Norton Avenues.

As noted above, the City may want to consider rezoning the "Railroad District" and Third Street Corridor to allow development that is consistent with the Central Area Plan Vision and Framework.

Southern Downtown Neighborhoods District

The southern downtown neighborhood is bordered to the north by Franklin, Georgia, Idaho and Tumalo Avenues, to the west by the Deschutes River, to the east by the Bend Parkway, and to the south by Carlon and Colorado Avenues. Primary transportation connections for these neighborhoods are Franklin and Tumalo Avenues, along with Wall and Bond Streets, and the Colorado/Arizona Avenue couplet.

This area contains two historic districts; the Old Bend Neighborhood and the Drake Park Neighborhood. In addition there is a residential neighborhood in the southwest portion of the district. The area is primarily designated Medium Density Residential (RM) by the General Plan, with the exception of the Drake Park Neighborhood which is designated Standard Density Residential (RS) and contains larger lot residential. The area along Riverside Boulevard is also zoned RS but is designated for Public Facilities (PF) in the general plan. In addition, areas adjacent to Franklin Avenue and the Parkway are designated CG, or general commercial, and the land around the north end of Wall and Bond Streets is designated RH. There are small pockets of neighborhood commercial zoning throughout the otherwise residential neighborhood. For the most part, the General Plan designations and zoning in this area are consistent with the Central Area Plan Vision and Framework.

This neighborhood is primarily comprised of well-preserved, mid-century bungalow style homes. Although lined by single-family scaled residential, the wide automobile oriented Wall and Bond Street couplet through this neighborhood is a vital transportation connection between the Historic Downtown Core and the Old Mill District. The Old Mill District is within view as one leaves the Old Bend Neighborhood traveling south across Colorado Avenue.

Colorado Avenue @ Wall Street
Looking south through intersection you can see the Old Mill District

The northern area of this neighborhood is adjacent to an area of larger scale civic buildings which act as a buffer between the Old Bend Neighborhood and the Historic Downtown Core. Connecting to the west and across the Deschutes River, Tumalo Avenue, Broadway Street, and Riverside Boulevard surround the Drake Park Neighborhood. This historic district is zoned standard residential (RS) and is cohesively established with older homes and tree lined streets. Surrounded by heavy traffic on all sides, the neighborhood is an isolated pedestrian friendly area.

Northeast of the Southern Downtown Neighborhoods, Franklin Avenue acts as the main connection to the Third Street Corridor area and contains a variety of commercial uses which act both as a part of the downtown commercial area and as neighborhood destinations for those residents living to the south of downtown. There are also several residential to commercial conversions in this area south of Franklin Avenue which operate as professional offices for accountants, massage therapists, and other small office professionals.

Franklin Avenue @ Wall Street
An example of wide streets fronted by civic buildings

Northern Downtown Neighborhood District

The northern downtown neighborhood district consists of slightly more residentially designated area than commercially designated land, however, because Division Street is the main entry to this neighborhood, many people are unaware of its residential nature. Prior to construction of the Parkway, the City improved Division Street to improve congestion on 3rd Street. Although it no longer fulfills this function, the zoning along this area remains CL and CG which are both oriented to commercial uses along with easy highway access. The general plan designations along Division are CL, CG, and a small area of ME. The construction of the Parkway had negative economic impacts to businesses along Division Street and this area suffered from a high level of turnover.

Although to the west of Division Street this neighborhood is largely medium density residential (RM), the businesses along this commercial strip do not offer much in the way of neighborhood commercial. In recent stakeholder interviews, several respondents noted that the area along Division Street lacks a neighborhood grocery. The RM designation allows six to ten units per acre and may include attached housing. This area contains underdeveloped parcels which may offer infill opportunities to uses that are compatible with proximity to the Parkway.

Along the Deschutes River, residential homes are zoned standard density residential (RS) which allows between two and seven units per acre and is restricted to single-family residential. In this area, housing stock quality and type is more consistent compared to the diverse housing in the neighborhood directly adjacent to Division Street. Although the northern downtown neighborhood is in close proximity to the historic downtown core, it does not have an easily accessible connection to or from downtown or other Central Area Districts.

To a great degree, the General Plan designations and zoning districts are consistent with the Central Area Plan Vision and Framework, however the City may want to consider rezoning some of the areas along Division Street as ME to allow for an innovative mix of residential and commercial development in this area.

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Transportation System

Introduction

This chapter documents and describes the existing transportation system within the Bend Central Area. An overview of existing street system features is provided, including descriptions of street functional classifications and other characteristics, identification of key intersections for study, and current PM peak hour traffic volumes along with an assessment of existing intersection operations. A discussion of existing transit service, and bicycle and pedestrian transportation facilities is provided, as well as a summary of general transportation and circulation issues and constraints. This latter information includes many of the items identified during Phase 1 of the Central Area Plan study as issues of concern to the community.

Functional Classification Definitions

In general, roadways provide two functions, mobility and accessibility, with the design of a roadway emphasizing one function over the other to varying degrees. Higher speeds and fewer intersections are preferred for mobility, while lower speeds and more frequent intersections support accessibility. Roadways are classified by governmental agencies depending on the function the facility plays in the agencies' overall transportation system. The resulting functional classification typically includes arterials, collectors, and local roadways. Some locations have more refined designations, such as major and minor arterials or collectors, neighborhood collectors, or other classifications.

Primary streets in the study area are described in terms of the functional classification assigned by the City of Bend in its Transportation System Plan. Definitions of the functional classifications used in the Project study area are as follows:

Expressways carry traffic through an urban area and connect major portions of a community to each other and to other neighboring communities. Expressways typically carry high traffic volumes and provide for higher travel speeds with access limited primarily to interchanges with arterial streets.

Principal Arterials carry traffic through an urban area and connect major elements of the area including central business districts, regional shopping centers and other major traffic generators. Principal arterials typically carry a high degree of through traffic on a minimum of roadway mileage. They frequently have some degree of access control, although direct access to major land use developments such as shopping centers may be allowed. Traffic signals are generally used for intersection traffic control, although principal arterials in urban areas often include a number of unsignalized driveway accesses. Spacing of principal arterials may vary from less than one mile in highly developed areas to five miles or more in lightly developed rural areas.

Minor Arterials carry traffic between principal arterials and lower classified streets or directly to commercial and industrial areas, with direct access to land use development generally permitted. Traffic control is commonly a mix of signalized intersections and stop sign control used on intersecting streets of lesser classification. Minor arterials in urban areas are usually separated by less than two miles.

Major Collectors often balance land access and traffic circulation within residential neighborhoods and commercial and industrial areas. They typically form the link between the arterial street system and lesser-classified streets that provide property access and local circulation. Major collectors may be used to handle through trips within small communities or between small communities in rural areas, but usually do not serve trips that link these communities to the regional transportation system. There is often a mix of signalized intersections and stop sign control used on intersecting streets.

Local Streets provide direct access to adjacent property and to higher classified facilities. They offer the lowest degree of mobility and usually have no bus routes. They are not intended to carry through traffic but make up a significant percentage of total roadway mileage within a community.

The existing street functional classification system in the Central Area Plan study area are illustrated in the graphic on the following page entitled "Roadway Functional Classifications".

Existing Street System Characteristics

The following is a description of the physical characteristics of streets and highways in the study area. The inventory includes functional classification, number of lanes, posted speeds, destinations served, and surrounding land uses. An inventory of bicycle and pedestrian facilities on and near study area streets is included in a subsequent section.

U.S. Highway 20, the Central Oregon Highway is a Statewide Highway and freight route within the study area. As the highway enters the study area it crosses NE 3rd Street, bisecting the city, then turns eastward at Greenwood Avenue and continues out of the study area. Land uses along this corridor are highly automobile oriented including retail shopping centers, restaurants, lodging and gas stations. The route functions as a principle arterial with a posted speed of 35 mph. The roadway has two travel lanes in each direction, turn pockets at select intersections, and no on-street parking.

U.S. Highway 97 is also known as the Bend Parkway. The Oregon Highway Plan designates the Parkway as a Statewide Expressway and freight route. The Bend Parkway is a controlled access roadway with two travel lanes in each direction and a center median. In the study area, full access interchanges occur at Butler Market Road, Revere Avenue, and Colorado Avenue. South bound on and off intersection ramps are provided at Lafayette Avenue and Hawthorne Avenue; however, these intersections are designed for low speed 90-degree turns. Even with the right turn deceleration lanes that are provided for traffic exiting from the parkway, the design of these intersections may create operational challenges as traffic volumes increase in the future. The Parkway carries the highest level of north/south traffic volumes in the community.

Butler Market Road is a minor arterial consisting of one travel lane in each direction with a center left turn lane. The road also provides direct access to the Bend Parkway via a half diamond interchange. It is also the northern terminus of NE 4th Street. To the east and west of the study area, Butler Market Road and Mt. Washington Drive connect predominately residential portions of the city.

Revere Avenue is classified as a minor arterial street with a posted speed of 35 mph. Between Hill and 4th Streets Revere Avenue has two travel lanes in each direction. East and west of this segment there is only one travel lane in each direction. Revere Avenue also provides access to the Bend Parkway via a partial cloverleaf interchange immediately west of an at-grade crossing of the BNSF railroad.

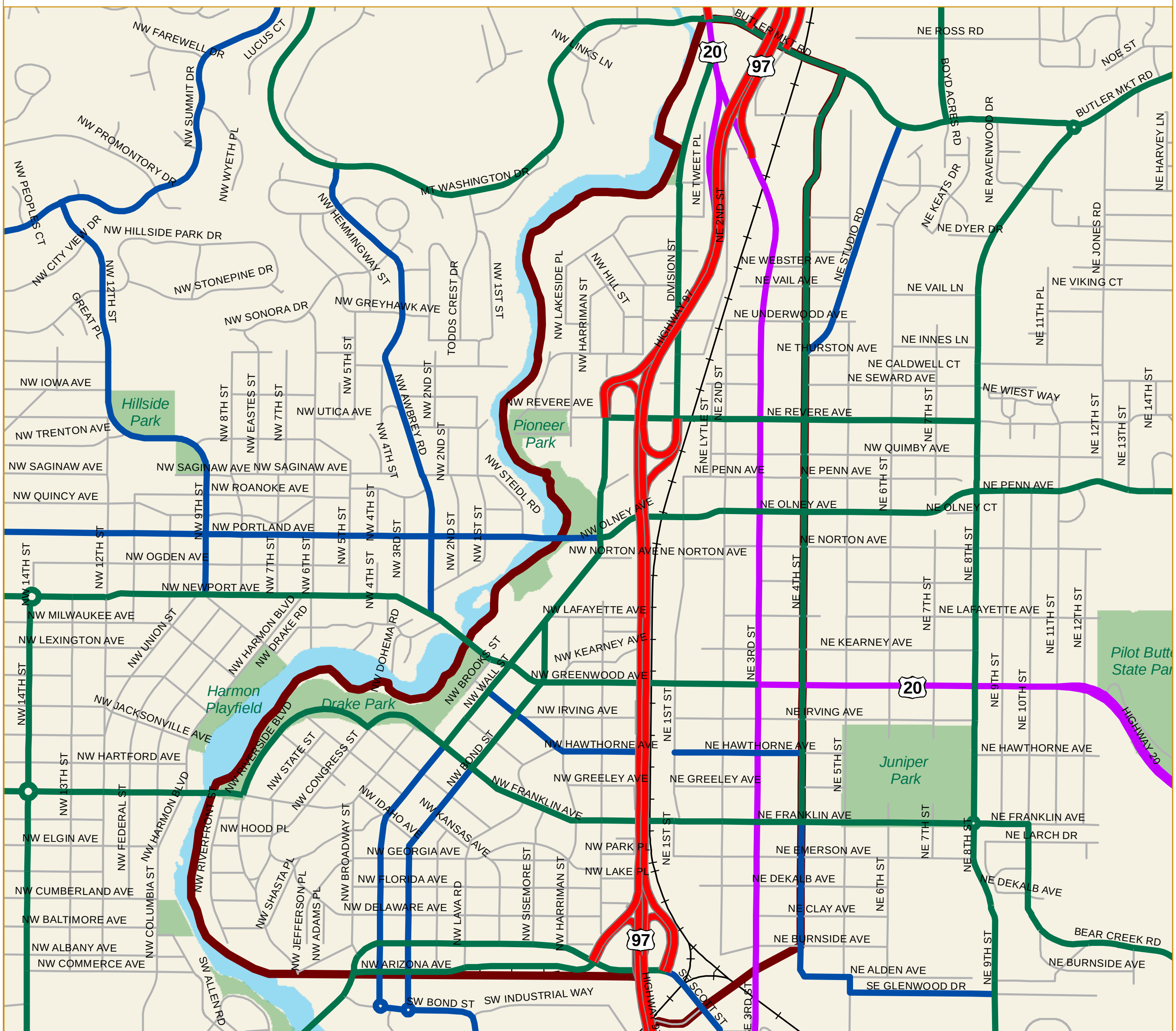
Hill Street runs north and south from Revere Avenue to Franklin Avenue and passes Pioneer Park. This two lane minor arterial roadway is a northern entry point from the southbound Bend Parkway into to the downtown area and connects with the Bond/Wall Street one-way couplet.

Portland and Olney Avenues provide an east/west travel route, connecting residential neighborhoods on the west side of Bend with the downtown, via a bridge crossing the Deschutes River. Portland Avenue runs to the west of Hill Street and Olney Avenue runs to the east. Portland Avenue is designated as a major collector facility, while Olney Avenue is classified as a minor arterial. A grade-separated crossing is provided at the Bend Parkway, while an at-grade crossing exists at the BNSF railroad. The posted speed in the vicinity of 3rd and 4th Streets is 25 mph.

BEND OREGON 1905

BEND CENTRAL AREA PLAN

Roadway Functional Classifications



City of Bend Central Area | Principal Arterial | Major Collector

Expressway | Minor Arterial | Local Streets

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Newport and Greenwood Avenues is a major east/west route that provides a crossing of the Deschutes River between the central area and the residential neighborhoods and employment opportunities to the west. From the new Newport Avenue bridge to 3rd Street, Greenwood Avenue is classified as a minor arterial with two travel lanes in each direction. The posted speed is 25 mph west of the Parkway rising to 35 mph east of the Parkway. Left turn lanes are provided at 3rd Street. East of 3rd Street, Greenwood Avenue is designated as a principal arterial and as US 20, a statewide highway. Greenwood Avenue is also grade-separated from the Parkway and the BNSF railroad via a four-lane undercrossing structure. As with Franklin Avenue, this undercrossing makes no provision for on-street bicycle travel outside of a vehicular travel lane. A separate and narrow walkway is provided on both sides of the undercrossing structure. It should be noted that flooding of the railroad/parkway undercrossing during major storm events is a common occurrence.

3rd Street south of Greenwood Avenue is under the jurisdiction of the City of Bend and has been classified as a Principal Arterial roadway. Land uses along this street are highly automobile oriented including retail shopping centers, restaurants, lodging and gas stations. The roadway has two travel lanes in each direction, turn pockets at select intersections, and no on-street parking. The posted speed is 35 mph. According to information received from ODOT, there are significant drainage problems along 3rd Street throughout the study area.

Franklin Avenue is a minor arterial street that provides an east/west travel route connecting to Riverside Boulevard on the west, and the Juniper Park area to the east. From Riverside Boulevard to the Bend Parkway, Franklin Avenue has one travel lane in each direction with on street parallel parking along certain blocks. East of the Parkway the street widens to accommodate two travel lanes in each direction. Franklin Avenue is grade-separated from the Parkway and the BNSF railroad via a very narrow two-lane undercrossing structure. This undercrossing makes no provision for on-street bicycle travel outside of a vehicular travel lane. A separate and narrow walkway is provided within the undercrossing structure. This undercrossing also floods during significant storms.

Riverside Boulevard links the Deschutes River crossing on Galveston Avenue with the study area. Riverside Boulevard is classified as a minor arterial with one travel lane in each direction and a posted speed of 25 mph. A southbound right turn lane is provided at the intersection of Riverside Boulevard with Tumalo Avenue.

Arizona and Colorado Avenues function as an east/west one way couplet system linking the Bend Parkway with the southern edge of the Central Area and with the Deschutes River bridge leading to Century Drive and the Mt. Batchelor ski area: The couplet system operates between Broadway Street and the Parkway. Both roadways are designated as minor arterials, with Colorado Avenue carrying the westbound traffic in two travel lanes with a bike lane, and Arizona Avenue carrying eastbound movements on a similar roadway configuration. On street parallel parking is provided, serving the mixture of adjacent land uses. The posted speed is 35 mph.

Wall and Bond Streets functions as a one way couplet system running north and south through the Historic Downtown core and connecting this area with portions of the Central Area both north and south. The Wall and Bond Street couplet also connects the core area with the newly developing Old Mill District. From Arizona Avenue to Franklin Avenue, the roadways are classified as major collectors. They both have two travel lanes with on street angle or parallel parking. Bond Street carries traffic one-way northbound, with Wall Street traveling one way southbound. From Franklin Avenue north, the couplet streets are classified as minor arterials and also have two travel lanes. Within the core area, these streets are posted for 20 mph speeds.

NE 4th Street is a minor arterial street which has one travel lane in each direction. The street runs north/south parallel to US 20 and the Bend Parkway one block east of 3rd Street. Intersections are controlled by stop signs and the posted speed is 25 mph. On-street parking is provided along the length of the street. Traffic is primarily local in nature and frequent access is provided to adjacent land uses. Northbound and southbound traffic is restricted to right-turns only at Greenwood Avenue (US 20).

Appendix A includes a detailed inventory of the existing street system including right-of-way widths, pavement widths, number of travel lanes, pavement type, pavement condition, and the presence of curbs, sidewalks and/or bicycle lanes. Appendix B summarizes field notes of lane channelization, traffic control and other features at each study area intersection. Appendix C includes photographs taken of each study area intersection.

Pavement Conditions

The City of Bend utilizes a Pavement Condition Index (PCI) that visually evaluates the surface conditions and assigns an index number based on the presence of potholes, cracking, weathering, asphalt bleeding, uneven pavement, wheel rutting, etc. This information is used to plan street chip sealing, overlays, reconstruction projects, and/or other roadway maintenance projects. The PCI ranges from 0 to 100. The condition and corresponding standard for the City of Bend is summarized in Table 2 below.

Table 2. Definitions of Pavement Condition Categories

Condition Category	PCI Range
Good	70-100
Satisfactory	50-69
Fair	25-49
Poor	< 25

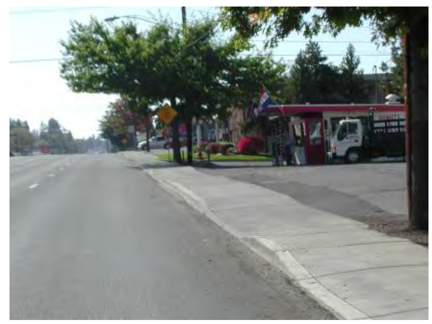
Source: City of Bend Public Works Pavement Management Program Budget Options Report, October 2005

Many of the streets within the Central Area are exhibiting Good or Satisfactory pavement conditions. The City has made a concerned and systematic effort over the past few years to devote resources to preserving or improving the pavement surfaces. However, some facilities, most notably Greenwood Avenue, have been rated only Fair. ODOT staff has indicated that the pavement condition along US 97 is poor and that it may be programmed in the 2008-2011 State Transportation Improvement Program (STIP) for improvement. According to ODOT, the pavement condition along 3rd Street is fair or better and will not likely need to be repaved until approximately 2011. The street system inventory in Appendix A includes the pavement width and PCI rating for the major street segments in the study area.

Access Management

The term access management refers to the process of balancing the need for vehicle access to parcels of land adjacent to roadways with the need for safe and efficient through movement of vehicular traffic on the roadway. Access management can be implemented by a variety of means. These include median controls (e.g., raised concrete medians); driveway spacing and/or driveway consolidation (so that there are fewer driveways serving one parcel or multiple parcels), requiring that driveways be placed on lower order streets where a parcel abuts both higher and lower order streets; and intersection spacing to reduce the number of conflict points or signal-controlled locations along a street, as the frequency of these locations can reduce the benefits of effective signal timing progression, and, thus, roadway capacity.

Access management is closely related to street functional classification. Typically, when access controls are in place, the frequency of driveways and intersecting streets is more restrictive along state highways and major arterials where the movement of traffic takes a higher priority. Access controls are less restrictive along collector streets where there is greater balance between access and mobility. Access controls are restricted only by safety considerations along local streets where property access is the primary function of the street.



Frequent driveway and cross-street access can significantly degrade traffic operations along major streets, as motorists must contend with people slowing to turn into adjacent properties or attempting to get back onto the major street from a side access location. Not only do frequent driveways adversely affect the operational capacity of a road, they also affect safety in that each driveway or intersecting street represents a potential conflict point for through-moving vehicles. The strip development that often occurs as a result of the lack of access control is often inhospitable to pedestrians and bicyclists, and dispersed uses make efficient transit service difficult. In Bend, Business US 97 (3rd Street) and US 20 share some of these characteristics, including frequent driveways.

Access management can be most effectively implemented during the land development process when access locations and localized street improvements can be adapted to ensure that adjacent street traffic-carrying functions are not degraded. Access management controls are more difficult to implement along streets with developed property due to possible right-of-way limitations and/or the concerns of property owners about business or on-site circulation impacts. In these cases, access controls can be incorporated into a roadway improvement project.

State of Oregon

Along state highways, access is commonly controlled by ODOT through the purchase of access rights. New access to/from a state highway is provided consistent with the standards adopted in the Oregon Highway Plan (OHP) for each highway classification, its location within an urban or rural area, and its posted speed. Access management guidelines for state highways are published in OAR 734-051. Access management standards along US Highways 20 and 97 within the Bend Metropolitan Area are shown in Table 3.

Table 3. Access Management Spacing Standards for Approaches	
US Highway 20	
Posted Speed (mph)	**Public and Private Approach Spacing[a]**
≥ 55	1,320 feet
50	1,100 feet
40 & 45	990 feet
30 & 35	720 feet
≤ 25	520 feet
US Highway 97 (Bend Parkway)	
Posted Speed (mph)	**At Grade Intersection Spacing[b]**
≥ or ≤ 55	2,640 feet

Source: OAR 734-051-00115 Table 1.
[a] Measurement of the approach road spacing is from center to center on the same side of road.
[b] See OHP for interchange spacing guidelines.

City of Bend Access Management

The City of Bend has established access management standards and policies. For arterial streets driveways should be spaced a minimum of 150 feet apart. Spacing should increase as speed increases with the maximum practical spacing and joint access with an adjoining property pursued wherever possible. Where medians are constructed on any arterial street, spacing between median openings should be at least 400 feet. The spacing may be reduced to 300 feet if a competent traffic study, satisfying officials shows that the lesser spacing will still safely and efficiently accommodate left turn movements to existing and projected future development in the immediate vicinity.

Access management standards are also adopted for principal arterials that provide for interstate, interregional, intercity, and longer distance intercity travel needs. These facilities can not efficiently function if they must also provide for significant levels of direct land access. The adopted policies and standards are jointly administered by the City of Bend, Deschutes County, and ODOT. The policies generally encourage the installation of a physical median barrier on new principal arterials to prevent left turns except at designated public road or street intersections where appropriate. All accesses, public or private, between these locations are intended to be limited to right-turn-in and right-turn-out movements. Private direct access to a principal arterial facility would not be permitted except under certain circumstances such as when no other alternative access is available.

Existing Traffic Volumes and Operations

This section of the Draft Existing Conditions Report identifies and discusses current facility capacity and existing operational deficiencies. The roadway capacity analysis focuses on the peak travel hour during a typical weekday which generally occurs between 4:00 PM and 6:00 PM. Analysis is based on existing traffic turning movement counts taken during this period and reflects the existing unique lane channelization and traffic control features of each intersection. Included in the analysis documented in this report are all intersections of arterial and collector streets with streets of similar designation located throughout the Central Area.

Existing PM Peak Hour Traffic Volumes

Evening peak hour traffic counts were conducted specifically for the Central Area Plan during early January 2007. Because winter traffic volumes are typically much lower than at other times of the year, the January counts were adjusted by a seasonal factor to reflect an annualized 30th highest hour traffic volume. The 30th highest hour is a reasonable traffic volume threshold used for facility design and planning purposes. 30th highest hourly volumes were developed using the assumptions and methodologies published by the ODOT Transportation Planning Analysis Unit (TPAU). The count date factor (1.1815) for the month of January was divided by the seasonal factor (0.8378) for the summer season which contains the 30th highest hour. From this calculation, the seasonal adjustment factor was found to be 1.4102 for the January counts. Existing intersection PM peak period turning movement counts are documented in Appendix D while the seasonal adjustments are documented in Appendix E.

Intersection Operational Standards

Within the City of Bend, traffic operations are evaluated based on the relationship between traffic volumes and the roadway or intersection's capacity or volume/capacity (V/C) ratio. For State Highways such as US 97 and US 20, the 1999 Oregon Highway Plan (OHP), identifies various V/C thresholds are applied to all state highways based on functional classification of these facilities.

Both US 97 and US 20 in Bend are classified as Statewide Highways. The peak hour, maximum V/C standards for these highways are related to posted roadway speeds and are summarized in Table 4.

Table 4. Maximum Volume to Capacity for Peak Hour Operating Conditions

Highway Name	OHP Designation	Freight Route	Signalized Intersection Maximum V/C Ratio	Unsignalized Intersection Maximum V/C Ratio (Minor Movement)
US Highway 97	Statewide Expressway	Yes	0.80	0.90
US Highway 20	Statewide Highway	Yes	0.80	0.90

Source: Oregon Highway Plan, Policy 1F Mobility Standards, Table 6.

For city streets, performance criteria are laid out in the City's Development Code, Chapter 4.7 which identifies traffic operational thresholds. The following standards define acceptable intersection operations, applied to the entire peak hour:

- **Two-Way Stop Control (TWSC)**
  - Delay for individual lane groups less than or equal to 50 seconds, and
  - Volume to capacity ratio for individual lane groups less than or equal to 1.0, and
  - 95th percentile queuing less than or equal to storage length available.
- **All-Way Stop Control (AWSC)**
  - Delay for the intersection as a whole less than or equal to 80 seconds.
- **Roundabout**
  - Volume to capacity ratio for individual approaches less than or equal to 1.0.
- **Signalized Intersection**
  - Volume to capacity ratio for the intersection as a whole less than or equal to 1.0, and
  - 95th percentile queuing less than or equal to storage length available.

Existing Intersection Operations

An understanding of general traffic patterns can be achieved by analyzing traffic volumes for selected intersections in an area. However, these patterns tell little of the roadway's ability to handle additional traffic or about driver comfort level at these intersections. To describe a roadway's ability to accommodate traffic, as well as the quality of traffic operations, analysis was conducted using the methodology in the 2000 Highway Capacity Manual (HCM) for signal-controlled or stop-controlled intersections. This methodology identifies both an average level of delay experienced by all vehicles passing through an intersection and a "volume-to-capacity" ratio indicating the degree of saturation experienced at the intersection.

Traffic conditions were analyzed for the existing (2006) PM peak period in the Central Area Plan study area using the Synchro software. Unlike other modeling software that analyzes intersections independently of each other, Synchro displays the effects of traffic congestion on a corridor-wide basis that allows for assessment of impacts related to traffic queuing. By using the Synchro model to conduct traffic analysis, multiple intersections along roadway corridors can be evaluated as a single interconnected network making it possible to assess the impacts of growth on corridor-wide traffic operations. Analysis was conducted using the existing intersection geometrics summarized in Appendix B and the seasonally adjusted PM peak hour turning movement counts illustrated in Appendix E.

As noted in the discussion in the preceding section, for state facilities, the intersection v/c ratio must be used to characterize operational performance. The ratio calculated for each intersection is then compared with the v/c standards incorporated into the 1999 Oregon Highway Plan (last amendment August 2005). V/C ratio is also used by the City of Bend (as established by Chapter 4.7 of the City of Bend Development Code).

Table 5 presents the results of the intersection level traffic operations analysis for the 19 signalized intersections that were evaluated in the study area. Detailed traffic operations calculations for existing conditions are included in Appendix F.

The data in Table 5 indicate that five intersections currently exceed either the State v/c standard or the City's operational standard for either v/c or average intersection delay. Four of these intersections are state facilities and one is a city intersection. For most of these intersections, signal retiming or additional lanes would be required to bring the intersections below the operational standard.

Poorly performing intersections include:

- **US 97/US 20 at Butler Market Road** – currently operating at a v/c ratio of 0.97. It should be noted that the intersection with Division Street and with Butler Market Road/Mt Washington Drive are very closely spaced together. According to ODOT, the spacing already impacts signal progression along 3rd Street. The potential may exist for queue spillback impacts between these two intersections in the future.

- **Revere Avenue at 3rd Street** – currently operating with a v/c ratio of 1.05. According to ODOT, traffic queuing frequently occurs along Revere between 3rd and 4th Streets with traffic queues backing up from the stop sign at 4th Street into the signalized intersection with 3rd Street. Safety and operations at the intersection are also affected by substandard access spacing at the intersection. It should be noted that the signal at this intersection is considered to be functionally obsolete and needs to be replaced. Problems include poorly aligned heads, no advance heads, and heads that are too small for current standards. ODOT is currently scoping the replacement of the signal at this intersection. Part of the replacement project will likely include replacement of the interconnect conduit between this intersection and the intersection at Revere Avenue and Division Street which has failed.

- **Olney Avenue at 3rd Street -** currently operating with a v/c ratio of 1.04. Similar to the situation on Revere Avenue, traffic queuing frequently occurs along Olney between 3rd and 4th Streets with traffic queues backing up from the stop sign at 4th Street into the signalized intersection with 3rd Street.
- **Greenwood Avenue at 3rd Street -** currently operating with a v/c ratio of 1.23, this is one of the most heavily congested intersections along the US 20 corridor. As with the intersection of Revere Avenue with 3rd Street, the signal at this intersection is considered by ODOT to be functionally obsolete and needs to be replaced. Problems with this signal are similar to those described for the Revere/3rd intersection.
- **Franklin Avenue at 3rd Street** – currently operating with a v/c ratio of 0.99, this intersection just meets the City's v/c standard of 1.00 for a signalized intersection.

Table 5. 2007 PM Peak Hour Intersection Levels of Service

#	Signalized Intersections	Overall V/C Ratio	Average Control Delay (sec./vehicle)	Exceeds City Standards	Exceeds State Standards
1	US 97/20 @ Butler Market Road	**0.97**	**50.4**		**Yes**
2	Revere Avenue @ Parkway SB Ramps	0.69	17.1		No
3	Revere Avenue @ Parkway NB Ramps	0.83	22.4		**Yes**
4	Revere Avenue @ 3rd Street	**1.05**	**82.3**		**Yes**
5	Portland Avenue @ Hill Street	0.92	42.3	No	
6	Olney Avenue @ 3rd Street	**1.04**	**67.4**		**Yes**
7	Greenwood Avenue @ Wall Street	0.77	41.8	No	
8	Greenwood Avenue @ Bond Street	0.61	20.4	No	
9	Greenwood Avenue @ 3rd Street	**1.23**	**181.1**		**Yes**
10	Oregon Street @ Wall Street	0.65	23.1	No	
11	Oregon Street @ Bond Street	0.57	14.7	No	
12	Franklin Avenue @ Wall Street	0.71	25.2	No	
13	Franklin Avenue @ Bond Street	0.78	28.8	No	
14	Franklin Avenue @ 3rd Street	0.99	80.7	**Yes**	
15	Colorado Avenue @ Wall Street	0.50	9.6	No	
16	Colorado Avenue @ Bond Street	0.61	15.2	No	
17	Colorado Avenue @ Parkway SB Ramp	0.67	18.6		No
18	Arizona Avenue @ Wall Street	0.68	10.7	No	
19	Arizona Avenue @ Bond Street	0.76	16.5	No	

Table 6 identifies existing volume-to-capacity ratios and delays for the 15 unsignalized intersections analyzed in the study area. Detailed traffic operations calculations for existing conditions are included in Appendix F.

Table 6. 2007 PM Peak Hour Intersection Levels of Service

#	Unsignalized Intersections	Type of Control	Worst Movement			Overall V/C Ratio	Average Delay (sec/veh)
			Movement	Volume/ Capacity Ratio	Average Delay (sec/veh)		
20	Parkway SB Ramp @ Butler Market Road	TWSC	SBL	>1.00	>80.0	0.68	52.4
21	Parkway NB Ramp @ Butler Market Road	TWSC	NBL	0.24	27.6	0.73	1.3
22	4th Street @ Butler Market Road	TWSC	NBL	>1.00	>80.0	0.81	>80.0
23	4th Street @ Studio Road	TWSC	WB	>1.00	>80.0	0.96	49.3
24	4th Street @ Revere Avenue	AWSC[1]	EBTR	>1.00	>80.0	0.93	>80.0
25	4th Street @ Olney Avenue	AWSC	WBTR	>1.00	>80.0	0.83	>80.0
26	Parkway SB @ Lafayette Avenue	TWSC	EBR	>1.00	>80.0	0.90	4.9
27	Wall Street @ Bond Street	TWSC	SB	0.53	58.7	0.51	9.1
28	Greenwood Avenue @ 4th Street	TWSC	SBR	0.41	19.6	0.52	2.3
29	Hawthorne Avenue @ 3rd Street	TWSC	EB	0.32	29.2	0.57	1.3
30	Hawthorne Avenue @ 4th Street	TWSC	EB	0.18	11.7	0.28	4.1
31	SB Parkway @ Hawthorne Avenue	TWSC	EBR	>1.00	>80.0	0.96	27.9
32	Franklin Avenue @ 4th Street	TWSC	NB	0.70	72.9	0.45	7.7
33	Riverside Drive @ Tumalo Avenue	AWSC	EBL	>1.00	>80.0	0.61	81.1
34	Parkway NB Ramp @ Colorado Ave	TWSC	NBL	>1.00	>80.0	0.99	>80.0

[1.] HCM analysis allows a maximum of two lanes per approach to an AWSC intersection. The EB approach to this intersection has three lanes. As a result, the intersection would actually operate better than the analysis indicates.
Bold Type Indicates ODOT Controlled Intersection

As Table 6 indicates, most of the two-way stop-controlled (TWSC) intersections in the study currently exceed the City of Bend and ODOT operational standards. All three all-way stop-controlled (AWSC) intersections currently exceed the City's operational standard. The most likely improvements for these unsignalized intersections are adding lanes or either signal or roundabout control.

Bicycle and Pedestrian System

Bicycle and pedestrian facilities in the Bend Central Area consist of dedicated bicycle lanes, bikeways (shared roadways), multi-use paths, and sidewalks.

The City of Bend requires the construction of sidewalks on both sides of new streets. Currently, about 3/4 of the streets in the study area have sidewalks (on at least one side of the street) along the arterial and collector streets. The existing sidewalk system inventory is depicted in Appendix A. Pedestrian crossing signal facilities are provided at signalized intersections.

On-street bikeway facilities have been constructed and striped along many of Bend's arterial and collector streets since the early 1980's. These facilities consist of bike lanes, shared lane, or wider shoulders. The off-street facilities (trails) are used by a wide range of people including; bikers, pedestrians, hikers, joggers, and strollers. Both the existing on street and "primary" trail systems are depicted in the graphic on the following page entitled "Existing Bike Lanes, Trails and Trip Attractors". The existing sidewalk system is illustrated in the graphic entitled "Existing Sidewalks".

Pedestrian and Bicycle System Trip Types

Pedestrians and bicyclists are people who use the most basic public spaces – sidewalks, streets, and other walkways – to travel, and have special characteristics that must be considered in planning. These individuals are highly diverse, including joggers, commuters, and groups enjoying a leisurely stroll or ride. Pedestrians and bicyclists in the Bend area can be classified based on trip types:

- Utilitarian trips – to pedestrian attractor (within a mile) such as shopping, errands
- Recreational trips – for aesthetic enjoyment and tourism
- Health and athletic training – such as jogging or walking
- Access to transit – generally trips under ½ mile to bus stops or park and ride lots
- Commute trips – travel to work or school

Because of the variety of trip types, facilities serve a variety of needs. A commuter or shopper may prefer short and direct routes to their destinations, while a recreational user may be more concerned about the aesthetics of the surroundings. Typically all users prefer routes that are clearly delineated. Pedestrian facilities should also consider persons with disabilities. The Americans with Disabilities Act (ADA) mandates that reasonable accommodation for access should be afforded those who may need such assistance. Bicyclists are typically attracted to the same destinations as pedestrians; however they are willing to travel a greater distance to reach them.

Table 7 presents a summary of bicycle and pedestrian trip attractors located in the Bend area. These include destinations that could attract commuter, utilitarian, transit access and/or recreational trips. The locations of some of these attractors are also indicated on the figure on the following page.

Table 7. Bicycle and Pedestrian Trip Attractors in the Bend Area

Summary of Types of Trip Attractors	
• Schools and Community College	• Employment centers
• Library	• Public facilities and community centers
• Parks, open spaces, and recreational facilities	• Cultural, historical and tourist destinations
• Shopping areas and retail centers	• Transit connections

There are many constraints to using the existing bicycle or pedestrian system within the study area. Both systems have many gaps where either no facilities or unattractive, unappealing facilities are provided. A key issue for the Central Area Plan is the lack of bicycle connections between the Third Street corridor and the core area. The existing Bend Parkway and BNSF tracks create a formidable barrier to connectivity by non-auto modes. Connections via either Greenwood Avenue or Franklin Avenue are narrow, dark and unappealing to the user. The existing connections must be shared between bicyclists and pedestrians and, in some instances, there is limited sight distance which could lead to potential conflicts between these two modes.

The width and traffic volumes along Greenwood Avenue have been identified as a barrier to pedestrian movement between the historic core and the neighborhoods/business areas to the north. Additionally, the level of traffic, frequent driveways and the presence of curb tight sidewalks (or lack of any sidewalks) make pedestrian activity along such streets as 3rd Street unappealing. In many locations, sidewalk pavement quality is poor or the existing facilities are out of compliance with ADA standards.

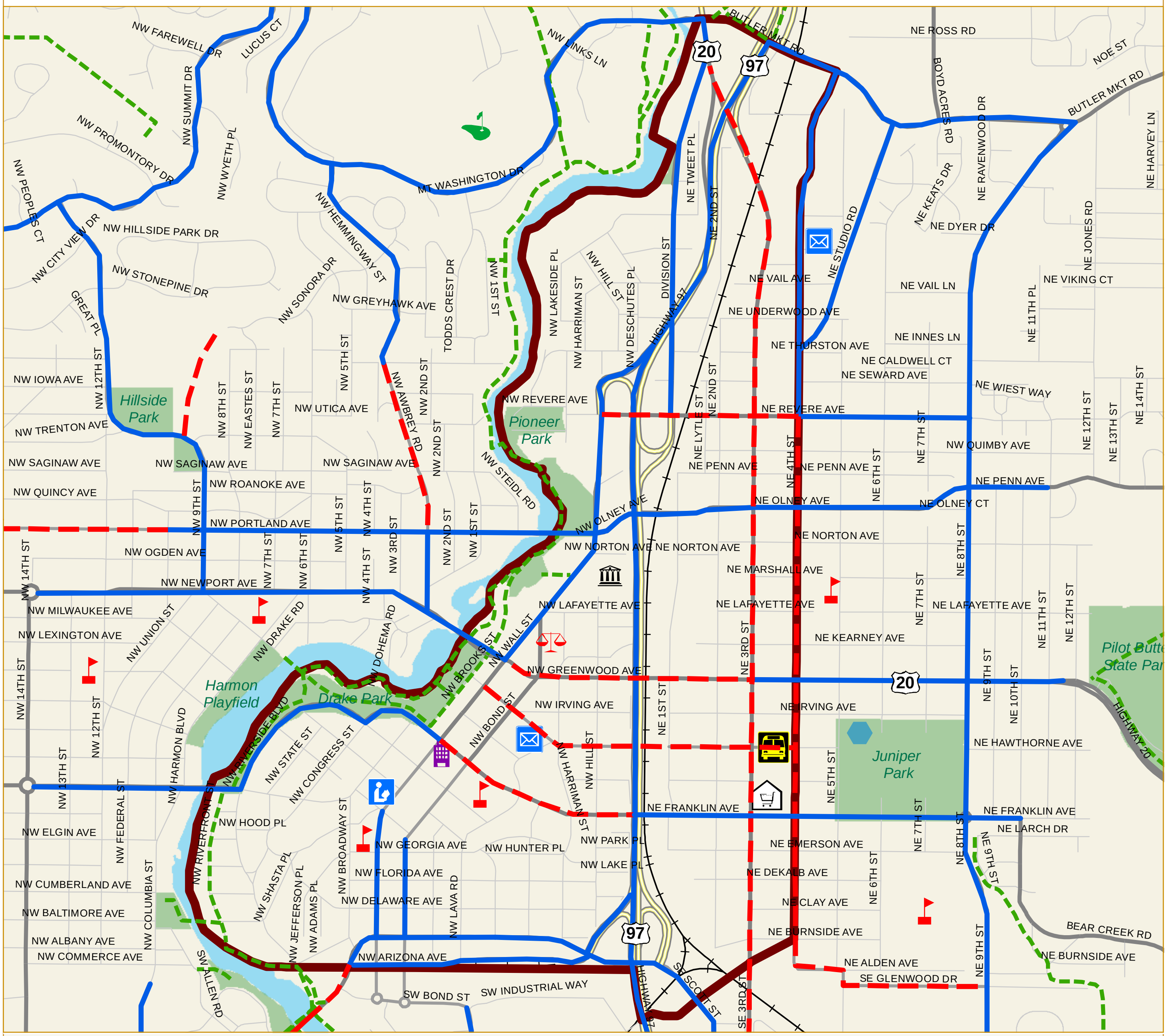
Transit System

The City of Bend's fixed-route bus service, Bend Area Transit, began on September 27, 2006. The service offers seven routes with over 180 stops. The routes serving the study area are shown in the Figure on the following page. Single ride fare is $1.00 for adults and youths and $0.50 for seniors and the disabled. Unlimited day passes are available for $2.00 for adults and youths and for $1.00 for seniors and the disabled. Ticket books of six day passes are available for $10.00 for adults and youths and for $5.00 for seniors and the disabled. Monthly passes are available for $30.00 for adults (19 to 59 years old), for $20.00 for youths (6 to 18 years old) and for $15.00 for seniors (60 years old and above) and for the disabled. Bus service is available Monday through Friday between 6:15 AM and 6:15 PM with a bus generally every 30 minutes. Hourly service is run on Saturday between 7:15 AM and 5:15 PM.

Bend Area Transit also offers paratransit, door-to-door rides with Dial-a-Ride during all hours that fixed route bus service is operated as well as limited hours on Sunday. Dial-a-Ride is available to eligible riders who have been certified to have a disability that keeps them from riding fixed route and/or are a low-income senior not living near a fixed route. Information on eligibility and special assistance is available by calling 322-5870.

BEND CENTRAL AREA PLAN

Existing Bike Lanes, Trails, and Trip Attractors



City of Bend Central Area
Existing Bike Lane
Proposed Bike Lane
Multi-Use Path
Aquatic Center
City Hall
County Offices
Courthouse
Golf Course
Library
Post Office
School
Shopping Center
Transit Center

0 500 1,000 1,500
Feet

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Data Source(s):
City of Bend, NAIP, Parametrix

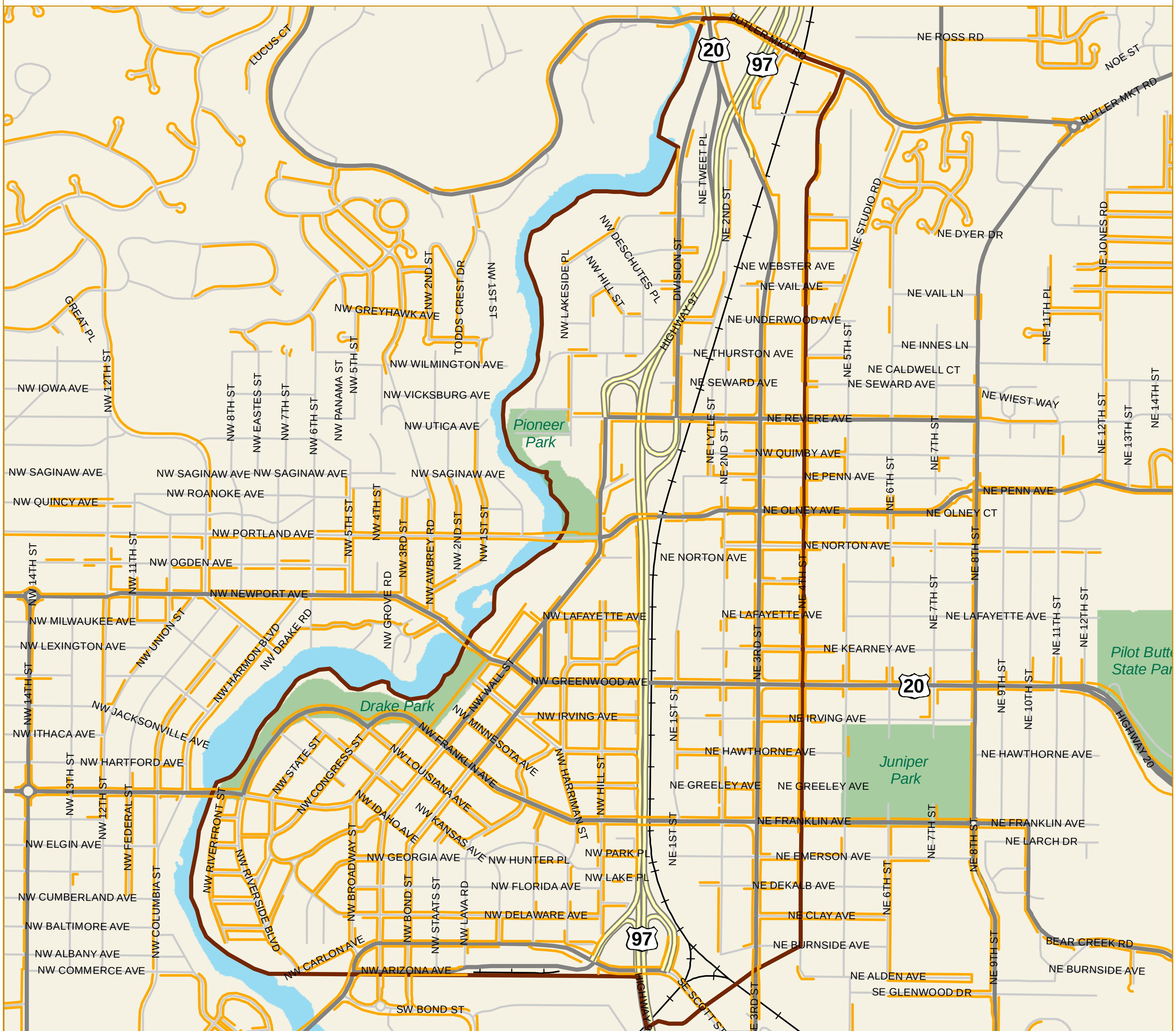
Geographic Data Standards:
Projected Coordinate System:
State Plane - Oregon South
Units: US Foot

Parametrix

Analysis by C. Hainey; Analysis Date: Jan-2007; Plot Date: Feb-2007: File Name: CAP_BikeLanesandAttractions.mxd

BEND CENTRAL AREA PLAN

Existing Sidewalks



City of Bend Central Area

Existing Sidewalks

0 500 1,000 1,500

Feet

Geographic Data Standards:
Projected Coordinate System:
State Plane - Oregon South
Units: US Foot

Data Source(s):
City of Bend, NAIP, Parametrix

Parametrix

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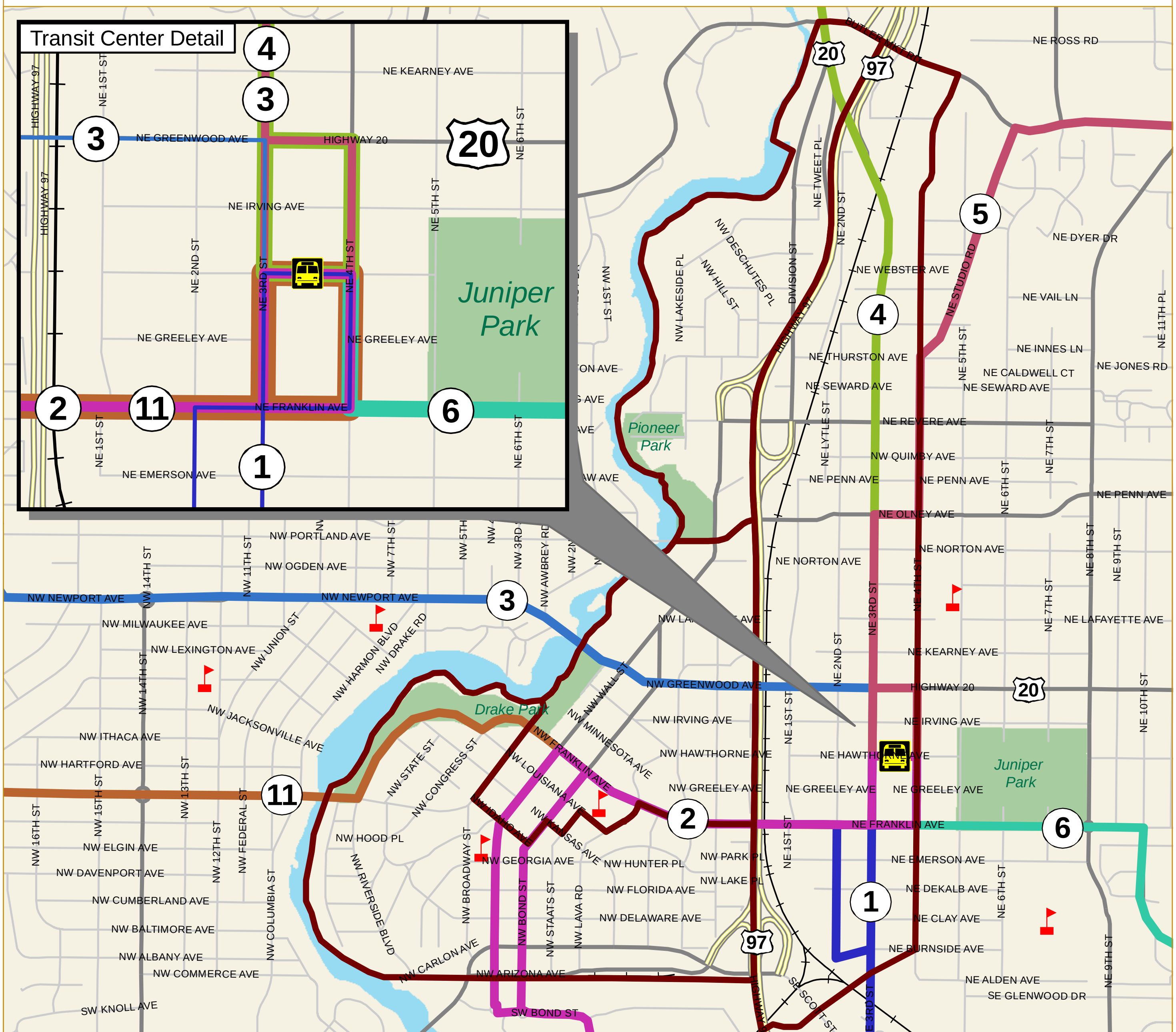
BEND CENTRAL AREA PLAN

Existing Transit



City of Bend Central Area
6 Bear Creek Rd.
2 Brookswood Blvd.
11 Galveston Ave.
3 Newport Ave.
4 North Third St.
1 South Third St.
5 Wells Acres Rd.

0 500 1,000 1,500
Feet

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Analysis by C. Hainey; Analysis Date: Jan-2007; Plot Date: Feb-2007: File Name: CAP_Existing_Transit.mxd

Summary of Existing Transportation System Deficiencies

This section presents a short summary of the most noteworthy existing transportation system issues, constraints and deficiencies in the Central Area. Several of these issues are depicted in the Figure on the following page entitled: "Existing Transportation Constraints and Opportunities".

Roadway Constraints

Congestion currently exists on all the routes leading to downtown. The number of travel lanes and levels of traffic delays at critical intersections along the east/west routes of Greenwood Avenue, Franklin Avenue and Portland/Olney Avenues, and the north/south routes of 3rd and 4th Streets affect access to downtown. Many of these routes accommodate significant amounts of through traffic, as well as traffic with downtown destinations. Revere Avenue is one of the few remaining at-grade railroad crossings in Bend and the close proximity of the Bend Parkway; Division Street and 3rd Street will make a future grade separation very difficult. Olney Avenue and BNSF Railroad crossing is also at-grade.

Several existing signalized intersections in the study area currently exceed either ODOT or City of Bend operational standards, and most of the unsignalized intersections of collector and arterial streets are experiencing significant delays for side street stop-controlled movements.

Bicycle and Pedestrian Constraints

Bicycle and pedestrian barriers include a wide variety of physical features that make it difficult or potentially dangerous for a pedestrian to travel. These barriers include such things as:

Pedestrian Barriers

- Absence or gaps in sidewalk system, and non-ADA compliant ramps or sidewalk widths
- Utility poles, signal control boxes, signs, trees in sidewalks
- Poor maintenance of facilities
- Lack of designated crossings opportunities
- Intersection crossing distances
- Lack of lighting and security along routes
- Frequent driveway crossings
- Lack of enforcement of traffic laws which can disadvantage pedestrians

Bicycle Barriers

- Poor maintenance of facilities
- High volumes of motor vehicle traffic
- Inadequate space for traffic and bicycles to safely coexist
- Places to safely store bicycles at destinations
- Frequent driveway crossings
- Storm sewer gratings running parallel to the direction of travel
- Lack of lighting and security along routes
- Lack of enforcement of traffic laws
- Conflict with vehicles maneuvering in and out of street parking stalls

Intersections

Intersections pose barriers to both bicycles and pedestrians including:

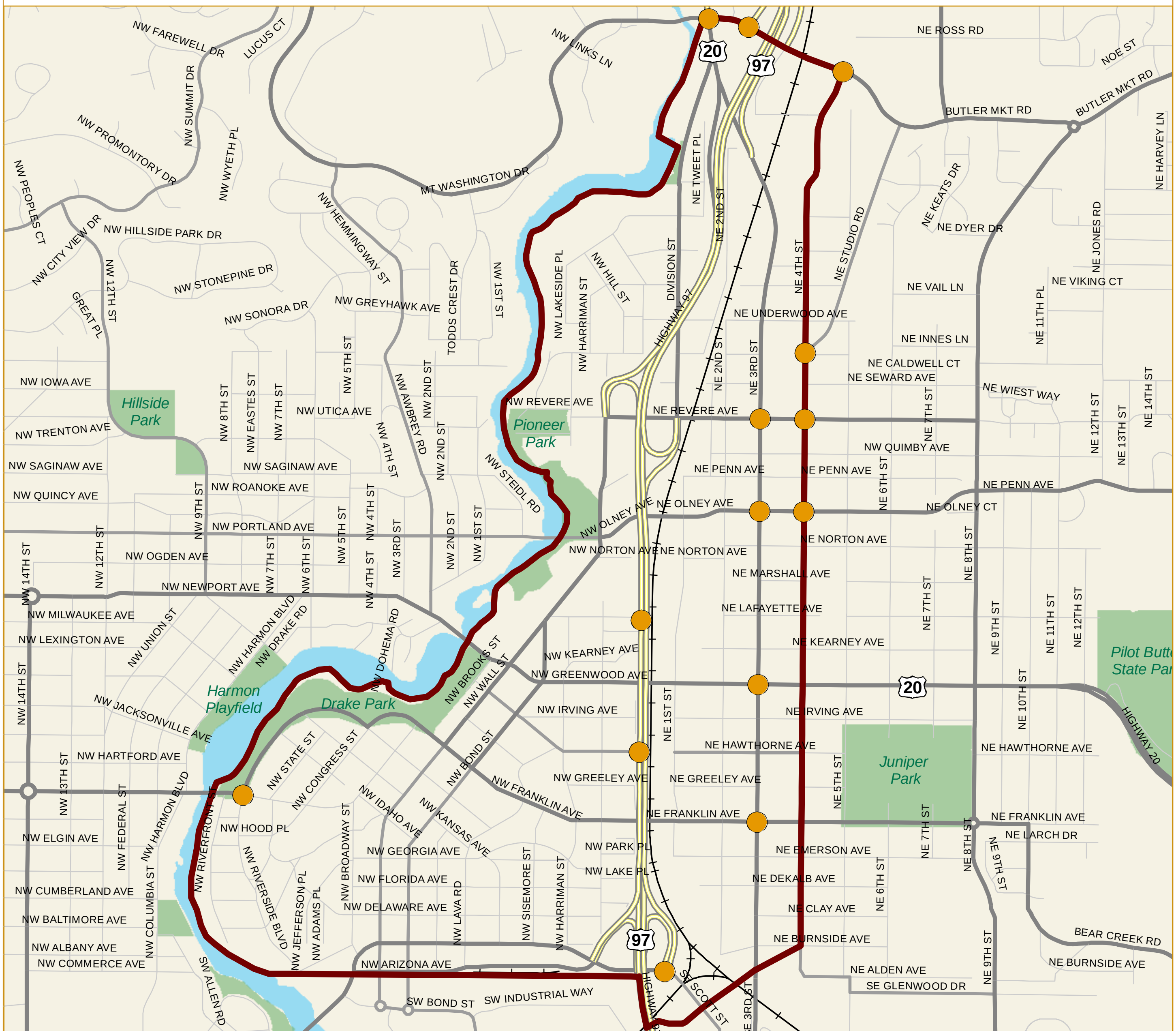
- Free-turning vehicle movements
- Insufficient lighting
- Wide crossing distances
- Absence of bicycle and pedestrian signal call devices
- Obscured sight distance
- Traffic speed at interchanges

These situations occur at several locations in the Bend Central Area. Significant gaps in the bicycle system include segments of Wall/Bond Streets, Portland Avenue, Greenwood Avenue, and Franklin Avenue. Pedestrian experience barriers at Greenwood Avenue and along Wall Street north of Greenwood Avenue. The railroad crossing is a barrier to providing connectivity for all modes.

Continuity of facilities and connections to desired destinations is essential to encourage both bicycle and pedestrian travel. Especially important is connecting people to other modes of transportation such as transit. Improving access to multi-modal travel is an important element in facilitating regional travel. The use of two of more modes of transportation in a single trip (i.e., bicycling and riding the bus) can extend the distance that someone is able to travel thus reducing another barrier to pedestrians and bicyclists, destinations that are out of reach.

BEND CENTRAL AREA PLAN

Existing Transportation Constraints and Opportunities



City of Bend Central Area

Poor Intersection Operations (Exceeds City/ODOT Standards)

0 500 1,000 1,500
Feet

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Units: US Foot

Parametrix

Analysis by C. Hainey; Analysis Date: Jan-2007; Plot Date: Jan-2007: File Name: CAP_Existing Transportation.mxd

Other Infrastructure

This section includes a brief summary of the existing water system, sewer system storm water facilities, and other private utility systems. The study area consists of the area east of the Deschutes River, west of 4th Street, north of Arizona Avenue and south of Butler Market Road as depicted on the accompanying graphic on the following page entitled “Existing Utilities”.

Water System

The Existing Utilities map shows existing water mains in the study area. Based on a January 17, 2007 conversation with Mike Miller of the City of Bend Public Works Department and a review of the City’s updated water master plan (October 2006), the system is generally adequate for the intensified density plan. However, the following notes are made regarding the system:

- Various, scattered in-fill upgrades are planned in the area, especially in the areas just east and west of the Division Street corridor. The in-fills comprise distribution size (8-inch, 10-inch and 12-inch) additions to the existing system.
- Pressure in the area is good (about 80 psi) and no pressure enhancing improvements are planned. However, mid-story building construction will need to provide its own pumping systems.
- Flow is good and will be sufficient to meet fire flow requirements. However, new building construction will need to provide its own fire suppression systems.

Sewer System

The Existing Utilities map shows existing sewer mains in the study area. Based on a January 17, 2007 conversation with Mike Miller of the City of Bend Public Works Department, and a review of the City’s updated draft Collection System Master Plan (October 2006), the following deficiencies were identified:

- Small, localized capacity enhancing improvements throughout the study area consisting of small diameter, short re-routes of the current system.
- Many of the sewers in the existing core system are already at capacity. In order for the higher density suggested for the Central Area Plan to be served by sewer, the existing main interceptor sewer that runs through the study area will need to be relieved of significant flows to generate additional capacity. This will be a major issue that will limit the ability to implement increased density in the study area. The construction of at least a one, and eventually both, of two proposed new interceptor sewers will need to be done to relieve flows in the study area in order to generate additional new capacity.
- Construction of the proposed Westside Interceptor will divert some flows on the west side of Bend that currently flow through the existing main interceptor in the study area. Currently, sewer flows from the southeastern part of Bend are flowing through the existing downtown interceptor. In order to alleviate that situation and provide additional capacity for a higher density downtown area, the proposed Southeast Interceptor will need to be constructed.

Mitigation of the specific Master Plan deficiencies located in the study area consists of gravity sewer upgrades at 2 locations, replacement of the Georgia and Idaho station and construction of a new pump station in the downtown area. More detailed description of the system and its deficiencies can be found in the Master Plan document.

Storm Drainage

The Existing Utilities map shows drill hole, catch basin and dry well locations in the study area. Based on a review of limited existing information and a discussion with Mike Miller, City of Bend Department of Public Works, January 17, 2007, the following is noted in regard to the area storm drain system:

- In addition to the facilities shown on the enclosed map, small underground pipe conveyance networks do exist with discharge points on the Deschutes River at three locations (Galveston Avenue, Mirror Pond and Newport Avenue).
- Generally, the existing storm drain system in the study area is inadequate. Compliance with DEQ standards is further aggravated by the area's close proximity to the river.
- Three known deficiencies exist at the intersection of the railroad line with three transportation links in the study area; namely at Franklin Avenue, Greenwood Avenue and Third Street. These areas consist of roadway under crossings to the rail system and have been constructed as sump areas that are difficult to navigate in times of heavy rainfall due to ponding.
- A stormwater master plan for the entire City of Bend is due for completion in December of 2007. However, this document will only provide a high level plan for addressing Bend stormwater disposal issues. It is anticipated that this document will identify significant trouble areas in the City including the study area.

Future redevelopment is unlikely to increase the total impervious area over existing conditions, as most properties are already paved and landscaping is limited to residential and park areas. Future developments will likely need to retrofit existing drywells, abandon drill holes, and/or install a piped conveyance system to avoid untreated subsurface discharge.

The proximity to the Deschutes River provides both an opportunity and a constraint for storm drainage. As a regulated river, discharge of higher peak flows (i.e. from rerouting drywell or drill hole drainage through a piped system) should be permitted as the stormwater contribution from the downtown area would be so minor compared to total river flows. However, surface discharge to the river will need to have pre-treatment to meet DEQ water quality standards. This will make it very important to identify open spaces in the study area that are located in low-lying areas that would be available for stormwater treatment prior to discharging to the river.

Other Infrastructure

Currently no known power deficiencies or problem areas exist in the study area. Information on possible system upgrades could become available when more information is known about the proposed density for the area. It should also be noted that, by law, franchise utilities are required to meet the need and to serve any demand in the area.

Electric

Currently, there are no plans to change the function or location of existing dam and power station downstream from the Newport Bridge Crossing. However, the PP&L representative interviewed did state that they would be open to thoughts and discussions on the issue, but currently had no reason or intent to alter either facility.[1]

[1] Based on discussions with Dave Munson of Pacific Power and Light, January 19, 2007 and March 6, 2007.

Telephone

The Quest representative interviewed stated that there are no known deficiencies in the subject area.[2]

Natural Gas

The Cascade Natural Gas Company representative interviewed stated that there are no known deficiencies in the subject area.[3]

Broadband Service

The Bend Broadband representative interviewed stated that there are no known deficiencies in the subject area.[4]

Private utility company contact information is as follows:

- Pacific Power: Dave Munson, 541.388.7152
- Qwest: Joe Dairy, 541.385.0221
- Bend Broadband: Mark Kaupp, 541.312.6458
- Cascade Natural Gas Corp.: Rod Carlile, 541.388.2775
- Cascade Natural Gas Corp.: Rod Carlile, 541.388.2775

[2] Based on a discussion with Joe Dairy of Quest, March 12, 2007
[3] Based on a discussion with Rod Carlile of Cascade Natural Gas, March 12, 2007
[4] Based on a discussion with Mark Kaupp of Bend Broadband, March 13, 2007

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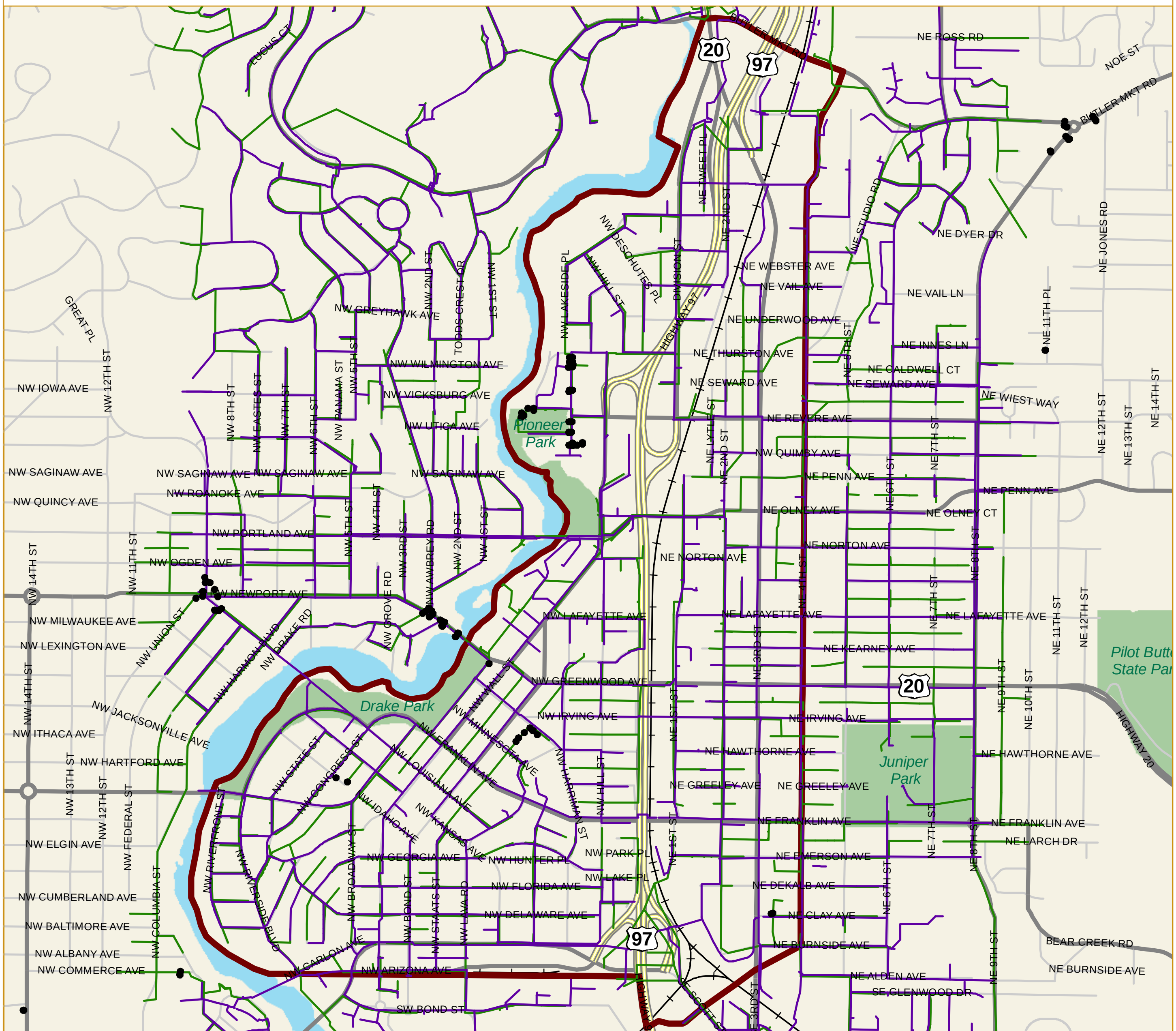
BEND CENTRAL AREA PLAN

Existing Utilities



City of Bend Central Area

Water

Sewer

Stormwater Catchbasins

0 500 1,000 1,500

Feet

This product is for informational purposes and may not have been prepared for legal, engineering or surveying purposes. Users of this information should review or consult the primary data and information source to ascertain the usability of this information. Any person or entity that relies on any information obtained from this document does so at their own risk.

Data Source(s):
City of Bend, NAIP, Parametrix

Geographic Data Standards:
Projected Coordinate System:
State Plane - Oregon South
Units: US Foot

Parametrix

Analysis by C. Hainey; Analysis Date: Jan-2007; Plot Date: Jan-2007; File Name: CAP_Utilities.mxd

APPENDIX A

Street Inventory

APPENDIX A
BEND CENTRAL AREA PLAN
STREET SYSTEM INVENTORY

Street Name	Begin	End	Jurisdiction	Functional Classification	ROW Width (feet)	Paved Width (feet)	Number of Lanes	Pavement Type	Pavement Condition (PCI)	Curb	Bike Lane	Sidewalk	Data Source
US 97	Cooley Road	Highway 20	ODOT	Expressway	100-210	74	5	AC	VG	Y	Y	N	TSP
US 97	Highway 20	South of study area	ODOT	Expressway	160	80	5	AC	P-F	N	Y	N	TSP
Highway 20	Empire Avenue	Division Street	ODOT	Principal Arterial	100-130	72-86	5	AC	VG	Y	Y	P	TSP
Highway 20	Division Street	Revere Avenue	ODOT	Principal Arterial	80-135	54-64	4-5	AC	VG	P	N	P	TSP
Highway 20	Revere Avenue	Greenwood Avenue	ODOT	Principal Arterial	80	64	5	AC	VG	Y	N	Y	TSP
Highway 20	3rd Street	4th Street	ODOT	Principal Arterial	80	66	5	AC	VP	Y	N	Y	TSP
Highway 20	4th Street	8th Street	ODOT	Principal Arterial	80	66	5	AC	F	Y	Y	Y	TSP
3rd Street	Greenwood Avenue	Franklin Avenue	ODOT	Principal Arterial	80	64	5	AC	VG	Y	N	Y	TSP
3rd Street	Franklin Avenue	Wilson Avenue	ODOT	Principal Arterial	80-110	64	5	AC	VG	Y	N	Y	TSP
4th Street	Butler Market Road	Addison Avenue	City	Minor Arterial	60-70	40	2-3	AC	67	N	N	N	TSP&Database
4th Street	Addison Avenue	Xerxes Avenue	City	Minor Arterial	60	36	2	AC	67	P	Y	P	TSP&Database
4th Street	Xerxes Avenue	Webster Avenue	City	Minor Arterial	60	40	2	AC	42	P	Y	P	TSP&Database
4th Street	Webster Avenue	Webster Avenue	City	Minor Arterial	60	40	2	AC	69	P	Y	P	TSP&Database
4th Street	Webster Avenue	Vail Avenue	City	Minor Arterial	60	40	2	AC	57	P	Y	P	TSP&Database
4th Street	Vail Avenue	Underwood Avenue	City	Minor Arterial	60	40	2	AC	37	P	Y	P	TSP&Database
4th Street	Underwood Avenue	Studio Road	City	Minor Arterial	60	40	2	AC	58	P	Y	P	TSP&Database
4th Street	Studio Road	Seward Avenue	City	Minor Arterial	60	40	2-3	AC	36	P	Y	P	TSP&Database
4th Street	Seward Avenue	Revere Avenue	City	Minor Arterial	60	40	2-3	AC	19	P	Y	P	TSP&Database
4th Street	Revere Avenue	Quimby Avenue	City	Minor Arterial	60	40	2	AC	71	Y	N	P	TSP&Database
4th Street	Quimby Avenue	Penn Avenue	City	Minor Arterial	60	40	2	AC	83	Y	N	P	TSP&Database
4th Street	Penn Avenue	Olney Avenue	City	Minor Arterial	60	40	2	AC	89	Y	N	P	TSP&Database
4th Street	Olney Avenue	Norton Avenue	City	Minor Arterial	60	40	2	AC	80	Y	N	P	TSP&Database
4th Street	Norton Avenue	Marshall Avenue	City	Minor Arterial	60	40	2	AC	80	Y	N	P	TSP&Database
4th Street	Marshall Avenue	Lafayette Avenue	City	Minor Arterial	60	40	2	AC	73	Y	N	P	TSP&Database
4th Street	Lafayette Avenue	Kearney Avenue	City	Minor Arterial	60	40	2	AC	85	Y	N	P	TSP&Database
4th Street	Kearney Avenue	Greenwood Avenue	City	Minor Arterial	60	40	2	AC	80	Y	N	P	TSP&Database
4th Street	Greenwood Avenue	Irving Avenue	City	Minor Arterial	60	30	2	AC	80	Y	N	P	TSP&Database
4th Street	Irving Avenue	Hawthorne Avenue	City	Minor Arterial	60	40	2-3	AC	79	Y	N	P	TSP&Database
4th Street	Hawthorne Avenue	Greeley Avenue	City	Minor Arterial	60	40	2-3	AC	81	Y	N	P	TSP&Database
4th Street	Greeley Avenue	Franklin Avenue	City	Minor Arterial	60	40	2-3	AC	74	Y	N	P	TSP&Database
4th Street	Franklin Avenue	Emerson Avenue	City	Major Collector	60	37	2	AC	85	Y	N	N	TSP&Database
4th Street	Emerson Avenue	Dekalb Avenue	City	Major Collector	60	37	2	AC	77	Y	N	N	TSP&Database
4th Street	Dekalb Avenue	Clay Avenue	City	Major Collector	60	37	2	AC	76	Y	N	N	TSP&Database
4th Street	Clay Avenue	Burnside Avenue	City	Major Collector	60	37	2	AC	83	Y	N	N	TSP&Database
4th Street	Burnside Avenue	Alden Avenue	City	Major Collector	60	34	2	PCC	80	Y	N	N	TSP&Database
Bond Street	Wall Street	Greenwood Avenue	City	Minor Arterial	80	58	2	AC	75	Y	N	Y	TSP&Database

Street Name	Begin	End	Jurisdiction	Functional Classification	ROW Width (feet)	Paved Width (feet)	Number of Lanes	Pavement Type	Pavement Condition (PCI)	Curb	Bike Lane	Sidewalk	Data Source
Bond Street	Greenwood Avenue	Oregon Avenue	City	Major Collector	80	56	2-3	AC/AC	90	Y	N	Y	TSP&Database
Bond Street	Oregon Avenue	Minnesota Avenue	City	Major Collector	80	56	2-3	AC/AC	90	Y	N	Y	TSP&Database
Bond Street	Minnesota Avenue	Franklin Avenue	City	Major Collector	80	56	2-3	AC/AC	92	Y	N	Y	TSP&Database
Bond Street	Franklin Avenue	Louisiana Avenue	City	Major Collector	60-80	36	2-3	AC	72	Y	N	Y	TSP&Database
Bond Street	Louisiana Avenue	Kansas Avenue	City	Major Collector	60-80	56	2-3	AC	81	Y	N	Y	TSP&Database
Bond Street	Kansas Avenue	Idaho Avenue	City	Major Collector	60-80	36	2-3	AC	81	Y	N	Y	TSP&Database
Bond Street	Idaho Avenue	Georgia Avenue	City	Major Collector	60-80	36	2-3	AC	80	Y	N	Y	TSP&Database
Bond Street	Georgia Avenue	Florida Avenue	City	Major Collector	60-80	36	2-3	AC	81	Y	N	Y	TSP&Database
Bond Street	Florida Avenue	Delaware Avenue	City	Major Collector	60-80	36	2-3	AC	80	Y	N	Y	TSP&Database
Bond Street	Delaware Avenue	Colorado Avenue	City	Major Collector	60-80	36	2-3	AC	85	Y	N	Y	TSP&Database
Bond Street	Colorado Avenue	Arizona Avenue	City	Major Collector		36	2-3	AC	89	Y	N	Y	TSP&Database
Bond Street	Arizona Avenue	Industrial Way	City	Major Collector		36	2-3	AC	90	Y	N	Y	TSP&Database
Colorado Avenue	Simpson Avenue	Industrial Way	City	Minor Arterial	80	32	2	AC	80	Y	P	P	TSP&Database
Colorado Avenue	Industrial Way	Wall Street	City	Minor Arterial	80	40	3	AC	83	Y	P	P	TSP&Database
Colorado Avenue	Wall Street	Sisemore Street	City	Minor Arterial	60	42	2	AC	77	Y	N	Y	TSP&Database
Colorado Avenue	Sisemore Street	US 97 Off-Ramp	City	Minor Arterial	60	42	2	AC	74	Y	N	Y	TSP&Database
Colorado Avenue	Harriman Street	Dead End West	City	Minor Arterial	60	40	2	AC	75	Y	N	Y	TSP&Database
Division Street	US 97	576 ft. s/o US 97	City	Minor Arterial	60-100	36	3	AC	76	Y	Y	P	TSP&Database
Division Street	576 ft. s/o US 97	Yale Avenue	City	Minor Arterial	60-100	48	3	AC	75	Y	Y	P	TSP&Database
Division Street	Yale Avenue	Xerxes Avenue	City	Minor Arterial	60-100	48	3	AC	83	Y	Y	P	TSP&Database
Division Street	Xerxes Avenue	Webster Avenue	City	Minor Arterial	60-100	48	3	AC	80	Y	Y	P	TSP&Database
Division Street	Webster Avenue	Vail Avenue	City	Minor Arterial	60-100	48	3	AC	79	Y	Y	P	TSP&Database
Division Street	Vail Avenue	Underwood Avenue	City	Minor Arterial	60-100	48	3	AC	77	Y	Y	P	TSP&Database
Division Street	Underwood Avenue	Thurston Avenue	City	Minor Arterial	60-100	48	3	AC	80	Y	Y	Y	TSP&Database
Division Street	Thurston Avenue	Revere Avenue	City	Minor Arterial	60-100	48	3	AC	61	Y	Y	Y	TSP&Database
Franklin Avenue	Broadway Street	Wall Street	City	Minor Arterial		45	2	AC	55	Y	N	Y	TSP&Database
Franklin Avenue	Wall Street	Bond Street	City	Minor Arterial	80	45	3-4	AC	56	Y	N	Y	TSP&Database
Franklin Avenue	Bond Street	Lava Road	City	Minor Arterial	80	45	3-4	AC/AC	75	Y	N	Y	TSP&Database
Franklin Avenue	Lava Road	Sisemore Street	City	Minor Arterial	80	43	3-4	AC/AC	81	Y	N	Y	TSP&Database
Franklin Avenue	Sisemore Street	Harriman Street	City	Minor Arterial	80	43	3-4	AC/AC	81	Y	N	Y	TSP&Database
Franklin Avenue	Harriman Street	Hill Street	City	Minor Arterial	80	56	3-4	AC	78	Y	N	Y	TSP&Database
Franklin Avenue	Hill Street	Division Street	City	Minor Arterial	80	44	3-4	AC	71	Y	N	Y	TSP&Database
Franklin Avenue	Division Street	1st Street	City	Minor Arterial	80	43	3-4	AC	80	Y	N	Y	TSP&Database
Franklin Avenue	1st Street	2nd Street	City	Minor Arterial	80	44	3-4	AC	73	Y	N	Y	TSP&Database
Franklin Avenue	2nd Street	3rd Street	City	Minor Arterial	80	44	3-4	AC	71	Y	N	Y	TSP&Database
Franklin Avenue	3rd Street	4th Street	City	Minor Arterial	80	44	3	AC	80	Y	N	Y	TSP&Database
Greenwood Avenue	Wall Street	Bond Street	City	Minor Arterial	80	64	4	AC	41	Y	N	Y	TSP&Database
Greenwood Avenue	Bond Street	Harriman Street	City	Minor Arterial	80	64	4	AC	39	Y	N	Y	TSP&Database

Street Name	Begin	End	Jurisdiction	Functional Classification	ROW Width (feet)	Paved Width (feet)	Number of Lanes	Pavement Type	Pavement Condition (PCI)	Curb	Bike Lane	Sidewalk	Data Source
Greenwood Avenue	Harriman Street	Hill Street	City	Minor Arterial	80	64	4	AC	33	Y	N	Y	TSP&Database
Greenwood Avenue	Hill Street	Parkway	City	Minor Arterial	80	64	4	AC	64	Y	N	Y	TSP&Database
Greenwood Avenue	Parkway	3rd Street	City	Minor Arterial	80	56	4	AC		Y	N	Y	TSP&Database
Hill Street	Revere Avenue	Portland Avenue	City	Minor Arterial	60-80	60	3-4	AC	83	Y	Y	P	TSP&Database
Hill Street	Portland Avenue	Norton Avenue	City	Minor Arterial	80-85	60	2-3	AC	84	Y	Y	P	TSP&Database
Newport Avenue	3rd Street	Awbrey Road	City	Minor Arterial	60-80	36	2-3	AC	84	Y	Y	Y	TSP&Database
Newport Avenue	Awbrey Road	Drake Road	City	Minor Arterial	60	36	2-3	AC	78	Y	Y	Y	TSP&Database
Newport Avenue	Drake Road	Brooks Street	City	Minor Arterial	60	36	2-3	AC	15	Y	Y	Y	TSP&Database
Newport Avenue	Brooks Street	Walls Street	City	Minor Arterial	60	56	2-3	AC	40	Y	Y	Y	TSP&Database
Olney Avenue	Hill Street	1st Street	City	Minor Arterial	60	48	2-3	AC	73	Y	Y	Y	TSP&Database
Olney Avenue	1st Street	2nd Street	City	Minor Arterial	60	46	2-3	AC	74	Y	Y	Y	TSP&Database
Olney Avenue	2nd Street	3rd Street	City	Minor Arterial	60	46	2-3	AC	90	Y	Y	Y	TSP&Database
Olney Avenue	3rd Street	4th Street	City	Minor Arterial	60	36	2	AC	89	Y	Y	N	TSP&Database
Olney Avenue	4th Street	5th Street	City	Minor Arterial	60	36	2	AC	89	Y	Y	N	TSP&Database
Portland Avenue	Steidl Road	Hill Street	City	Major Collector	60-80	36	2	AC/AC	70	Y	N	P	TSP&Database
Revere Avenue	Beginning of Pvmt	Harriman Street	City	Minor Arterial		16	2	AC	83	N	N	N	TSP&Database
Revere Avenue	Harriman Street	Hill Street	City	Minor Arterial		36	2	AC	21	N	N	N	TSP&Database
Revere Avenue	Hill Street	Parkway	City	Minor Arterial	80	65	4	AC	70	Y	Y	Y	TSP&Database
Revere Avenue	Parkway	Division Street	City	Minor Arterial	80	65	4	AC	74	Y	Y	Y	TSP&Database
Revere Avenue	Division Street	Lytle Street	City	Minor Arterial	80	48	4-5	AC	72	Y	N	Y	TSP&Database
Revere Avenue	Lytle Street	2nd Street	City	Minor Arterial	80	60	4-5	AC	83	Y	N	Y	TSP&Database
Revere Avenue	2nd Street	3rd Street	City	Minor Arterial	80	60	4-5	AC	81	Y	N	Y	TSP&Database
Revere Avenue	3rd Street	4th Street	City	Minor Arterial	80	60	4-5	AC	83	Y	N	Y	TSP&Database
Revere Avenue	4th Street	5th Street	City	Minor Arterial	80	36	2	AC	87	N	Y	P	TSP&Database
Riverside Avenue	Broadway Street	Louisiana Avenue	City	Minor Arterial	80	40	2	AC	84	P	Y	P	TSP&Database
Riverside Avenue	Louisiana Avenue	Kansas Avenue	City	Minor Arterial	80	40	2	AC	81	P	Y	P	TSP&Database
Riverside Avenue	Kansas Avenue	Idaho Avenue	City	Minor Arterial	80	40	2	AC	83	P	Y	P	TSP&Database
Riverside Avenue	Idaho Avenue	Tumalo Avenue	City	Minor Arterial	80	40	2	AC	81	P	Y	P	TSP&Database
Wall Street	Norton Avenue	Lafayette Avenue	City	Minor Arterial	80-85	56	2-3	AC/AC	91	Y	Y	P	TSP&Database
Wall Street	Lafayette Avenue	Bond Street	City	Minor Arterial	80-85	56	2-3	AC/AC	92	Y	Y	P	TSP&Database
Wall Street	Bond Street	Greenwood Avenue	City	Minor Arterial	80-85	56	2-3	AC/AC	93	Y	Y	P	TSP&Database
Wall Street	Greenwood Avenue	Oregon Avenue	City	Minor Arterial	80	56	2-3	AC/AC	91	Y	N	Y	TSP&Database
Wall Street	Oregon Avenue	Minnesota Avenue	City	Minor Arterial	80	56	2-3	AC/AC	91	Y	N	Y	TSP&Database
Wall Street	Minnesota Avenue	Franklin Avenue	City	Minor Arterial	80	56	2-3	AC/AC	90	Y	N	Y	TSP&Database
Wall Street	Franklin Avenue	Louisiana Avenue	City	Major Collector	60-80	56	2	AC	83	Y	N	Y	TSP&Database
Wall Street	Louisiana Avenue	Kansas Avenue	City	Major Collector	60-80	56	2	AC	89	Y	N	Y	TSP&Database
Wall Street	Kansas Avenue	Idaho Avenue	City	Major Collector	60-80	56	2	AC	89	Y	N	Y	TSP&Database
Wall Street	Idaho Avenue	Georgia Avenue	City	Major Collector	60-80	30	2	AC	89	Y	N	Y	TSP&Database

Street Name	Begin	End	Jurisdiction	Functional Classification	ROW Width (feet)	Paved Width (feet)	Number of Lanes	Pavement Type	Pavement Condition (PCI)	Curb	Bike Lane	Sidewalk	Data Source
Wall Street	Georgia Avenue	Florida Avenue	City	Major Collector	60-80	30	2	AC	85	Y	N	Y	TSP&Database
Wall Street	Florida Avenue	Delaware Avenue	City	Major Collector	60-80	36	2	AC	85	Y	N	Y	TSP&Database
Wall Street	Delaware Avenue	Colorado Avenue	City	Major Collector	60-80	36	2	AC	78	Y	N	Y	TSP&Database
Wall Street	Colorado Avenue	Arizona Avenue	City	Major Collector	60-80	36	2	AC	90	Y	N	Y	TSP&Database
Wall Street	Arizona Avenue	Industrial Way	City	Major Collector	60-80	36	2	AC	95	Y	N	Y	TSP&Database

APPENDIX B

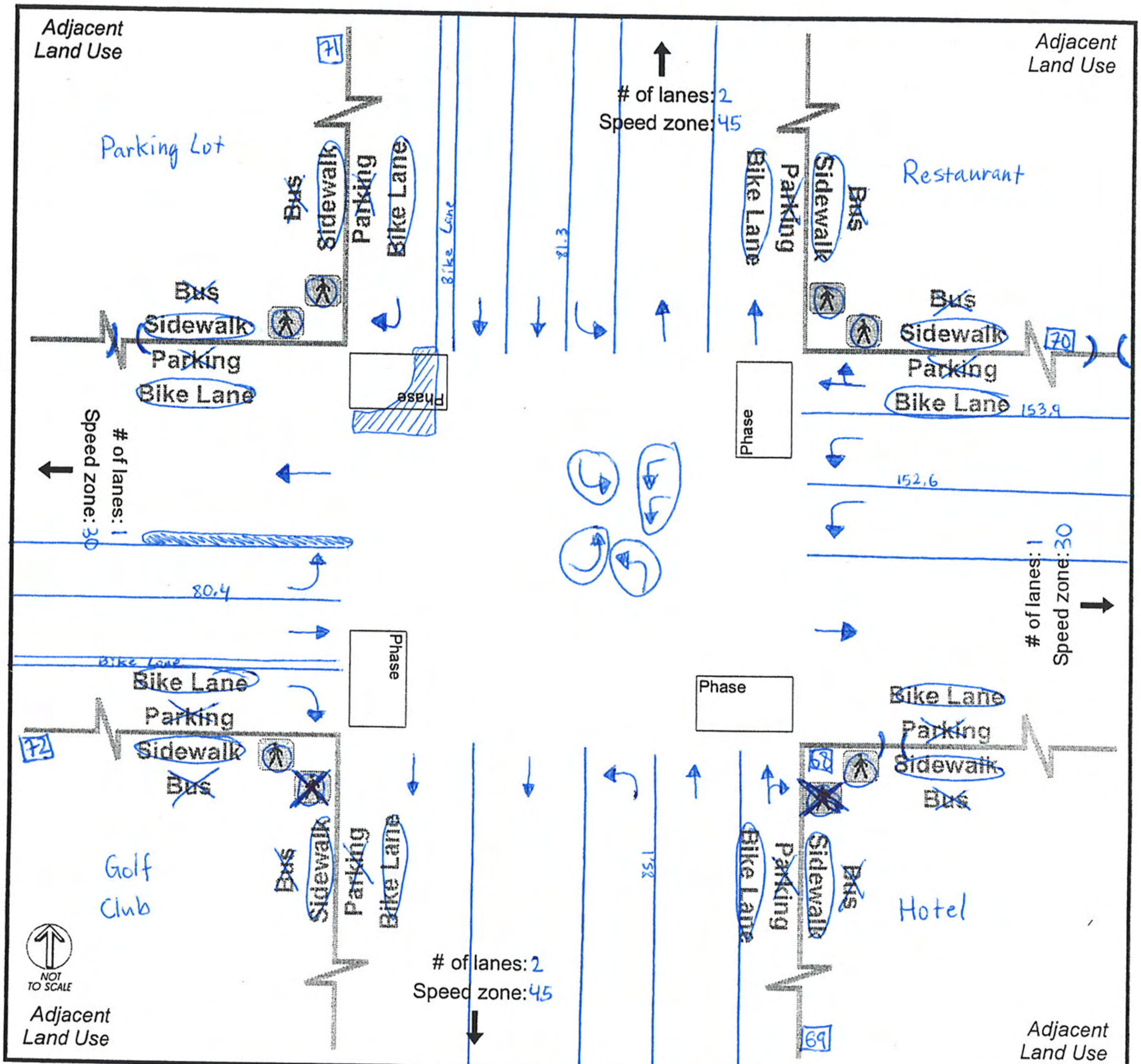
Existing Intersection Geometrics

LANE GEOMETRY

Date: 1/9/07

Time:

Intersection Name: US 97/20 and Butler Market Road



Staging:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

	green	red
Cycle Length:	53.63	41.74
Cycle Length:	44.06	38.28
Cycle Length:	48.68	52.86

Queuing Problems:

ROR per cycle

Perceived LOS

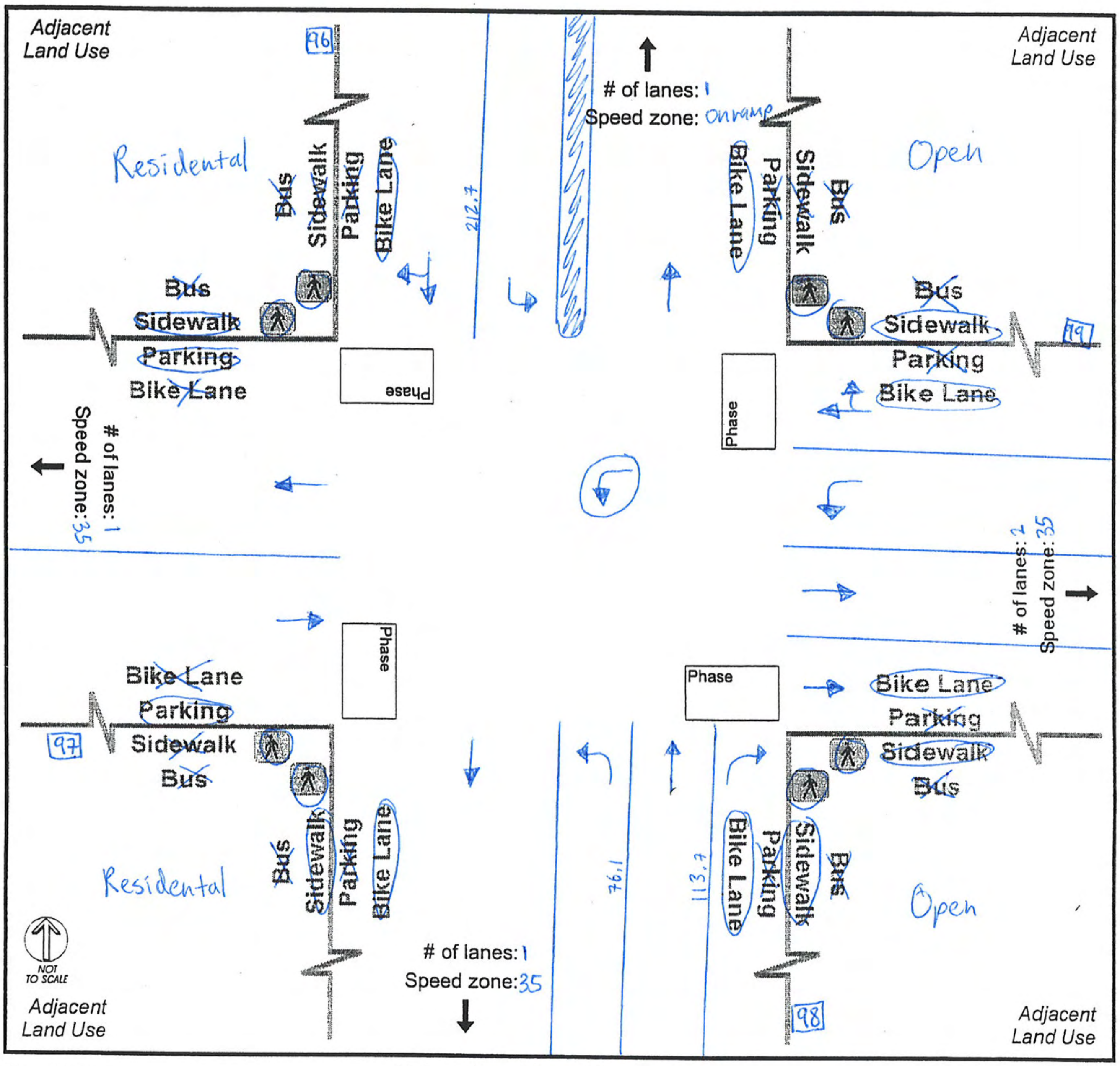
A B C D E F

LANE GEOMETRY

Date: 1/9/07

Time:

Intersection Name: Parkway SB Ramp and Revere Avenue



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

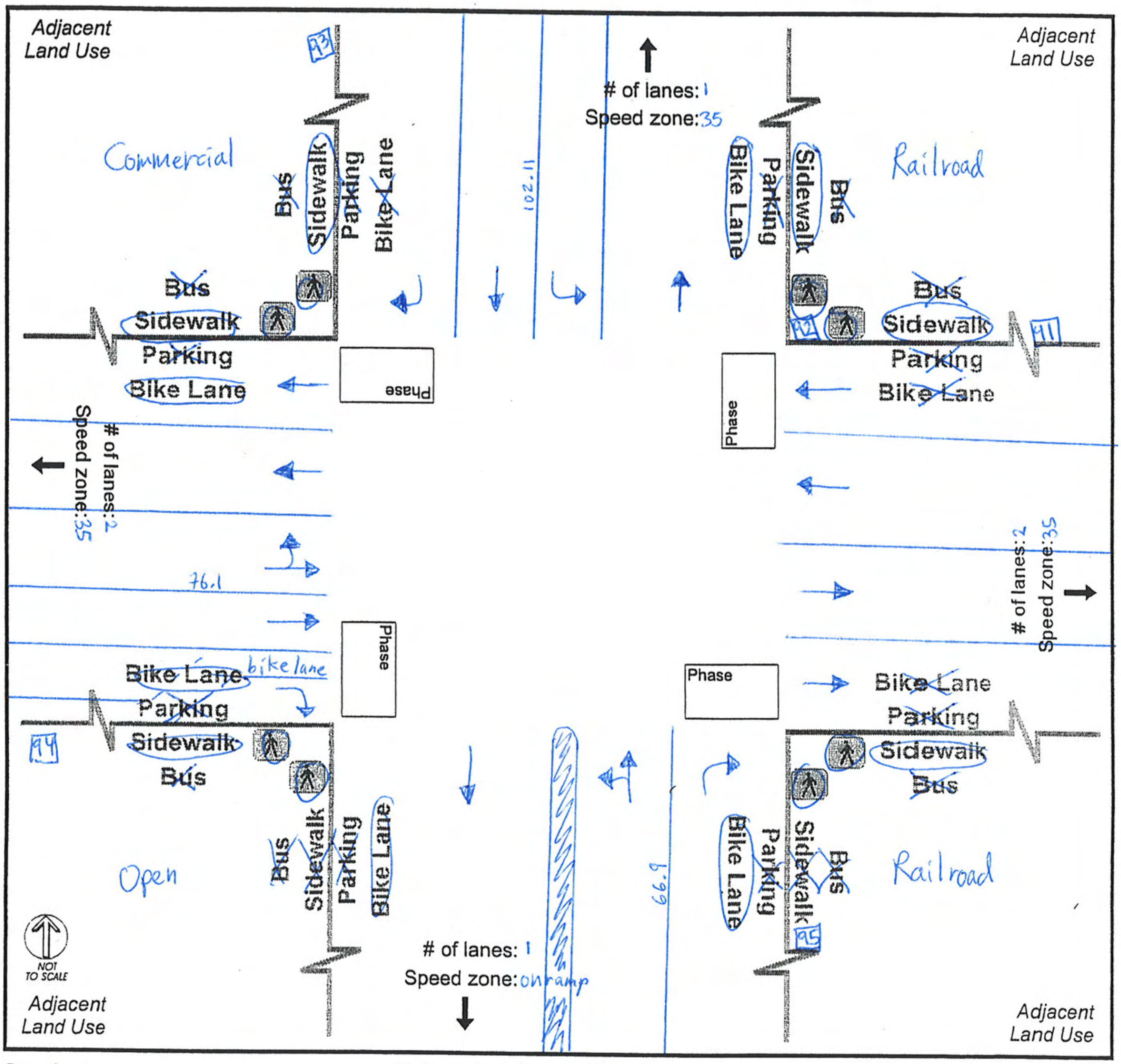
Perceived LOS					
A	B	C	D	E	F

LANE GEOMETRY

Date: 1/8/07

Time:

Intersection Name: Parkway NB Ramp and Revere Avenue



Staging:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Queuing Problems:

Perceived LOS

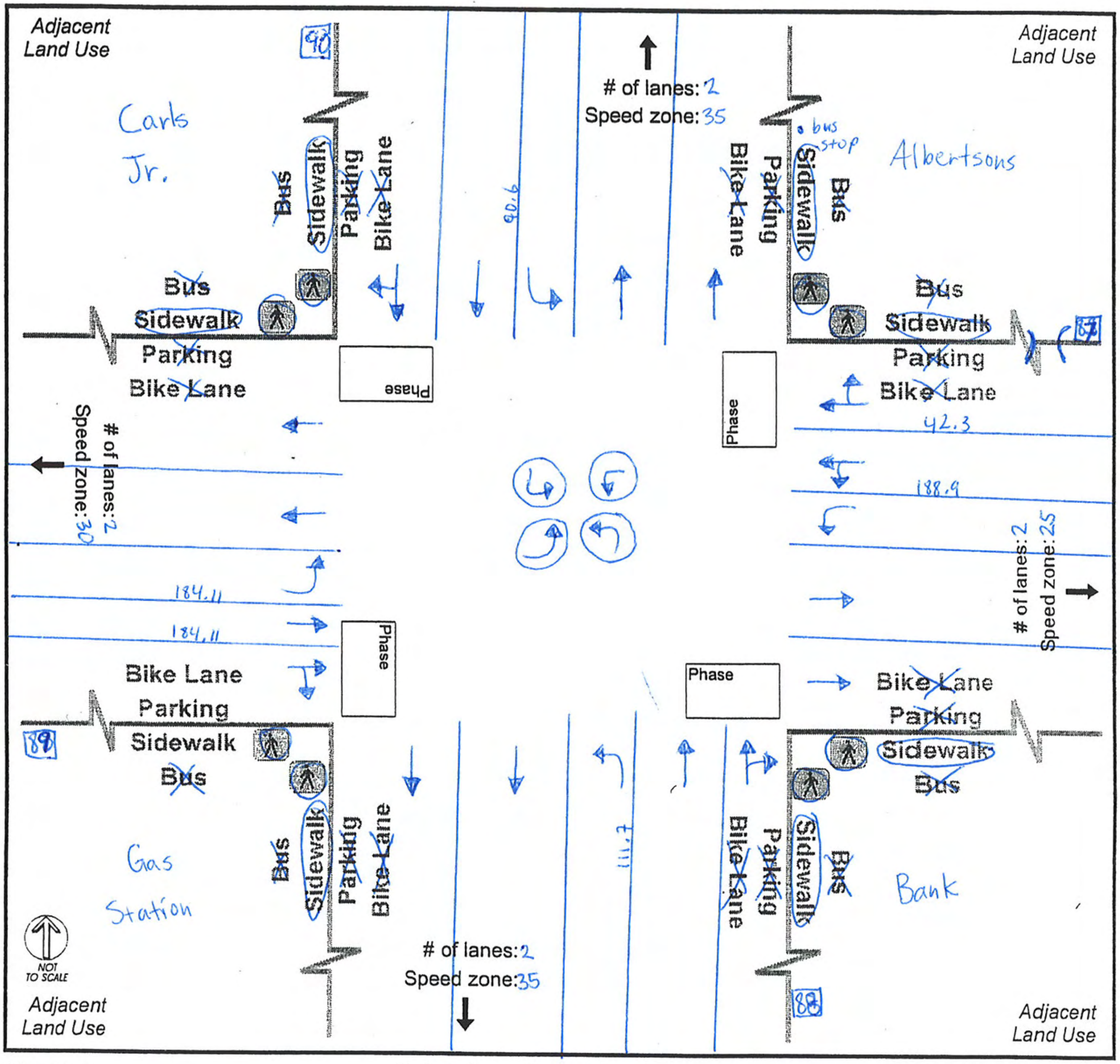
A B C D E F

LANE GEOMETRY

Date: 1/9/07

Time:

Intersection Name: 3rd Street and Revere Avenue



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

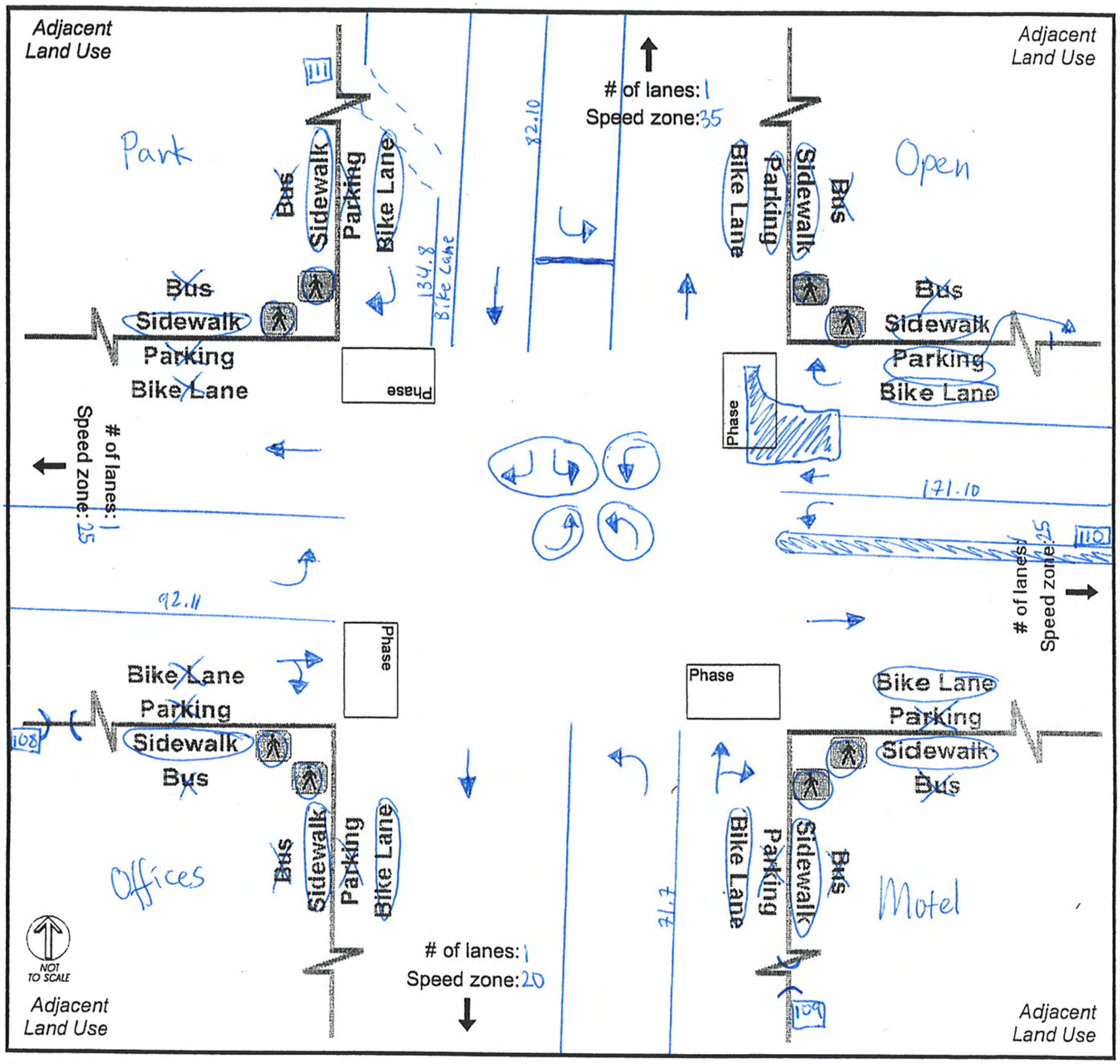
Perceived LOS					
A	B	C	D	E	F

LANE GEOMETRY

Date: 1/a/07

Time: ______________

Intersection Name: Portland Avenue and Hill Street



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

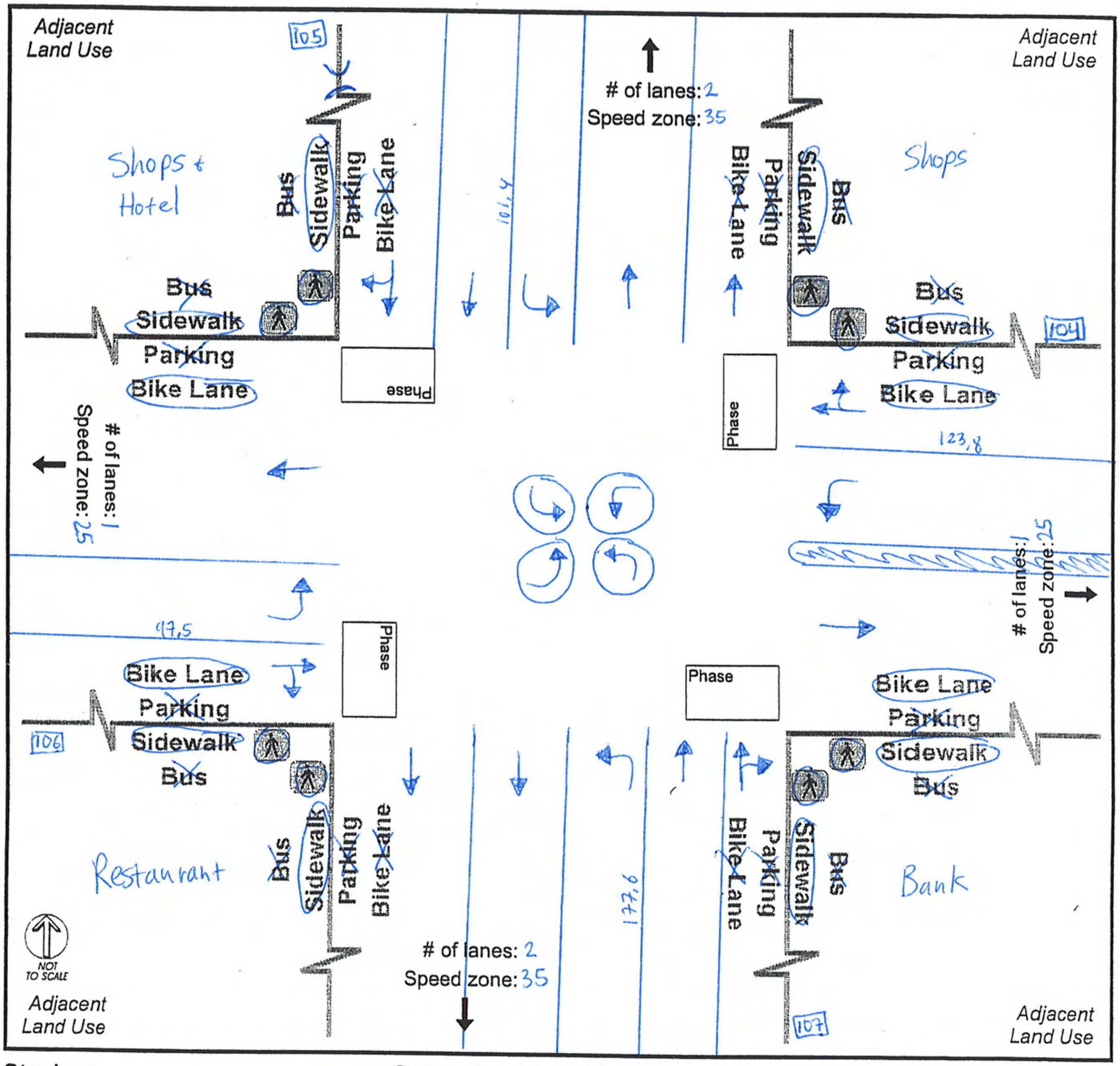
Perceived LOS					
A	B	C	D	E	F

LANE GEOMETRY

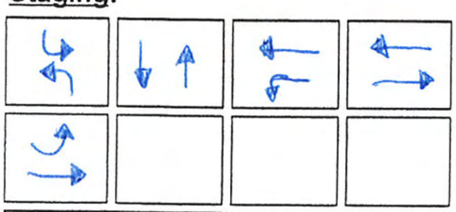
Date: 1/9/07

Time:

Intersection Name: 3rd Street and Olney Avenue



Staging:



Queuing Problems:

Saturation Flow Check

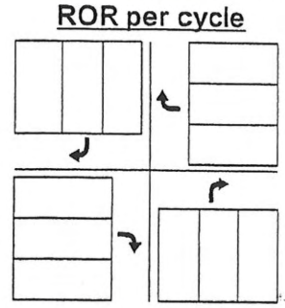
Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

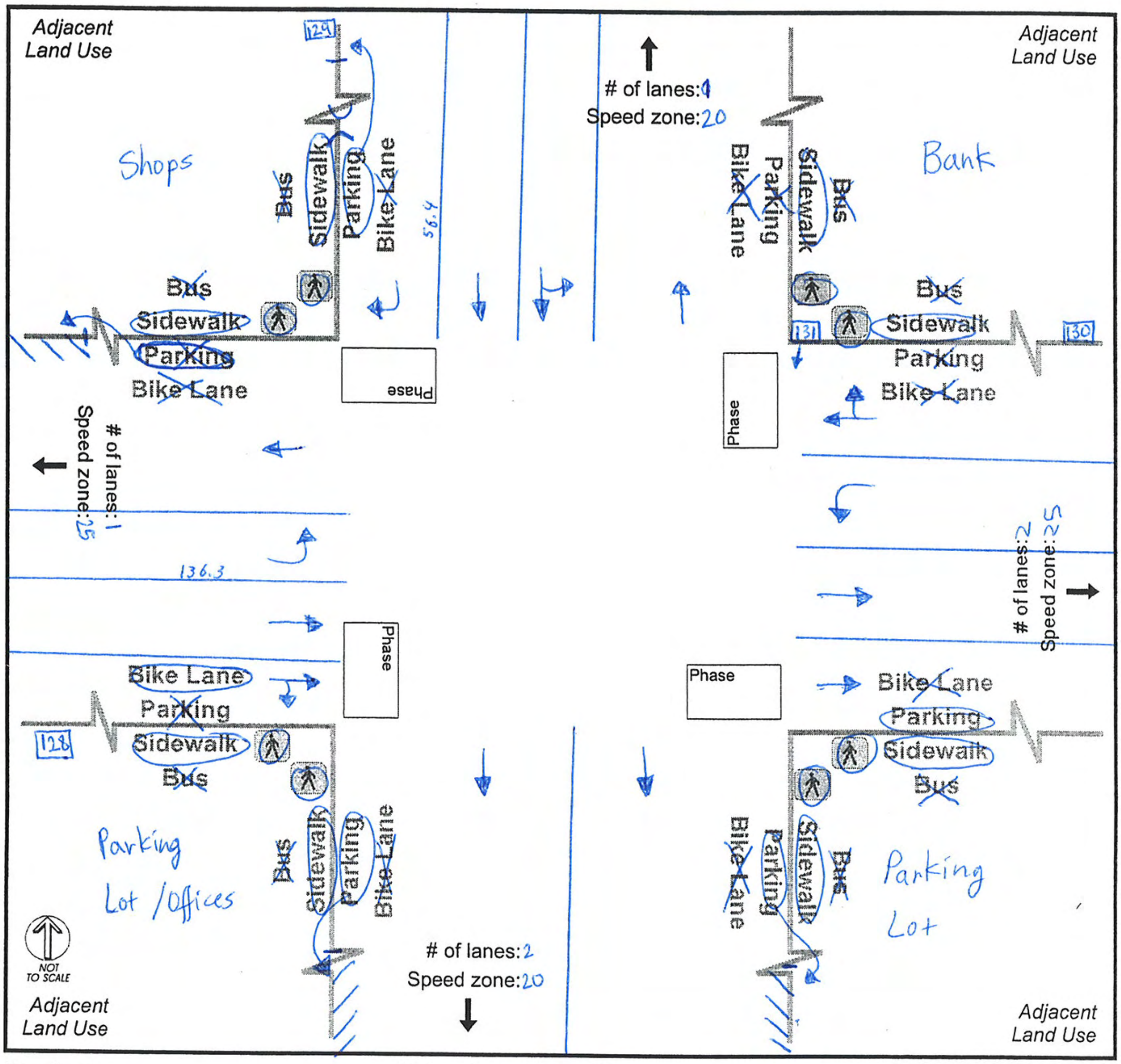


Perceived LOS

A B C D E F

LANE GEOMETRY

Date: 1/9/07
Time:
Intersection Name: Greenwood Avenue and Wall Street



Staging:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Queuing Problems:

Perceived LOS

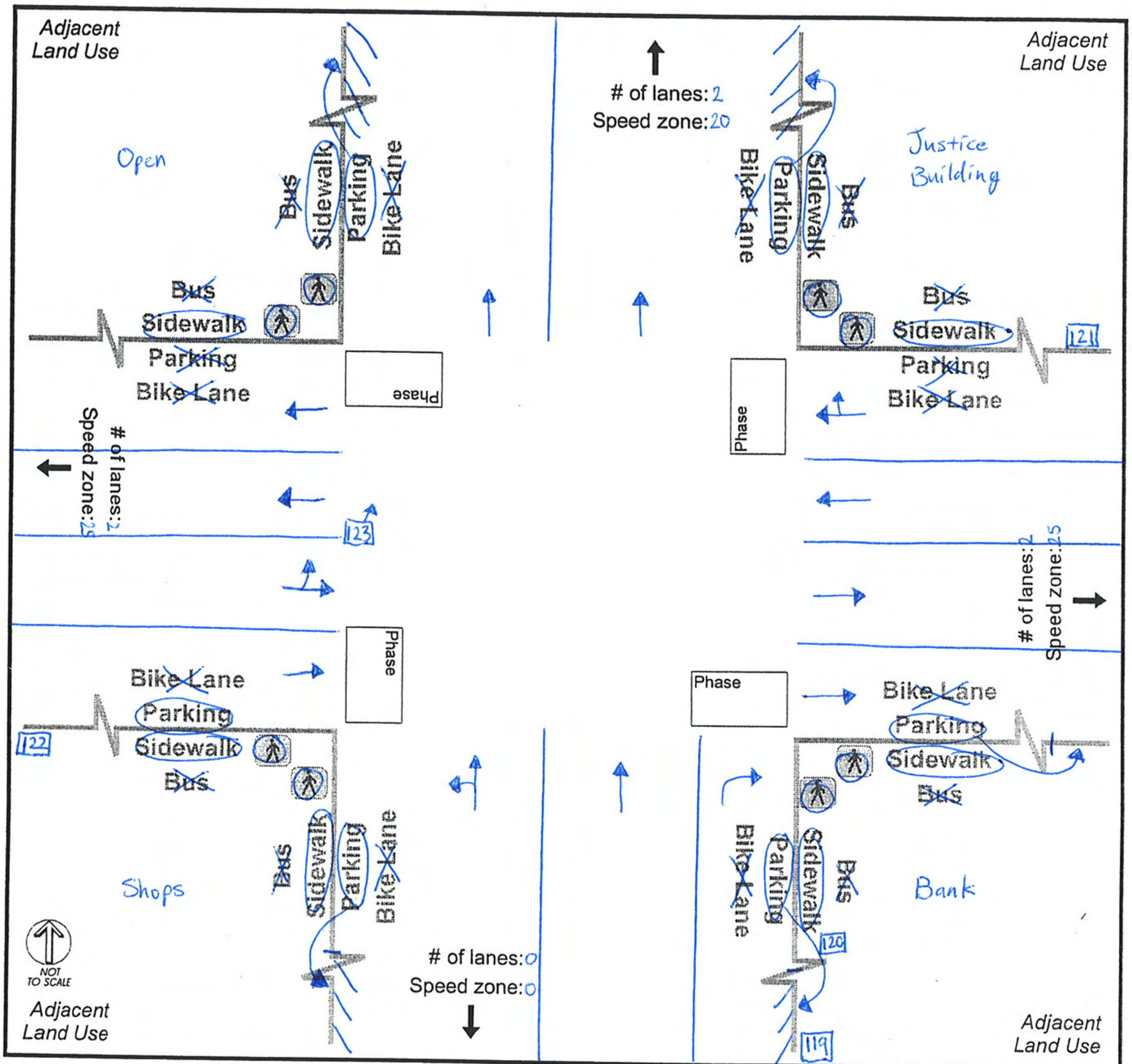
A B C D E F

LANE GEOMETRY

Date: 1/9/07

Time:

Intersection Name: Greenwood Avenue and Bond Street



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Perceived LOS

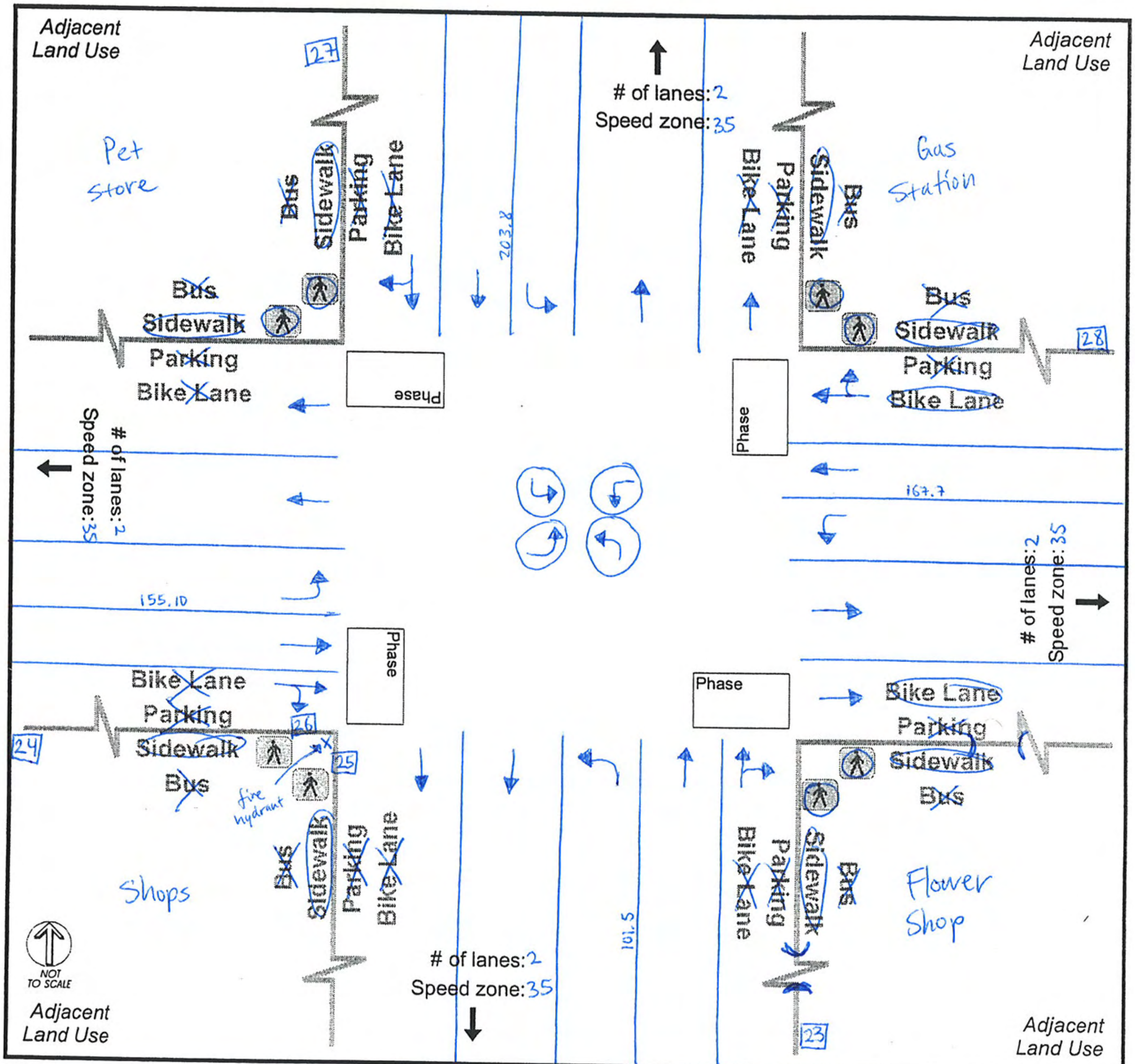
A B C D E F

LANE GEOMETRY

Date: 1/9/07

Time:

Intersection Name: Greenwood Avenue and 3rd Street



Staging:

Queuing Problems:

* right turn lane light are on poles in west and south directions

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

	green	red
Cycle Length:	23.23	1:37.13
Cycle Length:	20.25	1:35.81
Cycle Length:	21.72	1:58.10

ROR per cycle

Perceived LOS

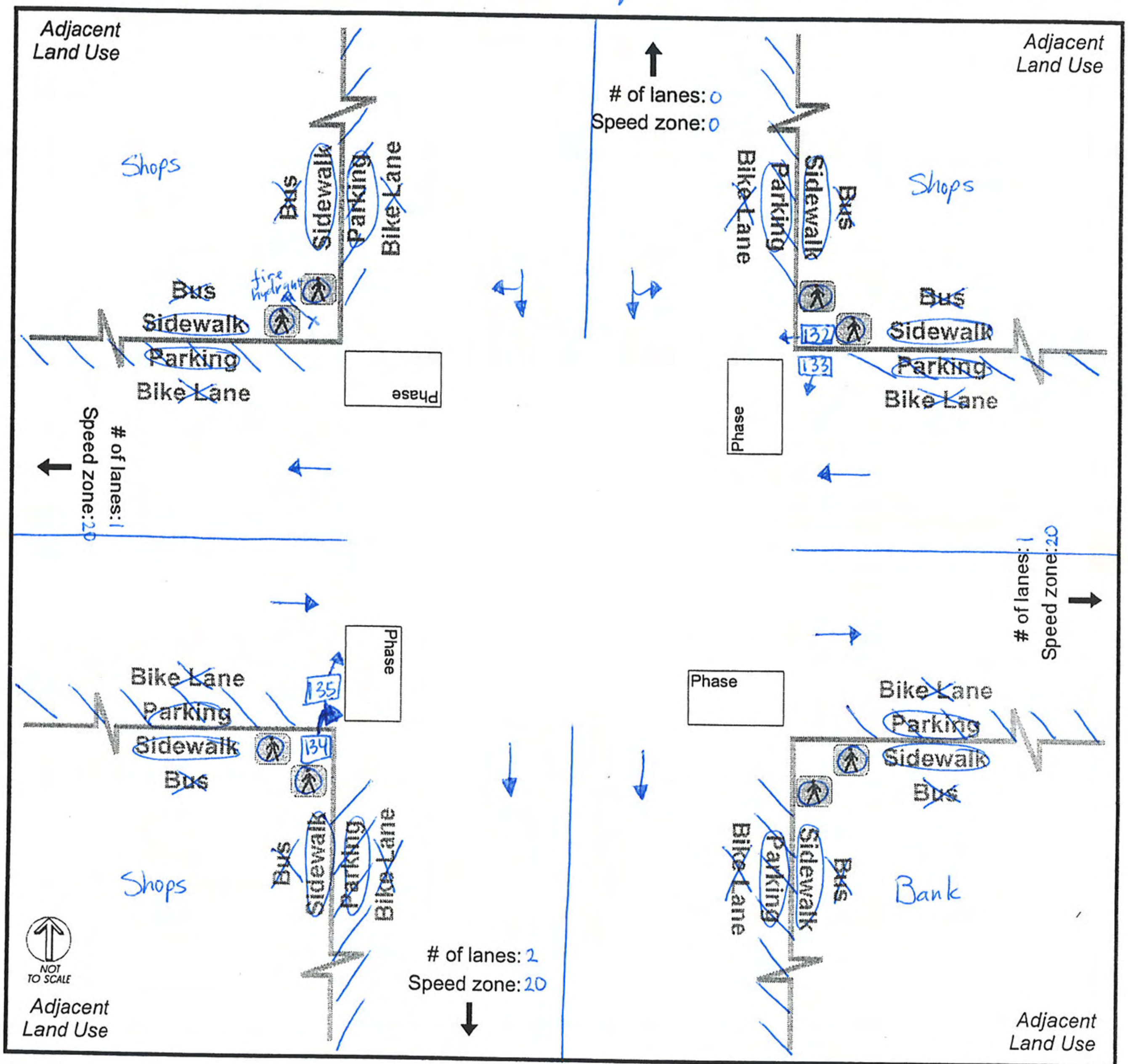
A B C D E F

LANE GEOMETRY

Date: 1/9/07

Time:

Intersection Name: Wall Street and Oregon Street



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Perceived LOS

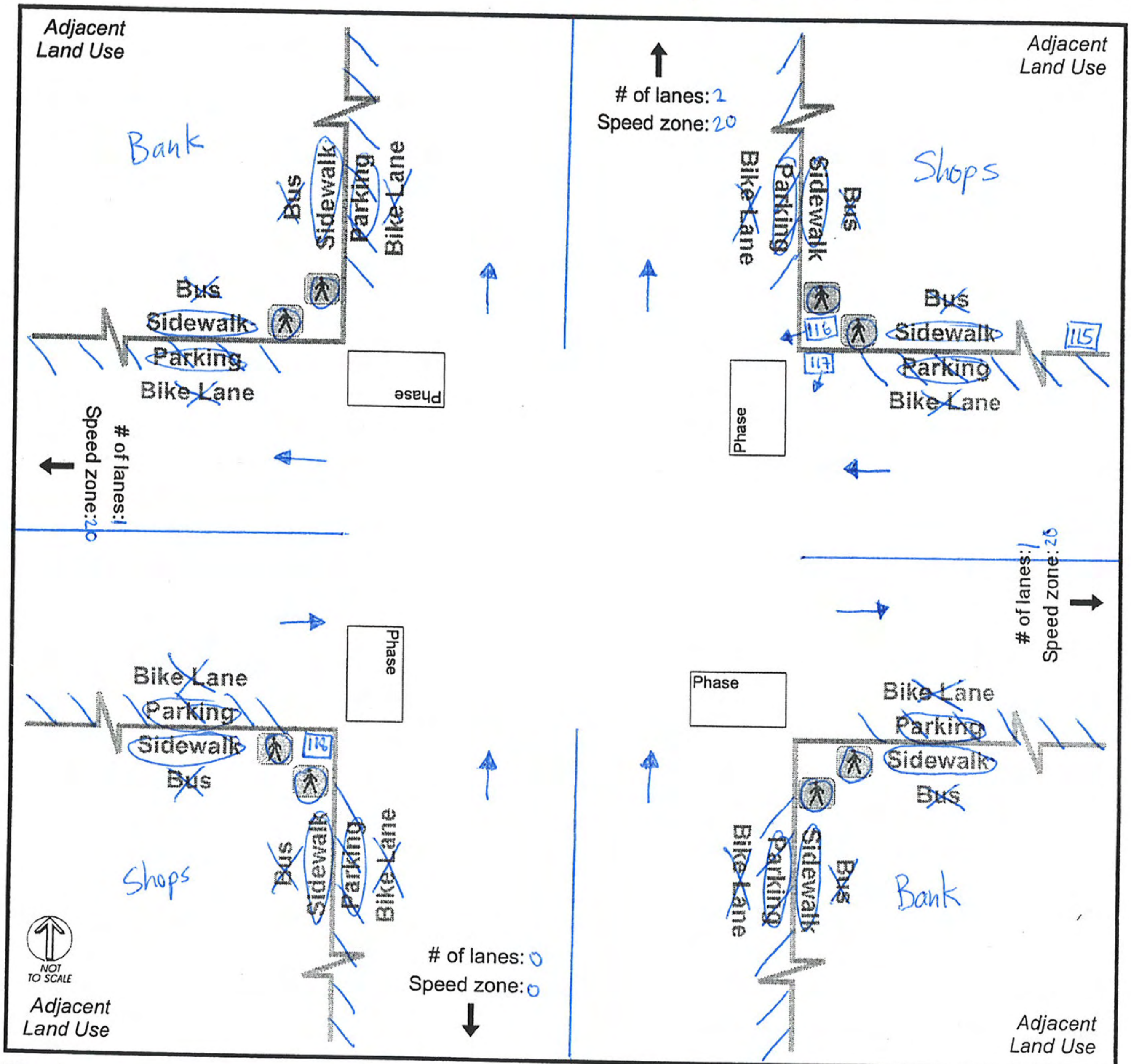
A B C D E F

LANE GEOMETRY

Date: 1/9/07

Time:

Intersection Name: Bond Street and Oregon Avenue



Staging:

← →　↑ ↑

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Perceived LOS

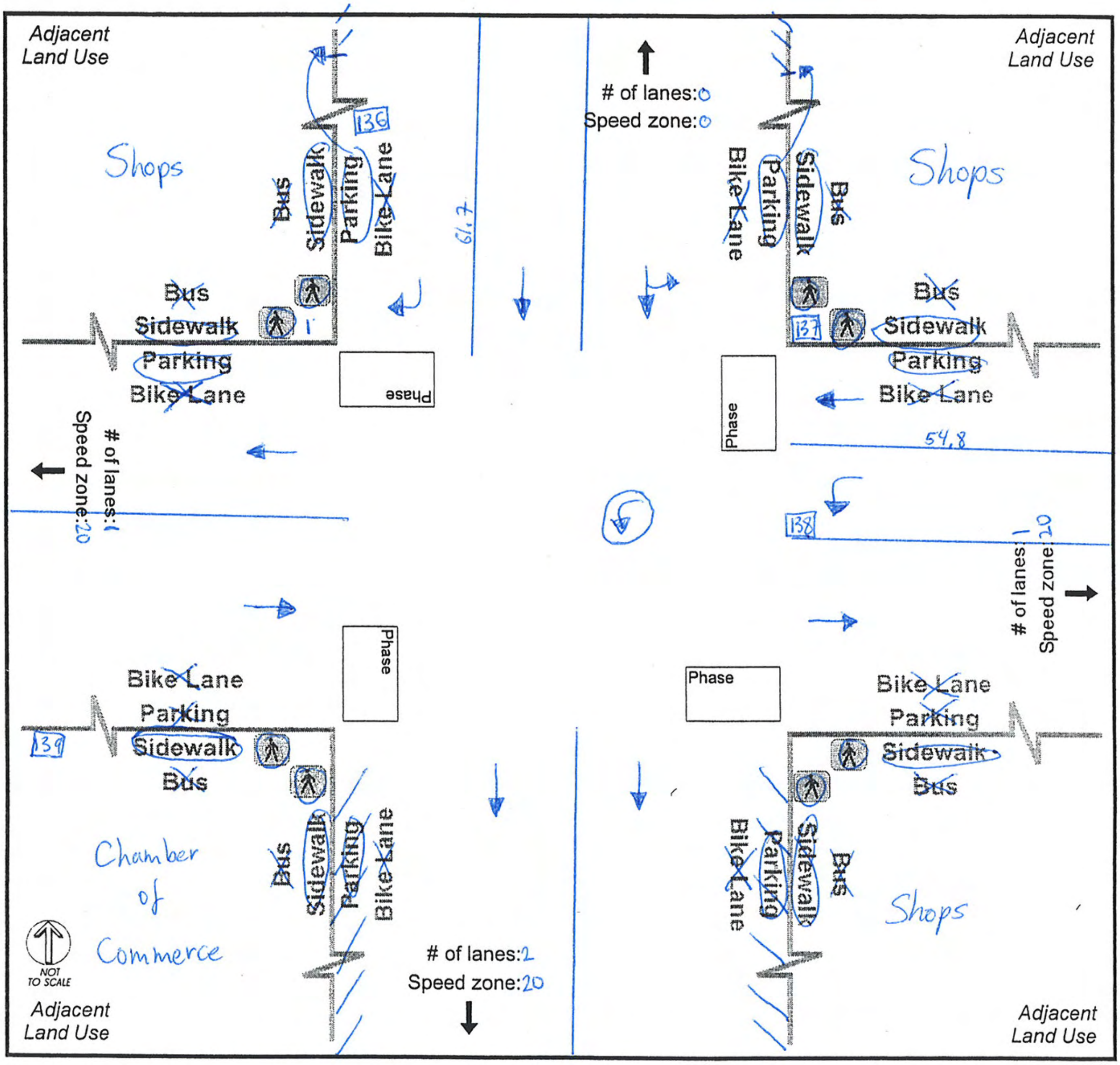
A B C D E F

LANE GEOMETRY

Date: 1/9/07

Time:

Intersection Name: Franklin Avenue and Wall Street



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

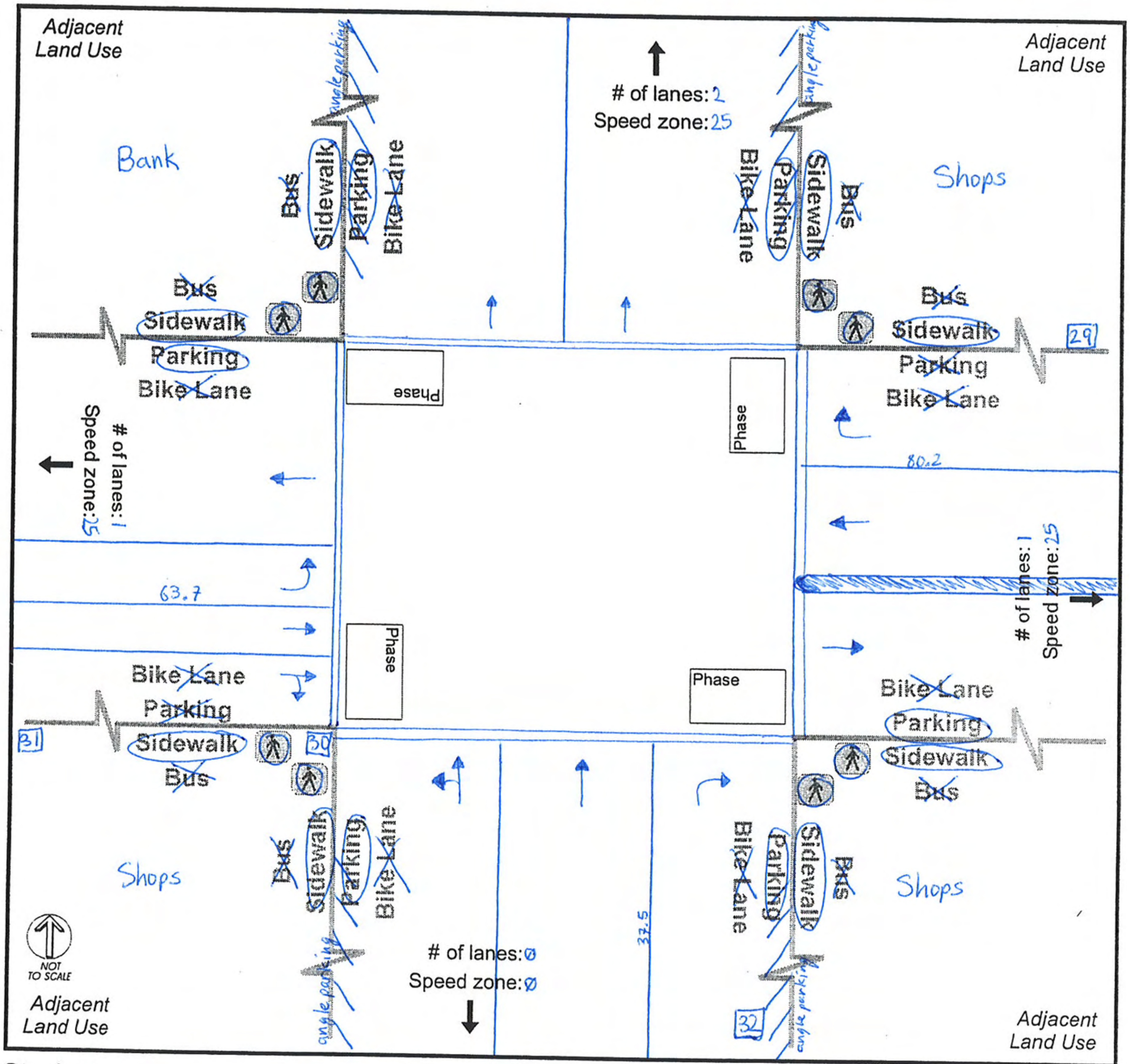
Perceived LOS					
A	B	C	D	E	F

LANE GEOMETRY

Date: 1/8/07

Time:

Intersection Name: Franklin Avenue and Bond Street



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

	green	red
Cycle Length:	25.44	53.44
Cycle Length:	24.39	53.79
Cycle Length:	25.12	53.99

ROR per cycle

Perceived LOS

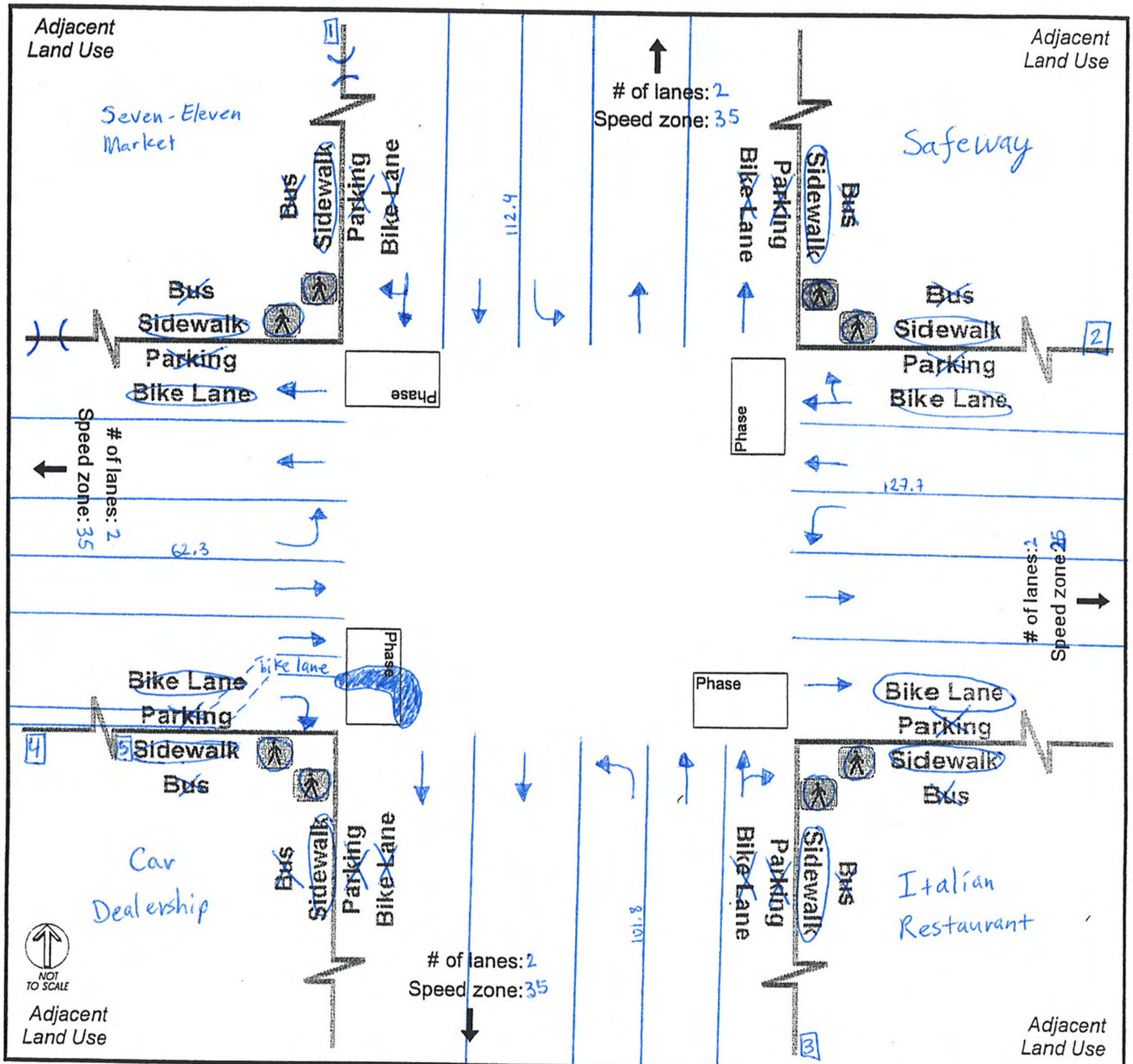
A B C D E F

LANE GEOMETRY

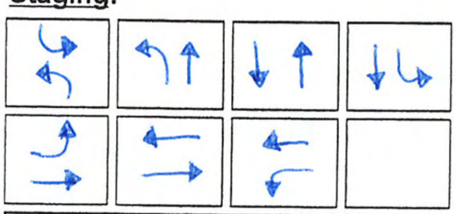
Date: 1/8/07

Time:

Intersection Name: Franklin Avenue and 3rd Street



Staging:



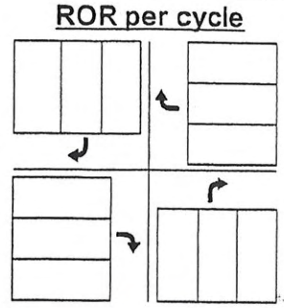
Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

	green	red
Cycle Length:	52.73	1:21.69
Cycle Length:	54.07	1:10.70
Cycle Length:	54.87	1:18.69

ROR per cycle



Perceived LOS

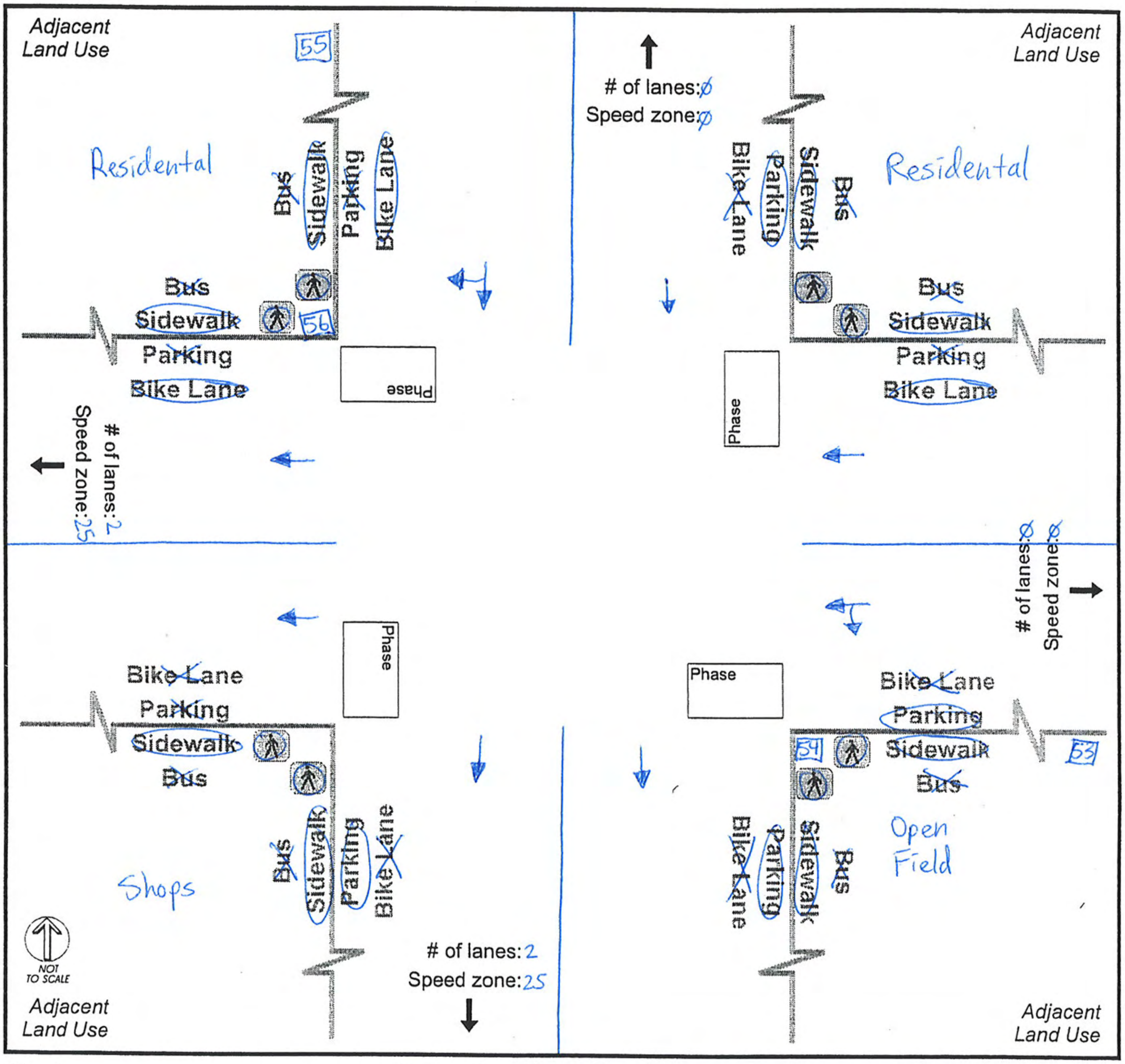
A B C D E F

LANE GEOMETRY

Date: 1/8/07

Time: ______

Intersection Name: Colorado Avenue and Wall Street



Staging:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Queuing Problems:

Perceived LOS

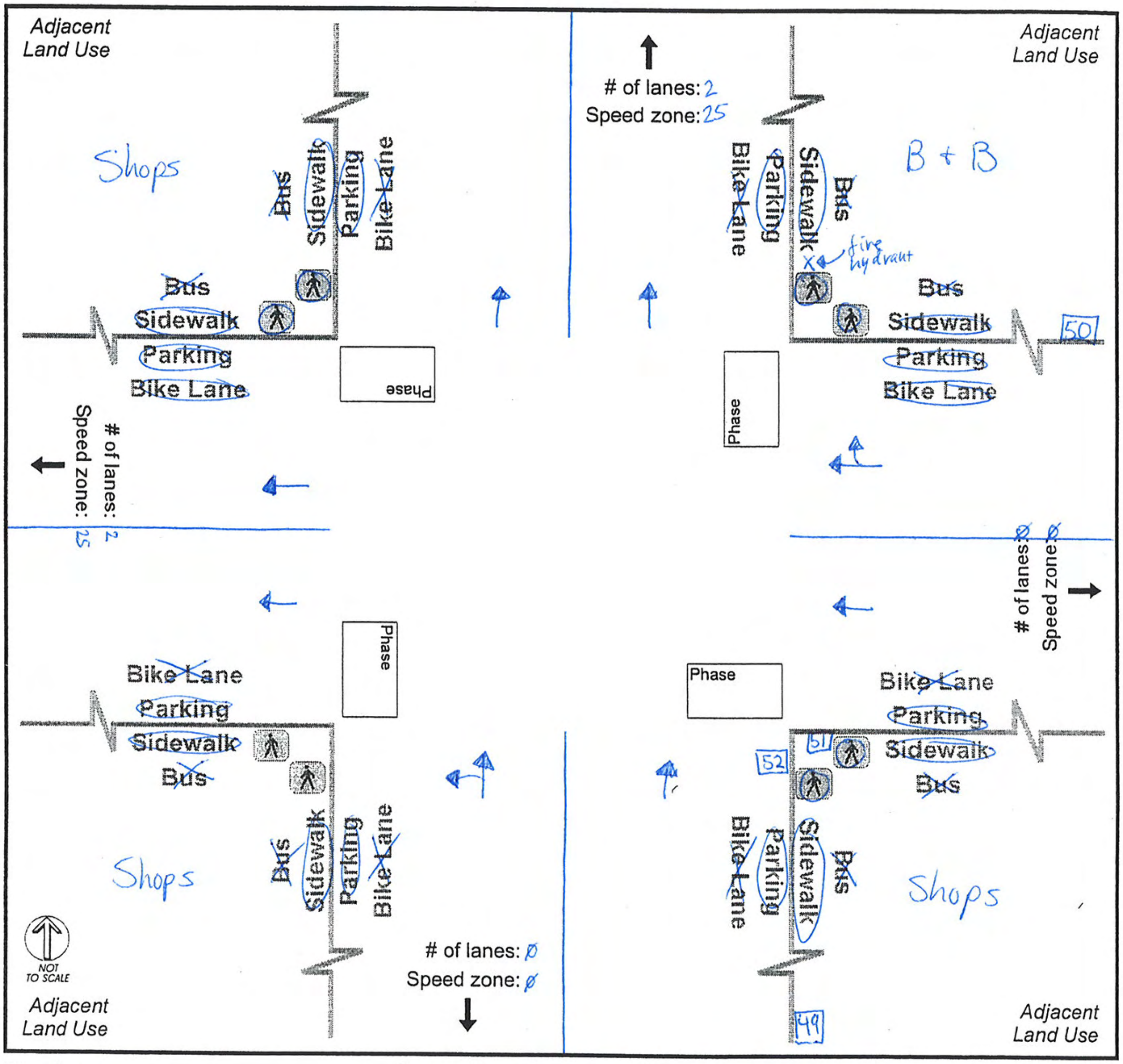
A B C D E F

LANE GEOMETRY

Date: 1/8/07

Time:

Intersection Name: Colorado Avenue and Bond Street



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Perceived LOS

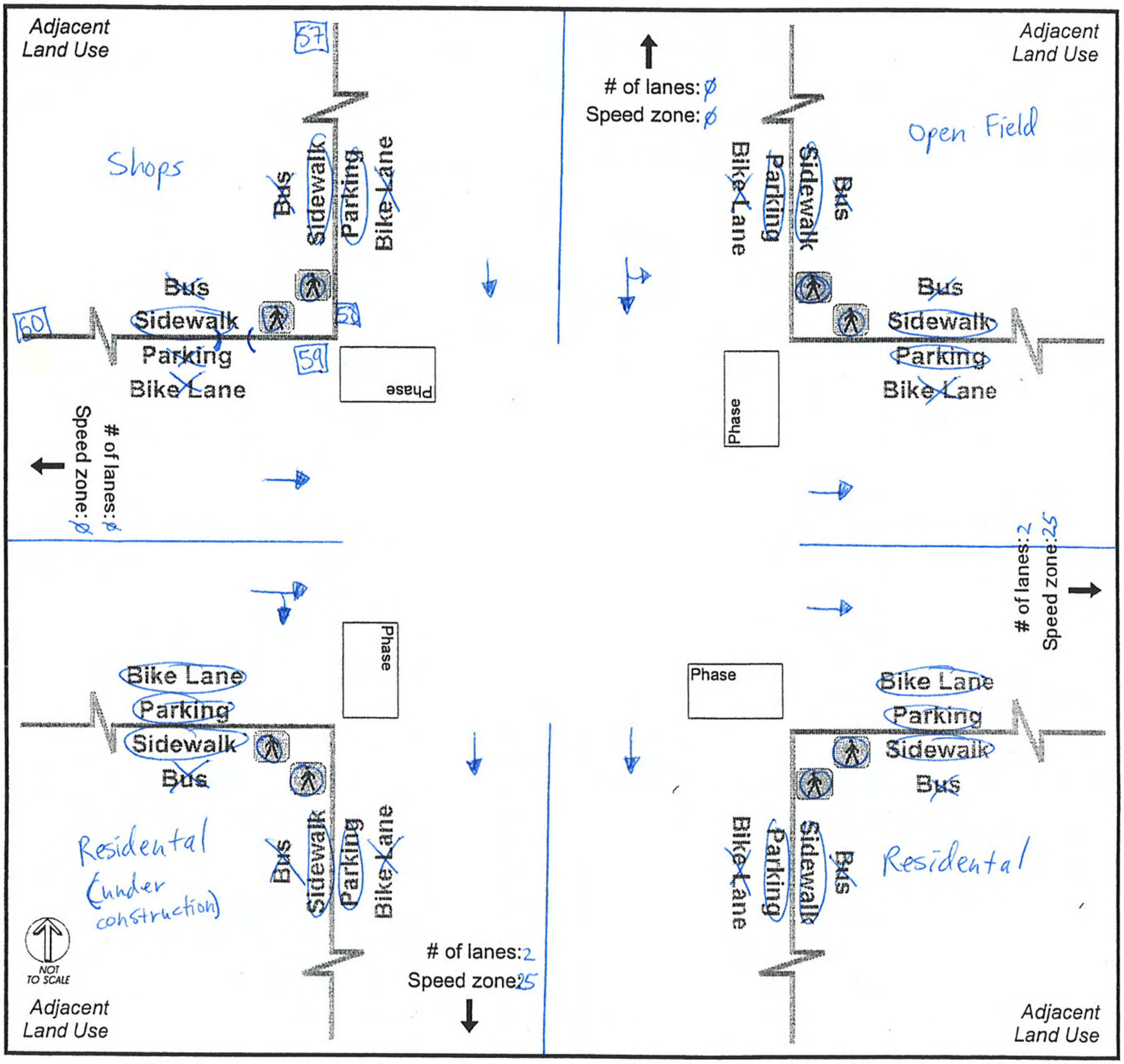
A B C D E F

LANE GEOMETRY

Date: 1/8/07

Time:

Intersection Name: Arizona Avenue and Wall Street



Staging:

Saturation Flow Check

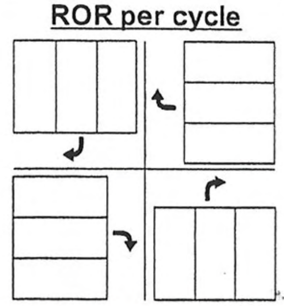
Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle



Queuing Problems:

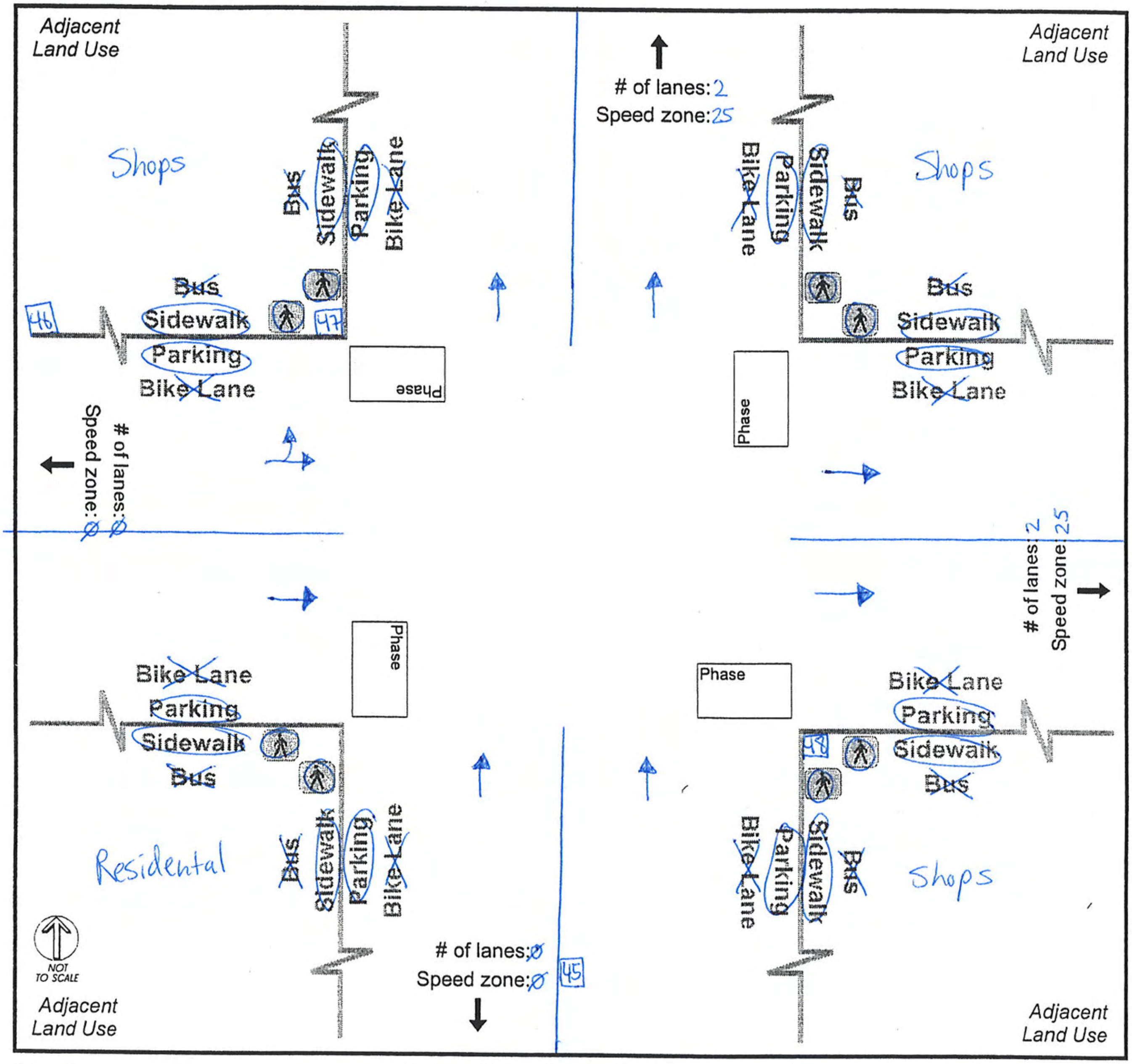
Perceived LOS					
A	B	C	D	E	F

LANE GEOMETRY

Date: 1/8/07

Time:

Intersection Name: Arizona Avenue and Bond Street



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

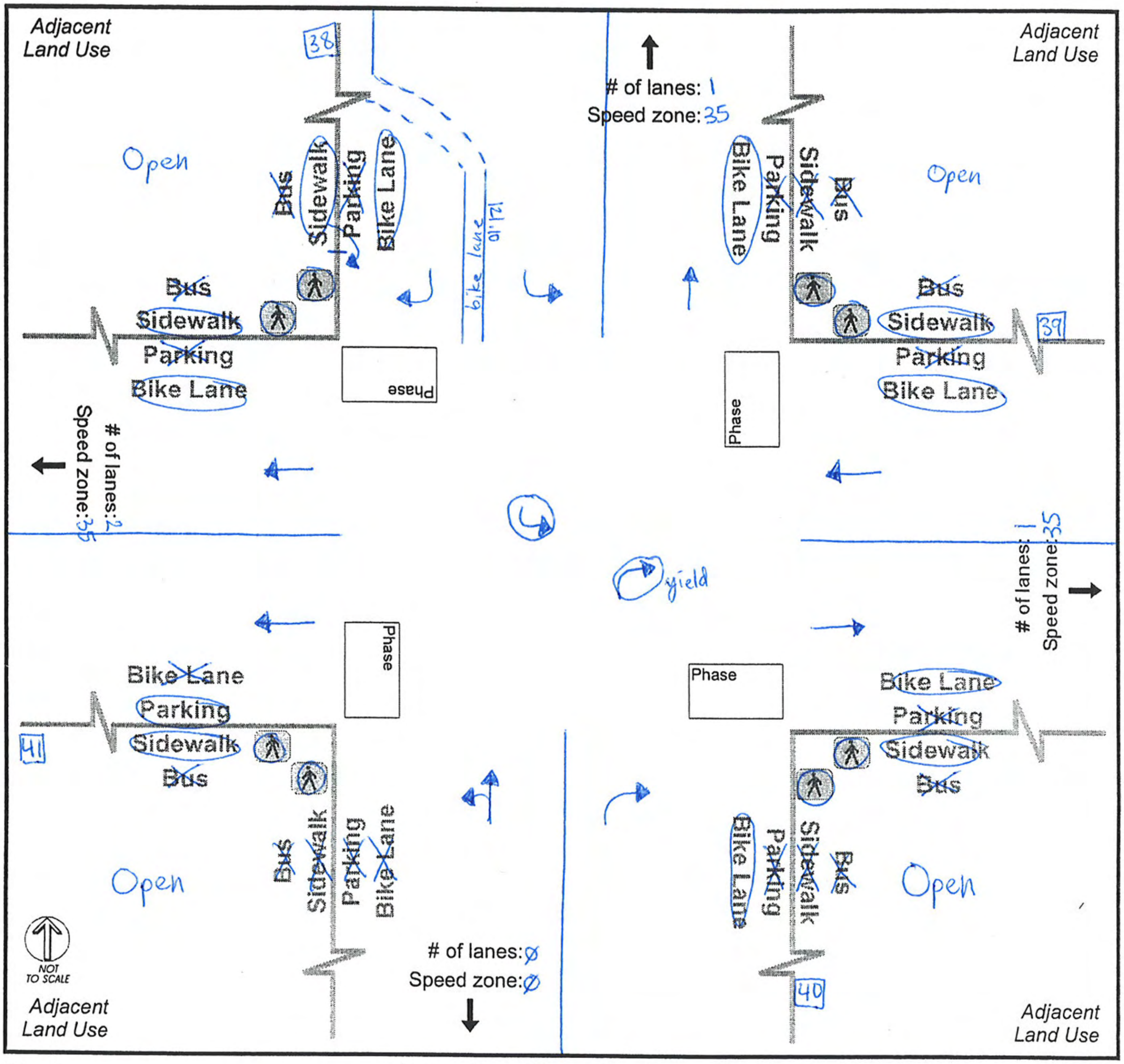
Cycle Length:

ROR per cycle

Perceived LOS					
A	B	C	D	E	F

LANE GEOMETRY

Date: 1/8/07
Time:
Intersection Name: Parkway SB Ramp and Colorado Avenue



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

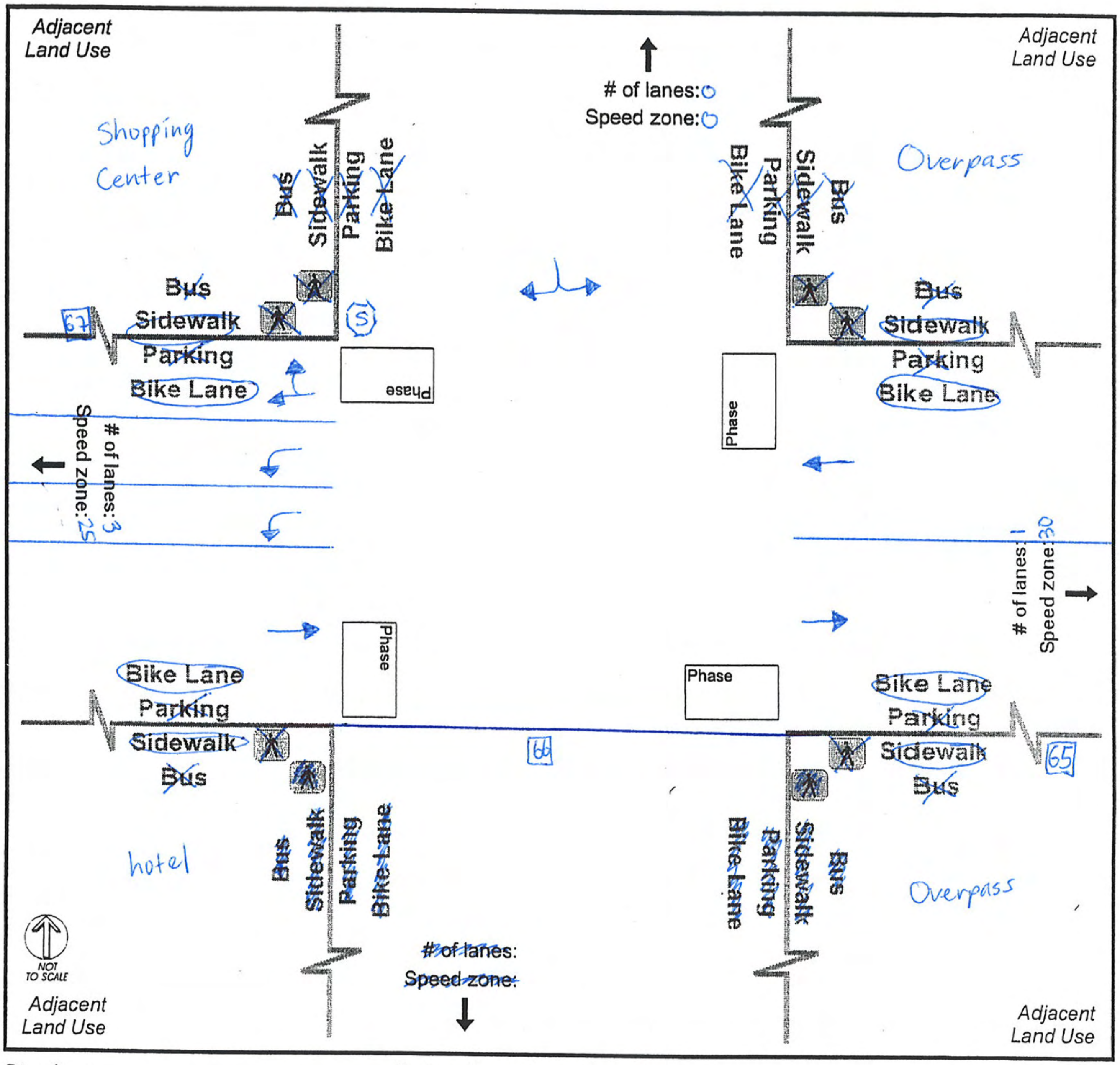
ROR per cycle

Perceived LOS

A B C D E F

LANE GEOMETRY

Date: 1/8/07
Time:
Intersection Name: Butler Market Road and Parkway SB Ramp



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

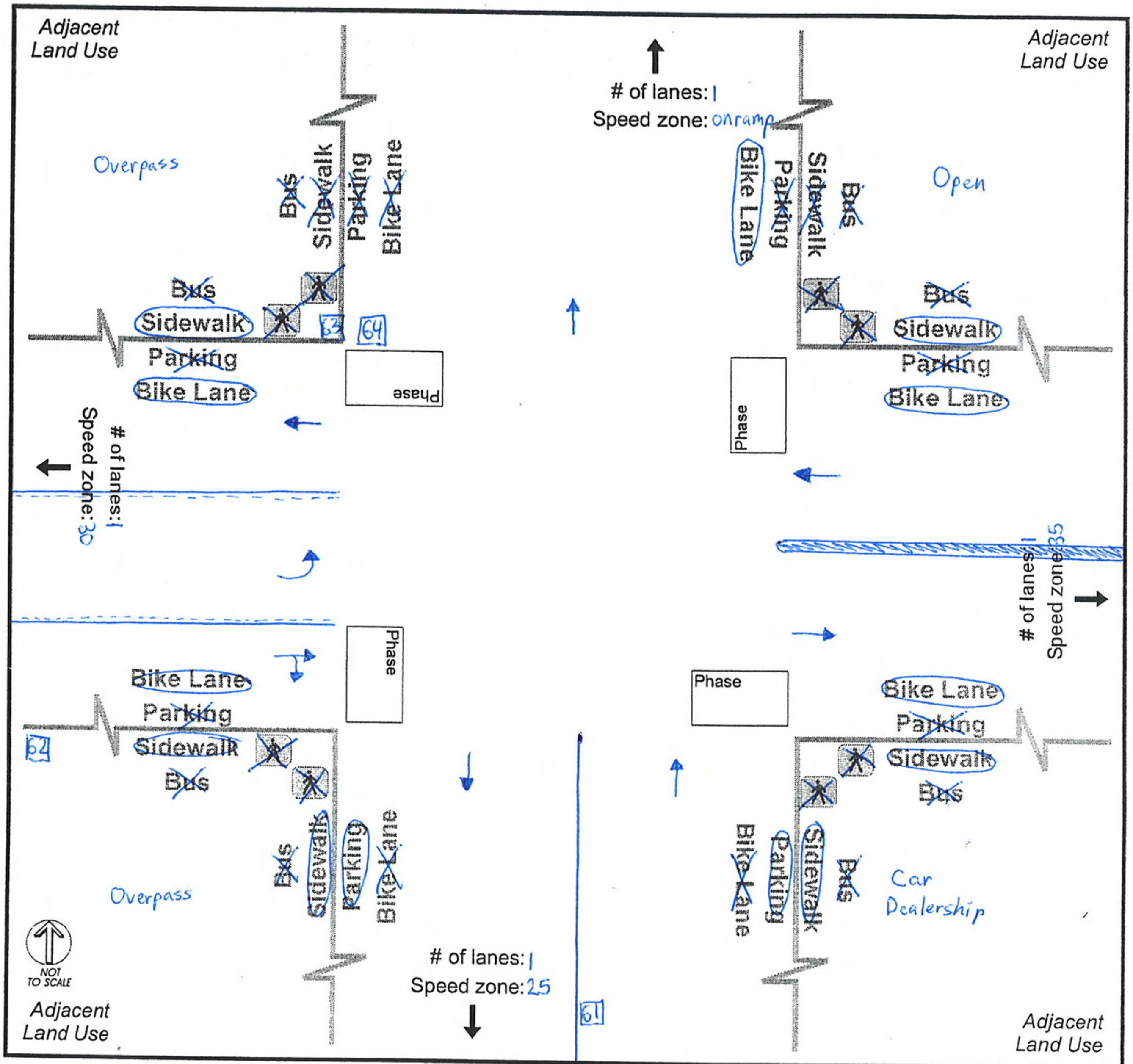
ROR per cycle

Perceived LOS

A B C D E F

LANE GEOMETRY

Date: 1/9/07
Time:
Intersection Name: Parkway NB Ramp and Butler Market Road



Staging:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:
Cycle Length:
Cycle Length:

ROR per cycle

Queuing Problems:

Perceived LOS

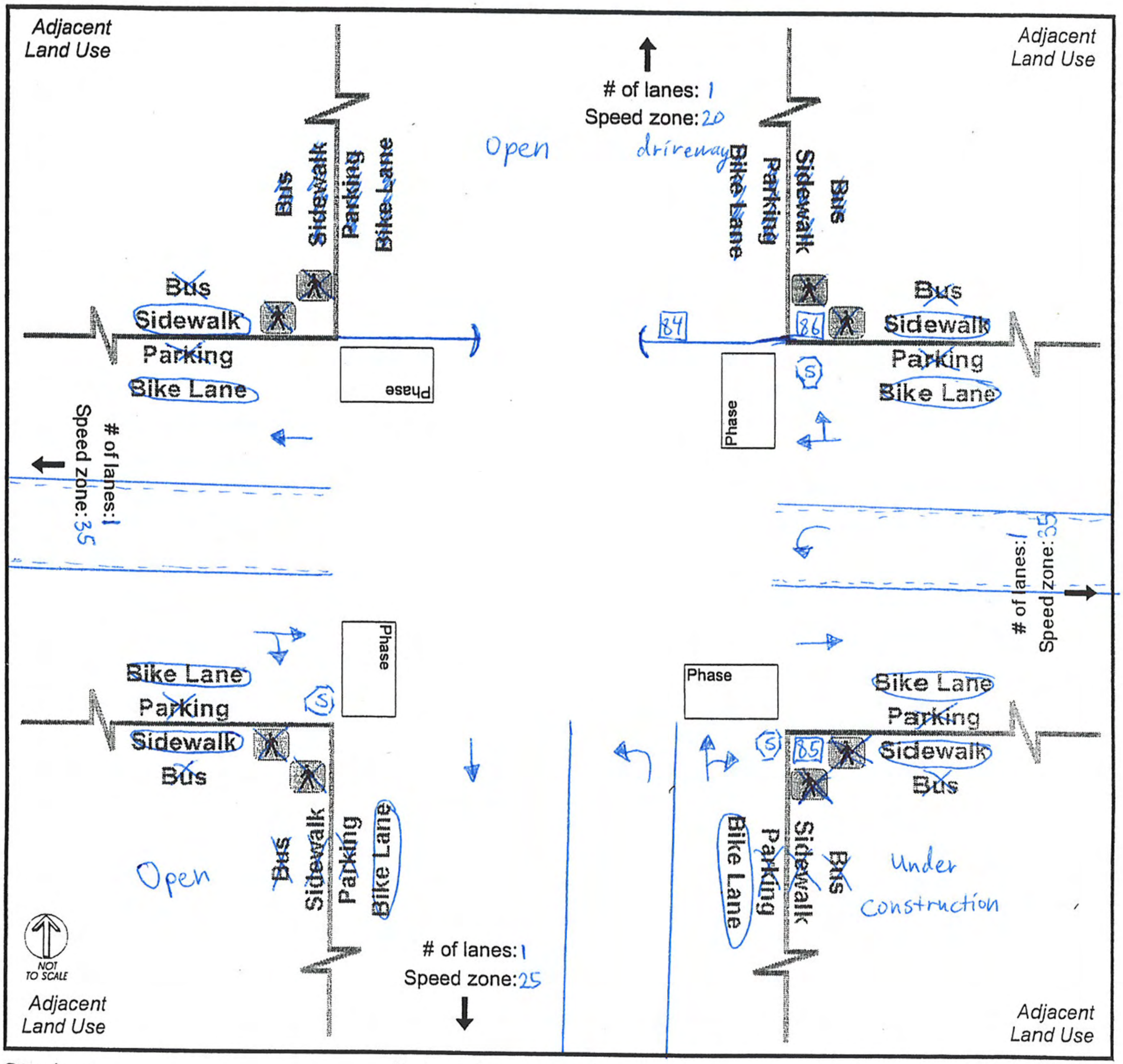
A B C D E F

LANE GEOMETRY

Date: 1/9/07

Time:

Intersection Name: 4th Street and Butler Market Road



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Perceived LOS

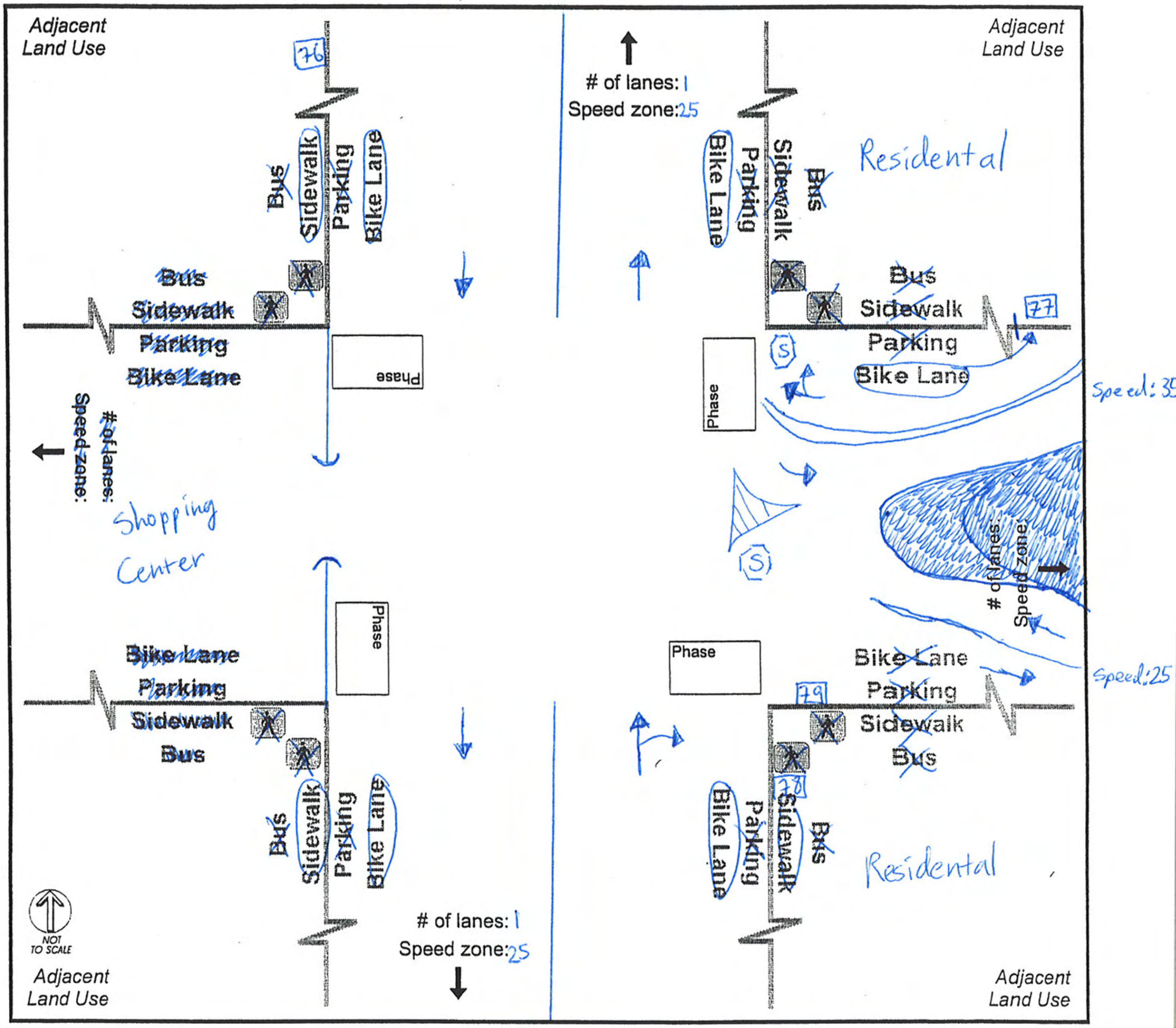
A B C D E F

LANE GEOMETRY

Date: 1/9/07

Time:

Intersection Name: 4th Street and Studio Road



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Perceived LOS

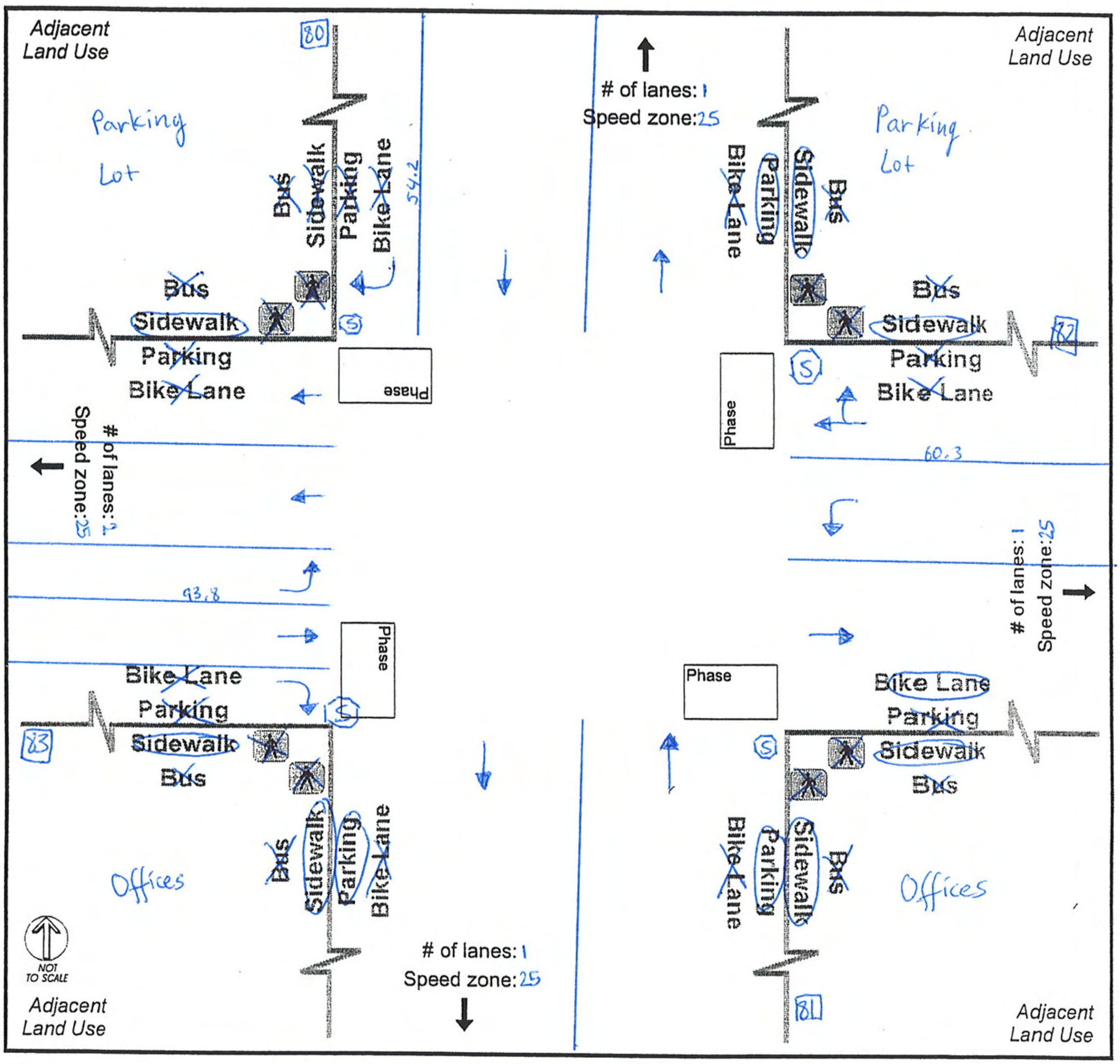
A B C D E F

LANE GEOMETRY

Date: 1/9/07

Time: ____________

Intersection Name: 4th Street and Revere Avenue



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

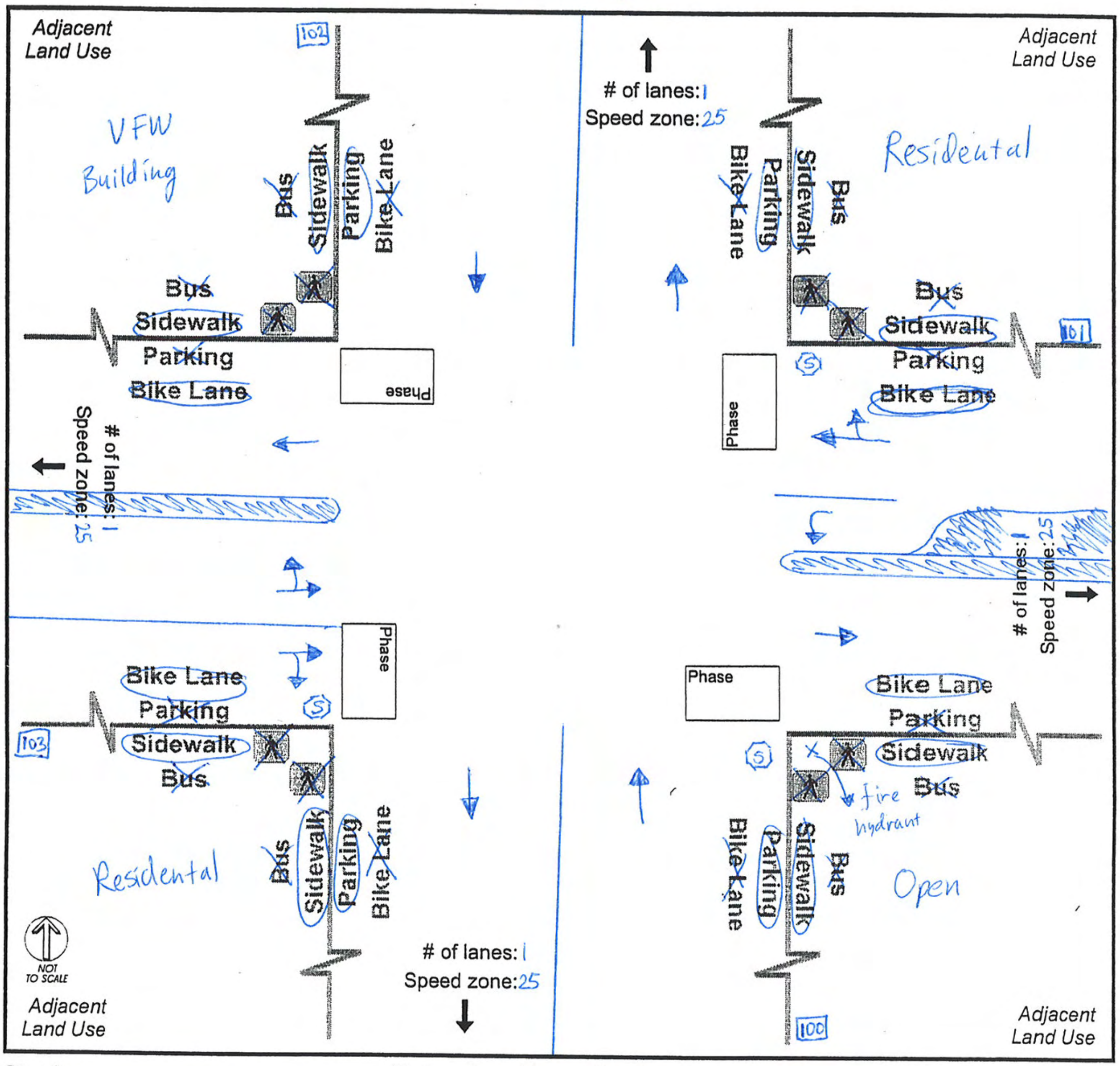
Perceived LOS					
A	B	C	D	E	F

LANE GEOMETRY

Date: 1/9/07

Time:

Intersection Name: 4th Street and Olney Avenue



Staging:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Queuing Problems:

Perceived LOS

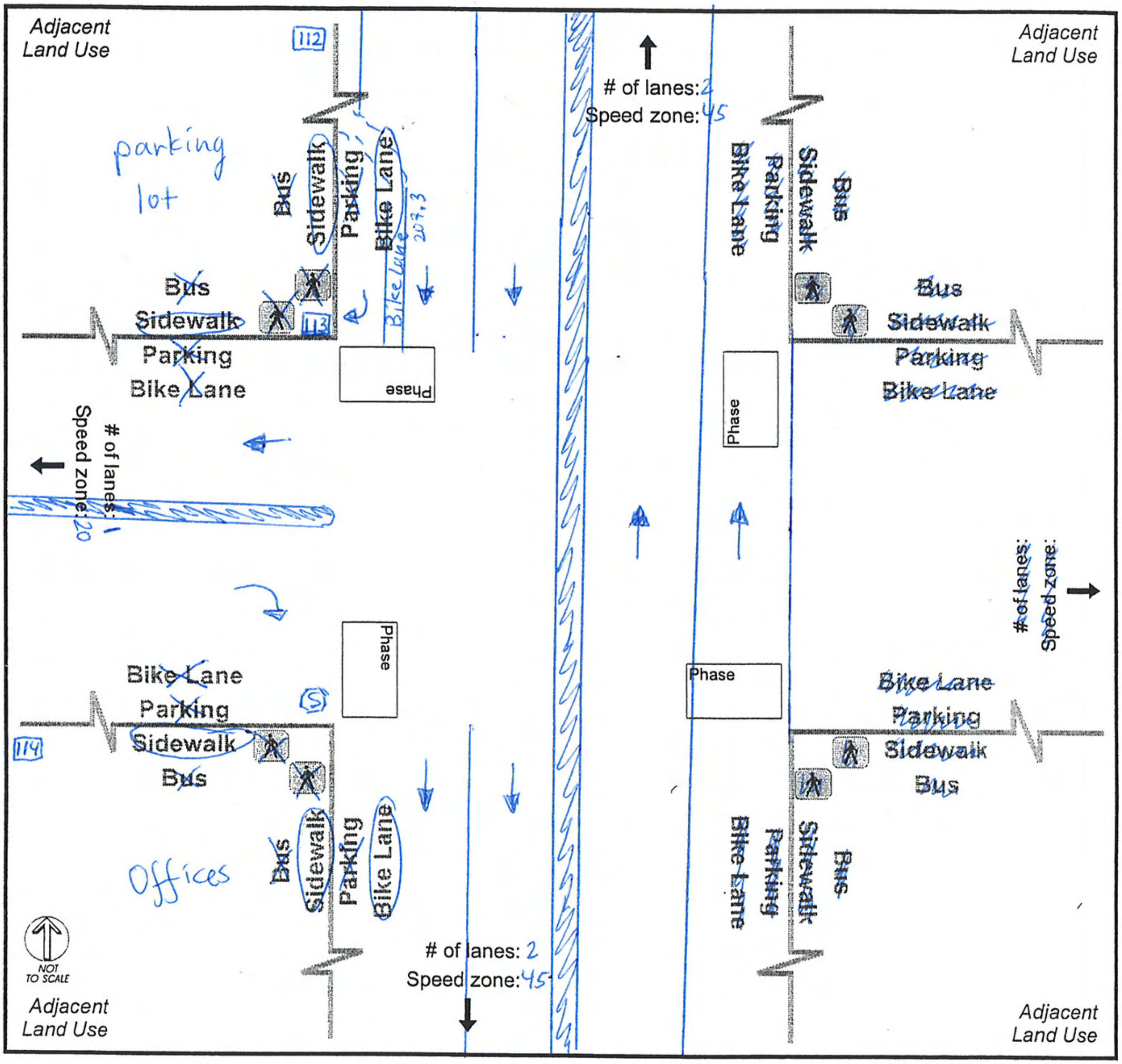
A B C D E F

LANE GEOMETRY

Date: 1/9/07

Time:

Intersection Name: Parkway SB and Lafayette Avenue



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Perceived LOS

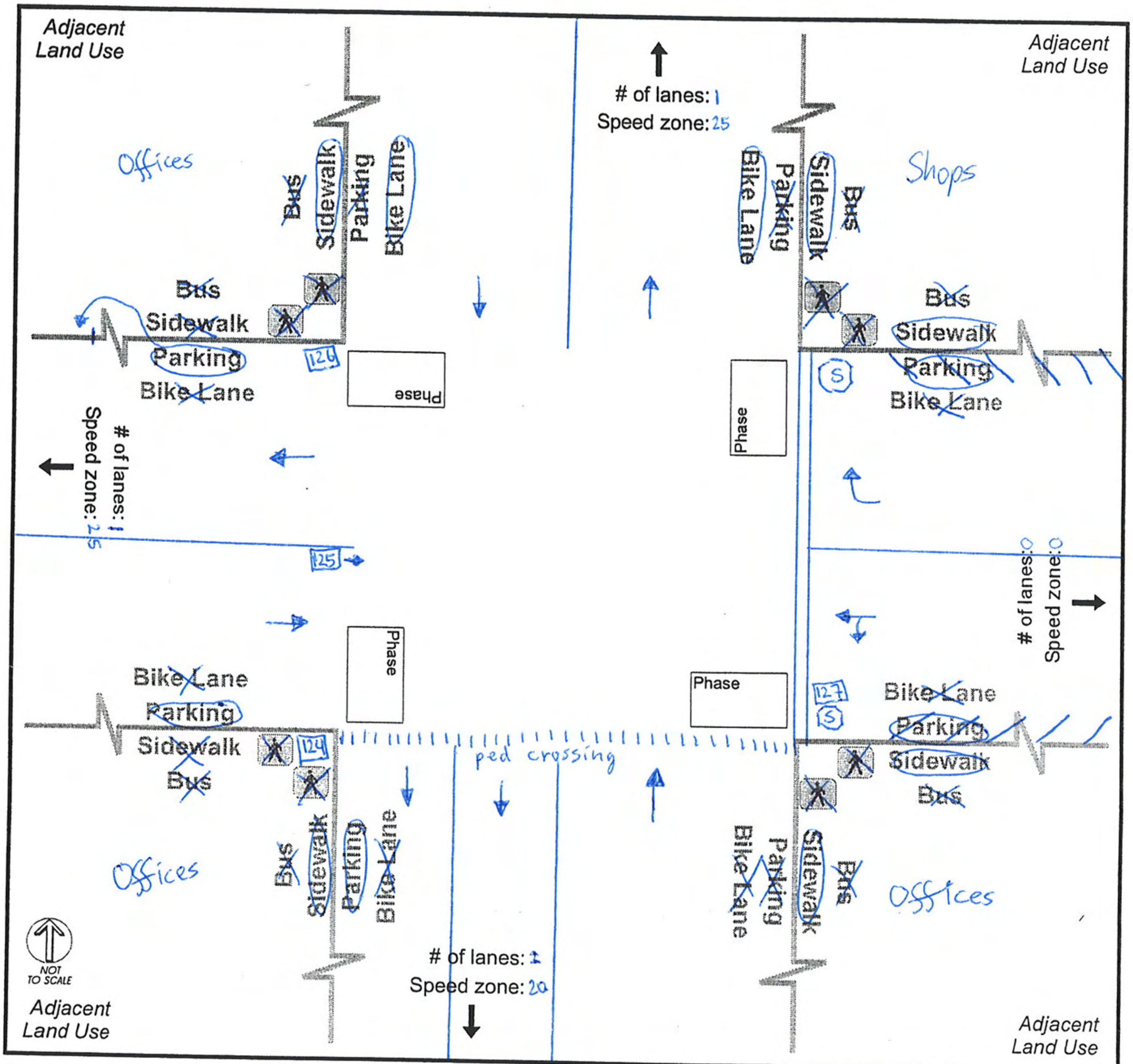
A B C D E F

LANE GEOMETRY

Date: 1/9/07

Time:

Intersection Name: Wall Street and Bond Street



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Perceived LOS

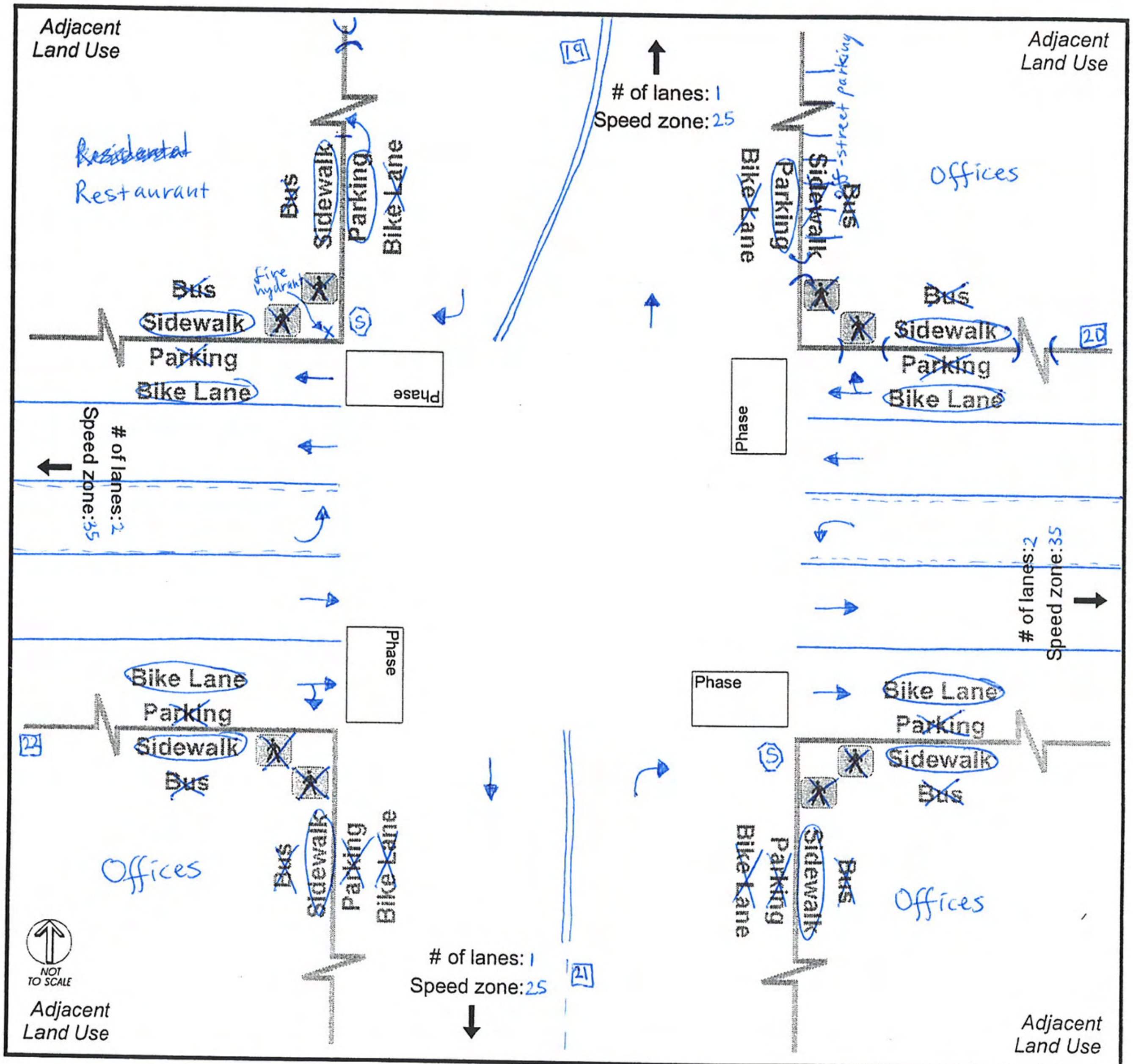
A B C D E F

LANE GEOMETRY

Date: 1/8/07

Time:

Intersection Name: Greenwood Avenue and 4th Street



Staging:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Queuing Problems:

Perceived LOS

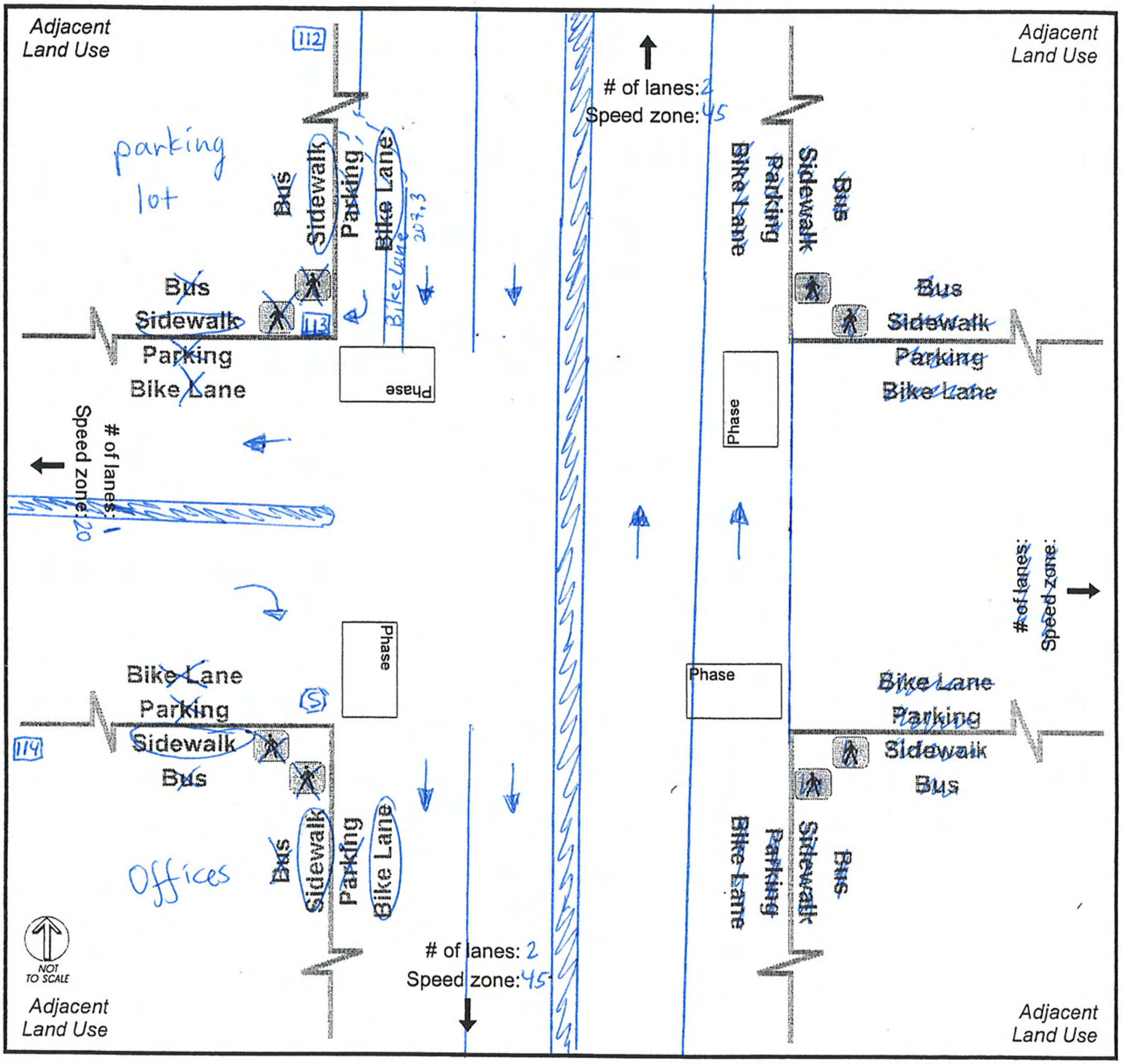
A B C D E F

LANE GEOMETRY

Date: 1/9/07

Time:

Intersection Name: Parkway SB and Lafayette Avenue



Staging:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Queuing Problems:

Perceived LOS

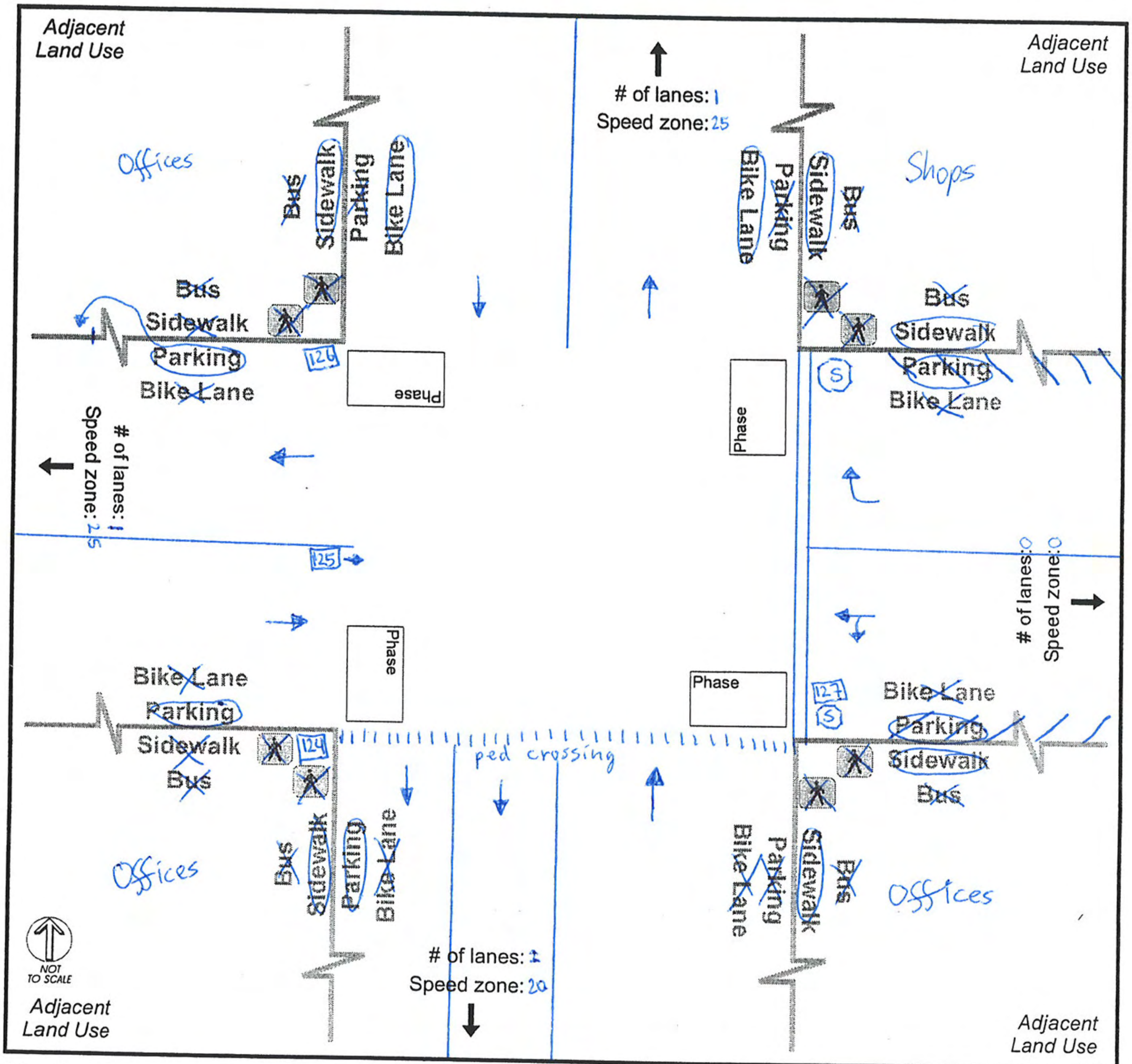
A B C D E F

LANE GEOMETRY

Date: 1/9/07

Time:

Intersection Name: Wall Street and Bond Street



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Perceived LOS

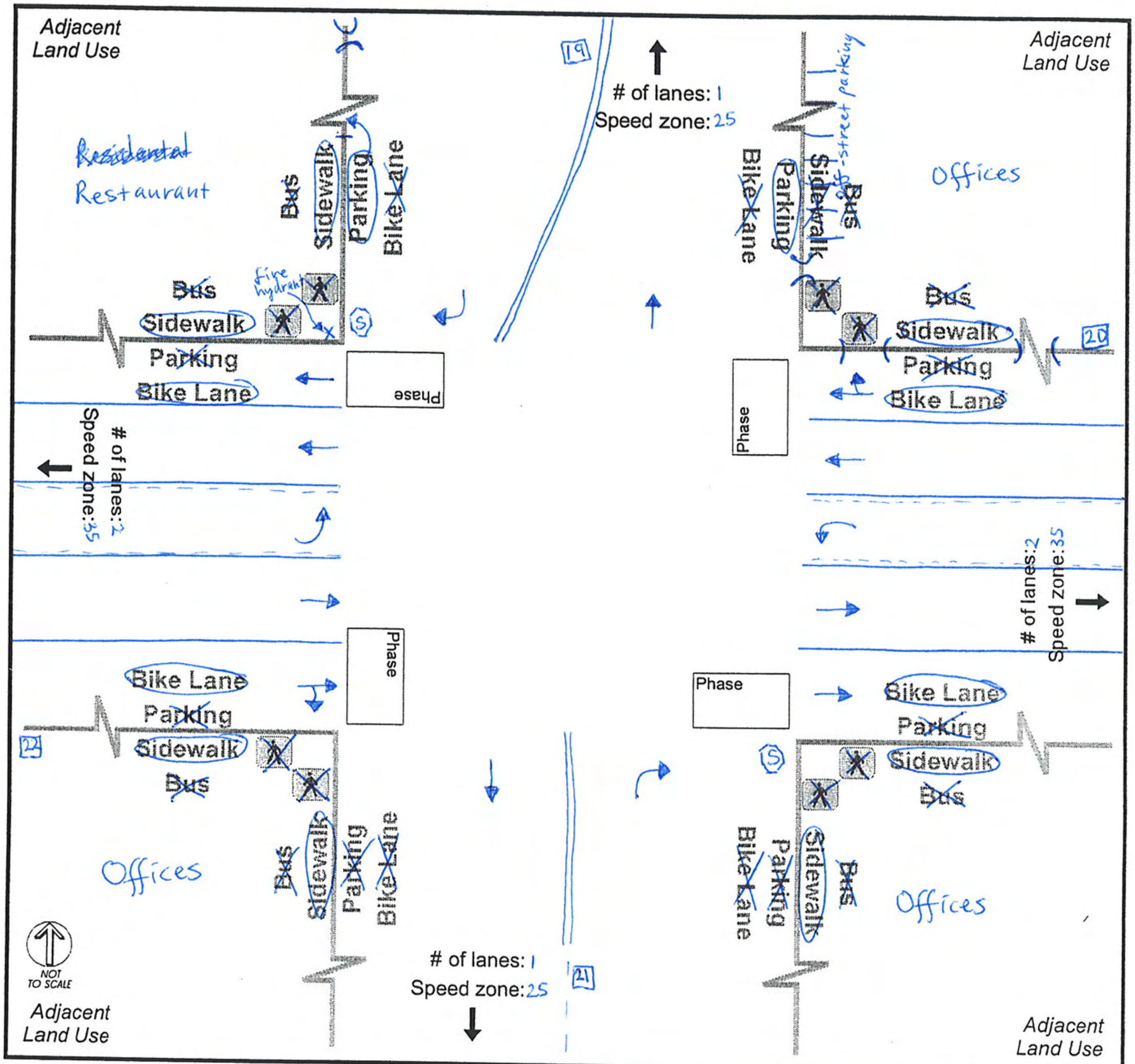
A B C D E F

LANE GEOMETRY

Date: 1/8/07

Time:

Intersection Name: Greenwood Avenue and 4th Street



Staging:

Saturation Flow Check

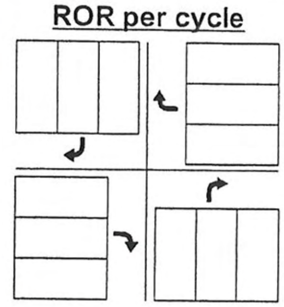
Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle



Queuing Problems:

Perceived LOS

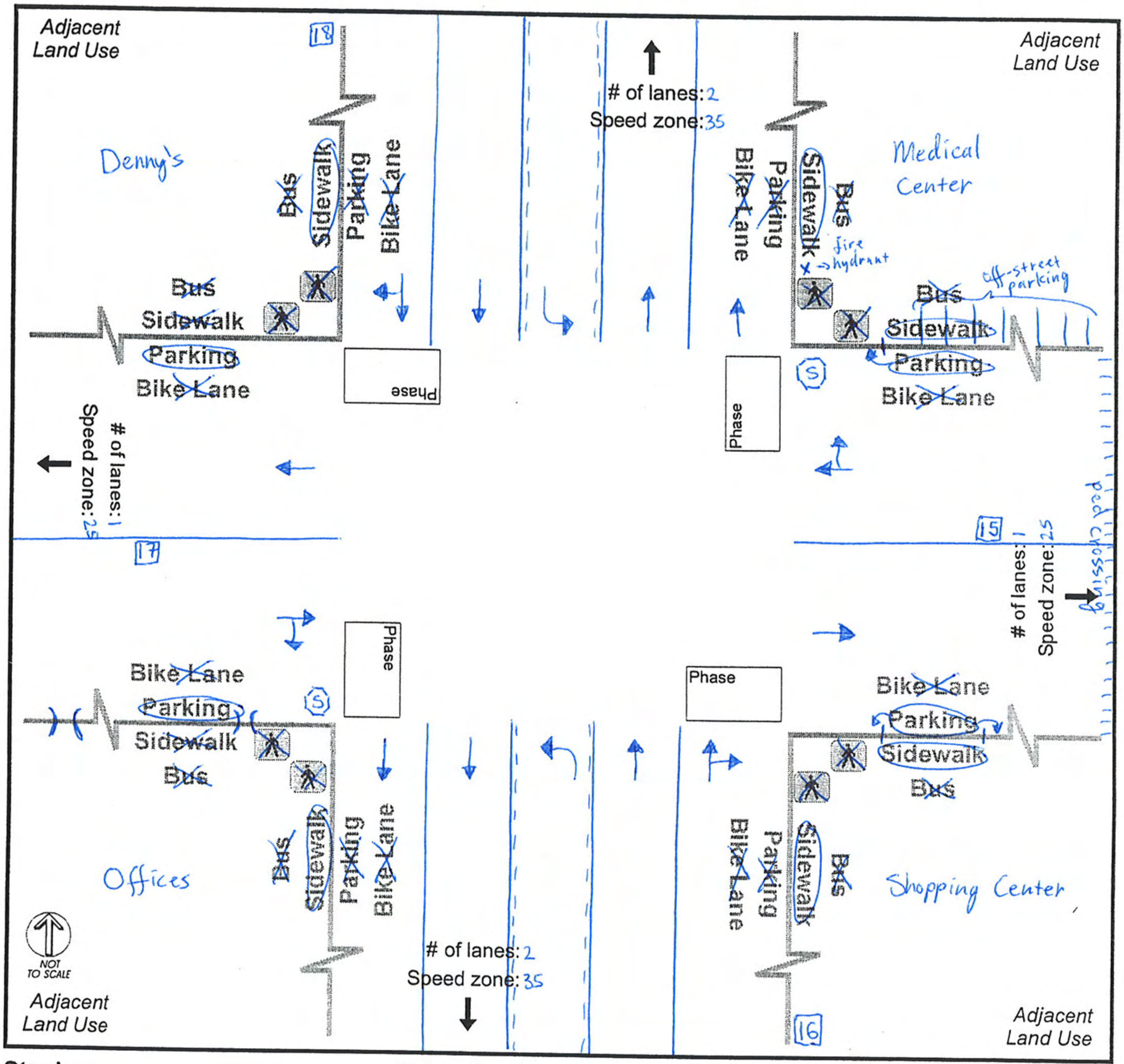
A B C D E F

LANE GEOMETRY

Date: 1/8/07

Time:

Intersection Name: Hawthorne Avenue and 3rd Street



Staging:

Queuing Problems:

Saturation Flow Check

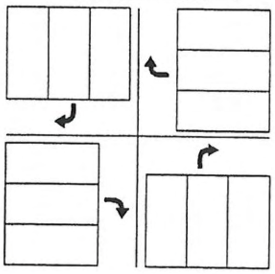
Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle



Perceived LOS

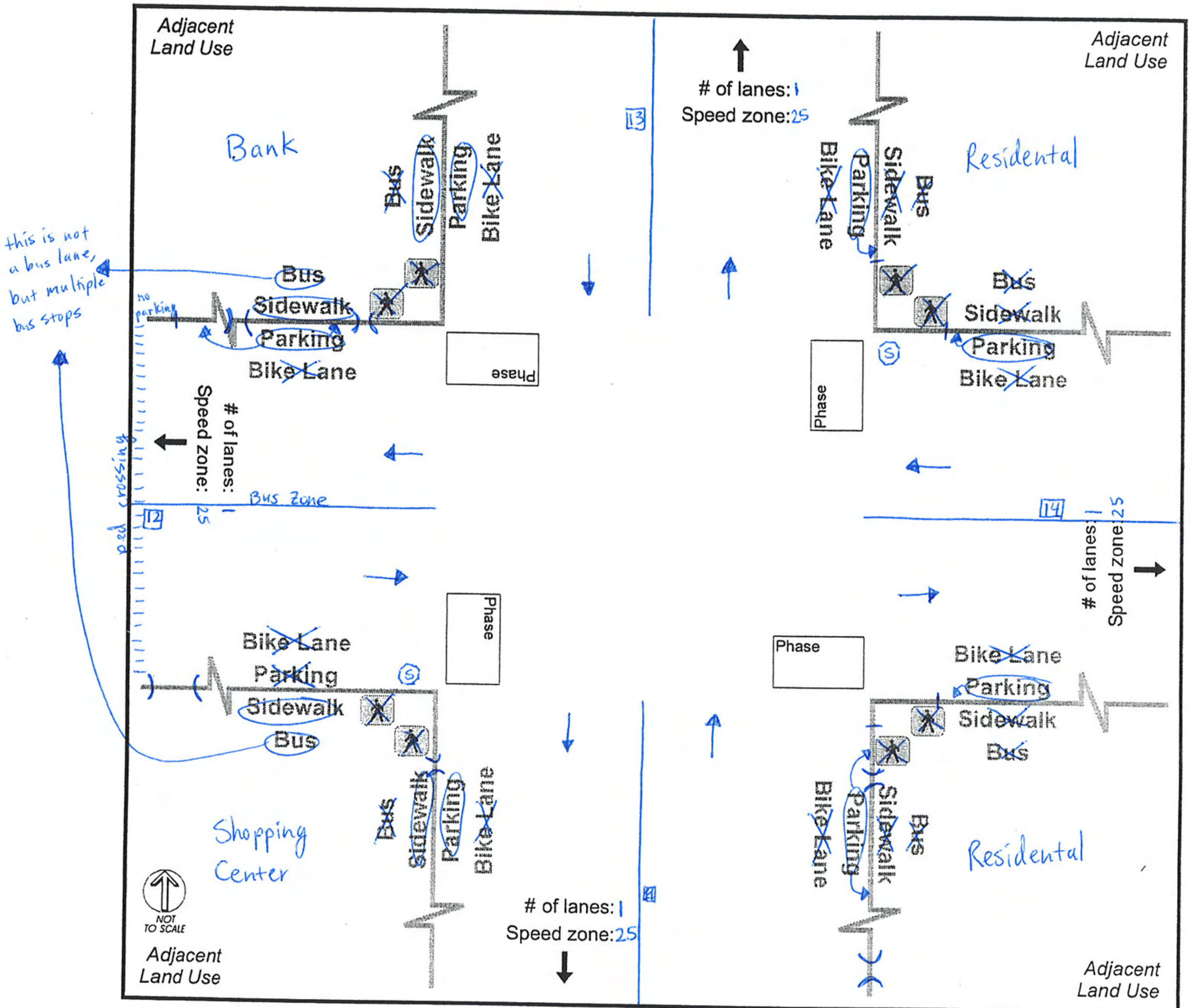
A B C D E F

LANE GEOMETRY

Date: 1/8/07

Time:

Intersection Name: Hawthorne Avenue and 4th Street



Staging:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Queuing Problems:

Perceived LOS

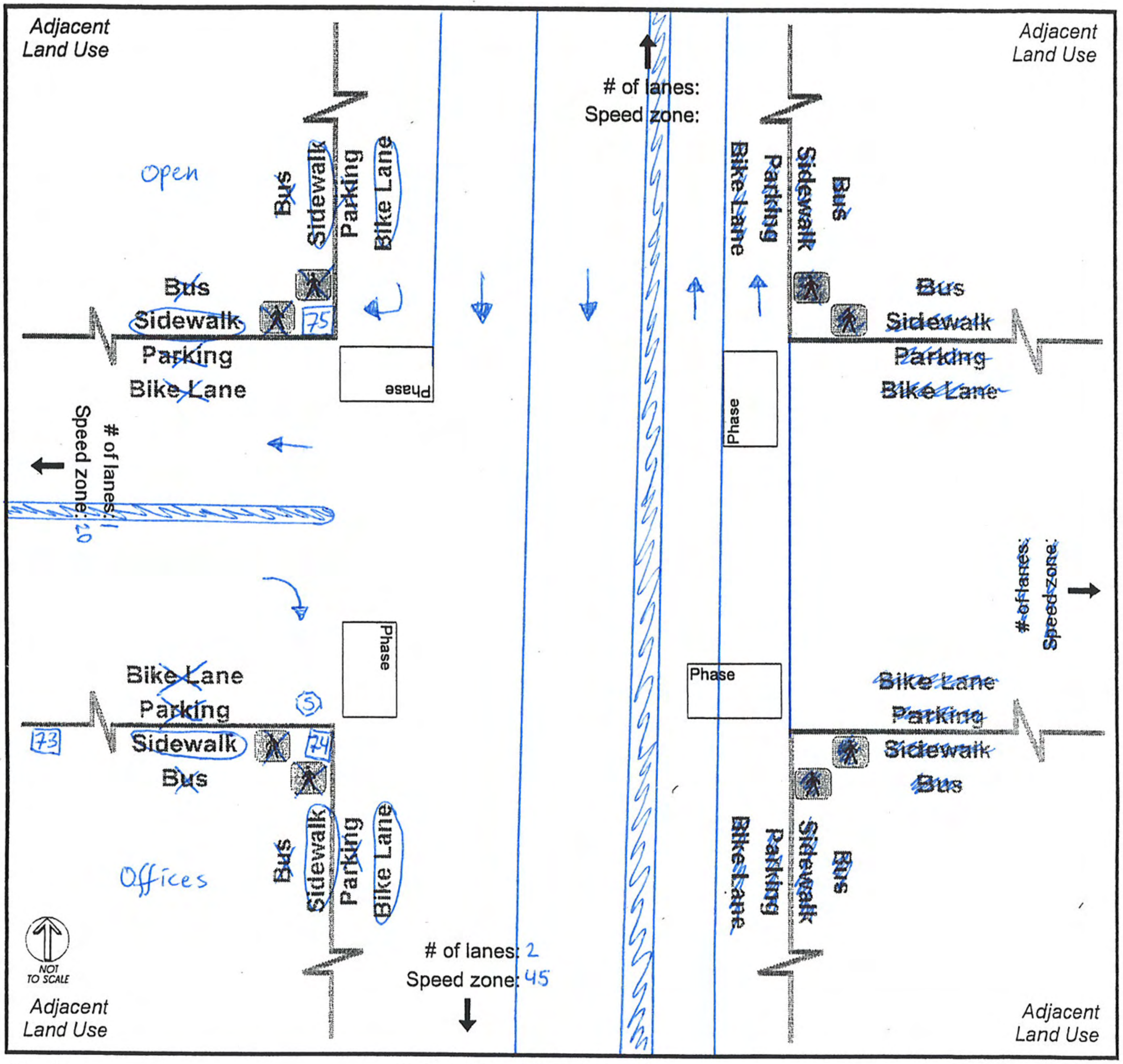
A B C D E F

LANE GEOMETRY

Date: 1/8/09

Time:

Intersection Name: SB Parkway and Hawthorne Avenue



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

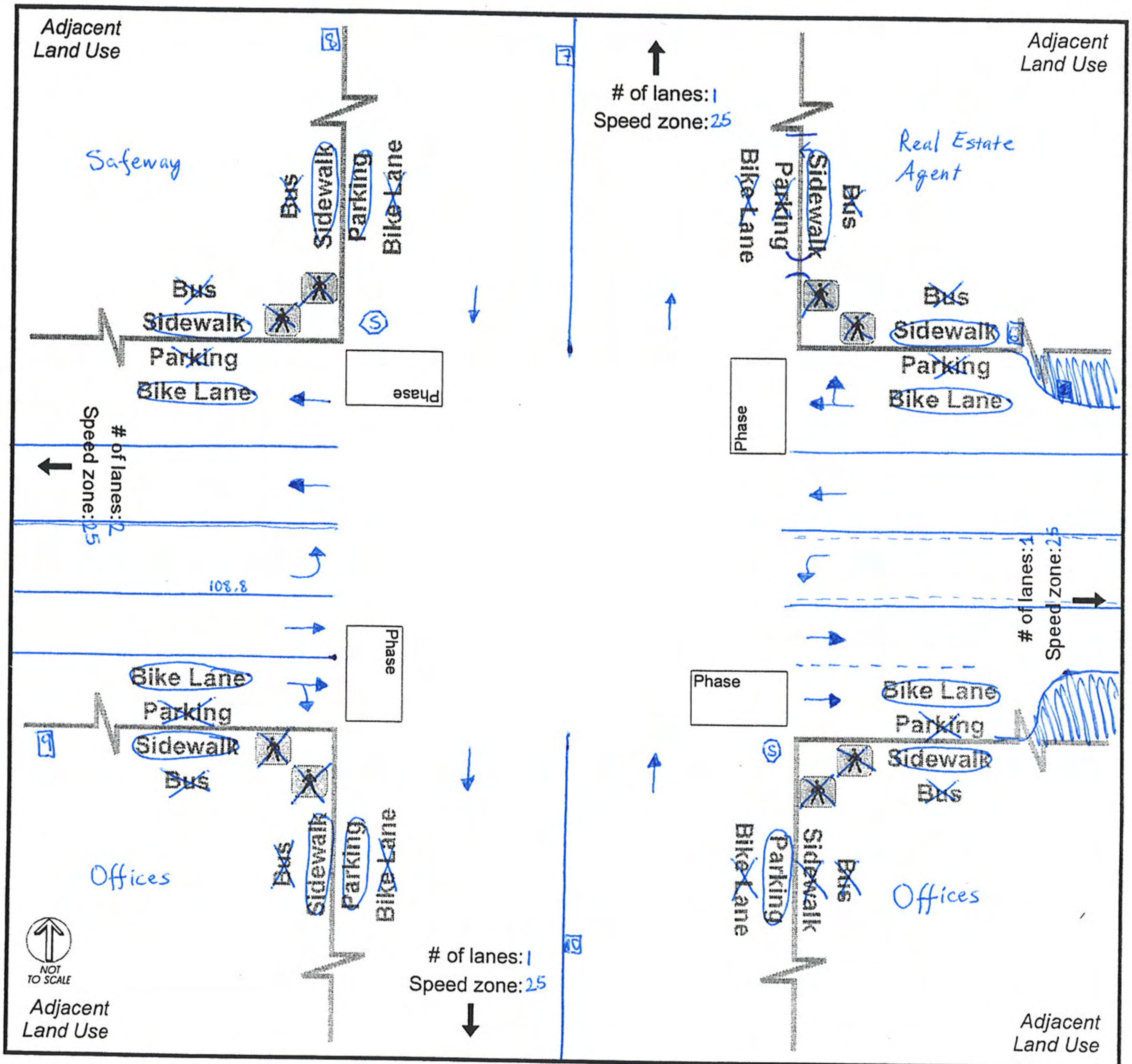
Perceived LOS					
A	B	C	D	E	F

LANE GEOMETRY

Date: 1/8/07

Time:

Intersection Name: NE 4th Street and NE Franklin Avenue



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Perceived LOS

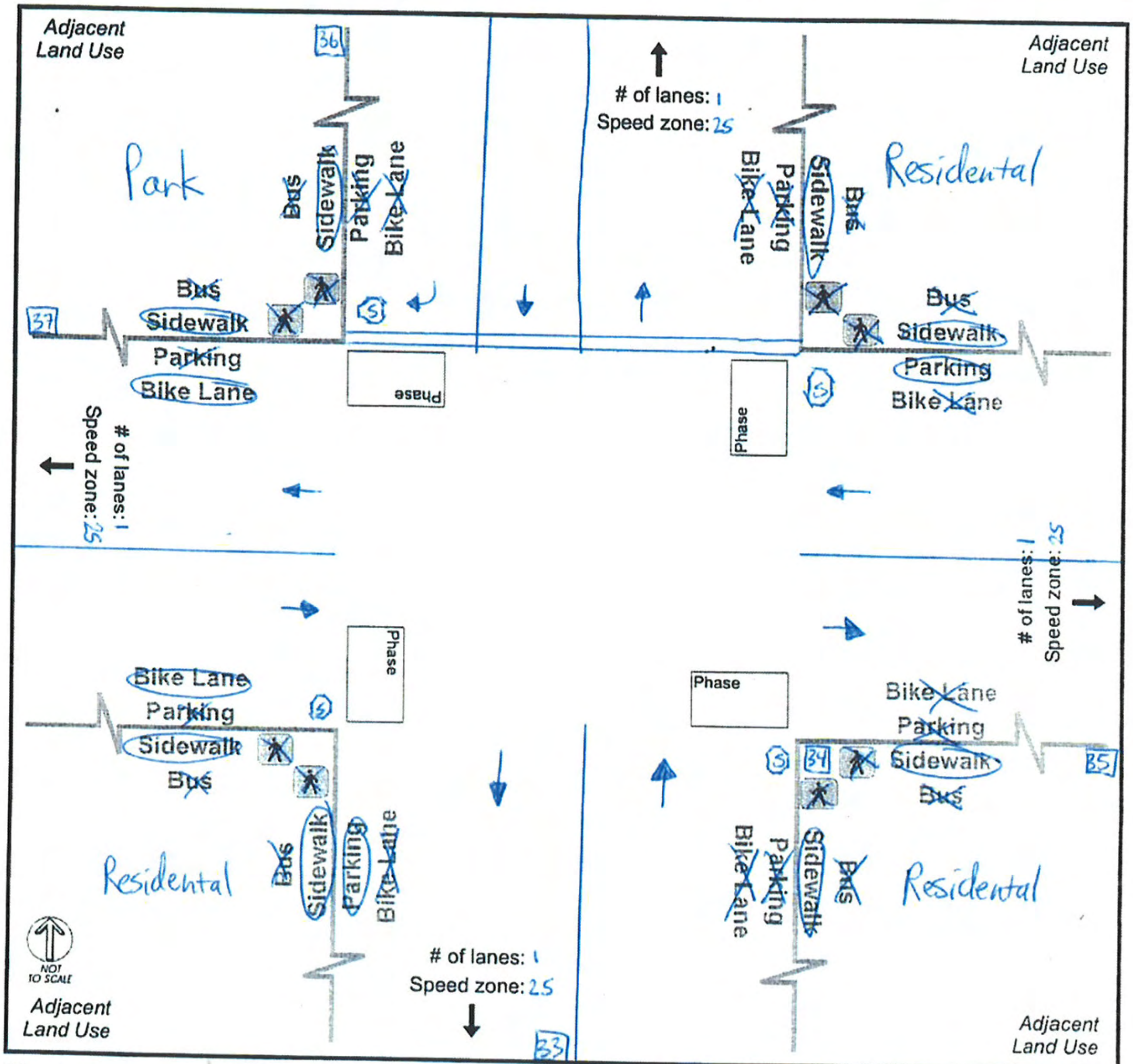
A B C D E F

LANE GEOMETRY

Date: 1/8/07

Time:

Intersection Name: Riverside Drive and Tumalo Avenue



Staging:

Queuing Problems:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Perceived LOS

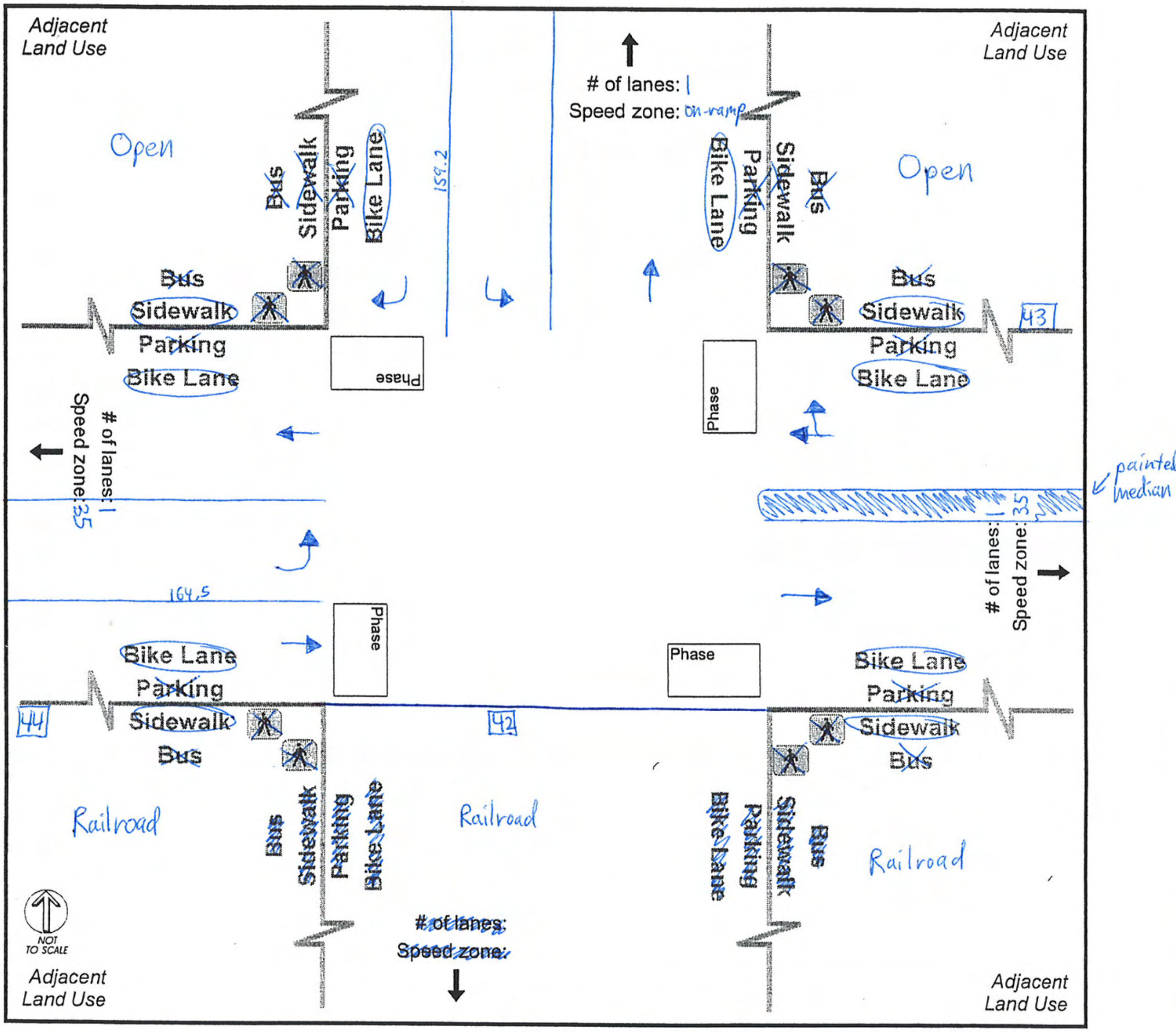
A B C D E F

LANE GEOMETRY

Date: 1/8/07

Time:

Intersection Name: Parkway NB Ramp and Colorado Avenue



Staging:

Saturation Flow Check

Direction	Vehicles	Seconds	Lanes

Cycle Length:

Cycle Length:

Cycle Length:

ROR per cycle

Queuing Problems:

Perceived LOS

A B C D E F

APPENDIX C

Existing Intersection Photographs

Arizona Avenue @ Wall Street:
Looking north through intersection from the west side of Wall Street.
bend 057.jpg

Arizona Avenue @ Wall Street:
Looking south through intersection from northwest corner.
bend 058.jpg

Arizona Avenue @ Wall Street:
Looking east through intersection from south side of Arizona Avenue.
bend 059.jpg

Arizona Avenue @ Wall Street:
Looking east through intersection along north side of Arizona Avenue.
bend 060.jpg

Arizona Avenue @ Bond Street:
Looking north through intersection from along Bond Street.
bend 045.jpg

Arizona Avenue @ Bond Street:
Looking west along north side of Arizona Avenue.
bend 046.jpg

Arizona Avenue @ Bond Street:
Looking east through intersection from northwest corner.
bend 047.jpg

Arizona Avenue @ Bond Street:
Looking north through intersection from southeast corner.
bend 048.jpg

Butler Market Road @ US 97/20:
Looking north through intersection from east side of US 97/20.
bend 069.jpg

Butler Market Road @ US 97/20:
Looking west along Butler Market Road from north side.
bend 070.jpg

Butler Market Road @ US 97/20:
Looking south through intersection from northwest side of US 97/20.
bend 071.jpg

Butler Market Road @ US 97/20:
Looking east through intersection from south side of Butler Market Road.
bend 072.jpg

Butler Market Road @ Parkway SB Ramp:
Looking west through intersection from south east corner of intersection.
bend 065.jpg

Butler Market Road @ Parkway SB Ramp:
Looking north through intersection from south side of Butler Market Road.
bend 066.jpg

Butler Market Road @ Parkway SB Ramp:
Looking east through intersection from north side of Butler Market Road.
bend 067.jpg

Butler Market Road @ US 97/20:
Looking west through intersection from southeast corner.
bend 068.jpg

Butler Market Road @ Parkway NB Ramp:
Looking north through intersection from south of intersection.
bend 061.jpg

Butler Market Road @ Parkway NB Ramp:
Looking east through intersection from south side of Butler Market Road.
bend 062.jpg

Butler Market Road @ Parkway NB Ramp:
Looking east through intersection from the northwest corner.
bend 063.jpg

Butler Market Road @ Parkway NB Ramp:
Close-up looking east through intersection the northwest corner.
bend 064.jpg

Butler Market Road @ 4^{th} Street:
Looking south through intersection along 4^{th} Street.
bend 085.jpg

Butler Market Road @ 4^{th} Street:
Looking east through intersection from north side of Butler Market Road.
bend 086.jpg

Butler Market Road @ 4^{th} Street:
Looking south through intersection from northeast corner.
bend 084.jpg

Colorado Avenue @ Wall Street:
Looking east through intersection from south side of Colorado Avenue.
bend 053.jpg

Colorado Avenue @ Wall Street:
Looking west through intersection from southeast corner.
bend 054.jpg

Colorado Avenue @ Wall Street:
Looking north through intersection along west side of Wall Street.
bend 055.jpg

Colorado Avenue @ Wall Street:
Looking south through intersection from northwest corner.
bend 056.jpg

Colorado Avenue @ Bond Street:
Looking north through intersection from east side of Bond Street.
bend 049.jpg

Colorado Avenue @ Bond Street:
Looking west through intersection from south side of Colorado Avenue.
bend 050.jpg

Colorado Avenue @ Bond Street:
Looking north through intersection from southeast corner.
bend 051.jpg

Colorado Avenue @ Bond Street:
Looking east through intersection from south side of Colorado Avenue.
bend 052.jpg

Colorado Avenue @ Parkway SB Ramp:
Looking south into intersection from west side ramp.
bend 038.jpg

Colorado Avenue @ Parkway SB Ramp:
Looking west into intersection from north side of Colorado Avenue.
bend 039.jpg

Colorado Avenue @ Parkway SB Ramp:
Looking north into intersection from southeast corner.
bend 040.jpg

Colorado Avenue @ Parkway SB Ramp:
Looking east through intersection along south side of Colorado Avenue.
bend 041.jpg

Colorado Avenue @ Parkway NB Ramp:
Looking north through intersection from south side of Colorado Avenue.
bend 042.jpg

Colorado Avenue @ Parkway NB Ramp:
Looking east through intersection from southwest corner.
bend 044.jpg

Colorado Avenue @ Parkway NB Ramp:
Looking west through intersection from northwest corner.
bend 043.jpg

Franklin Avenue @ Wall Street:
Looking south through intersection from west side of Wall Street.
bend 136.jpg

Franklin Avenue @ Wall Street:
Looking west through intersection from northeast corner.
bend 137.jpg

Franklin Avenue @ Wall Street:
Looking south into intersection from east side of Wall Street.
bend 138.jpg

Franklin Avenue @ Wall Street:
Looking east into intersection from south side of Franklin Avenue.
bend 139.jpg

Franklin Avenue @ Bond Street:
Looking west across intersection from northeast side of Franklin Avenue.
bend 029.jpg

Franklin Avenue @ Bond Street:
Looking north through intersection from southwest corner.
bend 030.jpg

Franklin Avenue @ Bond Street:
Looking east through intersection along southwest side of Franklin Avenue.
bend 031.jpg

Franklin Avenue @ Bond Street:
Looking north across intersection from east side of Bond Street.
bend 032.jpg

Franklin Avenue @ 3rd Street:
Looking south through intersection from northwest corner.
bend 001.jpg

Franklin Avenue @ 3rd Street:
Looking west through intersection from northeast corner.
bend 002.jpg

Franklin Avenue @ 3rd Street:
Looking north through intersection from southeast corner.
bend 003.jpg

Franklin Avenue @ 3rd Street:
Looking east through intersection from southwest corner.
bend 004.jpg

Franklin Avenue @ 3rd Street:
Looking east at right turn lane from southwest corner.
bend 005.jpg

Franklin Avenue @ 4th Street:
Looking west through intersection from northeast corner.
bend 006.jpg

Franklin Avenue @ 4th Street:
Looking south through intersection from north of intersection.
bend 007.jpg

Franklin Avenue @ 4th Street:
Looking south through intersection from northwest corner.
bend 008.jpg

Franklin Avenue @ 4th Street:
Looking west through intersection from southwest corner.
bend 009.jpg

Franklin Avenue @ 4th Street:
Looking north through intersection from the south.
bend 010.jpg

Greenwood Avenue @ Wall Street:
Looking east through intersection from southwest side of Greenwood Avenue.
bend 128.jpg

Greenwood Avenue @ Wall Street:
Looking south through intersection from northwest side of Wall Street.
bend 129.jpg

Greenwood Avenue @ Wall Street:
Looking west through intersection from north side of Greenwood Avenue.
bend 130.jpg

Greenwood Avenue @ Wall Street:
Looking north through intersection from east side of Wall Street.
bend 131.jpg

Greenwood Avenue @ Bond Street:
Looking northwest through intersection from east side of Bond Street.
bend 119.jpg

Greenwood Avenue @ Bond Street:
Looking north through intersection from east side of Bond Street.
bend 120.jpg

Greenwood Avenue @ Bond Street:
Looking west through intersection from north side of Greenwood Avenue.
bend 121.jpg

Greenwood Avenue @ Bond Street:
Looking east into intersection from south side of Greenwood Avenue.
bend 122.jpg

Greenwood Avenue @ Bond Street:
Looking north into intersection from west side of intersection.
bend 123.jpg

Greenwood Avenue @ 3rd Street:
Looking north through intersection from east side of 3rd Street.
bend 023.jpg

Greenwood Avenue @ 3rd Street:
Looking east through intersection along south side of Greenwood Avenue.
bend 024.jpg

Greenwood Avenue @ 3rd Street:
Sidewalk obstruction looking east along Greenwood Avenue.
bend 025.jpg

Greenwood Avenue @ 3rd Street:
Side walk obstruction looking west along Greenwood Avenue.
bend 026.jpg

Greenwood Avenue @ 3rd Street:
Sidewalk obstruction looking south through intersection from northwest side of 3rd Street.
bend 027.jpg

Greenwood Avenue @ 3rd Street:
Looking west through intersection from northeast side of Greenwood Avenue.
bend 028.jpg

Greenwood Avenue @ 4th Street:
Looking south through intersection from the north corner.
bend 019.jpg

Greenwood Avenue @ 4th Street:
Looking west through intersection along north side of Greenwood Avenue.
bend 020.jpg

Greenwood Avenue @ 4th Street:
Looking north through intersection from the south.
bend 021.jpg

Greenwood Avenue @ 4th Street:
Looking east through intersection along south side of Greenwood Avenue
bend 022.jpg

Hawthorne Avenue @ SB Parkway:
Looking east through intersection from south side of Hawthorne Avenue.
bend 073.jpg

Hawthorne Avenue @ SB Parkway:
Looking north through intersection from southwest corner.
bend 074.jpg

Hawthorne Avenue @ SB Parkway:
Looking south through intersection from northwest corner.
bend 075.jpg

Hawthorne Avenue @ 3rd Street:
Looking west through intersection along Hawthorne Avenue.
bend 015.jpg

Hawthorne Avenue @ 3rd Street:
Looking north through intersection along east side of 3rd Street.
bend 016.jpg

Hawthorne Avenue @ 3rd Street:
Looking east through intersection from west of intersection.
bend 017.jpg

Hawthorne Avenue @ 3rd Street:
Looking southeast through intersection from northwest corner.
bend 018.jpg

Hawthorne Avenue @ 4th Street:
Looking north through intersection from the south.
bend 011.jpg

Hawthorne Avenue @ 4th Street:
Looking east through intersection along 4th Street.
bend 012.jpg

Hawthorne Avenue @ 4th Street:
Looking south through intersection from the north.
bend 013.jpg

Hawthorne Avenue @ 4th Street:
Looking west through intersection along Hawthorne Avenue.
bend 014.jpg

Lafayette Avenue @ Parkway SB Ramp:
Looking south through intersection from west side of the Parkway.
bend 112.jpg

Lafayette Avenue @ Parkway SB Ramp:
Looking south through intersection from northwest corner of Lafayette Avenue.
bend 113.jpg

Lafayette Avenue @ Parkway SB Ramp Lafayette Avenue:
Looking east into intersection from south side of Lafayette Avenue.
bend 114.jpg

Olney Avenue @ BNSF Railroad Crossing:
Looking east through crossing along Olney Avenue.
bend 143.jpg

Olney Avenue @ 3rd Street:
Looking west through intersection from north side of Olney Avenue.
bend 104.jpg

Olney Avenue @ 3rd Street:
Looking south through intersection from northwest side of 3rd Street.
bend 105.jpg

Olney Avenue @ 3rd Street:
Looking east into intersection from south side Olney Avenue.
bend 106.jpg

Olney Avenue @ 3rd Street:
Looking north into intersection from east side of Olney Avenue.
bend 107.jpg

Olney Avenue @ 4th Street:
Looking north into intersection from southeast side of 4th Street.
bend 100.jpg

Olney Avenue @ 4th Street:
Looking west through intersection along north side of Olney Avenue.
bend 101.jpg

Olney Avenue @ 4th Street:
Looking south through intersection from west side of 4th Street.
bend 102.jpg

Olney Avenue @ 4th Street:
Looking east through intersection from south side of Olney Avenue.
bend 103.jpg

Oregon Avenue @ Wall Street:
Looking west into intersection from northeast corner.
bend 132.jpg

Oregon Avenue @ Wall Street:
Looking south through intersection from northeast corner.
bend 133.jpg

Oregon Avenue @ Wall Street:
Looking east through intersection from southwest corner.
bend 134.jpg

Oregon Avenue @ Wall Street:
Looking north through intersection from southwest corner.
bend 135.jpg

Oregon Avenue @ Bond Street:
Looking west into intersection from north side of Oregon Avenue.
bend 115.jpg

Oregon Avenue @ Bond Street:
Looking west into intersection from northeast corner.
bend 116.jpg

Oregon Avenue @ Bond Street:
Looking south through intersection from east side of Oregon Avenue.
bend 117.jpg

Oregon Avenue @ Bond Street:
Looking north through intersection from southwest corner of Oregon Avenue.
bend 140.jpg

Oregon Avenue @ Bond Street:
Looking north through intersection from southwest corner of Oregon Avenue.
bend 118.jpg

Portland Avenue @ Hill Street:
Looking east into intersection from south side of Portland Avenue.
bend 108.jpg

Portland Avenue @ Hill Street:
Looking north through intersection from the south.
bend 142.jpg

Portland Avenue @ Hill Street:
Looking north through intersection along east side of Hill Street.
bend 109.jpg

Portland Avenue @ Hill Street:
Looking east along Olney Avenue approaching the Parkway.
bend 141.jpg

Portland Avenue @ Hill Street:
Looking west through intersection from the median of Portland Avenue.
bend 110.jpg

Portland Avenue @ Hill Street:
Looking south through intersection from west side of Hill Street.
bend 111.jpg

Parkway SB Ramp @ Revere Avenue:
Looking west toward intersection while approaching the Parkway.
bend 144.jpg

Revere Avenue @ Parkway SB Ramp:
Looking west into intersection from north side of Revere Avenue.
bend 099.jpg

Revere Avenue @ Parkway SB Ramp:
Looking south through intersection from west of ramp.
bend 096.jpg

Revere Avenue @ Parkway SB Ramp:
Looking east through intersection from southwest side of Revere Avenue.
bend 097.jpg

Revere Avenue @ Parkway SB Ramp:
Looking north into intersection from east side.
bend 098.jpg

Revere Avenue @ Parkway NB Ramp:
Looking west into intersection from north side of Revere Avenue.
bend 091.jpg

Revere Avenue @ Parkway NB Ramp:
Looking south into ramp from northeast corner.
bend 092.jpg

Revere Avenue @ Parkway NB Ramp:
Looking south through intersection from the north.
bend 093.jpg

Revere Avenue @ Parkway NB Ramp:
Looking east through intersection from south side of Revere Avenue.
bend 094.jpg

Revere Avenue @ Parkway NB Ramp:
Looking south through intersection from ramp.
bend 095.jpg

Revere Avenue @ Parkway NB Ramp:
Looking west toward BNSF Railroad Crossing from north side of Revere Avenue.
bend 145.jpg

Revere Avenue @ 3rd Street:
Looking west through intersection from north side of Revere Avenue.
bend 087.jpg

Revere Avenue @ 3rd Street:
Looking north through intersection from east side of 3rd Street.
bend 088.jpg

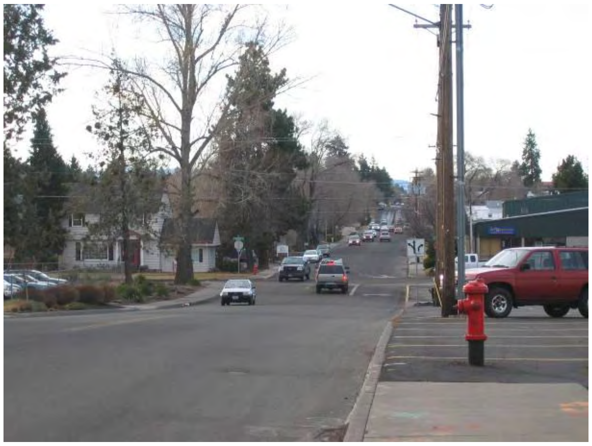
Revere Avenue @ 3rd Street:
Looking east through intersection from south side of Revere Avenue.
bend 089.jpg

Revere Avenue @ 3rd Street:
Looking south into intersection from west side 3rd Street.
bend 090.jpg

Revere Avenue @ 4th Street:
Looking north through intersection from along Revere Avenue.
bend 081.jpg

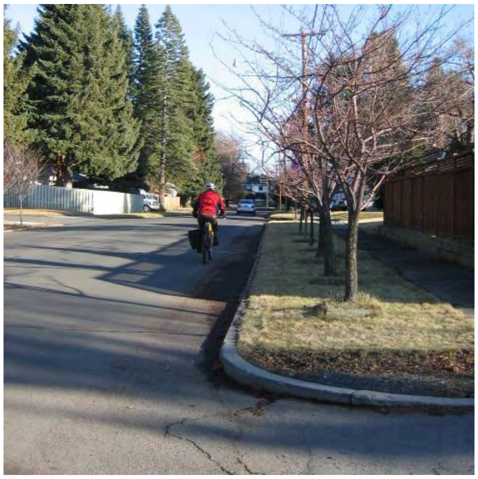
Revere Avenue @ 4th Street:
Looking west through intersection from north side of Revere Avenue.
bend 082.jpg

Revere Avenue @ 4th Street:
Looking east through intersection from south side of Revere Avenue.
bend 083.jpg



Revere Avenue @ 4th Street:
Looking south through intersection along west side 4th Street.
bend 080.jpg

Riverside Boulevard @ Tumalo Avenue:
Looking north through intersection along Riverside Boulevard.
bend 033.jpg



Riverside Boulevard @ Tumalo Avenue:
Looking east along east side of Tumalo Avenue.
bend 034.jpg

Riverside Boulevard @ Tumalo Avenue:
Looking west through intersection along south side of Tumalo Avenue.
bend 035.jpg

Riverside Boulevard @ Tumalo Avenue:
Looking south through intersection along west side Riverside Boulevard.
bend 036.jpg

Riverside Boulevard @ Tumalo Avenue:
Looking east through intersection from northwest side of Tumalo Avenue.
bend 037.jpg

Studio Road @ 4th Street:
Looking south through intersection from west side of 4th Street.
bend 076.jpg

Studio Road @ 4th Street:
Looking southwest through intersection along Studio Road.
bend 077.jpg

Studio Road @ 4th Street:
Looking north through intersection along east side of 4th Street.
bend 078.jpg

Studio Road @ 4th Street:
Looking northeast through intersection from southeast corner.
bend 079.jpg

Wall Street @ Bond Avenue:
Looking north into intersection from southwest corner.
bend 124.jpg

Wall Street @ Bond Avenue:
Looking east through intersection from pedestrian crossing.
bend 125.jpg

Wall Street @ Bond Avenue:
Looking south through intersection from west side of Wall Street.
bend 126.jpg

Wall Street @ Bond Avenue:
Looking west through intersection from east side of intersection.
bend 127.jpg

APPENDIX D

2006 PM Peak Hour Traffic Counts

TRAFSTATS
PO Box 13699
Salem, OR 97309
Tel: (503) 646-2942
Fax: (503) 526-0628

Intersection Turning Movement
Summary Report

Location BUTLER MARKET ROAD AT US 97/20
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: JW

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	24	290	33	33	161	18	25	36	10	32	15	67	744
16:15 - 16:30	14	270	30	25	207	18	28	20	18	32	24	74	760
16:30 - 16:45	15	252	46	24	145	16	38	29	17	30	29	76	717
16:45 - 17:00	22	216	38	24	183	25	19	21	15	42	20	66	691
17:00 - 17:15	11	227	39	39	171	25	21	31	11	29	35	75	714
17:15 - 17:30	27	215	38	30	180	19	27	19	13	23	21	47	659
17:30 - 17:45	12	188	32	31	130	18	20	15	9	30	20	60	565
17:45 - 18:00	16	169	21	26	127	20	14	14	16	23	16	52	514
Movement Totals	141	1827	277	232	1304	159	192	185	109	241	180	517	5364
Enter Totals	2245			1695			486			938			
Exit Totals	2536			1654			694			480			

Two-Hour Totals													
Light Trucks	1	23	0	2	17	0	4	4	0	0	0	7	58
Medium Trucks	1	4	1	1	0	0	0	0	0	1	0	0	8
Heavy Trucks	0	16	4	1	4	0	1	0	0	1	0	5	32
% Trucks	1.4%	2.4%	1.8%	1.7%	1.6%	0.0%	2.6%	2.2%	0.0%	0.8%	0.0%	2.3%	1.8%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	2	1	0	0	0	0	0	0	0	1	0	4

	South	West	East	North	
Pedestrians	7	0	0	0	7

Peak Hour Information

Peak Hour 16:00 17:00

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	75	1028	147	106	696	77	110	106	60	136	88	283	2912
Peak Hour Factor	0.78	0.89	0.80	0.80	0.84	0.77	0.72	0.74	0.83	0.81	0.76	0.93	0.96

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	1250	879	276	507
Peak Hour Factor	0.90	0.88	0.82	0.94

	Eastbound	Westbound	Northbound	Southbound
Exit Totals	1421	892	359	240
Peak Hour Factor	0.93	0.87	0.88	0.90

Light Trucks	0	13	0	1	7	0	1	2	0	0	0	6	30
Medium Trucks	0	2	1	0	0	0	0	0	0	1	0	0	4
Heavy Trucks	0	10	1	1	1	0	1	0	0	1	0	2	17
% Trucks	0.0%	2.4%	1.4%	1.9%	1.1%	0.0%	1.8%	1.9%	0.0%	1.5%	0.0%	2.8%	1.8%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	1	1	0	0	0	0	0	0	0	1	0	3

	South	West	East	North	
Pedestrians	5	0	0	0	5

TRAFSTATS
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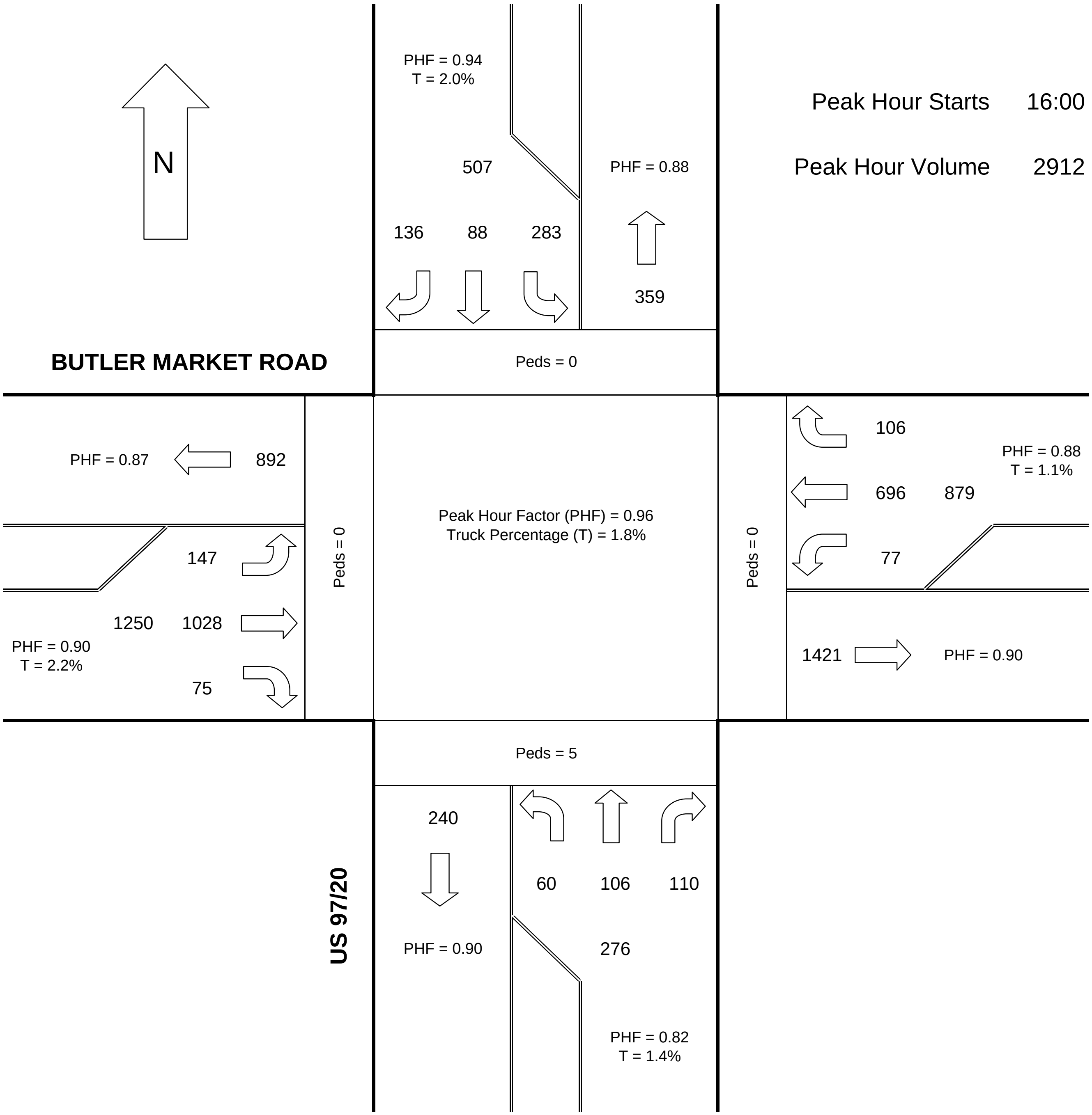
Intersection Turning Movement

Peak Hour Diagram

Location BUTLER MARKET ROAD AT US 97/20
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: JW



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Intersection Turning Movement
Summary Report

Location NE REVERE AVENUE AT BEND PARKWAY SB RAMPS
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: BM

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	0	7	1	68	11	102	126	26	0	2	37	41	421
16:15 - 16:30	2	4	4	68	6	98	119	24	2	4	49	30	410
16:30 - 16:45	1	1	4	58	5	139	99	16	1	0	47	29	400
16:45 - 17:00	1	1	1	57	3	87	113	21	4	0	37	34	359
17:00 - 17:15	2	4	0	69	2	109	164	21	4	0	31	47	453
17:15 - 17:30	4	3	3	58	9	85	132	30	2	4	53	30	413
17:30 - 17:45	1	2	1	55	2	77	114	16	4	0	45	31	348
17:45 - 18:00	2	7	0	31	15	94	81	8	11	0	52	22	323
Movement Totals	13	29	14	464	53	791	948	162	28	10	351	264	3127
Enter Totals	56			1308			1138			625			
Exit Totals	1241			91			640			1155			
Two-Hour Totals													
Light Trucks	0	0	0	4	0	7	9	1	0	0	1	2	24
Medium Trucks	0	0	0	0	0	0	0	0	0	0	0	1	1
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	2	2
% Trucks	0.0%	0.0%	0.0%	0.9%	0.0%	0.9%	0.9%	0.6%	0.0%	0.0%	0.3%	1.9%	0.9%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	2	0	0	4	0	0	0	0	0	0	0	6

	South	West	East	North	
Pedestrians	0	2	2	5	9

Peak Hour Information

Peak Hour 16:30 17:30

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	8	9	8	242	19	420	508	88	11	4	168	140	1625
Peak Hour Factor	0.50	0.56	0.50	0.88	0.53	0.76	0.77	0.73	0.69	0.25	0.79	0.74	0.90
Enter Totals	25			681			607			312			
Peak Hour Factor	0.63			0.84			0.80			0.90			
Exit Totals	657			34			338			596			
Peak Hour Factor	0.76			0.57			0.93			0.80			
Light Trucks	0	0	0	3	0	2	4	0	0	0	0	1	10
Medium Trucks	0	0	0	0	0	0	0	0	0	0	0	1	1
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0.0%	0.0%	0.0%	1.2%	0.0%	0.5%	0.8%	0.0%	0.0%	0.0%	0.0%	1.4%	0.7%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	1	0	0	0	0	0	0	0	1

	South	West	East	North	
Pedestrians	0	0	2	1	3

TRAFSTATS
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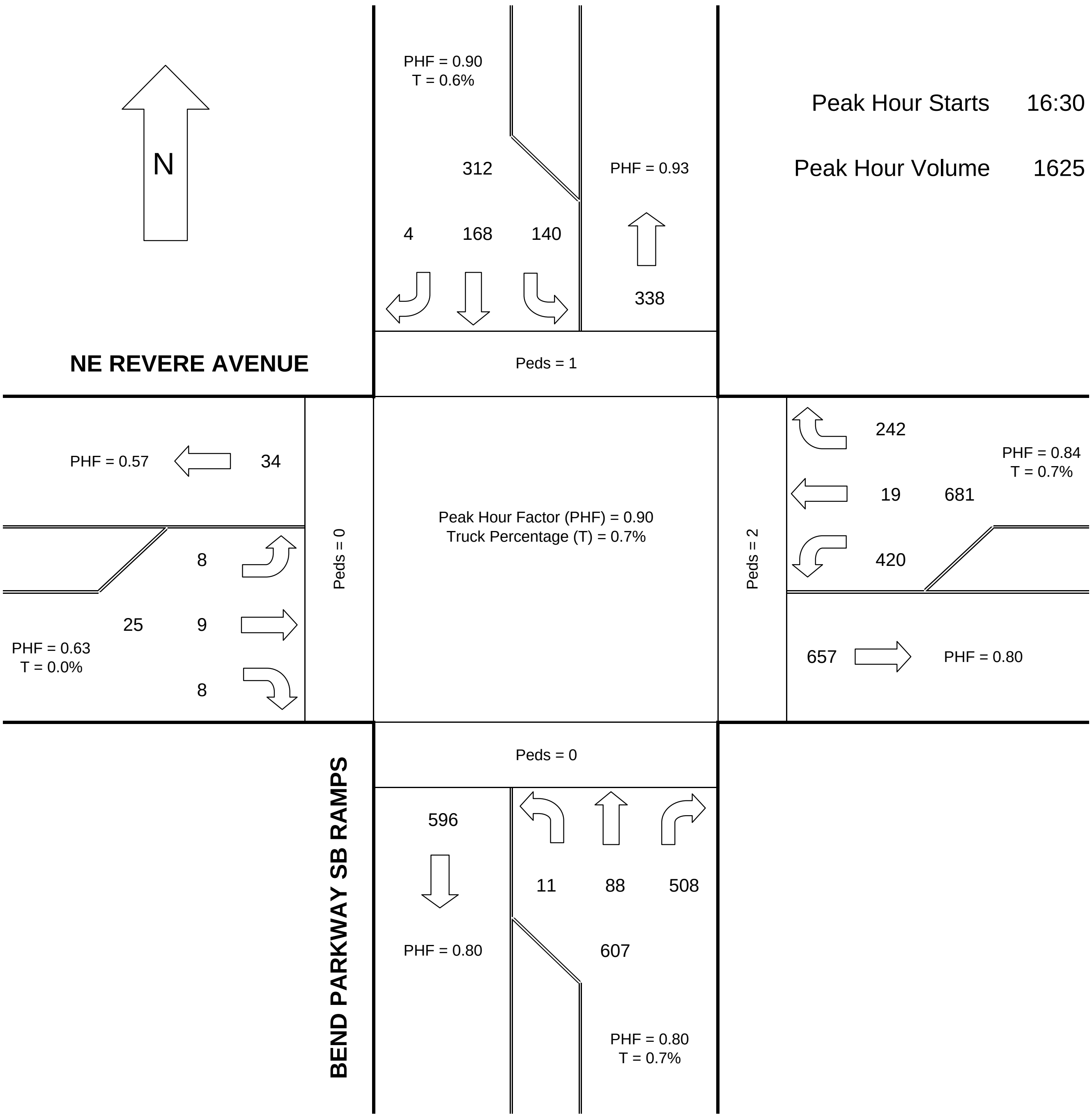
Intersection Turning Movement

Peak Hour Diagram

Location NE REVERE AVENUE AT BEND PARKWAY SB RAMPS
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: BM



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Intersection Turning Movement
Summary Report

Location NE REVERE AVENUE AT BEND PARKWAY NB RAMPS
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: TM

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	63	82	26	13	92	12	85	40	20	56	2	21	512
16:15 - 16:30	71	59	33	17	81	4	88	31	19	53	3	21	480
16:30 - 16:45	72	66	21	20	97	13	98	46	32	60	2	23	550
16:45 - 17:00	66	59	33	26	70	9	98	52	16	50	0	22	501
17:00 - 17:15	107	81	34	25	100	9	116	72	15	52	0	22	633
17:15 - 17:30	67	75	18	24	99	8	93	65	16	37	1	21	524
17:30 - 17:45	53	63	32	19	61	5	68	46	15	47	2	10	421
17:45 - 18:00	52	43	21	12	55	4	54	40	14	57	1	6	359
Movement Totals	551	528	218	156	655	64	700	392	147	412	11	146	3980
Enter Totals	1297			875			1239			569			
Exit Totals	1374			1214			766			626			

Two-Hour Totals

	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Totals
Light Trucks	12	9	12	8	12	0	17	16	0	9	1	5	101
Medium Trucks	0	2	0	0	1	0	4	0	0	0	0	0	7
Heavy Trucks	0	2	0	0	0	0	0	1	0	0	1	0	4
% Trucks	2.2%	2.5%	5.5%	5.1%	2.0%	0.0%	3.0%	4.3%	0.0%	2.2%	18.2%	3.4%	2.8%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	1	0	0	1	0	0	0	0	0	2

	South	West	East	North	
Pedestrians	0	0	0	0	0

Peak Hour Information

Peak Hour 16:30 17:30

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	312	281	106	95	366	39	405	235	79	199	3	88	2208
Peak Hour Factor	0.73	0.87	0.78	0.91	0.92	0.75	0.87	0.82	0.62	0.83	0.38	0.96	0.87

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	699	500	719	290
Peak Hour Factor	0.79	0.93	0.89	0.85
Exit Totals	774	644	436	354
Peak Hour Factor	0.88	0.85	0.83	0.76

	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Totals
Light Trucks	2	7	7	4	6	0	11	8	0	3	0	3	51
Medium Trucks	0	1	0	0	1	0	2	0	0	0	0	0	4
Heavy Trucks	0	0	0	0	0	0	0	1	0	0	1	0	2
% Trucks	0.6%	2.8%	6.6%	4.2%	1.9%	0.0%	3.2%	3.8%	0.0%	1.5%	33.3%	3.4%	2.6%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	1	0	0	1	0	0	0	0	0	2

	South	West	East	North	
Pedestrians	0	0	0	0	0

TrafStats
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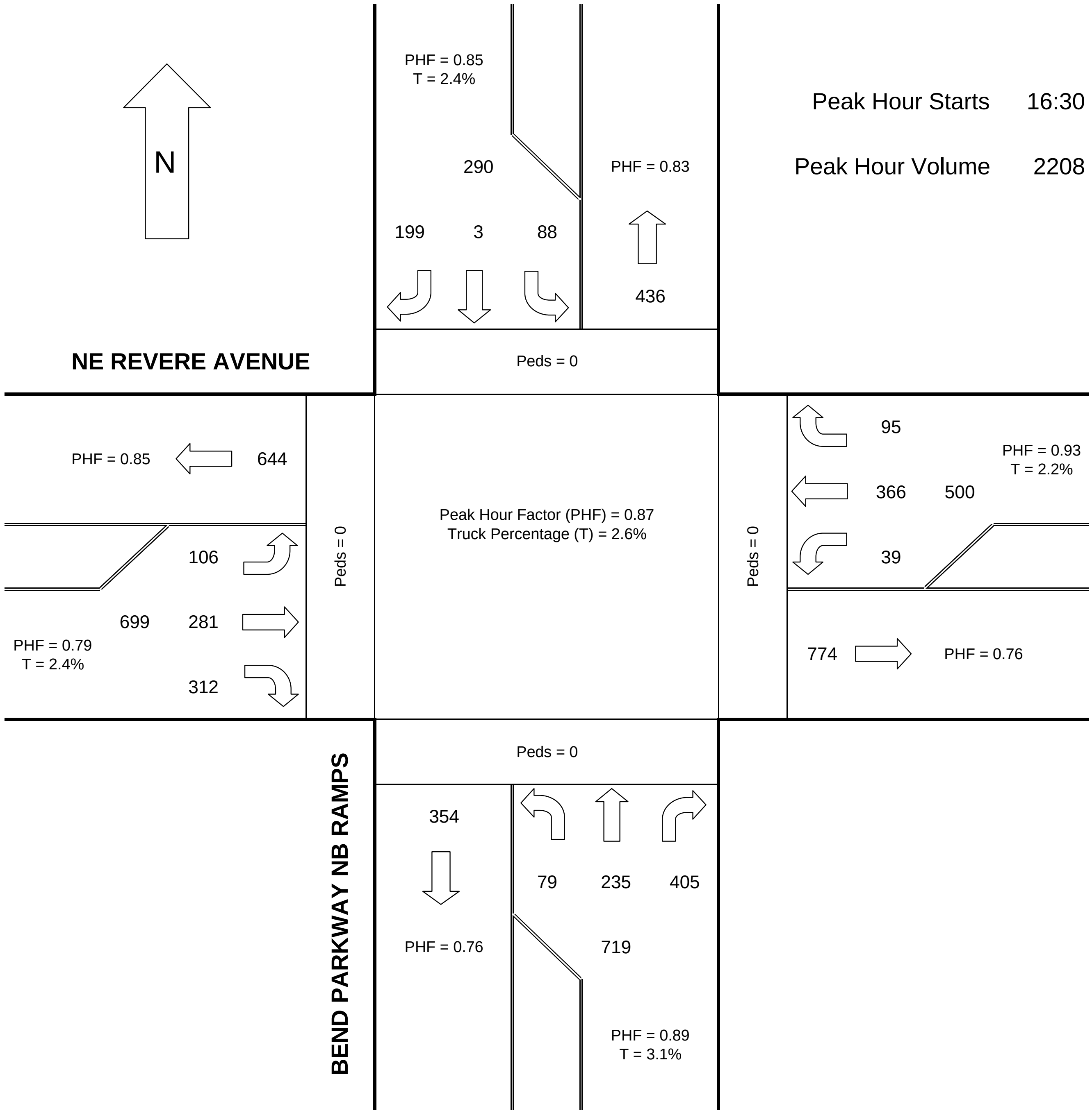
Intersection Turning Movement

Peak Hour Diagram

Location NE REVERE AVENUE AT BEND PARKWAY NB RAMPS
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: TM



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Salem, OR 97309
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Intersection Turning Movement
Summary Report

Location NE REVERE AVENUE AT NE 3RD STREET
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: JW

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	46	98	53	8	61	38	31	261	25	17	187	14	839
16:15 - 16:30	34	89	53	11	71	44	11	256	22	13	149	13	766
16:30 - 16:45	51	86	46	14	65	37	18	226	25	8	154	13	743
16:45 - 17:00	44	91	38	15	65	38	18	213	17	14	131	16	700
17:00 - 17:15	48	128	53	6	61	51	24	214	24	11	145	12	777
17:15 - 17:30	42	101	48	9	54	29	25	235	22	16	98	12	691
17:30 - 17:45	41	52	44	9	47	44	25	199	17	8	103	7	596
17:45 - 18:00	20	58	32	12	39	31	22	166	14	6	90	11	501
Movement Totals	326	703	367	84	463	312	174	1770	166	93	1057	98	5613
Enter Totals	1396			859			2110			1248			
Exit Totals	975			722			2221			1695			

Two-Hour Totals

Light Trucks	1	5	2	1	5	2	0	24	2	0	20	0	62
Medium Trucks	1	1	0	0	0	0	0	1	1	0	2	0	6
Heavy Trucks	1	4	0	0	0	1	0	15	0	0	16	0	37
% Trucks	0.9%	1.4%	0.5%	1.2%	1.1%	1.0%	0.0%	2.3%	1.8%	0.0%	3.6%	0.0%	1.9%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	2	0	0	2	0	0	0	0	0	0	0	4

	South	West	East	North	
Pedestrians	9	3	3	4	19

Peak Hour Information

Peak Hour 16:00 17:00

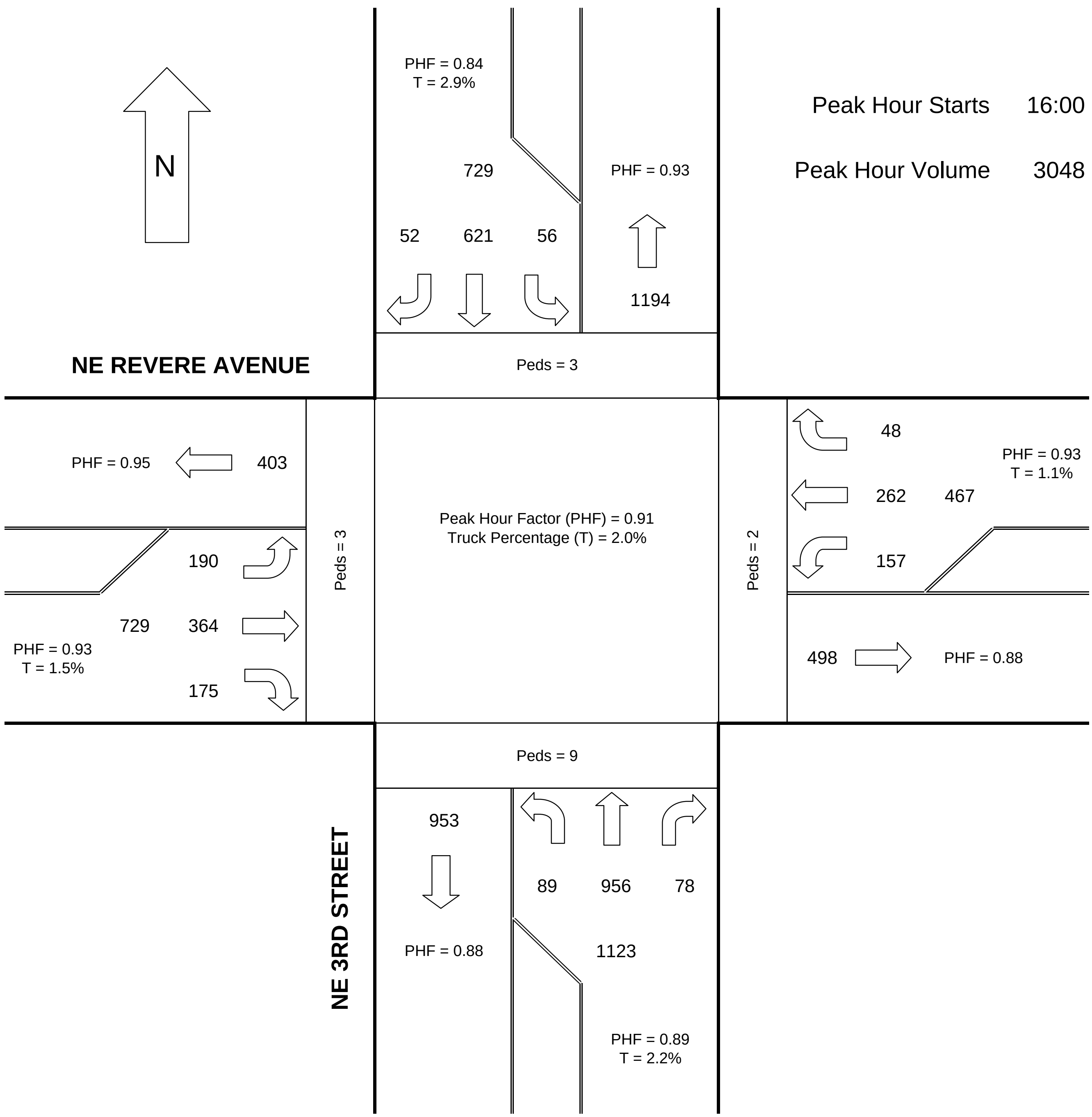
	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	175	364	190	48	262	157	78	956	89	52	621	56	3048
Peak Hour Factor	0.86	0.93	0.90	0.80	0.92	0.89	0.63	0.92	0.89	0.76	0.83	0.88	0.91
Enter Totals	729			467			1123			729			
Peak Hour Factor	0.93			0.93			0.89			0.84			
Exit Totals	498			403			1194			953			
Peak Hour Factor	0.87			0.95			0.93			0.88			
Light Trucks	1	3	2	1	1	2	0	14	1	0	10	0	35
Medium Trucks	1	1	0	0	0	0	0	1	1	0	1	0	5
Heavy Trucks	1	2	0	0	0	1	0	8	0	0	10	0	22
% Trucks	1.7%	1.6%	1.1%	2.1%	0.4%	1.9%	0.0%	2.4%	2.2%	0.0%	3.4%	0.0%	2.0%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	2	0	0	1	0	0	0	0	0	0	0	3

	South	West	East	North	
Pedestrians	9	3	2	3	17

Intersection Turning Movement

Peak Hour Diagram

Location NE REVERE AVENUE AT NE 3RD STREET
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: JW



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Intersection Turning Movement
Summary Report

Location NW PORTLAND AVENUE AT NW HILL STREET
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: JW

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	24	50	41	21	48	9	27	81	20	59	72	12	464
16:15 - 16:30	23	47	61	17	54	17	25	86	28	61	65	5	489
16:30 - 16:45	22	31	47	12	45	15	24	73	23	87	73	8	460
16:45 - 17:00	17	30	51	20	34	17	18	86	32	70	56	7	438
17:00 - 17:15	19	48	67	25	78	7	12	122	30	70	54	7	539
17:15 - 17:30	10	46	59	20	52	19	15	90	23	67	62	8	471
17:30 - 17:45	11	38	31	16	51	8	12	80	14	59	51	7	378
17:45 - 18:00	13	27	28	11	56	14	12	62	21	70	60	9	383
Movement Totals	139	317	385	142	418	106	145	680	191	543	493	63	3622
Enter Totals	841			666			1016			1099			
Exit Totals	525			1152			1207			738			

Two-Hour Totals

	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Totals
Light Trucks	0	0	4	1	0	0	3	4	0	1	4	0	17
Medium Trucks	0	1	0	0	0	0	0	0	0	0	0	0	1
Heavy Trucks	0	0	0	0	0	0	1	0	0	0	0	0	1
% Trucks	0.0%	0.3%	1.0%	0.7%	0.0%	0.0%	2.8%	0.6%	0.0%	0.2%	0.8%	0.0%	0.5%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	2	0	0	5	0	1	1	0	2	3	0	14

	South	West	East	North	
Pedestrians	6	8	3	5	22

Peak Hour Information

Peak Hour 16:15 17:15

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	81	156	226	74	211	56	79	367	113	288	248	27	1926
Peak Hour Factor	0.88	0.81	0.84	0.74	0.68	0.82	0.79	0.75	0.88	0.83	0.85	0.84	0.89

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	463	341	559	563
Peak Hour Factor	0.86	0.78	0.85	0.84
Exit Totals	262	612	667	385
Peak Hour Factor	0.85	0.86	0.78	0.88

	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Totals
Light Trucks	0	0	2	1	0	0	2	2	0	0	2	0	9
Medium Trucks	0	1	0	0	0	0	0	0	0	0	0	0	1
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0.0%	0.6%	0.9%	1.4%	0.0%	0.0%	2.5%	0.5%	0.0%	0.0%	0.8%	0.0%	0.5%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	1	0	0	4	0	1	1	0	1	2	0	10

	South	West	East	North	
Pedestrians	4	6	3	4	17

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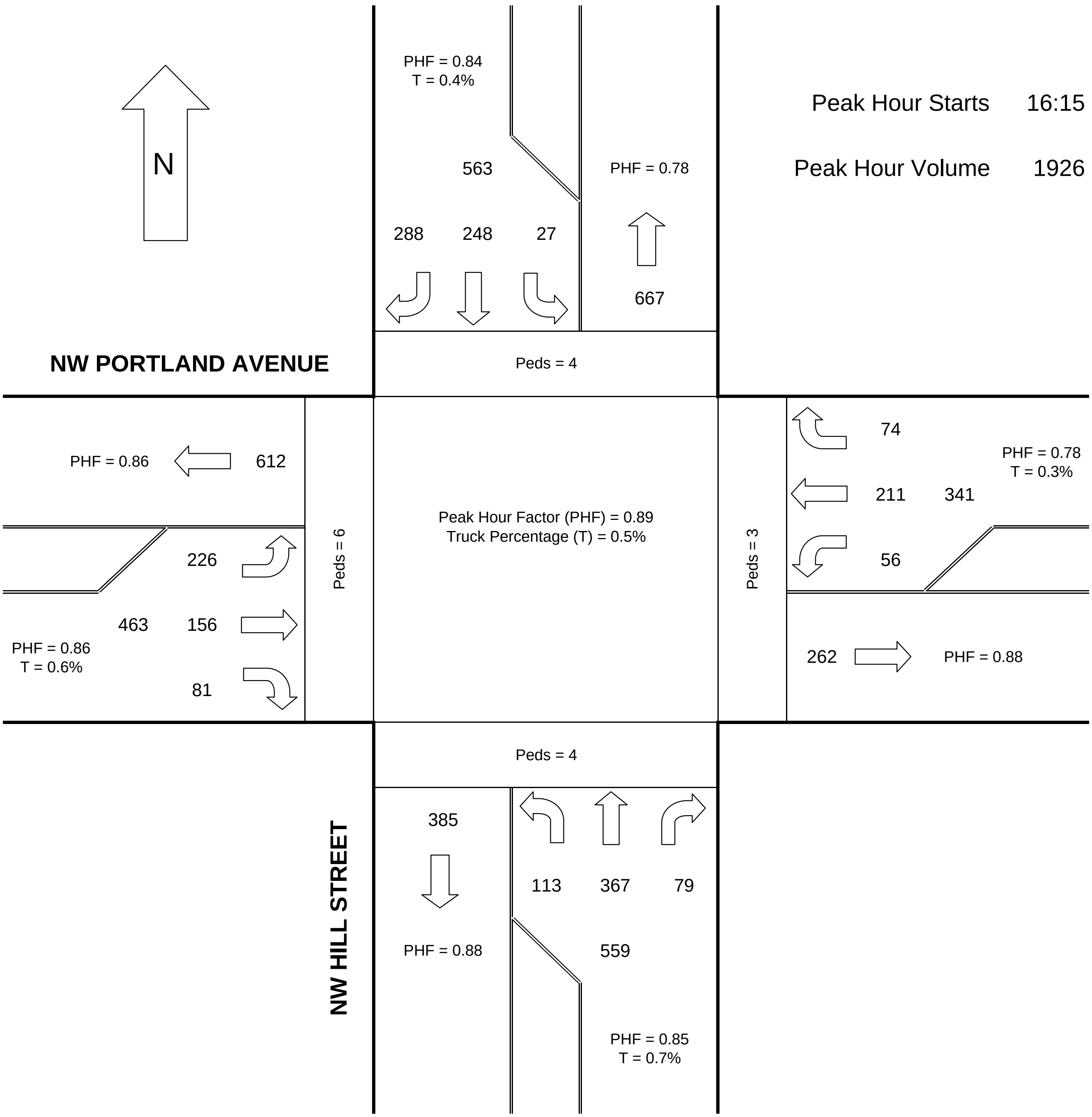
Intersection Turning Movement

Peak Hour Diagram

Location NW PORTLAND AVENUE AT NW HILL STREET
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: JW



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Intersection Turning Movement
Summary Report

Location NE OLNEY AVENUE AT NE 3RD STREET
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: BM

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	21	299	14	4	218	21	18	40	26	14	42	27	744
16:15 - 16:30	15	273	16	5	206	25	20	74	28	11	55	30	758
16:30 - 16:45	20	260	13	6	223	15	19	52	24	20	45	22	719
16:45 - 17:00	20	250	21	4	184	29	21	43	20	12	37	16	657
17:00 - 17:15	27	251	19	1	169	30	18	60	21	18	62	24	700
17:15 - 17:30	11	320	17	4	178	27	17	62	21	15	45	31	748
17:30 - 17:45	17	253	21	5	152	15	14	43	23	18	38	15	614
17:45 - 18:00	21	201	17	7	142	13	25	43	17	9	37	12	544
Movement Totals	152	2107	138	36	1472	175	152	417	180	117	361	177	5484
Enter Totals		2397			1683			749			655		
Exit Totals		2436			1769			591			688		

Two-Hour Totals

Light Trucks	6	25	0	0	24	1	0	1	7	0	2	1	67
Medium Trucks	0	1	0	0	0	0	0	0	0	0	0	0	1
Heavy Trucks	0	15	0	0	22	0	0	0	0	0	0	1	38
% Trucks	3.9%	1.9%	0.0%	0.0%	3.1%	0.6%	0.0%	0.2%	3.9%	0.0%	0.6%	1.1%	1.9%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	1	0	0	1	0	0	4	0	6

	South	West	East	North	
Pedestrians	4	0	5	2	11

Peak Hour Information

Peak Hour 16:00 17:00

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	76	1082	64	19	831	90	78	209	98	57	179	95	2878
Peak Hour Factor	0.90	0.90	0.76	0.79	0.93	0.78	0.93	0.71	0.88	0.71	0.81	0.79	0.95

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	1222	940	385	331
Peak Hour Factor	0.91	0.96	0.79	0.86
Exit Totals	1255	986	292	345
Peak Hour Factor	0.91	0.92	0.77	0.91

Light Trucks	2	15	0	0	14	0	0	0	4	0	1	1	37
Medium Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Trucks	0	7	0	0	15	0	0	0	0	0	0	1	23
% Trucks	2.6%	2.0%	0.0%	0.0%	3.5%	0.0%	0.0%	0.0%	4.1%	0.0%	0.6%	2.1%	2.1%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	1	0	0	1	0	0	4	0	6

	South	West	East	North	
Pedestrians	2	0	0	1	3

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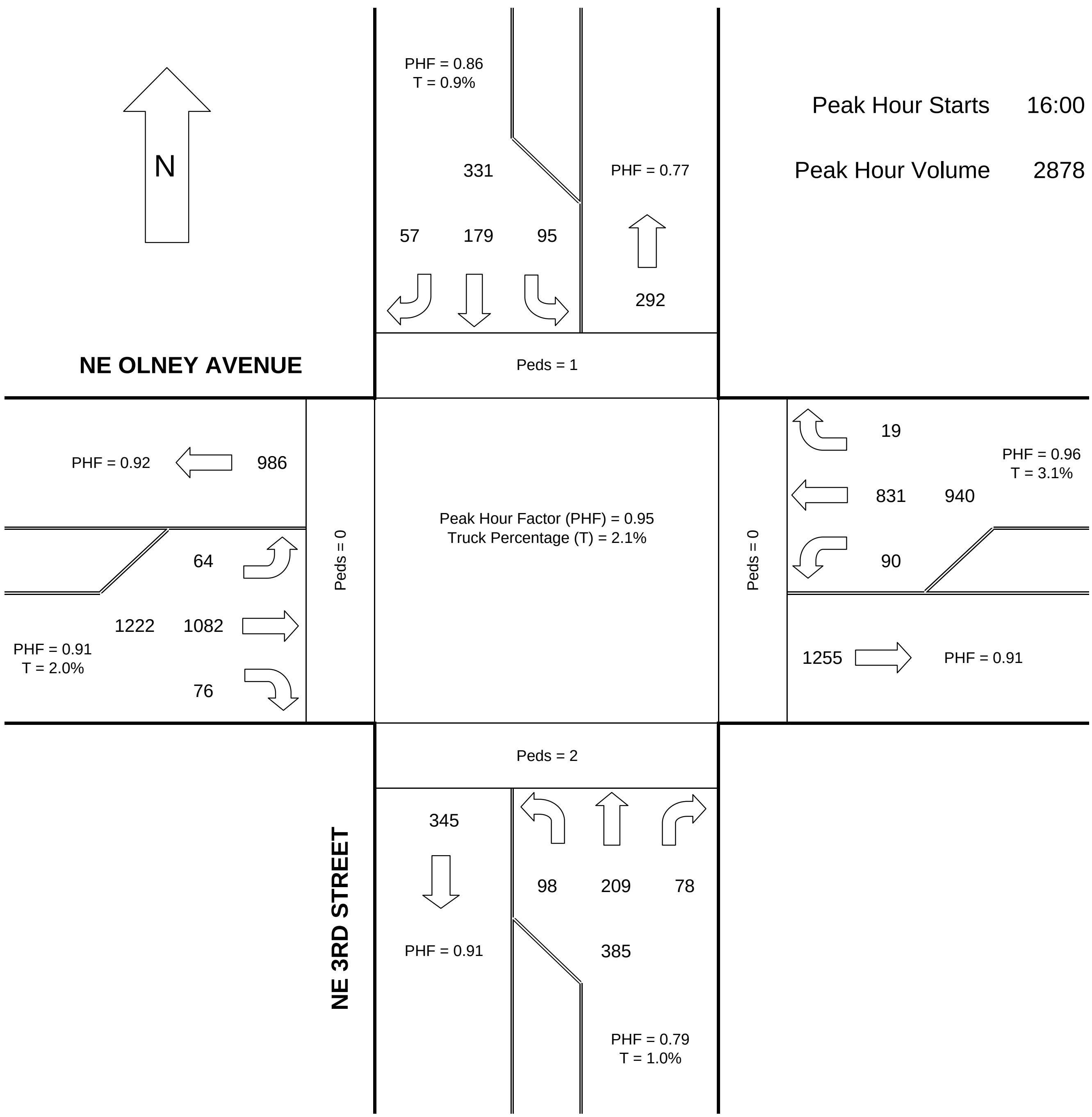
Intersection Turning Movement

Peak Hour Diagram

Location NE OLNEY AVENUE AT NE 3RD STREET
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: BM



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Intersection Turning Movement
Summary Report

Location NEWPORT AVE-GREENWOOD AVENUE AT WALL STREET
Date 1/4/2007
Day of Week Thursday
Time Begin 16:00
Reviewed By: BV

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	15	52	22	6	49	40	0	0	0	20	49	6	259
16:15 - 16:30	28	61	33	8	73	51	0	0	0	23	88	14	379
16:30 - 16:45	37	70	25	8	92	47	0	0	0	25	96	24	424
16:45 - 17:00	22	78	29	6	82	45	0	0	0	37	75	22	396
17:00 - 17:15	25	81	20	2	112	63	0	0	0	39	75	22	439
17:15 - 17:30	24	67	23	3	110	52	0	0	0	36	65	18	398
17:30 - 17:45	29	63	24	4	86	47	0	0	0	29	65	14	361
17:45 - 18:00	24	59	15	1	94	46	0	0	0	27	62	11	339
Movement Totals	204	531	191	38	698	391	0	0	0	236	575	131	2995
Enter Totals	926			1127			0			942			
Exit Totals	662			934			229			1170			

Two-Hour Totals

Light Trucks	0	16	1	1	10	2	0	0	0	1	5	0	36
Medium Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0.0%	3.0%	0.5%	2.6%	1.4%	0.5%	NA	NA	NA	0.4%	0.9%	0.0%	1.2%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	5	10	13	15	43

Peak Hour Information

Peak Hour 16:30 17:30

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	108	296	97	19	396	207	0	0	0	137	311	86	1657
Peak Hour Factor	0.73	0.91	0.84	0.59	0.88	0.82	NA	NA	NA	0.88	0.81	0.90	0.94

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	501	622	0	534
Peak Hour Factor	0.95	0.88	NA	0.92
Exit Totals	382	533	116	626
Peak Hour Factor	0.93	0.88	0.83	0.87

Light Trucks	0	8	0	1	4	0	0	0	0	1	1	0	15
Medium Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0.0%	2.7%	0.0%	5.3%	1.0%	0.0%	NA	NA	NA	0.7%	0.3%	0.0%	0.9%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	1	6	2	6	15

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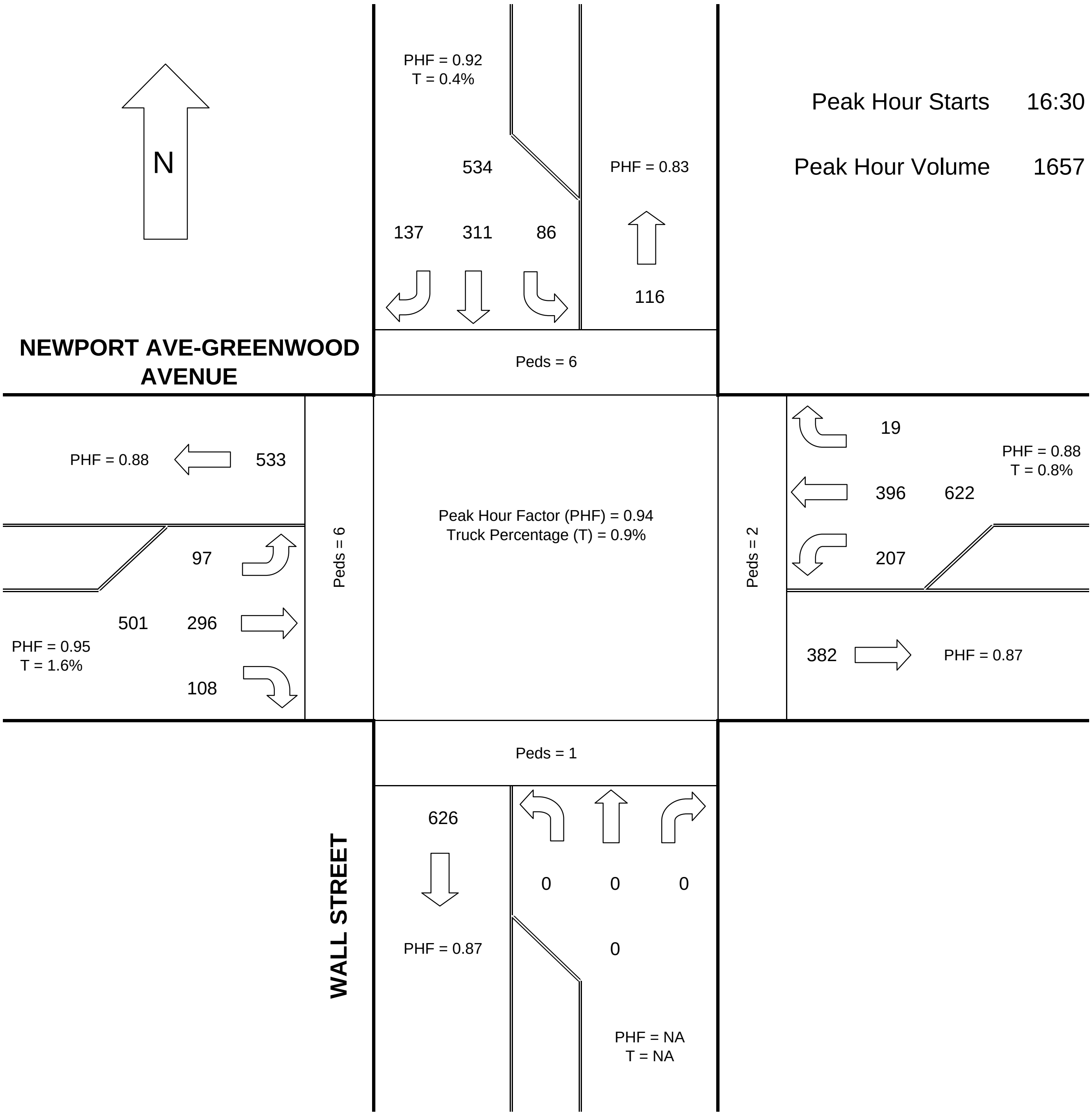
Intersection Turning Movement
Peak Hour Diagram

Location NEWPORT AVE-GREENWOOD AVENUE AT WALL STREET
Date 1/4/2007
Day of Week Thursday
Time Begin 16:00
Reviewed By: BV



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Intersection Turning Movement
Summary Report

Location GREENWOOD AVENUE AT BOND STREET
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: JW

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	0	70	2	14	114	0	66	79	41	0	0	0	386
16:15 - 16:30	0	87	3	12	116	0	66	86	44	0	0	0	414
16:30 - 16:45	0	76	2	10	134	0	60	76	37	0	0	0	395
16:45 - 17:00	0	97	0	14	100	0	59	73	44	0	0	0	387
17:00 - 17:15	0	86	4	8	141	0	66	73	45	0	0	0	423
17:15 - 17:30	0	71	2	12	101	0	57	63	45	0	0	0	351
17:30 - 17:45	0	78	1	11	98	0	50	40	38	0	0	0	316
17:45 - 18:00	0	49	1	4	93	0	46	42	48	0	0	0	283
Movement Totals	0	614	15	85	897	0	470	532	342	0	0	0	2955
Enter Totals		629			982			1344			0		
Exit Totals		1084			1239			632			0		

Two-Hour Totals

Light Trucks	0	8	0	0	8	0	4	5	1	0	0	0	26
Medium Trucks	0	2	0	0	0	0	0	1	0	0	0	0	3
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	NA	1.6%	0.0%	0.0%	0.9%	NA	0.9%	1.1%	0.3%	NA	NA	NA	1.0%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	11	5	18	5	39

Peak Hour Information

Peak Hour 16:15 17:15

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	0	346	9	44	491	0	251	308	170	0	0	0	1619
Peak Hour Factor	NA	0.89	0.56	0.79	0.87	NA	0.95	0.90	0.94	NA	NA	NA	0.96
Enter Totals		355			535			729			0		
Peak Hour Factor		0.91			0.90			0.93			NA		
Exit Totals		597			661			361			0		
Peak Hour Factor		0.96			0.89			0.89			NA		
Light Trucks	0	5	0	0	5	0	4	3	0	0	0	0	17
Medium Trucks	0	1	0	0	0	0	0	0	0	0	0	0	1
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	NA	1.7%	0.0%	0.0%	1.0%	NA	1.6%	1.0%	0.0%	NA	NA	NA	1.1%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	8	4	11	5	28

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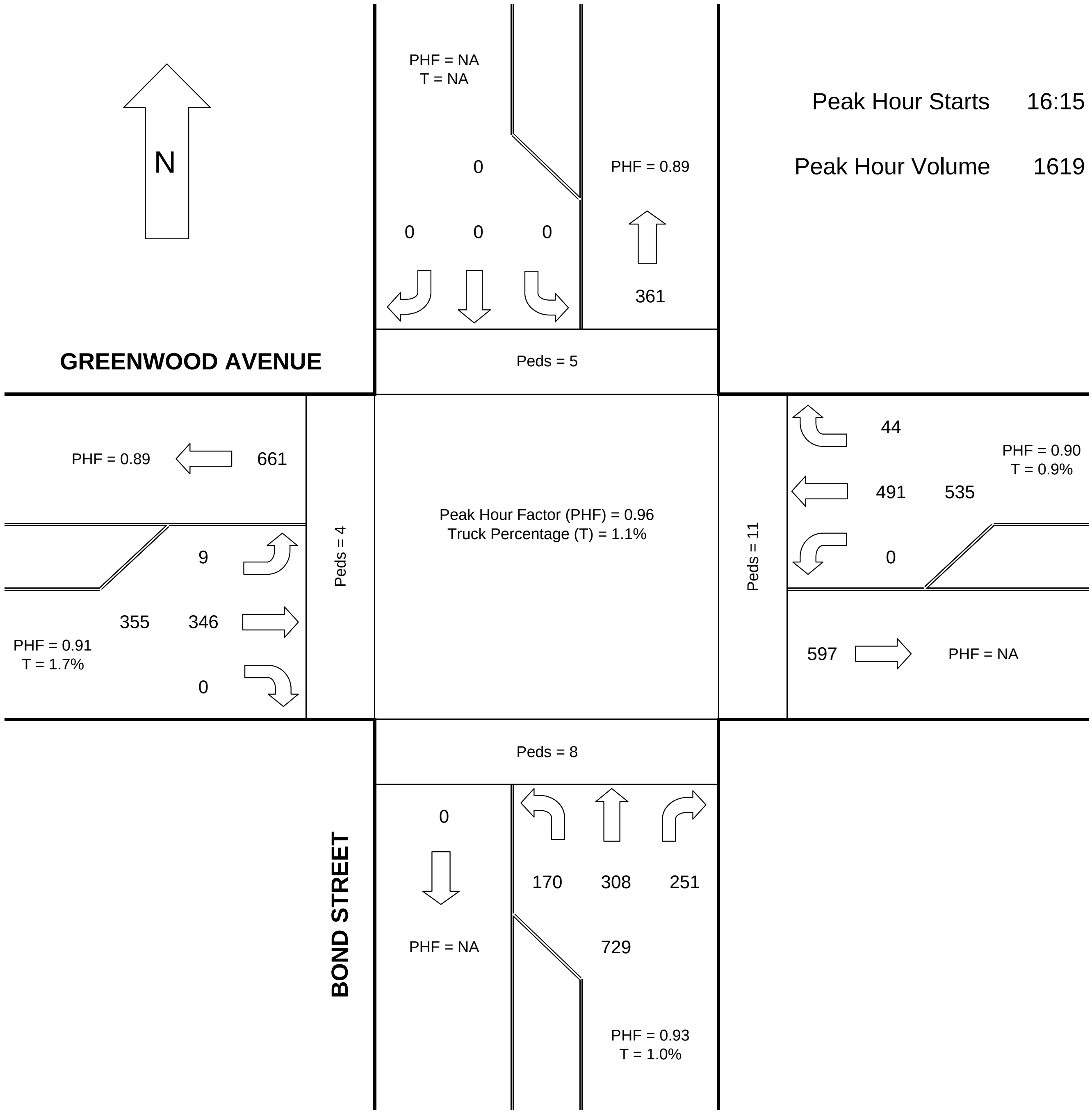
Intersection Turning Movement

Peak Hour Diagram

Location GREENWOOD AVENUE AT BOND STREET
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: JW



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Intersection Turning Movement
Summary Report

Location NE GREENWOOD AVENUE AT NE 3RD STREET
Date 1/4/2007
Day of Week Thursday
Time Begin 16:00
Reviewed By: BV

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	21	121	50	59	100	60	51	167	21	30	152	62	894
16:15 - 16:30	25	123	58	57	100	66	50	163	28	25	128	47	870
16:30 - 16:45	27	129	48	61	99	48	46	170	32	17	148	56	881
16:45 - 17:00	23	138	54	41	99	48	60	169	32	19	110	56	849
17:00 - 17:15	21	178	59	50	116	49	47	156	15	15	118	60	884
17:15 - 17:30	18	136	55	53	93	55	37	155	32	10	108	43	795
17:30 - 17:45	20	113	39	62	107	40	42	142	24	18	113	50	770
17:45 - 18:00	16	94	33	64	89	32	48	117	19	20	119	46	697
Movement Totals	171	1032	396	447	803	398	381	1239	203	154	996	420	6640
Enter Totals	1599			1648			1823			1570			
Exit Totals	1833			1160			2082			1565			

Two-Hour Totals

	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Totals
Light Trucks	3	23	8	5	5	3	3	20	4	1	20	13	108
Medium Trucks	0	0	1	0	2	2	0	1	0	0	1	1	8
Heavy Trucks	0	1	1	11	0	2	2	3	0	0	0	10	30
% Trucks	1.8%	2.3%	2.5%	3.6%	0.9%	1.8%	1.3%	1.9%	2.0%	0.6%	2.1%	5.7%	2.2%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	5	1	4	1	11

Peak Hour Information

Peak Hour 16:00 17:00

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	96	511	210	218	398	222	207	669	113	91	538	221	3494
Peak Hour Factor	0.89	0.93	0.91	0.89	1.00	0.84	0.86	0.98	0.88	0.76	0.88	0.89	0.98
Enter Totals	817			838			989			850			
Peak Hour Factor	0.95			0.94			0.95			0.87			
Exit Totals	939			602			1097			856			
Peak Hour Factor	0.92			0.98			0.98			0.92			
Light Trucks	3	14	5	2	5	2	2	11	2	1	11	6	64
Medium Trucks	0	0	0	0	1	2	0	1	0	0	0	0	4
Heavy Trucks	0	1	1	5	0	1	1	3	0	0	0	2	14
% Trucks	3.1%	2.9%	2.9%	3.2%	1.5%	2.3%	1.4%	2.2%	1.8%	1.1%	2.0%	3.6%	2.3%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	4	1	2	1	8

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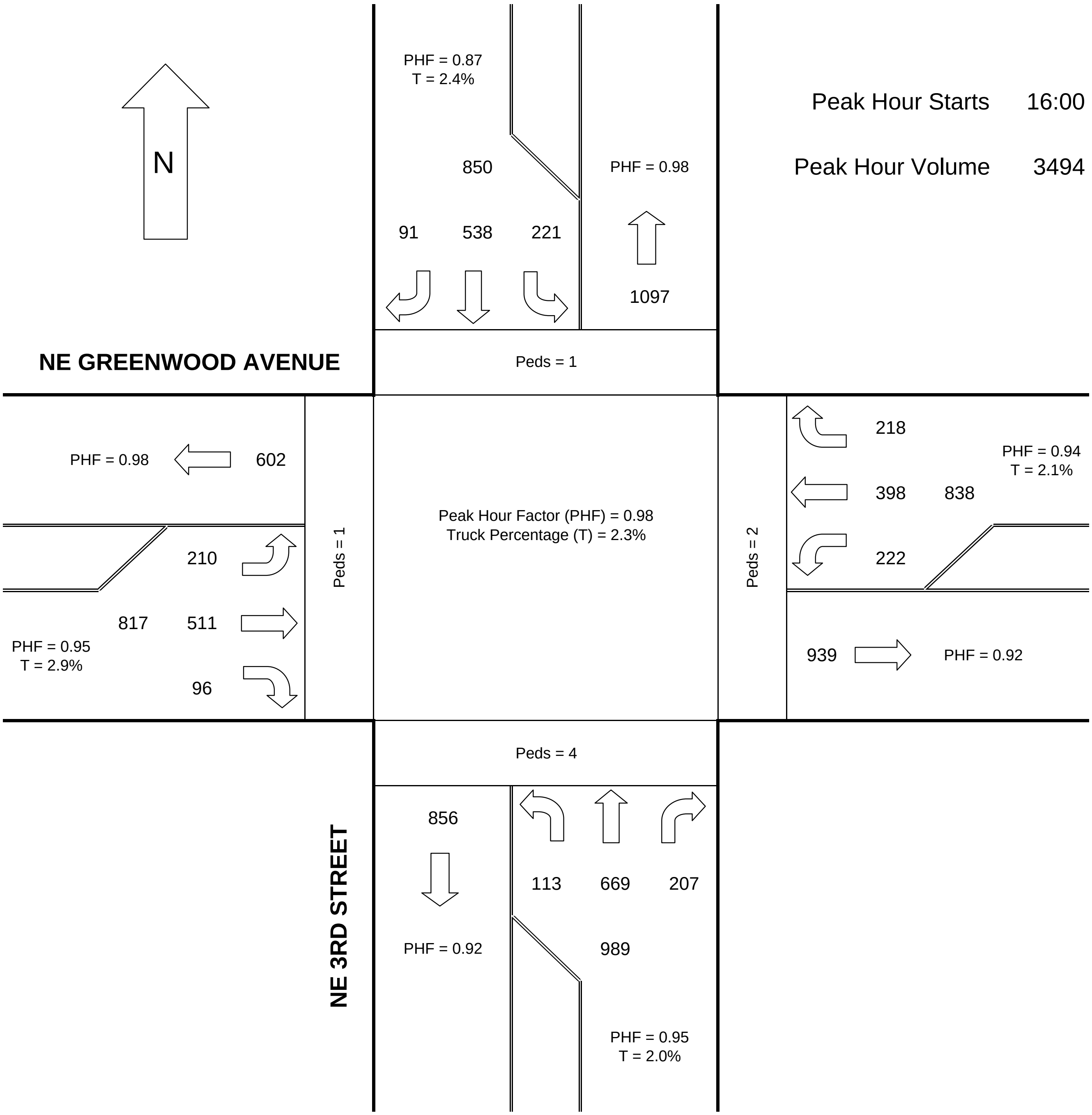
Intersection Turning Movement

Peak Hour Diagram

Location NE GREENWOOD AVENUE AT NE 3RD STREET
Date 1/4/2007
Day of Week Thursday
Time Begin 16:00
Reviewed By: BV



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Intersection Turning Movement

Summary Report

Location NW OREGON AVENUE AT NW WALL STREET
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: TM

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	3	3	0	0	7	40	1	0	0	13	134	17	218
16:15 - 16:30	1	7	0	0	13	30	0	0	0	10	132	30	223
16:30 - 16:45	6	6	0	0	15	36	0	0	0	6	152	17	238
16:45 - 17:00	4	2	0	0	8	52	0	0	0	11	145	28	250
17:00 - 17:15	7	3	0	0	12	33	0	0	0	9	164	17	245
17:15 - 17:30	6	3	0	0	12	38	0	0	0	11	119	16	205
17:30 - 17:45	6	7	0	0	4	26	0	0	0	9	101	11	164
17:45 - 18:00	7	5	0	0	9	20	0	0	0	10	97	16	164
Movement Totals	40	36	0	0	80	275	1	0	0	79	1044	152	1707
Enter Totals	76			355			1			1275			
Exit Totals	189			159			0			1359			

Two-Hour Totals

Light Trucks	0	0	0	0	0	9	0	0	0	2	25	4	40
Medium Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0.0%	0.0%	NA	NA	0.0%	3.3%	0.0%	NA	NA	2.5%	2.4%	2.6%	2.3%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	1	0	0	1

Peak Hour Information

Peak Hour 16:15 17:15

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	18	18	0	0	48	151	0	0	0	36	593	92	956
Peak Hour Factor	0.64	0.64	NA	NA	0.80	0.73	NA	NA	NA	0.82	0.90	0.77	0.96

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	36	199	0	721
Peak Hour Factor	0.75	0.83	NA	0.95

	Eastbound	Westbound	Northbound	Southbound
Exit Totals	110	84	0	762
Peak Hour Factor	0.74	0.91	NA	0.93

Light Trucks	0	0	0	0	0	7	0	0	0	1	11	1	20
Medium Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0.0%	0.0%	NA	NA	0.0%	4.6%	NA	NA	NA	2.8%	1.9%	1.1%	2.1%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	0	0

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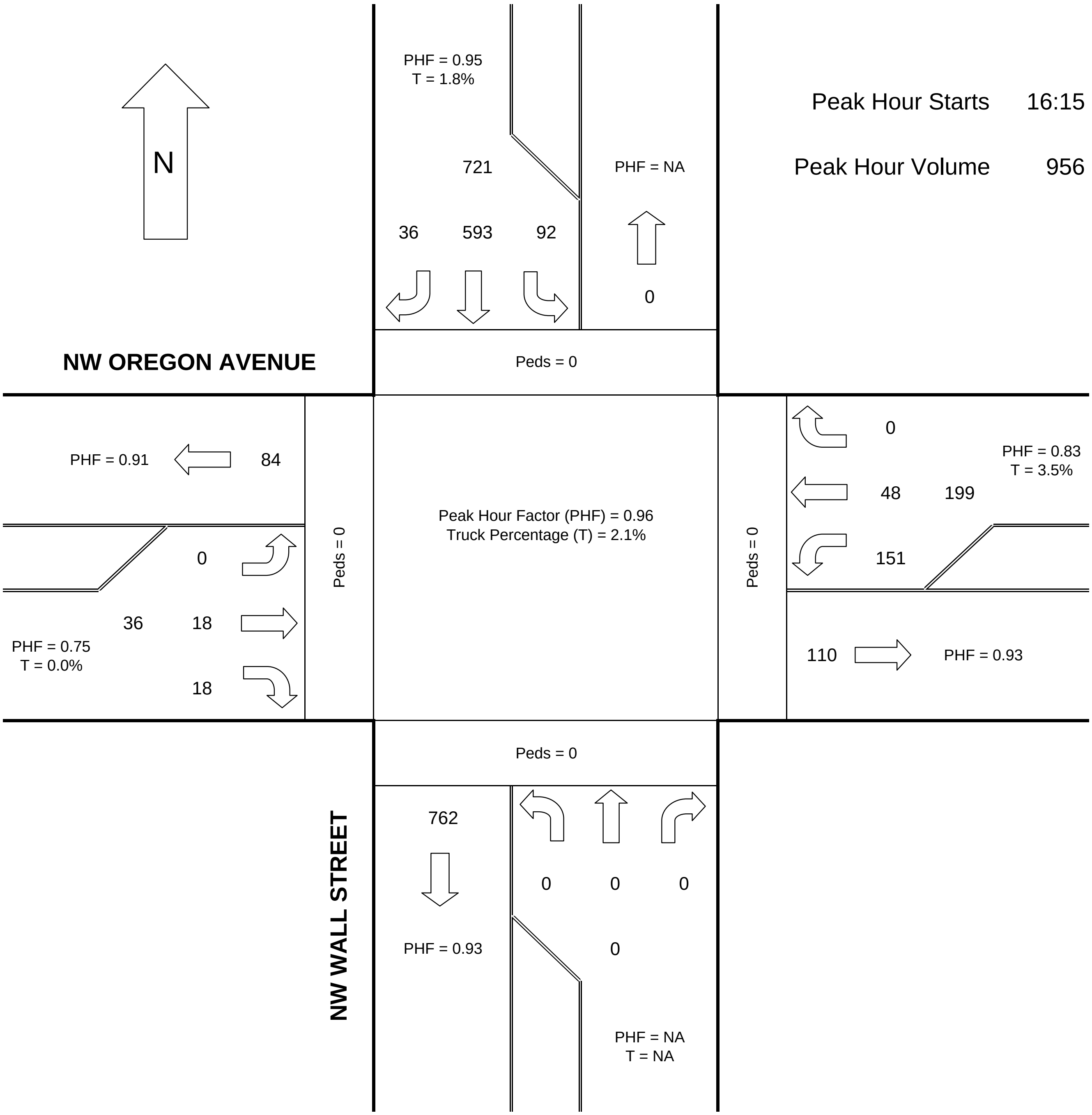
Intersection Turning Movement

Peak Hour Diagram

Location NW OREGON AVENUE AT NW WALL STREET
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: TM



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Intersection Turning Movement
Summary Report

Location NW OREGON AVENUE AT NW BOND STREET
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: BV

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	0	15	20	25	19	0	27	144	29	0	0	0	279
16:15 - 16:30	0	24	23	27	16	0	27	152	26	0	0	0	295
16:30 - 16:45	0	18	17	27	12	0	13	147	42	0	0	0	276
16:45 - 17:00	0	26	25	31	19	0	20	139	37	0	0	0	297
17:00 - 17:15	0	14	12	35	22	0	17	137	23	0	0	0	260
17:15 - 17:30	0	7	15	19	24	0	8	125	35	0	0	0	233
17:30 - 17:45	0	8	27	26	9	0	9	102	17	0	0	0	198
17:45 - 18:00	0	9	15	24	13	0	3	116	20	0	0	0	200
Movement Totals	0	121	154	214	134	0	124	1062	229	0	0	0	2038
Enter Totals	275			348			1415			0			
Exit Totals	245			363			1430			0			

Two-Hour Totals

Light Trucks	0	0	0	6	0	0	1	10	0	0	0	0	17
Medium Trucks	0	0	0	0	0	0	0	1	0	0	0	0	1
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	NA	0.0%	0.0%	2.8%	0.0%	NA	0.8%	1.0%	0.0%	NA	NA	NA	0.9%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	49	56	89	32	226

Peak Hour Information

Peak Hour 16:00 17:00

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	0	83	85	110	66	0	87	582	134	0	0	0	1147
Peak Hour Factor	NA	0.80	0.85	0.89	0.87	NA	0.81	0.96	0.80	NA	NA	NA	0.97

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	168	176	803	0
Peak Hour Factor	0.82	0.88	0.98	NA
Exit Totals	170	200	777	0
Peak Hour Factor	0.83	0.89	0.96	NA

Light Trucks	0	0	0	4	0	0	0	9	0	0	0	0	13
Medium Trucks	0	0	0	0	0	0	0	1	0	0	0	0	1
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	NA	0.0%	0.0%	3.6%	0.0%	NA	0.0%	1.7%	0.0%	NA	NA	NA	1.2%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	32	33	56	13	134

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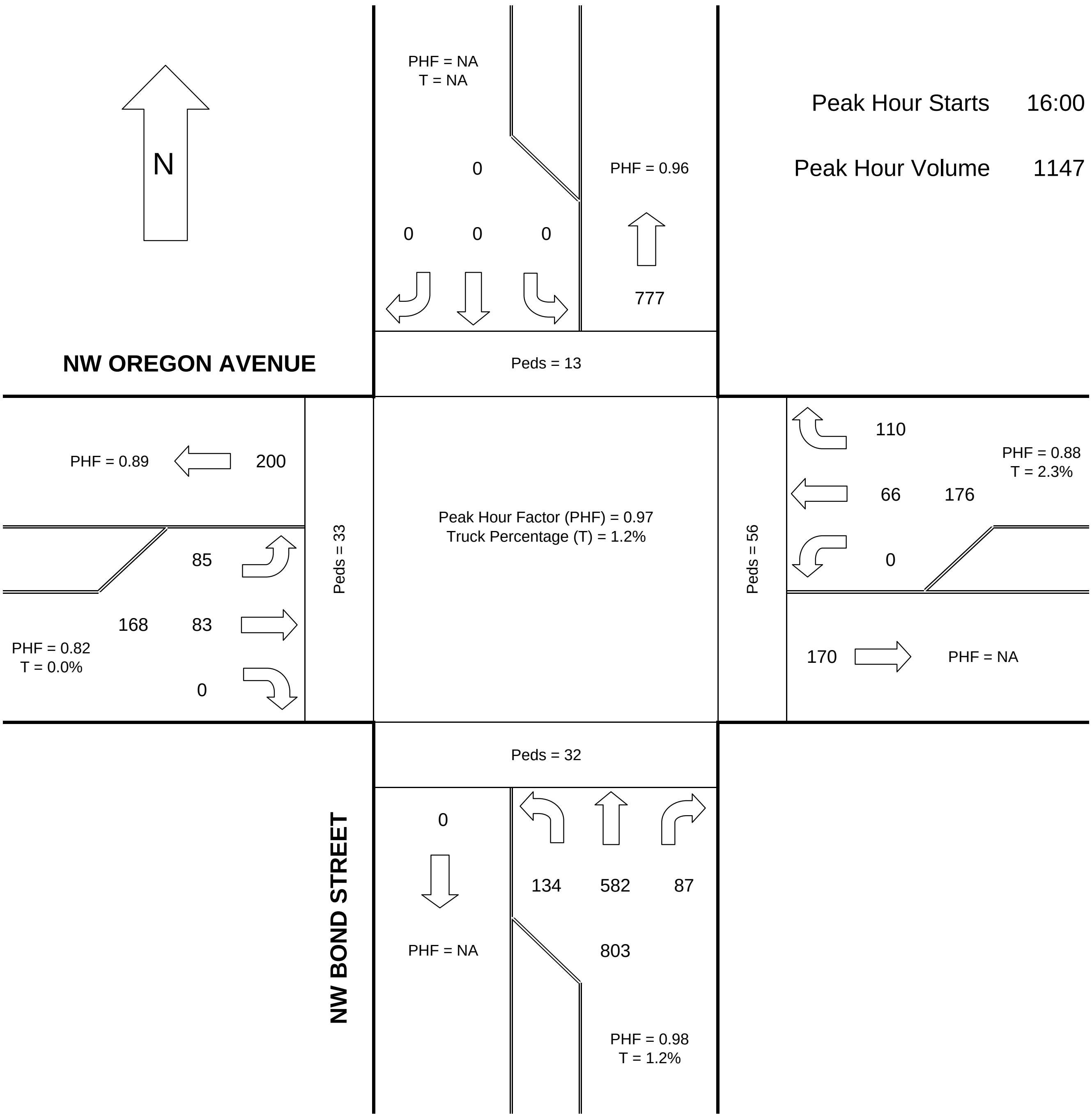
Intersection Turning Movement

Peak Hour Diagram

Location NW OREGON AVENUE AT NW BOND STREET
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: BV



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Intersection Turning Movement
Summary Report

Location NW FRANKLIN AVENUE AT NW WALL STREET
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: JW

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	1	87	0	0	58	49	0	0	0	47	85	36	363
16:15 - 16:30	5	76	0	0	69	30	0	0	0	42	81	36	339
16:30 - 16:45	5	99	0	0	66	30	0	0	0	41	73	39	353
16:45 - 17:00	6	76	0	0	66	30	0	0	0	67	91	36	372
17:00 - 17:15	5	78	0	0	77	34	0	0	0	43	104	49	390
17:15 - 17:30	2	87	0	0	68	35	0	0	0	39	72	35	338
17:30 - 17:45	8	59	0	0	69	34	0	0	0	40	62	32	304
17:45 - 18:00	7	63	0	0	43	30	0	0	0	37	54	22	256
Movement Totals	39	625	0	0	516	272	0	0	0	356	622	285	2715
Enter Totals	664			788			0			1263			
Exit Totals	910			872			0			933			

Two-Hour Totals

	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Totals
Light Trucks	1	10	0	0	6	5	0	0	0	4	3	2	31
Medium Trucks	0	1	0	0	0	0	0	0	0	0	0	0	1
Heavy Trucks	0	0	0	0	1	1	0	0	0	0	0	0	2
% Trucks	2.6%	1.8%	NA	NA	1.4%	2.2%	NA	NA	NA	1.1%	0.5%	0.7%	1.3%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	2	0	0	0	0	1	2	0	5

	South	West	East	North	
Pedestrians	22	10	56	79	167

Peak Hour Information

Peak Hour 16:15 17:15

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	21	329	0	0	278	124	0	0	0	193	349	160	1454
Peak Hour Factor	0.88	0.83	NA	NA	0.90	0.91	NA	NA	NA	0.72	0.84	0.82	0.93

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	350	402	0	702
Peak Hour Factor	0.84	0.91	NA	0.90
Exit Totals	489	471	0	494
Peak Hour Factor	0.89	0.89	NA	0.86

	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Totals
Light Trucks	1	7	0	0	3	2	0	0	0	2	1	1	17
Medium Trucks	0	1	0	0	0	0	0	0	0	0	0	0	1
Heavy Trucks	0	0	0	0	1	1	0	0	0	0	0	0	2
% Trucks	4.8%	2.4%	NA	NA	1.4%	2.4%	NA	NA	NA	1.0%	0.3%	0.6%	1.4%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	15	5	30	38	88

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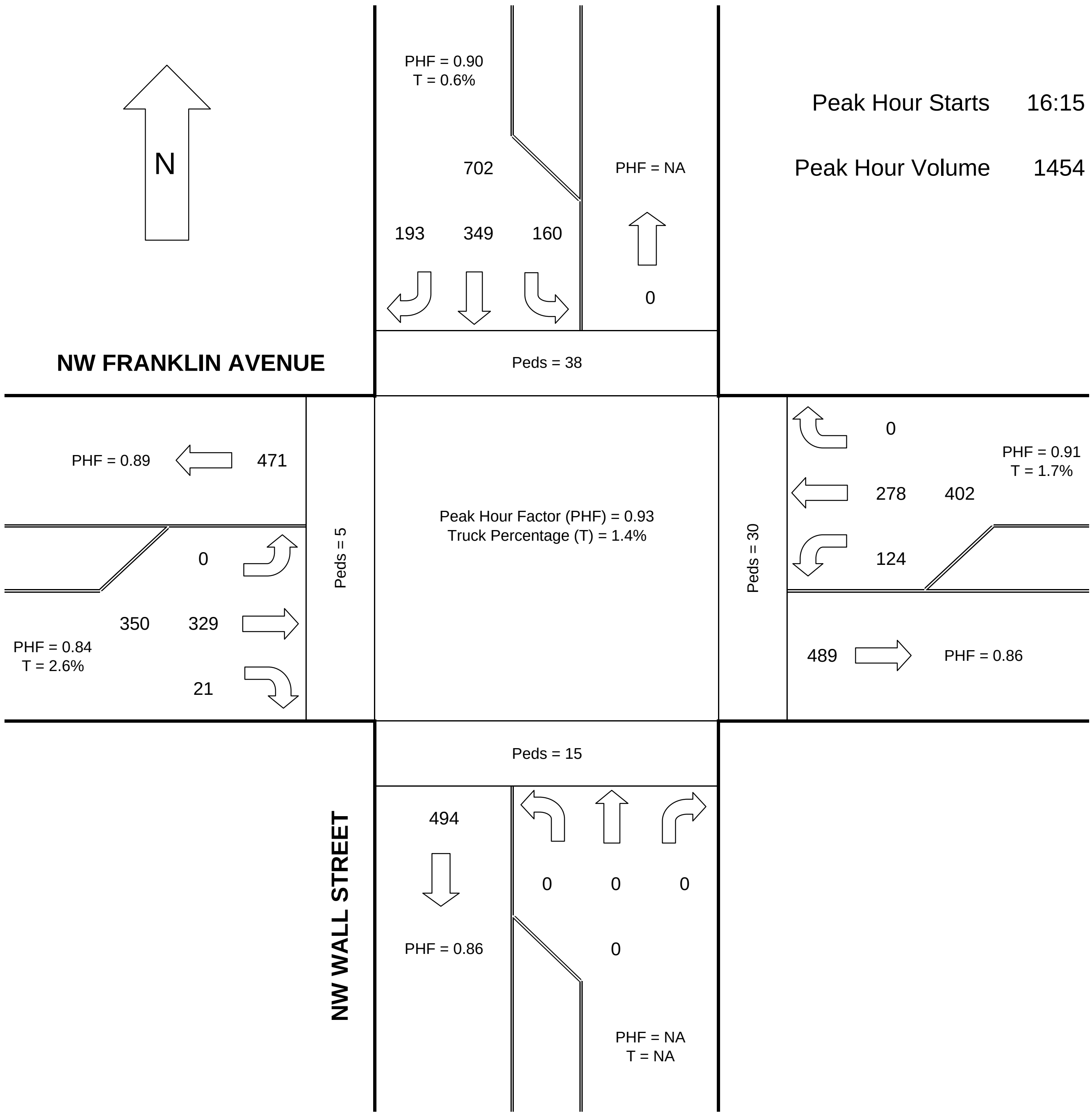
Intersection Turning Movement

Peak Hour Diagram

Location NW FRANKLIN AVENUE AT NW WALL STREET
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: JW



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Intersection Turning Movement
Summary Report

Location NE FRANKLIN AVENUE AT NW BOND STREET
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: JW

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	0	65	52	20	98	0	62	118	14	0	0	0	429
16:15 - 16:30	0	71	45	23	85	0	52	122	10	0	0	0	408
16:30 - 16:45	0	89	46	23	86	0	55	128	8	0	0	0	435
16:45 - 17:00	0	66	51	17	84	0	42	101	18	0	0	0	379
17:00 - 17:15	0	81	40	19	103	0	54	126	8	0	0	0	431
17:15 - 17:30	0	76	47	11	88	0	46	96	13	0	0	0	377
17:30 - 17:45	0	59	34	15	88	0	33	83	10	0	0	0	322
17:45 - 18:00	0	52	26	11	67	0	30	78	12	0	0	0	276
Movement Totals	0	559	341	139	699	0	374	852	93	0	0	0	3057
Enter Totals	900			838			1319			0			
Exit Totals	933			792			1332			0			

Two-Hour Totals

	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Totals
Light Trucks	0	8	2	0	11	0	8	4	0	0	0	0	33
Medium Trucks	0	1	0	0	0	0	0	1	0	0	0	0	2
Heavy Trucks	0	0	0	0	1	0	0	0	0	0	0	0	1
% Trucks	NA	1.6%	0.6%	0.0%	1.7%	NA	2.1%	0.6%	0.0%	NA	NA	NA	1.2%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	1	0	0	0	0	0	0	0	1

	South	West	East	North	
Pedestrians	16	38	45	32	131

Peak Hour Information

Peak Hour 16:15 17:15

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	0	307	182	82	358	0	203	477	44	0	0	0	1653
Peak Hour Factor	NA	0.86	0.89	0.89	0.87	NA	0.92	0.93	0.61	NA	NA	NA	0.95

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	489	440	724	0
Peak Hour Factor	0.91	0.90	0.95	NA

	Eastbound	Westbound	Northbound	Southbound
Exit Totals	510	402	741	0
Peak Hour Factor	0.89	0.91	0.94	NA

	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Totals
Light Trucks	0	5	1	0	5	0	5	3	0	0	0	0	19
Medium Trucks	0	1	0	0	0	0	0	0	0	0	0	0	1
Heavy Trucks	0	0	0	0	1	0	0	0	0	0	0	0	1
% Trucks	NA	2.0%	0.5%	0.0%	1.7%	NA	2.5%	0.6%	0.0%	NA	NA	NA	1.3%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	9	18	19	13	59

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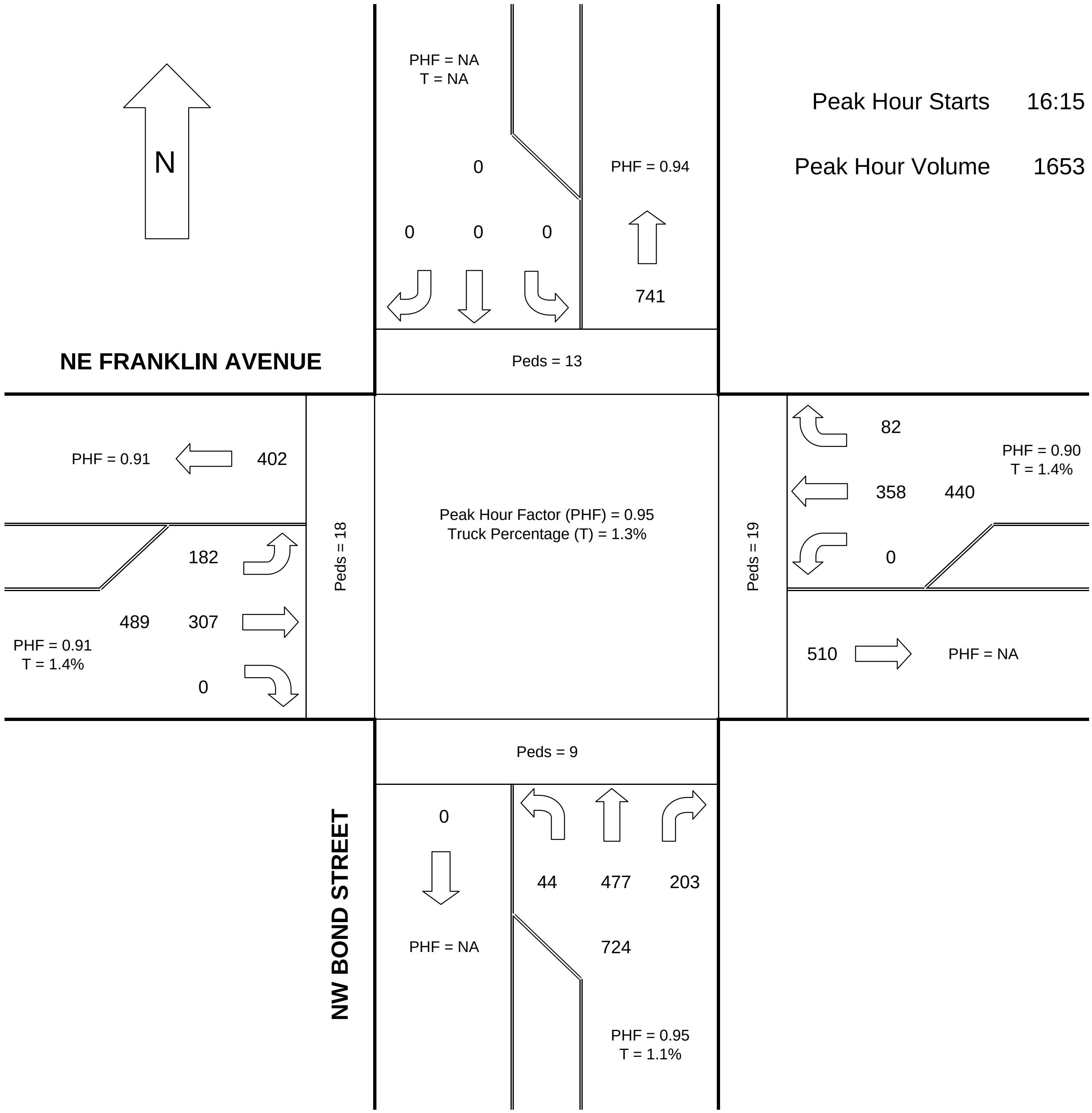
Intersection Turning Movement

Peak Hour Diagram

Location NE FRANKLIN AVENUE AT NW BOND STREET
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: JW

Peak Hour Starts 16:15

Peak Hour Volume 1653



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Intersection Turning Movement
Summary Report

Location NE FRANKLIN AVENUE AT NE 3RD STREET
Date 1/4/2007
Day of Week Thursday
Time Begin 16:00
Reviewed By: TM

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	24	93	64	9	75	41	14	176	26	26	203	16	767
16:15 - 16:30	20	110	64	12	70	21	5	147	33	24	197	17	720
16:30 - 16:45	23	102	67	17	66	32	5	244	26	27	230	21	860
16:45 - 17:00	17	88	53	12	77	28	9	181	30	16	174	12	697
17:00 - 17:15	23	162	59	7	88	45	13	161	35	25	170	29	817
17:15 - 17:30	15	99	55	10	76	27	8	124	17	20	109	17	577
17:30 - 17:45	10	71	51	13	57	39	9	159	15	20	146	11	601
17:45 - 18:00	21	51	37	11	45	28	5	166	20	12	125	8	529
Movement Totals	153	776	450	91	554	261	68	1358	202	170	1354	131	5568
Enter Totals	1379			906			1628			1655			
Exit Totals	975			926			1899			1768			

Two-Hour Totals													
Light Trucks	8	22	29	0	19	7	2	32	12	5	31	13	180
Medium Trucks	0	0	0	0	1	0	0	1	0	0	1	1	4
Heavy Trucks	0	0	1	0	0	0	0	6	3	0	4	0	14
% Trucks	5.2%	2.8%	6.7%	0.0%	3.6%	2.7%	2.9%	2.9%	7.4%	2.9%	2.7%	10.7%	3.6%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	1	0	0	0	0	0	1	0	2

	South	West	East	North	
Pedestrians	0	0	0	0	0

Peak Hour Information

Peak Hour 16:15 17:15

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	83	462	243	48	301	126	32	733	124	92	771	79	3094
Peak Hour Factor	0.90	0.71	0.91	0.71	0.86	0.70	0.62	0.75	0.89	0.85	0.84	0.68	0.90
Enter Totals	788			475			889			942			
Peak Hour Factor	0.81			0.85			0.81			0.85			
Exit Totals	573			517			1024			980			
Peak Hour Factor	0.70			0.87			0.78			0.86			
Light Trucks	6	15	16	0	11	3	2	14	6	3	15	9	100
Medium Trucks	0	0	0	0	1	0	0	1	0	0	1	1	4
Heavy Trucks	0	0	1	0	0	0	0	6	1	0	3	0	11
% Trucks	7.2%	3.2%	7.0%	0.0%	4.0%	2.4%	6.3%	2.9%	5.6%	3.3%	2.5%	12.7%	3.7%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	1	0	0	0	0	0	1	0	2

	South	West	East	North	
Pedestrians	0	0	0	0	0

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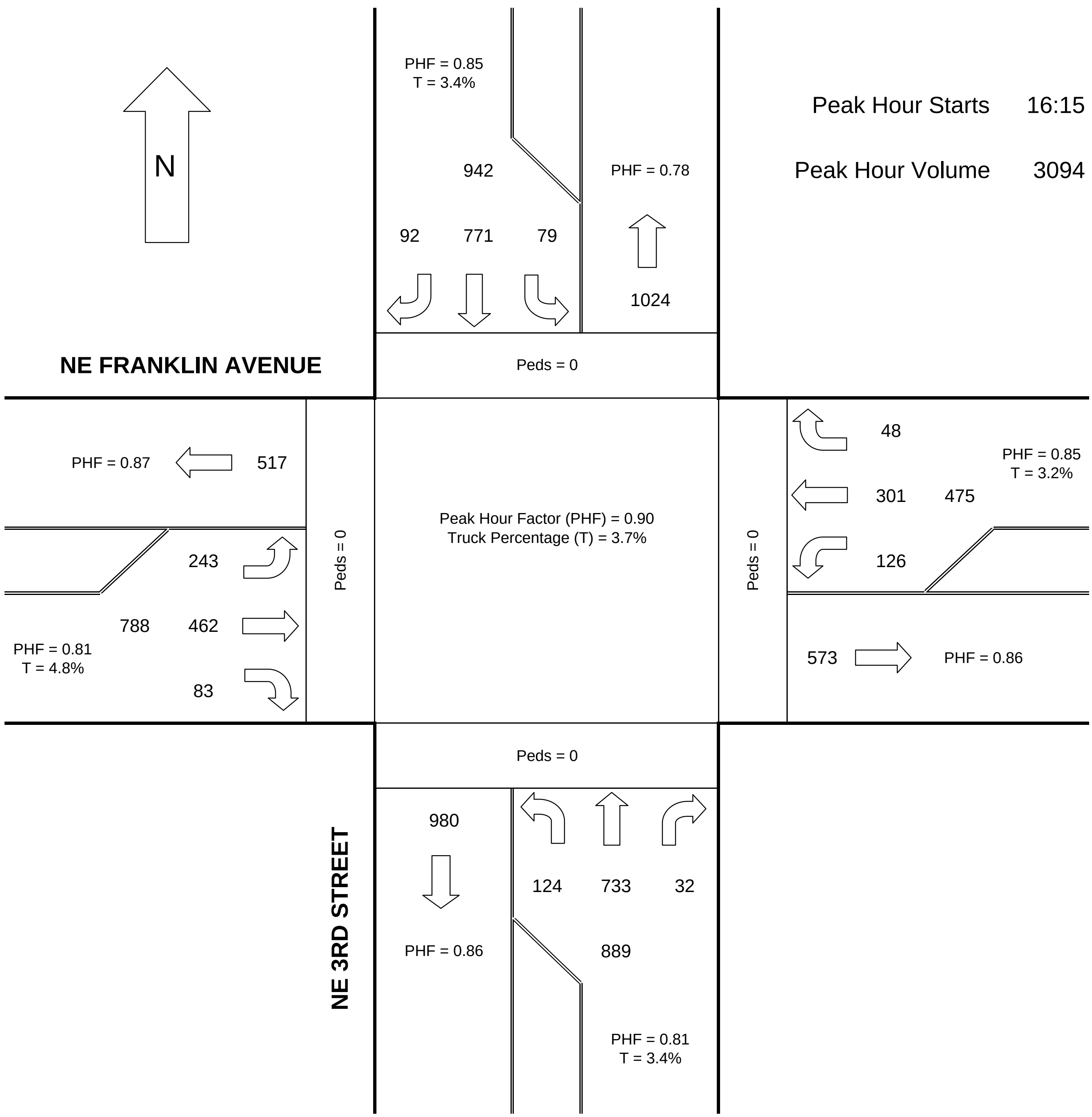
Intersection Turning Movement

Peak Hour Diagram

Location NE FRANKLIN AVENUE AT NE 3RD STREET
Date 1/4/2007
Day of Week Thursday
Time Begin 16:00
Reviewed By: TM



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PO Box 13699
Salem, OR 97309
Tel: (503) 646-2942
Fax: (503) 526-0628

Intersection Turning Movement

Summary Report

Location COLORADO AVENUE AT WALL STREET
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: TM

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	0	0	0	0	96	28	0	0	0	40	95	0	259
16:15 - 16:30	0	0	0	0	108	20	0	0	0	29	80	0	237
16:30 - 16:45	0	0	0	0	106	18	0	0	0	26	77	0	227
16:45 - 17:00	0	0	0	0	103	22	0	0	0	30	71	0	226
17:00 - 17:15	0	0	0	0	120	21	0	0	0	29	109	0	279
17:15 - 17:30	0	0	0	0	111	11	0	0	0	35	70	0	227
17:30 - 17:45	0	0	0	0	78	17	0	0	0	25	80	0	200
17:45 - 18:00	0	0	0	0	61	11	0	0	0	19	59	0	150
Movement Totals	0	0	0	0	783	148	0	0	0	233	641	0	1805
Enter Totals	0			931			0			874			
Exit Totals	0			1016			0			789			
Two-Hour Totals													
Light Trucks	0	0	0	0	20	3	0	0	0	4	17	0	44
Medium Trucks	0	0	0	0	2	0	0	0	0	0	0	0	2
Heavy Trucks	0	0	0	0	1	0	0	0	0	0	0	0	1
% Trucks	NA	NA	NA	NA	2.9%	2.0%	NA	NA	NA	1.7%	2.7%	NA	2.6%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	0	0

Peak Hour Information

Peak Hour 16:15 17:15

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	0	0	0	0	437	81	0	0	0	114	337	0	969
Peak Hour Factor	NA	NA	NA	NA	0.91	0.92	NA	NA	NA	0.95	0.77	NA	0.87
Enter Totals	0			518			0			451			
Peak Hour Factor	NA			0.92			NA			0.82			
Exit Totals	0			551			0			418			
Peak Hour Factor	NA			0.92			NA			0.80			
Light Trucks	0	0	0	0	11	1	0	0	0	4	9	0	25
Medium Trucks	0	0	0	0	1	0	0	0	0	0	0	0	1
Heavy Trucks	0	0	0	0	1	0	0	0	0	0	0	0	1
% Trucks	NA	NA	NA	NA	3.0%	1.2%	NA	NA	NA	3.5%	2.7%	NA	2.8%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	0	0

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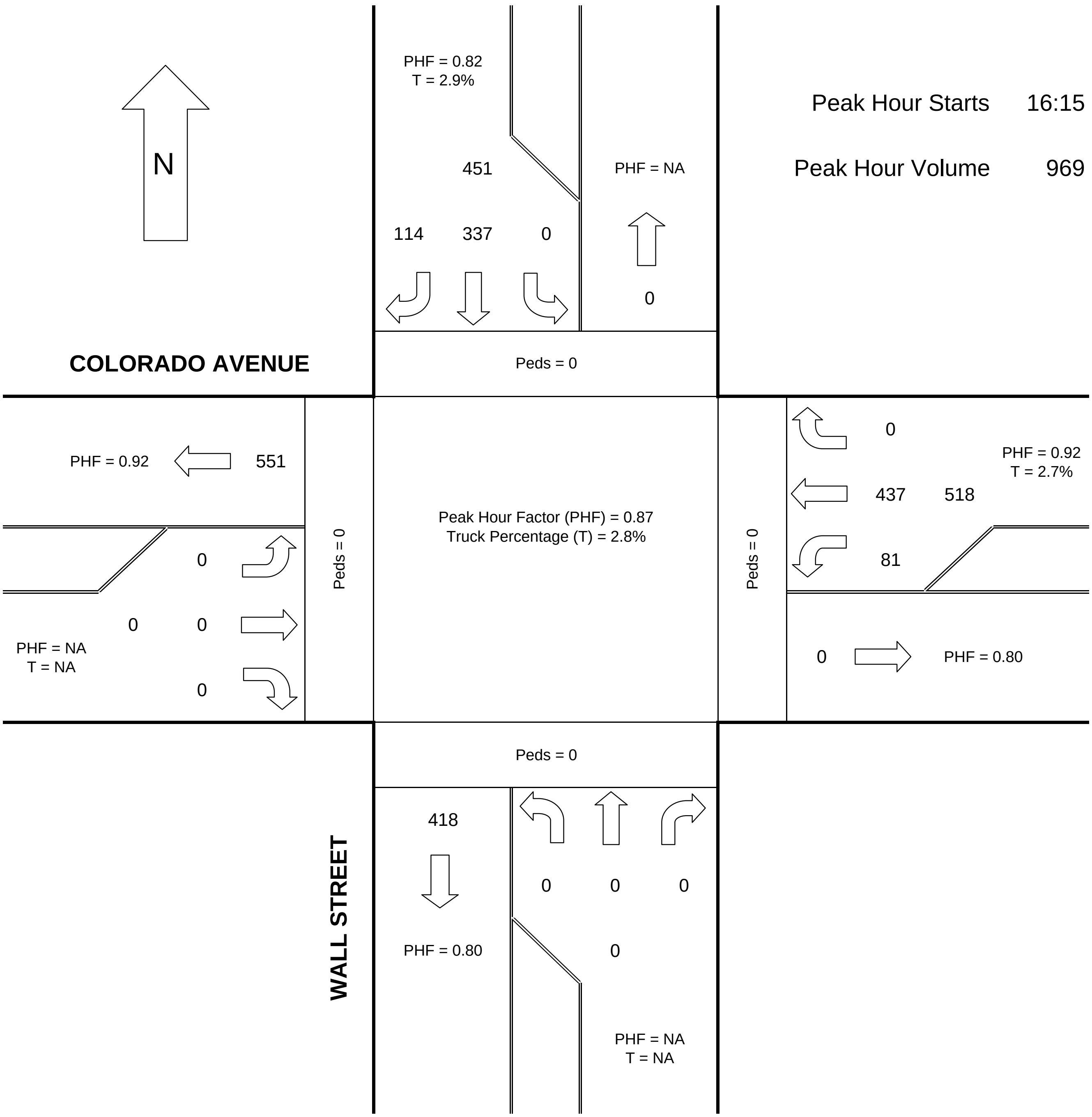
Intersection Turning Movement

Peak Hour Diagram

Location COLORADO AVENUE AT WALL STREET
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: TM



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Intersection Turning Movement

Summary Report

Location COLORADO AVENUE AT BOND STREET
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: TM

	Eastbound			**Westbound**			**Northbound**			**Southbound**			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	0	0	0	29	108	0	0	110	9	0	0	0	256
16:15 - 16:30	0	0	0	23	119	0	0	122	18	0	0	0	282
16:30 - 16:45	0	0	0	25	105	0	0	142	12	0	0	0	284
16:45 - 17:00	0	0	0	25	108	0	0	104	12	0	0	0	249
17:00 - 17:15	0	0	0	30	122	0	0	155	14	0	0	0	321
17:15 - 17:30	0	0	0	33	104	0	0	110	16	0	0	0	263
17:30 - 17:45	0	0	0	16	77	0	0	73	10	0	0	0	176
17:45 - 18:00	0	0	0	25	64	0	0	75	9	0	0	0	173
Movement Totals	0	0	0	206	807	0	0	891	100	0	0	0	2004
Enter Totals	0			1013			991			0			
Exit Totals	0			907			1097			0			
Two-Hour Totals													
Light Trucks	0	0	0	3	22	0	0	21	2	0	0	0	48
Medium Trucks	0	0	0	0	1	0	0	0	0	0	0	0	1
Heavy Trucks	0	0	0	0	2	0	0	0	0	0	0	0	2
% Trucks	NA	NA	NA	1.5%	3.1%	NA	NA	2.4%	2.0%	NA	NA	NA	2.5%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	1	0	0	0	0	0	0	0	1

	South	West	East	North	
Pedestrians	0	0	0	0	0

Peak Hour Information

Peak Hour 16:15 17:15

	Eastbound			**Westbound**			**Northbound**			**Southbound**			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	0	0	0	103	454	0	0	523	56	0	0	0	1136
Peak Hour Factor	NA	NA	NA	0.86	0.93	NA	NA	0.84	0.78	NA	NA	NA	0.88
Enter Totals	0			557			579			0			
Peak Hour Factor	NA			0.92			0.86			NA			
Exit Totals	0			510			626			0			
Peak Hour Factor	NA			0.93			0.85			NA			
Light Trucks	0	0	0	1	15	0	0	13	1	0	0	0	30
Medium Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Trucks	0	0	0	0	2	0	0	0	0	0	0	0	2
% Trucks	NA	NA	NA	1.0%	3.7%	NA	NA	2.5%	1.8%	NA	NA	NA	2.8%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	0	0

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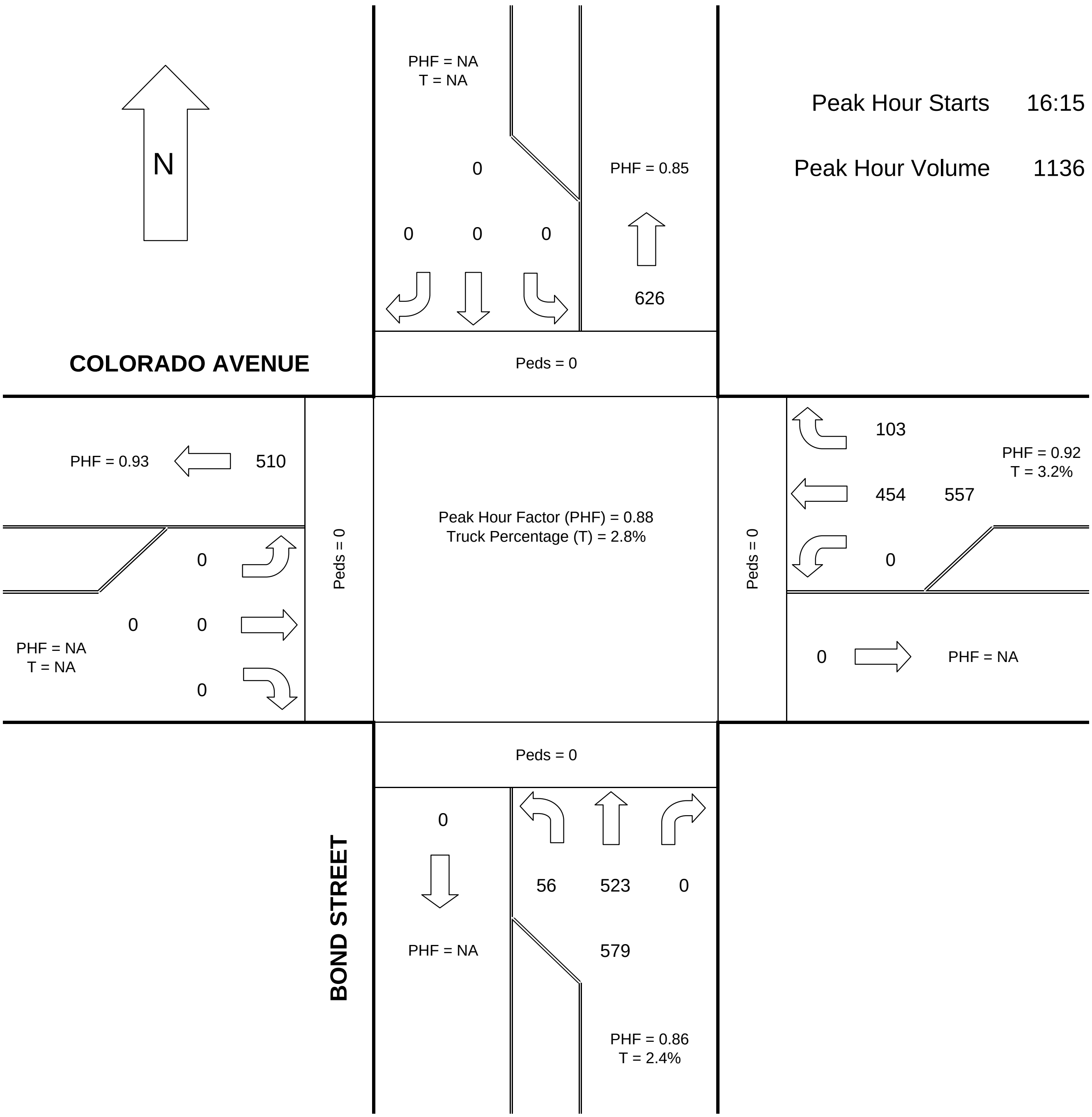
Intersection Turning Movement

Peak Hour Diagram

Location COLORADO AVENUE AT BOND STREET
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: TM

Peak Hour Starts 16:15

Peak Hour Volume 1136



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Intersection Turning Movement

Summary Report

Location ARIZONA AVENUE AT WALL STREET
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: TM

	Eastbound			**Westbound**			**Northbound**			**Southbound**			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	11	175	0	0	0	0	0	0	0	0	87	29	302
16:15 - 16:30	5	171	0	0	0	0	0	0	0	0	63	45	284
16:30 - 16:45	6	193	0	0	0	0	0	0	0	0	66	32	297
16:45 - 17:00	4	193	0	0	0	0	0	0	0	0	69	27	293
17:00 - 17:15	4	278	0	0	0	0	0	0	0	0	78	52	412
17:15 - 17:30	5	194	0	0	0	0	0	0	0	0	52	33	284
17:30 - 17:45	6	142	0	0	0	0	0	0	0	0	64	34	246
17:45 - 18:00	4	100	0	0	0	0	0	0	0	0	52	14	170
Movement Totals	45	1446	0	0	0	0	0	0	0	0	531	266	2288
Enter Totals		1491			0			0			797		
Exit Totals		1712			0			0			576		

Two-Hour Totals

Light Trucks	0	22	0	0	0	0	0	0	0	0	14	1	37
Medium Trucks	0	9	0	0	0	0	0	0	0	0	0	0	9
Heavy Trucks	0	4	0	0	0	0	0	0	0	0	0	0	4
% Trucks	0.0%	2.4%	NA	NA	NA	NA	NA	NA	NA	NA	2.6%	0.4%	2.2%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	0	0

Peak Hour Information

Peak Hour 16:15 17:15

	Eastbound			**Westbound**			**Northbound**			**Southbound**			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	19	835	0	0	0	0	0	0	0	0	276	156	1286
Peak Hour Factor	0.79	0.75	NA	NA	NA	NA	NA	NA	NA	NA	0.88	0.75	0.78
Enter Totals		854			0			0			432		
Peak Hour Factor		0.76			NA			NA			0.83		
Exit Totals		991			0			0			295		
Peak Hour Factor		0.75			NA			NA			0.90		
Light Trucks	0	16	0	0	0	0	0	0	0	0	7	1	24
Medium Trucks	0	6	0	0	0	0	0	0	0	0	0	0	6
Heavy Trucks	0	4	0	0	0	0	0	0	0	0	0	0	4
% Trucks	0.0%	3.1%	NA	NA	NA	NA	NA	NA	NA	NA	2.5%	0.6%	2.6%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	0	0

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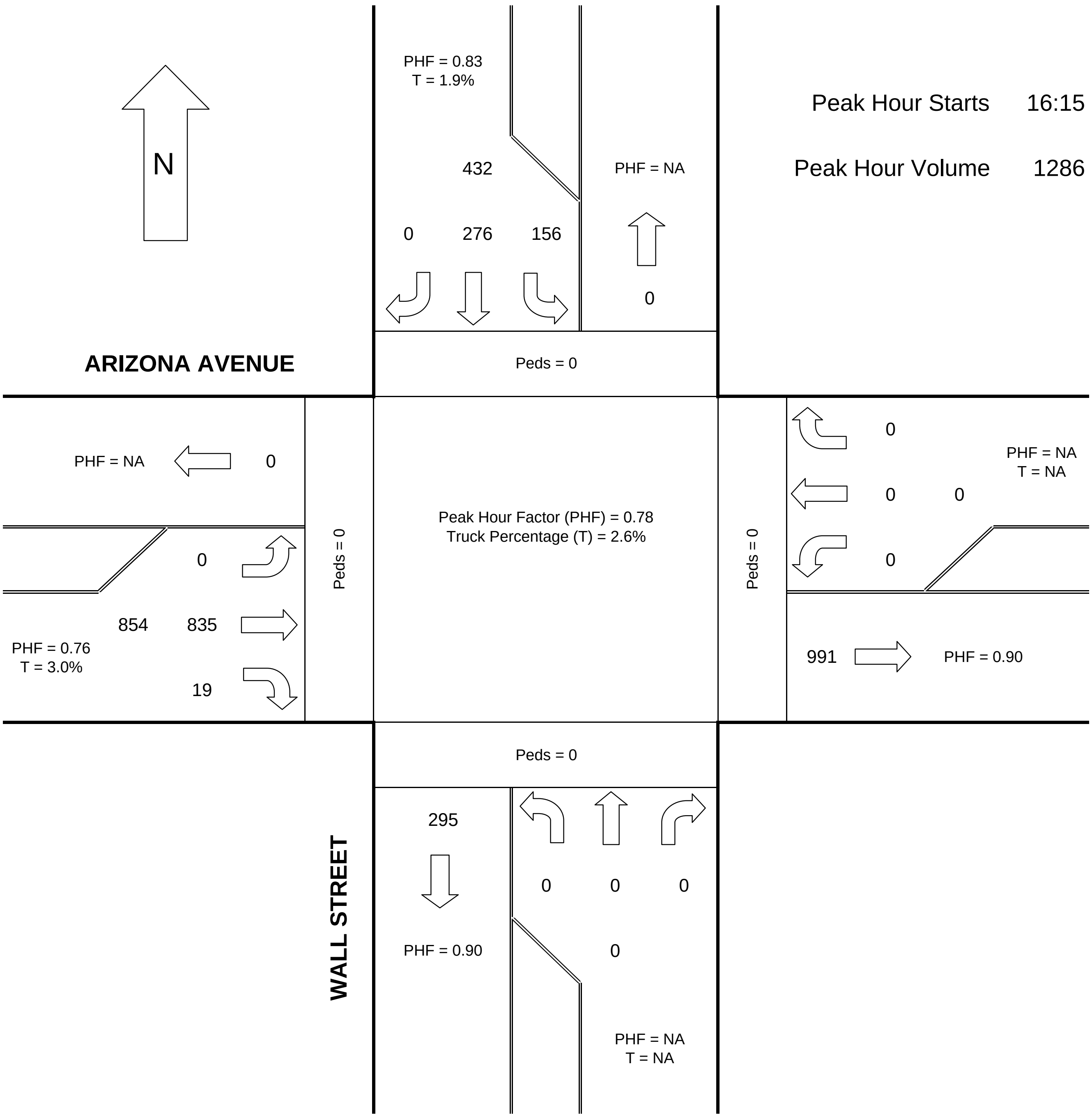
Intersection Turning Movement

Peak Hour Diagram

Location ARIZONA AVENUE AT WALL STREET
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: TM



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Intersection Turning Movement
Summary Report

Location ARIZONA AVENUE AT BOND STREET
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: TM

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	0	161	52	0	0	0	32	64	0	0	0	0	309
16:15 - 16:30	0	158	63	0	0	0	29	74	0	0	0	0	324
16:30 - 16:45	0	156	74	0	0	0	27	80	0	0	0	0	337
16:45 - 17:00	0	147	48	0	0	0	32	80	0	0	0	0	307
17:00 - 17:15	0	239	87	0	0	0	26	71	0	0	0	0	423
17:15 - 17:30	0	165	62	0	0	0	20	66	0	0	0	0	313
17:30 - 17:45	0	140	38	0	0	0	16	55	0	0	0	0	249
17:45 - 18:00	0	81	34	0	0	0	12	46	0	0	0	0	173
Movement Totals	0	1247	458	0	0	0	194	536	0	0	0	0	2435
Enter Totals		1705			0			730			0		
Exit Totals		1441			0			994			0		

Two-Hour Totals

Light Trucks	0	24	8	0	0	0	6	14	0	0	0	0	52
Medium Trucks	0	8	1	0	0	0	0	0	0	0	0	0	9
Heavy Trucks	0	3	0	0	0	0	0	0	0	0	0	0	3
% Trucks	NA	2.8%	2.0%	NA	NA	NA	3.1%	2.6%	NA	NA	NA	NA	2.6%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	0	0

Peak Hour Information

Peak Hour 16:15 17:15

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	0	700	272	0	0	0	114	305	0	0	0	0	1391
Peak Hour Factor	NA	0.73	0.78	NA	NA	NA	0.89	0.95	NA	NA	NA	NA	0.82

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	972	0	419	0
Peak Hour Factor	0.75	NA	0.94	NA
Exit Totals	814	0	577	0
Peak Hour Factor	0.77	NA	0.91	NA

Light Trucks	0	19	5	0	0	0	4	9	0	0	0	0	37
Medium Trucks	0	6	0	0	0	0	0	0	0	0	0	0	6
Heavy Trucks	0	3	0	0	0	0	0	0	0	0	0	0	3
% Trucks	NA	4.0%	1.8%	NA	NA	NA	3.5%	3.0%	NA	NA	NA	NA	3.3%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	0	0

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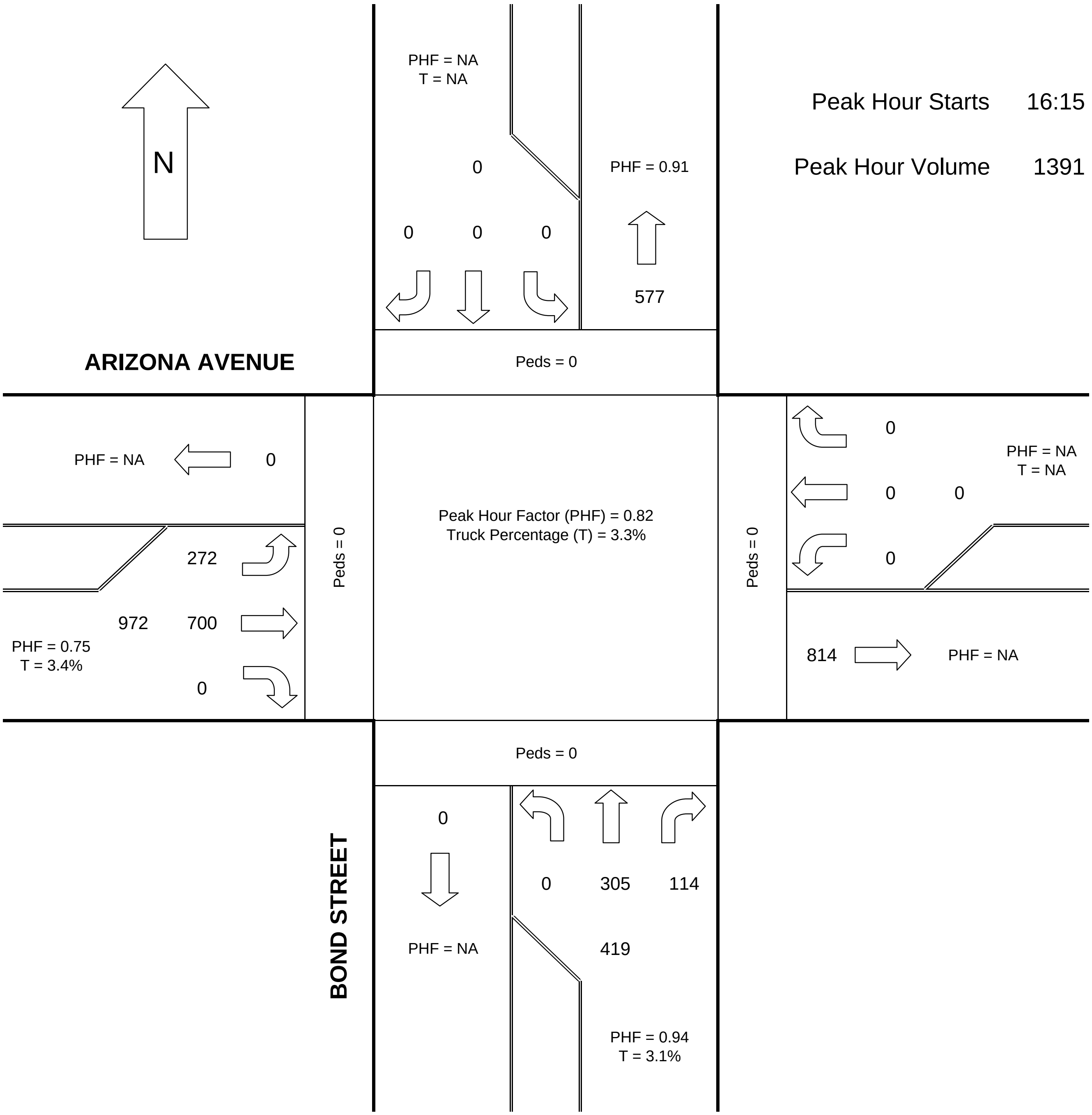
Intersection Turning Movement
Peak Hour Diagram

Location ARIZONA AVENUE AT BOND STREET
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: TM

Peak Hour Starts 16:15

Peak Hour Volume 1391



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Intersection Turning Movement
Summary Report

Location COLORADO AVENUE AT BEND PARKWAY-SB RAMP
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: TM

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	0	0	0	6	63	1	155	26	4	76	0	18	349
16:15 - 16:30	0	1	0	9	63	0	153	21	0	62	0	21	330
16:30 - 16:45	0	0	0	9	80	2	155	33	0	57	0	14	350
16:45 - 17:00	0	1	0	13	66	0	140	26	1	55	0	15	317
17:00 - 17:15	0	0	0	15	74	1	214	64	5	72	1	21	467
17:15 - 17:30	0	0	1	3	63	0	169	39	3	78	1	22	379
17:30 - 17:45	0	0	0	3	26	0	53	11	0	23	0	9	125
17:45 - 18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
Movement Totals	0	2	1	58	435	4	1039	220	13	423	2	120	2317
Enter Totals	3			497			1272			545			
Exit Totals	1161			871			279			6			

Two-Hour Totals

Light Trucks	0	0	0	0	8	0	23	3	0	15	0	4	53
Medium Trucks	0	0	0	0	0	0	1	0	0	1	0	0	2
Heavy Trucks	0	0	0	0	0	0	4	0	0	0	0	2	6
% Trucks	NA	0.0%	0.0%	0.0%	1.8%	0.0%	2.7%	1.4%	0.0%	3.8%	0.0%	5.0%	2.6%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	0	0

Peak Hour Information

Peak Hour 16:30 17:30

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	0	1	1	40	283	3	678	162	9	262	2	72	1513
Peak Hour Factor	NA	0.25	0.25	0.67	0.88	0.38	0.79	0.63	0.45	0.84	0.50	0.82	0.81

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	2	326	849	336
Peak Hour Factor	0.50	0.90	0.75	0.83
Exit Totals	751	554	203	5
Peak Hour Factor	0.80	0.92	0.64	0.63

Light Trucks	0	0	0	0	3	0	16	3	0	6	0	2	30
Medium Trucks	0	0	0	0	0	0	1	0	0	1	0	0	2
Heavy Trucks	0	0	0	0	0	0	4	0	0	0	0	2	6
% Trucks	NA	0.0%	0.0%	0.0%	1.1%	0.0%	3.1%	1.9%	0.0%	2.7%	0.0%	5.6%	2.5%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	0	0

TrafStats
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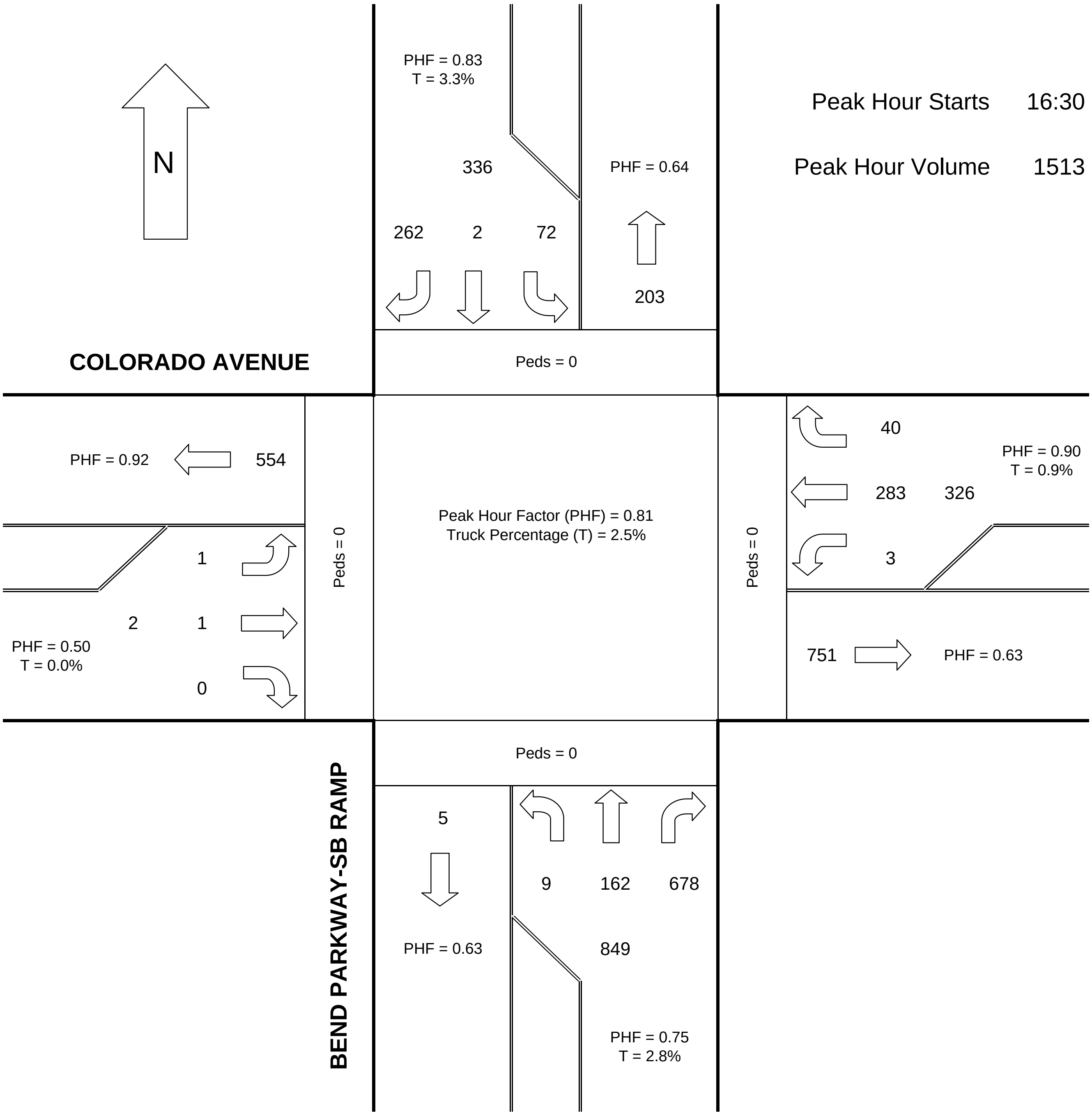
Intersection Turning Movement
Peak Hour Diagram

Location COLORADO AVENUE AT BEND PARKWAY-SB RAMP
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: TM

Peak Hour Starts 16:30
Peak Hour Volume 1513



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Intersection Turning Movement
Summary Report

Location BUTLER MARKET ROAD AT BEND PARKWAY-SB RAMP
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: TM

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	0	108	0	0	103	0	0	0	0	22	0	45	278
16:15 - 16:30	0	92	0	0	118	0	0	0	0	18	0	38	266
16:30 - 16:45	0	109	0	0	134	0	0	0	0	24	0	49	316
16:45 - 17:00	0	106	0	0	131	0	0	0	0	31	0	39	307
17:00 - 17:15	0	132	0	0	128	0	0	0	0	15	0	50	325
17:15 - 17:30	0	110	0	0	106	0	0	0	0	19	0	38	273
17:30 - 17:45	0	90	0	0	97	0	0	0	0	12	0	39	238
17:45 - 18:00	0	71	0	0	75	0	0	0	0	13	0	28	187
Movement Totals	0	818	0	0	892	0	0	0	0	154	0	326	2190
Enter Totals		818			892			0			480		
Exit Totals		1144			1046			0			0		

Two-Hour Totals

	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Totals
Light Trucks	0	32	0	0	13	0	0	0	0	4	0	15	64
Medium Trucks	0	2	0	0	2	0	0	0	0	0	0	0	4
Heavy Trucks	0	3	0	0	2	0	0	0	0	2	0	2	9
% Trucks	NA	4.5%	NA	NA	1.9%	NA	NA	NA	NA	3.9%	NA	5.2%	3.5%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	1	0	0	0	0	0	0	0	1	0	0	2

	South	West	East	North	
Pedestrians	0	0	0	0	0

Peak Hour Information

Peak Hour 16:30 17:30

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	0	457	0	0	499	0	0	0	0	89	0	176	1221
Peak Hour Factor	NA	0.87	NA	NA	0.93	NA	NA	NA	NA	0.72	NA	0.88	0.94
Enter Totals		457			499			0			265		
Peak Hour Factor		0.87			0.93			NA			0.91		
Exit Totals		633			588			0			0		
Peak Hour Factor		0.87			0.91			NA			NA		
Light Trucks	0	16	0	0	8	0	0	0	0	2	0	7	33
Medium Trucks	0	1	0	0	1	0	0	0	0	0	0	0	2
Heavy Trucks	0	1	0	0	0	0	0	0	0	2	0	2	5
% Trucks	NA	3.9%	NA	NA	1.8%	NA	NA	NA	NA	4.5%	NA	5.1%	3.3%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	1	0	0	0	0	0	0	0	0	0	0	1

	South	West	East	North	
Pedestrians	0	0	0	0	0

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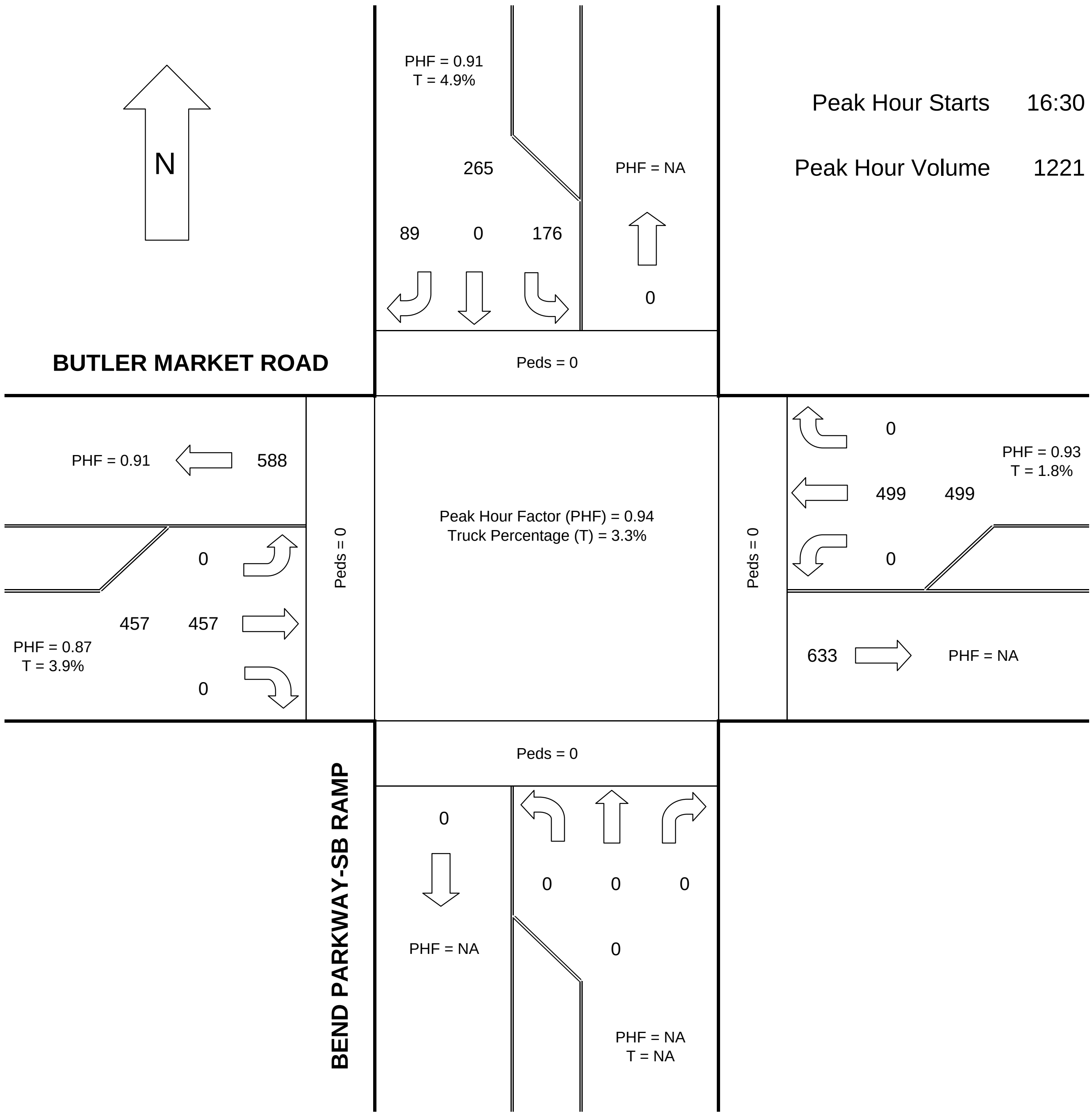
Intersection Turning Movement

Peak Hour Diagram

Location BUTLER MARKET ROAD AT BEND PARKWAY-SB RAMP
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: TM



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Intersection Turning Movement

Summary Report

Location BUTLER MARKET ROAD AT BEND PARKWAY-NB RAMP
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: TM

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	2	128	23	51	95	2	5	0	1	0	0	0	307
16:15 - 16:30	5	116	11	38	117	0	1	0	1	0	0	0	289
16:30 - 16:45	1	144	12	47	128	3	5	1	2	0	0	0	343
16:45 - 17:00	0	133	12	44	170	2	3	1	6	0	0	0	371
17:00 - 17:15	2	169	20	57	137	3	5	3	4	0	0	0	400
17:15 - 17:30	2	131	11	56	101	1	1	1	2	0	0	0	306
17:30 - 17:45	0	113	12	45	101	2	1	2	0	0	0	0	276
17:45 - 18:00	1	92	4	30	79	2	3	0	0	0	0	0	211
Movement Totals	13	1026	105	368	928	15	24	8	16	0	0	0	2503
Enter Totals	1144			1311			48			0			
Exit Totals	1050			944			481			28			

Two-Hour Totals

Light Trucks	1	34	5	10	14	1	0	0	2	0	0	0	67
Medium Trucks	1	1	0	0	3	0	0	0	0	0	0	0	5
Heavy Trucks	0	6	0	4	1	0	0	0	0	0	0	0	11
% Trucks	15.4%	4.0%	4.8%	3.8%	1.9%	6.7%	0.0%	0.0%	12.5%	NA	NA	NA	3.3%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	1	0	0	0	0	0	0	0	0	0	0	1

	South	West	East	North	
Pedestrians	0	0	0	0	0

Peak Hour Information

Peak Hour 16:30 17:30

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	5	577	55	204	536	9	14	6	14	0	0	0	1420
Peak Hour Factor	0.63	0.85	0.69	0.89	0.79	0.75	0.70	0.50	0.58	NA	NA	NA	0.89

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	637	749	34	0
Peak Hour Factor	0.83	0.87	0.71	NA
Exit Totals	591	550	265	14
Peak Hour Factor	0.85	0.78	0.83	0.70

Light Trucks	0	13	3	8	9	1	0	0	2	0	0	0	36
Medium Trucks	1	0	0	0	1	0	0	0	0	0	0	0	2
Heavy Trucks	0	4	0	1	0	0	0	0	0	0	0	0	5
% Trucks	20.0%	2.9%	5.5%	4.4%	1.9%	11.1%	0.0%	0.0%	14.3%	NA	NA	NA	3.0%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	1	0	0	0	0	0	0	0	0	0	0	1

	South	West	East	North	
Pedestrians	0	0	0	0	0

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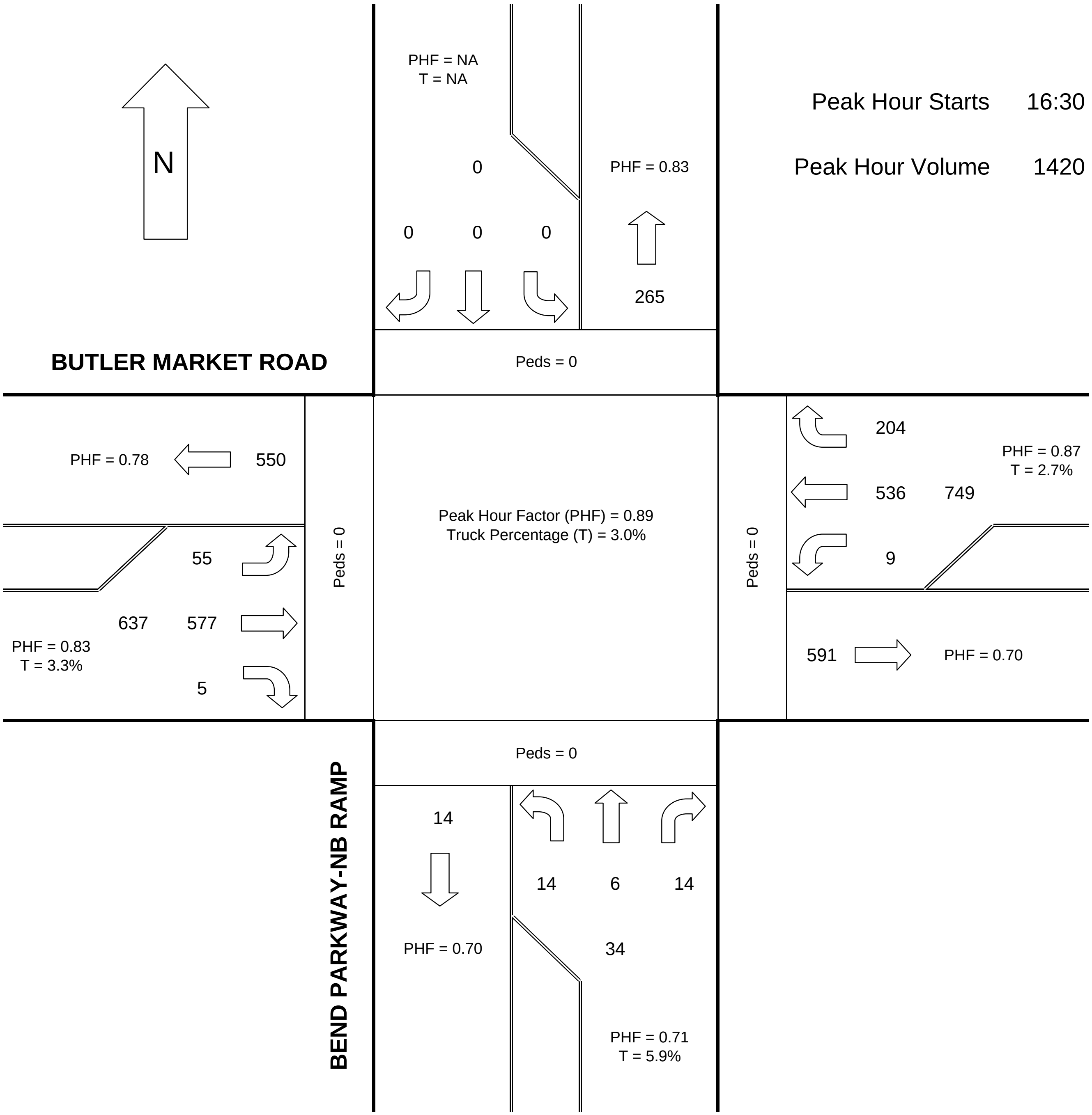
Intersection Turning Movement

Peak Hour Diagram

Location BUTLER MARKET ROAD AT BEND PARKWAY-NB RAMP
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: TM



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Intersection Turning Movement
Summary Report

Location BUTLER MARKET ROAD AT NE 4TH STREET
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: BV

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	26	109	3	1	97	18	15	0	43	11	5	1	329
16:15 - 16:30	28	84	0	1	93	11	16	0	43	13	1	0	290
16:30 - 16:45	28	116	0	0	123	13	10	0	41	5	3	0	339
16:45 - 17:00	23	108	0	0	112	22	16	0	62	5	1	0	349
17:00 - 17:15	28	130	1	0	112	23	19	0	53	8	0	0	374
17:15 - 17:30	16	109	1	0	99	9	15	0	46	5	1	0	301
17:30 - 17:45	18	98	0	0	101	11	9	1	37	4	1	0	280
17:45 - 18:00	16	81	0	0	73	10	7	1	31	1	0	0	220
Movement Totals	183	835	5	2	810	117	107	2	356	52	12	1	2482
Enter Totals		1023			929			465			65		
Exit Totals		943			1218			9			312		

Two-Hour Totals

	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Totals
Light Trucks	6	14	0	0	12	2	2	0	3	0	0	0	39
Medium Trucks	0	1	0	0	1	0	0	0	1	0	0	0	3
Heavy Trucks	4	1	1	0	2	0	0	0	3	1	0	0	12
% Trucks	5.5%	1.9%	20.0%	0.0%	1.9%	1.7%	1.9%	0.0%	2.0%	1.9%	0.0%	0.0%	2.2%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	3	3

Peak Hour Information

Peak Hour 16:30 17:30

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	95	463	2	0	446	67	60	0	202	23	5	0	1363
Peak Hour Factor	0.85	0.89	0.50	NA	0.91	0.73	0.79	NA	0.81	0.72	0.42	NA	0.91
Enter Totals		560			513			262			28		
Peak Hour Factor		0.88			0.94			0.84			0.88		
Exit Totals		523			671			2			167		
Peak Hour Factor		0.88			0.94			0.50			0.82		
Light Trucks	5	3	0	0	5	1	1	0	1	0	0	0	16
Medium Trucks	0	0	0	0	1	0	0	0	0	0	0	0	1
Heavy Trucks	3	0	1	0	0	0	0	0	0	1	0	0	5
% Trucks	8.4%	0.6%	50.0%	NA	1.3%	1.5%	1.7%	NA	0.5%	4.3%	0.0%	NA	1.6%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	3	3

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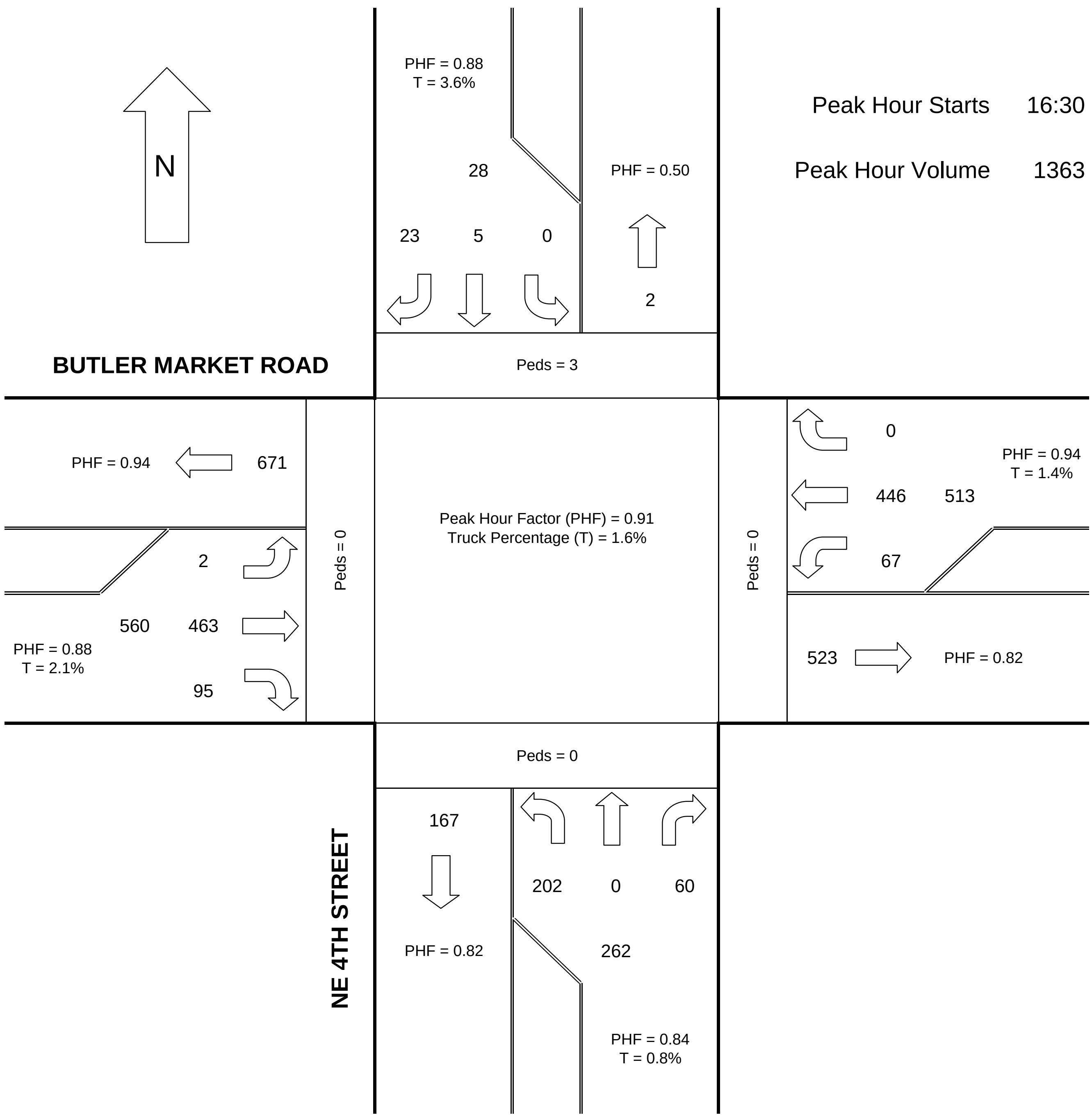
Intersection Turning Movement

Peak Hour Diagram

Location BUTLER MARKET ROAD AT NE 4TH STREET
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: BV



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Intersection Turning Movement
Summary Report

Location NE STUDIO ROAD AT NE 4TH STREET
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: BM

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	0	0	0	7	0	28	53	75	0	0	103	14	280
16:15 - 16:30	2	4	1	6	4	26	35	72	0	0	93	16	259
16:30 - 16:45	2	2	1	5	2	27	45	56	0	0	93	11	244
16:45 - 17:00	1	2	0	8	0	25	62	71	0	0	82	17	268
17:00 - 17:15	0	0	0	3	1	31	57	90	0	0	76	13	271
17:15 - 17:30	0	0	0	3	0	22	65	71	0	0	80	12	253
17:30 - 17:45	0	0	0	7	0	31	46	59	0	0	64	14	221
17:45 - 18:00	0	0	0	8	0	24	42	51	0	0	44	22	191
Movement Totals	5	8	2	47	7	214	405	545	0	0	635	119	1987
Enter Totals	15			268			950			754			
Exit Totals	532			7			594			854			

Two-Hour Totals

Light Trucks	0	0	0	0	0	6	10	5	0	0	7	0	28
Medium Trucks	0	0	0	0	0	0	2	0	0	0	0	0	2
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	1	0	1
% Trucks	0.0%	0.0%	0.0%	0.0%	0.0%	2.8%	3.0%	0.9%	NA	NA	1.3%	0.0%	1.6%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	8	0	0	7	1	1	1	0	0	4	0	22

	South	West	East	North	
Pedestrians	27	0	0	0	27

Peak Hour Information

Peak Hour 16:00 17:00

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	5	8	2	26	6	106	195	274	0	0	371	58	1051
Peak Hour Factor	0.63	0.50	0.50	0.81	0.38	0.95	0.79	0.91	NA	NA	0.90	0.85	0.94

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	15	138	469	429
Peak Hour Factor	0.54	0.96	0.88	0.92
Exit Totals	261	6	302	482
Peak Hour Factor	0.81	0.38	0.92	0.92

Light Trucks	0	0	0	0	0	3	6	4	0	0	6	0	19
Medium Trucks	0	0	0	0	0	0	2	0	0	0	0	0	2
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	1	0	1
% Trucks	0.0%	0.0%	0.0%	0.0%	0.0%	2.8%	4.1%	1.5%	NA	NA	1.9%	0.0%	2.1%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	8	0	0	6	1	0	1	0	0	2	0	18

	South	West	East	North	
Pedestrians	14	0	0	0	14

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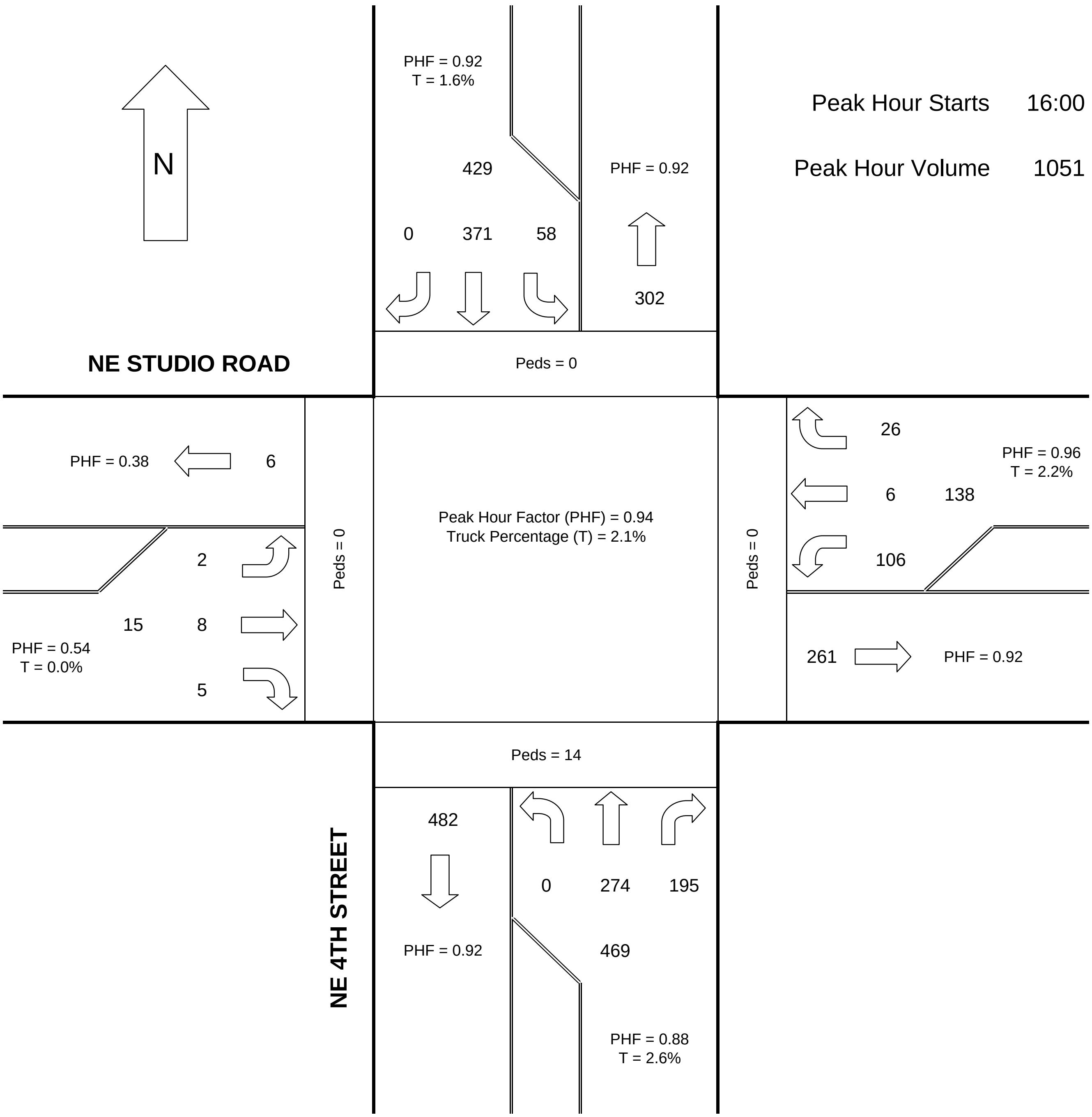
Intersection Turning Movement
Peak Hour Diagram

Location NE STUDIO ROAD AT NE 4TH STREET
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: BM



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Intersection Turning Movement
Summary Report

Location NE REVERE AVENUE AT NE 4TH STREET
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: BV

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	23	67	49	29	50	3	7	42	13	52	46	28	409
16:15 - 16:30	30	68	45	25	49	4	8	38	11	46	39	29	392
16:30 - 16:45	15	61	44	20	62	4	6	33	12	51	35	36	379
16:45 - 17:00	17	52	51	22	67	3	4	51	17	47	27	29	387
17:00 - 17:15	37	71	57	18	66	8	13	53	15	54	29	26	447
17:15 - 17:30	23	79	70	24	56	5	15	43	10	36	35	33	429
17:30 - 17:45	5	43	40	16	43	2	6	37	12	43	19	33	299
17:45 - 18:00	7	43	35	17	41	5	7	30	8	27	28	26	274
Movement Totals	157	484	391	171	434	34	66	327	98	356	258	240	3016
Enter Totals	1032			639			491			854			
Exit Totals	790			888			889			449			

Two-Hour Totals

	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Totals
Light Trucks	2	1	5	1	3	0	0	9	1	4	12	3	41
Medium Trucks	0	0	3	0	0	0	0	0	0	0	0	0	3
Heavy Trucks	0	0	1	0	0	0	0	0	0	1	0	0	2
% Trucks	1.3%	0.2%	2.3%	0.6%	0.7%	0.0%	0.0%	2.8%	1.0%	1.4%	4.7%	1.3%	1.5%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	4	1	3	8

Peak Hour Information

Peak Hour 16:30 17:30

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	92	263	222	84	251	20	38	180	54	188	126	124	1642
Peak Hour Factor	0.62	0.83	0.79	0.88	0.94	0.63	0.63	0.85	0.79	0.87	0.90	0.86	0.92

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	577	355	272	438
Peak Hour Factor	0.84	0.96	0.84	0.90
Exit Totals	425	493	486	238
Peak Hour Factor	0.84	0.91	0.89	0.80

	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Totals
Light Trucks	2	1	4	1	2	0	0	3	1	4	6	2	26
Medium Trucks	0	0	2	0	0	0	0	0	0	0	0	0	2
Heavy Trucks	0	0	0	0	0	0	0	0	0	1	0	0	1
% Trucks	2.2%	0.4%	2.7%	1.2%	0.8%	0.0%	0.0%	1.7%	1.9%	2.7%	4.8%	1.6%	1.8%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	1	1	1	3

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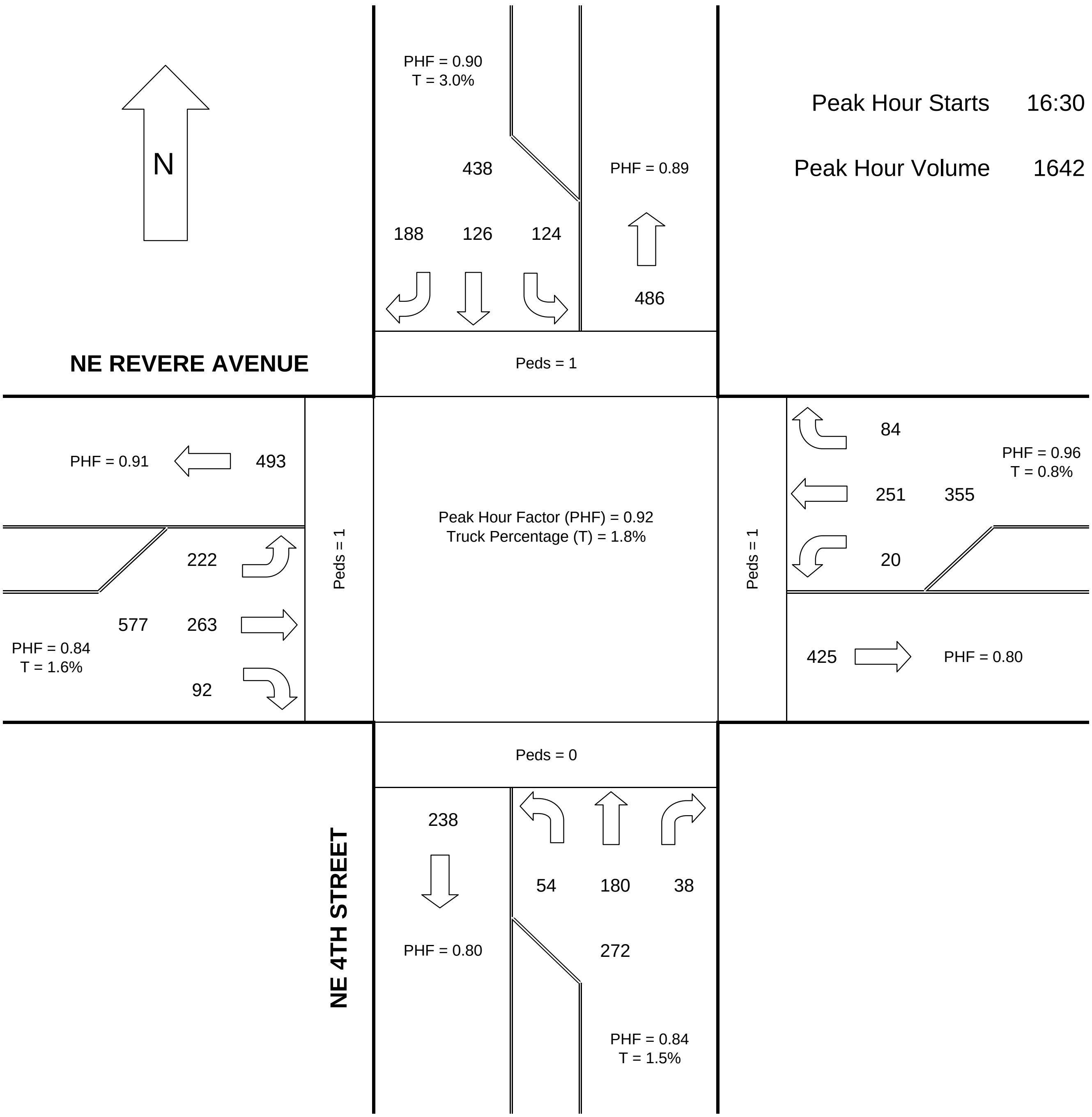
Intersection Turning Movement
Peak Hour Diagram

Location NE REVERE AVENUE AT NE 4TH STREET
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: BV

Peak Hour Starts 16:30

Peak Hour Volume 1642



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Intersection Turning Movement
Summary Report

Location OLNEY AVENUE AT 4TH STREET
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: BV

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	6	78	14	5	72	10	8	35	6	25	36	24	319
16:15 - 16:30	4	66	18	11	61	8	18	40	12	22	32	29	321
16:30 - 16:45	8	49	13	7	61	14	20	29	4	17	22	14	258
16:45 - 17:00	6	67	17	5	55	5	8	42	10	13	22	25	275
17:00 - 17:15	9	76	26	10	78	8	8	54	7	12	24	32	344
17:15 - 17:30	3	71	16	3	65	5	10	35	4	14	26	29	281
17:30 - 17:45	3	58	8	8	67	9	4	27	6	12	18	18	238
17:45 - 18:00	3	48	11	4	72	7	4	20	3	11	19	10	212
Movement Totals	42	513	123	53	531	66	80	282	52	126	199	181	2248
Enter Totals	678			650			414			506			
Exit Totals	774			709			458			307			

Two-Hour Totals

	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Totals
Light Trucks	0	2	5	0	2	0	0	3	0	6	4	3	25
Medium Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0.0%	0.4%	4.1%	0.0%	0.4%	0.0%	0.0%	1.1%	0.0%	4.8%	2.0%	1.7%	1.1%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	6	6	4	10	26

Peak Hour Information

Peak Hour 16:15 17:15

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	27	258	74	33	255	35	54	165	33	64	100	100	1198
Peak Hour Factor	0.75	0.85	0.71	0.75	0.82	0.63	0.68	0.76	0.69	0.73	0.78	0.78	0.87

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	359	323	252	264
Peak Hour Factor	0.81	0.84	0.90	0.80
Exit Totals	412	352	272	162
Peak Hour Factor	0.89	0.91	0.76	0.92

	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Totals
Light Trucks	0	1	2	0	0	0	0	2	0	3	2	0	10
Medium Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0.0%	0.4%	2.7%	0.0%	0.0%	0.0%	0.0%	1.2%	0.0%	4.7%	2.0%	0.0%	0.8%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	4	4	2	6	16

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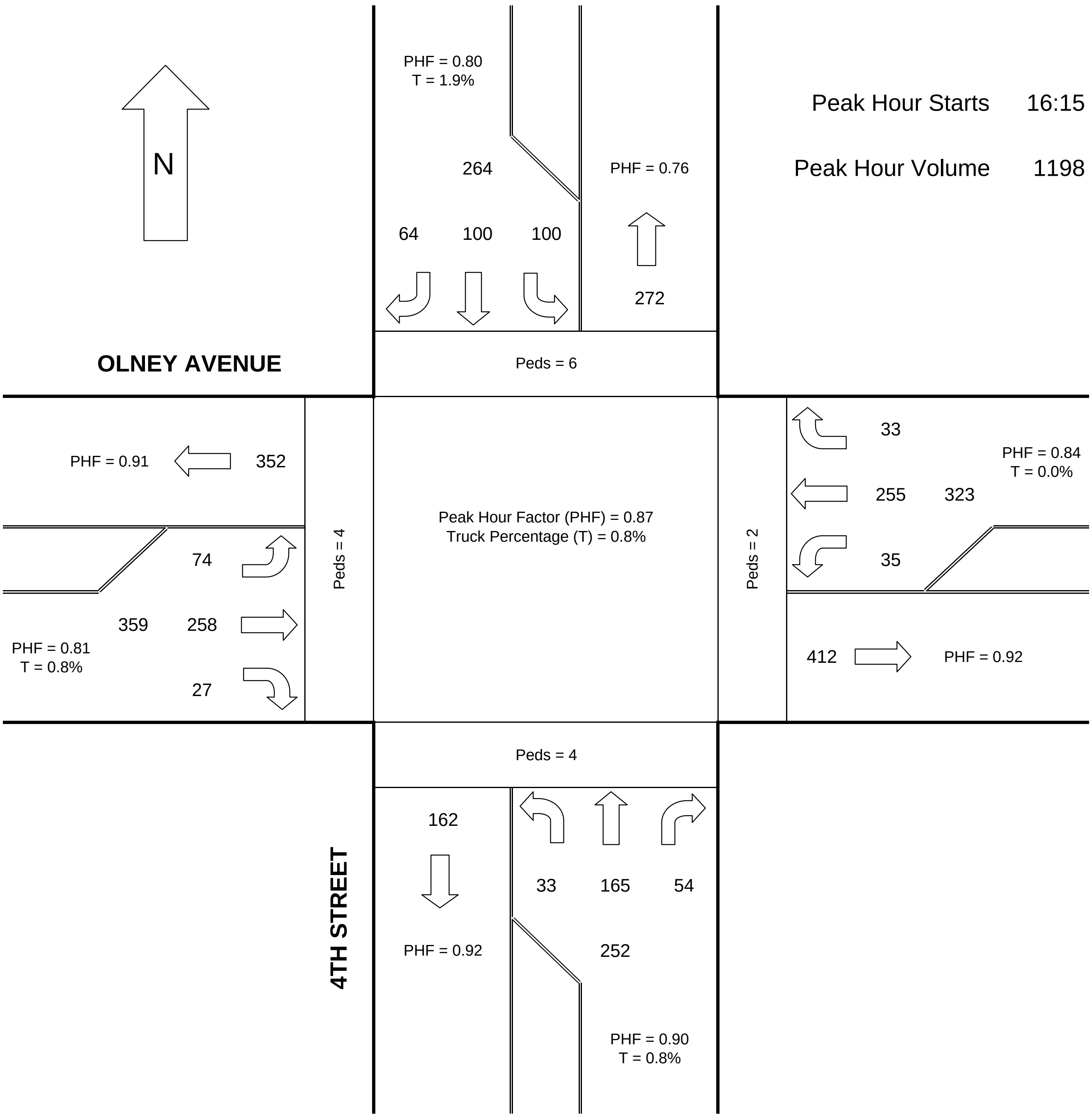
Intersection Turning Movement

Peak Hour Diagram

Location OLNEY AVENUE AT 4TH STREET
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: BV



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Intersection Turning Movement
Summary Report

Location NW LAFAYETTE AVENUE AT BEND PARKWAY
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: TM

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	19	0	0	0	0	0	0	468	0	12	486	0	985
16:15 - 16:30	12	0	0	0	0	0	0	409	0	14	421	0	856
16:30 - 16:45	22	0	0	0	0	0	0	451	0	17	474	0	964
16:45 - 17:00	14	0	0	0	0	0	0	417	0	12	487	0	930
17:00 - 17:15	41	0	0	0	0	0	0	561	0	9	550	0	1161
17:15 - 17:30	21	0	0	0	0	0	0	463	0	14	498	0	996
17:30 - 17:45	26	0	0	0	0	0	0	337	0	6	437	0	806
17:45 - 18:00	11	0	0	0	0	0	0	313	0	11	366	0	701
Movement Totals	166	0	0	0	0	0	0	3419	0	95	3719	0	7399
Enter Totals	166			0			3419			3814			
Exit Totals	0			95			3419			3885			

Two-Hour Totals

	Eastbound Right	Eastbound Thru	Eastbound Left	Westbound Right	Westbound Thru	Westbound Left	Northbound Right	Northbound Thru	Northbound Left	Southbound Right	Southbound Thru	Southbound Left	Totals
Light Trucks	3	0	0	0	0	0	0	104	0	3	118	0	228
Medium Trucks	0	0	0	0	0	0	0	10	0	0	15	0	25
Heavy Trucks	0	0	0	0	0	0	0	38	0	0	72	0	110
% Trucks	1.8%	NA	NA	NA	NA	NA	NA	4.4%	NA	3.2%	5.5%	NA	4.9%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	0	0

Peak Hour Information

Peak Hour 16:30 17:30

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	98	0	0	0	0	0	0	1892	0	52	2009	0	4051
Peak Hour Factor	0.60	NA	NA	NA	NA	NA	NA	0.84	NA	0.76	0.91	NA	0.87
Enter Totals	98			0			1892			2061			
Peak Hour Factor	0.60			NA			0.84			0.92			
Exit Totals	0			52			1892			2107			
Peak Hour Factor	NA			0.76			0.84			0.89			
Light Trucks	1	0	0	0	0	0	0	40	0	2	49	0	92
Medium Trucks	0	0	0	0	0	0	0	5	0	0	4	0	9
Heavy Trucks	0	0	0	0	0	0	0	22	0	0	34	0	56
% Trucks	1.0%	NA	NA	NA	NA	NA	NA	3.5%	NA	3.8%	4.3%	NA	3.9%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	0	0

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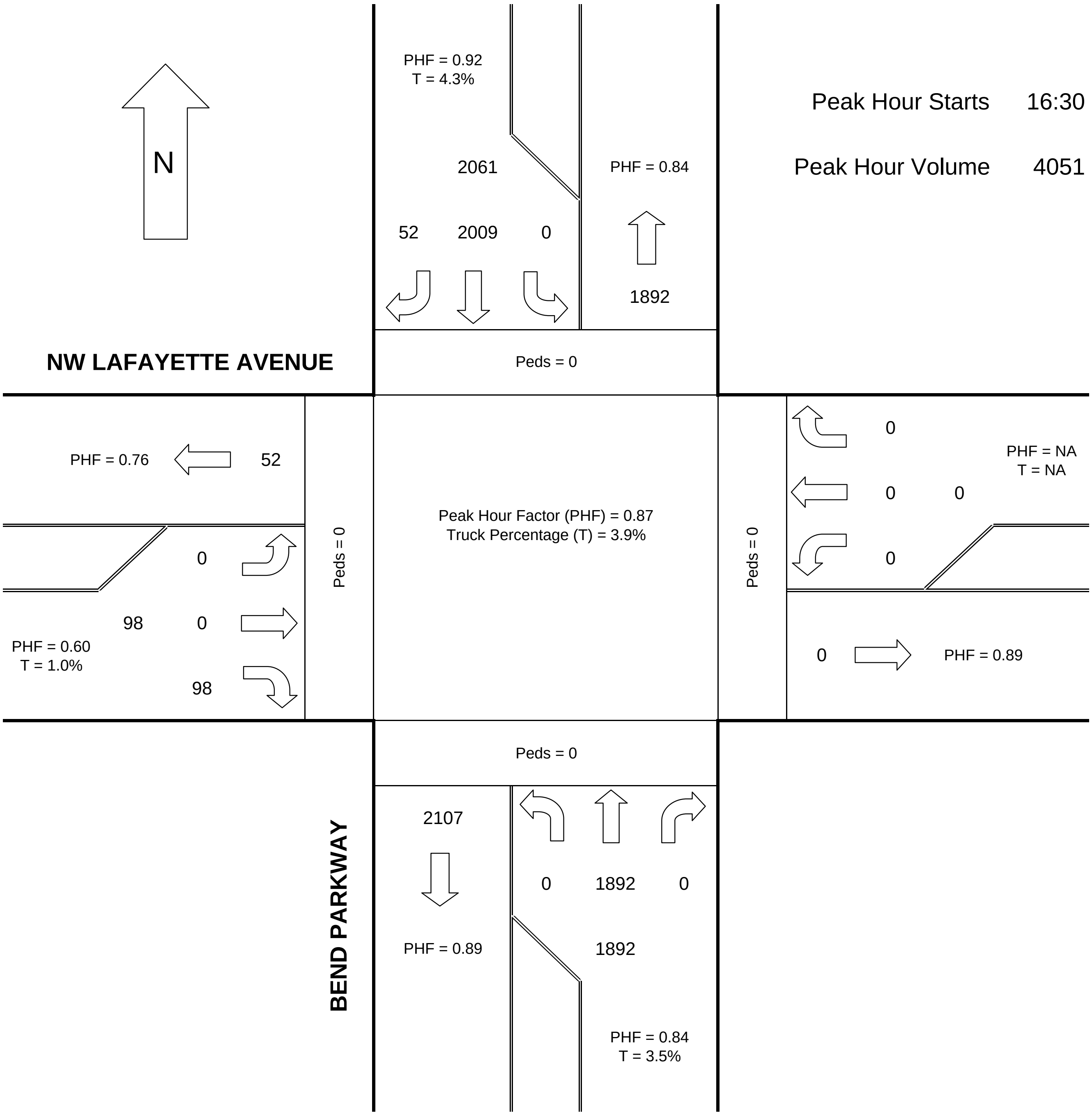
Intersection Turning Movement

Peak Hour Diagram

Location NW LAFAYETTE AVENUE AT BEND PARKWAY
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: TM



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Intersection Turning Movement
Summary Report

Location WALL STREET AT BOND STREET
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: BV

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	0	25	0	4	95	0	84	0	13	6	0	0	227
16:15 - 16:30	1	43	3	4	106	0	87	1	12	2	0	3	262
16:30 - 16:45	0	29	3	2	114	0	66	2	8	10	0	3	237
16:45 - 17:00	0	33	1	2	93	0	64	1	10	7	0	3	214
17:00 - 17:15	0	28	1	0	91	0	92	2	12	8	0	5	239
17:15 - 17:30	0	23	1	0	102	0	76	1	17	6	0	2	228
17:30 - 17:45	0	28	1	0	76	0	68	0	5	3	0	1	182
17:45 - 18:00	0	27	2	1	89	0	52	0	6	3	0	2	182
Movement Totals	1	236	12	13	766	0	589	7	83	45	0	19	1771
Enter Totals	249			779			679			64			
Exit Totals	844			894			32			1			

Two-Hour Totals

Light Trucks	0	2	0	0	5	0	5	0	0	0	0	0	12
Medium Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0.0%	0.8%	0.0%	0.0%	0.7%	NA	0.8%	0.0%	0.0%	0.0%	NA	0.0%	0.7%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	8	2	0	13	23

Peak Hour Information

Peak Hour 16:15 17:15

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	1	133	8	8	404	0	309	6	42	27	0	14	952
Peak Hour Factor	0.25	0.77	0.67	0.50	0.89	NA	0.84	0.75	0.88	0.68	NA	0.70	0.91

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	142	412	357	41
Peak Hour Factor	0.76	0.89	0.84	0.79
Exit Totals	456	473	22	1
Peak Hour Factor	0.86	0.90	0.69	0.25

Light Trucks	0	2	0	0	4	0	3	0	0	0	0	0	9
Medium Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0.0%	1.5%	0.0%	0.0%	1.0%	NA	1.0%	0.0%	0.0%	0.0%	NA	0.0%	0.9%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	2	2	0	7	11

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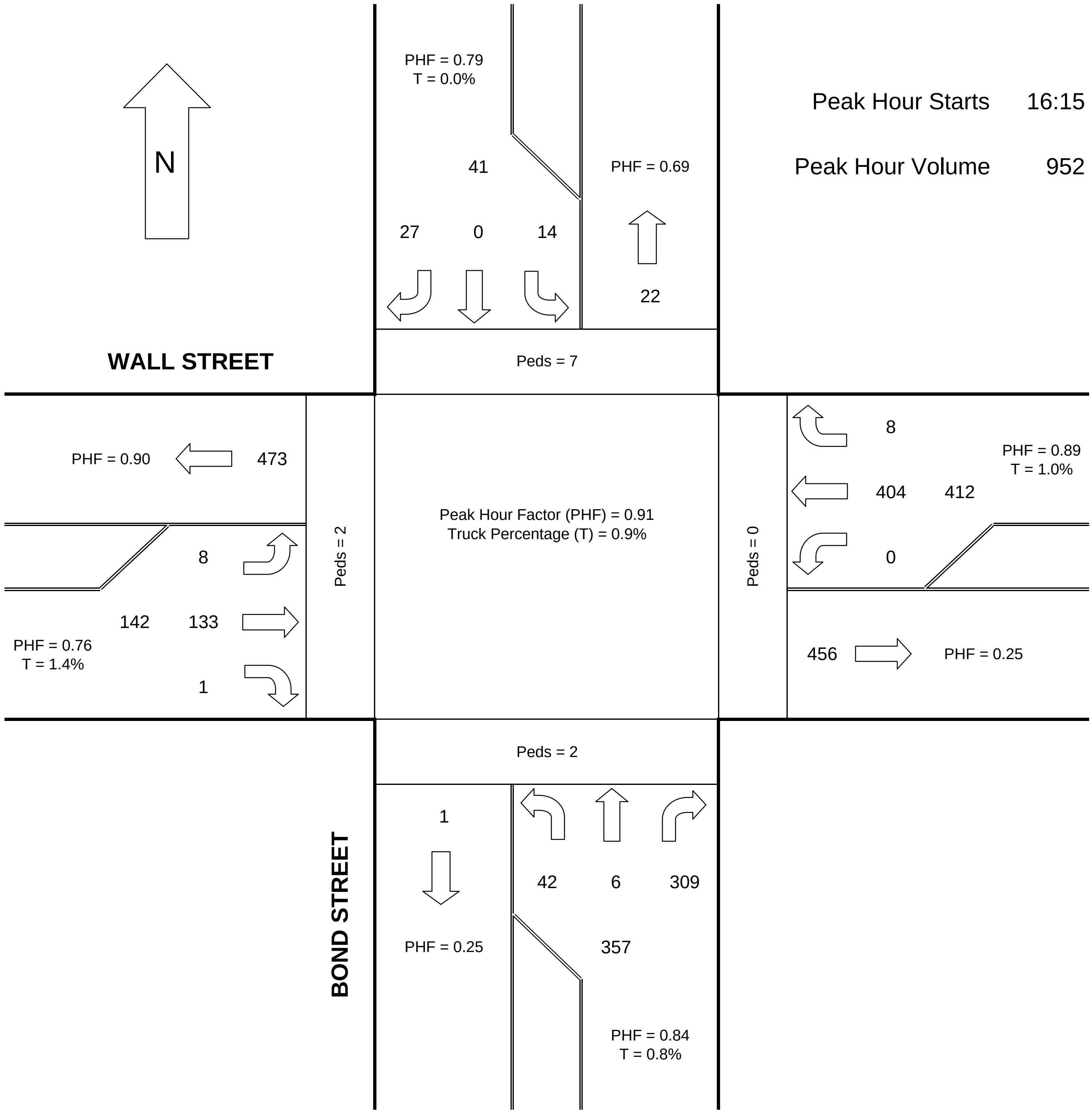
Intersection Turning Movement

Peak Hour Diagram

Location WALL STREET AT BOND STREET
Date 1/2/2007
Day of Week Tuesday
Time Begin 16:00
Reviewed By: BV



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Intersection Turning Movement
Summary Report

Location NE GREENWOOD AVENUE AT NE 4TH STREET
Date 1/4/2007
Day of Week Thursday
Time Begin 16:00
Reviewed By: BV

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	0	205	1	22	207	13	17	0	0	20	0	0	485
16:15 - 16:30	4	242	4	31	198	10	23	0	0	31	0	0	543
16:30 - 16:45	4	205	4	22	192	12	16	1	0	16	0	0	472
16:45 - 17:00	4	253	2	18	180	13	28	0	0	27	1	1	527
17:00 - 17:15	4	243	12	27	177	13	25	1	0	37	0	0	539
17:15 - 17:30	6	244	7	22	206	10	47	0	0	13	0	0	555
17:30 - 17:45	0	203	5	17	191	10	18	0	0	15	2	0	461
17:45 - 18:00	4	185	1	7	186	10	14	0	0	6	0	0	413
Movement Totals	26	1780	36	166	1537	91	188	2	0	165	3	1	3995
Enter Totals	1842			1794			190			169			
Exit Totals	1969			1702			204			120			

Two-Hour Totals

Light Trucks	6	25	1	4	11	1	1	0	0	5	0	0	54
Medium Trucks	0	0	0	0	4	0	0	0	0	0	0	0	4
Heavy Trucks	0	12	0	0	12	0	0	0	0	0	0	0	24
% Trucks	23.1%	2.1%	2.8%	2.4%	1.8%	1.1%	0.5%	0.0%	NA	3.0%	0.0%	0.0%	2.1%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	3	4	0	6	13

Peak Hour Information

Peak Hour 16:30 17:30

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	18	945	25	89	755	48	116	2	0	93	1	1	2093
Peak Hour Factor	0.75	0.93	0.52	0.82	0.92	0.92	0.62	0.50	NA	0.63	0.25	0.25	0.94

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	988	892	118	95
Peak Hour Factor	0.95	0.94	0.63	0.64
Exit Totals	1062	848	116	67
Peak Hour Factor	0.91	0.97	0.73	0.93

Light Trucks	2	12	1	2	7	0	1	0	0	2	0	0	27
Medium Trucks	0	0	0	0	3	0	0	0	0	0	0	0	3
Heavy Trucks	0	9	0	0	9	0	0	0	0	0	0	0	18
% Trucks	11.1%	2.2%	4.0%	2.2%	2.5%	0.0%	0.9%	0.0%	NA	2.2%	0.0%	0.0%	2.3%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	2	4	0	2	8

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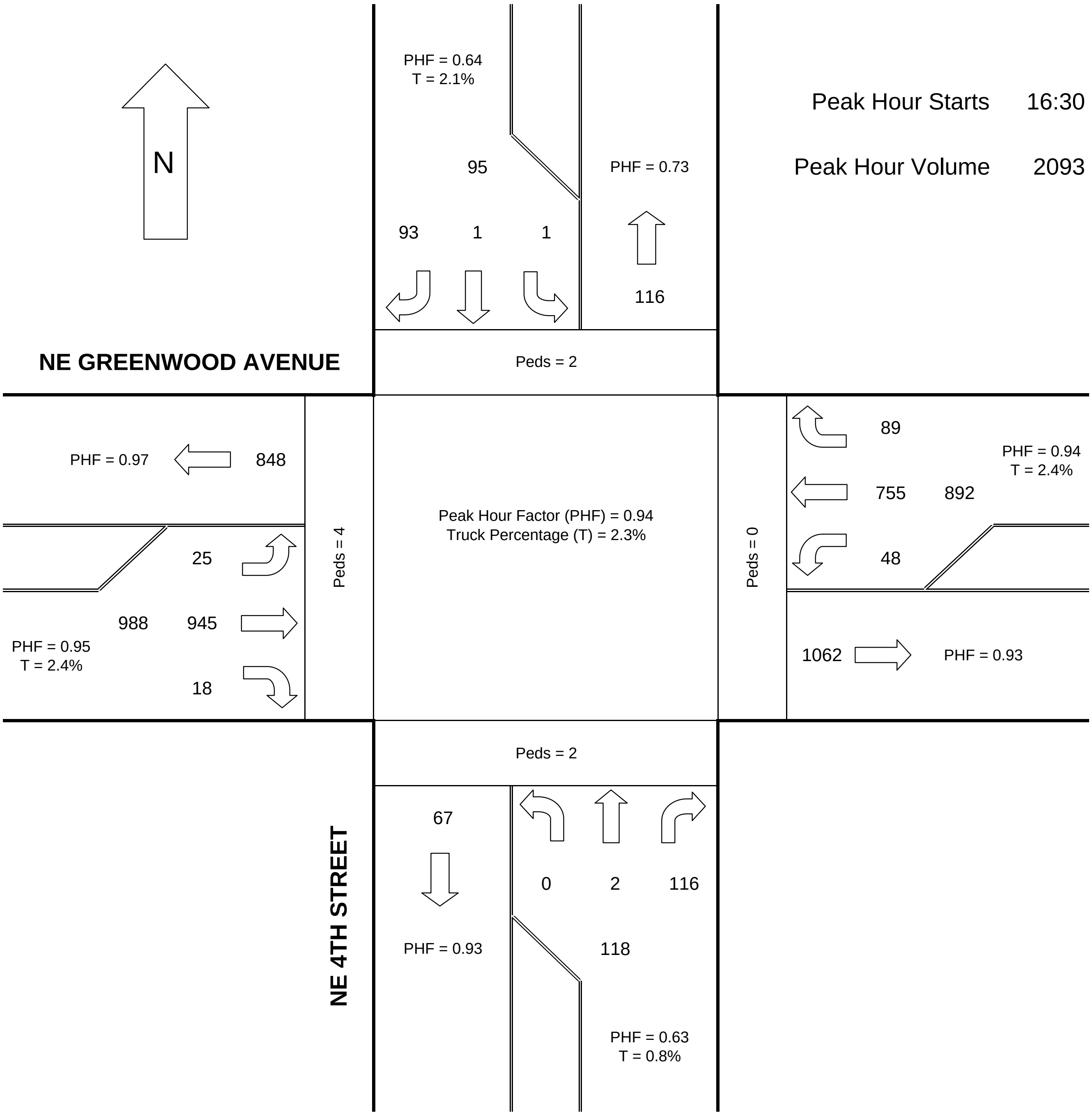
Intersection Turning Movement
Peak Hour Diagram

Location NE GREENWOOD AVENUE AT NE 4TH STREET
Date 1/4/2007
Day of Week Thursday
Time Begin 16:00
Reviewed By: BV



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Intersection Turning Movement
Summary Report

Location NE HAWTHORNE AVENUE AT NE 3RD STREET
Date 1/4/2007
Day of Week Thursday
Time Begin 16:00
Reviewed By: TM

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	8	0	0	11	0	0	2	239	3	6	223	6	498
16:15 - 16:30	6	0	3	6	3	0	7	246	2	6	219	6	504
16:30 - 16:45	9	1	1	13	0	0	6	249	1	4	206	8	498
16:45 - 17:00	7	0	0	6	0	0	7	253	1	4	182	5	465
17:00 - 17:15	7	1	6	13	0	0	4	235	3	4	191	7	471
17:15 - 17:30	7	0	1	15	0	1	2	242	2	3	198	10	481
17:30 - 17:45	5	0	1	9	0	0	5	253	2	0	243	6	524
17:45 - 18:00	0	0	1	8	0	1	4	193	1	0	161	2	371
Movement Totals	49	2	13	81	3	2	37	1910	15	27	1623	50	3812
Enter Totals	64			86			1962			1700			
Exit Totals	89			45			2004			1674			

Two-Hour Totals

	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Totals
Light Trucks	3	0	0	14	0	0	13	48	3	0	38	4	123
Medium Trucks	0	0	0	0	0	0	1	0	0	0	2	0	3
Heavy Trucks	0	0	0	0	0	0	0	7	0	0	5	0	12
% Trucks	6.1%	0.0%	0.0%	17.3%	0.0%	0.0%	37.8%	2.9%	20.0%	0.0%	2.8%	8.0%	3.6%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	1	0	1

	South	West	East	North	
Pedestrians	0	0	0	0	0

Peak Hour Information

Peak Hour 16:00 17:00

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	30	1	4	36	3	0	22	987	7	20	830	25	1965
Peak Hour Factor	0.83	0.25	0.33	0.69	0.25	NA	0.79	0.98	0.58	0.83	0.93	0.78	0.97

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	35	39	1016	875
Peak Hour Factor	0.80	0.75	0.97	0.93

	Eastbound	Westbound	Northbound	Southbound
Exit Totals	48	30	1027	860
Peak Hour Factor	0.80	0.68	0.98	0.93

	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Totals
Light Trucks	3	0	0	6	0	0	6	34	2	0	32	1	84
Medium Trucks	0	0	0	0	0	0	1	0	0	0	1	0	2
Heavy Trucks	0	0	0	0	0	0	0	6	0	0	3	0	9
% Trucks	10.0%	0.0%	0.0%	16.7%	0.0%	NA	31.8%	4.1%	28.6%	0.0%	4.3%	4.0%	4.8%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	1	0	1

	South	West	East	North	
Pedestrians	0	0	0	0	0

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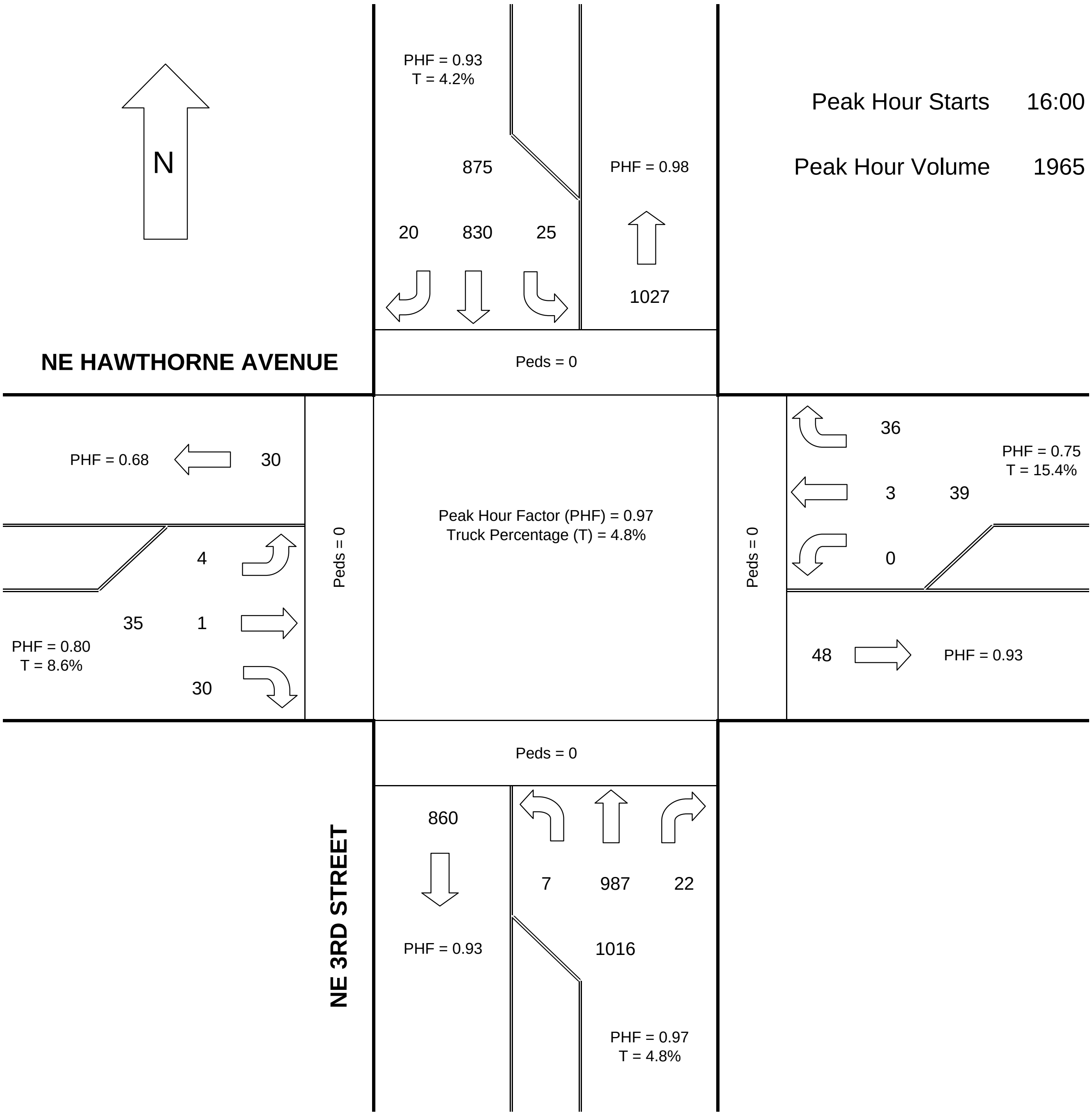
Intersection Turning Movement
Peak Hour Diagram

Location NE HAWTHORNE AVENUE AT NE 3RD STREET
Date 1/4/2007
Day of Week Thursday
Time Begin 16:00
Reviewed By: TM

Peak Hour Starts 16:00

Peak Hour Volume 1965



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Intersection Turning Movement
Summary Report

Location NE HAWTHORNE AVENUE AT NE 4TH STREET
Date 1/4/2007
Day of Week Thursday
Time Begin 16:00
Reviewed By: BV

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	1	5	5	0	1	0	0	13	3	4	26	0	58
16:15 - 16:30	6	6	8	1	3	1	1	14	2	7	18	2	69
16:30 - 16:45	6	3	5	1	1	0	1	18	2	7	26	1	71
16:45 - 17:00	3	7	8	0	1	2	0	12	3	4	25	2	67
17:00 - 17:15	6	7	15	1	3	1	1	20	3	6	24	2	89
17:15 - 17:30	5	2	9	0	5	1	0	15	5	7	15	1	65
17:30 - 17:45	4	6	9	0	5	0	0	8	4	3	11	1	51
17:45 - 18:00	3	2	4	0	3	0	1	7	1	3	16	0	40
Movement Totals	34	38	63	3	22	5	4	107	23	41	161	9	510
Enter Totals	135			30			134			211			
Exit Totals	51			86			173			200			

Two-Hour Totals

	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Totals
Light Trucks	12	4	1	0	0	0	0	1	4	7	0	0	29
Medium Trucks	1	0	0	0	0	0	0	0	0	0	0	0	1
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	38.2%	10.5%	1.6%	0.0%	0.0%	0.0%	0.0%	0.9%	17.4%	17.1%	0.0%	0.0%	5.9%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	4	0	4	8

Peak Hour Information

Peak Hour 16:15 17:15

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	21	23	36	3	8	4	3	64	10	24	93	7	296
Peak Hour Factor	0.88	0.82	0.60	0.75	0.67	0.50	0.75	0.80	0.83	0.86	0.89	0.88	0.83
Enter Totals	80			15			77			124			
Peak Hour Factor	0.71			0.75			0.80			0.91			
Exit Totals	33			42			103			118			
Peak Hour Factor	0.83			0.88			0.72			0.92			
Light Trucks	6	2	0	0	0	0	0	0	2	4	0	0	14
Medium Trucks	1	0	0	0	0	0	0	0	0	0	0	0	1
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	33.3%	8.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	20.0%	16.7%	0.0%	0.0%	5.1%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	3	0	4	7

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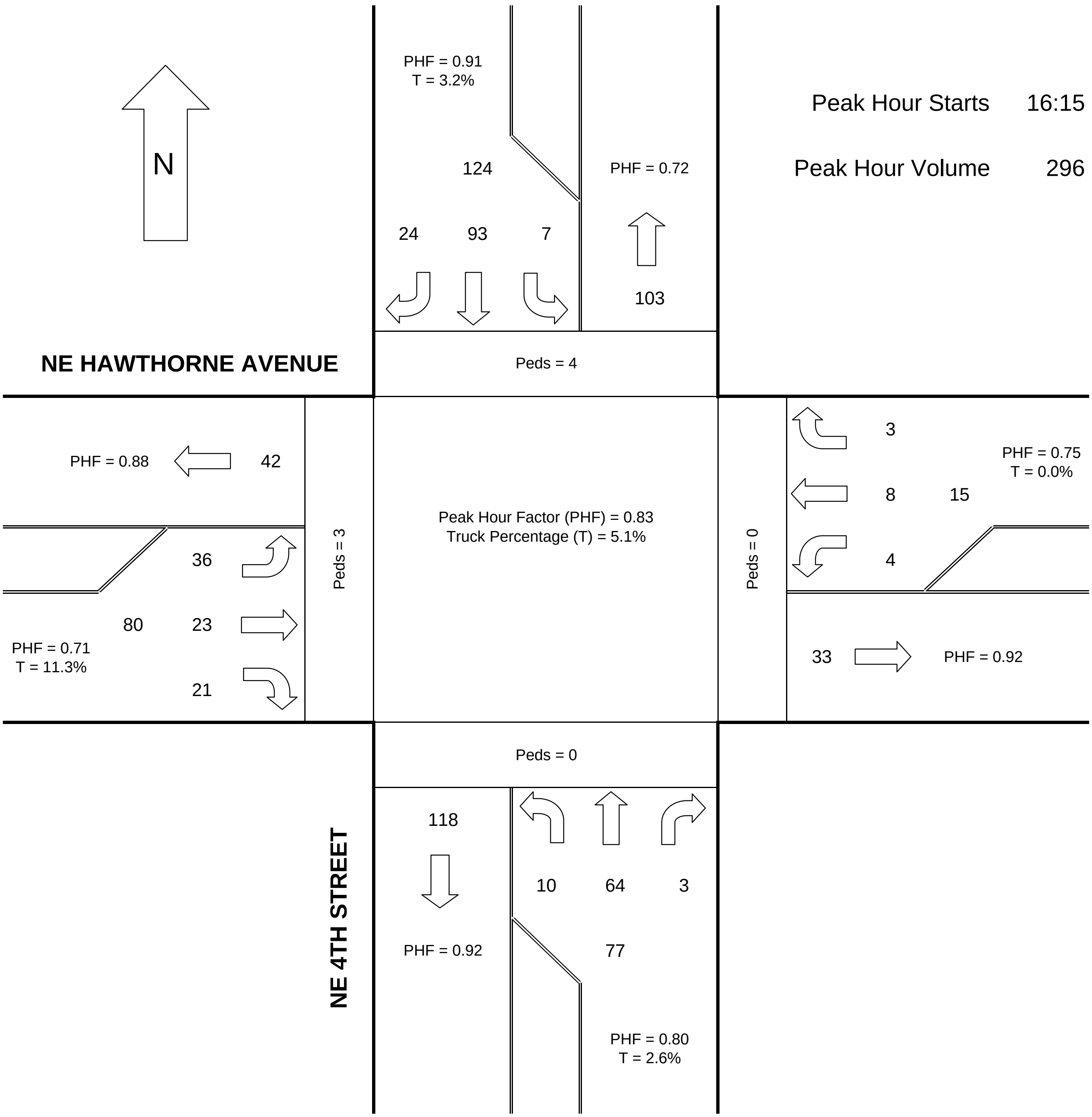
Intersection Turning Movement
Peak Hour Diagram

Location NE HAWTHORNE AVENUE AT NE 4TH STREET
Date 1/4/2007
Day of Week Thursday
Time Begin 16:00
Reviewed By: BV

Peak Hour Starts 16:15

Peak Hour Volume 296



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Intersection Turning Movement
Summary Report

Location NW HAWTHORNE AVENUE AT BEND PARKWAY
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: BV

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	44	0	0	0	0	0	0	469	0	49	481	0	1043
16:15 - 16:30	38	0	0	0	0	0	0	452	0	36	443	0	969
16:30 - 16:45	38	0	0	0	0	0	0	438	0	41	461	0	978
16:45 - 17:00	35	0	0	0	0	0	0	416	0	43	454	0	948
17:00 - 17:15	61	0	0	0	0	0	0	545	0	37	552	0	1195
17:15 - 17:30	40	0	0	0	0	0	0	462	0	41	474	0	1017
17:30 - 17:45	50	0	0	0	0	0	0	331	0	42	425	0	848
17:45 - 18:00	34	0	0	0	0	0	0	306	0	43	333	0	716
Movement Totals	340	0	0	0	0	0	0	3419	0	332	3623	0	7714

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	340	0	3419	3955
Exit Totals	0	332	3419	3963

Two-Hour Totals

	EB Right	EB Thru	EB Left	WB Right	WB Thru	WB Left	NB Right	NB Thru	NB Left	SB Right	SB Thru	SB Left	Totals
Light Trucks	1	0	0	0	0	0	0	56	0	15	57	0	129
Medium Trucks	0	0	0	0	0	0	0	16	0	2	19	0	37
Heavy Trucks	0	0	0	0	0	0	0	36	0	1	70	0	107
% Trucks	0.3%	NA	NA	NA	NA	NA	NA	3.2%	NA	5.4%	4.0%	NA	3.5%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	0	0

Peak Hour Information

Peak Hour 16:30 17:30

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	174	0	0	0	0	0	0	1861	0	162	1941	0	4138
Peak Hour Factor	0.71	NA	NA	NA	NA	NA	NA	0.85	NA	0.94	0.88	NA	0.87

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	174	0	1861	2103
Peak Hour Factor	0.71	NA	0.85	0.89

	Eastbound	Westbound	Northbound	Southbound
Exit Totals	0	162	1861	2115
Peak Hour Factor	NA	0.94	0.85	0.86

	EB Right	EB Thru	EB Left	WB Right	WB Thru	WB Left	NB Right	NB Thru	NB Left	SB Right	SB Thru	SB Left	Totals
Light Trucks	1	0	0	0	0	0	0	24	0	4	26	0	55
Medium Trucks	0	0	0	0	0	0	0	10	0	0	8	0	18
Heavy Trucks	0	0	0	0	0	0	0	21	0	1	33	0	55
% Trucks	0.6%	NA	NA	NA	NA	NA	NA	3.0%	NA	3.1%	3.5%	NA	3.1%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	0	0

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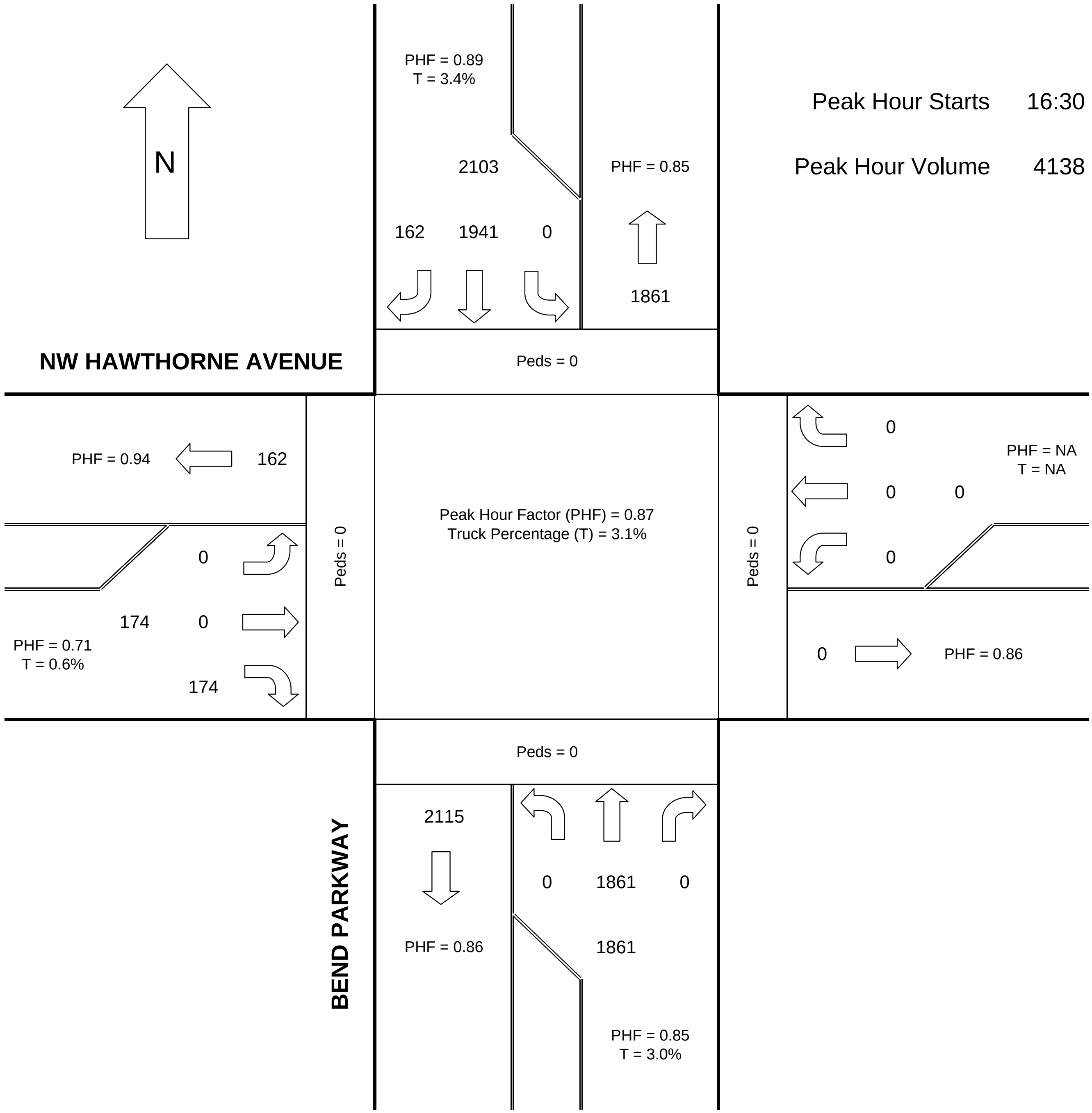
Intersection Turning Movement
Peak Hour Diagram

Location NW HAWTHORNE AVENUE AT BEND PARKWAY
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: BV



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Intersection Turning Movement
Summary Report

Location NE FRANKLIN AVENUE AT NE 4TH STREET
Date 1/4/2007
Day of Week Thursday
Time Begin 16:00
Reviewed By: BV

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	9	121	8	1	89	1	7	2	4	25	5	1	273
16:15 - 16:30	8	109	9	5	75	6	5	4	5	16	1	3	246
16:30 - 16:45	9	124	13	2	84	6	11	4	5	28	4	4	294
16:45 - 17:00	5	90	12	3	81	3	5	4	4	21	3	2	233
17:00 - 17:15	10	139	14	2	87	4	12	6	5	38	2	2	321
17:15 - 17:30	5	133	14	1	88	1	3	3	6	18	1	3	276
17:30 - 17:45	4	90	13	2	72	3	12	3	4	23	2	1	229
17:45 - 18:00	3	75	6	2	52	2	5	2	5	22	2	3	179
Movement Totals	53	881	89	18	628	26	60	28	38	191	20	19	2051
Enter Totals	1023			672			126			230			
Exit Totals	960			857			135			99			

Two-Hour Totals

Light Trucks	0	8	0	4	4	0	2	0	1	13	0	0	32
Medium Trucks	1	1	0	0	1	0	0	0	0	0	1	0	4
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	1.9%	1.0%	0.0%	22.2%	0.8%	0.0%	3.3%	0.0%	2.6%	6.8%	5.0%	0.0%	1.8%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	6	0	3	9

Peak Hour Information

Peak Hour 16:30 17:30

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	29	486	53	8	340	14	31	17	20	105	10	11	1124
Peak Hour Factor	0.73	0.87	0.95	0.67	0.97	0.58	0.65	0.71	0.83	0.69	0.63	0.69	0.88

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	568	362	68	126
Peak Hour Factor	0.87	0.97	0.74	0.75
Exit Totals	528	465	78	53
Peak Hour Factor	0.86	0.89	0.89	0.70

Light Trucks	0	5	0	1	2	0	1	0	0	6	0	0	15
Medium Trucks	1	0	0	0	1	0	0	0	0	0	1	0	3
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	3.4%	1.0%	0.0%	12.5%	0.9%	0.0%	3.2%	0.0%	0.0%	5.7%	10.0%	0.0%	1.6%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	2	0	1	3

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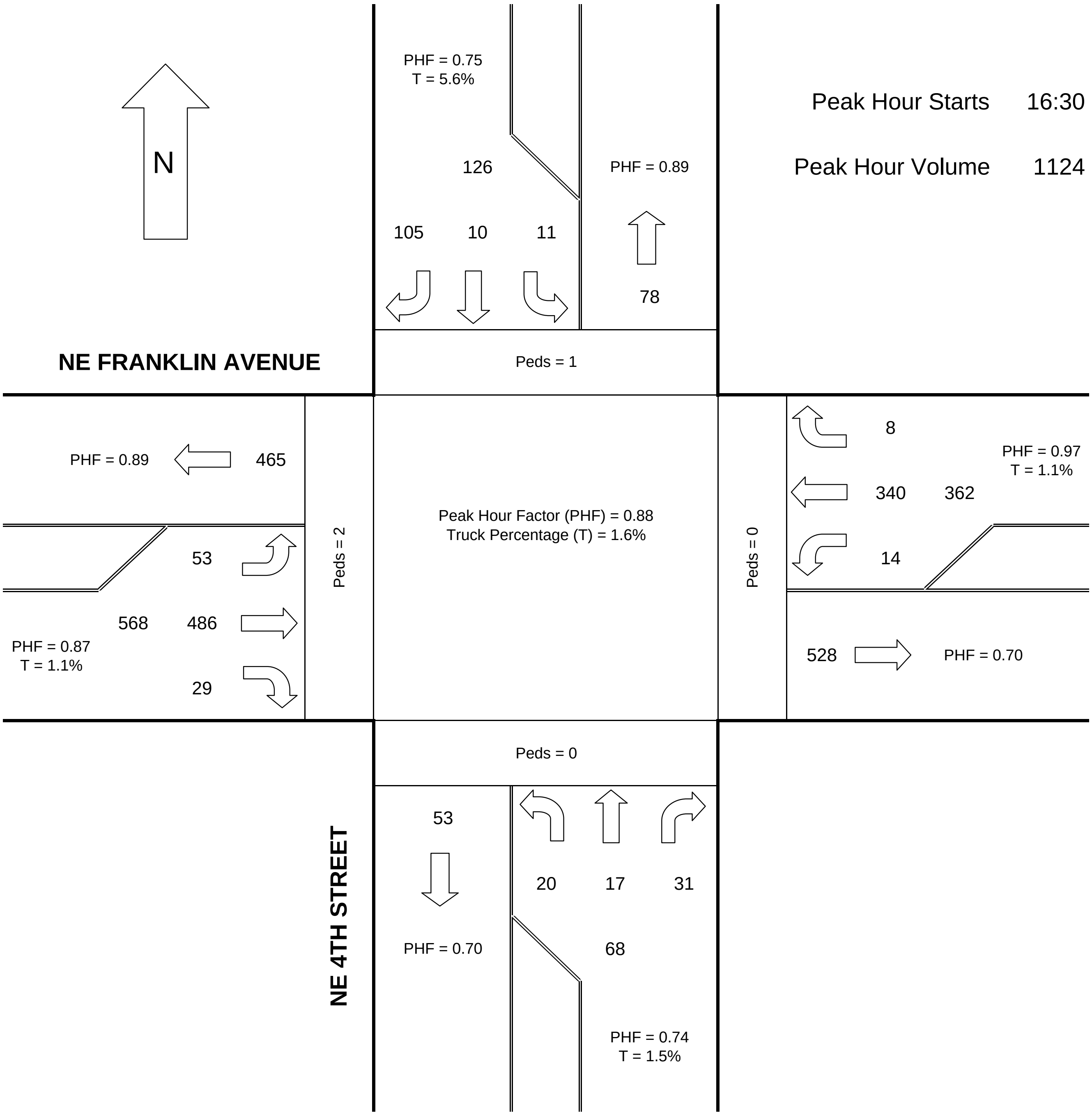
Intersection Turning Movement
Peak Hour Diagram

Location NE FRANKLIN AVENUE AT NE 4TH STREET
Date 1/4/2007
Day of Week Thursday
Time Begin 16:00
Reviewed By: BV



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Intersection Turning Movement
Summary Report

Location TUMALO AVENUE AT NW RIVERSIDE BOULEVARD
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: TM

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	1	32	68	0	23	1	0	2	2	78	2	3	212
16:15 - 16:30	4	31	58	0	36	0	0	2	9	99	5	0	244
16:30 - 16:45	6	40	66	0	32	0	1	1	7	100	6	6	265
16:45 - 17:00	4	38	50	2	28	0	1	1	9	111	8	2	254
17:00 - 17:15	7	37	50	1	52	1	0	1	11	93	4	1	258
17:15 - 17:30	7	35	70	0	47	0	0	1	14	88	6	1	269
17:30 - 17:45	6	35	45	0	40	0	1	4	12	80	6	4	233
17:45 - 18:00	5	27	52	1	26	1	1	1	5	63	7	1	190
Movement Totals	40	275	459	4	284	3	4	13	69	712	44	18	1925
Enter Totals		774			291			86			774		
Exit Totals		297			1065			476			87		

Two-Hour Totals

Light Trucks	0	3	23	0	2	0	0	0	1	14	1	1	45
Medium Trucks	0	0	1	0	0	0	0	0	0	0	0	0	1
Heavy Trucks	0	0	0	0	0	0	0	0	0	1	0	0	1
% Trucks	0.0%	1.1%	5.2%	0.0%	0.7%	0.0%	0.0%	0.0%	1.4%	2.1%	2.3%	5.6%	2.4%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	0	0

Peak Hour Information

Peak Hour 16:30 17:30

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	24	150	236	3	159	1	2	4	41	392	24	10	1046
Peak Hour Factor	0.86	0.94	0.84	0.38	0.76	0.25	0.50	1.00	0.73	0.88	0.75	0.42	0.97

	Eastbound	Westbound	Northbound	Southbound
Enter Totals	410	163	47	426
Peak Hour Factor	0.92	0.75	0.78	0.88
Exit Totals	162	592	243	49
Peak Hour Factor	0.86	0.95	0.86	0.94

Light Trucks	0	2	14	0	0	0	0	0	1	8	1	0	26
Medium Trucks	0	0	1	0	0	0	0	0	0	0	0	0	1
Heavy Trucks	0	0	0	0	0	0	0	0	0	1	0	0	1
% Trucks	0.0%	1.3%	6.4%	0.0%	0.0%	0.0%	0.0%	0.0%	2.4%	2.3%	4.2%	0.0%	2.7%
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	0	0

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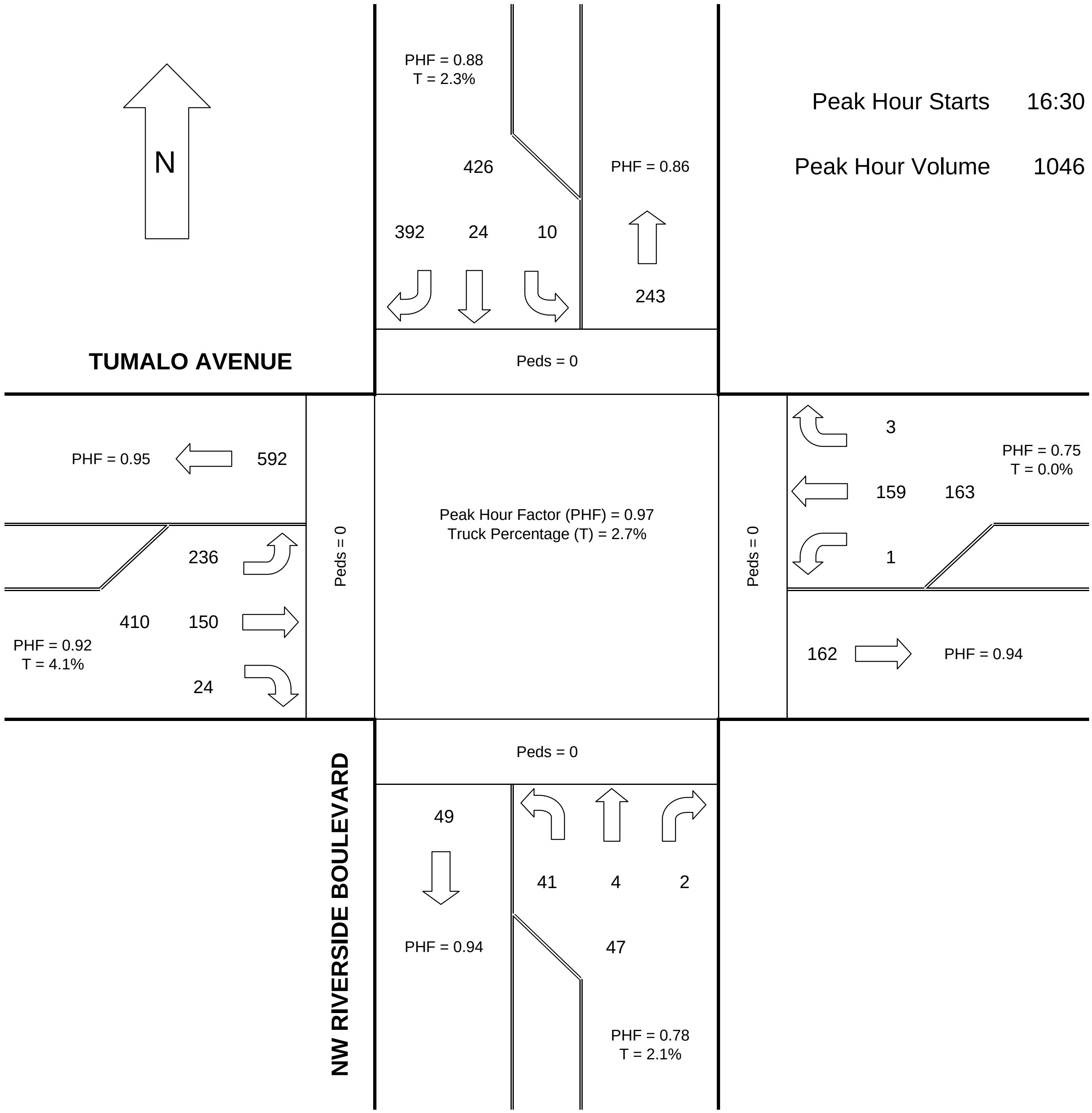
Intersection Turning Movement

Peak Hour Diagram

Location TUMALO AVENUE AT NW RIVERSIDE BOULEVARD
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: TM

Peak Hour Starts 16:30

Peak Hour Volume 1046



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Intersection Turning Movement

Summary Report

Location COLORADO AVENUE AT BEND PARKWAY-NB RAMP
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: TM

	Eastbound			Westbound			Northbound			Southbound			
Time Period	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
16:00 - 16:15	0	36	141	69	31	0	0	0	0	34	0	3	314
16:15 - 16:30	0	47	135	67	31	0	0	0	0	42	0	5	327
16:30 - 16:45	0	34	121	78	43	0	0	0	0	48	0	1	325
16:45 - 17:00	0	33	119	63	37	0	0	0	0	39	0	4	295
17:00 - 17:15	0	44	179	129	50	0	0	0	0	39	0	1	442
17:15 - 17:30	0	49	167	69	21	0	0	0	0	39	0	4	349
17:30 - 17:45	0	36	103	53	31	0	0	0	0	28	0	0	251
17:45 - 18:00	0	26	64	44	20	0	0	0	0	28	0	5	187
Movement Totals	0	305	1029	572	264	0	0	0	0	297	0	23	2490
Enter Totals	1334			836			0			320			
Exit Totals	328			561			1601			0			

Two-Hour Totals

	Eastbound Right	Eastbound Thru	Eastbound Left	Westbound Right	Westbound Thru	Westbound Left	Northbound Right	Northbound Thru	Northbound Left	Southbound Right	Southbound Thru	Southbound Left	Totals
Light Trucks	0	13	23	23	9	0	0	0	0	6	0	2	76
Medium Trucks	0	2	8	0	0	0	0	0	0	0	0	1	11
Heavy Trucks	0	2	3	3	1	0	0	0	0	0	0	0	9
% Trucks	NA	5.6%	3.3%	4.5%	3.8%	NA	NA	NA	NA	2.0%	NA	13.0%	3.9%
Stopped Buses	0	0	1	0	0	0	0	0	0	0	0	0	1
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	0	0

Peak Hour Information

Peak Hour 16:30 17:30

	Eastbound			Westbound			Northbound			Southbound			
	Right	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Right**	**Thru**	**Left**	**Totals**
Movement Total	0	160	586	339	151	0	0	0	0	165	0	10	1411
Peak Hour Factor	NA	0.82	0.82	0.66	0.76	NA	NA	NA	NA	0.86	NA	0.63	0.80
Enter Totals	746			490			0			175			
Peak Hour Factor	0.84			0.68			NA			0.89			
Exit Totals	170			316			925			0			
Peak Hour Factor	0.80			0.87			0.75			NA			
Light Trucks	0	8	13	9	3	0	0	0	0	1	0	1	35
Medium Trucks	0	1	3	0	0	0	0	0	0	0	0	0	4
Heavy Trucks	0	2	1	1	0	0	0	0	0	0	0	0	4
% Trucks	NA	6.9%	2.9%	2.9%	2.0%	NA	NA	NA	NA	0.6%	NA	10.0%	3.0%
Stopped Buses	0	0	1	0	0	0	0	0	0	0	0	0	1
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0

	South	West	East	North	
Pedestrians	0	0	0	0	0

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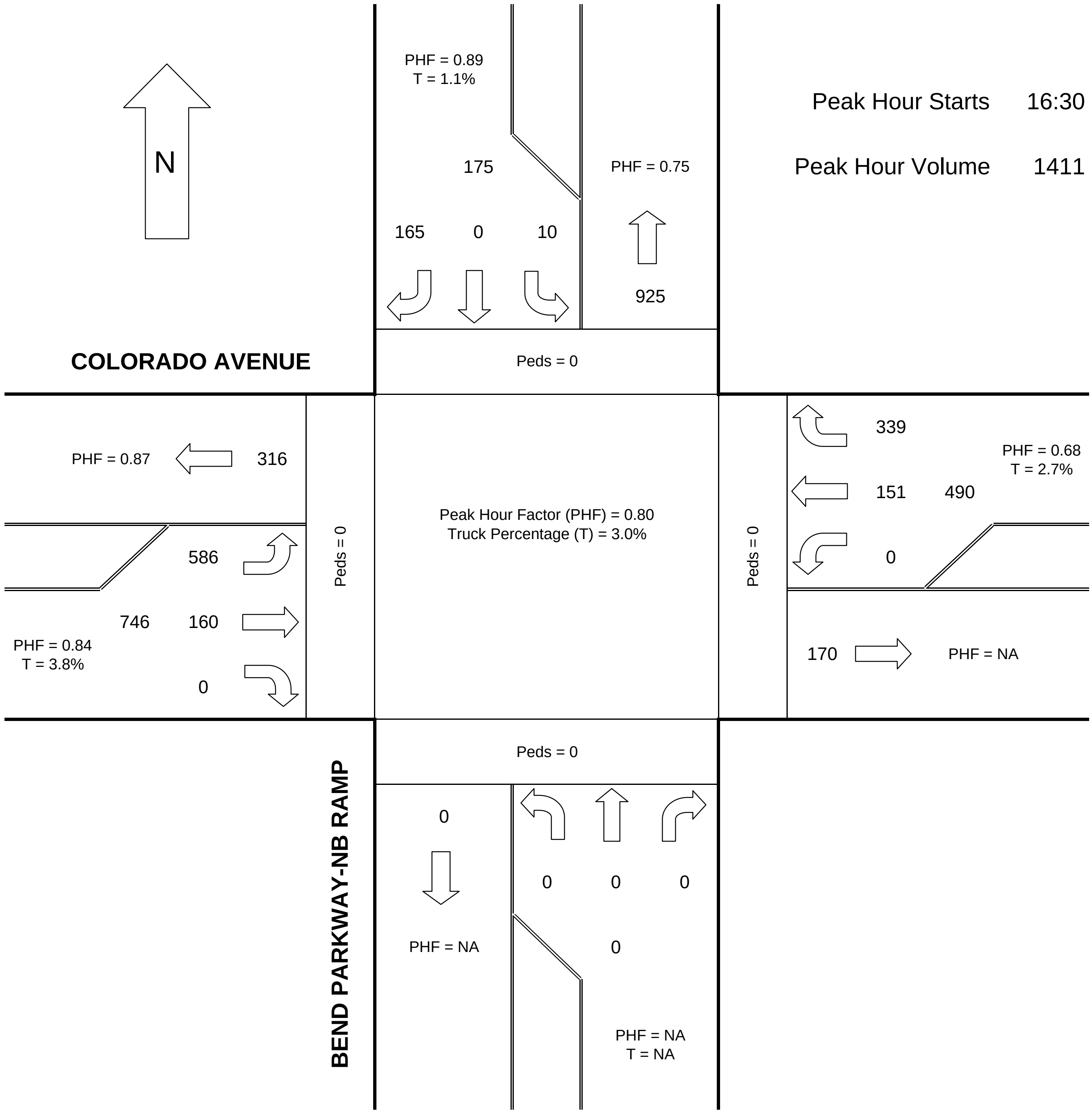
Intersection Turning Movement

Peak Hour Diagram

Location COLORADO AVENUE AT BEND PARKWAY-NB RAMP
Date 1/3/2007
Day of Week Wednesday
Time Begin 16:00
Reviewed By: TM



APPENDIX E

Seasonal Adjustments to Traffic Counts

Turning Movement Count 2007 HV Unbalanced
60 Minute Counts

DATE	TIME	INTID	INTNAME	EB-R	EB-T	EB-L	WB-R	WB-T	WB-L	NB-R	NB-T	NB-L	SB-R
1/2/2007	1615	101	Butler Market Rd & US 20	150	140	85	190	150	410	160	995	120	85
1/2/2007	1615	102	Butler Mkt Rd & Bend Pkway SB Ramp	0	620	0	0	720	0	0	0	0	125
1/2/2007	1615	103	Butler Mkt Rd & Bend Pkwy NB Ramp	10	795	80	260	780	10	20	5	20	0
1/3/2007	1615	104	Butler Mkt Rd & 4th St	150	620	0	0	620	95	85	0	280	45
1/2/2007	1615	105	Studio Rd & 4th St	5	10	5	30	10	155	280	410	0	0
1/2/2007	1615	106	Revere Ave & Bend Pkway SB Ramp	10	15	15	355	25	610	700	115	15	5
1/2/2007	1615	107	Revere Ave & Bend Pkwy NB Ramp	445	375	170	125	490	50	565	285	115	305
1/2/2007	1615	108	Revere Ave & 3rd St	250	555	270	65	370	240	100	1280	125	65
1/2/2007	1615	109	Revere Ave & 4th St	140	355	280	120	345	25	45	245	80	280
1/2/2007	1615	110	Portland Ave & Hill St	115	220	320	105	300	80	110	520	160	405
1/2/2007	1615	111	Olney Ave & 3rd St	85	280	130	110	325	135	115	1460	95	25
1/2/2007	1615	112	Olney Ave & 4th St	40	365	105	45	360	50	75	235	45	90
1/3/2007	1615	113	Lafayette Ave & Bend Pkwy SB Ramp	125	0	0	0	0	0	0	2590	0	75
1/2/2007	1615	114	**Bond St & Wall St.**	0	190	10	10	570	0	435	10	60	40
1/4/2007	1615	115	**Newport Ave & Wall St.**	160	410	150	35	505	290	0	0	0	175
1/3/2007	1615	116	**Newport Ave & Bond St**	0	490	15	60	690	0	355	435	240	0
1/4/2007	1615	117	Greenwood Ave & 3rd St	135	800	310	295	585	300	285	930	150	105
1/4/2007	1615	118	Greenwood Ave & 4th St	25	1330	30	140	1055	70	130	5	0	155
1/4/2007	1615	119	Hawthorne Ave & 3rd St	40	5	15	55	5	0	35	1385	10	25
1/4/2007	1615	120	Hawthorne Ave & 4th St	30	30	50	5	10	5	5	90	15	35
1/3/2007	1615	121	**Oregon St & Wall St.**	25	25	0	0	70	215	0	0	0	50
1/3/2007	1615	122	**Oregon St & Bond St**	0	115	110	170	95	0	110	810	180	0
1/3/2007	1615	123	Hawthorne Ave & Bend Pkwy SB Ramp	245	0	0	0	0	0	0	2610	0	220
1/3/2007	1615	124	**Franklin Ave & Wall St.**	30	465	0	0	390	175	0	0	0	270
1/3/2007	1615	125	**Franklin Ave & Bond St**	0	435	255	115	505	0	285	675	60	0
1/4/2007	1615	126	Franklin Ave & 3rd St	115	650	345	70	425	180	45	1035	175	130
1/4/2007	1615	127	Franklin Ave & 4th St	45	650	70	15	460	25	45	25	25	145
1/3/2007	1615	128	Tumalo Ave & Riverside Dr	30	205	315	5	210	0	5	5	50	570
1/3/2007	1615	129	**Colorado Ave & Wall St**	0	0	0	0	615	115	0	0	0	160
1/3/2007	1615	130	Colorado Ave & Bond St	0	0	0	145	640	0	0	740	80	0
1/3/2007	1615	131	Arizona Ave & Wall St	25	1180	0	0	0	0	0	0	0	0
1/3/2007	1615	132	Arizona Ave & Bond St	0	985	385	0	0	0	160	430	0	0
1/3/2007	1615	133	Colorado Ave & Bend Pkway SB Ramp	0	0	0	65	400	5	935	205	10	345
1/3/2007	1615	134	Colorado Ave & Bend Pkwy NB Ramp	0	225	780	475	225	0	0	0	0	235

Seasonal Adjustment for 30HV

US 97 Dalles-California Hwy		Hwy 04
ATR 09-0 Summer		Weekday
Seasonal Factor Peak Period		
0.8378		
Count Date Factor		
1-Jan	1.1815	
Adjustment Factor =Count Date Factor/ Seasonal Peak Period Factor		
	1.4102	

Turning Movement Count 2007 HV Balanced
60 Minute Counts

DATE	TIME	INTID	INTNAME	EBR	EBT	EBL	WBR	WBT	WBL	NBR	NBT	NBL	SBR	SBT	SBL
1/2/2007	1615	101	Butler Market Rd & US 20	150	140	85	190	150	410	160	995	120	85	1360	215
1/2/2007	1615	102	Butler Mkt Rd & Bend Pkway SB Ramp	0	620	0	0	760	0	0	0	0	125	0	255
1/2/2007	1615	103	Butler Mkt Rd & Bend Pkwy NB Ramp	10	785	80	255	760	10	20	5	20	0	0	0
1/3/2007	1615	104	Butler Mkt Rd & 4th St	155	635	0	0	655	95	85	0	295	45	5	0
1/2/2007	1615	105	Studio Rd & 4th St	5	10	5	30	10	155	280	410	0	0	485	80
1/2/2007	1615	106	Revere Ave & Bend Pkway SB Ramp	10	15	15	350	25	595	730	115	15	5	230	205
1/2/2007	1615	107	Revere Ave & Bend Pkwy NB Ramp	440	365	160	125	510	50	585	285	120	315	5	140
1/2/2007	1615	108	Revere Ave & 3rd St	250	565	270	65	395	240	105	1365	135	70	815	80
1/2/2007	1615	109	Revere Ave & 4th St	140	350	275	120	345	25	45	245	80	280	185	170
1/2/2007	1615	110	Portland Ave & Hill St	115	220	320	105	300	80	110	520	160	405	350	40
1/2/2007	1615	111	Olney Ave & 3rd St	85	280	130	105	315	130	115	1460	95	25	1105	140
1/2/2007	1615	112	Olney Ave & 4th St	40	385	105	45	385	50	75	235	45	100	140	140
1/3/2007	1615	113	Lafayette Ave & Bend Pkwy SB Ramp	125	0	0	0	0	0	0	2610	0	75	2725	0
1/2/2007	1615	114	**Bond St & Wall St.**	0	190	10	10	605	0	435	10	65	45	0	20
1/4/2007	1615	115	**Newport Ave & Wall St.**	160	410	150	40	565	325	0	0	0	170	455	115
1/3/2007	1615	116	**Newport Ave & Bond St**	0	510	15	60	690	0	370	450	240	0	0	0
1/4/2007	1615	117	Greenwood Ave & 3rd St	135	775	310	295	585	300	295	960	150	110	745	325
1/4/2007	1615	118	Greenwood Ave & 4th St	25	1330	30	140	1055	70	130	5	0	155	0	0
1/4/2007	1615	119	Hawthorne Ave & 3rd St	45	5	15	55	5	0	35	1385	10	25	1220	35
1/4/2007	1615	120	Hawthorne Ave & 4th St	30	30	50	5	10	5	5	90	15	35	130	10
1/3/2007	1615	121	**Oregon St & Wall St.**	25	25	0	0	70	205	0	0	0	20	835	140
1/3/2007	1615	122	**Oregon St & Bond St**	0	100	100	165	95	0	110	795	175	0	0	0
1/3/2007	1615	123	Hawthorne Ave & Bend Pkwy SB Ramp	245	0	0	0	0	0	0	2610	0	220	2695	0
1/3/2007	1615	124	**Franklin Ave & Wall St.**	30	465	0	0	390	175	0	0	0	280	510	235
1/3/2007	1615	125	**Franklin Ave & Bond St**	0	435	260	115	505	0	285	690	60	0	0	0
1/4/2007	1615	126	Franklin Ave & 3rd St	115	640	345	70	415	180	45	1035	175	125	1045	105
1/4/2007	1615	127	Franklin Ave & 4th St	45	660	70	15	470	25	45	25	25	145	15	15
1/3/2007	1615	128	Tumalo Ave & Riverside Dr	30	205	315	5	210	0	5	5	50	570	30	15
1/3/2007	1615	129	**Colorado Ave & Wall St**	0	0	0	0	615	115	0	0	0	160	485	0
1/3/2007	1615	130	Colorado Ave & Bond St	0	0	0	145	640	0	0	740	80	0	0	0
1/3/2007	1615	131	Arizona Ave & Wall St	25	1170	0	0	0	0	0	0	0	0	390	220
1/3/2007	1615	132	Arizona Ave & Bond St	0	990	390	0	0	0	160	430	0	0	0	0
1/3/2007	1615	133	Colorado Ave & Bend Pkway SB Ramp	0	0	0	65	400	5	930	205	10	345	0	95
1/3/2007	1615	134	Colorado Ave & Bend Pkwy NB Ramp	0	230	795	475	230	0	0	0	0	240	0	15

Turning Movement Count 2007 Raw Counts
60Minute Counts

DATE	TIME	INTID	INTNAME	EB-R	EB-T	EB-L	WB-R	WB-T	WB-L	NB-R	NB-T	NB-L	SB-R	SB-T	SB-L
1/2/2007	1615	101	Butler Market Rd & US 20	106	101	61	133	108	291	112	706	84	62	965	153
1/2/2007	1615	102	Butler Mkt Rd & Bend Pkway SB Ramp	0	439	0	0	511	0	0	0	0	88	0	176
1/2/2007	1615	103	Butler Mkt Rd & Bend Pkwy NB Ramp	8	562	55	186	552	8	14	5	13	0	0	0
1/3/2007	1615	104	Butler Mkt Rd & 4th St	107	438	1	1	440	69	61	0	199	31	5	0
1/2/2007	1615	105	Studio Rd & 4th St	5	8	2	22	7	109	199	289	0	0	344	57
1/2/2007	1615	106	Revere Ave & Bend Pkway SB Ramp	6	10	9	252	16	433	495	82	11	4	164	140
1/2/2007	1615	107	Revere Ave & Bend Pkwy NB Ramp	316	265	121	88	348	35	400	201	82	215	5	88
1/2/2007	1615	108	Revere Ave & 3rd St	177	394	190	46	262	170	71	909	88	46	579	54
1/2/2007	1615	109	Revere Ave & 4th St	99	252	197	85	244	19	31	175	55	198	130	120
1/2/2007	1615	110	Portland Ave & Hill St	81	156	226	74	211	56	79	367	113	288	248	27
1/2/2007	1615	111	Olney Ave & 3rd St	61	199	92	78	229	96	82	1034	69	16	782	99
1/2/2007	1615	112	Olney Ave & 4th St	27	258	74	33	255	35	54	165	33	64	100	100
1/3/2007	1615	113	Lafayette Ave & Bend Pkwy SB Ramp	89	0	0	0	0	0	0	1838	0	52	1932	0
1/2/2007	1615	114	**Bond St & Wall St.**	1	133	8	8	404	0	309	6	42	27	0	14
1/4/2007	1615	115	**Newport Ave & Wall St.**	112	290	107	24	359	206	0	0	0	124	334	82
1/3/2007	1615	116	**Newport Ave & Bond St**	0	346	9	44	491	0	251	308	170	0	0	0
1/4/2007	1615	117	Greenwood Ave & 3rd St	96	568	219	209	414	211	203	658	107	76	504	219
1/4/2007	1615	118	Greenwood Ave & 4th St	16	943	22	98	747	48	92	2	0	111	1	1
1/4/2007	1615	119	Hawthorne Ave & 3rd St	29	2	10	38	3	0	24	983	7	18	798	26
1/4/2007	1615	120	Hawthorne Ave & 4th St	21	23	36	3	8	4	3	64	10	24	93	7
1/3/2007	1615	121	**Oregon St & Wall St.**	18	18	0	0	48	151	0	0	0	36	593	92
1/3/2007	1615	122	**Oregon St & Bond St**	0	82	77	120	69	0	77	575	128	0	0	0
1/3/2007	1615	123	Hawthorne Ave & Bend Pkwy SB Ramp	172	0	0	0	0	0	0	1851	0	157	1910	0
1/3/2007	1615	124	**Franklin Ave & Wall St.**	21	329	0	0	278	124	0	0	0	193	349	160
1/3/2007	1615	125	**Franklin Ave & Bond St**	0	307	182	82	358	0	203	477	44	0	0	0
1/4/2007	1615	126	Franklin Ave & 3rd St	83	462	243	48	301	126	32	733	124	92	771	79
1/4/2007	1615	127	Franklin Ave & 4th St	32	462	48	12	327	19	33	18	19	103	10	11
1/3/2007	1615	128	Tumalo Ave & Riverside Dr	21	146	224	3	148	1	2	5	36	403	23	9
1/3/2007	1615	129	**Colorado Ave & Wall St**	0	0	0	0	437	81	0	0	0	114	337	0
1/3/2007	1615	130	Colorado Ave & Bond St	0	0	0	103	454	0	0	523	56	0	0	0
1/3/2007	1615	131	Arizona Ave & Wall St	19	835	0	0	0	0	0	0	0	0	276	156
1/3/2007	1615	132	Arizona Ave & Bond St	0	700	272	0	0	0	114	305	0	0	0	0
1/3/2007	1615	133	Colorado Ave & Bend Pkway SB Ramp	0	0	0	46	283	3	662	144	6	246	1	71
1/3/2007	1615	134	Colorado Ave & Bend Pkwy NB Ramp	0	158	554	337	161	0	0	0	0	168	0	11

APPENDIX F

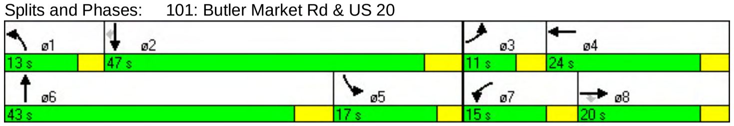
2006 Intersection Traffic Operations Analysis Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	85	140	150	410	150	120	995	215	1360	85
Lane Group Flow (vph)	92	152	163	446	370	130	1256	234	1478	92
Turn Type	Prot		Perm	Prot		Prot		Prot		Perm
Protected Phases	3	8		7	4	1	6	5	2	
Permitted Phases			8							2
Detector Phases	3	8	8	7	4	1	6	5	2	2
Minimum Initial (s)	6.0	8.0	8.0	6.0	5.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.0	12.0	12.0	10.0	25.0	8.5	31.0	8.5	31.0	31.0
Total Split (s)	11.0	20.0	20.0	15.0	24.0	13.0	43.0	17.0	47.0	47.0
Total Split (%)	11.6%	21.1%	21.1%	15.8%	25.3%	13.7%	45.3%	17.9%	49.5%	49.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.5	5.0	3.5	5.0	5.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
v/c Ratio	0.71	0.48	0.41	1.12	0.91	0.77	0.87	0.97	0.92	0.12
Control Delay	72.4	41.7	9.1	122.1	58.8	72.3	33.6	92.8	35.5	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.4	41.7	9.1	122.1	58.8	72.3	33.6	92.8	35.5	4.0
Queue Length 50th (ft)	55	84	0	~161	186	78	352	142	426	1
Queue Length 95th (ft)	#133	146	54	#257	#357	#173	#461	#290	#585	27
Internal Link Dist (ft)		466			381		888		693	
Turn Bay Length (ft)										
Base Capacity (vph)	130	314	402	398	407	168	1436	242	1602	766
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.48	0.41	1.12	0.91	0.77	0.87	0.97	0.92	0.12

Intersection Summary

Cycle Length: 95
Actuated Cycle Length: 95
Offset: 13 (14%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Natural Cycle: 90
Control Type: Pretimed
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 101: Butler Market Rd & US 20



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.92		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	3433	1706		1770	3466		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	3433	1706		1770	3466		1770	3539	1583
Volume (vph)	85	140	150	410	150	190	120	995	160	215	1360	85
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	152	163	446	163	207	130	1082	174	234	1478	92
RTOR Reduction (vph)	0	0	136	0	48	0	0	14	0	0	0	49
Lane Group Flow (vph)	92	152	27	446	322	0	130	1242	0	234	1478	43
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									2
Actuated Green, G (s)	7.0	16.0	16.0	11.0	20.0		9.5	38.0		13.5	42.0	42.0
Effective Green, g (s)	7.0	16.0	16.0	11.0	20.0		9.0	39.0		13.0	43.0	43.0
Actuated g/C Ratio	0.07	0.17	0.17	0.12	0.21		0.09	0.41		0.14	0.45	0.45
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		3.5	5.0		3.5	5.0	5.0
Lane Grp Cap (vph)	130	314	267	398	359		168	1423		242	1602	717
v/s Ratio Prot	0.05	0.08		c0.13	c0.19		0.07	c0.36		0.13	c0.42	
v/s Ratio Perm			0.02									0.03
v/c Ratio	0.71	0.48	0.10	1.12	0.90		0.77	0.87		0.97	0.92	0.06
Uniform Delay, d1	43.0	35.8	33.4	42.0	36.5		42.0	25.7		40.8	24.4	14.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	27.7	5.3	0.8	82.1	27.4		28.6	7.7		49.9	10.3	0.2
Delay (s)	70.7	41.0	34.2	124.1	63.9		70.6	33.4		90.7	34.8	14.8
Level of Service	E	D	C	F	E		E	C		F	C	B
Approach Delay (s)		45.0			96.8			36.9			41.0	
Approach LOS		D			F			D			D	

Intersection Summary

HCM Average Control Delay	50.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
102: Butler Mkt Rd & Bend Pkway SB Ramp

Baseline
2007 PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	620	760	0	255	125
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	674	826	0	277	136
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)		461				
pX, platoon unblocked					0.93	
vC, conflicting volume	826				1500	826
vC1, stage 1 conf vol					826	
vC2, stage 2 conf vol					674	
vCu, unblocked vol	826				1535	826
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				0	63
cM capacity (veh/h)	805				262	372

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	674	826	413
Volume Left	0	0	277
Volume Right	0	0	136
cSH	1700	1700	290
Volume to Capacity	0.40	0.49	1.42
Queue Length 95th (ft)	0	0	557
Control Delay (s)	0.0	0.0	242.5
Lane LOS			F
Approach Delay (s)	0.0	0.0	242.5
Approach LOS			F

Intersection Summary			
Average Delay	52.4		
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
103: Butler Mkt Rd & Bend Pkwy NB Ramp

Baseline
2007 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	80	785	10	10	760	255	20	5	20	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	853	11	11	826	277	22	5	22	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			None	
Median storage veh)								1				
Upstream signal (ft)		910										
pX, platoon unblocked				0.98			0.98	0.98	0.98	0.98	0.98	
vC, conflicting volume	1103			864			1880	2158	859	2038	2024	965
vC1, stage 1 conf vol							1033	1033				
vC2, stage 2 conf vol							848	1125				
vCu, unblocked vol	1103			861			1901	2185	855	2062	2048	965
tC, single (s)	4.1			4.1			*6.4	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							5.4	5.5				
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	86			99			87	95	94	100	100	100
cM capacity (veh/h)	633			763			171	117	350	32	46	309

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	87	864	11	1103	49
Volume Left	87	0	11	0	22
Volume Right	0	11	0	277	22
cSH	633	1700	763	1700	207
Volume to Capacity	0.14	0.51	0.01	0.65	0.24
Queue Length 95th (ft)	12	0	1	0	22
Control Delay (s)	11.6	0.0	9.8	0.0	27.6
Lane LOS	B		A		D
Approach Delay (s)	1.1		0.1		27.6
Approach LOS					D

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis
104: Butler Mkt Rd & 4th St

Baseline
2007 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	635	155	95	655	0	295	0	85	0	5	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	690	168	103	712	0	321	0	92	0	5	49
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			None	
Median storage veh)								1				
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	712			859			1745	1693	774	1701	1777	712
vC1, stage 1 conf vol							774	774				
vC2, stage 2 conf vol							970	918				
vCu, unblocked vol	712			859			1745	1693	774	1701	1777	712
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5				
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			87			0	100	77	100	92	89
cM capacity (veh/h)	888			782			148	195	398	50	72	432

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	0	859	103	712	321	92	54
Volume Left	0	0	103	0	321	0	0
Volume Right	0	168	0	0	0	92	49
cSH	1700	1700	782	1700	148	398	287
Volume to Capacity	0.00	0.51	0.13	0.42	2.16	0.23	0.19
Queue Length 95th (ft)	0	0	11	0	654	22	17
Control Delay (s)	0.0	0.0	10.3	0.0	595.2	16.8	20.4
Lane LOS			B		F	C	C
Approach Delay (s)	0.0		1.3		465.8		20.4
Approach LOS					F		C

Intersection Summary				
Average Delay	90.9			
Intersection Capacity Utilization	81.1%	ICU Level of Service		D
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
105: Studio Rd & 4th St

Baseline
2007 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	10	5	155	10	30	0	410	280	80	485	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	11	5	168	11	33	0	446	304	87	527	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1337	1451	527	1310	1299	598	527			750		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1337	1451	527	1310	1299	598	527			750		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	91	99	0	93	94	100			90		
cM capacity (veh/h)	106	117	551	116	145	502	1040			859		

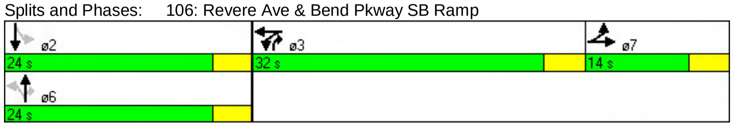
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	212	750	614
Volume Left	5	168	0	87
Volume Right	5	33	304	0
cSH	141	133	1040	859
Volume to Capacity	0.15	1.60	0.00	0.10
Queue Length 95th (ft)	13	379	0	8
Control Delay (s)	35.0	360.3	0.0	2.6
Lane LOS	E	F		A
Approach Delay (s)	35.0	360.3	0.0	2.6
Approach LOS	E	F		

Intersection Summary				
Average Delay	49.3			
Intersection Capacity Utilization	96.2%	ICU Level of Service		F
Analysis Period (min)	15			

Lane Group	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations								
Volume (vph)	15	595	25	15	115	730	205	230
Lane Group Flow (vph)	43	647	407	16	125	793	223	255
Turn Type		Split		Perm		pm+ov	Perm	
Protected Phases	7	3	3		6	3		2
Permitted Phases				6		6	2	
Detector Phases	7	3	3	6	6	3	2	2
Minimum Initial (s)	10.0	6.0	6.0	10.0	10.0	6.0	10.0	10.0
Minimum Split (s)	14.0	27.0	27.0	24.0	24.0	27.0	24.0	24.0
Total Split (s)	14.0	32.0	32.0	24.0	24.0	32.0	24.0	24.0
Total Split (%)	20.0%	45.7%	45.7%	34.3%	34.3%	45.7%	34.3%	34.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	Max	Max	None	Min	Min
v/c Ratio	0.16	0.89	0.46	0.05	0.20	0.54	0.53	0.41
Control Delay	22.8	36.0	4.3	19.1	19.3	1.8	25.5	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.8	36.0	4.3	19.1	19.3	1.8	25.5	21.2
Queue Length 50th (ft)	12	255	7	5	41	0	83	90
Queue Length 95th (ft)	39	#457	57	19	81	21	154	155
Internal Link Dist (ft)	273		685		1215			572
Turn Bay Length (ft)								
Base Capacity (vph)	274	779	918	296	626	1461	424	624
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.83	0.44	0.05	0.20	0.54	0.53	0.41

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 61.5
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 106: Revere Ave & Bend Pkwy SB Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.97		1.00	0.86		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1766		1770	1602		1770	1863	1583	1770	1857	
Flt Permitted		0.98		0.95	1.00		0.51	1.00	1.00	0.68	1.00	
Satd. Flow (perm)		1766		1770	1602		957	1863	1583	1261	1857	
Volume (vph)	15	15	10	595	25	350	15	115	730	205	230	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	16	11	647	27	380	16	125	793	223	250	5
RTOR Reduction (vph)	0	10	0	0	228	0	0	0	217	0	1	0
Lane Group Flow (vph)	0	33	0	647	179	0	16	125	576	223	254	0
Turn Type	Split			Split			Perm		pm+ov	Perm		
Protected Phases	7	7		3	3			6	3		2	
Permitted Phases							6		6	2		
Actuated Green, G (s)		5.3		25.2	25.2		20.7	20.7	45.9	20.7	20.7	
Effective Green, g (s)		5.3		25.2	25.2		20.7	20.7	45.9	20.7	20.7	
Actuated g/C Ratio		0.08		0.40	0.40		0.33	0.33	0.73	0.33	0.33	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.5		2.5	2.5		4.3	4.3	2.5	4.3	4.3	
Lane Grp Cap (vph)		148		706	639		313	610	1250	413	608	
v/s Ratio Prot		c0.02		c0.37	0.11			0.07	0.18		0.14	
v/s Ratio Perm							0.02		0.18	c0.18		
v/c Ratio		0.22		0.92	0.28		0.05	0.20	0.46	0.54	0.42	
Uniform Delay, d1		27.0		18.0	12.9		14.5	15.3	3.6	17.4	16.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.6		16.6	0.2		0.3	0.8	0.2	2.0	0.7	
Delay (s)		27.6		34.6	13.0		14.8	16.1	3.8	19.3	17.3	
Level of Service		C		C	B		B	B	A	B	B	
Approach Delay (s)		27.6			26.3			5.6			18.2	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	63.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

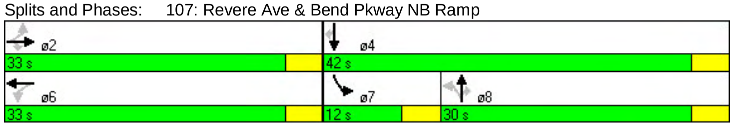
Timings
Baseline
107: Revere Ave & Bend Pkwy NB Ramp
2007 PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	160	365	440	50	510	120	285	585	140	5	315
Lane Group Flow (vph)	0	571	478	0	744	0	440	636	152	5	342
Turn Type	Perm		Perm	Perm		Perm		Perm	Prot		Perm
Protected Phases		2			6		8		7	4	
Permitted Phases	2		2	6		8		8			4
Detector Phases	2	2	2	6	6	8	8	8	7	4	4
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Split (s)	32.0	32.0	32.0	26.0	26.0	28.0	28.0	28.0	8.0	28.0	28.0
Total Split (s)	33.0	33.0	33.0	33.0	33.0	30.0	30.0	30.0	12.0	42.0	42.0
Total Split (%)	44.0%	44.0%	44.0%	44.0%	44.0%	40.0%	40.0%	40.0%	16.0%	56.0%	56.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lead/Lag						Lag	Lag	Lag	Lead		
Lead-Lag Optimize?						Yes	Yes	Yes	Yes		
Recall Mode	Min	Min	Min	Min	Min	None	None	None	None	None	None
v/c Ratio		1.02dl	0.55		0.68		0.75	0.88	0.68	0.01	0.40
Control Delay		29.2	4.4		20.2		29.5	28.9	50.3	9.0	6.9
Queue Delay		0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		29.2	4.4		20.2		29.5	28.9	50.3	9.0	6.9
Queue Length 50th (ft)		117	0		135		164	155	67	1	38
Queue Length 95th (ft)		179	55		192		#315	#379	#167	6	95
Internal Link Dist (ft)		685			811		202			274	
Turn Bay Length (ft)											
Base Capacity (vph)		883	968		1360		698	810	241	1056	969
Starvation Cap Reductn		0	0		0		0	0	0	0	0
Spillback Cap Reductn		0	0		0		0	0	0	0	0
Storage Cap Reductn		0	0		0		0	0	0	0	0
Reduced v/c Ratio		0.65	0.49		0.55		0.63	0.79	0.63	0.00	0.35

Intersection Summary

Cycle Length: 75
Actuated Cycle Length: 60.9
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 107: Revere Ave & Bend Pkwy NB Ramp



HCM Signalized Intersection Capacity Analysis
Baseline
107: Revere Ave & Bend Pkwy NB Ramp
2007 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95	1.00		0.95			1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98	1.00		1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3486	1583		3430			1836	1583	1770	1863	1583
Flt Permitted		0.57	1.00		0.88			0.90	1.00	0.95	1.00	1.00
Satd. Flow (perm)		2004	1583		3021			1684	1583	1770	1863	1583
Volume (vph)	160	365	440	50	510	125	120	285	585	140	5	315
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	397	478	54	554	136	130	310	636	152	5	342
RTOR Reduction (vph)	0	0	307	0	27	0	0	0	170	0	0	81
Lane Group Flow (vph)	0	571	171	0	717	0	0	440	466	152	5	261
Turn Type	Perm		Perm	Perm			Perm		Perm	Prot		Perm
Protected Phases		2			6			8		7	4	
Permitted Phases	2		2	6			8		8			4
Actuated Green, G (s)		21.7	21.7		21.7			21.2	21.2	5.6	30.8	30.8
Effective Green, g (s)		21.7	21.7		21.7			21.2	21.2	5.6	30.8	30.8
Actuated g/C Ratio		0.36	0.36		0.36			0.35	0.35	0.09	0.51	0.51
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		2.5	2.5		2.5			2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		719	568		1084			590	555	164	948	806
v/s Ratio Prot										c0.09	0.00	
v/s Ratio Perm		c0.28	0.11		0.24			0.26	c0.29			0.16
v/c Ratio		1.02dl	0.30		0.66			0.75	0.84	0.93	0.01	0.32
Uniform Delay, d1		17.4	14.0		16.3			17.3	18.1	27.2	7.3	8.7
Progression Factor		1.00	1.00		1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		5.9	0.2		1.4			4.5	10.6	48.3	0.0	0.1
Delay (s)		23.2	14.2		17.7			21.8	28.7	75.5	7.3	8.8
Level of Service		C	B		B			C	C	E	A	A
Approach Delay (s)		19.1			17.7			25.9			29.1	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	22.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	60.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Timings
108: Revere Ave & 3rd St

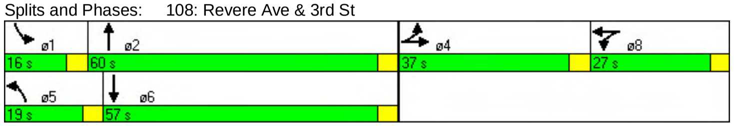
Baseline
2007 PM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	270	565	240	395	135	1365	80	815
Lane Group Flow (vph)	293	886	246	515	147	1598	87	962
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	10.0	10.0	6.0	6.0	6.0	10.0	6.0	10.0
Minimum Split (s)	27.0	27.0	27.0	27.0	10.0	24.0	10.0	24.0
Total Split (s)	37.0	37.0	27.0	27.0	19.0	60.0	16.0	57.0
Total Split (%)	26.4%	26.4%	19.3%	19.3%	13.6%	42.9%	11.4%	40.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
v/c Ratio	0.70	1.06	0.94	0.94	0.82	1.10	0.66	0.71
Control Delay	59.3	97.7	99.8	83.2	94.6	95.5	85.6	39.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.3	97.7	99.8	83.2	94.6	95.5	85.6	39.8
Queue Length 50th (ft)	246	~450	246	252	133	~887	78	390
Queue Length 95th (ft)	353	#586	#429	#368	#242	#1033	138	471
Internal Link Dist (ft)		811		432		924		603
Turn Bay Length (ft)								
Base Capacity (vph)	417	832	265	553	190	1450	152	1357
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	1.06	0.93	0.93	0.77	1.10	0.57	0.71

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 108: Revere Ave & 3rd St



HCM Signalized Intersection Capacity Analysis
108: Revere Ave & 3rd St

Baseline
2007 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		0.91	0.91		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3376		1610	3315		1770	3501		1770	3497	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3376		1610	3315		1770	3501		1770	3497	
Volume (vph)	270	565	250	240	395	65	135	1365	105	80	815	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	293	614	272	261	429	71	147	1484	114	87	886	76
RTOR Reduction (vph)	0	36	0	0	8	0	0	4	0	0	4	0
Lane Group Flow (vph)	293	850	0	246	507	0	147	1594	0	87	958	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	33.0	33.0		22.7	22.7		14.1	57.8		10.5	54.2	
Effective Green, g (s)	33.0	33.0		22.7	22.7		14.1	57.8		10.5	54.2	
Actuated g/C Ratio	0.24	0.24		0.16	0.16		0.10	0.41		0.08	0.39	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.3		2.5	4.3	
Lane Grp Cap (vph)	417	796		261	538		178	1445		133	1354	
v/s Ratio Prot	0.17	c0.25		0.15	c0.15		c0.08	c0.46		0.05	0.27	
v/s Ratio Perm												
v/c Ratio	0.70	1.07		0.94	0.94		0.83	1.10		0.65	0.71	
Uniform Delay, d1	49.0	53.5		58.0	58.0		61.7	41.1		63.0	36.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.9	51.6		40.1	25.0		25.2	57.2		9.9	3.1	
Delay (s)	53.9	105.1		98.1	83.0		87.0	98.3		72.9	39.3	
Level of Service	D	F		F	F		F	F		E	D	
Approach Delay (s)		92.4			87.9			97.3			42.1	
Approach LOS		F			F			F			D	

Intersection Summary

HCM Average Control Delay	82.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	275	350	140	25	345	120	80	245	45	170	185	280
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	299	380	152	27	375	130	87	266	49	185	201	304

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total (vph)	299	533	27	505	402	386	304
Volume Left (vph)	299	0	27	0	87	185	0
Volume Right (vph)	0	152	0	130	49	0	304
Hadj (s)	0.53	-0.17	0.53	-0.15	0.00	0.27	-0.67
Departure Headway (s)	10.1	9.4	10.3	9.6	9.9	9.8	8.9
Degree Utilization, x	0.84	1.39	0.08	1.35	1.11	1.06	0.75
Capacity (veh/h)	353	392	345	383	373	371	397
Control Delay (s)	47.2	216.4	12.9	199.0	111.0	93.5	33.4
Approach Delay (s)	155.6		189.5		111.0	67.0	
Approach LOS	F		F		F	F	

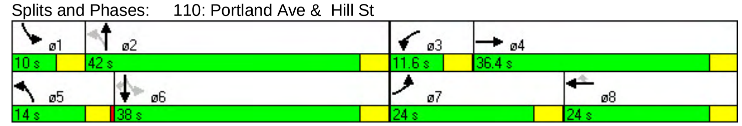
Intersection Summary			
Delay	130.7		
HCM Level of Service	F		
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	320	220	80	300	105	160	520	40	350	405
Lane Group Flow (vph)	348	364	87	326	114	174	685	43	380	440
Turn Type	Prot		Prot		Perm	pm+pt		pm+pt		Perm
Protected Phases	7	4	3	8		5	2	1	6	
Permitted Phases					8	2		6		6
Detector Phases	7	4	3	8	8	5	2	1	6	6
Minimum Initial (s)	5.0	6.0	5.0	10.0	10.0	4.0	10.0	6.0	8.0	8.0
Minimum Split (s)	9.2	23.0	9.2	24.0	24.0	8.0	21.0	10.0	23.0	23.0
Total Split (s)	24.0	36.4	11.6	24.0	24.0	14.0	42.0	10.0	38.0	38.0
Total Split (%)	24.0%	36.4%	11.6%	24.0%	24.0%	14.0%	42.0%	10.0%	38.0%	38.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.5	4.0	4.0	4.0	4.0
All-Red Time (s)	0.2	0.0	0.2	0.0	0.0	0.5	0.0	0.0	0.0	0.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min	Min
v/c Ratio	0.92	0.56	0.65	0.88	0.28	0.47	0.94	0.24	0.65	0.55
Control Delay	68.2	28.2	67.2	63.7	8.7	19.8	50.5	18.4	33.5	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.2	28.2	67.2	63.7	8.7	19.8	50.5	18.4	33.5	5.3
Queue Length 50th (ft)	223	180	55	203	0	62	420	14	199	0
Queue Length 95th (ft)	#403	278	#125	#357	45	104	#667	33	297	65
Internal Link Dist (ft)		940		1316			946		1215	
Turn Bay Length (ft)										
Base Capacity (vph)	380	656	141	393	424	375	740	176	647	837
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.55	0.62	0.83	0.27	0.46	0.93	0.24	0.59	0.53

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 93.8
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 110: Portland Ave & Hill St



HCM Signalized Intersection Capacity Analysis
110: Portland Ave & Hill St

Baseline
2007 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1767		1770	1863	1583	1770	1814		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.27	1.00		0.13	1.00	1.00
Satd. Flow (perm)	1770	1767		1770	1863	1583	509	1814		237	1863	1583
Volume (vph)	320	220	115	80	300	105	160	520	110	40	350	405
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	348	239	125	87	326	114	174	565	120	43	380	440
RTOR Reduction (vph)	0	18	0	0	0	91	0	7	0	0	0	296
Lane Group Flow (vph)	348	346	0	87	326	23	174	678	0	43	380	144
Turn Type	Prot			Prot		Perm	pm+pt			pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8	2			6		6
Actuated Green, G (s)	20.0	33.8		5.7	19.5	19.5	44.8	37.4		34.9	31.5	31.5
Effective Green, g (s)	20.2	33.8		5.9	19.5	19.5	44.8	37.4		34.9	31.5	31.5
Actuated g/C Ratio	0.21	0.35		0.06	0.20	0.20	0.46	0.39		0.36	0.33	0.33
Clearance Time (s)	4.2	4.0		4.2	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	3.0	4.2		2.5	4.2	4.2
Lane Grp Cap (vph)	371	619		108	376	320	358	703		140	608	517
v/s Ratio Prot	c0.20	0.20		0.05	c0.18		c0.05	c0.37		0.01	0.20	
v/s Ratio Perm						0.01	0.18			0.10		0.09
v/c Ratio	0.94	0.56		0.81	0.87	0.07	0.49	0.96		0.31	0.62	0.28
Uniform Delay, d1	37.5	25.3		44.7	37.2	31.2	17.3	28.9		23.9	27.5	24.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	30.9	0.9		33.1	18.3	0.1	1.0	25.3		0.9	2.4	0.4
Delay (s)	68.5	26.2		77.8	55.6	31.2	18.3	54.2		24.8	29.9	24.5
Level of Service	E	C		E	E	C	B	D		C	C	C
Approach Delay (s)		46.9			54.0			46.9			26.9	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	42.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	96.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
111: Olney Ave & 3rd St

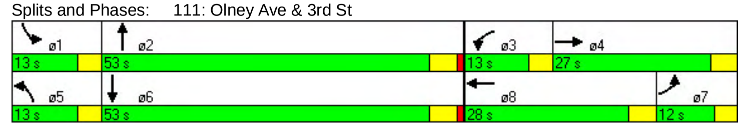
Baseline
2007 PM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	130	280	130	315	95	1460	140	1105
Lane Group Flow (vph)	141	396	141	456	103	1712	152	1228
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	24.0	8.0	24.0	8.0	25.0	8.0	25.0
Total Split (s)	12.0	27.0	13.0	28.0	13.0	53.0	13.0	53.0
Total Split (%)	11.3%	25.5%	12.3%	26.4%	12.3%	50.0%	12.3%	50.0%
Yellow Time (s)	3.5	4.0	3.5	4.0	3.5	4.0	3.5	4.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Min	None	C-Min
v/c Ratio	1.05	0.99	0.94	1.09	0.73	1.05	1.01	0.74
Control Delay	140.8	83.8	108.8	110.1	76.2	67.1	126.5	26.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	140.8	83.8	108.8	110.1	76.2	67.1	126.5	26.6
Queue Length 50th (ft)	~105	262	97	~343	69	~671	~106	350
Queue Length 95th (ft)	#231	#461	#220	#544	#149	#812	#238	435
Internal Link Dist (ft)		300		422		1798		924
Turn Bay Length (ft)								
Base Capacity (vph)	134	400	150	417	150	1623	150	1650
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.05	0.99	0.94	1.09	0.69	1.05	1.01	0.74

Intersection Summary

Cycle Length: 106
Actuated Cycle Length: 106
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 111: Olney Ave & 3rd St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.96		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1798		1770	1793		1770	3500		1770	3528	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1798		1770	1793		1770	3500		1770	3528	
Volume (vph)	130	280	85	130	315	105	95	1460	115	140	1105	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	304	92	141	342	114	103	1587	125	152	1201	27
RTOR Reduction (vph)	0	10	0	0	12	0	0	5	0	0	2	0
Lane Group Flow (vph)	141	386	0	141	444	0	103	1707	0	152	1226	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	8.5	23.0		9.5	24.0		9.0	48.0		9.5	48.5	
Effective Green, g (s)	8.0	23.0		9.0	24.0		8.5	49.0		9.0	49.5	
Actuated g/C Ratio	0.08	0.22		0.08	0.23		0.08	0.46		0.08	0.47	
Clearance Time (s)	3.5	4.0		3.5	4.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.8		2.5	4.8	
Lane Grp Cap (vph)	134	390		150	406		142	1618		150	1648	
v/s Ratio Prot	0.08	c0.21		0.08	c0.25		0.06	c0.49		c0.09	0.35	
v/s Ratio Perm												
v/c Ratio	1.05	0.99		0.94	1.09		0.73	1.05		1.01	0.74	
Uniform Delay, d1	49.0	41.4		48.2	41.0		47.6	28.5		48.5	23.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	92.4	42.3		55.6	72.6		15.8	38.4		77.0	3.1	
Delay (s)	141.4	83.6		103.8	113.6		63.4	66.9		125.5	26.2	
Level of Service	F	F		F	F		E	E		F	C	
Approach Delay (s)		98.8			111.3			66.7			37.1	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM Average Control Delay	67.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	105	385	40	50	385	45	45	235	75	140	140	100
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	114	418	43	54	418	49	49	255	82	152	152	109

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	114	462	54	467	386	413
Volume Left (vph)	114	0	54	0	49	152
Volume Right (vph)	0	43	0	49	82	109
Hadj (s)	0.53	-0.03	0.53	-0.04	-0.07	-0.05
Departure Headway (s)	10.2	9.6	10.2	9.6	9.4	9.4
Degree Utilization, x	0.32	1.23	0.15	1.24	1.01	1.08
Capacity (veh/h)	351	381	350	381	386	390
Control Delay (s)	16.7	153.1	13.8	158.2	79.1	100.2
Approach Delay (s)	126.1		143.2		79.1	100.2
Approach LOS	F		F		F	F

Intersection Summary			
Delay	115.6		
HCM Level of Service	F		
Intersection Capacity Utilization	82.8%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	125	0	2610	2725	75
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	136	0	2837	2962	82
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				740		
pX, platoon unblocked						
vC, conflicting volume	4380	1481	3043			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	4380	1481	3043			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	1	114	109			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	136	1418	1418	1481	1481	82
Volume Left	0	0	0	0	0	0
Volume Right	136	0	0	0	0	82
cSH	114	1700	1700	1700	1700	1700
Volume to Capacity	1.19	0.83	0.83	0.87	0.87	0.05
Queue Length 95th (ft)	215	0	0	0	0	0
Control Delay (s)	214.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	F					
Approach Delay (s)	214.9	0.0		0.0		
Approach LOS	F					

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	190	0	0	605	10	65	10	435	20	0	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	207	0	0	658	11	71	11	473	22	0	49
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		563			155							
pX, platoon unblocked												
vC, conflicting volume	668			207			940	897	207	1370	891	663
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	668			207			940	897	207	1370	891	663
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			67	96	43	58	100	89
cM capacity (veh/h)	921			1365			216	276	834	51	278	461

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	217	668	82	473	71
Volume Left	11	0	71	0	22
Volume Right	0	11	0	473	49
cSH	921	1700	222	834	134
Volume to Capacity	0.01	0.39	0.37	0.57	0.53
Queue Length 95th (ft)	1	0	40	91	64
Control Delay (s)	0.6	0.0	30.3	14.8	58.7
Lane LOS	A		D	B	F
Approach Delay (s)	0.6	0.0	17.1		58.7
Approach LOS			C		F

Intersection Summary			
Average Delay	9.1		
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		

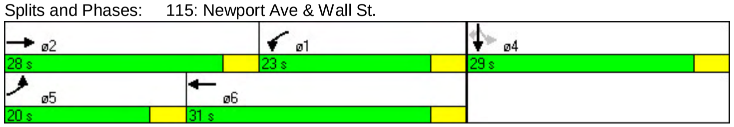
Timings
115: Newport Ave & Wall St.

Baseline
2007 PM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	SBT	SBR
Lane Configurations						
Volume (vph)	150	410	325	565	455	170
Lane Group Flow (vph)	163	620	353	657	620	185
Turn Type	Prot		Prot			Perm
Protected Phases	5	2	1	6	4	
Permitted Phases						4
Detector Phases	5	2	1	6	4	4
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.0	20.0	10.0	24.0	29.0	29.0
Total Split (s)	20.0	28.0	23.0	31.0	29.0	29.0
Total Split (%)	25.0%	35.0%	28.8%	38.8%	36.3%	36.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lead/Lag	Lead	Lead	Lag	Lag		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		
Recall Mode	Max	Max	Max	Max	Max	Max
v/c Ratio	0.46	0.58	0.84	1.05	0.57	0.30
Control Delay	33.1	23.3	49.2	77.4	25.4	4.8
Queue Delay	0.0	0.0	0.0	43.6	0.6	0.0
Total Delay	33.1	23.3	49.2	121.0	26.0	4.8
Queue Length 50th (ft)	72	120	180	~369	134	0
Queue Length 95th (ft)	131	173	m#316	#576	187	43
Internal Link Dist (ft)		429		314	483	
Turn Bay Length (ft)						
Base Capacity (vph)	354	1069	420	626	1095	622
Starvation Cap Reductn	0	0	0	59	0	0
Spillback Cap Reductn	0	1	0	0	184	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.58	0.84	1.16	0.68	0.30

Intersection Summary
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 75
Control Type: Pretimed
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 115: Newport Ave & Wall St.



HCM Signalized Intersection Capacity Analysis
115: Newport Ave & Wall St.

Baseline
2007 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00						0.95	1.00
Frt	1.00	0.96		1.00	0.99						1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (prot)	1770	3390		1770	1844						3504	1583
Flt Permitted	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (perm)	1770	3390		1770	1844						3504	1583
Volume (vph)	150	410	160	325	565	40	0	0	0	115	455	170
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	446	174	353	614	43	0	0	0	125	495	185
RTOR Reduction (vph)	0	52	0	0	3	0	0	0	0	0	0	127
Lane Group Flow (vph)	163	568	0	353	654	0	0	0	0	0	620	58
Turn Type	Prot			Prot						Perm		Perm
Protected Phases	5	2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)	16.0	24.0		19.0	27.0						25.0	25.0
Effective Green, g (s)	16.0	24.0		19.0	27.0						25.0	25.0
Actuated g/C Ratio	0.20	0.30		0.24	0.34						0.31	0.31
Clearance Time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Lane Grp Cap (vph)	354	1017		420	622						1095	495
v/s Ratio Prot	0.09	c0.17		0.20	c0.35							
v/s Ratio Perm											0.18	0.04
v/c Ratio	0.46	0.56		0.84	1.05						0.57	0.12
Uniform Delay, d1	28.2	23.5		29.1	26.5						23.0	19.6
Progression Factor	1.00	1.00		1.11	1.13						1.00	1.00
Incremental Delay, d2	4.3	2.2		15.3	46.9						2.1	0.5
Delay (s)	32.5	25.8		47.5	76.8						25.1	20.1
Level of Service	C	C		D	E						C	C
Approach Delay (s)		27.2			66.6			0.0			23.9	
Approach LOS		C			E			A			C	

Intersection Summary

HCM Average Control Delay	41.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
116: Newport Ave & Bond St

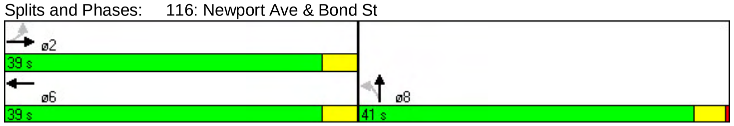
Baseline
2007 PM Peak Hour

Lane Group	EBL	EBT	WBT	NBT
Lane Configurations				
Volume (vph)	15	510	690	450
Lane Group Flow (vph)	0	570	815	1152
Turn Type	Perm			
Protected Phases		2	6	8
Permitted Phases	2			
Detector Phases	2	2	6	8
Minimum Initial (s)	6.0	6.0	6.0	4.0
Minimum Split (s)	28.0	28.0	29.0	20.0
Total Split (s)	39.0	39.0	39.0	41.0
Total Split (%)	48.8%	48.8%	48.8%	51.3%
Yellow Time (s)	4.0	4.0	4.0	3.5
All-Red Time (s)	0.0	0.0	0.0	0.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
v/c Ratio		0.40	0.53	0.71
Control Delay		22.9	17.7	20.9
Queue Delay		0.0	0.1	2.9
Total Delay		22.9	17.9	23.8
Queue Length 50th (ft)		88	148	193
Queue Length 95th (ft)		141	201	232
Internal Link Dist (ft)		314	1020	356
Turn Bay Length (ft)				
Base Capacity (vph)		1435	1538	1623
Starvation Cap Reductn		0	0	62
Spillback Cap Reductn		0	131	350
Storage Cap Reductn		0	0	0
Reduced v/c Ratio		0.40	0.58	0.90

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 38 (48%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 55
Control Type: Pretimed

Splits and Phases: 116: Newport Ave & Bond St



HCM Signalized Intersection Capacity Analysis
116: Newport Ave & Bond St

Baseline
2007 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			0.95			0.95				
Frt		1.00			0.99			0.95				
Flt Protected		1.00			1.00			0.99				
Satd. Flow (prot)		3534			3497			3316				
Flt Permitted		0.93			1.00			0.99				
Satd. Flow (perm)		3279			3497			3316				
Volume (vph)	15	510	0	0	690	60	240	450	370	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	554	0	0	750	65	261	489	402	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	89	0	0	0	0
Lane Group Flow (vph)	0	570	0	0	807	0	0	1063	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		35.0			35.0			37.0				
Effective Green, g (s)		35.0			35.0			37.0				
Actuated g/C Ratio		0.44			0.44			0.46				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		1435			1530			1534				
v/s Ratio Prot					c0.23							
v/s Ratio Perm		0.17						0.32				
v/c Ratio		0.40			0.53			0.69				
Uniform Delay, d1		15.3			16.5			17.0				
Progression Factor		1.43			1.00			1.26				
Incremental Delay, d2		0.7			1.3			2.1				
Delay (s)		22.6			17.8			23.6				
Level of Service		C			B			C				
Approach Delay (s)		22.6			17.8			23.6			0.0	
Approach LOS		C			B			C			A	

Intersection Summary			
HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

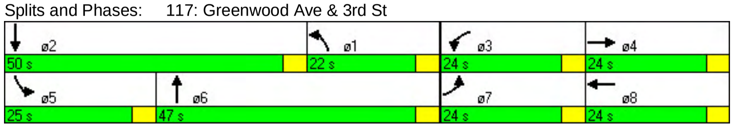
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	310	775	300	585	150	960	325	745
Lane Group Flow (vph)	337	989	326	957	163	1364	353	930
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	1	6	5	2
Permitted Phases								
Detector Phases	7	4	3	8	1	6	5	2
Minimum Initial (s)	5.0	8.0	5.0	8.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.0	27.0	9.0	27.0	9.0	24.0	9.0	24.0
Total Split (s)	24.0	24.0	24.0	24.0	22.0	47.0	25.0	50.0
Total Split (%)	20.0%	20.0%	20.0%	20.0%	18.3%	39.2%	20.8%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Ped	None	None	None	Min	None	C-Min
v/c Ratio	1.14	1.68	1.11	1.56	0.42	1.09	1.14	0.85
Control Delay	141.6	344.7	129.9	292.7	34.0	74.7	138.8	45.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	141.6	344.7	129.9	292.7	34.0	74.7	138.8	45.5
Queue Length 50th (ft)	~305	~590	~288	~533	73	~599	~319	350
Queue Length 95th (ft)	#491	#724	#471	#667	m133	m#633	#508	387
Internal Link Dist (ft)		1176		415		654		1798
Turn Bay Length (ft)								
Base Capacity (vph)	295	589	295	613	390	1248	310	1341
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.14	1.68	1.11	1.56	0.42	1.09	1.14	0.69

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 43 (36%), Referenced to phase 2:SBT, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 117: Greenwood Ave & 3rd St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.95		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3460		1770	3361		1770	3414		1770	3471	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3460		1770	3361		1770	3414		1770	3471	
Volume (vph)	310	775	135	300	585	295	150	960	295	325	745	110
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	337	842	147	326	636	321	163	1043	321	353	810	120
RTOR Reduction (vph)	0	12	0	0	53	0	0	24	0	0	11	0
Lane Group Flow (vph)	337	977	0	326	905	0	163	1340	0	353	919	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	20.0	20.0		20.0	20.0		26.4	43.0		21.0	37.6	
Effective Green, g (s)	20.0	20.0		20.0	20.0		26.4	43.0		21.0	37.6	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.22	0.36		0.18	0.31	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.3		2.5	4.3	
Lane Grp Cap (vph)	295	577		295	560		389	1223		310	1088	
v/s Ratio Prot	c0.19	c0.28		0.18	0.27		0.09	c0.39		c0.20	0.26	
v/s Ratio Perm												
v/c Ratio	1.14	1.69		1.11	1.62		0.42	1.10		1.14	0.84	
Uniform Delay, d1	50.0	50.0		50.0	50.0		40.2	38.5		49.5	38.5	
Progression Factor	1.00	1.00		1.00	1.00		0.75	0.66		1.00	1.00	
Incremental Delay, d2	96.6	319.7		83.6	285.0		0.3	50.0		94.1	8.1	
Delay (s)	146.6	369.7		133.6	335.0		30.6	75.6		143.6	46.5	
Level of Service	F	F		F	F		C	E		F	D	
Approach Delay (s)		313.0			283.8			70.8			73.2	
Approach LOS		F			F			E			E	

Intersection Summary

HCM Average Control Delay	181.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	110.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
118: Greenwood Ave & 4th St

Baseline
2007 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	30	1330	25	70	1055	140	0	0	130	0	0	155
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	1446	27	76	1147	152	0	0	141	0	0	168
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		495										
pX, platoon unblocked				0.84			0.84	0.84	0.84	0.84	0.84	
vC, conflicting volume	1299			1473			2418	2976	736	2304	2913	649
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1299			1375			2496	3157	501	2361	3083	649
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			82			100	100	67	100	100	59
cM capacity (veh/h)	529			417			6	7	434	9	8	412

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	33	964	509	76	764	534	141	168
Volume Left	33	0	0	76	0	0	0	0
Volume Right	0	0	27	0	0	152	141	168
cSH	529	1700	1700	417	1700	1700	434	412
Volume to Capacity	0.06	0.57	0.30	0.18	0.45	0.31	0.33	0.41
Queue Length 95th (ft)	5	0	0	16	0	0	35	49
Control Delay (s)	12.2	0.0	0.0	15.5	0.0	0.0	17.2	19.6
Lane LOS	B			C			C	C
Approach Delay (s)	0.3			0.9			17.2	19.6
Approach LOS							C	C

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
119: Hawthorne Ave & 3rd St

Baseline
2007 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	15	5	45	0	5	55	10	1385	35	35	1220	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	5	49	0	5	60	11	1505	38	38	1326	27
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		1			1							
Upstream signal (ft)								745			734	
pX, platoon unblocked	0.84	0.84	0.77	0.84	0.84	0.73	0.77			0.73		
vC, conflicting volume	2253	2981	677	2337	2976	772	1353			1543		
vC1, stage 1 conf vol	1416	1416		1546	1546							
vC2, stage 2 conf vol	837	1565		791	1429							
vCu, unblocked vol	1475	2340	278	1575	2334	308	1158			1371		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	92	91	100	93	88	98			89		
cM capacity (veh/h)	103	71	553	90	82	499	460			360		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	71	65	11	1004	540	38	884	469
Volume Left	16	0	11	0	0	38	0	0
Volume Right	49	60	0	0	38	0	0	27
cSH	218	350	460	1700	1700	360	1700	1700
Volume to Capacity	0.32	0.19	0.02	0.59	0.32	0.11	0.52	0.28
Queue Length 95th (ft)	33	17	2	0	0	9	0	0
Control Delay (s)	29.2	17.6	13.0	0.0	0.0	16.2	0.0	0.0
Lane LOS	D	C	B			C		
Approach Delay (s)	29.2	17.6	0.1			0.4		
Approach LOS	D	C						

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	50	30	30	5	10	5	15	90	5	10	130	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	33	33	5	11	5	16	98	5	11	141	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	326	318	160	364	334	101	179			103		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	326	318	160	364	334	101	179			103		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	94	96	99	98	99	99			99		
cM capacity (veh/h)	606	587	885	538	575	955	1396			1489		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	120	22	120	190
Volume Left	54	5	16	11
Volume Right	33	5	5	38
cSH	656	627	1396	1489
Volume to Capacity	0.18	0.03	0.01	0.01
Queue Length 95th (ft)	17	3	1	1
Control Delay (s)	11.7	11.0	1.1	0.5
Lane LOS	B	B	A	A
Approach Delay (s)	11.7	11.0	1.1	0.5
Approach LOS	B	B		

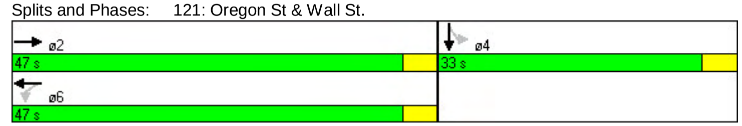
Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	WBL	WBT	SBT
Lane Configurations				
Volume (vph)	25	205	70	835
Lane Group Flow (vph)	54	0	299	1082
Turn Type		Perm		
Protected Phases	2		6	4
Permitted Phases		6		
Detector Phases	2	6	6	4
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5
Total Split (s)	47.0	47.0	47.0	33.0
Total Split (%)	58.8%	58.8%	58.8%	41.3%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	0.0	0.0	0.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
v/c Ratio	0.07		0.46	0.93
Control Delay	5.6		15.4	27.7
Queue Delay	0.0		0.0	1.3
Total Delay	5.6		15.4	28.9
Queue Length 50th (ft)	6		107	178
Queue Length 95th (ft)	22		181	m#382
Internal Link Dist (ft)	126		313	295
Turn Bay Length (ft)				
Base Capacity (vph)	820		646	1164
Starvation Cap Reductn	0		0	20
Spillback Cap Reductn	0		0	0
Storage Cap Reductn	0		0	0
Reduced v/c Ratio	0.07		0.46	0.95

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 61 (76%), Referenced to phase 2:EBT, Start of Green
Natural Cycle: 50
Control Type: Pretimed
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 121: Oregon St & Wall St.



HCM Signalized Intersection Capacity Analysis
121: Oregon St & Wall St.

Baseline
2007 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		1.00			1.00						0.95	
Frt		0.93			1.00						1.00	
Flt Protected		1.00			0.96						0.99	
Satd. Flow (prot)		1503			1553						3206	
Flt Permitted		1.00			0.75						0.99	
Satd. Flow (perm)		1503			1203						3206	
Volume (vph)	0	25	25	205	70	0	0	0	0	140	835	20
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	27	27	223	76	0	0	0	0	152	908	22
RTOR Reduction (vph)	0	12	0	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	42	0	0	299	0	0	0	0	0	1080	0
Parking (#/hr)	7	7	7	7	7	7				14	14	14
Turn Type				Perm						Perm		
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		43.0			43.0						29.0	
Effective Green, g (s)		43.0			43.0						29.0	
Actuated g/C Ratio		0.54			0.54						0.36	
Clearance Time (s)		4.0			4.0						4.0	
Lane Grp Cap (vph)		808			647						1162	
v/s Ratio Prot		0.03										
v/s Ratio Perm					c0.25						0.34	
v/c Ratio		0.05			0.46						0.93	
Uniform Delay, d1		8.8			11.4						24.5	
Progression Factor		1.00			1.12						0.58	
Incremental Delay, d2		0.1			2.0						11.6	
Delay (s)		8.9			14.7						25.9	
Level of Service		A			B						C	
Approach Delay (s)		8.9			14.7			0.0			25.9	
Approach LOS		A			B			A			C	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

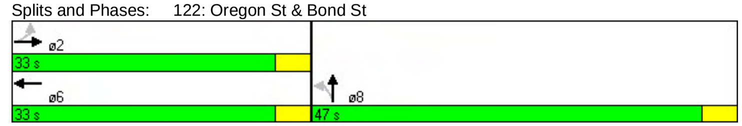
Timings
122: Oregon St & Bond St

Baseline
2007 PM Peak Hour

Lane Group	EBL	EBT	WBT	NBT
Lane Configurations				
Volume (vph)	100	100	95	795
Lane Group Flow (vph)	0	218	282	1174
Turn Type	Perm			
Protected Phases		2	6	8
Permitted Phases	2			
Detector Phases	2	2	6	8
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	20.5	20.5	20.5
Total Split (s)	33.0	33.0	33.0	47.0
Total Split (%)	41.3%	41.3%	41.3%	58.8%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	0.0	0.0	0.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
v/c Ratio		0.49	0.41	0.63
Control Delay		13.6	12.4	10.7
Queue Delay		0.0	0.0	0.0
Total Delay		13.6	12.4	10.8
Queue Length 50th (ft)		67	55	127
Queue Length 95th (ft)		m86	117	m161
Internal Link Dist (ft)		313	523	693
Turn Bay Length (ft)				
Base Capacity (vph)		442	696	1869
Starvation Cap Reductn		0	0	0
Spillback Cap Reductn		0	0	8
Storage Cap Reductn		0	0	0
Reduced v/c Ratio		0.49	0.41	0.63

Intersection Summary
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 51 (64%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 45
Control Type: Pretimed
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 122: Oregon St & Bond St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			0.95				
Frt		1.00			0.91			0.98				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		1817			1703			3457				
Flt Permitted		0.65			1.00			0.99				
Satd. Flow (perm)		1220			1703			3457				
Volume (vph)	100	100	0	0	95	165	175	795	110	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	109	0	0	103	179	190	864	120	0	0	0
RTOR Reduction (vph)	0	0	0	0	78	0	0	11	0	0	0	0
Lane Group Flow (vph)	0	218	0	0	204	0	0	1163	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		29.0			29.0			43.0				
Effective Green, g (s)		29.0			29.0			43.0				
Actuated g/C Ratio		0.36			0.36			0.54				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		442			617			1858				
v/s Ratio Prot					0.12							
v/s Ratio Perm		c0.18						0.34				
v/c Ratio		0.49			0.33			0.63				
Uniform Delay, d1		19.8			18.5			12.9				
Progression Factor		0.52			1.00			0.73				
Incremental Delay, d2		2.9			1.4			1.3				
Delay (s)		13.2			19.9			10.7				
Level of Service		B			B			B				
Approach Delay (s)		13.2			19.9			10.7			0.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	245	0	2610	2695	220
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	266	0	2837	2929	239
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				773	710	
pX, platoon unblocked						
vC, conflicting volume	4348	1465	3168			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	4348	1465	3168			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	1	117	97			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	266	1418	1418	1465	1465	239
Volume Left	0	0	0	0	0	0
Volume Right	266	0	0	0	0	239
cSH	117	1700	1700	1700	1700	1700
Volume to Capacity	2.27	0.83	0.83	0.86	0.86	0.14
Queue Length 95th (ft)	574	0	0	0	0	0
Control Delay (s)	656.8	0.0	0.0	0.0	0.0	0.0
Lane LOS	F					
Approach Delay (s)	656.8	0.0		0.0		
Approach LOS	F					

Intersection Summary			
Average Delay	27.9		
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		

Timings
124: Franklin Ave & Wall St.

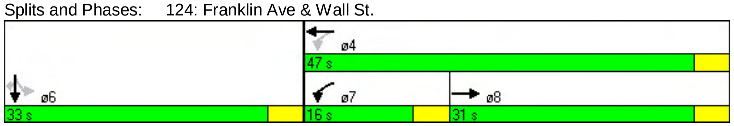
Baseline
2007 PM Peak Hour

Lane Group	EBT	WBL	WBT	SBT	SBR
Lane Configurations					
Volume (vph)	465	175	390	510	280
Lane Group Flow (vph)	538	190	424	809	304
Turn Type		pm+pt			Perm
Protected Phases	8	7	4	6	
Permitted Phases		4			6
Detector Phases	8	7	4	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.5	8.5	20.5	20.5	20.5
Total Split (s)	31.0	16.0	47.0	33.0	33.0
Total Split (%)	38.8%	20.0%	58.8%	41.3%	41.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes			
Recall Mode	Max	Max	Max	Max	Max
v/c Ratio	0.86	0.53	0.42	0.64	0.40
Control Delay	40.4	19.7	2.4	23.3	6.6
Queue Delay	0.0	0.0	0.9	0.0	0.0
Total Delay	40.4	19.7	3.3	23.3	6.6
Queue Length 50th (ft)	246	23	14	126	22
Queue Length 95th (ft)	#425	m41	m19	m153	m37
Internal Link Dist (ft)	420		308	677	
Turn Bay Length (ft)					
Base Capacity (vph)	626	359	1001	1263	768
Starvation Cap Reductn	0	0	317	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.86	0.53	0.62	0.64	0.40

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 4:WBTL and 8:EBT, Start of Green
Natural Cycle: 60
Control Type: Pretimed
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 124: Franklin Ave & Wall St.



HCM Signalized Intersection Capacity Analysis
124: Franklin Ave & Wall St.

Baseline
2007 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		1.00		1.00	1.00						0.95	1.00
Frt		0.99		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.98	1.00
Satd. Flow (prot)		1847		1770	1863						3484	1583
Flt Permitted		1.00		0.13	1.00						0.98	1.00
Satd. Flow (perm)		1847		240	1863						3484	1583
Volume (vph)	0	465	30	175	390	0	0	0	0	235	510	280
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	505	33	190	424	0	0	0	0	255	554	304
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	0	194
Lane Group Flow (vph)	0	535	0	190	424	0	0	0	0	0	809	110
Turn Type				pm+pt						Perm		Perm
Protected Phases		8		7	4						6	
Permitted Phases				4						6		6
Actuated Green, G (s)		27.0		43.0	43.0						29.0	29.0
Effective Green, g (s)		27.0		43.0	43.0						29.0	29.0
Actuated g/C Ratio		0.34		0.54	0.54						0.36	0.36
Clearance Time (s)		4.0		4.0	4.0						4.0	4.0
Lane Grp Cap (vph)		623		359	1001						1263	574
v/s Ratio Prot		c0.29		c0.08	0.23							
v/s Ratio Perm				0.21							0.23	0.07
v/c Ratio		0.86		0.53	0.42						0.64	0.19
Uniform Delay, d1		24.7		13.6	11.1						21.2	17.5
Progression Factor		1.00		1.46	0.15						1.02	2.32
Incremental Delay, d2		14.4		2.8	0.7						1.4	0.4
Delay (s)		39.1		22.7	2.4						22.9	40.9
Level of Service		D		C	A						C	D
Approach Delay (s)		39.1			8.7			0.0			27.8	
Approach LOS		D			A			A			C	

Intersection Summary

HCM Average Control Delay	25.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

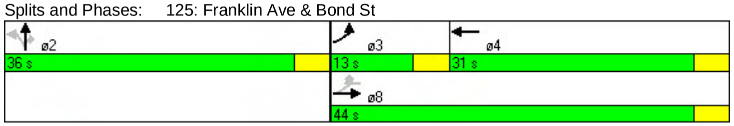
c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Configurations						
Volume (vph)	260	435	505	115	690	285
Lane Group Flow (vph)	283	473	549	125	815	310
Turn Type	pm+pt			custom		Perm
Protected Phases	3	8	4		2	
Permitted Phases	8			8		2
Detector Phases	3	8	4	8	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.5	20.5	20.5	20.5	20.5	20.5
Total Split (s)	13.0	44.0	31.0	44.0	36.0	36.0
Total Split (%)	16.3%	55.0%	38.8%	55.0%	45.0%	45.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	Max	Max	Max	Max	Max	Max
v/c Ratio	0.97	0.27	0.87	0.15	0.58	0.38
Control Delay	62.0	21.2	42.0	4.5	20.8	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.0	21.2	42.0	4.5	20.8	3.5
Queue Length 50th (ft)	134	114	254	8	162	0
Queue Length 95th (ft)	m#176	m137	#436	34	219	46
Internal Link Dist (ft)		308	596		574	
Turn Bay Length (ft)						
Base Capacity (vph)	292	1770	629	837	1410	819
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.27	0.87	0.15	0.58	0.38

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 59 (74%), Referenced to phase 4:WBT and 8:EBTL, Start of Green
Natural Cycle: 55
Control Type: Pretimed
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 125: Franklin Ave & Bond St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Lane Util. Factor	1.00	0.95			1.00	1.00		0.95	1.00			
Frt	1.00	1.00			1.00	0.85		1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00		1.00	1.00			
Satd. Flow (prot)	1770	3539			1863	1583		3525	1583			
Flt Permitted	0.13	1.00			1.00	1.00		1.00	1.00			
Satd. Flow (perm)	240	3539			1863	1583		3525	1583			
Volume (vph)	260	435	0	0	505	115	60	690	285	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	283	473	0	0	549	125	65	750	310	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	45	0	0	186	0	0	0
Lane Group Flow (vph)	283	473	0	0	549	80	0	815	124	0	0	0
Turn Type	pm+pt					custom	Perm		Perm			
Protected Phases	3	8			4			2				
Permitted Phases	8					8	2		2			
Actuated Green, G (s)	40.0	40.0			27.0	40.0		32.0	32.0			
Effective Green, g (s)	40.0	40.0			27.0	40.0		32.0	32.0			
Actuated g/C Ratio	0.50	0.50			0.34	0.50		0.40	0.40			
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Lane Grp Cap (vph)	292	1770			629	792		1410	633			
v/s Ratio Prot	c0.11	0.13			0.29							
v/s Ratio Perm	c0.37					0.05		0.23	0.08			
v/c Ratio	0.97	0.27			0.87	0.10		0.58	0.20			
Uniform Delay, d1	19.4	11.5			24.9	10.5		18.7	15.6			
Progression Factor	1.61	1.80			1.00	1.00		1.00	1.00			
Incremental Delay, d2	33.6	0.2			15.5	0.3		1.7	0.7			
Delay (s)	64.9	21.0			40.3	10.8		20.5	16.3			
Level of Service	E	C			D	B		C	B			
Approach Delay (s)		37.4			34.9			19.3			0.0	
Approach LOS		D			C			B			A	

Intersection Summary

HCM Average Control Delay	28.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
126: Franklin Ave & 3rd St

Baseline
2007 PM Peak Hour

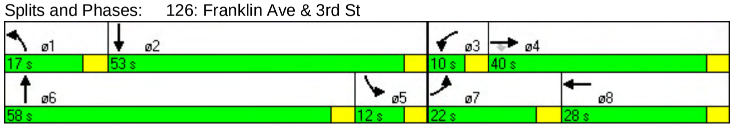
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	345	640	115	180	415	175	1035	105	1045
Lane Group Flow (vph)	375	696	125	196	527	190	1174	114	1272
Turn Type	Prot		Perm	Prot		Prot		Prot	
Protected Phases	7	4		3	8	1	6	5	2
Permitted Phases			4						
Detector Phases	7	4	4	3	8	1	6	5	2
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.0	26.0	26.0	9.0	26.0	9.0	24.0	9.0	24.0
Total Split (s)	22.0	40.0	40.0	10.0	28.0	17.0	58.0	12.0	53.0
Total Split (%)	18.3%	33.3%	33.3%	8.3%	23.3%	14.2%	48.3%	10.0%	44.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
v/c Ratio	1.41	0.66	0.22	2.20	0.75	0.99	0.74	0.97	0.89
Control Delay	243.4	40.1	6.4	602.4	51.5	116.2	30.6	91.6	23.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	243.4	40.1	6.4	602.4	51.5	116.2	30.6	91.6	23.9
Queue Length 50th (ft)	~390	246	0	~245	198	149	384	94	525
Queue Length 95th (ft)	#582	314	44	#396	262	#302	470	m#111	m412
Internal Link Dist (ft)		1152			410		1273		665
Turn Bay Length (ft)									
Base Capacity (vph)	266	1062	562	89	703	192	1586	118	1430
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.41	0.66	0.22	2.20	0.75	0.99	0.74	0.97	0.89

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 6:NBT, Start of Green
Natural Cycle: 120
Control Type: Pretimed

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 126: Franklin Ave & 3rd St



HCM Signalized Intersection Capacity Analysis
126: Franklin Ave & 3rd St

Baseline
2007 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3463		1770	3517		1770	3482	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3463		1770	3517		1770	3482	
Volume (vph)	345	640	115	180	415	70	175	1035	45	105	1045	125
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	375	696	125	196	451	76	190	1125	49	114	1136	136
RTOR Reduction (vph)	0	0	88	0	11	0	0	3	0	0	8	0
Lane Group Flow (vph)	375	696	38	196	516	0	190	1171	0	114	1264	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4									
Actuated Green, G (s)	18.0	36.0	36.0	6.0	24.0		13.0	54.0		8.0	49.0	
Effective Green, g (s)	18.0	36.0	36.0	6.0	24.0		13.0	54.0		8.0	49.0	
Actuated g/C Ratio	0.15	0.30	0.30	0.05	0.20		0.11	0.45		0.07	0.41	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	266	1062	475	89	693		192	1583		118	1422	
v/s Ratio Prot	c0.21	0.20		c0.11	c0.15		c0.11	0.33		0.06	c0.36	
v/s Ratio Perm			0.02									
v/c Ratio	1.41	0.66	0.08	2.20	0.74		0.99	0.74		0.97	0.89	
Uniform Delay, d1	51.0	36.6	30.1	57.0	45.1		53.4	27.2		55.9	33.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.76	0.59	
Incremental Delay, d2	205.3	3.2	0.3	575.8	7.1		62.3	3.1		46.5	4.1	
Delay (s)	256.3	39.8	30.4	632.8	52.2		115.7	30.4		88.8	23.4	
Level of Service	F	D	C	F	D		F	C		F	C	
Approach Delay (s)		106.7			209.6			42.3			28.8	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM Average Control Delay	80.7	HCM Level of Service	F
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	70	660	45	25	470	15	25	25	45	15	15	145
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	717	49	27	511	16	27	27	49	16	16	158
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		490										
pX, platoon unblocked				0.84			0.84	0.84	0.84	0.84	0.84	
vC, conflicting volume	527			766			1370	1476	383	1147	1492	264
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	527			533			1250	1376	77	985	1396	264
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			97			61	75	94	86	85	79
cM capacity (veh/h)	1036			867			69	109	814	119	106	735

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	76	478	288	27	341	187	103	190
Volume Left	76	0	0	27	0	0	27	16
Volume Right	0	0	49	0	0	16	49	158
cSH	1036	1700	1700	867	1700	1700	147	376
Volume to Capacity	0.07	0.28	0.17	0.03	0.20	0.11	0.70	0.51
Queue Length 95th (ft)	6	0	0	2	0	0	101	69
Control Delay (s)	8.8	0.0	0.0	9.3	0.0	0.0	72.9	23.9
Lane LOS	A			A			F	C
Approach Delay (s)	0.8			0.5			72.9	23.9
Approach LOS							F	C

Intersection Summary			
Average Delay	7.7		
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	315	205	30	0	210	5	50	5	5	15	30	570
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	342	223	33	0	228	5	54	5	5	16	33	620

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	598	234	65	49	620
Volume Left (vph)	342	0	54	16	0
Volume Right (vph)	33	5	5	0	620
Hadj (s)	0.12	0.02	0.15	0.20	-0.67
Departure Headway (s)	6.7	7.4	8.4	7.4	6.5
Degree Utilization, x	1.12	0.48	0.15	0.10	1.12
Capacity (veh/h)	540	480	406	476	555
Control Delay (s)	99.8	17.0	13.0	10.0	100.1
Approach Delay (s)	99.8	17.0	13.0	93.6	
Approach LOS	F	C	B	F	

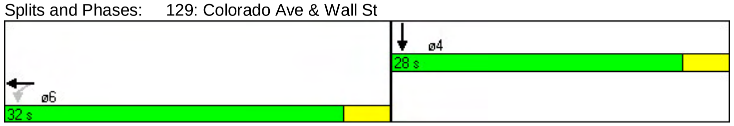
Intersection Summary			
Delay	81.1		
HCM Level of Service	F		
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	WBT	SBT
Lane Configurations		
Volume (vph)	615	485
Lane Group Flow (vph)	793	701
Turn Type		
Protected Phases	6	4
Permitted Phases		
Detector Phases	6	4
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	20.5	20.5
Total Split (s)	32.0	28.0
Total Split (%)	53.3%	46.7%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	0.0	0.0
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	Max
v/c Ratio	0.51	0.53
Control Delay	4.7	13.5
Queue Delay	0.1	0.0
Total Delay	4.8	13.5
Queue Length 50th (ft)	20	83
Queue Length 95th (ft)	26	128
Internal Link Dist (ft)	229	1179
Turn Bay Length (ft)		
Base Capacity (vph)	1561	1331
Starvation Cap Reductn	161	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.57	0.53

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 10 (17%), Referenced to phase 6:WBTL, Start of Green
Natural Cycle: 45
Control Type: Pretimed

Splits and Phases: 129: Colorado Ave & Wall St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						4.0	
Lane Util. Factor					0.95						0.95	
Frt					1.00						0.96	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					3292						3194	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					3292						3194	
Volume (vph)	0	0	0	115	615	0	0	0	0	0	485	160
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	125	668	0	0	0	0	0	527	174
RTOR Reduction (vph)	0	0	0	0	26	0	0	0	0	0	53	0
Lane Group Flow (vph)	0	0	0	0	767	0	0	0	0	0	648	0
Parking (#/hr)				5	5					5	5	
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					28.0						24.0	
Effective Green, g (s)					28.0						24.0	
Actuated g/C Ratio					0.47						0.40	
Clearance Time (s)					4.0						4.0	
Lane Grp Cap (vph)					1536						1278	
v/s Ratio Prot											c0.20	
v/s Ratio Perm					0.23							
v/c Ratio					0.50						0.51	
Uniform Delay, d1					11.1						13.5	
Progression Factor					0.35						1.00	
Incremental Delay, d2					1.0						1.4	
Delay (s)					4.8						15.0	
Level of Service					A						B	
Approach Delay (s)		0.0			4.8			0.0			15.0	
Approach LOS		A			A			A			B	

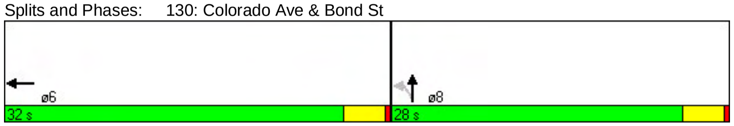
Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBT	NBT
Lane Configurations		
Volume (vph)	640	740
Lane Group Flow (vph)	854	891
Turn Type		
Protected Phases	6	8
Permitted Phases		
Detector Phases	6	8
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	20.0	20.0
Total Split (s)	32.0	28.0
Total Split (%)	53.3%	46.7%
Yellow Time (s)	3.5	3.5
All-Red Time (s)	0.5	0.5
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	Max
v/c Ratio	0.56	0.68
Control Delay	12.4	17.3
Queue Delay	0.0	0.7
Total Delay	12.4	17.9
Queue Length 50th (ft)	101	123
Queue Length 95th (ft)	150	m167
Internal Link Dist (ft)	1497	225
Turn Bay Length (ft)		
Base Capacity (vph)	1517	1317
Starvation Cap Reductn	0	155
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.56	0.77

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 6:WBT, Start of Green
Natural Cycle: 40
Control Type: Pretimed
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 130: Colorado Ave & Bond St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.95			0.95				
Frt					0.97			1.00				
Flt Protected					1.00			1.00				
Satd. Flow (prot)					3183			3258				
Flt Permitted					1.00			1.00				
Satd. Flow (perm)					3183			3258				
Volume (vph)	0	0	0	0	640	145	80	740	0	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	696	158	87	804	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	33	0	0	14	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	821	0	0	877	0	0	0	0
Parking (#/hr)				10	10	10	10	10	10			
Turn Type							Perm					
Protected Phases					6			8				
Permitted Phases							8					
Actuated Green, G (s)					28.0			24.0				
Effective Green, g (s)					28.0			24.0				
Actuated g/C Ratio					0.47			0.40				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					1485			1303				
v/s Ratio Prot					c0.26							
v/s Ratio Perm								0.27				
v/c Ratio					0.55			0.67				
Uniform Delay, d1					11.5			14.8				
Progression Factor					1.00			1.04				
Incremental Delay, d2					1.5			1.9				
Delay (s)					13.0			17.3				
Level of Service					B			B				
Approach Delay (s)		0.0			13.0			17.3			0.0	
Approach LOS		A			B			B			A	

Intersection Summary

HCM Average Control Delay	15.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

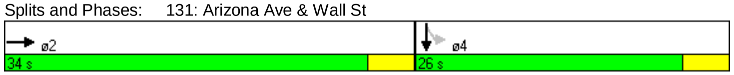
Timings
131: Arizona Ave & Wall St

Baseline
2007 PM Peak Hour

Lane Group	EBT	SBT
Lane Configurations		
Volume (vph)	1170	390
Lane Group Flow (vph)	1299	663
Turn Type		
Protected Phases	2	4
Permitted Phases		
Detector Phases	2	4
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	20.5	20.5
Total Split (s)	34.0	26.0
Total Split (%)	56.7%	43.3%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	0.0	0.0
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	Max
v/c Ratio	0.78	0.55
Control Delay	11.5	9.2
Queue Delay	26.8	0.1
Total Delay	38.3	9.3
Queue Length 50th (ft)	103	34
Queue Length 95th (ft)	132	45
Internal Link Dist (ft)	228	224
Turn Bay Length (ft)		
Base Capacity (vph)	1657	1201
Starvation Cap Reductn	0	53
Spillback Cap Reductn	415	2
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.05	0.58

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 17 (28%), Referenced to phase 2:EBT, Start of Green
Natural Cycle: 55
Control Type: Pretimed

Splits and Phases: 131: Arizona Ave & Wall St



HCM Signalized Intersection Capacity Analysis
131: Arizona Ave & Wall St

Baseline
2007 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									4.0	
Lane Util. Factor		0.95									0.95	
Frt		1.00									1.00	
Flt Protected		1.00									0.98	
Satd. Flow (prot)		3308									3216	
Flt Permitted		1.00									0.98	
Satd. Flow (perm)		3308									3216	
Volume (vph)	0	1170	25	0	0	0	0	0	0	220	390	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1272	27	0	0	0	0	0	0	239	424	0
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	22	0
Lane Group Flow (vph)	0	1297	0	0	0	0	0	0	0	0	641	0
Parking (#/hr)		5	5							10	10	10
Turn Type										Perm		
Protected Phases		2									4	
Permitted Phases										4		
Actuated Green, G (s)		30.0									22.0	
Effective Green, g (s)		30.0									22.0	
Actuated g/C Ratio		0.50									0.37	
Clearance Time (s)		4.0									4.0	
Lane Grp Cap (vph)		1654									1179	
v/s Ratio Prot		c0.39										
v/s Ratio Perm											0.20	
v/c Ratio		0.78									0.54	
Uniform Delay, d1		12.3									15.0	
Progression Factor		0.62									0.52	
Incremental Delay, d2		3.7									1.6	
Delay (s)		11.3									9.4	
Level of Service		B									A	
Approach Delay (s)		11.3			0.0			0.0			9.4	
Approach LOS		B			A			A			A	

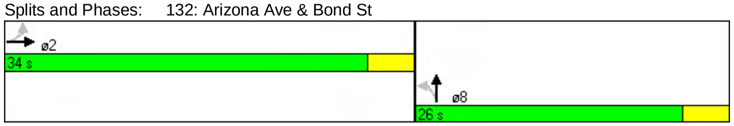
Intersection Summary			
HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	NBT
Lane Configurations		
Volume (vph)	990	430
Lane Group Flow (vph)	1500	641
Turn Type		
Protected Phases	2	8
Permitted Phases		
Detector Phases	2	8
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	20.5	20.5
Total Split (s)	34.0	26.0
Total Split (%)	56.7%	43.3%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	0.0	0.0
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	Max
v/c Ratio	0.93	0.54
Control Delay	18.5	15.5
Queue Delay	17.4	0.0
Total Delay	35.9	15.5
Queue Length 50th (ft)	298	83
Queue Length 95th (ft)	#422	128
Internal Link Dist (ft)	217	324
Turn Bay Length (ft)		
Base Capacity (vph)	1614	1190
Starvation Cap Reductn	157	0
Spillback Cap Reductn	6	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.03	0.54

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 28 (47%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 60
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 132: Arizona Ave & Bond St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0				
Lane Util. Factor		0.95						0.95				
Frt		1.00						0.96				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		3228						3140				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		3228						3140				
Volume (vph)	390	990	0	0	0	0	0	430	160	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	424	1076	0	0	0	0	0	467	174	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	39	0	0	0	0
Lane Group Flow (vph)	0	1500	0	0	0	0	0	602	0	0	0	0
Parking (#/hr)	10	10	10				10	10	10			
Turn Type	Perm						Perm					
Protected Phases		2						8				
Permitted Phases	2						8					
Actuated Green, G (s)		30.0						22.0				
Effective Green, g (s)		30.0						22.0				
Actuated g/C Ratio		0.50						0.37				
Clearance Time (s)		4.0						4.0				
Lane Grp Cap (vph)		1614						1151				
v/s Ratio Prot								c0.19				
v/s Ratio Perm		0.46										
v/c Ratio		0.93						0.52				
Uniform Delay, d1		14.0						14.9				
Progression Factor		0.63						1.00				
Incremental Delay, d2		7.6						1.7				
Delay (s)		16.5						16.6				
Level of Service		B						B				
Approach Delay (s)		16.5			0.0			16.6			0.0	
Approach LOS		B			A			B			A	

Intersection Summary

HCM Average Control Delay	16.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
133: Colorado Ave & Bend Pkwy SB Ramp

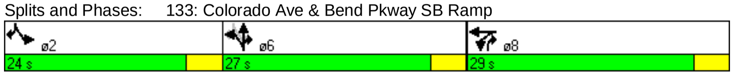
Baseline
2007 PM Peak Hour

Lane Group	WBT	NBT	NBR	SBL	SBR
Lane Configurations					
Volume (vph)	400	205	930	95	345
Lane Group Flow (vph)	511	234	1011	103	375
Turn Type			custom	D.P+P	custom
Protected Phases	8	6	6 8	2	2
Permitted Phases			6 8	6	6
Detector Phases	8	6	6 8	2	2
Minimum Initial (s)	4.0	4.0		4.0	4.0
Minimum Split (s)	29.0	27.0		24.0	24.0
Total Split (s)	29.0	27.0	56.0	24.0	24.0
Total Split (%)	36.3%	33.8%	70.0%	30.0%	30.0%
Yellow Time (s)	4.0	4.0		4.0	4.0
All-Red Time (s)	0.0	0.0		0.0	0.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None		Max	Max
v/c Ratio	0.86	0.54	0.79	0.15	0.38
Control Delay	40.4	29.2	7.5	8.1	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	40.4	29.2	7.5	8.1	5.7
Queue Length 50th (ft)	219	95	40	21	43
Queue Length 95th (ft)	#416	160	156	41	89
Internal Link Dist (ft)	738	1505			
Turn Bay Length (ft)					
Base Capacity (vph)	623	545	1304	706	975
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.82	0.43	0.78	0.15	0.38

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 73.1
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 133: Colorado Ave & Bend Pkwy SB Ramp



HCM Signalized Intersection Capacity Analysis
133: Colorado Ave & Bend Pkwy SB Ramp

Baseline
2007 PM Peak Hour

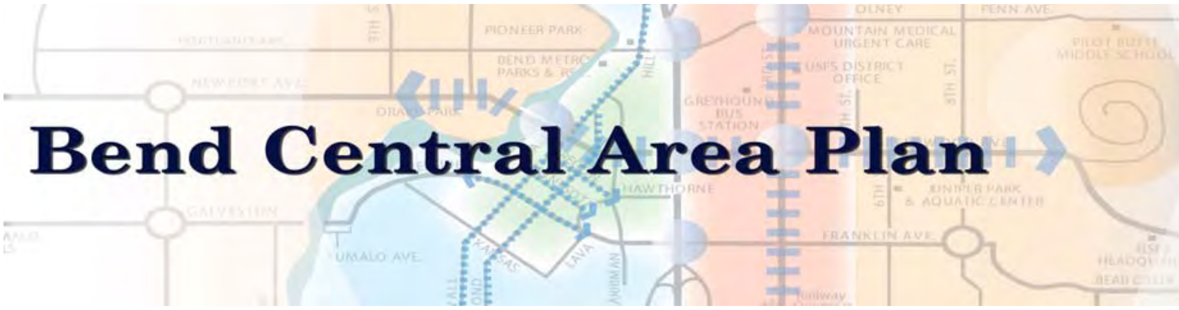
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0	4.0	4.0		4.0
Lane Util. Factor					1.00			1.00	1.00	1.00		1.00
Frt					0.98			1.00	0.85	1.00		0.85
Flt Protected					1.00			1.00	1.00	0.95		1.00
Satd. Flow (prot)					1827			1858	1583	1770		1583
Flt Permitted					1.00			1.00	1.00	0.46		1.00
Satd. Flow (perm)					1827			1858	1583	854		1583
Volume (vph)	0	0	0	5	400	65	10	205	930	95	0	345
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	5	435	71	11	223	1011	103	0	375
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	305	0	0	86
Lane Group Flow (vph)	0	0	0	0	504	0	0	234	706	103	0	289
Turn Type				custom			Split		custom	D.P+P		custom
Protected Phases				8	8		6	6	6 8	2		2
Permitted Phases				8					6 8	6		6
Actuated Green, G (s)					23.5			17.2	44.7	37.5		37.5
Effective Green, g (s)					23.5			17.2	44.7	37.5		37.5
Actuated g/C Ratio					0.32			0.24	0.61	0.51		0.51
Clearance Time (s)					4.0			4.0		4.0		4.0
Vehicle Extension (s)					3.0			3.0		3.0		3.0
Lane Grp Cap (vph)					588			438	969	693		900
v/s Ratio Prot					c0.28			0.13	c0.45	0.04		c0.09
v/s Ratio Perm										0.04		0.09
v/c Ratio					0.86			0.53	0.73	0.15		0.32
Uniform Delay, d1					23.2			24.4	9.9	9.3		10.3
Progression Factor					1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2					11.7			1.3	2.8	0.1		0.2
Delay (s)					34.9			25.7	12.7	9.4		10.5
Level of Service					C			C	B	A		B
Approach Delay (s)		0.0			34.9			15.1			10.3	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	795	230	230	475	15	240
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	864	250	250	516	16	261
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		818				
pX, platoon unblocked						
vC, conflicting volume	766				2486	508
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	766				2486	508
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	0				0	54
cM capacity (veh/h)	847				0	565

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	864	250	766	16	261
Volume Left	864	0	0	16	0
Volume Right	0	0	516	0	261
cSH	847	1700	1700	0	565
Volume to Capacity	1.02	0.15	0.45	Err	0.46
Queue Length 95th (ft)	477	0	0	Err	61
Control Delay (s)	58.2	0.0	0.0	Err	16.7
Lane LOS	F			F	C
Approach Delay (s)	45.1		0.0	Err	
Approach LOS				F	

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	98.7%	ICU Level of Service	F
Analysis Period (min)	15		



Bend Central Area Plan

TECHNICAL MEMORANDUM – LARGE-SCALE DEVELOPMENT OPPORTUNITIES

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March 22, 2007

BEND OREGON 1905

Introduction

This technical memorandum identifies key large-scale development opportunities in Bend's Central Area. Since the plan will be both a long-term conceptual plan as well as a short-term action plan, it is important to identify locations where significant change can occur. While cities grow and change through the course of many, many small projects, large-scale development opportunities can serve as the catalysts for multiple smaller changes in the surrounding areas. The identification of large-scale opportunity sites supports the plan by:

- Identifying the location of catalyst projects that will spur further redevelopment;
- Providing locations for anchor uses and destinations that will attract development in the future and set the tone and character of the surrounding area;
- Focusing public investments in places that will maximize the leverage of private investments;
- Prioritizing opportunities for "early successes" upon completion of the plan; and
- Helping to quantify the capacity for infill development and overall change.

The memorandum begins with a discussion of the criteria that are used to identify opportunity sites and the conditions in the Central Area. This is followed by a discussion of key large-scale development opportunities.

In the context of this report, the term "large-scale development opportunities" means the following:

- Sites or logical aggregations of sites of at least one acre in size.
- Sites that are vacant.
- Sites that are underutilized (those where the value of the land exceeds the value of any improvements on the land, according to the Deschutes County Assessor Office).

A Note About Corridors

The Urban Land Institute (ULI) has recently conducted significant research on the topic of revitalizing deteriorating urban and suburban corridors. Leland Consulting Group contributed to the final report of their research, *Ten Principles for Reinventing America's Suburban Strips*.[1] The principles outlined in the report are simple, straightforward, and directly relevant to the Central Area, particularly Third Street. The principles are:

1. Ignite Leadership and Nurture Partnership
2. Anticipate Evolution
3. Know the Market

[1] Available free online at http://www.uli.org/AM/TemplateRedirect.cfm?template=/CM/ContentDisplay.cfm&ContentID=56786

4. Prune Back Retail-Zoned Land
5. Establish Pulse Nodes of Development
6. Tame the Traffic
7. Create the Place
8. Diversify the Character
9. Eradicate the Ugliness
10. Put Your Money (and Regulations) Where Your Policy Is

Indeed, the framework concept for the Central Area incorporates many of these principles – creating pulse points, addressing traffic, being market responsive, and the introduction of non-retail uses into the corridor. In terms of large-scale redevelopment opportunities, the principles can inform not only the potential uses at each site, but also the actual locations of opportunity sites themselves. Thus, along Third Street, initial efforts at revitalization should be focused at the identified pulse points, allowing other uses, including housing, to fill in the areas in between.

Site Selection Criteria

Large-scale redevelopment opportunity sites should include sites that both have development potential and support implementation of the urban design framework. That is, they must both be redevelopable from an economic point of view, but, equally importantly, they must be located where they will support the evolution of the Central Area Plan. Thus, the selection of opportunity sites is both a quantitative and qualitative evaluation process. The following criteria should be used to identify large-scale redevelopment opportunities:

Support for the Framework Concept – The Central Area Plan Framework Concept includes five key components to implementing the vision: Great Streets, Open Spaces, Gateways, Key Redevelopment Sites, and Pedestrian Links. Figure 1 shows the Refined Framework Concept, identifying key pulse points, great streets, and other design features. Opportunity sites should be located at or near these key features.

- South Central Neighborhood – The neighborhoods south of the Historic Core are likely to see little change in the future, as they will retain their largely residential character. Any redevelopment is likely to be immediately on Wall and Bond Streets and will be of a smaller infill nature, not large-scale. Infill projects along Wall and Bond could include small office and retail buildings, potentially with office or housing above the ground floor. Parcel sizes and the need to not encroach on the surrounding neighborhoods will keep the scale of such projects small.
- North Central Neighborhood – This neighborhood is also largely residential in character and will see mostly infill projects. However, there are gateway opportunities where the neighborhood meets the Historic Core and where east-west streets provide connectivity to Third Street. While some underutilized property exists along Division Street, many of the parcels are small and do not meet the criteria for large-scale

redevelopment. Since the Parkway was built, Division no longer serves the same traffic function as it once did. This could enable it to fill in over time with smaller commercial uses that serve the immediate neighborhood.

- The Third Street Corridor is envisioned for a much more significant transition, from an auto-oriented commercial strip to a series of pedestrian-oriented “pulse points” and the transition of the Railroad District from a light industrial area to a medium-density urban neighborhood. Therefore, large-scale redevelopments are more appropriate and needed here.

For these reasons, the selection of large-scale development opportunity sites discussed later in this memorandum is organized around these pulse points.

Figure 1: Refined Framework Concept

Source: StastnyBrun Architects

Existing conditions opportunities and constraints – A previous technical memorandum described the existing conditions throughout the Central Area, including traffic conditions, infrastructure, zoning, and other elements.

- Zoning – For the purposes of identifying development opportunity sites, zoning is not considered a constraint since an expected outcome of the plan would be changes to zoning designations needed to implement the framework concept. Certain development opportunity areas, especially the Railroad District, will require new zoning to allow for housing and office mixed uses.

- Utilities – There are considerable constraints to large-scale development in the wastewater system until the new Westside interceptor is built. Storm drainage is also potentially constrained, especially if new development increases impervious surface area.
- Traffic – Many of the roads in the study area are congested and will need major improvements to meet the needs of existing traffic flows. More intense development in the Central Area will likely exacerbate the situation. However, traffic constraints are largely limited to the major signalized intersections along Third Street – while locations such as Greenwood and Franklin at Third are over capacity, there is more available capacity in intermediary locations such as Hawthorne and Third.
- Access – As traffic improvements are implemented, it is likely that an access management program will be needed, likely resulting in a reduction of access points to properties directly fronting Third Street. This would be a constraint to small-scale development, where properties might need to find alternative access points, but large-scale developments are well-suited to access management programs.

Real estate fundamentals – Most development in the Central Area will be private investments in housing, office, and commercial buildings. Therefore, each development opportunity must meet certain fundamental criteria for real estate success (e.g., high visibility, drive-by traffic for retail, good access, market demand, etc.). By their nature, pulse points have excellent visibility and typically have good access, which makes them ideal places for large-scale development.

Willing partners – Although property owners were not contacted in the course of this analysis, any redevelopment would be based on the interest and will of each property owner to participate in a redevelopment. As the plan moves further into implementation, the City should build relationships with property owners in key areas to better understand their current investment timelines and desire to redevelop. These relationships will improve the overall understanding of the market conditions in the Central Area and will increase the opportunities for public-private partnerships.

Underutilized property – Redevelopment is often easier on land that is vacant or underutilized. On such sites, there are usually few site constraints, which reduces development costs. Further, with little or no income being generated, there is often economic pressure to put the land into a higher use in order to produce revenue to cover taxes and maintenance. On the other hand, the time and expense of redevelopment often does not make economic sense for properties that are already highly developed and have an existing revenue stream.

These include all properties with an improvement value of less than $20,000 as tracked by the Deschutes County assessor.[2] **As can be seen in Figures 3** and 4, there are relatively few vacant sites in the Central Area. Many of those that are identified in the map are actually parks and cannot be developed. Thus, most redevelopment in the Central Area will need to occur through the redevelopment of already developed properties.

Properties that are developed can be considered underutilized when the value of the underlying land exceeds the value of any improvements on the land (land to improvement ratio greater than one). Therefore, properties colored more darkly indicate those that are underutilized. It is difficult to discern a pattern in the colors, but there are higher proportions of underutilized properties directly fronting Third Street, along the railroad, and near the riverfront. In the case of Third Street and the riverfront, this is an indication that the market values land in those locations very highly, whereas those properties adjacent to the railroad are likely underutilized due to the relatively low value of improvements.

Leverage – Large-scale developments will be just one component of implementation of the Central Area Plan. Many other smaller projects will be needed in order to call the plan a success. Properties that have the potential to attract additional investment should be prioritized. Likewise, priority sites should be chosen that leverage recent or planned public investments in streets, open space, infrastructure, and other features.

Size of parcel – By definition, large-scale development opportunities should be of a significant size. Parcels or aggregations of parcels of at least one acre in the Central Area should be sought out. At many key locations, there simply are no large parcels, so any large-scale development will require the aggregation of smaller parcels.

Ownership – Public ownership creates a unique opportunity for the City to play a lead role in implementation. Properties under public ownership should be identified. However, in the Central Area (outside the Historic Downtown Core), there is virtually no publicly owned land aside from parks. One exception to this is the former Bend Bulletin property at Hill Street and Olney Avenue, which the City purchased for a potential new city hall. The City recently decided to build a new city hall at its current location, which frees the former Bend Bulletin site for redevelopment.

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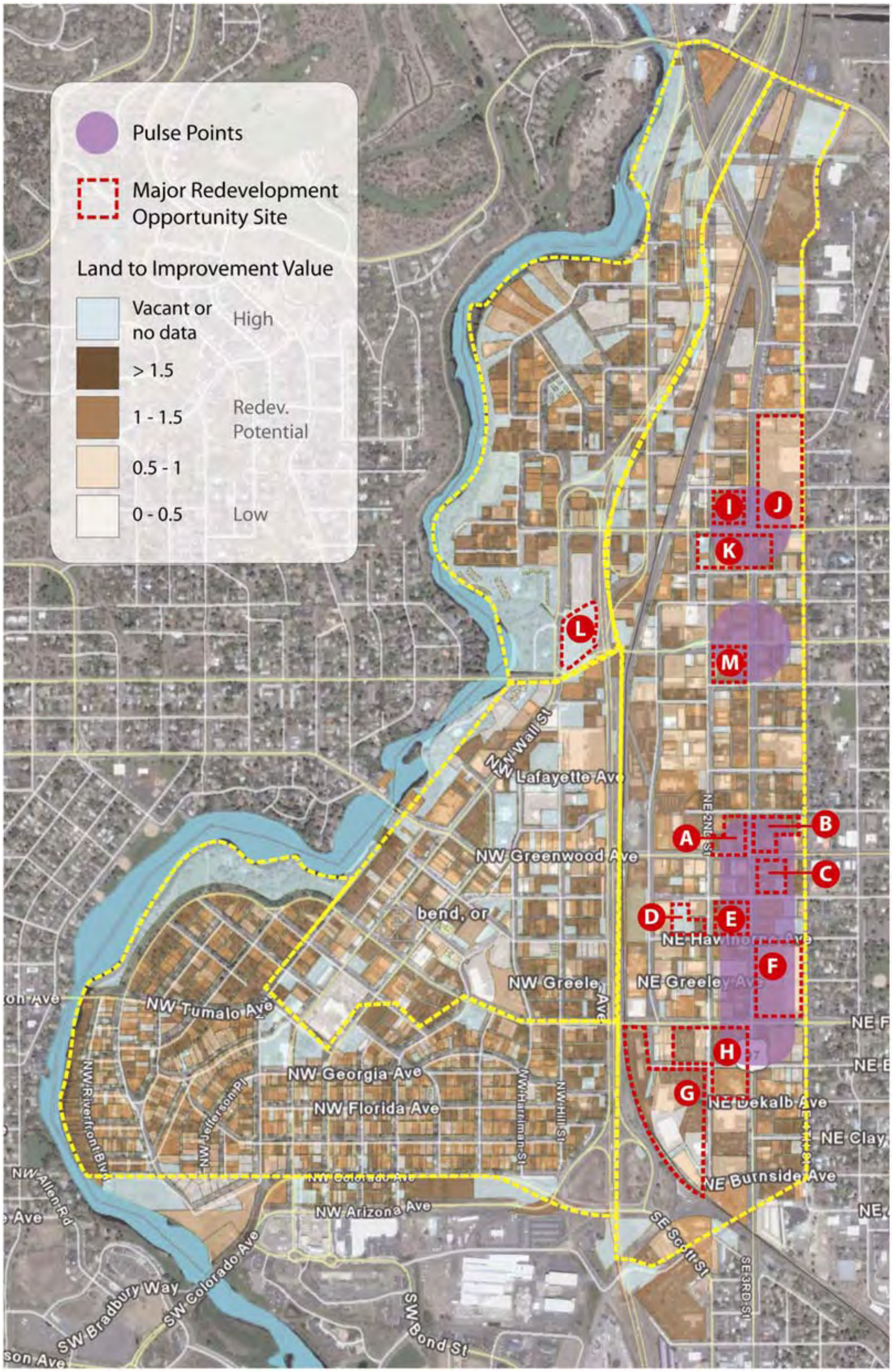
[2] A handful of sites identified as vacant may actually have development on them but appear as vacant due to missing data at the assessor's office.

Selected Large-Scale Development Opportunity Sites

Since the framework of the plan is to build upon pulse points located along Third Street, the selection of large-scale development opportunities is discussed in that context. In each area, there are multiple properties that could qualify as redevelopment opportunities. However, none of them will necessarily be developed unless the property owner decides to move forward. Therefore, at this stage of planning, they can be considered conceptual development opportunities to illustrate the potential capacity for redevelopment. Subsequent tasks will need to be performed to define specific land uses that are appropriate at each site and to identify an implementation plan to begin development.

Figure 2. Large Scale Development Opportunity Sites



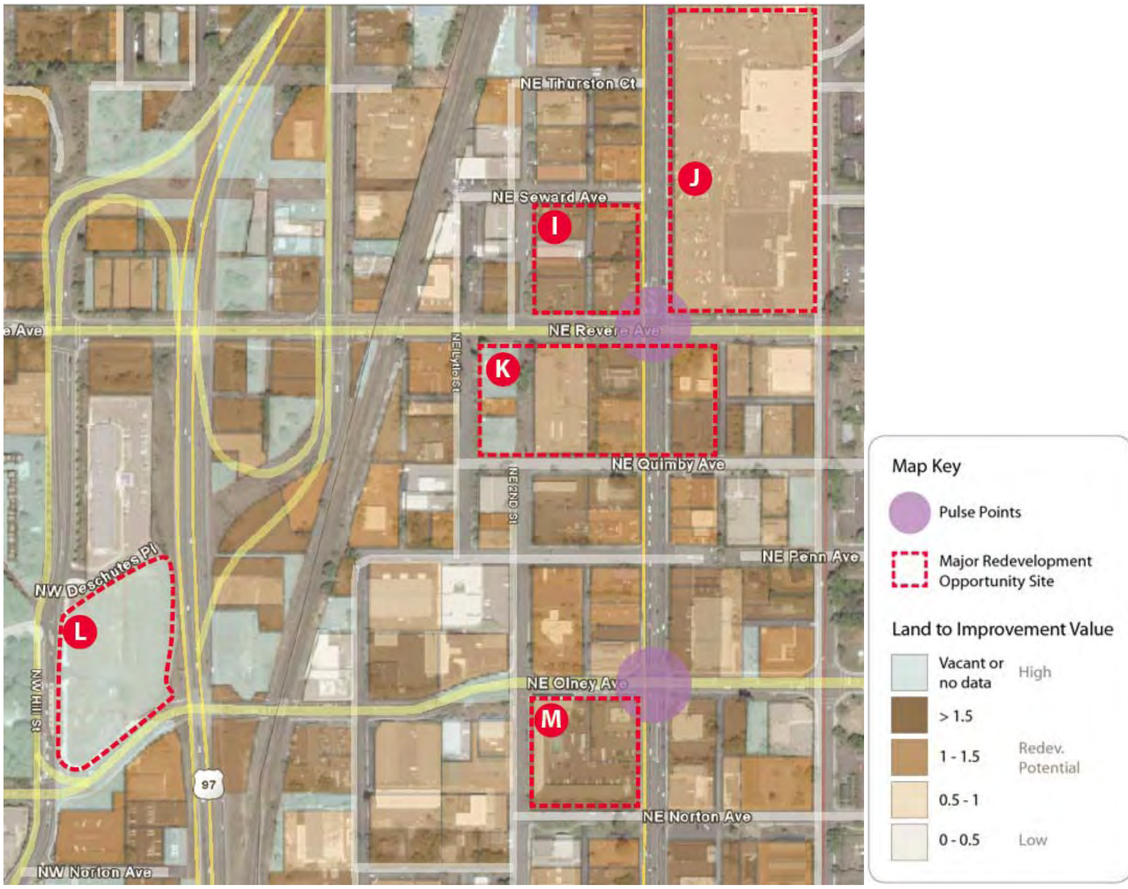
Source: Leland Consulting Group, Google Earth, and City of Bend.

Revere and Olney Pulse Points

Four large-scale development opportunity sites were selected in the Revere and Olney pulse points. In the same general area, but not directly at the pulse points, the former Bend Bulletin site was also selected.

Site	Size (acres)	Current use	Comments
I	2.0	Misc. commercial, fast food	Almost all parcels on this full block were noted as having a high land to improvement value ratio, indicating that it is ripe for redevelopment. However, there are multiple ownerships, which could make redevelopment more challenging.
J	7.4	Albertsons shopping center	This is one of the largest single ownership sites on Third Street. Although it is not vacant or even underutilized today, retail uses typically are redeveloped every 7 to 10 years in order to keep up with constantly changing industry trends; thus the site is likely to be redeveloped at some point in the next 20 years. Redevelopment would significantly change the character of both the Revere pulse point and areas north along Third Street. Revere also could serve as a gateway to the heart of Third Street.
K	4.0 (not including Third St. ROW)	Misc. commercial	This block and a half includes a number of small vacant parcels as well as other underutilized parcels. Combined, it could provide a significant presence at the Revere and Third intersection.
L	3.0	Vacant	The former Bend Bulletin site is a prime redevelopment opportunity, especially since it is currently owned by the City of Bend. Development here would serve as a gateway to the North Central Neighborhood from downtown as well as from Third Street.
M	2.0	Red Lion Inn, Black Bear Diner	This full-block parcel is identified as having a high land to improvement value ratio, indicating that it is ripe for redevelopment.

Figure 3: Underutilized properties – Olney and Revere pulse points



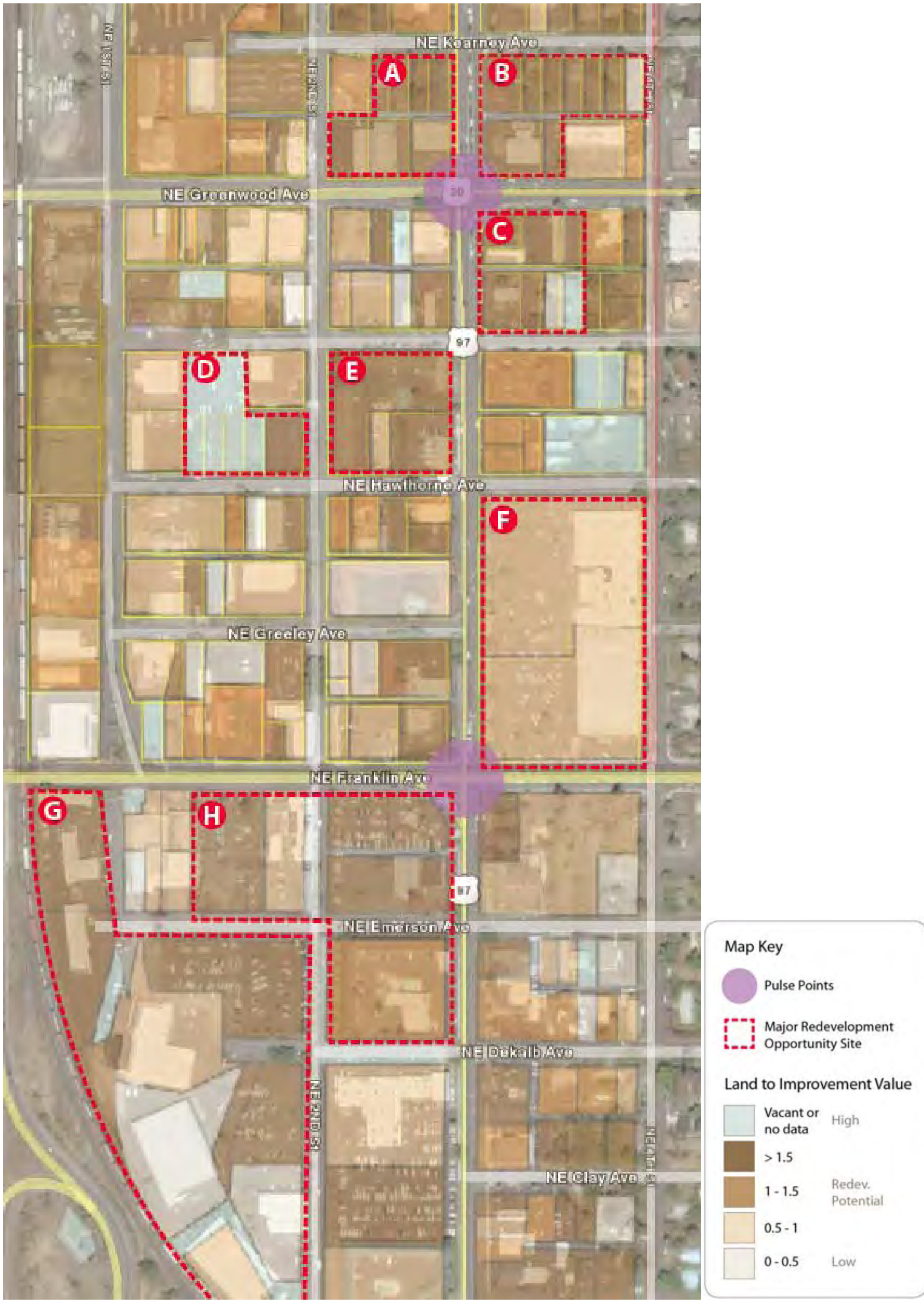
Source: Leland Consulting Group, Google Earth, and City of Bend.

Greenwood and Franklin Pulse Points

The Greenwood and Franklin pulse points anchor the north and south ends of the "Railroad District" – the area bounded between Third Street, the Bend Parkway, Greenwood, and Franklin. This area is envisioned to transition from light industrial to more intensive urban mixed uses over time. Rezoning of the current IL and CG designations will be required to allow for the integrated mix of uses that would revitalize the area, including urban housing, offices, and mid-rise buildings. Within that area are three key redevelopment opportunities located along Hawthorne Avenue (sites D, E, and F). Sites A, B, and C are all located at the Greenwood pulse point, which was identified by stakeholders as a high priority for revitalization. Sites G and H are located at the Franklin pulse point. Site G is currently occupied by a shopping center anchored by a Safeway store. Although it is actively used, strip retail centers are typically redeveloped every seven to ten years in order to keep pace with changing retail trends and market conditions.

Site	Size (acres)	Current use	Comments
A	1.8	Retail and Residential	Underutilized – could activate the Greenwood pulse point.
B	1.9	Gas Station, Retail, Residential	Greenwood pulse point.
C	1.6	Retail, Restaurant, Office	Greenwood pulse point.
D	1.5	Vacant	On its own, this site is relatively small, but is close enough to sites D and F that it could be considered in combination with those sites. Combined, these sites could anchor the Railroad District and could accommodate a use that draws attention and energy into the neighborhood.
E	2.0	Red Lion Inn, Restaurant	While currently occupied, this site could be redeveloped to draw uses off of Third Street into the Railroad District. In combination with sites D and E, it could be part of a much larger project.
F	5.9	Safeway center, Furniture store, Dental office	While not underutilized, this site is one of the largest single properties on Third Street and has the potential to activate the Franklin pulse point through redevelopment. New development should address the need to bring uses closer to the street on Third, while respecting the transition to residential uses on Fourth.
G	12.5	Bi-Mart, light industrial	Poor retail location, but large contiguous site suitable for housing and office uses
H	7.0 (net acres)	Auto dealership	Multi-block opportunity to activate Franklin Pulse Point. Would require relocation of dealership.

Figure 4: Underutilized property – Greenwood and Franklin pulse points

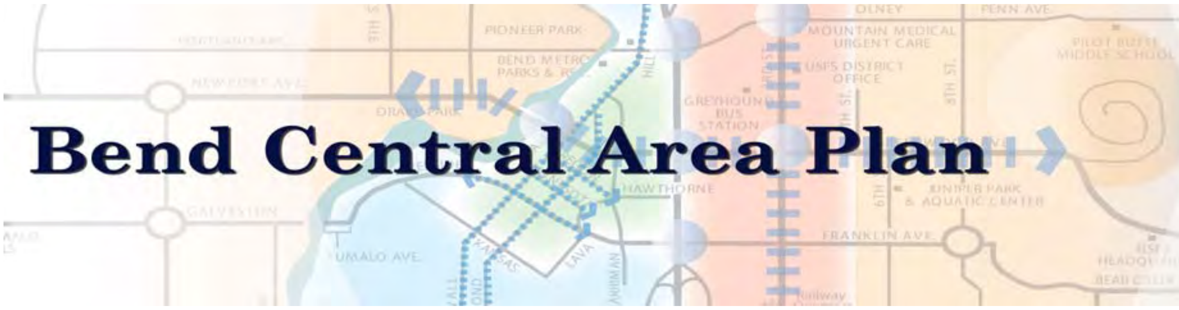


Source: Leland Consulting Group, Google Earth, and City of Bend.

Conclusion and Next Steps

This memorandum identified a number of potentially redevelopable sites throughout the Central Area, but primarily east of the Bend Parkway and focused at major pulse points. Largely due to rising land prices in Bend, many of these properties have land values that exceed the value of improvements on them. Under such conditions, redevelopment is more likely. Thus, even beyond the 13 sites identified here, there are many smaller redevelopment opportunities. Indeed, the ongoing evolution of the Central Area will largely occur through many small projects rather than one or two large ones. Yet, large redevelopments can serve as catalyst projects that set the new tone for a district, demonstrate the market viability of a new concept, and create excitement and interest in the community.

The specific uses that belong at each site will be determined in subsequent tasks based on further market research, direct contact with property owners and developers, and more definition of implementation recommendations.



Economic and Real Estate Analysis

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April 20, 2007

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Tables

Figures

This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), local government, and state of Oregon funds. The contents of this document do not necessarily reflect views or policies of the state of Oregon.

Introduction

This Economic and Real Estate analysis serves multiple purposes in support of the Bend Central Area Plan. First, it summarizes important economic and demographic information about the community, including projections of future growth. Secondly, it estimates growth potential within the Central Area in order to arrive at a projected level of development within the study area for 2030. This projection, a "development program," is an important baseline for estimates of infrastructure, transportation, and other improvements that will be needed in order to achieve the vision. That vision is summarized as follows:

> *The economic leader and social focal point of the region, the Bend Central Area is comprised of several districts with their own distinct identity, character and unique collection of uses.*
>
> *These districts represent a land use, transportation, and economic system that preserves and enhances the best parts of the Central Area while supporting revitalization where needed. Each district contributes to the overarching identity and overall sense of place for what is "Bend."*[1]

The growth projections are a combination of the aspirational goals embedded in the framework concept as well as an assessment of the Central Area's potential to capture growth given economic indicators and the area's location within the region.

The technical memo begins with a summary of key economic indicators that are used to estimate growth. This is followed by an analysis of Central Area real estate for the purpose of estimating overall development capacity and estimates of new development (the "development program"). Finally, the conclusion examines the degree to which this program and vision are achievable given what is known about economic trends and the degree of policy, leadership and financial support to achieving the vision.

Approach to Programming Development

This development program defines, in both narrative and quantitative terms, the guiding principles and types of development proposed for Bend's Central Area. The program is a planning tool that represents a snapshot in time taken in the year 2030. Thus, it is a blending of existing development, much of which will remain in place, and new development that may be developed at higher densities and of a different land use pattern from what exists in the Central Area today. Of course, a city never stops evolving and the year 2030 does not represent the "end" of the Central Area Plan; rather, it is a useful point in time in order to better understand the short- and long-term decisions about planning, infrastructure, and investments that should be made today.

[1] Source: Bend Central Area Plan, 2005

Market Study vs. Market Strategy

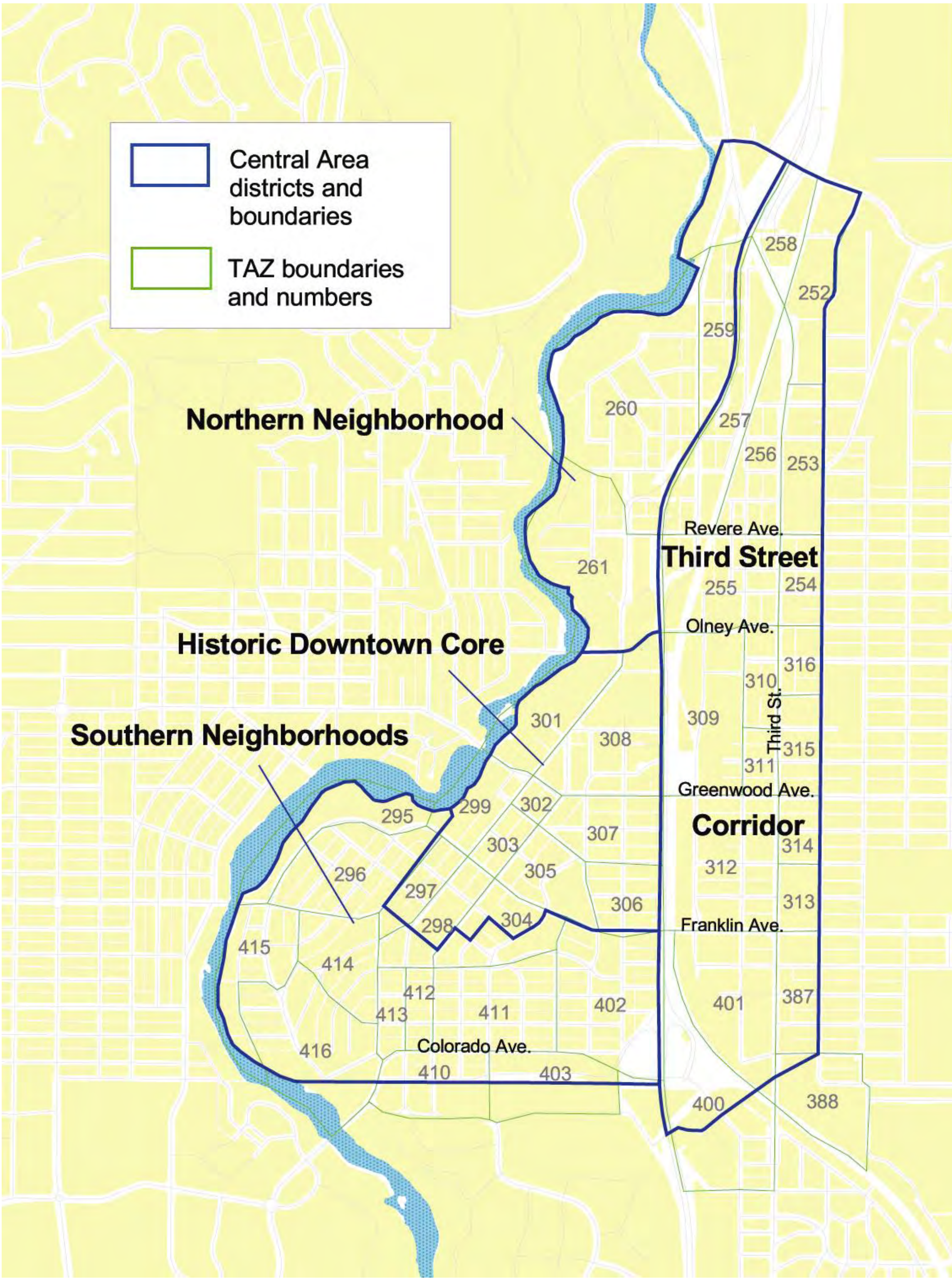
It is important to note the distinction between market studies and market strategies. A market study is a current assessment of development opportunities. Because supply and demand are never static and remain constantly in flux, particularly in an emerging downtown market, market studies tend to have a limited shelf life. A market study identifies underserved or poorly served market segments and, therefore, is most appropriate for evaluating projects ready to be built.

In contrast, a market strategy examines the means (tools, programs, incentives, policies, and other "levers") needed to enhance both existing opportunities and to create new ones. It is a longer-term approach, a proactive process for shaping conditions, investment attitudes and creating new opportunities. Such efforts are largely the responsibility of the public sector and include: removing physical and regulatory barriers, cleaning up blight, reducing crime, constructing infrastructure (utilities and transportation systems), and providing both incentives and supportive policies. Given the long-term goals of the Central Area Plan, this Economic and Real Estate Analysis is more of a market strategy than a traditional market study.

Methodology

The 2030 development program was prepared through the application of quantitative and qualitative analyses. In order to facilitate the use of traffic information and other special studies, transportation analysis zones (TAZ) were employed to break down the Central Area into smaller analytic subsections. A map of TAZ boundaries in the Central Area is shown in Figure 1, following. Development programming was completed only for the focus area of Phase 2 of the Central Area Plan (Northern Neighborhood, Third Street Corridor, and South Neighborhoods). Thus, it excludes the Historic Downtown Core, which was the subject of Phase 1 of the Central Area Plan, completed in 2005.

Figure 1. TAZ Boundaries in the Central Area



Source: City of Bend and Leland Consulting Group

The method of estimating the amount of development forecast to be present in the year 2030 included the following steps:

- Estimate the amount of existing development within each TAZ today. This was accomplished by applying average floor area ratios (FARs)[2] to the total area within each TAZ and estimating the amount of retail, housing, light industrial, and other uses based on site surveys and land use inventories prepared by the City of Bend.

- Within each TAZ, estimate the amount of land likely to be redeveloped over the next 20 years. This was accomplished by evaluating whether existing uses are the same as those in the Framework Concept, the amount of underutilized or vacant property (discussed in a previous technical memorandum), and the location's attractiveness for development (location, visibility, access).

- New uses and densities were assumed for the redevelopable portion of each area, based on the Central Area Plan vision. The redeveloped portions were combined with the areas that would remain the same to arrive at a total development program for 2030.

- Projected growth in the Central Area was then compared to adopted 20-year population and employment projections in order to provide a "reality check" of the vision and an assessment of whether the forecast is achievable or overly ambitious.

Guiding Principles

Actual uses assumed for each district in the Central Area reflect the principles embedded in the Framework Concept as well as known economic factors:

- Framework Concept vision: The Central Area will become more of a mixed-use area where housing, retail, open space, and employment will be mixed throughout the Central Area and often within individual blocks. This mixing of uses will be greatest in the Third Street Corridor, with more limited mixing in the North and South Neighborhoods.

- Visibility and access: Most retail uses will continue to be focused on Third Street, where visibility and access is greatest. In other parts of the Central Area, new retail will be developed in the ground floor of multistory buildings and on a similarly smaller scale.

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[2] FAR: The ratio of total floor area of building to the parcel size. Thus, a higher FAR represents a higher level of density. For example, a 10,000 square foot building (regardless of whether it is one, two, or more stories) on a 20,000 square foot lot would have a FAR of 0.5. A 10,000 square foot building on a 5,000 square foot lot would have a FAR of 2.0. For commercial uses, a FAR greater than 0.5 usually requires structured parking.

- Urban development market potential: Demographics in Bend are leaning more and more to a population that is increasingly ready for urban housing, with a growing percentage of households consisting of only one or two people.

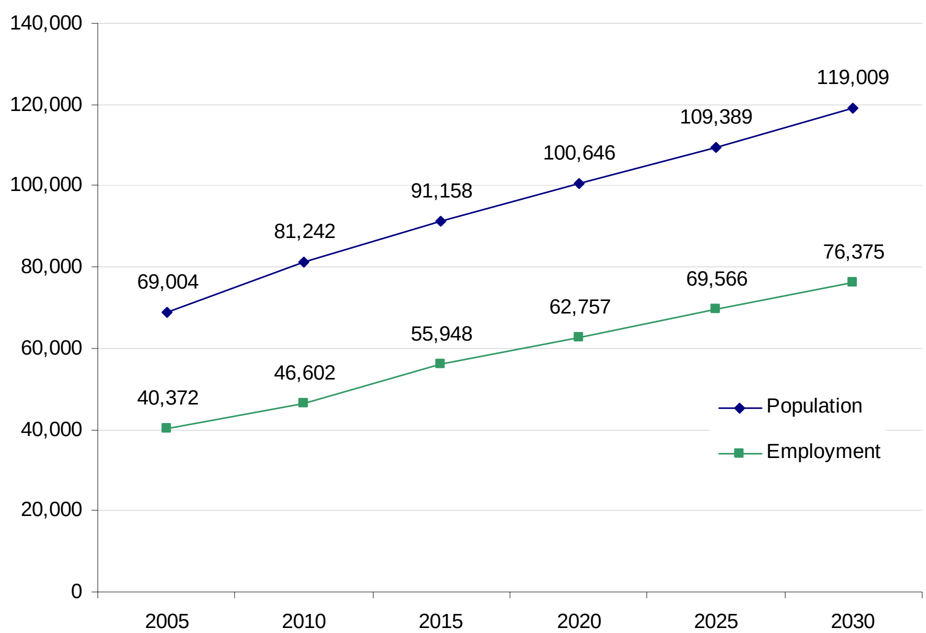
- 2030 is not the end of the planning horizon – the Central Area will continue to grow and evolve well past 2030. Therefore, the forecasted program does not necessarily represent the full realization of the vision, but rather a stopping point along the way.

Market Summary

Population

Any demographic forecast begins with a projection of growth in the population and employment—and Bend's population and employment as a whole are expected to continue to grow at rates that will far outpace the rates of other metropolitan areas around the state. Figure 2 shows the projected growth of population and employment in Bend through 2030. While Bend's population grew 26 percent between 2000 and 2005, the second-fastest growing large city, Hillsboro grew by 14.1 percent, while the state as a whole grew just 6.1 percent. Bend's economy, driven by in-migration and increasing employment in high-tech, hospitality, specialty manufacturing, and other targeted sectors, is also expected to maintain healthy growth.

Figure 2. Bend Population and Employment, 2005 -2030



Sources: Deschutes County Coordinated Population Forecast, 2007 Bend Economic Opportunities Analysis, and Leland Consulting Group

Table 1 shows the average annual growth rate over five-year blocks of time between 2005 and 2030 for population and employment. It demonstrates how the rate of growth is projected to slow down over time.

Table 1. Bend Long-term Population and Employment Projection Summary

Bend	2010	2015	2020	2025	2030
Population	81,242	91,158	100,646	109,389	119,009
5-year Avg. Annual Growth Rate	3.3%	2.3%	2.0%	1.7%	1.7%
Employment	46,602	55,948	62,757	69,566	76,375
5-year Avg. Annual Growth Rate	2.9%	3.7%	2.3%	2.1%	1.9%

Source: Deschutes County, Oregon Employment Department, and Leland Consulting Group

Demographic Summary

Table 2 and Figure 3 compare Bend's demographic composition to the populations of the Central Area and each of the area's districts. The data highlights a number of demographic differences that will have major impacts on the current and long-term character of the area.

Many of the demographic characteristics of Bend's Central Area reflect trends seen in many other downtowns around the country. For example, downtown households are frequently younger and smaller (1 and 2 person households) than the general population.

A notable fact is that the Central Area makes up a small percentage—just 4.3 percent—of Bend's total population in 2006. And of the Central Area's 2,977 residents, the largest majority live in the Southern Neighborhoods. By contrast, the Third Street Corridor is very lightly populated with just 122 residents spread over 326 gross acres. Figure 3 shows the population breakdown of the Central Area's various districts.

Household incomes are significantly lower in the Central Area than in Bend in general—especially in Downtown and the Third Street Corridor.

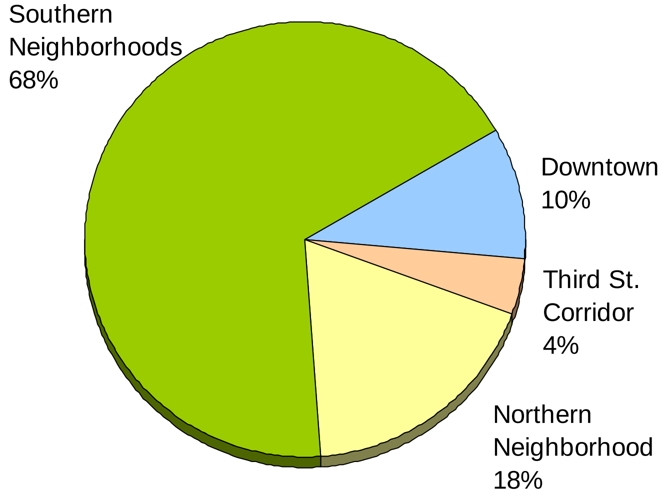
Table 2. Demographics in Bend and the Central Area, 2006 Estimates.*

Demographic Category	Bend	Central Area	Down-town	Third St. Corridor	North Nhood	South Nhood
Population	68,136	2,977	291	122	547	2,017
Median Household Income	$50,330	$34,215	$24,406	$24,267	$35,382	$35,819
Household Size**						
1 & 2 person HHs - percent	63.1%	75.6%	76.6%	75.0%	75.3%	75.6%
3 person HHs - percent	16.4%	13.8%	12.0%	13.6%	14.8%	14.0%
4+ person HHs - percent	20.5%	10.7%	11.4%	11.4%	9.8%	10.3%
Median Age	36.3	31.4	30.5	30.5	35.4	30.8
Education (Pop over 25)						
Percent with College Degree	29.4%	34.7%	35.8%	21.0%	19.7%	38.3%
Percent with Advanced Degree	9.3%	16.0%	18.2%	7.0%	7.7%	17.8%
Housing Tenure						
Owner Occupied Housing Units	58.8%	29.4%	26.4%	22.0%	21.3%	32.0%
Renter Occupied Housing Units	34.7%	63.6%	65.9%	68.0%	71.1%	61.3%
Vacant Housing Units	6.4%	7.0%	7.7%	10.0%	7.6%	6.7%

* All figures are 2006 projections from 2000 Census data, except Education, which is 2000 Census data.
** Not all numbers add up to 100 percent due to rounding.
Source: ESRI BIS and Leland Consulting Group

Household sizes are uniformly smaller throughout the Central Area when compared to Bend as a whole. Approximately three quarters of the households in every district are made up of only one or two people. The median age in the Central Area is also lower than that of the City as a whole—approximately 31 versus 36 years. As mentioned above, these trends are typical of central city housing across the country. Singles, couples, single parents, and empty nesters characterize these neighborhoods. Families with two parents and children tend to seek detached single-family homes in traditional neighborhoods.

Figure 3. Central Area Population by District



Source: ESRI BIS and Leland Consulting Group

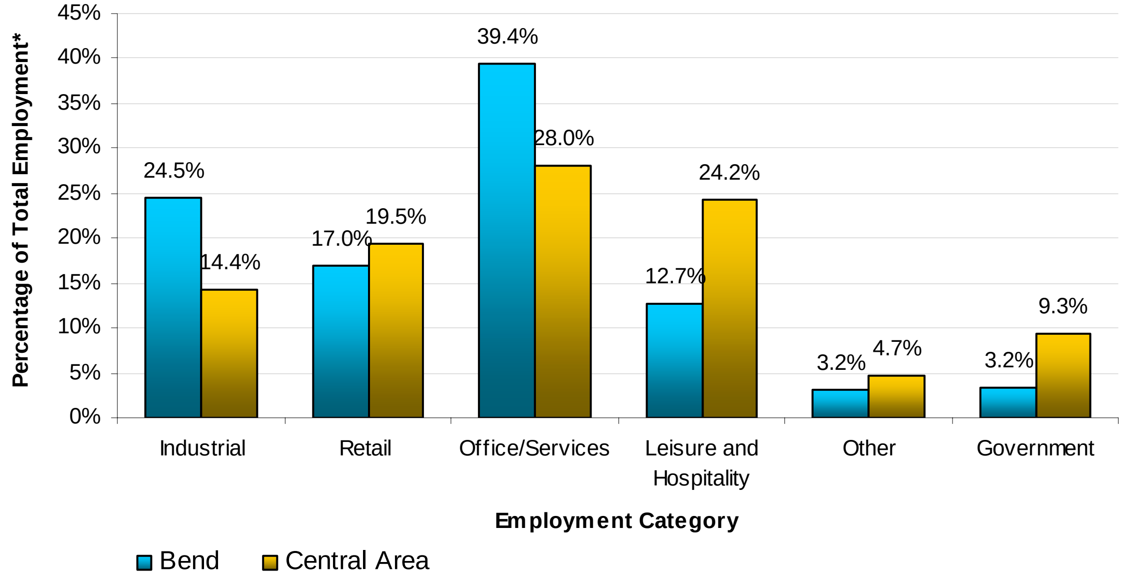
Despite being more highly educated, Central Area households typically make less than the Bend average. This apparent incongruity is likely due to two factors: the households are smaller or average (meaning fewer two income households), and the population is younger. Younger residents may have earned college degrees, but are still working their way up the earnings ladder.

Finally, Central Area residents are nearly twice as likely as Bend residents as a whole to be renters rather than owners; in fact, the percentages of renters and owners are inverted from the Bend norm.

Employment Summary

As Figure 4 shows, the employment profile of the Central Area is significantly different from the city as a whole. There is significantly less industrial employment, and considerably more employment in both the leisure and hospitality and government categories. Leisure and hospitality includes a wide range of establishments including hotels, restaurants, and cultural, entertainment, and recreational facilities. Retail employment in the area is just slightly higher than the Bend average.

Figure 4. Employment in Bend versus the Central Area (2004)



* Figures may not add up to 100 percent due to rounding.
Source: Oregon Employment Department and Leland Consulting Group

A major surprise, however, is the lower level of office and service jobs in the Central Area. The dearth of jobs in this category is of particular importance because such jobs are expected to grow at some of the fastest rates of any type in the coming decades. Many professional office and service jobs—especially those in the high-tech sectors—have also been identified by the city as critical "targeted sectors"—in which Bend has the potential to excel, pay is relatively high, and markets are national or international. Many of these jobs will be captured elsewhere in the city—including at Juniper Ridge and in Bend's office and industrial parks—but it may be useful for the project team to consider strategies to attract office, service, and high tech businesses to the Central Area and ensure they can thrive there. This is a reasonable goal, as office and service sector businesses have clustered for decades in downtown areas, where clients, project partners, and service providers are densely clustered, and the surrounding environment offers a rich mix of urban amenities.

Development Program

The development program represents all development that would exist in the Central Area in 2030. Thus, it is a combination of existing development that will remain in place and new development that will occur on vacant sites or through redevelopment of existing properties. In order to arrive at a development program, a number of assumptions and facts were taken into account:

- The amount of land within the Central Area that is underutilized today and likely to be redeveloped in the next 20 years.
- The amount of land within the Central Area that is currently developed and unlikely to change in the next 20 years.
- Demographic and development trends that will change the shape, character, and intensity of new development in the future.
- Framework concept elements that describe the desired vision for the Central Area and will lead to policies that encourage certain types of development and development regulations such as minimum densities.
- Real estate fundamentals (as described earlier) such as visibility, access, and amenities that make certain portions of the Central Area more appropriate for certain uses.

Specifically, the methodology began with an assessment of current land uses within each zone based on a combination of land use inventories, site surveys, aerial photographs, and tax assessor data (expressed as percentages of land area within each zone belonging to each land use and occurring at specified densities). Using information from prior technical memorandums regarding redevelopment potential, interviews with local real estate professionals, and market research, an estimate was made regarding how much land within each zone might redevelop between the 2007 and 2030 planning horizon. Land uses were then recalculated for 2030 (the "development program") based on new uses and development densities described in the draft framework concept and based on established employment and population projections for the City. Land area for each use in the new 2030 development was converted to square footages of building based on revised development densities (floor area). Employment and population figures were also extrapolated from these square footage numbers.[3]

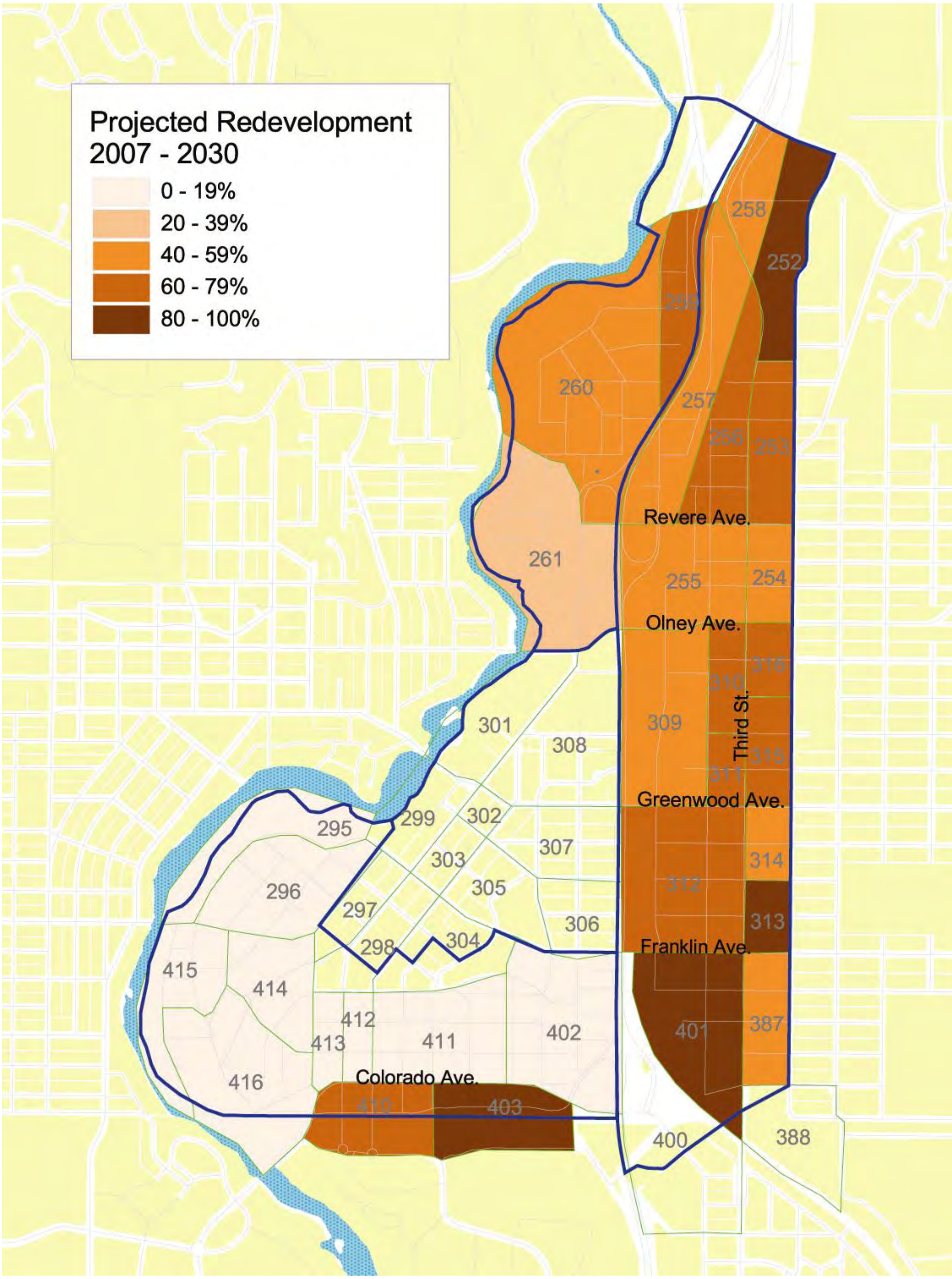
[3] Employment densities used were: Office, 330 square feet per employee; Retail, 400 square feet per employee; Light Industrial, 600 square feet per employee; Hotel, 0.25 employees per room. Population was calculated based on an average household size of 1.80 (assuming that the Central Area will be home to mostly one- and two-person households) and an average home size of 1,100 square feet (which assumes that most new housing in the Central Area will be attached urban housing products).

Figure 5 shows the amount of redevelopment projected within each zone. The rate of redevelopment represents the percentage of property within a zone that is likely to redevelop between 2007 and the 2030 planning horizon. All other land in each zone is assumed to remain in its current use. Given the stable residential nature of the South Neighborhoods, very little new development is projected, with slightly more projected for the Northern Neighborhood since there are more opportunities for infill development. Because of proximity to Downtown, the South Neighborhood could and likely would intensify were it not a protected neighborhood of historic and older single-family homes. Along the Third Street Corridor, varying levels of redevelopment are projected depending on the location along the corridor, existing inventory of vacant land, and whether the Framework Concept suggests that existing light industrial remain (primarily in the northern areas).

Figure 6 shows the projected average density of *new* development in each zone and indicates which parts of the Central Area will see more urban-scale development. The average density of each area will be lower than what is shown since most zones will include a combination of older, lower density development and newer, higher density development. Further, the projected density is the average density of new development – new development in early years is likely to be of a lower density, gradually increasing as the Central Area matures and land prices rise. Individual projects will vary in density in all locations, adjusting for land use, access, site size, and other site-specific factors.

The projected levels of density are based on the Framework Concept, reserving the areas of highest intensity for those parts of the Third Street Corridor immediately adjacent to the Downtown Historic Core.

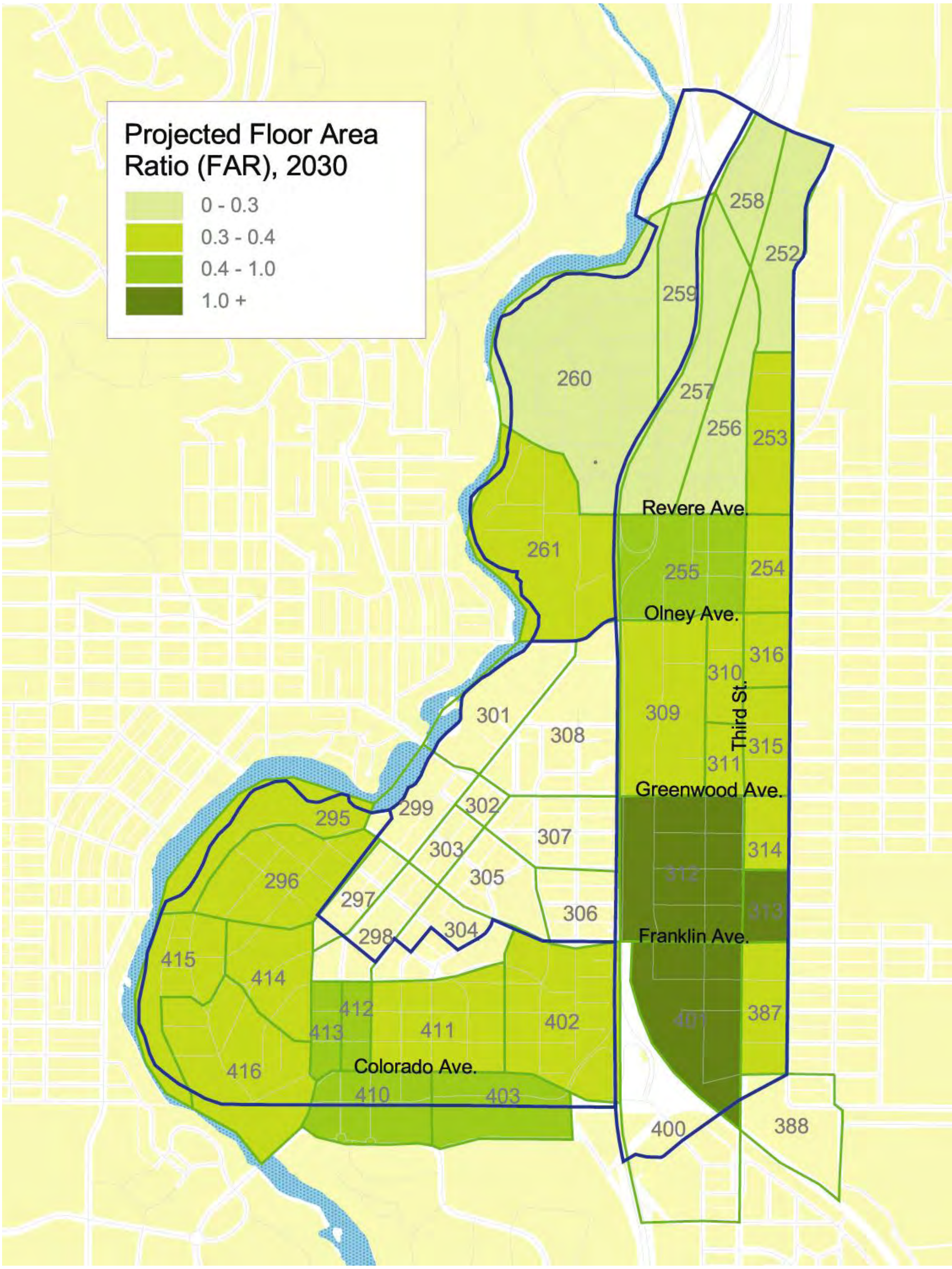
Figure 5. Redevelopment Ratio in Central Area by TAZ (excluding Historic Core).[*]



Source: Leland Consulting Group

[*] Blank areas at the north and south ends of the study area on the map above were not included since they contain little, if any, developable land.

Figure 6. FAR of New Development by TAZ (excluding Historic Core).



Source: Leland Consulting Group

Table 3 shows the projected development program for 2030 – all development, including new development and those in place today that will not change over the next 23 years. Each use is summarized by either unit count (housing units or hotel rooms) or square footage of building (not acres of land). It is important to note that these land uses are projections based on the best current knowledge about existing conditions and future growth trends (derived from the population and employment projections discussed earlier). These trends are best observed at the district level. For planning purposes, they have been interpolated down to the TAZ level, but they remain more accurate when summarized at the district level. Individual property owner decisions and site-specific issues will inevitably alter the actual mix of uses achieved in any specific area.

Table 3. Central Area Development Program, 2030.

District/TAZ	Housing Units	Office (sq. ft.)	Retail (sq. ft.)	Light Ind. (sq. ft.)	Hotel Rooms
Third St Corridor	**1,393**	**1,385,377**	**819,902**	**634,106**	**1,189**
252	-	16,007	-	144,066	-
253	24	15,042	125,527	-	-
254	29	15,238	30,551	7,362	-
255	37	46,849	39,041	68,322	-
256	19	43,065	34,635	49,600	-
257	-	23,122	9,428	114,487	-
258	-	-	-	54,703	-
309	100	111,970	11,664	116,636	-
310	1	29,393	22,955	8,398	49
311	4	21,166	19,990	6,719	-
312	655	575,977	154,221	40,907	754
313	66	58,080	116,160	-	87
314	17	22,102	25,417	-	-
315	37	26,747	38,999	-	-
316	21	14,984	22,864	7,769	-
387	32	28,064	48,985	10,205	-
401	351	337,571	119,465	4,932	299
North Neighborhood	**599**	**86,679**	**52,580**	**16,810**	**65**
259	21	27,408	19,368	16,810	18
260	359	21,669	17,335	-	-
261	219	37,602	15,877	-	47
South Neighborhood	**1,678**	**103,775**	**56,559**	**7,118**	**59**
295	-	-	-	-	-
296	249	-	-	-	-
402	241	29,444	-	-	-
403	98	39,112	19,556	-	59
410	78	24,321	13,643	7,118	-
411	251	-	-	-	-
412	54	5,395	3,426	-	-
413	55	5,503	3,494	-	-
414	176	-	-	-	-
415	170	-	-	-	-
416	306	-	16,440	-	-
TOTAL	**4,338**	**1,575,831**	**929,041**	**658,034**	**1,313**

Source: Leland Consulting Group

Table 4 presents the total development in 2030 in terms of employment based on standard densities of employment for each development type.[4]

Table 4. Total Employment in Central Area, 2030.

District/TAZ	Office	Retail	Light Ind.	Hotel
Third St Corridor	**4,198**	**2,050**	**1,056**	**298**
252	49	-	240	-
253	46	314	-	-
254	46	76	12	-
255	142	98	114	-
256	131	87	83	-
257	70	24	191	-
258	-	-	91	-
309	339	29	194	-
310	89	57	14	12
311	64	50	11	-
312	1,745	386	68	189
313	176	290	-	22
314	67	64	-	-
315	81	97	-	-
316	45	57	13	-
387	85	122	17	-
401	1,023	299	8	75
North Neighborhood	**263**	**131**	**28**	**17**
259	83	48	28	5
260	66	43	-	-
261	114	40	-	12
South Neighborhood	**315**	**142**	**12**	**15**
295	-	-	-	-
296	-	-	-	-
402	89	-	-	-
403	119	49	-	15
410	74	34	12	-
411	-	-	-	-
412	16	9	-	-
413	17	9	-	-
414	-	-	-	-
415	-	-	-	-
416	-	41	-	-
TOTAL	**4,776**	**2,323**	**1,096**	**330**

Source: Leland Consulting Group.

Table 5 breaks out the portion of development from Table 3 that represents new development that will be built between 2007 and 2030. Market conditions and the

[4] Employment densities used were: Office, 330 square feet per employee; Retail, 400 square feet per employee; Light Industrial, 600 square feet per employee; Hotel, 0.25 employees per room.

amount of growth projected for Bend are the driving factors for the overall amount of growth that will take place within the Central Area, but it is the Framework Concept that guides the specific land uses that are projected for different areas. Notes about each land use are as follows:

- Residential: Relatively little new housing will be built in the North and South Neighborhoods, but over 1,300 units will be built in the Third Street Corridor. Particularly in the Railroad District (zones 309-312), new housing is likely to take place in multistory buildings, many with ground floor retail or commercial uses.

- Office: As with housing, significant amounts of new office space are projected along the Third Street Corridor. Indeed, Bend's mixed employment zone is well suited for the technology and service businesses that will make up much of the region's new employment. Interviews with local real estate brokers and developers indicate that the Railroad District in particular is well suited for office development and would likely see significant amounts of new development once the Central Area Plan is implemented. Currently, much of the Third Street Corridor is zoned for light industrial uses, but is designated as mixed employment in Bend's comprehensive plan.

- Retail: Third Street will remain one of Bend's most prominent retail districts, showing a modest net increase in retail space over the next 20 years. As Bend continues to grow outward with new single-family residential neighborhoods and as retail continues to expand in the area near Cooley Road, the Central Area will capture a shrinking share of overall retail growth. Nevertheless, some growth will be needed to support new housing, offices, and nearby neighborhoods. Moreover, the physical design of the retail will likely change greater than the overall inventory of space. With urban design, pedestrian, and traffic improvements, particularly along Third Street, future retail will likely include more street-fronting buildings and retail space in the ground floor of mixed-use buildings.

- Industrial: One of the most notable changes from new development is the loss of light industrial buildings to other uses. This is largely due to the Framework Concept's changing of emphasis of the Railroad District from a light industrial district to a mixed employment and housing neighborhood. Thus, those areas that show a loss of light industrial space concurrently show a significant increase in the number of housing units and amount of office space. An important consideration during implementation will be where within the City this loss of light industrial land should be replaced. Areas at the north end of the Central Area and Juniper Ridge are two likely locations.

- Hotel: Third Street and the Railroad District will likely see an increase in the number of hotel rooms to serve Bend's growing tourist base and also business travelers related to the increase in office space. A hotel market study was not done for this report and the increase in hotel rooms is best considered at the aggregate level, not specific to any particular zone.

Table 5. Central Area Net New Development, 2007-2030.

District/TAZ	Housing Units	Office (sq. ft.)	Retail (sq. ft.)	Light Ind. (sq. ft.)	Hotel Rooms
Third St Corridor	**1,325**	**1,246,114**	**193,706**	**(386,832)**	**969**
252	-	16,007	-	(16,007)	-
253	24	8,297	(2,631)	-	-
254	19	4,196	(6,257)	(7,361)	-
255	37	35,137	15,616	(13,664)	-
256	19	36,530	8,496	(48,423)	-
257	-	(4,939)	9,428	2,245	-
258	-	-	-	-	-
309	100	111,970	11,664	(116,635)	-
310	(2)	29,393	(5,038)	(12,597)	14
311	(6)	21,166	5,291	(10,080)	-
312	655	575,977	113,314	(122,723)	618
313	66	58,080	36,960	-	87
314	15	(2,762)	(2,210)	-	-
315	18	5,177	(4,141)	-	-
316	16	6,660	666	(11,654)	-
387	13	7,654	8,164	(10,205)	-
401	351	337,571	4,384	(19,728)	250
North Neighborhood	**105**	**12,862**	**13,844**	**(8,771)**	**21**
259	14	16,445	12,059	(8,771)	(26)
260	79	(14,446)	(722)	-	-
261	12	10,863	2,507	-	47
South Neighborhood	**182**	**61,389**	**25,992**	**(10,678)**	**50**
295	-	-	-	-	-
296	2	-	-	-	-
402	2	209	-	-	-
403	83	33,245	16,623	-	50
410	72	22,838	9,194	(10,678)	-
411	2	-	-	-	-
412	7	2,523	554	-	-
413	7	2,574	565	-	-
414	1	-	-	-	-
415	1	-	-	-	-
416	5	-	(944)	-	-
TOTAL	**1,612**	**1,320,365**	**233,542**	**(406,281)**	**1,040**

Source: Leland Consulting Group

Table 6 shows the net increase (or decrease) in employment between 2007 and 2030 based on the future CAP vision based on typical employment densities for each land use type.[5]

[5] Employment densities used were: Office, 330 square feet per employee; Retail, 400 square feet per employee; Light Industrial, 600 square feet per employee; Hotel, 0.25 employees per room.

Table 6. Net New Employment in Central Area 2007-2030.

District/TAZ	Office	Retail	Light Ind.	Hotel
Third St Corridor	**3,776**	**482**	**(645)**	**242**
252	49	-	(27)	-
253	25	(7)	-	-
254	13	(16)	(12)	-
255	106	39	(23)	-
256	111	21	(81)	-
257	(15)	24	4	-
258	-	-	-	-
309	339	29	(194)	-
310	89	(13)	(21)	4
311	64	13	(17)	-
312	1,745	283	(205)	155
313	176	92	-	22
314	(8)	(6)	-	-
315	16	(10)	-	-
316	20	2	(19)	-
387	23	20	(17)	-
401	1,023	11	(33)	63
North Neighborhood	**39**	**34**	**(15)**	**5**
259	50	30	(15)	(7)
260	(44)	(2)	-	-
261	33	6	-	12
South Neighborhood	**187**	**65**	**(18)**	**13**
295	-	-	-	-
296	-	-	-	-
402	1	-	-	-
403	101	42	-	13
410	69	23	(18)	-
411	-	-	-	-
412	8	1	-	-
413	8	1	-	-
414	-	-	-	-
415	-	-	-	-
416	-	(2)	-	-
TOTAL	**4,002**	**581**	**-678**	**260**

Source: Leland Consulting Group.

Development Types

For reference, the following figures present prototypical development types that are similar in scale to what is expected to be developed in the Central area in the future.

Figure 7. Prototypical Development Types for Central Area

Medium Density Housing – Modified Townhouses

FAR: 0.6 – 1.0
Density (dwelling units/acre): 25 – 35
Notes: Wood frame construction, surface parking or one interior structured parking space per unit.

Medium Density Housing – Apts. or Condos

FAR: 1.0 – 2.0
Density (du/acre): 35 – 80
Notes: Wood or light steel frame construction, structured parking. May contain some minimal retail, office, or other secondary uses.

High Density Urban Housing - Apts. or Condos

FAR: 2.0 – 5.0
Density (du/acre): 80 +
Notes: Steel frame construction, structured or underground parking. Likely to contain some retail, office, or other secondary uses. Museum Place (pictured) in Portland, occupies a single downtown block and holds 140 units, a second-level private park space, and a full-size Safeway supermarket. Other high-density urban residential developments may be as dense as 350 du/acre.

Mixed Use Center

FAR: 0.3 – 2.0, varies widely depending on center type
Density (du/acre): 0 – 20, usually low
Notes: Usually includes significant retail, with office and sometimes other uses. Oregon models include Lake View Village (Lake Oswego, pictured), Orenco Station Town Center (Hillsboro), and Belmont Dairy (Portland).

Mid-Rise Office Buildings

FAR: 1.0 – 6.0

Notes: Steel or concrete construction depending on scale; largely structured parking, some surface parking possible.

Industrial Building

FAR: 0.2 – 0.5

Lowest FAR due to large areas needed for truck ingress, loading, and egress; parking; and single-floor format due to manufacturing and handling processes. Newer industrial uses are more compatible with other non-industrial adjacent uses as processes are varied and generate fewer nuisances. Clusters of small (1,000 – 3,000 s.f.), flexible, "tech-flex" spaces (at left) are possible for relatively small sites such as the ones available in the Central Area.

Source: Leland Consulting Group

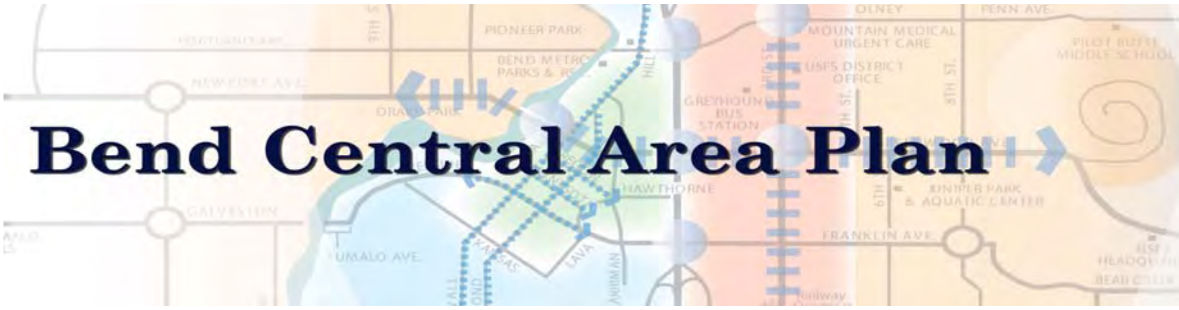
Conclusion

Table 7 compares the rate of new development in the Central Area to the rate of growth projected citywide (after conversion of development square footage to numbers of residents and workers). This serves as a market-based "reality check" to determine whether the amount of growth projected for the Central Area is achievable. There will be negative growth in industrial employment, while the Central Area is targeted to capture 17.3 percent and 9.7 percent of office and retail employment growth, respectively. Even with the significant intensification of uses projected by the development program, the vast majority of new growth over the next 20 years will take place outside of the Central Area in new residential developments and employment centers such as Juniper Ridge. Given these relatively small capture rates, it is reasonable to assume that the Central Area can capture the projected amount of development. Nevertheless, these "capture rates" reflect a significant increase in development for the Central Area in general and the Third Street Corridor in particular.

Table 7. Central Area Growth as a Percentage of Citywide Growth

District/TAZ	Residents	Office Emp.	Retail Emp.	Ind. Emp.
Third St Corridor	4.77%	16.51%	7.78%	-16.98%
North Neighborhood	0.38%	0.17%	0.56%	-0.39%
South Neighborhood	0.66%	0.81%	1.08%	-0.47%
TOTAL	5.81%	17.49%	9.42%	-17.84%

Source: Deschutes County, Oregon Employment Department, and Leland Consulting Group



Redevelopment Framework Refinement

Prepared for the City of Bend by:

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April 20, 2007

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Figures

This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), local government, and state of Oregon funds. The contents of this document do not necessarily reflect views or policies of the state of Oregon.

Introduction

This Redevelopment Framework Refinement technical memorandum updates the redevelopment strategy ("Large Scale Development Opportunities" technical memorandum) for the Central Area based on the latest economic and market research compiled for the project. It also evaluates whether the framework concept elements originally envisioned are still relevant given what is now known about existing conditions and market and economic trends. Based on these findings, the memorandum discusses specific issues that warrant special consideration.

Central Area Vision

For reference, the vision identified in the 2005 Phase 1 Central Area Plan is repeated:

> *The economic leader and social focal point of the region, the Bend Central Area is comprised of several districts with their own distinct identity, character and unique collection of uses.*
>
> *These districts represent a land use, transportation, and economic system that preserves and enhances the best parts of the Central Area while supporting revitalization where needed. Each district contributes to the overarching identity and overall sense of place for what is "Bend."*

Specifically in regard to the Third Street Corridor, the Plan states:

> The Third Street Corridor and the area between it and the Burlington Northern-Santa Fe Railroad is a new, mixed-use, east side downtown neighborhood connecting area residents and other users to Third Street and the Historic Downtown Core. The district supports the Historic Downtown Core's civic, cultural, and retail uses by providing a close-in location accommodating commercial, residential, and other uses demanded by Bend's rapid growth. This stylish, urbane district is characterized by higher density uses and taller structures than found elsewhere in the Central Area. A diversity of housing opportunities for all income levels is balanced with moderate scale employment and retail uses. A fusion of unique greenspace features and civic spaces for area residents provides opportunity for play, relaxation, and interaction within the neighborhood's built environment.
>
> Third Street itself serves as a model for how a commercial strip can be "reclaimed" and woven back into the fabric of the community: an active and attractive boulevard, with a high-quality streetscape and useable public spaces that invite pedestrians, employees, and shoppers into the district. While Third Street still serves as a major north/south corridor, its environment is organized into a series of "rooms" or nodes of activity that add spatial depth and provide definition and identity for certain segments of the corridor, with more intense urban uses between the nodes. These "rooms" or nodes are defined by a series of

east/west connections that provide access to the Historic Downtown Core and to neighborhoods to the east.

Figure 1. Central Area Development Framework

Source: StastnyBrun Architects

Issues

In retrospect, the vision and framework for the Central Area presented above is still valid. It speaks to a more urban character for the Central Area, which is clearly supportable by the growing population in Bend and its role as the economic hub of the Central Oregon region. Therefore, from an urban framework point of view (types of uses, scale, character), the vision is achievable. The following section discusses some areas where the plan could be refined to add more specificity and clearer direction for implementation.

District boundaries

As has been discussed in the Economic and Real Estate Analysis technical memorandum, the vast majority of new development in the Central Area will take place in the Third Street Corridor, with relatively less development in the Southern and Northern neighborhoods. The established single-family development in the Southern Neighborhoods will restrict significant redevelopment, while there are more, but still a limited number of, potential infill opportunities in the Northern Neighborhood. For that reason, the focus of this technical memorandum is on the Third Street Corridor.

While the Third Street Corridor has been considered a singular place (a corridor), it is in fact a series of different districts, each of which will redevelop on a different time schedule and at a different scale. The Railroad District (the area immediately east of the Historic Downtown Core) will see a higher level of redevelopment and change in both the short- and long-term timeframes. Other areas along Third Street will see much more gradual change. Therefore, a more appropriate way of looking at the Third Street Corridor would be to see it as a series of east-west districts that go from the Parkway to Fourth and may be anywhere from three to six or more blocks long (north to south). In that context, redevelopment in each area is likely to occur as follows:

- **North of Olney:** This area would retain its existing character of lower density uses, with a focus on light industrial and non-retail commercial uses. Redevelopment in this area is likely to be of a similar character to what is there today. Due to its distance from Downtown and physical disconnection from residential neighborhoods, it is not a good location for dense urban development.

- **Between Olney and Greenwood:** In early years (next 10 years), this area will retain its existing retail and light industrial character as "urbanizing" market forces will be focused in the area to the south, closer to Downtown. However, in later years (10+ years), as the area south of Greenwood intensifies, there will be spillover market demand that will drive increased densities and more mixing of uses in this area.

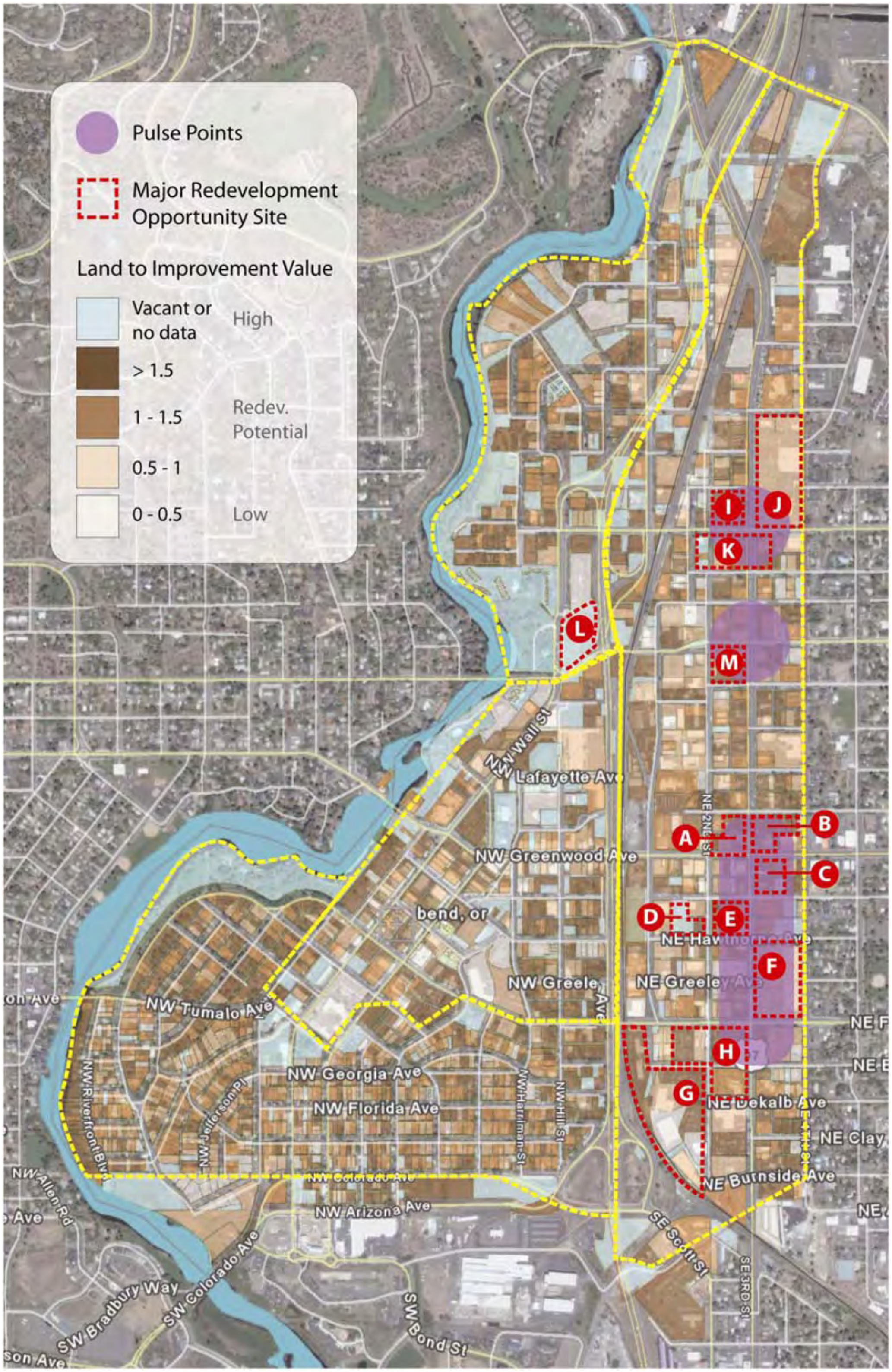
- **Railroad District (Between Greenwood and Franklin):** This district should be the area with the most intense urban development, including mid-rise (3 to 6 stories) and possibly high-rise (7+ stories) buildings. With its proximity to Downtown and easy walking distance to the residential neighborhood east of Fourth, it is well suited to become a major employment and residential hub. It is also at the heart of Bend's growing transit system.

- **South of Franklin:** This area is particularly disconnected from Downtown due to the railroad and Parkway. However, its location immediately south of Franklin will enable it to capture spillover growth from the Railroad District and it should intensify shortly in later years. It also has significant large and underutilized sites that give good potential for large-scale redevelopment.

Redevelopment Opportunity Site Locations

The large-scale redevelopment sites identified in the Large-Scale Development Opportunities technical memorandum (Figure 2) are generally in appropriate locations given market pressures. Indeed, the opportunity sites were selected in part based on market criteria (e.g., visibility, access), so they are already places that development will tend to gravitate toward. No recommended changes in the location of selected opportunity sites is warranted.

Figure 2. Large-Scale Development Opportunity Sites



Source: Leland Consulting Group

Ownership and Site Size

A constraint to capturing a share of Bend's future growth and the realization of the Central Area vision is that in the Railroad District, where the most intense level of development is projected to occur, there are relatively few large or contiguous development opportunity sites. This will not necessarily inhibit redevelopment, but it will tend to make infill development at a smaller scale in this area, since land assembly adds time and expense to development. This condition has a couple of consequences:

- Implementation of the plan may need to include efforts at property assembly to create better development opportunity sites that will allow more intense development in keeping with the vision.

- Large-scale users or institutions may not be able to locate in the Railroad District without larger sites. Such users could include medical facilities, schools, theaters, shopping centers, and other multi-block land uses. These large-scale uses could potentially serve as anchors that better define the district and attract other ancillary development.

Flexibility

In 2007, the housing market in Bend is slowing, while the office market remains strong. Real estate development moves in cycles, and often housing and commercial development move in different cycles. In order to maintain momentum and sustain progress steadily over the next 20 years, the Framework should be flexible enough to allow for a mix of uses so that property owners and developers can make investments that are economically feasible in a wider range of economic climates. Thus, in some years, the focus of development may be heavily oriented to office uses, while in other years, Bend may see more residential development. What is important is to create an atmosphere of continuous change, investment, and dynamism, without creating a neighborhood that is entirely commercial or entirely residential in nature.

Parking

Parking is one of the single greatest limiters to increased density, as structured parking can increase development costs tremendously.[1] In the Railroad District, structured parking will be necessary to achieve the densities and urban scale that is envisioned. This has implications in terms of development economics (sales and lease rates must support the much higher costs of structured parking) and land availability (larger sites will be needed in order to configure efficient parking structures). Also important to consider is that office uses have significantly higher parking requirements than residential uses. An office building may require between two and four parking spaces per 1,000 square feet, whereas a 1,200 square foot condominium may only require a single space. With Bend's rocky geology, underground parking is particularly costly. Thus, a parking strategy

[1] For example, surface parking can cost around $3,000 to $5,000 per stall, while above ground structured parking ranges from $15,000 to $30,000 per stall. Underground parking costs even more, ranging from $30,000 to $50,000 per stall.

should be considered as part of the framework in order to better facilitate new investment. A parking strategy could include the following elements:

- Identify locations for public parking facilities that can serve multiple projects and can reduce the overall need for parking within a district by encouraging shared use (e.g., office users parking during the day and residents or retail on evenings and weekends).

- Consider modified parking standards that reduce parking requirements in urban neighborhoods that will encourage more trips by foot.

- Encourage a greater mix of land uses in urban districts to allow for shared parking (e.g., office parking during the day and retail parking in the evening and on weekends).

Retail Emphasis

Retail uses will always need good visibility and access in order to thrive. Thus, so long as Third Street maintains its role as a north-south arterial and the east-west streets serve as gateways, they will be the preferred location for retail uses east of the Parkway. However, as development intensifies in the area between Third Street and the Parkway, small-scale retail may become feasible in the ground floor of larger residential and office buildings. This retail should be limited so as to not dilute the strength of retail elsewhere in the Central Area.

If the arterial role of Third Street changes by becoming a couplet or some other form, then the location of retail should be reconsidered. Potential configurations could include a redirection of retail emphasis from Third Street to the east-west streets of Greenwood and Franklin – thereby helping implement the Framework element of “pulse points” while simultaneously strengthening the east-west streets.

Place Making and Public Spaces

Great urban neighborhoods are the combination of private development (residential, retail, and employment) and public spaces (streets, sidewalks, parks, plazas). Locations for urban plazas, and possibly even parks, should be identified for the Railroad District and other areas of the Central Area where greater intensity of land use is envisioned.

Urban plazas, pocket parks, and other public spaces help create a sense of place for a neighborhood and set the tone for quality against which private development should be judged. Without these unifying themes, a neighborhood may end up merely as a collection of projects rather than a community. Quality parks, plazas, and open spaces create value for adjacent real estate and give certainty to the development community, which encourages investment.

Implementation

Implementation of the Central Area Plan will be discussed in greater detail in subsequent technical memoranda, but it is important to note that significant coordination of public and private investments will be necessary in order to achieve the vision. Truly realizing the vision will require a broad range of funding tools, public facilities, transportation improvements, open space improvements, parking improvements, land assembly, marketing efforts, and other joint public-private initiatives. The whole of the Central Area Framework Concept is greater than the sum of its parts, but this can only be achieved through careful coordination of public and private investments. As the project moves closer to the implementation phase, this connection should not be forgotten.

Conclusion

Based on the project team's research of market conditions and economic forecasts, Bend will see significant growth over the next 20 years. Capturing just a small fraction of that growth in the Central Area is very achievable and would bring with it the kind of investments that would transform it into the collection of urban districts described by the vision and framework concept. No significant changes to the redevelopment strategy are needed in order to make this happen, although the issues described above should be incorporated into the implementation strategy in later phases of the project.

Final

Technical Memorandum #6—Future Conditions

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This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), local government, and state of Oregon funds. The contents of this document do not necessarily reflect views or policies of the state of Oregon.

Introduction

Background

The focus of Phase 2 of the Central Area Planning effort is on the area adjacent to Bend's existing downtown core, to the east, north and south. This area includes the 3rd Street corridor (formerly designated as US 97 and now designated as Business 97) that runs north-south through the center of Bend. Greenwood and Franklin Avenues connect the 3rd Street corridor with the downtown core. With the completion of the Bend Parkway several years ago, 3rd Street carries lower volumes than previously; however, the Bend Parkway acts as a significant barrier separating the downtown core from the study area. A map of the Central Area Plan study area is presented on the following page.

One of the key objectives of the Phase 2 planning process will be to identify improved transportation linkages between the study area and the downtown core, while accommodating significant changes in the character of land uses in the area. Development of the Central Area Plan must result in:

- A detailed list of transportation improvements needed to support planned land uses. In particular, the Central Area Plan must identify needed improvements to arterials, collectors and local streets.
- Changes to both land use and transportation plans within this study area.
- A general indication of issues and/or limitations related to other supporting infrastructure that might constrain land use development within the study area.

In Part 2, special attention will be paid to the issues of mobility, circulation and access within and between the districts comprising the study area, and the balance of the community.

Content of This Memorandum

This memorandum includes a discussion of future growth expectations within the Central Area Plan study area and the impact of this growth on existing transportation facilities and other urban infrastructure including sewer, water, storm drainage and other facilities and services. Two scenarios have been addressed including growth to the 2030 planning horizon year under the current General Plan, and growth assuming the potential development and redevelopment activities that have been highlighted for the Central Area in Technical Memoranda #1 (related to urban design concepts) and #4 (related to redevelopment potential).

Chapter 1 is this Introduction. Chapter 2 presents a synopsis of growth expectations in the Central Area based on either the current General Plan or on proposed Central Area Plan as defined in Technical Memorandum #4. Data in this chapter has been enhanced from the information contained in the Technical Memorandum to provide a comparison of current (2003) household and employment estimates in the study area with projections for 2030 under both the General Plan and CAP scenarios.

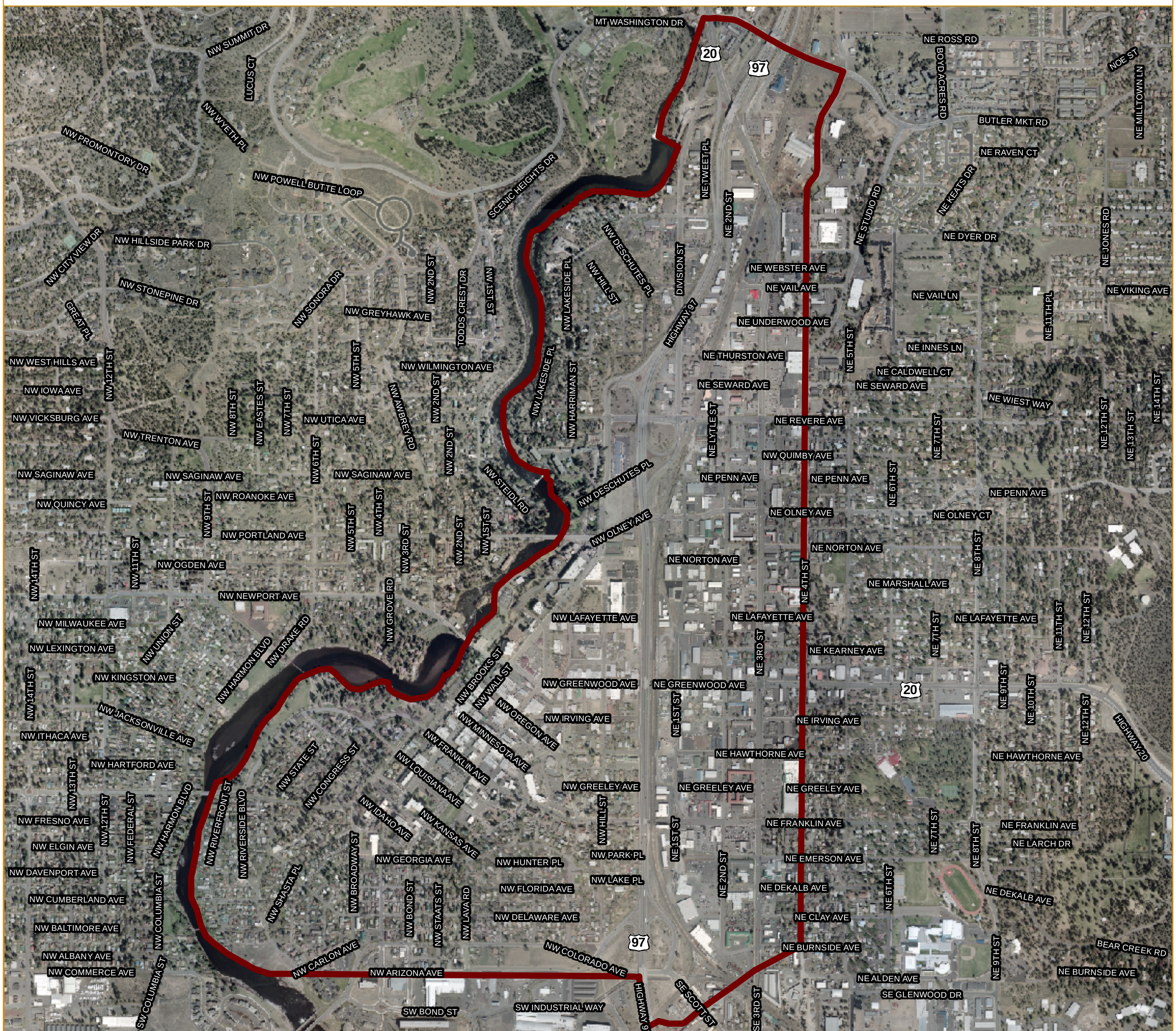
Chapter 3 discusses the future transportation system focusing on anticipated congestion challenges both the General Plan and CAP development scenarios.

Chapter 4 presents a range of transportation system options to address both the anticipated congestion problems within the Central Area and the actions needed to accomplish the overall objectives of the Central Area Plan for enhanced multi-modal circulation opportunities. Included in this chapter is a discussion of policy and planning guidance provided by various state and local documents, review of the transportation system options including bicycle and pedestrian facility needs, a synopsis of the Central Area Plan strategy as related to transportation. Included as part of this strategy is a discussion of: key plan elements, compliance with state and local policies, proposed TSP amendments, transportation system implementing actions, and funding opportunities.

Chapter 5 summarizes expected impacts on non-transportation infrastructure serving the Central Area. This infrastructure includes public infrastructure such as the water distribution, storm drainage and sewer system facilities, and private infrastructure elements including power, broadband, telephone and natural gas services.

BEND CENTRAL AREA PLAN

Study Area Boundary



City of Bend Central Area

0 500 1,000 1,500
Feet

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Data Source(s):
City of Bend, NAIP, Parametrix

Geographic Data Standards:
Projected Coordinate System:
State Plane - Oregon South
Units: US Foot

Parametrix

Analysis by C. Hainey; Analysis Date: Jan-2007; Plot Date: Jan-2007: File Name: CAP_Ortho.mxd

Future Community Development

Introduction

This chapter provides a brief summary of future land development and community growth expectations that affect transportation and other infrastructure needs within the Central Area Plan study area. This information has been excerpted from Technical Memorandum #4 and provides the foundation for development of future traffic volume projections for two scenarios: assuming continued development per the land use designations and zoning associated with the current General Plan, and for development expectations associated with the growth potential and land use allocations of the proposed Central Area Plan. Central Area Plan development expectations have also formed the basis of the qualitative assessment of future water, sewer, stormwater and other non-transportation infrastructure requirements.

Market Summary

Population and Employment Projections

Any forecast of future community development begins with a projection of growth in population and employment. Over the past decade, Bend has experienced some of the most rapid growth in the State of Oregon. While Bend's population grew 26 percent between 2000 and 2005, the second-fastest growing large city, Hillsboro, grew by 14.1 percent, while the state as a whole grew just 6.1 percent. Bend's population and employment as a whole are expected to continue to grow at rates that will far outpace the rates of other metropolitan areas around the state. Bend's economy, driven by in-migration and increasing employment in high-tech, hospitality, specialty manufacturing and other targeted sectors, is also expected to maintain healthy growth.

Between 2002 and 2004, the City of Bend worked with the planning and legal staff of Deschutes County and the Cities of Redmond and Sisters to prepare a coordinated population forecast for all of Deschutes County. The county adopted a 2000 to 2025 coordinated population forecast in September of 2004. By 2025, this forecast estimates 240,811 people living in Deschutes County. Bend's UGB population forecast for 2025 is 109,389 people. The City has chosen, for the purposes of the UGB expansion analysis, to forecast population five years beyond to 2030 to ensure that the City will have a 20-year buildable land supply (e.g. 2007 to 2027). Staff assumed an annual growth rate of 1.7 percent between 2025 and 2030, with Bend reaching a population of 119,009 by 2030.

Table 1 shows the average annual growth rate over five-year blocks of time between 2005 and 2030 for population and employment. It demonstrates how the rate of growth is projected to slow down over time.

Table 1. Bend Long-term Population and Employment Projection Summary

Bend	2005	2010	2015	2020	2025	2030
Population	69,004	81,242	91,158	100,646	109,389	119,009
5-year avg. annual growth rate		3.3%	2.3%	2.0%	1.7%	1.7%
Employment	40,372	46,602	55,948	62,757	69,566	76,375
5-year avg. annual growth rate		2.9%	3.7%	2.3%	2.1%	1.9%

Source: Leland Consulting Group, 2007.

Central Area Plan Study Area

The Central Area Plan study area (see Figure 1) makes up a small percentage (just 4.3 percent) of Bend's total population in 2006. Of the Central Area's 2,977 current residents, the largest majority live in the

South Neighborhoods. In contrast, the Third Street Corridor is very lightly populated with just 122 residents spreads over 326 gross acres. Additionally, household incomes are significantly lower in the Central Area than in Bend in general – especially in Downtown and along the Third Street Corridor.

Table 2 shows an estimate of net new development by 2030 with the Central Area Plan (CAP). The table includes households, along with office, retail and light industrial square footage. Market conditions and the amount of growth projected for Bend are the driving factors influencing the overall amount of growth that will take place within the Central Area, but it is the Framework Concept that guides the specific land uses that are projected for different areas. Given this, it is important to note that the land use projections are based on the best current knowledge about existing conditions and future growth trends. These trends are best observed and are more accurate at the district level, but to assess the transportation and infrastructure requirements associated with this development plan, they have been interpolated down to the level of Transportation Analysis Zones (TAZs)[1]. Individual property owner decisions and site-specific issues will inevitably alter the actual mix of uses achieved in any specific area. Locations of TAZs are illustrated in Figure 2.

Table 2. 2030 Central Area Plan Net New Development

District/TAZ	Housing Units	Office (sq. ft.)	Retail (sq. ft.)	Light Ind. (sq. ft.)	Hotel Rooms
Third Street Corridor	**1,369**	**1,230,089**	**201,918**	**(375,120)**	**969**
252	0	16,007	-	(16,007)	-
253	24	8,297	(2,631)	-	-
254	23	4,196	(6,257)	(7,362)	-
255	32	52,705	27,329	(1,952)	-
256	19	36,530	8,495	(48,423)	-
257	(3)	(4,939)	9,428	2,245	-
258	0	-	-	-	-
309	100	78,379	8,164	(116,636)	-
310	1	29,393	(5,039)	(12,597)	14
311	4	21,166	5,292	(10,079)	-
312	655	575,977	113,314	(122,722)	618
313	66	58,080	36,960	-	87
314	17	(2,763)	(2,210)	-	-
315	37	5,177	(4,141)	-	-
316	21	6,659	666	(11,654)	-
387	22	7,654	8,164	(10,205)	-
401	351	337,571	4,384	(19,728)	250
North Neighborhood	**184**	**12,862**	**13,844**	**(8,771)**	**21**
259	4	16,445	12,059	(8,771)	(26)

[1] The Bend Metropolitan Planning Organization (BMPO), Oregon Department of Transportation (ODOT), and the City of Bend (City) began developing a new travel demand model for the greater BMPO area in 2003. The base year for the new model is 2003. The model was developed using household activity surveys, Census data, employment data, and information on travel patterns from other cities in Oregon. The 2003 model was calibrated to match existing traffic counts from the City and ODOT. The model boundary is defined by political, census, and topographical constraints. The model includes all of the lands within the City Urban Growth Boundary plus additional outlying areas. The model is divided into 463 Transportation Analysis Zones (TAZs). Each TAZ contains demographic data such as household income, household size, number of vehicles, etc. Each TAZ also includes the number and type of jobs. The model network is comprised of major roads including the state highways, arterials, collectors, and some local roads. The network links include the number of lanes, lane capacities, and intersection controls. The model attempts to answer several questions about how many people are traveling, where they are going, what type of transportation they are choosing, which routes they take, and the resulting quantity of traffic.

Table 2. 2030 Central Area Plan Net New Development					
District/TAZ	**Housing Units**	**Office (sq. ft.)**	**Retail (sq. ft.)**	**Light Ind. (sq. ft.)**	**Hotel Rooms**
260	128	(14,446)	(722)	-	-
261	52	10,863	2,507	-	47
South Neighborhood	**761**	**61,389**	**24,992**	**(10,677)**	**50**
295	(7)	-	-	-	-
296	160	-	-	-	-
402	93	209	-	-	-
403	98	33,245	16,623	-	50
410	78	22,838	8,194	(10,677)	-
411	91	-	-	-	-
412	14	2,523	554	-	-
413	16	2,574	565	-	-
414	77	-	-	-	-
415	59	-	-	-	-
416	82	-	(944)	-	-
TOTAL	**2,314**	**1,304,340**	**240,754**	**(394,568)**	**1,040**

Source: Leland Consulting Group, 2007.
Note: Excludes Historic Downtown Core area.

The paragraphs below present a comparison of 2003 estimates of households, office, retail and light industrial employment with total projected development in the Central Area Plan study area for 2030 based on the current General Plan (and incorporated into the Bend Metropolitan Planning Organization's regional travel demand model) and the projections that reflect potential development trends and opportunities presented in the proposed Central Area Plan. The 2030 estimates include both new development and those uses that will not change. Key findings are summarized in Table 3.

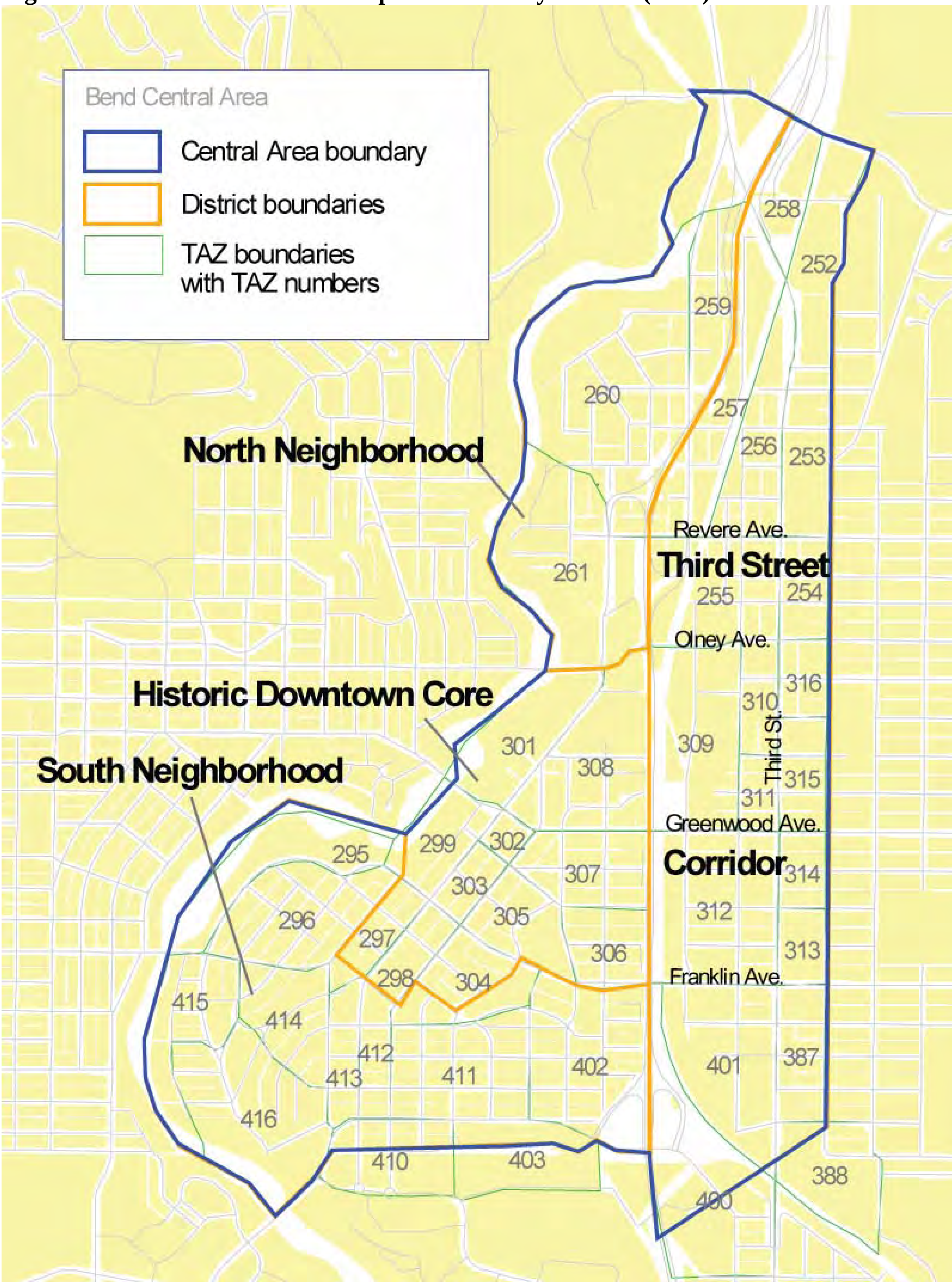
As indicated in the table, significant residential growth is anticipated along the Third Street Corridor and within the South Neighborhood. A moderate level of residential development is also anticipated within the Downtown core area. The Third Street Corridor and the Downtown Core areas would also see large increases in employment, particularly for office and retail employees. A drop in industrial employment is also anticipated in the overall Central Plan study area due to the conversion of current industrial properties to office and retail uses.

Households

As noted in Table 3, there would be a substantial increase in the number of households within the Central Area under the CAP development scenario. The existing General Plan anticipates little residential development in the Central area over today's conditions (approximately 2 percent growth), while the CAP would see an increase of about 175 percent over today's levels. Particularly in the Railroad District (zones 309-312), new housing is likely to take place in multistory buildings, many with ground floor retail or commercial uses.

It is important for the larger Bend Urbanized Area to prepare plans that are constrained to the Deschutes County control total and the County Coordinated Population Forecast. Thus, this localized increase in households and corresponding population must be accounted for within those control totals. While development of revisions to the currently forecasted levels of residential development throughout the Bend area is beyond the scope of this study, it is anticipated that some of this residential growth will likely come from redirecting growth elsewhere in the Bend UGB to the Central Area.

Figure 2. Bend Central Area Transportation Analysis Zone (TAZ) Boundaries



It should be noted, however, that many would contend the Coordinated Population Forecast underestimates both the recent growth experience and the potential for future growth. If this is the case, then it could be postulated that what the CAP captures will be new people coming to the area, attracted by the uniqueness of the CAP. That is, that the CAP creates an environment that fosters growth and economic development which would otherwise not occur. In either case, particularly with the policy interest in offering more affordable housing, the CAP could attract residents who would otherwise choose to live in Redmond or elsewhere in the County for affordability reasons, thus still fitting within the countywide population forecast. The Coordinated Population Forecast did not assume an enhanced CAP and, more importantly, a four-year university at Juniper Ridge that would completely change the economic paradigm of the region.

Beyond 2030, even more housing is likely as the Central Area continues to grow in prominence as the heart of Bend and the greater Central Oregon region.

Table 3. Comparison of Growth in Households with General Plan and CAP

District/TAZ	2003 (1)	2030 General Plan	2030 CAP	Net Difference CAP over (under) General Plan
Households				
Third Street Corridor	60	24	1,393	1,369
North Neighborhood	327	284	468	184
South Neighborhood	910	917	1,678	761
Historic Downtown Core	226	328	668	340
Totals	**1,523**	**1,553**	**4,207**	**2,654**
Office Employment				
Third Street Corridor	1,857	1,665	4,198	2,533
North Neighborhood	82	476	231	(245)
South Neighborhood	213	241	315	74
Historic Downtown Core	3,124	3,610	4,769	1,159
Totals	**5,276**	**5,992**	**9,513**	**3,521**
Retail Employment				
Third Street Corridor	1,169	1,304	2,050	746
North Neighborhood	6	11	118	107
South Neighborhood	54	300	142	(158)
Historic Downtown Core	293	382	922	540
Totals	**1,522**	**1,997**	**3,232**	**1,235**
Lt. Industrial Employment				
Third Street Corridor	783	803	1,056	253
North Neighborhood	39	33	28	(5)
South Neighborhood	190	199	12	(187)
Historic Downtown Core	198	198	48	(150)
Totals	**1,210**	**1,233**	**1,144**	**(89)**
Total Employment				
Third Street Corridor	3,809	3,772	7,304	3,532
North Neighborhood	127	520	377	(143)
South Neighborhood	457	740	469	(271)
Historic Downtown Core	3,615	4,190	5,739	1,549
Central Area Total	**8,008**	**9,222**	**13,889**	**4,667**

(1) Most recent year for which MPO data is available.
Source: Leland Consulting Group, 2007.

Office Employment

Table 3 also shows a comparison of changes in office employment in the Central Area from 2003 estimates for 2030 forecasts for both the General Plan and Central Area Plan development scenarios. As with housing, a significant amount of new office space is projected along the Third Street Corridor. Indeed, Bend's mixed employment zone is well suited for the technology and service businesses that will make up much of the region's new employment. Interviews with local real estate brokers and developers indicate that the Railroad District in particular is well suited for office development and would likely see significant amounts of new development once the Central Area Plan is implemented.

In addition to office development, Third Street and the Railroad District will likely see an increase in the number of hotel rooms to serve Bend's growing tourist base and also business travelers related to the office space. A hotel market study was not done for this report.

Retail Employment

Third Street will remain one of Bend's most prominent retail districts, showing a modest net increase in retail space over the next 20 years. As Bend continues to grow outward with new single family residential neighborhoods and as retail continues to expand in the area near Cooley Road, the Central Area will capture a shrinking share of overall retail growth. Nevertheless, some growth will be needed to support new housing, offices, and nearby neighborhoods. Moreover, the physical design of the retail will likely change greater than the overall inventory of space. With urban design, pedestrian, and traffic improvements, particularly along Third Street, future retail will likely include more street-fronting buildings and retail space in the ground floor of mixed-use buildings. Table 3 presents a comparison of 2003 retail employment estimates with 2030 General Plan and Central Area Plan development scenarios.

Light Industrial Employment

One of the most notable changes from new development is the loss of light industrial buildings to other uses. This is largely due to the Framework Concept's changing of emphasis of the Railroad District from a light industrial district to a mixed employment and housing neighborhood. Thus, those areas that show a loss of light industrial space concurrently show a significant increase in the number of housing units and amount of office space. Table 3 provides a comparison of light industrial employment in 2003 with the 2030 General Plan and Central Area Plan scenarios.

Central Area as a Percent of Overall Citywide Growth

Table 4 compares the rate of new development in the Central Area to the rate of growth projected citywide. As shown in this table, there will be negative growth in industrial employment, while the Central Area is targeted to capture 27 and 16 percent of office and retail employment growth, respectively. While the vast majority of new growth over the next 20 years will take place outside of the Central Area in new residential developments and employment centers such as Juniper Ridge, these "capture rates" reflect a significant increase in development for the Central Area in general, and the Third Street Corridor in particular.

Table 4. 2030 Central Area Growth as Percentage of Citywide Growth

District/TAZ	Residents	Office Emp.	Retail Emp.	Ind. Emp
Third Street Corridor	4.77%	16.51%	7.75%	(16.99%)
North Neighborhood	0.61%	0.24%	0.66%	(0.40%)
South Neighborhood	0.66%	0.82%	1.04%	(0.47%)
Historic Downtown Core	1.77%	9.42%	6.09%	(0.96%)
TOTAL	**7.81%**	**26.99%**	**15.54%**	**(18.82%)**

Source: Leland Consulting Group, 2007.

Transportation System Needs

Introduction

This chapter identifies and discusses anticipated capacity and operational deficiencies for the 2030 future planning period. The roadway capacity analysis focuses on the peak travel hour during a typical weekday which generally occurs between 4:00 PM and 6:00 PM. Analysis reflects the existing unique lane channelization and traffic control features of each major intersection in the study area. Future volumes were developed from traffic forecasts provided by the Bend MPO from the regional travel demand model which were post-processed into intersection turning movement projections using the procedures in ODOT's "Analysis Procedures Manual".

Two 2030 future year scenarios were developed and evaluated. The first is based directly on output from the regional model (post-processed as discussed above) which represents likely conditions assuming that community growth is consistent with the existing adopted City General Plan. The second scenario is based on an assessment of changes in these future travel projections based on the new development and/or redevelopment opportunities identified for the Bend Central Area Plan.

2030 Future Traffic Volumes and Operations

Development of 30th Highest Hourly Volumes for 2030

The development of 2030 peak hourly traffic volumes for the Bend Central Area followed a multi-step process.

1. First, output from the MPO's travel demand model for 2003 and 2030 (RTP Alternative) was obtained and reviewed for reasonableness. Where appropriate, minor adjustments were made to the model output to reflect the character and patterns of existing observed traffic movement within the core area.

2. Using model output for 2003 and 2030, link volume projections for the baseline (General Plan) condition were post-processed to develop 2030 peak hourly turning movement projections at each study area intersection. This analysis was conducted according to the procedures outlined in ODOT's Analysis Procedures Manual and NCHRP Report 255. Post-processing is a method for developing future traffic turning movement volumes at intersections based on existing traffic counts and the relative differences between modeling scenarios. The basic steps in post-processing involve calculating the differences between current and future modeled volumes, and applying the relative differences to 2007 count data. The differences are assigned to turning movements at intersections in proportion to the existing distribution of turning movements on each intersection approach leg.

3. Using existing intersection geometry, future baseline volumes were evaluated to determine likely 2030 peak hourly traffic operating conditions. The timing of existing traffic signals was optimized to accommodate and anticipated changes in volumes.

4. Using the 2030 baseline turning movement projections at each intersection as a starting point, intersection traffic forecasts were developed to reflect the land use changes inherent in the Central Area Plan scenario. The redevelopment potential outlined in Technical Memorandum #4 and summarized in Chapter 2 of this report, was translated into a net increase (or decrease) in vehicle trips for each Transportation Analysis Zone (TAZ) using aggregated trip generation rates based on three demographic types – number of households, retail employment and other employment. These trip generation rates were derived from the Portland Metro regional travel demand model and reflect a more appropriate set of trip-making assumptions for the scale and type of development anticipated.

5. Each TAZ was reviewed to evaluate the potential for selecting alternative travel (non-auto) modes. Estimated trip reductions for walking, bicycling and transit were based on available facilities, service, and adjacent land uses. Trip reductions were also applied to TAZ's where land uses internal to the zone complemented one another, such as residential and retail, and a reasonable level of trip interaction within the zone could occur. Internal trip-making was assumed to be largely walking trips. Total trip reductions related to the use of non-vehicular travel modes ranged from 3 percent to 14 percent of the estimated total trips within each TAZ, depending on location, presence of good non-motorized and/or transit connections, and land uses. These values are generally consistent with experience in other similar mixed use areas with enhanced bicycle, pedestrian and transit services.
6. After all the trip reductions were applied to each TAZ, the remaining trips were distributed to the surrounding roadway network within the study area. Because the destinations for household and employment trips are different, different distribution assumptions were applied to each. The destinations were also divided into three geographic areas: 1) internal to the Central Area Plan study area boundaries (see Figure 1), 2) within the City of Bend but outside of the Central Area, and 3) other regional destinations outside of the City of Bend. For household trips, it was estimated that the study area would capture 25 percent of new vehicle trips, the remainder of the City would capture 55 percent, and 20 percent would travel to/from destinations outside of the City. For the retail and other employment trips, it was estimated that the study area would capture 10 percent of new vehicle trips, the remainder of the City would capture 55 percent, and regional destinations would attract the remaining 35 percent.
7. For purpose of conducting traffic operations analysis of Central Area Plan trips intersection geometry was assumed to remain the same as existing, while the signal timing was optimized for this scenario.

Documentation of the 2030 traffic forecasting process and results are presented in Appendix A.

Intersection Operational Standards

Within the City of Bend, traffic operations are evaluated based on the relationship between traffic volumes and the roadway or intersection's capacity or volume/capacity (V/C) ratio. For State Highways such as US 97 and US 20, the 1999 Oregon Highway Plan (OHP), identifies various V/C thresholds are applied to all state highways based on functional classification of these facilities.

Both US 97 and US 20 in Bend are classified as Statewide Highways. The peak hour, maximum V/C standards for these highways are related to posted roadway speeds and are summarized in Table 5.

Table 5. Maximum Volume to Capacity for Peak Hour Operating Conditions

Highway Name	OHP Designation	Freight Route	Signalized Intersection Maximum V/C Ratio	Unsignalized Intersection Maximum V/C Ratio (Minor Movement)
US Highway 97	Statewide Expressway	Yes	0.80	0.90
US Highway 20	Statewide Highway	Yes	0.80	0.90

Source: Oregon Highway Plan, Policy 1F Mobility Standards, Table 6.

For city streets, performance criteria are laid out in the City's Development Code, Chapter 4.7 which identifies traffic operational thresholds. The following standards define acceptable intersection operations, applied to the entire peak hour:

- **Two-Way Stop Control (TWSC)**
  - Delay for individual lane groups less than or equal to 50 seconds, and
  - Volume to capacity ratio for individual lane groups less than or equal to 1.0, and
  - 95th percentile queuing less than or equal to storage length available.
- **All-Way Stop Control (AWSC)**
  - Delay for the intersection as a whole less than or equal to 80 seconds.
- **Roundabout**
  - Volume to capacity ratio for individual approaches less than or equal to 1.0.
- **Signalized Intersection**
  - Volume to capacity ratio for the intersection as a whole less than or equal to 1.0, and
  - 95th percentile queuing less than or equal to storage length available
  - Further details of relevant standards from City Code are presented below in Table 6.

Table 6. Bend Signalized Intersection Operations Standards

Intersection Status/Jurisdiction)	Operating Standards
Built to TSP/Master Plan; within Central Business/historic district	v/c less than 1.0 for hour preceding and following Peak Hour
Built to TSP/Master Plan; outside Central Business/historic district	v/c less than 1.0 for hour preceding and following Peak Hour
Not built to TSP/Master Plan; within Central Business/historic district	v/c less than 1.0 for hour preceding and following Peak Hour
Not built to TSP/Master Plan; outside Central Business/historic district	v/c less than 1.0 for Peak Hour

Source: Bend Development Code, Chapter 4.7, Transportation Analysis, Table 4.7.400a.

2030 Intersection Operations with General Plan (Baseline)

An understanding of general traffic patterns can be achieved by analyzing traffic volumes for selected intersections in an area. However, these patterns tell little of the roadway's ability to handle additional traffic or about driver comfort level at these intersections. To describe a roadway's ability to accommodate traffic, as well as the quality of traffic operations, analysis was conducted using the methodology in the 2000 Highway Capacity Manual (HCM) for signal-controlled or stop-controlled intersections. This methodology identifies both an average level of delay experienced by all vehicles passing through an intersection and a "volume-to-capacity" ratio indicating the degree of saturation experienced at the intersection.

Traffic conditions were analyzed for the future (2030) 30th highest hour period in the Central Area Plan study area using the Synchro software. Unlike other modeling software that analyzes intersections independently of each other, Synchro displays the effects of traffic congestion on a corridor-wide basis that allows for assessment of impacts related to traffic queuing. By using the Synchro model to conduct traffic analysis, multiple intersections along roadway corridors can be evaluated as a single interconnected network making it possible to assess the impacts of growth on corridor-wide traffic operations. Analysis was conducted using the existing intersection geometrics.

As noted in the discussion in the preceding section, for state facilities, the intersection v/c ratio must be used to characterize operational performance. The ratio calculated for each intersection is then compared with the v/c standards incorporated into the 1999 Oregon Highway Plan (last amendment August 2005).

V/C ratio is also used by the City of Bend (as established by Chapter 4.7 of the City of Bend Development Code).

Table 7 presents the results of the intersection level traffic operations analysis for the 19 signalized intersections that were evaluated in the study area. Detailed traffic operations calculations for 2030 baseline conditions are included in Appendix B.

The data in Table 7 indicate that seven signalized intersections are expected to exceed either the State v/c standard or the City's operational standard for either v/c or average intersection delay by 2030. Five of these intersections are state facilities and two are city intersections. With the exception of the intersection of Portland Avenue with Wall Street, all of these intersections currently experience operational problems today which would become worse in the future. The intersection of Portland Avenue with Hill Street operated acceptably in 2007, but would fall below the city's v/c threshold by 2030. For most of the intersections that do not meet applicable standards, signal retiming or additional lanes would bring the intersections into compliance with operational standard.

Table 7. 2030 30th Highest Hour Intersection Operations with Current General Plan

#	Signalized Intersections	Overall V/C Ratio	Average Control Delay (sec./vehicle)	Exceeds City Standards	Exceeds State Standards
1	US 97/20 @ Butler Market Road	**1.26**	**>80.0**		**Yes**
2	Revere Avenue @ Parkway SB Ramps	0.83	20.6		No
3	Revere Avenue @ Parkway NB Ramps	**0.92**	**27.8**		**Yes**
4	Revere Avenue @ 3rd Street	**1.22**	**>80.0**		**Yes**
5	Portland Avenue @ Wall Street	**1.15**	**80.6**	No (1)	
6	Olney Avenue @ 3rd Street	**1.15**	**>80.0**		**Yes**
7	Greenwood Avenue @ Wall Street	0.84	33.5	No	
8	Greenwood Avenue @ Bond Street	0.69	17.4	No	
9	Greenwood Avenue @ 3rd Street	**1.42**	**>80.0**		**Yes**
10	Oregon Street @ Wall Street	0.70	14.1	No	
11	Oregon Street @ Bond Street	0.60	11.4	No	
12	Franklin Avenue @ Wall Street	0.80	20.6	No	
13	Franklin Avenue @ Bond Street	0.89	31.1	No	
14	Franklin Avenue @ 3rd Street	**1.11**	**81.1**	No (1)	
15	Colorado Avenue @ Wall Street	0.59	16.8	No	
16	Colorado Avenue @ Bond Street	0.72	21.0	No	
17	Colorado Avenue @ Parkway SB Ramp	0.74	26.0		No
18	Arizona Avenue @ Wall Street	0.71	13.2	No	
19	Arizona Avenue @ Bond Street	0.80	18.3	No	

(1) Hour before or after would have a v/c ratio of less than 1.0.

Intersections expected to exceed operational standards include:

- **US 97/US 20 at Butler Market Road** – expected to operate at a v/c ratio of 1.26. It should be noted that the intersection with Division Street and with Butler Market Road/Mt Washington Drive are very closely spaced together. According to ODOT, the spacing impacts signal progression along Butler Market Road today. The potential may exist for queue spillback impacts between these two intersections in the future.
- **Revere Avenue at Parkway Northbound Ramps** – expected to operate at v/c of 0.92 which exceeds the ODOT standard of 0.80 for this intersection.
- **Revere Avenue at 3rd Street** – expected to operate with a v/c ratio of 1.22. According to ODOT, traffic queuing frequently occurs today along Revere between 3rd and 4th Streets with traffic queues backing up from the stop sign at 4th Street into the signalized intersection with 3rd Street. Safety and operations at the intersection are also affected by substandard access spacing at the intersection. It should be noted that the signal at this intersection is considered to be functionally obsolete and needs to be replaced. Problems include poorly aligned heads, no advance heads, and heads that are too small for current standards. ODOT is currently scoping the replacement of the signal at this intersection. Part of the replacement project will likely include replacement of the interconnect conduit between this intersection and the intersection at Revere Avenue and Division Street which has failed.
- **Portland Avenue at Wall Street** – this intersection would drop from a v/c of 0.92 in 2007 to an v/c of 1.15 by 2030. However, the second hour of the peak period (e.g., either before or after the peak hour) is expected to meet the City's standard. Opportunities to enhance traffic operations at this location are very limited due to limited right-of-way.
- **Olney Avenue at 3rd Street** – expected to operate with a v/c ratio of 1.15. Similar to the situation on Revere Avenue, traffic queuing frequently occurs along Olney between 3rd and 4th Streets with traffic queues backing up from the stop sign at 4th Street into the signalized intersection with 3rd Street.
- **Greenwood Avenue at 3rd Street** – expected to operate with a v/c ratio of 1.42, this is one of the most heavily congested intersections along the US 20 corridor. As with the intersection of Revere Avenue with 3rd Street, the signal at this intersection is considered by ODOT to be functionally obsolete and needs to be replaced. Problems with this signal are similar to those described for the Revere/3rd intersection.
- **Franklin Avenue at 3rd Street** – this intersection is expected to operate with a v/c ratio of 1.11. However, the second hour of the peak period (e.g., either before or after the peak hour) is expected to meet the City's standard.

Table 8 identifies 2030 volume-to-capacity ratios and delays for the 15 unsignalized intersections analyzed in the study area with the baseline condition. Detailed traffic operations calculations for 2030 General Plan conditions are included in Appendix B.

Table 8. 2030 30th Highest Hour Intersection Operations with General Plan

			Worst Movement				
#	Unsignalized Intersections	Type of Control	Movement	Volume/ Capacity Ratio	Average Delay (sec/veh)	Overall V/C Ratio	Average Delay (sec/veh)
20	Parkway SB Ramp @ Butler Market Road	TWSC	SBL	>1.00	>80.0	0.94	>80.0
21	Parkway NB Ramp @ Butler Market Road	TWSC	NBL	0.48	58.5	0.81	2.0

Table 8. 2030 30th Highest Hour Intersection Operations with General Plan							
			Worst Movement				
#	Unsignalized Intersections	Type of Control	Movement	Volume/ Capacity Ratio	Average Delay (sec/veh)	Overall V/C Ratio	Average Delay (sec/veh)
22	4th Street @ Butler Market Road	AWSC	NBL	>1.00	>80.0	>1.00	>80.0
23	4th Street @ Studio Road	TWSC	WB	>1.00	>80.0	>1.00	>80.0
24	4th Street @ Revere Avenue	AWSC[1]	EBTR	>1.00	>80.0	>1.00	>80.0
25	4th Street @ Olney Avenue	AWSC	WBTR	>1.00	>80.0	0.92	>80.0
26	Parkway SB @ Lafayette Ave.	TWSC	EBR	>1.00	>80.0	0.99	4.2
27	Wall Street @ Bond Street	TWSC	SB	0.92	>80.0	0.59	15.5
28	Greenwood Avenue @ 4th Street	TWSC	SBR	0.56	30.0	0.61	3.0
29	Hawthorne Avenue @ 3rd Street	TWSC	EB	0.71	>80.0	0.63	2.7
30	Hawthorne Avenue @ 4th Street	TWSC	EB	0.18	11.7	0.28	4.1
31	SB Parkway @ Hawthorne Ave.	TWSC	EBR	>1.00	>80.0	0.99	36.6
32	Franklin Avenue @ 4th Street	TWSC	NB	0.87	>80.0	0.47	10.5
33	Riverside Drive @ Tumalo Avenue	AWSC	EBL	>1.00	>80.0	0.83	>80.0
34	Parkway NB Ramp @ Colorado Ave	TWSC	SBL	>1.00	>80.0	>1.00	>80.0

1. HCM analysis allows a maximum of two lanes per approach to an AWSC intersection. The EB approach to this intersection has three lanes. As a result, the intersection would actually operate better than the analysis indicates.

As Table 8 indicates, most of the two-way stop-controlled (TWSC) intersections in the study are expected to exceed the City of Bend and ODOT operational standards. The three exceptions are the intersections of Butler Market Road with the NB Parkway Ramp, Greenwood Avenue with 4th Street, and Hawthorne Avenue with 4th Street. All four all-way stop-controlled (AWSC) intersections would exceed the City's operational standard. The most likely measures that could be implemented to meet operational standards at these unsignalized intersections would involve adding lanes and/or either signal or roundabout control.

2030 Intersection Operations with Central Area Plan

Table 9 presents the results of the intersection level traffic operations analysis for the 19 signalized intersections that were evaluated in the study area. Detailed traffic operations calculations for 2030 conditions with the Central Area Plan are included in Appendix C.

The data in Table 9 indicate that seven signalized intersections are expected to exceed either the State v/c standard or the City's operational standard for v/c (first hour only) by 2030. Five of these intersections are state facilities and two are city intersections. With the exception of the intersection of Portland Avenue with Wall Street, all of these intersections currently, and are expected to continue to operate with v/c ratios greater than applicable standards. The intersection of Portland Avenue with Wall Street operated within the standard in 2007, but would fall below the city's v/c threshold for the first hour by 2030. For most of these intersections, signal retiming or additional lanes are options to bring the intersections below the operational standard.

Table 9. 2030 30th Highest Hour Intersection Operations with Central Area Plan					
#	Signalized Intersections	Overall V/C Ratio	Average Control Delay (sec./vehicle)	Exceeds City Standards	Exceeds State Standards
1	US 97/20 @ Butler Market Road	**1.27**	**>80.0**		**Yes**
2	Revere Avenue @ Parkway SB Ramps	0.90	25.0		No
3	Revere Avenue @ Parkway NB Ramps	**1.06**	**30.6**		**Yes**
4	Revere Avenue @ 3rd Street	**1.32**	**>80.0**		**Yes**
5	Portland Avenue @ Wall Street	**1.25**	**>80.0**	**Yes**	
6	Olney Avenue @ 3rd Street	**1.30**	**>80.0**		**Yes**
7	Greenwood Avenue @ Wall Street	0.88	37.0	No	
8	Greenwood Avenue @ Bond Street	0.76	18.7	No	
9	Greenwood Avenue @ 3rd Street	**1.59**	**>80.0**		**Yes**
10	Oregon Street @ Wall Street	0.75	13.9	No	
11	Oregon Street @ Bond Street	0.67	12.2	No	
12	Franklin Avenue @ Wall Street	0.92	24.5	No	
13	Franklin Avenue @ Bond Street	0.95	37.6	No	
14	Franklin Avenue @ 3rd Street	**1.14**	**86.1**	**Yes**	
15	Colorado Avenue @ Wall Street	0.61	16.4	No	
16	Colorado Avenue @ Bond Street	0.77	22.3	No	
17	Colorado Avenue @ Parkway SB Ramp	**0.84**	**26.2**		**Yes**
18	Arizona Avenue @ Wall Street	0.72	13.8		No
19	Arizona Avenue @ Bond Street	0.83	18.3	No	

Table 10 presents a summary of the analysis of traffic operations during the second highest hour of the peak period. Second highest hour traffic volumes were calculated by overlaying the traffic volume growth assumptions prepared for the peak hour with Central Area Plan land uses onto existing traffic volumes for the combined second hour of the two-hour peak period originally counted for and documented in Technical Memorandum #2. While this method may slightly overstate the impact of traffic growth with CAP development, it is the only reasonable approach to estimating these volumes in the context of this study.

As noted in Table 6, City standards for signalized intersections allow for the v/c ratio of 1.0 to be exceeded during the first hour provided they operate below v/c 1.0 for the hour on either side of the peak. Based on this assessment, the intersection of Portland Avenue with Wall Street would be in compliance with City standards reducing to six the number of locations where expected 2030 operations with the CAP would exceed applicable standards. Worksheets for the analysis documented in Table 10 are presented in Appendix D.

In summary, intersections expected to exceed operational standards include:

- **US 97/US 20 at Butler Market Road** – expected to operate at a v/c ratio of 1.26 during the peak hour and 1.09 during the second highest hour of the peak period. It should be noted that the intersection with Division Street and with Butler Market Road/Mt Washington Drive are very closely spaced together. According to ODOT, the spacing already impacts signal progression along Butler Market Road. The potential may exist for queue spillback impacts between these two intersections in the future.

Table 10. 2030 2nd Highest Peak Hour Intersection Operations with Central Plan

#	Signalized Intersections	Overall V/C Ratio	Average Control Delay (sec./vehicle)	Exceeds City Standards	Exceeds State Standards
1	US 97/20 @ Butler Market Road	**1.09**	**81.3**		**Yes**
2	Revere Avenue @ Parkway SB Ramps	0.80	18.7		No
3	Revere Avenue @ Parkway NB Ramps	**0.93**	**21.6**		**Yes**
4	Revere Avenue @ 3rd Street	**1.17**	**>80.0**		**Yes**
5	Portland Avenue @ Wall Street	0.95	58.4	No	
6	Olney Avenue @ 3rd Street	**1.18**	**>80.0**		**Yes**
7	Greenwood Avenue @ Wall Street	0.74	29.6	No	
8	Greenwood Avenue @ Bond Street	0.61	15.7	No	
9	Greenwood Avenue @ 3rd Street	**1.53**	**>80.0**		**Yes**
10	Oregon Street @ Wall Street	0.63	12.6	No	
11	Oregon Street @ Bond Street	0.53	11.6	No	
12	Franklin Avenue @ Wall Street	0.68	17.9	No	
13	Franklin Avenue @ Bond Street	0.75	26.2	No	
14	Franklin Avenue @ 3rd Street	**1.06**	**66.2**	**Yes**	
15	Colorado Avenue @ Wall Street	0.51	15.9	No	
16	Colorado Avenue @ Bond Street	0.62	19.2	No	
18	Arizona Avenue @ Wall Street	0.60	11.6	No	
19	Arizona Avenue @ Bond Street	0.66	14.9	No	

- **Revere Avenue at Parkway Northbound Ramps -** expected to operate at v/c of 1.06 during the peak hour and 0.93 during the second highest hour of the peak period. Both conditions would exceed the ODOT standard of 0.80 for this intersection.

- **Revere Avenue at 3rd Street** – expected to operate with a v/c ratio of 1.32 during the peak hour and 1.17 during the second highest hour of the peak period. According to ODOT, traffic queuing frequently occurs today along Revere between 3rd and 4th Streets with traffic queues backing up from the stop sign at 4th Street into the signalized intersection with 3rd Street. Safety and operations at the intersection are also affected by substandard access spacing at the intersection. It should be noted that the signal at this intersection is considered to be functionally obsolete and needs to be replaced. Problems include poorly aligned heads, no advance heads, and heads that are too small for current standards. ODOT is currently scoping the replacement of the signal at this intersection. Part of the replacement project will likely include replacement of the interconnect conduit between this intersection and the intersection at Revere Avenue and Division Street which has failed.

- **Portland Avenue at Wall Street** – this intersection would drop from a v/c ratio of 0.92 in 2007 to a v/c of 1.25 during the 2030 peak hour. However, during the second hour of the peak period, this intersection is expected to operate with a v/c ratio of 0.95 which meets City standards.

- **Olney Avenue at 3rd Street** – expected to operate with a v/c ratio of 1.30 during the peak hour and 1.18 during the second highest hour of the peak period. Similar to the situation on Revere Avenue, traffic queuing frequently occurs along Olney between 3rd and 4th Streets with traffic queues backing up from the stop sign at 4th Street into the signalized intersection with 3rd Street.

- **Greenwood Avenue at 3rd Street** – expected to operate with a v/c ratio of 1.59 during the peak hour and 1.53 during the second highest hour of the peak period. This is one of the most heavily congested intersections along the US 20 corridor. As with the intersection of Revere Avenue with 3rd Street, the signal at this intersection is considered by ODOT to be functionally obsolete and needs to be replaced. Problems with this signal are similar to those described for the Revere/3rd intersection.
- **Franklin Avenue at 3rd Street** – expected to operate with a v/c ratio of 1.14 during the peak hour and 1.06 during the second highest hour of the peak period. This intersection would exceed the City's v/c standard of 1.00 for a signalized intersection.
- **Colorado Avenue at Southbound Parkway Ramps** – expected to operate at v/c of 0.84 which is slightly above the ODOT threshold of 0.80.

Table 11 identifies 2030 volume-to-capacity ratios and delays for the 15 unsignalized intersections analyzed in the study area with the Central Area Plan. Detailed traffic operations calculations for 2030 CAP conditions are included in Appendix C.

As Table 11 indicates, most of the two-way stop-controlled (TWSC) intersections in the study are expected to exceed the City of Bend and ODOT operational standards. The two exceptions are the intersections of Greenwood Avenue with 4th Street, and Hawthorne Avenue with 4th Street. All four all-way stop-controlled (AWSC) intersections would exceed the City's operational standard. The most likely measures that could be implemented to meet operational standards at these unsignalized intersections would involve adding lanes and/or either signal or roundabout control.

Table 11. 2030 30th Highest Hour Intersection Operations with Central Area Plan

			Worst Movement				
#	Unsignalized Intersections	Type of Control	Movement	Volume/ Capacity Ratio	Average Delay (sec/veh)	Overall V/C Ratio	Average Delay (sec/veh)
20	Parkway SB Ramp @ Butler Market Road	TWSC	SBL	>1.00	>80.0	0.96	>80.0
21	Parkway NB Ramp @ Butler Market Road	TWSC	NBL	>1.00	>80.0	0.84	13.8
22	4th Street @ Butler Market Road	AWSC	NBL	>1.00	>80.0	>1.00	>80.0
23	4th Street @ Studio Road	TWSC	WB	>1.00	>80.0	>1.00	>80.0
24	4th Street @ Revere Avenue	AWSC[1]	EBTR	>1.00	>80.0	>1.00	69.3
25	4th Street @ Olney Avenue	AWSC	WBTR	>1.00	>80.0	0.99	67.9
26	Parkway SB @ Lafayette Ave.	TWSC	EBR	>1.00	>80.0	0.99	4.2
27	Wall Street @ Bond Street	TWSC	SB	>1.00	>80.0	0.63	42.1
28	Greenwood Avenue @ 4th Street	TWSC	SBR	0.64	37.2	0.66	4.9
29	Hawthorne Avenue @ 3rd Street	TWSC	EB	>1.00	>80.0	0.86	>80.0
30	Hawthorne Avenue @ 4th Street	TWSC	EB	0.24	13.2	0.34	5.0
31	SB Parkway @ Hawthorne Ave.	TWSC	EBR	>1.00	>80.0	0.99	36.6
32	Franklin Avenue @ 4th Street	TWSC	NB	>1.00	>80.0	0.50	27.1
33	Riverside Drive @ Tumalo Avenue	AWSC	EBL	>1.00	>80.0	0.85	64.2
34	Parkway NB Ramp @ Colorado Ave	TWSC	SBL	>1.00	>80.0	>1.00	>80.0

[1.] HCM analysis allows a maximum of two lanes per approach to an AWSC intersection. The EB approach to this intersection has three lanes. As a result, the intersection would actually operate better than the analysis indicates.

Summary of Roadway Constraints

Congestion currently exists on all the routes leading to downtown, and is expected to worsen in the future with the anticipated community growth under either the baseline (General Plan) or Central Area Plan scenario. The number of travel lanes and levels of traffic delays at critical intersections along the east/west routes of Greenwood Avenue, Franklin Avenue and Portland/Olney Avenues, and the north/south routes of 3rd and 4th Streets affect access to downtown. Many of these routes accommodate significant amounts of through traffic, as well as traffic with downtown destinations. Revere Avenue is one of the few remaining at-grade railroad crossings in Bend and the close proximity of the Bend Parkway; Division Street and 3rd Street will make a future grade separation very difficult. Olney Avenue and BNSF Railroad crossing is also at-grade.

Several signalized intersections in the study area currently exceed and will continue to exceed either ODOT or City of Bend operational standards, and most of the unsignalized intersections of collector and arterial streets are experiencing significant delays for side street stop-controlled movements.

Table 12 compares the analysis results with the General Plan and Central Area Plan growth scenarios for signalized intersections. As indicated in the table, Central Area Plan land uses would not change the number of locations that are anticipated to exceed either State or City standards for intersection operations.

Table 12. Comparison of 2030 30th Highest Hour Intersection Operations at Signalized Locations – General Plan and Central Area Plan

		General Plan		Central Area Plan	
#	Signalized Intersections	Overall V/C Ratio	Exceeds Standards	Overall V/C Ratio	Exceeds Standards
1	US 97/20 @ Butler Market Road	**1.26**	**Yes**	**1.27**	**Yes**
2	Revere Avenue @ Parkway SB Ramps	0.83	No	0.90	No
3	Revere Avenue @ Parkway NB Ramps	**0.92**	**Yes**	**1.06**	**Yes**
4	Revere Avenue @ 3rd Street	**1.22**	**Yes**	**1.32**	**Yes**
5	Portland Avenue @ Wall Street	**1.15**	**Yes**	**1.25**	**Yes**
6	Olney Avenue @ 3rd Street	**1.15**	**Yes**	**1.30**	**Yes**
7	Greenwood Avenue @ Wall Street	0.84	No	0.88	No
8	Greenwood Avenue @ Bond Street	0.69	No	0.76	No
9	Greenwood Avenue @ 3rd Street	**1.42**	**Yes**	**1.59**	**Yes**
10	Oregon Street @ Wall Street	0.70	No	0.75	No
11	Oregon Street @ Bond Street	0.60	No	0.67	No
12	Franklin Avenue @ Wall Street	0.80	No	0.92	No
13	Franklin Avenue @ Bond Street	0.89	No	0.95	No
14	Franklin Avenue @ 3rd Street	**1.11**	**Yes**	**1.14**	**Yes**
15	Colorado Avenue @ Wall Street	0.59	No	0.61	No
16	Colorado Avenue @ Bond Street	0.72	No	0.77	No
17	Colorado Avenue @ Parkway SB Ramp	0.74	No	0.84	Yes
18	Arizona Avenue @ Wall Street	0.71	No	0.72	No
19	Arizona Avenue @ Bond Street	0.80	No	0.83	No

Table 13 presents a summary comparison of traffic operations at unsignalized intersection with either General Plan or Central Area Plan land uses. As indicated in the table, most intersections would exceed the applicable State or City operational standard during the 2030 peak hour. For the scenario based on the existing General Plan, exceptions would be at the intersections of the Butler Market Road at the northbound Parkway ramps, Wall Street at Bond Street, Hawthorne Avenue at 3rd, and along 4th Street at the intersections with Greenwood Avenue, Hawthorne Avenue, and Franklin Avenue. For the scenario based on Central Area Plan land uses, exceptions would include the intersections of 4th Street at both Greenwood and Hawthorne Avenues. In comparison with the General Plan scenario, additional lane channelization and/or signal control would be required at the intersections of Butler Market Road at the northbound Parkway ramps, Wall Street at Bond Street, Hawthorne Avenue at 3rd Street, and Franklin Avenue at 4th Street.

Table 13. Comparison of 2030 30th Highest Hour Intersection Operations at Unsignalized Locations – General Plan and Central Area Plan

		General Plan		Central Area Plan	
#	Unsignalized Intersections	Critical Movement V/C Ratio	Standard	Critical Movement V/C Ratio	Standard
20	Parkway SB Ramp @ Butler Market Road	>1.00	0.80	>1.00	0.80
21	Parkway NB Ramp @ Butler Market Road	0.48	0.80	>1.00	0.80
22	4th Street @ Butler Market Road	>1.00	1.00	>1.00	1.00
23	4th Street @ Studio Road	>1.00	1.00	>1.00	1.00
24	4th Street @ Revere Avenue	>1.00	1.00	>1.00	1.00
25	4th Street @ Olney Avenue	>1.00	1.00	>1.00	1.00
26	Parkway SB @ Lafayette Ave.	>1.00	0.80	>1.00	0.80
27	Wall Street @ Bond Street	0.92	1.00	>1.00	1.00
28	Greenwood Avenue @ 4th Street	0.56	1.00	0.64	1.00
29	Hawthorne Avenue @ 3rd Street	0.71	1.00	>1.00	1.00
30	Hawthorne Avenue @ 4th Street	0.18	1.00	0.24	1.00
31	SB Parkway @ Hawthorne Ave.	>1.00	0.80	>1.00	0.80
32	Franklin Avenue @ 4th Street	0.87	1.00	>1.00	1.00
33	Riverside Drive @ Tumalo Avenue	>1.00	1.00	>1.00	1.00
34	Parkway NB Ramp @ Colorado Ave	>1.00	0.80	>1.00	0.80

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Development and Evaluation of Roadway/Intersection Options

The City's currently adopted Transportation System Plan (TSP) presents both projects and policies that govern the development and operation of the multi-modal transportation system. This plan is further supported by specific ordinances, standards and other guidance to address issues related to traffic operating performance, access management, and a functional hierarchy of streets along with right-of-way and street cross-sections for each roadway type. The TSP also establishes a general policy directive for the implementation of specific improvements along most major streets in the city.

Coupled with the land use, economic and urban design features of the Central Area Plan (CAP), the policies and specific objectives of the TSP and its implementing ordinances were considered in the development and evaluation of multi-modal system improvements designed to serve existing and future community transportation needs. Pertinent directives are described in the paragraphs below.

Policy/Planning Guidance

Traffic Operations Standards

Traffic operations standards for both ODOT and the City of Bend were presented and discussed in the preceding chapter. These standards formed the basis for determining:

- The magnitude of congestion and related safety challenges in the Central Area with 2030 land development under either the General Plan or Central Area Plan growth scenarios.
- The nature of potential transportation system enhancements to address traffic operational needs without consideration of other competing objectives within the Central Area such as bicycle and pedestrian circulation, right-of-way acquisition, costs and many other factors.

Development of projects to address traffic operational deficiencies constitutes one of the alternative approaches to modifying the existing roadway system in the CAP area as discussed later in this chapter.

Access Management Standards

Along state highways, access is commonly controlled by ODOT through the purchase of access rights. New access to/from a state highway is provided consistent with the standards adopted in the OHP for each highway classification, its location within an urban or rural area, and its posted speed. Access management guidelines for state highways are published in OAR 734-051. Access management standards along US Highways 20 and 97 within the Bend Metropolitan Area are shown in Table 14.

Table 14. Access Management Spacing Standards for Approaches

US Highway 20	
Posted Speed (mph)	**Public and Private Approach Spacing[a]**
≥ 55	1,320 feet
50	1,100 feet
40 & 45	990 feet
30 & 35	720 feet
≤ 25	520 feet
US Highway 97 (Bend Parkway)	
Posted Speed (mph)	**At Grade Intersection Spacing[b]**
≥ or ≤ 55	2,640 feet

Source: OAR 734-051-00115 Table 1.
[a] Measurement of the approach road spacing is from center to center on the same side of road.
[b] See OHP for interchange spacing guidelines.

The City of Bend has established access management standards and policies. For arterial streets driveways should be spaced a minimum of 150 feet apart. Spacing should increase as speed increases with the maximum practical spacing and joint access with an adjoining property pursued wherever possible. Where medians are constructed on any arterial street, spacing between median openings should be at least 400 feet. The spacing may be reduced to 300 feet if a competent traffic study, satisfying officials shows that the lesser spacing will still safely and efficiently accommodate left turn movements to existing and projected future development in the immediate vicinity.

The installation of new traffic signals and/or the development of new intersections along arterial streets is also addressed in the city's access management policies as articulated in the TSP. It is noted that traffic signals and coordinated timing plans can improve or optimize traffic flow by grouping vehicles into platoons that can be better served by the limited available green time. It is also noted that signals can improve gaps in traffic flow to facilitate safer access to arterial streets between signalized locations. Accordingly, it is important to follow consistent signal spacing standards to maximize the effectiveness and functionality of traffic signals along the length of an arterial street segment. Installation of new signals into this system should be carefully considered in order to maintain the overall pattern of coordinated operations.

Street Standards

The City of Bend Code (section 10-13.10 Table A) provides guidance for the development of dedicated public roadways within the city by functional classification. Included are requirements related to minimum rights-of-way, pavement widths, planter strip widths, and turn lanes/median widths; grade; appropriateness of direct access to adjacent parcels; and standards related to bicycle lanes and sidewalk location and widths. For major streets in the Central Area Plan study area, the City's street standards are as follows.

Table 15. City of Bend Street Standards

Street Element	Principal Arterial (1)	Minor Arterial (2)	Major Collector (3)
Minimum right-of-way	100 feet	100 feet	80 feet
Minimum pavement width	76 feet	52 feet	52 feet
Minimum planter strip width	5 feet	8 feet	8 feet
Minimum turn lane/median width	16 feet / 10 feet	11 feet / 16 feet	11 feet / 16 feet
Maximum grade	6 percent	6 percent	8 percent
Direct site access	No	No	Yes
Bike lanes	Yes	Yes	Yes
Sidewalks	6 feet on both sides	5 feet on both sides	5 feet on both sides

(1) 3rd Street through study area, Greenwood Avenue east of 3rd Street.
(2) Butler Market Road, Division Street (Butler Market to Revere), 4th Street (Butler Market to Franklin), Revere (Hill to 8th), Olney (Wall to 8th), Greenwood (Wall to 3rd), Franklin/Riverside (Deschutes River to east of study area), Wall/Hill (Revere to Franklin), Bond (Wall to Franklin), Colorado/Arizona couplet.
(3) Hawthorne (Wall to 4th), Wall (Franklin to Arizona), Bond (Franklin to Arizona)

In addition to existing street standards, certain other policies related to street cross-sections apply in the Central City. Of particular importance is the limitation in Minor Arterial street widening incorporated into the Bend Transportation System Plan (TSP), as described below.

<u>Central City – Minor Arterial Widening Limitation</u>

Based on the results of several recent transportation studies in the Central Area and on concern for the dual objectives of realizing benefits related to encouraging non-automobile alternatives and preserving the existing character of Central Area neighborhoods, the Bend TSP identified several corridors requiring unique consideration of the trade-offs between arterial widening and other enhancements. Within these corridors, *"the combination of existing* (and potential future) *residential, commercial and institutional land uses, and the presence of a well-connected system of local streets and accessways, that provide a diverse range of travel options and mode choices, may make minor arterial roadway widening unnecessary and/or less desirable. Thus, the following minor arterial corridors are identified by the Plan as* "not being authorized for lane expansion" *(unless subsequent study has been supported by an amendment to the Plan to permit the roadway widening, an existing safety issue has been identified and approved by the City Council that will be resolved by a widening project, or the improvement is otherwise exempted by TSP Street Policy 21"):*

West Central City

- Newport Avenue between 14th Street and Wall Street

Downtown Central City

- Greenwood Avenue between Wall Street and the Parkway
- Riverside Avenue between Tumalo and Franklin Avenues
- Franklin Avenue between Wall Street and the Parkway
- Wall Street between Greenwood and Franklin Avenues
- Bond Street between Greenwood and Franklin Avenues

Identified Improvements

The TSP provides specific guidance on the development and enhancement of the existing multi-modal transportation system throughout the city. The following paragraphs summarize some of the details pertinent to the arterial and collector street system in the Central Area.

Third Street North of Greenwood Avenue (Highway 20)

The TSP identifies an access management approach for US 20 (3rd Street north of Greenwood Avenue) in the Central Area, noting that implementation of this approach will be difficult due to existing land development and property access patterns. As indicated in the TSP, over the longer term redevelopment patterns *"will provide opportunities to close and combine driveways, or to provide access via adjacent side streets. A raised median should be considered for installation on a principal arterial when any of the following occur (per ODOT recommendations):*

1. *Daily traffic counts exceed 28,000 vehicles per day,*
2. *In conjunction with reconstruction or modification projects, or*
3. *When operational, safety, or pedestrian needs warrant it."*

The TSP also notes, however, that construction of improvements that will limit left turn movements to/from between arterial streets and adjacent properties must be sensitive to existing development that relies on the convenience of roadway system access.

Third Street South of Greenwood Avenue

The section of 3rd Street south of Greenwood Avenue is designated as a Principal Arterial and is currently limited to two travel lanes in each direction with turn lane channelization at major intersections. After completion of the Parkway, traffic volumes initially dropped on 3rd Street. However, since 3rd Street remains a major business corridor within the urban area, traffic volumes have once again increased to significant levels and are expected to continue to grow.

Key issues identified in the TSP pertinent to this portion of 3rd Street include:

- The undercrossing of the BNSF railroad south of Burnside Street which is currently limited to one travel lane in each direction. The TSP anticipates that future traffic volumes and the need for bicycle and pedestrian improvements to this section of 3rd Street will likely generate the need for undercrossing improvements.

- There are numerous gaps in the sidewalk and bicycle lane systems which the TSP recommends from completion. Additionally, the TSP anticipates that 3rd Street will be subject to beautification and Transportation System Management (TSM) enhancements to improve the appearance and performance of this roadway.

Greenwood Avenue from Newport Avenue to 3rd Street

Greenwood Avenue from Newport Avenue to 3rd Street is currently improved with two travel lanes in each direction with left turn channelization at key intersections. While there are sidewalks along this arterial, bicycle lanes are absent. A raised median prevents left turn movements at 2nd Street, to optimize traffic flow, and improve arterial safety and efficiency. The TSP documents prior discussions about the need for bicycle and pedestrian system improvements between Wall Street and the Parkway. Concern has been expressed about the possible loss of on-street parking in order to accommodate the bicycle lane. Phase 1 of the Central Area Plan recommended a cross-section of Greenwood Avenue west of the Parkway. Phase 2 will identify a recommended cross-section east of the Parkway along with enhancements to the existing narrow and dark pedestrian and bicycle undercrossing of the BNSF railroad and the Parkway.

The portion of Greenwood Avenue east of 3rd Street is designated as a Principal Arterial and an expressway and is part of the State's highway system (US 20).

Franklin Avenue

The TSP recommends that Franklin Avenue be improved to four and five lanes from the railroad underpass to 4th or 5th Streets, and that existing gaps in the sidewalk system be completed. It is suggested that the need to widen the Franklin Avenue undercrossing should be monitored as traffic growth occurs in the City, although the need is not anticipated during the 20-year planning horizon of the TSP. Bicycle and pedestrian system improvements to this undercrossing should also be considered. The TSP further suggests that alternatives to widening Franklin Avenue be evaluated. Hawthorne Avenue, between Hill and 3rd Streets, is included within the Plan as such an alternative and the TSP recommends that efforts be made to preserve this corridor for a future undercrossing as it may be a more cost-effective and achievable improvement than widening the Franklin Avenue undercrossing. A comprehensive study should be conducted to determine the viability and appropriateness of the Hawthorne undercrossing as a substitute for widening Franklin Avenue.

Revere Avenue

The TSP anticipates that Revere Avenue between Hill and 8th Streets will require widening to a full five lane cross-section in the future due to the fact that it is one of the few full access interchanges to the Parkway. Other improvement needs focus on the provision of sidewalk and bicycle lane facilities and on the existing at-grade crossing with the BNSF railroad. The close proximity of the railroad crossing to the Parkway, Division and 3rd Streets will make a future grade-separation very difficult.

Hall and Wall Streets

From Revere Avenue to Lafayette Avenue, Hill and Wall Streets have also been significantly affected by traffic between the Parkway interchange at Revere Avenue and the downtown core area. Hill and Wall Streets are a major northern entry into the downtown. Future improvements may be needed but potential impacts on Pioneer Park must be minimized.

Arizona/Colorado Avenue One-Way Couplet System

The conversion of Arizona and Colorado Avenues to a one-way pair "couplet" system between Broadway and the Parkway was implemented as a method of increasing arterial road capacity without the need to widen existing Colorado Avenue. This couplet provides access between the Parkway and the southern portions of the Central Area and Old Mill District.

Wall and Bond Streets between Colorado and Industrial Way will also serve as major collectors connecting the Old Mill District with the downtown and other destinations. Per the TSP, the City will also study an additional connection, the use of Lava Road in combination the Bond and Wall Streets for this street connection.

Division Street

Prior to construction of the Parkway, Division Street extended from US 20/97 (just south of the Butler Market Road intersection with the highway) on the north to Broserhous Road on the south, and served as a major traffic reliever for 3rd Street. Since completion of the Parkway, Division Street has been fragmented. However, in the northern portion of the Central Area Plan study area, this street continues to serve as a minor arterial.

Hawthorne Street Extension

As part of the discussion of future railroad grade-separations in the City, an under crossing of the Parkway and railroad by Hawthorne Avenue is incorporated into the TSP. The Plan recommends that a detailed analysis of this connection be conducted when it is necessary to improve east/west capacity between the downtown and 3rd Street. The decision to construct this connection should be made as a part of a study of Franklin/RR/Parkway undercrossing (widening) alternatives (see discussion under Franklin Avenue).

Range of Roadway and Intersection Options

To address the intersection operational challenges anticipated by 2030 with either the General Plan or Central Area Plan development scenarios, a range of options for the transportation system were developed and considered. To provide grounding for the magnitude of capacity increases that would be needed to meet City and ODOT standards, one option was analyzed in detail focusing on roadway widening along with added turn lane channelization and signalized traffic control. Other options were formulated to address the general capacity requirements to service vehicular traffic but did so in a manner more inherently consistent with the overall vision of the Central Area Plan to provide opportunities for more intense, mixed use development served by a comprehensive multi-modal transportation system.

Findings and conclusions with respect to the No-Action Alternative and to various Build Alternatives are presented on the following pages. These options include:

- **No-Action Alternative**: Identifies the range of congestion challenges that would be experienced if no significant changes were made to the transportation system while allowing anticipated growth under either the General Plan or Central Area Plan development scenario.
- **Major Roadway Widening Alternative**: Identifies the magnitude of roadway system projects that would be required to meet City and ODOT standards while relying on the existing street classification system which articulates the role and purpose of each road in the study area (e.g., focus on using 3rd Street to accommodate north/south traffic movement with added east/west street capacity primarily along Butler Market Road, Revere Avenue and the Hawthorne Avenue Extension from Hill to 3rd Street).
- **3rd Street Corridor Enhancements**: this alternative includes at least three design options focusing to provide added roadway capacity along the 3rd Street corridor.
    - *Option 1* would involve developing a one-way couplet system using 2nd Street as the southbound half of the couplet and converting 3rd Street to the northbound half of the couplet. Both streets would be provided with widened sidewalks and bicycle lanes, narrowed

pedestrian crossings of both 2nd and 3rd, management of access to adjacent properties, and potential on-street parking. Some changes could be made to Greenwood and Franklin Avenues through the couplet intersections to accommodate changes in allowable movements. Signals would be added at the intersections of 2nd Street at both Greenwood and Franklin Avenue. The extension of Hawthorne Avenue from Hill to 3rd Street would provide east/west reliever capacity for both Greenwood and Franklin Avenues. A variation on Option 1 would involve developing a one-way couplet system using 3rd and 4th Streets.

- *Option 2* would involve continued use of 3rd Street for two-way traffic operations with development of an expanded grid system throughout the area between Revere Avenue on the north and Burnside Avenue on the south. This expanded grid system could include potential widening on 2nd and 4th Streets with traffic signal control or roundabouts at major intersections. 2nd and 4th Streets would provide reliever capacity to 3rd Street by accommodating localized north/south travel demand. As with Option 1, the extension of Hawthorne Avenue from Hill to 3rd Street would provide east/wets reliever capacity for both Greenwood and Franklin Avenues.

- *Option 3* would entail development of a one-way couplet system using 4th Street for northbound traffic and 2nd Street for southbound traffic. Two-way traffic would be maintained on 3rd Street between the two legs of the couplet but the existing cross-section could be narrowed to accommodate widened sidewalks, bicycle lanes and, potentially, on-street parking. Signals would be added at the intersections of 2nd and 4th Streets at both Greenwood and Franklin Avenue. The extension of Hawthorne Avenue from Hill to 3rd Street would provide east/west reliever capacity for both Greenwood and Franklin Avenues.

- A *fourth option* has been suggested by City of Bend staff which could involve development of a boulevard along 3rd Street with emphasis on widening sidewalks, and adding enhanced streetscape and bicycle lanes. North/south traffic movement would continue to use this facility with some minor widening and right-of-way acquisition to accommodate the bicycle lanes and sidewalks. Existing lane widths would be reduced to minimize the needed right-of-way. This option would not attempt to address full accommodation of the anticipated traffic demand but would permit a higher level of congestion in the corridor, making it similar to a “downtown” type of environment.

Key findings with respect to each of these alternatives are discussed below. After this discussion, a short evaluation matrix summarized comparative differences using criteria identified and discussed at public and technical meetings.

Findings of the No-Action Alternative

Key findings related to the No-Action Alternative were more fully documented in the preceding chapter and are summarized below:

- Many existing traffic operational and safety problems exist, particularly along 3rd Street at major intersections.
- The bicycle and pedestrian system is not complete and lacks both connectivity and full ADA compliance. The bicycle and pedestrian environment along 3rd Street is unpleasant and not conducive to encouraging used of non-vehicular travel modes.
- By 2030, peak period congestion will significantly expand even with improved bicycle, pedestrian, and transit connections.

Findings of the Major Roadway Widening Alternative

As noted above, this alternative focuses on identifying changes to the transportation system that would be needed to achieve City and ODOT operational standards without significant alternations in the current patterns of street functionality and purpose to accommodate north/south traffic. Thus, the system would rely solely on 3rd Street to service this demand. Some expansion would be made to east/west system capacity for non-motorized travel via Greenwood and Franklin Avenues, and for all traffic along Butler Market Road, Revere Avenue, and with the Hawthorne Avenue Extension from Hill to 3rd Street.

For intersections that are currently signalized, the mitigation considers changes in intersection geometry and signal timing optimization. This would entail significant roadway widening along the length of 3rd Street to accommodate three through lanes in each direction with added turning lane capacity at many major intersections. Most of the unsignalized intersections would require signalization only with few changes in geometry in order to meet standards.

Key findings related to the analysis of this Alternative are discussed below and summarized in Table 16. It should be noted that this information is not intended to serve as a recommendation on corridor improvement projects. Rather, it should be viewed as an indication of the extent of street construction and right-of-way acquisition that would be needed if the ultimate recommendation were to focus solely on addressing traffic congestion. Intersection analysis worksheets for these improvement options are included in Appendix E.

Table 16. Traffic Operations Summary with CAP and Major Widening Alternative

		Without Projects		With Projects		
#	Intersections	Overall V/C Ratio	Average Delay (sec./veh.)	Overall V/C Ratio	Average Delay (sec./veh.)	Standard
1	US 97/20 @ Butler Market Road • Add NB and SB thru lanes • Add WB separate right turn • Covert SB right turn to thru/right	1.26	>80.0	1.05	72.0	0.80
3	Revere Ave @ Pkwy NB Ramps • Add 2nd NB right	1.06	>80.0	0.93	21.8	0.80
4	Revere Avenue @ 3rd Street • Dual lefts for EB, WB and NB • Separate EB right turn lane • Add 3rd NB/SB thru lanes	1.32	>80.0	0.92	47.1	0.80
6	Olney Avenue @ 3rd Street • Add separate EB & WB rights • Add 3rd NB/SB thru lanes	1.32	>80.0	1.00	62.6	0.80
9	Greenwood Avenue @ 3rd Street • Provide dual left turn lanes for EB, WB & SB • Add 3rd NB & SB thru lanes • Add right turn lanes on all legs	1.60	>80.0	1.03	57.6	0.80
14	Franklin Avenue @ 3rd Street • Provide dual EB and WB left turn lanes	1.18	>80.0	0.99	58.1	1.00
20	Parkway SB Ramp @ Butler Market Road • Add 2nd EB & WB thru lanes • Provide separate SB left and right turn lanes	Unsignalized >1.00	 >80.0	Signalized 0.78	 15.4	0.80

Table 16. Traffic Operations Summary with CAP and Major Widening Alternative

#	Intersections	Without Projects: Overall V/C Ratio	Without Projects: Average Delay (sec./veh.)	With Projects: Overall V/C Ratio	With Projects: Average Delay (sec./veh.)	Standard
21	Parkway NB Ramp @ Butler Market Road	Unsignalized		Signalized		
	• No change to geometry	>1.00	>80.0	0.81	8.3	0.80
22	4th Street @ Butler Market Road	Unsignalized		Signalized		
	• Add EB right turn lane	>1.00	>80.0	0.99	42.2	1.00
23	4th Street @ Studio Road	Unsignalized		Signalized		
	• Add NB right turn lane • Add SB left turn lane	>1.00	>80.0	0.92	23.0	1.00
24	4th Street @ Revere Avenue	Unsignalized		Signalized		
	• Add 2nd EB left turn lane • Provide NB & SB left turn lanes	>1.00	>80.0	0.99	30.3	1.00
25	4th Street @ Olney Avenue	Unsignalized		Signalized		
	• No change to geometry	>1.00	>80.0	0.96	25.7	1.00
26	Parkway SB @ Lafayette Avenue	Unsignalized				
	• Consider closing EB to SB on ramp and adding SB deceleration lane					
27	Wall Street @ Bond Street	Unsignalized		Unsignalized		
	• Extend grid north of Greenwood with one-way on both Wall and Bond and median to allow free turns from Bond onto Wall	>1.00	>80.0	0.79	19.3	1.00
29	Hawthorne Avenue @ 3rd Street	Unsignalized		Signalized		
	• Develop intersection with 3 NB/SB thru lanes, single WB/WB thru lanes, 1 WB left, dual WB left and 1 EB right	>1.00	>80.0	0.99	49.0	1.00
31	SB Parkway @ Hawthorne Ave.	Unsignalized				
	• Consider closing EB to SB on ramp and adding SB deceleration lane					
32	Franklin Avenue @ 4th Street	Unsignalized		Signalized		
	• No change to geometry	>1.00	>80.0	0.61	12.3	1.00
33	Riverside Drive @ Tumalo Ave	Unsignalized		Signalized		
	• Add separate EB left turn lane • Overlap EBL and SBR signal phases	>1.00	>80.0	0.84	22.7	1.00
34	Parkway NB Ramp @ Colorado Ave	Unsignalized		Signalized		
	• Add 2nd EB left turn lane • Separate WB thru & right lanes	>1.00	>80.0	0.90	21.5	0.80

Note: Unsignalized delay and V/C ratio represent operations of the worst movement.

Typically, by 2030 with either General Plan or Central Area Plan growth, peak period traffic volumes along 3rd Street are expected to increase significantly. This increase would require an additional northbound and southbound thru lane from approximately Franklin Avenue northward to Butler Market Road. In addition, many of the intersections in the 3rd Street corridor will require auxiliary turn lanes to accommodate both right and/or left turning movements. The facility needs in this corridor will greatly impact the adjacent properties, as well as impact the travel of bicyclists and pedestrians.

The Parkway ramps at Lafayette and Hawthorne would experience considerable delay for vehicles entering the Parkway and heading south. The high volumes and speeds along the Parkway lead to safety concerns for the entering vehicles. Accordingly, it is recommended that ODOT consider closing the on-ramps and add deceleration lanes for the southbound off-ramps. The impact of a partial or total closure of these facilities on other study intersection was not evaluated.

Even with the wide variety of mitigation measures that were considered to address expected congestion problems in the Central Area, several intersections could potentially remain below either City or ODOT operating standards. For example, the intersection of Butler Market Road at US 97/20 would also remain in failure despite the addition of addition thru and turn lanes.

ODOT mobility standards were reviewed to determine if the state facilities would benefit from an STA designation. For US Highway 97, a statewide expressway, an STA designation is not an option. For US Highway 20, a statewide highway and freight route, the standard for signalized intersections would change from 0.80 V/C to 0.85 V/C, with a STA designation. This change does little to change the amount of mitigation required to bring the facilities into compliance with the estimated future volumes.

While the major roadway widening alternative addresses and attempts to resolve the anticipated traffic congestion issues associated with Central Area Plan growth along the 3rd Street corridor, it should be noted that this option does not meet the overall vision and objectives of the Central Area Plan in the following ways:

- It does not explicitly provide benefits for users of the non-motorized transportation system.
- It would require significant right-of-way acquisition and likely business relocation which could defeat the redevelopment focus of the CAP along 3rd Street.
- It would be very expensive and challenging to implement.
- It would still require concurrence by ODOT relative to acceptable levels of congestion that exceed current Oregon Highway Plan operational standards.
- Questionable support for efforts to redevelop and/or beautify the corridor.

Findings of the 3rd Street Corridor Enhancements

The 3rd Street corridor is the primary transportation link through the study area, connecting the Central Area with destinations both to the north and south. North of Greenwood Avenue, 3rd Street also serves as US 20, a statewide freight route operated and maintained by ODOT.

As indicated in the preceding section, significant capacity enhancements would be needed in the corridor to meet the applicable State and City operational standards based on the magnitude of vehicular traffic expected by 2030 with either the General Plan or Central Area Plan development scenarios. Assuming that three through lanes of north/south vehicle capacity would be needed (based on the analysis conducted above), the various design options considered in this section attempt to provide this capacity while minimizing the adverse impacts identified above.

Highlights of Corridor Options

Key findings with respect to each of these design options are as follows:

- *Option 1* (one-way couplet using 2nd and 3rd Streets):
    - Could offer improved traffic operations and vehicular safety due to the reduction in conflicting movements at major intersections.

  - Could accommodate widened sidewalks and bicycle lanes on both streets, thus offering a significantly improved and more attractive non-motorized circulation system in the Central Area.
  - Could reduce street crossings for pedestrians at most major intersections along 3rd Street by allowing for a narrower street cross-section.
  - As development occurs, parcel consolidation and street frontage improvements could offer opportunities to reduce access to adjacent properties, thus improving safety for all travel modes through the reduction of conflicting traffic movements.
  - Includes an option for the extension of Hawthorne Avenue to relieve east/west traffic volumes on Greenwood and Franklin Avenues, while providing improved connectivity throughout the entire Central Area.
  - Could have the disadvantage business impacts during the transition to one-way operations with the potentially long-term impacts associated with reduced traffic volumes in front of individual properties.
  - Effective in providing improved accessibility for parcels along 2nd Street.
- <u>Option 2</u> (Expanded Grid):
  - Could offer improved traffic operations by providing opportunities for traffic to disperse across added north/south and east/west street capacity in the area east of the Parkway. Would likely offer only limited ability to address existing congestion issues along 3rd Street.
  - Could accommodate widened sidewalks and bicycle lanes on several street (e.g., 2nd and 4th Streets), thus offering a significantly improved and more attractive non-motorized circulation system in the Central Area. Would be unlikely to improve pedestrian crossings of 3rd Street due to the need to retain similar street cross-section for capacity purposes.
  - As development occurs, parcel consolidation and street frontage improvements could offer opportunities to reduce access to adjacent properties, thus improving safety for all travel modes through the reduction of conflicting traffic movements.
  - Includes an option for the extension of Hawthorne Avenue to relieve east/west traffic volumes on Greenwood and Franklin Avenues, while providing improved connectivity throughout the entire Central Area.
  - May be one of the easiest to implement as the disruption to existing travel patterns in the study area would be minimized. Could also have lesser impacts on businesses dependent on the volume of traffic currently passing along 3rd Street. May have limited ability to encourage redevelopment opportunities along 3rd Street.
- <u>Option 3</u> (On-way couplet on 2nd and 4th Streets, 2-way traffic retained on 3rd Street):
  - Could offer improved traffic operations and vehicular safety due to the reduction in conflicting movements at major intersections.
  - Could accommodate widened sidewalks and bicycle lanes on all three streets, thus offering a significantly improved and more attractive non-motorized circulation system in the Central Area.
  - Could reduce street crossings for pedestrians at most major intersections along 3rd Street by allowing for a narrower street cross-section.

- As development occurs, parcel consolidation and street frontage improvements could offer opportunities to reduce access to adjacent properties, thus improving safety for all travel modes through the reduction of conflicting traffic movements.
- Includes an option for the extension of Hawthorne Avenue to relieve east/west traffic volumes on Greenwood and Franklin Avenues, while providing improved connectivity throughout the entire Central Area.
- Could have the disadvantage of business impacts during the transition to one-way operations with the potentially long-term impacts associated with reduced traffic volumes in front of individual properties.
- Could help local businesses by providing on-street parking along 2nd, 3rd and 4th.
- Effective in facilitating redevelopment along 3rd Street while providing improved accessibility for parcels along 2nd Street.
- May be the easiest to stage for construction in comparison with Options 1 and 2.
- Could adversely impact residential areas along 4th and/or to the east due to increased traffic volumes. However, it should be noted that land uses along 4th Street are currently in transition away from residential toward office and retail uses.
- May be the most expensive of all the options considering the linear feet of roadway improvements that are included.

- <u>Option 4</u> (Boulevard on 3rd Street with median and reduced lane widths):
  - Could accommodate widened sidewalks and bicycle lanes on 3rd Street, but would require right-of-way acquisition to accomplish. Would be unlikely to improve pedestrian crossings of 3rd Street at major intersections due to the need to retain similar street cross-section for capacity purposes. With installation of raised median, could provide some opportunities for reduced pedestrian crossing distances away from major intersections where left turn lanes would be needed.
  - As development occurs, parcel consolidation and street frontage improvements could offer opportunities to reduce access to adjacent properties, thus improving safety for all travel modes through the reduction of conflicting traffic movements.
  - Could include an option for the extension of Hawthorne Avenue to relieve east/west traffic volumes on Greenwood and Franklin Avenues, while providing improved connectivity throughout the entire Central Area.
  - Would likely experience significant levels of congestion at major intersections as indicated in the discussion of the Major Widening Alternative above.
  - May be one of the easiest to implement as the disruption to existing travel patterns in the study area would be minimized. Could also have lesser impacts on businesses dependent on the volume of traffic currently passing along 3rd Street. However, the need for right-of-way acquisition to add bicycle lanes and create a beautified and wider sidewalk environmental may have adverse business impacts.
  - May have limited ability to encourage redevelopment opportunities along 3rd Street.
  - May be one of the least expensive of all the options, dependent on extent of right-of-way acquisition needed. Narrowing of existing lane and median widths could help to minimize right-of-way acquisition needs, but will likely require concurrence by ODOT for the section of 3rd Street from Greenwood Avenue north.

3rd Street Roadway Option Conclusions

Based on discussions with the CAP Project Advisory Committee, city staff and a work session with City Council, it is recommended that the city further explore the feasibility and viability of the 3rd Street Option that includes development of a one-way couplet system along 2nd and 4th Streets while retaining two-way operations along 3rd Street with a narrowed cross-section and bicycle/pedestrian system enhancements including ADA-compliant pedestrian facilities. Street beautification should be emphasized to encourage revitalization.

Other Transportation Options

In addition to or in lieu of the foregoing design options that focus on 3rd Street, a variety of other transportation strategies might be considered to address the anticipated 2030 peak period congestion problems. These could include one or more of the following:

- Consider developing an expressway-to-expressway interchange at the existing signalized intersection of Butler Market Road with US 97/20. This improvement would need to be carefully coordinated with the existing adjacent Parkway interchange with Butler Market Road.
- Consider developing an improved Business 97 (3rd Street) bypass around the core city area to divert potential through traffic traveling from north of the Central Area to destinations east of the Central Area. A select link assessment was conducted of through trips on 3rd Street north of Greenwood Avenue which indicated that only about 5 percent of trips from north of Empire Avenue would likely be destined east of 27th Street. Other bypass options should be considered.
- Consider enhanced transportation system demand management strategies to reduce travel into and out of the Central Area. Such strategies could include further enhancements to the pedestrian and bicycle systems, expansion of transit service, parking pricing strategies in the core area, and other options.
- Consider a jurisdictional transfer of 3rd Street with the corresponding ability to reduce operating standards from those promulgated by ODOT to those currently in adopted City policy.

Bicycle and Pedestrian System Improvement Needs

Bicycle and pedestrian facilities in the Bend Central Area consist of dedicated bicycle lanes, bikeways (shared roadways), multi-use paths, and sidewalks. These systems are more fully described in Technical Memorandum #2 – Existing Conditions including identification of existing deficiencies.

There are many constraints to using the existing bicycle or pedestrian system within the study area. Both systems have many gaps where either no facilities or unattractive, unappealing facilities are provided. A key issue for the Central Area Plan is the lack of bicycle connections between the Third Street corridor and the core area. The existing Bend Parkway and BNSF tracks create a formidable barrier to connectivity by non-auto modes. Connections via either Greenwood Avenue or Franklin Avenue are narrow, dark and unappealing to the user. The existing connections must be shared between bicyclists and pedestrians and, in some instances, there is limited sight distance which could lead to potential conflicts between these two modes.

The width and traffic volumes along Greenwood Avenue have been identified as a barrier to pedestrian movement between the historic core and the neighborhoods/business areas to the north. Additionally, the level of traffic, frequent driveways and the presence of curb tight sidewalks (or lack of any sidewalks) make pedestrian activity along such streets as 3rd Street unappealing. In many locations, sidewalk pavement quality is poor or the existing facilities are out of compliance with ADA standards.

These situations occur at several locations in the Bend Central Area. Significant gaps in the bicycle system include segments of Wall/Bond Streets, Portland Avenue, Greenwood Avenue, and Franklin Avenue. Pedestrians experience barriers at Greenwood Avenue and along Wall Street north of Greenwood Avenue. The railroad crossing is a barrier to providing connectivity for all modes.

Continuity of facilities and connections to desired destinations is essential to encourage both bicycle and pedestrian travel. Especially important is connecting people to other modes of transportation such as transit. Improving access to multi-modal travel is an important element in facilitating regional travel. The use of two of more modes of transportation in a single trip (i.e., bicycling and riding the bus) can extend the distance that someone is able to travel thus reducing another barrier to pedestrians and bicyclists, destinations that are out of reach.

Based on an assessment of existing deficiencies in the bicycle and pedestrian circulation system along the priority streets in the Central Area, the recommended system improvements are presented in Table 17.

Table 17. Pedestrian and Bicycle System Improvements with Central Area Plan

		Improvement	
Street	**Segment**	**Sidewalk**	**Bike Lane**
3rd Street	Webster Avenue to Vail Avenue	1 side	
	Underwood Avenue to Thurston Avenue	1 side	
	Vail Avenue to Franklin Avenue (1)		2 lanes
4th Street	Vail Avenue to Thurston Avenue	1 side	
	Stewart Avenue to Revere Avenue	1 side	
	Quimby Avenue to Penn Avenue	1 side	
	Olney Avenue to Norton Avenue	1 side	
	Lafayette Avenue to Kearney Avenue	1 side	
	Irving Avenue to Franklin Avenue	1 side	
	Revere Avenue to Franklin Avenue		2 lanes
Studio Road	4th Street to Underwood Avenue	2 sides	
	South of Vail Avenue to Butler Market	1 side	
Division Street	Thurston Avenue to Riverview Park	1 side	
Revere Avenue	Hill Street to 4th Street		2 lanes
Greenwood Avenue	Hill Street to 2nd Street	Improve 2 sides	
	Bond Street to 3rd Street		Improve 2 sides
Hawthorne Avenue	2nd Street to 3rd Street	1 side	
	Parkway and BNSF RR undercrossing (2)	Pathway	Pathway

Table 17. Pedestrian and Bicycle System Improvements with Central Area Plan			
		Improvement	
Street	Segment	Sidewalk	Bike Lane
Hill Street	Lafayette Avenue to Kearney Avenue	1 side	
Franklin Avenue	Hill Street to 2nd Street Bond Street to 3rd Street	Improve 2 sides	 Improve 2 sides
Wall Street	North of Lafayette to Norton Avenue Greenwood Avenue to Idaho Avenue Colorado Avenue to Arizona Avenue	1 side	 Shared lane 1 lane
Bond Street	Greenwood Avenue to Idaho Avenue Colorado Avenue to Arizona Avenue		Shared lane 1 lane
Arizona Avenue	Lava Road to Hwy 97 ramps	2 sides	
Colorado Avenue	Chamberlain to Sizemore	1 side	

(1) Recommended in Bend Transportation System Plan, may be more practical to put on 4th Street due to significant traffic volumes expected along 3rd Street and need for widening.
(2) Recommended in Bend Transportation System Plan

Central Area Plan Strategy

This section draws preliminary conclusions from the discussion in the preceding section and lays out a strategy for proceeding with the transportation elements of a Central Area Plan strategy. This section includes a discussion of:

- Key plan elements
- Compliance with State laws and policies
- Compliance with Bend laws and policies
- Suggested TSP amendments
- Transportation system implementation actions
- Funding

Key Plan Elements

The key elements of the transportation portion of the Central Area Plan include a discussion of the primary objectives for the transportation system, along with specific direction on the component pieces of that system.

- **CAP Transportation Objectives**
  - *Support a system of street hierarchies with accompanying cross-sections, access control and improvement concepts to implement the City's Transportation System Plan (TSP).*
  - *Improve connectivity for all travel modes (vehicles, pedestrians, bicyclists, transit)*
  - *Enhance the traveling environment and safety for pedestrians and bicyclists.*
  - *Address street system congestion problems.*
  - *Address implementation of city and/or ODOT access management policies (e.g., driveway consolidation, access off side streets, etc.).*
  - *Support revitalization of 3rd Street by enhancing street beautification.*
  - *Provide for and manage parking resources.*
  - *Consider using alleyways for access, pedestrians, stormwater management.*

- **Circulation System Components**

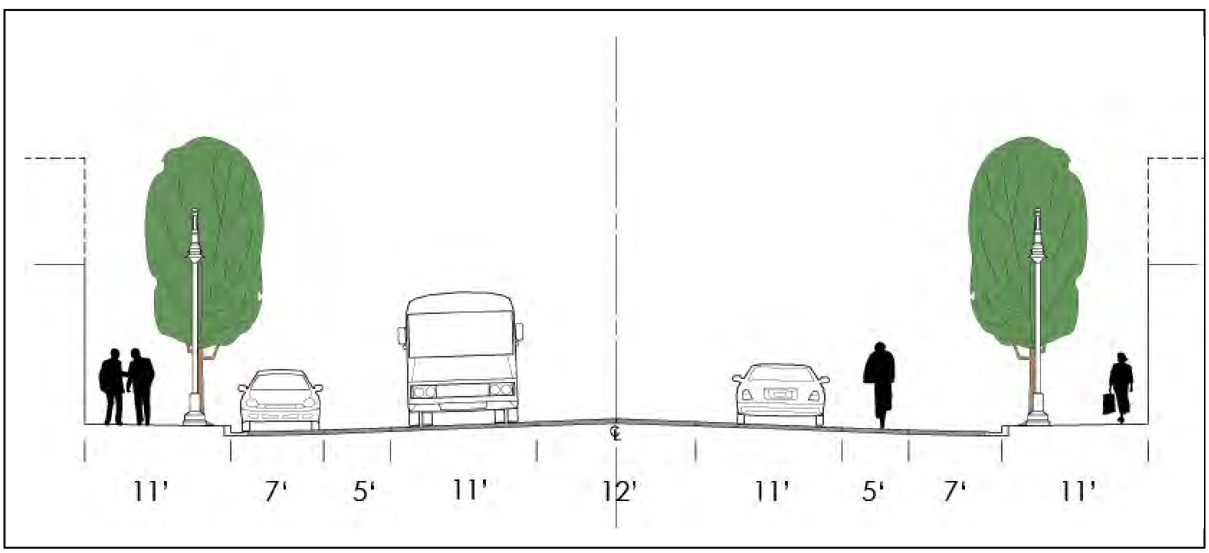
  The components of the Central Area Plan circulation system include a variety of specific elements which are described below:

  - <u>Functional classification system</u> – Building on the classification system established by the City's Transportation System Plan, the Central Area Plan includes a hierarchical system of streets that reflect varying functions. Based on the preliminary choice of the 3rd Street Option that included a one-way couplet on 2nd and 4th Streets with two-way operations on 3rd Street, several classification system changes should be considered:

    - *3rd Street* is currently designated as a Principal Arterial whose primary function is to carry though traffic. This function influences the appropriate street cross-section (typically wider to accommodate large vehicles and heavy traffic), the nature of roadway system projects (usually focused on improving traffic flow and operations), and the control and/or reduction of access to adjacent properties and the spacing of side street intersections. If 3rd Street were to become a two-way street between a one-way couplet system, consideration should be given to changing its classification to Minor Arterial. Additionally, an overlay should be established that identifies it as a Great Street and defines what that means.

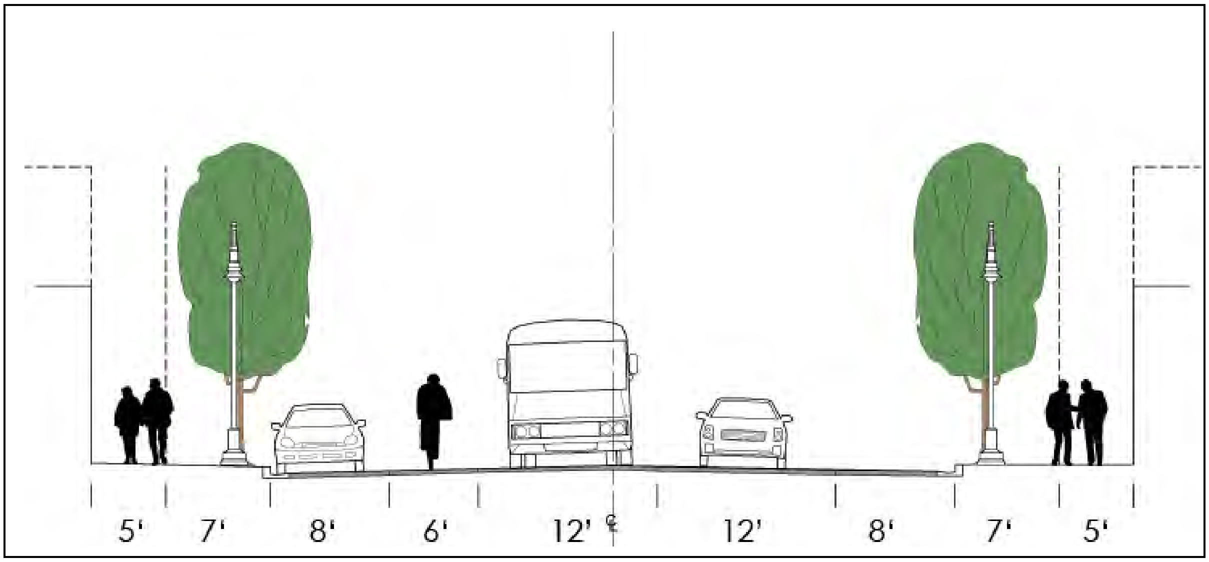
    - *2nd and 4th Streets* – 4th Street is currently designated as a Minor Arterial north of Franklin Street and a Major Collector south of Franklin Street. 2nd Street is currently designated as a local street. Both streets should be considered for Principal Arterial Designation consistent with their new through traffic-moving function under the CAP.

  - <u>Street cross-sections</u> – Consistent with the CAP vision of a revitalized 3rd Street, changes in its existing street cross-section should be made consistent with a Minor Arterial/Boulevard type function. An example of such a cross-section is presented below.



3rd Street Boulevard Concept – Street Cross-Section in 80-foot Right-of-Way

Consistent with the proposed change in the functions of 2nd and 4th Streets, an appropriate cross-section might look like the following. The version shown here could be either 2nd Street looking north or 4th Street looking south.



2nd or 4th Street Concept – Street Cross-section in 70-foot Right-of-Way

- Street system connectivity – Several suggestions are made with respect to overall system connectivity. These include:
  - Extending Hawthorne Avenue from Hill Street to 3rd Street and providing enhanced transportation connections between the Historic Downtown and the Railroad District.
  - Incorporating platted but undeveloped streets into the grid to ensure long-term access and connectivity of the system.
  - Reviewing the role of Division Street in the City's transportation system and offering suggestions for added connectivity as appropriate.
- Enhancements to the existing bicycle and pedestrian circulation system to include:
  - Completion of missing segments as identified in Table 17.
  - Improve pedestrian and bicycle connections between the Railroad District and the Historic Core via both Franklin and Greenwood Avenues
  - Provide multi-modal connections between Historic Downtown and the Railroad District via the Hawthorne Avenue Extension.
  - Enhance pedestrian crossings of 3rd Street by development of the narrowed street cross-section presented above, and through the use of curb bulb-outs at intersections.
  - Enhance the pedestrian and bicycling environment along 3rd Street by developing the Great Street Concept including widened sidewalks and installation of bicycle lanes.
  - Enhance the pedestrian and bicycling environment along 2nd and 4th Streets by including wider sidewalks and bicycle lanes as the one-way couplet concept is developed.
  - Continue to work towards a sidewalk and pedestrian pathway system that is fully compliant with the requirements of the Americans with Disabilities Act (ADA) using the City prioritization, funding and implementation mechanisms currently in place.
  - Consider adding or improving pathways and/or sidewalks in the Historic Southern Neighborhoods to provide better and safer connections between this area and the Historic Downtown.
  - Strong multi-modal connectivity should be maintained between the Old Mill District and the Historic Downtown for a focus on Wall and Bond Streets. The TSP also provides for consideration of Lava Road in this context.

  - Explore the feasibility of providing a separate pedestrian and bicycle pathway across 3rd Street immediately south of the existing railroad crossing structure.

- Access management – based on existing ODOT and City policy, develop an access management plan in conjunction with a refined improvement concept for the 3rd Street Revitalization Concept. This access management plan should address:

  - Opportunities for driveway consolidation and/or shared driveway usage.
  - Opportunities for the installation of medians along 3rd Street with the proposed "Boulevard" concept (this could be an early action item to incorporate street trees along a portion of the corridor).
  - Opportunities for property access to obtained from side streets wherever possible.

- Parking – consideration of parking within the Central Area should focus on to key objectives;

  - To accomplish the vision of higher densities, a mix of land uses, and a viable multi-modal transportation system it will be important to consider both structured parking and establishing a paid parking system within the Central Area. The City is currently addressing this issue and the recommendations of this effort should be coordinated with the recommendations of this Plan.
  - Additionally, consideration should be given to identifying the location of future public parking facilities and land banking these as surface lots in advance of the need for parking structures.

- Transit – Suggestions related to the future transit system in the Central Area focused on two objectives:

  - Consider locating a permanent downtown transit center in the area generally bounded by the Parkway on the west, Franklin Avenue on the south, 2nd Street on the east and Greenwood Avenue on the north. A transit center located in this general area would provide greater proximity to the Historic Downtown than the current location and would be situated within the area with the highest potential for dense mixed use development within the Railroad District. Additionally, by located on the west side of 2nd Avenue, pedestrian crossings of the couplet would be eliminated for the largest target market – downtown workers and visitors.
  - Consideration should also be give to providing a Downtown shuttle bus as the Bend Area Transit system matures, densities in the core area increase, and parking becomes more constrained and/or expensive.

- Alleyways – Alleyways have been identified for a variety of functions in the Central Area Plan including added bicycle and pedestrian connectivity, back of building access for deliveries, and as a component element in a stormwater management strategy for the study area.

- Wayfinding – during Phase 1 of the Central Area Plan development process concern was raised by the community about how difficult it can be for visitors to find the downtown from either the Parkway or from 3rd Street (Business 97). During Phase 2, concerns were also expressed about wayfinding within the Central Area as development densities increase and transportation connectivity is enhanced. Accordingly, it is recommended that:

  - A wayfinding program be established to locate added and/or improved directional signage for

motorists between the Parkway/3rd Street corridors and downtown.
- A wayfinding program focused on pedestrians and bicyclists be established in the Historic Downtown (and ultimately throughout the Railroad District) to direct people to major destinations. An example of a typical Wayfinding sign is presented in the adjacent photograph.

Compliance with ODOT Policies

Access Management

3rd Street north of Greenwood Avenue and Greenwood Avenue east of 3rd Street are under the jurisdiction of ODOT. The CAP does not call for any additional access points to either of these streets. However, the development of the CAP would alter the existing state highway by creating a one-way couplet system using 2nd and 4th Streets in lieu of the existing highway alignment along 3rd Street. Various modifications to existing north/south street cross-sections are proposed as a preliminary concept. It is recommended that a refinement plan be prepared to flesh out the details of the preliminary concept and finalize the details of a preferred concept. As this concept is further developed, ODOT Access Management Policies outlined in OAR 734-051 be addressed.

Transportation Planning Rule

Recent modifications to the Oregon Transportation Planning Rule require that *"where an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation would significantly affect an existing or planned transportation facility, the local government shall put in place measures as provided in section (2) of this rule to assure that allowed land uses are consistent with the identified function, capacity, and performance standards (e.g., level of service, volume to capacity ratio, etc) of the facility."* The modifications to the rule also explain that a land use plan or regulation significantly affects a facility if it would:

- *"Change the functional classification of an existing or planned transportation facility;*
- *Change standards implementing a functional classification;*
- *Allow land uses or levels of development that would result in types or levels of travel or access that are inconsistent with the functional classification of an existing or planned facility;*
- *Reduce the performance of an existing or planned facility below the minimum acceptable performance standard identified in the TSP or comprehensive plan; or*
- *Worsen the performance of an existing or planned transportation facility that is otherwise projected to perform below the minimum acceptable performance standard identified in the TSP or comprehensive plan."*

As shown in Table 15, most signalized intersection in the CAP study area would meet the applicable standards with either the General Plan or Central Area Plan scenarios. As indicated in Table 16, most unsignalized intersections would exceed these standards, but many would require only signalization and/or minor turn land additions to come into compliance. However, in assessing the compliance of the Central Area Plan with the TPR, it should be noted that the CAP anticipates a future of significant change in the downtown and its surroundings which will alter the functional usage of several major streets to an increasingly urban "core area" type environment. Accordingly, along with the changes in land uses from the existing strip commercial and light industrial, to urban mixed use including retail, office and residential uses, the inherent nature of the CAP would result in a development pattern largely in keeping with the goals of the TPR. Thus, changes to the transportation system to address the anticipated growth in traffic volumes should be consistent with the vision of the CAP and not simply focused on "fixing" the traffic problem. Additionally, since the CAP in and of itself does not alter the existing General Plan, zoning or TSP, the need to determine identify a specific list of multi-modal projects should best be determined when, and as these changes are made. Guidance in determining this list of projects is provided in the section entitled “Transportation Implementing Actions”.

Special Transportation Area and Urban Business Area

Consideration was give to designating 3rd Street and Greenwood Avenue as Special Transportation Areas or Urban Business Areas in order to meet OHP v/c standards. However, because these highways have been designated as statewide freight routes, an STA or UBA designation would only drop the standard from a v/c of 0.80 to 0.85 which would not make a difference. Accordingly, these designations were not considered further.

Compliance with City Policies

The Bend Development Code (Chapters 3 and 4) and various city street system policies provide specific guidance on the development and management of the city’s transportation system. Of particular relevance to the Central Area Plan are guidelines related to street design, traffic analysis to determine infrastructure requirements and access management provisions.

Design Requirements

Chapter 3 of the Development Code addresses street design standards including street geometrics and right-of-way, grades, sight distance, property access, traffic control, sidewalks, planter strips, bicycle lanes, curb cuts, parking and many other features. It is intended that implementation of transportation system projects pursuant to the CAP will be consistent with the requirements identified in Chapter 3.

Traffic Analysis

Chapter 4 of the Development Code and Street Policy #6 address transportation analysis requirements that determine needed street infrastructure to accommodate existing and potential future traffic volumes. These requirements are typically related to and carried out in conjunction with land development activity and stipulate: when study is required, how a study should be conducted, how the findings, conclusions and recommendations of a study are approved, and mitigation requirements/conditions of development approval. It is not intended that the transportation analysis prepared for the CAP substitute for any development-related transportation analysis required by Chapter 4 or Street Policy #6. This analysis should accompany specific development activity. However, there may be value in visiting a streamlining of transportation analysis requirements as part of the 3rd Street Corridor Refinement Plan which is further discussed below.

Access Management

Within the Central Area all streets other than 3rd Street north of Greenwood Avenue, Greenwood Avenue east of 3rd Street and the Parkway are under the jurisdiction of the City of Bend. Accordingly, ODOT access management policies do not apply. The City of Bend had adopted several guidelines for managing access along major city streets (including City Street Policies #2 and #4, and Development Code Chapter 3.1) that identify guidelines for access spacing, sight distance, median openings, turn prohibitions, and coordination with other jurisdictions. As the CAP is implemented, the City of Bend should pursue opportunities for shared access arrangements with developers and property owners as new development occurs. This will ultimately minimize the number of access points to the City’s downtown street system; therefore preserving and enhancing the long term mobility and safety of the streets. In addition, this complements shared parking policies to minimize the amount of space devoted to parking supply.

TSP Amendments

Consideration should be given to amending the City’s current Transportation System Plan and Street Standards to accommodate the cross-sections and general streetscape features associated with new street classifications within the Central Area. These include:

- A Principal Arterial that has been designated as a Great Street (3rd Street)
- A Minor Arterial that has been designated as a Great Street (Greenwood, Olney and Franklin)
- Consider redesignation of 2nd Street as a Minor Arterial or Major Collector to distribute north/south traffic within revitalized corridor.

Transportation System Implementing Actions

This section focuses on identifying specific actions that could be taken to advance implementation of the Central Area Plan from the perspective of developing and altering the transportation system. Most particularly, this section focuses on the revitalization of 3rd Street and enhancements to the pedestrian and bicycle circulation systems, but also includes many other proposed actions. The discussion of implementing actions is organized as follows:

- Future refinement studies to address conceptual design issues that were beyond the scope of the Central Area Planning process;
- Public investment transportation catalyst projects to help “jump start” land use development consistent with the vision of the CAP; and
- Short, mid and long-range transportation projects that will help carry out the CAP.

Studies

- 3rd Street Corridor Refinement Plan – develop consensus on a preferred concept, layout linear details of the concept including identification of right-of-way and access needs, detailed cost estimates, and an implementation strategy. A key issue to be addressed in this study will include:
    - Address sidewalk, bicycle lane and travel lane widths, on-street parking configuration, property access, signal timing, and pedestrian crossings for not only the north/south streets in the corridor (2nd, 3rd and 4th Streets), but also the key east/west streets (Revere, Olney, Greenwood and Franklin). Consider long-term integration with a future Hawthorne Avenue extension between Hill and 3rd Streets.
    - Identify design standards and/or general guideline for streetscape and amenities along the 3rd Street corridor to provide each street with its own character
    - Resolve transitional areas at the northern and southern termini. This could include development of an additional railroad undercrossing at the southern terminus to improve connectivity between the 3rd Street corridor and the Old Mill District. It is suggested that the northern terminus be located north of Revere Street to provide sufficient capacity for north/south traffic through the intersections with this street which provide access to the Parkway.
    - Work out an implementation strategy that includes, at a minimum, refined cost estimates, funding sources, timing and priorities of projects, and an approach to phasing of construction and transitions between two-way and one-way traffic operations.
    - Initiate long-term discussion of a potential redesignation of Highway 20 away from its current alignment along 3rd Street north of Greenwood Avenue and along Greenwood Avenue to the east of 3rd Street.
    - Potentially consider creating a master transportation impact study to help streamline traffic impact analyses for development review in the Central Area. This could make development activity within the Central Area more attractive to and easier for various development interests.

Projects

- **Catalyst projects** – Actions that should be taken over the next 1 to 5 years to help "jump start" revitalization along the 3rd Street Corridor. These projects should include:
    - Pedestrian improvements under railroad and Parkway for Greenwood and Franklin Avenues to add lighting and security, improve line of sight.
    - Install raised and landscaped median along 3rd Street between Greenwood and Franklin Avenues with ADA compliant pedestrian projects at selected locations.
    - Build 2nd and 4th Streets to full 70-foot cross-section as identified with the couplet concept, but retain 2-way operations between Greenwood and Franklin Avenues until additional phases of couplet development to the north and south can be completed.

Error! Objects cannot be created from editing field codes.

- **Short-term projects** – other actions that could be taken over the next 1 to 5 years that are not focused on 3rd Street revitalization.
    - Conversion of Wall Street between Greenwood and Bond, extend downtown grid to north (see illustration of this concept to the right).
    - Sidewalk along the west side of Wall Street north of Lafayette Street

The catalyst and short-term transportation system projects are summarized in Table 18 along with a range of other suggested roadway, pedestrian and bicycle circulation projects to be developed in the study area in the medium (5 to 10 years) and longer-term (more than 10 years). Also presented in the table is an order-of-magnitude estimate of likely cost and a suggested assignment of funding and implementation responsibilities. It is anticipated that cost estimates and a more detailed funding and implementation strategy will be developed as project details are further refined through conceptual design in the proposed 3rd Street Corridor Refinement Study.

Table 18. Transportation Implementation Projects

	Priorities/Timing				
Description	**Short**	**Medium**	**Long**	**Cost**	**Funding and Responsibility**
Catalyst Projects					
• Greenwood and Franklin Avenues at Parkway/Railroad – enhance pedestrian undercrossing	X			Moderate	City/Urban Renewal
• 3rd Street, Greenwood to Franklin – install raised, landscaped median and ADA improvements	X			Moderate	City/Urban Renewal
• 2nd and 4th Streets, Greenwood to Franklin – widen street and sidewalk, add bike lanes, install landscaping	X			Medium	City/Urban Renewal

Table 18. Transportation Implementation Projects					
	Priorities/Timing				
Description	Short	Medium	Long	Cost	Funding and Responsibility
Roadway Projects • Wall Street, Bond to Greenwood – convert to one-way southbound, install angle parking, modify intersection of Wall @ Bond	X			Low	City
• 2nd and 4th Streets, Revere to Greenwood – widen street and sidewalk, add bike lanes, install landscaping and on-street parking		X			City/Urban Renewal
• Revere Avenue @ NB Parkway Ramps – NB right turn lane		X		Medium	ODOT
• Butler Market Rd @ US 97/20 – add lane capacity		X		High	ODOT
• Butler Market @ SB Parkway Ramp – provide right & left turn lanes from ramp		X		Medium	ODOT
• Butler Market @ 4th Street – EB right turn lane		X		Low	City
• 2nd and 4th Streets, Franklin to southern terminus – widen street and sidewalk, add bike lanes, install landscaping and on-street parking. Southern terminus could involve added railroad undercrossing to improve connectivity with Old Mill District		X		High	City/Urban Renewal
• 2nd and 4th Streets, north of Revere – construct new and modify existing streets to accommodate one-way couplet transition to 3rd Street		X		High	City/Urban Renewal
• 3rd Street, northern to southern terminus – narrow street, widen sidewalks, add bike lanes, landscaping and on-street parking, convert 2nd and 4th Streets to one-way operations		X		High	City/Urban Renewal
• Studio Road @ 4th Street – add turning lanes		X		Medium	City
• SB Parkway @ Lafayette Avenue – close on-ramp, decel lane for off-ramp			X	Low	ODOT
• SB Parkway @ Hawthorne Avenue under RR/Parkway to 2nd			X	High	ODOT/City
• Hawthorne Avenue undercrossing, Hill to 3rd – construct new grade-separated road with 2 vehicular lanes, bike lanes, sidewalks and landscaping.			X	High	City/Urban Renewal
• NB Parkway Ramp @ Colorado Avenue – signalize &added EB/WB turn lanes			X	Medium	ODOT
Pedestrian Projects (excluding 2nd, 3rd, and 4th Street couplet corridor and catalyst projects) • Wall Street: n/o Lafayette	X			Medium	City
• 3rd Street: Webster – Vail		X		Low	ODOT
• 3rd Street: Underwood – Thurston		X		Low	ODOT

Table 18. Transportation Implementation Projects					
	Priorities/Timing				
Description	Short	Medium	Long	Cost	Funding and Responsibility
• 4th Street: Vail – Thurston		X		Low	City
• 4th Street: Steward – Revere		X		Low	City
• Hill Street: Lafayette – Kearney		X		Low	City
• Arizona Avenue: Lava – US 97		X		Medium	City
• Studio Road: 4th – Underwood			X	Low	City
• Studio Road: s/o Vail – Butler Mkt			X	Medium	City
• Division Street: Thurston - Riverview			X	Medium	City
• Colorado Avenue: Chamberlain to Sizemore			X	Low	City
Bicycle Projects (excluding 2nd, 3rd, and 4th Street couplet corridor and catalyst projects) • Revere Avenue: Hill – 4th		X			City/ODOT
• 3rd Street: Vail – couplet transition		X			ODOT

Note: Some of the suggested roadway projects are premised on meeting City operational standards, in particular focusing on the hours on either side of the peak.

Funding

A wide range of funding opportunities exist to support the development of transportation infrastructure in the Central Area consistent with the suggestions and recommendations of this Plan. These opportunities include the following.

- **State Gas Taxes** are collected by the State based on the amount of gasoline delivered, and distributed to local jurisdictions based on the amount sold locally. While the gas tax provides needed transportation system revenue, it is unlikely to keep pace with future maintenance needs. The legislature fuel efficiency and the appearance of hybrid or mixed-fuel vehicles offset the future purchasing power of the gas tax. This funding source can be used both by ODOT and the City to fund projects under their respective jurisdictions.

- **System Development Charges** or development impact fees are one-time fees assessed to new development and changes in use. These fees are paid by land developers to cover a portion of the increased system capacity needed to accommodate new development. Development charges are calculated to include the costs of impacts on adjacent areas or services, such as increased school enrollment, parks and recreation use, or traffic congestion. SDCs are one of the major sources of funding for the City of Bend's current Capital Improvement Program which prioritizes the use of city revenues for transportation (and other infrastructure) purposes. New SDC assessments can be created in specific districts and can be dedicated to specific infrastructure investments.

- **Street Bonds** can be of two types: Revenue Bonds and General Obligation Bonds. Revenue bonds are typically secured by local gas tax receipts, street utility fees or other transportation-related stable revenue stream. General Obligation Bonds, which must be approved by majority of the voters and which are typically secured by a property tax, also can be used to finance transportation improvements.

- **Tax Increment Financing** – Tax increment financing is a mechanism where public projects are financed by debt borrowed against the future growth of property taxes in an urban renewal district. The assessed value of all properties within the district is set at the time the district is first established (the base). As public and private projects enhance property values within the district, the increase in property taxes over the base (the increment) is set aside. Debt is issued, up to a set maximum amount, to carry out the urban renewal plan and is repaid through the incremental taxes generated within the district. Urban Renewal Districts usually are in effect for 15 to 20 years. When the district is retired, the base is removed and all property taxes in the district return to normal distribution. Bend currently has urban renewal districts in the Downtown Historic Core and at Juniper Ridge.

- **Enterprise Zone** – An Enterprise Zone is a State-designated area where businesses located within them that make capital investments, hire new employees, contribute to economic development plans, rehabilitate old buildings, and/or do research and development are provided a tax credit and potentially other development incentives. An Enterprise Zone designation would be an incentive to attract business investment in the Central Area.
- **Local improvement districts** (LIDs) levy special assessment charge on property owners within a defined area such as a neighborhood, street frontage or industrial/commercial district, with each property assessed a portion of total project cost. LIDs are commonly used for street paving, drainage, parking facilities and sewer lines. The justification for such levies is that many of these public works improvements provide a direct benefit or enhancement to the value of nearby land, thereby providing direct financial benefits to its owners. LIDs are used typically for local street projects that cannot be funded through other means. State law and city code govern the formation of LIDs, the assessment methodology, and other factors. LIDs are usually funded by the participants, but may also be combined with other funding sources to leverage all available resources. LIDs are typically petitioned by and must be supported by a majority or supermajority of the affected property owners.
- **Grant Revenue** is available through a number of state and federal programs for street, bicycle/pedestrian and transit improvements. Grant programs that the City has and/ or can pursue successfully include:
  - *Community Development Block Grants* (CDBG) from the federal Housing and Urban Development Agency (HUD);
  - *Transportation and Growth Management* (TGM) - ODOT provides grants to local governments in Oregon for a variety of purposes including updating land use and transportation plans, making walking and biking safer and more convenient, improving access to transit, improving the pedestrian-friendliness of downtowns and Main Streets, amending local codes to encourage "transportation efficient" development, and creating better connections between local destinations.
  - *ODOT local access street grants*; and
  - *ODOT Pedestrian and Bicycle Program* – ODOT provides grants for crosswalks, bike lane striping, and pedestrian crossing islands that fall within the rights-of-way of streets, roads and highways. Bike/ped grants usually fall between $80,000 and $500,000.
  - *Oregon Transportation Enhancements (TE) Program* – Using federal transportation funds, ODOT TE grants are awarded to local governments and other public agencies to support projects that improve communities and enhance the experience of traveling. New sidewalks, bike lanes, and pedestrian amenities such as benches and streetlights are eligible TE projects, as are the restoration of historic railroad stations, bus stations, and bridges. TE awards typically range from $200,000 to $1 million, and local governments must contribute ten percent of the project's cost.
  - *Safe Routes to School (SR2S)* – Administered in Oregon through ODOT, this federal program funds advocacy efforts such as traffic education, safety enforcement near schools, and public awareness campaigns aimed at making it safer for children to walk to school. SR2S funds

may also be used for the construction of sidewalks, pedestrian crossings, bike storage racks, and traffic calming facilities.

- **Parking District –** A Parking District is a special district created to fund parking improvements and programs. Typically, the District receives funding from parking meters, garages, and fines. Funds in a Parking District are part of a special enterprise fund, remaining separate from the City's general fund. A Parking District can also include a fee in lieu of program for new development to fund shared parking structures.

Other revenue is available from a variety of smaller sources, most of which can be generated locally including:

- Pedestrian-scale Street Light Utility Fees
- Developer share of specific projects
- Signal Maintenance Charges to ODOT
- Jurisdictional Transfers from ODOT
- Fees from Street Cuts (e.g., for utility installation)

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Other Infrastructure

This section includes a brief summary of the improvement needs for water systems, sewer systems, storm water facilities, and other private utility systems. The study area consists of the area east of the Deschutes River, west of 4th Street, north of Arizona Avenue and south of Butler Market Road.

Water System

The Central Area is located primarily within the City of Bend's Water Pressure Zone 5, which provides customers with gravity fed water from the Awbrey reservoir and the Pilot Butte reservoirs at elevations ranging from 3,650 to 3,750 feet. Pressure Zone 5 extends well beyond the Central Area and serves an existing population of approximately 20,890.[2] Future water demand assumptions and facility requirements have been identified within the Bend Water System Master Plan (October 2006 – Final Draft) with estimates of population for the service area at build-out. Key findings and assumptions contained within the Waster System Master Plan are cited in this Technical Memorandum for comparison and consistency purposes.

As indicated in Table 19, the current Bend Water Master Plan provides water demand forecasts for Pressure Zone 5, based upon vacant and redevelopment land assumptions. Zone 5 is expected to accommodate 29,840 people at build-out, after it adds approximately 9,007 residents. The average daily water demand (ADD) is expected to increase by 2.96 million gallons per day (mgd), and maximum daily water demand (MDD) is expected to increase by 6.8 mgd.

Table 19. Zone 5 Water Demand (Included Central Area)

	2006 Estimate	Build-out	Change
Population	20,833	29,840	+ 9,007
Per Capita Water Demand *			
Avg. Daily Demand (gallons per day)	216	250	+ 34
Maximum Daily Demand (gallons per day)	518	590	+ 71
Peak Hour Factor (x MDD)	2.1	1.5	--
Water Demand in Central Area*			
Avg. Daily Demand (gallons per day)	4,500,000	7,460,000	+ 2,960,000
Maximum Daily Demand (gallons per day)	10,800,000	17,600,000	+ 6,800,000
Peak Hour Demand (gallons)	22,800,000	26,400,000	+ 3,600,000

* Derived from the Bend Water System Master Plan, October 2006 as compiled by Otak, Inc.

According to the market forecasts conducted as part of this planning effort (please refer to Table 2), the Bend Central Area is expected to add approximately 2,314 dwellings that house an additional 4,143 people by 2030. This amount of growth is likely to generate additional water demand, which is shown in Table 20. Future water demand within the Central Area is expected to increase by approximately 0.9 mgd, and maximum water demand is expected to increase by 2.2 mgd.

[2] Bend Water System Master Plan, October 2006 – Final Draft.

Table 20. Central Area Household Water Demand	2006 Estimate	2030 Projection	Change
Housing Units +	2,056	4,370	+ 2,314
Population *	2,977	6,199	+ 4,143
Per Capita Water Demand **			
Avg. Daily Demand (gallons per day)	216	250	+ 34
Maximum Daily Demand (gallons per day)	518	590	+ 71
Peak Hour Factor (x MDD)	2.1	1.5	--
Calculated Water Demand in Central Area			
Avg. Daily Demand (gallons per day)	643,042	1,549,750	+ 906,708
Maximum Daily Demand (gallons per day)	1,500,000	3,700,000	+ 2,200,000
Peak Hour Demand (gallons)	3,200,000	5,550,000	+ 2,350,000

+ Excludes Historic Downtown core.
* Derived from Table 3 (assumes MPO forecast for Central Area equals 3,056 people for 2030).
** Derived from the Bend Water System Master Plan, Oct. 2006.
Compiled by Otak, Inc.

This preliminary analysis of water demand indicates that the Central Area is likely to account for approximately 22 percent of the Zone 5 water demand—which appears to be consistent with the Water Master Plan assumptions. Table 21 indicates that a portion of the total Central Area water demand will be generated by commercial users. Commercial demand will likely have a midday peak demand flow, while residential demand has an early and late-day peak flow. Lodging development can pose an exception to this rule. It appears that the commercial water demand that is expected to occur with full Central Area Plan residential and commercial build-out is consistent with the current Water Master Plan assumptions.

Table 21. Central Area Commercial Water Demand	2030 Net New Growth
Redevelopment +	
Office (floor area square feet)	1,304,340
Retail (floor area square feet)	240,754
Industrial (floor area square feet)	(394,568)
Hotel (floor area square feet) *	728,000
Net New (floor area square feet)	**1,878,526**
Est. Redeveloped Land Area (acres) **	**86.3**
Avg. Daily Water Demand (gallons per acre) ***	4,500
Maximum Daily Water Demand (gallons per acre)	9,000
Peak Hour Factor (x MDD)	1.5
Calculated Water Demand in Central Area	
Avg. Daily Demand (gallons per day)	388,125
Maximum Daily Demand (gallons per day)	776,250
Peak Hour Demand (gallons)	1,164,376

+ Excludes Historic Downtown core.
* Based on 700 square feet per hotel room and 1,040 rooms added.
** Assumes 0.5 average floor area ratio.
*** Derived from the Bend Water System Master Plan, Oct. 2006.
Compiled by Otak, Inc.

Water Infrastructure Needs

To maintain consistency with the City of Bend Water System Master Plan Update and implementing policies, the following water system improvements are needed to adequately serve the Central Area:

- Various, scattered in-fill upgrades are planned in the area, especially in the areas just east and west of the Division Street corridor. The in-fills comprise distribution size (8-inch, 10-inch and 12-inch) additions to the existing system. Please refer to the Water Master Plan, Section 6.
- Pressure in the area is good (about 80 psi) and no pressure enhancing improvements are planned. However, mid-story building construction will need to provide its own internal pumping systems.
- Flow is good and will be sufficient to meet fire flow requirements. However, new building construction will need to provide its own fire suppression systems.
- Eventually, three new Pilot Butte reservoirs are needed to accommodate build-out water demand within Pressure Zones 5, 6 and 7. The exact timing for these will be a function of demand, city priorities, and funding.

Sewer System

The Central Area is located primarily within the City of Bend's Sewer Area 6. According to the Bend wastewater Collection System Master Plan (2006), the city currently provides sewer service to approximately 4,413 residents within Area 6 (the total population of Area 6 is estimated at 5,455 people.) As indicated in Table 22 and based on the Sewer Master Plan, it is anticipated that the base wastewater flows generated in this area will increase from a current 0.436 mgd to 0.950 mgd by build-out.

Table 22. Zone 6 Sanitary Sewer Flows (Includes Central Area)

	2006 Estimate	Build-out	Change
Population	5,455	11,866	+ 6,411
Per Capita Sewer Flow *			
Avg. Daily Flow (gallons per day)	79.9	80.06	+ 0.13
Calculated Sewer Flow in Central Area *			
Avg. Daily Flow (gallons per day)	436,000	950,000	+ 514,000

* Derived from the Bend Collection System Master Plan, Nov. 2006, as compiled by Otak, Inc.

According to the market forecasts conducted as part of this planning effort (please refer to Table 2), the Bend Central Area is expected to add approximately 2,314 dwellings that house an additional 4,143 people by 2030. This amount of growth is likely to generate additional wastewater flow, which is shown in Table 23. Future wastewater flow within the Central Area is expected to increase by approximately 0.258 mgd by 2030.

Table 23. Central Area Sanitary Sewer Flows

	2006 Estimate	2030 Projection	Change
Housing Units +	2,056	4,370	+ 2,314
Population *	2,977	6,199	+ 4,143
Per Capita Sewer Flow **			
Avg. Daily Flow (gallons per day)	79.9	80.06	0.13
Calculated Sewer Flow in Central Area			
Avg. Daily Flow (gallons per day)	237,942	496,292	+ 258,350

+ Excludes Historic Downtown core.
* Derived from Table 3 (assumes MPO forecast for Central Area equals 3,056 people for year 2030).
** Derived from the Bend Collection System Master Plan, Nov. 2006.
Compiled by Otak, Inc.

This preliminary analysis of water demand indicates that the Central Area is likely to account for approximately 50 percent of the Zone 6 wastewater flow—which appears to be consistent with the Water Master Plan assumptions.

Wastewater Infrastructure Needs

To maintain consistency with the City of Bend Collection System Master Plan and implementing policies, the following wastewater system improvements are needed to adequately serve the Central Area:

- Small, localized capacity enhancing improvements throughout the study area consisting of small diameter, short re-routes of the current system (please refer to the wastewater Collection Master Plan).
- Many of the sewers in the existing core system are already at capacity. In order for the higher density suggested for the Central Area Plan to be served by sewer, the existing main interceptor sewer that runs through the study area will need to be relieved of significant flows to generate additional capacity. This will be a major issue that will limit the ability to implement increased density in the study area. The construction of at least a one, and eventually both, of two proposed new interceptor sewers will need to be done to relieve flows in the study area in order to generate additional new capacity,
- Construction of the proposed Westside Interceptor will divert some flows on the west side of Bend that currently flow through the existing main interceptor in the study area. Currently, sewer flows from the southeastern part of Bend are passing through the existing downtown interceptor. In order to alleviate that situation and provide additional capacity for a higher density downtown area, the proposed Southeast Interceptor will need to be constructed.
- Replacement of the Drake Pump Station.
- Replacement of the pump station near 4th and Addison.
- Replacing 2,700 feet of gravity sewer (including a bore under Highway 97) and installing a new pump station near the Linster Pump Station.

More detailed description of the system and its deficiencies can be found in the Master Plan document.

Storm Drainage

Generally, the existing storm drain system in the study area is inadequate. Compliance with DEQ standards is further aggravated by the area's close proximity to the river. The proximity to the Deschutes River provides both an opportunity and a constraint for storm drainage. As a regulated river, discharge of higher peak flows (i.e. from rerouting drywell or drill hole drainage through a piped system) should be permitted as the stormwater contribution from the downtown area would be so minor compared to total river flows. However, surface discharge to the river will need to have pre-treatment to meet DEQ water quality standards. This will make it very important to identify open spaces in the study area that are located in low-lying areas that would be available for stormwater treatment prior to discharging to the river.

Future redevelopment is unlikely to increase the total impervious area over existing conditions, as most properties are already paved and landscaping is limited to residential and park areas. Future developments will likely need to retrofit existing drywells, abandon drill holes, and/or install a piped conveyance system to avoid untreated subsurface discharge. More specific recommendations for individual and programmatic improvements can be found in the Bend Integrated Stormwater Management Plan, November 2006 (final draft).

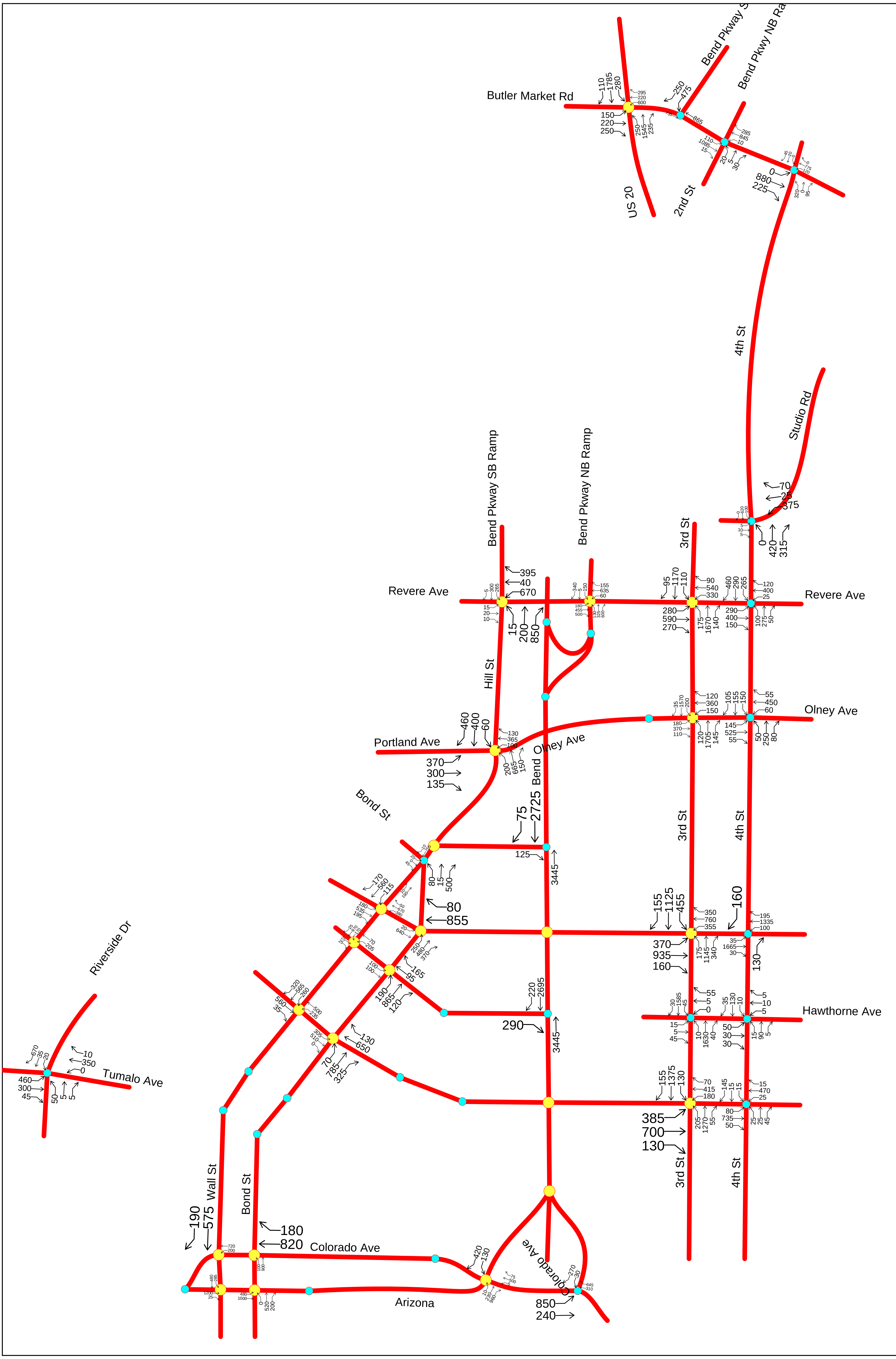
Other Infrastructure

Currently no known power deficiencies or problem areas exist in the study area with regard to electric power, telecommunications, and natural gas. It should be noted that, by law, franchise utilities are required to meet the need and to serve any demand in the area.

APPENDIX A

Future Traffic Volume Forecasts

2030 General Plan Volumes



CAP Trip Reductions for Use of Alternative Modes

TAZ	Percentage of Future CAP Trips					
	Walk	Bicycle	Transit	Internal to Zone	Total	Total Walk/Bike
416	1	4	1	1	7	5
415	1	4	1	0	6	5
414,296,297	2	4	1	0	7	6
298	2	4	2	0	8	6
413,412	1	4	1	0	6	5
410,403	1	5	1	0	7	6
411,402	1	4	1	0	6	5
304,305	3	5	1	0	9	8
299	4	5	2	0	11	9
303	4	5	2	1	12	9
302	4	5	1	1	11	9
307	3	5	1	1	10	8
306,308,301	2	4	1	1	8	6
401	4	5	2	2	13	9
312	4	5	2	3	14	9
313,314,387	2	4	2	1	9	6
311,315,309,310,316	2	4	1	0	7	6
261,260,259,257	0	3	0	0	3	3
256,258,252	0	3	0	0	3	3
255,254,253	1	3	1	0	5	4

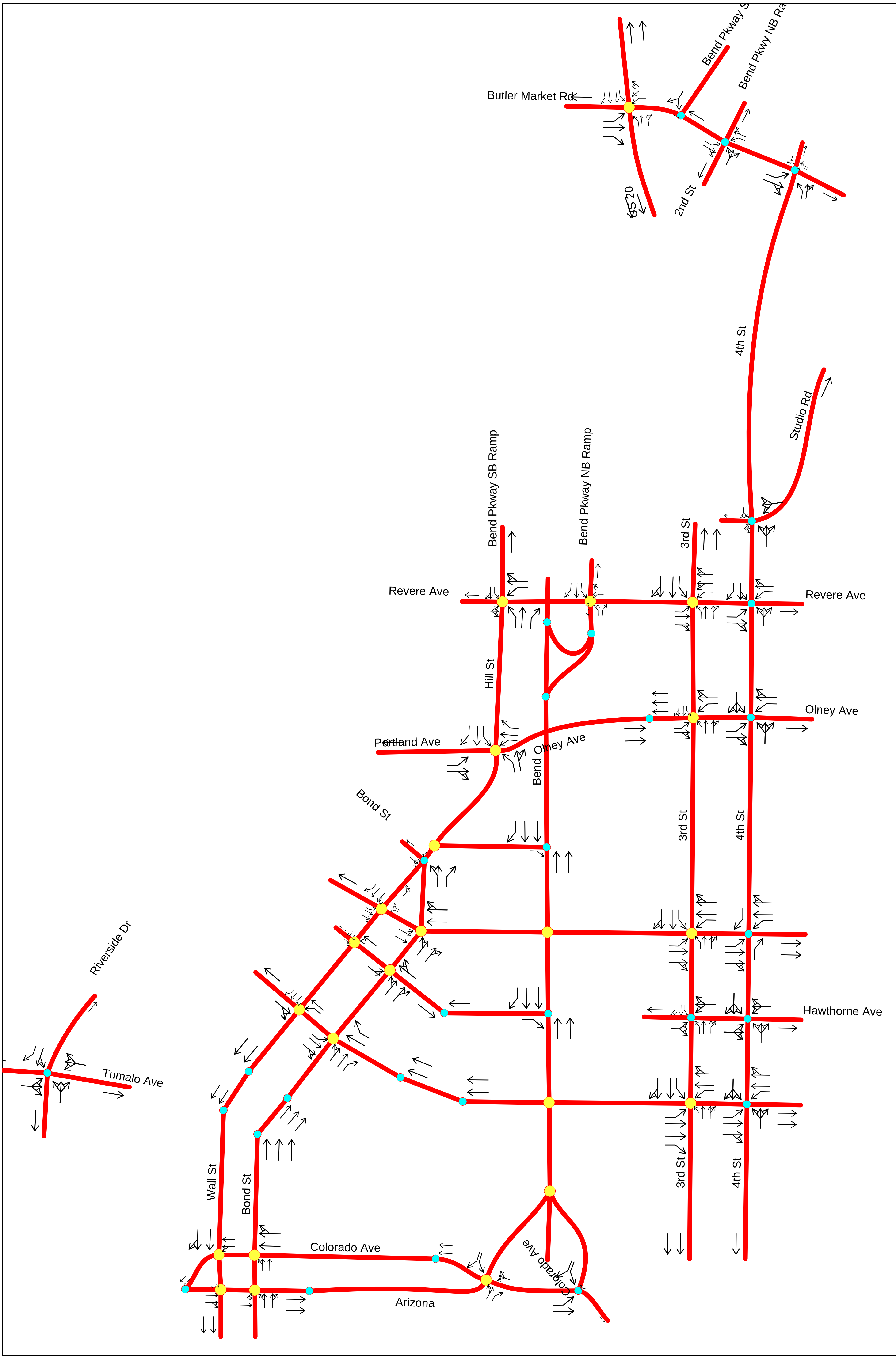
CAP Trip Distribution

Houshold Trip Distribution	North	South	East	West
Study Area			25%	
Within City	15%	20%	10%	10%
Regional	10%	5%	5%	0%

Employment Trip Distributioı	North	South	East	West
Study Area			10%	
Within City	20%	10%	20%	5%
Regional	20%	10%	5%	0%

Bend Central Area Plan - 2030 Peak Hour 6/27/2007

Existing Geometry



Bend Central Area Plan - 2030 Peak Hour
Mitigated Intersection Geometry

6/27/2007

APPENDIX B

2030 General Plan Intersection Traffic Operations Analysis Worksheets

101: Butler Market Rd & US 20

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.91		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	3433	1703		1770	3469		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	3433	1703		1770	3469		1770	3539	1583
Volume (vph)	150	220	250	600	220	295	250	1545	235	280	1785	110
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	239	272	652	239	321	272	1679	255	304	1940	120
RTOR Reduction (vph)	0	0	164	0	31	0	0	8	0	0	0	30
Lane Group Flow (vph)	163	239	108	652	529	0	272	1926	0	304	1940	90
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									2
Actuated Green, G (s)	11.0	20.0	20.0	29.0	38.0		18.5	69.0		20.5	71.0	71.0
Effective Green, g (s)	11.0	20.0	20.0	29.0	38.0		18.0	70.0		20.0	72.0	72.0
Actuated g/C Ratio	0.07	0.13	0.13	0.19	0.25		0.12	0.45		0.13	0.46	0.46
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		3.5	5.0		3.5	5.0	5.0
Lane Grp Cap (vph)	126	240	204	642	418		206	1567		228	1644	735
v/s Ratio Prot	c0.09	0.13		0.19	c0.31		0.15	c0.56		c0.17	0.55	
v/s Ratio Perm			0.07									0.06
v/c Ratio	1.29	1.00	0.53	1.02	1.27		1.32	1.23		1.33	1.18	0.12
Uniform Delay, d1	72.0	67.5	63.1	63.0	58.5		68.5	42.5		67.5	41.5	23.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	178.7	57.0	9.5	39.5	137.4		174.0	109.0		176.8	87.7	0.3
Delay (s)	250.7	124.5	72.7	102.5	195.9		242.5	151.5		244.3	129.2	23.9
Level of Service	F	F	E	F	F		F	F		F	F	C
Approach Delay (s)		134.1			145.6			162.7			138.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	147.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	155.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	117.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

106: Revere Ave & Bend Pkway SB Ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.97		1.00	0.86		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1777		1770	1609		1770	1863	1583	1770	1859	
Flt Permitted		0.98		0.95	1.00		0.41	1.00	1.00	0.55	1.00	
Satd. Flow (perm)		1777		1770	1609		771	1863	1583	1033	1859	
Volume (vph)	15	20	10	670	40	395	15	200	850	265	300	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	22	11	728	43	429	16	217	924	288	326	5
RTOR Reduction (vph)	0	10	0	0	248	0	0	0	182	0	1	0
Lane Group Flow (vph)	0	39	0	728	224	0	16	217	742	288	330	0
Turn Type	Split			Split			Perm		pm+ov	Perm		
Protected Phases	7	7		3	3			6	3		2	
Permitted Phases							6		6	2		
Actuated Green, G (s)		6.0		35.9	35.9		31.1	31.1	67.0	31.1	31.1	
Effective Green, g (s)		6.0		35.9	35.9		31.1	31.1	67.0	31.1	31.1	
Actuated g/C Ratio		0.07		0.42	0.42		0.37	0.37	0.79	0.37	0.37	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.5		2.5	2.5		4.3	4.3	2.5	4.3	4.3	
Lane Grp Cap (vph)		125		748	680		282	682	1322	378	680	
v/s Ratio Prot		c0.02		c0.41	0.14			0.12	0.24		0.18	
v/s Ratio Perm							0.02		0.23	c0.28		
v/c Ratio		0.31		0.97	0.33		0.06	0.32	0.56	0.76	0.49	
Uniform Delay, d1		37.5		24.1	16.5		17.5	19.3	3.4	23.7	20.8	
Progression Factor		1.00		0.83	0.41		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.0		21.7	0.2		0.4	1.2	0.4	13.5	2.5	
Delay (s)		38.6		41.7	6.8		17.8	20.6	3.9	37.2	23.3	
Level of Service		D		D	A		B	C	A	D	C	
Approach Delay (s)		38.6			28.0			7.2			29.8	
Approach LOS		D			C			A			C	

Intersection Summary			
HCM Average Control Delay	20.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

107: Revere Ave & Bend Pkway NB Ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95	1.00		0.95			1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00		1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3490	1583		3431			1837	1583	1770	1863	1583
Flt Permitted		0.52	1.00		0.83			0.90	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1853	1583		2854			1683	1583	1770	1863	1583
Volume (vph)	180	455	500	60	635	155	130	325	600	150	5	340
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	495	543	65	690	168	141	353	652	163	5	370
RTOR Reduction (vph)	0	0	316	0	22	0	0	0	136	0	0	61
Lane Group Flow (vph)	0	691	227	0	901	0	0	494	516	163	5	309
Turn Type	Perm		Perm	Perm			Perm		Perm	Prot		Perm
Protected Phases		2			6			8		7	4	
Permitted Phases	2		2	6			8		8			4
Actuated Green, G (s)		35.6	35.6		35.6			28.7	28.7	8.7	41.4	41.4
Effective Green, g (s)		35.6	35.6		35.6			28.7	28.7	8.7	41.4	41.4
Actuated g/C Ratio		0.42	0.42		0.42			0.34	0.34	0.10	0.49	0.49
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		2.5	2.5		2.5			2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		776	663		1195			568	534	181	907	771
v/s Ratio Prot										c0.09	0.00	
v/s Ratio Perm		c0.37	0.14		0.32			0.29	c0.33			0.20
v/c Ratio		1.39dl	0.34		0.75			0.87	0.97	0.90	0.01	0.40
Uniform Delay, d1		22.9	16.8		21.0			26.4	27.7	37.7	11.2	13.9
Progression Factor		0.80	0.10		0.50			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		11.6	1.1		0.2			13.0	29.9	39.3	0.0	0.1
Delay (s)		29.8	2.7		10.8			39.4	57.6	77.0	11.2	14.0
Level of Service		C	A		B			D	E	E	B	B
Approach Delay (s)		17.9			10.8			49.7			33.1	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	27.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.0%	ICU Level of Service	E
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

108: Revere Ave & 3rd St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		0.91	0.91		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3373		1610	3315		1770	3498		1770	3499	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3373		1610	3315		1770	3498		1770	3499	
Volume (vph)	280	590	270	330	540	90	175	1670	140	110	1170	95
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	304	641	293	359	587	98	190	1815	152	120	1272	103
RTOR Reduction (vph)	0	31	0	0	7	0	0	4	0	0	4	0
Lane Group Flow (vph)	304	903	0	338	699	0	190	1963	0	120	1371	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	37.0	37.0		31.0	31.0		18.0	76.0		10.0	68.0	
Effective Green, g (s)	37.0	37.0		31.0	31.0		18.0	76.0		10.0	68.0	
Actuated g/C Ratio	0.22	0.22		0.18	0.18		0.11	0.45		0.06	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.3		2.5	4.3	
Lane Grp Cap (vph)	385	734		294	605		187	1564		104	1400	
v/s Ratio Prot	0.17	c0.27		0.21	c0.21		0.11	c0.56		c0.07	0.39	
v/s Ratio Perm												
v/c Ratio	0.79	1.23		1.15	1.15		1.02	1.26		1.15	0.98	
Uniform Delay, d1	62.8	66.5		69.5	69.5		76.0	47.0		80.0	50.3	
Progression Factor	0.99	0.99		1.00	1.00		0.61	0.37		1.00	1.00	
Incremental Delay, d2	3.8	107.9		99.3	87.4		23.8	115.3		135.5	19.6	
Delay (s)	65.8	173.6		168.8	156.9		70.0	132.7		215.5	70.0	
Level of Service	E	F		F	F		E	F		F	E	
Approach Delay (s)		147.1			160.7			127.2			81.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	125.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	113.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1776		1770	1863	1583	1770	1811		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.24	1.00		0.11	1.00	1.00
Satd. Flow (perm)	1770	1776		1770	1863	1583	456	1811		212	1863	1583
Volume (vph)	370	300	135	100	365	130	200	665	150	60	400	460
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	402	326	147	109	397	141	217	723	163	65	435	500
RTOR Reduction (vph)	0	17	0	0	0	112	0	8	0	0	0	323
Lane Group Flow (vph)	402	456	0	109	397	29	217	878	0	65	435	177
Turn Type	Prot			Prot		Perm	pm+pt			pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8	2			6		6
Actuated Green, G (s)	17.8	27.8		10.1	20.1	20.1	48.8	40.1		39.8	35.1	35.1
Effective Green, g (s)	18.0	27.8		10.3	20.1	20.1	48.8	40.1		39.8	35.1	35.1
Actuated g/C Ratio	0.18	0.28		0.10	0.20	0.20	0.49	0.41		0.40	0.35	0.35
Clearance Time (s)	4.2	4.0		4.2	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	3.0	4.2		2.5	4.2	4.2
Lane Grp Cap (vph)	322	499		184	379	322	354	734		159	661	562
v/s Ratio Prot	c0.23	0.26		0.06	c0.21		c0.06	c0.48		0.02	0.23	
v/s Ratio Perm						0.02	0.24			0.14		0.11
v/c Ratio	1.25	0.91		0.59	1.05	0.09	0.61	1.20		0.41	0.66	0.32
Uniform Delay, d1	40.5	34.4		42.3	39.4	32.0	17.2	29.4		24.6	26.8	23.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	135.1	21.3		4.2	59.2	0.1	3.1	101.1		1.2	2.7	0.5
Delay (s)	175.5	55.7		46.5	98.6	32.1	20.3	130.5		25.8	29.6	23.7
Level of Service	F	E		D	F	C	C	F		C	C	C
Approach Delay (s)		110.7			75.3			108.8			26.4	
Approach LOS		F			E			F			C	

Intersection Summary			
HCM Average Control Delay	80.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	98.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	102.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

111: Olney Ave & 3rd St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.96		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1799		1770	1793		1770	3498		1770	3528	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1799		1770	1793		1770	3498		1770	3528	
Volume (vph)	180	370	110	150	360	120	120	1705	145	200	1570	35
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	402	120	163	391	130	130	1853	158	217	1707	38
RTOR Reduction (vph)	0	6	0	0	7	0	0	4	0	0	1	0
Lane Group Flow (vph)	196	516	0	163	514	0	130	2007	0	217	1744	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	15.5	43.0		13.5	41.0		12.5	80.0		17.5	85.0	
Effective Green, g (s)	15.0	43.0		13.0	41.0		12.0	81.0		17.0	86.0	
Actuated g/C Ratio	0.09	0.25		0.08	0.24		0.07	0.48		0.10	0.51	
Clearance Time (s)	3.5	4.0		3.5	4.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.8		2.5	4.8	
Lane Grp Cap (vph)	156	455		135	432		125	1667		177	1785	
v/s Ratio Prot	c0.11	0.29		0.09	c0.29		0.07	c0.57		c0.12	c0.49	
v/s Ratio Perm												
v/c Ratio	1.26	1.13		1.21	1.19		1.04	1.20		1.23	0.98	
Uniform Delay, d1	77.5	63.5		78.5	64.5		79.0	44.5		76.5	41.0	
Progression Factor	1.00	1.00		1.00	1.00		0.70	0.56		0.80	0.40	
Incremental Delay, d2	156.9	84.3		143.7	106.5		35.2	92.4		106.4	3.0	
Delay (s)	234.4	147.8		222.2	171.0		90.4	117.3		167.5	19.2	
Level of Service	F	F		F	F		F	F		F	B	
Approach Delay (s)		171.5			183.2			115.6			35.6	
Approach LOS		F			F			F			D	

Intersection Summary			
HCM Average Control Delay	102.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	112.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

115: Newport Ave & Wall St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00						0.95	1.00
Frt	1.00	0.96		1.00	0.99						1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (prot)	1770	3397		1770	1843						3509	1583
Flt Permitted	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (perm)	1770	3397		1770	1843						3509	1583
Volume (vph)	180	535	195	380	670	50	0	0	0	115	560	170
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	582	212	413	728	54	0	0	0	125	609	185
RTOR Reduction (vph)	0	37	0	0	3	0	0	0	0	0	0	139
Lane Group Flow (vph)	196	757	0	413	779	0	0	0	0	0	734	46
Turn Type	Prot			Prot						Perm		Perm
Protected Phases	5	2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)	14.0	35.0		28.0	49.0						25.0	25.0
Effective Green, g (s)	14.0	35.0		28.0	49.0						25.0	25.0
Actuated g/C Ratio	0.14	0.35		0.28	0.49						0.25	0.25
Clearance Time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Lane Grp Cap (vph)	248	1189		496	903						877	396
v/s Ratio Prot	0.11	0.22		c0.23	c0.42							
v/s Ratio Perm											0.21	0.03
v/c Ratio	0.79	0.64		0.83	0.86						0.84	0.12
Uniform Delay, d1	41.6	27.2		33.8	22.5						35.6	29.0
Progression Factor	1.00	1.00		0.75	0.46						1.00	1.00
Incremental Delay, d2	22.2	2.6		11.2	7.9						9.3	0.6
Delay (s)	63.7	29.8		36.5	18.3						44.9	29.6
Level of Service	E	C		D	B						D	C
Approach Delay (s)		36.5			24.6			0.0			41.8	
Approach LOS		D			C			A			D	

Intersection Summary			
HCM Average Control Delay	33.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

116: Newport Ave & Bond St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			0.95			0.95				
Frt		1.00			0.99			0.95				
Flt Protected		1.00			1.00			0.99				
Satd. Flow (prot)		3534			3494			3323				
Flt Permitted		0.88			1.00			0.99				
Satd. Flow (perm)		3132			3494			3323				
Volume (vph)	20	640	0	0	855	80	250	480	370	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	696	0	0	929	87	272	522	402	0	0	0
RTOR Reduction (vph)	0	0	0	0	7	0	0	61	0	0	0	0
Lane Group Flow (vph)	0	718	0	0	1009	0	0	1135	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		42.0			42.0			50.0				
Effective Green, g (s)		42.0			42.0			50.0				
Actuated g/C Ratio		0.42			0.42			0.50				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		1315			1467			1662				
v/s Ratio Prot					c0.29							
v/s Ratio Perm		0.23						0.34				
v/c Ratio		0.55			0.69			0.68				
Uniform Delay, d1		21.8			23.7			19.0				
Progression Factor		0.28			1.00			0.74				
Incremental Delay, d2		1.2			2.7			1.8				
Delay (s)		7.4			26.3			15.9				
Level of Service		A			C			B				
Approach Delay (s)		7.4			26.3			15.9			0.0	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

117: Greenwood Ave & 3rd St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.95		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3462		1770	3372		1770	3418		1770	3475	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3462		1770	3372		1770	3418		1770	3475	
Volume (vph)	370	935	160	355	760	350	175	1145	340	455	1125	155
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	402	1016	174	386	826	380	190	1245	370	495	1223	168
RTOR Reduction (vph)	0	8	0	0	31	0	0	16	0	0	7	0
Lane Group Flow (vph)	402	1182	0	386	1175	0	190	1599	0	495	1384	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	25.0	44.0		24.0	43.0		18.0	56.0		30.0	68.0	
Effective Green, g (s)	25.0	44.0		24.0	43.0		18.0	56.0		30.0	68.0	
Actuated g/C Ratio	0.15	0.26		0.14	0.25		0.11	0.33		0.18	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.3		2.5	4.3	
Lane Grp Cap (vph)	260	896		250	853		187	1126		312	1390	
v/s Ratio Prot	c0.23	0.34		0.22	c0.35		0.11	c0.47		c0.28	0.40	
v/s Ratio Perm												
v/c Ratio	1.55	1.32		1.54	1.38		1.02	1.42		1.59	1.00	
Uniform Delay, d1	72.5	63.0		73.0	63.5		76.0	57.0		70.0	50.9	
Progression Factor	1.00	1.00		1.00	1.00		0.68	0.96		0.80	1.06	
Incremental Delay, d2	264.0	151.4		263.8	177.1		45.3	191.1		265.3	6.4	
Delay (s)	336.5	214.4		336.8	240.6		96.8	245.7		321.0	60.2	
Level of Service	F	F		F	F		F	F		F	E	
Approach Delay (s)		245.3			263.9			230.1			128.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	213.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.42		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	133.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		1.00			1.00						0.95	
Frt		0.93			1.00						1.00	
Flt Protected		1.00			0.96						0.99	
Satd. Flow (prot)		1503			1553						3205	
Flt Permitted		1.00			0.75						0.99	
Satd. Flow (perm)		1503			1202						3205	
Volume (vph)	0	25	25	205	70	0	0	0	0	170	970	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	27	27	223	76	0	0	0	0	185	1054	27
RTOR Reduction (vph)	0	16	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	38	0	0	299	0	0	0	0	0	1265	0
Parking (#/hr)	7	7	7	7	7	7				14	14	14
Turn Type				Perm						Perm		
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		41.0			41.0						51.0	
Effective Green, g (s)		41.0			41.0						51.0	
Actuated g/C Ratio		0.41			0.41						0.51	
Clearance Time (s)		4.0			4.0						4.0	
Lane Grp Cap (vph)		616			493						1635	
v/s Ratio Prot		0.03										
v/s Ratio Perm					c0.25						0.39	
v/c Ratio		0.06			0.61						0.77	
Uniform Delay, d1		17.9			23.2						19.8	
Progression Factor		1.00			0.88						0.47	
Incremental Delay, d2		0.2			4.5						2.2	
Delay (s)		18.0			24.8						11.5	
Level of Service		B			C						B	
Approach Delay (s)		18.0			24.8			0.0			11.5	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM Average Control Delay	14.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			0.95				
Frt		1.00			0.91			0.98				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		1817			1703			3457				
Flt Permitted		0.63			1.00			0.99				
Satd. Flow (perm)		1174			1703			3457				
Volume (vph)	100	100	0	0	95	165	190	865	120	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	109	0	0	103	179	207	940	130	0	0	0
RTOR Reduction (vph)	0	0	0	0	63	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	218	0	0	219	0	0	1268	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		37.4			37.4			54.6				
Effective Green, g (s)		37.4			37.4			54.6				
Actuated g/C Ratio		0.37			0.37			0.55				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		439			637			1888				
v/s Ratio Prot					0.13							
v/s Ratio Perm		c0.19						0.37				
v/c Ratio		0.50			0.34			0.67				
Uniform Delay, d1		24.1			22.5			16.3				
Progression Factor		1.60			1.00			0.16				
Incremental Delay, d2		2.9			1.5			1.0				
Delay (s)		41.4			24.0			3.5				
Level of Service		D			C			A				
Approach Delay (s)		41.4			24.0			3.5			0.0	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

124: Franklin Ave & Wall St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		1.00		1.00	1.00						0.95	1.00
Frt		0.99		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.98	1.00
Satd. Flow (prot)		1848		1770	1863						3484	1583
Flt Permitted		1.00		0.13	1.00						0.98	1.00
Satd. Flow (perm)		1848		249	1863						3484	1583
Volume (vph)	0	560	35	235	500	0	0	0	0	260	565	320
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	609	38	255	543	0	0	0	0	283	614	348
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	0	237
Lane Group Flow (vph)	0	645	0	255	543	0	0	0	0	0	897	111
Turn Type				pm+pt						Perm		Perm
Protected Phases		8		7	4						6	
Permitted Phases				4						6		6
Actuated Green, G (s)		43.0		61.0	61.0						31.0	31.0
Effective Green, g (s)		43.0		61.0	61.0						31.0	31.0
Actuated g/C Ratio		0.43		0.61	0.61						0.31	0.31
Clearance Time (s)		4.0		4.0	4.0						4.0	4.0
Lane Grp Cap (vph)		795		365	1136						1080	491
v/s Ratio Prot		c0.35		c0.10	0.29							
v/s Ratio Perm				0.33							0.26	0.07
v/c Ratio		0.81		0.70	0.48						0.83	0.23
Uniform Delay, d1		24.9		17.0	10.7						32.1	25.6
Progression Factor		1.00		0.80	0.42						0.58	0.52
Incremental Delay, d2		8.8		5.1	0.7						5.1	0.7
Delay (s)		33.7		18.7	5.1						23.7	14.1
Level of Service		C		B	A						C	B
Approach Delay (s)		33.7			9.4			0.0			21.0	
Approach LOS		C			A			A			C	

Intersection Summary			
HCM Average Control Delay	20.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Lane Util. Factor	1.00	0.95			1.00	1.00		0.95	1.00			
Frt	1.00	1.00			1.00	0.85		1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00		1.00	1.00			
Satd. Flow (prot)	1770	3539			1863	1583		3525	1583			
Flt Permitted	0.09	1.00			1.00	1.00		1.00	1.00			
Satd. Flow (perm)	159	3539			1863	1583		3525	1583			
Volume (vph)	305	510	0	0	650	130	70	785	325	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	332	554	0	0	707	141	76	853	353	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	6	0	0	254	0	0	0
Lane Group Flow (vph)	332	554	0	0	707	135	0	929	99	0	0	0
Turn Type	pm+pt					custom	Perm		Perm			
Protected Phases	3	8			4			2				
Permitted Phases	8					8	2		2			
Actuated Green, G (s)	64.0	64.0			43.0	64.0		28.0	28.0			
Effective Green, g (s)	64.0	64.0			43.0	64.0		28.0	28.0			
Actuated g/C Ratio	0.64	0.64			0.43	0.64		0.28	0.28			
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Lane Grp Cap (vph)	376	2265			801	1013		987	443			
v/s Ratio Prot	c0.15	0.16			0.38							
v/s Ratio Perm	c0.42					0.09		0.26	0.06			
v/c Ratio	0.88	0.24			0.88	0.13		0.94	0.22			
Uniform Delay, d1	29.4	7.7			26.2	7.1		35.2	27.6			
Progression Factor	0.87	1.86			1.00	1.00		0.62	0.97			
Incremental Delay, d2	15.3	0.1			13.5	0.3		14.1	0.9			
Delay (s)	41.0	14.5			39.6	7.4		35.9	27.6			
Level of Service	D	B			D	A		D	C			
Approach Delay (s)		24.4			34.3			33.6			0.0	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM Average Control Delay	31.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3463		1770	3517		1770	3486	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3463		1770	3517		1770	3486	
Volume (vph)	385	700	130	180	415	70	205	1270	55	130	1375	155
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	418	761	141	196	451	76	223	1380	60	141	1495	168
RTOR Reduction (vph)	0	0	82	0	8	0	0	2	0	0	5	0
Lane Group Flow (vph)	418	761	59	196	519	0	223	1438	0	141	1658	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4									
Actuated Green, G (s)	37.0	41.0	41.0	19.0	23.0		20.0	77.0		17.0	74.0	
Effective Green, g (s)	37.0	41.0	41.0	19.0	23.0		20.0	77.0		17.0	74.0	
Actuated g/C Ratio	0.22	0.24	0.24	0.11	0.14		0.12	0.45		0.10	0.44	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	385	854	382	198	469		208	1593		177	1517	
v/s Ratio Prot	c0.24	c0.22		0.11	c0.15		c0.13	0.41		0.08	c0.48	
v/s Ratio Perm			0.04									
v/c Ratio	1.09	0.89	0.15	0.99	1.11		1.07	0.90		0.80	1.09	
Uniform Delay, d1	66.5	62.3	50.8	75.4	73.5		75.0	43.0		74.8	48.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.62	0.40	
Incremental Delay, d2	70.8	13.5	0.9	61.4	74.0		82.8	8.8		3.5	43.0	
Delay (s)	137.3	75.9	51.7	136.8	147.5		157.8	51.8		49.6	62.0	
Level of Service	F	E	D	F	F		F	D		D	E	
Approach Delay (s)		92.7			144.6			66.0			61.1	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM Average Control Delay	81.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	102.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						4.0	
Lane Util. Factor					0.95						0.95	
Frt					1.00						0.96	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					3282						3194	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					3282						3194	
Volume (vph)	0	0	0	200	720	0	0	0	0	0	575	190
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	217	783	0	0	0	0	0	625	207
RTOR Reduction (vph)	0	0	0	0	26	0	0	0	0	0	32	0
Lane Group Flow (vph)	0	0	0	0	974	0	0	0	0	0	800	0
Parking (#/hr)				5	5					5	5	
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					47.9						44.1	
Effective Green, g (s)					47.9						44.1	
Actuated g/C Ratio					0.48						0.44	
Clearance Time (s)					4.0						4.0	
Lane Grp Cap (vph)					1572						1409	
v/s Ratio Prot											c0.25	
v/s Ratio Perm					0.30							
v/c Ratio					0.62						0.57	
Uniform Delay, d1					19.3						20.8	
Progression Factor					0.21						1.43	
Incremental Delay, d2					1.2						1.0	
Delay (s)					5.3						30.7	
Level of Service					A						C	
Approach Delay (s)		0.0			5.3			0.0			30.7	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.95			0.95				
Frt					0.97			1.00				
Flt Protected					1.00			1.00				
Satd. Flow (prot)					3185			3257				
Flt Permitted					1.00			1.00				
Satd. Flow (perm)					3185			3257				
Volume (vph)	0	0	0	0	820	180	100	900	0	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	891	196	109	978	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	19	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1068	0	0	1078	0	0	0	0
Parking (#/hr)				10	10	10	10	10	10			
Turn Type							Perm					
Protected Phases					6			8				
Permitted Phases							8					
Actuated Green, G (s)					46.0			46.0				
Effective Green, g (s)					46.0			46.0				
Actuated g/C Ratio					0.46			0.46				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					1465			1498				
v/s Ratio Prot					c0.34							
v/s Ratio Perm								0.33				
v/c Ratio					0.73			0.72				
Uniform Delay, d1					21.9			21.8				
Progression Factor					1.00			0.69				
Incremental Delay, d2					3.2			1.8				
Delay (s)					25.2			16.8				
Level of Service					C			B				
Approach Delay (s)		0.0			25.2			16.8			0.0	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

131: Arizona Ave & Wall St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									4.0	
Lane Util. Factor		0.95									0.95	
Frt		1.00									1.00	
Flt Protected		1.00									0.98	
Satd. Flow (prot)		3308									3214	
Flt Permitted		1.00									0.98	
Satd. Flow (perm)		3308									3214	
Volume (vph)	0	1200	25	0	0	0	0	0	0	285	480	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1304	27	0	0	0	0	0	0	310	522	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	27	0
Lane Group Flow (vph)	0	1330	0	0	0	0	0	0	0	0	805	0
Parking (#/hr)		5	5							10	10	10
Turn Type										Perm		
Protected Phases		2									4	
Permitted Phases										4		
Actuated Green, G (s)		54.1									37.9	
Effective Green, g (s)		54.1									37.9	
Actuated g/C Ratio		0.54									0.38	
Clearance Time (s)		4.0									4.0	
Lane Grp Cap (vph)		1790									1218	
v/s Ratio Prot		c0.40										
v/s Ratio Perm											0.25	
v/c Ratio		0.74									0.66	
Uniform Delay, d1		17.6									25.7	
Progression Factor		0.66									0.36	
Incremental Delay, d2		2.6									2.3	
Delay (s)		14.2									11.6	
Level of Service		B									B	
Approach Delay (s)		14.2			0.0			0.0			11.6	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

132: Arizona Ave & Bond St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0				
Lane Util. Factor		0.95						0.95				
Frt		1.00						0.96				
Flt Protected		0.98						1.00				
Satd. Flow (prot)		3222						3138				
Flt Permitted		0.98						1.00				
Satd. Flow (perm)		3222						3138				
Volume (vph)	480	1000	0	0	0	0	0	520	200	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	522	1087	0	0	0	0	0	565	217	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	40	0	0	0	0
Lane Group Flow (vph)	0	1609	0	0	0	0	0	742	0	0	0	0
Parking (#/hr)	10	10	10				10	10	10			
Turn Type	Perm						Perm					
Protected Phases		2						8				
Permitted Phases	2						8					
Actuated Green, G (s)		61.0						31.0				
Effective Green, g (s)		61.0						31.0				
Actuated g/C Ratio		0.61						0.31				
Clearance Time (s)		4.0						4.0				
Lane Grp Cap (vph)		1965						973				
v/s Ratio Prot								c0.24				
v/s Ratio Perm		0.50										
v/c Ratio		0.82						0.76				
Uniform Delay, d1		15.2						31.2				
Progression Factor		0.43						1.00				
Incremental Delay, d2		2.7						5.6				
Delay (s)		9.3						36.8				
Level of Service		A						D				
Approach Delay (s)		9.3			0.0			36.8			0.0	
Approach LOS		A			A			D			A	

Intersection Summary			
HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

133: Colorado Ave & Bend Pkway SB Ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0	4.0	4.0		4.0
Lane Util. Factor					1.00			1.00	1.00	1.00		1.00
Frt					0.98			1.00	0.85	1.00		0.85
Flt Protected					1.00			1.00	1.00	0.95		1.00
Satd. Flow (prot)					1829			1859	1583	1770		1583
Flt Permitted					1.00			1.00	1.00	0.41		1.00
Satd. Flow (perm)					1829			1859	1583	756		1583
Volume (vph)	0	0	0	5	500	75	10	230	960	130	0	420
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	5	543	82	11	250	1043	141	0	457
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	186	0	0	97
Lane Group Flow (vph)	0	0	0	0	625	0	0	261	857	141	0	360
Turn Type				custom			Split		custom	D.P+P		custom
Protected Phases				8	8		6	6	6 8	2		2
Permitted Phases				8					6 8	6		6
Actuated Green, G (s)					46.5			33.3	83.8	61.5		61.5
Effective Green, g (s)					46.5			33.3	83.8	61.5		61.5
Actuated g/C Ratio					0.39			0.28	0.70	0.51		0.51
Clearance Time (s)					4.0			4.0		4.0		4.0
Vehicle Extension (s)					3.0			3.0		3.0		3.0
Lane Grp Cap (vph)					709			516	1105	626		864
v/s Ratio Prot					c0.34			0.14	c0.54	0.05		c0.10
v/s Ratio Perm										0.06		0.13
v/c Ratio					0.88			0.51	0.78	0.23		0.42
Uniform Delay, d1					34.2			36.4	11.9	16.0		18.1
Progression Factor					1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2					12.4			0.8	3.5	0.2		0.3
Delay (s)					46.6			37.2	15.4	16.2		18.5
Level of Service					D			D	B	B		B
Approach Delay (s)		0.0			46.6			19.8			17.9	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM Average Control Delay	26.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

102: Butler Mkt Rd & Bend Pkway SB Ramp

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	735	865	0	475	250
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	799	940	0	516	272
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)		461				
pX, platoon unblocked					0.88	
vC, conflicting volume	940				1739	940
vC1, stage 1 conf vol					940	
vC2, stage 2 conf vol					799	
vCu, unblocked vol	940				1845	940
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				0	15
cM capacity (veh/h)	729				211	320

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	799	940	788
Volume Left	0	0	516
Volume Right	0	0	272
cSH	1700	1700	239
Volume to Capacity	0.47	0.55	3.30
Queue Length 95th (ft)	0	0	Err
Control Delay (s)	0.0	0.0	Err
Lane LOS			F
Approach Delay (s)	0.0	0.0	Err
Approach LOS			F

Intersection Summary			
Average Delay	3118.0		
Intersection Capacity Utilization	93.8%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	110	1085	15	10	845	285	20	5	30	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	120	1179	16	11	918	310	22	5	33	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			None	
Median storage veh)								1				
Upstream signal (ft)		910										
pX, platoon unblocked				0.89			0.89	0.89	0.89	0.89	0.89	
vC, conflicting volume	1228			1196			2367	2677	1188	2549	2530	1073
vC1, stage 1 conf vol							1427	1427				
vC2, stage 2 conf vol							940	1250				
vCu, unblocked vol	1228			1220			2538	2886	1211	2743	2721	1073
tC, single (s)	4.1			4.1			*6.4	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							5.4	5.5				
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	79			98			77	91	83	100	100	100
cM capacity (veh/h)	567			508			95	62	198	7	14	267

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	120	1196	11	1228	60
Volume Left	120	0	11	0	22
Volume Right	0	16	0	310	33
cSH	567	1700	508	1700	124
Volume to Capacity	0.21	0.70	0.02	0.72	0.48
Queue Length 95th (ft)	20	0	2	0	55
Control Delay (s)	13.0	0.0	12.2	0.0	58.5
Lane LOS	B		B		F
Approach Delay (s)	1.2		0.1		58.5
Approach LOS					F

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	880	225	120	775	0	320	0	95	0	20	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	957	245	130	842	0	348	0	103	0	22	49
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			None	
Median storage veh)								1				
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	842			1201			2242	2182	1079	2163	2304	842
vC1, stage 1 conf vol							1079	1079				
vC2, stage 2 conf vol							1163	1103				
vCu, unblocked vol	842			1201			2242	2182	1079	2163	2304	842
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5				
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			78			0	100	61	100	27	87
cM capacity (veh/h)	793			581			36	132	266	17	30	364

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	0	1201	130	842	348	103	71
Volume Left	0	0	130	0	348	0	0
Volume Right	0	245	0	0	0	103	49
cSH	1700	1700	581	1700	36	266	82
Volume to Capacity	0.00	0.71	0.22	0.50	9.76	0.39	0.86
Queue Length 95th (ft)	0	0	21	0	Err	44	112
Control Delay (s)	0.0	0.0	13.0	0.0	Err	26.9	152.8
Lane LOS			B		F	D	F
Approach Delay (s)	0.0		1.7		7716.2		152.8
Approach LOS					F		F

Intersection Summary			
Average Delay	1295.9		
Intersection Capacity Utilization	101.0%	ICU Level of Service	G
Analysis Period (min)	15		

105: Studio Rd & 4th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	10	5	375	25	70	0	420	315	100	620	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	11	5	408	27	76	0	457	342	109	674	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1609	1690	674	1530	1519	628	674			799		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1609	1690	674	1530	1519	628	674			799		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	87	99	0	74	84	100			87		
cM capacity (veh/h)	51	81	455	76	103	483	917			824		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	511	799	783
Volume Left	5	408	0	109
Volume Right	5	76	342	0
cSH	86	89	917	824
Volume to Capacity	0.25	5.75	0.00	0.13
Queue Length 95th (ft)	23	Err	0	11
Control Delay (s)	60.4	Err	0.0	3.3
Lane LOS	F	F		A
Approach Delay (s)	60.4	Err	0.0	3.3
Approach LOS	F	F		

Intersection Summary			
Average Delay	2418.0		
Intersection Capacity Utilization	122.5%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	290	400	150	25	400	120	100	275	50	265	290	460
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	315	435	163	27	435	130	109	299	54	288	315	500

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total (vph)	315	598	27	565	462	603	500
Volume Left (vph)	315	0	27	0	109	288	0
Volume Right (vph)	0	163	0	130	54	0	500
Hadj (s)	0.53	-0.16	0.53	-0.13	0.01	0.27	-0.67
Departure Headway (s)	10.2	9.5	10.4	9.8	10.1	9.8	8.9
Degree Utilization, x	0.89	1.58	0.08	1.53	1.29	1.65	1.24
Capacity (veh/h)	344	383	340	381	364	369	410
Control Delay (s)	56.0	294.6	13.1	277.1	179.1	327.2	153.1
Approach Delay (s)	212.2		265.0		179.1	248.3	
Approach LOS	F		F		F	F	

Intersection Summary			
Delay	230.4		
HCM Level of Service	F		
Intersection Capacity Utilization	110.7%	ICU Level of Service	H
Analysis Period (min)	15		

112: Olney Ave & 4th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	145	525	55	60	450	55	50	250	80	150	155	105
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	158	571	60	65	489	60	54	272	87	163	168	114

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	158	630	65	549	413	446
Volume Left (vph)	158	0	65	0	54	163
Volume Right (vph)	0	60	0	60	87	114
Hadj (s)	0.53	-0.03	0.53	-0.04	-0.07	-0.05
Departure Headway (s)	10.2	9.6	10.2	9.6	9.4	9.4
Degree Utilization, x	0.44	1.68	0.18	1.46	1.08	1.17
Capacity (veh/h)	342	379	350	386	391	386
Control Delay (s)	19.8	339.7	14.2	246.0	99.6	129.0
Approach Delay (s)	275.7		221.4		99.6	129.0
Approach LOS	F		F		F	F

Intersection Summary			
Delay	199.9		
HCM Level of Service	F		
Intersection Capacity Utilization	92.0%	ICU Level of Service	F
Analysis Period (min)	15		

113: Lafayette Ave & Bend Pkwy SB Ramp

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	125	0	3445	2725	75
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	136	0	3745	2962	82
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				740		
pX, platoon unblocked						
vC, conflicting volume	4834	1481	3043			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	4834	1481	3043			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	1	114	109			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	136	1872	1872	1481	1481	82
Volume Left	0	0	0	0	0	0
Volume Right	136	0	0	0	0	82
cSH	114	1700	1700	1700	1700	1700
Volume to Capacity	1.19	1.10	1.10	0.87	0.87	0.05
Queue Length 95th (ft)	215	0	0	0	0	0
Control Delay (s)	214.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	F					
Approach Delay (s)	214.9	0.0		0.0		
Approach LOS	F					

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	98.6%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	190	0	0	755	10	80	15	500	20	0	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	207	0	0	821	11	87	16	543	22	0	49
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		563			155							
pX, platoon unblocked												
vC, conflicting volume	832			207			1103	1060	207	1606	1054	826
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	832			207			1103	1060	207	1606	1054	826
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			46	93	35	21	100	87
cM capacity (veh/h)	801			1365			162	221	834	28	223	372

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	217	832	103	543	71
Volume Left	11	0	87	0	22
Volume Right	0	11	0	543	49
cSH	801	1700	169	834	77
Volume to Capacity	0.01	0.49	0.61	0.65	0.92
Queue Length 95th (ft)	1	0	84	124	120
Control Delay (s)	0.6	0.0	54.9	17.0	174.7
Lane LOS	A		F	C	F
Approach Delay (s)	0.6	0.0	23.1		174.7
Approach LOS			C		F

Intersection Summary			
Average Delay	15.5		
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

118: Greenwood Ave & 4th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	35	1665	30	100	1335	195	0	0	130	0	0	160
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	1810	33	109	1451	212	0	0	141	0	0	174
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		495										
pX, platoon unblocked				0.75			0.75	0.75	0.75	0.75	0.75	
vC, conflicting volume	1663			1842			3019	3783	921	2897	3693	832
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1663			1789			3362	4383	558	3199	4263	832
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			58			100	100	60	100	100	44
cM capacity (veh/h)	383			256			1	1	354	1	1	313

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	38	1207	636	109	967	696	141	174
Volume Left	38	0	0	109	0	0	0	0
Volume Right	0	0	33	0	0	212	141	174
cSH	383	1700	1700	256	1700	1700	354	313
Volume to Capacity	0.10	0.71	0.37	0.42	0.57	0.41	0.40	0.56
Queue Length 95th (ft)	8	0	0	50	0	0	47	79
Control Delay (s)	15.4	0.0	0.0	29.1	0.0	0.0	21.8	30.0
Lane LOS	C			D			C	D
Approach Delay (s)	0.3			1.8			21.8	30.0
Approach LOS							C	D

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	15	5	45	0	5	55	10	1630	40	45	1585	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	5	49	0	5	60	11	1772	43	49	1723	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		1			1							
Upstream signal (ft)								745			734	
pX, platoon unblocked	0.81	0.81	0.62	0.81	0.81	0.62	0.62			0.62		
vC, conflicting volume	2807	3674	878	2826	3668	908	1755			1815		
vC1, stage 1 conf vol	1837	1837		1815	1815							
vC2, stage 2 conf vol	970	1837		1011	1853							
vCu, unblocked vol	1581	2653	183	1604	2646	232	1604			1701		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	59	79	90	100	85	87	96			79		
cM capacity (veh/h)	40	26	511	50	37	476	249			229		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	71	65	11	1181	634	49	1149	607
Volume Left	16	0	11	0	0	49	0	0
Volume Right	49	60	0	0	43	0	0	33
cSH	99	238	249	1700	1700	229	1700	1700
Volume to Capacity	0.71	0.27	0.04	0.69	0.37	0.21	0.68	0.36
Queue Length 95th (ft)	92	27	3	0	0	20	0	0
Control Delay (s)	102.3	25.7	20.1	0.0	0.0	25.0	0.0	0.0
Lane LOS	F	D	C			C		
Approach Delay (s)	102.3	25.7	0.1			0.7		
Approach LOS	F	D						

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

120: Hawthorne Ave & 4th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	50	30	30	5	10	5	15	90	5	10	130	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	33	33	5	11	5	16	98	5	11	141	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	326	318	160	364	334	101	179			103		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	326	318	160	364	334	101	179			103		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	94	96	99	98	99	99			99		
cM capacity (veh/h)	606	587	885	538	575	955	1396			1489		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	120	22	120	190
Volume Left	54	5	16	11
Volume Right	33	5	5	38
cSH	656	627	1396	1489
Volume to Capacity	0.18	0.03	0.01	0.01
Queue Length 95th (ft)	17	3	1	1
Control Delay (s)	11.7	11.0	1.1	0.5
Lane LOS	B	B	A	A
Approach Delay (s)	11.7	11.0	1.1	0.5
Approach LOS	B	B		

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		

123: Oregon St & Bend Pkwy SB Ramp

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	290	0	3445	2695	220
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	315	0	3745	2929	239
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				773	710	
pX, platoon unblocked						
vC, conflicting volume	4802	1465	3168			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	4802	1465	3168			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	0	100			
cM capacity (veh/h)	1	117	97			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	315	1872	1872	1465	1465	239
Volume Left	0	0	0	0	0	0
Volume Right	315	0	0	0	0	239
cSH	117	1700	1700	1700	1700	1700
Volume to Capacity	2.68	1.10	1.10	0.86	0.86	0.14
Queue Length 95th (ft)	721	0	0	0	0	0
Control Delay (s)	839.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	F					
Approach Delay (s)	839.9	0.0		0.0		
Approach LOS	F					

Intersection Summary			
Average Delay	36.6		
Intersection Capacity Utilization	99.1%	ICU Level of Service	F
Analysis Period (min)	15		

127: Franklin Ave & 4th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	80	735	50	25	470	15	25	25	45	15	15	145
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	799	54	27	511	16	27	27	49	16	16	158
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		490										
pX, platoon unblocked				0.80			0.80	0.80	0.80	0.80	0.80	
vC, conflicting volume	527			853			1476	1582	427	1209	1601	264
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	527			568			1345	1477	35	1012	1501	264
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			97			50	69	94	84	81	79
cM capacity (veh/h)	1036			801			54	88	825	102	86	735

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	87	533	321	27	341	187	103	190
Volume Left	87	0	0	27	0	0	27	16
Volume Right	0	0	54	0	0	16	49	158
cSH	1036	1700	1700	801	1700	1700	119	337
Volume to Capacity	0.08	0.31	0.19	0.03	0.20	0.11	0.87	0.57
Queue Length 95th (ft)	7	0	0	3	0	0	133	83
Control Delay (s)	8.8	0.0	0.0	9.7	0.0	0.0	118.8	28.7
Lane LOS	A			A			F	D
Approach Delay (s)	0.8			0.5			118.8	28.7
Approach LOS							F	D

Intersection Summary			
Average Delay	10.5		
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	460	300	45	0	350	10	50	5	5	20	35	670
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	500	326	49	0	380	11	54	5	5	22	38	728

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	875	391	65	60	728
Volume Left (vph)	500	0	54	22	0
Volume Right (vph)	49	11	5	0	728
Hadj (s)	0.11	0.02	0.15	0.22	-0.67
Departure Headway (s)	7.2	7.4	9.3	7.9	7.0
Degree Utilization, x	1.76	0.81	0.17	0.13	1.42
Capacity (veh/h)	504	479	365	446	517
Control Delay (s)	366.7	34.6	14.1	10.9	217.5
Approach Delay (s)	366.7	34.6	14.1	201.9	
Approach LOS	F	D	B	F	

Intersection Summary			
Delay	233.3		
HCM Level of Service	F		
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		

134: Colorado Ave & Bend Pkwy NB Ramp

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	850	240	310	645	30	270
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	924	261	337	701	33	293
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		818				
pX, platoon unblocked						
vC, conflicting volume	1038				2796	688
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1038				2796	688
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	0				0	34
cM capacity (veh/h)	670				0	447

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	924	261	1038	33	293
Volume Left	924	0	0	33	0
Volume Right	0	0	701	0	293
cSH	670	1700	1700	0	447
Volume to Capacity	1.38	0.15	0.61	Err	0.66
Queue Length 95th (ft)	1009	0	0	Err	116
Control Delay (s)	198.9	0.0	0.0	Err	27.2
Lane LOS	F			F	D
Approach Delay (s)	155.1		0.0	Err	
Approach LOS				F	

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	116.4%	ICU Level of Service	H
Analysis Period (min)	15		

APPENDIX C

2030 Central Area Plan Intersection Traffic Operations Analysis Worksheets for Peak Hour

Bend Central Area Plan
Butler Market Road @ US 97/US20

2030 CAP with Added Trip Reductions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.91		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	3433	1700		1770	3471		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	3433	1700		1770	3471		1770	3539	1583
Volume (vph)	150	220	250	620	215	300	250	1600	235	280	1935	110
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	239	272	674	234	326	272	1739	255	304	2103	120
RTOR Reduction (vph)	0	0	159	0	28	0	0	7	0	0	0	24
Lane Group Flow (vph)	163	239	113	674	532	0	272	1987	0	304	2103	96
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									2
Actuated Green, G (s)	13.0	24.0	24.0	34.0	45.0		21.5	81.0		24.5	84.0	84.0
Effective Green, g (s)	13.0	24.0	24.0	34.0	45.0		21.0	82.0		24.0	85.0	85.0
Actuated g/C Ratio	0.07	0.13	0.13	0.19	0.25		0.12	0.46		0.13	0.47	0.47
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		3.5	5.0		3.5	5.0	5.0
Lane Grp Cap (vph)	128	248	211	648	425		207	1581		236	1671	748
v/s Ratio Prot	c0.09	0.13		0.20	c0.33		0.15	c0.57		0.17	c0.59	
v/s Ratio Perm			0.17									0.08
v/c Ratio	1.27	0.96	0.54	1.04	1.25		1.31	1.26		1.29	1.26	0.13
Uniform Delay, d1	83.5	77.6	72.8	73.0	67.5		79.5	49.0		78.0	47.5	26.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	170.4	48.5	9.5	46.2	131.7		171.3	121.0		157.7	121.4	0.4
Delay (s)	253.9	126.1	82.3	119.2	199.2		250.8	170.0		235.7	168.9	27.0
Level of Service	F	F	F	F	F		F	F		F	F	C
Approach Delay (s)		139.3			155.5			179.7			170.2	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	167.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	118.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.97		1.00	0.87		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1777		1770	1620		1770	1863	1583	1770	1859	
Flt Permitted		0.98		0.95	1.00		0.41	1.00	1.00	0.53	1.00	
Satd. Flow (perm)		1777		1770	1620		770	1863	1583	980	1859	
Volume (vph)	15	20	10	720	65	435	20	220	960	255	300	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	22	11	783	71	473	22	239	1043	277	326	5
RTOR Reduction (vph)	0	10	0	0	273	0	0	0	182	0	1	0
Lane Group Flow (vph)	0	39	0	783	271	0	22	239	861	277	330	0
Turn Type	Split			Split			Perm		pm+ov	Perm		
Protected Phases	7	7		3	3			6	3		2	
Permitted Phases							6		6	2		
Actuated Green, G (s)		6.0		36.0	36.0		31.0	31.0	67.0	31.0	31.0	
Effective Green, g (s)		6.0		36.0	36.0		31.0	31.0	67.0	31.0	31.0	
Actuated g/C Ratio		0.07		0.42	0.42		0.36	0.36	0.79	0.36	0.36	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.5		2.5	2.5		4.3	4.3	2.5	4.3	4.3	
Lane Grp Cap (vph)		125		750	686		281	679	1322	357	678	
v/s Ratio Prot		c0.03		c0.44	0.34			0.13	c0.33		0.18	
v/s Ratio Perm							0.03		0.32	0.28		
v/c Ratio		0.31		1.04	0.40		0.08	0.35	0.65	0.78	0.49	
Uniform Delay, d1		37.5		24.5	17.0		17.7	19.7	3.9	23.9	20.9	
Progression Factor		1.00		0.84	0.48		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.0		38.9	0.2		0.5	1.4	1.0	15.2	2.5	
Delay (s)		38.6		59.4	8.3		18.2	21.1	5.0	39.1	23.4	
Level of Service		D		E	A		B	C	A	D	C	
Approach Delay (s)		38.6			38.4			8.1			30.5	
Approach LOS		D			D			A			C	

Intersection Summary			
HCM Average Control Delay	25.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95	1.00		0.95			1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00		1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3488	1583		3433			1835	1583	1770	1863	1583
Flt Permitted		0.53	1.00		0.81			0.90	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1864	1583		2801			1670	1583	1770	1863	1583
Volume (vph)	190	460	585	60	680	160	160	370	600	160	5	380
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	207	500	636	65	739	174	174	402	652	174	5	413
RTOR Reduction (vph)	0	0	383	0	22	0	0	0	129	0	0	50
Lane Group Flow (vph)	0	707	253	0	956	0	0	576	523	174	5	363
Turn Type	Perm		Perm	Perm			Perm		Perm	Prot		Perm
Protected Phases		2			6			8		7	4	
Permitted Phases	2		2	6			8		8			4
Actuated Green, G (s)		33.8	33.8		33.8			30.0	30.0	9.2	43.2	43.2
Effective Green, g (s)		33.8	33.8		33.8			30.0	30.0	9.2	43.2	43.2
Actuated g/C Ratio		0.40	0.40		0.40			0.35	0.35	0.11	0.51	0.51
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		2.5	2.5		2.5			2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		741	629		1114			589	559	192	947	805
v/s Ratio Prot										c0.10	0.00	
v/s Ratio Perm		0.38	0.40		0.35			0.34	0.41			0.26
v/c Ratio		1.75dl	0.40		0.86			0.98	0.94	0.91	0.01	0.45
Uniform Delay, d1		24.8	18.4		23.4			27.2	26.6	37.5	10.3	13.3
Progression Factor		0.82	0.14		0.50			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		18.5	1.3		0.7			31.0	22.9	38.7	0.0	0.1
Delay (s)		38.7	3.9		12.5			58.2	49.5	76.2	10.3	13.5
Level of Service		D	A		B			E	D	E	B	B
Approach Delay (s)		22.2			12.5			53.6			31.9	
Approach LOS		C			B			D			C	

Intersection Summary

HCM Average Control Delay	30.6	HCM Level of Service	C
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Bend Central Area Plan
Revere Avenue @ 3rd Street

2030 CAP with Added Trip Reductions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		0.91	0.91		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3365		1610	3314		1770	3491		1770	3498	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3365		1610	3314		1770	3491		1770	3498	
Volume (vph)	280	605	295	375	560	90	225	1765	175	110	1245	105
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	304	658	321	408	609	98	245	1918	190	120	1353	114
RTOR Reduction (vph)	0	35	0	0	7	0	0	4	0	0	4	0
Lane Group Flow (vph)	304	944	0	362	746	0	245	2104	0	120	1463	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	37.0	37.0		31.0	31.0		18.0	76.0		10.0	68.0	
Effective Green, g (s)	37.0	37.0		31.0	31.0		18.0	76.0		10.0	68.0	
Actuated g/C Ratio	0.22	0.22		0.18	0.18		0.11	0.45		0.06	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.3		2.5	4.3	
Lane Grp Cap (vph)	385	732		294	604		187	1561		104	1399	
v/s Ratio Prot	0.17	c0.29		0.22	c0.23		0.14	c0.60		0.07	c0.42	
v/s Ratio Perm												
v/c Ratio	0.79	1.29		1.23	1.24		1.31	1.35		1.15	1.05	
Uniform Delay, d1	62.8	66.5		69.5	69.5		76.0	47.0		80.0	51.0	
Progression Factor	0.99	0.99		1.00	1.00		0.61	0.36		1.00	1.00	
Incremental Delay, d2	3.7	133.9		130.1	120.0		143.1	156.8		135.5	37.1	
Delay (s)	65.8	199.6		199.6	189.5		189.2	173.8		215.5	88.1	
Level of Service	E	F		F	F		F	F		F	F	
Approach Delay (s)		167.9			192.8			175.4			97.7	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	157.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.32		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	119.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1781		1770	1863	1583	1770	1812		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.19	1.00		0.11	1.00	1.00
Satd. Flow (perm)	1770	1781		1770	1863	1583	354	1812		212	1863	1583
Volume (vph)	370	325	135	115	390	150	200	745	165	80	450	480
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	402	353	147	125	424	163	217	810	179	87	489	522
RTOR Reduction (vph)	0	16	0	0	0	130	0	8	0	0	0	337
Lane Group Flow (vph)	402	484	0	125	424	33	217	981	0	87	489	185
Turn Type	Prot			Prot		Perm	pm+pt			pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8	2			6		6
Actuated Green, G (s)	17.8	28.7		9.2	20.1	20.1	48.8	40.1		39.8	35.1	35.1
Effective Green, g (s)	18.0	28.7		9.4	20.1	20.1	48.8	40.1		39.8	35.1	35.1
Actuated g/C Ratio	0.18	0.29		0.10	0.20	0.20	0.49	0.41		0.40	0.35	0.35
Clearance Time (s)	4.2	4.0		4.2	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	3.0	4.2		2.5	4.2	4.2
Lane Grp Cap (vph)	322	517		168	379	322	314	735		159	661	562
v/s Ratio Prot	c0.23	0.28		0.07	c0.23		c0.07	c0.55		0.03	0.26	
v/s Ratio Perm						0.10	0.27			0.19		0.33
v/c Ratio	1.25	0.94		0.74	1.12	0.10	0.69	1.34		0.55	0.74	0.33
Uniform Delay, d1	40.5	34.2		43.6	39.4	32.1	18.2	29.4		24.8	27.9	23.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	135.1	24.6		15.5	82.4	0.1	6.4	160.0		3.0	4.7	0.5
Delay (s)	175.5	58.8		59.1	121.8	32.2	24.7	189.4		27.8	32.7	23.8
Level of Service	F	E		E	F	C	C	F		C	C	C
Approach Delay (s)		110.8			90.3			159.7			28.1	
Approach LOS		F			F			F			C	

Intersection Summary			
HCM Average Control Delay	99.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	98.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	108.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.96		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1784		1770	1793		1770	3496		1770	3527	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1784		1770	1793		1770	3496		1770	3527	
Volume (vph)	175	395	155	190	390	130	150	1880	165	200	1700	40
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	429	168	207	424	141	163	2043	179	217	1848	43
RTOR Reduction (vph)	0	8	0	0	7	0	0	4	0	0	1	0
Lane Group Flow (vph)	190	589	0	207	558	0	163	2218	0	217	1890	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	15.5	43.0		13.5	41.0		12.5	80.0		17.5	85.0	
Effective Green, g (s)	15.0	43.0		13.0	41.0		12.0	81.0		17.0	86.0	
Actuated g/C Ratio	0.09	0.25		0.08	0.24		0.07	0.48		0.10	0.51	
Clearance Time (s)	3.5	4.0		3.5	4.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.8		2.5	4.8	
Lane Grp Cap (vph)	156	451		135	432		125	1666		177	1784	
v/s Ratio Prot	0.11	c0.33		c0.12	0.32		0.09	c0.64		c0.12	c0.54	
v/s Ratio Perm												
v/c Ratio	1.22	1.31		1.53	1.29		1.30	1.33		1.23	1.06	
Uniform Delay, d1	77.5	63.5		78.5	64.5		79.0	44.5		76.5	42.0	
Progression Factor	1.00	1.00		1.00	1.00		0.66	0.57		0.80	0.43	
Incremental Delay, d2	142.5	152.8		273.6	147.8		142.1	149.6		106.4	28.3	
Delay (s)	220.0	216.3		352.1	212.3		194.6	175.1		167.3	46.2	
Level of Service	F	F		F	F		F	F		F	D	
Approach Delay (s)		217.2			249.8			176.5			58.7	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM Average Control Delay	150.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	122.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00						0.95	1.00
Frt	1.00	0.96		1.00	0.99						1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (prot)	1770	3396		1770	1845						3506	1583
Flt Permitted	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (perm)	1770	3396		1770	1845						3506	1583
Volume (vph)	150	540	200	390	680	45	0	0	0	145	630	170
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	587	217	424	739	49	0	0	0	158	685	185
RTOR Reduction (vph)	0	38	0	0	3	0	0	0	0	0	0	139
Lane Group Flow (vph)	163	766	0	424	785	0	0	0	0	0	843	46
Turn Type	Prot			Prot						Perm		Perm
Protected Phases	5	2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)	14.0	35.0		28.0	49.0						25.0	25.0
Effective Green, g (s)	14.0	35.0		28.0	49.0						25.0	25.0
Actuated g/C Ratio	0.14	0.35		0.28	0.49						0.25	0.25
Clearance Time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Lane Grp Cap (vph)	248	1189		496	904						877	396
v/s Ratio Prot	0.09	0.24		c0.24	c0.43							
v/s Ratio Perm											0.24	0.12
v/c Ratio	0.66	0.64		0.85	0.87						0.96	0.12
Uniform Delay, d1	40.7	27.3		34.1	22.6						37.0	29.0
Progression Factor	1.00	1.00		0.77	0.44						1.00	1.00
Incremental Delay, d2	12.8	2.7		12.1	7.8						22.3	0.6
Delay (s)	53.6	30.0		38.3	17.9						59.3	29.6
Level of Service	D	C		D	B						E	C
Approach Delay (s)		34.0			25.0			0.0			54.0	
Approach LOS		C			C			A			D	

Intersection Summary			
HCM Average Control Delay	37.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			0.95			0.95				
Frt		1.00			0.98			0.95				
Flt Protected		1.00			1.00			0.99				
Satd. Flow (prot)		3534			3478			3332				
Flt Permitted		0.88			1.00			0.99				
Satd. Flow (perm)		3099			3478			3332				
Volume (vph)	20	675	0	0	850	110	265	560	390	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	734	0	0	924	120	288	609	424	0	0	0
RTOR Reduction (vph)	0	0	0	0	10	0	0	54	0	0	0	0
Lane Group Flow (vph)	0	756	0	0	1034	0	0	1267	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		42.0			42.0			50.0				
Effective Green, g (s)		42.0			42.0			50.0				
Actuated g/C Ratio		0.42			0.42			0.50				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		1302			1461			1666				
v/s Ratio Prot					c0.30							
v/s Ratio Perm		0.24						0.40				
v/c Ratio		0.58			0.71			0.76				
Uniform Delay, d1		22.2			23.9			20.2				
Progression Factor		0.33			1.00			0.77				
Incremental Delay, d2		1.3			2.9			2.5				
Delay (s)		8.8			26.9			17.9				
Level of Service		A			C			B				
Approach Delay (s)		8.8			26.9			17.9			0.0	
Approach LOS		A			C			B			A	

Intersection Summary

HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.95		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3463		1770	3365		1770	3435		1770	3482	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3463		1770	3365		1770	3435		1770	3482	
Volume (vph)	415	980	165	405	775	380	165	1355	330	515	1320	160
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	451	1065	179	440	842	413	179	1473	359	560	1435	174
RTOR Reduction (vph)	0	8	0	0	35	0	0	13	0	0	5	0
Lane Group Flow (vph)	451	1236	0	440	1220	0	179	1819	0	560	1604	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	25.0	42.0		24.0	41.0		11.0	58.0		30.0	77.0	
Effective Green, g (s)	25.0	42.0		24.0	41.0		11.0	58.0		30.0	77.0	
Actuated g/C Ratio	0.15	0.25		0.14	0.24		0.06	0.34		0.18	0.45	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.3		2.5	4.3	
Lane Grp Cap (vph)	260	856		250	812		115	1172		312	1577	
v/s Ratio Prot	c0.25	0.36		0.25	c0.37		0.10	c0.53		c0.32	0.46	
v/s Ratio Perm												
v/c Ratio	1.73	1.44		1.76	1.50		1.56	1.55		1.79	1.02	
Uniform Delay, d1	72.5	64.0		73.0	64.5		79.5	56.0		70.0	46.5	
Progression Factor	1.00	1.00		1.00	1.00		0.73	0.95		0.81	0.94	
Incremental Delay, d2	346.2	206.2		357.9	232.6		271.6	250.8		358.9	11.6	
Delay (s)	418.7	270.2		430.9	297.1		329.5	304.3		415.5	55.1	
Level of Service	F	F		F	F		F	F		F	E	
Approach Delay (s)		309.7			331.8			306.6			148.2	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	267.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.59		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	146.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Bend Central Area Plan
Oregon Street @ Wall Street

2030 CAP with Added Trip Reductions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		1.00			1.00						0.95	
Frt		0.93			1.00						1.00	
Flt Protected		1.00			0.96						0.99	
Satd. Flow (prot)		1503			1552						3206	
Flt Permitted		1.00			0.74						0.99	
Satd. Flow (perm)		1503			1192						3206	
Volume (vph)	0	25	25	235	70	0	0	0	0	170	1030	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	27	27	255	76	0	0	0	0	185	1120	27
RTOR Reduction (vph)	0	16	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	38	0	0	331	0	0	0	0	0	1331	0
Parking (#/hr)	7	7	7	7	7	7				14	14	14
Turn Type				Perm						Perm		
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		41.0			41.0						51.0	
Effective Green, g (s)		41.0			41.0						51.0	
Actuated g/C Ratio		0.41			0.41						0.51	
Clearance Time (s)		4.0			4.0						4.0	
Lane Grp Cap (vph)		616			489						1635	
v/s Ratio Prot		0.04										
v/s Ratio Perm					c0.28						0.42	
v/c Ratio		0.06			0.68						0.81	
Uniform Delay, d1		17.9			24.1						20.5	
Progression Factor		1.00			0.83						0.42	
Incremental Delay, d2		0.2			5.7						2.2	
Delay (s)		18.0			25.6						10.8	
Level of Service		B			C						B	
Approach Delay (s)		18.0			25.6			0.0			10.8	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM Average Control Delay	13.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Bend Central Area Plan
Oregon Street @ Bond Street

2030 CAP with Added Trip Reductions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			0.95				
Frt		1.00			0.92			0.98				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		1817			1707			3447				
Flt Permitted		0.53			1.00			0.99				
Satd. Flow (perm)		990			1707			3447				
Volume (vph)	100	100	0	0	125	205	190	905	155	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	109	0	0	136	223	207	984	168	0	0	0
RTOR Reduction (vph)	0	0	0	0	59	0	0	11	0	0	0	0
Lane Group Flow (vph)	0	218	0	0	300	0	0	1348	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		37.4			37.4			54.6				
Effective Green, g (s)		37.4			37.4			54.6				
Actuated g/C Ratio		0.37			0.37			0.55				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		370			638			1882				
v/s Ratio Prot					0.21							
v/s Ratio Perm		c0.22						0.39				
v/c Ratio		0.59			0.47			0.72				
Uniform Delay, d1		25.1			23.8			16.9				
Progression Factor		1.55			1.00			0.15				
Incremental Delay, d2		4.8			2.5			1.0				
Delay (s)		43.7			26.3			3.5				
Level of Service		D			C			A				
Approach Delay (s)		43.7			26.3			3.5			0.0	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM Average Control Delay	12.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		1.00		1.00	1.00						0.95	1.00
Frt		0.99		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.99	1.00
Satd. Flow (prot)		1847		1770	1863						3487	1583
Flt Permitted		1.00		0.12	1.00						0.99	1.00
Satd. Flow (perm)		1847		218	1863						3487	1583
Volume (vph)	0	575	40	315	485	0	0	0	0	255	600	355
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	625	43	342	527	0	0	0	0	277	652	386
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	0	246
Lane Group Flow (vph)	0	666	0	342	527	0	0	0	0	0	929	140
Turn Type				pm+pt						Perm		Perm
Protected Phases		8		7	4						6	
Permitted Phases				4						6		6
Actuated Green, G (s)		43.0		61.0	61.0						31.0	31.0
Effective Green, g (s)		43.0		61.0	61.0						31.0	31.0
Actuated g/C Ratio		0.43		0.61	0.61						0.31	0.31
Clearance Time (s)		4.0		4.0	4.0						4.0	4.0
Lane Grp Cap (vph)		794		350	1136						1081	491
v/s Ratio Prot		0.36		c0.14	0.28							
v/s Ratio Perm				c0.46							0.27	0.24
v/c Ratio		0.84		0.98	0.46						0.86	0.28
Uniform Delay, d1		25.4		27.1	10.6						32.5	26.1
Progression Factor		1.00		0.86	0.36						0.61	0.41
Incremental Delay, d2		10.3		22.3	0.4						5.7	0.9
Delay (s)		35.7		45.6	4.2						25.6	11.7
Level of Service		D		D	A						C	B
Approach Delay (s)		35.7			20.5			0.0			21.5	
Approach LOS		D			C			A			C	

Intersection Summary			
HCM Average Control Delay	24.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Lane Util. Factor	1.00	0.95			1.00	1.00		0.95	1.00			
Frt	1.00	1.00			1.00	0.85		1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00		0.99	1.00			
Satd. Flow (prot)	1770	3539			1863	1583		3521	1583			
Flt Permitted	0.09	1.00			1.00	1.00		0.99	1.00			
Satd. Flow (perm)	159	3539			1863	1583		3521	1583			
Volume (vph)	325	500	0	0	700	120	95	815	385	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	353	543	0	0	761	130	103	886	418	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	5	0	0	262	0	0	0
Lane Group Flow (vph)	353	543	0	0	761	125	0	989	156	0	0	0
Turn Type	pm+pt					custom	Perm		Perm			
Protected Phases	3	8			4			2				
Permitted Phases	8					8	2		2			
Actuated Green, G (s)	64.0	64.0			43.0	64.0		28.0	28.0			
Effective Green, g (s)	64.0	64.0			43.0	64.0		28.0	28.0			
Actuated g/C Ratio	0.64	0.64			0.43	0.64		0.28	0.28			
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Lane Grp Cap (vph)	376	2265			801	1013		986	443			
v/s Ratio Prot	c0.16	0.15			0.41							
v/s Ratio Perm	c0.44					0.08		0.28	0.26			
v/c Ratio	0.94	0.24			0.95	0.12		1.00	0.35			
Uniform Delay, d1	31.1	7.7			27.5	7.0		36.0	28.8			
Progression Factor	0.85	1.87			1.00	1.00		0.69	0.60			
Incremental Delay, d2	21.0	0.1			21.7	0.2		24.9	1.6			
Delay (s)	47.3	14.4			49.2	7.3		49.8	18.8			
Level of Service	D	B			D	A		D	B			
Approach Delay (s)		27.4			43.1			40.6			0.0	
Approach LOS		C			D			D			A	

Intersection Summary

HCM Average Control Delay	37.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Bend Central Area Plan
Franklin Avenue @ 3rd Street

2030 CAP with Added Trip Reductions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3460		1770	3518		1770	3486	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3460		1770	3518		1770	3486	
Volume (vph)	370	705	165	200	455	80	200	1320	55	145	1445	160
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	402	766	179	217	495	87	217	1435	60	158	1571	174
RTOR Reduction (vph)	0	0	103	0	9	0	0	2	0	0	5	0
Lane Group Flow (vph)	402	766	76	217	573	0	217	1493	0	158	1740	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4									
Actuated Green, G (s)	34.0	38.0	38.0	21.0	25.0		18.0	79.0		16.0	77.0	
Effective Green, g (s)	34.0	38.0	38.0	21.0	25.0		18.0	79.0		16.0	77.0	
Actuated g/C Ratio	0.20	0.22	0.22	0.12	0.15		0.11	0.46		0.09	0.45	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	354	791	354	219	509		187	1635		167	1579	
v/s Ratio Prot	c0.23	c0.22		0.12	c0.17		c0.12	0.42		0.09	c0.50	
v/s Ratio Perm			0.11									
v/c Ratio	1.14	0.97	0.21	0.99	1.13		1.16	0.91		0.95	1.10	
Uniform Delay, d1	68.0	65.4	53.8	74.4	72.5		76.0	42.3		76.6	46.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.59	0.32	
Incremental Delay, d2	89.9	25.2	1.4	58.5	79.5		115.7	9.4		11.5	47.0	
Delay (s)	157.9	90.6	55.2	132.9	152.0		191.7	51.7		56.8	62.0	
Level of Service	F	F	E	F	F		F	D		E	E	
Approach Delay (s)		106.0			146.8			69.4			61.5	
Approach LOS		F			F			E			E	

Intersection Summary

HCM Average Control Delay	86.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	105.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑						↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						4.0	
Lane Util. Factor					0.95						0.95	
Frt					1.00						0.96	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					3287						3177	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					3287						3177	
Volume (vph)	0	0	0	170	740	0	0	0	0	0	545	215
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	185	804	0	0	0	0	0	592	234
RTOR Reduction (vph)	0	0	0	0	20	0	0	0	0	0	42	0
Lane Group Flow (vph)	0	0	0	0	969	0	0	0	0	0	784	0
Parking (#/hr)				5	5					5	5	
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					47.9						44.1	
Effective Green, g (s)					47.9						44.1	
Actuated g/C Ratio					0.48						0.44	
Clearance Time (s)					4.0						4.0	
Lane Grp Cap (vph)					1574						1401	
v/s Ratio Prot											c0.26	
v/s Ratio Perm					0.30							
v/c Ratio					0.62						0.56	
Uniform Delay, d1					19.2						20.7	
Progression Factor					0.26						1.36	
Incremental Delay, d2					1.1						0.7	
Delay (s)					6.0						28.9	
Level of Service					A						C	
Approach Delay (s)		0.0			6.0			0.0			28.9	
Approach LOS		A			A			A			C	

Intersection Summary

HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↱			↰↑				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.95			0.95				
Frt					0.96			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					3149			3256				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					3149			3256				
Volume (vph)	0	0	0	0	795	270	115	920	0	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	864	293	125	1000	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	32	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1125	0	0	1115	0	0	0	0
Parking (#/hr)				10	10	10	10	10	10			
Turn Type							Perm					
Protected Phases					6			8				
Permitted Phases							8					
Actuated Green, G (s)					46.0			46.0				
Effective Green, g (s)					46.0			46.0				
Actuated g/C Ratio					0.46			0.46				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					1449			1498				
v/s Ratio Prot					c0.37							
v/s Ratio Perm								0.35				
v/c Ratio					0.78			0.74				
Uniform Delay, d1					22.7			22.2				
Progression Factor					1.00			0.71				
Incremental Delay, d2					4.1			1.9				
Delay (s)					26.8			17.6				
Level of Service					C			B				
Approach Delay (s)		0.0			26.8			17.6			0.0	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0	4.0	4.0		4.0
Lane Util. Factor					1.00			1.00	1.00	1.00		1.00
Frt					0.98			1.00	0.85	1.00		0.85
Flt Protected					1.00			1.00	1.00	0.95		1.00
Satd. Flow (prot)					1830			1861	1583	1770		1583
Flt Permitted					1.00			1.00	1.00	0.42		1.00
Satd. Flow (perm)					1830			1861	1583	777		1583
Volume (vph)	0	0	0	5	515	75	5	215	920	130	0	460
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	5	560	82	5	234	1000	141	0	500
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	198	0	0	93
Lane Group Flow (vph)	0	0	0	0	643	0	0	239	802	141	0	407
Turn Type				custom			Split		custom	D.P+P		custom
Protected Phases				8	8		6	6	6 8	2		2
Permitted Phases				8					6 8	6		6
Actuated Green, G (s)					47.6			30.6	82.2	60.4		60.4
Effective Green, g (s)					47.6			30.6	82.2	60.4		60.4
Actuated g/C Ratio					0.40			0.26	0.69	0.50		0.50
Clearance Time (s)					4.0			4.0		4.0		4.0
Vehicle Extension (s)					3.0			3.0		3.0		3.0
Lane Grp Cap (vph)					726			475	1084	638		850
v/s Ratio Prot					0.35			0.13	c0.63	0.05		c0.15
v/s Ratio Perm										0.06		0.17
v/c Ratio					0.89			0.50	0.74	0.22		0.48
Uniform Delay, d1					33.7			38.2	12.1	16.5		19.5
Progression Factor					1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2					12.5			0.8	2.8	0.2		0.4
Delay (s)					46.1			39.0	14.8	16.7		19.9
Level of Service					D			D	B	B		B
Approach Delay (s)		0.0			46.1			19.5			19.2	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM Average Control Delay	26.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									4.0	
Lane Util. Factor		0.95									0.95	
Frt		1.00									1.00	
Flt Protected		1.00									0.98	
Satd. Flow (prot)		3304									3213	
Flt Permitted		1.00									0.98	
Satd. Flow (perm)		3304									3213	
Volume (vph)	0	1230	35	0	0	0	0	0	0	270	445	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1337	38	0	0	0	0	0	0	293	484	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	24	0
Lane Group Flow (vph)	0	1373	0	0	0	0	0	0	0	0	753	0
Parking (#/hr)		5	5							10	10	10
Turn Type										Perm		
Protected Phases		2									4	
Permitted Phases										4		
Actuated Green, G (s)		54.1									37.9	
Effective Green, g (s)		54.1									37.9	
Actuated g/C Ratio		0.54									0.38	
Clearance Time (s)		4.0									4.0	
Lane Grp Cap (vph)		1787									1218	
v/s Ratio Prot		c0.42										
v/s Ratio Perm											0.24	
v/c Ratio		0.77									0.62	
Uniform Delay, d1		18.0									25.2	
Progression Factor		0.69									0.35	
Incremental Delay, d2		2.9									1.9	
Delay (s)		15.4									10.9	
Level of Service		B									B	
Approach Delay (s)		15.4			0.0			0.0			10.9	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑						↰↑				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0				
Lane Util. Factor		0.95						0.95				
Frt		1.00						0.96				
Flt Protected		0.98						1.00				
Satd. Flow (prot)		3219						3138				
Flt Permitted		0.98						1.00				
Satd. Flow (perm)		3219						3138				
Volume (vph)	515	1000	0	0	0	0	0	520	200	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	560	1087	0	0	0	0	0	565	217	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	40	0	0	0	0
Lane Group Flow (vph)	0	1647	0	0	0	0	0	742	0	0	0	0
Parking (#/hr)	10	10	10				10	10	10			
Turn Type	Perm						Perm					
Protected Phases		2						8				
Permitted Phases	2						8					
Actuated Green, G (s)		61.0						31.0				
Effective Green, g (s)		61.0						31.0				
Actuated g/C Ratio		0.61						0.31				
Clearance Time (s)		4.0						4.0				
Lane Grp Cap (vph)		1964						973				
v/s Ratio Prot								c0.25				
v/s Ratio Perm		0.51										
v/c Ratio		0.84						0.76				
Uniform Delay, d1		15.6						31.2				
Progression Factor		0.42						1.00				
Incremental Delay, d2		3.0						5.6				
Delay (s)		9.6						36.8				
Level of Service		A						D				
Approach Delay (s)		9.6			0.0			36.8			0.0	
Approach LOS		A			A			D			A	

Intersection Summary			
HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		Y	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	730	885	0	495	250
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	793	962	0	538	272
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)		461				
pX, platoon unblocked					0.87	
vC, conflicting volume	962				1755	962
vC1, stage 1 conf vol					962	
vC2, stage 2 conf vol					793	
vCu, unblocked vol	962				1864	962
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				0	12
cM capacity (veh/h)	715				208	310

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	793	962	810
Volume Left	0	0	538
Volume Right	0	0	272
cSH	1700	1700	234
Volume to Capacity	0.47	0.57	3.46
Queue Length (ft)	0	0	Err
Control Delay (s)	0.0	0.0	Err
Lane LOS			F
Approach Delay (s)	0.0	0.0	Err
Approach LOS			F

Intersection Summary			
Average Delay	3156.5		
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	110	1100	15	10	860	305	25	5	35	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	120	1196	16	11	935	332	27	5	38	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			None	
Median storage veh)								1				
Upstream signal (ft)		910										
pX, platoon unblocked				0.89			0.89	0.89	0.89	0.89	0.89	
vC, conflicting volume	1266			1212			2399	2731	1204	2598	2573	1101
vC1, stage 1 conf vol							1443	1443				
vC2, stage 2 conf vol							957	1288				
vCu, unblocked vol	1266			1239			2579	2953	1230	2803	2776	1101
tC, single (s)	4.1			4.1			*6.4	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							5.4	5.5				
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	78			98			0	91	80	100	100	100
cM capacity (veh/h)	549			498			21	58	192	6	13	258

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	120	1212	11	1266	71
Volume Left	120	0	11	0	27
Volume Right	0	16	0	332	38
cSH	549	1700	498	1700	44
Volume to Capacity	0.22	0.71	0.02	0.74	1.60
Queue Length (ft)	21	0	2	0	177
Control Delay (s)	13.4	0.0	12.4	0.0	499.0
Lane LOS	B		B		F
Approach Delay (s)	1.2		0.1		499.0
Approach LOS					F

Intersection Summary			
Average Delay	13.8		
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	880	255	130	790	0	340	0	95	0	20	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	957	277	141	859	0	370	0	103	0	22	49
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			None	
Median storage veh)								1				
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	859			1234			2296	2236	1095	2201	2375	859
vC1, stage 1 conf vol							1095	1095				
vC2, stage 2 conf vol							1201	1141				
vCu, unblocked vol	859			1234			2296	2236	1095	2201	2375	859
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5				
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			75			0	100	60	100	16	86
cM capacity (veh/h)	782			565			6	124	260	16	26	356

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	0	1234	141	859	370	103	71
Volume Left	0	0	141	0	370	0	0
Volume Right	0	277	0	0	0	103	49
cSH	1700	1700	565	1700	6	260	72
Volume to Capacity	0.00	0.73	0.25	0.51	62.66	0.40	0.97
Queue Length (ft)	0	0	25	0	Err	45	126
Control Delay (s)	0.0	0.0	13.5	0.0	Err	27.7	196.7
Lane LOS			B		F	D	F
Approach Delay (s)	0.0		1.9		7821.4		196.7
Approach LOS					F		F

Intersection Summary			
Average Delay	1337.3		
Intersection Capacity Utilization	104.5%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	15	20	15	405	25	70	5	435	335	100	655	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	22	16	440	27	76	5	473	364	109	712	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1685	1777	712	1622	1595	655	712			837		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1685	1777	712	1622	1595	655	712			837		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	62	69	96	0	70	84	99			86		
cM capacity (veh/h)	43	71	432	54	92	466	888			797		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	54	543	842	821
Volume Left	16	440	5	109
Volume Right	16	76	364	0
cSH	75	63	888	797
Volume to Capacity	0.72	8.57	0.01	0.14
Queue Length (ft)	85	Err	0	12
Control Delay (s)	130.1	Err	0.2	3.4
Lane LOS	F	F	A	A
Approach Delay (s)	130.1	Err	0.2	3.4
Approach LOS	F	F		

Intersection Summary			
Average Delay	2408.0		
Intersection Capacity Utilization	128.3%	ICU Level of Service	H
Analysis Period (min)	15		

Bend Central Area Plan
Revere Avenue @ 4th Street

2030 CAP with Added Trip Reductions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	315	410	165	30	445	115	105	295	55	270	335	475
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	342	446	179	33	484	125	114	321	60	293	364	516

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total (vph)	342	625	33	609	495	658	516
Volume Left (vph)	342	0	33	0	114	293	0
Volume Right (vph)	0	179	0	125	60	0	516
Hadj (s)	0.5	-0.2	0.5	-0.1	0.0	0.3	-0.7
Departure Headway (s)	9.8	9.1	9.8	9.2	9.7	9.6	8.6
Degree Utilization, x	0.94	1.59	0.09	1.55	1.34	1.74	1.24
Capacity (veh/h)	360	398	353	403	378	381	423
Control Delay (s)	24.5	82.4	11.9	79.1	58.6	100.4	45.7
Approach Delay (s)	61.9		75.7		58.6	76.3	
Approach LOS	F		F		F	F	

Intersection Summary			
Delay	69.3		
HCM Level of Service	F		
Intersection Capacity Utilization	118.4%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	145	565	65	70	515	55	60	270	95	150	215	110
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	158	614	71	76	560	60	65	293	103	163	234	120

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	158	685	76	620	462	516
Volume Left (vph)	158	0	76	0	65	163
Volume Right (vph)	0	71	0	60	103	120
Hadj (s)	0.5	0.0	0.5	0.0	-0.1	0.0
Departure Headway (s)	9.8	9.2	9.8	9.3	9.1	9.1
Degree Utilization, x	0.43	1.76	0.21	1.59	1.16	1.30
Capacity (veh/h)	354	395	358	392	402	404
Control Delay (s)	13.4	101.2	12.3	83.6	40.6	54.0
Approach Delay (s)	84.7		75.8		40.6	54.0
Approach LOS	F		F		E	F

Intersection Summary			
Delay	67.9		
HCM Level of Service	F		
Intersection Capacity Utilization	98.9%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	250	0	0	780	10	80	20	570	20	0	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	272	0	0	848	11	87	22	620	22	0	54
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		563			155							
pX, platoon unblocked												
vC, conflicting volume	859			272			1201	1152	272	1777	1147	853
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	859			272			1201	1152	272	1777	1147	853
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			36	89	19	0	100	85
cM capacity (veh/h)	782			1292			136	195	767	11	196	359

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	283	859	109	620	76
Volume Left	11	0	87	0	22
Volume Right	0	11	0	620	54
cSH	782	1700	144	767	36
Volume to Capacity	0.01	0.51	0.75	0.81	2.10
Queue Length (ft)	1	0	113	215	210
Control Delay (s)	0.5	0.0	81.6	26.3	745.3
Lane LOS	A		F	D	F
Approach Delay (s)	0.5	0.0	34.5		745.3
Approach LOS			D		F

Intersection Summary			
Average Delay	42.1		
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	35	1770	30	160	1405	220	0	0	155	0	0	170
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	1924	33	174	1527	239	0	0	168	0	0	185
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		495										
pX, platoon unblocked												
vC, conflicting volume	1766			1957			3312	4130	978	3201	4027	883
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1766			1957			3312	4130	978	3201	4027	883
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			41			100	100	33	100	100	36
cM capacity (veh/h)	349			294			1	1	250	1	1	289

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	38	1283	674	174	1018	748	168	185
Volume Left	38	0	0	174	0	0	0	0
Volume Right	0	0	33	0	0	239	168	185
cSH	349	1700	1700	294	1700	1700	250	289
Volume to Capacity	0.11	0.75	0.40	0.59	0.60	0.44	0.67	0.64
Queue Length (ft)	9	0	0	88	0	0	109	101
Control Delay (s)	16.6	0.0	0.0	33.5	0.0	0.0	44.9	37.2
Lane LOS	C			D			E	E
Approach Delay (s)	0.3			3.0			44.9	37.2
Approach LOS							E	E

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	210	30	30	5	45	55	75	1620	40	70	1695	115
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	228	33	33	5	49	60	82	1761	43	76	1842	125
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		1			1							
Upstream signal (ft)								745			734	
pX, platoon unblocked												
vC, conflicting volume	3185	4024	984	3068	4065	902	1967			1804		
vC1, stage 1 conf vol	2057	2057		1946	1946							
vC2, stage 2 conf vol	1128	1967		1122	2120							
vCu, unblocked vol	3185	4024	984	3068	4065	902	1967			1804		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	87	0	0	79	72			77		
cM capacity (veh/h)	0	2	248	1	1	281	291			337		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	293	114	82	1174	630	76	1228	739
Volume Left	228	5	82	0	0	76	0	0
Volume Right	33	60	0	0	43	0	0	125
cSH	0	3	291	1700	1700	337	1700	1700
Volume to Capacity	Err	38.43	0.28	0.69	0.37	0.23	0.72	0.43
Queue Length (ft)	Err	Err	28	0	0	21	0	0
Control Delay (s)	Err	Err	22.1	0.0	0.0	18.7	0.0	0.0
Lane LOS	F	F	C			C		
Approach Delay (s)	Err	Err	1.0			0.7		
Approach LOS	F	F						

Intersection Summary				
Average Delay	Err			
Intersection Capacity Utilization	86.4%	ICU Level of Service		E
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	70	30	30	5	30	5	25	95	5	15	140	55
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	33	33	5	33	5	27	103	5	16	152	60
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	397	378	182	424	405	106	212			109		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	397	378	182	424	405	106	212			109		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	94	96	99	94	99	98			99		
cM capacity (veh/h)	521	537	860	484	518	948	1358			1482		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	141	43	136	228
Volume Left	76	5	27	16
Volume Right	33	5	5	60
cSH	577	544	1358	1482
Volume to Capacity	0.24	0.08	0.02	0.01
Queue Length (ft)	24	6	2	1
Control Delay (s)	13.2	12.2	1.7	0.6
Lane LOS	B	B	A	A
Approach Delay (s)	13.2	12.2	1.7	0.6
Approach LOS	B	B		

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	33.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	80	750	55	25	540	25	30	30	50	15	25	145
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	815	60	27	587	27	33	33	54	16	27	158
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		490										
pX, platoon unblocked				0.80			0.80	0.80	0.80	0.80	0.80	
vC, conflicting volume	614			875			1538	1688	438	1307	1704	307
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	614			585			1419	1607	35	1129	1627	307
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			97			14	55	93	77	61	77
cM capacity (veh/h)	961			784			38	73	819	70	71	689

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	87	543	332	27	391	223	120	201
Volume Left	87	0	0	27	0	0	33	16
Volume Right	0	0	60	0	0	27	54	158
cSH	961	1700	1700	784	1700	1700	87	237
Volume to Capacity	0.09	0.32	0.20	0.03	0.23	0.13	1.37	0.85
Queue Length (ft)	7	0	0	3	0	0	226	168
Control Delay (s)	9.1	0.0	0.0	9.8	0.0	0.0	311.5	69.2
Lane LOS	A			A			F	F
Approach Delay (s)	0.8			0.4			311.5	69.2
Approach LOS							F	F

Intersection Summary

Average Delay	27.1		
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

Bend Central Area Plan
Tumalo Avenue @ Riverside Drive

2030 CAP with Added Trip Reductions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	470	315	50	0	350	10	50	5	5	20	35	690
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	511	342	54	0	380	11	54	5	5	22	38	750

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	908	391	65	60	750
Volume Left (vph)	511	0	54	22	0
Volume Right (vph)	54	11	5	0	750
Hadj (s)	0.1	0.0	0.2	0.2	-0.7
Departure Headway (s)	6.9	6.6	8.7	7.6	6.7
Degree Utilization, x	1.75	0.72	0.16	0.13	1.40
Capacity (veh/h)	524	507	375	464	550
Control Delay (s)	98.2	13.3	12.1	9.7	58.5
Approach Delay (s)	98.2	13.3	12.1	54.9	
Approach LOS	F	B	B	F	

Intersection Summary			
Delay	64.2		
HCM Level of Service	F		
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	835	215	290	645	30	305
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	908	234	315	701	33	332
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		818				
pX, platoon unblocked						
vC, conflicting volume	1016				2715	666
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1016				2715	666
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	0				0	28
cM capacity (veh/h)	683				0	460

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	908	234	1016	33	332
Volume Left	908	0	0	33	0
Volume Right	0	0	701	0	332
cSH	683	1700	1700	0	460
Volume to Capacity	1.33	0.14	0.60	Err	0.72
Queue Length (ft)	932	0	0	Err	143
Control Delay (s)	177.6	0.0	0.0	Err	30.6
Lane LOS	F			F	D
Approach Delay (s)	141.2		0.0	Err	
Approach LOS				F	

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	114.5%	ICU Level of Service	H
Analysis Period (min)	15		

APPENDIX D

2030 Central Area Plan Intersection Traffic Operations Analysis Worksheets for Second Hour in Peak Period

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.91		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	3433	1700		1770	3471		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	3433	1700		1770	3471		1770	3539	1583
Volume (vph)	150	220	250	620	215	300	250	1600	235	280	1935	110
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%
Adj. Flow (vph)	134	196	223	553	192	267	223	1426	209	250	1725	98
RTOR Reduction (vph)	0	0	186	0	46	0	0	10	0	0	0	39
Lane Group Flow (vph)	134	196	37	553	413	0	223	1625	0	250	1725	59
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8									2
Actuated Green, G (s)	7.0	12.0	12.0	18.0	23.0		13.5	49.0		14.5	50.0	50.0
Effective Green, g (s)	7.0	12.0	12.0	18.0	23.0		13.0	50.0		14.0	51.0	51.0
Actuated g/C Ratio	0.06	0.11	0.11	0.16	0.21		0.12	0.45		0.13	0.46	0.46
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		3.5	5.0		3.5	5.0	5.0
Lane Grp Cap (vph)	113	203	173	562	355		209	1578		225	1641	734
v/s Ratio Prot	0.08	0.11		c0.16	c0.27		0.13	c0.47		0.14	c0.49	
v/s Ratio Perm			0.14									0.06
v/c Ratio	1.19	0.97	0.21	0.98	1.16		1.07	1.03		1.11	1.05	0.08
Uniform Delay, d1	51.5	48.8	44.7	45.9	43.5		48.5	30.0		48.0	29.5	16.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	143.1	54.8	2.8	34.2	100.2		81.1	30.6		93.0	37.0	0.2
Delay (s)	194.6	103.6	47.5	80.1	143.7		129.6	60.6		141.0	66.5	16.7
Level of Service	F	F	D	F	F		F	E		F	E	B
Approach Delay (s)		103.0			108.9			68.9			73.2	
Approach LOS		F			F			E			E	

Intersection Summary

HCM Average Control Delay	81.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.97		1.00	0.87		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1775		1770	1620		1770	1863	1583	1770	1858	
Flt Permitted		0.98		0.95	1.00		0.47	1.00	1.00	0.57	1.00	
Satd. Flow (perm)		1775		1770	1620		873	1863	1583	1059	1858	
Volume (vph)	15	20	10	720	65	435	20	220	960	255	300	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%
Adj. Flow (vph)	14	19	10	689	62	416	19	210	918	244	287	5
RTOR Reduction (vph)	0	9	0	0	246	0	0	0	188	0	1	0
Lane Group Flow (vph)	0	34	0	689	232	0	19	210	730	244	291	0
Turn Type	Split			Split			Perm		pm+ov	Perm		
Protected Phases	7	7		3	3			6	3		2	
Permitted Phases							6		6	2		
Actuated Green, G (s)		6.0		34.8	34.8		32.2	32.2	67.0	32.2	32.2	
Effective Green, g (s)		6.0		34.8	34.8		32.2	32.2	67.0	32.2	32.2	
Actuated g/C Ratio		0.07		0.41	0.41		0.38	0.38	0.79	0.38	0.38	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.5		2.5	2.5		4.3	4.3	2.5	4.3	4.3	
Lane Grp Cap (vph)		125		725	663		331	706	1322	401	704	
v/s Ratio Prot		c0.02		c0.39	0.30			0.11	c0.28		0.16	
v/s Ratio Perm							0.02		0.30	0.23		
v/c Ratio		0.27		0.95	0.35		0.06	0.30	0.55	0.61	0.41	
Uniform Delay, d1		37.4		24.3	17.3		16.8	18.5	3.4	21.3	19.4	
Progression Factor		1.00		0.90	0.42		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.8		18.8	0.2		0.3	1.1	0.4	6.7	1.8	
Delay (s)		38.3		40.6	7.4		17.1	19.6	3.8	28.0	21.2	
Level of Service		D		D	A		B	B	A	C	C	
Approach Delay (s)		38.3			27.0			6.9			24.3	
Approach LOS		D			C			A			C	

Intersection Summary

HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Bend Central Area Plan
Revere Avenue @ NB Parkway Ramp

2030 CAP with Added Trip Reductions
2nd Highest Hour in Peak Period

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95	1.00		0.95			1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00		1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3488	1583		3433			1835	1583	1770	1863	1583
Flt Permitted		0.54	1.00		0.87			0.90	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1897	1583		2992			1670	1583	1770	1863	1583
Volume (vph)	190	460	585	60	680	160	160	370	600	160	5	380
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%
Adj. Flow (vph)	182	440	560	57	650	153	153	354	574	153	5	363
RTOR Reduction (vph)	0	0	325	0	22	0	0	0	165	0	0	70
Lane Group Flow (vph)	0	622	235	0	838	0	0	507	409	153	5	293
Turn Type	Perm		Perm	Perm			Perm		Perm	Prot		Perm
Protected Phases		2			6			8		7	4	
Permitted Phases	2		2	6			8		8			4
Actuated Green, G (s)		35.6	35.6		35.6			27.8	27.8	9.6	41.4	41.4
Effective Green, g (s)		35.6	35.6		35.6			27.8	27.8	9.6	41.4	41.4
Actuated g/C Ratio		0.42	0.42		0.42			0.33	0.33	0.11	0.49	0.49
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		2.5	2.5		2.5			2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		795	663		1253			546	518	200	907	771
v/s Ratio Prot										c0.09	0.00	
v/s Ratio Perm		0.33	0.35		0.29			0.30	0.36			0.23
v/c Ratio		1.12dl	0.35		0.67			0.93	0.79	0.77	0.01	0.38
Uniform Delay, d1		21.4	16.9		19.9			27.6	25.9	36.6	11.2	13.7
Progression Factor		0.78	0.08		0.38			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		5.3	1.0		0.1			21.8	7.3	14.4	0.0	0.1
Delay (s)		22.1	2.4		7.7			49.5	33.2	51.0	11.2	13.8
Level of Service		C	A		A			D	C	D	B	B
Approach Delay (s)		12.8			7.7			40.9			24.7	
Approach LOS		B			A			D			C	

Intersection Summary			
HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		0.91	0.91		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3365		1610	3314		1770	3491		1770	3498	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3365		1610	3314		1770	3491		1770	3498	
Volume (vph)	280	605	295	375	560	90	225	1765	175	110	1245	105
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%
Adj. Flow (vph)	268	579	282	359	536	86	215	1688	167	105	1191	100
RTOR Reduction (vph)	0	40	0	0	7	0	0	5	0	0	4	0
Lane Group Flow (vph)	268	821	0	318	656	0	215	1850	0	105	1287	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	31.0	31.0		26.0	26.0		18.0	69.0		8.0	59.0	
Effective Green, g (s)	31.0	31.0		26.0	26.0		18.0	69.0		8.0	59.0	
Actuated g/C Ratio	0.21	0.21		0.17	0.17		0.12	0.46		0.05	0.39	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.3		2.5	4.3	
Lane Grp Cap (vph)	366	695		279	574		212	1606		94	1376	
v/s Ratio Prot	0.15	c0.26		0.20	c0.20		0.12	c0.53		0.06	c0.37	
v/s Ratio Perm												
v/c Ratio	0.73	1.18		1.14	1.14		1.01	1.15		1.12	0.94	
Uniform Delay, d1	55.6	59.5		62.0	62.0		66.0	40.5		71.0	43.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.0	96.1		97.0	83.3		65.5	76.0		127.9	13.0	
Delay (s)	62.6	155.6		159.0	145.3		131.5	116.5		198.9	56.7	
Level of Service	E	F		F	F		F	F		F	E	
Approach Delay (s)		133.5			149.7			118.1			67.4	
Approach LOS		F			F			F			E	

Intersection Summary

HCM Average Control Delay	114.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	106.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1781		1770	1863	1583	1770	1812		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.32	1.00		0.07	1.00	1.00
Satd. Flow (perm)	1770	1781		1770	1863	1583	601	1812		138	1863	1583
Volume (vph)	370	325	135	115	390	150	200	745	165	80	450	480
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%
Adj. Flow (vph)	338	297	123	105	356	137	183	680	151	73	411	438
RTOR Reduction (vph)	0	12	0	0	0	111	0	6	0	0	0	254
Lane Group Flow (vph)	338	408	0	105	356	26	183	825	0	73	411	184
Turn Type	Prot			Prot		Perm	pm+pt			pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8	2			6		6
Actuated Green, G (s)	24.8	32.8		16.1	24.1	24.1	67.8	59.1		58.8	54.1	54.1
Effective Green, g (s)	25.0	32.8		16.3	24.1	24.1	67.8	59.1		58.8	54.1	54.1
Actuated g/C Ratio	0.19	0.25		0.13	0.19	0.19	0.53	0.46		0.46	0.42	0.42
Clearance Time (s)	4.2	4.0		4.2	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	3.0	4.2		2.5	4.2	4.2
Lane Grp Cap (vph)	343	453		224	348	296	404	831		122	782	664
v/s Ratio Prot	c0.19	c0.24		0.06	c0.19		c0.03	c0.46		0.02	0.22	
v/s Ratio Perm						0.09	0.20			0.25		0.28
v/c Ratio	0.99	0.90		0.47	1.02	0.09	0.45	0.99		0.60	0.53	0.28
Uniform Delay, d1	51.8	46.5		52.3	52.4	43.3	18.5	34.7		30.2	27.8	24.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	44.3	20.7		1.1	54.2	0.1	0.8	29.3		6.5	0.9	0.3
Delay (s)	96.1	67.2		53.4	106.6	43.4	19.3	64.0		36.7	28.8	24.9
Level of Service	F	E		D	F	D	B	E		D	C	C
Approach Delay (s)		80.1			82.8			56.0			27.6	
Approach LOS		F			F			E			C	

Intersection Summary

HCM Average Control Delay	58.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	128.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.96		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1784		1770	1793		1770	3496		1770	3527	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1784		1770	1793		1770	3496		1770	3527	
Volume (vph)	175	395	155	190	390	130	150	1880	165	200	1700	40
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%
Adj. Flow (vph)	175	395	155	190	390	130	150	1880	165	200	1700	40
RTOR Reduction (vph)	0	10	0	0	8	0	0	5	0	0	1	0
Lane Group Flow (vph)	175	540	0	190	512	0	150	2040	0	200	1739	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	11.5	34.0		12.5	35.0		11.5	65.0		12.5	66.0	
Effective Green, g (s)	11.0	34.0		12.0	35.0		11.0	66.0		12.0	67.0	
Actuated g/C Ratio	0.08	0.24		0.09	0.25		0.08	0.47		0.09	0.48	
Clearance Time (s)	3.5	4.0		3.5	4.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.8		2.5	4.8	
Lane Grp Cap (vph)	139	433		152	448		139	1648		152	1688	
v/s Ratio Prot	0.10	c0.31		c0.11	0.29		0.08	c0.58		c0.11	0.49	
v/s Ratio Perm												
v/c Ratio	1.26	1.25		1.25	1.14		1.08	1.24		1.32	1.03	
Uniform Delay, d1	64.5	53.0		64.0	52.5		64.5	37.0		64.0	36.5	
Progression Factor	1.00	1.00		1.00	1.00		0.61	0.69		1.00	1.00	
Incremental Delay, d2	161.9	129.4		155.4	87.6		47.5	107.6		180.9	30.0	
Delay (s)	226.4	182.4		219.4	140.1		86.7	133.1		244.9	66.5	
Level of Service	F	F		F	F		F	F		F	E	
Approach Delay (s)		193.0			161.3			129.9			84.9	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	126.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	113.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Bend Central Area Plan
Greenwood Avenue @ Wall Street

2030 CAP with Added Trip Reductions
2nd Highest Hour in Peak Period

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00						0.95	1.00
Frt	1.00	0.96		1.00	0.99						1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (prot)	1770	3396		1770	1845						3505	1583
Flt Permitted	0.95	1.00		0.95	1.00						0.99	1.00
Satd. Flow (perm)	1770	3396		1770	1845						3505	1583
Volume (vph)	150	540	200	390	680	45	0	0	0	150	630	145
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%
Adj. Flow (vph)	137	493	183	356	621	41	0	0	0	137	575	132
RTOR Reduction (vph)	0	38	0	0	3	0	0	0	0	0	0	99
Lane Group Flow (vph)	137	638	0	356	659	0	0	0	0	0	712	33
Turn Type	Prot			Prot						Perm		Perm
Protected Phases	5	2		1	6						4	
Permitted Phases										4		4
Actuated Green, G (s)	14.0	35.0		28.0	49.0						25.0	25.0
Effective Green, g (s)	14.0	35.0		28.0	49.0						25.0	25.0
Actuated g/C Ratio	0.14	0.35		0.28	0.49						0.25	0.25
Clearance Time (s)	4.0	4.0		4.0	4.0						4.0	4.0
Lane Grp Cap (vph)	248	1189		496	904						876	396
v/s Ratio Prot	0.08	0.20		c0.20	c0.36							
v/s Ratio Perm											0.20	0.08
v/c Ratio	0.55	0.54		0.72	0.73						0.81	0.08
Uniform Delay, d1	40.1	26.0		32.4	20.2						35.3	28.7
Progression Factor	1.00	1.00		0.76	0.43						1.00	1.00
Incremental Delay, d2	8.6	1.7		5.9	3.5						8.1	0.4
Delay (s)	48.7	27.7		30.4	12.2						43.4	29.1
Level of Service	D	C		C	B						D	C
Approach Delay (s)		31.3			18.6			0.0			41.2	
Approach LOS		C			B			A			D	

Intersection Summary			
HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Bend Central Area Plan
Greenwood Avenue @ Bond Street

2030 CAP with Added Trip Reductions
2nd Highest Hour in Peak Period

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			0.95			0.95				
Frt		1.00			0.98			0.95				
Flt Protected		1.00			1.00			0.99				
Satd. Flow (prot)		3534			3478			3332				
Flt Permitted		0.92			1.00			0.99				
Satd. Flow (perm)		3264			3478			3332				
Volume (vph)	20	675	0	0	850	110	265	560	390	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	17	587	0	0	739	96	230	487	339	0	0	0
RTOR Reduction (vph)	0	0	0	0	10	0	0	56	0	0	0	0
Lane Group Flow (vph)	0	604	0	0	825	0	0	1000	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		42.0			42.0			50.0				
Effective Green, g (s)		42.0			42.0			50.0				
Actuated g/C Ratio		0.42			0.42			0.50				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		1371			1461			1666				
v/s Ratio Prot					c0.24							
v/s Ratio Perm		0.19						0.32				
v/c Ratio		0.44			0.56			0.60				
Uniform Delay, d1		20.6			22.1			17.9				
Progression Factor		0.32			1.00			0.71				
Incremental Delay, d2		0.8			1.6			1.4				
Delay (s)		7.4			23.6			14.1				
Level of Service		A			C			B				
Approach Delay (s)		7.4			23.6			14.1			0.0	
Approach LOS		A			C			B			A	

Intersection Summary

HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.95		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3463		1770	3365		1770	3435		1770	3482	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3463		1770	3365		1770	3435		1770	3482	
Volume (vph)	400	980	165	405	775	380	165	1355	330	515	1320	160
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%
Adj. Flow (vph)	400	980	165	405	775	380	165	1355	330	515	1320	160
RTOR Reduction (vph)	0	10	0	0	43	0	0	15	0	0	6	0
Lane Group Flow (vph)	400	1135	0	405	1112	0	165	1670	0	515	1474	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	19.0	34.0		19.0	34.0		12.0	47.0		24.0	59.0	
Effective Green, g (s)	19.0	34.0		19.0	34.0		12.0	47.0		24.0	59.0	
Actuated g/C Ratio	0.14	0.24		0.14	0.24		0.09	0.34		0.17	0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	4.3		2.5	4.3	
Lane Grp Cap (vph)	240	841		240	817		152	1153		303	1467	
v/s Ratio Prot	0.23	0.33		c0.23	c0.34		0.09	c0.49		c0.29	0.43	
v/s Ratio Perm												
v/c Ratio	1.67	1.35		1.69	1.36		1.09	1.45		1.70	1.00	
Uniform Delay, d1	60.5	53.0		60.5	53.0		64.0	46.5		58.0	40.5	
Progression Factor	1.00	1.00		1.00	1.00		0.73	1.05		0.87	1.14	
Incremental Delay, d2	317.7	165.3		326.8	170.3		80.7	204.6		316.1	8.2	
Delay (s)	378.2	218.3		387.3	223.3		127.3	253.2		366.5	54.5	
Level of Service	F	F		F	F		F	F		F	D	
Approach Delay (s)		259.7			265.9			242.0			135.0	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	220.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.53		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	135.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Bend Central Area Plan
Oregon Avenue @ Wall Street

2030 CAP with Added Trip Reductions
2nd Highest Hour in Peak Period

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		1.00			1.00						0.95	
Frt		0.93			1.00						1.00	
Flt Protected		1.00			0.96						0.99	
Satd. Flow (prot)		1503			1551						3206	
Flt Permitted		1.00			0.74						0.99	
Satd. Flow (perm)		1503			1200						3206	
Volume (vph)	0	25	25	235	70	0	0	0	0	170	1030	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%
Adj. Flow (vph)	0	23	23	215	64	0	0	0	0	155	940	23
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	32	0	0	279	0	0	0	0	0	1117	0
Parking (#/hr)	7	7	7	7	7	7				14	14	14
Turn Type				Perm						Perm		
Protected Phases		2			6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		41.0			41.0						51.0	
Effective Green, g (s)		41.0			41.0						51.0	
Actuated g/C Ratio		0.41			0.41						0.51	
Clearance Time (s)		4.0			4.0						4.0	
Lane Grp Cap (vph)		616			492						1635	
v/s Ratio Prot		0.03										
v/s Ratio Perm					c0.23						0.35	
v/c Ratio		0.05			0.57						0.68	
Uniform Delay, d1		17.8			22.7						18.4	
Progression Factor		1.00			0.81						0.45	
Incremental Delay, d2		0.2			4.0						1.5	
Delay (s)		18.0			22.4						9.9	
Level of Service		B			C						A	
Approach Delay (s)		18.0			22.4			0.0			9.9	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			0.95				
Frt		1.00			0.92			0.98				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		1817			1707			3447				
Flt Permitted		0.67			1.00			0.99				
Satd. Flow (perm)		1247			1707			3447				
Volume (vph)	100	100	0	0	125	205	190	905	155	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	87	87	0	0	109	178	165	787	135	0	0	0
RTOR Reduction (vph)	0	0	0	0	59	0	0	11	0	0	0	0
Lane Group Flow (vph)	0	174	0	0	228	0	0	1076	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		2			6			8				
Permitted Phases	2						8					
Actuated Green, G (s)		37.4			37.4			54.6				
Effective Green, g (s)		37.4			37.4			54.6				
Actuated g/C Ratio		0.37			0.37			0.55				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		466			638			1882				
v/s Ratio Prot					c0.17							
v/s Ratio Perm		0.14						0.32				
v/c Ratio		0.37			0.36			0.57				
Uniform Delay, d1		22.8			22.6			15.0				
Progression Factor		1.62			1.00			0.20				
Incremental Delay, d2		1.8			1.6			0.9				
Delay (s)		38.8			24.2			3.9				
Level of Service		D			C			A				
Approach Delay (s)		38.8			24.2			3.9			0.0	
Approach LOS		D			C			A			A	

Intersection Summary

HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		1.00		1.00	1.00						0.95	1.00
Frt		0.99		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.99	1.00
Satd. Flow (prot)		1846		1770	1863						3487	1583
Flt Permitted		1.00		0.20	1.00						0.99	1.00
Satd. Flow (perm)		1846		380	1863						3487	1583
Volume (vph)	0	575	40	315	485	0	0	0	0	255	600	355
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%
Adj. Flow (vph)	0	525	37	288	443	0	0	0	0	233	548	324
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	0	224
Lane Group Flow (vph)	0	560	0	288	443	0	0	0	0	0	781	100
Turn Type				pm+pt						Perm		Perm
Protected Phases		8		7	4						6	
Permitted Phases				4						6		6
Actuated Green, G (s)		43.0		61.0	61.0						31.0	31.0
Effective Green, g (s)		43.0		61.0	61.0						31.0	31.0
Actuated g/C Ratio		0.43		0.61	0.61						0.31	0.31
Clearance Time (s)		4.0		4.0	4.0						4.0	4.0
Lane Grp Cap (vph)		794		426	1136						1081	491
v/s Ratio Prot		0.30		c0.09	0.24							
v/s Ratio Perm				c0.32							0.22	0.20
v/c Ratio		0.70		0.68	0.39						0.72	0.20
Uniform Delay, d1		23.3		14.2	10.0						30.7	25.4
Progression Factor		1.00		0.65	0.29						0.59	0.63
Incremental Delay, d2		5.2		2.7	0.3						3.2	0.7
Delay (s)		28.5		11.9	3.2						21.3	16.6
Level of Service		C		B	A						C	B
Approach Delay (s)		28.5			6.7			0.0			19.9	
Approach LOS		C			A			A			B	

Intersection Summary

HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Lane Util. Factor	1.00	0.95			1.00	1.00		0.95	1.00			
Frt	1.00	1.00			1.00	0.85		1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00		0.99	1.00			
Satd. Flow (prot)	1770	3539			1863	1583		3521	1583			
Flt Permitted	0.16	1.00			1.00	1.00		0.99	1.00			
Satd. Flow (perm)	307	3539			1863	1583		3521	1583			
Volume (vph)	325	500	0	0	700	120	95	815	385	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	283	435	0	0	609	104	83	709	335	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	13	0	0	241	0	0	0
Lane Group Flow (vph)	283	435	0	0	609	91	0	792	94	0	0	0
Turn Type	pm+pt					custom	Perm		Perm			
Protected Phases	3	8			4			2				
Permitted Phases	8					8	2		2			
Actuated Green, G (s)	64.0	64.0			43.0	64.0		28.0	28.0			
Effective Green, g (s)	64.0	64.0			43.0	64.0		28.0	28.0			
Actuated g/C Ratio	0.64	0.64			0.43	0.64		0.28	0.28			
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Lane Grp Cap (vph)	445	2265			801	1013		986	443			
v/s Ratio Prot	c0.11	0.12			c0.33							
v/s Ratio Perm	0.30					0.07		0.22	0.21			
v/c Ratio	0.64	0.19			0.76	0.09		0.80	0.21			
Uniform Delay, d1	14.2	7.4			24.1	6.9		33.4	27.6			
Progression Factor	1.51	2.00			1.00	1.00		0.73	1.00			
Incremental Delay, d2	4.7	0.1			6.7	0.2		5.9	0.9			
Delay (s)	26.2	14.9			30.8	7.1		30.2	28.6			
Level of Service	C	B			C	A		C	C			
Approach Delay (s)		19.4			27.4			29.7			0.0	
Approach LOS		B			C			C			A	

Intersection Summary

HCM Average Control Delay	26.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Bend Central Area Plan
Franklin Avenue @ 3rd Street

2030 CAP with Added Trip Reductions
2nd Highest Hour in Peak Period

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3460		1770	3518		1770	3486	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3460		1770	3518		1770	3486	
Volume (vph)	370	705	165	200	455	80	200	1320	55	145	1445	160
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%
Adj. Flow (vph)	370	705	165	200	455	80	200	1320	55	145	1445	160
RTOR Reduction (vph)	0	0	126	0	10	0	0	2	0	0	6	0
Lane Group Flow (vph)	370	705	39	200	525	0	200	1373	0	145	1599	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4									
Actuated Green, G (s)	27.0	33.0	33.0	16.0	22.0		15.0	63.0		12.0	60.0	
Effective Green, g (s)	27.0	33.0	33.0	16.0	22.0		15.0	63.0		12.0	60.0	
Actuated g/C Ratio	0.19	0.24	0.24	0.11	0.16		0.11	0.45		0.09	0.43	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	341	834	373	202	544		190	1583		152	1494	
v/s Ratio Prot	c0.21	0.20		0.11	c0.15		c0.11	0.39		0.08	c0.46	
v/s Ratio Perm			0.10									
v/c Ratio	1.09	0.85	0.10	0.99	0.96		1.05	0.87		0.95	1.07	
Uniform Delay, d1	56.5	51.1	41.9	61.9	58.6		62.5	34.7		63.7	40.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.70	0.52	
Incremental Delay, d2	73.4	10.3	0.6	60.8	30.8		79.9	6.7		13.4	33.1	
Delay (s)	129.9	61.3	42.5	122.7	89.4		142.4	41.4		58.2	53.9	
Level of Service	F	E	D	F	F		F	D		E	D	
Approach Delay (s)		79.3			98.5			54.2			54.2	
Approach LOS		E			F			D			D	

Intersection Summary

HCM Average Control Delay	66.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	97.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						4.0	
Lane Util. Factor					0.95						0.95	
Frt					1.00						0.96	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					3287						3177	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					3287						3177	
Volume (vph)	0	0	0	170	740	0	0	0	0	0	545	215
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%
Adj. Flow (vph)	0	0	0	155	676	0	0	0	0	0	498	196
RTOR Reduction (vph)	0	0	0	0	20	0	0	0	0	0	42	0
Lane Group Flow (vph)	0	0	0	0	811	0	0	0	0	0	652	0
Parking (#/hr)				5	5					5	5	
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					47.9						44.1	
Effective Green, g (s)					47.9						44.1	
Actuated g/C Ratio					0.48						0.44	
Clearance Time (s)					4.0						4.0	
Lane Grp Cap (vph)					1574						1401	
v/s Ratio Prot											c0.22	
v/s Ratio Perm					0.25							
v/c Ratio					0.52						0.47	
Uniform Delay, d1					18.0						19.7	
Progression Factor					0.29						1.37	
Incremental Delay, d2					0.9						0.8	
Delay (s)					6.0						27.7	
Level of Service					A						C	
Approach Delay (s)		0.0			6.0			0.0			27.7	
Approach LOS		A			A			A			C	

Intersection Summary

HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.95			0.95				
Frt					0.96			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					3149			3256				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					3149			3256				
Volume (vph)	0	0	0	0	795	270	115	920	0	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	0	0	0	0	691	235	100	800	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	33	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	893	0	0	890	0	0	0	0
Parking (#/hr)				10	10	10	10	10	10			
Turn Type							Perm					
Protected Phases					6			8				
Permitted Phases							8					
Actuated Green, G (s)					46.0			46.0				
Effective Green, g (s)					46.0			46.0				
Actuated g/C Ratio					0.46			0.46				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					1449			1498				
v/s Ratio Prot					c0.29							
v/s Ratio Perm								0.28				
v/c Ratio					0.62			0.59				
Uniform Delay, d1					20.3			20.1				
Progression Factor					1.00			0.73				
Incremental Delay, d2					2.0			1.3				
Delay (s)					22.3			15.9				
Level of Service					C			B				
Approach Delay (s)		0.0			22.3			15.9			0.0	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0	4.0	4.0		4.0
Lane Util. Factor					1.00			1.00	1.00	1.00		1.00
Frt					0.98			1.00	0.85	1.00		0.85
Flt Protected					1.00			1.00	1.00	0.95		1.00
Satd. Flow (prot)					1830			1861	1583	1770		1583
Flt Permitted					1.00			1.00	1.00	0.42		1.00
Satd. Flow (perm)					1830			1861	1583	777		1583
Volume (vph)	0	0	0	5	515	75	5	215	920	130	0	460
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	5	560	82	5	234	1000	141	0	500
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	198	0	0	93
Lane Group Flow (vph)	0	0	0	0	643	0	0	239	802	141	0	407
Turn Type				custom			Split		custom	D.P+P		custom
Protected Phases				8	8		6	6	6 8	2		2
Permitted Phases				8					6 8	6		6
Actuated Green, G (s)					47.6			30.6	82.2	60.4		60.4
Effective Green, g (s)					47.6			30.6	82.2	60.4		60.4
Actuated g/C Ratio					0.40			0.26	0.69	0.50		0.50
Clearance Time (s)					4.0			4.0		4.0		4.0
Vehicle Extension (s)					3.0			3.0		3.0		3.0
Lane Grp Cap (vph)					726			475	1084	638		850
v/s Ratio Prot					0.35			0.13	c0.63	0.05		c0.15
v/s Ratio Perm										0.06		0.17
v/c Ratio					0.89			0.50	0.74	0.22		0.48
Uniform Delay, d1					33.7			38.2	12.1	16.5		19.5
Progression Factor					1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2					12.5			0.8	2.8	0.2		0.4
Delay (s)					46.1			39.0	14.8	16.7		19.9
Level of Service					D			D	B	B		B
Approach Delay (s)		0.0			46.1			19.5			19.2	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM Average Control Delay	26.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									4.0	
Lane Util. Factor		0.95									0.95	
Frt		1.00									1.00	
Flt Protected		1.00									0.98	
Satd. Flow (prot)		3304									3213	
Flt Permitted		1.00									0.98	
Satd. Flow (perm)		3304									3213	
Volume (vph)	0	1230	35	0	0	0	0	0	0	270	445	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%
Adj. Flow (vph)	0	1123	32	0	0	0	0	0	0	247	406	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	42	0
Lane Group Flow (vph)	0	1153	0	0	0	0	0	0	0	0	611	0
Parking (#/hr)		5	5							10	10	10
Turn Type										Perm		
Protected Phases		2									4	
Permitted Phases										4		
Actuated Green, G (s)		54.1									37.9	
Effective Green, g (s)		54.1									37.9	
Actuated g/C Ratio		0.54									0.38	
Clearance Time (s)		4.0									4.0	
Lane Grp Cap (vph)		1787									1218	
v/s Ratio Prot		c0.35										
v/s Ratio Perm											0.20	
v/c Ratio		0.65									0.50	
Uniform Delay, d1		16.2									23.8	
Progression Factor		0.66									0.37	
Incremental Delay, d2		1.7									1.3	
Delay (s)		12.4									10.1	
Level of Service		B									B	
Approach Delay (s)		12.4			0.0			0.0			10.1	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0				
Lane Util. Factor		0.95						0.95				
Frt		1.00						0.96				
Flt Protected		0.98						1.00				
Satd. Flow (prot)		3219						3137				
Flt Permitted		0.98						1.00				
Satd. Flow (perm)		3219						3137				
Volume (vph)	515	1000	0	0	0	0	0	520	200	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	448	870	0	0	0	0	0	452	174	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	41	0	0	0	0
Lane Group Flow (vph)	0	1318	0	0	0	0	0	585	0	0	0	0
Parking (#/hr)	10	10	10				10	10	10			
Turn Type	Perm						Perm					
Protected Phases		2						8				
Permitted Phases	2						8					
Actuated Green, G (s)		61.0						31.0				
Effective Green, g (s)		61.0						31.0				
Actuated g/C Ratio		0.61						0.31				
Clearance Time (s)		4.0						4.0				
Lane Grp Cap (vph)		1964						972				
v/s Ratio Prot								c0.20				
v/s Ratio Perm		0.41										
v/c Ratio		0.67						0.60				
Uniform Delay, d1		12.9						29.3				
Progression Factor		0.42						1.00				
Incremental Delay, d2		1.4						2.8				
Delay (s)		6.8						32.0				
Level of Service		A						C				
Approach Delay (s)		6.8			0.0			32.0			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX E

2030 Central Area Plan Intersection Mitigation Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3433	1863	1583	1770	4988		1770	5044	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	1863	1583	1770	4988		1770	5044	
Volume (vph)	150	220	250	620	215	300	250	1600	235	280	1935	110
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	239	272	674	234	326	272	1739	255	304	2103	120
RTOR Reduction (vph)	0	0	2	0	0	27	0	15	0	0	5	0
Lane Group Flow (vph)	163	239	270	674	234	299	272	1979	0	304	2218	0
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot			Prot		
Protected Phases	3	8	1	7	4	5	1	6		5	2	
Permitted Phases			8			4						
Actuated Green, G (s)	15.0	16.0	35.5	24.0	25.0	46.5	19.5	52.0		21.5	54.0	
Effective Green, g (s)	15.0	16.0	35.0	24.0	25.0	46.0	19.0	53.0		21.0	55.0	
Actuated g/C Ratio	0.12	0.12	0.27	0.18	0.19	0.35	0.15	0.41		0.16	0.42	
Clearance Time (s)	4.0	4.0	3.5	4.0	4.0	3.5	3.5	5.0		3.5	5.0	
Lane Grp Cap (vph)	204	229	475	634	358	560	259	2034		286	2134	
v/s Ratio Prot	0.09	c0.13	0.08	c0.20	0.13	0.09	0.15	c0.40		0.17	c0.44	
v/s Ratio Perm			0.09			0.11						
v/c Ratio	0.80	1.04	0.57	1.06	0.65	0.53	1.05	0.97		1.06	1.04	
Uniform Delay, d1	56.0	57.0	41.0	53.0	48.5	33.5	55.5	37.8		54.5	37.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	27.0	71.4	4.9	53.7	9.0	3.6	69.7	14.5		70.8	30.7	
Delay (s)	83.0	128.4	45.8	106.7	57.5	37.1	125.2	52.3		125.3	68.2	
Level of Service	F	F	D	F	E	D	F	D		F	E	
Approach Delay (s)		84.1			79.0			61.1			75.0	
Approach LOS		F			E			E			E	

Intersection Summary			
HCM Average Control Delay	72.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95	1.00		0.95			1.00	0.88	1.00	1.00	1.00
Frt		1.00	0.85		0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00		1.00			0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3488	1583		3433			1835	2787	1770	1863	1583
Flt Permitted		0.53	1.00		0.86			0.90	1.00	0.23	1.00	1.00
Satd. Flow (perm)		1877	1583		2966			1675	2787	420	1863	1583
Volume (vph)	190	460	585	60	680	160	160	370	600	160	5	380
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	207	500	636	65	739	174	174	402	652	174	5	413
RTOR Reduction (vph)	0	0	347	0	28	0	0	0	257	0	0	70
Lane Group Flow (vph)	0	707	289	0	950	0	0	576	395	174	5	343
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		Perm
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6			8		8	4		4
Actuated Green, G (s)		29.5	29.5		29.5			27.5	27.5	27.5	27.5	27.5
Effective Green, g (s)		29.5	29.5		29.5			27.5	27.5	27.5	27.5	27.5
Actuated g/C Ratio		0.45	0.45		0.45			0.42	0.42	0.42	0.42	0.42
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		2.5	2.5		2.5			2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)		852	718		1346			709	1179	178	788	670
v/s Ratio Prot											0.00	
v/s Ratio Perm		0.38	0.40		0.33			0.34	0.23	c0.41		0.26
v/c Ratio		1.30dl	0.40		0.71			0.81	0.33	0.98	0.01	0.51
Uniform Delay, d1		15.6	11.9		14.3			16.5	12.6	18.4	10.8	13.8
Progression Factor		1.00	1.00		1.59			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		9.2	1.7		0.9			6.7	0.1	60.0	0.0	0.3
Delay (s)		24.7	13.5		23.6			23.2	12.7	78.5	10.8	14.1
Level of Service		C	B		C			C	B	E	B	B
Approach Delay (s)		19.4			23.6			17.6			33.0	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95	1.00	0.86	0.86		0.97	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3539	1583	3044	3137		3433	5017		1770	5026	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3539	1583	3044	3137		3433	5017		1770	5026	
Volume (vph)	280	605	295	375	560	90	225	1765	175	110	1245	105
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	304	658	321	408	609	98	245	1918	190	120	1353	114
RTOR Reduction (vph)	0	0	16	0	8	0	0	9	0	0	7	0
Lane Group Flow (vph)	304	658	305	408	699	0	245	2099	0	120	1460	0
Turn Type	Prot		pm+ov	Prot			Prot			Prot		
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	15.8	30.2	42.2	20.7	35.1		12.0	53.9		9.2	51.1	
Effective Green, g (s)	15.8	30.2	42.2	20.7	35.1		12.0	53.9		9.2	51.1	
Actuated g/C Ratio	0.12	0.23	0.32	0.16	0.27		0.09	0.41		0.07	0.39	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.5	4.3		2.5	4.3	
Lane Grp Cap (vph)	417	822	514	485	847		317	2080		125	1976	
v/s Ratio Prot	0.09	0.19	0.06	c0.13	c0.23		0.07	c0.42		c0.07	0.29	
v/s Ratio Perm			0.15									
v/c Ratio	0.73	0.80	0.59	0.84	0.83		0.77	1.01		0.96	0.74	
Uniform Delay, d1	55.0	47.1	36.7	53.1	44.6		57.7	38.0		60.2	33.7	
Progression Factor	1.01	0.99	0.97	1.00	1.00		0.87	0.79		1.00	1.00	
Incremental Delay, d2	4.6	4.2	1.2	12.3	6.5		3.3	12.9		67.2	2.5	
Delay (s)	60.0	50.6	36.8	65.3	51.0		53.2	43.0		127.4	36.3	
Level of Service	E	D	D	E	D		D	D		F	D	
Approach Delay (s)		49.4			56.3			44.1			43.2	
Approach LOS		D			E			D			D	

Intersection Summary

HCM Average Control Delay	47.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	5024		1770	5068	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	5024		1770	5068	
Volume (vph)	175	395	155	190	390	130	150	1880	165	200	1700	40
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	429	168	207	424	141	163	2043	179	217	1848	43
RTOR Reduction (vph)	0	0	119	0	0	101	0	8	0	0	2	0
Lane Group Flow (vph)	190	429	49	207	424	40	163	2214	0	217	1889	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	13.5	28.0	28.0	14.5	29.0	29.0	17.9	56.0		15.5	53.6	
Effective Green, g (s)	13.0	28.0	28.0	14.0	29.0	29.0	17.4	57.0		15.0	54.6	
Actuated g/C Ratio	0.10	0.22	0.22	0.11	0.22	0.22	0.13	0.44		0.12	0.42	
Clearance Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	4.8		2.5	4.8	
Lane Grp Cap (vph)	177	401	341	191	416	353	237	2203		204	2129	
v/s Ratio Prot	0.11	c0.23		c0.12	0.23		0.09	c0.44		c0.12	0.37	
v/s Ratio Perm			0.11			0.09						
v/c Ratio	1.07	1.07	0.14	1.08	1.02	0.11	0.69	1.01		1.06	0.89	
Uniform Delay, d1	58.5	51.0	41.3	58.0	50.5	40.3	53.7	36.5		57.5	34.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.98	0.67	
Incremental Delay, d2	88.5	64.8	0.1	89.2	49.1	0.1	7.4	20.4		70.0	4.2	
Delay (s)	147.0	115.8	41.4	147.2	99.6	40.4	61.1	56.9		126.5	27.7	
Level of Service	F	F	D	F	F	D	E	E		F	C	
Approach Delay (s)		107.5			101.5			57.2			37.8	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM Average Control Delay	62.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰	↑↑↑	↱	↰↰	↑↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	5085	1583	3433	5085	1583
Volume (vph)	250	980	165	405	675	380	115	1355	330	515	1320	160
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	272	1065	179	440	734	413	125	1473	359	560	1435	174
RTOR Reduction (vph)	0	0	2	0	0	5	0	0	3	0	0	44
Lane Group Flow (vph)	272	1065	177	440	734	408	125	1473	356	560	1435	130
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4	1	3	8	5	1	6	3	5	2	7
Permitted Phases			4			8			6			2
Actuated Green, G (s)	17.3	31.0	44.2	13.0	26.7	43.7	13.2	33.0	46.0	17.0	36.8	54.1
Effective Green, g (s)	17.3	31.0	44.2	13.0	26.7	43.7	13.2	33.0	46.0	17.0	36.8	54.1
Actuated g/C Ratio	0.16	0.28	0.40	0.12	0.24	0.40	0.12	0.30	0.42	0.15	0.33	0.49
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	4.3	2.5	2.5	4.3	2.5
Lane Grp Cap (vph)	540	997	694	406	859	686	212	1526	720	531	1701	836
v/s Ratio Prot	0.08	c0.30	0.03	c0.13	0.21	0.09	0.07	c0.29	0.06	c0.16	0.28	0.03
v/s Ratio Perm			0.08			0.17			0.17			0.08
v/c Ratio	0.50	1.07	0.25	1.08	0.85	0.60	0.59	0.97	0.49	1.05	0.84	0.16
Uniform Delay, d1	42.4	39.5	21.9	48.5	39.8	26.2	45.8	37.9	23.5	46.5	33.9	15.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	48.6	0.1	69.0	8.2	1.2	3.4	15.6	0.4	54.2	5.3	0.1
Delay (s)	43.0	88.1	22.1	117.5	48.0	27.3	49.3	53.5	23.9	100.7	39.2	15.4
Level of Service	D	F	C	F	D	C	D	D	C	F	D	B
Approach Delay (s)		72.2			61.9			47.8			53.2	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM Average Control Delay	57.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3539	1583	3433	3452		1770	3519		1770	3486	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3539	1583	3433	3452		1770	3519		1770	3486	
Volume (vph)	270	655	215	200	405	80	150	1370	55	145	1445	160
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	293	712	234	217	440	87	163	1489	60	158	1571	174
RTOR Reduction (vph)	0	0	137	0	14	0	0	2	0	0	7	0
Lane Group Flow (vph)	293	712	97	217	513	0	163	1547	0	158	1738	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4									
Actuated Green, G (s)	10.0	24.0	24.0	8.0	22.0		11.0	61.0		11.0	61.0	
Effective Green, g (s)	10.0	24.0	24.0	8.0	22.0		11.0	61.0		11.0	61.0	
Actuated g/C Ratio	0.08	0.20	0.20	0.07	0.18		0.09	0.51		0.09	0.51	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	286	708	317	229	633		162	1789		162	1772	
v/s Ratio Prot	0.09	c0.20		0.06	c0.15		c0.09	0.44		0.09	c0.50	
v/s Ratio Perm			0.15									
v/c Ratio	1.02	1.01	0.31	0.95	0.81		1.01	0.86		0.98	0.98	
Uniform Delay, d1	55.0	48.0	40.9	55.8	47.0		54.5	25.9		54.4	28.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	59.7	35.2	2.5	47.3	10.8		72.3	5.9		64.5	17.3	
Delay (s)	114.7	83.2	43.4	103.1	57.8		126.8	31.7		118.9	46.2	
Level of Service	F	F	D	F	E		F	C		F	D	
Approach Delay (s)		83.1			71.0			40.8			52.3	
Approach LOS		F			E			D			D	

Intersection Summary

HCM Average Control Delay	58.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	1.00		0.97	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		1863	1863		3433	1583
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		1863	1863		3433	1583
Volume (vph)	0	730	885	0	495	250
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	793	962	0	538	272
RTOR Reduction (vph)	0	0	0	0	0	32
Lane Group Flow (vph)	0	793	962	0	538	240
Turn Type						Perm
Protected Phases		4	8		6	
Permitted Phases						6
Actuated Green, G (s)		41.1	41.1		15.9	15.9
Effective Green, g (s)		41.1	41.1		15.9	15.9
Actuated g/C Ratio		0.63	0.63		0.24	0.24
Clearance Time (s)		4.0	4.0		4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1178	1178		840	387
v/s Ratio Prot		0.43	c0.52		0.16	
v/s Ratio Perm						0.17
v/c Ratio		0.67	0.82		0.64	0.62
Uniform Delay, d1		7.7	9.1		22.0	21.9
Progression Factor		0.74	1.00		1.00	1.00
Incremental Delay, d2		0.1	4.5		3.7	7.2
Delay (s)		5.8	13.6		25.7	29.1
Level of Service		A	B		C	C
Approach Delay (s)		5.8	13.6		26.9	
Approach LOS		A	B		C	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0				
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00				
Frt	1.00	1.00		1.00	0.96			0.93				
Flt Protected	0.95	1.00		0.95	1.00			0.98				
Satd. Flow (prot)	1770	1859		1770	1790			1694				
Flt Permitted	0.14	1.00		0.16	1.00			0.98				
Satd. Flow (perm)	261	1859		302	1790			1694				
Volume (vph)	110	1100	15	10	860	305	25	5	35	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	1196	16	11	935	332	27	5	38	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	35	0	0	0	0
Lane Group Flow (vph)	120	1212	0	11	1259	0	0	35	0	0	0	0
Turn Type	Perm			Perm			Perm					
Protected Phases		4			8			2				
Permitted Phases	4			8			2					
Actuated Green, G (s)	84.1	84.1		84.1	84.1			7.9				
Effective Green, g (s)	84.1	84.1		84.1	84.1			7.9				
Actuated g/C Ratio	0.84	0.84		0.84	0.84			0.08				
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0				
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0				
Lane Grp Cap (vph)	220	1563		254	1505			134				
v/s Ratio Prot		0.65			c0.71							
v/s Ratio Perm	0.46			0.04				0.04				
v/c Ratio	0.55	0.78		0.04	0.84			0.26				
Uniform Delay, d1	2.3	3.6		1.3	4.3			43.3				
Progression Factor	1.00	1.00		1.00	1.00			1.00				
Incremental Delay, d2	2.8	2.5		0.1	4.2			4.7				
Delay (s)	5.1	6.1		1.4	8.5			48.0				
Level of Service	A	A		A	A			D				
Approach Delay (s)		6.0			8.4			48.0			0.0	
Approach LOS		A			A			D			A	

Intersection Summary			
HCM Average Control Delay	8.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt		1.00	0.85	1.00	1.00		1.00	0.85			0.91	
Flt Protected		1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)		1863	1583	1770	1863		1770	1583			1689	
Flt Permitted		1.00	1.00	0.95	1.00		0.71	1.00			1.00	
Satd. Flow (perm)		1863	1583	1770	1863		1324	1583			1689	
Volume (vph)	0	880	255	130	790	0	340	0	95	0	20	45
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	957	277	141	859	0	370	0	103	0	22	49
RTOR Reduction (vph)	0	0	115	0	0	0	0	73	0	0	35	0
Lane Group Flow (vph)	0	957	162	141	859	0	370	30	0	0	36	0
Turn Type	Perm		Perm	Prot			Perm			Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4				2			6		
Actuated Green, G (s)		51.0	51.0	8.0	63.0		28.9	28.9			28.9	
Effective Green, g (s)		51.0	51.0	8.0	63.0		28.9	28.9			28.9	
Actuated g/C Ratio		0.51	0.51	0.08	0.63		0.29	0.29			0.29	
Clearance Time (s)		4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		951	808	142	1175		383	458			489	
v/s Ratio Prot		c0.51		c0.08	0.46			0.07			0.04	
v/s Ratio Perm			0.17				c0.28					
v/c Ratio		1.01	0.20	0.99	0.73		0.97	0.07			0.07	
Uniform Delay, d1		24.5	13.3	45.9	12.6		35.0	25.7			25.8	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2		30.7	0.1	73.1	2.4		36.8	0.1			0.1	
Delay (s)		55.2	13.5	119.0	15.0		71.8	25.8			25.8	
Level of Service		E	B	F	B		E	C			C	
Approach Delay (s)		45.8			29.7			61.8			25.8	
Approach LOS		D			C			E			C	

Intersection Summary			
HCM Average Control Delay	42.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	99.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00			1.00	1.00	1.00	1.00	
Frt		0.96			0.98			1.00	0.85	1.00	1.00	
Flt Protected		0.99			0.96			1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1762			1756			1862	1583	1770	1863	
Flt Permitted		0.86			0.73			0.95	1.00	0.33	1.00	
Satd. Flow (perm)		1544			1334			1771	1583	620	1863	
Volume (vph)	15	20	15	405	25	70	5	435	335	100	655	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	22	16	440	27	76	5	473	364	109	712	0
RTOR Reduction (vph)	0	9	0	0	10	0	0	0	209	0	0	0
Lane Group Flow (vph)	0	45	0	0	533	0	0	478	155	109	712	0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		24.2			24.2			23.8	23.8	23.8	23.8	
Effective Green, g (s)		24.2			24.2			23.8	23.8	23.8	23.8	
Actuated g/C Ratio		0.43			0.43			0.43	0.43	0.43	0.43	
Clearance Time (s)		4.0			4.0			4.0	4.0	4.0	4.0	
Vehicle Extension (s)		3.0			3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		667			576			753	673	264	792	
v/s Ratio Prot											c0.38	
v/s Ratio Perm		0.03			c0.41			0.27	0.23	0.18		
v/c Ratio		0.07			0.93			0.63	0.23	0.41	0.90	
Uniform Delay, d1		9.3			15.1			12.7	10.3	11.2	15.0	
Progression Factor		1.00			1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.0			20.9			1.8	0.2	1.1	13.0	
Delay (s)		9.3			36.0			14.4	10.4	12.3	27.9	
Level of Service		A			D			B	B	B	C	
Approach Delay (s)		9.3			36.0			12.7			25.9	
Approach LOS		A			D			B			C	

Intersection Summary

HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	56.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1805		1770	1819		1770	1863	1583
Flt Permitted	0.19	1.00	1.00	0.35	1.00		0.46	1.00		0.44	1.00	1.00
Satd. Flow (perm)	676	1863	1583	650	1805		854	1819		823	1863	1583
Volume (vph)	315	410	165	30	445	115	105	295	55	270	335	475
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	342	446	179	33	484	125	114	321	60	293	364	516
RTOR Reduction (vph)	0	0	105	0	18	0	0	10	0	0	0	169
Lane Group Flow (vph)	342	446	74	33	591	0	114	371	0	293	364	347
Turn Type	Perm		Perm	Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	24.7	24.7	24.7	24.7	24.7		27.3	27.3		27.3	27.3	27.3
Effective Green, g (s)	24.7	24.7	24.7	24.7	24.7		27.3	27.3		27.3	27.3	27.3
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41		0.46	0.46		0.46	0.46	0.46
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	278	767	652	268	743		389	828		374	848	720
v/s Ratio Prot		0.24			0.34			0.21			0.20	
v/s Ratio Perm	c0.51		0.11	0.05			0.13			c0.36		0.33
v/c Ratio	1.23	0.58	0.11	0.12	0.80		0.29	0.45		0.78	0.43	0.48
Uniform Delay, d1	17.6	13.7	10.9	10.9	15.4		10.3	11.2		13.8	11.1	11.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	131.0	1.1	0.1	0.2	5.9		1.9	1.8		15.1	1.6	2.3
Delay (s)	148.6	14.8	11.0	11.1	21.3		12.2	12.9		28.9	12.7	13.7
Level of Service	F	B	B	B	C		B	B		C	B	B
Approach Delay (s)		61.4			20.8			12.8			17.2	
Approach LOS		E			C			B			B	

Intersection Summary

HCM Average Control Delay	30.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.99			0.97			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1770	1834		1770	1836			1794			1776	
Flt Permitted	0.25	1.00		0.25	1.00			0.90			0.73	
Satd. Flow (perm)	469	1834		469	1836			1628			1310	
Volume (vph)	145	565	65	70	515	55	60	270	95	150	215	110
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	158	614	71	76	560	60	65	293	103	163	234	120
RTOR Reduction (vph)	0	10	0	0	10	0	0	26	0	0	27	0
Lane Group Flow (vph)	158	675	0	76	610	0	0	435	0	0	490	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.9	15.9		15.9	15.9			16.1			16.1	
Effective Green, g (s)	15.9	15.9		15.9	15.9			16.1			16.1	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.40			0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	186	729		186	730			655			527	
v/s Ratio Prot		c0.37			0.34							
v/s Ratio Perm	0.34			0.16				0.28			c0.39	
v/c Ratio	0.85	0.93		0.41	0.84			0.66			0.93	
Uniform Delay, d1	11.0	11.5		8.7	10.9			9.7			11.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	28.6	17.6		1.5	8.2			5.3			25.2	
Delay (s)	39.5	29.1		10.1	19.1			15.0			36.6	
Level of Service	D	C		B	B			B			D	
Approach Delay (s)		31.0			18.1			15.0			36.6	
Approach LOS		C			B			B			D	

Intersection Summary			
HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	98.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑↱		↰		↱			↱
Sign Control		Free			Free		Free	~~Stop~~	Free		Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	0	780	30	80	0	785	0	0	70
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	848	33	87	0	853	0	0	76
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		563			155							
pX, platoon unblocked												
vC, conflicting volume	880			0			940	880	0	1717	864	864
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	880			0			940	880	0	1717	864	864
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			55	100	21	100	100	78
cM capacity (veh/h)	768			1623			191	286	1085	15	292	354

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	0	880	87	853	76
Volume Left	0	0	87	0	0
Volume Right	0	33	0	853	76
cSH	1700	1700	191	1085	354
Volume to Capacity	0.00	0.52	0.45	0.79	0.22
Queue Length (ft)	0	0	54	213	20
Control Delay (s)	0.0	0.0	38.6	19.3	17.9
Lane LOS			E	C	C
Approach Delay (s)	0.0	0.0	21.1		17.9
Approach LOS			C		C

Intersection Summary

Average Delay	11.2		
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00		1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3261	1676	1425	1593	1621		1770	5067		1770	5033	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3261	1676	1425	1593	1621		1770	5067		1770	5033	
Volume (vph)	460	180	310	5	195	55	185	1570	40	70	1695	125
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	500	196	337	5	212	60	201	1707	43	76	1842	136
RTOR Reduction (vph)	0	0	151	0	10	0	0	3	0	0	9	0
Lane Group Flow (vph)	500	196	186	5	262	0	201	1747	0	76	1969	0
Parking (#/hr)	0	0	0	0	0	0						
Turn Type	Prot		pt+ov	Prot			Prot			Prot		
Protected Phases	7	4	4 5	3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	16.0	33.9	48.9	1.3	19.2		11.0	43.2		5.6	37.8	
Effective Green, g (s)	16.0	33.9	48.9	1.3	19.2		11.0	43.2		5.6	37.8	
Actuated g/C Ratio	0.16	0.34	0.49	0.01	0.19		0.11	0.43		0.06	0.38	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	522	568	697	21	311		195	2189		99	1902	
v/s Ratio Prot	c0.15	0.12	0.24	0.00	c0.17		c0.11	0.35		0.04	c0.39	
v/s Ratio Perm												
v/c Ratio	0.96	0.35	0.27	0.24	0.84		1.03	0.80		0.77	1.04	
Uniform Delay, d1	41.7	24.7	15.0	48.9	39.0		44.5	24.6		46.6	31.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	28.7	0.4	0.2	5.8	18.4		72.7	3.1		29.3	30.4	
Delay (s)	70.4	25.1	15.2	54.7	57.3		117.2	27.8		75.8	61.5	
Level of Service	E	C	B	D	E		F	C		E	E	
Approach Delay (s)		43.8			57.3			37.0			62.0	
Approach LOS		D			E			D			E	

Intersection Summary

HCM Average Control Delay	49.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Bend Central Area Plan
Franklin Avenue @ 4th Street

2030 CAP with Added Trip Reductions
Highest Peak - Diversion of Some E/W Traffic to Hawthorne

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	*0.60		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.94			0.89	
Flt Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1770	2211		1770	3514			1553			1493	
Flt Permitted	0.42	1.00		0.17	1.00			0.90			0.98	
Satd. Flow (perm)	778	2211		323	3514			1417			1467	
Volume (vph)	80	700	55	25	490	25	30	30	50	15	25	145
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	761	60	27	533	27	33	33	54	16	27	158
RTOR Reduction (vph)	0	8	0	0	8	0	0	34	0	0	98	0
Lane Group Flow (vph)	87	813	0	27	552	0	0	86	0	0	103	0
Parking (#/hr)							0	0	0	0	0	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.1	23.1		23.1	23.1			18.9			18.9	
Effective Green, g (s)	23.1	23.1		23.1	23.1			18.9			18.9	
Actuated g/C Ratio	0.46	0.46		0.46	0.46			0.38			0.38	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	359	1021		149	1623			536			555	
v/s Ratio Prot		c0.37			0.16							
v/s Ratio Perm	0.11			0.08				0.08			c0.14	
v/c Ratio	0.24	0.80		0.18	0.34			0.16			0.19	
Uniform Delay, d1	8.1	11.5		7.9	8.6			10.3			10.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.4	4.4		0.6	0.1			0.6			0.7	
Delay (s)	8.5	15.8		8.5	8.7			10.9			11.1	
Level of Service	A	B		A	A			B			B	
Approach Delay (s)		15.1			8.7			10.9			11.1	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00			1.00			1.00	1.00
Frt	1.00	0.98			1.00			0.99			1.00	0.85
Flt Protected	0.95	1.00			1.00			0.96			0.98	1.00
Satd. Flow (prot)	1770	1825			1856			1768			1646	1425
Flt Permitted	0.95	1.00			1.00			0.77			0.91	1.00
Satd. Flow (perm)	1770	1825			1856			1421			1523	1425
Volume (vph)	470	315	50	0	350	10	50	5	5	20	35	690
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	511	342	54	0	380	11	54	5	5	22	38	750
RTOR Reduction (vph)	0	8	0	0	2	0	0	4	0	0	0	50
Lane Group Flow (vph)	511	388	0	0	389	0	0	60	0	0	60	700
Parking (#/hr)										0	0	0
Turn Type	Prot			Perm			Perm			Perm		pt+ov
Protected Phases	7	4			8			2			6	6 7
Permitted Phases				8			2			6		
Actuated Green, G (s)	21.6	41.6			16.0			17.0			17.0	42.6
Effective Green, g (s)	21.6	41.6			16.0			17.0			17.0	42.6
Actuated g/C Ratio	0.32	0.62			0.24			0.26			0.26	0.64
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	574	1140			446			363			389	911
v/s Ratio Prot	0.29	0.22			c0.21							c0.53
v/s Ratio Perm								0.05			0.04	
v/c Ratio	0.89	0.34			0.87			0.17			0.15	0.77
Uniform Delay, d1	21.4	6.0			24.3			19.3			19.2	8.5
Progression Factor	1.00	1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2	15.9	0.2			17.0			0.2			0.2	3.9
Delay (s)	37.2	6.1			41.3			19.5			19.4	12.4
Level of Service	D	A			D			B			B	B
Approach Delay (s)		23.7			41.3			19.5			13.0	
Approach LOS		C			D			B			B	

Intersection Summary

HCM Average Control Delay	22.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	66.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1863	1863	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1863	1863	1583	1770	1583
Volume (vph)	835	215	290	645	30	305
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	908	234	315	701	33	332
RTOR Reduction (vph)	0	0	0	203	0	159
Lane Group Flow (vph)	908	234	315	498	33	173
Turn Type	Prot			Perm		pt+ov
Protected Phases	7	4	8		6	6 7
Permitted Phases				8		
Actuated Green, G (s)	27.6	60.4	28.8	28.8	8.2	39.8
Effective Green, g (s)	27.6	60.4	28.8	28.8	8.2	39.8
Actuated g/C Ratio	0.36	0.79	0.38	0.38	0.11	0.52
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	1237	1469	700	595	189	822
v/s Ratio Prot	c0.26	0.13	0.17		0.02	c0.21
v/s Ratio Perm				0.44		
v/c Ratio	0.73	0.16	0.45	0.84	0.17	0.21
Uniform Delay, d1	21.3	2.0	18.0	21.8	31.1	9.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	0.1	0.5	10.0	0.4	0.1
Delay (s)	23.6	2.0	18.4	31.7	31.6	10.0
Level of Service	C	A	B	C	C	B
Approach Delay (s)		19.2	27.6		12.0	
Approach LOS		B	C		B	

Intersection Summary			
HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	76.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Technical Memorandum - 7 Urban Design Framework Refinement

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Table of Contents

This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed by federal Safe Accountable Flexible Efficient Transportation Equity A Legacy for Users (SAFETEA-LU), and local government funds.

Introduction

The Framework Concept introduced in the first phase of the Central Area Plan depicts the vision to be achieved over the next twenty years. It represents the preferred structure for the area and describes how various urban elements will interact in order to achieve the vision. The Framework Concept encompasses land uses, overall urban form, and circulation issues and is the context within which the Central Area Plan (CAP) is being addressed. The basic Framework Concept was developed during the Bend CAP, Part 1 in 2004. At the beginning of the Bend CAP, Part 2, the project team refined the Framework Concept to include the 3rd Street corridor, as well as neighborhoods north and south of the downtown core. The Project Advisory Committee (PAC) provided input and feedback on the framework refinement. After the initial framework refinement of Part 2, the City of Bend hosted a Public Workshop to gather community input. In addition, the project team conducted analysis on existing conditions, the real estate market and transportation and utility facilities in the project area and presented this work to the PAC for further discussion and input. The purpose of this memo is to further refine the Bend CAP Framework, where needed, based on this additional research, public input and PAC comments prior to the second public workshop and the implementation workshops.

Framework Concept

During the first phase of the Bend Central Area Plan, the "Central Area" was defined as the Historic Downtown Core, Greenwood Avenue and Environs, and the 3rd Street/Railroad District. The Framework Concept addressed these three districts in terms of five key components: great streets, open spaces, gateways, key redevelopment opportunity sites, and key pedestrian links and alleys.

- **Great Streets** are memorable civic spaces rather than just thoroughfares. Streets such as Greenwood, Franklin and 3rd have the potential to become inviting pedestrian spaces and activity centers featuring a variety of uses and interesting places.
- **Open spaces** provide multi-use public spaces. Areas such as Mirror Pond and Drake Park are great examples of open spaces that currently provide both organic and organized gathering spaces. There is a great potential for additional open spaces throughout the Central Area, particularly in linear open spaces in conjunction with boulevards or Great Streets.
- **Gateways** are welcoming and inviting transitions from one part of the City to another. The Central Area has several opportunities to enhance such gateways, particularly on Greenwood and Franklin Avenues as citizens and tourists enter or exit the Historic Downtown Core.
- **Key redevelopment opportunity sites** are those public areas that when redeveloped provide the most leverage for encouraging additional private investment to enhance the Central Area. These sites are best used for mixed uses when possible in areas that are highly visible and easily accessible.
- **Key pedestrian links and alleys** are often parallel to heavier automobile transportation links, and offer interesting and safe pathways to a variety of walking-oriented uses such as shopping and sidewalk cafes. Brooks Alley is a prominent example of an existing key pedestrian link on which other alleys can be modeled.

Overarching Framework Concepts for the Central Area included identifying and building upon Great Streets, enhancing and encouraging pedestrian-friendly environments while facilitating an increasing amount of downtown vehicular traffic, and encouraging development with complementary uses that can collaboratively provide and use public infrastructure facilities (such as parking or plazas).

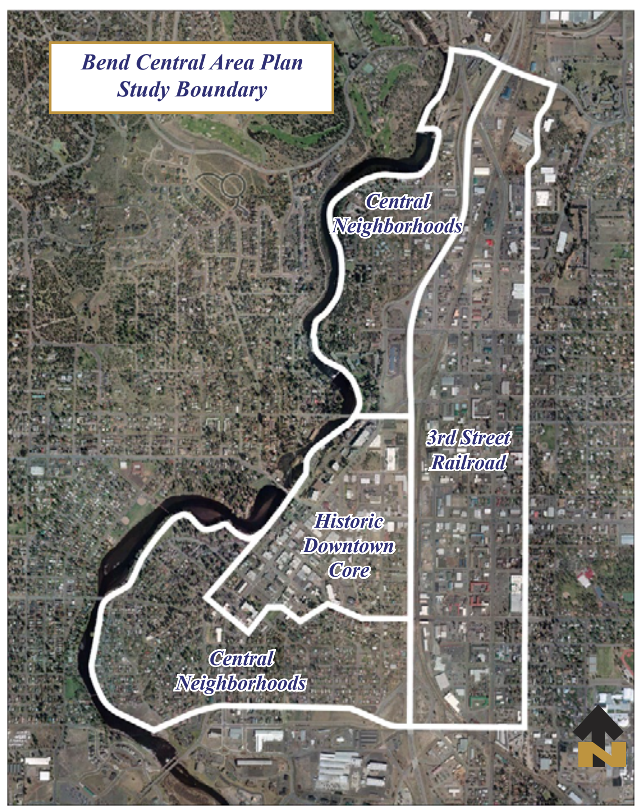
Refining and Expanding the Framework Concept

As the Central Area Plan moves into its second phase, the Framework Concept has been refined to build upon these components and consider adjacent areas within the Central Area.

The refined Framework Concept (refer to Figure 8) continues to focus on the Great Streets. Each of these east/west linkages develop a special character of its own and set up the gateways and nodes of development along 3rd Street. The densest building form would occur in the Railroad District, east of the railroad and west of 3rd Street, preserving views to the mountains. Greenways or special streets permeate the dense development and connect the area to the greater system of open space in the Central Area. This system also works to delicately weave development along 3rd Street back into the neighborhood to the east of 4th Street.

Consideration should be given to creating an exciting new identity for the Third Street/Railroad District. "Branding" this area will draw attention to the area by owners, developers and citizens. As a working title, in this technical memorandum, the District is referred to as "Bend Central". Within Bend Central, there are sub-districts and corridors that may have unique characteristics.

The components of the refined Framework Concept are Defined Districts, Hierarchy of Streets, Intersections of Character, System of Open Spaces, City Form and Skyline, and Transitions and Seams. These components address the different character and unique attributes of the distinct areas within the Central Area, how pedestrians and cars will move about, and the connection of open spaces throughout. It addresses the contribution of topography and landmarks and the transition of uses and forms between the districts and adjacent neighborhoods. Based on market and real estate analysis, the Framework Concept also suggests where development could first occur by identifying key pulse points of activity within the Districts. Components of the Framework Concept are not discrete pieces, but rather layers that build upon one another and work together to achieve the vision of the Central Area. Each of these components will be discussed, in turn, in the following sections.



Components of the Framework

1. Defined Districts

Areas of the city evolve a character that can be unique, yet complimentary to adjacent areas. By establishing districts, it is possible to set forth expectations as to the development/redevelopment of an area and guide future development. Demands for land and increased density requirements within the Urban Growth Boundary will force levels of development (density, height) that have not been seen in Bend or Central Oregon. By defining districts, the places for density and height can be determined so that the resultant development is complimentary to the Historic Downtown Core and neighboring residential areas.

The 3rd Street Corridor from the Parkway on the west to 4th Street on the east will most certainly redevelop in a new form, utilizing the land more effectively and efficiently than one-story retail buildings and parking lots. This District should have a "brand" or "identity" (Bend Central) with subdivisions of specific character that results from applying the "layers" of the Framework Structure. Also, the evolving districts surrounding Bend Central should be defined as to expectations, edges and transitions.

See the Districts Map to the right for a delineation of Bend's Central Area Districts.

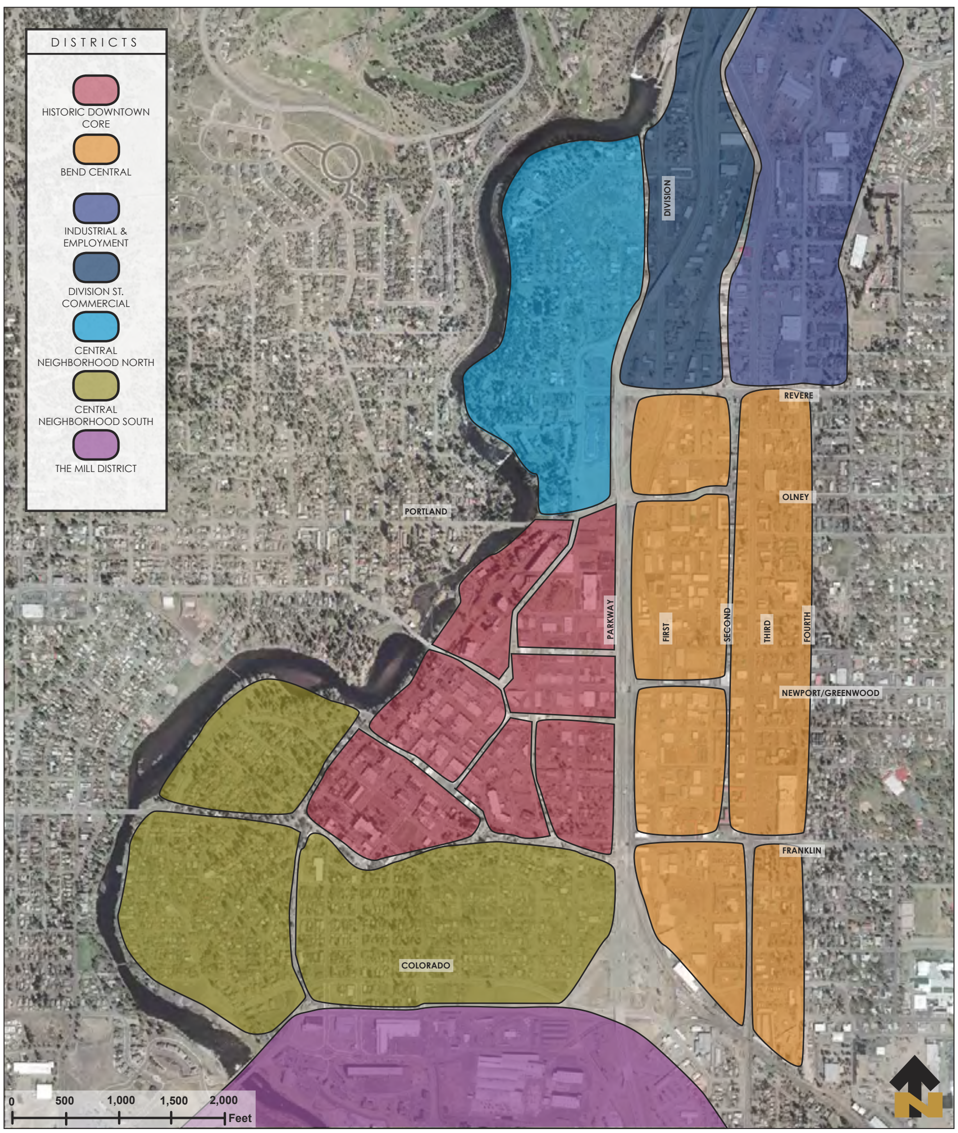


figure 1

2. Hierarchy of Streets

All streets are not equal. A component of an active and diverse urban fabric are streets that are designed to certain functionality criteria for vehicular circulation but also provide for various levels of pedestrian activity, integrate infrastructure for storm water and utilities and create an ambiance through lighting, signage and way-finding. The street is not only the horizontal surface for vehicles and pedestrians. It should be considered as a linear room that has a character established by the combination of functional aspects (vehicular and pedestrians) the enclosure of the buildings facing the street and the landscape of the street (green, furniture, signage, lighting).

Analysis of the current and future transportation capacity in the Central Area indicates several areas of congestion which will require mitigation. This Framework Refinement assumes mitigation and alternative solutions can be achieved in a manner that will enable implementation of the CAP Vision and Framework by the 2030 plan year.

The hierarchy includes the following:

- Expressway
- Principal Arterial
- Minor Arterial Streets
- Major Collector Streets
- Transit Streets
- Multi-modal Streets
- Local Streets
- Residential Streets
- Pedestrian Streets

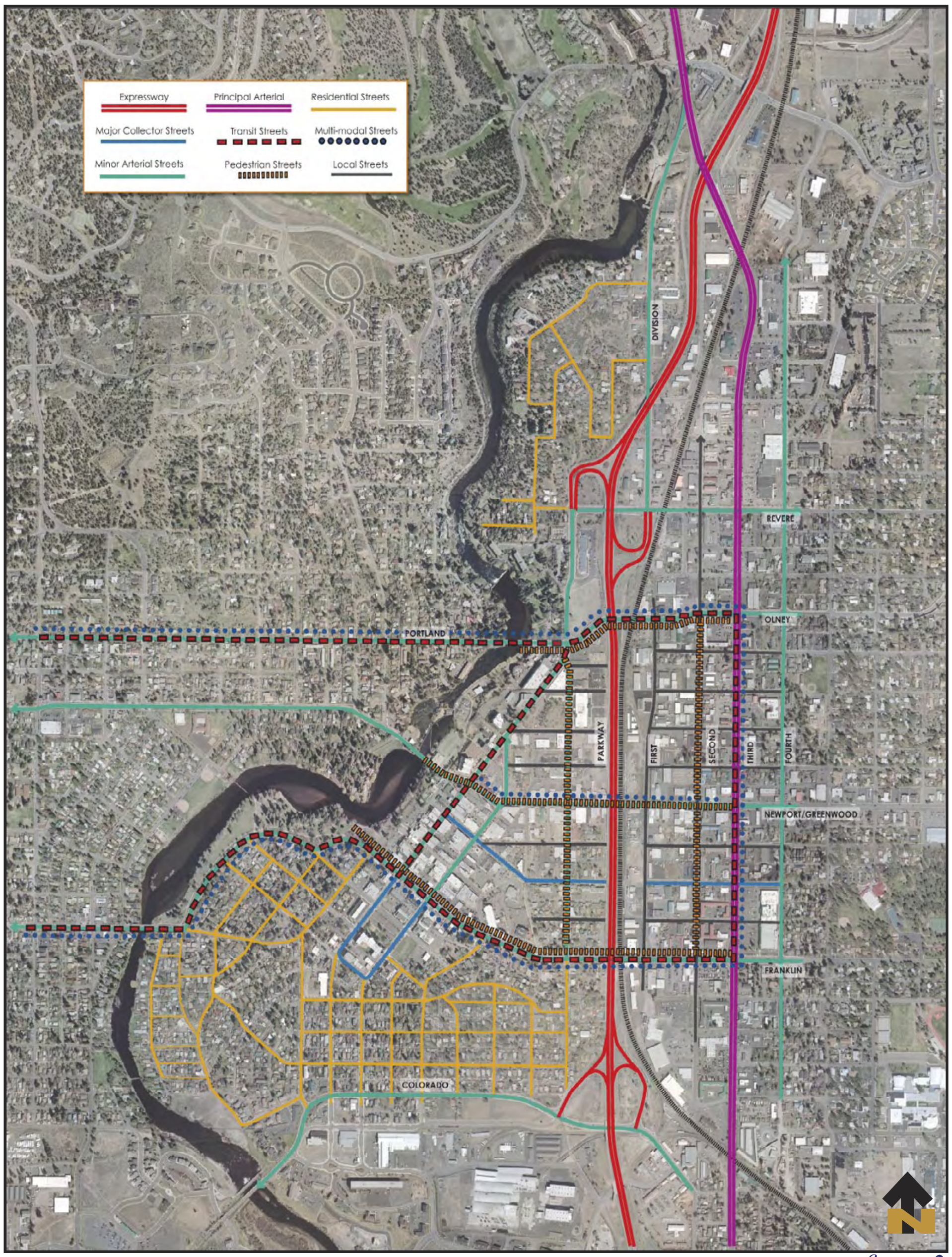


figure 2

3. Intersections of Character

The meeting of two or more circulation routes/paths should be celebrated. The intersection should be thought of as an outside room and should have greater content than “a holder of traffic signals”. The intersection may serve as an introduction of the visitor to the city, is instrumental in way-finding, and (in the case of Bend Central) identifies the east-west connecting from the principle north-south routes. Buildings surrounding the intersection should define the space but should also be complimentary to each other. Lighting should signal a decision point. Pedestrian and vehicular zones should be delineated to insure safe and secure passage for all. The new tradition of public art in the round-abouts in the new neighborhoods of Bend should be repeated in Bend Central.

The intersections include the following:

- The hierarchy of the streets intersecting
- Gateways to Districts
- The ground surfaces (texture, materials)
- Identity and common language for Intersections in different Districts

figure 3

4. Network of Open Spaces

The character of Oregon is open space with islands of development. The character of Central Oregon is low-density, with towns and cities of 1-2 story buildings. As our cities grow and evolve, the tendency is to define specific places for open spaces and what the character of each should be. Bend has evolved in a way that already incorporates open space (natural elements) into the fabric of the city. The opportunity is to continue to build upon natural features with a series of spaces of diverse character—some urban, some naturalistic. The approach should not be "A" city square, but many city squares; not "A" park, but parks integrated throughout the urban core; not "Just Streets", but green streets. AND the concept is one of connecting a series of diverse and varied open spaces that are developed within the public realm combined with courtyards, parks and spaces in private development. The result is an interconnected network of open spaces that are accessible and flexible as to use and capacity.

Elements in the network include:

- Green Corridors
- Pedestrian Paths
- Linear Green Spaces
- Courtyards/Plazas
- Civic Squares
- Linking Pathways
- Green Ladder

figure 4

5. Transitions and Seams

Cities evolve in sectors. These sectors are a result of public intervention and private response to the intervention. Neighborhoods and clusters of compatible uses build upon the success of prior developments. As each district or sub-district begins to establish its own specific character, the differentiation between parts of the city becomes greater—and the fear of unwanted intrusions (e.g. entertainment venues in single family residential areas) become greater. The interaction between zones or districts should be a product of careful study and consideration. In Bend Central, redevelopment of the 3rd Street corridor is certain. Redevelopment will undoubtedly be of higher density and taller buildings—and be a mix of uses that may or may not include housing. Whatever the eventual development pattern, it will abut a vital residential neighborhood east of 4th Street. The "seam" of 4th Street and the transitions between uses and areas should be addressed to set priorities and methodologies to guide redevelopment activities - with special care given to the transitions into and out of the Central Neighborhoods. "Transitions and seams" occur throughout Bend Central and the larger Central Plan Area.

Considerations in this are the following:

- Major Seams
- Use Transitions
- Connections
- Topographical Transitions

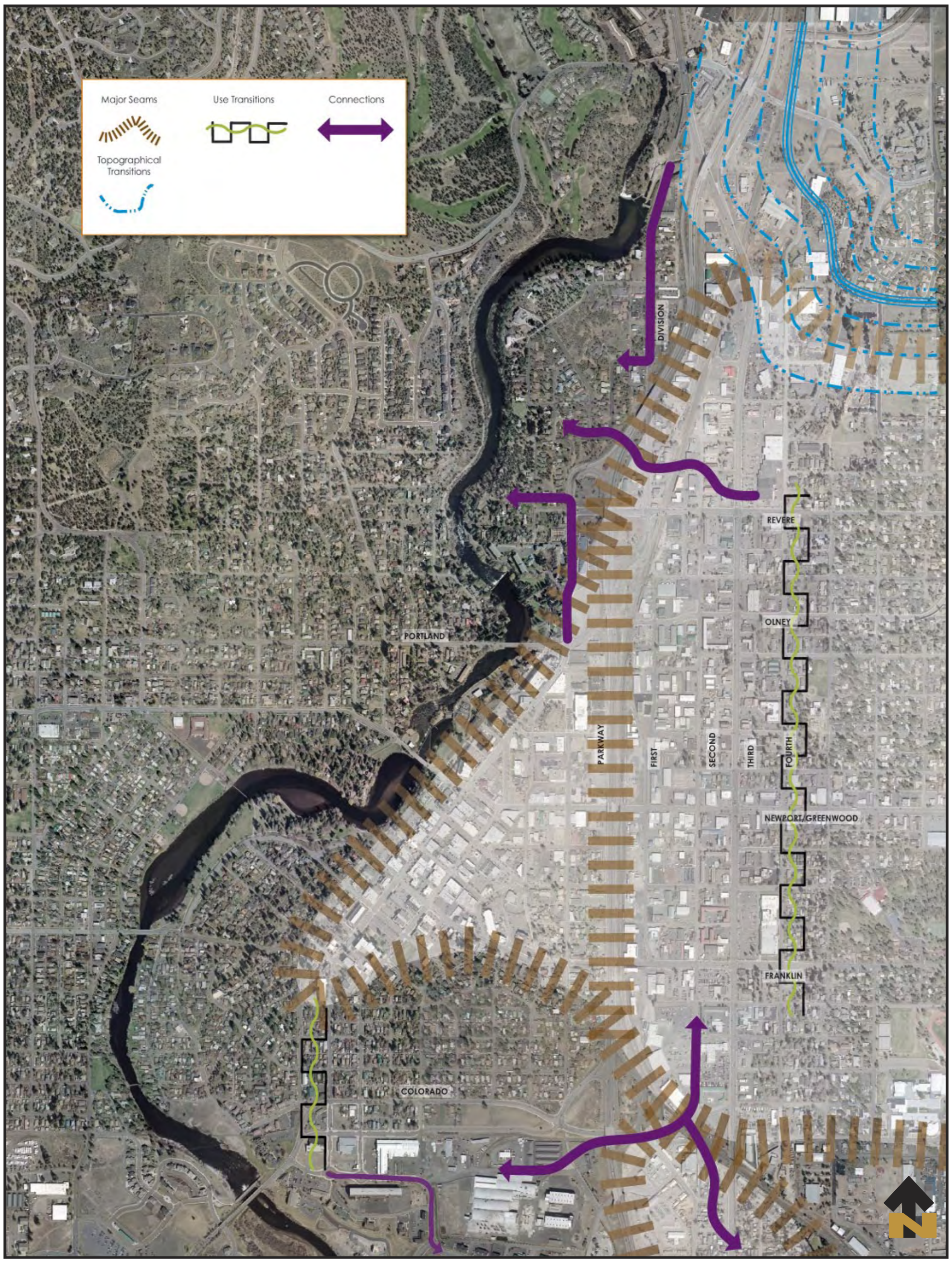


figure 5

6. Bend Character

The City of Bend has evolved to be the focus of economic and cultural activity in Central Oregon. From its founding to the present, it has displayed a unique character that is a rich layering of historic structures, integration with natural geologic conditions, incorporation of native stands of pines and understory plants and framing of views of the majestic Cascade mountain range. Buildings and the spaces "in-between" (paths, streets, open spaces) have traditionally been of a scale and texture that is comprehensible, friendly and welcoming to the resident and visitor alike. As the city continues to evolve and develop, new development and re-development should be designed to honor and enhance those special elements and features that contribute to the "uniqueness" of Bend as a city and as a place.

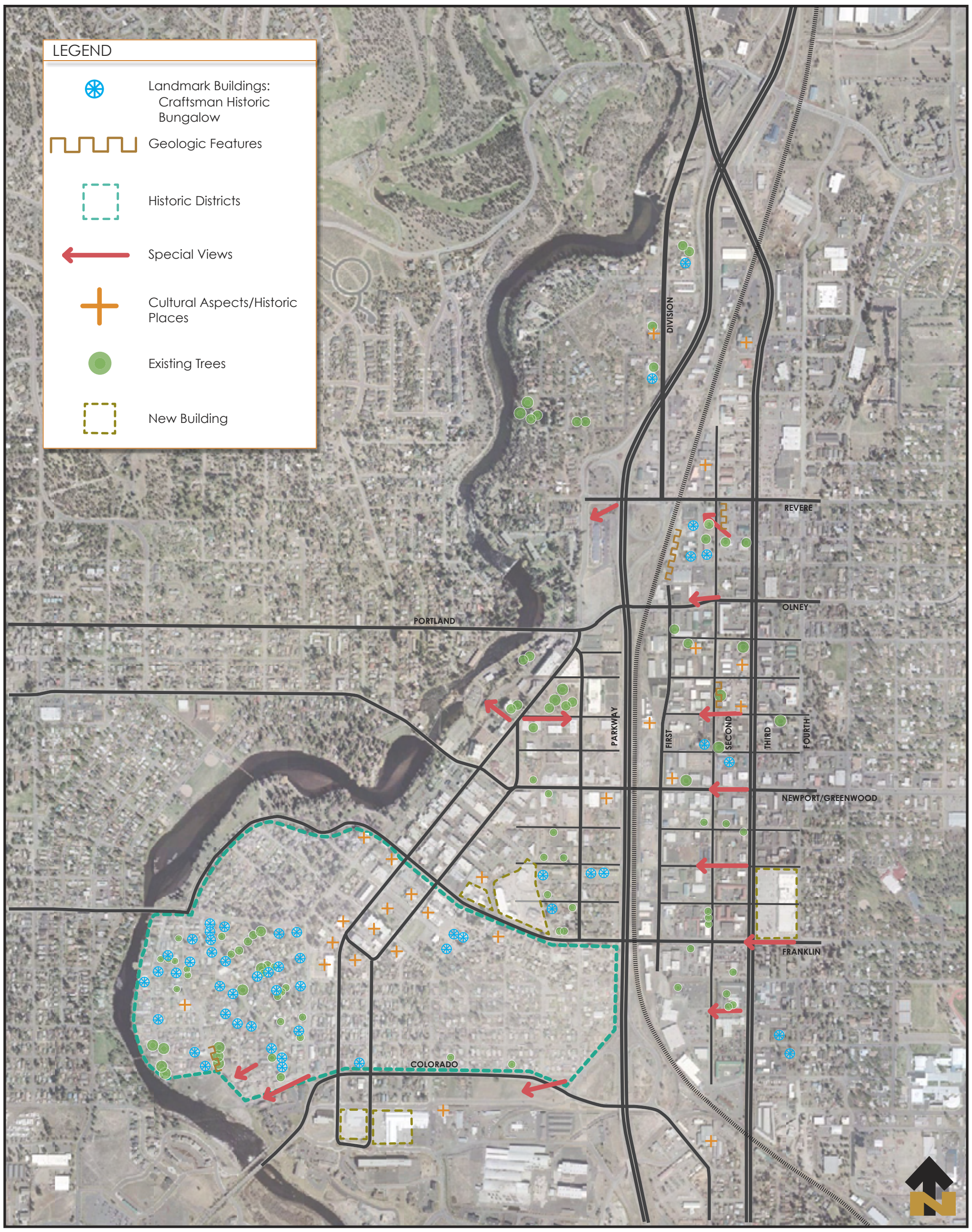


figure 6

7. City Form and Skyline

As development and redevelopment occur, taller buildings will become more the rule than the exception. Real estate and market analysis conducted for the Central Area has confirmed there is a demand for higher densities in this area. These taller buildings will be single use, as well as mixed use and the character of each should be uniquely Bend. As the city evolves, the "form" of the city will become more and more important. There will be issues of civic identity and remembrance, views and view corridors, axial relationships and monuments, open space and the "spaces in between"—all will contribute to the scale, texture and grain of the urban fabric.

The uniqueness of the skyline could be a derivation of the natural landscape surrounding or it could be more of a conventional form resulting from specific height limitations. Whatever the determination, there should be much discussion about the relationship of built form to the topography of the land—and the combined effect of land elevation and building height that will define the topography of the skyline.

The following figures reflect a possible future skyline profile as Bend's Central Area evolves into a higher-density, mixed-use center, and demonstrates how increased densities might fit into the existing urban form.

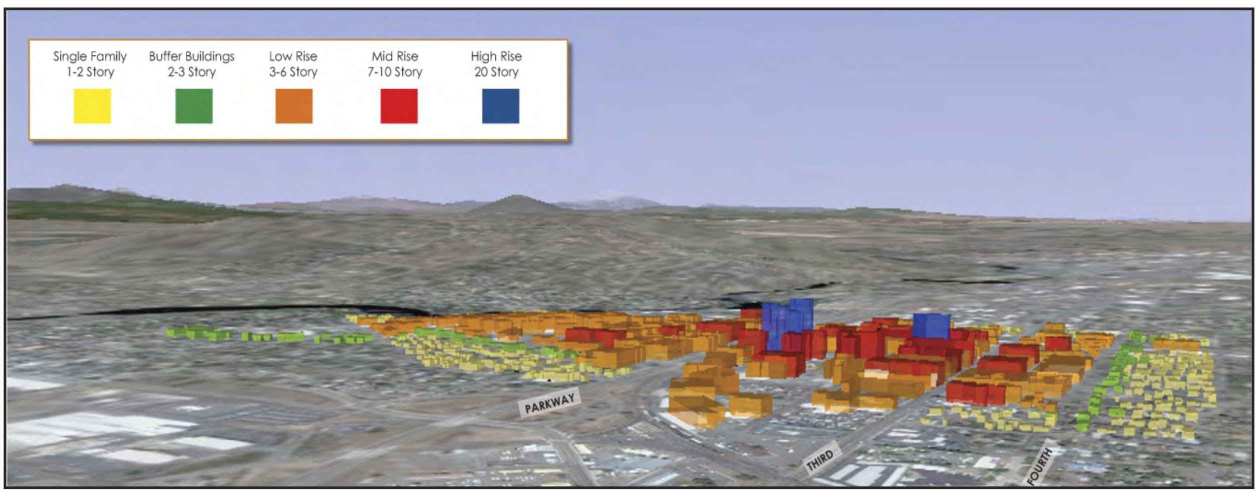


figure 7.1

Issues to consider include:

- The "lay of the land" (topography)
- The geologic structure of the underlying land
- Built forms (existing and expected)
- Symbology of form and landmarks
- Contributing fabric
- Icons and remembrances
- The "view from the road"

7. City Form and Skyline

figure 7.2

figure 7.3

8. Refined Framework Concept

In working with the community to prepare the Central Area Plan, the project team has employed an iterative process...one in which the initial concepts identified within the community's vision for the area have evolved in the light of additional information, testing and public involvement. The previously described components, taken together, have evolved into a Refined Framework Concept (Figure 8). The Refined Framework Concept reflects the continued focus upon a few Great Streets, and a "reinvented" 3rd Street corridor organized around pulse points of higher-density development, linked by these Great Streets to the Historic Downtown Core. 3rd Street is envisioned as a boulevard and a destination, with 2nd and 4th Streets serving a complimentary role, helping to improve circulation throughout the Central Area.

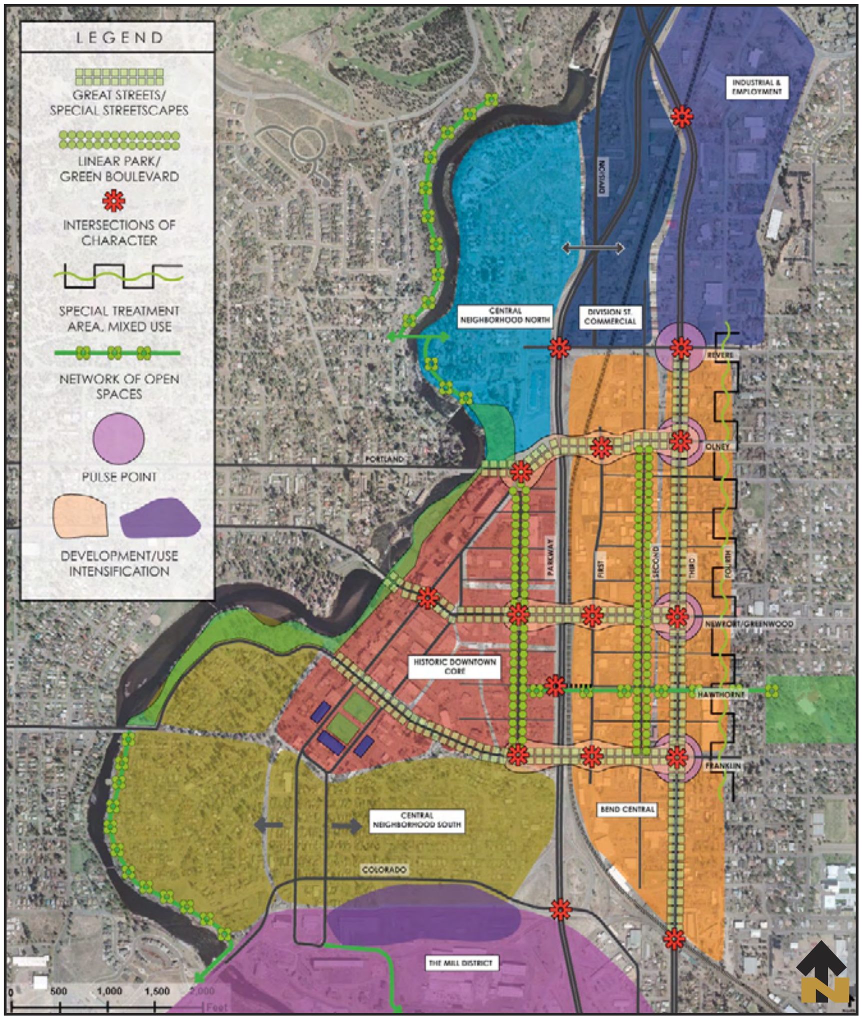


figure 8

As the Central Area Plan has evolved, a more clearly defined character for each of the districts/ neightborhoods has become clearer. The following summary descriptions of envisioned district character is provided below.

Central Area Neighborhoods – Northern

- *A mix of single-family residential lot sizes and higher density residential opportunities in a neighborhood with a unified identity*
- *A defined neighborhood with appropriate transitions and easier connections to other Central Area neighborhoods*

8. Refined Framework Concept

Central Area Neighborhoods – Division Commercial

- *A revitalized mixed-use area with complimentary storefronts and street improvements*
- *Landscaping and way-finding leading to the Historic Downtown Core*
- *A place with distinct character, yet connected with the residential neighborhood to the west and the employment and industrial area to the east*

Central Area Neighborhoods – Bend Central

- *Includes the reinvention of 3rd Street*
- *Mixed-use, close-in neighborhood*
- *Assembling properties makes higher densities and taller signature structures economically feasible*
- *Includes activity centers with unique green spaces and public places*
- *Has effective connections to the Historic Downtown Core via all modes of transportation*
- *Vibrant street-level uses along East-West corridors connecting 3rd Street to the Historic Core*

Central Area Neighborhoods – Historic Downtown Core

- *The heart and soul of Bend*
- *The traditional civic "center" and "town square"*
- *Open, green spaces and pathways along the river…a key feature*
- *Cultural, entertainment, and specialty retail center of Central Oregon*

Central Area Neighborhoods – Employment/Industrial District

- *A mixed-use area with industrial "destination" businesses (e.g., small offices, warehouses)*
- *Flexible use zoning standards also encourage creative and incubator industries*
- *Streets and infrastructure system support growth and connectivity to other Central Area neighborhoods*
- *Transportation circulation system effectively accommodates area freight and service delivery*

Central Area Neighborhoods – Southern

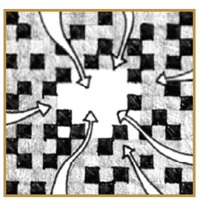
- *Current character of Old Bend and Drake Park Neighborhoods is maintained*
- *Quality "transitional", neighborhood-oriented commercial/retail uses along Wall and Bond*
- *Defined seams between the residential neighborhoods and the existing commercial districts, with transitional "buffer" development along Franklin*

Bend Central Performance Guidelines

These Performance Guidelines describe elements of urban form that must be addressed in ongoing development to achieve the desired Vision. The Guidelines are a methodology to inform developers and designers of the expectations of the city. These are suggested Performance Guidelines that focus on the area indicated as “Bend Central”. As the Central Area planning process continues, these guidelines will be refined and expanded to address the district seams and transitions into the Central Neighborhoods. Similar guidelines would also apply to the Historic Downtown Core and Greenwood Avenue area addressed in the first planning phase.

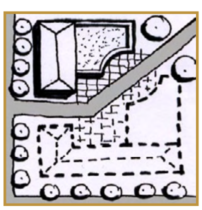
Guidelines should be performance oriented and not prescriptive. They address the general look, feel, and function of Bend Central and should be applied to the district as it develops. They create an environment for design excellence to occur, for small actions to have a major cumulative effect, and a mechanism for checking the progress of the Vision implementation. If the Guidelines are properly followed, each and every development increment will contribute to a better-defined and coordinated urban form. These guidelines guide developers, city officials, and the community in their efforts to achieve the vision for Bend’s Central Area.

Making Bend Central a “New Town In Town”



1.1 Draw People & Activity Into Bend Central

Bend Central is strategically situated to be both a local and regional focal point. Developments should lend themselves to attracting a variety of pedestrian activities in Bend Central with linkages to adjacent neighborhoods and downtown core. Entry points into Bend Central should establish a sense of arrival.



1.2 Encourage Further Development

Buildings and spaces should be designed with future adjacent development as a consideration. Designs should not be “islands,” but should create design opportunities for future abutting development.

1.3 All Seasons City

Building uses and exterior spaces should lend themselves to use throughout all four seasons. Designs should include protected spaces and pathways to enable year-round use by visitors and inhabitants.

1.4 24 Hour / 7 Day City

Developments should foster the idea of extended hours of use throughout the week. Where uses are subject to “business hour” operation, the development should include amenities that provide for external enjoyment of buildings at all times of day.

1.5 Sustainable Design

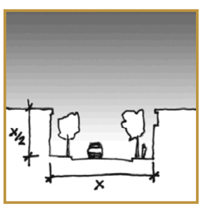
New development should embody current green building techniques wherever possible. Energy efficient design options should be explored as well as alternative building products, which have less impact on the local and world environment. Strive for LEED® (Leadership in Energy and Environmental Design) certification of development.

1.6 Buildings As Good Neighbors

Each building should be designed to fit into, and contribute to the future vision of Bend Central. Each building should enhance the public experience of itself and of the abutting buildings. Undesirable elements of buildings should either be screened or hidden from view.

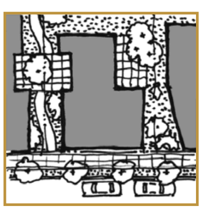
1.7 A Place Of Multiple Activities

When practicable, include multiple uses in building structures, as well as using exterior spaces as extensions of interior uses. Create combinations of public rights of way and open space within blocks to create places that can accommodate multiple activities.



1.8 Scale Of The Street

Building heights adjacent to a street edge should be at least as tall as half the width of the right of way. Existing buildings would improve the street scale with vertical expansion. Street trees can also be used in meeting the height goal. A combination of taller buildings and trees will create the appropriate scale for the street.



1.9 Building Setbacks

A continuous street edge contributes to the pedestrian health of Bend Central. Buildings should front the sidewalk. In addition, buildings placed close to side and rear property lines should be designed with sensitivity to future development on adjacent properties and to potential public spaces within the block.

1.10 Pedestrian Interaction

Buildings and exterior space should foster activity and interaction of citizens at a pedestrian scale. Encourage a variety of uses within walking distance for residents, employees, and visitors. Employ appropriate sidewalk widths and weather protection to encourage use and activity.

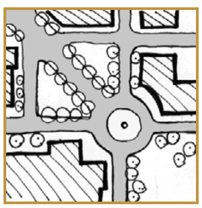
Bend Central Connections

2.1 Visual Linkages

Design interior and exterior spaces that recognize and promote visual linkages to other defining elements, such as monuments, civic spaces, outlooks, water features and other natural and man-made landmarks that orient the user.

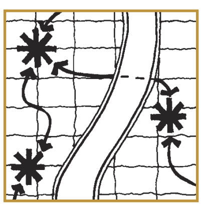
2.2 Attraction Of Attractors

Future “attractors” should be located strategically in Bend Central, providing a sense of “this is where it’s happening,” making Bend Central the “new” destination in the city - unique, but complimentary to the Historic Downtown Core and the Mill District.



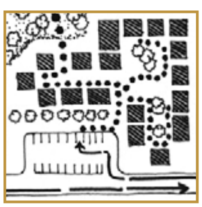
2.3 Axial Relationships And Monuments

Recognize existing and potential axial relationships of places and buildings. In building form, monuments, or in water features, incorporate extensions or terminations of these relationships.



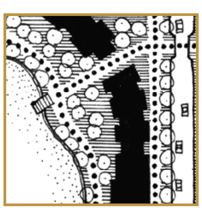
2.4 Places And Connections

Provide a safe, inviting series of interconnected “places”, both interior and exterior to the building structures. Provide linkages to adjacent neighborhoods for pedestrians, bicycles, and automobiles.



2.5 Driving And Parking

In the design of streets and parking areas, functional requirements of vehicular activity should not compromise, but should enhance, the pedestrian environment.



2.6 Pedestrian Opportunities

Integrate pedestrian circulation systems with existing and planned systems, both indoor and outdoor, that connect public rights-of-way and spaces, activities and uses. Design systems to use paving, furniture, and landscaping that are handicap and stroller accessible, convenient to use, and in character with the public improvements.

2.7 Green Streets

Promote creation of "green" streets and surface parking areas utilizing features like permeable paving, solar powered lighting, and native landscaping. City design standards should be flexible to allow designs that have a minimal impact on non-renewable natural resources.

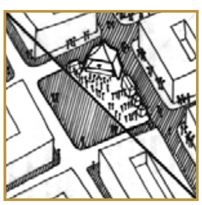
2.8 Connections Through Buildings

Promote design that allows for public interaction between buildings. Encourage pedestrian walkways through and connections between clusters of buildings.

Spaces And Landscapes in Bend Central

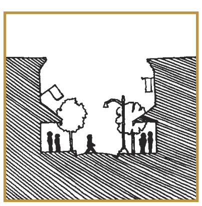
3.1 Civic Rooms

Development of public spaces within and around Bend Central should contribute to the formation of "civic rooms." Within these rooms, specific commercial and public uses, circulation patterns, public art, and cultural recognition shall be encouraged to reinforce the "room" and its linkage to Bend Central and the downtown core.



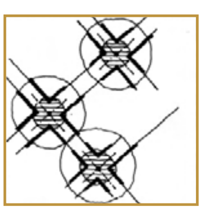
3.2 Areas Of Many Functions

Create pathways, open spaces and enclosed or sheltered public spaces to be flexible and to accommodate a number of functions, whether organized or casual.



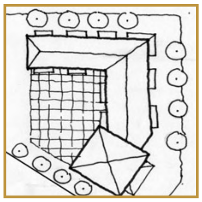
3.3 The Street

Define the street by considering it as a linear room with building faces, landscaping, lighting and signing appropriate to the function of the street and the area of Bend Central it serves. Street trees spaced at no more than 30 feet on center are critical to establishing the character of a street.



3.4 The Intersections

Consider intersections as "rooms" within the city. Maintain vehicular flow requirements while providing safe and convenient pedestrian access. When possible, use the location of building entries, building details, street lighting, and signage to enhance the concept of the intersection as a room.



3.5 Courtyards And Plazas

In private development, design courtyards and plazas that provide a continuity of experience between the inside and outside of the building and between the public and private realm.

3.6 Open Space Defined By Buildings

The spaces in-between buildings should enhance the public experience through building design, form and organization. The character of the spaces in-between will add to the texture and scale of the pedestrian environment.

3.7 Inside And Outside

Ground floor activities in buildings within Bend Central should present an interesting and enticing addition to the pedestrian experience. Exterior walls abutting public rights of way shall have more than 50% of the surface in windows, showcases, displays, art or pedestrian access elements.

3.8 Roofscaping

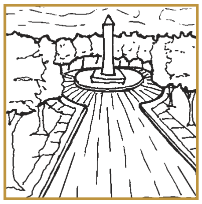
The rooftops of buildings within Bend Central present an opportunity for "green" design and upper level activities. New development should be encouraged to create eco-roofs and/or opportunities for places where activity could enhance the street.

3.9 Street Trees

Selection of trees along street edges should create a unifying canopy for the street. Trees should be chosen to ensure commercial views from the street. Trees with strong vertical shapes should be used sparingly to avoid a discontinuous or "lollipop" appearance.

3.10 Signage

Business identity signs, while conforming to requirements of the sign ordinance, should add to the quality and character of the street. Signs should also relate to the building's character and provide identity and focus for the use. Signs should be readable from vehicular as well as pedestrian views.



3.11 Public Art

Public art can enhance the landscape and provide focus within public spaces. Incorporate public art in strategic locations to create a better visual environment and provide interactive and interpretive experiences for both children and adults. Integrate the design work of artists, with a focus on local artists, into new development.

3.12 Safe Environments

New development and civic improvements should use crime prevention techniques wherever possible. Design options that reduce the opportunity for crime and nuisance activities should be explored, such as "eyes on the street" and the principles of CPTED (Crime Prevention Through Environmental Design), to create a safer environment.

Buildings in Bend Central

4.1 Building Form

Single-purpose buildings should be treated as "stand-alone" structures with style and size appropriate to use. Mixed-use buildings should be designed to relate contextually to the surrounding buildings.

4.2 Adaptable Design

As Bend Central evolves over time, the market will dictate changes in uses and densities. Design of buildings should consider flexibility in use and density over the life of the building.

4.3 Active Buildings Along Pedestrian Oriented Streets

Where pedestrian oriented streets are identified within Bend Central, active uses should be developed to support them. The street edges should help to reinforce the pedestrian link between focal points or attractors.

4.4 Activate Buildings Along Paths & Linkage Streets

Where possible, maximize use of deep building lots and the alleys. Businesses that do not require high exposure street frontage may develop along improved alleys and open space internal to blocks, giving the most important exposure to retail and businesses requiring street front identity.

4.5 Craft Of Building

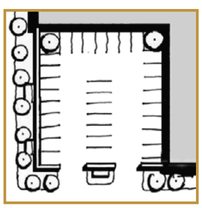
In designing buildings, recognize the "craft of building" as fundamental in creating appropriate building detail. Proportion, attention to detail and quality design should be stressed. Lasting materials are strongly encouraged and the way buildings are assembled contributes to the texture and fabric of Bend Central.

4.6 The Outside Wall

The "outside wall", the building's presentation both to passers-by and to users, should invite participation. Upper levels of buildings facing the street should incorporate decks, balconies or other devices that activate the wall enclosing the street, any open space, pathways, or lanes.

4.7 Building Entrances

Building entrances should support and enhance the pedestrian oriented quality of Bend Central. Design entrances to give identity to buildings and uses therein. Entrances to upper level uses should be located mid-block with corner entrances reserved for retail uses.

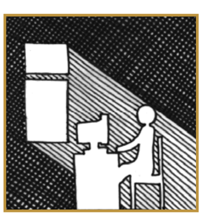


4.8 Parking Relationship To Building

Parking areas and structures are to be integrated into new building designs. Surface parking should be limited to short-term parking along the alleys where possible to maintain an active street-front. Delineate surface parking from pedestrian ways by low vertical screening elements, such as masonry walls, fences or landscaping.

4.9 Service Areas

Since service access and trash holding areas are expected to be in the alley or adjacent to roadways and open spaces, care must be taken to avoid a back-door appearance to the building faces that are adjacent to pedestrian areas and other buildings. Employ screening and landscaping to reduce the visual impact of service areas.



4.10 Interior Environments

Interior design of buildings in Bend Central should recognize the need for quality living and working environments for all its users. Natural lighting and ventilation should be utilized to the maximum extent possible.

CENTRAL AREA PLAN, PART 2
DRAFT STAKEHOLDER INTERVIEW REPORT

Prepared for the City of Bend by:

Parametrix
700 NE Multnomah Avenue, Suite 1000
Portland, OR 97232
Project No. 277-2395-056

January 22, 2007

Background

The City of Bend is undertaking Part 2 of the Central Area Plan (CAP) which will build on work done by the City during CAP Part 1 in 2005. Efforts during CAP Part 1 resulted in an overall vision for the Central Area, one in which it is seen as:

> The economic leader and social focal point of the region, the Bend Central Area is comprised of several districts with their own distinct identity, character and unique collection of uses.
>
> These districts represent a land use, transportation, and economic system that preserves and enhances the best part of the Central Area while supporting revitalization where needed. Each district contributes to the overarching identity and overall sense of place for what is "Bend."

As part of the vision, four distinct districts were identified. These Central Area districts are:

- The Historic Downtown Core
- The Third Street/Railroad District
- The North Central Residential Area
- The South Central Residential Area (including the Old Bend Neighborhood)

The Central Area Plan focuses on the fundamental elements of quality urban design, access and mobility, and development and redevelopment opportunities. These elements are the nexus for maintaining and further developing the vibrant character of central Bend and can be implemented as:

- Urban Spaces, Open Spaces, Transitions, and Gateways
- Great Streets, Access, and Mobility, Key Pedestrian Links and Alleys
- Key Redevelopment Opportunity Sites

As part of the Bend Central Area Plan – Part 2, the City of Bend, working in conjunction with a team of private consultants, will build on work currently underway to create a long-term land use, redevelopment, and transportation plan for Bend's central area. The study area includes the existing, historic downtown core and adjacent areas while focusing on the Third Street Corridor and neighborhoods to the north and south.

Prior to a kick-off workshop for CAP 2, the public was engaged by interviewing stakeholders from a variety of public and private interests. The goal of these interviews was to identify overall opportunities and challenges in the central area, while also collecting information that aid in the study of the CAP Part 2 focus areas. These stakeholders will continue to play an important role in the development of the Central Area Plan during our studio work and in the development of our test ideas.

The information gathered through these interviews and summarized below was used to guide the planning of the January 23, 2007 Public Workshop. Primary questions asked at the workshop were a refinement of the questions asked of the stakeholders during the interviews, with the added benefit of visual interaction and group discussion to promote further discovery and refinement of viewpoints.

Key Findings and Conclusions

The stakeholder interviews produced a wide range of information and elicited varied opinions. Some of the key stakeholder comments included:

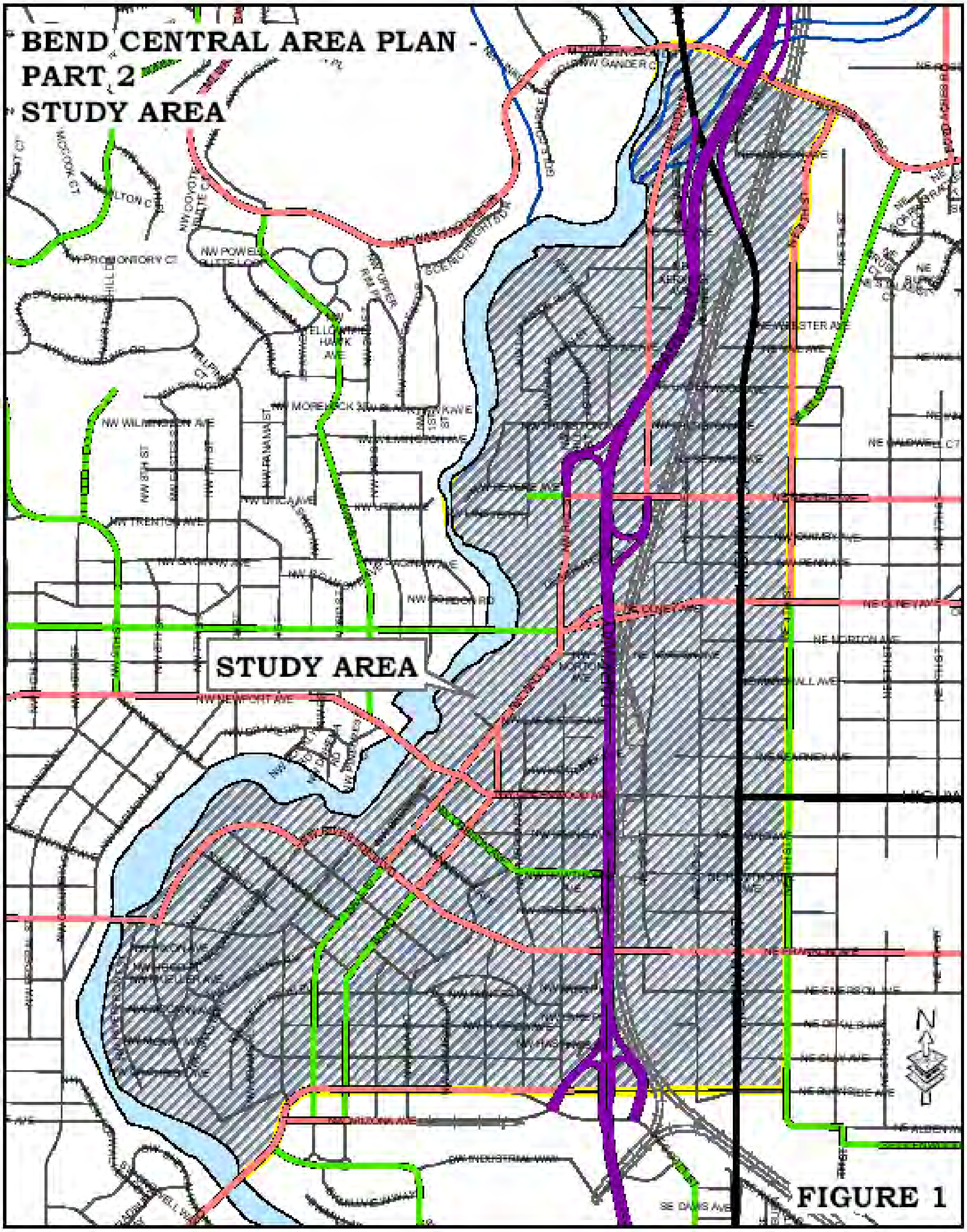
- There is a need to encourage and enhance pedestrian and bicycle travel in the Central Area. River trails for pedestrians and bicyclists are needed throughout the area.
- Automobile traffic on Third Street presents the greatest challenge to revitalization. Streetscaping and physical changes to Third would have to occur before it could become more pedestrian friendly.
- Public transit should be encouraged and further developed.
- Third Street is a large area and it should be approached as a sum of smaller parts.
- Visual blight and sign pollution are a major problem along Third Street; the area needs visual improvements such as façade treatments, trees, and art.
- Franklin and Greenwood Avenues are the primary way to connect to the Historic Core and need better way finding mechanisms or a continuity of theme to tie the two areas together. These areas must be addressed for a successful Third Street transformation.
- Urban style plazas should be the primary open space along Third Street, followed by green spaces.
- The southern neighborhoods are functioning well, are protected by their historic designation, and no major changes are desired.
- Traffic along Franklin, as well as Wall and Bond threaten the character of the southern neighborhoods. Connectivity between downtown and the Old Mill District is both an opportunity and a challenge.
- A Heritage Square type-area or a civic area south of Franklin Avenue is still desired.
- Commuters from outside of Bend are creating traffic impacts in the Central Area; carpooling or transit use should be encouraged.
- Division Street needs revitalization and should include neighborhood commercial.
- The northern neighborhood needs an identity and better connectivity to downtown.

Methodology

Over 16 key stakeholders were interviewed to allow a variety of individuals to comment on opportunities for sustaining the central area of Bend, and to identify challenges in the Third Street corridor and southern and northern central neighborhood areas. The stakeholders interviewed for this project included: three Bend City Council members, one Bend Planning Commission member, two developers, several property owners, two Chamber of Commerce officers, one neighborhood district representative, and several city employees in various service agencies. Some interviews were conducted in person, while others were conducted by telephone.

The interviews were conducted between early and mid January 2007, by Parametrix staff. The stakeholders were encouraged to frankly and openly express their thoughts on the issues. In order to maintain anonymity, the responses have been summarized collectively. The valuable information gained from talking with a variety of interests has helped us frame the issues for discussion right up front, and will help us attain a deeper knowledge of identified issues.

The interviews consisted of a brief introduction of the scope of the Central Area Plan, Part 2 project as well as a familiarization of the study area and individual districts. As part of telephone interviews, Figure 1 was e-mailed to the participants prior to the interview.


BEND CENTRAL AREA PLAN -
PART 2
STUDY AREA
STUDY AREA
FIGURE 1

Respondents were asked several questions focusing on urban design, transportation, character and redevelopment opportunities in each of the three study districts. General questions were as follows:

Third Street Corridor (Old Highway 97):

The Central Area Vision identified this area as a new, higher density, mixed-use, east side downtown neighborhood centered on the Third Street Corridor. What do you see as the greatest opportunity for making Third Street a "Great Street"?

- What opportunities for open spaces and gateways does this area offer?
- What type of redevelopment along this Corridor might have the greatest potential for "setting the tone" for this part of the Central Area?
- What transportation options would best help ease congestion problems in the Central Area?
- Access to/from the core area is constrained but what do you see as the best way to tie Third Street to the historic downtown core?
- Are there any other challenges or issues that should be addressed if a Third Street transformation is to be successful?

Residential neighborhoods to the south of the Historic Downtown Core:

- How should these neighborhoods relate to the downtown area? How? What kinds of activities?
- What are some of the challenges and issues that need to be addressed in preserving the character of these neighborhoods?
- Any specific suggestions about enhancing the transitions from this neighborhood to downtown and Franklin Avenue (a Great Street)?
- How should the transportation system from this primarily residential area interact with the downtown transportation system?

Residential neighborhoods to the north of the Historic Downtown Core:

- There are opportunities for infill in these neighborhoods. What are the most important characteristics any new development in these areas should consider?
- How should these neighborhoods relate to the downtown area? How? What kinds of activities?

- What are some of the challenges and issues that need to be addressed in preserving the character of these neighborhoods?

- How should the transportation system from this primarily residential and employment area interact with the downtown transportation system?

The Historic downtown core as it relates to the rest of the Central Area . I'd like your opinion about some of the possible opportunities or impacts that future downtown growth might pose to adjacent and surrounding neighborhoods.

- What are some of the opportunities and challenges related to neighborhoods surrounding downtown?

- What are the most vital pedestrian access opportunities and issues connecting these neighborhoods with the larger Central Area?

- What transportation options would be most effective to tie these areas into the larger Central Area?

- What types of development would best complement the existing neighborhoods?

- Priority areas?

Interview Responses

The responses of the individuals interviewed are summarized below, by question and subtopic as appropriate.

Third Street Corridor (Old Highway 97):

What do you see as the greatest opportunity for making Third Street a "Great Street"? What opportunities for open spaces and gateways does this area offer?

Most interviewees felt that the greatest opportunity for making Third Street a "Great Street" was in changing the streetscape by making sidewalks, trees, and street furniture a focus of the street rather than cars alone. Many respondents also felt that concentrating on visual elements such as signage and façade treatments would best transform this street.

Other respondents felt that focusing on mixed use and clustered building forms would best transform the street. Most respondents felt that any open space should focus on "plaza type" spaces and had a difficult time imagining green open spaces along Third Street. Several respondents suggested transforming Third Street into a Boulevard between Franklin and Greenwood, and possibly to Revere or Olney.

Almost all respondents felt that the intersection of Third Street with Greenwood Avenue, followed by the intersection of Franklin Avenue, would be the most logical gateways. A few respondents mentioned the possibility of Revere Avenue as a gateway from the North.

What type of redevelopment along this Corridor might have the greatest potential for "setting the tone" for this part of the Central Area?

Most respondents felt that development of mixed-use (residential/office/retail) with higher buildings could set the tone for transforming Third Street. Several respondents specified that any new development needs to consider varied building scale and setbacks. Most felt that there was a potential for a mix of residential, office and commercial uses in this area, while a few felt that residential development in this area would be a hard sell due to the heavy traffic on Third Street, and that a mix of office and retail with a few large anchors would be more suitable.

What transportation options would best help ease congestion problems in the Central Area? Access to/from the core area is constrained but what do you see as the best way to tie Third Street to the historic downtown core?

Most respondents felt the biggest existing transportation gap along Third Street is the lack of prominent bike lanes and safe pedestrian walkways. Many felt that improvement of these transportation modes would reduce congestion problems in the Central Area as a whole and also provide better connectivity to the historic downtown core from Third Street. A few respondents suggested consolidating access points along Third Street and providing turn-out areas for pedestrians to sit or bus riders to gather. Most respondents were in agreement that improving aesthetic connections and design themes along Third Street would be both a challenge and an opportunity. Several respondents commented that it is difficult to know where the historic downtown core was in relationship to Third Street and felt that better way-finding between the areas through signage and designated paths would greatly help the Third Street transformation as part of the downtown area.

Are there any other challenges or issues that should be addressed if a Third Street transformation is to be successful?

Respondents saw the lack of east / west connections from Third Street to downtown as a major issue and felt that new connections under the Parkway and the railroad could open new opportunities for Third Street. Some respondents felt that existing businesses may not have adequate incentives to make changes in accordance with transformation plans. Others saw the large number of property owners in this area as a challenge to developing a uniform plan and design. Finally, nearly all respondents felt that the great volume of traffic, including trucks, would be a challenge to a Third Street transformation.

Residential neighborhoods to the south of the Historic Downtown Core:

How should these neighborhoods relate to the downtown area? How? What kinds of activities?

Overwhelmingly, respondents strongly felt that the southern residential neighborhood related well to downtown and shouldn't change. Some felt that better pathways and sidewalk completions / improvements could strengthen the relationship of this neighborhood to downtown.

What are some of the challenges and issues that need to be addressed in preserving the character of these neighborhoods?

Most of the respondents felt that historic designations in this area already protect these neighborhoods. However, at least one respondent questioned whether current development code regulations were consistent with historic preservation goals. A few people expressed concern that land costs are encouraging changes and that some "remodels" were really re-builds and that they degraded the character of the neighborhood.

Any specific suggestions about enhancing the transitions from this neighborhood to downtown and Franklin Avenue (a Great Street)?

Several respondents felt that a buffer of small scale commercial uses already exists along Franklin Avenue and this acts as a transition from the residential neighborhood to downtown. Some respondents felt that further development of a civic area or Heritage Square plan could act as a stronger transition from the residential neighborhoods to downtown. Most of the respondents felt that heavy traffic on Franklin Avenue is a challenge that should be addressed when considering any changes to this area.

How should the transportation system from this primarily residential area interact with the downtown transportation system?

About half of the respondents felt that traffic from downtown to the Old Mill District should be diverted out of the residential neighborhood, while half felt that this traffic could be better accommodated with upgrades to Wall and Bond Streets. Most of the respondents mentioned that overflow downtown parking is still an issue in this neighborhood, even after the construction of the parking garage. A few respondents felt that much of the traffic and overflow parking in this area was linked to commuters from out of town and suggested encouraging carpools or expanding transit use, along with park and rides to decrease this traffic.

Residential neighborhoods to the north of the Historic Downtown Core:

Are there opportunities for infill in these neighborhoods? What are the most important characteristics any new development in these areas should consider?

The general consensus in response to this question was that housing stock in this area should be preserved and that perhaps there is an opportunity for greater density near Division Street. There was an overall feeling among those interviewed that the riverfront area in this neighborhood should be preserved as low density. A great number of respondents identified condos and neighborhood commercial as possible developments for this area. A few respondents felt that this area offered an opportunity to introduce lower-income or senior housing near the downtown area. Nearly all respondents felt that Division Street needs revitalizing and that any new development needs to lend a sense of place or identity to the neighborhood. A few respondents felt that this may be an area for some types of light industrial.

How should these neighborhoods relate to the downtown area? How? What kinds of activities?

Several respondents felt that this neighborhood could relate better to the downtown area, perhaps through better bike and pedestrian connectivity; however, some felt that this neighborhood had a better possibility of developing its own identity. Many respondents stressed that the river was a natural connection for this area to downtown and suggested further development of river trails in.

What are some of the challenges and issues that need to be addressed in preserving the character of these neighborhoods?

The lack of identity for this neighborhood was the most common challenge cited by respondents. This was closely followed by the poor connectivity of this area to downtown. Other challenges mentioned were proximity to the Parkway and triangular land pieces.

How should the transportation system from this primarily residential and employment area interact with the downtown transportation system?

Many respondents felt that automobile and general connectivity between this area and other areas within the Central Area should be simplified. Some respondents noted, however, that directing more cars to the downtown historic core would just cause additional congestion. Some respondents suggested a shuttle system could aid in reducing this disconnect, should enough need develop. A few people mentioned that it would depend largely on what type of future development occurred. It was noted that if lower income or senior housing is developed in this area, there would be a need for transit or a shuttle system because the area is not within walking distance of the historic downtown core.

Relationship between the Historic Downtown Core and Other Central Areas

What are some of the opportunities and challenges related to neighborhoods surrounding downtown?

Several respondents wanted to make sure that opportunities on Greenwood Avenue were highlighted. They felt Greenwood Avenue is an area with development possibilities for commercial and higher buildings, possible mixed-use. One of the biggest challenges for this area was seen as parking availability. It was felt that this has been an impediment to some development opportunities in the past.

Respondents also noted the challenges the railroad creates for development and redevelopment opportunities in Central Area. A few respondents felt that long term plans should look at moving the railroad east of town.

The heavy traffic on Greenwood Avenue east of Third Street (designated as Hwy 20) was seen as an impediment to creating a pedestrian friendly environment at the intersection of Greenwood Avenue and Third Street. Several respondents suggested removing the Hwy 20 designation from Greenwood and moving it north to another existing east-west road. It was suggested this would allow more flexible options for function and design. Overall challenges in the areas surrounding the historic downtown core were perceived as infrastructure, connectivity, and preservation of existing businesses and homes.

What are the most vital pedestrian access opportunities and issues connecting these neighborhoods with the larger Central Area?

Respondents described Greenwood Avenue, Franklin Avenue, and Olney Avenue as the most vital geographic areas for pedestrian access opportunities. Overall opportunities were seen as better connectivity, lighting, safety and pedestrian street presence for people with all levels and types of mobility. Many respondents noted that the Franklin Avenue underpass was of the highest priority, followed by the Greenwood Avenue underpass. Some respondents noted the need to tie pedestrian access goals to design elements because environmental design makes walking more interesting.

What transportation options would be most effective to tie these areas into the larger Central Area?

Pedestrian and bicycle facilities were the most cited transportation options that would effectively tie the surrounding neighborhoods to the larger Central Area. The second most cited transportation option was public transit and most respondents seemed to be pleased with the new bus service and expressed hopes that it would be successful and service would be expanded.

Several respondents felt strongly that downtown traffic was problematic and should be addressed. There were several suggestions including adding parking facilities in close proximity, requiring employers to provide off-site parking, and possibly revisiting the shuttle concept with better defined schedules and routes.

What types of development would best complement the existing neighborhoods? Priority areas?

Most respondents saw Third Street, particularly between Greenwood Avenue and Franklin Avenue as a priority area for redevelopment. Greenwood Avenue between Third Street and the Parkway was seen as a priority by some. Mixed use was suggested for both of these areas; however, some expressed doubt that anyone would want to live along Third Street.

Many respondents felt any development to the northern neighborhood should not be completely reliant on downtown but should include services for adjacent residential development and be complimentary to downtown.

Some respondents felt that the southern neighborhood could be enhanced by the development of a few corner stores and cafes along Wall and Bond Streets, as long as it was of appropriate scale and character for the historic neighborhood. Any new commercial development should be focused on serving these residential neighborhoods, rather than a destination for people in the greater Bend area. Several people also commented that automobile traffic between downtown and the Old Mill District on Wall and Bond Streets was heavy and likely to increase rather than decrease.

A few respondents felt that Division Street was a priority area for redevelopment because it was a smaller area than Third Street and because it lacked a strong identity (positive or negative) it was seen as being easier to transform.

Overall comments about development and redevelopment included a review of zoning and making sure it reflects market driven uses along Third Street and Division Street, and that it is consistent with the historic preservation goals in the southern neighborhood.

Additional PAC Comments to Stakeholder Interview Questions

In addition to the Stakeholder Interviews, the project team shared the interview questions with the Project Advisory Committee at their first meeting and asked for their input on any of the issues already identified or new issues. This exercise elicited the following comments which are organized by district:

Third Street Area

- Planning should consider an aging population and future energy conservation.
- There should be landscape guidelines for meaningful streetscapes and that consider irrigation.
- There should be balance between the state highway and community goals
- If the RR stays, look at the need for a local Amtrak station
- A state highway designation along Greenwood Avenue will inhibit redevelopment in the short term
- Protect accessibility along Third Street and the ability of automobiles to turnaround
- Beautify the RR tracks – like Billings, MT
- There should be incentives or tools for developers or property owners to relocate or redevelop
- Relax system development charges to create development incentives
- Look at expanding the existing UBA to include 3rd Street
- Look at Tax Increment Financing as a way to finance redevelopment
- Bicycle access is very important
- Look at setback, scale, and design guidelines

Residential Neighborhood to the South

- This area is underserved in the way of neighborhood parks and playgrounds

- Way finding / signage / paths would strengthen current downtown connections with the Old Mill District
- Look at fixed route transit (rail) from downtown to the Old Mill
- Management and transition of land uses and traffic is important
- Preservation is important. Don't become like east of downtown
- Points of interest along pedestrian paths should be encouraged through design and should be allowed uses in the development code

Residential Neighborhood to the North

- Special purpose district like the Portland Pearl may be appropriate for parts of this area
- Still need to have light industrial – Not all of Bend can be gentrified
- Pedestrian connections are a high priority; complete the River trail in this area
- Division Street's place in the City's transportation hierarchy should be reviewed
- Neighborhood park amenities are needed

BEND CAP PART 2

Project Advisory Committee Meeting #1
Council Chambers of City Hall,
710 NW Wall St, Bend Oregon
Tuesday, January 9, 2007 – 11:00 a.m. to 1:00 p.m.

Meeting Summary

The following materials were distributed to the PAC:

Agenda
Project Overview
Proposed project calendar / schedule
Scope overview
Committee guidelines and suggested protocols
Initial issues identified through stakeholder interviews

1. Introductions

David Siegel of Parametrix, and Brian Shetterly of the City of Bend, welcomed the Project Advisory Committee (PAC) to its first meeting. Dave noted that attendance was very good and added that there may be public participants in attendance. Dave introduced himself as the consultant project manager and Brian introduced himself as the City's project manager. Dave asked each of the attendees to introduce themselves by stating their names, whether they were a PAC member or a public attendee, and their affiliation or interest in the meeting. A PAC roster was also passed around the room and those in attendance were asked to sign-in next to their name.

2. Project purpose and overview

Dave gave a brief overview of the history of Bend CAP Part 1, and the focus of Bend CAP 2. Dave reviewed the Vision and Framework developed during CAP Part 1. A summary of the project scope was passed out and Dave described the tasks the project team would be undertaking.

3. Proposed project schedule

Shelley Holly of Parametrix passed out a project calendar and reviewed the overall process and timeframe of the project and noted deliverables and dates for public meetings. Dave Siegel reviewed the calendar of PAC meetings. David Knitowski noted that the PAC meetings would generally be held from 11:00 a.m. to 1:00 p.m. in the Council Chambers, with the exception of the next meeting on January 24th, which would be held from 10:00 a.m. till noon due to availability of the room.

4. Project Advisory Committee meeting protocols

Dave Siegel handed out a sheet of committee protocols and described the basic format of future meetings. Dave indicated that as facilitator, he would work to keep the group on target and schedule and this may mean wrapping up discussions or determining that some topics are outside of the meeting purpose and should be tabled until a later time. Dave indicated that questions and comments from public attendees would be entertained at the end of the meeting. He concluded by reminding everyone that respectful treatment of the views expressed by other PAC members or the public is important.

5. Expectations, tasks and responsibilities

David Siegel reviewed the expectations, tasks and responsibilities of the PAC, and described its participants as representatives from a wide variety of public, community, technical and business interests. Dave indicated the PAC would be expected to review meeting materials provided in advance of each meeting and actively participate in meeting discussions. He also indicated the importance of acknowledging any potential conflicts of interest that may be associated with individual statements, opinions or recommendations.

Dave indicated the primary responsibilities of the PAC are:

- Advising City and ODOT staff and the consultant team as the Central Area Plan Part II proceeds
- Providing two-way communication to groups and constituencies that CAP-PAC members represent
- Participating in public events related to the Central Area Plan, for example, attendance at public workshops and open houses

Jeff Datwyler of the City of Bend described the Central Area Plan Committee (CAPC) and indicated some of the members of the PAC and CAPC may be on both committees. He described the CAPC as a smaller group appointed by the City Council that would look at comprehensive central area issues extending beyond the focus of the Central Area Plan, Part 2, and advise the Council in ongoing matters concerning the Central Area. There were several questions about the difference in the two committees and how their membership was created. Brian Shetterly and John Russell of the City of Bend offered additional information about the differences of each group and the history behind the CAPC.

6. Initial feedback from stakeholder interviews

Dave and Shelley handed out a sheet highlighting the issues and comments provided by the ongoing stakeholder interviews. Dave indicated over half of the interviews had been completed and described the process for conducting the interviews and summarized the types of stakeholders that were interviewed. Dave reviewed each of the question areas and main points collected from the interviews. Dave then asked if there were any other comments the PAC members would like to add. Shelley recorded bulleted points of PAC comments during this session. These points are included at the end of this summary.

7. Agenda items for next meeting

Dave Siegel indicated agenda items for the next meeting (January 24th) would include a review of information gathered from the 1st Public Workshop on January 23rd as well as a review of draft Tech Memos #1 and #2 which would discuss the urban design framework refinement and existing conditions.

PAC Attendance:

Nick Arnis
Brian Shetterly
David Knitowski
John Russell
Jeff Datwyler
Pat Kliewer
Bruce Ronning
Steve Jorgensen (signed in with Bruce Ronning but wasn't on list yet)
Mark DeVoney
David Boyd
Joel McCarroll
Tyler Deke
James Lewis
Mary Louise Vidas
Jeff Eager
Kathy DeGree
Jean Wood
Doug Knight
Kathleen Combs
Robin Voba (signed in with Kathleen Combs of the ODNA)

Pam Hardy (signed in for Riverwest)
Joseph Katroschik (signed in for Riverwest)
Tracy Young (signed in for Linda Crossman)

Additional PAC Comments to Stakeholder Interview Questions

Third Street Area

- Planning should consider an aging population and future energy conservation.
- There should be landscape guidelines for meaningful streetscapes and that consider irrigation.
- Planning efforts should balance the goals of the state highway with community goals
- If the RR stays, the community should look at the need for a local Amtrak station
- State highway will inhibit redevelopment in the short term
- It is important to protect accessibility and U-turn factor
- There is a lot of common ground between state and local goals, i.e., STAs, UBAs, etc.
- Beautify the RR tracks – like Billings, MT
- There should be incentives or tools for developers or property owners
- The City should relax SDCs to create incentives
- Can you expand existing URA? (not likely according to John Russell)
- The City should look at TIFs (Tax Increment Financing)
- Will this project look at financing as part of implementation (Dave Siegel responded that it will)
- Bicycle access is very important
- Look at setback, scale, and design guidelines

Residential Neighborhood to the South

- This area is underserved in the way of neighborhood parks and playgrounds
- Way finding, signage, and paths would strengthen current downtown connections with the Old Mill District
- Explore strengthening the Bond/Wall couplet through the neighborhood that connects downtown with the Old Mill District
- Fixed route transit (rail) from downtown to the Old Mill should be explored
- Management and transition of land uses and traffic is important
- Preservation is important. Don't become like east of downtown
- Points of interest along pedestrian paths should be encouraged through design and allowed uses in the development code.

Residential Neighborhood to the North

- A special purpose district like the Pearl in Portland might be appropriate for parts of this area
- Bend still needs light industrial areas – can't gentrify all of Bend
- Pedestrian connections from this area to the Historic Downtown Core should have a high priority
- An extension of the River trail should be completed in this area
- A Division Street redress to give it a higher place in the City's transportation hierarchy would better reflect its use
- Neighborhood park amenities are needed in this and other areas surrounding downtown

Bend Central Area Plan

BEND CAP PART 2

Project Advisory Committee Meeting #2
Council Chambers of City Hall,
710 NW Wall St, Bend Oregon
Wednesday, January 24, 2007 – 10:00 a.m. to 12:00 p.m.

Meeting Summary

The following materials were distributed to the PAC:

Agenda
Draft Technical Memorandum #1: Urban Design Framework
Draft Technical Memorandum #2: Existing Conditions

1. Introductions

David Siegel of Parametrix and Brian Shetterly of the City of Bend welcomed the Project Advisory Committee (PAC) to its second meeting. Dave asked each of the attendees to introduce themselves by stating their names, whether they were a PAC member or a public attendee, and their affiliation or interest in the meeting. A PAC roster was also passed around the room and those in attendance were asked to sign-in next to their name. Dave went over the role of the CAP-PAC, asking for questions if clarification was needed.

2. Review of Public Workshop #1

The City and the consultant team held a public Open House for Central Area Plan Part 2 on January 23, 2007, from 5:30 – 8:00 PM at the Phoenix Inn Suites in Bend. The purpose of the Open House was to:

- Inform interested members of the public about the planning project and objectives,
- Review the vision for the Central Area developed during Central Area Plan Part 1,
- Gather public input on “great ideas” for Central Area components: Third Street, Neighborhoods north and south of Downtown, and the overall Central Area, and
- Achieve consensus on direction for planning

The Open House included opening remarks and a welcome by Mayor Abernethy followed by a presentation by David Siegel. The opening presentation provided an overview of the Bend

Central Area Plan Part 1 and the preliminary project team work on Part 2. After the presentation, the attendees split between three workshop stations, each focusing on a different technical area – Community Development and Urban Form, Access and Mobility, and Land Use and Development. The stations were designed to collect public input on the “great ideas” components for each technical area.

Although there was substantial input obtained from those attending, several themes emerged from the workshop:

- The City should use incentives to encourage certain types of development, such as transit-oriented development, high-density, and mixed use.
- Green streets and landscaping are needed throughout the Central Area.
- Pedestrian and bicycle facilities should be improved.
- Connectivity within Central Area components and throughout the Central Area should be improved.
- The City should minimize the Parkway and Railroad as barriers to redevelopment.

3. Overview of Draft Technical Memorandum #1: Urban Design Framework

Consultant team members Don Stastny and Leslie Hara Shick provided an overview of the Urban Design Framework memo, paying particular attention to the urban design principles that would be forming the foundation for that aspect of the Central Area Plan. Questions were solicited and responded to. The CAP-PAC was asked to review the memorandum at their earliest opportunity and to send comments to David Knitowski, Senior Long-Range Planner.

4. Overview of Draft Technical Memorandum #2: Existing Conditions

Consultant team member Anne Sylvester provided an overview of the Existing Conditions memo, paying particular attention to the transportation system network that would be informing and supporting the Central Area Plan. Questions were solicited and responded to. The CAP-PAC was asked to review the memorandum at their earliest opportunity and to send comments to David Knitowski, Senior Long-Range Planner.

5. Agenda items for next meeting

Dave Siegel indicated agenda items for the next meeting (February 23rd) would include an update on the first two technical memoranda, a presentation of Draft Technical Memorandum

#3, Large Scale Development Opportunities, and a status report on the evolution and current status of the Framework Plan.

Attendance:

Brian Shetterly
David Knitowski
Jeff Datwyler
Pat Kliewer
Shannon Levine
Mike Miller
Ron Kidder
Terry Scott
Pat Kesgard
Jack Holt
Bruce Ronning
Steve Jorgensen
Mark DeVoney
David Boyd
Joel McCarroll
Tyler Deke
James Lewis
Mary Louise Vidas
Jeff Eager
Kathy DeGree
Jean Wood
Doug Knight
Kathleen Combs
Pam Hardy

Consultant Team Attendance:

David Siegel, Parametrix
Anne Sylvester, Parametrix
Don Stastny, StastnyBrunArchitects
Leslie Hara Shick, HSR Architecture

Bend Central Area Plan

BEND CAP PART 2

Project Advisory Committee Meeting #3
Deschutes County Building – Allen Room
1300 NW Wall St, Bend Oregon
Friday, February 23, 2007 – 10:00 a.m. to 12:00 p.m.

Meeting Summary

The following materials were distributed to the PAC:

Agenda
Draft Technical Memorandum #3: Redevelopment Analysis

1. Introductions

Dave Siegel of Parametrix welcomed the Project Advisory Committee (PAC) to its third meeting. A PAC roster was passed around the room and those in attendance were asked to sign-in next to their name.

2. Review of Draft Technical Memos #1 and #2

Dave Siegel asked if the PAC team had additional comments on the Urban Design Framework Memo or the Transportation and Infrastructure Existing Conditions Memo that had been distributed at the last meeting. A PAC team member noted that a correction should be made to Memo #2 on page 15: BNSF rail is not grade-separated at Olney Avenue. Another PAC team member asked for a summary of comments from the previous PAC meeting. Dave indicated that we were completing the meeting summary and hoped to have it to the City soon so they could distribute it. It was noted that receiving summary notes prior to the next meeting would be helpful.

3. Tech Memo #3: Redevelopment Analysis

Chris Zahas reviewed the criteria for the large scale development analysis. He indicated redevelopment potential for the northern and southern central neighborhood is very limited as they are primarily built out with residential development; however, each area contained one large vacant lot.

Chris noted that the Bulletin site is owned by the City and could be an opportunity site. He indicated preliminary analysis indicated most of the redevelopment opportunities are along Third Street and that this corresponds with the Central Area Plan Vision.

4. Design Principle Workshop

Don Stastny guided the PAC team through design principles for the Central Area that were developed following the January Public Workshop and the first and second PAC meetings. It was suggested that special character places within the area be mapped and preserved to the extent possible. After reviewing the principles, Don provided examples of where within the Central Area these principles could be applied and sought input from the PAC team. The PAC team participated in a discussion about the design principles and comments were recorded (see PAC Comments section).

5. Wrap up and Next Steps

Dave Siegel thanked the PAC team for their involvement and invited them to direct further comments to David Knitowski at the City of Bend. He indicated Chris Zahas is working on the real estate and market analysis and redevelopment refinement memos and we would be discussing those at the next PAC meeting on March 29th.

6. PAC Comments

Process

- What is the role of the PAC in reacting to methodology and criteria? It would be good to have more information. Are we identifying the scope of potential ideas? Where do we focus?
- If the function of PAC is to be reactionary to proposed ideas – this has value.
- Success of the Bend Central Area Plan depends on many projects or actions to move forward and it's important to coordinate pieces together.
- There is a need to identify the character "making" points in the study area. What makes Bend? What are the individual places we value? Pat Kliewer asked for volunteers to identify these and will get back to the PAC.
- There is concern that the current methodology won't work to accomplish the goals. There is a need to focus on a different strategy to assess the arterial. Look at Transportation System Management or Transportation Demand Management strategies.
- Is the process or the results the focus of this planning exercise? The goal is different for each PAC member.
- Are the names of districts as shown on the figures going to stay the same? It was suggested that the City use neighborhood chosen names for the districts. The City should get buy-in from neighborhoods and property owners.

- Is the consultant team analyzing population projections? How does this impact the transportation and infrastructure system?
- It would be nice to have the notes from this meeting before the next meeting.
- There is a feeling of disconnect between what we're seeing and what we see on the ground in Bend.
- There is a desire to see a change in city culture – make things happen rather than make it more difficult for things to happen.
- The group needs to acknowledge that preliminary planning can increase property values.
- The consistency in planning ideas and graphics between CAP 1 and CAP 2 is appreciated. Please continue to incorporate changes.
- There is a desire to incorporate prioritization into the plan and include a schedule.

Redevelopment

- In doing the Redevelopment Analysis, did the consultant team look at contiguous lots that together would be 1 acre? There are a lot of opportunities here.
- The Bi-Mart area is under-utilized (southern part of study area).
- Most of the properties identified are privately owned - How do we get from here to future redevelopment?
- There is a huge disconnect between land prices and what can be built based on current codes.
- Level 1 Environmental Studies can be done by the City – reimbursed by fees when an application is filed.
- Maybe there can be tax credits so demolition can happen? This could make property aggregation easier.
- There are concerns about a UGB expansion and it may or may not happen. If it doesn't that will put additional pressure on Third Street and if development starts to happen before the City is ready, things will get built that may inhibit implementation of the plan.
- Property assemblage is difficult.
- Areas along Greeley Avenue, Hawthorne Avenue and Lava Road are commercial but development hasn't happened because they consist of mostly smaller lots and commercial zoning regulates parking and other items that aren't financially reasonable.
- Conventional thinking is that individual lots of 50 x 100 are more valuable than a single parcel of 20,000 sq. feet.
- Are we fronting all metropolitan uses along one area and creating future problems because of the concentration?
- How will the City deal with the back side of commercial on Third Street (facing Fourth Street)?
- There is a concern about mobile homes and pressure to re-develop mobile home parks.
- Affordability should be considered, especially the costs of building.

Bend Central Area Plan

Urban Design and Land Use

- Is the City anticipating using existing zone districts or could there be new zones or overlays?
- Third Street needs to be addressed concurrently to any rezoning or other tool implementation.
- How does the Bend CAP relate to Bend Vision 2030? Does it incorporate sustainable issues?
- Is it conceivable that we're talking about something that could be implemented by the end of the year?
- Some suggestions such as zoning could happen in the next year. The tools for transformation would likely be staged.
- Does the City have a theme in mind for zoning? How will the City deal with smaller properties that don't develop?
- (Looking at one of the graphics presented by Don Stastny) What is green transition area? Answer: A zone or land use transition. What is purple? Answer: Severe constraints in connectivity
- Important to consider topography when planning open spaces.
- Are the figures we're seeing today available?
- It is important to capture view opportunities created by bluffs or elevations.
- It would it be good to align districts with topography – move the orange area north.
- When the development code is re-drafted, gentle transitions are important, especially between single family and three or four story commercial.
- There are rough edges between RS and commercial zoning between the Old Bend neighborhood and downtown. A buffer is needed. The City may want to redesignate single-family zoning along this area.
- The issue of rough transitions isn't just height, it's about uses.
- Look at the new subdivisions ordinance buffering requirements.

Transportation

- There is concern about greater traffic levels if Greenwood and Third Street redevelops.
- Mayor Abernethy authorized City Councilor Chris Telfer to move forward with looking at moving the RR. There is a meeting in March; it could happen in 20-30 years.
- What will happen with existing right-of-way if the RR is moved?
- The number of trains and frequency will increase in the future.
- BNSF representative wasn't too open to moving the RR.
- Think about permeable streets and urban swales. The pink area showing use intensity doesn't really reflect availability.
- Look into green street techniques.
- How serious of a hindrance will the Parkway be to our plan? Is a beltway route possible?
- The Parkway is a viable use in downtown, the RR is not.

- One PAC member mentioned that the City should consider the possibility of moving the Parkway, however, another PAC member acknowledged some people rely on this access to downtown. Another PAC member noted that if the RR was moved, the City might also want to think of moving the Parkway, because they naturally co-exist.
- Better connections across the Parkway can be an easier way to connect Third Street and downtown. These connections can be bike and ped connections. More undercrossings should be considered.
- DEQ may have concerns about permeable surfaces and there is the issue of durability.

Project Advisory Committee Members:

- ➢ Nick Arnis, City of Bend - Transportation
- ➢ David Boyd, ODOT Access Management Engineer
- ➢ Patrick Creedican, ODOT District Manager
- ➢ Jeff Datwyler, City of Bend – Bend Urban Renewal / Economic Development
- ➢ Tyler Deke, City of Bend – MPO
- ➢ Mark DeVoney, ODOT Contract Administrator
- ➢ Jeff Eager, Bend Central Area Planning Committee
- ➢ Ron Kidder, Design Interest
- ➢ Pat Kliewer, City of Bend – Historic & Cultural Resources
- ➢ David Knitowski, City of Bend – Long Range Planning
- ➢ Mike Miller, City of Bend – Public Works
- ➢ Brian Shetterly, City of Bend - Long Range Planning
- ➢ John Russell, City of Bend – Bend Urban Renewal / Economic Development
- ➢ Tyler Deke, City of Bend - MPO
- ➢ Bruce Ronning, Bend Metro Park & Rec. District
- ➢ Steve Jorgensen, Bend Metro Park & Rec District
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- ➢ Jean Wood, Bend Central Area Planning Committee
- ➢ Bob Thomas, Bend Central Area Planning Committee
- ➢ Doug Knight, Old Bend Land Use Chair
- ➢ Kathleen Combs, Orchard District Land Use Chair
- ➢ Pam Hardy, Riverwest Land Use Chair
- ➢ Linda Crossman, City of Bend – Accessibility Manager
- ➢ Patrick Kesgard, Steve Scott Realtors

Bend Central Area Plan

BEND CAP PART 2

Project Advisory Committee Meeting #4
Deschutes County Building – DeArmond Room
1300 NW Wall St, Bend Oregon
Thursday, March 29, 2007 – 10:00 a.m. to 12:00 p.m.

Meeting Summary

The following materials were distributed to the Project Advisory Committee:

Agenda
Final Technical Memorandum #3: Redevelopment Analysis
Draft Technical Memorandum #4: Economic and Real Estate Analysis
Draft Technical Memorandum #5: Redevelopment Framework Refinement

1. Introductions

Dave Siegel of Parametrix welcomed the Project Advisory Committee (PAC) to its fourth meeting. A PAC roster was passed around the room and those in attendance were asked to sign-in next to their name.

2. Project Update

Don gave an overview of urban form and design map changes since the last PAC meeting. Don said the team further defined the districts, a suggestion of the PAC. David Knitowski will review the district boundaries. The team moved the intersections of character and began analyzing linkages between intersections. Don also said the team made corrections to the trail and open space connections. Additionally, the team further refined the transitions and seams. Don said the city form and skyline concept is continuing to evolve for PAC discussion.

The updated maps are available on the City FTP site.

Don commented that he and Pat Kliewer are working together to prepare a map of Bend "character", based on cultural, historic, and geological resources in the city. Hopefully this map will be available at the next PAC meeting.

The Final Draft Technical Memo #3: Redevelopment Analysis was emailed to the PAC. That draft incorporated suggestions from the PAC. Please send any final comments to Chris.

3. Tech Memo #4: Economic and Real Estate Analysis

Chris said the Economic and Real Estate Analysis Memo serves multiple purposes. First, it summarizes important economic and demographic information about the community, including projections of future growth. Secondly, it estimates growth potential within the Central Area in order to arrive at a projected level of development within the study area for 2030. Finally, the memo examines the degree to which this program and vision are achievable given what is known about economic trends and the degree of policy, leadership, and financial support to achieving the vision. Chris added that the findings in these memos will be evaluated in future transportation memos.

Chris noted that the demographic data includes all of the Central Area. However, the analysis does not consider the Historic Core, as the team analyzed it in Bend CAP Part 1.

Chris described the key demographic points. He said Bend is rapidly growing and there are 3,000 people living in the project study area. Most of the households in the Central Area are 1 and 2 person households, which makes downtown ideally suited for townhouses, condos, and high rises. The Central Area has a lower than median age population and incomes are lower than the city average. The Central Area has approximately a 60% rental rate and a higher vacant rate in comparison to other cities. (Note: “incomes” includes wage and salary and “vacant” includes vacant and not owner’s primary residence.)

Chris also described the employment analysis highlights. He explained that industrial uses in the Central Area are under represented compared to the city as a whole. Offices and services are also under represented; although those services will grow in the next several years.

Mark Devoney asked Chris if adding industrial along Third Street will detract from industrial planned uses in Juniper Ridge and other areas. Chris responded yes, but asked the PAC to keep in mind that there are a variety of industrial types, and some industrial types could fit in well with Third Street. Additionally, Chris said even without the Bend Central Area Plan, the increase of land prices would push industrial uses out of the Third Street area. There is some capacity for light industrial to the north of the Central Area and some could go to Juniper Ridge.

Chris said the memos make a few assumptions. The memo assumes there will not be very much change in the Southern and Northern neighborhoods, although there are some large redevelopment sites in those areas. The memo also assumes that the vast majority of redevelopment sites will be along the Third Street Corridor. Additionally, the memo assumes higher density in the railroad district and lower density away from Third Street.

John Russell suggested Chris check the projected floor to area ratio (FAR) for the area between Olney Ave. and Greenwood Ave.

Bob Thomas asked if projected FAR is contingent on transitions and seams. Based on stakeholder interviews, Chris responded not necessarily. Stakeholders indicated a pent up demand for office space, and they would build office on Third Street without infrastructure improvements. Unlike the Third Street area, Chris added that FAR is more contingent on amenities in the downtown.

Jean Wood commented that over 50,000 sq. ft. of office a year seems like a lot, although Bend may be able to absorb it. David Knitowski echoed Jean's comment. After concern from a few members of the PAC, Chris will double check the numbers on the Central Area Development Program, 2030, and Central Area Net New Development, 2007-2030, tables.

Pat Kesgard said he would prefer to overshoot new development projections so that the city can get the right density and parking. Overshooting the projections would leave the city in a better situation than if the city under projected or under built. John Russell seconded Pat's point on overshooting the projections.

Chris said the project team will evaluate parking and any potential city subsidies as part of the implementation analysis.

Chris said there will not be a lot of additional retail square footage along Third Street. Chris added that typically only a small amount of retail can activate street frontages. Chris said there is strong retail at Cooley Road and an increase of retail near new housing developments around town.

Bob said he is surprised TAZ District 401, which is south of Franklin Avenue, has high projected redevelopment, given signs in the area. Pat Kesgard remarked there is a large amount of redevelopment opportunity because of a zoning change.

Pat Kliewer commented she likes the idea of new buildings towards the front of Third Street. She also likes the idea of keeping transitional uses along Second and Fourth Streets.

Chris said 1.3 million sq. ft. of office would translate into approximately 4,000 jobs. Pat Kesgard suggested determining how many housing units are needed based on the projected number of jobs. From there, Pat suggested determining how many of those people live and work downtown. Chris said it is possible to determine the ratio of downtown housing to downtown jobs. However, it is more difficult to determine how many people live and work downtown.

Charles Kettenring stated that ODOT is working on railroad relocation, but the railroad is unlikely to be relocated by 2030. In 20 years, ODOT estimates there will be 50 trains a day traveling at 60 MPH. Charles also said ODOT is in opposition to expanding the at grade crossings at Revere, Butler Market, and Olney. Anne Sylvester from Parametrix will talk with Charles and ODOT about ODOT's plans. Dave added that the Bend Central Area Plan will assume no railroad realignment, but will not preclude any railroad realignment in the future.

Given the Central Area has 4.3% of the city's population and will capture little more than 5.7% of population in the future, Brian Shetterly asked if the city wants to use policies to encourage a greater number of housing in the area, with the goal being to strengthen the 24-hour environment? Dave said the project team will evaluate policies such as these during the implementation phase of the project.

James Lewis asked if residential uses in the Central Area would include live/work spaces. He said if the PAC would like for a certain percentage of people to live and work in the Central Area, the Council must create a policy for affordable housing for the area. Chris commented that even if there is affordable housing in the area, the city can't ensure people both live and work in the area.

Don Stastny asked how the analysis takes into account the region. Chris responded that the Central Area Plan will discuss the Central Area in relation to the region in the vision, but not in the numbers analysis.

4. Draft Technical Memorandum #5: Redevelopment Framework Refinement

Chris said the purpose of the Redevelopment Framework Refinement Memo is to reevaluate the Bend Central Area Plan Part 1 framework based on recent work and determine if there is anything in the recent work that needs to change. Chris said the memo's finding is that the recent work is consistent with the Bend Central Area Plan Part 1 Framework.

Chris described the highlights of the memo. The memo identifies Third Street as a series of districts and east/west areas. There is a need for flexibility in mixed-use zoning to account for changes in commercial and residential development trends. A parking solution is needed to address the need of a few large, contiguous parcels and the desired density. Greenwood, Franklin, and Olney Avenues are currently envisioned as retail streets between Third Street and Downtown. Parks and open space are needed to achieve the vision.

Kathy Combs asked if the project team has identified which streets would be coupled, Second and Third Streets or Third and Fourth Streets. Dave Siegel said the team is still analyzing the potential for coupling. Mark DeVoney suggested that the project team look at the Parkway EIS to find any mention of couplet alternative.

5. Wrap up and Next Steps

Dave Siegel thanked the PAC for their input. He said the project team will address the real estate analysis with respect to transportation and infrastructure. Anne Sylvester is preparing the transportation and infrastructure memos and will present her findings at the next PAC meeting.

Upcoming Meetings and Workshops

April 24, 2007 – PAC Meeting
May 17, 2007 – Public Workshop
May 18, 2007 – Implementation Workshop for the PAC
June 8, 2007 – PAC Meeting

Project Team Attendees:
David Knitowski, Brian Shetterly (City of Bend); Mark DeVoney (ODOT); Lauren Golden, Dave Siegel (Parametrix); Don Stastny (StastnyBrun Architects); Chris Zahas (Leland Consulting)

Project Advisory Committee Members:
(Attendees in Bold)

- Nick Arnis, City of Bend - Transportation
- David Boyd, ODOT Access Management Engineer
- Patrick Creedican, ODOT District Manager
- Jeff Datwyler, City of Bend – Bend Urban Renewal / Economic Development
- Tyler Deke, City of Bend – MPO
- **Mark DeVoney, ODOT Contract Administrator**
- Jeff Eager, Bend Central Area Planning Committee
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- **David Knitowski, City of Bend – Long Range Planning**
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- Doug Knight, Old Bend Land Use Chair
- **Kathleen Combs, Orchard District Land Use Chair**
- **Pam Hardy, Riverwest Land Use Chair**
- Linda Crossman, City of Bend – Accessibility Manager
- **Patrick Kesgard, Steve Scott Realtors**

Bend Central Area Plan

BEND CAP PART 2

Project Advisory Committee Meeting #5
Deschutes County Building – Allen Room
1300 NW Wall St, Bend Oregon
Tuesday, April 24, 2007 – 10:00 a.m. to 12:00 p.m.

Meeting Summary

The following materials were distributed to the Project Advisory Committee:

Agenda
Final Technical Memorandum #5: Redevelopment Framework Refinement
Draft Technical Memorandum #6: Future Transportation and Infrastructure Capacity
Draft Technical Memorandum #7: Review of Central Area Plan Vision and Framework

Summary meeting notes:

1. Introductions

Dave Siegel of Parametrix welcomed the Project Advisory Committee (PAC) to its fifth meeting. A PAC roster was passed around the room and those in attendance were asked to sign-in next to their name.

2. Project Update

Dave Siegel gave a brief overview to the PAC on what has been accomplished so far in previous CAP PAC meetings and in project team works sessions.

3. Tech Memo #6: Future Transportation and Infrastructure Capacity

Anne Sylvester provided an overview of Technical Memorandum # 6-Future Transportation and Infrastructure Capacity. Anne explained that the report is based on population projections that begin at the State level, which are then filtered down to the County level, and finally distributed and coordinated at the City level. During the PAC presentation, Anne informed the PAC that the draft report offers a depiction of the transportation and infrastructure implications and potential impacts, offering options for consideration, and not recommendations at this point. Among the conclusions presented:

- The existing transportation system is currently congested, and is projected to get worse, with or without the envisioned direction suggested by the Central Area Plan to-date, given the City's rapid growth.
- Diverting traffic to and through the Central Area could be difficult.
- Limiting access to Third Street can help in dealing with access management.
- The City's existing efforts to provide for pedestrian and bicycle circulation could be more aggressive.
- Our transportation planning efforts have to do more to meet ODOT's 0.80 v/c standard than the City's 1.00 standard.

Other points raised included the following:

- The figures in Table 1 on page 5 of Tech Memo# 6 were based on control levels received from the City of Bend's employment forecast.
- Thirty-four intersections were reviewed and analyzed based on the standards given within the Tech Memo. Several options for improving upon traffic constraints as well as improvements to the pedestrian and bicycle system were discussed.
- At this time it looks like 2800 new residences could be added as well as an additional 5,000 new jobs.
- Mixed-use development would allow for a slight reduction in traffic but not enough to off-set the increase in residences and jobs.

Dave Siegel pointed out that the Central Area Plan, the Comprehensive Plan, as well as the Infrastructure plans all have to be consistent which may take reviewing and updating the various plans to provide consistency.

Doug Knight suggested adding a paragraph to the report that addresses the large amount and rapid rate of growth within the city. The Plan should acknowledge that the numbers required have been provided, but that they may be inaccurate due to the rate of growth Bend has experienced.

Jack Holt also recommended that citizens want a real view of the numbers not a view mandated by the state.

Pat Kesgard pointed out that at this time there has not been any significant growth within the Central Area as of yet.

David Boyd noted that efforts to limit access in the future would likely put more pressure upon area intersections.

General discussion ensued regarding options for addressing the area infrastructure's current state of disrepair while planning for the future. Options include looking at intermediate goals, and looking for grants for smaller projects, including those for sidewalks, pedestrian pathways and bicycle facilities.

Future demand on sewer facilities could be an issue. An interceptor is proposed that would relieve pressure from the Downtown Core area. There are also storm drainage issues that need to be addressed. Run-off and how it affects the Deschutes River need to be dealt with. The CAP may not create any additional run-off but we have to deal with where it goes.

4. Tech Memo #7: Review of Central Area Plan Vision and Framework

Don reviewed the Tech Memo and how we have evolved so far in the process. We now have place keepers (maps) which continue to be modified. The Bend Character piece has been inserted. The taller buildings have been moved to be more centralized within the blocks to keep pedestrian access ways more open along the east-west connections. Three to six story buildings will still be allowed along the street.

A “ladder” couplet idea on 2^{nd} & 3^{rd} streets was raised and discussed. It has been found that retail responds quickly to one way streets. Potential options for consideration include:

- Maybe tying 2nd, 3^{rd}, & 4^{th} together.
- Focus the retail on the east to west streets.
- Create a “green ladder” effect through the middle running North & South that would include strong east-west connections (“rungs”).
- 4^{th} could be used more as a seam, and/or pedestrian system
- Perhaps consider a trolley system.
- Looking at railroad crossing opportunities.

5. Wrap up and Next Steps

Dave Siegel thanked the PAC for their input. For the upcoming public workshop, the Project Team intends on identifying the hierarchy of streets, and accompanying cross sections and standards needed to help carry out the Central Area Plan’s vision. In addition to identifying potential transportation improvement projects, the team may also be identifying refinement studies required to inform project decision making. Dave encouraged CAP PAC members to bring their constituents to the next public workshop, scheduled for May 17^{th} at the Deschutes County Building. Dave also reminded the PAC of the Implementation Workshop for the PAC(scheduled for May 18) and the next official PAC meeting (June 8, 2007).

Bend Central Area Plan

Project Team Attendees:

- David Knitowski, Brian Shetterly, Shannon Levine (City of Bend)
- Devin Hearing (ODOT)
- Anne Sylvester, Dave Siegel (Parametrix)
- Don Stastny (StastnyBrun Architects).

Project Advisory Committee Members:

(Attendees in Bold)

- Nick Arnis, City of Bend - Transportation
- **David Boyd, ODOT Access Management Engineer**
- Patrick Creedican, ODOT District Manager
- **Jeff Datwyler, City of Bend – Bend Urban Renewal / Economic Development**
- **Tyler Deke, City of Bend – MPO**
- **Devin Hearing, ODOT Planner**
- Mark DeVoney, ODOT Contract Administrator
- **Jeff Eager, Bend Central Area Planning Committee**
- Ron Kidder, Design Interest
- **Pat Kliewer, City of Bend – Historic & Cultural Resources**
- **Robin Lewis, City of Bend – Transportation**
- **David Knitowski, City of Bend – Long Range Planning**
- Mike Miller, City of Bend – Public Works
- **Brian Shetterly, City of Bend - Long Range Planning**
- **John Russell, City of Bend – Bend Urban Renewal / Economic Development**
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- Steve Jorgensen, Bend Metro Park & Rec District
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- **Jack Holt, Bend Central Area Planning Committee**
- **Jean Wood, Bend Central Area Planning Committee**
- **Bob Thomas, Bend Central Area Planning Committee**
- **Doug Knight, Old Bend Land Use Chair**
- **Kathleen Combs, Orchard District Land Use Chair**
- **Pam Hardy, Riverwest Land Use Chair**
- Linda Crossman, City of Bend – Accessibility Manager
- **Patrick Kesgard, Steve Scott Realtors**

Bend Central Area Plan

BEND CAP PART 2

Project Advisory Committee Meeting #6
Deschutes County Building – DeArmond Room
1300 NW Wall St, Bend Oregon
Friday, June 8, 2007 – 10:00 a.m. to 12:00 p.m.

Meeting Summary

The following materials were distributed to the Project Advisory Committee:

Agenda
Draft Central Area Plan Table of Contents
Catalyst Project Matrix
Transportation Highlights

Summary meeting notes:

1. Introductions

Dave Siegel of Parametrix welcomed the Project Advisory Committee (PAC) to its sixth meeting. Those in attendance were asked to sign-in next to their name on the PAC roster.

2. Project Update

Dave Siegel gave a brief overview to the PAC on what has been accomplished so far in previous CAP PAC meetings and in project team works sessions and updated the committee on input received at the May 16th City Council Meeting, the May 17th Public Workshop, and the May 18th Implementation Workshops. Dave noted that there was weak attendance at the public workshop despite many attempts by City staff to publicize the event.

Dave indicated the implementation workshops held with the CAP PAC concentrated on three general areas: transportation, development and redevelopment, and land use and urban design. He briefly described a number of projects and actions identified by participants for carrying out the plan. These included short-term actions, long-range project ideas, and some things that would require additional follow-up analysis to flesh them out.

3. Draft Central Area Plan, Part 2

Dave described the process of developing the Draft Central Area Plan as an iterative process, incorporating input from the PAC, the public and the City Council. He pointed out that we are in a crucial point in the development of the plan and that PAC feedback is important. Dave described the physical characteristics of the plan document being developed as a summary document with each of the technical memos provided as appendices. He indicated the team will be providing the initial draft of the physical document to the City and ODOT by the end of June. Dave then identified the latest revisions to the Framework Plan and briefly described the key transportation highlights and introduced Anne Sylvester who presented the transportation system concept development process and described in detail the third street reinvention concept, including the split couplet option and south-bound 2^{nd} Street railroad undercrossing. This includes:

- Near term improvements to 2nd and 4th Streets in preparation for the 3rd Street Reinvention. Both 2^{nd} and 4^{th} Streets would include 60-feet of right-of-way containing two 12-foot, single-direction lanes of traffic capable of handling higher volumes and speeds of traffic. 2^{nd} and 4^{th} Streets would also have one 6-foot bike lane, and parking on each side of the street, a 7-foot planter strip and 5-foot sidewalks.
- A main street boulevard treatment of 3^{rd} Street that would include 80-feet of right-of-way, but handle lower volumes and speeds of traffic. This would include two 11-foot two-way direction traffic lanes with on-street parking on both sides, 12-foot center turn lane near intersections, and a center landscape median mid-block. Both sides of the 3^{rd} Street boulevard would also include bike lanes and 11-foot sidewalk-planter strips.
- The Bend Central Neighborhood would also include a "green ladder" street system whereby stormwater for the $2^{nd}/3^{rd}/4^{th}$ Street concepts could be handled through green alleys, swales, or permeable surfaces.

Anne also described a fourth option for 3^{rd} Street that the City introduced after the last public workshop as a possibly more financially feasible option. This option included acquiring greater right-of-way on 3^{rd} Street for pedestrian and bicycle improvements and allowing greater levels of congestions on 3^{rd} which would essentially slow traffic.

Dave and Anne indicated that the project team and those participating in the Implementation Workshops discussed the various 3rd Street options at length, indicating a strong preference for the version presented as Option 3. In discussions immediately following the Implementation Workshops, the project team reviewed Option 3 in greater detail, and developed a modified version of it that would be advanced through the Draft Plan as the recommended option for further study and refinement.

4. Carrying Out the Plan

Dave discussed some of the key concepts for carrying out the plan, the most important of which was an implementation strategy that would include catalyst projects, refinements, stage setting actions, and recommendations for programming and prioritization.

Shelley Holly described some of the initial catalyst projects identified on a map and in a matrix handed out to the PAC that would be key to kick starting the Plan's implementation.

The draft catalyst project list included physical projects such as redevelopment projects, transportation improvements, public spaces and design projects, and zoning and regulatory changes. The following projects were described:

- Bend Bulletin Site – possible workforce housing / mixed use development
- Hawthorne Avenue mixed use development (retail, office, housing)
- Redevelopment at 3rd Street and Greenwood Avenue (retail, office, entertainment)
- Structured parking facilities
- Redesign / redevelopment of Mirror Pond Parking Lots
- Infill housing projects in the northern and southern neighborhoods
- Relocation of auto dealers & light industrial
- Greenwood undercrossing pedestrian pathway improvements (lighting, wider pathways, improved line of sight, etc.)
- Franklin Avenue undercrossing pedestrian pathway improvements (lighting, wider pathways, improved line of sight, etc.)
- Widening and bicycle/pedestrian enhancements to 2nd and 4th Streets between Greenwood and Franklin Avenues (includes traffic control)
- Acquisition of park sites along 1st Street
- Develop public plaza near civic center (Heritage Square)
- Performing Arts Center in the Central Area
- Greenwood Avenue Gateway (at undercrossing)
- Franklin Avenue Gateway (at undercrossing)
- Rezoning of areas to variations of mixed use
- Expand Central Business District and/or examine new zoning districts and regulations and incentives

Dave then described the Central Area Plan as an action-oriented plan, focusing upon the projects and actions needing to be taken to carry out a clearly defined vision, a set of desired outcomes, and a development/design concept. Dave reminded the PAC that the CAP is a long-term plan for the revitalization and growth of Bend's Central Area over the course of the next 20-30 years and require implementation in pieces, over time.

John Russell indicated that the Performing Arts Center that had been discussed in CAP1 was no longer being proposed for the Historic Downtown Core.

Dave indicated the City may begin talking with potential development interests regarding making the Plan a reality and that certain major improvements will be made by the City of Bend through a variety of funding sources, including urban renewal. .Other improvements would require investment by developers and the possibility of “public-private partnerships”.

Dave indicated that the Central Area Plan document will include an incremental implementation strategy, and that the CAP’s vision and desired outcomes should be examined on an annual basis to ascertain progress and actions for moving ahead in each of the next three years. He also mentioned the need for a coordinating body within the City that would be responsible for the monitoring, development and update of the implementation strategy. Dave reiterated that a substantial number of actions, programs and projects are being recommended to carry out the CAP and that not all of these can be done at once. The phasing or timing of actions needs to be considered early and ongoing throughout the process.

5. Wrap up and Next Steps

Dave Siegel thanked the PAC for their input and reminded everyone of the joint planning commission and city council workshop the team would be having on Monday, June 18th. Dave encouraged CAP PAC members to attend the workshop and indicated the project team would be working on the draft CAP document to be submitted to the City by the end of the month. He also indicated that the next PAC meeting would be in August and an updated calendar would be sent out to the PAC.

6. Questions and Comments

Jean Wood asked about the future of the transit hub and how it might be considered as a possible link to future commuter rail.

Doug Knight expressed that it sounds like there are differing opinions between the consultant team and the city about Options 3 and 4. He asked if the development of Option 4 could be part of a larger phasing program. He also questioned how Option 4 would be less expensive when additional right-of-way is required.

Doug also suggested the painted yellow curb along Greenwood should be moved because it doesn’t allow all movements. He cautioned that this could limit the functioning of the couplet and development of the plan.

Jack Holt asked how Hwy 20 is considered in Option 4. Brian Shetterly said nothing specific was considered but ODOT has recently indicated that they may be more willing to allow more traffic and congestion on Hwy 20. Dave Siegel suggested that conversations between ODOT and the City regarding the issue of where the appropriate designation of Highway 20 should be begin as part of the implementation of the Plan.

Jeff Eager asked if a Great Street flooded. The PAC chuckled and Anne described stormwater treatments tied to the transportation improvements that could handle greater runoff. Robin Lewis commented that as we rezone to allow higher density, it could require greater effort to handle the stormwater. She suggested pervious surfaces be considered.

John Russell reminded everyone that the City Council Citizen's Task Force places a high priority on the underpasses. John also questioned how Option 4 could be less expensive if you truly do a boulevard treatment. He also agreed that a couplet would activate development on 2nd and 4th Streets.

Pat Kesgard suggested the team think in terms of project goals when considering transportation costs. He also suggested that transportation and connectivity improvements between the Parkway and 3rd Street would spur development. He also questioned the location of parks along 1st Street due to the proximity to the Parkway. Jean Wood suggested that green ways or linear parks be done through design requirements.

Charles Kettering asked if the crossing at Hawthorne would be over or under the railroad. Anne indicated it would be an underpass. Charles also asked if there is a long range plan to grade separate at Portland and Olney. He indicated the railroad's goal was to completely grade separate the railroad up and down the corridor.

Doug Knight asked that the team re-address the goals of the CAP. While he agrees with Pat that we need to beautify 1st and 2nd, he feels we need to focus on the purpose of CAP 2, which is to revitalize 3rd Street. He suggested looking at smaller "cherry picked" street improvement projects along 3rd to kick start the change. Robin Lewis indicated a boulevard treatment could be pretty easily staged with trees, etc. but that sidewalk continuity would be a challenge.

Pat Kesgard asked if a CB zone expansion would expand the stringent parking requirements to a larger area. Brian responded that the CB zone was up for consideration, not only in location but in requirements, and could be completely revamped.

Jean Wood suggested any new zoning include a provision for artist workspaces. Another PAC member indicated a desire for something like a Pike's Street Market or farmer's market space.

Pat Kesgard urged the City to include a lot of people that are actively doing development in the discussions about zoning. He stated that unless you make it easy for private sector to develop things, it won't happen. He suggested the city conduct a master level 1 environmental study as well as a traffic impact study for the entire area.

John Russell agreed with the earlier comment that 3rd Street should be the focus of the CAP2. He also cautioned that city parking structures cannot be expected to handle all of the parking in the Central Area. He also indicated the City needs to commit resources to do things while the code is being rewritten. He also reminded the PAC that initial studies and steps for forming a new urban renewal district will take 2 years before investors will be able to see results. He suggested looking at the CIP for projects that can be initiated early.

Doug Knight asked if the City could commit to actions, for example through the CIP. He indicated that developers look at <u>when</u> just as much as <u>what</u>. He asked how we can change the CIP.

Dave Siegel reminded everyone that it is incremental change or the unseen actions that make things happen.

Jack Holt reminded everyone that the fundamental difference between CAP 1 and CAP 2 is the focus upon changes to 3rd Street.

Pat Kesgard said the City needs to address setbacks along the couplet right away so that developers know what to expect in the future and won't be building in areas to be dedicated to public right-of-way. He also indicated that adoption of the implementation strategy by the City Council would show a strong commitment.

Jean Wood countered that some of the incremental changes could be done by developers and they could help fund these elements.

Doug Knight stressed that defining individual aspects of "incremental" will get this started earlier. Pat Kesgard added that in the past the City has taken too long to review and change codes. Actions need to be put on a timeline.

<u>Project Team Attendees:</u>

- Brian Shetterly, Shannon Levine (City of Bend)
- Anne Sylvester, Dave Siegel, Shelley Holly (Parametrix)

<u>Project Advisory Committee Members:</u>

(Attendees in Bold)

- Nick Arnis, City of Bend - Transportation
- David Boyd, ODOT Access Management Engineer
- Patrick Creedican, ODOT District Manager
- **Jeff Datwyler, City of Bend – Bend Urban Renewal / Economic Development**
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- **Brian Shetterly, City of Bend - Long Range Planning**
- **John Russell, City of Bend – Bend Urban Renewal / Economic Development**
- Bruce Ronning, Bend Metro Park & Rec. District
- Steve Jorgensen, Bend Metro Park & Rec District
- Joel McCarroll, ODOT Traffic Engineer
- **Charles Kettenring, ODOT Manager Rail**
- James Lewis, Bend Central Area Planning Committee
- Mary Louise Vidas, Bend Central Area Planning Committee
- **Kathy DeGree, Bend Central Area Planning Committee**
- **Jack Holt, Bend Central Area Planning Committee**
- **Jean Wood, Bend Central Area Planning Committee**
- **Bob Thomas, Bend Central Area Planning Committee**
- **Doug Knight, Old Bend Land Use Chair**
- Kathleen Combs, Orchard District Land Use Chair
- Pam Hardy, Riverwest Land Use Chair
- Linda Crossman, City of Bend – Accessibility Manager
- **Patrick Kesgard, Steve Scott Realtors**

Bend Central Area Plan

BEND CAP PART 2

Project Advisory Committee Meeting #7
Deschutes County Building – DeArmond Room
1300 NW Wall St, Bend Oregon
Wednesday, August 15, 2007 – 10:00 a.m. to 12:00 p.m.

Meeting Summary

The following materials were distributed to the Project Advisory Committee:

Agenda
Graphics: Existing Zoning within the Plan Area, CAP Framework, and City Form
Outline of Possible Regulatory Framework Changes

Summary meeting notes:

1. Welcome and Introductions

Shelley Holly of Parametrix welcomed the Project Advisory Committee (PAC) to its seventh meeting. Those in attendance were asked to sign-in next to their name on the PAC roster. Shelley explained that due to a recent surgery, Dave Siegel was not able to attend today's PAC meeting, but would be at the August 28th open house and the next PAC meeting. She then introduced Jason Franklin, the Parametrix Community Building Division Manager, who has been involved in the project in an advisory role.

2. Overview of Draft CAP and project status

Shelley gave a brief overview to the PAC on what has been accomplished so far in previous CAP PAC meetings, public workshops, and in project team work sessions. She updated the committee on product status indicating there had been few comments on the Draft CAP document, and that these comments were being incorporated and the Final CAP document was underway. Shelley invited the PAC to provide further comments during this meeting. No further comments were received on the draft plan.

3. Discussion regarding implementation, funding and prioritization

Shelley described the funding toolkit memo as being final and noted that the implementation memo had been revised to incorporate comments and would be finalized after this PAC meeting incorporating comments given during the regulatory changes discussion. She then invited the PAC to share any further comments on the implementation memo.

Mark DeVoney indicated ODOT supports the Draft Central Area Plan and the Implementation Action Plan at a conceptual level but stated that during the implementation phase, more details will be required to get detailed information about how the mix of residential and small office / commercial will impact the 2nd and 4th couplet, signal spacing, driveway access, and other transportation issues. Mark noted that as this occurs, further public involvement is needed throughout the process. Shelley noted that a traffic refinement analysis for 3rd Street and surrounding areas was recommended in the implementation memo as an initial step.

The conversation turned to public involvement and Pam Hardy asked if the City had been doing anything creative to involve the public besides open houses. She asked if the City had consulted a sociologist to find better ways to engage people. David Knitowski responded with a description of the many things the City has done to publicize the CAP public events, including radio and television interviews and requests that the Bend Bulletin run stories about the project. Paid display ads are also run in the Bend Bulletin prior to public meetings and information is available on the City's website.

Mary Louise noted that the workshops during CAP 1 were well attended. Mark DeVoney said that when actual changes to 2nd and 4th are implemented the team may want to look at creative solutions to public involvement and outreach.

Pat Kliewer said that people need to be included in the beginning of the project so they don't go to city council and get a negative view of the plan. Door hangers can be effective. Shelley Holly noted that early participation was encouraged in both the 1st and 2nd CAP process through stakeholder interviews. Pam suggested that special notification to all stakeholders interviewed be sent out. Mary Louise suggested holding the meeting on 3rd Street, closer to the impact area. Pat suggested utilizing booths at existing events to attract attention to the project. After the meeting, City staff agreed to do a direct mailing to all property owners in the study area announcing the upcoming public meeting.

4. Initial "framework-level" discussion regarding regulatory changes (development code, zones, incentives, process streamlining, etc.)

Shelley gave an overview of the zoning concepts that could be recommended to implement the Central Area Plan. Mary Louise noted that City Hall has not been designated as a Public Facilities zone and that it should be to allow for more civic development.

David Knitowski offered that there are several advantages to having City Hall in the Central Business District, including the allowance of in-lieu parking fees and no landscaping requirements and no maximum lot coverage requirement and allowance of taller buildings. Pat asked if the City was going to support the development of the Heritage Square and noted that she'd like to see it on the map during implementation.

Shelley gave an overview of the geographic applications of the mixed use zones. Mary Louise asked if this would include both sides of 4th Street. She also noted that Franklin and Greenwood Avenues were more key than other catalyst areas.

Jean Wood commented that artists shouldn't be limited to the industrial employment area and that flexibility should be kept throughout. Pat asked how the City should deal with existing single family residences north of Revere and indicated people in this area want to preserve the residential in this area.

Mary Louise noted that these are neighborhoods that are just starting to establish themselves. Also, she noted that the zones and planning guidelines needed to be based on walkable distances of ¼ to ½ mile and referenced Northwest Crossing as a way to get better planning results. David Boyd said that it almost required a block by block view to get the pulse points. Mary Louise indicated that the Bend Central Area represented in orange needs to be defined at a smaller scale.

Pat asked if modeling could be done to help with zoning analysis. Shelley indicated that modeling had been done for households, employees, and traffic and the findings could be found in the technical memos distributed over the last few months. These findings have influenced the plan framework along the way.

Mark DeVoney noted that there are some commercial areas in the Industrial / Employment area that are not likely to relocate. He cited Albertsons as an example of an interest that would probably have some concern with going industrial.

Jean asked what happens when Pepsi relocates out of the Industrial / Employment area. Would the City want to encourage another distribution center or some other use?

Brian Shetterly noted this might be a receiving area for light industrial interests that relocate from 3rd Street. He said we should look at these finer points of whether a distribution center is a better use of the land or a smaller industrial use. He referred to the Central Eastside Industrial District as an example. Jean Wood indicated that she didn't think we'd want to encourage a distribution center.

David Boyd noted that this brings up the allowed uses within the zones and the need to balance these uses with the transportation modeling done during implementation. He noted that the existing zones need to be refined. Brian indicated that this is what the new zoning district could accomplish and that it will be unique to the Central Area.

Mary Louise Vidas asked if the character map was completed because it included good information. She suggested having strong statements of intent for these new areas similar to those used in the LEED process. Also, great flexibility is needed.

Pat Kliewer noted that the Great Streets and intersections should have greater definition.

Shelley then asked the PAC if they felt the Central Business District (CBD) should be expanded. Jean Wood asked if this would increase the height allowance. There was agreement that the CBD should be expanded east to the Bend Parkway.

Pat Kliewer suggested that the character mapping could help answer this question, and could help encourage preservation of special tree stands and buildings. Mary Louise agreed that there are some good buildings in the area and it would be helpful to conduct a survey to find out which businesses will remain for the next 20 years.

Jeff Datwyler asked how the CBD expansion fit in with the 3-D height analysis. Shelley distributed a hand out showing the height analysis. Mary Louise asked how it works to have higher density off of major streets. She felt this was a good question for the next stage of the project.

Brian Shetterly noted that the 3D analysis takes into account the eastern expansion. Jeff Datwyler noted that it doesn't take into account the area north of Greenwood to Olney/Revere.

Shelley asked if the CBD expansion should be bounded by Wall Street on the west. David Knitowski said he thought it should go all the way the river. Brian said he thought expanding north to Revere Avenue would be good.

Jean Wood noted that the south side should take in both sides of Franklin. Pat Kliewer disagreed and much discussion ensued about transitions between higher density uses and neighborhoods. Brian Shetterly suggested replacing the General Commercial zoning with the CB District in the downtown area and protecting the historic neighborhood with buffering requirements. He noted that transitions can be softened with design standards and indicated he felt the CBD should be extended to both sides of Franklin, but not necessarily the entire depth of the block.

Mary Louise noted the meeting was concluding and that the group hadn't yet gotten into incentives. Shelley indicated that several incentives to development are outlined in the implementation memo. She invited the group to send any suggestions on additional incentives in the next few days because the Final Central Area Plan was in the process of being finalized.

5. Wrap up and Next Steps

Shelley reminded the group that the next public open house was going to be held on August 28th followed by the last PAC meeting on the 29th. She also noted that a Planning Commission and City Council Workshop on the Central Area Plan is scheduled for September 10th and invited the PAC to attend.

<u>Consultant Team Attendees:</u>

- Shelley Holly, Jason Franklin (Parametrix)

<u>Project Advisory Committee Members:</u>

(Attendees in Bold)

- Nick Arnis, City of Bend - Transportation
- **David Boyd, ODOT Access Management Engineer**
- Patrick Creedican, ODOT District Manager
- **Jeff Datwyler, City of Bend – Bend Urban Renewal / Economic Development**
- Tyler Deke, City of Bend – MPO
- Devin Hearing, ODOT Planner
- **Mark DeVoney, ODOT Contract Administrator**
- Jeff Eager, Bend Central Area Planning Committee
- Ron Kidder, Design Interest
- **Pat Kliewer, City of Bend – Historic & Cultural Resources**
- Robin Lewis, City of Bend – Transportation
- **David Knitowski, City of Bend – Long Range Planning**
- **Paul Rheault, City of Bend – Public Works**
- **Brian Shetterly, City of Bend - Long Range Planning**
- John Russell, City of Bend – Bend Urban Renewal / Economic Development
- Bruce Ronning, Bend Metro Park & Rec. District
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- Doug Knight, Old Bend Land Use Chair
- Kathleen Combs, Orchard District Land Use Chair
- **Pam Hardy, Riverwest Land Use Chair**
- Linda Crossman, City of Bend – Accessibility Manager
- Patrick Kesgard, Steve Scott Realtors

Bend Central Area Plan

BEND CAP PART 2

Project Advisory Committee Meeting #8
Deschutes County Building – DeArmond Room
1300 NW Wall St, Bend Oregon
Wednesday, August 29th, 2007 – 10:00 a.m. to 12:00 p.m.

Meeting Summary

The following materials were distributed to the Project Advisory Committee:

Agenda
Graphic: Proposed New Zones and CB Expansion
Summary Overview: Recommended Land Use Regulatory Changes

1. Introductions

   Dave Siegel of Parametrix welcomed the Project Advisory Committee (PAC) to its eighth and final meeting. A PAC roster was passed around the room and those in attendance were asked to sign-in next to their name. The agenda was reviewed with the PAC.

2. Comments From August 28th Open House

   Dave provided an overview of the previous evening's open house, noting that there were approximately 60 people in attendance…about 8 of them affiliated with the project (consultant team, City staff and officials, PAC members). Dave indicated that, following the initial presentation, attendees examined the exhibits on display and talked with representatives of the consultant team and City staff. Attendees were invited to ask questions, to provide comments on the easels and comment forms provided for this purpose, and to just talk and become more familiar with the project.

   Comments received were very supportive of the Draft Central Area Plan. A general summary of the comments received includes the following:
   - There were some questions regarding the prospect of taller buildings, how they might impact the "feel" of downtown Bend, and how they might transition to adjacent neighborhoods.
   - There was support for the concept of "gateways" that would help define entryways into the Historic Downtown core and other Central Area neighborhood districts.
   - There was broad support for the "reinvention" of 3rd Street, and the plan to transform it from an auto-dominated commercial strip to a boulevard with a tree-lined median

featuring a series of higher-density, mixed-use, pedestrian-friendly neighborhood centers connected to the Historic Downtown Core by effective east-west connecting streets, particularly the Plan's designated "great streets": Franklin; Greenwood/Newport; and Portland-Olney.

- The concept of facilitating the distribution of future levels of traffic through the downtown (and particularly the new Bend Central neighborhood district) by use of the "grid" formed by a one-way couplet system (2nd Street and 4th Street) and the aforementioned improved east-west connections was well-supported. There were, however, general concerns about the future volumes of traffic the future would bring to the Central Area; this was coupled with support for transit, increasing the ability to get around using all modes of transportation, and for additional parking.

Robin Lewis provided her thoughts regarding the concept of the traffic "engine" that is proposed to facilitate the movement of traffic through a grid of north-south and east west streets, indicating that this seemed to be understood by those in attendance.

3. Comments and Suggestions Regarding "Regulatory Recommendations Memorandum"

Dave Siegel and Don Stastny provided an overview of the draft Regulatory Recommendations Memorandum to the PAC, noting that it had been sent electronically to the PAC prior to the meeting for their review. Dave distributed a one-page summary overview of the memo's major recommendations.

The PAC asked whether the Central Business zone was being proposed for expansion, and Dave indicated that it had. David Knitowski distributed copies of a map showing the proposed new zoning designations and the expanded reach of the CB zone.

The PAC was most interested in the proposed guidance for how the height of new buildings would be handled and how issues of transitioning or buffering would be accommodated.

There was discussion regarding whether or not the market ought to be the primary determining factor for how high buildings would be. Doug Knight indicated that the potential allowance of buildings up to 20 stories in height might be too much of a major change in the short term; other opinions, some in agreement, others not, were expressed. The PAC and the Project Team discussed this, and discussed the various aspects and implications of how (perhaps) a phased implementation approach might be considered; one that might allow buildings up to 10 stories (for example) for an initial period of time, or until a particular performance standard or milestone had been achieved. Don indicated that this is certainly an approach the City may wish to examine and pursue, should they think it best to do so.

Don Stastny discussed a potential approach for how building heights, relationship of buildings to the block, and transitions between blocks and from the "reinvented" 3rd Street

Corridor to the Historic Downtown Core along the three east-west "great streets" might be accommodated, one based upon the size of the average floor area proposed or allowed by the size/configuration of the property in question. He also discussed having shorter buildings being oriented towards the street frontages, with the taller buildings being constructed in the middle to ensure transition in scale and a more pedestrian-friendly feel. He indicated the importance of retaining the pedestrian friendliness between Portland and Franklin Ave along east-west streets, particularly the great streets of Portland-Olney, Greenwood-Newport, and Franklin.

Don and Dave indicated that the Project Team would take this discussion to heart and consider how best to recommend it be addressed in the Central Area Plan, its technical appendices and recommended changes to the City's land use regulatory tools.

4. Final Comments on Draft Central Area Plan

Dave Siegel indicated that the Draft Central Area Plan had previously been presented for review by the CAP-PAC and the City staff, and that that a consolidated set of comments had been provided by City staff. Dave mentioned that the draft Plan is being distributed to the City Council and Planning Commission for their review prior to their September 10th joint work session. After the work session, the project consultants will take any direction and comments into account and will complete a final draft product for delivery to the City by the termination date of the contract, September 30th.

Although the time for comments on the draft Plan from the CAP-PAC to City staff had passed, the PAC was invited to provide any additional comments to City staff for consideration prior to the City's approvals process anticipated to begin this fall.

5. Continuing Role for the Central Area Plan Committee (CAP-C)

Brian Shetterly thanked the CAP-PAC for their participation in the development of Part 2 of the Central Area Plan. He indicated that those PAC members who had also been previously named to the Central Area Plan Committee (CAP-C) by the City Council would continue to work with the City to see the Plan carried through the processes for approval and implementation.

6. Wrap up and Next Steps

Dave Siegel thanked the PAC for their participation, input and support over the past eight months, and invited the PAC to attend the joint work session of the City Council and Planning Commission on September 10, 2007 at 5:30 p.m. at the City Council chambers at City Hall. He reiterated that the final products would be provided by the consultant team to the City and to ODOT on September 30, and that the hearing and approval process would be occurring during the winter of 2007 – 2008. The meeting adjourned at noon.

Bend Central Area Plan

Project Team Attendees:

- City of Bend
  - David Knitowski
  - Brian Shetterly
  - Shannon Levine
  - Robin Lewis
- Consultant Team
  - Dave Siegel (Parametrix)
  - Don Stastny (StastnyBrun Architects)

Project Advisory Committee Members:

(Attendees in Bold)

- Nick Arnis, City of Bend - Transportation
- David Boyd, ODOT Access Management Engineer
- Patrick Creedican, ODOT District Manager
- Jeff Datwyler, City of Bend – Bend Urban Renewal / Economic Development
- Mark DeVoney, ODOT Contract Administrator
- Jeff Eager, Bend Central Area Planning Committee
- Ron Kidder, Design Interest
- Pat Kliewer, City of Bend – Historic & Cultural Resources
- **David Knitowski, City of Bend – Long Range Planning**
- **Paul Rheault, City of Bend – Public Works**
- **Brian Shetterly, City of Bend - Long Range Planning**
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- Bruce Ronning, Bend Metro Park & Rec. District
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- Pam Hardy, Riverwest Land Use Chair
- Linda Crossman, City of Bend – Accessibility Manager
- Patrick Kesgard, Steve Scott Realtors

Bend Central Area Plan

BEND CAP PART 2

Project Advisory Committee Meeting #8
Deschutes County Building – DeArmond Room
1300 NW Wall St, Bend Oregon
Wednesday, August 29, 2007 – 10:00 a.m. to 12:00 p.m.

Meeting Agenda

1. Welcome and Introductions

2. Comments from August 28th Open House

3. Comments and suggestions on "Regulatory Recommendation Memo"

4. Final Comments on Draft CAP Document

5. Continuing role for the Bend CAP Committee

6. Next steps

    a. Planning Commission/City Council Briefing September 10, 2007
    b. Products to the City on September 30, 2007
    c. Hearing and approval process – Winter 2007/2008

Bend Central Area Plan

Project Advisory Committee Members:

- Nick Arnis, City of Bend - Transportation
- David Boyd, ODOT Access Management Engineer
- Patrick Creedican, ODOT District Manager
- Jeff Datwyler, City of Bend – Bend Urban Renewal / Economic Development
- Tyler Deke, City of Bend – MPO
- Paul Rheault, City of Bend – Public Works
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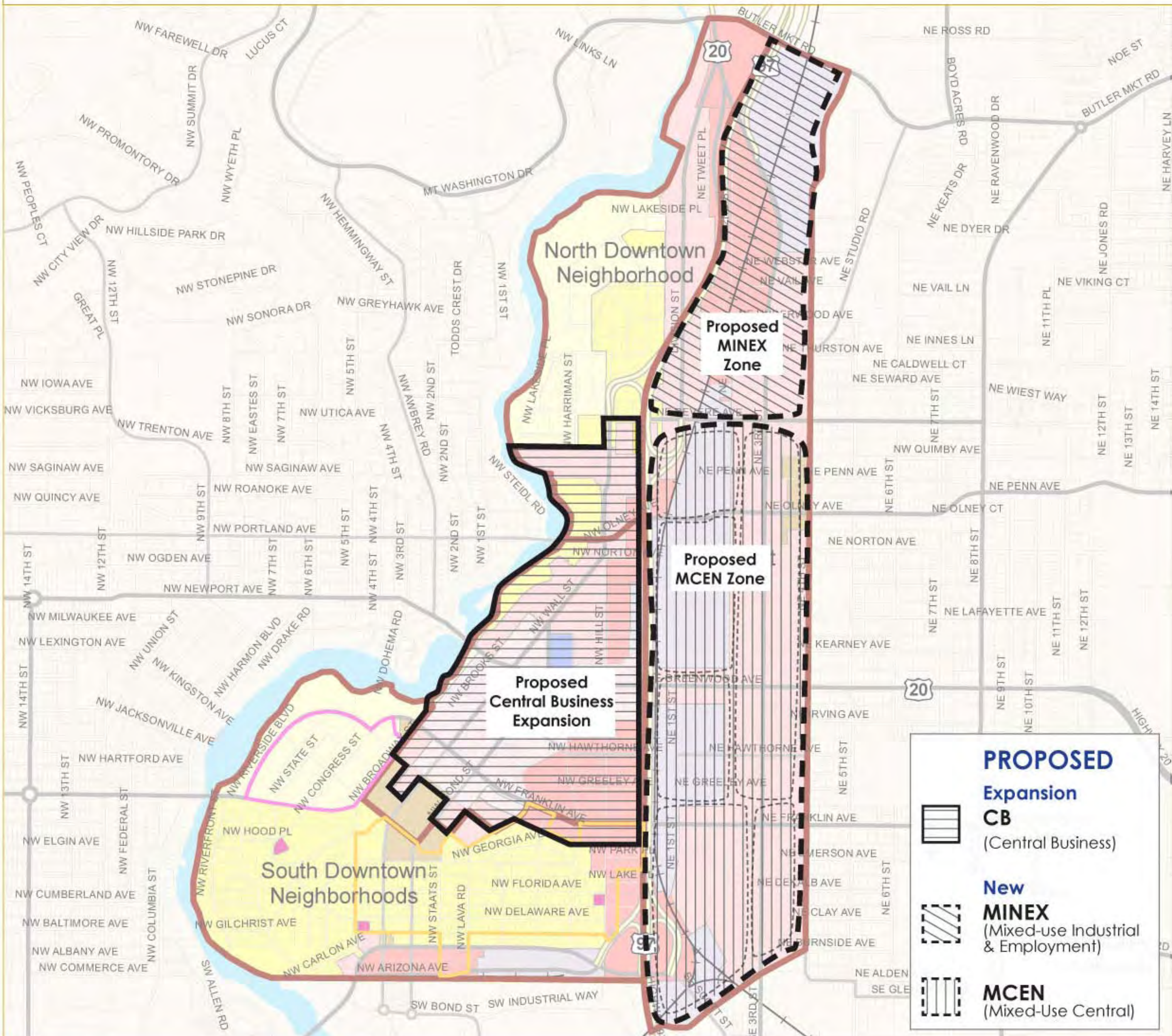
- Pam Hardy, Riverwest Land Use Chair
- Linda Crossman, City of Bend – Accessibility Manager
- Patrick Kesgard, Steve Scott Realtors

Attachments:

Draft Regulatory Recommendation Memo

BEND CENTRAL AREA PLAN

Proposed New Zones & CB Expansion



Zoning

CB | CC | CG | CH | CL | CN | IG | IL | IP | ME | MR | PF | PO | PO/RM/RS | RH | RL | RM | RS | SM | SR2-1/2 | UAR10

Drake Park Neighborhood Historic District

Old Town Historic District

City of Bend Central Area Plan

0 500 1,000 1,500
Feet

This product is for informational purposes and may not have been prepared for legal, engineering or surveying purposes. Users of this information should review or consult the primary data and information source to ascertain the usability of this information. Any person or entity that relies on any information obtained from this document does so at their own risk.

Data Source(s): City of Bend, NAIP, Parametrix

Geographic Data Standards:
Projected Coordinate System:
State Plane - Oregon South
Units: US Foot

Parametrix

Bend Central Area Plan

Overview of Recommended Land Use Regulatory Changes

City Form

1. Expand the Central Business District so it includes all areas referred to as Historic Downtown Core District, as well as the commercial areas north to Revere Avenue west of the Bend Parkway. This will facilitate the unification of the "core" of the Central Area through urban design and development.
2. Adopt new zones to offer maximum development flexibility within the Bend Central and the Industrial and Employment Districts and provide incentives for redevelopment.
3. Implement the proposed Bend Central Performance Guidelines for new development in the Historic Downtown Core, Bend Central, and the Industrial and Employment Districts to ensure that quality development occurs consistent with the Central Area Vision, and ensures appropriate transitions with surrounding areas.
4. Strengthen current buffering mechanisms between existing residential neighborhoods and the Historic Downtown Core, Bend Central and the Industrial and Employment Districts.

Defined Neighborhood Districts

1. Define and strengthen the identity of smaller sub-areas within Central Area neighborhood districts.
2. Adopt the six Central Area Plan district identities into the Bend Area General Plan.
3. Adopt new flexible mixed-use zones for the Bend Central and the Industrial and Employment Districts into the Bend Area General Plan and Development Code.
4. Apply a Central Area Plan Development Performance Guidelines overlay zone to the Central Business District, Bend Central, and the Industrial and Employment District.
5. Develop neighborhood plans for the Northern Central Neighborhood, the Division Commercial District, and the Southern Central Neighborhood.

3rd Street Reinvention / Bend Central Revitalization

1. Complete a 3rd Street transportation refinement plan to further develop the 2nd / 4th Street couplet concept and the planned reinvention of 3rd Street.
2. Implement Bend Central Performance Guidelines.
3. Amend the TSP to reflect the 2nd / 4th Street couplet configuration.*
4. Amend the TSP to reflect cross section recommendations and designations of "Great Streets."*
5. Amend setbacks, sidewalks, and planter strip requirements to reflect Great Streets and the proposed couplet.*
6. Incorporate design standards that encourage "green street" techniques.
7. Revise development standards to encourage shared parking and parking districts. Allow in-lieu of fees for required parking within the Bend Central District.

** These changes or amendments are dependent on the results of the 3rd Street transportation refinement plan.*

Bend CAP Part 2
CAP-PAC Implementation Workshops
Friday, May 18, 2007

Location: Barnes/Sawyer/DeArmond Rooms
Deschutes County Building, 1300 NW Wall Street
9:00 a.m. – 12:30 p.m.

Workshop Summaries

Objectives of the CAP-PAC Implementation Workshops

- *Providing an update on the Plan vision, framework and outcomes*
- *Getting guidance on refining the Plan*
- *Getting ideas on carrying out the Plan*
- *Answering questions*

1. Introduction, welcome and meeting objectives

Dave Siegel began the implementation workshops by welcoming those in attendance and stating that the objectives of the workshop would be: 1) to give the Project Advisory Committee (PAC) an update on the Plan vision, framework and outcomes; 2) getting their guidance on refining the Plan; and, 3) getting ideas from the PAC on which actions would be most important to carrying out the Plan.

Dave also gave an overview of the City Council presentation on May 16th as well as the second Bend Public Workshop held Thursday evening, May 17th. Dave described how the implementation workshops would be organized into two sessions so members of the PAC and project team could examine a variety of issues in two of the three workshop stations: Transportation, Urban Design and Land Use, and Development and Redevelopment. After asking if there were any questions, Dave invited the PAC members to join discussions in an area of their interest. Many of the topics, ideas, and outcomes from the three different workshop stations were often similar and are summarized below.

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M E M O R A N D U M

Date: **February 16, 2007**

To: **David Knitowski – City of Bend**

From: **Dave Siegel, Shelley Holly, and Lauren Golden - Parametrix**

Subject: **Bend Central Area Plan Part 2 January Public Open House Summary**

cc:

Project Number: **277-2395-053**

Project Name: **Bend Central Area Plan Part 2**

Overview

The City of Bend and the Oregon Department of Transportation held a public Open House for the Bend Central Area Plan Part 2 on January 23, 2007. The meeting was from 5:30 – 8:00 PM at the Phoenix Inn Suites in Bend, Oregon. The purpose of the Open House was to:

- Inform interested members of the public about the planning project and objectives,
- Review the vision for Central Area developed during Central Area Plan Part 1,
- Gather public input on "great ideas" for Central Area components: Third Street, Neighborhoods north and south of Downtown, and the overall Central Area, and
- Achieve consensus on direction for planning framework.

The Open House included a presentation and three workshop stations. Mayor Abernethy made opening remarks and welcomed the community. The opening presentation provided an overview of the Bend Central Area Plan Part 1 and the preliminary project team work on Part 2. After the presentation, the attendees split between three workshop stations. Each station focused on a different technical area – Community Development and Urban Form, Access and Mobility, and Land Use and Development. The stations were designed to collect public input on the "great ideas" components for each technical area.

The project team provided several handouts, including:

- Workshop Agenda
- Project background information sheet
- Map of the Bend Central Area Plan study area
- Workshop Comment Form

The sign-in sheets recorded 31 attendees from the public at the Open House. Members of the project team in attendance included:

- David Knitowski, City of Bend-Long Range Planning

- Nick Arnis, City of Bend-Transportation Engineering
- Brian Shetterly, City of Bend-Long Range Planning
- John Russell, City of Bend Urban Renewal and Economic Development
- Jeff Datwyler, City of Bend Urban Renewal and Economic Development
- Lauren Golden, Parametrix
- Shelley Holly, Parametrix
- David Siegel, Parametrix
- Jennifer Mannhard, StastnyBrun
- Don Stastny, StastnyBrun
- Chris Zahas, Leland Consulting
- Leslie Hara-Shick, Hara Shick Architecture

Key Findings and Conclusions

Several themes emerged from the workshop:

- The City should use incentives to encourage certain types of development, such as transit-oriented development, high-density, and mixed use.
- Green streets and landscaping are needed throughout the Central Area.
- Pedestrian and bicycle facilities should be improved.
- Connectivity within Central Area components and throughout the Central Area should be improved.
- The City should minimize the Parkway and Railroad as barriers to redevelopment.

Detailed Public Comment

The project team collected public comment at each of the three workshop stations and on the comment forms. Below is a summary of the comments recorded at each workshop station and on the comment forms.

Community Development and Urban Form

The Community Development and Urban Form workshop station structured their conversation around four broad questions:

- What are the districts of special character?
- What is the character of the streets & intersections?
- Where are there opportunities for open space & paths?
- What should the transitions be between development & residential areas?

Several members of the public commented on the character and design of the overall Central Area. Two people commented that the City should consider using zoning or other development incentives to encourage desired development. For example, one person suggested a mixed use zoning overlay to help integrate certain areas into the downtown core. Another person suggested creating "density hubs", whereby the City encourages denser development while maintaining views and downtown character. Finally, an attendee commented that topography and natural features should be the natural distinction between land use zoning.

Two people said that the City should maintain the existing character of the Central Area. One person commented that the "funky" character of the area is positive, and should be maintained. Another person said that the green streets, landscaping, and industrial areas should be maintained.

A large part of the conversation on the Central area components focused on the area to the north of the downtown core. Several attendees stressed the importance of connecting the northern area to the river and to the downtown core. One person specifically suggested that Division Street could provide connectivity from the northern area, provided that greenscaping is added to the street. A second person recommended using trails and bike paths to connect the northern area to the downtown core. Another person more generally stated that the transportation system within the northern area and between the northern area and the rest of the Central Area should be improved. Attendees also commented on the uses and character of the northern area. Ideas included maintaining the historic character associated with the Pendleton Woolen Mill, creating a mixed use area, and adding a variety of destination businesses (e.g., small offices, warehouses).

Attendees at this workshop station had a few ideas on how to improve the Third Street area. Attendees would like for Third Street to have a boulevard feel with greenscaping, traffic calming, and pedestrian amenities. Others suggested that Fourth Street include low intensity office uses, which will help Third and Fourth Streets transition into the residential neighborhood east of the Central Area.

As for the southern area, attendees thought that connectivity and transitions between the area and the Mill District should be improved. Additionally, some attendees recommended that open space and green space should be added to the area.

Access and Mobility

The Access and Mobility workshop station structured their conversation around two broad questions:

- What transportation issues are most important when considering redevelopment of the Central Area?
- Where are there opportunities for additional pedestrian and bicycle facilities?

The discussion at the Access and Mobility station focused on the overall Bend Central Area, with a few comments specifically addressing the north and south sides. Attendees had several comments on street design, such as adding a one-way couplet that could use Third and Fourth Streets or Second and Third Streets and restricting left turns at Second Street along both Greenwood and Franklin due to safety reasons. Another attendee suggested adding sidewalk setbacks in place of curb tight design, where possible.

Several attendees stressed the need for the City to coordinate with other governmental programs, such as American with Disabilities Act, Safe Routes to Schools, and Rails to Trails. Other attendees commented on the inter-relationship of transportation and land use decisions in the overall area. For example, one person said that the City should consider the effect of a new performing arts center on streetscape. Finally, one person said that there should be a better understanding of the long-term purpose and function of the Parkway.

The two main topics related to the north side included pedestrian connections and how to minimize the Parkway and Railroad as barriers. As for pedestrian connections, some attendees stressed the importance of improved connections from the Westside to the Central Area. Other attendees stated that better east/west connections are needed.

The attendees raised several questions about how to minimize the Parkway and Railroad as barriers, including:

- Can they, including their function and operations, be improved?
- How do you get across them?
- How do you address bottlenecks?
- Can you raise the railroad?

Focusing on the south side, attendees commented that the City should address the need for connectivity at the following locations:

- The area around Colorado and Industrial
- Between downtown and the Old Mill District, which should be a clear and natural connection
- East/west connections at the south end of the study area, particularly over to Third Street. Connectivity in this area should include bicycle and pedestrian connections and consider using some of the smaller existing streets.

Land Use and Development

The Land Use and Development workshop station structured their conversation around three broad questions:

- Where are high priority redevelopment areas located?
- What type of character should the districts have?
- How can redevelopment capture the character of Bend?

The conversation at the Land Use and Development station primarily focused on preferred land uses and along Third Street. In general, the attendees at this workshop station agreed that changing the uses and urban feel along Third Street would be difficult. Some attendees agreed that although the uses along Third Street could change, the uses will likely remain light industrial and general commercial because existing businesses and property owners lack incentives to relocate or redevelop their land, and it is difficult to site office space and residential in this area because of existing zoning and the character of the street. However, a few attendees commented that the City could improve Third Street by adding streetscaping and access to businesses.

A few people commented on the preferred zoning for particular areas. Comments included:

- The Railroad District should be zoned mixed employment.

- With regard to the Wall / Bond couplet through the Old Bend Neighborhood, any zoning changes such as neighborhood commercial would have to be “corner store” scale.

- Three story mixed-use with professional offices along Greenwood is possible.

Two people commented that ODOT should remove the Highway 20 designation from Greenwood Avenue, east of Third Street. They stated that this would make the area much more pedestrian friendly and would invite the amenities needed to attract development to this area.

Two people specifically commented on the need for City incentives for development in the Third Street area. One person said that the City should give parking incentives for transit-oriented development. Another person suggested that the City should give incentives that would encourage large businesses to relocate outside of downtown if they don’t need to be in close proximity to the Central Business District.

One person commented on the difficulty of permitting a mixed use development in the Mixed Employment Overlay along Third Street (it was later determined in conversations with city staff that the area surrounding Third Street is not within a Mixed Employment Overlay). The person stated that the City, not the property owner, should conduct the City-required traffic and environmental studies to permit mixed use development.

A few people noted the importance of the Third Street intersections with Greenwood Avenue and Franklin Avenue as gateways to downtown. Attendees said that the City should add streetscaping and landscaping to these intersections.

Finally, one person encouraged the project team to consider commuter rail along the railroad.

Comment Forms

Two people completed and returned comment forms. The questions and responses are listed below.

1. What obstacles would need to be removed in order to achieve this vision? What opportunities should be examined?

- The Central Area should not “look like” the West side of the river.

2. The Central Area Vision identified the Third Street Corridor as a new, higher density, mixed-use neighborhood. What types of building designs and streetscape elements would you like to see in this district?

- No comments.

3. Are there any opportunities to enhance the community design and the connections between the Historic Downtown Core and the residential neighborhoods to the north and south of it?

- Division Street north of Revere Avenue to Butler Market Road is an important corridor, but is not currently properly designed for bicycles and pedestrians.

- Emphasize the two access points into the Lakeside neighborhood. The character of the Lakeside neighborhood is changing because of investment.

4. What are the transportation options for more effectively connecting the Third Street Corridor and surrounding neighborhoods with the Historic Downtown Core and the larger Central Area?

- Use bicycle lanes and footpaths.

- Visually appealing streets are important.
- Light rail.

5. Are there opportunities for additional pedestrian and bicycle access to connect the Third Street Corridor and surrounding neighborhoods with the larger Central Area?

- The City should have plenty of public bike parking and bike trails that are separate from the roads.

6. Which district in the Central Area do you think is the most important to focus on first: Historic Downtown Core, Third Street Corridor, North Central Residential Area, or South Central Residential Area? What type of neighborhood would you like that district to become?

- Third Street with three-story residential abutting the street.
- Highway 20/97 corner as a gateway.
- It is important to have urban design elements, but do not over design. Not every street needs to be over designed.

7. What are the most important characteristics any new development should consider to preserve the character of the Bend Central Area?

- Good design.
- Historic character.
- Modern awareness of smart growth principles.
- Mixed residential/retail/commercial.
- Areas that discourage vehicle use by having alternatives like light rail.

2. Transportation Implementation Session

There was a general consensus that the analysis of 3rd Street needs to address specific problem areas and should consider such evaluation criteria for assessing improvements as:

- Retail, residential and office impacts
- Impacts on pedestrian/bicycle circulation
- Ease of implementation
- Cost and cost-effectiveness
- Right-of-way impacts
- ODOT acceptance (traffic analysis, freight route)

One participant asked if the project team knew of comparable examples of couplets, particularly those with boulevards in between the one-way streets.

Another participant noted that 4th Street is beginning to transition from residential to office/commercial.

Mark Devoney of ODOT expressed concern about how alternatives get selected. He said property owners need to be contacted and the City needs to look at impacts to businesses along 3rd Street that could lose traffic volume exposure.

It was thought that the options with two-way traffic on 3rd Street would have less business impact/disruption, and that no right-of-way acquisition would likely be required.

Another participant suggested that a fourth option could be developed that would consider a one-way couplet using 3rd and 4th instead of 2nd and 3rd. It was pointed out that the option using 2nd as the southbound portion of the couplet would likely require more right-of-way along 2nd. Concern was also expressed about putting roundabouts in this corridor.

Three options for a potential couplet in this area were discussed. General conclusions about the three options seemed to be:

- Option 3, a couplet on 2nd Street and 4th Street with a main street boulevard on 3rd Street, would probably experience the greatest opposition.
- Option 2, a broader grid system utilizing east-west streets, would be easiest to implement but would make it hard to revitalize 3rd Street Most traffic will likely continue to use 3rd Street.
- Option 1, a couplet on 3rd Street and 4th Street, would be best from a traffic flow perspective.

It was felt that each street in the study area should have its own character with design standards and general guidelines, with bicycle and pedestrian facilities on all streets (arterials and collectors) except along Wall and Bond Streets, or where volumes are low and shared use is viable.

Some concern was expressed about 10-foot lanes on 2nd and 4th Streets if these streets are going to be used by trucks. There should be at least one truck lane in each direction on these streets. It was noted that signal coordination along the couplet will be important.

It was felt that 1st Street might need to be improved under all scenarios and that the City might wish to consider improvements to 5th Street because of all the destinations along this street (e.g., community center, park, etc.).

The participants of the Transportation Implementation session offered comments on priorities and felt that widening the Greenwood and Franklin Avenue undercrossings to better accommodate bicycle and pedestrian users was very important. It was also suggested that the City consider a pedestrian/bicycle bridge over the railroad and parkway to a transit hub on the east side/Railroad District rather than an undercrossing.

The idea of an auto mall was also floated and it was suggested the City could facilitate this to free-up development opportunities in the Bend Central neighborhood district. Most participants felt the improvement of Division Street would be the lowest priority.

An evaluation matrix was prepared for each of the 3 couplet street conceptual options that were reviewed during the Transportation Implementation session:

	Option 1	Option 2	Option 3
Advantages	• No advantages	• Disperses traffic • Easiest to implement in terms of total construction	• Facilitates redevelopment of 3rd • Allows parking on 3rd • Easiest to stage for construction
Disadvantages	• Favors one street over another	• Fewest opportunities to improve 3rd	• Impacts to residential area • Most expensive (e.g., most linear feet of roadway improvements)

3. Urban Design and Land Use Implementation Session

The urban design discussion began with a brainstorming session on design-related elements that could act as catalysts for the Central Area Plan's implementation. Suggestions are summarized below.

Many felt the way to jumpstart development within the Central Area would be to initiate zoning and development code changes, including new height limitations and a possible expansion of the CB zone. Implementation of special mixed-use zones with a special Design Review Committee for Bend Central was suggested.

One participant stressed that a transportation hub should be identified and preserved and the framework and standards should support this.

Another participant felt that it was important to encourage the development of an "artistic community" (district) along the railroad and suggested this could be done through a refinement plan or a zoning overlay.

Overall, it was thought that development and design guidelines should be applied in the Bend Central neighborhood to bring the buildings closer to the street.

A signature pedestrian bridge across the railroad and the Parkway at Hawthorne was identified as a design related catalyst project that might help jumpstart development within the Bend Central Area. The pedestrian bridge should be high enough to create a view of the mountains.

Discussion ensued about design themes and a “Bend Design Language” in which development could use artwork such as mountains, river, fish, and/or volcanoes to define Bend. This raised some concerns that it could create too many restrictions. Another participant offered that buildings should look like they have been here for years.

One participant suggested extending the design of the 3rd Street couplet concept to beyond the overpass to the south (over the rail road). This would incorporate 2nd & 3rd Streets or 2nd & 4th Streets as the north-south connections.

Other comments included a desire to incorporate the diverse geographical and geological aspects of Bend (water, mountains) into design, and a reiteration of the desire to create a public space such as Heritage Square.

There were several suggestions for improving the Franklin and Greenwood Avenue underpasses, including use of design elements to upgrade pedestrian undercrossings and consolidation of an aesthetic treatment to the Greenwood Avenue overpass / underpass addressed in CAP Part 1.

Participants felt that the City should develop a streetscape plan (w/details and illustrations) for this area.

4. Development and Redevelopment Implementation Session

The Development and Redevelopment Implementation session addressed three aspects of catalyst projects:

1. Principles on how catalyst projects should effect the Central Area Plan;
2. Projects that will best promote the goals and vision of the Central Area Plan; and,
3. Priorities for the identified catalyst projects.

Discussions of these categories are summarized below:

Principles

It was felt that catalyst projects should reflect the Cap’s vision and should be solving a problem. The City should clearly identify the problem that is trying to be solved (e.g., 3rd Street, connectivity, etc.). Most people felt it was important to do something right away so the City could show visible, early successes.

Several people felt that public infrastructure and transportation is the best catalyst for development and that it would be hard to do anything without fixing 3rd Street. Reinventing 3rd Street would draw energy from downtown to 3rd Street, not just vice-versa.

One participant suggested thinking ahead to providing for connections to Juniper Park and another indicated that the 3rd Street reinvention needs to include "Bend" character.

There was a suggestion that the Bend Central neighborhood district should be a place for affordable housing for workers to walk to downtown from Hawthorne.

Several participants felt that the City should change the current zoning because its too limited and won't accommodate vision.

Catalyst Projects

Several catalyst projects or activities that would encourage redevelopment in the Central Area were suggested. These include:

- Land assembly
- Formation of an urban renewal district
- Formation of an LID or BID/EID (business improvement district/economic improvement district)
- A "Gateway" treatment for Greenwood/overpass
- A relocation assistance program to help reorient uses to achieve vision
- Auto-mall concept…create mutually supportive environment
- Expansion of the CB zone / district
- Construction of centralized parking structures
- Parking regulation & incentives
- Building a Hawthorne Avenue connection to the Historic Downtown Core
- Bike routes separate from roads
    - Enhance, complete to riverfront trail
    - Connect destinations / attractions
- Pocket parks, green spaces, buffers – link to storm water needs
- Locating a Performing Arts Center in the Central Area, not Juniper Ridge

Project Priorities

The latter part of the discussion turned to catalyst project priorities. There were different views as to which projects should have the highest priorities.

Some participants felt that redeveloping 2nd Street and its cross streets could be done soon without waiting for the full 3rd Street traffic refinement study. Others felt that working on the Historic Downtown Core and 3rd Street would promote greater momentum. It was thought that downtown core improvements will catalyze and intensify opportunities and implementing projects east of Lava will help set the stage for more intense development east of the Parkway.

Some participants felt that Greenwood Avenue east of the Parkway and the intersection of Greenwood Avenue and 3rd Street would be a logical starting place.

It was noted that identifying "receiving areas" for business relocation from 3rd Street and the Bend Central neighborhood district early in the process would be key to allowing the 3rd Street reinvention.

Overall, it was felt that actions should be focused in higher-priority districts. It was acknowledged that access and circulation improvements and land assembly in the northern neighborhoods is needed, but not a high priority. It was felt that the northern area to the east of the Parkway could be a "receiving area" in the interim.

5. Closing

David Siegel thanked everyone for their input and noted that the next Bend CAP PAC meeting would be on Friday, June 8th.

BEND CAP PART 2

Public Workshop on the Draft Central Area Plan
Deschutes County Building
1300 NW Wall St, Bend Oregon
Thursday, May 17th, 2007 – 5:30 p.m. to 7:30 p.m.

Workshop Summary

Attending:

City Representatives:
- City Council: Mayor Bruce Abernethy
- Dept. Public Works: Nick Arnis, Robin Lewis
- Dept. Community Development: Brian Shetterly; David Knitowski, Shannon Levine
- Dept. Economic Development: Jeff Datwyler

Oregon Dept. of Transportation:
- Mark Devoney

Consultant Team:
- David Siegel, Project Manager (Parametrix)
- Shelley Holly, Deputy Project Manager (Parametrix)
- Anne Sylvester, Transportation Lead (Parametrix)
- Don Stastny, Design Lead (StastnyBrun Architects)
- Chris Zahas, Economic Analysis Lead (Leland Consulting Group)

Public:
- Approximately 18 non-staff individuals

Agenda:
- 5:30 p.m. Registration
- 6:00 p.m. Welcome by Bruce Abernethy, Mayor of Bend
- 6:10 p.m. Overview and Expectations
- 6:30 p.m. Interactive Open House and Public "Tour de Plan"
- 7:30 p.m. Coming Attractions and Next Steps

Workshop Summary

Mayor Abernethy welcomed the attendees and set the stage with an overview of the Central Area Plan and why it was important to ensure that the community determined how growth should be accommodated in this area over the course of the next 20-30 years.

Project Manager Dave Siegel (consultant team, Parametrix) welcomed the open house attendees to the second of three public events associated with the Central Area Plan. Dave gave an overview of the evening's agenda and then gave a presentation on the Draft Central Area Plan.

Following the presentation, Dave Siegel, Don Stastny, Brian Shetterly and Mark DeVoney responded to a few questions from the attendees. Dave noted that the periphery of the room was lined with graphics demonstrating the transportation, urban design, land use and redevelopment aspects of the project. The attendees were invited to examine the exhibits on display and to talk with representatives of the consultant team and City staff. Large note pad flip charts were provided throughout the room to allow attendees to provide comments. Comment sheets were also available for participants to complete and return to the project team.

Comments on the Draft Central Area Plan were varied and included the following suggestions:

- One participant suggested moving Highway 20 to get through traffic off of 3rd Street and configuring an Eastside Bypass. There was a concern that as long as Highway 20 turns left at Greenwood Ave the proposed couplet concept may not work.
- A participant suggested that a centerpiece such as a representation of a volcano or Three Sisters should be used at any roundabouts at the gateways.
- Another participant suggested changing Minnesota Avenue to a pedestrian walkway going from the waterfall all the way through to connect to a plaza. The plaza should be similar to Pacific Plaza.
- There was a preference from some participants to limit heights to 3-5 stories.
- There were concerns with the lack of parking and a suggestion that drivers could park near the rail road tracks and use a shuttle system.
- Someone proposed a different architectural scheme for each street (i.e.: Jazz Neighborhood Street).
- One participant felt the Portland Road bridge should be more pedestrian friendly.
- There were concerns about speeding traffic in neighborhoods around Florida Avenue.
- Some people felt there was a lack of open space in the Historic District.

Suggestions collected on the comment sheets included:

- One person felt that the study area boundary should be changed to include the Pine Avenue and 3rd Street intersection while another felt the Division Street Commercial and the Industrial and Employment Districts should be combined.

- Suggested district names included: Mirror Pond District, Historic District, Old Mill, Downtown, Bend Central, and Old Downtown.
- Bend's skyline in 2030 should contain some high rise buildings, some new urbanism, and a sculpture park at the north end.
- There should be mid-rise buildings along 3rd Street; and the tallest buildings should be close to the Parkway.
- The future of 3rd Street should include a tree-lined, pedestrian and bike friendly environment with plazas and parks in key locations. Children's and artist's parks should be included.
- The Greenwood Avenue and 3rd Street intersection should be like Columbus Circle in Washington, D.C. It should include retail and low-rise residential and have a more open feel, almost like the center of a compass for the city. Another participant felt that there should be larger, taller buildings at each corner to create a gateway to Downtown.
- The Franklin Avenue and 3rd Street intersection should feel like a gateway and like you're entering a district. One participant felt this would be a great place for a large green roundabout. Retail was also suggested for this intersection.

Four comment sheets were filled out by Open House attendees; these have been scanned and appended to this summary document. The event concluded at 7:15 p.m.

Attachment

Open House comment forms

Bend Central Area Plan

Public Workshop Comment Form

Please share your thoughts regarding re-inventing 3rd St. and improving connections and circulation through the Central Area.

● = Excellent ◒ = Good ○ = Not so good

	Achieves vision for re-inventing 3rd St. Commercial Strip	Transportation: Provides good circulation and connections	Provides Development and Redevelopment Opportunities	Rank (1 is the highest and 3 is the lowest)	Comments
Third Street Concept 1	O	O	O		
Third Street Concept 2	O	O	O		THIS IS BEST. COUPLETS HAVE FAILED ALL OVER. 1ST + 2ND STREETS DON'T NEED AUTOS IN ORDER TO BE REVITALIZED.
Third Street Concept 3	O	O	O		

(Please see reverse)

Additional comments:

Central Area Neighborhood Districts

1. Mistaken identity. Are there any boundary changes you would suggest to better identify the Central Area's districts?

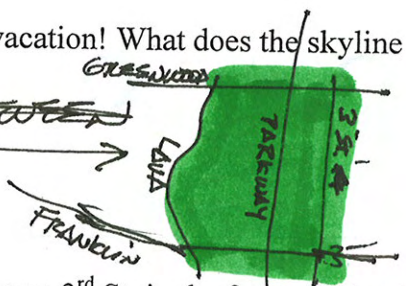
   NO.

2. So what's in a name? What names do you think best reflect the identities of the Central Area's neighborhood districts?

City Form

1. It's 2030 and you're driving into Bend after a long vacation! What does the skyline of Bend's Central Area look like?

   TALLEST BUILDINGS ~~BETWEEN~~ HERE →
   BUILDINGS 6 STORIES TALL.
   TALLER THAN 6 STORIES CAN BE OK., BUT HUMAN SCALE CAN BE LOST.



2. Imagine running into a former neighbor or co-worker on 3rd St. in the future. What kind of open space would best suit a "lets catch-up" conversation? What other activities do you envision in the open spaces of Bend's Central Area?

3. What kind of "character" do you envision for the following intersections:

   - 3rd Street and Greenwood Avenue?

     LARGER, TALLER BUILDINGS ON EACH CORNER, ESPECIALLY THE TWO WESTERN CORNERS CREATING A GATEWAY TO DOWNTOWN BEND.

   - 3rd Street and Franklin Avenue?

     DITTO.

Thank you for your time!

Bend Central Area Plan
Public Workshop Comment Form

Please share your thoughts regarding re-inventing 3rd St. and improving connections and circulation through the Central Area.

● = Excellent ◒ = Good ○ = Not so good

	Achieves vision for re-inventing 3rd St. Commercial Strip	Transportation: Provides good circulation and connections	Provides Development and Redevelopment Opportunities	Rank (1 is the highest and 3 is the lowest)	Comments
Third Street Concept 1	○	○	○	2	
Third Street Concept 2	◒	◒	◒	~~3~~ 1	
Third Street Concept 3	~~◒~~	~~◒~~	~~◒~~	~~3~~ 3	

a great blvd. where 3rd is

(Please see reverse)

Additional comments:

Central Area Neighborhood Districts

1. Mistaken identity. Are there any boundary changes you would suggest to better identify the Central Area's districts?

   Maybe combine the Division commercial & industrial & employment to create a sense of connecting vibrant commercial with potential large employers (industrial)
   Technically, its all commercial.

2. So what's in a name? What names do you think best reflect the identities of the Central Area's neighborhood districts?

   I'm not sure if I'm supposed to pick from what's presented or offer new ideas.
   "Bend Central" reflects the 3rd St. corridor well.
   "Historic Downtown" - Is the area still "historic" with so much new development - maybe "old downtown"

City Form

1. It's 2030 and you're driving into Bend after a long vacation! What does the skyline of Bend's Central Area look like?

   Higher, but not like you're driving through a tunnel of buildings. More like San Diego's Balboa Park/Gaslamp district, or Chico's Esplanade/Promenade.

2. Imagine running into a former neighbor or co-worker on 3rd St. in the future. What kind of open space would best suit a "lets catch-up" conversation? What other activities do you envision in the open spaces of Bend's Central Area?

   Larger, park or plaza areas in key locations.

3. What kind of "character" do you envision for the following intersections:

   - 3rd Street and Greenwood Avenue? an over/under pass - just kidding - a more open feel - almost like the center of a compass for the city
   - 3rd Street and Franklin Avenue? feeling that you're entering a "district"

Thank you for your time!

Bend Central Area Plan
Public Workshop Comment Form

Please share your thoughts regarding re-inventing 3rd St. and improving connections and circulation through the Central Area.

● = Excellent   ◒ = Good   ○ = Not so good

	Achieves vision for re-inventing 3rd St. Commercial Strip	Transportation: Provides good circulation and connections	Provides Development and Redevelopment Opportunities	Rank (1 is the highest and 3 is the lowest)	Comments
Third Street Concept 1	◒	○	○		
Third Street Concept 2	●	●	●		Put 'main St' idea in the concept.
Third Street Concept 3	●	◒	◒		like the "main St." concept

(Please see reverse)

Additional comments:

Central Area Neighborhood Districts

1. Mistaken identity. Are there any boundary changes you would suggest to better identify the Central Area's districts? Should go North to include Empire/3rd intersection + effects of 97/20 refinement plan.

2. So what's in a name? What names do you think best reflect the identities of the Central Area's neighborhood districts?

City Form

1. It's 2030 and you're driving into Bend after a long vacation! What does the skyline of Bend's Central Area look like? Some high rise
   new urbanist
   green space
   walkable
   Sculpture Park at No End
   gateway?

2. Imagine running into a former neighbor or co-worker on 3rd St. in the future. What kind of open space would best suit a "lets catch-up" conversation? What other activities do you envision in the open spaces of Bend's Central Area?
   walk + bike - ped. friendly
   tree lined streets + sidewalks
   "Bend re-invented"

3. What kind of "character" do you envision for the following intersections:
   - 3rd Street and Greenwood Avenue? - Columbus Circle in DC - Large. open, core business +/or transit center
   - 3rd Street and Franklin Avenue? Large green Roundabout

Thank you for your time!

Bend Central Area Plan
Public Workshop Comment Form

Please share your thoughts regarding re-inventing 3rd St. and improving connections and circulation through the Central Area.

● = Excellent ◒ = Good ○ = Not so good

	Achieves vision for re-inventing 3rd St. Commercial Strip	Transportation: Provides good circulation and connections	Provides Development and Redevelopment Opportunities	Rank (1 is the highest and 3 is the lowest)	Comments
Third Street Concept 1	○	○	○	2	
Third Street Concept 2	○	○	○	3	
Third Street Concept 3	◒	◒	◒	1	provide flexibility

We need city gov't (Council/Mayor) to unite (cut out the infighting) and trying to "please all the people;" make the hard decisions and push the Central Area Plan to implementation.

(Please see reverse)

Additional comments:

Central Area Neighborhood Districts

1. Mistaken identity. Are there any boundary changes you would suggest to better identify the Central Area's districts?

2. So what's in a name? What names do you think best reflect the identities of the Central Area's neighborhood districts?

1. Mirror Pond District
2. Historic District
3. Old Mill
4. Downtown

City Form

1. It's 2030 and you're driving into Bend after a long vacation! What does the skyline of Bend's Central Area look like?

mid-risers along the 3RD st corridor (4-6 stories)

2. Imagine running into a former neighbor or co-worker on 3rd St. in the future. What kind of open space would best suit a "lets catch-up" conversation? What other activities do you envision in the open spaces of Bend's Central Area?

- children's parks
- Arts parks

3. What kind of "character" do you envision for the following intersections:

- 3rd Street and Greenwood Avenue?

Retail combined w/ low-inc residential

- 3rd Street and Franklin Avenue?

Retail " " "

Thank you for your time!

BEND CAP PART 2

Public Open House "Presenting the Draft Plan"
Deschutes County Building
1300 NW Wall St, Bend Oregon
Tuesday, August 28th, 2007 – 5:30 p.m. to 8:00 p.m.

Open House Summary

Attending:

<u>City Representatives</u>:
- City Council: Councilor Bill Friedman; Councilor Peter Gramlich
- Dept. Public Works: Paul Rheault; Robin Lewis
- Dept. Community Development: Brian Shetterly; David Knitowski, Shannon Levine; Rick Root
- Dept. Economic Development: Jeff Datwyler

<u>Oregon Dept. of Transportation</u>:
- Mark DeVoney

<u>Consultant Team</u>:
- David Siegel, Project Manager (Parametrix)
- Don Stastny, Design Lead (StastnyBrun Architects)

<u>Public</u>:
- Approximately 53 non-staff individuals (sign-in sheets scanned and attached)

Agenda:

1. Welcoming Remarks: Councilor Bill Friedman
2. Overview Presentation: David Siegel, Parametrix
3. Questions
4. Open House

Summary of Open House:

Councilor Friedman welcomed the attendees and set the stage with an overview of the Central Area Plan and why it was important to ensure that the community determined how growth should be accommodated in this area over the course of the next 20-30 years.

Project Manager David Siegel (consultant team, Parametrix) welcomed the open house attendees to the third and final public event associated with the Central Area Plan prior to its being forwarded to the City for consideration and approval. Dave Siegel and Don Stastny provided an overview presentation regarding:

- the purpose of the Central Area Plan;
- the community's vision and desired outcomes, approved by the City Council;
- the components of the Plan and how they were developed;
- the three "Big Ideas" around which the Plan was centered;
- the Draft Plan and the projects and actions needed to carry it out over time; and
- the recommended strategy for programming implementation actions.

Following the presentation, David Siegel, Brian Shetterly and David Knitowski responded to a few questions from the attendees. The attendees were invited to examine the exhibits on display and to talk with representatives of the consultant team and City staff. Attendees were invited to ask questions, to provide comments on the easels and comment forms provided for this purpose, and to just talk and become more familiar with the project.

Comments received were very supportive of the Draft Central Area Plan. A general summary of the comments received includes the following:

- There were some questions regarding the prospect of taller buildings, how they might impact the "feel" of downtown Bend, and how they might transition to adjacent neighborhoods.
- There was support for the concept of "gateways" that would help define entryways into the Historic Downtown core and other Central Area neighborhood districts.
- There was broad support for the "reinvention" of 3rd Street, and the plan to transform it from an auto-dominated commercial strip to a boulevard with a tree-lined median featuring a series of higher-density, mixed-use, pedestrian-friendly neighborhood centers connected to the Historic Downtown Core by effective east-west connecting streets, particularly the Plan's designated "great streets": Franklin; Greenwood/Newport; and Portland-Olney.
- The concept of facilitating the distribution of future levels of traffic through the downtown (and particularly the new Bend Central neighborhood district) by use of the "grid" formed by a one-way couplet system (2nd Street and 4th Street) and the aforementioned improved east-west connections was well-supported. There were, however, general concerns about the future volumes of traffic the future would bring to the Central Area; this was coupled with support for transit, increasing the ability to get around using all modes of transportation, and for additional parking.

Eight Open House attendees completed comment sheets; these have been scanned and appended to this summary document. The event concluded at 8:00 p.m.

Attachments (2):

1. Open House sign-in sheets
2. Open House comment forms

Bend Central Area Plan

Public Open House Registration – August 28, 2007

Name	Address	Phone	E-mail
David Heron	2724 NW Rainbow Ridge Dr	410-9283 ~~383-0~~	dkheron@gmail.com
Bob Thomas	1801 NW Iowa Av	389-1257	rThomas@bobthomas.com
Wallace & Karen Corcoran	505 NW Florida	385-3606	WallyandKAREN@BendBroadband.com
ML Vidas	2328 NW Quinn Creek	318-7212	mlvidas@bendbroadband.com
CHARLES W O'NEIL	38#2 NW. IRVING AVE	389-4902	
BRET EVERT	20364 STRAWLINE RD	388-8226	evert@bendbroadband.com
Suzanne Johnson	660 NW 3rd St.	410-1720	suzanne@benddentalgroup.com
Kathy Combs	PO Box 1654	Bend	
Fritz Johnston		408-1033	fritz@bendbroadband.com

Bend Central Area Plan

Public Open House Registration – August 28, 2007

Name	Address	Phone	E-mail
Bob Bobosky	6770 SW Canyon Drive Portland OR 97225	503 292 8261	r.bobosky@comcast.net
Dave Webster	2055 NW Vicksburg Ave 97701	388-3147	dave@gravitybend.com
Glen Raymond	63371 Majestic Loop 97701	382-8743	
Carla Wigle	2473 NW Marken St 01	388 -2490	carla@datastor.biz
RICHARD WHITTEMORE	102 NW GREENWOOD 01	389-1410	
GARY & CHERYL PLAGMANN	334 NE IRVING #104 BEND 01	541.382-0351	eastwestone@qwest.net
Bill Robie	2788 NW Colter Ave. Bend OR	848-8267	bill@coar.com
H Gene Hackett	PO Box 5232 Bend, Or	382-1414	
Reece Ellingson	1345 NW Wall St.	408-3119	
Samantha Gisler	" "	389-5800	samantha.gisler@gmail.com
David + Alycia McDonald	22122 Neff Rd Bend 97701	480-8133	themcdonalds@clearwire.net
MIKE KIRKMAN	3257 SW GLACIER AVE. RDM 97756	420-0597	PASTORMIKE@FBCBEND.ORG
Darren Glazier	21330 Stevens Rd	977-5278	darren@stevelarsenproperties.com
Brett Harpham	920 NW Bond St. Suite 200	771-2705	brett@desertscape.com
Rick Hayes	19552 E. Campbell Rd. Bend 97702	419-7776	rickhayes@sch-bend.com
JOHN HARRIS	220 SENECA RD EUGENE 97402	541-344-0681	JHARRI@RIMART.COM

Bend Central Area Plan

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Name	Address	Phone	E-mail
KIP NARBER	64720 COLLINS RD, BEND, OR	382-1286	knarber@westerntitle.com
NUNZIA TROUTMAN	POB 5486 - Bend, OR 97708	385-9177	
Kevin & Debby Black-Tomsle	63177 Eastview #9 97701	2358176	
Dagmar Eriksson	26 NW Shasta Pl. Bend	382-2409	nils_dagmar@hotmail.com
Lynne Shackell	202 NW Thurston Ave Bend 01	385-8692	
Bill Friedman	361 NE Franklin	382-7510	
PATRICK GISLER	1345 NW WALL	389-5800	patrick@gislermgmt.com
George Thayer	2000 NW Trenton Ave	388-3392	gthayer@bendbroadband.com
Bob Dempster	60580 Elkai Woods D	312-1769	
PETER GRAMLICH	105 NW ALLEN RD	617 5935	
Chris Melrose	839 NE 2nd St.	317-9111	chris@melroseconstruction.com
Robin Lewis	COB		
Gene & Marie	232 NE Fourth St.	389-4767	
Arne Gołdnor	1494 NW 12th St	389-8660	RWNA arneg@bendcable
CINDY Melrose	839 NE 2ND ST	948 1505	

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Name	Address	Phone	E-mail
Jim Prosser	1075 NE Bellevue A	389 3761	jprosser@coinet.com
David Miller	1863 NW Vicksburg	382-1357	dmiller@bendcable
Steven Rzonca	19930 McClellan Rd Bend OR	382-8753	owner@eaglemountainllc.net
Richard J. Root	710 NW Wall St.	388-5576	rroot@ci.bend.or.us
JEFF DATWYLER	19407 Charleswood Ln. SW	302-4910	jdatwyler@ci.bend.or.us
PAUL RHEAULT	575 NE 15TH ST.	317-3006	PRHEAULT@ci.BEND.OR.US
Kieran Tobin	60584 Elkai Woods Dr	617-0554	tobytobin@bendbroadband.com
Sean Williams	920 NW Bond #200, Bend	306-7598	sean@desertscape.com
Jerry Sherman	P.O. Box 338, Terrebonne, 97760	382-3406	jerryhelen13@msn.com
JOHN MACINNIS	415 NE NORTON #14, BEND	788-7814	CASCADECDC@BENDCABLE.COM
Mike Widmann	1000 S/E 9th ST	389-8080	
Anthony Albertazzi	1070 NW Bond #202	317-0231	a.albertazzi@albertazzilaw.com
Jon Skidmore	2570 NW Sacagawea Ln Bend	350-3783	jonski@bendbroadband.com
Jean Wood	19433 Ironwood Circle	385-0707	jean.wood@mhicorp.com
Tim Elliott	42 NW Greeley Ave.	383-3755	telliott@bendbroadband.com
Bud Evert	3156 QUIET RIVER		

Bend Central Area Plan
Public Open House Comment Form

Please share your thoughts below on key issues related to the Draft Bend Central Area Plan.

Glad you keep working on it. I like many of the ideas.

~~Some~~ I am still concerned about the traffic backup from a left turn off 2nd Street ~~comin~~ onto Greenwood going across 3rd and 4th. Seems like heavy traffic for ~~a~~ people using 3rd Street and potential for traffic backup. – Underpass? Hwy 20 relocation across NE Bend would help.

Downtown could be enhanced further with more specific proposals for the Mirror Pond Gallery area and how Minnesota (Oregon!) opens into it – another opportunity for pedestrian street with art.
Area west of Wall Street between Newport and Revere needs more work. More riverfront potential.
I <u>don't</u> think buildings in Bend should be > 5 storeys.

Name: Robin Vora

Address: 1679 NE Daphne Dr, Bend, OR 97701

Phone: 541 318 4652 (don't sell # please)

E-mail:

Bend Central Area Plan
Public Open House Comment Form

Please share your thoughts below on key issues related to the Draft Bend Central Area Plan.

A truly wonderful Master Plan!! – Love It!!!

Some Concerns:

Building Heights – you repeatedly refer to preserving the "sense of place" and a "sensitive treatment of building heights" – 20 story buildings will certainly adversely impact Bend's now dramatic mountain setting, also becomes a self-fulfilling prophecy

New 3rd Streets – will 2nd and 4th Streets become the new 3rd Streets; a 3rd street creates itself in most cities — i.e. Nevada Avenue in Colorado Springs

I heard that three traffic lanes are needed both North and South on 2nd, 3rd and 4th Streets combined. However a pedestrian-only 3rd street would be wonderful a la Boulder, Colorado.

We do own a commercial building – O'Hara Styling Shoppe behind Dandy's Drive-In, actually on Norton

Name: KIP NARBER

Address: 64720 COLLINS ROAD, BEND, OR 97701

Phone: (541) 382-1286

E-mail: knarber@westerntitle.com

Bend Central Area Plan

Public Open House Comment Form

Please share your thoughts below on key issues related to the Draft Bend Central Area Plan.

I am concerned about plans to convert overhead utilities to underground. The area of direct interest to me is bounded by Hill, Greenwood and Hawthorne. Can this be done as a single project rather than by individual owners? This would enhance the appearance and value of the area.

Name: Anthony Albertazzi

Address: 1070 NW Bond St. Ste. 202 Bend 97701

Phone: 541 317-0231

E-mail: a.albertazzi@albertazzilaw.com 8/28/07

Bend Central Area Plan
Public Open House Comment Form

Please share your thoughts below on key issues related to the Draft Bend Central Area Plan.

Spend more time answering questions
Tour exhibits w/microphone
and answer questions everyone
can hear

Name: NUNZIA TROUTMAN

Address: POB 5486 - Bend 97708

Phone: 385- 9177

E-mail:

Bend Central Area Plan
Public Open House Comment Form

Please share your thoughts below on key issues related to the Draft Bend Central Area Plan.

Re the 2nd & 4th couplet concept -

I think this works from a traffic flow standpoint, and I agree that it could be key to reinvigorating 3rd St, which would be narrowed and made greener.

However - I don't equate 2nd and 4th St from an urban form standpoint. 2nd backs (almost) to the parkway and thus warrants taller, denser buildings & uses. Also, the presence of the railroad makes this area different - I could imagine green areas along with tall buildings and high densities on either side of the parkway.

In this sense, 3rd St is the "mirroring line" for traffic flow on 2nd & 4th but the parkway is the mirroring line for urban form on Hill & 2nd.

Name: Peter Oramlid.

Address:

Phone:

E-mail:

Bend Central Area Plan
Public Open House Comment Form

Please share your thoughts below on key issues related to the Draft Bend Central Area Plan.

Re the gateway concepts -

I totally agree that the Central Area needs gateways and architectural/urban highlights. Good work on this front!

One key gateway seems to be the on & off ramps to the parkway at Revere. This may mean the "blue" north district residential neighborhood warrants a non-residential use in this area, provided the scale steps down to the west.

This gateway should motivate better development in the block along Wall St between Portland/Olney and Wall/Greenwood, which is now a mess.

Name: Peter Gramlich.

Address:

Phone:

E-mail:

Bend Central Area Plan

Public Open House Comment Form

Please share your thoughts below on key issues related to the Draft Bend Central Area Plan.

Re timing & prioritizing -

I think a highly visible project is instrumental in helping the public visualize the CAP & in motivating private, subsequent development. One parcel that seems to lend itself to this possibility is the old Bulletin site at Portland and Wall. Ties in with gateway concept and would likely have parties interested in bidding for ownership. The site is less complicated than 3rd St, as far as ownership, and certainly visible and important.

Name: Peter Gramlich.

Address:

Phone:

E-mail:

Bend Central Area Plan

Public Open House Comment Form

Please share your thoughts below on key issues related to the Draft Bend Central Area Plan.

Great presentation! Nice
Explanation + good plan.

Name: Jim Elliott

Address: 42 NW Greeley Ave, Bend 97701

Phone: 383-3755

E-mail: telliott@bendbroadband.com

Bend Central Area Plan
Public Open House Comment Form

Please share your thoughts below on key issues related to the Draft Bend Central Area Plan.

WE WILL NOT SUPPORT ANY PLAN THAT DEVALUES OUR PROPERTY IN ANY WAY. We will support some changes that enhance our property's value.

We have owned this parcel since the 1970's and look forward to using it for our retirement, which we are not ready for now.

Since your planning description is so vague, we can not support what we're reading at the present time. We have had some generous offers for this property over the past few years, which we have turned down, as we have an excellent lessee since 1982.

Gary M. Wilde

Name: GARY WILDE

Address: 18048 MIDDLE ROCK CREEK LANE ARLINGTON, ORE 97812

Phone: 541-454-2995

E-mail:

Bend Central Area Plan
Public Open House Comment Form

Please share your thoughts below on key issues related to the Draft Bend Central Area Plan.

By what I understood of the plan I felt it to be ~~a~~ good plan. The only thing I don't understand is why the parkway was left out of redoing it also. How come there was no mention ~~th~~ of the changes it will undertake in the next 20-30 years. I would like to know more about this if any thing to know. As the parkway is a part of this central area too. And we have one house in the historic area and ~~the~~ one house in what you call the Northern area. Both close to the Parkway the Northern area house even closest.

Thank you
Lynne Shackell

Name: Simon & Lynne Shackell

Address: 202 NW Thurston Ave Bend Or

Phone: (541) 385-8692

E-mail: None

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M E M O R A N D U M

Date: **September 24, 2007**

To: **Brian Shetterly, Long-Range Planning Manager, City of Bend**
David Knitowski, Senior Planner, City of Bend
Mark Devoney, Planning Manager, ODOT Region 4

From: **David M. Siegel, AICP**
Project Manager

Subject: **Central Area Plan Part 2: Implementation Action Plan**

cc:

Project Number:

Project Name: **Bend Central Area Plan (CAP), Part 2**

Introduction

The City of Bend has been planning for the improvement of its downtown for many years prior to the initiation of the current Bend Central Area Plan (CAP) effort in 2004. These earlier efforts included establishment of an urban renewal district, streetscape improvements, parking improvements, and a wide range of other programs, facilities and improvements. In March 2004, City Council directed staff to begin the process of preparing a master concept plan for central Bend. The Central Area generally comprises the downtown business core area and its surrounding neighborhoods. The Central Area Plan takes a broad view of this Central Area of Bend, providing an overall vision and framework for future development, redevelopment, and investment. The Plan addresses the area bounded on the west by the Deschutes River, on the north by Butler Market Road, on the east by Fourth Street, and on the south by the Colorado/Arizona Street couplet.

The purpose of the Plan is to guide future growth – twenty, thirty years and beyond, while protecting the unique characteristics that have made Bend such a special place. In the face of rapid growth, the City wanted to address the possible implications of this growth in a forward thinking manner. The plan also identifies opportunities for the City to leverage its role in continuing to promote a livable Central Area through public-private partnerships, quality urban design, and effective transportation connections and transitions. The Plan provides the link between the existing successful downtown area and recent planning efforts by offering a land use and urban design framework along with a strategy designed to guide and catalyze future private and public investment.

Any good plan is accompanied by an implementation program…a program indicating the appropriate tools and actions for carrying out the plan. The purpose of this memorandum is to present the Implementation Action Plan being recommended to carry out the CAP. This implementation program will focus on the following:

- Recommended future transportation system and infrastructure improvements and any suggested changes to the City's Transportation System Plan;
- Recommended changes to the City's Comprehensive Plan, zoning code and implementing ordinances; and

- Recommended development and community projects important for creating a climate of investment in the Central Area, with recommended sources of funding for these and other improvements.

These three areas of focus have been discussed in depth in several technical memoranda accompanying the plan that address community design framework and urban form, existing and future transportation and infrastructure systems, land use, economics and real estate, and development/redevelopment opportunities. Each memorandum contains recommendations for short and longer-term actions to carry out the CAP. The purpose of the CAP's Implementation Action Plan is threefold:

- To collect all the recommended actions in one location and prioritize them;
- To identify those catalyst projects and actions needing to occur in the short-term, the near-term, and the longer term; and
- To separate the key short-term actions into three categories when appropriate: "process", "organizational", and "project-related".

Context

To help understand why certain actions are being recommended, it is appropriate to provide some foundational context with regard to the overall vision for the Central Area's future, and the principles guiding further refinement of the Plan.

1. Central Area Visioning

Early on in the planning process, the consulting team worked with a planning advisory committee to develop a vision for Bend's Central area…for what the greater downtown would be like in 20-30 years. In addition, vision statements were also generated for several of the Central Area's neighborhood districts: the Historic Downtown Core; the 3rd Street corridor; the Greenwood Avenue corridor; and the Bend Central neighborhood. The following area-specific vision statements were generated by the community and approved by the City Council in December, 2005:

A. The Central Area

"The economic leader and social focal point of the region, the Bend Central Area is comprised of several districts with their own distinct identity, character, and unique collection of uses. These districts represent a land use, transportation, and economic system that preserves and enhances the best parts of the Central Area while supporting revitalization where needed. Each district contributes to the overarching identity and overall sense of place for what is "Bend."

B. Historic Downtown Core

"The community's "public face", Bend's Historic Downtown Core is the heart and soul of the community, serving the traditional role of civic center or town square, and provides its primary park and open space access. It is the cultural, entertainment and specialty retail center of the community, vibrant and active from early in the day through late in the evening."

C. Greenwood Avenue Corridor

"The Greenwood Avenue Corridor serves as a major gateway to the Historic Downtown Core, and one of the primary connections between Third Street and the Historic Downtown Core area. Parts of the corridor have a historic character, while others have a multi-faceted identity, together boasting a wide range of uses and activities. Greenwood Avenue serves as an attractive boulevard along which the creative class can live, work, entertain, and play – a little "edgy," but safe and accessible to all by a variety of modes of transportation."

D. Third Street Corridor
"Third Street serves as a model for how a commercial strip can be "reclaimed" and woven back into the fabric of the community: an active and attractive boulevard, with a high-quality streetscape and useable public spaces that invite pedestrians, employees, and shoppers into the district. While Third Street still serves as a major north/south corridor, its environment is organized into a series of "rooms" or nodes of activity that add spatial depth and provide definition and identity for certain segments of the corridor, with more intense urban uses between the nodes. These "rooms" or nodes are defined by a series of east/west connections that provide access to the Historic Downtown Core and to neighborhoods to the east."

E. "Bend Central" Neighborhood

"The Third Street Corridor and the area between it and the Burlington Northern-Santa Fe Railroad is a new, mixed-use, east side downtown neighborhood connecting area residents and other users to Third Street and the Historic Downtown Core. Referred to as "Bend Central", the district supports the Historic Downtown Core's civic, cultural, and retail uses by providing a close-in location accommodating commercial, residential, and other uses demanded by Bend's rapid growth. This stylish, urbane district is characterized by higher density uses and taller structures than found elsewhere in the Central Area. A diversity of housing opportunities for all income levels are balanced with moderate scale employment and retail uses. A fusion of unique greenspace features and civic spaces for area residents provides opportunity for play, relaxation, and interaction within the neighborhood's built environment."

2. Guiding Principles
To ensure the planning effort was focused toward achieving the vision, the planning advisory committee and the broader community developed a set of guiding principles…statements reflecting desired outcomes. The guiding principles, which also served as criteria against which the success of the CAP would be gauged, are as follows:

- Base the plan upon a community-driven vision
- Create and maintain a "sense of place" and reinforce the area's distinct character
- Encourage a mixing of uses in development and activity centers
- Demonstrate density "done right"
- Ensure planning is based upon both current and future market reality
- Create access to and linkage between transportation modes
- Create effective connections between the Historic Downtown Core and adjacent districts
- Incorporate public spaces, pedestrian/bike facilities, and streetscape beautification
- Maximize development and redevelopment opportunities, and create activity centers or nodes of development where appropriate
- Ensure sensitive transitions between Central Area neighborhoods
- Establish an outcomes-oriented development strategy
- Identify and recommend improvements, actions and projects for carrying out the Plan

The Vision and Guiding Principles provided the foundation for developing the successive iterations of the Central Area conceptual plan and the aforementioned Technical Memoranda.

Implementation Concept

The Central Area Plan is an action-oriented plan with a 20-30 year horizon, focusing upon the projects and activities needing to be undertaken to carry out a clearly defined vision, a set of guiding principles, and a development/design concept. The CAP will be implemented in pieces, or components, over time. Some actions will be initiated in 2007, others initiated in the years to follow.

1. Implementation Action Plan

For a plan to be the "chart for change" it is intended to be, it must be accompanied by an implementation program…a strategy indicating the appropriate tools, actions and timelines for carrying out the plan. The Implementation Action Plan being recommended to carry out the CAP focuses on the following:

- Recommended future transportation system improvements and any suggested changes to the City's Transportation System Plan;
- Recommended changes to the City's Comprehensive Plan, zoning code and implementing ordinances;
- Recommended development and community projects important for creating a climate of investment Downtown,
- Recommended sources of funding for CAP-related improvements, and
- Suggested time frame for initiating key actions and projects.

Accordingly, it is recommended that the City review the CAP on a regularly-scheduled basis, and make amendments as opportunity or changing community and economic circumstances necessitates. Should there be a desire to change the guiding principles or shift the emphasis of a particular project, this plan-update process provides the mechanism for doing so within the context of reviewing the plan as a whole.

2. Programming Concept

A substantial number of actions, programs and projects are being recommended to carry out the CAP. Not all of these can be done at once, and consideration needs to be given at the outset to the grouping, phasing or timing of particular actions. It is recommended that the community program available/limited resources where they can do the most good, where they can leverage other resources or supporting activities or provide the "biggest bang for the buck", or where they can be concentrated to focus on a designated geographic target area. However, as opportunities and priorities change, or as additional funding becomes available, there may very well be the desire to change the geographic focus or implementation priorities for carrying out components of the CAP. The Incremental Implementation Strategy and its periodic review are intended to allow for and accommodate just this sort of flexibility.

All too often, the best-intended plans are approved without an action plan for implementation, without a system or process for monitoring progress, and without a time frame for checking back in and updating the plan to reflect progress made or changing conditions. The implementation strategy for the CAP is an assemblage of objectives and a game plan of short-term and medium-range actions for achieving them. Given the aforementioned Technical Memoranda and their recommendations for improvements and actions, the focus now turns to:

- Collecting all the recommended actions in one location;
- Categorizing the implementing projects and actions, and prioritizing them with regard to relative timing (e.g., short-term: 1-3 years; near-term: 4-6 years; and long-term: 7 years and beyond);
- Identifying those short-term actions needing to occur in each of the next three years to set the stage for the activities to be programmed for the next year.

The project team recommends that the City of Bend develop and maintain a short-term strategic action plan for incrementally implementing the CAP's recommendations for improvements and actions. It is envisioned that this would be viewed as an "Incremental Implementation Strategy"…a three year, renewable/rolling, short-term action plan that would be annually updated, with a regularly-scheduled monitoring and updating process and a supporting budget. A description of how such a program might operate is provided below.

> ***Example:*** In developing this Incremental Implementation Strategy, each of the CAP's Guiding Principles would be examined on an annual basis to ascertain the current status of progress in achieving them, and actions for moving ahead in each of the next three years would be identified and planned for. The activities for Year 1 would be tied to the City's annual operating budget. The activities identified for Year 2 and Year 3 would serve as a placeholder or indication of anticipated action-related resource needs for the coming two years. Once Year 1 is nearly complete, the status of activities would be reviewed, and the activities for Year 2 would be adjusted as necessary, as it will

become the new Year 1. Year 3 would be adjusted as appropriate in readiness for its becoming the new Year 2, and activities for a new Year 3 would be identified. The City would identify the coordinating body responsible for the monitoring, development and update of the Incremental Implementation Strategy, and for the coordination of the various City departmental activities to fund and/or carry out the strategy. City staff or the identified coordinating body would provide the City Council with a regularly scheduled status report on implementation activities. This regular monitoring, reporting and updating helps to keep the CAP flexible and current, keeps all City departments focused on the carrying out of this important public policy objective, and keeps the CAP and its implementation on the "front burner".

As indicated above, it is recommended that the City review the CAP on a regularly-scheduled basis (every few years), and make amendments as changing community and economic circumstances (and/or opportunity) necessitates.

Incremental Implementation Strategy

As mentioned earlier, the Technical Memoranda accompanying the Plan contained discussion and recommendations for short and longer-term actions for carrying out the CAP, including:

- Recommended development and community projects important for creating a climate of investment in the Central Area (e.g., the "catalyst projects"),
- Recommended future transportation system improvements and any suggested changes to the City's Transportation System Plan;
- Recommended changes to the Bend Area General Plan, zoning code and implementing ordinances;
- Recommended sources of funding for CAP-related improvements, and a
- Suggested time frame for initiating key actions and projects.

As these projects and actions have been discussed in the Technical Memoranda, this discussion will not be repeated here. A full listing of the recommended projects and actions is included in a summary matrix below, along with an indication of their relative priority (short-term, near-tern, long-range).

Those projects and actions which can be considered as "catalyst projects"…those seen as being able to substantively alter the development environment in the study area… will be discussed in the sections that follow. An initial indication of when these projects and actions should be prioritized/programmed will also be provided below. There are numerous improvements, projects and actions being recommended in the CAP; there are a number of these which are considered to serve as catalysts for carrying out the Plan.

In addition, there will be a discussion of the "foundational" actions needing to be taken to realize the public policy objectives of this Plan, and its vision. These actions will be presented within three categories:

1. Land Use Code and Regulatory Adjustments
2. Funding Sources
3. Organizational/Follow-Up Actions

Finally, realizing that not everything can be done within a short time frame and that there are other community priorities needing to be addressed, those seen as having the most importance to undertake within the first three years are highlighted within a Short-Term Action Plan.

<u>1. Summary of Recommended Improvements</u>

As mentioned above, a listing of the projects and actions recommended within the Technical Memoranda providing the foundation for the Central Area Plan is included in a summary matrix to this document, along with an indication of their relative priority (short-term, near-term, long-range). Projects and actions have been organized within the following four categories:

- Transportation and Infrastructure
- Development and Redevelopment
- Design and Public Spaces
- Land Use, Regulatory and Organizational Improvements
- Funding Tools and Actions

These projects serve as a starting point for further consideration and future updating of the Central Area Plan. They represent the initial thinking of the project team regarding the most appropriate steps for beginning the long-term journey of achieving the future Central Area as envisioned by the Central Area Plan.

2. Catalyst Projects and Their Implementation

A subset of the list provided above, "Catalyst Projects" are those seen as being able to substantively alter the development environment in the study area. These projects represent key components of the overall plan, and their development would be expected to serve as a catalyst for development in the study area consistent with that outlined in the plan. A number of catalyst projects were identified by the project team and the planning advisory committee. Each of these projects is noted on the Catalyst Project graphic from the Central Area Plan (also provided as Attachment A to this document) In some instances, a catalyst project is an idea or a program requiring a refinement study to pin down a concept, a location, a cross-section or access point, a footprint or criteria for subsequent development proposals. Accordingly, in the short description of each catalyst project, the proposed preliminary "set-up" tasks or refinement study is briefly described. Catalyst projects have been categorized into the following three areas: Transportation; Development and Redevelopment; and Design and Public Spaces.

A. Transportation Catalysts

As mentioned above, Technical Memorandum #6 (Appendix F) presents a number of projects, studies and actions to be undertaken over time to carry out the Central Area Plan. Those projects and actions that should be taken over the next 1 to 5 years to help "jump start" revitalization along the 3rd Street Corridor include:

- Pedestrian improvements under the railroad and the Bend Parkway for Greenwood and Franklin Avenues to add lighting and security, and to improve line of sight. Interim measures to improve flooding problems should also be provided.
- Install a raised and landscaped median along 3rd Street between Greenwood and Franklin Avenues with ADA-compliant pedestrian projects at selected locations.
- Design and build 2nd and 4th Streets to full 70-foot cross-section as identified with the couplet concept, but retain 2-way operations between Greenwood and Franklin Avenues until additional phases of couplet development to the north and south can be completed.
- 3rd Street Corridor Refinement Plan – develop consensus on a preferred concept; lay out linear details of the concept including identification of right-of-way and access needs; prepare detailed cost estimates and an implementation strategy.

Implementation Timing for Transportation Improvements & Actions

Description	YR 1- 3	YR 4-6	YR 7-10	ONGOING
Greenwood Avenue Pedestrian Undercrossing				
Design	X			
Construction		X		
Franklin Avenue Pedestrian Undercrossing				
Design	X			
Construction		X		

3rd Street Landscaped Median				
Design	X			
Construction		X		
2nd Street Widening & Improvements				
Design	X			
Construction		X		
4th Street Widening & Improvements				
Design	X			
Construction		X		
3rd Street Corridor Concept Refinement				
Conduct refinement plan	X			
Amend CAP, General Plan, TSP if needed	X			

B. Development and Redevelopment Catalysts

While there are a number of projects, studies and actions to be undertaken over time to carry out the Central Area Plan, those development and redevelopment projects and actions that should be taken over the next few years to help "jump start" envisioned development within the Central Area include the following:

- Bend Bulletin Site – This publicly owned parcel could be redeveloped as a mixed-use housing project, providing workforce housing in close proximity to the downtown jobs base. The City could recruit a developer through a competitive request for qualifications (RFQ) process.

- Hawthorne Avenue Mixed-Use Development – To activate the Railroad District as well as a new Hawthorne Avenue connection, multiple mixed-use developments should be built in the area on opportunity sites. Uses along Hawthorne should include office and housing, with a small amount of ground-floor retail and service uses.

- Redevelopment at 3rd Street and Greenwood Avenue – This project would activate the 3rd Street and Greenwood Avenue gateway, providing a signature building of active retail, office, and/or entertainment uses. While too busy for housing, the high traffic flow could benefit commercial users.

- Structured parking facilities – The scale of development envisioned for the areas west of 3rd Street and east of the Parkway will require structured parking. However, structured parking is difficult to accommodate on smaller parcels and is very expensive. Shared parking structures that can serve multiple adjacent and nearby properties would allow for more efficient use of parking facilities and would reduce the cost of development. A parking district or other mechanism should be formed to ensure that development pays its fair share when parking is not required by each project.

- Relocate auto dealers and light industrial businesses – Relocate existing businesses to new sites in order to free up existing properties for redevelopment. This could include the creation of an auto mall somewhere in Bend, which could be facilitated through a public-private partnership.

- Infill housing between southern central neighborhood and the Old Mill District – This area, generally between Colorado and Arizona is already developing with a mix of housing and retail uses. These uses should continue to be built on remaining vacant land to provide additional close-in housing while also buffering the Old Bend neighborhood from the Old Mill District.

- Infill housing in the northern central neighborhood – Medium-density infill housing in this area would strengthen the residential character of the neighborhood while providing new housing opportunities close to downtown.

- Mirror Pond Parking Area redevelopment - Conduct an interactive and participatory process to determine a future vision for redevelopment of the Mirror Pond Parking Area. Hold community workshops to set goals, identify/evaluate options, and refine a preferred option and course of action for carrying it out.

- City Hall and "Civic Center/Civic Neighborhood"" improvements – Prepare master plan for use and design of design of buildings, parking and open spaces in the Civic Neighborhood. Initiate property acquisition and consolidation, recruit a developer through a competitive request for qualifications (RFQ) process.

Implementation Timing for Development & Redevelopment Improvements and Actions

Description	YR 1- 3	YR 4-6	YR 7-10	ONGOING
Bend Bulletin Site Housing/Mixed Use				
Program development/RFP	X			
Design and construction		X		
Hawthorne Avenue Mixed Use				
Program development/RFP	X			
Design and construction		X		
3rd/Greenwood Gateway Redevelopment				
Program development/RFP	X			
Design	X			
Construction			X	
Structured Parking Facilities				
Program development	X			
Design		X		
Construction			X	
3rd Street Auto Dealership & Industrial Relocation				
Program development	X			
Land assembly	X	X		
Design and construction		X		
Infill Housing - South				
Program development	X			
Design	X			
Construction		X		
Infill Housing – North				
Program development	X			
Design and construction		X		
City Hall/Civic Center Improvements				
Public process – vision and plan	X			
Program development	X			
Design and construction		X		
Mirror Pond Parking Area Redevelopment				
Public process – vision and plan	X			
Program development	X			
Design and construction		X		

C. Design and Public Space Catalysts

There are several catalyst projects that fall under the category of “design and public space catalysts” that should be taken over the next several years to help “jump start” envisioned development within the Central Area include the following:

- Acquisition of Bend Central Neighborhood Park Sites – Begin securing park, plaza and open space sites within the neighborhood in advance of envisioned development actions. Being able to provide park and open space amenities early on or in conjunction with new development will help establish the desired context for future development.

- Heritage Square/Civic Center Plaza/Space – Consistent with the recommendations within the first phase of the Central Area Plan for focusing civic uses within a “civic neighborhood”, develop the concept plan and development criteria for the Civic Neighborhood site, sufficient for preparing and issuing a request for development proposals, establish a development program, and begin acquisition of balance of civic neighborhood properties.

- Franklin and Greenwood Avenue Gateway Design – Establish a public process (and perhaps a design competition) for identifying needed functional and aesthetic improvements, identifying funding sources, and programming improvements.

- Hawthorne Trail (Juniper Park to Hill St.) – Establish a public process to identify desired alignment, features and improvements to link the Historic Downtown Core and the Bend Central neighborhood with Juniper Park. Identify needed improvements early-on, and protect for future construction.

Implementation Timing for Design and Public Spaces Improvements and Actions

Description	YR 1- 3	YR 4-6	YR 7-10	ONGOING
Acquisition of 1st Street Park Sites				
Identification of sites	X			
Site acquisition	X	X	X	
Heritage Square/Civic Center Plaza/Space				
Public process – vision and plan	X			
Program development	X			
Property assemblage		X		
Design		X		
Construction		X		
Franklin Avenue Gateway Design				
Public process – vision and plan	X			
Design	X			
Construction		X		
Greenwood Avenue Gateway Design				
Public process – vision and plan	X			
Design	X			
Construction		X		
Hawthorne Trail (Juniper Park to Hill St.)				
Public process – vision and plan	X			
Program development	X			
Design	X			
Construction		X		

3. Foundational Funding, Land Use, Regulatory and Organizational Improvements

In addition to the projects that have been identified as “catalyst projects”, those seen as having the potential to help “jumpstart” development and redevelopment activities, there are a number of other projects and actions being recommended that are needed to form the foundation for helping realize the public policy objectives of this Plan, and its vision. These “foundational” recommendations fall under several categories: Land Use Code and Regulatory Adjustments; Funding Sources; and Organizational and Follow-Up Actions.

A. Land Use Code and Regulatory Adjustments

The existing Community Development Code, the Bend Area General Plan and their associated ordinances and policies do not allow the flexibility needed to allow for the mix of uses as envisioned in the Central Area Plan. A review of these documents revealed that guidance is needed within the existing regulatory framework to shape the rapidly growing Central Area in accordance with the Central Area Plan and its vision. Accordingly, the Plan recommends the following:

- Expansion of the area covered by the City’s Central Business District. The expanded area would include all areas referred to by the Central Area Plan as the Historic Downtown Core, as well as commercial districts north to Revere Avenue west of the Bend Parkway, enabling the unification of the “core” of the Central Area through urban design and development.

- Adoption of Mixed-Use Zoning in the Bend Central District and the Industrial and Employment District. Mixed-use zoning will allow the flexibility and greater density required to achieve the Central Area Plan’s vision. This can be accomplished either through the adoption of two new mixed-use base zones for the Bend Central District and the Industrial and Employment District in Development Code Chapter 2.3 or through the adoption of a special Central Area Plan Refinement Overlay district in Development Code Chapter 2.7. Either of these actions would require an amendment to the Area General Plan text and map.

- Rezoning of areas to Mixed Employment. There are areas within the Bend Central neighborhood district that are currently designated as Mixed Employment by the Bend Area General Plan, but zoned as Light Industrial (a zone with less flexibility to achieve the envisioned development within this area). Because creation and approval of the new base zones in this area will take time, it is recommended that in the City take the interim step of rezoning these areas to Mixed Employment, making them consistent with the Bend Area General Plan.

- New overlay zone. In the interim period while details for the new base zones are refined and the new zones put in place, it is recommended that a Central Area Plan Overlay be applied as soon as possible to the expanded area to which the Central Business zone is recommended to be applied; the Bend Central neighborhood district; and the Industrial and Employment neighborhood district. Application of this overlay will ensure coordination, review and appropriate guidance of potential development proposals that might have the ability to limit or preclude options for future, envisioned uses pending approval of the recommended expansion of the area zoned as Central Business, the new special plan district or the two new mixed use base zones.

- Implementing Design Standards and Bend Central Performance Guidelines. The design standards required for development in the existing area zoned Central Business should also be applied to the proposed Bend Central District until specific design standards for this area have been developed as part of the new mixed use zone or the special district plan. The City should also consider offering an alternative review track/process for those developers seeking additional flexibility by demonstrating adherence to Central Area Plan Performance Guidelines.

With regard to the timing that ought to be associated with carrying out these land use, code and regulatory adjustments, this Plan recommends that an interim Central Area Plan Overlay be put in place as soon as possible to provide protection from future development actions that might compromise opportunities and/or location of future improvements, or preclude the type and form of development envisioned by this Plan. Concurrently with the adoption of the overlay zone, the City will need to conduct a Measure 37 analysis of the recommended zoning for Downtown Bend. Following these actions, adjustments to the Bend Area General Plan should be refined and adopted to set the framework to guide the future refinement and adoption of the changes to the community's Development Code.

The following sections summarize the findings and recommendations contained within the Land Use Regulatory Recommendations Technical Memorandum (CAP Appendix M).

1. Bend Area General Plan

To be consistent with the vision of the Central Area Plan, the City needs to make some adjustments to policy statements and implementation strategies within the Bend Area General Plan. The recommendations are focused on emphasizing the multi-functional character and vibrancy desired within Downtown and also allow for consideration of additional funding mechanisms. Additionally, the Area General Plan text and map will need to be amended to reflect the proposed expansion of the CB zone and the addition of two mixed use zones or special planned district overlay. These are discussed in the Technical Memorandum addressing Land Use Regulatory Recommendations (Appendix M).

2. Development Code and Performance Standards

Given the desired characteristics for an improved Downtown Bend and the analysis of the current Central Business zoning in the Community Development Code, it is recommended that the area covered by the CB zone be expanded. It is also recommended that either two new zones be created for application to the Bend Central District and the Industrial and Employment District or that a special Central Area Refinement Overlay be adopted into the Development Code.. These recommended development code changes are designed to guide and enable land uses as they have been envisioned within the Central Area Plan.

In the interim, it is recommended that the City initiate a zone change from Light Industrial to Mixed-use Employment in the Bend Central District to allow flexibility and bring the zoning into consistency with the Area General Plan designation.

Bend has previously developed design standards for its downtown area within the regulations of the CB zoning designation. Specific guidance for recommended changes to the City's development code, as well as incorporating Central Area Plan Performance Guidelines that are consistent with carrying out the vision and guiding principles of this Central Area Plan are contained within the Technical Memorandum addressing Land Use Regulatory Recommendations (Appendix M).

3. Transportation System Plan Amendments

There are several recommended changes to the Transportation System Plan (TSP), including new street designations for Great Streets and Green Ladder Streets. It is also recommended that a 3rd Street transportation refinement study be conducted to assess the feasibility of a 2nd and 4th Street couplet. Depending on the results of this refinement study, it is recommended that the TSP be amended to include the 2nd and 4th Street couplet configuration called for in the Central Area Plan.

4. Measure 37

The recent passage of Measure 37, requiring waivers of regulations or compensation to property owners if regulations have the effect of reducing a property's value, presents a challenge to every Oregon jurisdiction, as communities are still determining how to address it. Accordingly, the potential "Measure 37 impacts" of the Central Area Plan have yet to be addressed. It is recommended that this issue be addressed by the City in consultation with the state and

Deschutes County as soon as possible. Once Measure 37 issues are addressed, the Central Area Plan may need to be revisited if adjustments appear to be required.

Implementation Timing for Land Use, Code and Regulatory Improvements & Actions

Description	YR 1- 3	YR 4-6	YR 6-10	ONGOING
Measure 37 Analysis	X			
Comprehensive Plan Amendments	X			
Transportation System Plan Amendments	X			
Development Code/Zoning and Standards	X			
Zone change to ME for areas within Bend Central neighborhood district currently designated as Mixed Employment by the General Plan	X			
Central Area Plan Overlay Zone	X			
Establishment of Expanded CB zoning and New Mixed-Use Zones	X			
Development Incentives				
Establish incentive program	X			

B. Funding Sources

Specific public-improvement projects can come about as a result of local, state and federal grants, private investment and donations, city general fund allocations and other sources of public financing. A variety of funding tools, options and policies were discussed in the process of preparing this Plan, and more detailed information on these is provided in the appendices to this document. Bend has a number of financing tools currently in place, or that can be easily activated to generate revenue. A list of these tools and the activities needing to be pursued to enable the City to generate the level of funding necessary to carry out the range of improvements recommended by this plan is provided in the Technical Memorandum laying out the Financial Tool kit for Implementation, and summarized in an attachment to this document.

It should be noted that implementing the recommended Central Area Plan is not reliant upon any one of the above funding sources being available. An effort to investigate, arrange and execute (or make available) the most appropriate package of funding mechanisms, tools and financial incentives should be undertaken early-on in order to maximize potential opportunities.

Implementation Timing for Funding Improvements & Actions

Description	YR 1- 3	YR 4-6	YR 7-10	ONGOING
Urban Renewal District				
Develop urban renewal plan	X			
Activate & maintain district	X	X	X	X
3rd St. Business Improvement District				
Establish district	X			
Operate & maintain district	X	X	X	X
Central Area Parking District				
Establish district	X			
Operate & maintain district	X	X	X	X
Central Area Financing Program				
Commission the study & plan	X			
Establish & maintain Central Area Financing Program	X	X	X	X

C. Organizational/Follow-Up Actions

There are three actions falling within the “Organizational/Follow- Up” category that will help set the stage for carrying out the Central Area Plan:

1. **Central Area Advocacy Office**
A number of the recommended actions for carrying out this Plan will require focused support from staff. Tasks requiring such support include establishment and maintenance of an urban renewal district, development of Central Area Neighborhood Plans, property owner outreach efforts, property assemblage, project development and administration, housing program development and maintenance, and update/maintenance of a short-term implementation strategy. Among the catalyst projects recommended for approval is the establishment of a Central Area Advocacy Office, charged with carrying out the short-term action plan, and for monitoring and updating the program for implementing the Central Area Plan and its vision.

2. **Central Area Plan Action Groups**
During Plan development, the Central Area Plan Project Advisory Committee worked hard at addressing projects, tools and techniques for carrying out the plan. It is recommended that some form of this committee be appointed and charged with helping to flesh out and carry out the Plan’s recommendations in three categories: Funding Sources; Catalyst Projects; Land Use and Neighborhood Planning; and smaller, “Brand Bend” projects (the many, smaller projects that help generate interest and maintain momentum). It is recommended that the Committee organize three “action groups” to advise them and the Council in carrying out the Plan.

3. **Funding Workshop**
The process of developing and carrying out the Central Area Plan and its recommendations has created a window of opportunity for leveraging resources, building upon synergies, and developing partnerships. What is the potential for partnership, and how can various sources of revenue be tapped, or incentives taken advantage of to carry out the projects and ideas envisioned by the Plan? An annual “Developing Partnerships & Funding Downtown’s Future” workshop is proposed for the first few years of the Plan’s implementation to help stimulate interest, share ideas and information, and to generate and maintain a climate that facilitates investment.

Implementation Timing for Organizational/Follow-up Improvements & Actions

Description	YR 1- 3	YR 4-6	YR 7-10	ONGOING
Central Area Advocacy Office				
Form Office	X			
Regular Reporting & Updating	X	X	X	X
Central Area Plan Action Groups				
Form and Operate Action Groups	X			X
Developing Partnerships & Funding Downtown’s Future (Workshop)				
Prepare and hold workshop	X			

Short-Term Action Plan

As mentioned earlier in this memorandum, there are many projects and actions recommended for carrying out the Central Area Plan. A rapidly-growing community like Bend has a number of important projects and programs competing for limited time and financial resources. Attached to this document (Attachment A) is a summary matrix displaying recommended actions and projects for implementing the Plan over time. In the discussion provided above, a subset of this list has been identified as being “catalyst projects”…those projects seen as having the ability to help jumpstart the development and actions envisioned by the Central Area Plan.

Realizing that the City and its planning partners cannot do it all at once, a short-term plan for initiating those actions which are critical to initiating the realization of the Plan and its vision is of utmost importance. It is important that the recommended projects and actions within this Short-Term Action Plan combine visible improvements with the somewhat (initially) “invisible” efforts to set the stage for enabling and encouraging envisioned growth, development and change to occur. This smaller list of high-priority projects is intended to respond to the question of “what is the short list of actions that can be undertaken within the first three years to initiate and demonstrate movement and set the stage for other actions to follow”?

The actions contained within this initial short-term plan are presented within three categories: process improvements; projects and actions; and organizational improvements, and are listed in the tables provided below. It should be noted that there are a number of projects, improvements and actions recommended within the technical memoranda accompanying the CAP, and some of these are short-term in nature. Not all short-term projects are contained within this Short-Term Action Plan. The City may wish to revisit this recommended Short-Term Action Plan as opportunities arise, priorities change, or the capacity to undertake additional projects increases.

1. Process Improvements

There are four short-term process improvements and actions that are critical to the initiation and ongoing success of the CAP's incremental implementation strategy, as follows:

- Codes, Standards and Controls: These are the stage-setting amendments to plans, codes and regulatory processes needed to encourage envisioned development to occur.
- Financing Mechanisms: Establishment of an urban renewal district and a business improvement district in the 3rd Street area will help generate revenue for carrying out Central Area Plan Improvements.
- 3rd Street Corridor Refinement Plan: Developing the details on the preferred concept, linear details including identification of right-of-way and access needs, detailed cost estimates, and an implementation strategy.
- Central Area Financing Program: There are many financing and funding mechanisms available for facilitating Central Area improvements. Which are most appropriate, and how should they be used (and in what combination) to "get the most bang for the buck"?

Implementation Timing for Key Short-Term Process Improvements & Actions

Description	Year 1	Year 2	Year 3
Codes, Standards & Controls			
Measure 37 Analysis	X		
Comprehensive Plan Amendments	X		
Transportation System Plan Amendments		X	
Development/Design Standards		X	
Catalyst Opportunity Overlay Zone(s)	X		
Establishment of New CB and Mixed-Use Zones	X		
Develop CAP Incentives & Program		X	
Urban Renewal District			
Develop urban renewal plan	X		
Activate & maintain district		X	
3rd Street Corridor Concept Refinement			
Conduct refinement plan	X		
Amend CAP, General Plan, TSP if needed		X	
3rd Street Business Improvement District			
Establish district	X		
Ongoing operation	X	X	X
Central Area Financing Program			
Commission the study & plan	X		
Establish & maintain Central Area Financing Program		X	X

2. Projects and Actions

There are five short-term projects and actions that are critical to the initiation and ongoing success of the CAP's incremental implementation strategy, as follows:

Implementation Timing for Key Short-Term Projects & Actions

Description	Year 1	Year 2	Year 3
Greenwood/Franklin Undercrossings			
Public design process	X		
Preliminary engineering		X	
3rd/Greenwood Mixed Use Development			
Feasibility/preliminary design & guidelines		X	
Land disposition-methodology/programming		X	X
Land assembly		X	X
Developer RFP			X

Bend Bulletin Site Housing/Mixed Use			
Feasibility/preliminary design & guidelines	X	X	
Land disposition-methodology/programming		X	X
Developer RFP			X
3rd Street Landscaped Median			
Preliminary engineering		X	
Initial short-term improvements			X
3rd Street Auto Dealership and Industrial Use Relocation			
Research feasibility, dealer needs, “receiving” sites	X		
Develop relocation plan		X	
Establish relocation incentive program			X

3. Organizational Improvements

There are three short-term organizational improvements and actions that are critical to the initiation and ongoing success of the CAP’s incremental implementation strategy, as follows:

- **Central Area Advocacy Office**: Establishment of a group of staff or another entity charged with carrying out the short-term action plan, and for monitoring and updating the program for implementing the Central Area Plan and its vision.
- **CAP Implementation Action Groups**: Appointed and charged with helping to flesh out and carry out the Plan’s recommendations in three categories: Funding Sources; Catalyst Projects; Land Use and Neighborhood Planning; and smaller, “Brand Bend” projects.
- **Northern Neighborhood Planning Program**: Establishment of a program to work with the community to prepare area-specific plans for the three Northern Neighborhoods reflecting the Central Area Plan’s vision and principles.

Implementation Timing for Key Short-Term Organizational Improvements & Actions

Description	Year 1	Year 2	Year 3
Central Area Advocacy Office			
Establish office	X		
Quarterly reporting on progress to Council	X	X	X
Annual update of Short-Term Action Plan and Implementation Strategy	X	X	X
Implementation Action Groups			
Establish Action Groups	X		
Ongoing operation	X	X	X
Northern Neighborhood Planning Program			
Establish program	X		
North CAP Neighborhood Plan		X	
Division-Commercial Neighborhood Plan			X
Northern Employment Neighborhood Plan		X	

Conclusion

As stated in the beginning of this document, the purpose of the Central Area Plan is to guide future growth – twenty, thirty years and beyond, while protecting the unique characteristics that have made Bend such a special place. The purpose of this memorandum is to present the Implementation Action Plan…a program indicating the appropriate tools and actions for carrying out the Central Area Plan. This implementation program focuses on the following:

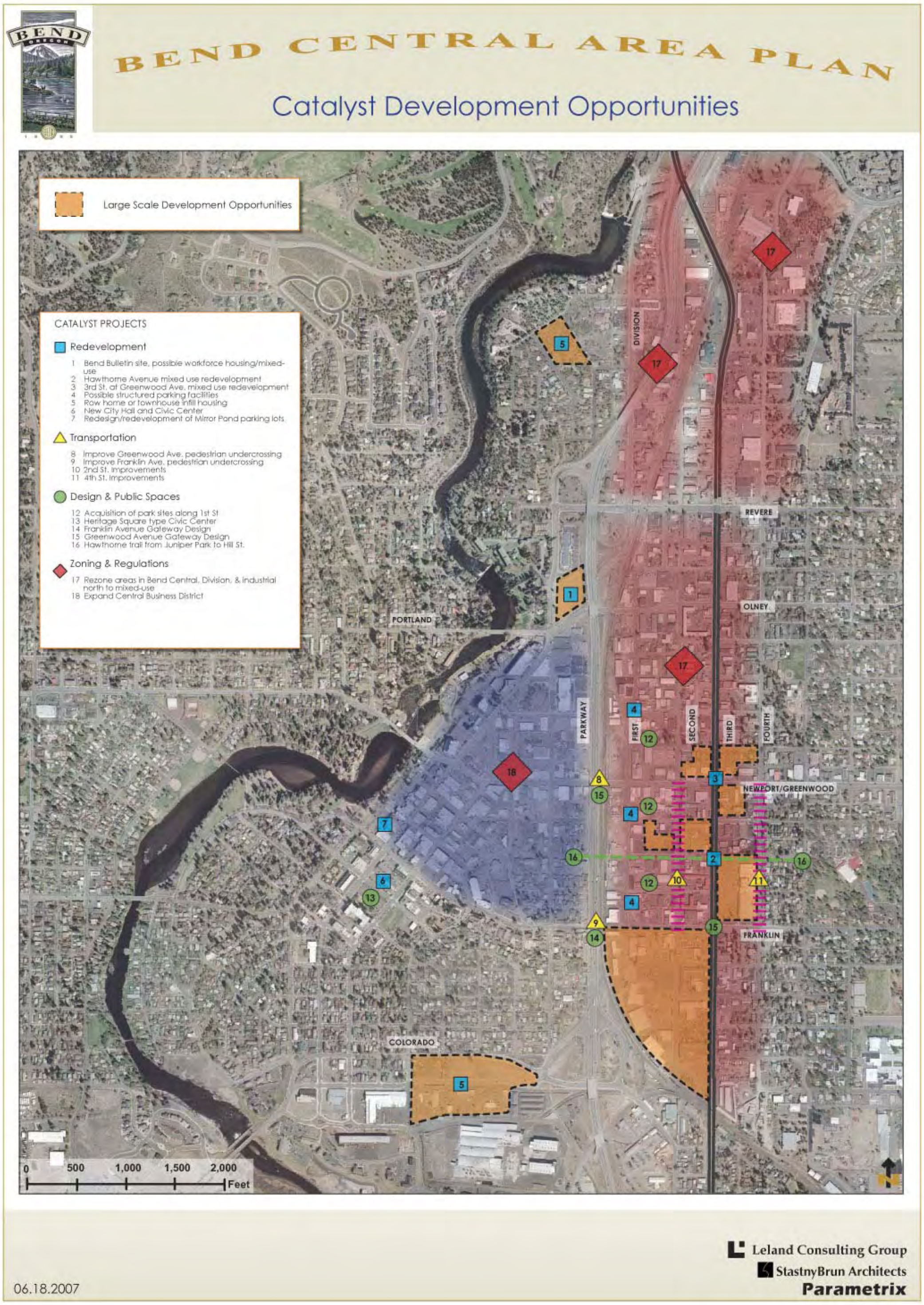
- Recommended future transportation system and infrastructure improvements;

- Recommended changes to the City's incentive and regulatory environments (e.g., changes to the Comprehensive Plan, Transportation system Plan, zoning code, implementing ordinances and standards; and
- Recommended development, open space, and community projects important for creating a climate of investment in the Central Area, and recommended sources of funding for these and other improvements

It is anticipated and intended for this Incremental Action Plan to be closely monitored, reported upon to City decision makers, and updated on an annual basis. By doing so, the City will be more likely to achieve the outcomes envisioned by the Central Area Plan in a timely and effective manner.

Attachment A

Recommended Catalyst Projects
Central Area Plan



Attachment B

Central Area Plan Financial Tool Kit
Summary and Recommendation

Potential Tools: Development and Other Project Funding

- ***Tool:*** Tax Abatements
  - ***Action:*** Allow for property tax abatements for dense housing development, under the State's Vertical Housing Tax Credit Program. ***Note:*** Can impact tax increment revenues in an urban renewal district.

- ***Tool:*** Urban Renewal District
  - ***Action:*** Define a boundary for a new district and prepare Urban Renewal District Plan.

- ***Tool:*** Business or Local Improvement District
  - ***Action:*** Explore establishment of committed funding sources to pay for identified improvements along the 3rd Street Corridor.

- ***Tool:*** Low Income Housing Tax Credits
  - ***Action:*** Examine for applicability in Central Area, possibly in association with suggested catalyst project for mixed use/workforce housing at Bend Bulletin site.

- ***Tool:*** Multi-Family Housing Tax Abatement
  - ***Action:*** Consider relaxing the criteria to allow for tax abatement on a wider range of housing.

- ***Tool:*** Central Area Parking District
  - ***Action:*** Examine for further applicability in the Central Area, possibly as a dedicated fund for development of Central Area Plan-related parking facilities.

- ***Tool:*** Transient Room Tax
  - ***Action:*** Consider raising the tax and perhaps dedicating a specific portion to Central Area improvements.

- ***Tool:*** Façade Improvement Program
  - ***Action:*** Consider using in conjunction with new urban renewal district to establish and help fund a program for visible improvements that help carry out the vision.

Potential Tools: Sustainability and Energy

- ***Tool:*** EPA Brownfields Program
  - ***Action:*** Investigate potential applicability to help fund assessment and cleanup of former industrial sites suggested for potential redevelopment.

- ***Tool:*** Energy Trust of Oregon
  - ***Action:*** Obtain and disseminate information for potential application to specific development proposals.

- ***Tool:*** Oregon Energy Loan Program
  - ***Action:*** Obtain and disseminate information for potential application to specific development proposals.

Potential Tools: Infrastructure Funding

- ***Tool:*** Grants
  - ***Action:*** Establish a coordinated and focused strategy for applying for Federal, State and Regional grants to help fund transportation and other catalyst and infrastructure projects. A list of potential grant sources is provided in Appendix L (Funding Tool Kit Memorandum).

- ***Tool:*** Systems Development Charges
  - ***Action:*** Consider creating new SDC assessments in specific districts dedicated to specific infrastructure investments.

Potential Tools: Implementation Incentives

- ***Tool:*** Expedited Permitting
  - ***Action:*** Consider how to fund additional staffing resources for expedited permit processing within the Central Area to incentivize development.

- ***Tool:*** Land Assembly
  - ***Action:*** Pursue land assembly of identified key parcels to form parcels of sufficient size to accommodate envisioned development.

- ***Tool:*** Fee Waivers and Reductions
  - ***Action:*** Consider reducing or waiving certain fees if specific criteria are met for achieving specific public policy objectives.

BEND CAP
Project Memorandum

TO:	Project Team
FROM:	Chris Zahas, Leland Consulting Group
DATE:	6 June 2007
SUBJECT:	Financial Tool Kit for Implementation, Bend Central Area Plan, Part 2 Project Number: 4503.2

Development Funding Tools

Tax Increment Financing/Urban Renewal – Tax increment financing (TIF) is one of the most powerful public funding tools for revitalization. TIF is a mechanism where public projects are financed by debt borrowed against the future growth of property taxes in a defined urban renewal district. The assessed value of all properties within the district is set at the time the district is first established (the base). As public and private projects enhance property values within the district, the increase in property taxes over the base (the increment) is set aside. Debt is issued, up to a set maximum amount, to carry out the urban renewal plan and is repaid through the incremental taxes generated within the district. Urban Renewal Districts usually are in effect for 15 to 20 years. When the district is retired, the base is removed and all property taxes in the district return to normal distribution. Bend currently has urban renewal districts in the Downtown Historic Core and at Juniper Ridge, but not in the Central Area east of the Parkway. Since Bend has used this funding mechanism before, has an urban renewal agency in place to administer it, and because it is such a useful tool for revitalization, it should be strongly considered to help fund projects in the Central Area.

Enterprise Zone – An Enterprise Zone is a State-designated area where businesses located within them that make capital investments, hire new employees, contribute to economic development plans, rehabilitate old buildings, and/or do research and development are provided a tax credit and potentially other development incentives. An Enterprise Zone designation would be an incentive to attract business investment in the Central Area.

New Market Tax Credits – New Market Tax Credits can be used to fund projects by selling credits against Federal income taxes to taxable investors for making qualified equity investments in designated Community Development Entities (CDEs). NMTCs are allocated annually to CDEs under a competitive application process. CDEs then offer these credits to investors in exchange for stock or capital interest in the CDEs. CDEs then invest in projects in designated low-income census tracts (in the CAP, the area south of Franklin qualifies, but the area to the north does not). While limited in geographical eligibility in the Central Area, NMTCs can generate significant funding for projects and should be investigated further.

Low Income Housing Tax Credits – Granted by the State through a highly competitive process, Low Income Housing Tax Credits (LIHTC) provide equity capital for multifamily rental housing developments for low-income households. The credit contributes to project equity, reducing developer's out-of-pocket investment and can be a significant incentive for the provision of affordable housing. Since Bend already faces a significant workforce housing shortage, LIHTCs could be a useful tool to support new housing development in the Central Area.

Local Improvement District – A Local Improvement District, or LID, is a special assessment district where property owners are assessed a fee to pay for capital improvements such as sidewalks, underground utilities, shared open space, and other features. LIDs are typically petitioned by and must be supported by a majority or supermajority of the affected property owners. Since LIDs are funded by private property owners, they can help share the funding burden in a public-private partnership. Further, since it requires private property owner support, it is a good mechanism to help organize property owners around a common goal.

Business Improvement District/Economic Improvement District – A Business or Economic Improvement District is a special assessment district where property and/or business owners are assessed a fee to pay for programs and services that benefit the area such as business marketing, extra street cleaning, flower baskets, events, security patrols, and other non-capital expenses. A BID or EID is petitioned and must be supported by a majority or supermajority of property and/or business owners. A BID/EID is an excellent tool to ensure adequate funding for a business or district association, including funding for a full-time director. A BID was recently passed in downtown Bend, but nullified due to a technicality and is expected to be proposed again soon. BIDs are useful in both early and late stages of revitalization, where they can help organize businesses in early years and help maintain programs and services in later years after capital improvements are in place.

Multifamily Housing Tax Abatement – As an incentive for new housing development, the City can abate or reduce a portion of tax burden for multifamily housing development (either apartments or condominiums). Taxes are typically abated for a period of ten years and appear as a property tax savings for condominium owners or apartment building owners. Bend already has a policy in place to do this for projects that provide housing for families earning less than 60 percent of the area median income. In order to spur additional housing development in the Central Area, the City could consider relaxing the criteria to allow for tax abatement on a wider range of housing.

Parking District – A Parking District is a special district created to fund parking improvements and programs. Typically, the District receives funding from parking meters, garages, and fines. Funds in a Parking District are part of a special enterprise fund, remaining separate from the City's general fund.

The City of Bend currently has a program that provides funding for city provided parking structures in the CB zone by charging a fee to developers in-lieu of providing parking. Since the Plan calls for densities that require structured parking for many parts of the Central Area, and since structured parking is particularly expensive an often not

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feasible for development outside the Historic Core, a Parking District could be established for the Bend Central area to alleviate this burden and spur denser development along Third Street quicker than the private sector would otherwise build. The City's 2007-2008 in-lieu of fee program in the CB zone charges $20,656 per required parking space for automobiles and $1,033 per required space for bicycles. A new parking district for the Bend Central area could include a similar program.

Both the existing program in the CBD and a new in-lieu of fee program established for the Bend Central area should anticipate parking needs, provide parking in a timely manner as the area develops, charge adequate fees for the city to construct and maintain parking facilities, and retain fees specifically for parking within the Parking District boundaries. Finally, the parking district program should be equitable between large and small property owners and encourage shared parking arrangement agreements when possible.

Transient Room Tax (TRT) – Bend currently assesses a 9.0 percent tax on hotel and motel rooms within the City. Revenues go to the general fund and a variety of tourism promotion programs. Funds (either through an increase in the tax or a redirection of existing revenues) could fund projects in the Central Area, although such expenditures should be regionally-serving since the tax is assessed on hotels throughout the City, not just those in the Central Area. This funding tool should only be considered in the Central Area for regionally significant projects such as a convention center or performing arts center.

Façade Improvement Program – A façade/storefront improvement program provides matching grants and/or loans to property and business owners to improve building facades within a planning area. Programs are typically implemented in conjunction with an urban renewal district. In areas such as Greenwood, where existing buildings are likely to remain and have the desired scale and character, a façade improvement program can provide a highly visible improvement for a relatively low cost. Typical façade grants/loans range between $5,000 and $20,000. Therefore, it is a low-cost, highly visible tool that can lead to early successes.

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Sustainability and Energy Funding Tools

EPA Brownfields Program – The EPA Brownfields Program enables productive economic development on sites where cleanup is otherwise prohibitively expensive by providing funding for remediation of environmental cleanup. Some areas east of the Parkway that are currently in industrial use may be contaminated. The Brownfields program can accelerate cleanup, enabling redevelopment to occur sooner.

EnergyTrust of Oregon Programs – To enhance energy efficiency and sustainability, EnergyTrust, a nonprofit funded by the Oregon Public Utility Commission, provides financial incentives for equipment upgrades and components of lighting and controls, motors, drives, HVAC, and gas equipment by covering the above-market cost component for equipment that is above code or beyond standard practice. Grants are available for new construction and upgrades to existing facilities. As redevelopment of existing buildings and development of new ones occurs throughout the Central Area, the City should encourage energy efficiency wherever possible.

Oregon Energy Loan Program – The Oregon Department of Energy offers low-interest loans for projects that save energy; produce energy from renewable resources such as water, wind, geothermal, solar, biomass, waste materials, or waste heat; use recycled materials to create products; or use alternative fuels. The program can apply to individuals, businesses, schools, cities, counties, special districts, state and federal agencies, public corporations, tribes, and nonprofits.

Infrastructure Funding Tools

A wide range of funding tools is available to support transportation infrastructure and planning in Oregon. Many of those tools are funded via the Oregon Department of transportation (ODOT) through competitive grants that are offered annually or biannually. The following programs are some of the most common and most likely to be of use in the Central Area, particularly as it relates to addressing the transportation needs of the Third Street corridor.

Oregon Pedestrian and Bicycle Program (ODOT) – ODOT provides grants for crosswalks, bike lane striping, and pedestrian crossing islands that fall within the rights-of-way of streets, roads and highways. Bike/ped grants usually fall between $80,000 and $500,000.

Oregon Transportation Enhancements (TE) Program – Using federal transportation funds, ODOT TE grants are awarded to local governments and other public agencies to support projects that improve communities and enhance the experience of traveling. New sidewalks, bike lanes, and pedestrian amenities such as benches and streetlights are eligible TE projects, as are the restoration of historic railroad stations, bus stations, and bridges. TE awards typically range from $200,000 to $1 million, and local governments must contribute ten percent of the project's cost.

ODOT Transportation Growth Management Program – ODOT provides grants to local governments in Oregon for a variety of purposes including updating land use and transportation plans, making walking and biking safer and more convenient, improving access to transit, improving the pedestrian-friendliness of downtowns and Main Streets, amending local codes to encourage "transportation efficient" development, and creating better connections between local destinations.

Safe Routes to School (SR2S) – Administered in Oregon through ODOT, this federal program funds advocacy efforts such as traffic education, safety enforcement near schools, and public awareness campaigns aimed at making it safer for children to walk to school. SR2S funds may also be used for the construction of sidewalks, pedestrian crossings, bike storage racks, and traffic calming facilities.

Oregon Parks and Recreation Local Government Grant Program - OPRD gives more than $4 million annually to Oregon communities for outdoor recreation projects. Eligible projects involve land acquisition, development, and major rehabilitation projects that are consistent with the outdoor recreation goals and objectives contained in the Statewide Comprehensive Outdoor Recreation Plan (SCORP).

Systems Development Charges - System development charges (SDCs) or development impact fees are one-time fees assessed to new development and changes in use. The fees cover the capital cost of the infrastructure needed to serve new development and the people who occupy or use the new development. SDCs often pay for a wide range of improvements, including roads, schools, fire and police stations, sewer, water, stormwater, utilities, and other costs. The City of Bend already assesses at 100% of the allowable charge for SDCs based on formulas calculating the Equivalent Residential Unit (ERU). The 2007-2008 SDCs for various services are as follows:

Water	$3,496 ERU
Sewer	$2,038 ERU
Park	$3,550 ERU
Transportation	$4,356 ERU

Because the City of Bend already assesses a range of fees for various types of development at the maximum allowable level, it is recommended that the CIP be reviewed and appropriate funding from SDC charges be allocated to areas within the CAP boundaries consistent with the catalyst projects identified. Additionally, the City's SDC program should be reviewed to determine if earmarking funds by particular overlay areas is feasible. In the absence of the ability or desire to revise the existing SDC program or CIP, it will be necessary for the city to work with private property owners to form an LID or BID as described above.

Deleted: New SDC assessments can be created in specific districts, such as the Bend Central District, and can be dedicated to specific infrastructure investments.

Implementation Incentives

Urban development and redevelopment is almost always more expensive and more complex than new development on the edge of the city. Land is more expensive, regulations are usually stricter, and construction staging is more challenging – all of which tend to increase development costs. If the Central Area is to be the most important urban district in the region, it should also be the "easiest" place to do business, not the most difficult. Thus, a package of incentives that reduce the challenges of development can speed up development and increase the amount of investment in the area.

Expedited Permitting – For developers, time is literally money and saving weeks or months on a project is often more important than saving money. For projects that support the Plan or meet certain thresholds of quality, the City can create a program to process development applications within an expedited time period as an incentive for developers. To process permits faster, cities often assign a staff person as a single point of contact for developers in the target area to shepherd the project through the various city agencies.

Land Assembly – The Central Area is characterized by fractured ownership, which makes it challenging and expensive to assemble parcels large enough to achieve a critical mass that supports the densities envisioned by the Plan. As an incentive, the City can acquire target properties and assemble larger parcels to be offered to developers, usually through a competitive request for qualifications (RFQ) process. This not only relieves the burden on private developers of having to assemble property, but it also gives the City leverage to require the project to include specific design elements or other features. Land assembly would likely require seed funding through an urban renewal district, but could become a revolving fund as land is sold to private developers.

Fee Waivers/Reductions – As a further incentive to desired types of development, the City can implement a fee waiver or fee reduction program. Such a program could reduce traffic impact fees, system development charges, building permit fees, and other expenses related to development. Eligibility criteria should include meeting high standards for quality and supporting the Plan. Bend already has such a program in place for affordable housing projects.

Catalyst Projects

Bend Bulletin Site – This publicly owned parcel could be redeveloped as a mixed-use housing project, providing workforce housing in close proximity to the downtown jobs base. The City could recruit a developer through a competitive request for qualifications (RFQ) process.

Hawthorne Avenue Mixed-Use Development – To activate the Railroad District as well as a new Hawthorne Avenue connection, multiple mixed-use developments should be built in the area on opportunity sites. Uses along Hawthorne should include office and housing, with a small amount of ground-floor retail and service uses.

Redevelopment at 3rd Street and Greenwood Avenue – This project would activate the 3rd Street and Greenwood Avenue gateway, providing a signature building of active retail, office, and/or entertainment uses. While too busy for housing, the high traffic flow could benefit commercial users.

Structured parking facilities – The scale of development envisioned for the areas west of 3rd Street and east of the Parkway will require structured parking. However, structured parking is difficult to accommodate on smaller parcels and is very expensive. Shared parking structures that can serve multiple adjacent and nearby properties would allow for more efficient use of parking facilities and would reduce the cost of development. A parking district or other mechanism should be formed to ensure that development pays its fair share when parking is not required by each project.

City Hall / Civic Center –Consistent with the recommendations within the first phase of the Central Area Plan for focusing civic uses within a "civic neighborhood", develop the concept plan and development criteria for the Civic Neighborhood site with a range of uses, including a new or expanded City hall a, public parking and a plaza/open space, sufficient for preparing and issuing a request for development proposals, establish a development program, and begin acquisition of balance of civic neighborhood properties.

Infill housing between southern central neighborhood and the Old Mill District – This area, generally between Colorado and Arizona is already developing with a mix of housing and retail uses. These uses should continue to be built on remaining vacant land to provide additional close-in housing while also buffering the Old Bend neighborhood from the Old Mill District.

Infill housing in the northern central neighborhood – Medium-density infill housing in this area would strengthen the residential character of the neighborhood while providing new housing opportunities close to downtown.

Develop surface parking lot at Wall and Greenwood into appropriate mixed-use – The small corner lot at the corner of Wall and Greenwood is a classic infill redevelopment opportunity. As a gateway site with visual prominence from both directions on Greenwood, it will demand high quality architecture that sets the tone for the rest of the Historic Downtown Core. Recent developments in downtown Bend show that the market exists for multistory development on small sites. As the City of Bend has done with other redevelopment sites, it should issue a request for qualifications to identify a developer to purchase the site and build a mixed-use project.

Mirror Pond Parking Lots – The Mirror Pond Parking Area is a public space that holds great emotional ties in the civic heart of Bend and, as such, a specific redevelopment recommendation is not appropriate. The first phase of the Central Area Plan recommended an interactive and participatory process to determine a future vision and course of action for redevelopment of the Mirror Pond Parking Area. Based on input from the public process workshops, a program and solicitation for design or development services would be issued.

Relocate auto dealers and light industrial businesses – Relocate existing businesses to new sites in order to free up existing properties for redevelopment. This could include the creation of an auto mall somewhere in Bend, which could be facilitated through a public-private partnership.

Land Use Regulatory Recommendations

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This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), local government, and State of Oregon funds. The contents of this document do not necessarily reflect views or policies of the State of Oregon.

Introduction

Before the City of Bend's Central Area can grow into the vision created by the Central Area Plan (CAP), the City must ensure that the appropriate Bend Area General Plan policies and zoning ordinances (Bend's Development Code) are in place to help carry out the community's public policy objectives. This Land Use Technical Memorandum provides guidance to the City of Bend by identifying existing regulatory conditions that should be changed to implement the CAP. This memo suggests conceptual level additions or changes that facilitate the desired development types as stated in the Central Area Plan Vision (CAP Vision).

The CAP Vision is summarized as follows:

> *The economic leader and social focal point of the region, the Bend Central Area is comprised of several districts with their own distinct identity, character and unique collection of uses.*
>
> *These districts represent a land use, transportation, and economic system that preserves and enhances the best parts of the Central Area while supporting revitalization where needed. Each district contributes to the overarching identity and overall sense of place for what is "Bend."*[1]

This memo suggests changes to create a community with quality urban design that integrates a variety of development types. A key to the CAP Vision is redevelopment of areas east of the Parkway and along 3rd Street. Allowing additional flexibility, greater density, and higher building heights by rezoning parts of the Central Area to mixed-use and expanding the Central Business District (CBD) boundaries will encourage this redevelopment. Additionally, reconfiguring 2nd and 4th Streets as a couplet to allow a main street boulevard along 3rd Street will encourage a pedestrian friendly environment. Finally, creativity can be fostered by allowing developers the option of demonstrating they meet Bend Central Area Performance Guidelines rather than meeting prescriptive design standards. As redevelopment occurs, it is important to ensure new development complements existing and future structures while allowing changes to density, heights, and land uses. Flexible zoning and guidelines that focus on the interaction of people and places will best respond to market demands and result in quality design and desirable communities.

This memo describes the overarching characteristics of the CAP, as well as land uses, Area General Plan and zoning designations within the Central Area. This memo concludes with recommendations for changes to the regulatory environment to aid in implementing the CAP.

Central Area Plan Characteristics

The CAP includes three big ideas for transforming the Central Area; city form, neighborhood district identity and the reinvention of 3rd Street.

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[1] Source: Bend Central Area Plan, 2005

City form is transformed over time through zoning code changes and design performance guidelines. Several factors associated with city form were considered during the planning study and incorporated into the CAP Vision. These include:

- Consideration of topography and geologic structure when considering building heights;
- Establishing harmony between existing and desired built forms;
- Respecting the symbolism of form and landmarks (i.e., prominent corners, plazas or buildings);
- Preserving or enhancing existing texture and fabric of environment (dense urban residential or sparse commercial);
- Incorporating icons, remembrances and Bend specific character elements into development design; and,
- Preserving the "view from the road" or view corridors to maximize the visual quality of Bend's natural and built environment.

The CAP recommends considering City Form through the application of Development Performance Guidelines to ensure development collectively functions according to the CAP Vision.

The CAP identifies preliminary ***neighborhood districts*** while acknowledging the need to further review and develop neighborhood plans for some of these areas. Because of the existing residential nature of some of these neighborhood districts, it is recommended that community and property owners be engaged in smaller groups to develop individual neighborhood plans for the Central Neighborhood North, Division Street Commercial area, and Central Neighborhood South, in accordance with the CAP vision for these areas.

A key element of the CAP is the ***reinvention of 3rd Street*** as a "Great Street". Great Streets are memorable civic spaces rather than just thoroughfares. Great streets are inviting pedestrian spaces and activity centers featuring a variety of uses and interesting places that foster the idea of extended hours of use throughout the week. Great Streets facilitate a variety of activities including small retail, restaurants with and without outdoor seating, mid-sized commercial uses, public spaces, public art, and cultural sites.

The reinvention of 3rd Street and surrounding areas will strengthen connections with the Historic Downtown Core primarily through the east-west streets of Greenwood and Franklin Avenues. A 3rd Street transformation requires changes to current traffic and land use patterns. This can be accomplished through the reconfiguration of 2nd and 4th Street into a couplet. This would decrease traffic along 3rd Street and allow an increase in the variety of activity types, and encourage redevelopment of areas between 3rd Street and the Parkway. Key points in this transformation include:

- Increased emphasis on streetscape design, and pedestrian friendly environments;
- Master planning for key areas of activity within the 3rd Street/Bend Central area;
- Store front orientation to 3rd Street;
- A second story presence allowing for office and residential uses;
- Shared parking areas to allow for auto access; and,

- Increased focus on pedestrian and other non-vehicular modes within the 3rd Street/Bend Central area.

The CAP Vision includes the possibility for a medium to high-density residential area east of the Parkway and west of 3rd Street. This area is envisioned to provide seven to twelve-story residential towers with underground or structured parking and ample open, green space or public plazas. Areas along Great Streets such as 3rd Street, NE Greenwood Avenue, and NE Franklin Avenue would provide a pedestrian scale environment with mid-rise building heights of three to six stories. Refer to Appendix E for a map showing proposed building height increases.

In addition to the recommendations on the layout of Central Area land uses and functions, the Project Advisory Committee appointed by the City of Bend and the Bend community-at-large also incorporated an overarching environmental responsibility, or "green ladder" within the Bend Central Area that would aid in stormwater retention for the area while providing integrated green spaces between the Parkway and 3rd Street. This area will draw upon Bend's location amidst natural resources, vistas, and geologic characteristics for inspiration.

The organization of unique elements of the CAP promotes greater density, greater transit use, shared parking, successful commerce, and community enjoyment, all vital to a vibrant central area and downtown. A critical element to this transition is providing the flexibility in regulatory standards to allow development to respond to market demand for a well-designed, urban, multi-purpose community.

Existing Land Uses and Regulations

Overview of Current Area General Plan and Zoning Designations

This section summarizes existing land use conditions within the Bend Central Area Plan District, and provides an overview of existing zoning designations as well as Area General Plan designations. Maps detailing the existing Bend Area General Plan and Bend Zoning are provided in Appendices C and D, respectively. The Central Area is a diverse composite of Area General Plan and zoning map designations.

Area General Plan changes are recommended for portions of the Historic Downtown Core, the Bend Central District and the Industrial and Employment District. Descriptions of Area General Plan designations found within these districts are summarized below.

- The Industrial Light designation provides for heavier commercial and light industrial uses in built- up areas of the urban area.
- The Industrial General designation provides for light and heavier industrial uses with a minimum conflict between uses.
- The Mixed Employment designation provides for mixed light industrial and commercial uses in areas that already exhibit a pattern of mixed development.
- The General Commercial designation provides a broad mixing of commercial uses in older, close-in sections of the community.
- The Limited Commercial designation provides locations for a wide range of retail, service, and tourist commercial uses in the community along highways or in new centers.

- The Central Business District designation is only applied to several blocks of downtown.
- The High Density Residential designation provides between 21.7 and 43.0 dwellings per gross acre and is primarily used for any attached housing, manufactured homes, and park, offices/clinics.
- The Public Facility designation provides land in Central Bend for civic and public buildings.

Throughout the study, public participants and stakeholders made it very clear that the the Northern and Southern Central Neighborhood residential areas should be preserved as they currently exist. Existing zoning designations for the Northern and Southern Central Neighborhoods are predominantly Standard Residential (RS) and Medium Residential (RM) within the Southern Downtown Neighborhoods. The Division Commercial District is predominantly Limited Commercial (CL). Because the Division Commercial District has a strong boundary at the Parkway to the east, the project team feels it is important to encourage this area to re-develop with a broad mix of employment uses in a manner that is compatible with the Northern Downtown Neighborhood. In order to afford proper time for adequate public outreach and neighborhood involvement, the project team recommends that neighborhood plans be developed concurrently for these areas and involve stakeholders from both districts. Further information on the Central Neighborhood North and South, and Division Commercial District is available in Technical Memo #2.

Zoning changes are recommended for portions of the Historic Downtown Core, the Bend Central District and the Industrial and Employment District. Descriptions of zoning designations found within these areas and are fully described in Chapters 2.1, 2.2, and 2.4 of the Bend Development Code, and highlighted below.

- High Density Residential (RH) allows for high density multiple family housing developments with a range of approximately 21 to 43 units per gross acre.
- Light Industrial (IL) provides for heavier commercial and light industrial uses with easy access to collector and arterial streets.
- Central Business District (CBD) encompasses the historic downtown and central business district that has commercial and/or mixed-use development with a storefront character.
- Limited Commercial District (CL) provides for a wide range of retail, service, and tourist commercial uses in the community along highways or in new commercial centers.
- General Commercial District (CG) provides a broad mixing of commercial uses that have large site requirements, are oriented to the highway and provide services to the traveling public.

The following section describes the districts where regulatory changes are recommended to help implement the CAP.

Historic Downtown Core

The Area General Plan designations within the Historic Downtown Core include Central Business (CB), General Commercial (CG), Public Facility (PF), and Limited Commercial (CL).

Commercial land uses are predominant in the Historic Downtown Core and range from boutique retail in the Central Business District Zone (CBD) to a variety of general commercial uses in the General Commercial Zone (GC) and remnant single-family residential uses to the west of the Parkway. The Southern area of the Historic Downtown Core is zoned for Limited Commercial (CL) and Higher Density Residential (RH) but is dominated by public and government office uses. Small professional offices often occupy single-family homes surrounding the CBD. The CBD extends east along Greenwood Avenue until it reaches the Parkway, where zoning changes to CL.

Areas within the Historic Downtown Core that are not designated as CBD by the Area General Plan or zoning map are inconsistent with the CAP Vision.

Bend Central District

The Bend Central District is bound by Butler Market Road to the north, 4th Street to the east, the Bend Parkway to the west, and the Burlington Northern Santa Fe (BNSF) railroad overpass to the south. The intersections of 3rd Street with Greenwood and Franklin Avenues carry a great deal of traffic into downtown and across the Deschutes River. Existing uses include a large chain grocery store, several automobile lots, fast food restaurants, and other regional highway type businesses that currently utilize large parking areas that lend no dominant character or prominent visibility to the corridor. There are various commercial developments along these east-west connections. Greenwood Avenue is also designated as US Highway 20 east of 3rd Street. The intersection of Greenwood Avenue and 3rd Street is a key gateway opportunity for this area, as commercial development along Greenwood Avenue is in the early stages of revitalization.

The Area General Plan designations for this area consist of Limited Commercial (CL) and Mixed Employment (ME). The CL designation allows for a mix of auto-oriented commercial uses. The ME designation allows a mix of development types including “vertical” and “horizontal” uses. The area immediately east of the Parkway designated as ME is generally consistent with much of the CAP Vision in land use types; however, heights are limited to 45 feet which may be inconsistent with the CAP Vision.

This area is predominantly zoned for Limited Commercial (CL) land uses along 3rd Street and Light Industrial (IL) land uses between the Parkway and 2nd Street. Exceptions to this are the blocks fronting Greenwood Avenue between 2nd Street and the Parkway which are also zoned CG. While new development in commercial zones must adhere to standards concerning allowed uses, building heights, densities, parking, and building setbacks, as well as other standards, much of the commercial and industrial uses in this area were developed prior to current development code standards. Because this district is a long linear area, it contains a great variety of development types and character.

Areas along 4th Street are zoned for either Higher Density Residential (RH) or Limited Commercial (CL) throughout the project area, with commercial uses concentrated on the west side of the street. The CL designation is inconsistent with the CAP and does not allow the development flexibility that would support the Plan’s Vision.

The existing Area General Plan designations of ME within the Central Bend District are generally consistent with the CAP vision, but zoning in this is area is IL which is much more restrictive.

Industrial and Employment District

The Area General Plan designations for this area consist of Limited Commercial (CL), Light Industrial (IL), and Mixed Employment (ME). Similar to the IL zoning district, the IL Area General Plan designation allows for a mix of heavier commercial and light industrial uses. The ME allows greater flexibility in land use types; however, heights are limited to 45 feet which may be inconsistent with the CAP Vision.

The Industrial and Employment District in the area north of Revere Avenue transitions into a mixture of residential, commercial and industrial businesses and is zoned with a combination of General Commercial (CG), Light Industrial (IL), and Limited Commercial (CL). The CG district allows a great variety of commercial uses and, like the CL district, is oriented to the highway and the provision of services to the traveling public; however, it allows larger lot sizes. The IL zone allows a variety of mixed industrial uses ranging from warehouses to research campuses.

While many aspects of the zoning designations within the Industrial and Employment District are consistent with the CAP, the area lacks design cohesion and integrated function.

Recommended Changes to the Land Use Regulatory Environment

The three main themes of the Central Area Plan are City Form, Defined Neighborhood Districts, and a 3rd Street Reinvention. These big ideas will contribute to an ongoing vibrant downtown character and while revitalizing the central area, but several changes to the existing land use regulatory environment are needed to implement these themes.

Bend Area General Plan

The Bend Area General Plan was updated by the City in 1998 and provides directives to the City for making decisions and preparing plans. Much of the Bend Area General Plan is consistent with the CAP Vision; however there are a few sections where changes are recommended to ensure consistency between the plans.

The changes are focused on acknowledging the adopted CAP districts, recognizing the new characteristics associated with the reinvention of 3rd Street, increasing flexibility of uses in some areas of the Central Area to include higher density housing, and improving transportation and other infrastructure to support projected growth.

Policy recommendations are made to guide the Bend Central District east of the Parkway toward a high-density residential and mixed use area that is inviting to pedestrians. The CAP includes several key implementation elements, including changes to the Area General Plan. For further information on the implementation strategies, please refer to the Implementation Memo that is attached as an appendix to the CAP. Recommendations for changes to the Bend Area General Plan, Development Code, and TSP are described in greater detail and categorized by geographic area in the sections below. Tables 1 and 2 summarize these recommendations.

Bend Development Code

The Bend Development Code recently underwent a substantial revision that was adopted in August 2006. The changes in the revised code include expanded standards for development and design, as well as updated purpose statements for many of the zoning districts. The revisions are generally consistent with the CAP Vision within the Central Business District; however, CAP implementation strategies include zone changes in the Bend Central District, the Industrial and Employment District, and the Historic Downtown Core.

Areas requiring zoning designation changes within these areas are currently zoned as Central Business District (CBD), Limited Commercial (CL), General Commercial (CG), Light Industrial (IL), and High Density Residential (RH).

The Central Business District

The purpose statement and the allowed uses and basic development standards of the CBD zone are generally appropriate for several districts proposed in the CAP, but the CL and CG zones are inconsistent with an interactive, multi-functioning downtown as seen in the CAP Vision. Therefore, this Plan recommends the expansion of the area covered by the City's CBD zone. The expanded area would include all areas referred to by the CAP as the Historic Downtown Core, as well as commercial districts north to Revere Avenue west of the Bend Parkway. This expansion would require amending the Area General Plan and Map designations in some areas from Public Facility and CL to a CBD designation, as well as amending the zoning map from CL, CG and PF to CBD.

The Bend Central District

The CAP Vision includes a new mixed-use area in the Bend Central District that will fill in missing spaces and provide greater density feeding onto a "new" 3rd Street. Because the 3rd Street re-invention will carry less automobile traffic, it can transition into a boulevard with greater levels of pedestrians socializing in community plazas, dining in local restaurants, shopping in a variety of mid-sized businesses, and working in a variety of professional offices. 3rd Street will become a passageway through medium to high density, compact, mixed-use residential areas with cafes and shops; it will be a street full of public spaces linking with the employment/industrial district to the north, the employment/office districts in Bend Central, the Historic Downtown Core via Greenwood and Franklin Avenues, and the Mill District to the south. Third Street will play a key role in connecting the local bus system and the potential transit center. Activity will also be dispersed into internal activity areas accessed on adjacent east-west Streets such as Hawthorne Avenue.

As noted earlier, much of the Bend Central District is zoned CL which allows residential developments to occur, as long as they adhere to the base zone development standards for height and setbacks as well as the applicable sections of the Special Standards for Certain Uses Chapter in the Bend Development Code (Chapter 3.6). Height restrictions in this area are 55 feet and minimum setbacks are 10 feet in the Limited Commercial district.

Other areas within the Bend Central District are zoned as Light Industrial which prohibits the development of residential mixed uses. The Area General Plan designations within the Bend Central District include CL and Mixed Use Employment. The Mixed Use Employment Area General Plan designation is applied to much of the area that is zoned Light Industrial in the Bend Central District.

The project team recommends two options to bring the Bend Central District into consistency with the CAP.

The first option includes establishing a new Central Area mixed-use base zone in Development Code Chapter 2.3 specifically for the Bend Central District. While the City of Bend already has two mixed-use zones that are specifically tailored to meet the needs of other areas in Bend, the new mixed use zone for the Bend Central District is proposed to achieve mixed-used development appropriate for areas surrounding the reinvention of 3rd Street.

Prior to adopting these new zones, new text and a new General Plan map will need to be adopted into the Area General Plan. The proposed mixed-use zone is highlighted below.

CAP-MCEN: Bend Central District – In order to achieve the vision for the Bend Central District east of the Parkway and west of 4th Street, this new mixed-use zone proposes:

- Greater density development with a mix of uses
- Retail and entertainment at street level
- A mix of housing options
- Design elements to encourage a pedestrian friendly environment
- Development compatible with a future transit hub in this rea

A second option is to adopt a Central Area Plan Refinement Overlay as a special district plan in Development Code Chapter 2.7. This Special Plan District would coincide with the boundaries of the Central Area Plan and could "package" several zone changes and specific design standards within the plan to make the area consistent with the CAP Vision and Framework. As noted earlier, the City of Bend already has two mixed-use zones that are can be tailored through design standards to achieve development appropriate to meet area-specific goals surrounding 3rd Street. Adoption of a Central Area Plan Refinement Overlay as a special district plan would also require adoption of new text and map changes to the Area General Plan.

As an interim step, the City should consider rezoning areas within the Bend Central District so that zoning is consistent with the Bend Area General Plan designation of Mixed-Use Employment (ME). Stakeholder interviews have indicated that the burden of applicant initiated zone changes to the ME zone are a potential hindrance to redevelopment in this area. It is recommended that the City initiate zone changes in this area in the near future while new zones or a Central Area Plan Refinement Overlay as a special district plan is developed for the Central Area. Because the current ME zone only allows heights of 45 feet and up to 50 percent lot coverage this rezoning should be considered a temporary measure because it would restrict development to a lower density than what is envisioned in the CAP for this area.

The Industrial and Employment District

The Bend Central Area Vision for the Industrial and Employment District, north of the Bend Central District, includes a creative mix of uses, ranging from light industrial to live-work spaces. This is also an area that is envisioned as a possible receiving area for light industrial and automobile oriented business relocation from Bend Central. This area is seen as a multi-use area that supports both existing businesses and encourages the location of micro-business ventures, artists, and light industrial with accompanying retail. It is also envisioned that a mix of housing may be included in areas of the District as appropriate, depending on adjacent existing land uses.

Large portions of the Industrial and Employment District are zoned General Commercial, Limited Commercial, and Light Industrial. Much like the zoning environment in the Bend Central District, residential mixed-use development is either prohibited or restricted by base zone heights and setbacks, and requires adhering to applicable sections of the Special Standards for Certain Uses Chapter in the Bend Development Code (Chapter 3.6). For these reasons, the project team recommends two options to bring the Central Area Industrial and Employment District into consistency with the CAP.

The first option would include establishing a new Central Area mixed-use base zone in Development Code Chapter 2.3. The new Mixed-Use Industrial and Employment zone which would be applied to the CAP Industrial and Employment District. While the City of Bend already has two mixed-use zones they are specifically tailored to meet the needs of other areas in Bend. Prior to adopting this new zone, new text identifying the zone and a revised General Plan map will need to be adopted into the Area General Plan. The proposed mixed-use zone is highlighted below.

CAP-MINEX: Industrial and Employment District – In order to achieve the vision for the Industrial and Employment District this zone retains some of the characteristics of the current light industrial zoning but also provides:

- Greater density development with a mix of uses
- A mixture of live/work spaces (artists lofts, for example)
- Mixed-employment uses that are vital for micro-enterprises
- A mix of housing options
- Areas for relocation of light industrial businesses from the Bend Central District

The second option for this area is consistent with the second option of the Bend Central District of adopting a Central Area Plan Refinement Overlay as a special district plan in Development Code Chapter 2.7. The refinement plan could “package” several zone changes and specific design standards within the plan to make the area consistent with the CAP Vision and Framework. The existing Mixed-use Employment zone can be tailored through design standards to achieve development appropriate for the Industrial and Employment neighborhood district. Adoption of a Central Area Plan Refinement Overlay as a special district plan would also require adoption of new text and map changes to the Area General Plan.

The new mixed-use zone or Central Area Plan Refinement Overlay should guide uses and foster development and encourage preservation of industrial land for a variety of uses. Appendices A and B provide draft samples of language that may be incorporated as Central Area Plan Development Performance Guidelines and new mixed-use zone guidelines for the Development Code Chapter 2.3.

Transportation System Plan

General recommended changes to the Transportation System Plan (TSP) are stated within Table 1 of this memo under the Chapter 7: Transportation Systems heading. Of particular note is the recommendation for a 3rd Street Traffic Refinement Study. This study will provide the detailed analysis required to determine access point changes, signaling, and the feasibility of a 2nd/4th Street Couplet and boulevard treatment of 3rd Street as is proposed in the conceptual CAP. Other changes to the TSP include new street classifications for Great Streets and Green Ladder Streets. Detailed changes recommended for the TSP can be found in the Bend Central Area Technical Memo #6 – Future Conditions.

Summary Tables of Recommended Area General Plan and Development Code Changes

Bend Area General Plan recommended changes applicable to the CAP area are shown in Table 1. General recommended development code changes are shown in Table 2. Based on conversations with the PAC, the public, and city staff, much consideration was given to height limitations in the Central Area. Greater heights are necessary to fulfill higher density and design goals. Proposed guidelines specific to building heights are outlined in Appendix E.

Table 1: Bend Area General Plan Recommended Changes

Bend Area General Plan Chapter	Current Policy Language	Recommended Changes
Chapter 5: Housing and Residential Lands	*5.* Of necessity, nonresidential uses will have to abut residential areas in different parts of the community. In these instances, any nonresidential use shall be subject to special development standards in terms of setbacks, landscaping, sign regulations, and building design.	This policy currently addresses buffering and transitions between nonresidential uses and residential areas. It is recommended that this language be strengthened to include specific reference to buffering requirements for all types of development, including high density residential or mixed-use development abutting lower density or historic residential neighborhoods.
	General	Add: High density residential in combination with vertical mixed uses shall be encouraged within the CAP boundaries.
	General	Add: The CAP and designation of individual districts within is adopted as part of the Bend Area General Plan.
Chapter 6: The Economy and Lands for Economic Growth	Addition of mixed use designations	Add: It is the intent of the MCEN and the MINEX designations within the Central Area Plan boundaries to: ▪ Promote a pedestrian friendly and multi-modal environment along 3rd Street between NE Revere Avenue to the north and the BNSF railroad crossing south of NE Burnside Avenue; ▪ Promote a variety of employment opportunities and a wide range of density housing types; ▪ Ensure functionally coordinated, aesthetically pleasing and cohesive site planning and design; and, ▪ Ensure compatibility of mixed-use development with the surrounding area and minimize off-site impacts associated with the development.
	#28: The city shall continue the revitalization process in the Central Business District through rehabilitation or redevelopment of existing areas.	The Bend Area General Plan map should be amended to show an expansion of the CBD boundaries to include current commercial areas north to NW Revere Avenue, south to include both sides of NW Franklin Avenue, and east to the Parkway. (Refer to Map of Proposed Zones for recommended boundaries.)
	General	New policies or implementation strategies should recognize that change in the Central Area will occur gradually and that when possible, flexibility can be employed to foster the development of catalyst projects identified in the CAP. This chapter should also recognize that new funding mechanisms, including urban renewal, be used to help carry out implementation of the CAP.

Table 1: Bend Area General Plan Recommended Changes

Bend Area General Plan Chapter	Current Policy Language	Recommended Changes
Chapter 7: Transportation Systems	General	Add: Several corridors within the CAP boundaries are designated "Great Streets" which act as Gateways to adjoining central areas, exhibit special design characteristics, and allow low to mid-rise building heights: ▪ 3rd Street from NE Revere Avenue to NE Burnside Avenue; ▪ Olney Avenue from NW Wall Street to NE 4th Street; ▪ Greenwood Avenue from NW Wall Street to NE 4th Street ;and, ▪ Franklin Avenue from NW Wall Street to NE 4th Street.
	Mapping	Redesignate 2nd Street to a minor arterial or major collector to distribute north/south traffic within the revitalized corridor. (It is recommended that a 3rd Street Traffic Refinement Plan be conducted prior to this redesignation.)
	Section 7.5	Add: policy language to consider priority funding for a master transportation impact study within the Bend Central and Employment and Industrial Districts to aid in streamlining traffic impact analyses for development review in this area of the CAP.
	General	Add: General recommended location specific changes to the transportation system as noted in the Central Area Plan Tech Memo #6.
Chapter 8: Public Facilities and Services	General	Add: General recommended changes to the Public Facilities and Services chapter consistent with the Central Area Plan Tech Memo #6.
Chapter 9: Community Appearance	Add a new Policy 13 as noted to the right.	Special design consideration shall be given to development within the Central Area Plan Area, and particular design performance guidelines shall apply to the Central Business District, Bend Central, and the Industrial and Employment District. Similar special design considerations should be developed during future neighborhood planning efforts within the CAP.

Table 2: Bend Development Code Recommended Changes

Development Code Section	Current Policy Language	Recommended Changes
Chapter 1	Section 1.2	Definitions for the following terms should be added: ➢ Buffer buildings – 2 to 3 story buildings sited between higher density residential and low density residential or historic districts. ➢ Central Area Plan Development Performance Guidelines – Development guidelines which ensure community areas provide an experience consistent with the CAP Vision. ➢ Gateways – Intersections that signify transitions or seams between districts within the Central Area. ➢ Great Streets – Great Streets are memorable civic spaces rather than just thoroughfares. Great streets are inviting pedestrian spaces and activity centers featuring a variety of uses and interesting places. Land uses along Great Streets should foster the idea of extended hours of use throughout the week. Where uses are subject to "business hour" operation, the development should include amenities that provide for external enjoyment of buildings at all times of day. Great Streets facilitate a variety of activities including small retail, restaurants with and without outdoor seating, mid-sized commercial uses, public spaces, public art, and cultural sites with linkage to Bend Central and the downtown core. Great Streets include: o NE 3rd Street o NE Greenwood Avenue o NE Franklin Avenue o NE Portland/Olney Avenue Great Streets should be an added street classification within the TSP and also reflected in any special district plans adopted within Development Code Chapter 2.7. ➢ Green Ladder Streets – Green Ladder Streets are east-west streets within the Bend Central District that incorporate stormwater management within the right of way to reduce the amount of runoff that flows onto NE Greenwood Avenue, NE Franklin Avenue, and other Great Streets. The Green Ladder Streets will utilize storm management techniques that utilize vegetation, street trees, stormwater planters and permeable surfaces to reduce the impact of development on surrounding areas. Green Ladder Streets will be integrated into the community aesthetics with linear parks and green spaces incorporated into sidewalk and parking strip designs. Green Ladder Streets include: o NE Norton Avenue o NE Marshall Avenue

Table 2: Bend Development Code Recommended Changes

Development Code Section	Current Policy Language	Recommended Changes
		o NE Lafayette Avenue o NE Kearney Avenue o NE Irving Avenue o NE Hawthorne Avenue o NE Greeley Avenue o NE Emerson Avenue o NE Dekalb Avenue o NE Clay Avenue o NE Burnside Avenue Green Ladder Streets should be an added street classification within the TSP and also reflected in any special district plans adopted within Development Code Chapter 2.7. ➢ High rise buildings – 6 to 12 story ➢ Intersections of Character - Intersections that include outside public spaces and rooms and serve as landmarks and facilitate better wayfinding. Buildings surrounding the intersection should be low rise, but complimentary to each other. Lighting should emphasize activity and public art is encouraged. Pedestrian and vehicular zones should be delineated to ensure safe and secure passage for all. The following Intersections of Character should be adopted into the TSP and also reflected in any special district plans adopted within Development Code Chapter 2.7: o NE Revere Avenue and NE 3rd Street o NE Olney Avenue and NE 3rd Street o NW Olney Avenue and NW Wall Street o NE Greenwood Avenue and NE 3rd Street o NE Greenwood Avenue and NE First Street o NW Greenwood Avenue and NW Hill Street o NW Greenwood Avenue and NW Wall Street o NE Franklin Avenue and NE 3rd Street o NE Franklin Avenue and NE 1st Street o NW Franklin Avenue and NW Hill Street ➢ Low rise buildings – 1 to 2 story

Table 2: Bend Development Code Recommended Changes

Development Code Section	Current Policy Language	Recommended Changes
		➢ Mid rise buildings – 3 to 5 story
Chapters 2.2 and 2.3	General Comment: These chapters include provisions for the CBD and Mixed Use districts; however existing code language does not reflect the CAP Vision.	Add language to include an interim Central Area Plan Design Overlay for the Central Area. Language should include: The purpose of the Overlay should include support of the Central Area and protection of the planned land uses and regulations. The overlays should be effective immediately in the interim period until new zones for these areas are adopted. New zones can either incorporate requirements of the overlay zones or maintain the overlay in addition to the new zone. The Central Area Plan Overlay includes the application of the Central Area Plan Development Performance Guidelines for the Bend Central District. Preliminary demonstration of conformance with these Guidelines which must be addressed during a mandatory pre-application meeting. These Performance Guidelines may be used to obtain an exception to the design standards associated with base zones through a Type III Hearing Process before the City of Bend Planning Commission upon recommendation by an appointed Central Area Review Sub-Committee subject to findings of compliance with the purpose of the CAP. The Central Area Plan Development Performance Guidelines shall apply to lands within the CAP identified as the Bend Central District for which new zoning designations are proposed. The purpose of the Development Performance Guidelines is to require early coordination between the City and a developer to ensure new development is consistent with the CAP. To achieve the purpose of the CAP, the City of Bend will not approve zone changes inconsistent with the CAP within the boundaries of the Overlays during the interim period before CAP zones are prepared and adopted. Zone changes consistent with the existing Area General Plan Map Mixed Use designations should be pursued by the City of Bend in the interim period to allow added flexibility in the Bend Central and the Industrial and Employment Districts. Language should be added indicating that nothing in the overlay section shall be construed as a waiver or suspension of the provisions of any underlying zoning district, or any other applicable overlay district. To protect the overlay area from development that is inconsistent with the new Central Area zones, the following uses within the CL, CG, and IL Districts should be prohibited within the boundaries of the Central Area Plan Overlay: billboards; distribution centers; retails sales and services that are solely auto dependent; drive-through restaurants; trailer park / campground; mortuary; wholesale only sales; manufacturing and production greater than 5,000 sq. ft.; warehouse; transportation and freight, manufactured home sales; surface parking fronting Great Streets, massive scale individual commercial uses;

Table 2: Bend Development Code Recommended Changes

Development Code Section	Current Policy Language	Recommended Changes
		or any other use that is inconsistent with the Central Area Plan Framework and Vision as adopted into the Bend General Area Plan. Minimum and maximum setbacks should be between 0 and 10 feet and established in accordance with newly recommended right-of-way requirements.
Chapter 2.2 – Commercial Districts (CBD, CC, CL, CG)	General	Add language to expand the CBD east to the Parkway and south to include both sides of Franklin Avenue. Add language to expand the CBD north to Revere along the Parkway and west to the River to include current CL and RM zoning.
	General	Amend zoning map to show an expanded CBD area in the Historic Downtown Core.
Chapter 2.3 Mixed – Use Districts	General	Adopt two new Mixed-Use Districts: 1) Bend Central (MCEN), and 2) Industrial and Employment (MINEX) with boundaries congruent with the proposed neighborhood districts of the same name. These new districts should either maintain the Bend Central Area Overlay and require the Bend Central Area Development Performance Guidelines, or incorporate these guidelines into the zoning language. Sample language for these new zones are included as Appendix B.
Chapter 2.7 Special Planned Districts	General	*(If the City chooses to implement a new Special Planned District as opposed to creating new mixed-use zones in Chapter 2.3, these changes should be considered)* As an alternative to adopting new mixed-use districts it is recommended the City adopt a new Special Planned District with boundaries congruent with the CAP. This new district should be based on neighborhood plans for each of the Central Area Plan Neighborhood Districts. The Central Area Plan should establish overlay zoning standards for the residential, commercial and mixed use districts within the plan area that identify and coordinate utility locations; develop a street plan that identifies new street classifications (Great Streets, Green Ladder Streets, and the 2nd/4th Couplet) and specific design standards for streets in the plan area; identifies open spaces, intersections of character, and density development standards that will increase flexibility for property owners. The Bend Central Area Development Performance Guidelines and specific neighborhood design standards should be developed and adapted as guidelines into the special CAP district zoning language.

Recommendation Summary and Preferred Timing

The project team recognizes that implementing the recommended changes may take a great deal of staff time, planning commission and city council review, as well as public input. Several steps are needed in order to incorporate the recommended changes into the Comprehensive Plan and Bend Development Code. These general steps are identified below and a recommended time frame is provided.

Table 3: Implementation Timing

Action	*Year 1*	*Year 2*	*Year 3*
Rezone areas of the Bend Central District to Mixed Use Employment, consistent with existing Area General Plan designations.	√		
Initiate a 3rd Street Traffic Refinement Plan to analyze feasibility of the 2nd/4th Street Couplet concept.	√		
Expand the CBD boundaries through a Area General Plan and zoning amendment, consistent with the CAP Vision and Framework.	√	√	
Refine Comprehensive Plan Policies	√		
Amendment the TSP to incorporate new street classifications for Great Streets and Green Ladder Streets. Adopt new street design standards consistent with the intent of these new street designations.		√	
Amend the TSP to reflect findings of the 3rd Street Traffic Refinement Plan and incorporate the 2nd/4th Street Couplet if appropriate.			√
Refine and adopt either new mixed-use zones into Chapter 2.3 of the development code or a Special Planned District into Chapter 2.7 of the development code; development applications should be reviewed under the conditional use provisions in the interim period before new base zones or a special planned district for the Central Area are adopted.			√
Measure 37 Analysis of Zoning Recommendation	√		

Concurrent with the adoption of the overlay zones, the City will need to conduct a Measure 37 analysis of the recommended zoning for the Central Area. Following these actions, adjustments to the Comprehensive Plan should be refined and adopted to set the framework to guide the future refinement and adoption of the changes to the Bend Development Code, including the new mixed-use base zones.

Summary

This memorandum provides concept level recommendations for adjusting the existing regulatory framework to facilitate development of the Central Area as recommended in the CAP. In general, existing commercial and industrial zones in the plan area represent barriers to the CAP in the Bend Central and the Industrial and Employment District, while the existing Central Business District can be used as model with modifications to accommodate the unique character planned for Central Area.

The City of Bend currently has two mixed-use zones applicable to the riverfront and specific employment areas. These mixed-use zones can be used as models for the new mixed-use zones (see Appendix B); however, more specific guidance for uses and development standards is needed in order to ensure that the Central Area develops according to the CAP. Recommendations are provided for new base zones, overlay zones, development performance guidelines standards, and adjustments to the Comprehensive Plan.

APPENDIX A

Bend Central Performance Guideline Recommendations

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Bend Central Performance Guideline Recommendations

The following Performance Guidelines are meant as general recommendations to describe elements of urban form that must be addressed in ongoing development to achieve the desired Vision. These draft guidelines include concepts that should be refined and developed into Performance Guidelines that can be adopted into the zoning code as a design overlay within the MCEN zone or as part of the Central Area Plan Refinement Overlay adopted as a special district plan in Development Code Chapter 2.7. Whichever zoning option the City implements, Performance Guidelines for the Bend Central District can be used as a tool to inform developers and designers of the expectations of the city early in the process by requiring demonstration of general adherence during the pre-application meeting process.

These are suggested Performance Guidelines that focus on the area indicated as the Bend Central District. While not all guidelines may apply to every development, a majority of these should be addressed in a manner that reflects the vision for each of these districts. In addition to the development of Central Area Plan Performance Guidelines, the plan recommends that a two-track review process should be implemented to aid development flexibility. The Plan recommends that the Central Area Plan Performance Guidelines be refined and adopted as an alternative to design standards in the mixed-use plan areas. The two-track process would allow two review options: 1) adherence to prescriptive design standards; or, 2) demonstration, through a conditional use process, that proposed developments meet the intent of the CAP through the Performance Guidelines.

The plan recommends that the review system for approval of conformance with the Central Area Plan Performance Guidelines include a special review body specifically focused on Central Area issues.

Similar performance guidelines should be developed for the Industrial and Employment District during the development of a new mixed-use zoning district as part of Development Code Chapter 2.3 or the Special Central Area Plan District in Development Code Chapter 2.7.

Guidelines should be performance oriented and not prescriptive. They address the general look, feel, and function of the Bend Central Area and should be applied to the district as it develops. They create an environment for design excellence to occur, for small actions to have a major cumulative effect, and a mechanism for checking the progress of the Vision implementation. If the Guidelines are properly followed, each and every development increment will contribute to a better-defined and coordinated urban form. These guidelines guide developers, city officials, and the community in their efforts to achieve the vision for Bend's Central Area.

Contributing to Community

1.1 Draw People & Activity Into the Bend Central District

Developments should attract a variety of pedestrian activities in Bend Central with linkages to adjacent neighborhoods and downtown core. Entry points into Bend Central should establish a sense of arrival.

1.2 Encourage Further Development

Buildings and spaces should be designed with future adjacent development as a consideration. Designs should not be "islands," but should create design opportunities for future abutting development.

1.3 All Seasons City

Building uses and exterior spaces should lend themselves to use throughout all four seasons. Designs should include protected spaces and pathways to enable year-round use by visitors and inhabitants.

1.4 24 Hour / 7 Day City

Developments should foster the idea of extended hours of use throughout the week. Where uses are subject to "business hour" operation, the development should include amenities that provide for external enjoyment of buildings at all times of day.

1.5 Sustainable Design

New development should embody current green building techniques wherever possible. Energy efficient design options should be explored as well as alternative building products, which have less impact on the local and world environment. Strive for LEED® (Leadership in Energy and Environmental Design) certification of development.

1.6 Buildings as Good Neighbors

Each building should be designed to fit into, and contribute to the future vision of Bend Central. Each building should enhance the public experience of itself and of the abutting buildings. Undesirable elements of buildings should either be screened or hidden from view.

1.7 A Place of Multiple Activities

When practicable, developments should include multiple uses in building structures, as well as using exterior spaces as extensions of interior uses. Create combinations of public rights of way and open space within blocks to create places that can accommodate multiple activities.

1.8 Scale of The Street

Building heights adjacent to a street edge should be at least as tall as half the width of the right of way. Existing buildings would improve the street scale with vertical expansion. Street trees can also be used in meeting the height goal. A combination of taller buildings and trees will create the appropriate scale for the street.

1.9 Building Setbacks

A continuous street edge contributes to the pedestrian health of Bend Central. Buildings should front the sidewalk. In addition, buildings placed close to side and rear property lines should be designed with sensitivity to future development on adjacent properties and to potential public spaces within the block.

1.10 Pedestrian Interaction

Buildings and exterior space should foster activity and interaction of citizens at a pedestrian scale. Encourage a variety of uses within walking distance for residents, employees, and visitors. Employ appropriate sidewalk widths and weather protection to encourage use and activity.

Interconnectivity

2.1 Visual Linkages

Design interior and exterior spaces that recognize and promote visual linkages to other defining elements, such as monuments, civic spaces, outlooks, water features and other natural and man-made landmarks that orient the user.

2.2 Attraction of Attractors

Future attractors should be located strategically in Bend Central, providing a sense of "this is where it's happening," making Bend Central the new destination in the city - unique, but complimentary to the Historic Downtown Core and the Mill District.

2.3 Axial Relationships and Monuments

Recognize existing and potential axial relationships of places and buildings. In building form, monuments, or in water features, incorporate extensions or terminations of these relationships. Developments should recognize culturally valued characteristics of the community.

2.4 Places and Connections

Provide a safe, inviting series of interconnected places, both interior and exterior to the building structures. Provide linkages to adjacent neighborhoods for pedestrians, bicycles, and automobiles.

2.5 Driving and Parking

In the design of streets and parking areas, functional requirements of vehicular activity should not compromise, but should enhance, the pedestrian environment.

2.6 Pedestrian Opportunities

Integrate pedestrian circulation systems with existing and planned systems, both indoor and outdoor, that connect public rights-of-way and spaces, activities and uses. Design systems to use paving, furniture, and landscaping that are handicap and stroller accessible, convenient to use, and in character with the public improvements.

2.7 Green Streets

Promote creation of green streets and surface parking areas utilizing features like permeable paving, solar powered lighting, and native landscaping. City design standards should be flexible to allow designs that have a minimal impact on non-renewable natural resources.

2.8 Connections Through Buildings

Architectural design should allow for public interaction between buildings. Pedestrian walkways through and connections between clusters of buildings should be encouraged.

Bend Central Open Spaces and Landscapes

3.1 Civic Rooms

Development of public spaces within and around Bend Central should contribute to the formation of civic rooms. Within these rooms, specific commercial and public uses, circulation patterns, public art, and cultural recognition shall be encouraged to reinforce the room and its linkage to Bend Central and the downtown core.

3.2 Areas of Many Functions

Pathways, open spaces and enclosed or sheltered public spaces should be flexible to accommodate a number of functions, whether organized or casual.

3.3 The Street

Streets should be considered as a linear room with building faces, landscaping, lighting and signing appropriate to the function of the street and the area of Bend Central it serves. Street trees should be spaced at no more than 30 feet on center and are critical to establishing the character of a street.

3.4 The Intersections

Intersections should be considered as rooms within the city. Maintain vehicular flow requirements while providing safe and convenient pedestrian access. When possible, use the location of building entries, building details, street lighting, and signage to enhance the concept of the intersection as a room.

3.5 Courtyards And Plazas

Private development should include design courtyards and plazas that provide a continuity of experience between the inside and outside of the building and between the public and private realm.

3.6 Open Space Defined By Buildings

The spaces in-between buildings should enhance the public experience through building design, form and organization. The character of the spaces in-between should add to the texture and scale of the pedestrian environment.

3.7 Inside And Outside

Ground floor activities in buildings within Bend Central should present an interesting and enticing addition to the pedestrian experience. Exterior walls abutting public rights of way shall have more than 50% of the surface in windows, showcases, displays, art or pedestrian access elements.

3.8 Roofscaping

The rooftops of buildings within Bend Central present an opportunity for green design and upper level activities. New development should be encouraged to create eco-roofs and/or opportunities for places where activity could enhance the street.

3.9 Street Trees

Selection of trees along street edges should create a unifying canopy for the street. Trees should be chosen to ensure commercial views from the street. Trees with strong vertical shapes should be used sparingly to avoid a discontinuous or lollipop appearance.

3.10 Signage

Business identity signs, while conforming to requirements of the sign ordinance, should add to the quality and character of the street. Signs should also relate to the building's character and provide identity and focus for the use. Signs should be readable from vehicular as well as pedestrian views.

3.11 Public Art

Public art can enhance the landscape and provide focus within public spaces. Public art should be incorporated in strategic locations to create a better visual environment and provide interactive and interpretive experiences for both children and adults. The design work of artists, with a focus on local artists, should be integrated into new development.

3.12 Safe Environments

New development and civic improvements should use crime prevention techniques wherever possible. Design options that reduce the opportunity for crime and nuisance activities should be explored, such as eyes on the street and the principles of Crime Prevention Through Environmental Design (CPTED), to create a safer environment.

Bend Central District Development Form

4.1 Building Form

Single-purpose buildings should be treated as unique structures with style and size appropriate to the intended use. Mixed-use buildings should be designed to relate contextually to the surrounding buildings.

4.2 Adaptable Design

As the Bend Central District evolves over time, the market will dictate changes in uses and densities. Design of buildings should consider flexibility in use and density over the life of the building.

4.3 Active Buildings along Pedestrian Oriented Streets

Where pedestrian oriented Great Streets are identified within Bend Central, active uses should be developed to support them. The street edges should help to reinforce the pedestrian link between focal points or attractors.

4.4 Activate Buildings Along Paths & Linkage Streets

Where possible, maximize use of deep building lots and the alleys. Businesses that do not require high exposure street frontage may develop along improved alleys and open space internal to blocks, giving the most important exposure to retail and businesses requiring street front identity.

4.5 Craft of Building

In designing buildings, recognize the craft of building as fundamental in creating appropriate building detail. Proportion, attention to detail and quality design should be stressed. Lasting materials are strongly encouraged and the way buildings are assembled contributes to the texture and fabric of Bend Central.

4.6 The Outside Wall

The outside wall, the building’s presentation both to passers-by and to users, should invite participation. Upper levels of buildings facing the street should incorporate decks, balconies or other devices that activate the wall enclosing the street, any open space, pathways, or lanes.

4.7 Building Entrances

Building entrances should support and enhance the pedestrian oriented quality of Bend Central. Design entrances to give identity to buildings and uses therein. Entrances to upper level uses should be located mid-block with corner entrances reserved for retail uses.

4.8 Parking Relationship To Building

Parking areas and structures are to be integrated into new building designs. Surface parking should be limited to short-term parking along the streets where possible to maintain an active street-front. Delineate surface parking from pedestrian ways by low vertical screening elements, such as masonry walls, fences or landscaping.

4.9 Service Areas

Since service access and trash holding areas are expected to be in the alley or adjacent to roadways and open spaces, care must be taken to avoid a back-door appearance to the building faces that are adjacent to pedestrian areas and other buildings. Employ screening and landscaping to reduce the visual impact of service areas.

4.10 Interior Environments

Interior design of buildings in Bend Central should recognize the need for quality living and working environments for all its users. Natural lighting and ventilation should be utilized to the maximum extent possible.

APPENDIX B

General Recommendations for New Zone Language

The following is an example of possible additions to Chapter 2.3. It is anticipated that specific language will be refined before adoption to ensure clarity and objectivity. Similar elements should be incorporated into Chapter 2.7 if the City chooses adopt a Central Area Refinement Overlay as a Special Planned District.

Chapter 2.3 Mixed - Use Districts (ME, MR, MCEN, MINEX,and PO)

Sections:

2.3.100 Purpose

The Mixed Use Districts are intended to provide a balanced mix of residential and employment opportunities. These mixed-use areas provide a transition between existing urban environments and both existing and future residential developments. The mixed-use districts support service commercial, employment, and housing needs of a growing community. The Mixed-Use district standards are based on the following principles:

- Ensure efficient use of land and public services
- Create a mix of housing and employment opportunities
- Provide transportation options for employees and customers
- Provide business services close to major employment centers
- Ensure compatibility of mixed-use developments with the surrounding area and minimize off-site impacts associated with development.
- Provide maximum development flexibility to respond to market demands while ensuring quality, integrated development.

The Mixed-use Districts ME, MR, MCEN, MINEX, and PO are identified on the City's official zoning map. The districts serve distinctly different purposes as described below.

Zone District	Location and Characteristics
Mixed Employment District (ME)	The Mixed Employment zone is intended to provide a broad mix of uses that offer a variety of employment opportunities. Where Mixed Employment Districts occur on the edge of the city, their function is more transitional in nature providing service commercial businesses

	and supporting residential uses in an aesthetic mixed environment. In this instance, when residential units are provided, the units shall be within easy walking distance to the commercial and employment uses.
Mixed Use Riverfront District (MR)	The Mixed Use Riverfront District is intended to implement the General Plan policies for the creative redevelopment of mill site properties adjacent to the Deschutes River. It is intended to allow for a mix of uses that: ▪ Provide a variety of employment opportunities and housing types; ▪ Foster pedestrian and other non-motor vehicle activity; ▪ Ensure functionally coordinated, aesthetically pleasing and cohesive site planning and design; ▪ Ensure compatibility of mixed-use development with the surrounding area and minimize off-site impacts associated with the development; and ▪ Encourage access to, and enjoyment of, the Deschutes River.
Mixed Use Bend Central District (CAP-MCEN)	The Mixed Use Bend Central District is intended to implement Bend Area General Plan policies for the creative redevelopment of the Central Third Street Corridor and surrounding areas west to the Parkway and east to and including 4th Street. It is intended to: ▪ Provide for a wide range of mixed residential, commercial and office uses, throughout the area and, depending on the parcel and its surroundings, vertical mixed use (i.e., a mix of uses within the same structure) and with an emphasis on pedestrian access wherever possible. ▪ Provide for greater density development with a mix of housing and office with retail and entertainment at street level. ▪ Provide for development that is complementary to a future transit center by encouraging a pedestrian friendly environment.
Industrial and Employment District (CAP-INEX)	This zone retains some of the characteristics of the current light industrial zoning but it is also intended to: ▪ Provide for a mixture of live/work spaces (artists lofts, etc.). ▪ Provide for mixed-employment uses that are vital for micro-enterprises.
Professional Office District (PO)	The Professional Office zone is intended to provide for professional offices in locations near arterial or collector streets and to provide a transition of uses between residential areas and other more intensive zones. Through design standards, the Professional Office zone is intended to create a mix of high density residential housing, office and service commercial developments that are pedestrian oriented and provide a positive contribution to the streetscape.

2.3.200 Permitted Land Uses

A. **Permitted Uses.** The land uses listed in Table 2.3.200 are allowed in the Mixed Use Districts, subject to the provisions of this Chapter. Only land uses that are specifically listed in Table 2.3.200 and land uses that are approved as similar to those in Table 2.3.200 may be permitted or conditionally allowed. The land uses identified with a "C" in Table 2.3.200 require Conditional Use Permit approval prior to development, in accordance with Chapter 4.4.

B. **Determination of Similar Land Use.** Similar use determinations shall be made in conformance with the procedures in Chapter 4.1.1400, Declaratory Ruling.

C. **Exceptions.** Existing uses and buildings lawfully established prior to the adoption of this ordinance shall be permitted. Expansion or enlargement of an existing uses and buildings not identified as permitted or conditional uses below shall be subject to the Conditional Use criteria, standards and conditions within Chapter 4.4.

Table 2.3.200
Permitted Land Uses

Land Use	ME	MR	MCEN	MINEX	PO
Residential					
Single Family / as primary use	C	P	N	C	C
as secondary use	P	P	N	C	P
Multi-family housing */ as primary use	C	P	P	C	C
as secondary use	P	P	P	C	P
Temporary Housing* as a secondary use	P	N	C	C	P/C
Commercial					
Retail Sales and Service					
• Not to exceed 20,000 sq ft gross floor area	P	N	N	P	NN
• not to exceed 20,000 sq ft ground floor per lease space	N	P	P	N	P
• ground floor only / not to exceed 2500 sq ft for single use / 5000 sq ft for multiple users	N	N	N	N	
Commercial (continued)	**ME**	**MR**	**MCEN**	**MINEX**	**PO**
Retail Sales and Service (auto dependent*)	P	N	C	P	N
Retail Sales and Service (auto oriented*)	P	N	N	P	N
Restaurants/Food Services					N
- with drive-through*	P	N	N	P	
- without drive-through	P	P	P	P	
Offices and Clinics	P	P	P	P	P
Conference Centers/Meeting facility associated with a hotel / motel	C	P	P	P	N
Lodging (bed and breakfast inns, vacation rentals, boarding houses timeshare)	P	P	C	N	N
Hotel / Motels	P	P	P	P	N
- with conference center	P	P			
Commercial and Public Parking as primary use**	P	P	C	C	C
Commercial Storage					
- enclosed in building and on an upper story	P	P	P	P	N
- not enclosed in building	N	N	N	P	N
- enclosed in building on ground floor (i.e., mini-	P	P	N	P	N

storage)					
Entertainment and Recreation					
- enclosed in building (*e.g.*, theater)	P	P	P	P	C
- not enclosed (*e.g.*, amusement)	P	C	N	P	C
Wholesale Sales (more than 75% of sales are wholesale)	P	P	C	P	N
Broadcasting/production studios and facilities	P	P	P	P	N
Hospital	P	C	C	C	C
Public & Institutional					
Government - point of service (e.g., library)	P	P	P	P	C
Government – limited point of service ;(e.g., public works yards, vehicle storage etc.)	N	N	N	P	N
Parks and Open Space	P	P	P	P	P
Schools					
-- pre-school, daycare, and primary, secondary	P	P	P	P	C
-- colleges, and vocational schools	P	P	P	P	P
Clubs and Religious Institutions	P	P	P	P	P
Industrial					
Manufacturing and Production					
- greater than 5,000 sq. ft.	P	P	C	P	N
- less than 5,000 sq. ft. with retail outlet	P	P	P	P	N
Warehouse	P	P	C	C	N
Transportation, Freight and Distribution	C	C	C	C	N
Production businesses (*e.g.*, IT Support Centers, biotechnology, software/hardware development Broadcast and Production studios/facilities.)	P	P	P	P	C
Industrial Service (*e.g.*, cleaning, repair)	P	N	N	P	N

Key to Districts
ME = Mixed Employment
MR = Mixed Use Riverfront
PO = Professional Office

Key to Permitted Uses
P = Permitted; subject to Chapter 4.1
N = Not Permitted;
C = Conditional Use, subject to Chapter 4.4

***** Special Standards for Certain Uses subject to Chapter 3.6 and 2.1.900
** No new surface parking lots are permitted in the MCEN District

2.3.300 Development Standards

The following table provides the numerical development standards within the Mixed Use Districts. Additional standards specific to each district follow within a separate sub-section of this Chapter.

Building setback standards provide building separation for fire protection/security, building maintenance, sunlight and air circulation, noise buffering, and visual separation. Building setbacks are measured from the building foundation to the respective property line.

No new building or modification of an existing building shall exceed the development standards provided herein without receiving approval of a Variance application in accordance with the criteria listed in Chapter 5.1

Table 2.3.300
Mixed Use District Development Standards

Standard	ME	MR	MCEN	MINEX	PO
Minimum Front Yard Setback	10’	0’ **	0’ **	0’ **	10’
Maximum Front Yard Setback	10’/80’*	None**	10’**	None**	10’
Rear Yard Setback	0’ / 10’ (see standards below)	0’ **	0’ **	0’ **	0’ / 10’ (see standards below)
Side Yard Setback	0’ / 10’ (see standards below)	0’ **	0’ **	0’ **	0’ / 10’ (see standards below)
Lot Coverage	50%	None **	None ***	None ***	50%
Building Height	45’	35’**	Refer to Central Area Height Map	Refer to Central Area Height Map	45’

* Subject to special standards in 2.3.400
**Subject to special standards in 2.3.600
***Except at Intersections of Character for which the maximum coverage must allow for outdoor public space.

A. Applicability. The setback standards outlined in Table 2.3.300 above shall apply to all new and expanded buildings. The setback standards apply to both primary structures and accessory structures. The standards may be modified only by approval of a variance, in accordance with Chapter 5.1; Variances.

B. Front Yard Setbacks.

1. General Standards. See Table 2.3.300; Mixed Use District Development Standards.

2. Double Frontage Lots. For buildings on lots with double frontage, the minimum front yard setback standards in Table 2.3.300 shall be applied to both frontages. In the ME and PO zoning districts, the maximum setback standard of 10 feet shall be applied to only one of the frontages, provided that where the abutting streets are of different street classification, the maximum setback standard shall be applied to the street with the higher classification.

3. Exceptions. The following exceptions apply to ME and PO zoned properties.

   a. For buildings on corner lots at the intersection of two arterial streets, the maximum front yard setback standard specified in Table 2.3.300 shall be met for one frontage and for the other frontage, a maximum setback of 160 feet shall be allowed. Off-street parking, driveways and other vehicular use and circulation areas may be placed between a building and the 10 foot wide required landscape setback adjacent to the street when the 160 foot maximum setback option is applied.

b. When the street fronting the development does not allow on-street parking, the maximum front yard setback of 80 feet shall apply.

c. Other special setbacks in conformance with Chapter 3.5.300; Special Setbacks.

C. Side and Rear Yard Setbacks.

1. ME, MCEN, and MINEX Zones. There is no rear yard setback required (*i.e.* 0 feet), except when abutting a lot in a residential zone, the rear yard setback shall be 15 feet for all portions of the structure less than 35 feet in height. For portions of the building 35 feet in height or greater, the setback shall set back an additional 1 foot for each foot the building exceeds 35 feet, however, developments within the MCEN and MINEX Zones, may demonstrate alternative means of buffering through design elements.

2. PO Zone. There is no rear yard setback required (*i.e.* 0 feet), except when abutting a residential zone, the rear year setback distance shall be a minimum of 10 feet and the rear yard setback shall be increased by 1 foot for each 1 foot by which the building height exceeds 25 feet.
3. When a public alley abuts a side or rear yard of property within the PO or ME zones, the width of the alley can be included in the additional setback calculation as described above in subsections (1) and (2) above for the purpose of offsetting the impacts of the building height over 35 feet. The alley does not eliminate the required 10 foot building setback.

D. Other Requirements.

1. Buffering. A 10-foot minimum landscape buffer shall be required along the side and rear property lines between industrial use development listed in Table 2.3.200 and any adjacent Residential District. The buffer zone is in addition to the required side and rear setbacks required in section 2.3.300(C) above. The buffer shall provide landscaping to screen parking, service and delivery areas; and walls without windows or entries, as applicable. The buffer may contain pedestrian seating but shall not contain any trash receptacles or storage of equipment, materials, vehicles, etc. The landscaping standards in Chapter 3.2, Landscaping, Streets Trees, Fences and Walls, provide other buffering requirements where applicable. Developments within the MCEN and MINEX Zones, may demonstrate alternative means of buffering through design elements.

2 Building and Fire Codes. All developments shall meet applicable fire and building code standards. Larger setbacks than those listed above may be required due to the proposed use and/or storage of combustible materials.

2.3.400 Building Orientation

All of the following standards shall apply to new and expanded development within the Mixed Use Districts, unless otherwise specified in this code, in order to reinforce streets as public spaces and encourage alternative modes of transportation, such as walking, bicycling and future transit.

A. Building Entrances. All buildings shall have an entrance(s) visible or oriented to a street. Oriented to a street means that the building entrance faces the street, or is visible to the street and connected by a direct and convenient walkway. Building entrances may include entrances to individual units, lobby entrances, entrances oriented to pedestrian plazas, or breezeway/courtyards. Streets used to comply with this standard may be public streets or private streets and shall contain sidewalks and street trees, in accordance with the standards in Chapter 3.0; Development Standards. The building entrance orientation standard is met when the following criteria are met:

1. When on-street parking is permitted on the street fronting the development, the front yard maximum setback shall be 10 feet.

2. When the street fronting the development does not allow on-street parking, the maximum front yard setback shall be 80 feet, except in the MR Zone.

3. Corner Lot Standard. Buildings on corner lots are encouraged to have an entrance oriented to the street corner. The minimum front yard setback specified in 2.3.400 A(1) above shall be met for both street frontages.

B. Walkway Connections. Walkways shall be placed through yard setbacks as necessary to provide direct and convenient pedestrian circulation between developments and neighborhoods. Walkways shall conform to the standards in Chapter 3.1; Access, Circulation and Lot Design.

C. Parking. Parking and maneuvering areas shall be prohibited between the street and the building when on-street parking is allowed on the street fronting the development property. Parking shall be provided in conformance with Chapter 3.3; Vehicle Parking, Loading and Bicycle Parking. Developments within the MCEN and the MINEX Zones are required to site off-street parking behind, below grade, or beside the development. Shared parking arrangements may be approved upon provision of legal agreements with abutting properties with which the parking will be shared. Developments within the MCEN Zone may pay an in-lieu of fee to be applied to city provided structured parking.

2.3.500 Architectural Standards

All developments in the Mixed Use Districts shall be subject to Commercial Design Review, Chapter 2.2.800 and be reviewed for conformance with the criteria in A and B below unless otherwise specified in this code. Note: Developments within the MCEN and the MINEX Zones are required to demonstrate compliance with the alternative Bend Central Area Development Performance Guidelines instead of the architectural standards shown in 2.3.500.

A. Building Mass. Where building elevations are oriented to the street in conformance with Chapter 2.2.600; Block Layout and Building Orientation, architectural features such as windows, pedestrian entrances, building off-sets, projections, detailing, a change in materials or similar features, shall be used to break up and articulate large building surfaces and volumes greater than 50 linear feet in length. A minimum of 15% of the horizontal building façade shall contain a variety of architectural features

B. Pedestrian-Scale Building Entrances. Recessed entries, canopies, and/or similar features shall be used at the entries to buildings in order to create a pedestrian-scale.

2.3.600 Special Development Standards for the MCEN and MINEX Zones.

The Mixed Use Bend Central District is divided into several corridor areas or sub-districts which are suited for different types of development. Great Streets which act as Gateways to adjoining central areas, are designated as:

- 3rd Street from NE Revere Avenue to NE Burnside Avenue;
- Olney Avenue from NW Wall Street to NE 4th Street;
- Greenwood Avenue from NW Wall Street to NE 4th Street; and,
- Franklin Avenue. from NW Wall Street to NE 4th Street.

Design characteristics are intended to maintain view corridors along Great Streets within the Bend Central Area by allowing only low to mid -rise building heights along these streets.

In addition to Great Streets, the Mixed Use Bend Central District contains special Intersections of Character which are reserved for future redevelopment that includes outside public spaces and rooms that shall serve as landmarks and facilitate better way finding. Buildings surrounding the intersection shall be low rise, but complimentary to each other. Lighting shall emphasize activity and pedestrian and vehicular zones should be delineated to ensure safe and secure passage for all. The following Intersections of Character are identified in the Bend Central area:

- NE Revere Avenue and NE 3rd Streeet
- NE Olney Avenue and NE 3rd Street
- NW Olney Avenue and NW Wall Street
- NE Greenwood Avenue and NE 3rd Street
- NE Greenwood Avenue and NE First Street
- NW Greenwood Avenue and NW Hill Street
- NW Greenwood Avenue and NW Wall Street
- NE Franklin Avenue and NE 3rd Street
- NE Franklin Avenue and NE 1st Street
- NW Franklin Avenue and NW Hill Street

A. Development Plans Required. The Mixed-use Bend Central and Industrial and Employment zones shall only be applied to the area designated on the Bend Area General Plan Map. Before development of properties can occur in the MCEN and MINEX zones, a Facilities Plan shall be reviewed and approved. The Facility Plan shall be processed as a Type II Activity. The Bend Planning Commission shall review and approve the Master Development Plan.

B. Facilities Plan. Prior to or concurrent with submitting a Master Development Plan the owners shall submit for review and approval a Facilities Plan that shows how the area will be served by roads and utilities.

1. The Facilities Plan shall, at a minimum, include:

   a. A map of existing and planned water and sewer facilities to serve the sub-area including line sizes, general location or routes, and how the lines will tie in with areas adjacent to the MCEN or the MINEX zone.

   b. A map of existing and planned collector and arterial streets adjacent to the sub-area and of the general route of planned collector, arterial, and major local streets through the sub-area and where the streets will connect with the existing collector or arterial street system.

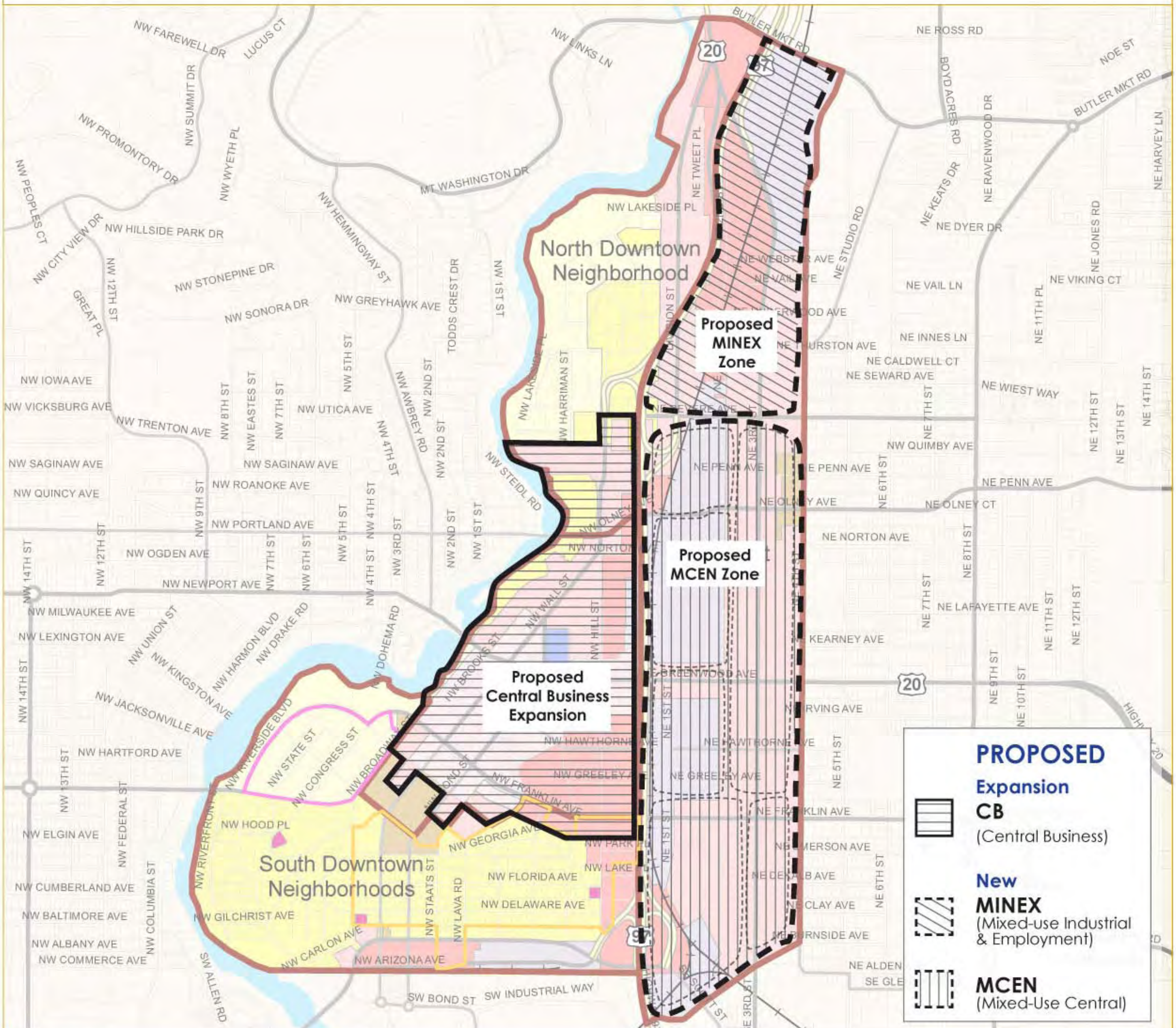
   c. Such other utility or transportation information as the City may determine.

d. A written narrative that explains or describes:
   i. How the proposed water, sewer, and street system will be adequate to serve the type and size of development planned for the area;
   ii. How the location and sizing of facilities on-site will be consistent with the existing and planned utilities;
   iii. How adequate water flow volumes will be provided to meet fire flow and domestic demands; and
   iv. The function and location of any private utility systems.

3. The Facilities Plan shall be approved if it is determined to be consistent with the Utilities Master Plan and the Transportation Element of the Bend Area General Plan and other information required by the City.

BEND CENTRAL AREA PLAN

Proposed New Zones & CB Expansion



Zoning

CB	IG	PO	SM	Drake Park Neighborhood Historic District
CC	IL	PO/RM/RS	SR2-1/2	Old Town Historic District
CG	IP	RH	UAR10	City of Bend Central Area Plan
CH	ME	RL		
CL	MR	RM		
CN	PF	RS		

0 500 1,000 1,500
Feet

Data Source(s):
City of Bend, NAIP, Parametrix

Geographic Data Standards:
Projected Coordinate System:
State Plane - Oregon South
Units: US Foot

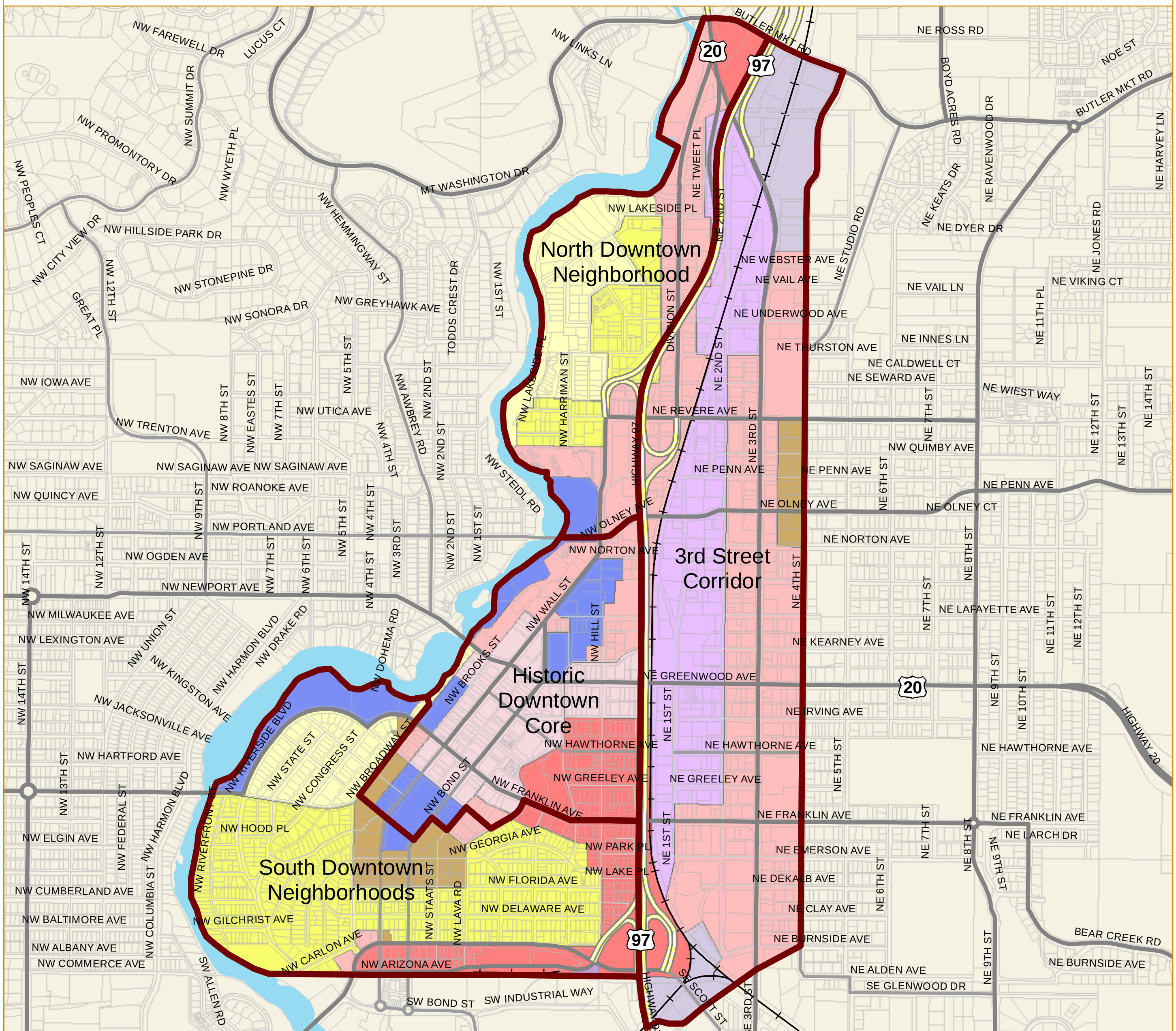
Parametrix

APPENDIX C

Bend Area General Plan Map

BEND CENTRAL AREA PLAN

Bend Area General Plan Map



General Plan

- CB
- CC
- CG
- CH
- CL
- IG
- IL
- IP
- IR
- ME
- MR
- PF
- PO
- PO/RM/RS
- RH
- RL
- RM
- RS
- SM
- URA

City of Bend Central Area Plan

0 500 1,000 1,500
Feet

Geographic Data Standards:
Projected Coordinate System:
State Plane - Oregon South
Units: US Foot

Data Source(s):
City of Bend, NAIP, Parametrix

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Parametrix

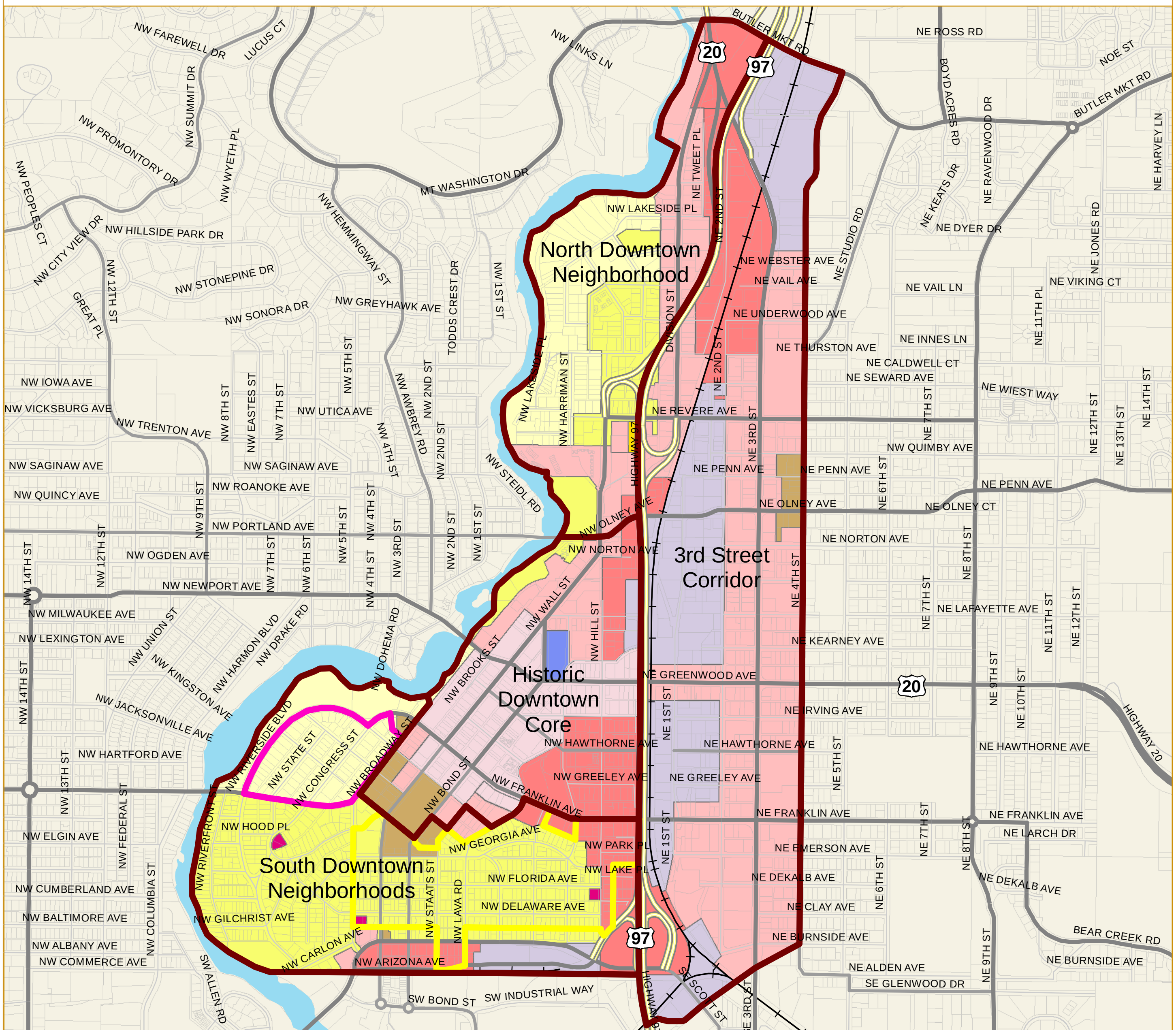
Analysis by C. Hainey; Analysis Date: Jan-2007; Plot Date: Jan-2007: File Name: CAP_GP.mxd

APPENDIX D

Bend Zoning Map

BEND CENTRAL AREA PLAN

Existing Zoning and Historic Districts



Zoning

- CB
- CC
- CG
- CH
- CL
- CN
- IG
- IL
- IP
- ME
- MR
- PF
- PO
- PO/RM/RS
- RH
- RL
- RM
- RS
- SM
- SR2-1/2
- UAR10

- Drake Park Neighborhood Historic District
- Old Town Historic District
- City of Bend Central Area Plan

0 500 1,000 1,500
Feet

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Data Source(s):
City of Bend, NAIP, Parametrix

Geographic Data Standards:
Projected Coordinate System:
State Plane - Oregon South
Units: US Foot

Parametrix

Analysis by C. Hainey; Analysis Date: Jan-2007; Plot Date: Aug-2007: File Name: CAP_Zoning.mxd

APPENDIX E

Proposed Building Height Increases

SBA
09/05/07

Recommended Changes to Building Heights within the Central Area

Building Heights

1. Everything west of the Parkway retains current height requirement.
2. Everything east of the Parkway would have the following maximum height restrictions:
    a. 35 feet along east/west "great streets" to build pedestrian scale.
    b. 35 feet bordering (1/2 block both sides) 4th Street to provide a transition scale to neighborhood.
    c. 65 feet on both sides of 3rd Street to facilitate redevelopment of current parking lots, such as the Safeway redevelopment between Newport/Franklin & 3rd and 4th Streets.
    d. Within the Tall Building District, the height limit would be 50 feet but would have opportunities in designated areas to go up to 100 and 150 feet if certain criteria are met.

Tall Building District

Area of Bend Central designated as the location for taller buildings.

Intent:

1. Provide opportunities for development of taller, more slender buildings if conditions met
2. Floor plate limitations coincide with housing towers, not office. The texture of a housing tower is different than an office tower due to need for outdoor space (balconies, terraces).
3. Buildings are placed with their long dimension E/W, therefore creating and maintaining view corridors from east to west mountains.
4. Buildings are set back from property lines on the east and west, allowing positioning of taller buildings to minimize view blockage on/from neighboring properties.

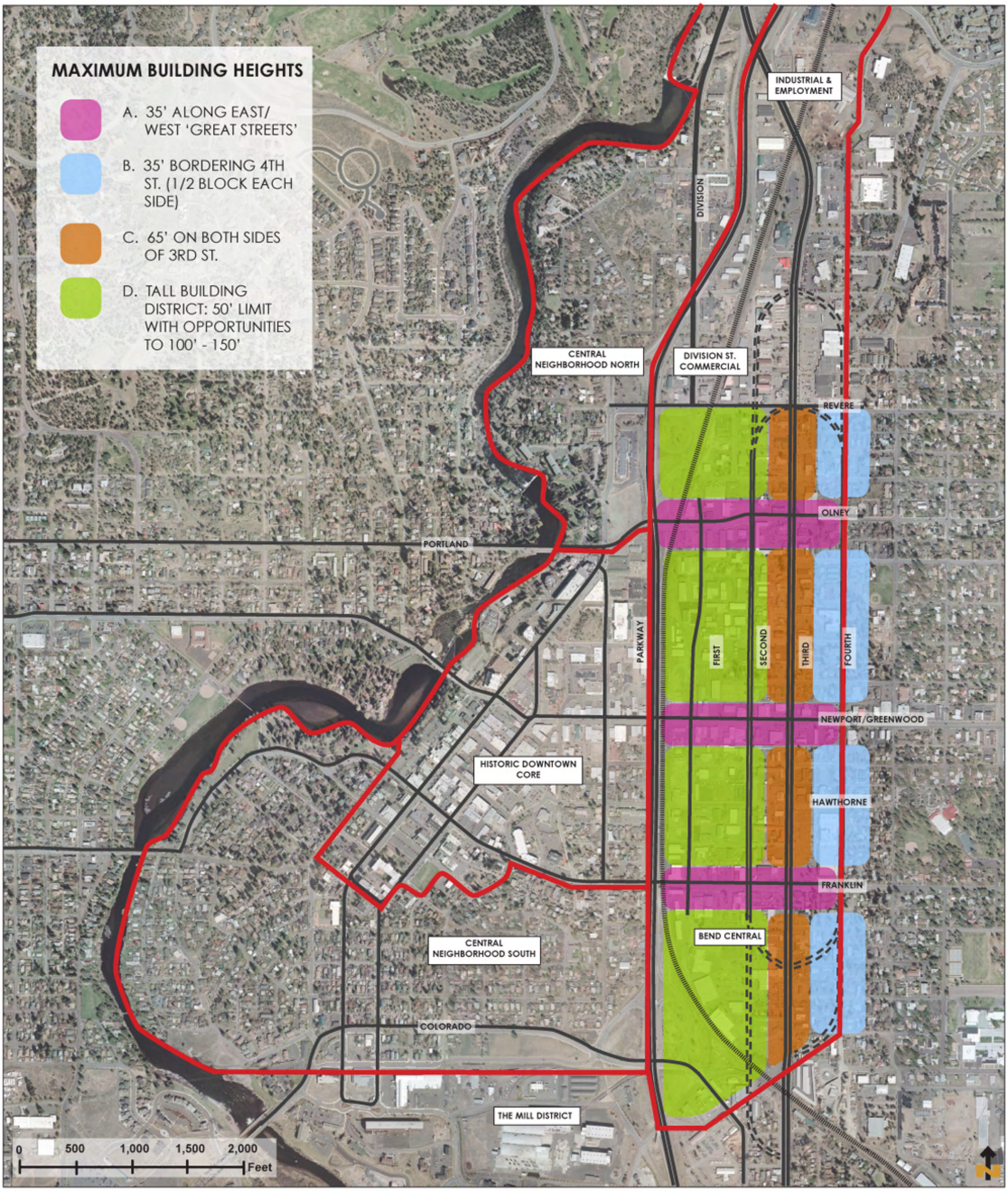
Conditions:

1. Base Condition
    1.1. Base height limitation – 50 feet
    1.2. Setbacks – front: zero, side: zero, rear: 20 feet
    1.3. F.A.R. – minimum 2:1
2. Sites less than 40,000 square feet
    2.1. Height limitation: 100 feet
    2.2. Total site area is greater than 20,000 square feet
    2.3. Average floor area (total floor area of all levels divided by number of floors) is less than 15,000 square feet
    2.4. Building has longest axis in east/west direction
    2.5. Setbacks – north/south property lines: zero, east/west property lines: 20 feet
3. Sites greater than 40,000 square feet
    3.1. Height limitation – 150 feet

3.2. Total site area is greater than 40,000 square feet
3.3. Average floor area (total floor area of all levels divided by number of floors) is less than 20,000 square feet
3.4. Building has longest axis in the east/west direction
3.5. Setbacks – north/south property lines: zero, east/west property lines: 25 feet

BEND CENTRAL AREA PLAN

Proposed Building Heights



09.06.2007

Leland Consulting Group

StastnyBrun Architects

Parametrix