PLANNING COMMISSION MEETING

Tuesday, November 13, 2018, 6:30 PM

Fairview City Hall – Council Chambers, 2nd Floor
1300 NE Village Street, Fairview, OR 97024

MEETING AGENDA

1. **CALL TO ORDER:** 6:30 p.m.

2. **CITIZENS WISHING TO SPEAK ON NON-AGENDA ITEMS**

3. **PUBLIC HEARINGS**

File Number 2018-37-DR

Allwood Recycling (22800 NE Marine Drive)
Type III Quasi-Judicial Procedure

Summary: The applicant is requesting Site Design Review approval for a new sales and storage yard for landscape materials in the General Industrial (GI) zone.

Applicable Fairview Municipal Code Criteria:
FMC 19.400 Administration of Land Use and Development Review
FMC 19.412 Description of Permit Procedures
FMC 19.413 Procedures
FMC 19.424 Site Design Review – Application Review Procedure
FMC 19.425 Site Design Review – Application Submission Requirements
FMC 19.426 Site Design Review – Approval Criteria
FMC 19.440 Conditional Use Permit
FMC 19.85 General Industrial District
FMC 19.162 Access and Circulation
FMC 19.163 Landscaping, Street Trees, Fences and Walls
FMC 19.164 Vehicle and Bicycle Parking
FMC 19.165 Public Facilities Standards

4. **COMMISSION AND STAFF UPDATES**

5. **TENTATIVE AGENDA**

6. **ADJOURNMENT**

NEXT PLANNING COMMISSION MEETING: TUESDAY, NOV. 27, 2018

Planning Commission hearings are broadcast live on Comcast Cable Channel 30 and Frontier FiOs Channel 38. Replays of the meeting are shown on Saturday at 12:30pm and Monday at 2:00pm following the original broadcast date. Meetings are also available for viewing on the MetroEast website. Further information is available on our web page at www.fairvieworegon.gov or by calling Devree Leymaster, City Recorder, 503-674-6224.

The meeting location is wheelchair accessible. A request for an interpreter for the hearing impaired or for other accommodations for person with disabilities should be made at least 48 hours before the meeting to: Devree Leymaster, 503-674-6224.

PLANNING COMMISSION STAFF REPORT
TYPE III SITE DESIGN REVIEW
FINDINGS AND STAFF RECOMMENDATION

Date of Report:	November 6, 2018
Staff Contact:	Eric Rutledge, Associate Planner rutledgee@ci.fairview.or.us 503-674-6205
Application Number:	2018-37-DR
Property Owner:	MRW Properties LLC, Mark Wubben
Applicant:	PLS Engineering
Site Address:	22800 NE Marine Drive
Parcel Number/Tax ID:	1N3E22C -109 (R575270)
Proposal:	New sales and storage yard for Allwood Recycling, a company that recycles landscape material (bark, mulch, soil, rock, etc.) for residential and commercial customers. The site will provide a 924 SF office building, weight scale, bins for material storage, and employee and customer parking.
Recommendation:	**Approval with Conditions**
Exhibits:	**A. Application Material** 1. Application Narrative **B. Plans/Drawings** 1. Cover Page

2. Existing Conditions
3. Site Plan
4. Grading & Drainage Plan
5. Sewer & Water Plan
6. Stormwater Details
7. Water Details
8. Sewer Details
9. Stormwater Facility Plan
10. Misc. Details
11. Standard Details
12. Landscape Plan
13. Example Photo – Office Trailer

C. Other Information

1. Traffic Analysis Report
2. Updated Traffic Memo
3. Stormwater Management Report
4. Geotechnical Report
5. Draft Consent to Use Agreement – PacifiCorp
6. Access Easement - PGE

D. Department Referral Comments

1. Multnomah County Transportation Divison
2. Gresham Fire & Emergency Services
3. Multnomah County Drainage District

I. BACKGROUND & EXISTING CONDITIONS

Address/Location: 22800 NE Marine Drive

Acreage: 4.64 Acres (202,003 SF)

Comprehensive Plan: General Industrial

Zoning Designation: General Industrial

Zoning Overlays: None

Surround Zoning / Land Use:

North: Agricultural Holding / NE Marine Drive & Allwood Recycling
South: General Industrial / Chinook RV Storage
East: General Industrial / NE Marine Drive & Allwood Recycling
West: General Industrial / Chinook RV Storage

Streets/Classification: NE Marine Drive is a Major Collector under Multnomah County jurisdiction.

Application Overview:
Allwood Recycling currently operates a sales, processing, and storage yard for landscape materials directly across the street from the proposed development site. The business accepts wood and rock waste and recycles the material into soil, bark, compost, and other landscape material. All operations are currently performed at the existing site on the north/east side of NE Marine Drive (23001 NE Marine Drive). The proposed development will allow Allwood Recycling to improve business operations and relieve congestion at their current site by separating different business activities. The proposed development site will primarily serve customers dropping off and picking up material while the existing site will be used for screening and processing material.

Existing Site Conditions:
The site is currently flat and has been graded in preparation of site development. A Grading & Erosion Control permit was issued for the site through a concurrent review process. Prior to grading, the site was a vacant grassy field. Historical aerial photographs indicate the site had been tilled for agricultural production.

The property is burdened by various powerline, sewer, and stormwater easements. A 125 ft. powerline easement held by PacifiCorp runs east-west through the north end of the property. The Marine Drive Trail, a 9 ft. wide multi-use trail runs parallel to the site, between the north property line and NE Marine Drive.

Photo 1: View of development site (left) and Marine Drive Trail (right). Heading north/northwest. Photo taken on 11-2-2018 by staff.

II. NOTICES & REFERRALS

Application Date:	May 22, 2018
Application Deemed Complete:	October 25, 2018
Public Hearing Date:	November 13, 2018
Public Notice Date/Type:	October 24, 2018 Notice Property Owners (250 ft.) October 26, 2018 Notice in Outlook November 2, 2018 Notice Posted to Site
Referrals:	Multnomah County Transportation Division Gresham Fire & Emergency Services Multnomah County Drainage District PacifiCorp City of Fairview Engineering / Public Works

III. APPLICABLE CRITERIA

This Type III application process requires a planning commission decision subject to the following requirements of the Fairview Municipal Code (FMC) Title 19:

A) Application Review Procedures
- FMC 19.400 Administration of Land Use Review
- FMC 19.413 Procedures
- FMC 19.424 Site Design Review – Application Review Procedure
- FMC 19.425 Site Design Review – Application Submission Requirements
- FMC 19.426 Site Design Review – Approval Criteria
- FMC 19.440 Conditional Use Permit

B) Land Use Districts
- FMC 19.85 General Industrial District

C) Design Standards
- FMC 19.162 Access and Circulation
- FMC 19.163 Landscaping, Street Trees, Fences, and Walls
- FMC 19.164 Vehicle and Bicycle Parking
- FMC 19.165 Public Facilities Standards

IV. APPLICATION REVIEW PROCEDURE FINDINGS

Chapter 19.400 Administration of Land Use Review

19.400.030 Time limit on land use decisions for approval.

Unless otherwise specified in the decision or elsewhere in this title, an approved land use decision shall expire two years from date of final decision.

> **FINDINGS:** If approved, this Site Design Review shall expire two (2) years from the date of final decision.

Chapter 19.413 Procedures

19.413.030 Type III procedure (quasi-judicial).

Type III decisions are made by the planning commission after a public hearing. Appeals of Type III decisions are reviewed and decided by the city council..

> **FINDINGS:** A planning commission hearing on the application is scheduled for November 13, 2018. Public notification for the hearing was provided by city staff in accordance with the requirements in this section, with the exception of publishing notice in a public newspaper 20 days prior to the hearing. Notice was published in the Gresham Outlook 18 days prior to the hearing. As of the date of this report, no comments have been received on the application and missing the newspaper deadline by two days has not negatively impacted the application or the public notification process in a significant way.

Chapter 19.424 Site Design Review – Application Review Procedures

19.424.020 Determination of Type II and Type III applications.

Applications for site design review shall be subject to Type II or Type III review, based on the following criteria:

> *D. Developments with 25 or fewer off-street vehicle parking spaces shall be reviewed as Type II applications, and those with more than 25 off-street vehicle parking spaces shall be reviewed as Type III applications, notwithstanding the provisions contained in subsections A through C and E and F of this section.*
>
> **FINDINGS:** The applicant is proposing a total of 41 parking spaces and the development is subject to Site Design Review.

Chapter 19.425 Site Design Review – Application Submission Requirements

19.425.010 General submission requirements.

The applicant shall submit…

FINDINGS: The applicant has submitted an application containing all of the information required for the Type III application and Site Design Review approval. The application was deemed complete on October 25, 2018.

Chapter 19.426 Site Design Review – Approval Criteria
19.426.001 Site design review approval criteria.
The review authority shall make written findings with respect to all of the following criteria when approving, approving with conditions, or denying an application.

19.426.010 Complete application.
The application must be complete, as determined in accordance with FMC 19.412.050, on types of applications, and Chapter 19.425 FMC.

FINDINGS: A complete application in accordance with the chapters above was submitted on October 25, 2018.

19.426.020 Compliance with land use district provisions.

The application complies with all of the applicable provisions of the underlying land use district, including: building and yard setbacks, lot area and dimensions, density and floor area, lot coverage, building height, building orientation, architecture, and other special standards as may be required for certain land uses.

FINDINGS: The application complies, or can be conditioned to comply with the General Industrial land use district. Full land use district findings are described in Section V of this report below.

19.426.030 Upgrade existing development.
The applicant shall be required to upgrade any existing development that does not comply with the applicable land use district standards, in conformance with Chapter 19.530 FMC, Nonconforming Uses and Development.

FINDINGS: The site is vacant and does not include any non-conforming development. This section does not apply.

19.426.040 Compliance with design standards.
The application complies with the design standards contained in Article III of this title. All of the following standards shall be met:

A. Chapter 19.162 FMC – Access and Circulation;
B. Chapter 19.163 FMC – Landscaping, Street Trees, Fences and Walls;
C. Chapter 19.164 FMC – Automobile and Bicycle Parking;

D. Chapter 19.165 FMC – Public Facilities Standards;
E. Other standards (telecommunications facilities, solid waste storage, environmental performance, signs), as applicable. (Ord. 6-2001 § 1)

FINDINGS: The application complies, or can be conditioned to comply with the design standard chapters listed above. Full design standards findings are described in Section VI of this report below.

19.426.050 Conditions.
All conditions required as part of an approval shall be met.

19.426.060 Exceptions.
Exceptions to criteria in FMC 19.426.040(A) through (E) may be granted only when approved as a variance.

FINDINGS: No variances are sought as part of this application.

V. LAND USE DISTRICT FINDINGS

Chapter 19.85 General Industrial District
19.85.010 Purpose.
This district is intended for a broad range of uses, which can be located in areas where they do not directly affect the livability of residential neighborhoods and the quality and viability of commercial areas in the city. This district provides for the normal operation of an industry, which can meet and maintain the standards set in this section in order to reasonably protect nearby residential and commercial districts. The general industrial district accommodates a range of light and heavy industrial land uses. It is intended to segregate incompatible developments from other districts, while providing a high-quality environment for businesses and employees. This chapter guides the orderly development of industrial areas based on the following principles:

A. Provide for efficient use of land and public services;
B. Provide transportation options for employees and customers;
C. Provide appropriate design standards to accommodate a range of industrial users, in conformance with the Comprehensive Plan.

19.85.020 Permitted land uses.
A. Permitted Uses. The land uses listed in Table 19.85.020.A are permitted in the general industrial district, subject to the provisions of this chapter.

Table 19.85.020.A

Zone	***Land Use Types Permitted***
General Industrial	*1. Industrial** *a. Heavy manufacturing, assembly, and processing of raw materials (CU)* *b. Light manufacture (e.g., electronic equipment, printing, bindery, furniture, and similar goods)* ***c. Warehousing and distribution*** *d. Junk yard, motor vehicle wrecking yards, and similar uses* *e. Columbia River industrial uses north of Marine Drive* ***f. Uses similar to those listed above*** *3. Commercial (CU)* ***Offices and other commercial uses are permitted when they are integral to a primary pre-existing or concurrently established industrial use (e.g., administrative offices, wholesale of goods produced on location, and similar uses).***

FINDINGS: The site will be used for the storage, distribution, and sale of landscape material, including wholesale pickup and deliveries. The proposed use is categorized as "warehousing and distribution" and "uses similar to those listed above" in Table 19.85.020(A). A 924 SF trailer will be used as an on-site office. Office uses are allowed when they are concurrently established with an industrial use.

19.85.030 Development setbacks.
Development setbacks provide separation between industrial and nonindustrial uses for fire protection/security, building maintenance, sunlight and air circulation, noise buffering, and visual separation.

A. Front, Side and Rear Setbacks.

1. None, unless the property abuts a parcel of land in a more restrictive manufacturing district (i.e., LI), or a commercial district, in which case the requirements of the abutting property shall apply. If an established building line exists, the setback may be the same as the established building line following approval by the planning commission.

FINDINGS: The property is surrounded in all directions by General Industrial or Agricultural Holding zoning and no setbacks are required. The applicant is proposing a 5 ft. setback with mulch around the perimeter of the storage yard.

2. If any use in this district abuts or faces any residential zone, a setback of 50 feet on the side abutting or facing the residential district may be required.

FINDINGS: The development site does not abut a residential zone, this standard does not apply.

3. Setbacks for Insufficient Right-of-Way. Setbacks shall be established when a lot abuts a street having insufficient right-of-way width to serve the area. The necessary right-of-way widths and the setback requirements in such cases shall be based upon the Comprehensive Plan and applicable ordinances and standards.

FINDINGS: NE Marine Drive is classified as a Major Collector under Multnomah County jurisdiction, requiring up to an 80 ft. right-of-way. The existing right-of-way adjacent to the site ranges between 130 ft. – 170 ft. The application has been reviewed by Multnomah County Transportation Division and no additional right-of-way dedications are required.

B. Other Requirements.

1. Buffering. The city may require landscaping, walls or other buffering in setback yards to mitigate adverse noise, light, glare, and aesthetic impacts to adjacent properties.

FINDINGS: No setbacks are required and this standard does not apply.

2. *Neighborhood Access. Construction of pathway(s) within setbacks may be required to provide pedestrian connections to adjacent neighborhoods or other districts, in accordance with Chapter 19.162 FMC, Access and Circulation.*

FINDINGS: No pathways are required within the setbacks for connections to adjacent neighborhoods. The site is surrounded by private industrial land in all directions. The applicant is proposing a 5 ft. wide pedestrian path from the site to the multi-use Marine Drive Trail.

3. *Building and Fire Codes. All developments shall meet applicable fire and building code standards, which may require setbacks different from those listed above (e.g., combustible materials, etc.).*

FINDINGS: Gresham Fire & Emergency Services reviewed the application and provided comment (Exhibit D2). The comments do not require setbacks different from those listed above. No buildings are proposed around the perimeter of the site that would require additional setbacks.

4. *Groundwater Protection. All development shall meet the standards for the groundwater protection area.*

FINDINGS: The property is located within the Columbia South Shore Well Field Wellhead Protection Program Area and all future development and operations must comply with the Columbia South Shore Well Field Wellhead Area Reference Manual.

Condition of Approval: A Hazardous Materials Inventory Form and site plan shall be submitted and approved prior to final occupancy.

19.85.040 Lot coverage.
The maximum allowable lot coverage in the general industrial district is 85 percent. The maximum allowable lot coverage is computed by calculating the total area covered by buildings and impervious (paved) surfaces, including accessory structures. Compliance with other sections of this code may preclude development of the maximum lot coverage for some land uses.

FINDINGS: The total site area is 202,003 SF. The site plan indicates a total of 30,300 SF of landscaping will be provided (or 15%). Therefore, the maximum amount of impervious surface is 171,703 SF or 85%.

19.85.050 Development orientation.
Industrial developments shall be oriented on the site to minimize adverse impacts (e.g., noise, glare, smoke, dust, exhaust, vibration, etc.) and protect the privacy of adjacent uses to the extent possible. The following standards shall apply to all development in the general industrial district:

A. Mechanical equipment, lights, emissions, shipping/receiving areas, and other components of an industrial use that are outside enclosed buildings, shall be located away from residential areas, schools, parks and other nonindustrial areas to the maximum extent practicable; and

FINDINGS: Most site operations, including material storage and handling, will be conducted outdoors. Outdoor storage bins will be located around the perimeter of the site, including adjacent to the Marine Drive Trail. The distance between the property line and trail ranges between approximately 25-50 ft., with narrower widths towards the south end of the site. Trail users may be subject to adverse impacts when soil, rock, and other natural material are handled along the northeast property line. It is not practicable to relocate the bins away from the trail; however, additional vegetative screening can help minimize off-site impacts. Screening requirements are addressed through subsection (B) below and FMC 19.440 Conditional Use Permit.

B. The city may require a landscape buffer, or other visual or sound barrier (fence, wall, landscaping, or combination thereof) to mitigate adverse impacts that cannot be avoided through building orientation standards alone.

FINDINGS: As noted above, storage bins and landscape material will be located adjacent to the Marine Drive Trail and relocating the bins is not practicable. A 5 ft. wide setback and a 6 ft. tall chain link fence are proposed to provide a buffer along the northeast property line. However, the setback and chain link fence are not expected to provide an adequate visual screen between the trail and the site. Landscape material may be stored over 6 ft. in height and other trucks and machinery operating in the bins will also be over 6 ft. tall and visible from the trail. A row of evergreen trees that reach a mature height of at least 15 ft. will provide improve site aesthetics and provide appropriate screening between the site and the public trail.

Condition of Approval: Prior to issuance of building permits, the applicant shall revise the site plan and landscape plan to provide a row of evergreen trees between storage bins and Marine Drive Trail along the northeast property line.

The trees shall reach a mature height of at least 15 ft. and be spaced to provide contiguous screening along the property line.

19.85.060 Building height.
The following building height standards are intended to promote land use compatibility and flexibility for industrial development at an appropriate community scale:

A. Base Requirement. Buildings shall be no more than three stories or 45 feet in height, whichever is greater, and shall comply with the building setback standards in FMC 19.85.030.

FINDINGS: The applicant is proposing a one-story, 924 SF office trailer. The approximate height is 12 ft. This standard is met.

19.85.070 Special standards for certain uses.

A. Uses With Significant Noise, Light/Glare, Dust, Vibration, or Traffic Impacts. The following uses shall require conditional use permit approval, in addition to development review or site design review:

1. Uses with Significant Noise, Light/Glare, Dust and Vibration Impacts. Uses which are likely to create significant adverse impacts beyond the industrial district boundaries, such as noise, light/glare, dust, or vibration, shall require conditional use approval, in conformance with Article IV of this title. The following criteria shall be used in determining whether the adverse impacts of a use are likely to be "significant":

a. Noise. The noise level beyond the property line exceeds 65 dBA (24-hour average) on a regular basis.

b. Light/Glare. Lighting and/or reflected light from the development exceeds ordinary ambient light and glare levels (i.e., levels typical of the surrounding area).

c. Dust and/or Exhaust. Dust and/or exhaust emissions from the development exceeds ambient dust or exhaust levels, or levels that existed prior to development.

FINDINGS: Noise will be created by delivery trucks, backhoes, and other equipment and will be compatible with other uses in the General Industrial district. Peak noise levels will occur during business hours and adverse impacts are not anticipated.

Lighting will be provided by new 20 ft. tall light poles throughout the interior of the site. The applicant's narrative also states the lights will be oriented towards the interior of the site in order to avoid adverse impacts to surrounding properties.

Dust and exhaust emissions on the site will increase over ambient levels resulting in a significant impact. There will be regular handling of natural material including bark, rock, and soil that will result in an increase in dust levels. Vehicles picking up, dropping off, and idling on site will result in an increase in on-site emissions over ambient levels. A Conditional Use permit is required.

2. *Traffic. Uses which are likely to generate unusually high levels of vehicle traffic due to shipping and receiving. "Unusually high levels of traffic" means that the average number of daily trips on any existing street would increase by 10 percent or more as a result of the development. The city may require a traffic impact analysis prepared by a qualified professional prior to deeming a land use application complete, and determining whether the proposed use requires conditional use approval. Applicants may be required to provide a traffic analysis for review by ODOT for developments that increase traffic on state highways.*

FINDINGS: A Trip Generation Memo has been submitted with the application and reviewed by Multnomah County Transportation Division. All traffic requirements for the development are outlined in Exhibit D1.

19.85.080 Special standards for city of Fairview adopted Metro Title 4 industrial properties.

A. *The purpose of this section is to impose special standards to protect and preserve the supply of industrial lands in Fairview in accordance with the limitations set out in Title 4 of Metro's Urban Growth Management Functional Plan (see Figure 9-C in the Comprehensive Plan for all Fairview Adopted Title 4 Industrial and Employment Lands).*

FINDINGS: The property is not designated as a Title 4 Industrial property. This standard does not apply.

VI. DESIGN STANDARDS FINDINGS

Chapter 19.162 Access and Circulation

19.162.010 Purpose.

The purpose of this chapter is to ensure that developments provide safe and efficient access and circulation, for pedestrians and vehicles. FMC 19.162.020 provides standards for vehicular access and circulation. FMC 19.162.030 provides standards for pedestrian access and circulation. Standards for transportation improvements are provided in Chapter 19.165 FMC.

FMC 19.162.020 Vehicular Access and circulation

B. Applicability. This section shall apply to all public streets within the city and to all properties that abut these streets.

FINDINGS: NE Marine Drive is a Multnomah Road and the application has been reviewed in accordance with the Multnomah County Road Rules. Exhibit D1 provides full vehicular access requirements. Some vehicular access standards of this Chapter still apply and are addressed below.

C. Access Permit Required.

FINDINGS: Access permits are issued in accordance with the Multnomah County Road Rules. This section does not apply.

D. Traffic Study Requirements. The city may require a traffic study prepared by a qualified professional to determine access, circulation and other transportation requirements.

A traffic study must be provided for any proposed development that includes more than 10 dwellings or generates at least 100 vehicle trips per day. The traffic study shall include those adjacent intersections that will receive more than 50 vehicle trips per day.

A freight network impact statement is to be included in all traffic studies for proposed developments on properties identified as industrial lands in Title 4 of the Metro Urban Growth Management Functional Plan. The purpose of this statement is to analyze potential adverse effects of the proposed development on the regional freight system as identified in the regional transportation plan (RTP) and the Fairview transportation system plan. Freight routes located in Fairview include Interstate 84, Marine Drive, 223rd Avenue, Fairview Parkway, Sandy Boulevard, and Glisan Street.

FINDINGS: A Trip Generation Memo was submitted with the application and reviewed by Multnomah County. The property is not classified as Industrial Land in the Metro Urban Growth Management Functional Plan and a freight system analysis is not required.

E. Conditions of Approval..

FINDINGS: Conditions of Approval related to vehicular access are provided by Multnomah County.

F. Access Options…

G. Access Spacing…

H. Number of Access Points…

I. Shared Driveways…

J. …street layout and connectivity…

K. Street Connectivity and Formation of Blocks Required…

L. Driveway Openings. All driveway openings must comply with the "Standard Specifications for Public Works Construction," pages 53 – 55.

FINDINGS: Standards F-L relate to vehicular access and are subject to the Multnomah County Road Rules standards. These sections do not apply.

M. Fire Access and Parking Area Turnarounds. A fire equipment access drive shall be provided for any portion of an exterior wall of the first story of a building that is located more than 150 feet from an existing public street or approved fire equipment access drive. Parking areas shall provide adequate aisles or turnaround areas for service and delivery vehicles so that all vehicles may enter the street in a forward manner. For requirements related to cul-de-sacs, please refer to Chapter 19.165 FMC.

FINDINGS: The site will include two access points and has been designed to allow large vehicles to enter and exit without turning around. The site plan has been reviewed by Gresham Fire and full Conditions of Approval are included in Exhibit D2.

NOTE: The applicant narrative indicates a hammerhead turnaround has been provided near the vehicular entrance to the site to allow large

vehicles to turn around in the event the gate is locked. The Oregon Fire Code requires gates located on fire access roads to be installed with a KNOX brand lockbox for emergency access. The KNOX order form and Gresham Fire gate policy are included as part of Exhibit D2.

Condition of Approval: Prior to final occupancy, the applicant shall provide a final Fire Access and Water Supply Plan to be reviewed by Gresham Fire and show compliance with all of the comments provided by Gresham Fire in Exhibit D2.

N. Vertical Clearances. Driveways, private streets, aisles, turnaround areas and ramps shall have a minimum vertical clearance of 13 feet 6 inches for their entire length and width.

FINDINGS: All portions of proposed driveways, aisles, turnaround areas, and ramps have a vertical clearance of at least 13 ft. 6 in. This standard is met.

P. Construction. The following development and maintenance standards shall apply to all driveways and private streets, except that the standards do not apply to driveways serving one single-family detached dwelling:

1. Surface Options. Driveways, parking areas, aisles, and turnarounds may be paved with asphalt, concrete or comparable surfacing, or a durable nonpaving material may be used to reduce surface water runoff and protect water quality. Paving surfaces shall be subject to review and approval by the city engineer.

FINDINGS: All parking and maneuvering areas will be constructed of asphalt. This standard is met.

2. Surface Water Management. When a paved surface is used, all driveways, parking areas, aisles and turnarounds shall have on-site collection or infiltration of surface waters to eliminate sheet flow of such waters onto public rights-of-way and abutting property. Surface water facilities shall be constructed in conformance with city standards.

FINDINGS: A Grading & Drainage Plan and Stormwater Management Report have been submitted with the application showing how stormwater will be directed and treated (Exhibit B4 & C3).

Condition of Approval: Prior to issuance of building permits, a final stormwater management plan is required showing the site complies with the 2016 Portland Stormwater Management Manual. Surface water facilities shall be constructed in conformance with city standards.

19.162.030 Pedestrian access and circulation.
The standards presented in this code provide standards for safe, connected and user-friendly pedestrian connections and pathways that join neighborhoods and buildings within a development.

A. Pedestrian Access and Circulation. To ensure safe, direct and convenient pedestrian circulation, all developments, except single-family detached housing (i.e., on individual lots), shall provide a continuous pedestrian and/or multi-use pathway system. (Pathways only provide for pedestrian circulation. Multi-use pathways accommodate pedestrians and bicycles.) The system of pathways shall be designed based on the standards in subsections (A)(1) through (5) of this section:

1. Continuous Pathways. The pathway system shall extend throughout the development site, and connect to all future phases of development, adjacent trails, public parks and open space areas whenever possible. The developer may also be required to connect or stub pathway(s) to adjacent streets and private property, in accordance with the provisions of FMC 19.162.020, Vehicular access and circulation, and the transportation standards in Chapter 19.165 FMC.

FINDINGS: The site is surrounded by private industrial land to the south and west and a pedestrian pathway to these properties is not required. A pathway between the office building and Marine Drive Trail will be required as a Condition of Approval for compliance with section FMC 19.163.030(A)(2). See below.

2. Safe, Direct, and Convenient Pathways. Pathways within developments shall provide safe, reasonably direct and convenient connections between primary building entrances and all adjacent streets, based on the following definitions:

a. "Reasonably direct" means a route that does not deviate unnecessarily from a straight line or a route that does not involve a significant amount of out-of-direction travel for likely users.

b. "Safe and convenient" means bicycle and pedestrian routes that are reasonably free from hazards and provide a reasonably direct route of travel between destinations.

c. For commercial, industrial, mixed use, public, and institutional buildings, the "primary entrance" is the main public entrance to the building. In the case where no public entrance exists, street connections shall be provided to the main employee entrance.

FINDINGS: The site plan indicates a pathway will be provided from the site to the public right-of-way but complete details are not shown. The entrance to the office trailer will be the main public entrance for pedestrians and cyclists and a pathway is required between the entrance and the right-of-way.

Condition of Approval: Prior to the issuance of building permits, the applicant shall submit a revised site plan showing a pedestrian pathway connecting the office trailer entrance to the Marine Drive Trail.

3. Connections within Development. For all developments subject to site design review, pathways shall connect all building entrances to one another. In addition, pathways shall connect all parking areas, storage areas, recreational facilities and common areas (as applicable), and adjacent developments to the site, as applicable.

FINDINGS: On-site buildings include the office trailer and the scale house. The site plan does not show a pedestrian pathway connecting these two building entrances. The scale house will include water and sewer connections, and frequently be used by employees for shelter. The scale house will also require a building permit, under the 2014 Oregon Structural Specialty Code.

Condition of Approval: Prior to the issuance of building permits, the site plan shall be revised to include a pedestrian path connecting the office trailer building to the scale house building.

4. Street Connectivity. Pathways (for pedestrians and bicycles) shall be provided at or near midblock where the block length exceeds the length required by FMC 19.162.020. Pathways shall also be provided where cul-de-sacs or dead-end streets are planned, to connect the ends of the streets together, to other streets, and/or to other developments, as applicable. Pathways used to comply with these standards shall conform to all of the following criteria:

FINDINGS: The block formation standard required for land divisions and large site developments in FMC 19.162.020(K) does not apply to this site. This standard does not apply.

5. *Connections to Other Facilities. Proposed pathways shall be located to provide access to existing or planned commercial services and other neighborhood facilities, such as schools, shopping areas and park and transit facilities. To the greatest extent possible, access shall be reasonably direct, providing a route or routes that do not deviate unnecessarily from a straight line or that do not involve a significant amount of out-of-direction travel.*

FINDINGS: A pedestrian pathway connecting the primary building to the Marine Drive Trail is required as a Condition of Approval for compliance with FMC 19.163.030(A)(2) (see above). The required pathway will also meet this standard.

B. *Design and Construction. Pathways shall conform to all of the standards in subsections (B)(1) through (B)(5) of this section:*

1. *Vehicle/Pathway Separation. Where pathways are parallel and adjacent to a driveway or street (public or private), they shall be raised six inches and curbed, or separated from the driveway/street by a five-foot minimum strip with bollards, a landscape buffer, or other physical barrier. If a raised path is used, the ends of the raised portions must be equipped with curb ramps.*

FINDINGS: There are no pedestrian pathways parallel and adjacent to driveways or streets.

2. *Housing/Pathway Separation..*

FINDINGS: Housing is not proposed. This standard does not apply.

3. *Crosswalks. Where pathways cross a parking area, driveway, or street ("crosswalk"), they shall be clearly marked with contrasting paving materials, humps/raised crossings.*

Findings: The required pedestrian path between the office trailer and the scale house may cross the northern parking lot.

Condition of Approval: If the pedestrian pathway between the office trailer and the scale house crosses the northern parking lot, it shall be clearly marked with contrasting paving materials or humped/raised in compliance with FMC 19.162.030(B).

4. Pathway Surface. Pathway surfaces shall be concrete, asphalt, brick/masonry pavers, or other durable surface, at least six feet wide, and shall conform to ADA requirements. Multi-use paths (i.e., for bicycles and pedestrians) shall be the same materials, at least 10 feet wide. (See also Chapter 19.165 FMC, Transportation Standards for public, multi-use pathway standard.)

FINDINGS: All pedestrian pathways shown on the site plan are 5 ft. in width. The Fairview Development code allows for two different pedestrian pathway widths. In addition to the 6 ft. standard noted above, the Public Facilities standards in FMC 19.165.025(K) "Transportation Improvements – Internal Pathways" calls for internal pathways to be at least 5 ft. in width. The Planning Commission has previously found that a 5 ft. width complies with ADA requirements and that the differing requirements created an unintended conflict, and have approved pedestrian pathways at the 5 ft. width.

Condition of Approval: All pedestrian pathways required as a Condition of Approval shall be at least 5 ft. in width.

5. Accessible Routes. Pathways shall comply with the Americans with Disabilities Act, which requires accessible routes of travel.

Condition of Approval: Prior to the issuance of building permits, site development plans must comply with applicable ADA requirements.

Chapter 19.163 Landscaping, Street Trees, Fences and Walls

19.163.020 Landscape conservation.

A. Applicability. All development sites containing significant vegetation, as defined below, shall comply with the standards of this section….

B. Significant Vegetation. "Significant vegetation" means:

1. Significant Trees and Shrubs. Individual trees and shrubs with a trunk diameter of six inches or greater, as measured four feet above the ground (DBH), and all plants within the drip line of such trees and shrubs, shall be protected.

FINDINGS: The site was a vacant grassy field without significant trees or vegetation. No on-site vegetation is required to be protected as defined above. A grading permit was issued to the site and preparation of site development.

2. Sensitive Lands. Trees and shrubs on sites that have been designated as "sensitive lands," in accordance with Chapter 19.106 FMC, Natural Resource Regulations, and Chapter 19.105 FMC, Floodplain Overlay (e.g., due to slope, natural resource areas, wildlife habitat, etc.) shall be protected.

FINDINGS: The site does not contain any sensitive lands as described in the Natural Resource or Floodplain Overlay sections.

C. Mapping and Protection Required…

FINDINGS: The site does not contain any significant vegetation and this section does not apply.

D. Protection Standards. All of the following protection standards shall apply to significant vegetation areas:

FINDINGS: The site does not contain any significant vegetation and this standard does not apply.

19.163.025 Existing landscaping…

FINDINGS: The site does not contain any significant vegetation and this section does not apply.

19.163.030 New landscaping.

A. Applicability. This section shall apply to all developments requiring site design review, and other developments with required landscaping.

FINDINGS: Site design review is required and this section applies.

B. Landscaping Plan Required. A landscape plan is required at the time of design review or other pertinent applications. All landscape plans shall conform to the requirements in FMC 19.420.020 (E), Landscape plans.

FINDINGS: A landscape plan has been submitted with the application (Exhibit B12). This standard is met.

C. Landscape Area Standards. The minimum percentage of required landscaping equals:

3. General Industrial District: ten percent of the site.

FINDINGS: The total site area is 202,003 SF and the proposed landscaped area is 30,301 SF or 15%. This standard is met.

D. Landscape Materials. This section provides guidelines that ensure significant vegetation growth and establishment using a variety of size specifications and coverage recommendations.

Landscape materials include trees, shrubs, ground cover plants, nonplant ground covers, and outdoor hardscape features, as described below:

1. Native Vegetation. Native vegetation shall be preserved or planted where practicable.

FINDINGS: The landscape plan proposes a variety of native trees and plants including western red cedar, pacific wax myrtle, Oregon grape. No existing native vegetation warrants protection. This standard is met.

2. Plant Selection. A combination of deciduous and evergreen trees, shrubs and ground covers shall be used for all planted areas, the selection of which shall be based on local climate, exposure, water availability, and drainage conditions. As necessary, soils shall be amended to allow for healthy plant growth.

FINDINGS: A variety of trees, shrubs, and ground covers will be used to fit the space and provide screening and shade. A mix of evergreen and deciduous trees has been selected. All plants chosen are well suited for the local climate. This standard is met.

3. Non-native, invasive plants, as per FMC 19.164.020(B), shall be prohibited.

FINDINGS: Non-native ornamental plants are proposed, however, these plants are not considered invasive to the region. This standard is met.

4. Hardscape features (i.e., patios, decks, plazas, etc.) may cover up to 15 percent of the required landscape area. Swimming pools, sports courts and similar active recreation facilities may not be counted toward fulfilling the landscape requirement.

FINDINGS: The landscape plan, site plan and narrative do not propose any hardscape features to be counted towards the required landscaping.

5. *Nonplant Ground Covers. Bark dust, chips, aggregate or other nonplant ground covers may be used, but shall cover no more than five percent of the area to be landscaped. "Coverage" is measured based on the size of plants at maturity or after five years of growth, whichever comes sooner.*

FINDINGS: The landscape plan indicates bark will be used in the 5 ft. buffer around the perimeter of the site, however, the ratio of bark to plant material is not provided.

Condition of Approval: Prior to issuance of building permits, the applicant shall submit a revised landscape plan indicating non-plant ground covers cover no more than 5% of the total landscaped area.

6. *Tree Size. Trees shall have a minimum caliper size of 1.5 inches or greater, or be six feet or taller, at time of planting.*

FINDINGS: All of the proposed trees will be 1.5 in. caliper or 6 ft. tall at the time of planting. This standard is met.

7. *Shrub Size. Shrubs shall be planted from one-gallon containers or larger.*

FINDINGS: All of the proposed shrubs will be from 1 gallon containers at time of planting. This standard is met.

8. *Ground Cover Size. Ground cover plants shall be sized and spaced so that they grow together to cover a minimum of 80 percent of the underlying soil within three years.*

FINDINGS: The ground cover is sized and spaced appropriately to meet this standard.

9. *Significant Vegetation. Significant vegetation preserved in accordance with FMC 19.163.020 may be credited toward meeting the minimum landscape area standards. Credit shall be granted on a per square foot basis. The street tree standards of FMC 19.163.040 may be waived when trees preserved within the*

front yard provide the same or better shading and visual quality as would otherwise be provided by street trees.

FINDINGS: The site does not contain any significant vegetation.

10. Stormwater Facilities. Stormwater facilities (e.g., detention/retention ponds and swales) shall be landscaped with water tolerant, native plants.

FINDINGS: The Stormwater Facility Pan (Exhibit B9) indicates the on-site stormwater facility will be planted according to the Portland Stormwater Management Manual. This standard is met.

E. Landscape Design Standards. The landscape design standards provide guidelines within setback areas, parking areas, etc.

All yards, parking lots and required street tree planter strips shall be landscaped in accordance with the provisions of this chapter. Landscaping shall be installed with development to provide erosion control, visual interest, buffering, privacy, open space and pathway identification, shading and wind buffering, based on the following standards:

1. Yard Setback Landscaping. Landscaping shall satisfy the following criteria…

FINDINGS: The GI zone does not require landscaped setbacks and this standard does not apply. The applicant is proposing a 5 ft. wide landscape buffer between the storage bins and the property line. Additional landscaping will be provided around the primary entrance and office trailer.

2. Parking Areas. A minimum of five percent of the combined area of all parking areas, as measured around the perimeter of all parking spaces and maneuvering areas, shall be landscaped. Such landscaping shall consist of an evenly distributed mix of shade trees with shrubs and/or ground cover plants. "Evenly distributed" means that the trees and other plants are distributed around the parking lot perimeter and between parking bays to provide a partial canopy. At a minimum, one tree per five parking spaces total shall be planted to create a partial tree canopy over and around the parking area. All parking areas with more than 20 spaces shall include landscape islands with trees to break up the parking area into rows of not more than 12 contiguous parking spaces. All landscaped areas shall have minimum dimensions of

four feet by four feet to ensure adequate soil, water, and space for healthy plant growth.

FINDINGS: Two on-site parking areas are proposed, including 15 spaces near the office trailer and 26 spaces in the middle of the site/storage area. The applicant has submitted a narrative, site plan and landscape plan; however, the percentage of parking lot landscaping is not calculated. Trees are not provided for both parking areas and the middle parking area contains more than 12 contiguous parking spaces without a landscape island.

Condition of Approval: Prior to the issuance of building permits, the applicant shall submit a revised site plan and landscape plan showing compliance with all requirements listed in FMC 19.163.030(E)(2).

3. Buffering and Screening Required. Buffering and screening are required under the following conditions:

a. Parking/Maneuvering Area Adjacent to Streets and Drives. Where a parking or maneuvering area is adjacent and parallel to a street or driveway, a decorative wall (masonry or similar quality material), arcade, trellis, evergreen hedge, or similar screen shall be established parallel to the street or driveway. The required wall or screening shall provide breaks, as necessary, to allow for access to the site and sidewalk by pedestrians via pathways. The design of the wall or screening shall also allow for visual surveillance of the site for security. Evergreen hedges used to comply with this standard shall be a minimum of 36 inches in height at maturity, and shall be of such species, number and spacing to provide the required screening within one year after planting. Any areas between the wall/hedge and the street/driveway line shall be landscaped with plants or other ground cover. All walls shall be maintained in good condition, or otherwise replaced by the owner.

FINDINGS: There are no parking or maneuvering areas adjacent to streets or drives. This section does not apply.

b. Parking/Maneuvering Area Adjacent to Building. Where a parking or maneuvering area, or driveway, is adjacent to a building, the area shall be separated from the building by a raised pathway, plaza, or landscaped buffer no less than four feet in width. Raised curbs, bollards, wheel stops, or

other design features shall be used to protect buildings from being damaged by vehicles. When parking areas are located adjacent to residential ground-floor living space, a landscape buffer is required to fulfill this requirement.

FINDINGS: The primary on-site building will be the office trailer at the north end of the site. A 5 ft. wide concrete pathway is proposed between the parking area and the building. This standard is met.

c. Screening of Mechanical Equipment, Outdoor Storage, Service and Delivery Areas, and Automobile-Oriented Uses. All mechanical equipment, outdoor storage and manufacturing, and service and delivery areas, shall be screened from view from all public streets and residential districts. Screening shall be provided by one or more of the following: decorative wall (i.e., masonry or similar quality material), evergreen hedge, non-see-through fence, or a similar feature that provides a non-see-through barrier. Walls, fences, and hedges shall comply with the vision clearance requirements and provide for pedestrian circulation, in accordance with Chapter 19.162 FMC, Access and Circulation.

FINDINGS: The site will include 18 concrete storage bins along the northeast property line adjacent to NE Marine Drive and the Marine Drive Trail. The site plan and narrative do not indicate the height, building material, or final design of the bin walls. A new 6 ft. tall chain link fence is proposed on the property line between the storage bins and the Marine Drive Trail, however, the fence is see-through. As proposed, the development site does not comply with this standard. See B10 for details on the proposed fence.

Condition of Approval: Prior to the issuance of building permits, the applicant shall submit a revised site plan, landscape plan, and/or drawings indicating how the site's storage area will be screened from NE Marine Drive with a decorative wall, evergreen hedge, non-see-through fence, or similar feature.

Note: The vegetated screening required as part of the Conditional Use Permit may also be counted towards this standard.

19.163.040 Street trees.
The guidelines provided in this section promote healthy street trees and adequate canopy cover to provide shade, reduce stormwater runoff, and improve the appearance of a development.

Street trees shall be planted for all developments that are subject to land division or site design review…

FINDINGS: Street tree planting and removal in the NE Marine Drive right-of-way is under jurisdiction of Multnomah County.

19.163.050 Fences and walls.
The fences and walls section provides height limits for construction of new walls. The guidelines prevent walls that reduce pedestrian connectivity and sight clearance. The standards also provide guidelines relating to maintenance.

The following standards shall apply to all fences and walls:

A. General Requirements. All fences and walls shall comply with the standards of this section. The city may require installation of walls and/or fences as a condition of development approval, in accordance with conditional use permits or site design review. Walls built for required landscape buffers shall comply with FMC 19.163.030.

B. Dimensions.

1. The maximum allowable height of fences and walls is six feet, as measured from the lowest grade at the base of the wall or fence, except that retaining walls and terraced walls may exceed six feet when permitted as part of a site development approval, or as necessary to construct streets and sidewalks. A building permit is required for walls exceeding six feet in height, in conformance with the Uniform Building Code.

2. The height of fences and walls within a front yard setback shall not exceed four feet (except decorative arbors, gates, etc.), as measured from the grade closest to the street right-of-way.

3. Walls and fences to be built for required buffers shall comply with FMC 19.163.030.

4. Fences and walls shall comply with the vision clearance standards of FMC 19.162.020.

FINDINGS: The site plan indicates the height of the proposed chain-link fence is 6 ft. The exact height of the storage bins is not specified.

Condition of Approval: Prior to the issuance of building permits, the applicant shall submit a revised site plan and/or detailed drawings that show the height of the storage bins not to exceed 6 ft. in height.

C. Maintenance. For safety and for compliance with the purpose of this chapter, walls and fences required as a condition of development approval shall be maintained in good condition, or otherwise replaced by the owner.

D. Fences – Recreational Courts…

E. Swimming Pool Fences…

F. Barbed Wire Fencing. Barbed wire fencing may be permitted for property zoned commercial or industrial when the wire is employed on the top of any other type of fencing, and when the barbed wire is a minimum of six feet above the finished ground surface. Standard barbed wire fencing may be used to enclose property which is zoned agricultural.

FINDINGS: The detailed drawings for the chain link fence indicate barbed wire may be used on top of the fence. The wire is situated on top of the fence, with a minimum clearance of 6 ft. above the ground. This standard is met.

G. Electrically Charged or Sharp Pointed Fencing…

H. Critical Facility Security Fences…

FINDINGS: No fences or walls are proposed under sections D, E, G, or H.

Chapter 19.164 Vehicle and Bicycle Parking
19.164.020 Applicability.
All developments subject to site design review Chapter 19.420 FMC, including development of parking facilities, shall comply with the provisions of this chapter.

FINDINGS: Site design review is required as part of this application and this chapter applies.

19.164.030 Vehicle parking standards.

A. The minimum number of required off-street vehicle parking spaces (i.e., parking that is located in parking lots and garages and not in the street right-of-way) shall be determined based on the standards in Table 19.164.030.A.

FINDINGS:

Type of Use	Parking Ratio	Proposed Area	Min. # Spaces Required
Warehousing **Unspecified Uses** Where a use is not specifically listed in this table, parking requirements shall be determined by finding that a use is similar to those listed in terms of parking needs.	0.3 spaces per 1,000 SF of gross floor area	57,650 (gross area of storage bins)	17.30
Total number of spaces required			**18**
Total number of spaces proposed			**41**

B. Credit for On-Street Parking.

1. The credit for on-street parking allows a reduction of one off-street parking space for every one on-street parking space adjacent to the development if deemed appropriate by the city.

FINDINGS: The applicant is not seeking credit for on street parking.

C. Parking Location and Shared Parking.

1. Location. Vehicle parking is allowed only on approved parking shoulders (streets), within garages, carports and other structures, or on driveways or parking lots that have been developed in conformance with this code. Specific locations for parking are indicated in Article II of this title for some land uses (e.g., the requirement that parking be located to side or rear of buildings, with access from alleys, for some uses). (See also Chapter 19.162 FMC, Access and Circulation.)

FINDINGS: Vehicle parking will be supplied via a paved and striped surface level parking lot. There are no restrictions on parking location for the General Industrial zone.

2. Off-Site Parking…

FINDINGS: No off-site parking is proposed.

3. Mixed Uses.

FINDINGS: A mixed use development is not proposed. The office trailer/space is accessory to the industrial use.

4. Shared Parking.

FINDINGS: The applicant is not proposing shared parking facilities. This standard does not apply.

5. Availability of Facilities. Owners of off-street parking facilities may post a sign indicating that all parking on the site is available only for residents, customers and/or employees, as applicable. Signs shall conform to the standards of Chapter 19.170 FMC, Sign Regulations.

D. Maximum Number of Parking Spaces. The number of parking spaces provided shall not exceed the standards in the following table:

Use	***Max in Non-Transit Areas***
Light Industrial	No limit

FINDINGS: The proposed parking does not exceed the allowed maximum. This standard is met.

E. Parking Management. The planning director may require a parking management plan for development of any use that requires more than 10 parking spaces based on the minimum parking spaces provided in Table 19.164.030.A.

FINDINGS: Parking issues that would warrant a management plan are not anticipated.

F. Parking Stall Standard Dimensions and Compact Parking Spaces. All off-street parking stalls shall be improved to conform to city standards for surfacing, stormwater management and striping, and provide dimensions in accordance with the following table. Disabled person parking shall conform to the standards and dimensions of this chapter. The number of compact parking spaces shall not exceed 40 percent of all parking spaces provided on site.

Minimum Parking Space and Aisle Dimensions

Angle (A)	***Type***	***Width (B)***	***Curb Length (C)***	***1-Way Aisle Width (D)***	***2-Way Aisle Width (D)***	***Stall Depth***
90°	*Standard* *Compact* *Disabled*	*9 ft.* *7 ft. 6 in.*	*9 ft.* *7 ft. 6 in.*	*24 ft.* *22 ft.*	*24 ft.* *24 ft.*	*19 ft.* *15 ft.*

FINDINGS: The applicant is proposing 15 parking spaces adjacent to the office trailer and 26 spaces in the middle of the site. Complete details on the stall dimensions were not included in the narrative or site plan.

Condition of Approval: Prior to the issuance of building permits, the applicant shall submit a revised site plan that shows how the parking stalls comply with dimensional standards in FMC 19.164.030(F).

G. Variances. Developments may request exceptions to the parking standards; see FMC 19.520.030(A)(4).

FINDINGS: The applicant is not requesting a parking variance.

H. Disabled Person Parking Spaces. The following parking shall be provided for disabled persons, in conformance with the Americans with Disabilities Act (ADA)

FINDINGS: A parking area with 41 parking spaces requires two ADA spaces, including one with an 8 ft. aisle and one with a 5ft. aisle. The proposed parking area includes two ADA spaces with a 9 ft. aisle. This standard is met.

I. In parking lots three acres and larger intended for use by the general public, pedestrian pathways shall be raised or separated from parking, parking aisles and travel lanes by a raised curb, concrete bumpers,

bollards, landscaping or other physical barrier. If a raised pathway is used, curb ramps shall be provided in accordance with the Americans with Disabilities Act Accessibility Guidelines.

FINDINGS: The proposed parking is not over 3 acres. This standard does not apply.

19.164.040 Bicycle parking standards.
All uses which are subject to site design review shall provide bicycle parking, in conformance with the following standards, which are evaluated during site design review:

A. Number of Bicycle Parking Spaces. A minimum of two bicycle parking spaces per use is required for all uses with greater than 10 vehicle parking spaces. The following additional standards apply to specific types of development:

1. Multifamily Residences.

2. Commercial Retail, Office, and Institutional Developments.

3. Schools.

4. Colleges and Trade Schools.

5. Town Center Commercial District.

6. Multiple Uses.

FINDINGS: The proposed use requires over 10 vehicle parking spaces and a minimum of two bicycle spaces. The applicant is proposing two bicycle spaces and this standard is met. Subsections 1-6 do not apply to industrial developments.

C. Location and Design. Bicycle parking shall be conveniently located with respect to both the street right-of-way and at least one building entrance (e.g., no farther away than the closest parking space). It should be incorporated whenever possible into building design and coordinated with the design of street furniture when it is provided. Street furniture includes benches, streetlights, planters and other pedestrian amenities.

FINDINGS: The site plan indicates two bicycle spaces will be provided, however, the location of the bike racks is shown in the middle of a landscaped area (see Exhibit B3).

Condition of Approval: Prior to the issuance of building permits, the applicant shall submit a revised site plan that relocates the bike racks near the office trailer entrance. The bike racks shall be located no further away than the closest parking space.

D. Visibility and Security. Bicycle parking should be visible to cyclists from street sidewalks or building entrances, so that it provides sufficient security from theft and damage.

FINDINGS: As conditioned above, the bicycle rack will be relocated to a visible and secure location near the trailer entrance.

E. Options for Storage. Bicycle parking requirements for long-term and employee parking can be met by providing a bicycle storage room, bicycle lockers, racks, or other secure storage space inside or outside of the building.

FINDINGS: Long-term bicycle storage is not required or proposed.

F. Lighting. Bicycle parking shall be at least as well lit as vehicle parking for security.

FINDINGS: As conditioned above, the bicycle rack will be relocated to a visible and well-lit location near the building entrance.

G. Reserved Areas. Areas set aside for bicycle parking shall be clearly marked and reserved for bicycle parking only.

H. Hazards. Bicycle parking shall not impede or create a hazard to pedestrians. Parking areas shall be located so as to not conflict with vision clearance standards (Chapter 19.162 FMC, Access and Circulation).

FINDINGS: Signage and design of the bicycle parking were not provided in the site plan or narrative.

Condition of Approval: The relocated bicycle parking area shall be clearly marked and reserved for bicycle parking only. If the bike rack is located near a pedestrian path, the pathway shall remain clear of obstructions from the bicycle rack/bicycles.

Chapter 19.165 Public Facilities Standards

19.165.010 Purpose and applicability.

A. Purpose. The purpose of this chapter is to provide planning and design standards for public and private transportation facilities and utilities. Streets are the most common public spaces, touching virtually every parcel of land…

B. When Standards Apply. Unless otherwise provided, the standard specifications for construction, reconstruction or repair of transportation facilities, utilities and other public improvements within the city shall occur in accordance with the standards of this chapter...

C. Standard Specifications…

D. Conditions of Development Approval…

E. Rough Proportionality Report…

FINDINGS: NE Marine Drive is a Multnomah County road and the applicant is required to meet all Conditions of Approval and construction standards as determined by Multnomah County (see Exhibit D1). No public improvements related to Fairview storm, sewer, and water systems are required as part of this development. Many of the standards of this section do not apply. Those that do are included below.

19.165.025 Transportation improvements.

A. *Development Standards…*

B. Variances…

C. Creation of Rights-of-Way for Streets and Related Purposes…

D. Creation of Access Easements.

E. Street Location, Width and Grade…

F. Minimum Rights-of-Way and Street Sections…

G. Traffic Signals and Neighborhood Traffic Management..

H. Future Street Plan and Extension of Streets..

I. Street Alignment and Connections…

J. Sidewalks, Planter Strips, Bicycle Lanes…

FINDINGS: Sections A-J are related to street design and access standards. These sections do not apply to the subject development.

K. Internal Pathways. Pathways shall be at least five feet in unobstructed width and shall be constructed to sidewalk standards found in Standard Specifications for Public Works Construction, or according to Multnomah County or ODOT standards as applicable. The property owner shall keep a minimum of five feet of the pathway width clear of both permanent and temporary obstructions (e.g., utility poles, sandwich signs). Maintenance of internal pathways is the continuing obligation of the property owner or adjacent property owner. All work must comply with the city of Fairview public works construction standards.

FINDINGS: All proposed pathways are at least 5 ft. in width.

L. Intersection Angles…

M. Existing Rights-of-Way…

N. Cul-de-Sacs…

O. Grades and Curves.

P. Curbs, Curb Cuts, Ramps, and Driveway Approaches.

Q. Streets Adjacent to Railroad Right-of-Way.

R. Development Adjoining Arterial Streets.

S. Alleys, Public or Private.

T. Private Streets.

U. Street Names.

V. Survey Monuments.

W. Street Signs.

FINDINGS: Sections L-W above are related to street design and access standards. These sections do not apply to the subject development.

X. Mail Boxes. Plans for mail boxes to be used shall be approved by the United States Postal Service (USPS).

FINDINGS: An address has already been issued to the site (22800 NE Marine Drive). This standard applies and any location of a new mailbox shall be reviewed by and approved by USPS.

Y. Streetlight Standards. Streetlights shall be installed in accordance with city standards.

FINDINGS: The property is located within the Mid-County Lighting District and is subject to district standards. Comments from Multnomah County Transportation (Exhibit D2) indicate that the applicant is required to submit a lighting plan for the site's frontage and at crossings with the Marine Drive Trail.

Z. Street Cross-Sections.

FINDINGS: This section relates to street design and does not apply to the subject development.

19.165.030 Public use areas.
Public use areas implement Comprehensive Plan policies that may require a developer to reserve a piece of land for future park and open space to serve the residents of the new development. Specific issues to consider include the amount of time the city has to purchase parkland and whether dedication of park land should count as a credit towards SDCs.

Findings: No new residents will live on site. Dedication of a future park or open space area is not applicable. This standard does not apply.

19.165.040 Sanitary sewer and water service improvements.
The sanitary sewer and water service improvements ensure adequate sanitary sewer services to new developments.

A. Sewers and Water Mains Required.

Findings: A 12 in. water main is available in NE Marine Drive and an 8 in. sewer main is available south/west of the site. The applicant is proposing a domestic water line, irrigation water line, and a sanitary sewer connection these mains.

B. Sewer and Water Plan Approval. Development permits for sewer and water improvements shall not be issued until the city engineer has approved all sanitary sewer and water plans in conformance with city standards.

Findings: No new public water or sewer lines are required to be installed by the applicant. This standard does not apply.

C. Oversizing.

Findings: No oversizing of water or sewer lines is proposed or required.

D. Permits Denied. Development permits may be restricted by the city where a deficiency exists in the existing water or sewer system which cannot be rectified by the development and which if not rectified will result in a threat to public health or safety, surcharging of existing mains, or violations of state or federal standards pertaining to operation of domestic water and sewerage treatment systems. Building moratoriums shall conform to the criteria and procedures contained in ORS 197.505 to 197.520.

FINDINGS: The public water and sewer systems have adequate capacity to serve the site.

19.165.050 Storm drainage.
The storm drainage section requires developers to accommodate and treat stormwater runoff from buildings and parking lots.

A. General Provisions. The city shall issue a development permit only where adequate provisions for stormwater and flood water runoff have been made.

B. Accommodation of Upstream Drainage. Culverts and other drainage facilities shall be large enough to accommodate potential runoff from the entire upstream drainage area, whether inside or outside the development. Such facilities shall be subject to review and approval by the city engineer.

C. Effect on Downstream Drainage. Where it is anticipated by the city engineer that the additional runoff resulting from the development will overload an existing drainage facility, the city may deny approval of the development permit unless provisions have been made for improvement of the potential condition or until provisions have been made for storage

of additional runoff caused by the development in accordance with city standards.

D. Easements. Where a development is traversed by a watercourse, drainage way, channel or stream, there shall be provided a stormwater easement or drainage right-of-way conforming substantially with the lines of such watercourse and such further width as will be adequate for conveyance and maintenance.

FINDINGS: Storm drains are provided throughout the site and a stormwater facility will treat and discharge surface water runoff. The applicant has submitted a stormwater report for the proposed system.

Condition of Approval: Prior to the issuance of building permits the applicant shall provide the city with a final stormwater management plan and Stormwater Facility Operations & Maintenance agreement demonstrating compliance with the 2016 Portland Stormwater Management Manual.

19.165.060 Utilities.
The utilities section provides standards regarding electric lines and cable. Many types of utilities now must be installed underground for safety and aesthetic purposes.

A. Underground Utilities. All utility lines including, but not limited to, those required for electric, communication, lighting and cable television services and related facilities shall be placed underground, except for surface-mounted transformers, surface-mounted connection boxes and meter cabinets which may be placed above ground, temporary utility service facilities during construction, and high capacity electric lines operating at 50,000 volts or above. The following additional standards apply to all new subdivisions, in order to facilitate underground placement of utilities:

FINDINGS: The Birdsdale Transmission Line (230,000 volts) and Rocky Butte Transmission Line (115,000 volts) run through east-west through the north end of the property. Both transmission lines are over 50,000 volts and exempt from the undergrounding requirement.

B. Easements. Easements shall be provided for all underground utility facilities.

FINDINGS: No new easements are required for this development site.

C. Exception to Undergrounding Requirement. The standard applies only to proposed subdivisions. An exception to the undergrounding requirement

may be granted due to physical constraints, such as steep topography, sensitive lands, Chapter 19.106 FMC, or existing development conditions.

FINDINGS: An exception to the undergrounding requirement is not sought as part of this application.

19.165.070 Easements.
The easements section provisions reserve adequate space for utilities.
Easements for sewers, storm drainage and water quality facilities, water mains, electric lines or other public utilities shall be dedicated on a final plat, or provided for in the deed restrictions. See also, Chapter 19.420 FMC, Development Review and Site Design Review and Chapter 19.430, Land Divisions and Lot Line Adjustments. The developer or applicant shall make arrangements with the city, the applicable district and each utility franchise for the provision and dedication of utility easements necessary to provide full services to the development. The city's standard width for public main line utility easements shall be 20 feet unless otherwise specified by the utility company, applicable district, or city engineer.

FINDINGS: New utility easements dedicated to the City of Fairview are not required for this development. There are a number of easements and deed restrictions on the property, including:

- Right-of-way easement granted to Northwestern Electric Company (1913)*
- Right-of-way easement dedicated to the Sandy Drainage District (1940)
- Transmission line easement to Pacific Power & Light Co. (1958)*
- Deed Restriction for contribution to public water and sewer improvements (1993)
- Stormwater easement dedicated to Gary Dempsey (1996)
- Consent letter granted to Gary Dempsey for a recreational vehicle storage yard (1997)
- Stormwater easement dedicated to Gary Dempsey (2005)

*A draft consent agreement (Exhibit C5) has been established between PacifiCorp and the property owner that identifies allowable site improvements and uses within these easements. The consent agreement will be finalized and recorded with Multnomah County after the land use hearing.

19.165.080 Construction plan approval and assurances.
The construction plan approval portion ensures the completion of a development by a builder.

No public improvements, including sanitary sewers, storm sewers, streets, sidewalks, curbs, lighting, parks, or other requirements, shall be undertaken except after the plans have been approved by the city, permit fee paid, and permit issued. The permit fee is required to defray the cost and expenses incurred by the city for construction and other services in connection with the improvement. The permit fee shall be set by the city council. The city may require the developer or subdivider to provide bonding or other performance guarantees to ensure completion of required public improvements.

19.165.090 Installation.

A. Conformance Required. Improvements installed by the developer either as a requirement of these regulations or at his/her own option, shall conform to the requirements of this chapter, approved construction plans, and to improvement standards and specifications adopted by the city.

B. Adopted Installation Standards. The Standard Specifications for Public Works Construction, Oregon Chapter APWA shall be a part of the city's adopted installation standard(s); other standards may also be required upon recommendation of the city engineer.

C. Commencement. Work shall not begin until the city has been notified in advance.

D. Resumption. If work is discontinued for more than one month, it shall not be resumed until the city is notified.

E. City Inspection. Improvements shall be constructed under the inspection and to the satisfaction of the city. The city may require minor changes in typical sections and details if unusual conditions arising during construction warrant such changes in the public interest. Modifications requested by the developer shall be subject to land use review under Chapter 19.415 FMC, Modifications to Approved Plans and Conditions of Approval. Any monuments that are disturbed before all improvements are completed by the subdivider shall be replaced prior to final acceptance of the improvements.

F. Engineer's Certification and As-Built Plans. A registered civil engineer shall provide written certification in a form required by the city that all improvements, workmanship and materials are in accord with current and standard engineering and construction practices, conform to

approved plans and conditions of approval, and are of high grade, prior to city acceptance of the public improvements, or any portion thereof, for operation and maintenance. The developer's engineer shall also provide three sets (one mylar, one electronic, one paper copy) of "as-built" plans, in conformance with the city engineer's specifications, for permanent filing with the city.

Condition of Approval: The applicant agrees to comply with all regulations and requirements of the Fairview City Code which are current on this date, except where variance or deviation from such regulation and requirements have been specifically approved by formal Planning Commission action as documented by the records of this decision and/or the associated Conditions of Approval.

Chapter 19.440 Conditional Use Permits

19.440.100 Purpose.

There are certain uses, which, due to the nature of their impacts on surrounding land uses and public facilities, require a case-by-case review and analysis. These are identified as "conditional uses" in Article II of this title, Land Use Districts. The purpose of this chapter is to provide standards and procedures under which a conditional use may be permitted, enlarged or altered if the site is appropriate and if other appropriate conditions of approval can be met.

FINDINGS: Uses in the General Industrial zone with significant noise, light/glare, vibration, or traffic impacts are required to obtain a Conditional Use Permit. The proposed use will create significant dust and exhaust impacts as described in FMC 19.85.070(1)(c) and a Conditional Use Permit is required.

A Conditional Use Permit is required because dust and exhaust emissions on the site will increase over ambient levels. There will be regular handling of natural material including bark, rock, and soil that will result in an increase in dust levels. Vehicles picking up, dropping off, and idling on site will result in an increase in on-site emissions over ambient levels.

19.440.200 Approvals process.

A. Initial Application. An application for a new conditional use shall be processed as a Type III procedure. The application shall meet the submission requirements, and the approval criteria contained in this chapter.

FINDINGS: The conditional use permit is being processed as a Type III application, concurrent with the Design Review for the site. All of the application submission requirements have been met.

B. Modification of Approved or Existing Conditional Use. Modifications to approved or existing conditional uses shall be processed in accordance with Chapter 19.415 FMC, Modifications to Approved Plans and Conditions of Approval.

FINDINGS: This standard does not apply.

19.440.400 Criteria, standards and conditions of approval.
The city shall approve, approve with conditions, or deny an application for a conditional use or to enlarge or alter a conditional use based on findings of fact with respect to each of the following standards and criteria.

A. Use Criteria.

1. The site size, dimensions, location, topography and access are adequate for the needs of the proposed use, considering the proposed building mass, parking, traffic, noise, vibration, exhaust/emissions, light, glare, erosion, odor, dust, visibility, safety, and aesthetic considerations;

FINDINGS: The proposed use is outdoor storage and distribution of landscape material. The site size is 4.64 acres, allowing for adequate space for material storage, vehicle and truck circulation, and minimal off-site noise and light impacts. The section below addresses the dust and exhaust impacts.

2. The negative impacts of the proposed use on adjacent properties and on the public can be mitigated through application of other code standards, or other reasonable conditions of approval; and

FINDINGS: A Conditional Use Permit is required as a result of potential dust and exhaust impacts to users of the Marine Drive Trail. The condition of approval to mitigate dust and exhaust impacts is described in subsection (C) below.

3. All required public facilities have adequate capacity to serve the proposal.

FINDINGS: All public facilities have adequate capacity to serve the development.

B. Site Design Standards. The criteria for site design review approval (Chapter 19.420 FMC) shall be met.

FINDINGS: As outlined in the findings in this report, the development meets the requirements for site design review approval or can be conditioned to meet the requirements.

C. Conditions of Approval. The city may impose conditions that are found necessary to ensure that the use is compatible with other uses in the vicinity, and that the negative impact of the proposed use on the surrounding uses and public facilities is minimized. These conditions include, but are not limited to, the following:

1. Limiting the hours, days, place and/or manner of operation;

2. Requiring site or architectural design features which minimize environmental impacts such as noise, vibration, exhaust/emissions, light, glare, erosion, odor and/or dust;

3. Requiring larger setback areas, lot area, and/or lot depth or width;

4. Limiting the building height, size or lot coverage, and/or location on the site;

5. Designating the size, number, location and/or design of vehicle access points or parking areas;

6. Requiring street right-of-way to be dedicated and street(s), sidewalks, curbs, planting strips, pathways, or trails to be improved;

7. Requiring landscaping, screening, drainage, water quality facilities, and/or improvement of parking and loading areas;

8. Limiting the number, size, location, height and/or lighting of signs;

9. Limiting or setting standards for the location, design, and/or intensity of outdoor lighting;

10. Requiring berms, screening or landscaping and the establishment of standards for their installation and maintenance;

11. Requiring and designating the size, height, location and/or materials for fences;

12. Requiring the protection and preservation of existing trees, soils, vegetation, watercourses, habitat areas, drainage areas, historic resources, cultural resources, and/or sensitive lands;

13. Requiring the dedication of sufficient land to the public, and/or construction of pedestrian/bicycle pathways in accordance with the adopted plans. Dedication of land and construction shall conform to the provisions of Chapter 19.160 FMC.

FINDINGS: The Condition of Approval required under this section is intended to mitigate the adverse impact to trail users resulting from the outdoor storage and handling of landscape material including bark, rock, and soil.

Condition of Approval: A row of evergreen trees, reaching a mature height of at least 15 ft., shall be installed on-site between the storage bins and the trail. The trees will provide a natural buffer to capture loose dust, leaves, and other natural material that might otherwise leave the site and impact trail users. The trees are also intended to act as a visual buffer between the site and the trail. Trucks, back hoes, and other equipment will be regularly used and will be visible over a 6 ft. tall fence alone.

Note: It is recommended that the trees be located on the subject property but outside of the fence. This will provide additional room for growth and provide the most attractive visual screen between the trail and the site.

19.440.500 Additional development standards for conditional use types.

A. Concurrent Variance Application(s). A conditional use permit shall not grant variances to regulations otherwise prescribed by the development code. Variance application(s) may be filed in conjunction with the conditional use application and both applications may be reviewed at the same hearing.

FINDINGS: Variances to the development code are not requested for the development.

B. Additional Development Standards. Development standards for specific uses are contained in Article II of this title, Land Use Districts.

FINDINGS: As described in the findings of this report, the proposal meets or can be conditioned to meet all of the development standards in Article II of the development code.

VII. CONCLUSION AND RECOMMENDATIONS

STAFF RECOMMENDATION

Staff finds that the proposed application will meet the requirements of the City Code as conditioned, and recommends approval of the site design review application.

PLANNING COMMISSION ALTERNATIVES

1. Approve the application based on the findings of compliance with City regulations and conditions of approval.
2. Modify the findings, reasons, or conditions, and approve the request as modified.
3. Deny the application based on the Commission's findings
4. Continue the Public Hearing to a date certain if more information is needed.

CONDITIONS OF APPROVAL

The application, as presented, meets or can meet applicable City codes and requirements, provided that the following conditions of approval are met. The site shall be developed in accordance with the applicant's approved plans, as attached and modified below.

A. General Requirements

1. The approval for application 2018-37-DR shall become null and void after two (2) years if construction activities have not commenced.

4. Any signs on the site, including monument signs for the development and building signs for the commercial uses, must obtain a sign permit and comply with FMC 19.170.

5. The applicant agrees to comply with all regulations and requirements of the Fairview City Code which are current on this date, except where variance or deviation from such regulation and requirements have been specifically approved by formal Planning Commission action as documented by the records of this decision and/or the associated Conditions of Approval.

B. Prior to Building Permits

1. Prior to issuance of building permits, a final stormwater management plan is required showing the site complies with the 2016 Portland Stormwater Management Manual. Surface water facilities shall be constructed in conformance with city standards.

3. Prior to issuance of building permits, the applicant shall revise the site plan and landscape plan to provide a row of evergreen trees between the storage bins and Marine Drive Trail along the northeast property line. The trees shall reach a mature height of at least 15 ft. and be spaced to provide contiguous screening along the property line.

4. Prior to the issuance of building permits, the applicant shall submit a revised site plan showing a pedestrian pathway connecting the office trailer entrance to the Marine Drive Trail.

5. Prior to the issuance of building permits, the applicant shall submit a revised site plan showing a pedestrian path connecting the office trailer building to the scale house building.

6. If the pedestrian pathway between the office trailer and the scale house crosses the northern parking lot, it shall be clearly marked with contrasting paving materials or humped/raised in compliance with FMC 19.162.030(B).

7. All pedestrian pathways required as a Condition of Approval shall be at least 5 ft. in width.

8. Prior to issuance of building permits, the applicant shall submit a revised landscape plan indicating non-plant ground covers cover no more than 5% of the total landscaped area.

9. Prior to the issuance of building permits, the applicant shall submit a revised site plan, landscape plan, and/or drawings indicating how the site's storage area will be screened from NE Marine Drive with a decorative wall, evergreen hedge, non-see-through fence, or similar feature.

   Note: The vegetated screening required as part of the Conditional Use Permit may also be counted towards this standard.

10. Prior to the issuance of building permits, the applicant shall submit a revised site plan and/or detailed drawings that show the height of the storage bins not to exceed 6 ft. in height.

11. Prior to the issuance of building permits, the applicant shall submit a revised site plan that relocates the bike racks near the office trailer entrance. The bike racks shall be located no further away than the closest parking space.

C. PRIOR TO OCCUPANCY

1. Prior to final occupancy, the applicant shall provide a final Fire Access and Water Supply Plan to be reviewed by Gresham Fire and show compliance with all of the comments provided by Gresham Fire in Exhibit D2.

2. A row of evergreen trees, reaching a mature height of at least 15 ft., shall be installed on-site between the storage bins and the trail. The trees will provide a natural buffer to capture loose dust, leaves, and other natural material that might otherwise leave the site and impact trail users. The trees are also intended to act as a visual buffer between the site and the trail. Trucks, back hoes, and other equipment will be regularly used and will be visible over a 6 ft. tall fence alone.

   Note: It is recommended that the trees be located on the subject property but outside of the fence. This will provide additional room for growth and provide the most attractive visual screen between the trail and the site.

Exhibit A1

SITE DESIGN REVIEW TYPE III NARRATIVE

TO

CITY OF FAIRVIEW

FOR

AWR SITE PLAN

22800 NE Marine Drive, Fairmont, OR

MAY 2018
UPDATED AUGUST 2018

APPLICANT:

MRW Properties LLC
PO Box 115
Fairview, OR 97024
Contact: Mark Wubben
(360) 921-4528
markwubben.awr@gmail.com

PREPARED BY:

PLS Engineering
2008 C Street
Vancouver, WA 98663
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(360) 944-6519
travis@plsengineering.com

Exhibit A1

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Exhibit A1

I. INTRODUCTION

General Information

Applicant	**MWR Properties LLC** PO Box 115 Fairview, OR 97024 Contact: Mark Wubben (360) 921-4528 markwubben.awr@gmail.com
Applicant's Representative	**PLS Engineering** 2008 C Street Vancouver, WA 98663 Contact: Travis Johnson, P.E. (360) 944-6519 travis@plsengineering.com
Tax Lot Information	Map Tax Lot 1N3E22C - 00109
Location	22800 NE Marine Drive Fairview, OR 97024
Current Zoning Districts:	General Industrial (GI)
Project Site Area:	4.64 acres (202,003 SF)

Exhibit A1

SUMMARY OF PROPOSAL

The applicant is seeking Site Design Review Type III approval for a proposed development on the property at 22800 NE Marine Drive, Fairview, OR 97024. The property is identified as Assessor's map and Map Tax Lot number 1N3E22C -00109.

MWR Properties LLC and Allwood Recyclers, Inc. is proposing a sales and storage yard for landscape materials (bark, mulch, soil, rock, etc.). The site will provide 924 sq. ft. office building, a weight scale, and bins for storage of materials, and employee and customer parking. Two access points are proposed on Marine Drive, one full access and one exit only. All material storage bins and vehicle maneuvering areas are proposed to be paved.

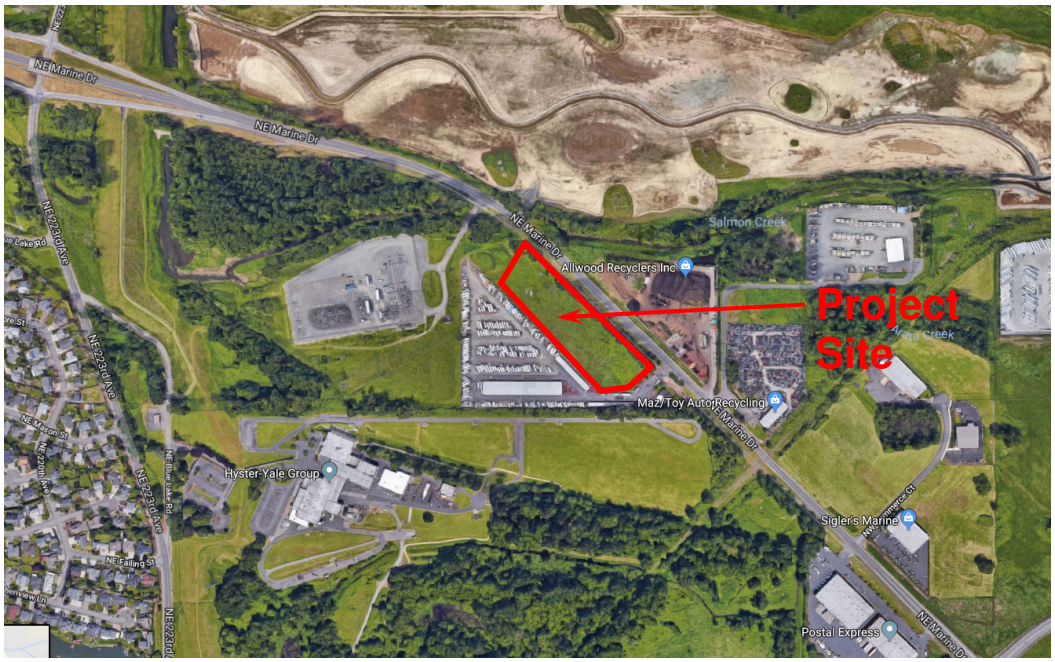


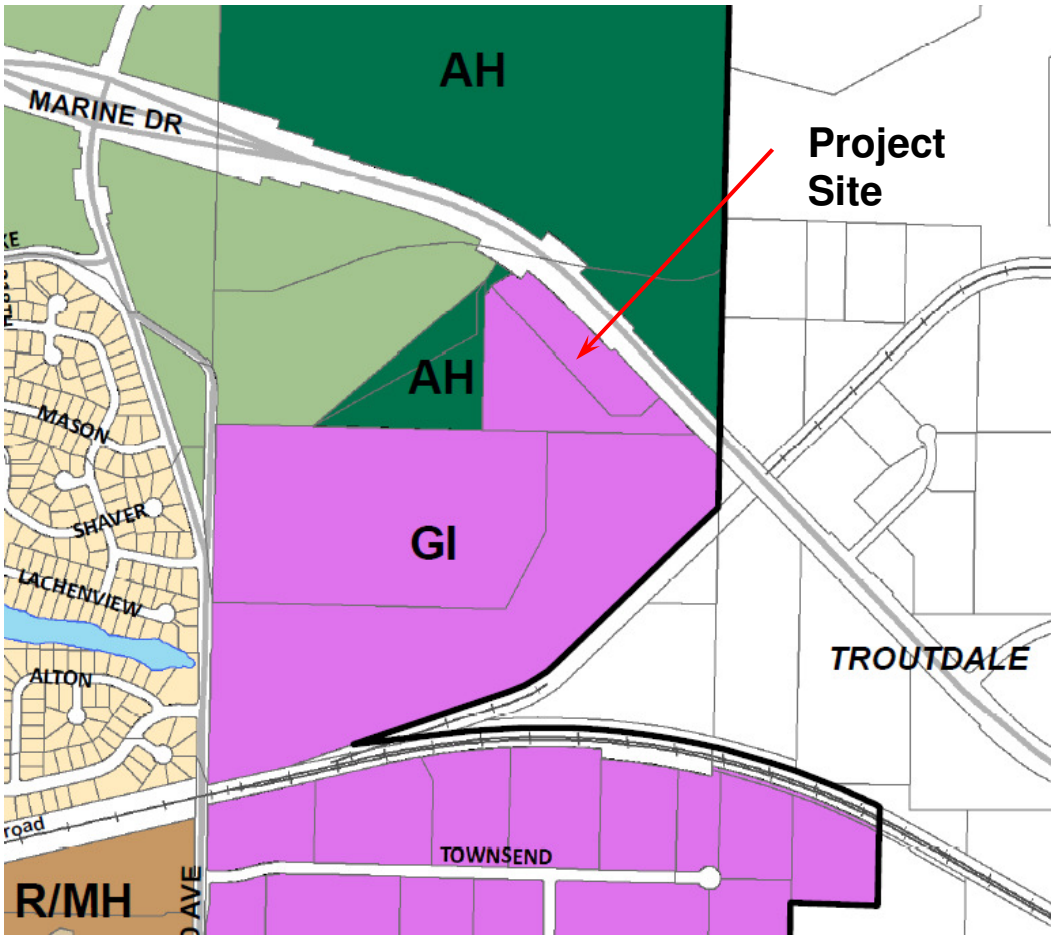
Exhibit A1

SURROUNDING USES

Table A: SURROUNDING LAND USE

Location	***Zoning Designation***	***Land Use***
North	Public R.O.W. (Marine Drive, a Multnomah County road) and across the road is Agricultural Holding (AH)	Allwood Recyclers, Inc. (Yard debris recycling, landscape material storage)
South	General Industrial (GI)	Chinook RV Storage (Storage of RV Vehicles)
East	Public R.O.W (Marine Drive, a Multnomah County road) and across the road is Agricultural Holding (AH)	Allwood Recyclers, Inc. (Yard debris recycling, landscape material storage)
West	Agricultural Holding (AH) & General Industrial (GI)	Chinook RV Storage (Storage of RV Vehicles)

Exhibit A1



City of Fairview Zoning

- General Industrial (GI)
- Agricultural Holding (AH)
- Residential Community Service Parks (R/CSP)

Title 19 DEVELOPMENT CODE

CHAPTER 19.85 GENERAL INDUSTRIAL (GI) DISTRICT

19.85.010 Purpose.

This district is intended for a broad range of uses, which can be located in areas where they do not directly affect the livability of residential neighborhoods and the quality and viability of commercial areas in the city. This district provides for the normal operation of an industry, which can meet and maintain the standards set in this section in order to reasonably protect nearby residential and commercial districts. The general industrial district accommodates a range of light and heavy industrial land uses. It is intended to segregate incompatible developments from other districts, while providing a high-quality environment for businesses and employees. This chapter guides the orderly development of industrial areas based on the following principles:
A. Provide for efficient use of land and public services;

B. Provide transportation options for employees and customers;

C. Provide appropriate design standards to accommodate a range of industrial users, in conformance with the Comprehensive Plan. (Ord. 6-2001 § 1)

Response: This project has been designed in accordance with this chapter and these principles.

19.85.020 Permitted land uses.

A. Permitted Uses. The land uses listed in Table 19.85.020.A are permitted in the general industrial district, subject to the provisions of this chapter. Only land uses which are specifically listed below, and land uses which are approved as "similar" to those listed below, may be permitted. The land uses identified with a "CU" in Table 19.85.020.A require conditional use permit approval prior to development or a change in use.

Table 19.85.020.A

Land Uses Types Permitted in the General Industrial District

1. Industrial* a. Heavy manufacturing, assembly, and processing of raw materials (CU) b. Light manufacture (e.g., electronic equipment, printing, bindery, furniture, and similar goods) c. Warehousing and distribution d. Junk yard, motor vehicle wrecking yards, and similar uses e. Columbia River industrial uses north of Marine Drive f. Uses similar to those listed above **2. Residential*** One caretaker unit shall be permitted for each development, subject to the standards in FMC 19.85.070(B). Other residential uses are not permitted, except that residences existing prior to the effective date of this code may continue, subject to the requirements for nonconforming uses and developments **3. Commercial (CU)** Offices and other commercial uses are permitted when they are integral to a primary pre-existing or concurrently established industrial use (e.g., administrative offices, wholesale of goods produced on location, and similar uses).	a. Retail and commercial service uses up to 5,000 square feet in gross floor area (e.g., convenience market, small restaurant, secondary use for wholesaler, similar use) **4. Community Services/Parks Uses (CU)*** a. Government facilities (e.g., public safety, utilities, school district bus facilities, public works yards, transit and transportation, and similar facilities where the public is generally not received) b. Private utilities (e.g., natural gas, electricity, telephone, cable, and similar facilities) c. Passive open space (e.g., natural areas) d. Special district facilities (e.g., irrigation district, and similar facilities) e. Vocational schools co-located with parent industry or sponsoring organization f. Uses similar to those listed above	**5. Wireless Communication Equipment – subject to the standards in Chapter 19.245 FMC** **6. Accessory Uses and Structures** **7. Uses Requiring Groundwater Protection Compliance** a. Machine shop with drop hammer or punch press b. Dry cleaning or dyeing using explosive materials c. Enameling and metal coating (galvanizing) d. Ornamental metal works e. Welding or sheet metal shop and other manufacturing of a similar nature f. Any other uses, including similar to those listed in FMC 19.85.020, as may be determined by the city to pose a high potential risk to the ground and surface water resources g. All uses occurring within the city's groundwater protection area
Land uses with an asterisk (*) are subject to the standards in FMC 19.85.070, Special standards for certain uses. Conditional Uses (CU) shall require a conditional use permit when they generate significant noise, light/glare, dust and vibration impacts, or traffic; or when they include resource extraction.		

B. Determination of Similar Land Use. Similar use determinations shall be made in conformance with the procedures in Chapter 19.480 FMC, Code Interpretations.

C. Land Uses Prohibited in General Industrial District. Only uses specifically listed in Table 19.85.020.A, and uses similar to those in

Table 19.85.020.A, are permitted in this district. The following uses are expressly prohibited: new housing, churches and similar facilities and schools. (Ord. 6-2001 § 1)

Response: The proposed project will be covered under "Uses similar to those listed above" in the industrial land use types that are permitted. This project will be a sales and storage yard for landscape materials.

19.85.030 Development setbacks.

Development setbacks provide separation between industrial and nonindustrial uses for fire protection/security, building maintenance, sunlight and air circulation, noise buffering, and visual separation.

A. Front, Side and Rear Setbacks.

1. None, unless the property abuts a parcel of land in a more restrictive manufacturing district (i.e., LI), or a commercial district, in which case the requirements of the abutting property shall apply. If an established building line exists, the setback may be the same as the established building line following approval by the planning commission.

2. If any use in this district abuts or faces any residential zone, a setback of 50 feet on the side abutting or facing the residential district may be required.

3. Setbacks for Insufficient Right-of-Way. Setbacks shall be established when a lot abuts a street having insufficient right-of-way width to serve the area. The necessary right-of-way widths and the setback requirements in such cases shall be based upon the Comprehensive Plan and applicable ordinances and standards.

B. Other Requirements.

1. Buffering. The city may require landscaping, walls or other buffering in setback yards to mitigate adverse noise, light, glare, and aesthetic impacts to adjacent properties.

2. Neighborhood Access. Construction of pathway(s) within setbacks may be required to provide pedestrian connections to adjacent neighborhoods or other districts, in accordance with Chapter 19.162 FMC, Access and Circulation.

3. Building and Fire Codes. All developments shall meet applicable fire and building code standards, which may require setbacks different from those listed above (e.g., combustible materials, etc.).

4. Groundwater Protection. All development shall meet the standards for the groundwater protection area. (Ord. 6-2001 § 1)

Response: See preliminary site plan. Setbacks are not required for this project since it does not abut a more restrictive manufacturing district, or a commercial district, or residential zone. Although not required, a 5' landscape setback has been incorporated into our design around the perimeter of the materials yard.

19.85.040 Lot coverage.

The maximum allowable lot coverage in the general industrial district is 85 percent. The maximum allowable lot coverage is computed by calculating the total area covered by buildings and impervious (paved) surfaces, including accessory structures. Compliance with other sections of this code may preclude development of the maximum lot coverage for some land uses. (Ord. 6-2001 § 1)

Response: Total landscaping for the site has been calculated at 15%. This landscaping has been provided, which results in compliance with the maximum allowable lot coverage of 85%. See preliminary site plan.

19.85.050 Development orientation.

Industrial developments shall be oriented on the site to minimize adverse impacts (e.g., noise, glare, smoke, dust, exhaust, vibration, etc.) and protect the privacy of adjacent uses to the extent possible. The following standards shall apply to all development in the general industrial district:

A. Mechanical equipment, lights, emissions, shipping/receiving areas, and other components of an industrial use that are outside enclosed buildings, shall be located away from residential areas, schools, parks and other nonindustrial areas to the maximum extent practicable; and

B. The city may require a landscape buffer, or other visual or sound barrier (fence, wall, landscaping, or combination thereof) to mitigate adverse impacts that cannot be avoided through building orientation standards alone.

Response: This development will take care not to create adverse impacts. There are no residential areas, schools or parks adjacent to the development. A 5' landscape buffer, and 6' wall will be placed around the storage yard, and care will be

taken to prevent noise, glare, smoke, dust, exhaust, vibration, etc., as required.

19.85.060 Building height.

The following building height standards are intended to promote land use compatibility and flexibility for industrial development at an appropriate community scale:

A. Base Requirement. Buildings shall be no more than three stories or 45 feet in height, whichever is greater, and shall comply with the building setback standards in FMC 19.85.030.

B. Performance Option. The allowable building height may be increased to 55 feet, when approved as part of a conditional use permit. The development approval may require additional setbacks, stepping-down of building elevations, visual buffering, screening, and/or other appropriate measures to provide a height transition between industrial development and adjacent nonindustrial development. Smoke stacks, cranes, roof equipment, and other similar features which are necessary to the industrial operation may not exceed 20 feet in height without approval of a conditional use permit.

C. Method of Measurement. "Building height" is measured as the vertical distance above a reference datum measured to the highest point of the coping of a flat roof or to the deck line of a mansard roof or to the average height of the highest gable of a pitched or hipped roof. The reference datum shall be selected by either of the following, whichever yields a greater height of building:

1. The elevation of the highest adjoining sidewalk or ground surface within a five-foot horizontal distance of an exterior wall of the building when such sidewalk or ground surface is not more than 10 feet above the lowest grade;

2. An elevation 10 feet higher than the lowest grade when the sidewalk or ground surface described in subsection (C)(1) of this section is more than 10 feet above the lowest grade. The height of a stepped or terraced building is the maximum height of any segment of the building. Not included in the maximum height are: chimneys, bell towers, steeples, roof equipment, flagpoles, and similar features which are not for human occupancy. (Ord. 6-2001 § 1)

Response: The building that is proposed will be 1-story and will be approximately 12' tall, which is less than the 45 maximum feet height standard. See building plans.

19.85.070 Special standards for certain uses.

A. Uses With Significant Noise, Light/Glare, Dust, Vibration, or Traffic Impacts. The following uses shall require conditional use permit approval, in addition to development review or site design review:

1. Uses with Significant Noise, Light/Glare, Dust and Vibration Impacts. Uses which are likely to create significant adverse impacts beyond the industrial district boundaries, such as noise, light/glare, dust, or vibration, shall require conditional use approval, in conformance with Article IV of this title. The following criteria shall be used in determining whether the adverse impacts of a use are likely to be "significant":

a. Noise. The noise level beyond the property line exceeds 65 dBA (24-hour average) on a regular basis.

b. Light/Glare. Lighting and/or reflected light from the development exceeds ordinary ambient light and glare levels (i.e., levels typical of the surrounding area).

c. Dust and/or Exhaust. Dust and/or exhaust emissions from the development exceeds ambient dust or exhaust levels, or levels that existed prior to development.

Response: This project will not produce significant noise, light/glare, dust and/or exhaust. The storage yard will be surrounded by a 6' wall which will reduce noise. 20' tall lights will be directed inwardly toward the project site so as not to produce significant light/glare on adjacent properties or roadways. Efforts will be made to reduce dust during dry months including installation of mist sprayers.

2. Traffic. Uses which are likely to generate unusually high levels of vehicle traffic due to shipping and receiving. "Unusually high levels of traffic" means that the average number of daily trips on any existing street would increase by 10 percent or more as a result of the development. The city may require a traffic impact analysis prepared by a qualified professional prior to deeming a land use application complete, and determining whether the proposed use requires conditional use approval. Applicants may be required to provide a traffic analysis for review by ODOT for developments that increase traffic on state highways.

Response: A traffic study has been prepared for this project and is included with this application. Marine Drive is a Multnomah County roadway and the traffic study has been prepared based upon their required traffic impact analysis scoping. It is not anticipated that this project will significantly increase traffic on state highways or require review by ODOT.

3. Resource extraction, such as the operation of mineral and aggregate quarries and similar uses, shall require a conditional use permit in conformance with Article IV of this title. The applicant shall also be required to prepare a site reclamation plan for review and approval by the city and other affected agencies, prior to commencing resource extraction. The required scope of the reclamation plan shall be identified by the conditional use permit, and shall comply with applicable requirements of state natural resource regulatory agencies.

Response: Not applicable, no resource extraction proposed.

B. Residential Caretakers. One residential caretaker unit shall be permitted for each primary industrial use, subject to the following conditions:

1. The unit shall be served with public water and sanitary sewerage disposal, in conformance with city engineering requirements.

2. Caretaker units shall be required to meet applicable fire safety and building code requirements, in addition to the applicable setback standards of this chapter.

C. Wireless Communication Equipment. Wireless communication equipment includes radio (i.e., cellular), television and similar types of transmission and receiving facilities. The requirements for wireless communication equipment are provided in Chapter 19.245 FMC. Wireless communication equipment shall also comply with required setbacks, lot coverage and other applicable standards of the general industrial district.

Response: Not applicable, no residential caretaker unit is proposed.

D. Columbia River Uses Located North of Marine Drive.

Response: Not applicable, located south of Marine Drive.

19.85.080 Special standards for City of Fairview adopted Metro Title 4 industrial properties.

A. The purpose of this section is to impose special standards to protect and preserve the supply of industrial lands in Fairview in

accordance with the limitations set out in Title 4 of Metro's Urban Growth Management Functional Plan (see Figure 9-C in the Comprehensive Plan for all Fairview Adopted Title 4 Industrial and Employment Lands).

1. Limitation on Retail/Commercial Service Land Uses. Retail and commercial service uses (in accordance with FMC 19.85.020) are limited in size to a maximum of 5,000 square feet in gross floor area for a single outlet (e.g., convenience market, small restaurant, secondary use for wholesaler, similar use) and up to 20,000 square feet in gross floor area for a multi-building project.

2. Freight Network Analysis Required. A freight network impact statement is to be included in all traffic studies for proposed developments on properties identified as industrial lands in Title 4 of the Metro Urban Growth Management Functional Plan. The purpose of this statement is to analyze potential adverse effects of the proposed development on the regional freight system as identified in the regional transportation plan (RTP) and the Fairview transportation system plan. Freight routes located in Fairview include Interstate 84, Marine Drive, 223rd Avenue, Fairview Parkway, Sandy Boulevard, and Glisan Street.

3. Land Division Standards. Properties in the general industrial district that are identified as industrial lands as shown on the Title 4 Properties Map in the Comprehensive Plan shall be subject to certain land division restrictions. All land divisions in the general industrial district shall be in accordance with Chapter 19.430 FMC, Land Divisions and Lot Line Adjustments.

Response: Not applicable, this project site is located on the Title 4 Lands map, but it is shown as an employment land, not an industrial land.

B. The following standards shall apply to all general industrial properties included in the Fairview Title 4 industrial land inventory:

1. Lots smaller than 50 acres may be divided into any number of smaller lots.

2. Lots 50 acres or larger may be divided into smaller lots and parcels pursuant to a master plan approved by the city or county so long as the resulting division yields at least one lot or parcel of at least 50 acres in size.

3. Lots 50 acres or larger may be divided (including those created pursuant to subsection (B)(2) of this section) into any smaller lots or

parcels pursuant to a master plan approved by the city or county so long as at least 40 percent of the area of the lot or parcel has been developed with industrial uses or uses accessory to industrial use. (Ord. 5-2009 § 1 (Att. 1))

Response: Not applicable, this project site is located on the Title 4 Lands map, but it is shown as an employment land, not an industrial land.

CHAPTER 19.162

ACCESS AND CIRCULATION

19.162.010 Purpose.

The purpose of this chapter is to ensure that developments provide safe and efficient access and circulation, for pedestrians and vehicles. FMC 19.162.020 provides standards for vehicular access and circulation. FMC 19.162.030 provides standards for pedestrian access and circulation. Standards for transportation improvements are provided in Chapter 19.165 FMC. (Ord. 6-2001 § 1)

Response: This project is taking access from Marine Drive, which is a Multnomah County road. This project will provide safe and efficient access and circulation, for both pedestrian and vehicles.

19.162.020 Vehicular access and circulation.

A. Intent and Purpose. The intent of this section is to manage vehicle access to development through a connected street system, while preserving the flow of traffic in terms of safety, roadway capacity, and efficiency. Access shall be managed to maintain an adequate "level of service" and to maintain the "functional classification" of roadways as required by the city's transportation system plan. Major roadways, including highways, arterials, and collectors, serve as the primary system for moving people and goods. "Access management" is a primary concern on these roads. Local streets and alleys provide access to individual properties. If vehicular access and circulation are not properly designed, these roadways will be unable to accommodate the needs of development and serve their transportation function. This section attempts to balance the right of reasonable access to private property with the right of the citizens of the city and the state of Oregon to safe and efficient travel. It also requires all developments to construct planned streets (arterials and collectors) and to extend local streets.

To achieve this policy intent, state and local roadways have been categorized in the transportation system plan by function and classified for access purposes based upon their level of importance and function (see Chapter 19.165 FMC). Regulations have been applied to these roadways for the purpose of reducing traffic accidents, personal injury, and property damage attributable to access systems, and to thereby improve the safety and operation of the roadway network. This will protect the substantial public investment in the existing transportation system and reduce the need for expensive remedial measures. These regulations also further the orderly layout and use of land, protect community character, and conserve natural resources by promoting well-designed road and access systems and discouraging the unplanned subdivision of land.

Response: This project is taking access from Marine Drive, which is a Multnomah County road. This project will provide safe and efficient access and circulation, for both pedestrian and vehicles. This project has been designed per the intent and purpose of this chapter to provide access to the property and also provide safe and efficient travel.

B. Applicability. This section shall apply to all public streets within the city and to all properties that abut these streets.

Response: The public street is within the City; however, it is a Multnomah County roadway. The subject property abuts this public street.

C. Access Permit Required. Access to a public street requires an access permit in accordance with the following procedures:

1. Permits for access to city streets shall be subject to review and approval by the city engineer based on the standards contained in this chapter, and the provisions of the transportation standards. An access permit may be in the form of a letter to the applicant, or it may be attached to a land use decision notice as a condition of approval. In either case, an access permit will be reviewed consistent with the procedures required for the complementary development permit. If no development permit is requested, the access permit shall be reviewed consistent with a Type III process.

Response: Not applicable, not a City Street. See 3 below.

2. Permits for access to state highways shall be subject to review and approval by the Oregon Department of Transportation (ODOT), except when ODOT has delegated this responsibility to the city or

Multnomah County. In that case, the city or county shall determine whether access is granted based on its adopted standards.

Response: Not applicable, not an ODOT Street. See 3 below.

3. Permits for access to county highways shall be subject to review and approval by Multnomah County, except where the county has delegated this responsibility to the city, in which case the city shall determine whether access is granted based on adopted county standards.

Response: Marine Drive is a Multnomah County roadway and therefore access permits from the County will be required.

D. Traffic Study Requirements. The city may require a traffic study prepared by a qualified professional to determine access, circulation and other transportation requirements.

A traffic study must be provided for any proposed development that includes more than 10 dwellings or generates at least 100 vehicle trips per day. The traffic study shall include those adjacent intersections that will receive more than 50 vehicle trips per day.

A freight network impact statement is to be included in all traffic studies for proposed developments on properties identified as industrial lands in Title 4 of the Metro Urban Growth Management Functional Plan. The purpose of this statement is to analyze potential adverse effects of the proposed development on the regional freight system as identified in the regional transportation plan (RTP) and the Fairview transportation system plan. Freight routes located in Fairview include Interstate 84, Marine Drive, 223rd Avenue, Fairview Parkway, Sandy Boulevard, and Glisan Street.

Response: A traffic study has been prepared and is included with this application. It has also been submitted also to Multnomah County. It has been prepared based upon scoping requirements provided by Multnomah County.

E. Conditions of Approval. The city may require the closing or consolidation of existing curb cuts or other vehicle access points, recording of reciprocal access easements (i.e., for shared driveways), development of a frontage street, installation of traffic control devices, and/or other mitigation as a condition of granting an access permit, to ensure the safe and efficient operation of the street. When obtaining access to off-street parking areas (both to and from), backing onto a public street shall not be permitted, except for single-family dwellings.

Response: It is understood that there may be conditions of approval from the City and/or County associated with this project.

F. Access Options. When vehicle access is required for development (i.e., for off-street parking, delivery, service, drive-through facilities, etc.), access shall be provided by one of the following methods. These methods are "options" to the developer/subdivider, unless one method is specifically required by "Special Standards for Certain Uses." A minimum of 10 feet per lane is required.

1. Option 1. Access is from an existing or proposed alley or mid-block lane. If a property has access to an alley or lane, direct access to a public street is not permitted.

2. Option 2. Access is from a private street or driveway connected to an adjoining property that has direct access to a public street (i.e., "shared driveway"). A public access easement covering the driveway shall be recorded in this case to assure access to the closest public street for all users of the private street/drive.

3. Option 3. Access is from a public street adjacent to the development parcel. If practicable, the owner/developer may be required to close or consolidate an existing access point as a condition of approving a new access. Street accesses shall comply with the access spacing.

Response: Vehicle access is required for this development, and access will be from a public street, Marine Drive. This is a Multnomah County roadway and will be subject to their requirements for access.

4. Subdivisions Fronting onto an Arterial Street. New residential subdivisions fronting onto an arterial street shall be required to provide alleys or secondary (local or collector) streets for access to individual lots. When alleys or secondary streets cannot be constructed due to topographic or other physical constraints, access may be provided by consolidating driveways for clusters of two or more lots (e.g., includes flag lots and mid-block lanes).

Response: Not applicable, not a subdivision.

5. Double-Frontage Lots. When a lot has frontage onto two or more streets, access shall be provided first from the street with the lowest classification. For example, access shall be provided from a local street before a collector or arterial street. Except for corner lots, the creation of new double-frontage lots shall be prohibited in the

residential district, unless topographic or physical constraints require the formation of such lots. When double-frontage lots are permitted in the residential district, a landscape buffer with trees and/or shrubs and ground cover not less than 20 feet wide shall be provided between the back yard fence/wall and the sidewalk or street; maintenance shall be assured by the owner (i.e., through homeowners association, etc.).

Important cross-references to other code sections: Provisions in Articles II and III of this title may require buildings placed at or near the front property line and driveways and parking areas oriented to the side or rear yard. The city may require the dedication of public right-of-way and construction of a street (e.g., frontage road, alley or other street) when the development impact is proportionate to the need for such a street, and the street is identified by the Comprehensive Plan or an adopted local streets plan. (Please refer to the transportation standards in Chapter 19.165 FMC.)

Response: Not applicable, not a double frontage lot, only public street is Marine Drive.

G. Access Spacing. Access spacing ensures safe connections to local and arterial streets. Driveway accesses shall be separated from other driveways and street intersections in accordance with the following standards and procedures:

1. Local Streets. A minimum of 50 feet separation (as measured from the sides of the driveway/street) shall be required on local streets (i.e., streets not designated as collectors or arterials), except as provided in subsection (G)(3) of this section.

2. Arterial and Collector Streets. Access spacing on collector and arterial streets, and at controlled intersections (i.e., with four-way stop sign or traffic signal) shall be determined based on the policies and standards contained in the city's transportation system plan. Access to Interstate 84 is subject to the jurisdiction of ODOT.

3. Special Provisions for All Streets. Direct street access may be restricted for some land uses, in conformance with the provisions of Chapters 19.20 through 19.155 – Land Use Districts. For example, access consolidation, shared access, and/or access separation greater than that specified by subsections (G)(1) and (G)(2) of this section may be required by the city, county or ODOT for the purpose of protecting the function, safety and operation of the street for all users. (See subsection I of this section.) Where no other alternatives

exist, the permitting agency may allow construction of an access connection along the property line farthest from an intersection. In such cases, directional connections (i.e., right in/out, right in only, or right out only) may be required.

Response: Access spacing shall be per Multnomah County standards.

H. Number of Access Points. Reducing the number of access points on a street provides pedestrians fewer obstructions, fewer points at which automobile traffic crosses the sidewalk, and fewer opportunities for conflicts between through traffic and vehicles using access points.

For single-family (detached and attached), two-family, and three-family housing types, one street access point is permitted per lot, when alley access cannot otherwise be provided; except that two access points may be permitted for two-family and three-family housing on corner lots (i.e., no more than one access per street), subject to the access spacing standards in subsection G of this section. The number of street access points for multiple-family, commercial, industrial, and public/institutional developments shall be minimized to protect the function, safety and operation of the street(s) and sidewalk(s) for all users. Shared access may be required, in conformance with subsection I of this section in order to maintain the required access spacing, and minimize the number of access points.

Response: Number of access points is per Multnomah County standards. One access point is allowed per parcel. A shared access is proposed for this project, which allows for 2 access points.

I. Shared Driveways. Shared driveways serve to reduce impermeable surfaces, reduce visual blight associated with large expanses of pavement, and provide more linear curb space for on-street parking.

The number of driveway and private street intersections with public streets shall be minimized by the use of shared driveways with adjoining lots where feasible. The city shall require shared driveways as a condition of land division or site design review, as applicable, for traffic safety and access management purposes in accordance with the following standards:

1. Shared driveways and frontage streets may be required to consolidate access onto a collector or arterial street. When shared driveways or frontage streets are required, they shall be stubbed to adjacent developable parcels to indicate future extension. "Stub"

means that a driveway or street temporarily ends at the property line, but may be extended in the future as the adjacent parcel develops. "Developable" means that a parcel is either vacant or it is likely to receive additional development (i.e., due to infill or redevelopment potential).

2. Access easements (i.e., for the benefit of affected properties) shall be recorded for all shared driveways, including pathways, at the time of final plat approval or as a condition of site development approval.

3. Exception. Shared driveways are not required when existing development patterns or physical constraints (e.g., topography, parcel configuration, and similar conditions) prevent extending the street/driveway in the future.

Response: A shared access is proposed for this project between this property and the parcel to the west. There will be an access easement recorded for this shared driveway. The shared driveway will also provide access to the future Lot #106.

J. Figure 19.162.020.J provides examples of street layout and connectivity.

Figure 19.162.020.J – Street Connectivity and Formation of Blocks

Response: Not applicable in the general industrial district.

K. Street Connectivity and Formation of Blocks Required. In order to promote efficient vehicular and pedestrian circulation throughout the city, land divisions and large site developments shall produce complete blocks bounded by a connecting network of public and/or private streets, in accordance with the following standards:

1. Mixed-use and residential development proposed on sites five acres or greater must submit a site plan that identifies conceptual street connections that are consistent with the transportation system plan.

2. Block Length and Perimeter. The maximum block length and perimeter shall not exceed:

a. Five hundred thirty feet length and 1,600 feet perimeter in the residential district;

b. Two hundred feet length and 1,200 feet perimeter in the town center commercial district, except as provided by FMC 19.65.050, Block layout and building orientation;

c. Three hundred feet length and 1,200 feet perimeter in the corridor commercial district and neighborhood commercial;

d. Not applicable to the general industrial district; and

e. Seven hundred feet length and 1,700 feet perimeter in the light industrial district, except as required for commercial developments subject to FMC 19.80.060(F).

Response: Not applicable in the general industrial district.

3. Street Standards. Public and private streets shall also conform to FMC 19.165.020, Transportation standards, FMC 19.162.030, Pedestrian access and circulation, and applicable Americans with Disabilities Act (ADA) design standards.

Response: There are no proposed public or private streets associated with this project. This project will be designed per the Americans with Disabilities Act (ADA) design standards.

4. A variance to street spacing standards may be granted pursuant to FMC 19.520.030 (Class B variances) when resources are present that are mapped on the Natural Resources Map, where street spacing can be achieved at a minimum of 800 feet and no greater than 1,200 feet.

Response: Not applicable, there are no proposed streets associated with this project.

5. Exception. Exceptions to the above standards may be granted when blocks are divided by one or more pathway(s), where spacing is no more than 330 feet as measured from the right-of-way or easement line and in conformance with the provisions of FMC 19.162.030(A). Pathways shall be located to minimize out-of-direction travel by pedestrians and may be designed to accommodate bicycles.

Response: Exceptions are not requested.

L. Driveway Openings. All driveway openings must comply with the "Standard Specifications for Public Works Construction," pages 53 – 55. Driveway openings or curb cuts shall be within the minimum width necessary to provide the required number of vehicle travel lanes (10 feet for each travel lane). The following standards (i.e., as measured where the front property line meets the sidewalk or right-of-way) are required to provide adequate site access, minimize surface water runoff, and avoid conflicts between vehicles and pedestrians:

1. Single-family, two-family, and three-family uses shall have a minimum driveway width of 10 feet, and a maximum width of 24 feet, except that one recreational vehicle pad driveway may be provided in addition to the standard driveway for lots containing more than 10,000 square feet of area.

2. Multiple-family uses with between four and seven dwelling units shall have a minimum driveway width of 20 feet, and a maximum width of 24 feet.

3. Multiple-family uses with more than eight dwelling units, and off-street parking areas with 16 or more parking spaces, shall have a minimum driveway width of 24 feet, and a maximum width of 30 feet. These dimensions may be increased if the city engineer determines that more than two lanes are required based on the number of trips generated or the need for turning lanes.

4. Access widths for all other uses shall be based on 10 feet of width for every travel lane, except that driveways providing direct access to parking spaces shall conform to the parking area standards in Chapter 19.164 FMC, Vehicle and Bicycle Parking.

5. Driveway Aprons. Driveway aprons (when required) shall be constructed of concrete and shall be installed between the street right-of-way and the private drive, as shown above. Driveway aprons shall conform to ADA standards for sidewalks and pathways, which require a continuous route of travel that is a minimum of three feet in width, with a cross slope not exceeding two percent.

Figure 19.162.020.L – Examples of Acceptable Driveway Openings Next to Sidewalks/Pathways

Response: The proposed driveways will have at least 10 feet of width for every travel lane. The parking lot driveways will be based upon the parking code. Driveway approaches are proposed to be constructed of asphalt.

M. Fire Access and Parking Area Turnarounds. A fire equipment access drive shall be provided for any portion of an exterior wall of the first story of a building that is located more than 150 feet from an existing public street or approved fire equipment access drive. Parking areas shall provide adequate aisles or turnaround areas for service and delivery vehicles so that all vehicles may enter the street in a forward manner. For requirements related to cul-de-sacs, please refer to Chapter 19.165 FMC.

Response: The project site has been designed to allow large vehicles, including fire trucks, dump trucks, and garbage vehicles to circulate the project site without needing to back onto any public street. A sideways hammerhead turnaround has been provided in the event that the gate is closed at the entry to the site.

N. Vertical Clearances. Driveways, private streets, aisles, turnaround areas and ramps shall have a minimum vertical clearance of 13 feet 6 inches for their entire length and width.

Response: There will be a vertical clearance of 13.5' throughout the entire site.

O. Vision Clearance. No signs, structures or vegetation in excess of three feet in height shall be placed in "vision clearance areas," as shown above. The city engineer upon finding that more sight distance is required may increase the minimum vision clearance area (i.e., due to traffic speeds, roadway alignment, etc.).

Figure 19.162.020.O – Vision Clearance Areas

Response: The vision clearance areas will remain clear as required.

P. Construction. The following development and maintenance standards shall apply to all driveways and private streets, except that the standards do not apply to driveways serving one single-family detached dwelling:

1. Surface Options. Driveways, parking areas, aisles, and turnarounds may be paved with asphalt, concrete or comparable surfacing, or a durable nonpaving material may be used to reduce surface water runoff and protect water quality. Paving surfaces shall be subject to review and approval by the city engineer.

2. Surface Water Management. When a paved surface is used, all driveways, parking areas, aisles and turnarounds shall have on-site collection or infiltration of surface waters to eliminate sheet flow of such waters onto public rights-of-way and abutting property. Surface water facilities shall be constructed in conformance with city standards.

3. Driveway Aprons. When driveway approaches or "aprons" are required to connect driveways to the public right-of-way, they shall be paved with concrete surfacing (see also subsection L of this section). (Ord. 2-2017 § 1 (Exh. A); Ord. 5-2009 § 2 (Att. 1); Ord. 6-2001 § 1)

Response: The proposed driveways within public right-of-way will be constructed of asphalt as required. The grading of driveways will be such that the stormwater runoff will be handled in the on-site stormwater system.

19.162.030 Pedestrian access and circulation.

The standards presented in this code provide standards for safe, connected and user-friendly pedestrian connections and pathways that join neighborhoods and buildings within a development.

A. Pedestrian Access and Circulation. To ensure safe, direct and convenient pedestrian circulation, all developments, except single-family detached housing (i.e., on individual lots), shall provide a continuous pedestrian and/or multi-use pathway system. (Pathways only provide for pedestrian circulation. Multi-use pathways accommodate pedestrians and bicycles.) The system of pathways shall be designed based on the standards in subsections (A)(1) through (5) of this section:

1. Continuous Pathways. The pathway system shall extend throughout the development site, and connect to all future phases of development, adjacent trails, public parks and open space areas whenever possible. The developer may also be required to connect or stub pathway(s) to adjacent streets and private property, in accordance with the provisions of FMC 19.162.020, Vehicular access and circulation, and the transportation standards in Chapter 19.165 FMC.

Response: There are no future phases of development or adjacent trails, public parks and opens spaces to connect our proposed pedestrian access to. Therefore, a continuous pathway is not applicable for this project. This project does connect to the Marine Drive multiuse trail.

2. Safe, Direct, and Convenient Pathways. Pathways within developments shall provide safe, reasonably direct and convenient connections between primary building entrances and all adjacent streets, based on the following definitions:

a. "Reasonably direct" means a route that does not deviate unnecessarily from a straight line or a route that does not involve a significant amount of out-of-direction travel for likely users.

b. "Safe and convenient" means bicycle and pedestrian routes that are reasonably free from hazards and provide a reasonably direct route of travel between destinations.

c. For commercial, industrial, mixed use, public, and institutional buildings, the "primary entrance" is the main public entrance to the building. In the case where no public entrance exists, street connections shall be provided to the main employee entrance.

Response: This project is an industrial building and will include a "primary entrance". A safe, direct and convenient connection is proposed to this primary building entrance.

d. For residential buildings the "primary entrance" is the front door (i.e., facing the street). For multifamily buildings in which each unit does not have its own exterior entrance, the "primary entrance" may be a lobby, courtyard or breezeway, which serves as a common entrance for more than one dwelling.

Response: Not applicable, no proposed residential buildings or multifamily buildings.

3. Connections within Development. For all developments subject to site design review, pathways shall connect all building entrances to one another. In addition, pathways shall connect all parking areas, storage areas, recreational facilities and common areas (as applicable), and adjacent developments to the site, as applicable.

Response: See site plan for proposed sidewalks.

4. Street Connectivity. Pathways (for pedestrians and bicycles) shall be provided at or near midblock where the block length exceeds the length required by FMC 19.162.020. Pathways shall also be provided where cul-de-sacs or dead-end streets are planned, to connect the ends of the streets together, to other streets, and/or to other developments, as applicable. Pathways used to comply with these standards shall conform to all of the following criteria:

a. Multi-use pathways (i.e., for pedestrians and bicyclists) are no less than 10 feet wide and located within a 20-foot-wide right-of-way or easement that allows access for emergency vehicles.

b. If the streets within the subdivision or neighborhood are lighted, the pathways shall also be lighted.

c. Stairs or switchback paths using a narrower right-of-way/easement may be required in lieu of a multi-use pathway where grades are steep.

d. The city may require landscaping within the pathway easement/right-of-way for screening and the privacy of adjoining properties.

e. The hearings body or planning director may determine, based upon facts in the record, that a pathway is impracticable due to: physical or topographic conditions (e.g., freeways, railroads, extremely steep slopes, sensitive lands, and similar physical constraints); buildings or other existing development on adjacent properties that physically prevent a connection now or in the future, considering the potential for redevelopment; and sites where the provisions of recorded leases, easements, covenants, restrictions, or other agreements recorded as of the effective date of this code prohibit the pathway connection.

Response: The proposed office will provide supplemental service to the yard and is not an additional use to the development. Additionally, there are no proposed retail use so no pathway is proposed.

5. Connections to Other Facilities. Proposed pathways shall be located to provide access to existing or planned commercial services and other neighborhood facilities, such as schools, shopping areas and park and transit facilities. To the greatest extent possible, access shall be reasonably direct, providing a route or routes that do not deviate unnecessarily from a straight line or that do not involve a significant amount of out-of-direction travel.

Figure 19.162.030.A – Pedestrian Pathway System for Multifamily Development (Typical)

Response: Not applicable, not a multifamily development, no proposed residential buildings or multifamily buildings.

B. Design and Construction. Pathways shall conform to all of the standards in subsections (B)(1) through (B)(5) of this section:

1. Vehicle/Pathway Separation. Where pathways are parallel and adjacent to a driveway or street (public or private), they shall be raised six inches and curbed, or separated from the driveway/street by a five-foot minimum strip with bollards, a landscape buffer, or other physical barrier. If a raised path is used, the ends of the raised portions must be equipped with curb ramps.

2. Housing/Pathway Separation. Pedestrian pathways shall be separated a minimum of five feet from all residential living areas on the ground floor, except at building entrances. Separation is measured as measured from the pathway edge to the closest dwelling unit. The separation area shall be landscaped in conformance with the provisions of Chapter 19.163 FMC, Landscaping, Street Trees, Fences and Walls. No pathway/building

separation is required for commercial, industrial, public, or institutional uses.

3. Crosswalks. Where pathways cross a parking area, driveway, or street ("crosswalk"), they shall be clearly marked with contrasting paving materials, humps/raised crossings.

4. Pathway Surface. Pathway surfaces shall be concrete, asphalt, brick/masonry pavers, or other durable surface, at least six feet wide, and shall conform to ADA requirements. Multi-use paths (i.e., for bicycles and pedestrians) shall be the same materials, at least 10 feet wide. (See also Chapter 19.165 FMC, Transportation Standards for public, multi-use pathway standard.)

5. Accessible Routes. Pathways shall comply with the Americans with Disabilities Act, which requires accessible routes of travel.

Figure 19.162.030.B – Pathway Standards (Typical)

(Ord. 2-2017 § 1 (Exh. A); Ord. 6-2001 § 1)

Response: No pathway is proposed with this development. There is no need for pedestrians to enter the site using a pathway.

CHAPTER 19.163

LANDSCAPING, STREET TREES, FENCES AND WALLS

19.163.010 Purpose.

The purpose of this chapter is to promote community health, safety and welfare by protecting natural vegetation, and setting development standards for landscaping, street trees, fences and walls. Together, these elements of the natural and built environment contribute to the visual quality, environmental health and character of the community. Trees provide climate control through shading during summer months and wind screening during winter. Trees and other plants can also buffer pedestrians from traffic. Walls, fences, trees and other landscape materials also provide vital screening and buffering between land uses. Landscaped areas help to control surface water drainage and can improve water quality, as compared to paved or built surfaces.

The chapter is organized into the following sections:

19.163.020, Landscape Conservation. This section prevents the indiscriminate removal of significant trees and other vegetation,

including vegetation associated with streams, wetlands and other protected natural resource areas. This section cross-references Chapter 19.106 FMC, which regulates development of sensitive lands.

19.163.030, New Landscaping. This section sets standards for and requires landscaping of all development sites that require site design review. This section also requires buffering for parking and maneuvering areas, and between different land use districts. Note that other landscaping standards are provided in Article II of this title, Land Use Districts, for specific types of development.

19.163.040, Street Trees. This section sets standards for and requires planting of trees along all streets for shading, comfort and aesthetic purposes.

19.163.050, Fences and Walls. This section sets standards for new fences and walls, including maximum allowable height and materials, to promote security, personal safety, privacy, and aesthetics. (Ord. 3-2012 § 6; Ord. 6-2001 § 1)

Response: See preliminary landscape plan. New landscaping is proposed on this project site. Trees have been located outside of the overhead power easement to prevent tree maintenance in the future.

19.163.020 Landscape conservation.

A. Applicability. All development sites containing significant vegetation, as defined below, shall comply with the standards of this section. The purpose of this section is to incorporate significant native vegetation into the landscapes of development and protect vegetation that is subject to requirements of the significant environmental concern and riparian buffer overlay zones, Chapter 19.106 FMC. The use of mature, native vegetation within developments is a preferred alternative to removal of vegetation and re-planting. Mature landscaping provides summer shade and wind breaks, and allows for water conservation due to larger plants having established root systems.

B. Significant Vegetation. "Significant vegetation" means:

1. Significant Trees and Shrubs. Individual trees and shrubs with a trunk diameter of six inches or greater, as measured four feet above the ground (DBH), and all plants within the drip line of such trees and shrubs, shall be protected.

2. Sensitive Lands. Trees and shrubs on sites that have been designated as "sensitive lands," in accordance with Chapter 19.106 FMC, Natural Resource Regulations, and Chapter 19.105 FMC, Floodplain Overlay (e.g., due to slope, natural resource areas, wildlife habitat, etc.) shall be protected.

3. Exception. Protection shall not be required for plants listed as non-native, invasive plants by the Oregon State University Extension Service in the applicable OSU bulletins for Multnomah County.

C. Mapping and Protection Required. Significant vegetation shall be mapped as required by this code. Significant trees shall be mapped individually and identified by species and size (diameter at four feet above grade, or "DBH"). A "protection" area shall be defined around the edge of all branches (drip-line) of each tree (drip lines may overlap between trees). The city also may require an inventory, survey, or assessment prepared by a qualified professional when necessary to determine vegetation boundaries, building setbacks, and other protection or mitigation requirements.

D. Protection Standards. All of the following protection standards shall apply to significant vegetation areas:

1. Protection of Significant Trees. Significant trees identified as meeting the criteria in subsection (B)(1) of this section shall be retained whenever practicable. Preservation may become impracticable when it would prevent reasonable development of public streets, utilities, or land uses permitted by the applicable land use district.

2. Sensitive Lands. Sensitive lands shall be protected in conformance with the provisions of Chapters 19.105 and 19.106 FMC.

3. Conservation Easements and Dedications. When necessary to implement the Comprehensive Plan, the city may require dedication of land or recordation of a conservation easement to protect sensitive lands, including groves of significant trees. This will be addressed on a case by case basis. (Ord. 3-2012 § 6; Ord. 6-2001 § 1)

Response: There are no trees on the subject property. There are no sensitive lands or conservation easements and dedications onsite.

19.163.025 Existing landscaping.

A. Applicability. This section shall apply to all developments.

B. Construction. All areas of significant vegetation shall be protected prior to, during, and after construction. Grading and operation of vehicles and heavy equipment is prohibited within significant vegetation areas, except as approved by the city for installation of utilities or streets. Such approval shall only be granted after finding that there is no other reasonable alternative to avoid the protected area, and any required mitigation is provided in conformance with Chapter 19.105 FMC, Floodplain Overlay and Chapter 19.106 FMC, Natural Resource Regulations.

C. Exemptions. The protection standards in FMC 19.163.020(D) shall not apply in the following situations:

1. Dead, Diseased, and/or Hazardous Vegetation. Vegetation that is dead or diseased, or poses a hazard to personal safety, property or the health of other trees, may be removed. Prior to tree removal, the applicant shall provide a report from a certified arborist or other qualified professional to determine whether the subject tree is diseased or poses a hazard, and any possible treatment to avoid removal, except as provided by subsection (C)(2) of this section.

2. Emergencies. Significant vegetation may be removed in the event of an emergency without land use approval when the vegetation poses an immediate threat to life or safety, as determined by the planning director. The planning director shall prepare a notice or letter of decision within 10 days of the tree(s) being removed. The decision letter or notice shall explain the nature of the emergency and be on file and available for public review at City Hall. (Ord. 3-2012 § 6; Ord. 6-2001 § 1)

Response: There are no trees on the subject property.

19.163.030 New landscaping.

A. Applicability. This section shall apply to all developments requiring site design review, and other developments with required landscaping.

B. Landscaping Plan Required. A landscape plan is required at the time of design review or other pertinent applications. All landscape plans shall conform to the requirements in FMC 19.420.020 (E), Landscape plans.

Response: A landscape plan has been prepared associated with this project and is submitted for design review.

C. Landscape Area Standards. The minimum percentage of required landscaping equals:

1. Residential districts: 20 percent of the site.

2. Town center commercial district: five percent of the site.

3. General industrial district: 10 percent of the site.

4. Light industrial district: 10 percent of the site.

5. Corridor commercial district: five percent of the site.

6. Neighborhood commercial district: 10 percent of the site.

Response: This project is in the general industrial district and therefore per the standard a minimum of 10 percent of the project site is required to be landscaped. 15 percent of this project site is proposed to be landscaped.

D. Landscape Materials. This section provides guidelines that ensure significant vegetation growth and establishment using a variety of size specifications and coverage recommendations.

Landscape materials include trees, shrubs, ground cover plants, nonplant ground covers, and outdoor hardscape features, as described below:

1. Native Vegetation. Native vegetation shall be preserved or planted where practicable.

2. Plant Selection. A combination of deciduous and evergreen trees, shrubs and ground covers shall be used for all planted areas, the selection of which shall be based on local climate, exposure, water availability, and drainage conditions. As necessary, soils shall be amended to allow for healthy plant growth.

3. Non-native, invasive plants, as per FMC 19.164.020(B), shall be prohibited.

4. Hardscape features (i.e., patios, decks, plazas, etc.) may cover up to 15 percent of the required landscape area. Swimming pools, sports courts and similar active recreation facilities may not be counted toward fulfilling the landscape requirement.

5. Nonplant Ground Covers. Bark dust, chips, aggregate or other nonplant ground covers may be used, but shall cover no more than five percent of the area to be landscaped. "Coverage" is measured based on the size of plants at maturity or after five years of growth, whichever comes sooner.

6. Tree Size. Trees shall have a minimum caliper size of 1.5 inches or greater, or be six feet or taller, at time of planting.

7. Shrub Size. Shrubs shall be planted from one-gallon containers or larger.

8. Ground Cover Size. Ground cover plants shall be sized and spaced so that they grow together to cover a minimum of 80 percent of the underlying soil within three years.

9. Significant Vegetation. Significant vegetation preserved in accordance with FMC 19.163.020 may be credited toward meeting the minimum landscape area standards. Credit shall be granted on a per square foot basis. The street tree standards of FMC 19.163.040 may be waived when trees preserved within the front yard provide the same or better shading and visual quality as would otherwise be provided by street trees.

10. Stormwater Facilities. Stormwater facilities (e.g., detention/retention ponds and swales) shall be landscaped with water tolerant, native plants.

Figure 19.163.030 – Landscape Areas in a Multiple-Family Development (Typical)

E. Landscape Design Standards. The landscape design standards provide guidelines within setback areas, parking areas, etc.

All yards, parking lots and required street tree planter strips shall be landscaped in accordance with the provisions of this chapter. Landscaping shall be installed with development to provide erosion control, visual interest, buffering, privacy, open space and pathway identification, shading and wind buffering, based on the following standards:

1. Yard Setback Landscaping. Landscaping shall satisfy the following criteria:

a. Provide visual screening and privacy within side and rear yards; while leaving front yards and building entrances mostly visible for security purposes;

b. Use shrubs and trees as windbreaks, as appropriate;

c. Retain natural vegetation, as practicable;

d. Define pedestrian pathways and open space areas with landscape materials;

e. Provide focal points within a development, such as signature trees (i.e., large or unique trees), hedges and flowering plants;

f. Use trees to provide summer shading within common open space areas, and within front yards when street trees cannot be provided;

g. Use a combination of plants for year-long color and interest;

h. Use landscaping to screen outdoor storage and mechanical equipment areas, and to enhance graded areas such as berms, swales and detention/retention ponds.

2. Parking Areas. A minimum of five percent of the combined area of all parking areas, as measured around the perimeter of all parking spaces and maneuvering areas, shall be landscaped. Such landscaping shall consist of an evenly distributed mix of shade trees with shrubs and/or ground cover plants. "Evenly distributed" means that the trees and other plants are distributed around the parking lot perimeter and between parking bays to provide a partial canopy. At a minimum, one tree per five parking spaces total shall be planted to create a partial tree canopy over and around the parking area. All parking areas with more than 20 spaces shall include landscape islands with trees to break up the parking area into rows of not more than 12 contiguous parking spaces. All landscaped areas shall have minimum dimensions of four feet by four feet to ensure adequate soil, water, and space for healthy plant growth.

3. Buffering and Screening Required. Buffering and screening are required under the following conditions:

a. Parking/Maneuvering Area Adjacent to Streets and Drives. Where a parking or maneuvering area is adjacent and parallel to a street or driveway, a decorative wall (masonry or similar quality material), arcade, trellis, evergreen hedge, or similar screen shall be established parallel to the street or driveway. The required wall or screening shall provide breaks, as necessary, to allow for access to the site and sidewalk by pedestrians via pathways. The design of the wall or screening shall also allow for visual surveillance of the site for security. Evergreen hedges used to comply with this standard shall be a minimum of 36 inches in height at maturity, and shall be of such species, number and spacing to provide the required screening within one year after planting. Any areas between the wall/hedge and the street/driveway line shall be landscaped with plants or other ground cover. All walls shall be maintained in good condition, or otherwise replaced by the owner.

b. Parking/Maneuvering Area Adjacent to Building. Where a parking or maneuvering area, or driveway, is adjacent to a building, the area

shall be separated from the building by a raised pathway, plaza, or landscaped buffer no less than four feet in width. Raised curbs, bollards, wheel stops, or other design features shall be used to protect buildings from being damaged by vehicles. When parking areas are located adjacent to residential ground-floor living space, a landscape buffer is required to fulfill this requirement.

c. Screening of Mechanical Equipment, Outdoor Storage, Service and Delivery Areas, and Automobile-Oriented Uses. All mechanical equipment, outdoor storage and manufacturing, and service and delivery areas, shall be screened from view from all public streets and residential districts. Screening shall be provided by one or more of the following: decorative wall (i.e., masonry or similar quality material), evergreen hedge, non-see-through fence, or a similar feature that provides a non-see-through barrier. Walls, fences, and hedges shall comply with the vision clearance requirements and provide for pedestrian circulation, in accordance with Chapter 19.162 FMC, Access and Circulation. (Ord. 6-2001 § 1)

Response: See proposed landscape plan. This plan has been developed considering the requirements of this section.

19.163.040 Street trees.

The guidelines provided in this section promote healthy street trees and adequate canopy cover to provide shade, reduce stormwater runoff, and improve the appearance of a development.

Street trees shall be planted for all developments that are subject to land division or site design review. Requirements for street tree planting strips are provided in Chapter 19.165 FMC, Public Facility Standards. Planting of unimproved streets shall be deferred until the construction of curbs and sidewalks. Street trees shall conform to the following standards and guidelines:

A. Soil Preparation, Planting and Care. The developer shall be responsible for planting street trees, including soil preparation, ground cover material, staking, and temporary irrigation for two years after planting. The developer shall also be responsible for tree care (pruning, watering, fertilization, and replacement as necessary) during the first two years after planting.

B. Assurances. The city shall require the developer to provide a performance and maintenance bond in an amount determined by the city engineer, to ensure the planting of the tree(s) and care during the first two years after planting.

C. Growth Characteristics. Trees shall be selected based on growth characteristics and site conditions, including available space, overhead clearance, soil conditions, exposure, and desired color and appearance. The following should guide tree selection:

1. Provide a broad canopy where shade is desired.

2. Use low-growing trees for spaces under utility wires.

3. Select trees which can be "limbed-up" where vision clearance is a concern.

4. Use narrow or "columnar" trees where awnings or other building features limit growth, or where greater visibility is desired between buildings and the street.

5. Use species with similar growth characteristics on the same block for design continuity.

6. Avoid using trees that are susceptible to insect damage, and avoid using trees that produce excessive seeds or fruit.

7. Select trees that are well adapted to the environment, including soil, wind, sun exposure, and exhaust. Drought-resistant trees should be used in areas with sandy or rocky soil.

8. Select trees for their seasonal color, as desired.

9. Use deciduous trees for summer shade and winter sun.

D. Caliper Size. The minimum caliper size at planting shall be 1.5 inches, based on the American Association of Nurserymen Standards.

E. Spacing and Location. Street trees shall be planted within existing and proposed planting strips, and in sidewalk tree wells on streets without planting strips. Street tree spacing shall be based upon the type of tree(s) selected and the canopy size at maturity. In general, trees shall be spaced no more than 30 feet apart, except where planting a tree would conflict with existing trees, retaining walls, utilities and similar physical barriers.

F. Maintenance and Irrigation. The use of drought-tolerant plant species is encouraged, and may be required when irrigation is not available. Irrigation shall be provided for plants that are not drought-tolerant. If the plantings fail to survive, the property owner shall replace them with an equivalent specimen (i.e., evergreen shrub replaces evergreen shrub, deciduous tree replaces deciduous tree, etc.). All other landscape features required by this code shall be maintained in good condition, or otherwise replaced by the owner.

G. Additional Requirements. Additional buffering and screening may be required for specific land uses, as identified by Article II of this title, and the city may require additional landscaping through the conditional use permit process. (Ord. 6-2001 § 1)

Response: See proposed landscape plan.

19.163.050 Fences and walls.

The fences and walls section provides height limits for construction of new walls. The guidelines prevent walls that reduce pedestrian connectivity and sight clearance. The standards also provide guidelines relating to maintenance.

The following standards shall apply to all fences and walls:

A. General Requirements. All fences and walls shall comply with the standards of this section. The city may require installation of walls and/or fences as a condition of development approval, in accordance with conditional use permits or site design review. Walls built for required landscape buffers shall comply with FMC 19.163.030.

B. Dimensions.

1. The maximum allowable height of fences and walls is six feet, as measured from the lowest grade at the base of the wall or fence, except that retaining walls and terraced walls may exceed six feet when permitted as part of a site development approval, or as necessary to construct streets and sidewalks. A building permit is required for walls exceeding six feet in height, in conformance with the Uniform Building Code.

2. The height of fences and walls within a front yard setback shall not exceed four feet (except decorative arbors, gates, etc.), as measured from the grade closest to the street right-of-way.

3. Walls and fences to be built for required buffers shall comply with FMC 19.163.030.

4. Fences and walls shall comply with the vision clearance standards of FMC 19.162.020.

C. Maintenance. For safety and for compliance with the purpose of this chapter, walls and fences required as a condition of development approval shall be maintained in good condition, or otherwise replaced by the owner.

D. Fences – Recreational Courts. Any recreational court, with the consent of the planning commission, may be enclosed by a wire fence not to exceed 12 feet in height; provided, that no part of the court fence is within 20 feet of any street.

E. Swimming Pool Fences. A swimming pool, or other manmade outside body of water, which has a minimum depth of three and one-half feet shall be enclosed with a fence not less than four feet and not more than six feet in height. The fence shall not have any opening, holes or gaps therein larger than six inches square, except for doors or gates. The fence gates shall be equipped with a self-closing, self-catching device. The dwelling unit and/or accessory building can be used as part of the enclosure.

F. Barbed Wire Fencing. Barbed wire fencing may be permitted for property zoned commercial or industrial when the wire is employed on the top of any other type of fencing, and when the barbed wire is a minimum of six feet above the finished ground surface. Standard barbed wire fencing may be used to enclose property which is zoned agricultural.

G. Electrically Charged or Sharp Pointed Fencing. No electrically charged or sharp pointed fencing (other than barbed wire fencing) shall be constructed or maintained within the city limits except that electrically charged fencing may be permitted when the following standards are met:

1. Allowed only in general industrial, light industrial and agricultural holding zoning districts.

2. The electric fence shall not exceed 10 feet in height and shall be completely surrounded by a nonelectric fence or wall a minimum of six feet in height.

3. A minimum one-foot separation shall be maintained between the electric fence and surrounding nonelectric fence or wall, except at gates/entrances.

4. The fence shall be clearly posted with warning signs that include the statement, “Danger – Electric Fence,” or an equivalent, together with a pictorial warning, at an interval of not more than 30 feet.

5. An approved method to manually disconnect electrical power to all portions of the fence and/or gates shall be provided and approved by the fire chief.

6. All necessary permits shall be obtained prior to installation from the city of Fairview.

H. Critical Facility Security Fences. Notwithstanding subsections (B)(2), (F), and (G) of this section, a facility that is located in any zoning district which is deemed a critical facility for the public health and safety, emergency management or homeland security purposes may include installation of fencing as follows:

1. A facility subject to this provision includes but is not limited to water or sewer pump station, well, public works yard, emergency management and other communications facilities, public safety facilities, flood control structures, public and private utility installations, or water tower or other facility deemed to be a similar use under Chapter 19.480 FMC.

2. Security fencing may not exceed six feet in height surrounding all or a portion of the facility, except that barbed wire, razor wire or other similar measure designed to impede access may be added to the top of a fence not less than six feet in height.

3. The vertical dimension of security measures such as barbed wire located along the top of a fence shall not exceed 18 inches.

4. The combined height of a fence and additional security measures may not exceed seven and one-half feet in height. (Ord. 12-2015 § 2 (Exh. A), 2015; Ord. 5-2011 § 1; Ord. 6-2001 § 1)

Response: The site is proposed to be fenced and gated for security. This will prevent unauthorized dumping and also theft of landscaping materials. The proposed fencing shall meet the requirements of the City's code.

CHAPTER 19.164

VEHICLE AND BICYCLE PARKING

19.164.010 Purpose.

The purpose of this chapter is to provide basic and flexible standards for development of vehicle and bicycle parking. The design of parking areas is critically important to the viability of some commercial areas, pedestrian and driver safety, the efficient and safe operation of adjoining streets, and community image and livability. Historically, some communities have required more parking than is necessary for some land uses, paving extensive areas of land that could be put to better use. Because vehicle parking facilities can occupy large amounts of land, they must be planned and designed carefully to use the land efficiently while

maintaining the visual character of the community. This chapter recognizes that each development has unique parking needs by providing a flexible approach for determining parking space requirements (i.e., "minimum" and "performance-based" standards). This chapter also provides standards for bicycle parking because many people use bicycles for recreation, commuting, and general transportation. Children as well as adults need safe and adequate spaces to park their bicycles throughout the community. (Ord. 6-2001 § 1)

Response: See preliminary site plan. Vehicle and bicycle parking have been provided as required by this chapter.

19.164.020 Applicability.

All developments subject to site design review Chapter 19.420 FMC, including development of parking facilities, shall comply with the provisions of this chapter. (Ord. 6-2001 § 1)

19.164.030 Vehicle parking standards.

A. The minimum number of required off-street vehicle parking spaces (i.e., parking that is located in parking lots and garages and not in the street right-of-way) shall be determined based on the standards in Table 19.164.030.A.

There is no minimum number of off-street parking spaces required in the town center commercial district; however, the "maximum parking" standards of this chapter apply.

Table 19.164.030.A

Exhibit A1

Table 19.164.030.A

Vehicle Parking – Minimum Standards Option

The number of required off-street vehicle parking spaces shall be determined in accordance with the following standards. Off-street parking spaces may include spaces in garages, carports, parking lots, and/or driveways so long as vehicles are not parked in a vehicle travel lane (including emergency or fire access lanes), public right-of-way, pathway or landscape area. Credit shall be allowed for "on-street parking," as provided in FMC 19.164.030(B). Parking ratios are based on spaces per 1,000 square feet of gross leasable area unless otherwise stated.

Residential Uses

Single-Family Detached Housing. One parking space shall be provided for each detached single-family dwelling or manufactured home on an individual lot.

Two- and Three-Family Housing. 1.5 spaces per dwelling unit.

Multifamily and Single-Family Attached Housing.

a. Studio units or 1-bedroom units less than 500 sq. ft. – 1 space.

b. 1-bedroom units 500 sq. ft. or larger – 1.25 spaces.

c. 2-bedroom units – 1.50 spaces.

d. 3-bedroom or greater units – 1.75 spaces.

e. Retirement complexes for seniors 55 years or greater – 1 space per unit, plus one per three employees.

Rooming and Boarding Houses, Dormitories. Two spaces for each three guest rooms, or one per three beds, whichever is more.

Senior Housing. Same as for retirement complexes.

Manufactured Home Parks. Same as for single-family detached housing.

Accessory Dwelling. One space.

Commercial Uses

Auto, Boat or Trailer Sales, Retail Nurseries and Similar Bulk Retail Uses. One space per 1,000 square feet of the first 10,000 square feet of gross land area; plus one space per 5,000 square feet for the excess over 10,000 square feet of gross land area; and one space per two employees.

Bank with Drive-In. 4.3 spaces per 1,000 square feet of gross leasable area.

Business, General Retail, Personal Services. General – 4.1 per 1,000 square feet of gross floor area. Furniture and appliances – 0.5 space per 1,000 square feet of gross leasable area.

Chapels and Mortuaries. Two spaces per four fixed seats in the main chapel.

Fast Food with Drive-Through. 9.9 spaces per 1,000 square feet of gross leasable area.

Hotels and Motels. One space per 1,000 square feet of gross leasable area.

Offices. Medical and dental offices – 3.9 spaces per 1,000 square feet of gross leasable area; general offices – 2.7 spaces per 1,000 square feet of gross leasable area.

Restaurants, Bars, Ice Cream Parlors and Similar Uses. 15.3 spaces per 1,000 sq. ft. of gross leasable floor area.

Theaters, Auditoriums, Stadiums, Gymnasiums, Similar Uses. 0.3 spaces per each seat.

Industrial Uses

Industrial Uses, Except Warehousing. 1.6 spaces per 1,000 square feet of leasable floor area.

Warehousing. 0.3 spaces per 1,000 square feet of gross floor area. Parking ratios apply to warehouses 150,000 gross square feet or greater.

Public Utilities (Gas, Water, Telephone, Etc.), Not Including Business Offices. One space per each employee on the largest shift, plus one space per company vehicle.

Public and Institutional Uses

Childcare Centers Having 13 or More Children. One space per two employees; a minimum of two spaces is required.

Churches and Similar Places of Worship. The same as other similar uses.

Golf Courses, Except Miniature. Eight spaces per hole, plus additional spaces for auxiliary uses set forth in this section. Miniature golf courses – four spaces per hole.

Hospitals. Two spaces per patient bed based on maximum capacity.

Nursing and Convalescent Homes. One space per two patient beds based on maximum capacity.

Rest Homes, Homes for the Aged, or Assisted Living. One space for each per dwelling plus one per three employees.

Schools, Elementary and Junior High. One space per employee.

Sports Club/Recreational Facilities. 4.3 spaces per 1,000 square feet of gross leasable area.

High Schools. 0.2 spaces per each student and staff member.

Colleges, Universities and Trade Schools. 0.2 spaces per each student and staff member.

Unspecified Uses

Where a use is not specifically listed in this table, parking requirements shall be determined by finding that a use is similar to those listed in terms of parking needs.

Exhibit A1

Response: See preliminary site plan. The following table shows how the parking requirements were calculated for this project. This is included on the site plan, which shows 25 standard parking spaces, 26 yard parking spaces, 2 ADA parking spaces and 2 bicycle parking spaces.

PARKING REQUIREMENT SUMMARY

		Areas & Qty	Spaces
Office	~ 2.7 spaces per 1,000 SF	2,500 SF	6.8
Retail	~ 4.1 spaces per 1,000 SF	1,750 SF	7.2
Industrial	~ 1.6 spaces per 1,000 SF	1,250 SF	2
Retail Nursery	~ 1 space per 1,000 SF	10,000 SF	10
Retail Nursery	~ 1 space per 5,000 SF	57,650 SF	12
Retail Nursery	~ 1 space per 2 employees	4 employees	2
		Min. Required:	40 Spaces
		Provided:	53 Spaces
Bicycle Parking	~ General Industrial Use	2 spaces minimum provided	

Vehicle Parking – Minimum Standards Option

The number of required off-street vehicle parking spaces shall be determined in accordance with the following standards. Off-street parking spaces may include spaces in garages, carports, parking lots, and/or driveways so long as vehicles are not parked in a vehicle travel lane (including emergency or fire access lanes), public right-of-way, pathway or landscape area. Credit shall be allowed for "on-street parking," as provided in FMC 19.164.030(B). Parking ratios are based on spaces per 1,000 square feet of gross leasable area unless otherwise stated.

Commercial Uses

Auto, Boat or Trailer Sales, Retail Nurseries and Similar Bulk Retail Uses. One space per 1,000 square feet of the first 10,000 square feet of gross land area; plus one space per 5,000 square feet for the excess over 10,000 square feet of gross land area; and one space per two employees.

Business, General Retail, Personal Services. General – 4.1 per 1,000 square feet of gross floor area. Furniture and appliances – 0.5 space per 1,000 square feet of gross leasable area.

Offices. Medical and dental offices – 3.9 spaces per 1,000 square feet of gross leasable area; general offices – 2.7 spaces per 1,000 square feet of gross leasable area.

Industrial Uses

Industrial Uses, Except Warehousing. 1.6 spaces per 1,000 square feet of leasable floor area.

B. Credit for On-Street Parking.

1. The credit for on-street parking allows a reduction of one off-street parking space for every one on-street parking space adjacent to the development if deemed appropriate by the city.

2. On-Street Parking Credit. The amount of off-street parking required shall be reduced by one off-street parking space for every uncommitted on-street parking space adjacent to the development. On-street parking shall follow the established configuration of existing on-street parking, except that angled parking may be allowed for some streets, where permitted by city standards. The following constitutes an on-street parking space:

a. Parallel parking, each 24 feet of uninterrupted curb;

b. Fifty-degree diagonal, each with 12 feet of curb;

c. Ninety-degree (perpendicular) parking, each with 10 feet of curb;

d. Curb space must be connected to the lot which contains the use;

e. Parking spaces that would not obstruct a required clear vision area, nor any other parking that violates any law or street standard; and

f. On-street parking spaces credited for a specific use may not be used exclusively by that use, but shall be available for general public use at all times. No signs or actions limiting general public use of on-street spaces is permitted.

Response: See preliminary site plan. Parking has been provided, as required.

C. Parking Location and Shared Parking.

1. Location. Vehicle parking is allowed only on approved parking shoulders (streets), within garages, carports and other structures, or on driveways or parking lots that have been developed in conformance with this code. Specific locations for parking are indicated in Article II of this title for some land uses (e.g., the requirement that parking be located to side or rear of buildings, with

access from alleys, for some uses). (See also Chapter 19.162 FMC, Access and Circulation.)

2. Off-Site Parking. Except for single-family dwellings, the vehicle parking spaces required by this chapter may be located on another parcel of land, provided the parcel is within 500 feet walking distance of the use it serves. The distance from the parking area to the use shall be measured from the nearest parking space to a building entrance, following a sidewalk or other pedestrian route. The right to use the off-site parking must be evidenced by a recorded deed, lease, easement, or similar written instrument.

3. Mixed Uses. If more than one type of land use occupies a single structure or parcel of land, the total requirements for off-street vehicle parking shall be the sum of the requirements for all uses, unless it can be shown that the peak parking demands are actually less (i.e., the uses operate on different days or at different times of the day). In that case, the total requirements shall be reduced accordingly.

4. Shared Parking. Required parking facilities for two or more uses, structures, or parcels of land may be satisfied by the same parking facilities used jointly, to the extent that the owners or operators show that the need for parking facilities does not materially overlap (e.g., uses primarily of a daytime versus nighttime nature), and provided that the right of joint use is evidenced by a recorded deed, lease, contract, or similar written instrument establishing the joint use.

5. Availability of Facilities. Owners of off-street parking facilities may post a sign indicating that all parking on the site is available only for residents, customers and/or employees, as applicable. Signs shall conform to the standards of Chapter 19.170 FMC, Sign Regulations.

D. Maximum Number of Parking Spaces. The number of parking spaces provided shall not exceed the standards in the following table:

Use	Maximum in Transit/Ped. Areas	Maximum in All Other Areas
General Office	3.4/1,000 s.f.	4.1
Light Industrial	none	none
Retail/Commercial	5.1	6.2

E. Parking Management. The planning director may require a parking management plan for development of any use that requires

more than 10 parking spaces based on the minimum parking spaces provided in Table 19.164.030.A. The parking management plan shall be prepared by a qualified parking or traffic consultant or certified engineer and should include the following:

1. Defining a study area and time period necessary to evaluate parking supply and demand in the area consistent with the planning period for the city's transportation system plan.

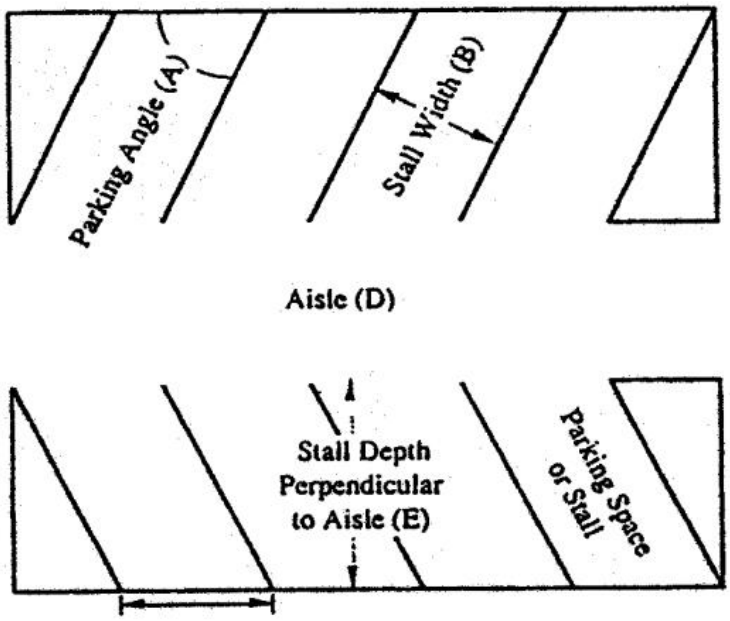
2. Surveying the capacity of the parking supply options in the study area such as shared parking, transit stations or other high-efficiency parking management alternatives.

3. Defining a study area and time period necessary to evaluate parking supply and demand in the area consistent with the planning period for the city's transportation system plan.

4. Surveying the capacity of the parking supply options in the study area such as shared parking, transit stations or other high-efficiency parking management alternatives.

F. Parking Stall Standard Dimensions and Compact Parking Spaces. All off-street parking stalls shall be improved to conform to city standards for surfacing, stormwater management and striping, and provide dimensions in accordance with the following table. Disabled person parking shall conform to the standards and dimensions of this chapter. The number of compact parking spaces shall not exceed 40 percent of all parking spaces provided on site.

Figure 19.164.030.F – Parking Stall Standard Dimensions and Compact Car Parking



Minimum Parking Space and Aisle Dimensions

Angle (A)	Type	Width (B)	Curb Length (C)	1-Way Aisle Width (D)	2-Way Aisle Width (D)	Stall Depth
0° (Parallel)	Standard Compact Disabled	8 ft. 7 ft. 6 in.	22 ft. 6 in. 19 ft. 6 in.	12 ft. 12 ft.	24 ft. 24 ft.	8 ft. 7 ft. 6 in.
30°	Standard Compact Disabled	9 ft. 7 ft. 6 in.	18 ft. 15 ft.	12 ft. 12 ft.	24 ft. 24 ft.	17 ft. 14 ft.
45°	Standard Compact Disabled	9 ft. 7 ft. 6 in.	12 ft. 6 in. 10 ft. 6 in.	12 ft. 12 ft.	24 ft. 24 ft.	19 ft. 16 ft.
60°	Standard Compact Disabled	9 ft. 7 ft. 6 in.	10 ft. 6 in. 8 ft. 6 in.	18 ft. 15 ft.	24 ft. 24 ft.	20 ft. 16 ft. 6 in.
90°	Standard Compact Disabled	9 ft. 7 ft. 6 in.	9 ft. 7 ft. 6 in.	24 ft. 22 ft.	24 ft. 24 ft.	19 ft. 15 ft.

G. Variances. Developments may request exceptions to the parking standards; see FMC 19.520.030(A)(4).

Important cross-references: See also Article II of this title, land use district standards; Chapter 19.162 FMC, Access and Circulation; Chapter 19.163 FMC, Landscaping, Street Trees, Fences and Walls; and FMC 19.165.050, Storm drainage.

H. Disabled Person Parking Spaces. The following parking shall be provided for disabled persons, in conformance with the Americans with Disabilities Act (Figure 19.164.030.H):

Figure 19.164.030.H – Disabled Person

Parking Spaces

-Diagram Omitted, see Fairview Municipal Code-

The following graphics and text further illustrate Americans with Disability Act requirements.

-Diagram Omitted, see Fairview Municipal Code-

I. In parking lots three acres and larger intended for use by the general public, pedestrian pathways shall be raised or separated from parking, parking aisles and travel lanes by a raised curb, concrete bumpers, bollards, landscaping or other physical barrier. If a raised pathway is used, curb ramps shall be provided in accordance with the Americans with Disabilities Act Accessibility Guidelines. (Ord. 2-2017 § 1 (Exh. A); Ord. 3-2010 § 5; Ord. 8-2002 §§ 1 – 3; Ord. 6-2001 § 1)

Response: See preliminary site plan, parking is provided in accordance with this standard. The parking spaces meet the minimum parking space and aisle dimensions, as required.

19.164.040 Bicycle parking standards.

All uses which are subject to site design review shall provide bicycle parking, in conformance with the following standards, which are evaluated during site design review:

A. Number of Bicycle Parking Spaces. A minimum of two bicycle parking spaces per use is required for all uses with greater than 10 vehicle parking spaces. The following additional standards apply to specific types of development:

1. Multifamily Residences. Every residential use of four or more dwelling units shall provide bicycle parking spaces according to the following standards:

a. Short-term bicycle parking shall be provided at a ratio of one bicycle space for every 10 vehicle parking spaces and shall be

located within 30 feet of the main entrance to the building, in a location that is easily accessible for bicycles.

b. Long-term bicycle parking shall be provided at a ratio of one bicycle space per dwelling unit. Sheltered bicycle parking spaces may be located within a garage, storage shed, basement, utility room or similar area. In those instances in which the residential complex has no garage or other easily accessible storage unit, the bicycle parking spaces may be sheltered from sun and precipitation under an eave, overhang, an independent structure, or similar cover.

2. Commercial Retail, Office, and Institutional Developments. Commercial retail, office, and institutional developments shall provide bicycle parking spaces according to the following standards:

a. Short-term bicycle parking shall be provided at a ratio of one bicycle space for every 10 vehicle parking spaces and shall be located within 50 feet of the main entrance to the building, in a location that is easily accessible for bicycles.

b. Long-term bicycle parking shall be provided at a ratio of one bicycle space per employee.

3. Schools. Elementary and middle schools, both private and public, shall provide one bicycle parking space for every eight students and employees. High schools shall provide one bicycle parking space for every five students and employees. All spaces shall be long-term spaces sheltered under an eave, overhang, independent structure, or similar cover.

4. Colleges and Trade Schools. Colleges and trade schools shall provide one bicycle parking space for every eight motor vehicle spaces plus one space for every dormitory unit. Fifty percent of the bicycle parking spaces shall be sheltered under an eave, overhang, independent structure, or similar cover.

5. Town Center Commercial District. Within the town center commercial district, bicycle parking for customers shall be provided along the street at a rate of at least one space per use. Individual uses shall provide their own parking, or spaces may be clustered to serve up to six bicycles. Bicycle parking spaces shall be located in front of the stores along the street, either on the sidewalks or in specially constructed areas such as pedestrian curb extensions. Inverted "U" style racks are recommended. Bicycle parking shall not interfere with pedestrian passage, leaving a clear area of at least 36 inches between bicycles and other existing and potential

obstructions. Customer spaces may or may not be sheltered. When provided, sheltered parking (within a building, or under an eave, overhang, or similar structure) shall be provided at a rate of one space per 10 employees, with a minimum of one space per store.

6. Multiple Uses. For buildings with multiple uses (such as a commercial or mixed use center), bicycle parking standards shall be calculated by using the total number of motor vehicle parking spaces required for the entire development. A minimum of one bicycle parking space for every 10 motor vehicle parking spaces is required.

B. Exemptions. This section does not apply to single-family, two-family, and three-family housing (attached, detached or manufactured housing), home occupations, agriculture and livestock uses, or other developments with fewer than eight vehicle parking spaces.

C. Location and Design. Bicycle parking shall be conveniently located with respect to both the street right-of-way and at least one building entrance (e.g., no farther away than the closest parking space). It should be incorporated whenever possible into building design and coordinated with the design of street furniture when it is provided. Street furniture includes benches, streetlights, planters and other pedestrian amenities.

D. Visibility and Security. Bicycle parking should be visible to cyclists from street sidewalks or building entrances, so that it provides sufficient security from theft and damage.

E. Options for Storage. Bicycle parking requirements for long-term and employee parking can be met by providing a bicycle storage room, bicycle lockers, racks, or other secure storage space inside or outside of the building.

F. Lighting. Bicycle parking shall be at least as well lit as vehicle parking for security.

G. Reserved Areas. Areas set aside for bicycle parking shall be clearly marked and reserved for bicycle parking only.

H. Hazards. Bicycle parking shall not impede or create a hazard to pedestrians. Parking areas shall be located so as to not conflict with vision clearance standards (Chapter 19.162 FMC, Access and Circulation). (Ord. 2-2017 § 1 (Exh. A); Ord. 6-2001 § 1)

Response: See preliminary site plan. 2 bicycle parking stalls are provided. Additional bicycle parking spaces can be located

inside the building as required.

CHAPTER 19.165

PUBLIC FACILITIES STANDARDS

19.165.010 Purpose and applicability.

A. Purpose. The purpose of this chapter is to provide planning and design standards for public and private transportation facilities and utilities. Streets are the most common public spaces, touching virtually every parcel of land. Therefore, one of the primary purposes of this chapter is to provide standards for attractive and safe streets that can accommodate vehicle traffic from planned growth, and provide a range of transportation options, including options for driving, walking, bus transit and bicycling. This chapter is also intended to implement the city's transportation system plan.

B. When Standards Apply. Unless otherwise provided, the standard specifications for construction, reconstruction or repair of transportation facilities, utilities and other public improvements within the city shall occur in accordance with the standards of this chapter. No development may occur unless the public facilities related to development comply with the public facility requirements established in this chapter. The street cross sections found in the Fairview transportation system plan may be modified to accommodate alternative stormwater management methods in accordance with the adopted stormwater design manual subject to the approval of the public works director. The public works director may require modification of the typical cross section to accommodate alternative stormwater management methods when associated with development proposals. Such modifications may be applied as conditions of development approval.

C. Standard Specifications. The city engineer shall establish standard construction specifications consistent with the design standards of this chapter and application of engineering principles. They are incorporated in this code by reference.

D. Conditions of Development Approval. No development may occur unless required public facilities are in place or guaranteed, in conformance with the provisions of this code. Improvements required as a condition of development approval that require a dedication of property for a public use, when not voluntarily accepted by the applicant, shall be roughly proportional to the impact of development. Findings in the development approval shall

indicate how the required improvements are roughly proportional to the impact of the proposed development on public facilities.

E. Rough Proportionality Report. Where the applicant objects to the imposition of any applicable development standard under this chapter that required a dedication of property for a public use, the applicant must provide a rough proportionality report justifying an alternative level of improvements including:

1. The estimated extent, on a quantitative basis, to which the improvements will be used by persons served by the building or development, whether the use is for safety or convenience;

2. The estimated level, on a quantitative basis, of improvements needed to meet the estimated extent of use by persons served by the building or development;

3. The estimated impact, on a quantitative basis, of the building or development on the public infrastructure system of which the improvements will be a part; and

4. The estimated level, on a quantitative basis, of improvements needed to mitigate the estimated impact on the public infrastructure system. (Ord. 2-2007 § 1(Exh. 1 § 1); Ord. 6-2001 § 1)

Response: This project fronts a Multnomah County roadway in Marine Drive. Therefore we have prepared a traffic analysis in accordance with their scoping requirements, and then we understand that the County will determine the required frontage improvements necessary.

19.165.020 Transportation standards.

Transportation standards are necessary so that the Fairview street system remains intact and well connected. Streets are critical to the connection of neighborhoods, businesses, schools, etc. It is important to regulate roadway sizes, locations and right-of-way dimensions.

The street standards are based directly on the Fairview transportation system plan. Traffic calming measures are addressed in the adopted transportation system plan. The city of Fairview has no formalized traffic-calming plan, but has recently adopted a speed hump management program. The street alignment illustrations used in the proposed code are taken directly from the transportation system plan. (Ord. 6-2001 § 1)

Response: There are no proposed private or public streets. The only

proposed transportation elements of this project impact Marine Drive, which is a Multnomah County roadway.

19.165.025 Transportation improvements.

A. Development Standards. No development shall occur unless the development has frontage or approved access to a public street, in conformance with the provisions of Chapter 19.162 FMC, Access and Circulation, and the following standards are met:

1. Streets within or adjacent to a development shall be improved in accordance with the transportation system plan and the provisions of this chapter;

2. Development of new streets, and additional street width or improvements planned as a portion of an existing street, shall be improved in accordance with this section, and public streets shall be dedicated to the applicable city, county or state jurisdiction;

3. New streets and drives connected to a collector or arterial street shall be paved; and

4. The city may accept a future improvement guarantee (e.g., owner agrees not to remonstrate (object) against the formation of a local improvement district in the future) in lieu of street improvements if one or more of the following conditions exist:

a. A partial improvement may create a potential safety hazard to motorists or pedestrians;

b. Due to the developed condition of adjacent properties it is unlikely that street improvements would be extended in the foreseeable future and the improvement associated with the project under review does not, by itself, provide increased street safety or capacity, or improved pedestrian circulation;

c. The improvement would be in conflict with an adopted capital improvement plan; or

d. The improvement is associated with an approved land partition on property zoned residential and the proposed land partition does not create any new streets.

B. Variances. Variances to the transportation design standards in this section may be granted by means of a Class B variance, as governed by Article V of this title, Exceptions to Code Standards. A variance may be granted under this provision only if a required improvement is not feasible due to topographic constraints or constraints posed by sensitive lands Chapter 19.106 FMC.

C. Creation of Rights-of-Way for Streets and Related Purposes. Streets shall be created through the approval and recording of a final subdivision or partition plat; except the city may approve the creation of a street by acceptance of a deed; provided, that the street is deemed essential by the city council for the purpose of implementing the transportation system plan, and the deeded right-of-way conforms to the standards of this code. All deeds of dedication shall be in a form prescribed by the city engineer and shall name "the public" as grantee.

D. Creation of Access Easements. The city may approve an access easement established by deed when the easement is necessary to provide for access and circulation in conformance with Chapter 19.162 FMC, Access and Circulation. Setback standards do not permit conflicting structures to be built in public easements.

E. Street Location, Width and Grade. Except as noted below, the location, width and grade of all streets shall conform to the transportation system plan, and an approved street plan or subdivision plat. Street location, width and grade shall be determined in relation to existing and planned streets, topographic conditions, public convenience and safety, and in appropriate relation to the proposed use of the land to be served by such streets:

1. Street grades shall be approved by the city engineer in accordance with the design standards in subsection O of this section; and

2. Where the location of a street is not shown in an existing street plan (see subsection H of this section), the location of streets in a development shall either:

a. Provide for the continuation and connection of existing streets in the surrounding areas, conforming to the street standards of this chapter, or

b. Conform to a street plan adopted by the planning commission, if it is impractical to connect with existing street patterns because of particular topographical or other existing conditions of the land. Such a plan shall be based on the type of land use to be served, the volume of traffic, the capacity of adjoining streets and the need for public convenience and safety.

F. Minimum Rights-of-Way and Street Sections. Street rights-of-way and improvements shall be the widths as required in the "Standards" section of the Fairview transportation system plan. A

variance shall be required to vary the standards found in the Fairview transportation system plan. Where a range of width is indicated, the width shall be determined by the decision-making authority based upon the following factors:

1. Street classification in the transportation system plan;

2. Anticipated traffic generation;

3. On-street parking needs;

4. Sidewalk and bikeway requirements based on anticipated level of use;

5. Requirements for placement of utilities;

6. Street lighting;

7. Minimize drainage, slope, and sensitive lands impacts, as identified by Chapter 19.106 FMC;

8. Street tree location, as provided for in Chapter 19.163 FMC;

9. Protection of significant vegetation, as provided for in Chapter 19.163 FMC;

10. Safety and comfort for motorists, bicyclists, and pedestrians;

11. Street furnishings (e.g., benches, lighting, bus shelters, etc.), when provided;

12. Access needs for emergency vehicles; and

13. Transition between different street widths (i.e., existing streets and new streets), as applicable.

G. Traffic Signals and Neighborhood Traffic Management.

1. Traffic management features, such as traffic circles, curb extensions, narrow residential streets, and special paving, may be used to slow traffic in neighborhoods and areas with high pedestrian traffic.

2. Traffic signals shall be required with development when traffic signal warrants are met, in conformance with the Highway Capacity Manual and Manual of Uniform Traffic Control Devices. The location of traffic signals shall be noted on approved street plans. Where a proposed street intersection will result in an immediate need for a traffic signal, a signal meeting approved specifications shall be installed. The developer's cost and the timing of improvements shall be included as a condition of development approval.

3. Preferred neighborhood traffic management tools are detailed in the Fairview transportation system plan.

H. Future Street Plan and Extension of Streets.

1. A future street plan shall be filed by the applicant in conjunction with an application for a subdivision in order to facilitate orderly development of the street system. The plan shall show the pattern of existing and proposed future streets from the boundaries of the proposed land division and shall include other parcels within 500 feet surrounding and adjacent to the proposed land division. The street plan is not binding; rather it is intended to show potential future street extensions with future development.

2. Streets shall be extended to the boundary lines of the parcel or tract to be developed, when the city council determines that the extension is necessary to give street access to, or permit a satisfactory future division of, adjoining land. The point where the streets temporarily end shall conform to subsections (H)(2)(a) through (d) of this section:

a. These extended streets or street stubs to adjoining properties are not considered to be cul-de-sacs since they are intended to continue as through streets when the adjoining property is developed.

b. A barricade (e.g., fence, bollards, boulders or similar vehicle barrier) shall be constructed at the end of the street by the subdivider and shall not be removed until authorized by the city or other applicable agency with jurisdiction over the street. The cost of the barricade shall be included in the street construction cost.

c. Temporary turnarounds (e.g., hammerhead or bulb-shaped configuration) shall be constructed for stub streets over 150 feet in length.

d. In the case of dead-end stub streets that will connect to streets on adjacent sites in the future, notification that the street is planned for future extension shall be posted on the stub street until the street is extended and shall inform the public that the dead-end street may be extended in the future.

I. Street Alignment and Connections.

1. Mixed-use and residential development proposed on sites five acres or greater must submit a site plan that identifies conceptual street connections that are consistent with the transportation system plan.

2. Staggering of streets making "T" intersections at collectors and arterials shall not be designed so that jogs of less than 300 feet on such streets are created, as measured from the centerline of the street.

3. Spacing between local street intersections shall have a minimum separation of 125 feet, except where more closely spaced intersections are designed to provide an open space, pocket park, common area or similar neighborhood amenity. This standard applies to four-way and three-way (offset) intersections.

4. All local and collector streets which abut a development site shall be extended within the site to provide through circulation unless the applicant demonstrates that extension is prevented by environmental or topographical constraints, existing development patterns or compliance with other standards in this code. This exception applies when it is not possible to redesign or reconfigure the street pattern to provide required extensions. Land is considered topographically constrained if the slope is greater than 15 percent for a distance of 250 feet or more. In the case of environmental or topographical constraints, the mere presence of a constraint is not sufficient to show that a street connection is not possible. The applicant must show why the environmental or topographic constraint precludes some reasonable street connection.

5. Proposed streets or street extensions shall be located to provide direct access to existing or planned commercial services and other neighborhood facilities, such as schools, shopping areas and parks and transit facilities.

6. In order to promote efficient vehicular and pedestrian circulation throughout the city, the design of subdivisions and alignment of new streets shall conform to the following standards in Chapter 19.162 FMC, Access and Circulation. The maximum block length shall not exceed:

a. Five hundred thirty feet in the residential district;

b. Two hundred feet in the town center commercial district, except as provided by FMC 19.65.050, Block layout and building orientation;

c. Not applicable to the general industrial district;

d. Seven hundred feet in the light industrial district, except as required for commercial developments subject to Chapter 19.80 FMC;

e. Three hundred feet in the corridor commercial district;

f. Three hundred feet in the neighborhood commercial district.

7. A variance to street spacing standards may be granted pursuant to FMC 19.520.030 (Class B variances) when resources are present that are mapped on the Natural Resources Map, where street spacing can be achieved at a minimum of 800 feet and no greater than 1,200 feet.

8. Exceptions to the standards in this subsection may be granted when:

a. Habitat quality or the length of the crossing required prevents a full street connection, pursuant to Chapter 19.106 FMC;

b. An access way is provided at or near midblock, in conformance with the provisions of Chapter 19.162 FMC.

J. Sidewalks, Planter Strips, Bicycle Lanes. Sidewalks, planter strips, and bicycle lanes shall be installed in conformance with applicable provisions of the transportation system plan, the Comprehensive Plan, and adopted street plans. Maintenance of sidewalks, curbs, and planter strips is the continuing obligation of the adjacent property owner. All work must comply with the city of Fairview public works construction standards.

K. Internal Pathways. Pathways shall be at least five feet in unobstructed width and shall be constructed to sidewalk standards found in Standard Specifications for Public Works Construction, or according to Multnomah County or ODOT standards as applicable. The property owner shall keep a minimum of five feet of the pathway width clear of both permanent and temporary obstructions (e.g., utility poles, sandwich signs). Maintenance of internal pathways is the continuing obligation of the property owner or adjacent property owner. All work must comply with the city of Fairview public works construction standards.

L. Intersection Angles. Streets shall be laid out so as to intersect at an angle as near to a right angle as practicable, except where topography requires a lesser angle or where a reduced angle is necessary to provide an open space, pocket park, common area or similar neighborhood amenity. In addition, the following standards shall apply:

1. Streets shall have at least 25 feet of tangent adjacent to the right-of-way intersection unless topography requires a lesser distance;

2. Intersections which are not at right angles shall have a minimum corner radius of 20 feet along the right-of-way lines of the acute angle; and

3. Right-of-way lines at intersection with arterial streets shall have a corner radius of not less than 20 feet.

M. Existing Rights-of-Way. Whenever existing rights-of-way adjacent to or within a tract are of less than standard width, additional rights-of-way shall be provided at the time of subdivision or development, subject to the provision of FMC 19.165.025 (C).

N. Cul-de-Sacs. A dead-end street shall be no more than 200 feet long, shall not provide access to greater than eight dwelling units, and shall only be used when environmental or topographical constraints, existing development patterns, or compliance with other standards in this code preclude street extension and through circulation:

1. All cul-de-sacs shall terminate with a circular turnaround. Circular turnarounds shall have a radius of no less than 25 feet, and not more than a radius of 40 feet (i.e., from center to edge of pavement); except that turnarounds may be larger when they contain a landscaped island or parking bay in their center. When an island or parking bay is provided, there shall be a fire apparatus lane of 20 feet in width; and

2. The length of the cul-de-sac shall be measured along the centerline of the roadway from the near side of the intersecting street to the farthest point of the cul-de-sac.

O. Grades and Curves. Grades shall not exceed 10 percent on arterials, 12 percent on collector streets, or 12 percent on any other street (except that local or residential access streets may have segments with grades up to 15 percent for distances of no greater than 250 feet), and:

1. Centerline curve radii shall not be less than 700 feet on arterials, 500 feet on major collectors, 350 feet on minor collectors, or 100 feet on other streets; and

2. Streets intersecting with a minor collector or greater functional classification street, or streets intended to be posted with a stop sign or signalization, shall provide a landing averaging five percent

or less. Landings are that portion of the street within 20 feet of the edge of the intersecting street at full improvement.

P. Curbs, Curb Cuts, Ramps, and Driveway Approaches. Concrete curbs, curb cuts, wheelchair, bicycle ramps and driveway approaches shall be constructed in accordance with standards specified in Chapter 19.162 FMC, Access and Circulation.

Q. Streets Adjacent to Railroad Right-of-Way. Wherever the proposed development contains or is adjacent to a railroad right-of-way, a street approximately parallel to and on each side of such right-of-way at a distance suitable for the appropriate use of the land shall be created. New railroad crossings and modifications to existing crossings are subject to review and approval by Oregon Department of Transportation.

R. Development Adjoining Arterial Streets. Where a development adjoins or is crossed by an existing or proposed arterial street, the development design shall separate residential access and through traffic, and shall minimize traffic conflicts. The design shall include one or more of the following:

1. A parallel access street along the arterial with a landscape buffer separating the two streets;

2. Deep lots abutting the arterial or major collector to provide adequate buffering with frontage along another street. Double-frontage lots shall conform to the buffering standards in FMC 19.163.030;

3. Screen planting at the rear or side property line to be contained in a non-access reservation (e.g., public easement or tract) along the arterial;

4. Other treatment suitable to meet the objectives of this subsection; or

5. If a lot has access to two streets with different classifications, primary access shall be from the lower classification street, in conformance with Chapter 19.162 FMC.

S. Alleys, Public or Private. Alleys shall conform to the standards in the Fairview transportation system plan. While alley intersections and sharp changes in alignment shall be avoided, the corners of necessary alley intersections shall have a radius of not less than 12 feet.

T. Private Streets. Private streets shall not be used to avoid connections with public streets. Gated communities (i.e., where a gate limits access to a development from a public street) are prohibited. Design standards for private streets shall conform to the provisions of the Fairview transportation system plan.

U. Street Names. No street name shall be used which will duplicate or be confused with the names of existing streets in Multnomah County, except for extensions of existing streets. Street names, signs and numbers shall conform to the established pattern in the surrounding area, except as requested by emergency service providers.

V. Survey Monuments. Upon completion of a street improvement and prior to acceptance by the city, it shall be the responsibility of the developer's registered professional land surveyor to provide certification to the city that all boundary and interior monuments shall be reestablished and protected.

W. Street Signs. The city, county or state with jurisdiction shall install all signs for traffic control and street names. The cost of signs required for new development shall be the responsibility of the developer. Street name signs shall be installed at all street intersections. Stop signs and other signs may be required.

X. Mail Boxes. Plans for mail boxes to be used shall be approved by the United States Postal Service.

Y. Streetlight Standards. Streetlights shall be installed in accordance with city standards.

Z. Street Cross-Sections. All street cross-sections must comply with the Standard Specifications for Public Works Construction pages 40-51. The final lift of asphalt or concrete pavement shall be placed on all new constructed public roadways prior to final city acceptance of the roadway and within one year of the conditional acceptance of the roadway unless otherwise approved by the city engineer. The final lift shall also be placed no later than when 90 percent of the structures in the new development are completed or one year from the commencement of initial construction of the development, whichever is less. All work must comply with public works construction standards.

1. Sub-base and leveling course shall be of select crushed rock;

2. Surface material shall be of Class C or B asphaltic concrete;

3. The final lift shall be Class C asphaltic concrete as defined by APWA standard specifications; and

4. No lift shall be less than one and one-half inches in thickness. (Ord. 2-2017 § 1 (Exh. A); Ord. 3-2012 § 6; Ord. 6-2001 § 1)

Response: Transportation improvements, if required, will be accomplished in accordance with this section.

19.165.030 Public use areas.

Public use areas implement Comprehensive Plan policies that may require a developer to reserve a piece of land for future park and open space to serve the residents of the new development. Specific issues to consider include the amount of time the city has to purchase parkland and whether dedication of park land should count as a credit towards SDCs.

A. Dedication Requirements.

1. Where a proposed park, playground or other public use shown in a plan adopted by the city is located in whole or in part in a subdivision, the city may require the dedication or reservation of this area on the final plat for the subdivision.

2. If determined by the planning commission to be in the public interest in accordance with adopted Comprehensive Plan policies, and where an adopted plan of the city does not indicate proposed public use areas, the city may require the dedication or reservation of areas within the subdivision of a character, extent and location suitable for the development of parks and other public uses.

3. All required dedications of public use areas shall conform to FMC 19.430.150(D), Conditions of approval.

B. Acquisition by Public Agency. If the developer is required to reserve land area for a park or playground, the land shall be acquired by the appropriate public agency within 12 months following final plat approval, at a price agreed upon prior to approval of the plat, or the reservation shall be released to the property owner.

C. System Development Charge Credit. Dedication of land to the city for public use areas shall be eligible as a credit toward any required system development charge for parks. (Ord. 6-2001 § 1)

Response: Not applicable, there are no public use areas proposed associated with this project.

19.165.040 Sanitary sewer and water service improvements.

The sanitary sewer and water service improvements ensure adequate sanitary sewer services to new developments.

A. Sewers and Water Mains Required. Sanitary sewers and water mains shall be installed to serve each new development and to connect developments to existing mains in accordance with the city's construction specifications and the applicable Comprehensive Plan policies.

B. Sewer and Water Plan Approval. Development permits for sewer and water improvements shall not be issued until the city engineer has approved all sanitary sewer and water plans in conformance with city standards.

C. Oversizing. Proposed sewer and water systems shall be sized to accommodate additional development within the area as projected by the Comprehensive Plan. The developer shall be entitled to system development charge credits for the oversizing.

D. Permits Denied. Development permits may be restricted by the city where a deficiency exists in the existing water or sewer system which cannot be rectified by the development and which if not rectified will result in a threat to public health or safety, surcharging of existing mains, or violations of state or federal standards pertaining to operation of domestic water and sewerage treatment systems. Building moratoriums shall conform to the criteria and procedures contained in ORS 197.505 to 197.520. (Ord. 6-2001 § 1)

Response: See preliminary utility plan. This project proposes to connect to the existing 12" water main in Marine Drive with a domestic water line and an irrigation water line, both of these will have backflow preventers, as required. Sewer service stubs will connect from the proposed office and proposed scale house to an existing manhole which flows to a pump station that is serviced by City of Fairview. We understand that City of Fairview will work on their existing pump station to prepare it and to provide sewer service to this property.

19.165.050 Storm drainage.

The storm drainage section requires developers to accommodate and treat stormwater runoff from buildings and parking lots.

A. General Provisions. The city shall issue a development permit only where adequate provisions for stormwater and flood water runoff have been made.

B. Accommodation of Upstream Drainage. Culverts and other drainage facilities shall be large enough to accommodate potential runoff from the entire upstream drainage area, whether inside or outside the development. Such facilities shall be subject to review and approval by the city engineer.

C. Effect on Downstream Drainage. Where it is anticipated by the city engineer that the additional runoff resulting from the development will overload an existing drainage facility, the city may deny approval of the development permit unless provisions have been made for improvement of the potential condition or until provisions have been made for storage of additional runoff caused by the development in accordance with city standards.

D. Easements. Where a development is traversed by a watercourse, drainage way, channel or stream, there shall be provided a stormwater easement or drainage right-of-way conforming substantially with the lines of such watercourse and such further width as will be adequate for conveyance and maintenance. (Ord. 6-2001 § 1)

Response: See preliminary grading plan. This plan includes stormwater facilities for collection, conveyance, and water quality, prior to conveyance to an outfall at Salmon Creek and the Multnomah County Drainage District.

19.165.060 Utilities.

The utilities section provides standards regarding electric lines and cable. Many types of utilities now must be installed underground for safety and aesthetic purposes.

A. Underground Utilities. All utility lines including, but not limited to, those required for electric, communication, lighting and cable television services and related facilities shall be placed underground, except for surface-mounted transformers, surface-mounted connection boxes and meter cabinets which may be placed above ground, temporary utility service facilities during construction, and high capacity electric lines operating at 50,000 volts or above. The following additional standards apply to all new subdivisions, in order to facilitate underground placement of utilities:

1. The developer shall make all necessary arrangements with the serving utility to provide the underground services. Care shall be taken to ensure that all above ground equipment does not obstruct vision clearance areas for vehicular traffic;

2. The city reserves the right to approve the location of all surface-mounted facilities;

3. All underground utilities, including sanitary sewers and storm drains installed in streets by the developer, shall be constructed prior to the surfacing of the streets; and

4. Stubs for service connections shall be long enough to avoid disturbing the street improvements when service connections are made.

B. Easements. Easements shall be provided for all underground utility facilities.

C. Exception to Undergrounding Requirement. The standard applies only to proposed subdivisions. An exception to the undergrounding requirement may be granted due to physical constraints, such as steep topography, sensitive lands, Chapter 19.106 FMC, or existing development conditions. (Ord. 3-2012 § 6; Ord. 6-2001 § 1)

Response: It is not required to underground utilities since this is not a subdivision.

19.165.070 Easements.

The easements section provisions reserve adequate space for utilities.

Easements for sewers, storm drainage and water quality facilities, water mains, electric lines or other public utilities shall be dedicated on a final plat, or provided for in the deed restrictions. See also, Chapter 19.420 FMC, Development Review and Site Design Review and Chapter 19.430, Land Divisions and Lot Line Adjustments. The developer or applicant shall make arrangements with the city, the applicable district and each utility franchise for the provision and dedication of utility easements necessary to provide full services to the development. The city's standard width for public main line utility easements shall be 20 feet unless otherwise specified by the utility company, applicable district, or city engineer. (Ord. 6-2001 § 1)

Response: Easements will be provided as required.

19.165.080 Construction plan approval and assurances.

The construction plan approval portion ensures the completion of a development by a builder.

No public improvements, including sanitary sewers, storm sewers, streets, sidewalks, curbs, lighting, parks, or other requirements, shall be undertaken except after the plans have been approved by the city, permit fee paid, and permit issued. The permit fee is required to defray the cost and expenses incurred by the city for construction and other services in connection with the improvement. The permit fee shall be set by the city council. The city may require the developer or subdivider to provide bonding or other performance guarantees to ensure completion of required public improvements. (Ord. 6-2001 § 1)

Response: Permits will be acquired and permit fees paid, as required by the City of Fairview and Multnomah County Drainage District.

19.165.090 Installation.

A. Conformance Required. Improvements installed by the developer either as a requirement of these regulations or at his/her own option, shall conform to the requirements of this chapter, approved construction plans, and to improvement standards and specifications adopted by the city.

B. Adopted Installation Standards. The Standard Specifications for Public Works Construction, Oregon Chapter APWA shall be a part of the city's adopted installation standard(s); other standards may also be required upon recommendation of the city engineer.

C. Commencement. Work shall not begin until the city has been notified in advance.

D. Resumption. If work is discontinued for more than one month, it shall not be resumed until the city is notified.

E. City Inspection. Improvements shall be constructed under the inspection and to the satisfaction of the city. The city may require minor changes in typical sections and details if unusual conditions arising during construction warrant such changes in the public interest. Modifications requested by the developer shall be subject to land use review under Chapter 19.415 FMC, Modifications to Approved Plans and Conditions of Approval. Any monuments that are disturbed before all improvements are completed by the subdivider shall be replaced prior to final acceptance of the improvements.

F. Engineer's Certification and As-Built Plans. A registered civil engineer shall provide written certification in a form required by the city that all improvements, workmanship and materials are in accord with current and standard engineering and construction practices, conform to approved plans and conditions of approval, and are of high grade, prior to city acceptance of the public improvements, or any portion thereof, for operation and maintenance. The developer's engineer shall also provide three sets (one mylar, one electronic, one paper copy) of "as-built" plans, in conformance with the city engineer's specifications, for permanent filing with the city. (Ord. 6-2009 § 4; Ord. 6-2001 § 1)

Response: Construction and installation completed in accordance with the City's standards and other standards and requirements listed in this section.

CHAPTER 19.400

ADMINISTRATION OF LAND USE REVIEW

19.400.010 Introduction.

This article specifies application requirements and procedures for obtaining land use permits required for development within the city of Fairview. Table 19.413.050 provides permit and decision-making requirements for land use permit applications. (Ord. 1-2012 § 1; Ord. 6-2009 § 2 (Att. 1))

19.400.020 Decision-making authority.

This article shall be administered by the community development director or designee. (Ord. 1-2012 § 1; Ord. 6-2009 § 2 (Att. 1))

19.400.030 Time limit on land use decisions for approval.

Unless otherwise specified in the decision or elsewhere in this title, an approved land use decision shall expire two years from date of final decision. (Ord. 1-2012 § 1)

Response: It is understood that this project will require land use review, and the decision-making authority and time limits.

CHAPTER 19.413.030

TYPE III PROCEDURES

19.413.030 Type III procedure (quasi-judicial).

Type III decisions are made by the planning commission after a public hearing. Appeals of Type III decisions are reviewed and decided by the city council.

A. Public Notification. Notice of the public hearing shall be mailed to the property owner and applicant, if different, and to all property owners within 250 feet of the outer boundaries of the site, not less than 20 days prior to the date of the hearing. Notice must also be provided in a public news paper at least 20 days prior to the hearing date. In addition, a sign indicating the date of the public hearing, shall be posted on the subject property not less than 10 days prior to the date of the hearing. Notice must also be provided at least 20 days prior to the scheduled hearing to any neighborhood or community organization recognized by the city whose boundaries include the subject property.

B. Content of Public Notices. The mailed and published notices shall be consistent with ORS 197.763 and include the following information:

1. The file number and city contact information.

2. A description of the location of the proposal that effectively and clearly describes the location of the geographic area.

3. An explanation of the nature of the application and the proposed use or uses which could be authorized.

4. A list of the applicable criteria from the ordinance that apply to the application at issue.

5. The time(s), place(s), and date(s) of the public hearing(s).

6. A statement that public oral or written testimony is invited.

7. A statement that the failure of an issue to be raised in a hearing, in person, or by letter or failure to provide statements or evidence sufficient to afford the decision maker an opportunity to respond to the issue precludes appeal on the issue.

8. A statement that a copy of the staff report will be available for inspection at no cost and a copy will be provided as a reasonable cost at least seven days before the hearing.

C. Public Hearing. The planning commission conducts a public hearing and renders a decision on the matter including findings, conclusions, and conditions, if necessary, consistent with FMC 19.412.070.

D. Notice of Decision. Written notice of a Type III decision shall be mailed to the applicant and to all participants of record within five business days after the hearings body decision. Failure of any person to receive mailed notice shall not invalidate the decision; provided, that a good faith attempt was made to mail the notice. The notice of decision shall include the following:

1. The file number and city contact information.

2. Description of the property, including the street address or other easily understandable reference to the location of the site.

3. All approval criteria and findings and conclusions in support of the decision adopted by the planning commission.

4. Decision made by the planning commission and conditions in support of the decision adopted by the planning commission.

5. Appeal process and deadline.

6. List of applicable criteria used to decide the application. (Ord. 6-2009 § 2 (Att. 1))

Response: It is understood that this project will require a Type III decision, and will require public notice and hearing prior to decision. It is also understood that there is an appeal process.

19.424.010 Procedure.

Site design review shall be conducted as a Type III procedure, as specified in FMC 19.424.020, using the procedures in Chapter 19.410 FMC, and using the approval criteria contained in Chapter 19.426 FMC. (Ord. 6-2001 § 1)

19.424.020 Determination of Type II and Type III applications.

Applications for site design review shall be subject to Type II or Type III review, based on the following criteria:

A. Residential buildings with three or fewer dwelling units shall be reviewed as a Type II application, except when development review is allowed under Chapter 19.423 FMC. Residential buildings with greater than three units shall be reviewed as a Type III application.

B. Commercial, industrial, public/semi-public, and institutional buildings with 5,000 square feet of gross floor area or smaller shall be reviewed as a Type II application, except when development review is allowed under Chapter 19.423 FMC. Commercial, industrial, public/semi-public, and institutional buildings with greater than

5,000 square feet of gross floor area shall be reviewed as a Type III application.

C. Developments with more than one building (e.g., two duplex buildings or an industrial building with accessory workshop) shall be reviewed as Type III applications, notwithstanding the provisions contained in subsections A and B of this section.

D. Developments with 25 or fewer off-street vehicle parking spaces shall be reviewed as Type II applications, and those with more than 25 off-street vehicle parking spaces shall be reviewed as Type III applications, notwithstanding the provisions contained in subsections A through C and E and F of this section.

E. Developments involving the clearing and/or grading of 10 acres or a larger area shall be reviewed as Type III applications, notwithstanding the provisions contained in subsections A through D and F of this section.

F. All developments in designated sensitive lands and historic overlay districts shall be reviewed as Type III applications. (Ord. 6-2001 § 1)

19.425.001 Site design review – Application submission requirements.

All of the following information is required for site design review application submittal. (Ord. 6-2001 § 1)

19.425.010 General submission requirements.

The applicant shall submit an application containing all of the general information required by FMC 19.413.020 (Type II Application) or FMC 19.413.030 (Type III Application), as applicable. The type of application shall be determined in accordance with FMC 19.424.020. (Ord. 6-2009 § 4; Ord. 6-2001 § 1)

Response: A Type III determination is required for this project.

19.425.020 Site design review information.

An application for site design review shall include the following information, as deemed applicable by the city administrator or designee:

A. Site Analysis Map. At a minimum the site map shall contain the following:

1. The applicant's entire property and the surrounding property to a distance sufficient to determine the location of the development in

the city, and the relationship between the proposed development site and adjacent property and development. The property boundaries, dimensions and gross area shall be identified;

2. Topographic contour lines at intervals determined by the city;

3. Identification of slopes greater than 25 percent;

4. The location and width of all public and private streets, drives, sidewalks, pathways, rights-of-way, and easements on the site and adjoining the site;

5. Potential natural hazard areas, including any areas identified as subject to a 100-year flood, areas subject to high water table, and areas mapped by the city, county, or state as having a potential for geologic hazards;

6. Resource areas, including marsh and wetland areas, streams, wildlife habitat identified by the city or any natural resource regulatory agencies as requiring protection;

7. Site features, including existing structures, pavement, large rock outcroppings, areas having unique views, and drainage ways, canals and ditches;

8. Locally or federally designated historic and cultural resources on the site and adjacent parcels or lots;

9. The location, size and species of trees and other vegetation having a caliper (diameter) of six inches or greater at four feet above grade;

10. North arrow, scale, names and addresses of all persons listed as owners on the most recently recorded deed;

11. Name and address of project designer, engineer, surveyor, and/or planner, if applicable;

12. Other information, as determined by the city. The city may require studies or exhibits prepared by qualified professionals to address specific site features.

Response: See application materials and preliminary plans.

B. Proposed Site Plan. The site plan shall contain the following information, if applicable:

1. The proposed development site, including boundaries, dimensions, and gross area;

2. Features identified on the existing site analysis map which are proposed to remain on the site;

3. Features identified on the existing site map, if any, which are proposed to be removed or modified by the development;

4. The location and dimensions of all proposed public and private streets, drives, rights-of-way, and easements;

5. The location and dimensions of all existing and proposed structures, utilities, pavement and other improvements on the site. Setback dimensions for all existing and proposed buildings shall be provided on the site plan;

6. The location and dimensions of entrances and exits to the site for vehicular, pedestrian, and bicycle access;

7. The location and dimensions of all parking and vehicle circulation areas (show striping for parking stalls and wheel stops, as applicable);

8. Pedestrian and bicycle circulation areas, including sidewalks, internal pathways, pathway connections to adjacent properties, and any bicycle lanes or trails;

9. Loading and service areas for waste disposal, loading and delivery;

10. Outdoor recreation spaces, common areas, plazas, outdoor seating, street furniture, and similar improvements, as applicable;

11. Location, type, and height of outdoor lighting;

12. Location of mail boxes, if known;

13. Name and address of project designer, if applicable;

14. Location of bus stops and other public or private transportation facilities;

15. Locations, sizes, and types of signs;

16. Other information, determined by the city. The city may require studies or exhibits prepared by qualified professionals to address specific site features (e.g., traffic, noise, environmental features, natural hazards, etc.), in conformance with this code.

Response: See application materials and preliminary plans.

C. Architectural Drawings. Architectural drawings shall be submitted showing:

1. Building elevations (as determined by the city with building height and width dimensions;

2. Building materials, color and type;

3. The name of the architect or designer.

Response: See application materials and preliminary architectural plans.

D. Preliminary Grading Plan. A preliminary grading plan prepared by a registered engineer shall be required for developments which would result in the grading (cut or fill) of 1,000 cubic yards or greater. The preliminary grading plan shall show the location and extent to which grading will take place, indicating general changes to contour lines, slope ratios, slope stabilization proposals, and location and height of retaining walls, if proposed. Surface water detention and treatment plans may also be required.

Response: A preliminary grading plan is included with this application.

E. Landscape Plan. A landscape plan is required and shall show the following:

1. The location and height of existing and proposed fences and other buffering or screening materials;

2. The location of existing and proposed terraces, retaining walls, decks, patios, shelters, and play areas;

3. The location, size, and species of the existing and proposed plant materials (at time of planting);

4. Existing and proposed building and pavement outlines;

5. Specifications for soil at time of planting, irrigation if plantings are not drought-tolerant (may be automatic or other approved method of irrigation) and anticipated planting schedule;

6. Other information as deemed appropriate by the city. An arborist's report may be required for sites with mature trees that are protected under this code;

7. Sign drawings shall be required in conformance with the city's sign code;

8. Copies of all existing and proposed restrictions or covenants;

9. Letter or narrative report documenting compliance with the applicable approval criteria contained in Chapter 19.426 FMC. (Ord. 6-2001 § 1)

Response: A preliminary landscape plan is included with this application

19.426.001 Site design review approval criteria.

The review authority shall make written findings with respect to all of the following criteria when approving, approving with conditions, or denying an application. (Ord. 6-2001 § 1)

19.426.010 Complete application.

The application must be complete, as determined in accordance with FMC 19.412.050, on types of applications, and Chapter 19.425 FMC. (Ord. 6-2009 § 4; Ord. 6-2001 § 1)

19.426.020 Compliance with land use district provisions.

The application complies with all of the applicable provisions of the underlying land use district, including: building and yard setbacks, lot area and dimensions, density and floor area, lot coverage, building height, building orientation, architecture, and other special standards as may be required for certain land uses. (Ord. 6-2001 § 1)

19.426.030 Upgrade existing development.

The applicant shall be required to upgrade any existing development that does not comply with the applicable land use district standards, in conformance with Chapter 19.530 FMC, Nonconforming Uses and Development. (Ord. 6-2001 § 1)

19.426.040 Compliance with design standards.

The application complies with the design standards contained in Article III of this title. All of the following standards shall be met:

A. Chapter 19.162 FMC – Access and Circulation;

B. Chapter 19.163 FMC – Landscaping, Street Trees, Fences and Walls;

C. Chapter 19.164 FMC – Automobile and Bicycle Parking;

D. Chapter 19.165 FMC – Public Facilities Standards;

E. Other standards (telecommunications facilities, solid waste storage, environmental performance, signs), as applicable. (Ord. 6-2001 § 1)

19.426.050 Conditions.

All conditions required as part of an approval shall be met. (Ord. 6-2001 § 1)

19.426.060 Exceptions.

Exceptions to criteria in FMC 19.426.040(A) through (E) may be granted only when approved as a variance. (Ord. 6-2001 § 1)

Response: It is understood that there are site design review approval criteria and design standards which shall be met with our application.

CHAPTER 19.440

CONDITIONAL USE PERMITS

19.440.400 Criteria, standards and conditions of approval.

A. Use Criteria.

1. The site size, dimensions, location, topography and access are adequate for the needs of the proposed use, considering the proposed building mass, parking, traffic, noise, vibration, exhaust/emissions, light, glare, erosion, odor, dust, visibility, safety, and aesthetic considerations;

Response: The dimensions of the site and the size of the site will provide the adequate needs of the proposed use. The applicant is proposing an access that will provide the necessary queueing for the intended use and the site will provide the necessary area to provide sufficient room and safety for a picking up landscape material or dropping off yard debris. The proposed building will be small and will have no effect on the size of the site. The emissions, traffic, noise, vibration, light, and glare will be consistent with the current All Wood Recycling Use across NE Marine Drive. The applicant is familiar with dust control with this type of use, they have this type of use across NE Marine Drive and will have water trucks and on-site piping to maintain dust control on the proposed development.

2. The negative impacts of the proposed use on adjacent properties and on the public can be mitigated through application of other code standards, or other reasonable conditions of approval; and

3. All required public facilities have adequate capacity to serve the proposal.

Response: There is adequate capacity to serve the site and the use will have no negative impact on adjacent properties or the public.

III. CONCLUSION

The site layout provides safe and efficient ingress and egress from NE Marine Drive and meets City of Fairview development and design standards. The site does provide landscaping to meet the City standard.

As demonstrated by the responses provided in this narrative and the supporting exhibits and the attached preliminary site plan set (including landscaping and building floor plans), the applicant does meet all provisions applicable to the Site Design Review Type III requirements and hereby requests approval of the proposed preliminary site plan.

Exhibit B1

AWR Site Plan

Located in the SE 1/4 & SW 1/4 of Section 22, T1N, R3E, W.M.
Fairview, Oregon

Linetype Legend
Extg Sanitary Sewer Pipe
Extg Storm Sewer Pipe
Extg Water Pipe
Extg Cable Tv Line
Extg Electric Line
Extg Gas Line
Extg Irrigation Line
Extg Telephone Line
Existing Centerline
Existing Curb
Existing Lot Line
Existing Gravel road
Existing Right-of-way
Existing Fence
Existing Property Line
Existing Utility Easement
Existing Contour
Proposed Sanitary Sewer Pipe
Proposed Storm Rain Drain
Proposed Storm Pipe
Proposed Irrigation Pipe
Proposed Irrigation Lateral
Proposed Water Lateral
Proposed Water Pipe
Proposed Lot Line
Proposed Centerline
Proposed Right-of-way
Proposed Sawcut Line
Proposed Easement
Proposed Curb & Gutter
Proposed Edge Of Pav't
Proposed Sidewalk
Proposed Property Line
Proposed Contour

Symbol Legend
Existing Water Valve
Existing Fire Hydrant
Existing Power Pole
Existing Water Meter
Existing Electrical Pedestal
Existing Sanitary Manhole
Existing Storm Manhole
Existing Catch Basin
Existing Type 2 Catch Basin
Existing Area Drain
Existing Telephone Pad
Existing Cleanout
Proposed Catch Basin
Proposed Type 2 Catch Basin
Proposed Area Drain
Proposed Storm Cleanout
Proposed Storm Manhole
Proposed Sanitary Cleanout
Proposed Sanitary Manhole
Proposed Water Meter
Proposed Water Backflow Device
Proposed Water Valve
Proposed Water Bend Tee W/valve
Proposed Water Bend Tee W/tb
Proposed 2" Blow Off Assembly
Proposed Water Bend W/tb
Proposed Fire Hydrant
Proposed Irrigation Meter
Proposed Street Luminaire
Proposed Electrical Vault
Proposed On-Site Luminaire
Proposed Electrical Pedestal

Legend
Proposed Asphalt Concrete
Proposed Building
Proposed Concrete
Proposed Landscaping

Scale 1" = 40'

40 20 0 40

VICINITY MAP
NOT TO SCALE

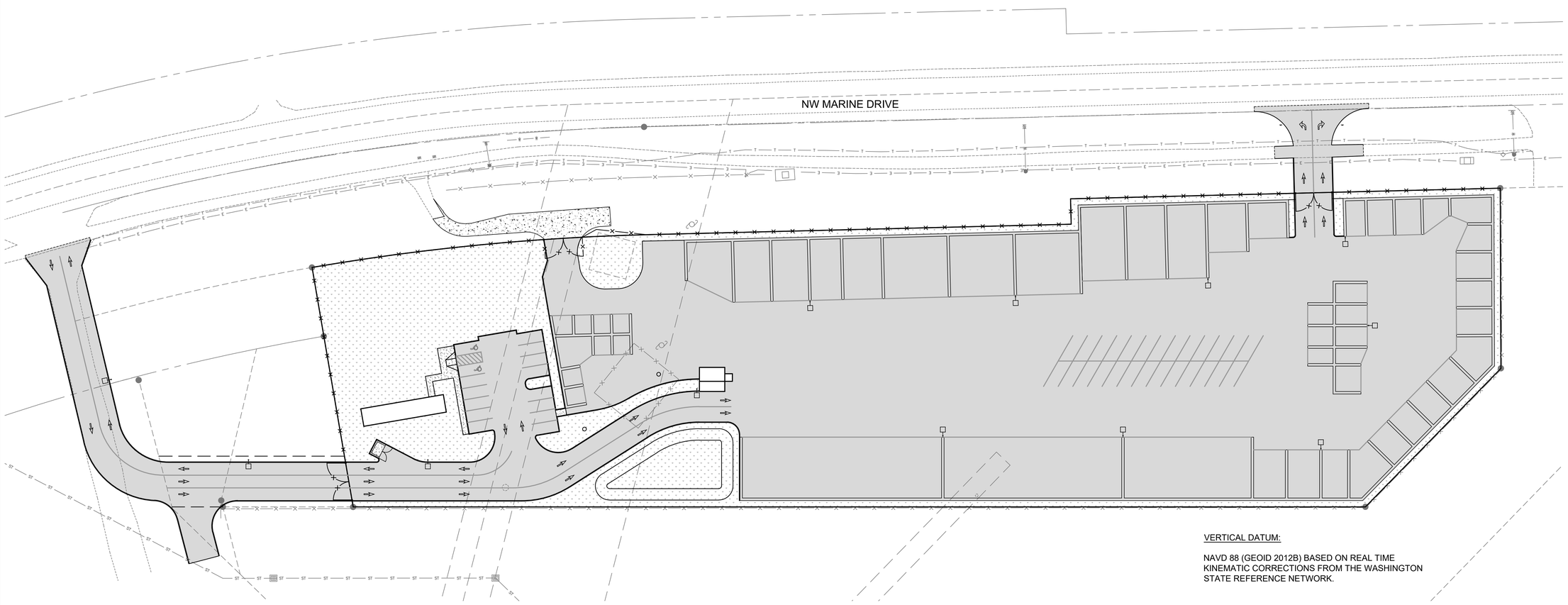
CONTACT INFO:

Property Owner / Project Contact:
MRW Properties LLC
PO Box 115
Fairview, OR 97024
PH: (360) 921-4528
Email: markwubben.awr@gmail.com

Planning / Engineering Contact:
PLS Engineering
Travis Johnson, PE
2008 C Street
Vancouver, WA 98663
PH: (360) 944-6519
Fax: (360) 944-6539
Email: travis@plsengineering.com

SHEET INDEX

C1.	Cover Sheet
C2.	Existing Conditions Plan
C3.	Site Plan
C4.	Grading and Drainage Plan
C5.	Utility Plan
C6.	Stormwater Details & Notes
C7.	Water Details & Notes
C8.	Sewer Details & Notes
C9.	Stormwater Facility Plan
C10.	Miscellaneous Details
C11.	Standard Details & Notes
D1.	Erosion Cover Sheet
D2.	Erosion & Sediment Control Notes
D3.	Erosion Control Plan
D4.	Erosion Control Details
L1.	Landscape Plan



VERTICAL DATUM:

NAVD 88 (GEOID 2012B) BASED ON REAL TIME KINEMATIC CORRECTIONS FROM THE WASHINGTON STATE REFERENCE NETWORK.

PLS ENGINEERING
2008 C Street, Vancouver, WA 98663 | PH (360) 944-6519 | Fax (360) 944-6539
Consulting Engineers & Planners

Cover Sheet For:
AWR Site Plan
A Site Located In Fairview, Oregon

Revisions

A	5/14/2018	1st Submittal
B		
1		
2		
3		
4		

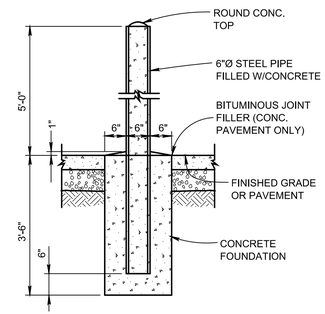
REGISTERED PROFESSIONAL ENGINEER
74948
OREGON
SEPT. 14, 2001
DAVID GLEN SPENCER
5/14/18
RENEWS: 06/30/2018

Project No. 2761

SCALE:	H: 1" = 40' V: N/A
DESIGNED BY:	TGJ
DRAFTED BY:	DGS
REVIEWED BY:	AJG

C1
C11

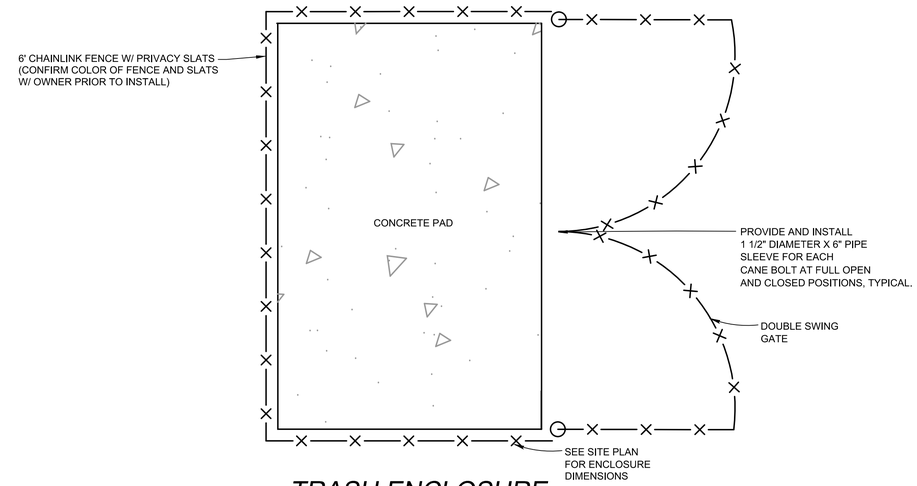
Exhibit B10



NOTE: STEEL PIPE SHALL BE GALVANIZED AND HAVE A MINIMUM WALL THICKNESS OF 0.280 INCHES.

PIPE BOLLARD DETAIL

NTS



TRASH ENCLOSURE

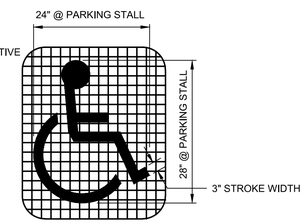
NTS

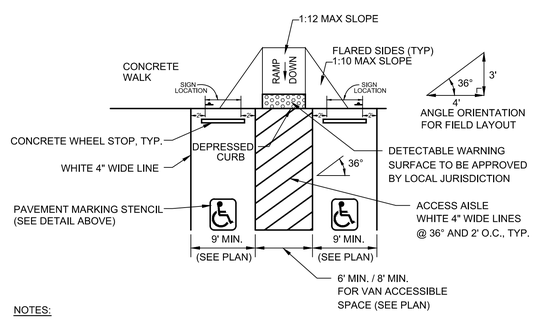
PAVEMENT MARKING COLORS

BACKGROUND: BLUE, RETROFLECTIVE

STENCIL: WHITE, RETROFLECTIVE

NOTE:
GRID IS FOR PROPORTIONAL REFERENCE ONLY, NOT TO BE PAINTED. CENTER IN ACCESSIBLE STALLS - PER SITE PLAN & CODE.





NOTES:

1. ALL PAVEMENT MARKINGS SHALL BE PAINTED. CONTRACTOR SHALL VERIFY ALL TEXT, GRAPHICS, AND DIMENSIONS WITH LOCAL JURISDICTION'S REQUIREMENTS.

2. EACH ACCESSIBLE SPACE SHALL BE SO DESIGNATED WITH THE OR7-8 SIGN SHOWN. VAN ACCESSIBLE SPACES SHALL HAVE THE ADDITIONAL R7-8P SIGN MOUNTED BENEATH, SUCH DESIGNATING "VAN ACCESSIBLE". THE LOWEST SIGN ON THE POST SHALL BE MOUNTED A MINIMUM OF 7 FEET ABOVE GRADE TO THE BOTTOM OF THE SIGN. WHEN SIGNS ARE MOUNTED ON BUILDINGS OR PIERS THE VERTICAL CLEARANCE DOES NOT APPLY, HOWEVER, THE SIGNS SHALL BE READABLE BY A PERSON DRIVING BY THE SPACES EVEN WHEN THE SPACES ARE OCCUPIED.

3. ACCESSIBLE PARKING SHALL BE PROVIDED IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CITY/COUNTY REGULATIONS.

4. ONE IN EVERY EIGHT ACCESSIBLE SPACES, BUT NOT LESS THAN ONE, SHALL BE SERVED BY AN ACCESS AISLE 96" WIDE AND SHALL BE DESIGNATED AS "VAN ACCESSIBLE" AS SPECIFIED IN NOTE 2.

5. PARKING ACCESS AISLES SHALL BE PART OF AN ACCESS ROUTE TO THE BUILDING OR FACILITY ENTRANCE. TWO ACCESSIBLE PARKING SPACES MAY SHARE A COMMON ACCESS AISLE. PARKING SPACES AND ACCESS AISLES SHALL BE LEVEL WITH SURFACE SLOPES NOT EXCEEDING 1:50 IN ALL DIRECTIONS.

ACCESSIBLE PARKING SPACE DETAILS

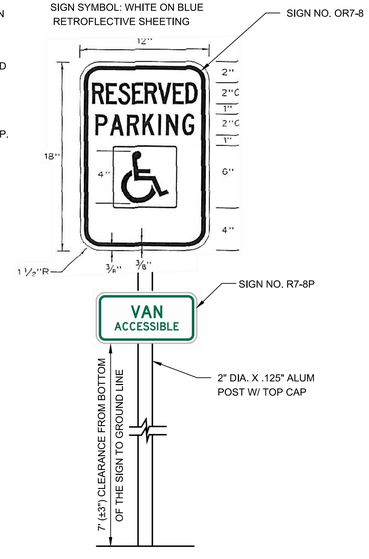
NTS

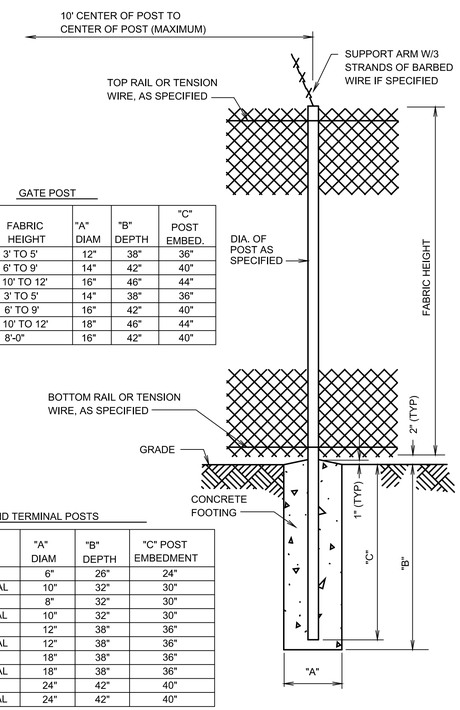
SIGN COLORS

SIGN BACKGROUND: WHITE, RETROFLECTIVE SHEETING

SIGN LEGEND: GREEN, RETROFLECTIVE SHEETING

SIGN SYMBOL: WHITE ON BLUE RETROFLECTIVE SHEETING





GATE POST

GATE LEAF WIDTH	GATE POST (OD)	FABRIC HEIGHT	"A" DIAM	"B" DEPTH	"C" POST EMBED.
3' TO 6'	2.875"	3' TO 5'	12"	38"	36"
		6' TO 9'	14"	42"	40"
		10' TO 12'	16"	46"	44"
7' TO 12'	4.000"	3' TO 5'	14"	38"	36"
		6' TO 9'	16"	42"	40"
		10' TO 12'	18"	46"	44"
13'	6.625"	8'-0"	16"	42"	40"

LINE AND TERMINAL POSTS

FABRIC HEIGHT	TYPE POST	"A" DIAM	"B" DEPTH	"C" POST EMBEDMENT
3'-0" TO 4'-0"	LINE	6"	26"	24"
	TERMINAL	10"	32"	30"
5'-0"	LINE	8"	32"	30"
	TERMINAL	10"	32"	30"
6'-0" TO 9'-0"	LINE	12"	38"	36"
	TERMINAL	12"	38"	36"
10'-0" TO 12'-0"	LINE	18"	38"	36"
	TERMINAL	18"	38"	36"
13'-0" TO 18'-0"	LINE	24"	42"	40"
	TERMINAL	24"	42"	40"

NOTE: TERMINAL POSTS INCLUDE END, CORNER, AND PULL POSTS

CHAIN LINK FENCE DETAILS

NTS

PLS ENGINEERING

2008 C Street, Vancouver, WA 98663 | PH (360) 944-6519 | Fax (360) 944-6539

Miscellaneous Details For:

AWR Site Plan

A Site Located In Fairview, Oregon

Consulting Engineers & Planners

Revisions

A	5/14/2018	1st Submittal				
B						
1						
2						
3						
4						

REGISTERED PROFESSIONAL ENGINEER 74948 OREGON SEPT. 14, 2004 DAVID GLEN SPENCER 5/14/18

RENEWS: 06/30/2018

Project No. 2761

SCALE: H: N/A V: N/A

DESIGNED BY: TGJ

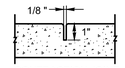
DRAFTED BY: DGS

REVIEWED BY: AJG

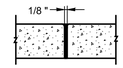
C10

C11

Exhibit B11



CONTRACTION JOINT



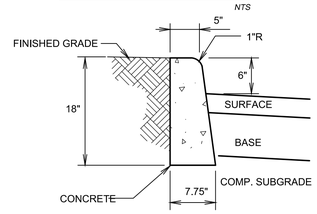
JOINT SEALER CONFORMING TO ASTM D 1850

PREMOULDED EXPANSION JOINT FILLER CONFORMING TO ASTM D1751 OR D1752

EXPANSION JOINT

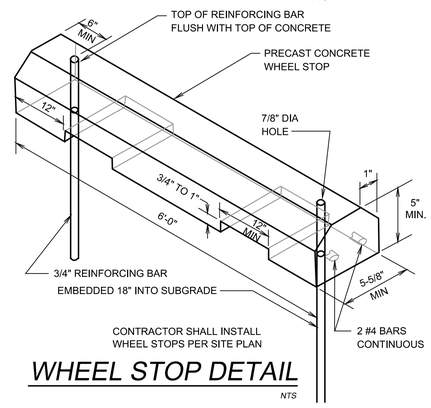
CONCRETE JOINT DETAILS

NTS



PRIVATE CURB DETAIL

NTS



WHEEL STOP DETAIL

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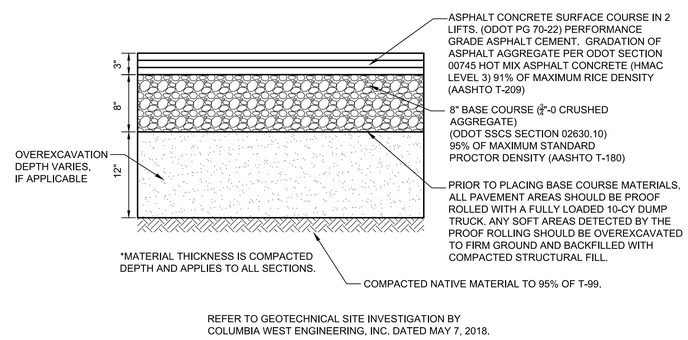
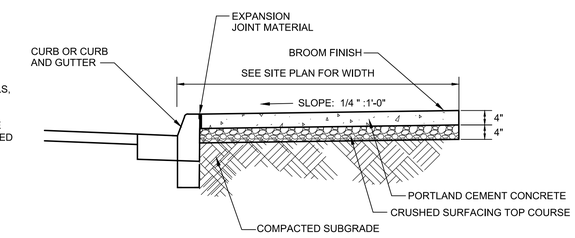


REFER TO GEOTECHNICAL SITE INVESTIGATION BY COLUMBIA WEST ENGINEERING, INC. DATED MAY 7, 2018.

STANDARD DUTY PAVEMENT SECTION

NTS



PRIVATE SITE SIDEWALK DETAIL

NTS

PLS ENGINEERING

Standard Details & Notes For:

AWR Site Plan

A Site Located In Fairview, Oregon

Consulting Engineers & Planners | 2008 C Street, Vancouver, WA 98663 | PH (360) 944-6519 | Fax (360) 944-6539

Revisions

A	5/14/2018	1st Submittal
B		
1		
2		
3		
4		

REGISTERED PROFESSIONAL ENGINEER 74948 OREGON SEPT. 14, 2004 DAVID GLEN SPENCER

David G. Spencer 5/14/18

RENEWS: 06/30/2018

Project No. 2761

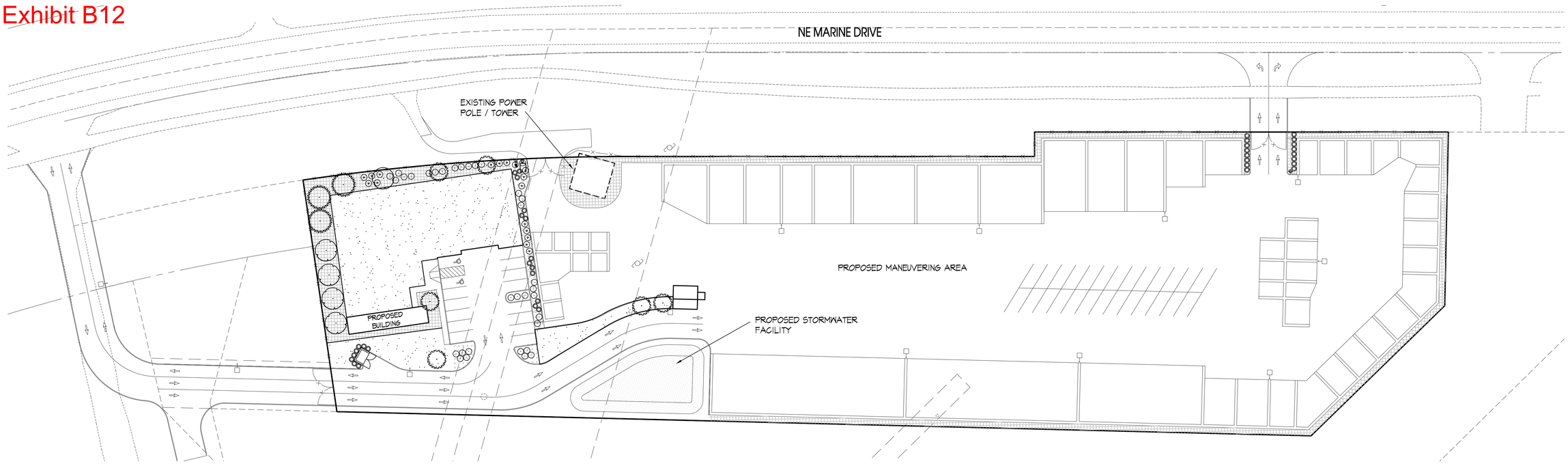
SCALE: H: N/A V: N/A

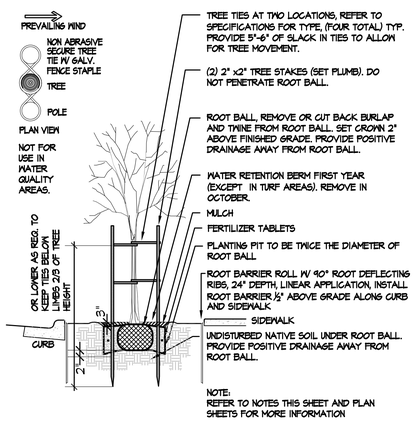
DESIGNED BY:	TGJ
DRAFTED BY:	DGS
REVIEWED BY:	AJG

C11

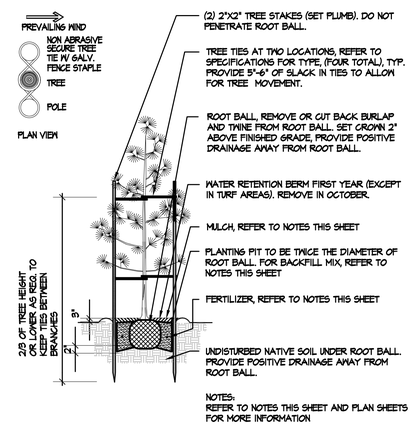
C11

Exhibit B12





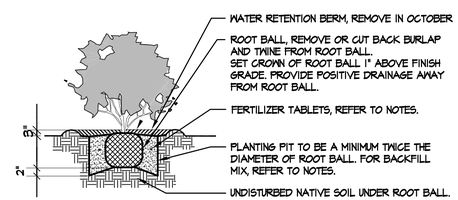
A B & B Tree Planting Detail
Not To Scale — SECTION / PLAN VIEW



B B & B Tree Planting Detail: Evergreen under 8' Height
Not To Scale — SECTION / PLAN VIEW

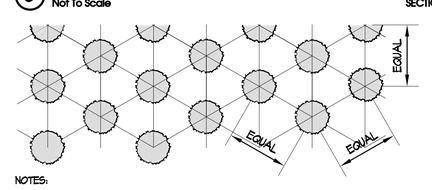
PLANT LEGEND

SYMBOL	BOTANICAL / COMMON NAME	SIZE	QUANTITY
TREES			
	ACER RUBRUM 'ARMSTRONG' ARMSTRONG MAPLE	1 1/2" cal. min.	6
	THUJA PLICATA WESTERN RED CEDAR	6' ht. min.	3
	ZELKOVA SERRATA 'GREEN VASE' GREEN VASE ZELKOVA	1 1/2" cal. min.	5
SHRUBS			
	MAHONIA AQUIFOLIUM 'COMPACTA' COMPACT OREGON GRAPE	1 GAL.	37
	MYRICA CALIFORNICA PACIFIC WAXMYRTLE	1 GAL.	18
	VIBURNUM DAVIDII DAVID VIBURNUM	1 GAL.	33
GROUNDCOVER			
	ARCTOSTAPHYLOS UVA URSI 'MASS.' MASSACHUSETTS KINIICKINNICK	1 GAL.	24" O.C.
	MAHONIA NERVOSA OREGON GRAPE	1 GAL.	24" O.C.
	TURF, DROUGHT RESISTANT, SUN & SHADE MIX AT RATE OF 2-3 LBS PER 1,000 SF		
	BARK, TYP.		
	STORMWATER FACILITY, REFER TO CIVIL PLANS		



NOTE:
REFER TO NOTES AND PLANS PRIOR TO BIDDING AND CONSTRUCTION.

C B & B Shrub Planting Detail
Not To Scale — SECTION



NOTES:

ALL GROUND COVER SHALL BE PLANTED AT EQUAL TRIANGULAR SPACING AS SPECIFIED IN PLANTING LEGEND.

GROUND COVER TO BE LOCATED ONE HALF OF SPECIFIED SPACING DISTANCE FROM ANY HARD SURFACE, UNLESS OTHERWISE SPECIFIED.

D Ground Cover Planting Detail
Not To Scale — PLAN VIEW

PLANTING NOTES

1. ALL BOUNDARIES, EASEMENTS, UTILITIES AND LEGAL ENCUMBRANCES TO BE CONFIRMED WITH OWNER PRIOR TO BEGINNING WORK. PROPERTY LINES AND SURVEY INFORMATION PROVIDED BY PLS ENGINEERING INC.
2. IN NO WAY IS THIS PLAN TO BE INTERPRETED TO EXCEED THE LEGAL BOUNDARIES OF THE OWNER'S REAL PROPERTY.
3. THE LANDSCAPE DESIGNER ASSUMES NO RESPONSIBILITY FOR THE LOCATION OF BOUNDARIES, UTILITIES AND WETLANDS.
4. THIS PLAN SHALL BE INSTALLED TO MEET ALL APPLICABLE CITY, COUNTY, STATE AND FEDERAL CODES.
5. THIS PLAN SHALL BE CONSIDERED PRELIMINARY UNTIL APPROVED BY ALL GOVERNING AGENCIES. IMPLEMENTATION OF THIS PLAN SHALL NOT PROCEED UNTIL ISSUANCE OF ALL RELATED PERMITS.
6. PLANT QUANTITIES ARE FOR INFORMATION ONLY. IN CASE OF ANY DISCREPANCY, THE PLAN SHALL GOVERN.
7. ALL WORK IS TO BE PERFORMED BY LICENSED CONTRACTORS AND EXPERIENCED WORKERS.
8. THE CONTRACTOR IS TO VERIFY THE LOCATION OF EXISTING UNDERGROUND UTILITIES AND STRUCTURES PRIOR TO PERFORMING ANY EXCAVATION. CONTRACTOR SHALL REPAIR ANY DAMAGE TO UTILITIES CAUSED BY THE CONTRACTOR'S WORK, AT NO ADDITIONAL COST TO THE OWNER. CONTACT ALL UTILITY PROVIDERS SERVING THE SITE AREA 48 HOURS PRIOR TO ANY EXCAVATION.
9. ALL PLANT MATERIALS SHALL MATCH SPECIFICATIONS PER SPECIES AND SHALL COMPLY WITH ANSI Z60.1 STANDARD FOR NURSERY STOCK'.
10. THE CONTRACTOR SHALL ADHERE TO THE OREGON ASSOCIATION OF NURSERYMEN'S GUIDELINES FOR PLANTING PRACTICES.
11. THE CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING ELEMENTS ON AND OFF SITE, RESULTING FROM THE CONTRACTOR'S WORK.
12. THE CONTRACTOR IS RESPONSIBLE FOR THE VIABILITY OF ALL PLANT MATERIAL FOR 2 YEARS AFTER COMPLETION OF PLANTING. DISEASED, DYING, OR DEAD PLANT MATERIAL SHALL BE REPLACED BY THE CONTRACTOR DURING THE TWO YEAR PERIOD AND MAINTAINED FOR AN ADDITIONAL 2 YEAR PERIOD.
13. IMMEDIATELY UPON BID AWARD, CONTRACTOR SHALL SECURE THE PLANT MATERIALS AS SPECIFIED FROM AVAILABLE SOURCES. IN THE EVENT THAT PLANT MATERIALS ARE NOT AVAILABLE, CONTACT LANDSCAPE ARCHITECT FOR APPROVED SUBSTITUTIONS. NO SUBSTITUTION FOR PLANT MATERIAL WILL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF THE LANDSCAPE ARCHITECT.
14. TOP DRESS ALL SHRUB AND GROUND COVER AREAS (NOT LAWN) WITH 3" OF FIR BARK MULCH. SUBMIT SAMPLE TO THE LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO CONSTRUCTION.
15. TREE LOCATIONS MAY BE ADJUSTED IN THE FIELD TO SUIT SITE REQUIREMENTS AS DIRECTED BY THE LANDSCAPE ARCHITECT.
16. THE CONTRACTOR SHALL ENSURE THAT ALL EXCAVATED PLANTING PITS HAVE POSITIVE DRAINAGE. PLANT PITS FULLY FLOODED WITH WATER SHALL DRAIN WITHIN (12) HOURS OF FILLING.
17. FINISH GRADE SHALL BE SET TO ALLOW POSITIVE DRAINAGE
18. ROTOTILL 2" OF COMPOST INTO ALL PLANTED AREAS.
19. INCORPORATE PEAT INTO THE ROOT ZONE OF RHODODENDRONS, AZALEAS AND OTHER ACID LOVING PLANTS.
20. INCORPORATE 10-20-20 FERTILIZER INTO THE ROOT ZONE OF ALL NEW PLANTINGS.
21. RONSTAR, OR APPROVED EQUAL, PREEMERGENT HERBICIDE TO BE APPLIED TO ALL PLANTED AREAS PER MANUFACTURERS INSTRUCTIONS.
22. EXISTING VEGETATION TO BE SPRAYED WITH ROUNDUP, OR APPROVED EQUAL, PER MANUFACTURERS INSTRUCTIONS. SUFFICIENT TIME SHALL BE GIVEN TO ALLOW EXISTING MATERIAL TO DIE. REMOVE EXISTING 2T. THE PROPERTY OWNER IS RESPONSIBLE FOR MAINTAINING TURF PLANTED WITHIN THE RIGHT OF WAY.
23. CROWN LAWN AREAS AND GRADE TO PROVIDE POSITIVE DRAINAGE.
24. ROLL LAWN AREA TO INSURE PROPER COMPACTION TO MINIMIZE SETTLING.
25. AMEND SOIL IN LAWN AREAS WITH 80 LBS. OF DOLOMITE LIME AND 40 LBS. OF 10-20-20 SLOW RELEASE FERTILIZER OR EQUIVALENT. PROVIDE A 3" LAYER OF SANDY LOAM TOPSOIL FOR LAWN AND BED AREA.
26. SEED LAWN AREAS WITH GRASS SEED MANUFACTURER'S RECOMMENDATIONS. COVER SEED WITH FINE MULCH APPLIED WITH ROLLER OR HYDROSEED.
27. THE PROPERTY OWNER IS RESPONSIBLE FOR MAINTAINING TURF PLANTED WITHIN THE RIGHT OF WAY.
28. PLANT MATERIAL SHALL BE PLANTED W/ ROOT CROWN 1" ABOVE FINISHED GRADE TO ALLOW POSITIVE DRAINAGE AWAY FROM CROWN.
29. STAKE ALL TREES OVER 6 FT. IN HEIGHT PER DETAILS ON THIS SHEET.
30. REFER TO DETAILS FOR ADDITIONAL INFORMATION.
31. ALL PLANTING SHALL BE IRRIGATED BY AN AUTOMATIC UNDERGROUND SPRINKLER SYSTEM.
32. ALL PLANT MATERIALS FURNISHED ARE TO BE HEALTHY, UNIFORMLY BRANCHED AND WITH WELL DEVELOPED FIBROUS ROOT SYSTEMS.
33. ALL PLANT MATERIALS FURNISHED ARE TO BE FREE FROM DEAD OR BROKEN BRANCHES, LICHENS, SCARS, BROKEN BARK OR WOUNDS. ALL PLANT MATERIALS WILL BE INSECT, WEED, AND DISEASE FREE ACCORDING TO THE REQUIREMENTS OF THE OREGON STATE DEPARTMENT OF AGRICULTURE FOR NURSERY PLANT MATERIALS SOLD FOR WHOLESALE OR RETAIL. ALL PRUNING WOUNDS MUST BE WELL HEALED WITH NO EVIDENCE OF DECAY.

IRRIGATION NOTE

ALL LANDSCAPE AREAS SHALL BE IRRIGATED WITH AN AUTOMATIC DRIP AND/OR SPRAY IRRIGATION SYSTEM. REFER TO CIVIL ENGINEERING PLANS FOR WATER SOURCE.

Planning Solutions, Inc.
Creating Solutions to Complex Issues
4400 NE 77th Avenue
Suite 275
VANCOUVER, WA 98662
VOICE: 360-750-9000 FAX: 360-713-6102
www.planningsolutionsinc.com

REGISTERED 354 Christopher A. Baumann OREGON 07/26/96 LANDSCAPE ARCHITECT

AWR Site Plan

22800 NE Marine Drive
Fairview, Oregon

DRAWN: VH	CHECKED: CB
SCALE: 1" = 40'-0"	DATE: 04-27-18
JOB #: 18-1458	
ISSUED FOR: SPR	
REVISIONS:	
1 Site Changes 08-17-18	
2	
3	
4	
5	
6	

SHEET NAME:
LANDSCAPE PLAN

SHEET #:
L1

SHEET 1 OF 1

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Exhibit B2

CONTACT INFO:

Property Owner / Project Contact:
MRW Properties LLC
PO Box 115
Fairview, OR 97024
PH: (360) 921-4528
Email: markwubben.awr@gmail.com

Planning / Engineering Contact:
PLS Engineering
Travis Johnson, PE
2008 C Street
Vancouver, WA 98663
PH: (360) 944-6519
Fax: (360) 944-6539
Email: travis@plsengineering.com

The site is located at 22800 NE Marine Drive in Fairview, Oregon. The parcel is identified as Map Tax Lot 1N3E22C -00109, property ID R575270.

This project is within the GI zone of the City of Fairview, a General Industrial District site. The comprehensive plan designation for the site is General Industrial. The site is currently a grassed field. Site Area - 4.64 acres (202,003 sq ft).

Boundary data shown on the site plan was prepared by PLS Engineering.

Existing topographic contour lines are shown at 1 foot intervals.

There are no slopes on-site greater than 25%. The steepest area of the project is located near the northwest corner in the public right-of-way. There is a depression that slopes down at approximately 25% and will be levelled out with this project. See grading plan.

The project site is located in an area that is protected from the 1-percent annual chance or greater flood hazard by a levee system. Overtopping or failure of any levee system is possible. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. FEMA mapping shows Zone AE Base Flood Elevations determined in the vicinity of this site, however these areas are within the levee protected area.

A geotechnical site investigation has been prepared for this site and has been included with this application. This geotechnical investigation includes regional geology discussion, soil conditions, and discusses regional seismology.

There are no known resource areas such as marsh, wetland, streams, wildlife habitat areas requiring protection.

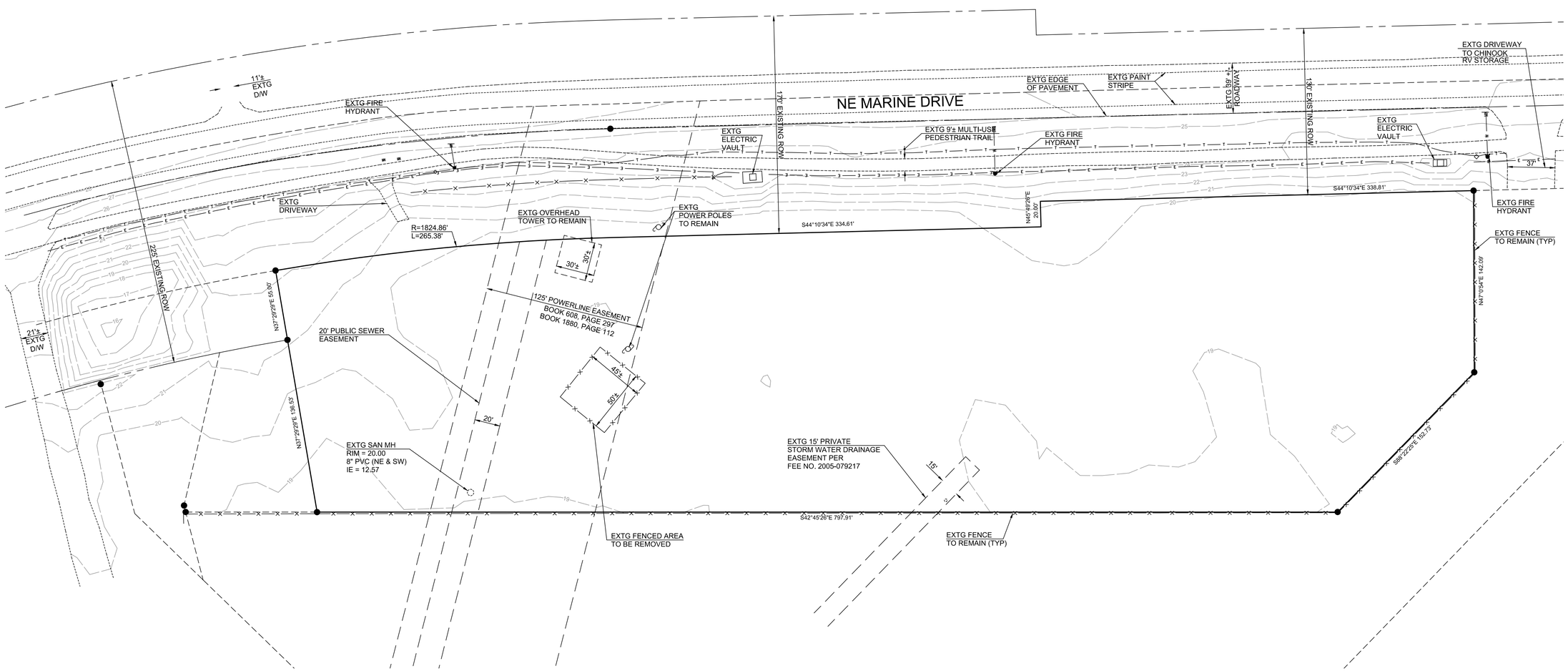
All site features are shown on the map below.

There are no known historic or cultural resources on the site and adjacent parcels or lots.

There are no trees located on this project site.

VICINITY MAP
NOT TO SCALE

Scale 1" = 40'
40 20 0 40



PLS ENGINEERING

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Consulting Engineers & Planners

Existing Conditions Plan For:

AWR Site Plan

A Site Located In Fairview, Oregon

Revisions

A	5/14/2018	1st Submittal
B		
1		
2		
3		
4		

REGISTERED PROFESSIONAL ENGINEER
74948
OREGON
SEPT. 14, 2004
DAVID GLEN SPENCER
5/14/18
RENEWS: 06/30/2018

Project No. 2761	
SCALE:	H: 1" = 40' V: N/A
DESIGNED BY:	TGJ
DRAFTED BY:	DGS
REVIEWED BY:	AJG

C2

C11

Exhibit B3

AWR Site Plan

Located in the SE 1/4 & SW 1/4 of Section 22, T1N, R3E, W.M.
Fairview, Oregon

SITE STATISTICS		
ZONE: GI		
Gross Site Area	202,003 SQ FT	4.64 AC
Building Square Footage		924 sq ft
Total Landscaping		> 30,300 sq ft (15.0%)
Total Parking Spaces		15
Standard Parking Spaces		13
Yard Parking Spaces		26
ADA Parking Spaces		2

PARKING REQUIREMENT SUMMARY

		Areas & Qty	Spaces
Office	~ 2.7 spaces per 1,000 SF	924 SF	2.5
Retail Nursery	~ 1 space per 5,000 SF	57,650 SF	12
Retail Nursery	~ 1 space per 2 employees	4 employees	2
		Min. Required:	17 Spaces
		Provided:	41 Spaces

PROJECT NOTES:

The site is located at 22800 NE Marine Drive in Fairview, Oregon. The parcel is identified as Map Tax Lot 1N3E22C -00109, property ID R575270.

This project is within the GI zone of the City of Fairview, a General Industrial District site. The comprehensive plan designation for the site is General Industrial. The site is currently a grassed field. Site Area - 4.64 acres (202,003 sq ft).

Boundary data shown on the site plan was prepared by PLS Engineering.

Proposed use will be a sales and storage yard for landscape materials (bark, mulch, soil, rock, etc.) and other construction materials (pavers, boulders, wall rock, etc.). Site will provide a building with an office, a weight scale, and bins for storage of materials.

There are 3 existing fire hydrants along NE Marine Drive.

Stormwater will be treated by a stormwater facility planter, to be designed per City of Portland Stormwater Manual, to treat and release without detention to the Salmon Creek (Multnomah County Drainage District).

Erosion control will conform to Oregon DEQ standards and details. Coverage under a 1200-C permit will be required for this project (land disturbance > 1 acre).

Cut and Fill amounts are unknown at this time.

5% Landscaping is provided in parking area as required per Code.

Parking dimensions meet or exceed the minimum size requirements.

Intersection warning signs (MUTCD W2-2) to be installed 100' in advance of driveway intersections. Three of the four signs to be installed are shown in plan. One additional sign northwest of the furthest northwest entrance can not be shown in the plan, but will be noted in the construction plans.

VICINITY MAP
NOT TO SCALE

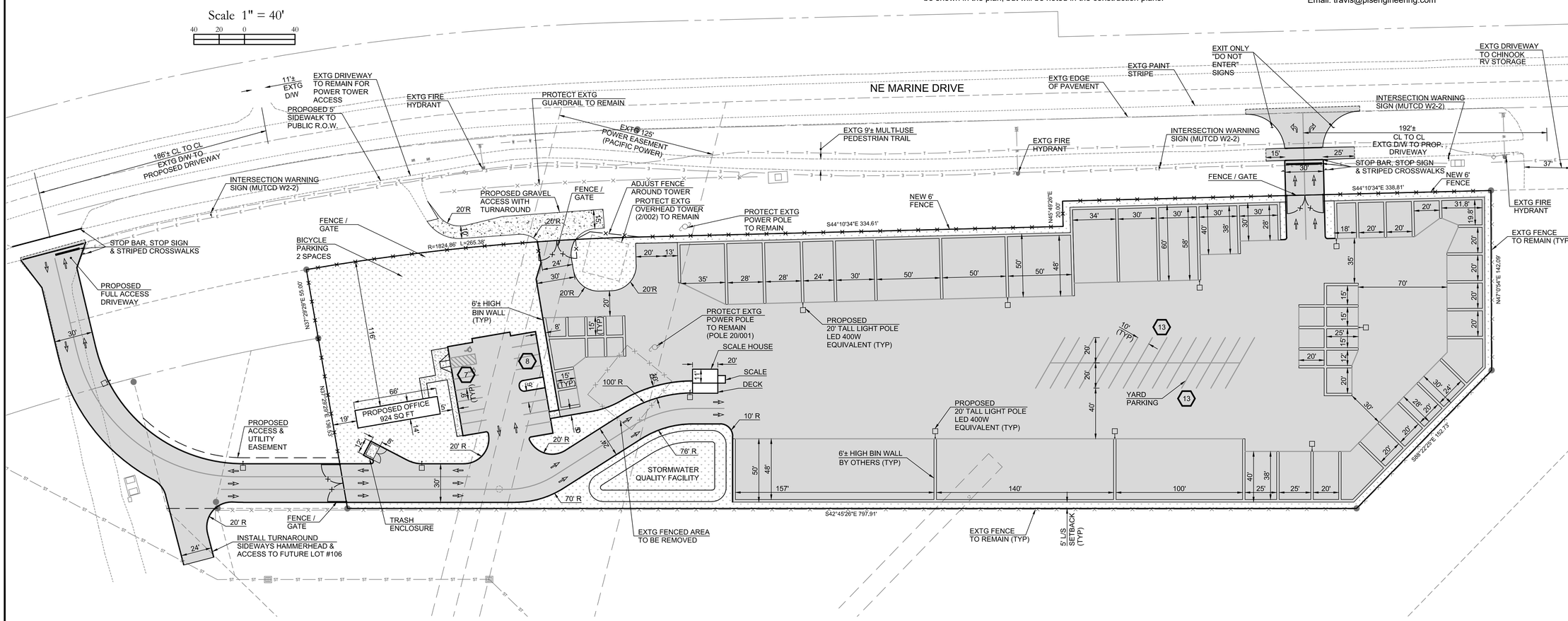
CONTACT INFO:

Property Owner / Project Contact:
MRW Properties LLC
PO Box 115
Fairview, OR 97024
PH: (360) 921-4528
Email: markwubben.awr@gmail.com

Planning / Engineering Contact:
PLS Engineering
Travis Johnson, PE
2008 C Street
Vancouver, WA 98663
PH: (360) 944-6519
Fax: (360) 944-6539
Email: travis@plsengineering.com

Legend
Proposed Asphalt Concrete
Proposed Building
Proposed Concrete
Proposed Landscaping

Scale 1" = 40'



ENGINEERING
PLS

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2008 C Street, Vancouver, WA 98663 | Consulting Engineers & Planners

Site Plan For:
AWR Site Plan
A Site Located In Fairview, Oregon

Revisions				
A	5/14/2018	1st Submittal	TGJ	
B	8/8/2018	Submitted for 2nd Review	TGJ	
1				
2				
3				
4				

REGISTERED PROFESSIONAL ENGINEER 74948 OREGON SEPT. 14, 2004 DAVID GLEN SPENCER
5/9/18
RENEWS: 06/30/2018

Project No. 2761	
SCALE:	H: 1" = 40' V: N/A
DESIGNED BY:	TGJ
DRAFTED BY:	DGS
REVIEWED BY:	AJG

C3
C11

Exhibit B4

STORMWATER DRAINAGE NOTES

All storm drainage collection and conveyance piping is subject to the Plumbing Code.

All construction/installation of storm sewer mains shall be done in a safe, neat and professional manner. All safety requirements from OSHA, and other State regulatory agencies must be met.

All requirements from DEQ must be met.

Pipe cover shall be 24 inches minimum from finished grade. If a shallower depth is required, pipe used must be D.I.

All new storm sewer pipes and manholes must be thoroughly cleaned.

Any storm sewer line installed within private property will be privately owned and maintained.

Finished site grading should be conducted with positive drainage away from structures. Depression or shallow areas that may retain ponding water should be avoided. Roof drains, low-point drains, and perimeter foundation drains should be connected to the storm system. Drains should consist of separate systems and gravity flow with a minimum two-percent slope away from foundations into the stormwater system. Concentrated discharge of water should be prohibited across slopes and water should not be diverted, routed, or allowed to flow over or across slope faces.

SITE PREPARATION AND GRADING:

Vegetation, organic material, unsuitable fill, and deleterious material that may be encountered should be cleared from areas identified for structures and site grading. Vegetation, other organic material, and debris should be removed from the site. Stripped topsoil should also be removed, or used only as landscape fill in nonstructural areas with slopes less than 25 percent. The stripping depth for sod and highly organic topsoil is anticipated to vary between 6 to 10 inches. The required stripping depth may increase in areas of existing fill, heavy organics, or previously existing structures. Actual stripping depths should be determined based upon visual observations made during construction when soil conditions are exposed. The post construction maximum depth of landscape fill placed or spread at any location onsite should not exceed one foot.

Previously disturbed soil, debris, or unconsolidated fill encountered during grading or construction activities should be removed completely and thoroughly from structural areas. Test pits excavated during site exploration were backfilled loosely with onsite soils. These test pits should be located and properly backfilled with structural fill during site improvements construction. Trees, stumps, and associated roots should also be removed from structural areas, individually and carefully. Resulting cavities and excavation areas should be backfilled with engineered structural fill.

Due to the presence of moisture sensitive soils and potentially shallow groundwater, installation of a granular working blanket may be necessary to construct site improvements. Refer to geotechnical report for specific recommendations for wet weather construction.

Site grading activities should be performed in accordance with requirements specified in the 2015 International Building Code (IBC), Chapter 18 and Appendix J, with exceptions noted in the text herein. Site preparation, soil stripping, and grading activities should be observed and documented by Columbia West.

Engineered structural fill placement acivities should be performed during dry summer months if possible. Clean native soils may be suitable for use as structural fill if adequately moisture-conditioned to achieve recommended compaction specifications. A field density at least equal to 95 percent of the maximum dry density, obtained from the standard Proctor moisture-density relationship test (ASTM D698), is recommended for structural fill placement. For engineered structural fill placed on sloped grades, the area should be benched to provide a horizontal surface for compaction.

Compaction of engineered structural fill should be verified by nuclear gauge field compaction testing performed in accordance with ASTM D6938.

Final cut or fill slopes at the site should not exceed 2H:1V or 10 feet in height without individual slope stability analysis.

Foundations shall be designed per geotechnical site investigation by Columbia West Engineering dated May 7, 2018. Foundations should not be permitted to bear upon existing fill or disturbed soil. Geotechnical engineer should observe foundation subgrade soils prior to placing forms or reinforcing bar to verify subgrade support conditions are as anticipated in this report.ust be met.

Site improvements construction in some areas may occur at or near the shallow seasonal groundwater table, particularly if work is conducted during wet-weather conditions. Dewatering may be necessary and a drainage mat may be required to achieve sufficient elevation for fill placement.

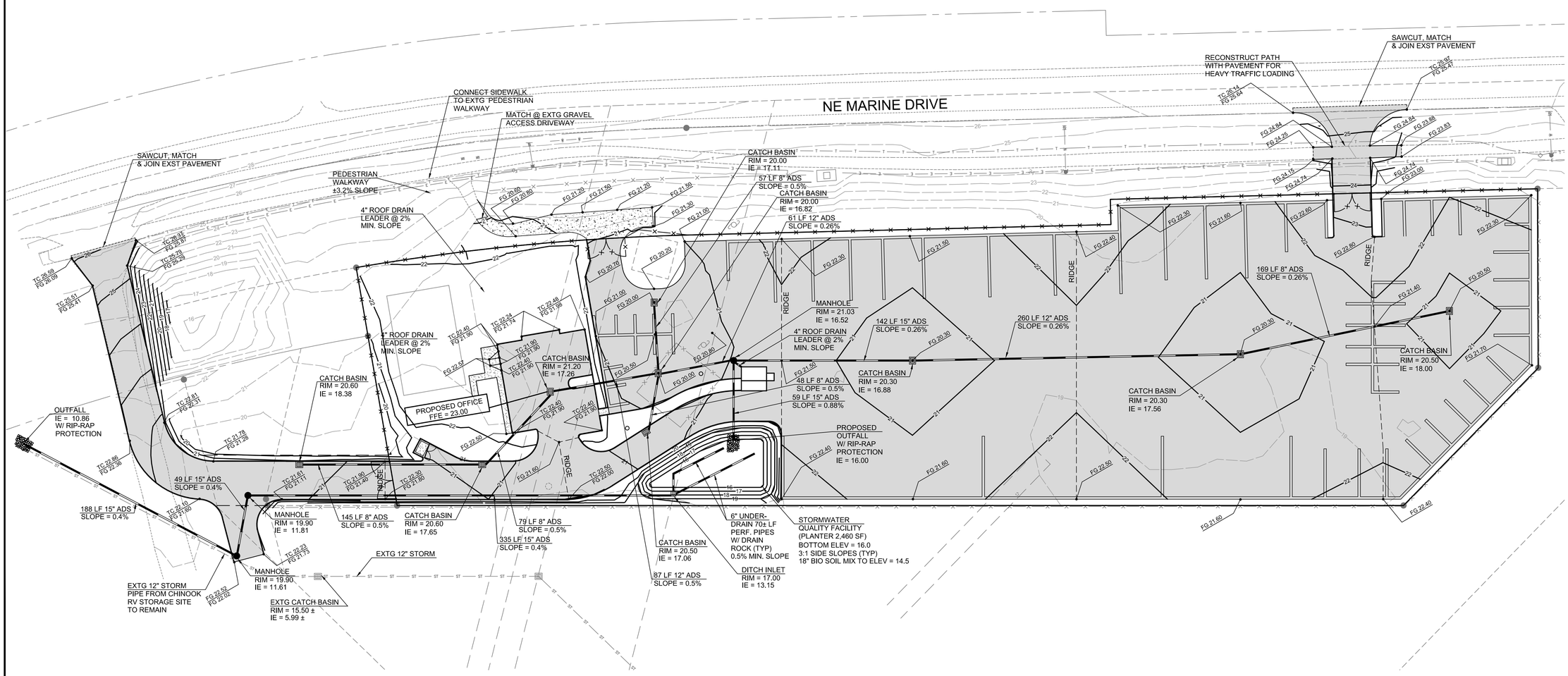
GRADING SPOT ELEVATION ABBREVIATIONS

TC = TOP OF CURB ELEVATION
FG = FINISH GRADE AT TOP OF PAV'T OR EXTERNAL TO BLDG
SW = FINISH GRADE FOR SIDEWALK
EG = EXTG GRADE AT EDGE OF PAV'T (FOR REFERENCE)
TW = TOP OF WALL ELEV.
BW = FINISH GRADE AT BOTTOM OF WALL

GRADING NOTES:

1. ALL TOP OF CURB ELEVATIONS ARE 0.5' ABOVE PAVEMENT FINISH GRADE (FG) ELEVATION SHOWN UNLESS OTHERWISE INDICATED.
2. SIDEWALK CROSS-SLOPES SHALL NORMALLY BE 2% TOWARD ADJACENT PAVEMENT (AWAY FROM THE BUILDING) UNLESS OTHERWISE INDICATED ON THIS PLAN BY SPOT GRADES.
3. EXCEPT WHERE OTHERWISE NOTED BY FG ELEVATIONS, FINISH GRADE EXTERNAL TO THE BUILDING IS EQUAL TO BLDG FINISH FLOOR.

Scale 1" = 40'



PLS ENGINEERING

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Consulting Engineers & Planners

Grading & Drainage Plan For:

AWR Site Plan

A Site Located In Fairview, Oregon

Revisions

A	5/14/2018	1st Submittal
B		
1		
2		
3		
4		

REGISTERED PROFESSIONAL ENGINEER 74948 OREGON SEPT. 14, 2004 DAVID GLEN SPENCER 6/5/18

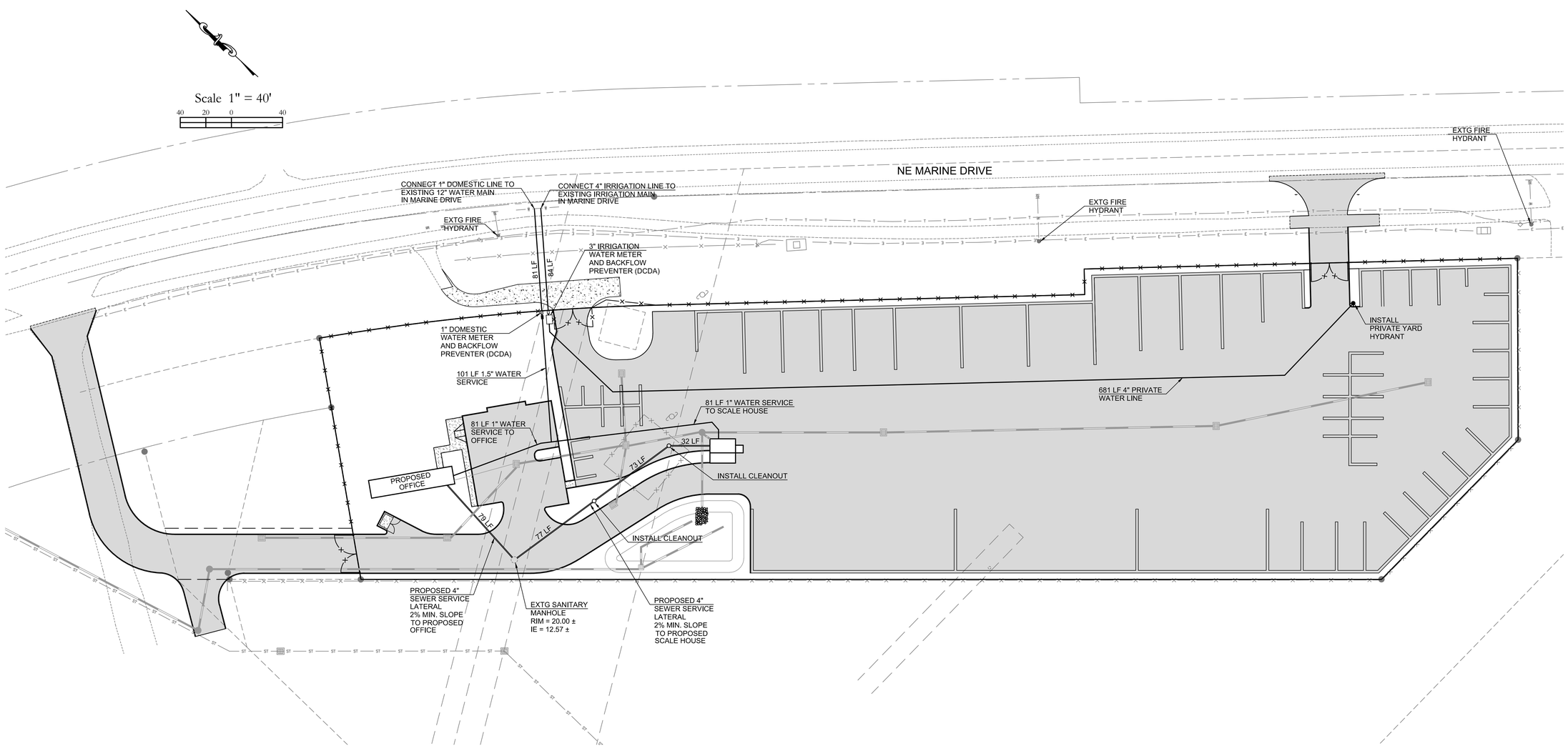
RENEWS: 06/30/2018

Project No. 2761	
SCALE:	H: 1" = 40' V: N/A
DESIGNED BY:	TGJ
DRAFTED BY:	DGS
REVIEWED BY:	AJG

C4

C11

Exhibit B5



PLS ENGINEERING

2008 C Street, Vancouver, WA 98663 | PH (360) 944-6519 | Fax (360) 944-6539

Consulting Engineers & Planners

Sewer & Water Plan For:

AWR Site Plan

A Site Located In Fairview, Oregon

Revisions

A	5/14/2018	1st Submittal
B		
1		
2		
3		
4		

REGISTERED PROFESSIONAL ENGINEER 74948 OREGON SEPT. 14, 2004 DAVID GLEN SPENCER

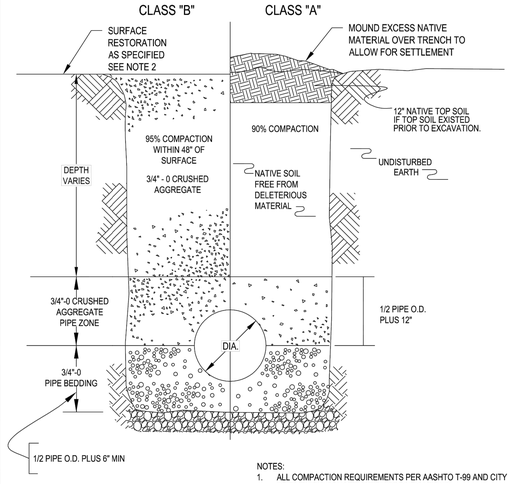
David G. Spencer 6/5/18

RENEWS: 06/30/2018

Project No. 2761	
SCALE:	H: 1" = 40' V: N/A
DESIGNED BY:	TGJ
DRAFTED BY:	DGS
REVIEWED BY:	AJG

C5 / C11

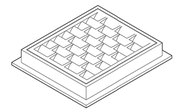
Exhibit B6



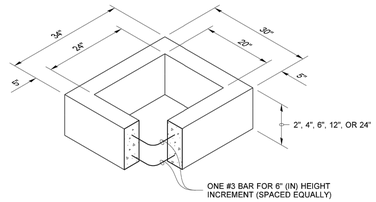
NOTES:
1. ALL COMPACTION REQUIREMENTS PER AASHTO T-99 AND CITY OF FAIRVIEW CONSTRUCTION SPECIFICATIONS.
2. SEE FV527 FOR STREET CUT AND REPAIRS.
3. WHEN GEOTEXTILE FABRIC IS USED IT SHALL BE PLACED BELOW RESURFACING IN "TEE CUT" AND EXTEND A MINIMUM OF 12" BEYOND TRENCH WALLS.
4. DO NOT COMPACT TOP 2" OF NATIVE BACKFILL IN AREAS TO BE SEEDED.
5. IF REQUIRED, TRENCH STABILIZATION SHALL BE SPECIFIED SEPARATELY AND PLACED PRIOR TO PLACEMENT OF BEDDING MATERIAL.

CITY OF FAIRVIEW OREGON	TRENCH BACKFILL SCALE: NTS	DETAIL NUMBER FV200
		REVISED MAR 23, 2017

DRAWN BY: LISA CYFORD



FRAME AND VANED GRATE



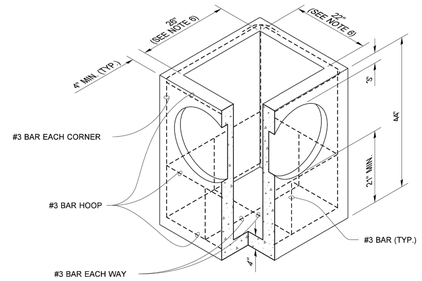
RECTANGULAR ADJUSTMENT SECTION

PIPE ALLOWANCES	
PIPE MATERIAL	MAXIMUM INSIDE DIAMETER (INCHES)
REINFORCED OR PLAIN CONCRETE	12"
ALL METAL PIPE	15"
CPSSP ★ (STD. SPEC. SECT. 9-05.20)	12"
SOLID WALL PVC (STD. SPEC. SECT. 9-05.12(1))	15"
PROFILE WALL PVC (STD. SPEC. SECT. 9-05.12(2))	15"

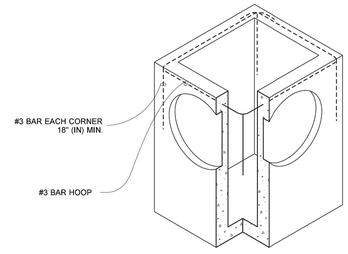
★ CORRUGATED POLYETHYLENE STORM SEWER PIPE

NOTES

1. As acceptable alternatives to the rebar shown in the **PRECAST BASE SECTION**, fibers (placed according to the Standard Specifications), or wire mesh having a minimum area of 0.12 square inches per foot shall be used with the minimum required rebar shown in the ALTERNATIVE **PRECAST BASE SECTION**. Wire mesh shall not be placed in the knockouts.
2. The knockout diameter shall not be greater than 20" (in). Knockouts shall have a wall thickness of 2" (in) minimum to 2.5" (in) maximum. Provide a 1.5" (in) minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with **Standard Specification Section 9-04.3**.
3. The maximum depth from the finished grade to the lowest pipe invert shall be 5' (ft).
4. The frame and grate may be installed with the flange down, or integrally cast into the adjustment section with flange up.
5. The Precast Base Section may have a rounded floor, and the walls may be sloped at a rate of 1 : 24 or steeper.
6. The opening shall be measured at the top of the **Precast Base Section**.
7. All pickup holes shall be grouted full after the basin has been placed.



PRECAST BASE SECTION



(SEE NOTE 1)

ALTERNATIVE PRECAST BASE SECTION

JULIE HEILMAN STATE OF WASHINGTON 41819 REGISTERED PROFESSIONAL ENGINEER

Heilman, Julie
Jan 25 2017 2:53 PM

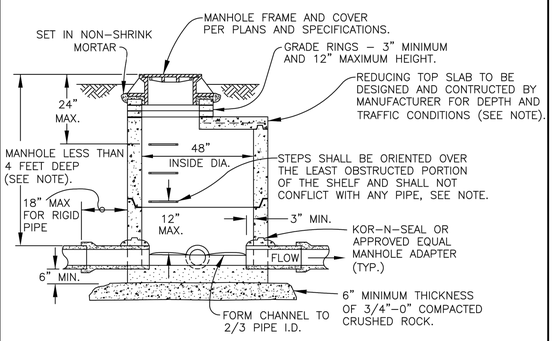
CATCH BASIN TYPE 1

STANDARD PLAN B-5.20-02

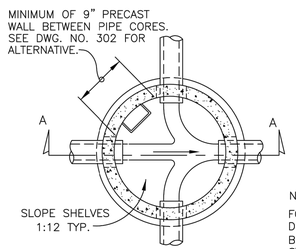
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jan 26 2017 6:48 AM

STATE DESIGN ENGINEER
Washington State Department of Transportation



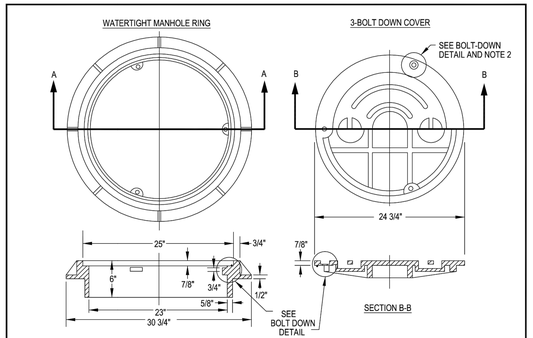
SECTION A–A



PLAN

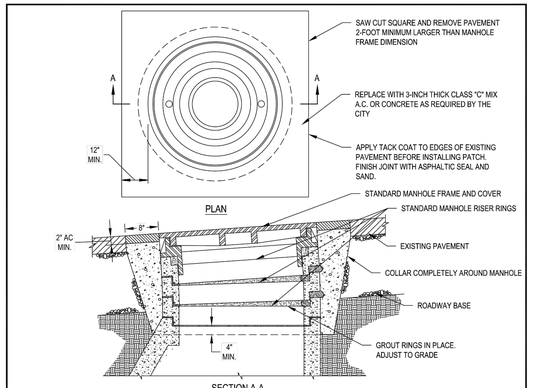
NOTE:
FOR MANHOLES LESS THAN 2' DEEP A CONCENTRIC CONE SHALL BE USED (NOT SHOWN), AND NO STEPS SHALL BE INSTALLED.

DRAWN DLS	DEPARTMENT OF ENVIRONMENTAL SERVICES	SCALE NTS	
DIV.	CITY OF GRESHAM	DATE JAN 1, 2006	
REV. DATE APPR.	1333 N.W. EASTMAN PARKWAY, GRESHAM, OREGON 97030	APPR.	
	WASTEWATER & STORMWATER SHALLOW MANHOLE FOR 27" and LESSER DIA. PIPES	DWG. NO. 303	



NOTE:
1. COVER AND FRAME SHALL BE GRAY CAST IRON A.S.T.M. A-48 CLASS 30. TAMPER PROOF (REMOVE GASKETS).
2. BOLT-DOWN TYPE MANHOLE COVERS NOT REQUIRED FOR IN-ROAD LOCATIONS .
3. TAMPER PROOF MANHOLE FRAME AND COVER SHALL BE USED IN ALL EASEMENT AND OFF STREET AREAS.
4. WATERTIGHT COVERS REQUIRED IF LOCATED WHERE COVER MAY BE SUBMERGED.
5. SANITARY SEWER COVERS TO HAVE 2 HOLES MAXIMUM.

CITY OF FAIRVIEW OREGON	MANHOLE COVER AND FRAME SCALE: NTS	DETAIL NUMBER FV207
		REVISED MAR 23, 2017



CITY OF FAIRVIEW OREGON	MANHOLE RISER AND GRADE RINGS SCALE: NTS	DETAIL NUMBER FV206
		REVISED MAR 23, 2017

PLS ENGINEERING

Stormwater Details & Notes For:

AWR Site Plan

A Site Located In Fairview, Oregon

Consulting Engineers & Planners | 2008 C Street, Vancouver, WA 98663 | PH (360) 944-6519 | Fax (360) 944-6539

Revisions

A	5/14/2018	1st Submittal
B		
1		
2		
3		
4		

REGISTERED PROFESSIONAL ENGINEER 74948 OREGON SEPT. 14, 2004 DAVID GLEN SPENCER 5/14/18

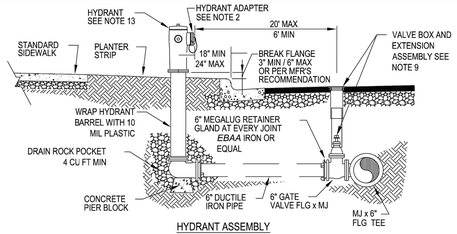
RENEWS: 06/30/2018

Project No. 2761	
SCALE:	H: N/A V: N/A
DESIGNED BY:	TGJ
DRAFTED BY:	DGS
REVIEWED BY:	AJG

C6

C11

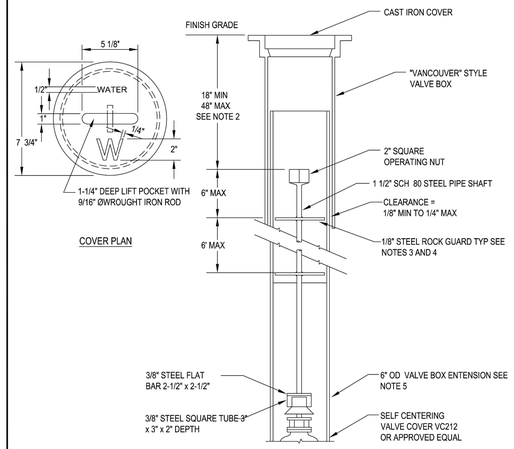
Exhibit B7



HYDRANT ASSEMBLY
AT STANDARD SIDEWALK WITH PLANTER STRIP

NOTES:
1. HYDRANTS ARE TO HAVE TWO 2½ INCH AND ONE 4½ INCH PORTS.
2. INSTALL A *STORZ* HPHA50 - 45NH PERMANENT HYDRANT ADAPTER ON THE 4½ INCH PORT.
3. THE MINIMUM MAIN - TO - HYDRANT PIPE SIZE IS 6 INCHES.
4. HYDRANTS TO BE: *MUELLER* (SUPER CENTURION 200), *WATEROUS* (PACER WB67-250), *CLOW* (MEDALLION F-2545), OR *KENNEDY* (GUARDIAN K-81D) WITH THE FOLLOWING SPECIFICATIONS:
   - 4.1. 5¼ INCH MAIN VALVE (BARREL)
   - 4.2. OIL RESERVOIR
   - 4.3. BRONZE ACTUATING NUT
   - 4.4. BRONZE SEAT RING
   - 4.5. WEATHER SHIELD CAP
   - 4.6. SAFETY SLEEVE COUPLING
   - 4.7. THREADED NOZZLES WITH "O" RINGS
   - 4.8. NATIONAL STANDARD THREADS
5. PUBLIC HYDRANTS ARE TO BE PAINTED YELLOW AND PRIVATE HYDRANTS ARE TO BE PAINTED RED.
6. SAFETY CHAINS ARE TO BE REMOVED.
7. HYDRANTS ARE TO BE INSTALLED PLUMB.
8. PROTECTIVE POST IS TO BE PROVIDED AND INSTALLED, PER *UFC STANDARDS*, IF HYDRANT IS SUBJECT TO VEHICULAR DAMAGE.
9. VALVE BOX ASSEMBLY AND OR EXTENSION ASSEMBLY IS TO BE IN ACCORDANCE *FAIRVIEW STANDARD DRAWING* FV452 OR AS APPROVED BY THE CITY.
10. NO OBSTRUCTIONS ARE ALLOWED WITHIN 3 FEET OF HYDRANT.
11. SEE *FAIRVIEW STANDARD DRAWING* FV521 FOR SIDEWALK STANDARDS.
12. PIPE BENDS ARE NOT ALLOWED WITHOUT PERMISSION OF THE CITY ENGINEER.
13. HYDRANTS MAY BE LOCATED AT VARYING DISTANCES FROM CURB OR IN SIDEWALK ONLY WITH PRIOR APPROVAL OF THE CITY ENGINEER. IF HYDRANT IS LOCATED IN SIDEWALK, SIDEWALK'S CLEAR WIDTH SHALL MEET *ADA* CLEARANCE WIDTH REQUIREMENTS.

FIRE HYDRANT ASSEMBLY SCALE: NTS	DETAIL NUMBER FV451	
	REVISED MAR 23, 2017	



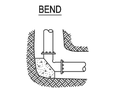
NOTES:
1. VALVE BOX NOT TO REST ON OPERATING ASSEMBLY.
2. EXTEND THE 2 INCH SQUARE OPERATING NUT WHEN THE VALVE NUT IS 48 INCHES OR DEEPER BELOW THE FINISHED GRADE.
3. THE ROCK GUARD SHALL BE A 1/8 INCH STEEL PLATE WELDED TO THE PIPE SHAFT WITH A DIAMETER THAT IS 3/8 INCH LESS THAN THE INSIDE DIAMETER OF THE VALVE BOX.
4. WHERE DEPTH IS OVER 6 FEET, A SECOND PLATE SHALL BE INSTALLED EQUIDISTANT BETWEEN THE FIRST ROCK GUARD AND THE VALVE NUT. SECOND PLATE SHALL BE CONSTRUCTED SAME AS ROCK GUARD.
5. EXTEND VALVE BOX BY USING ONE PIECE WITH NO LONGITUDINAL CUTS, TO THE LENGTH REQUIRED, OF 6 INCH OD, 12 GAUGE STEEL PIPE OR *ASTM* D3034-SDR 35 PVC PIPE.

VALVE BOX AND EXTENSION ASSEMBLY SCALE: NTS	DETAIL NUMBER FV452	
	REVISED MAR 03, 2018	

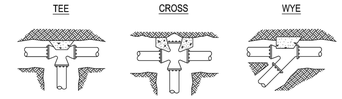
CONCRETE THRUST BLOCK SCHEDULE

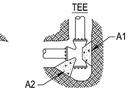
(HORIZONTAL)
BEARING AREA OF THRUST BLOCKS
IN SQUARE FEET

FITTING SIZE	TEE, WYE, DEAD END	STRADDLE BLOCK	90° BEND PLUGGED CROSS	TEE PLUGGED ON RUN A-1	TEE PLUGGED ON RUN A-2	45° BEND	22-1/2° BEND	11-1/4° BEND
4	1.0	1.6	1.4	1.9	1.4	1.0	---	---
6	2.1	3.7	3.0	4.3	3.0	1.6	1.0	---
8	3.8	6.5	5.3	7.6	5.4	2.9	1.5	1.0
10	5.9	10.2	8.4	11.8	8.4	4.6	2.4	1.2
12	8.5	14.7	12.0	17.0	12.0	6.6	3.4	1.7
14	11.5	---	16.3	23.0	16.3	8.9	4.6	2.3
16	15.0	26.1	21.3	30.0	21.3	11.6	6.0	3.0
18	19.0	---	27.0	38.0	27.0	14.6	7.6	3.8
20	23.5	40.8	33.3	47.0	33.3	18.1	9.4	4.7
24	34.0	58.8	48.0	68.0	48.0	26.2	13.6	6.8

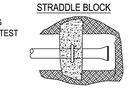

BEND

CROSS


TEE CROSS WYE



TEE

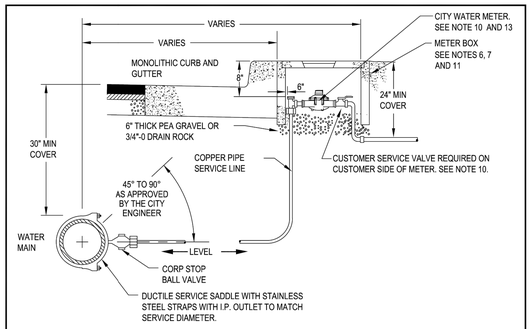

STRADDLE BLOCK

ABOVE BEARING AREAS BASED ON TEST PRESSURE OF 150 PSI AND AN ALLOWABLE SOIL BEARING STRENGTH OF 2,000 POUNDS PER SQUARE FOOT. TO COMPUTE BEARING AREAS FOR DIFFERENT TEST PRESSURES AND SOIL BEARING STRESSES, USE THE FOLLOWING EQUATION:
BEARING AREA = (TEST PRESSURE / 150) x (2,000 / SOIL BEARING STRESS) x (TABLE VALUE)

ABOVE VOLUMES BASED ON TEST PRESSURE OF 150 PSI AND CONCRETE UNIT WEIGHT OF 4,050 POUNDS PER CUBIC YARD. TO COMPUTE FOR DIFFERENT TEST PRESSURES , USE THE FOLLOWING EQUATION:
VOLUME = (TEST PRESSURE / 150) x (TABLE VALUE)

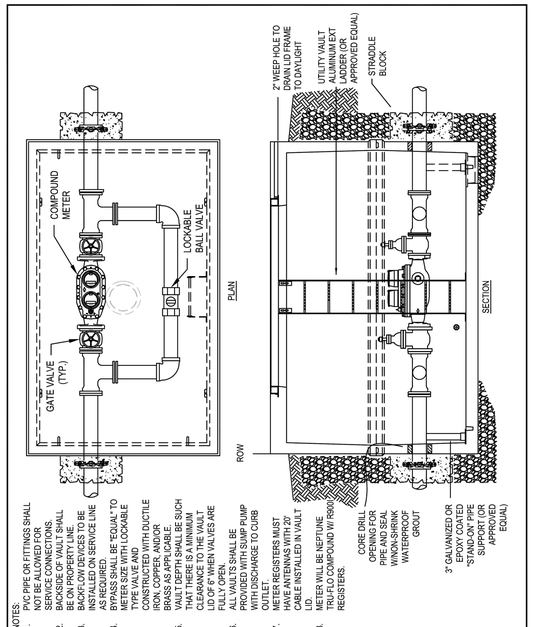
NOTES:
1. CONCRETE THRUST BLOCKING TO BE POURED AGAINST UNDISTURBED EARTH.
2. KEEP CONCRETE CLEAR OF JOINT AND ACCESSORIES. INSTALL 12 MIL TOTAL THICKNESS POLYETHYLENE SHEET AROUND FITTING. SECURE SHEET ENDS TO PREVENT INFILTRATION OF DIRT BETWEEN SHEET AND PIPE FITTING PRIOR TO POURING THRUST BLOCKING.
3. THE REQUIRED THRUST BEARING AREAS FOR SPECIAL CONNECTIONS ARE SHOWN.
4. IF NOT SHOWN ON PLANS, REQUIRED BEARING AREAS AT FITTING SHALL BE AS INDICATED ABOVE, ADJUST IF NECESSARY, TO CONFORM TO THE TEST PRESSURE(S) AND ALLOWABLE SOIL BEARING STRESS(ES) STATED IN THE *SPECIFICATIONS*.
5. BEARING AREAS ON THIS DETAIL ARE MINIMUMS AND SPECIAL BLOCKING DETAILS SHOWN ON PLANS TAKE PRECEDENCE OVER BEARING AREAS AND BLOCKING DETAILS SHOWN ON THIS *STANDARD DRAWING*.

HORIZONTAL THRUST BLOCKING SCALE: NTS	DETAIL NUMBER FV450A	
	REVISED MAR 23, 2017	



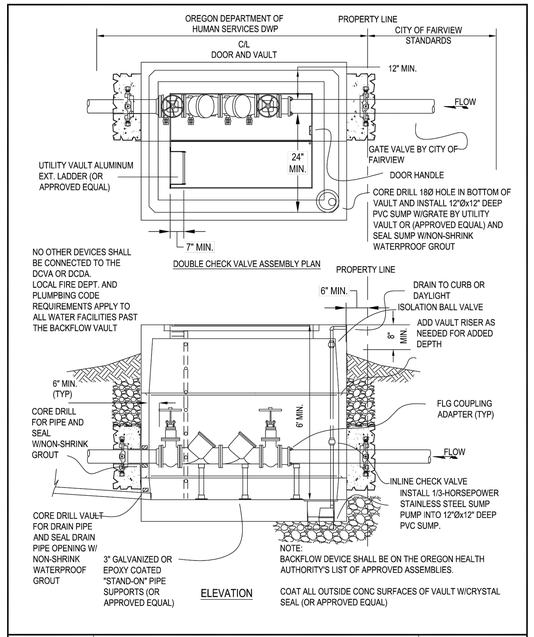
NOTES:
1. WATER SERVICE TO BE INSTALLED BY DEVELOPER.
2. WATER METER TO BE PROVIDED BY CITY AFTER PAYMENT OF ALL APPLICABLE FEES.
3. WHEREVER POSSIBLE, SERVICE LINE TO EXTEND PERPENDICULAR FROM THE WATER MAIN TO THE METER STOP.
4. CORPORATION AND CURB STOPS TO BE *MUELLER* 300 BALL VALVES, 300 PSI RATED, WITH *MUELLER* 110 COMPRESSION JOINTS AND PADLOCK WINGS, *FORD METER BOX CO. BALLCORP* 300 PSI RATED BALL VALVE WITH "QUICK JOINT" CONNECTIONS AND PADLOCK WINGS, OR IDENTICAL EQUAL. CORPORATION STOP TO BE INSTALLED WITH KEY SIDEWAYS IN OPEN POSITION.
5. A 1-INCH BYPASS LINE WITH LOCKING CURB STOP MAY BE REQUIRED FOR CONTINUOUS SERVICE INSTALLATIONS.
6. TOP OF METER BOX TO BE SET FLUSH WITH SIDEWALK OR TOP OF CURB.
7. ALL METER BOXES LOCATED IN DRIVEWAYS AND SIDEWALKS SHALL HAVE TRAFFIC COVERS.
8. METER TO BE CENTERED AND SET PLUMB INSIDE METER BOX.
9. ALL PIPE AND STRUCTURE ZONES SHALL BE BACKFILLED USING 3/4"-MINUS CRUSHED AGGREGATE AND COMPACTED TO 95% MAX. DENSITY AS DETERMINED BY AASTHO T-180.
10. WATER METER AND CUSTOMER VALVE INSTALLATION SHALL BE COORDINATED WITH THE CITY.
11. METER BOX TO BE ARMORCAST OR APPROVED EQUAL. SEE METERBOX A OR B IN THE DESIGN STANDARDS AS APPLICABLE .
12. THIS DETAIL MAY BE USED ON METERED IRRIGATION SYSTEMS ON COMMERCIAL SITES.
13. WATER METER REQUIRED IS A NEPTUNE T-10 W/ R900i REGISTER AND A 6 FOOT ANTENNA INSTALLED IN METER LID.

3/4" TO 1 1/2" WATER SERVICE SCALE: NTS	DETAIL NUMBER FV456	
	REVISED MAR 03, 2018	



NOTES:
1. PVC PIPE OR FITTINGS SHALL NOT BE ALLOWED FOR SUPPORT CONDITIONS. BACKSIDE OF VAULT SHALL BE ON PROPERTY LINE.
2. BACKFLOW DEVICES TO BE INSTALLED ON SERVICE LINE AS REQUIRED.
3. BYPASS SHALL BE "EQUAL" TO METER SIZE WITH LOCKABLE TYPE VALVE AND CONSTRUCTED WITH DUCTILE IRON, COPPER, AND/OR BRASS AS APPLICABLE.
4. VAULT DEPTH SHALL BE SUCH THAT THERE IS A MINIMUM CLEARANCE OF 12" FROM THE LID OF 6" WHEN VALVES ARE FULLY OPEN.
5. ALL VAULTS SHALL BE PERFORATED WITH SUMP PUMP WITH DISCHARGE TO CURB OUTLET.
6. METER REGISTERS MUST HAVE ANTENNAS WITH 20' CABLE INSTALLED IN VAULT LID.
7. METER WILL BE NEPTUNE TRU-FLO COMPOUND W/ R900i REGISTERS.
8.

COMPOUND METER LARGER THAN 2" SERVICE SCALE: NTS	DETAIL NUMBER FV459	
	REVISED MAR 03, 2018	



DOUBLE CHECK VALVE ASSEMBLY-DETECTOR SCALE: NTS	DETAIL NUMBER FV462	
	REVISED MAR 12, 2018	

PLS ENGINEERING
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Water Details & Notes For:
AWR Site Plan
A Site Located In Fairview, Oregon
Consulting Engineers & Planners

Revisions

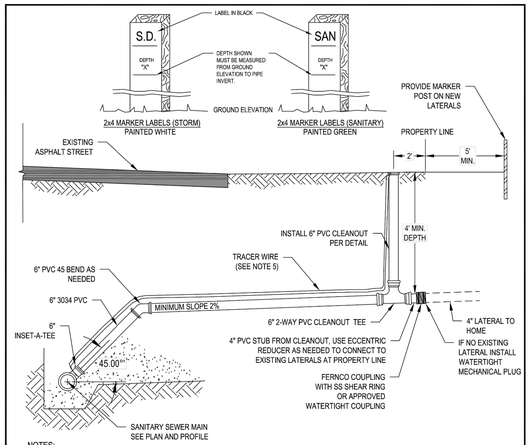
A	5/14/2018	1st Submittal
B		
1		
2		
3		
4		

REGISTERED PROFESSIONAL ENGINEER 74948 OREGON SEPT. 14, 2001 DAVID GLEN SPENCER
5/14/18
RENEWS: 06/30/2018

Project No. 2761
SCALE: H: N/A V: N/A
DESIGNED BY: TGJ
DRAFTED BY: DGS
REVIEWED BY: AJG

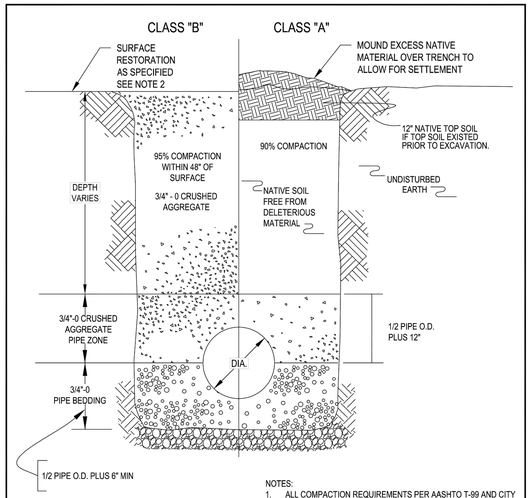
C7
C11

Exhibit B8



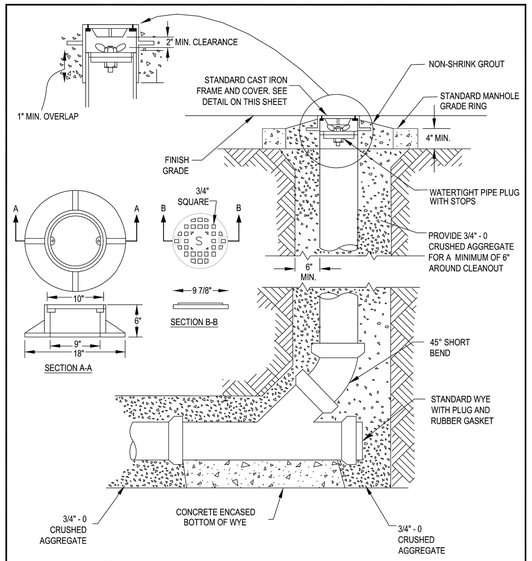
NOTES:
1. PROVIDE FERNCO COUPLING WITH STAINLESS STEEL SHEAR RING AT CONNECTION TO 2-WAY PVC TEE.
2. WHEN REQUIRED, CLEANOUTS SHALL BE INSTALLED AT 100' INTERVALS.
3. VERTICAL DROPS INTO SEWER MAIN ARE NOT PERMITTED.
4. SEWER LATERAL INSTALLATIONS SHALL BE INSPECTED PRIOR TO BEING BACKFILLED.
5. INSTALL TRACER WIRE (GREEN, 18 GAGE, INSULATED COPPER) FROM THE MAINLINE TO THE CLEANOUT SO THAT BOTH ENDS OF A SINGLE CONDUCTOR ARE AT CLEANOUT. TIE TRACER WIRE TO THE TOP OF THE CAP BEFORE BURYING.
6. CONTRACTOR TO POTHOLE LOCATION OF LATERAL CONNECTION AT RIGHT-OF-WAY AND UTILITY CROSSINGS AS NEEDED TO SET LINE AND GRADE AND AVOID CONFLICTS.
7. MAINTAIN MINIMUM 4' DEPTH FOR NEW LATERALS.
8. PIPE AND FITTINGS SHALL BE COMPATIBLE.
9. INSET-A-TEE ONLY ALLOWED ON PIPES 6"-10" WITH USE OF A MANDREL. FLAT TEES MUST BE APPROVED BY THE CITY.
10. MARKER POSTS SHALL BE TREATED WOOD. POST SHALL BE 2" X 4" X REQUIRED LENGTH FIR. POST TO EXTEND 24" MINIMUM ABOVE FINISH GRADE.
11. STAMP (IN CONCRETE) A 3" HIGH BY 2 WIDE BY 1/4" DEEP "SD" (FOR STORM DRAIN) OR "S" (FOR SANITARY) ON TOP OF THE CONCRETE CURB FOR FUTURE LOCATES.
12. PIPE ZONE AND TRENCH BACKFILL TO BE INSTALLED PER STANDARD DRAWING FV201.

CITY OF FAIRVIEW OREGON	SEWER SERVICE CONNECTION SCALE: NTS	DETAIL NUMBER FV219
		REVISED MAR 23, 2017



NOTES:
1. ALL COMPACTION REQUIREMENTS PER AASHTO T-99 AND CITY OF FAIRVIEW CONSTRUCTION SPECIFICATIONS.
2. SEE FV527 FOR STREET CUT AND REPAIRS.
3. WHEN GEOTEXTILE FABRIC IS USED IT SHALL BE PLACED BELOW RESURFACING IN "TEE CUT" AND EXTEND A MINIMUM OF 12" BEYOND TRENCH WALLS.
4. DO NOT COMPACT TOP 2" OF NATIVE BACKFILL IN AREAS TO BE SEEDED.
5. IF REQUIRED, TRENCH STABILIZATION SHALL BE SPECIFIED SEPARATELY AND PLACED PRIOR TO PLACEMENT OF BEDDING MATERIAL.

CITY OF FAIRVIEW OREGON	TRENCH BACKFILL SCALE: NTS	DETAIL NUMBER FV200
		REVISED MAR 23, 2017



NOTE:
1. STAND PIPE TO BE SAME SIZE AS MAINLINE UP TO AND INCLUDING 8" PIPE. MAINLINE GREATER THAN 8" SHALL HAVE A 8" STANDPIPE.
2. FRAME AND COVER SHALL BE GRAY CAST-IRON, ASTM A-48, CLASS 30.
3. ALL PERMANENT CLEANOUTS TO HAVE BOLT DOWN COVER.

CITY OF FAIRVIEW OREGON	END OF MAINLINE CLEANOUT SCALE: NTS	DETAIL NUMBER FV204
		REVISED MAR 23, 2017

PLS ENGINEERING

Sewer Details & Notes For:

AWR Site Plan

A Site Located In Fairview, Oregon

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Revisions

A	5/14/2018	1st Submittal
B		
1		
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3		
4		

REGISTERED PROFESSIONAL ENGINEER
74948
OREGON
SEPT. 14, 2004
DAVID GLEN SPENCER
5/14/18
RENEWS: 06/30/2018

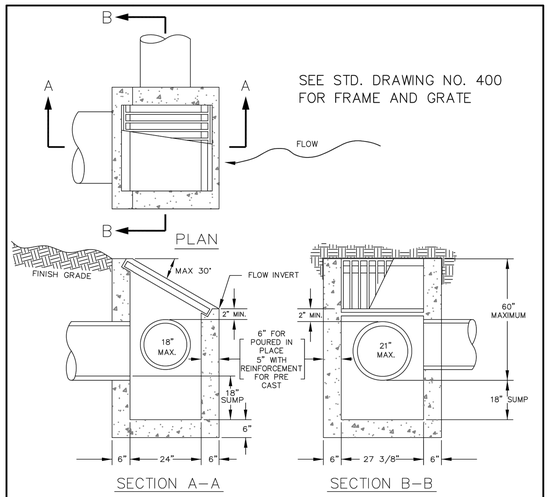
Project No. 2761

SCALE: H: N/A V: N/A

DESIGNED BY: TGJ
DRAFTED BY: DGS
REVIEWED BY: AJG

C8 / C11

Exhibit B9



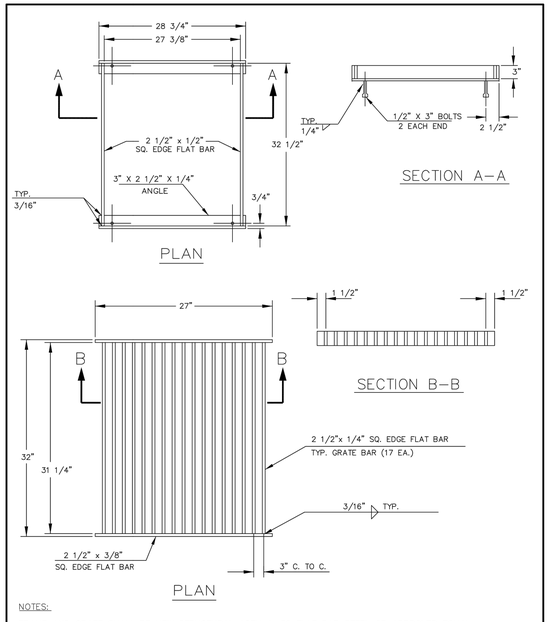
NOTES:

1. ALL PRE CAST SECTIONS SHALL CONFORM TO REQUIREMENTS OF ASTM C–478.
2. INSTALL STRUCTURE ON MINIMUM OF 8" OF 3/4" – 0" COMPACTED BASE MATERIAL.
3. PRE CAST REINFORCEMENT SHALL BE REBAR MEETING ASTM A615 GRADE 60 OR WELDED WIRE MEETING ASTM A497
4. ALL POURED IN PLACE CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 PSI AND SLUMP OF 2" TO 4".
5. PRE–CAST STRUCTURE'S CONFORMING TO O.D.O.T. TYPE G–2 CATCH BASIN DESIGN/WITH DITCH INLET TOP ARE AN ACCEPTABLE ALTERNATE. ALL GRATE MATERIALS SHALL MEET C.W.S. STANDARDS AS SHOWN ON DETAIL #400

DITCH INLET

DRAWING NO. 390 REVISED 05–07

CleanWater Services



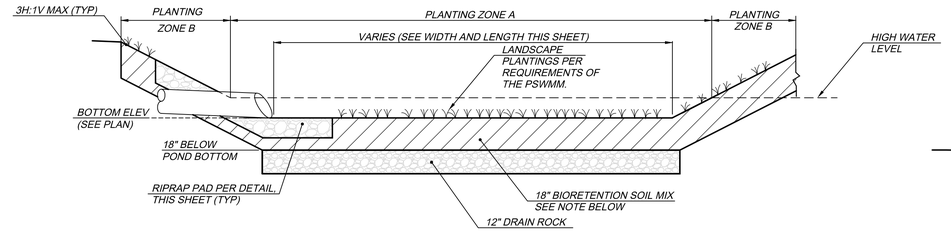
NOTES:

FRAME AND GRATE SHALL BE NEW STRUCTURAL ASTM A–36 FLAT BAR STEEL OR APPROVED EQUAL.

DITCH INLET
FRAME AND GRATE

DRAWING NO. 400 REVISED 12–06

CleanWater Services

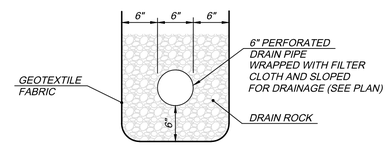


NOTE:
"BIORETENTION SOIL MIX" SHALL BE A 3-WAY SAND/LOAM/COMPOST MIX MEETING THE GROWING MEDIUM REQUIREMENTS OF PSWMM FACILITY DETAIL SW-241. PLANTINGS SHALL MEET THE REQUIREMENTS OF THE PSWMM. SEE THE "PRIVATE STORMWATER FACILITIES PLANT LIST" FOR PLANT OPTIONS, INCLUDING SPACING AND TYPES OF PLANTS TO BE PLANTED IN ZONE A AND ZONE B AS SHOWN ABOVE.

IMPORTANT:
CONTRACTOR SHALL PLACE TEMPORARY CONSTRUCTION FENCING OR SEDIMENT FENCING AROUND INFILTRATION BASIN AREAS DURING CONSTRUCTION TO PREVENT CONSTRUCTION EQUIPMENT FROM ENTERING THOSE AREAS.

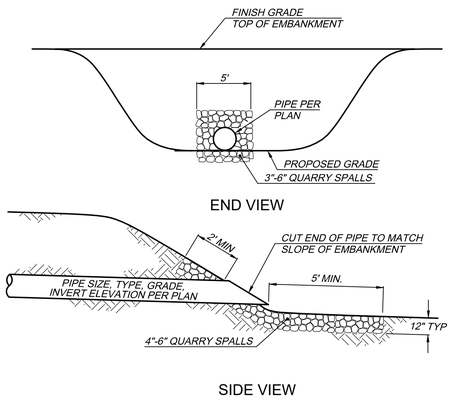
Infiltration Basin Typical Section

NTS



Underdrain

NTS

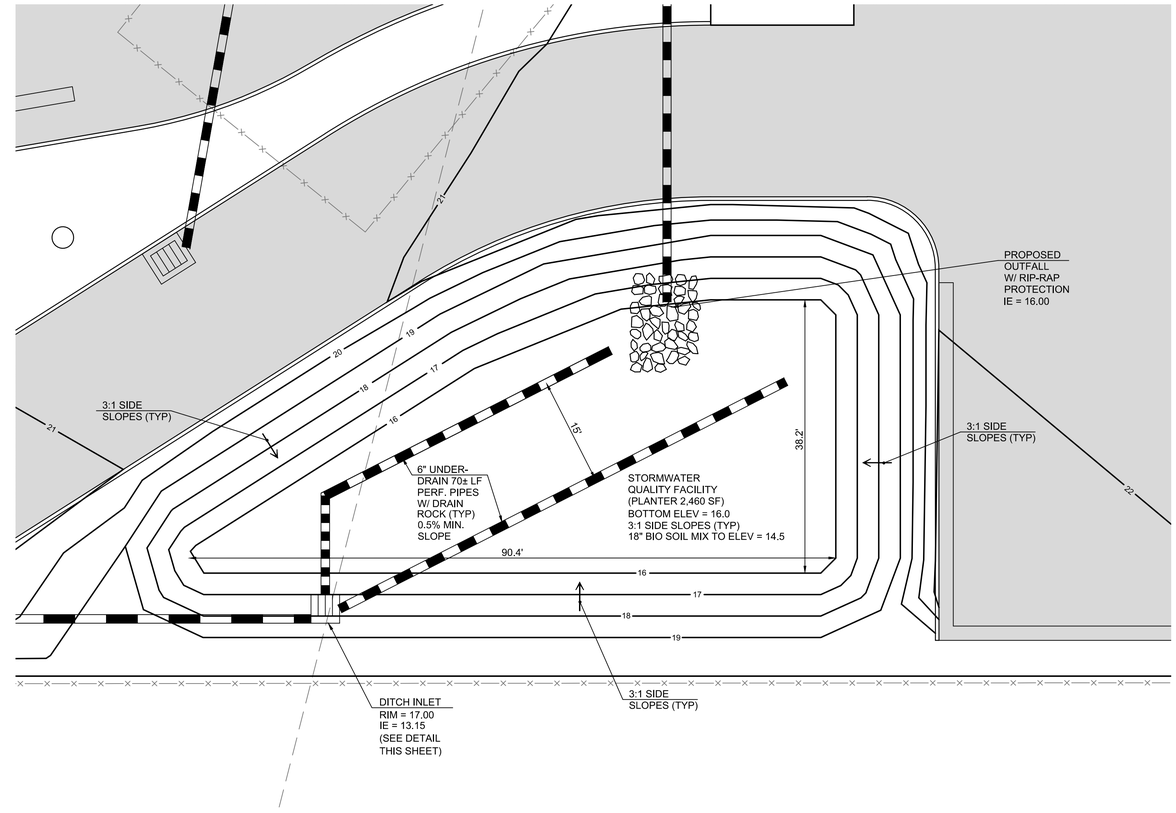


Typical Riprap Pad Detail

NTS

Scale 1" = 10'

10 5 0 10



PLS ENGINEERING

2008 C Street, Vancouver, WA 98663 | PH (360) 944-6519 | Fax (360) 944-6539

Stormwater Facility Plan For:

AWR Site Plan

A Site Located In Fairview, Oregon

Consulting Engineers & Planners

Revisions

A	5/14/2018	1st Submittal				
B						
1						
2						
3						
4						

REGISTERED PROFESSIONAL ENGINEER 74948 OREGON SEPT. 14, 2001 DAVID GLEN SPENCER

5/14/18

RENEWS: 06/30/2018

Project No. 2761	
SCALE:	H: 1" = 40' V: N/A
DESIGNED BY:	TGJ
DRAFTED BY:	DGS
REVIEWED BY:	AJG

C9

C11

Exhibit C1

TRAFFIC ANALYSIS REPORT

FOR

ALLWOOD RECYCLERS

NE MARINE DRIVE

CITY OF FAIRVIEW & MULTNOMAH COUNTY

SUBMITTED BY

CHARBONNEAU ENGINEERING LLC

May 2018

Project 18-18

Exhibit C1

TRAFFIC ANALYSIS REPORT

FOR

ALLWOOD RECYCLERS

NE MARINE DRIVE

CITY OF FAIRVIEW & MULTNOMAH COUNTY

Prepared By

CHARBONNEAU Engineering LLC

5-18-18

REGISTERED PROFESSIONAL ENGINEER
9301
OREGON
JULY 22, 1977
FRANK R. CHARBONNEAU
RENEWS: 12-31-19

May 2018

Project 18-18

10211 SW Barbur Blvd, Suite 210A, Portland, OR 97219 Phone: (503) 293-1118

Exhibit C1

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INTRODUCTION

This traffic study has been prepared to evaluate and document the operations and safety conditions for Allwood Recyclers. The project in Multnomah County and the City of Fairview proposes to develop a five-acre property located on the southerly side of NE Marine Drive and east of 223rd Avenue as a nursery/garden center for public use. The site will contain an office & sales building totaling 4,250 square feet and industrial/warehouse space totaling 1,250 square feet. The existing Allwood Recyclers facility located across Marine Drive will be maintained as a composting/industrial yard operations for all garbage trucks, dump trucks, and large flatbed units. The general public-use and retail business component will shift to the new project location at 22800 NE Marine Drive on tax lots #1N3E22C-00109, property ID #R575270. The location is shown on the attached vicinity map (Figure 'a') in the attached appendix.

In accordance with the County's requirements the study area was defined as the site's frontage area along Marine Drive between the highway interchange at 223rd Avenue and the adjacent highway interchange (Marine Drive) to the east. Several intersections were evaluated in the project including Marine Drive at the existing Allwood Recyclers' site access, existing container storage/auto salvage yard access, proposed east and west site accesses for the new Allwood Recyclers property and the Sundial Road intersection.

TRAFFIC ANALYSIS CONSIDERATIONS

In the project scope established with Multnomah County staff, a number of important elements were identified and considered in this study.

- Inventory and note pertinent information such as traffic control devices, circulation patterns, lane conditions, pedestrian & bicycle facilities, transit zones, parking, and street characteristics.
- Record data on typical weekdays during the AM and PM peak traffic hours.
- Collect traffic count data at the following intersections

    - Marine Drive at the existing Allwood Recyclers' access location
    - Marine Drive at the existing container storage/auto salvage yard access
    - Marine Drive at the existing RV storage lot access
    - Marine Drive at Sundial Road

- Two years of traffic growth at 2.0% per year was applied to establish the year 2020 background volumes.
- County staff confirmed that in-process traffic was applicable and furnished the data for several development projects including NW Freight, Waste Management, & Troutdale Reynolds Industrial Park. The Galli Storage expansion was also considered, however the project did not contribute any trips within the study area.
- Level of service (LOS) analysis of the study intersections to measure the approach delays for comparison to Multnomah County standards.

- Determination of vehicular queuing at the study intersections including at the site accesses on Marine Drive.
- Review intersection sight distance at the proposed access locations.
- Review traffic accident data furnished by ODOT. Determine the intersection crash rates at the study intersections.
- Access spacing comparison to County standards

SITE DESCRIPTION, STREETS, ACCESS, AND CRITICAL INTERSECTIONS

Development of the Allwood Recyclers project in Multnomah County and the City of Fairview will occur on a five-acre property located on the southerly side of NE Marine Drive and serve as nursery/garden center for public use. The site will contain an office & sales building totaling 4,250 square feet and industrial/warehouse space totaling 1,250 square feet. Landscaping materials such as bark, mulch, soil, and rock will be stocked and available for sale. Other materials including pavers, boulders, and wall rock will also be sold. The existing Allwood Recyclers facility located across Marine Drive will be maintained as a composting/industrial yard operations for all garbage trucks, dump trucks, and large flatbed units with the general public-use and retail business component shifting to the new project location.

The site plan (Figure `b`) depicts two proposed access points on the south side of Marine Drive. The west access will serve as a full traffic-movement intersection and be located approximately 56 feet east of the existing gated electrical substation property. The east site access will operate as an exit driveway approach to Marine Drive with separate right and left turn lanes. It will be located approximately 192 feet west of the existing RV storage property gated access. Both accesses will be controlled by stop signs on the driveway approaches.

The intersection of Marine Drive at the existing facility's access is controlled by stop signing on the driveway approach. The existing and proposed lane configurations and traffic control are presented in Figure `c` in the report's appendix.

Marine Drive is under County jurisdiction and classified as a major collector. The road section contains one travel lane in each direction without a center left turn lane within the development's frontage. Paved shoulders are present with no sidewalks. The roadway is currently fully developed and has no posted speed in the immediate vicinity (travel speed assumed to be 55 MPH for analysis purposes).

There is a separated paved pedestrian and bicycle path running parallel to Marine Drive on the south side. The pathway will be maintained as designated on the project site plan. A pedestrian connection from the building site will be constructed to facilitate mobility to the existing pathway.

An adjacent land parcel known as lot #106 (tax ID #239086) is situated southwest of the development site and may develop in the future. The parcel encompasses approximately two

buildable acres and is planned to share Allwood Recyclers` west site access to Marine Drive in order to consolidate intersections on the major collector road. Future development of the property zoned for grazing, agriculture, or horticulture and timber was accounted for in the trip generation and traffic flow analysis. For lot #106 a conservative assumption including 1,000 square feet of office building plus 12,000 square feet of general light industrial space was applied in the analysis.

Marine Drive at Sundial Road is a signalized intersection configured as a tee-shaped design. The eastbound to northbound left turn movement operates with protected phasing. The Sundial Road approach contains separate right and left turn lanes. On Marine Drive there are single through lanes with the westbound approach containing a separate right turn lane. Pedestrian signals are included for the Marine Drive crossing on the west intersection leg.

TRAFFIC OPERATIONAL ANALYSIS

In order to evaluate traffic flow and delay the study intersections were analyzed for level of service (LOS) conditions, delay, and safety. The intersections evaluated included Marine Drive at the existing Allwood Recyclers' site access, existing auto storage yard access, proposed east and west Allwood Recyclers' site access points, and Sundial Road. The two existing gated accesses including the electrical power substation (no site trips recorded in peak hours) and the RV storage facility (no AM peak hour site trips & three egress site trips in the PM peak hour) were not evaluated for LOS due to the negligible volume of traffic.

Level of service (LOS) and queuing analyses were completed in the AM and PM peak hour periods for the following scenarios:

- Year 2018 Traffic
- 2020 Background Traffic
- 2020 Total Traffic

In order to perform the LOS analysis video traffic counts were conducted. The counts were collected in year 2018 during the AM peak (7:00-9:00 AM) and PM peak (4:00-6:00 PM) traffic hours. Figure 1 illustrates the year 2018 volume data.

Multnomah County staff confirmed that in-process traffic existed for this project and furnished the data for several development projects including NW Freight, Waste Management, & Troutdale Reynolds Industrial Park. The Galli Storage expansion was also considered, however the project did not contribute any trips within the study area. The in-process traffic is depicted on Figure 2.

Two years of traffic growth at 2.0% per year has been added to the existing volumes to account for the background traffic volumes. The year 2020 background traffic volumes (including in-process traffic) are illustrated in Figure 3.

When the proposed development is completed existing vehicular trips associated the general public will shift from the existing Allwood Recyclers' site to the new project location. The number of trips making the change was estimated to be approximately 50% of the volume now accessing the site. Figure 6 representing the existing site traffic reroute was developed to account for the circulation change. Additionally the developer has estimated that several Allwood Recyclers' truck trips per day would make roundtrips between the proposed and existing sites to redistribute waste materials deposited by the public at the new site. The truck trips were estimated to be one vehicle in each peak hour and is shown on Figure 7.

Figure 8 illustrates the trip assignment associated with the future development of lot #106 (future office and light industrial).

Figure 9 presents a summary of all the added and site generated trips at the study intersections in the peak hours. The flow map includes the Allwood Recyclers' trip generation, lot #106 trip generation, rerouted trips from existing Allwood Recyclers' business, and the roundtrip truck trip occurring between the proposed and existing site in the peak hours.

The year 2020 total traffic (summation of background traffic volumes and all added traffic including the site generated traffic) is presented in Figure 10.

VEHICULAR TRIP GENERATION

Trip rates presented in the Institute of Transportation Engineers (ITE) Trip Generation manual, 9th edition (year 2012) were utilized to estimate the site's trip generation. The trip generation is summarized in Tables 1 & 2.

Table 1 summarizes the trip generation for the new development under the ITE land use category Nursery-Garden Center (ITE #817) based on 5,500 square feet of building space. The site is projected to generate an ADT of 375 trips per weekday. In the AM peak hour a total of 13 trips will be generated and in the PM peak hour 38 trips will be generated.

Table 2 presents the trip generation for the two uses proposed on lot #106 including a 1,000 square foot office building and 12,000 square feet of general light industrial building space. Lot #106 is projected to generate an ADT of 95 trips per weekday. In the AM peak hour a total of 13 trips will be generated and in the PM peak hour 13 trips will be generated.

Table 1 Trip Generation Summary - Allwood Recyclers

ITE Land Use	Units (sq. ft.)	Weekday						
		ADT	AM Peak Hour			PM Peak Hour		
			Total	Enter	Exit	Total	Enter	Exit
PROPOSED DEVELOPMENT								
Nursery-Garden Center (#817)	5,500							
Generation Rate [1,2]		68.10	2.43	50%	50%	6.94	50%	50%
Site Trips		**375**	**13**	7	6	**38**	19	19

[1] Source: Trip Generation, 9th Edition, ITE, 2012, average rates.

[2] Peak hour enter-exit percentages are estimated.

Table 2 Trip Generation Summary - Lot #106

ITE Land Use	Units (sq.ft.)	Weekday						
		ADT	AM Peak Hour			PM Peak Hour		
			Total	Enter	Exit	Total	Enter	Exit
General Office (#710)	1,000							
Generation Rate [1]		11.03	1.56	88%	12%	1.49	17%	83%
Site Trips		**11**	**2**	2	0	**1**	0	1
Gen. Light Industrial (#110)	12,000							
Generation Rate [1]		6.97	0.92	88%	12%	0.97	12%	88%
Site Trips		**84**	**11**	10	1	**12**	1	11
Lot 106 Estimated Trips (Future)		**95**	**13**	12	1	**13**	1	12

[1] Source: *Trip Generation*, 9th Edition, ITE, 2012, average rates.

The trip distribution was based on the existing count data and engineering judgment. This information is presented on Figure 4. The corresponding trip assignments are presented in Figure 5 for the AM & PM peak hours.

CAPACITY ANALYSIS

Capacity analyses were performed to determine the levels of service for the weekday peak hours. Synchro v9.1 software was used to determine the approach delays and level of service for the study intersections. The program is based on the year 2010 Highway Capacity Manual methodology. Table 3 summarizes the analysis results for each of the study intersections. All are stop controlled locations. Copies of the capacity analysis summaries are included in the appendix.

Table 3 Capacity Analysis Summary

Intersection	Type of Control	Peak Hour	Traffic Scenario											
			2018 Existing				2020 Background				2020 Total			
			Crit. Mov't	LOS	Delay	v/c	Crit. Mov't	LOS	Delay	v/c	Crit. Mov't	LOS	Delay	v/c
Existing Allwood Site Access & Marine Drive	Two-way Stop	AM	SB	C	18.3	-	SB	D	33.2	-	SB	E	36.8	-
		PM	SB	B	14.0	-	SB	D	26.6	-	SB	C	21.5	-
	Mitigated[1]	*AM*	-	-	-	-	-	-	-	-	SB	D	34.9	-
		PM	-	-	-	-	-	-	-	-	-	-	-	-
Container Storage & Auto Salvage Access & Marine Drive	Two-way Stop	AM	SB	C	20.0	-	SB	E	42.5	-	SB	E	43.3	-
		PM	SB	B	14.4	-	SB	D	28.3	-	SB	D	29.1	-
Proposed West Site Access & Marine Drive	Two-way Stop	AM	-	-	-	-	-	-	-	-	NB	D	33.7	-
		PM	-	-	-	-	-	-	-	-	NB	E	49.8	-
	Mitigated[2]	*AM*	-	-	-	-	-	-	-	-	-	-	-	-
		PM	-	-	-	-	-	-	-	-	NB	E	47.5	-
	Mitigated[3]	*AM*	-	-	-	-	-	-	-	-	-	-	-	-
		PM	-	-	-	-	-	-	-	-	NB	E	49.2	-
Proposed East Site Access (exit only) & Marine Drive	Two-way Stop	AM	-	-	-	-	-	-	-	-	NB	D	19.5	-
		PM	-	-	-	-	-	-	-	-	NB	C	19.2	-
Sundial Road & Marine Drive	Signal	AM	-	C	23.5	0.32	-	F	85.0	0.57	-	F	87.1	0.57
		PM	-	B	18.7	0.34	-	C	29.2	0.58	-	C	29.6	0.59
	Mitigated[4]	*AM*	-	-	-	-	-	*C*	*31.8*	*0.50*	-	*C*	*33.0*	*0.58*
		PM	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 2010 Highway Capacity Manual methodology used in analysis, Synchro v9. NB - Northbound, SB - Southbound, EB - Eastbound, WB - Westbound, LT - Left Turn, Crit. Mov't - Critical movement or critical approach.

[1] Mitigation: Re-stripe existing access (SB) approach to designate a separate left turn lane and a separate right turn lane.

[2] Access Approach Consideration: Provide separate NB left and NB right turn lanes. Not Recommended.

[3] Alternative Consideration: Widen Marine Drive to provide WB left turn lane at west site access - Not Recommended.

[4] Mitigation: Construct second eastbound left turn lane and second westbound through lane - Not Recommended.

Multnomah County's minimum level of service (LOS) standard is LOS `D`.

The intersection on Marine Drive at the existing Allwood Recyclers' access currently operates at acceptable LOS `C` and LOS `B` in the AM & PM peak hours, respectively. It will continue to operate at LOS `D` or better through the year 2020 conditions except during the AM peak hour for the year 2020 total traffic scenario. The condition can be mitigated by restriping the southbound approach to accommodate separate left and right turn lanes.

The intersection on Marine Drive at the existing container storage/auto salvage yard access currently operates at acceptable LOS `C` and LOS `B` in the AM & PM peak hours,

respectively. It will operate at LOS `E` in the AM peak hour during the year 2020 background and total traffic scenarios. Restriping the intersection to accommodate separate left and right turn lanes on the access approach will not mitigate the operation. The LOS `E` condition is attributed to the in-process traffic. The average vehicular delay change between the background and total traffic scenarios is less than 2%. A traffic signal is not warranted at the intersection. No improvements are recommended as the critical vehicular delay occurs on the private driveway approach.

The proposed east site access at Marine Drive will operate at LOS `D` and LOS `C` in the AM & PM peak hours, respectively in the year 2020 total traffic scenario.

The proposed west site access at Marine Drive will operate at LOS `D` and LOS `E` in the AM & PM peak hours, respectively in the year 2020 total traffic scenario. Striping the access approach for separate northbound left and right turn lanes will not mitigate the operation. Signalization is not warranted. Therefore, stop control on the access approach is recommended.

Marine Drive at Sundial Road is signalized and currently operates at acceptable LOS conditions in the peak hours. By year 2020 the background traffic scenario will fail at LOS `F` in the AM peak hour (85.0" delay, v/c = 0.57). For the year 2020 total traffic scenario the LOS remains failing (87.1" delay, v/c= 0.57). Without making significant improvements on Marine Drive such as adding a second eastbound left turn lane and a second westbound through lane the intersection will continue to experience LOS `F` conditions. The proposed development will add four trips in each direction on Marine Drive in the failing AM peak hour. This total represents less than a 0.75% impact compared to the existing intersection traffic volume and less than a 0.40% impact compared to the intersection background traffic. Considering that the in-process traffic (1,091 vehicles) doubles the intersection volume causing the failing LOS condition and only eight site trips impact the intersection, no mitigation is proposed.

Generally, LOS 'A', 'B', 'C', and 'D' are desirable service levels ranging from no vehicle delays to average or longer than average delays in the peak hours. Level 'E' represents long delays indicating signalization warrants need to be reviewed and signals considered only if warrants are met. Level 'F' indicates that intersection improvements, such as widening and signalization, may be required. According to the Highway Capacity Manual (HCM), the following delay times are associated with the LOS at stop controlled unsignalized and signalized intersections.

Level of Service criteria defined in Highway Capacity Manual

Level of Service (LOS)	Unsignalized Control Stopped Delay (sec/veh)	Signalized Control Stopped Delay (sec/veh)
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

QUEUING ANALYSIS

Queue length demand for the study intersections was established in the Synchro analysis based on the 95th percentile queue values. Copies of the reports are included in the appendix.

The Marine Drive and proposed east access intersection is considered the critical location for queuing in terms of vehicles turning left from Marine Drive into the site. Additionally, sufficient vehicle stacking capacity inside the development site is necessary to prohibit inbound queues from extending out on to Marine Drive.

The capacity analysis determined that the westbound to southbound left turn into the site will experience minimal or no queuing during the peak hours. The queue results are based on the projected 14 vehicles and 12 vehicles turning left into the site in the AM peak and PM peak hours, respectively.

The site design includes a long on-site driveway for trips that have entered the site. The internal site design provides approximately 200 feet of southbound single-lane stacking prior to turning in the east direction where two receiving lanes for stacking are available each at approximately 210 feet. In total there will be approximately 620 feet of internal vehicle storage for incoming traffic. The distance is enough to stack a total of 15 vehicles or 10 sedan type vehicles plus five very long (70 feet) truck and trailer rigs. This number of vehicles is over half of the trips projected to enter the site in the peak hours (28 enter in the AM peak hour and 29 enter in the PM peak hour). Therefore, the driveway design is considered more than adequate to safely accommodate the demand.

Queuing conditions for the eastbound to northbound movement at Marine Drive and Sundial Road were assessed. Currently Marine Drive provides a center median lane westerly of the intersection with a striped left turn storage length of 120 feet. The storage distance can be extended by restriping the median to provide storage for approximately 425 feet if necessary. The LOS analysis revealed that the worst case period for storage demand occurs in the AM

peak hour. For existing traffic the AM peak hour queue is 100 feet. For the year 2020 background and total traffic scenarios the queue demand will be 625 feet, essentially indicating an intersection design modification to incorporate dual eastbound left turn lanes. The need is 100% attributable to the in-process traffic which is projected to increase the left turn demand from 81 vehicles to 404 vehicles in the AM peak hour. The proposed development will not distribute any trips to the left turn movement. Therefore, no mitigation is recommended in conjunction with the development.

SIGHT DISTANCE

Intersection sight distance at the proposed access points on Marine Drive was reviewed in the field in accordance with the AASHTO standards. The travel speed is not posted within a mile east or west of the project site so a speed of 55 miles per hour was assumed for the sight distance analysis. At 55 MPH the standard requires that 610 feet of sight distance be available.

The Marine Drive alignment is tangent with essentially flat grade easterly of the project site with a long moderate horizontal curve west of the site. Currently over 750 feet of sightline is available in both directions at the east access location.

At the west access point over 750 feet of sight distance is available to the east and 650 feet is available to the west.

Therefore, the sight distance standard is met. It will be necessary to maintain the required sight distance. Overgrowth of existing vegetation along the roadway frontage must be controlled. Placement of any objects such as building structures, walls, signing, parking, above ground utilities, or landscaping that obstruct the sightlines is not permitted for safety purposes.

LEFT TURN LANE REQUIREMENTS

The need for a separate westbound left turn lane on Marine Drive at the west site access was evaluated based on ODOT's criteria contained within the Analysis Procedures Manual (version 1, April 2006). A copy of the left turn lane criterion warrant curve is contained in the appendix.

For the year 2020 total traffic scenario the warrant is met during the AM & PM peak hours. According to the warrant criterion the warrant is not met when the turn lane demand is less than 11 vehicles per hour. Discounting the left turn lane demand associated with the future development of Lot #106 (not part of the proposed Allwood Recycler's project) reduces the AM peak hour left turn demand to seven vehicles. The PM peak hour demand would remain at 12 vehicles or only two vehicles over the warrant threshold. The LOS analysis confirmed that westbound traffic will experience LOS `A` conditions without queuing on Marine Drive in the peak hours indicating that adequate traffic gaps will occur for left turns. As a result installation of a separate westbound left turn lane at the west site access is not recommended.

TRAFFIC SIGNAL WARRANTS

The peak hour signal warrant was evaluated for the worst case west site access on Marine Drive. It was determined the warrant is not met through the year 2020 total traffic scenario.

ACCIDENT HISTORY

Crash data for the study intersections were obtained from ODOT staff and reviewed to identify any traffic safety problems. The study period covered the five year period from January 2011 through December 2015.

The accident rates presented in Table 4 are based on the number of accidents per million entering vehicles (MEV) per year. Typically, an intersection is not considered unsafe unless its accident rate exceeds the threshold value of 1.0 accidents per MEV.

Table 4 Crash Rate Results

Intersection	Crash History (Years)	Number of Crashes	Crashes per year	Annual Traffic Entering (veh/yr)	Crash rate per M.E.V.*
Existing Allwood Site Access and Marine Drive	5	0	0.0	3279855	**0.00**
Container Store Depot (Auto Salvage) and Marine Drive	5	1	0.2	3272550	**0.06**
Sundial Road and Marine Drive	5	5	1.0	4466885	**0.22**

* M.E.V. - million entering vehicles.

None of the study locations experienced a crash rate over 0.22 MEV per year and therefore no safety mitigation is necessary.

PEDESTRIANS, BICYCLES, & BUSES

Sidewalk is not provided on the north side of Marine Drive. A multi-use eight foot wide paved surface exists as a separated pathway along the south side of Marine Drive at the project frontage and beyond. The existing pathway will be maintained with the development. A pedestrian connection from the building site will be constructed to facilitate mobility between the existing pathway and development.

Bicycle lanes are not provided on Marine Drive.

Transit service is not provided by Tri-Met on Marine Drive or the immediate project vicinity. The nearest bus route is in Gresham along 257th Avenue (Route #81-Kane/257th).

ACCESS LOCATIONS & SPACING STANDARDS

Multnomah County's road standards include minimum spacing standards for private driveway approaches located on the public transportation system. Table 1.2.5 (Minimum Private Access Driveway Spacing Standards) and Figure 1.2.1 referenced in the County's Design Standards document that on major collectors the minimum separation allowed is 148 feet.

The proposed east site access will meet the spacing standard as the nearest existing driveway (gated access for RV storage lot) is positioned at a distance of 192 feet to the east. The location is referenced on the site plan.

The proposed west site access is planned east of the existing electrical substation driveway with a separation distance of 56 feet. Across Marine Drive on the north side is another private access located 134 feet east of the new site access. The spacing to both existing driveways does not meet the standard. The existing electrical substation driveway is an unimproved gravel/dirt surfaced and gated driveway permitting authorized use only that did not register any driveway trips during the AM & PM peak hours. The existing private driveway located on the north side of Marine Drive is also an unimproved gravel/dirt surfaced access. It serves property with no obvious building improvements and is zoned as agricultural holding (AH) according to the City of Fairview's zoning map. The access was not counted for traffic flow as no trip purpose was evident. Considering the zoning very few future trips are anticipated to the parcel.

Based on the insignificant traffic use of both adjacent existing driveways no traffic movement conflicts are anticipated in conjunction with the proposed west site access on Marine Drive. The intersection sight distance is excellent at the driveway locations. The potential for conflicting traffic movements between the proposed and existing driveways is minimal. Therefore, it is recommended that the County support the new driveway location as shown on the site plan.

SUMMARY AND RECOMMENDATIONS

The traffic study for the Allwood Recyclers' development in Multnomah County and the City of Fairview proposes to develop a five-acre property located on the southerly side of Marine Drive and east of 223rd Avenue as a nursery/garden center for public use. The site will contain an office & sales building totaling 4,250 square feet and industrial/warehouse space totaling 1,250 square feet. The existing Allwood Recyclers facility located across Marine Drive will be maintained as a composting/industrial yard operations. Development of the site is expected to generate 375 daily trips, 13 AM peak hour trips, and 38 PM peak hour trips.

Intersection sight distance at the proposed access points on Marine Drive was reviewed in the field in accordance with the AASHTO standards. The travel speed is not posted within a mile east or west of the project site so a speed of 55 miles per hour was assumed for the sight distance analysis. At 55 MPH the standard requires that 610 feet of sight distance be

available. Currently over 750 feet of sightline is available in both directions at the east access location. At the west access point over 750 feet of sight distance is available to the east and 650 feet is available to the west. Therefore, the sight distance standard is met. It will be necessary to maintain the required sight distance. Overgrowth of existing vegetation along the roadway frontage must be controlled. Placement of any objects such as building structures, walls, signing, parking, above ground utilities, or landscaping that obstruct the sightlines is not permitted for safety purposes.

The intersection on Marine Drive at the existing Allwood Recyclers' access currently operates at acceptable LOS `C` and LOS `B` in the AM & PM peak hours, respectively. It will continue to operate at LOS `D` or better through the year 2020 conditions except during the AM peak hour for the year 2020 total traffic scenario. The condition can be mitigated by restriping the southbound approach to accommodate separate left and right turn lanes.

The intersection on Marine Drive at the existing container storage/auto salvage yard access currently operates at acceptable LOS `C` and LOS `B` in the AM & PM peak hours, respectively. It will operate at LOS `E` in the AM peak hour during the year 2020 background and total traffic scenarios. Restriping the intersection to accommodate separate left and right turn lanes on the access approach will not mitigate the operation. The LOS `E` condition is attributed to the in-process traffic. The average vehicular delay change between the background and total traffic scenarios is less than 2%. A traffic signal is not warranted at the intersection. No improvements are recommended as the critical vehicular delay occurs on the private driveway approach.

The proposed east site access at Marine Drive will operate at LOS `D` and LOS `C` in the AM & PM peak hours, respectively in the year 2020 total traffic scenario.

The proposed west site access at Marine Drive will operate at LOS `D` and LOS `E` in the AM & PM peak hours, respectively in the year 2020 total traffic scenario. Striping the access approach for separate northbound left and right turn lanes will not mitigate the operation. Signalization is not warranted. Therefore, stop control on the access approach is recommended.

Marine Drive at Sundial Road currently operates at acceptable LOS conditions in the peak hours. By year 2020 the intersection is projected to fail at LOS `F` in the AM peak hour for the year 2020 background and total traffic scenarios. Without making significant improvements on Marine Drive such as adding a second eastbound left turn lane and a second westbound through lane the intersection will ultimately experience LOS `F` conditions. The proposed development will add four trips in each direction on Marine Drive in the failing AM peak hour. This total represents less than a 0.75% impact compared to the existing intersection traffic volume and less than a 0.40% impact compared to the intersection background traffic. Considering that the in-process traffic (1,091 vehicles) doubles the intersection volume causing the failing LOS condition and only eight site trips impact the intersection, no mitigation is proposed.

For the year 2020 total traffic scenario the left turn lane warrant is met during the AM & PM peak hours. According to the warrant criterion the warrant is not met when the turn lane demand is less than 11 vehicles per hour. Discounting the left turn lane demand associated with the future development of Lot #106 (not part of the proposed Allwood Recycler's project) reduces the AM peak hour left turn demand to seven vehicles. The PM peak hour demand would remain at 12 vehicles or only two vehicles over the warrant threshold. The LOS analysis confirmed that westbound traffic will experience LOS `A` conditions without queuing on Marine Drive in the peak hours indicating that adequate traffic gaps will occur for left turns. As a result installation of a separate westbound left turn lane at the west site access is not recommended.

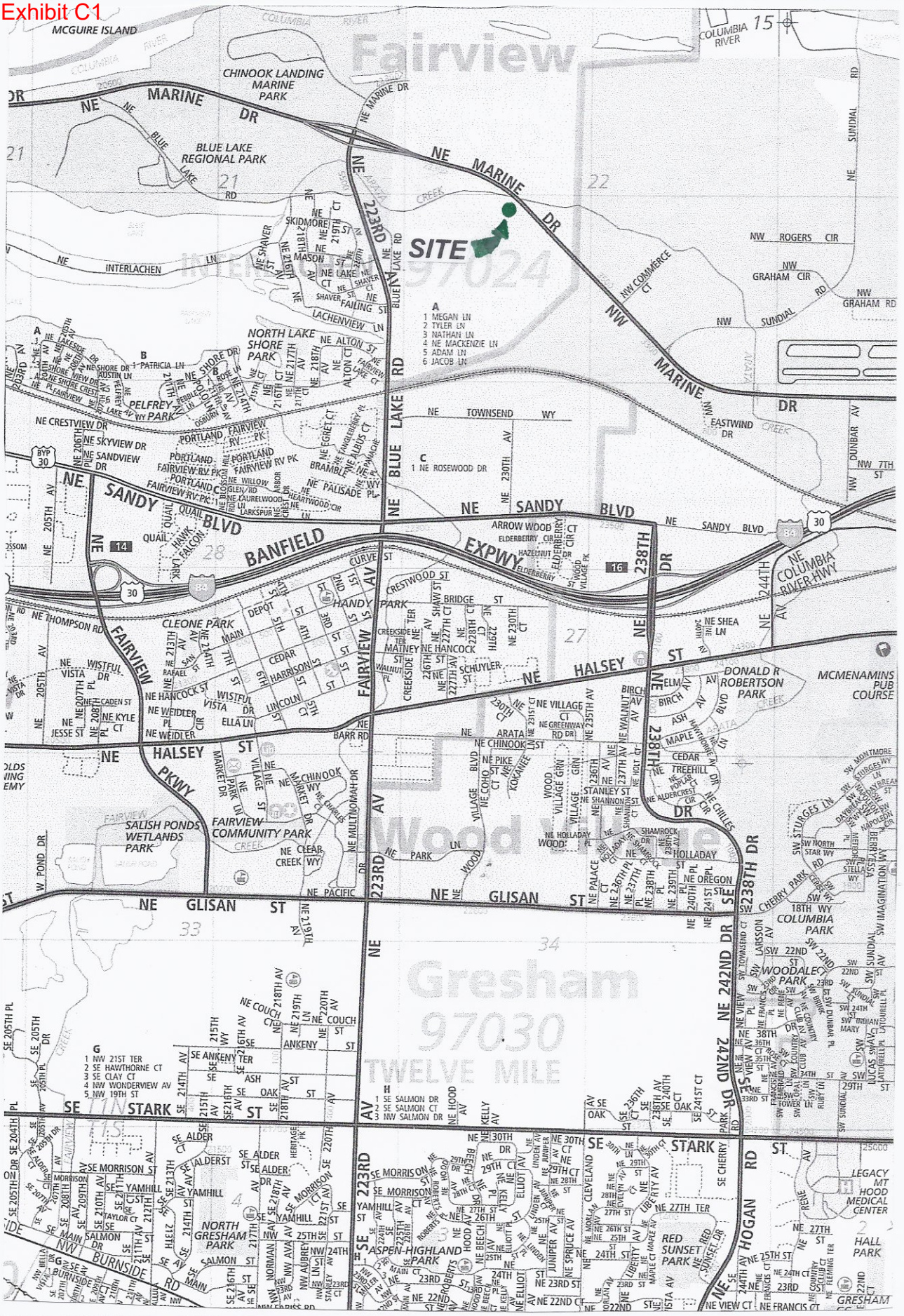
Crash data for the study intersections were obtained from ODOT staff and reviewed to identify any traffic safety problems. The study period covered the five year period from January 2011 through December 2015. The accident rates are based on the number of accidents per million entering vehicles (MEV) per year and typically an intersection is not considered unsafe unless the crash rate exceeds a threshold value of 1.0 accidents per MEV. None of the study locations experience a crash rate over 0.22 MEV per year and therefore no safety mitigation is necessary.

Both of the proposed access approaches to Marine Drive shall be controlled with stop signs.

APPENDIX

- Vicinity Map — Figure `a`
- Site Plan — Figure `b`
- Lane Configurations & Traffic Control — Figure `c`
- Traffic Flow Diagrams
  - Figure 1 — 2018 Existing Traffic (AM & PM)
  - Figure 2 — In-Process Traffic
  - Figure 3 — 2020 Background Traffic
  - Figure 4 — Trip Distribution
  - Figure 5 — Trip Assignment
  - Figure 6 — Existing Allwood Recyclers Site Traffic Reroute
  - Figure 7 — Site-to-Site Truck Traffic
  - Figure 8 — Lot #106 Trip Assignment
  - Figure 9 — Added Traffic Summary
  - Figure 10 — 2020 Total Traffic
- Traffic Count Data
- In-Process Traffic
- Left Turn Lane Warrants
- Peak Hour Signal Warrant
- Accident History Summary (furnished by ODOT)
- Synchro Capacity Analysis Worksheets

Exhibit C1



FILE NAME: 1818flow.dwg

PLOT DATE: 04.11.18

CHARBONNEAU ENGINEERING LLC

PROJECT: 18-18

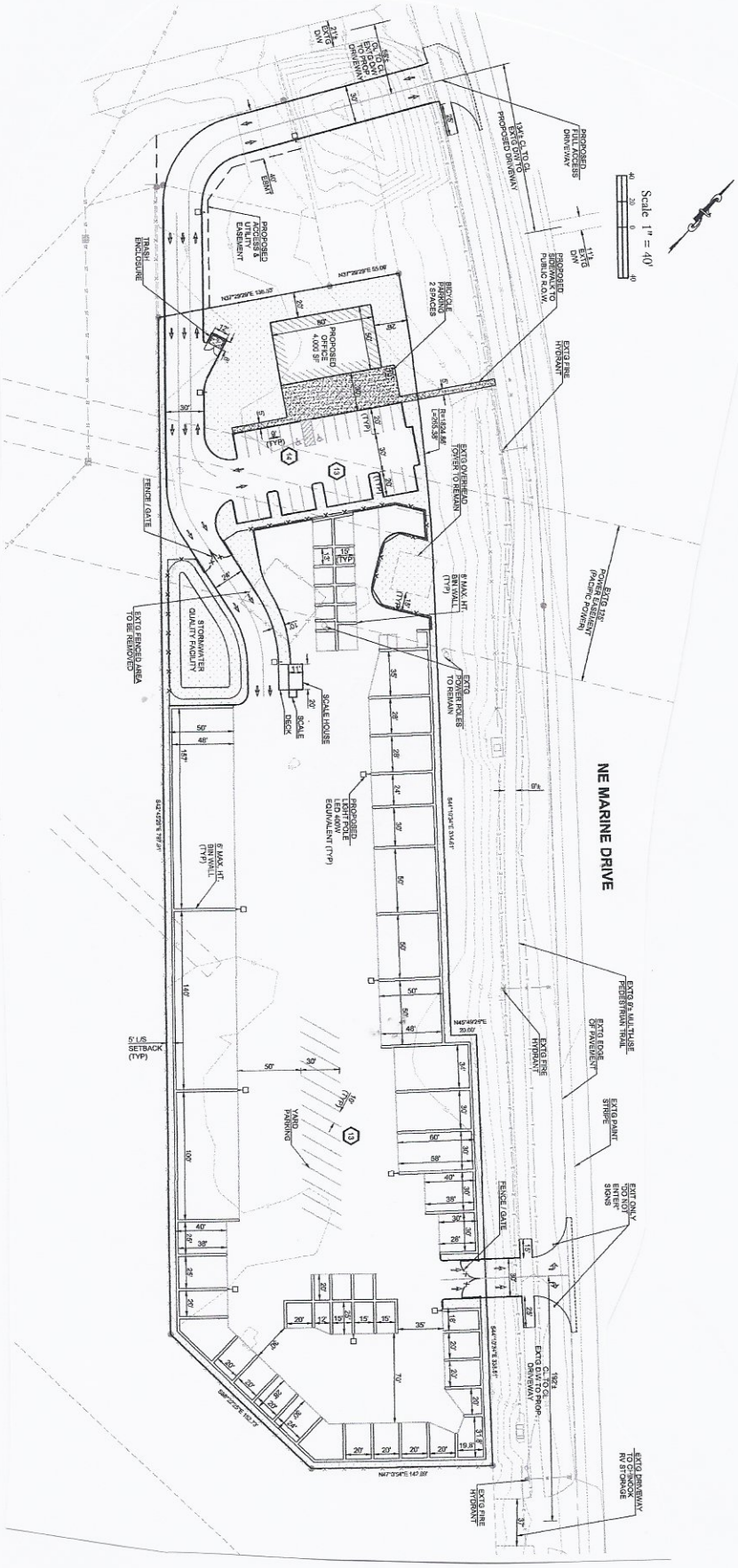
NOTES:
NO SCALE

N

VICINITY MAP
ALLWOOD RECYCLERS

FIGURE
a

Exhibit C1

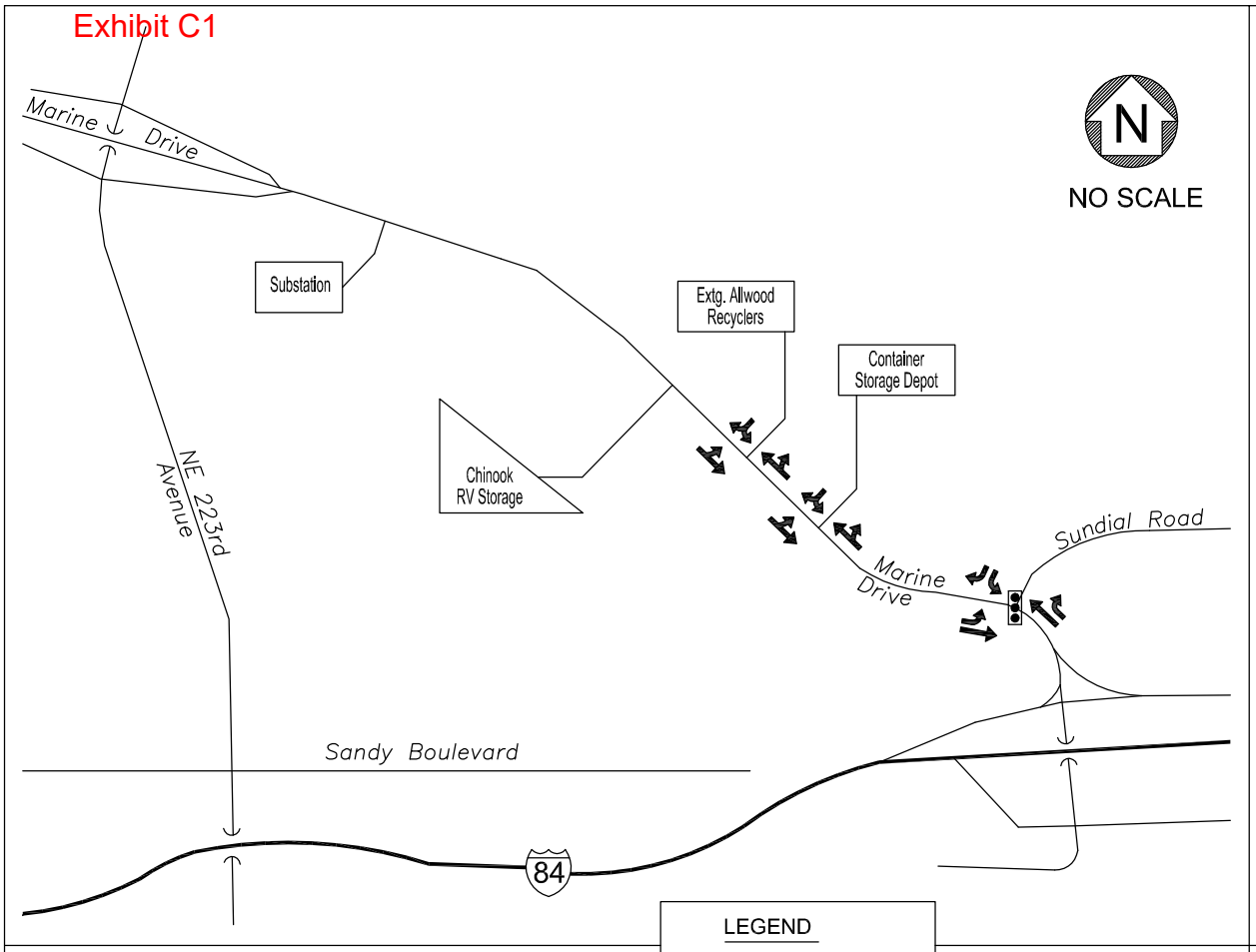


FILE NAME: 1818flow.dwg

PLOT DATE: 04.27.18

CHARBONNEAU ENGINEERING LLC PROJECT: 18-18	NOTES: NO SCALE	SITE PLAN ALLWOOD RECYCLERS	FIGURE b

Exhibit C1



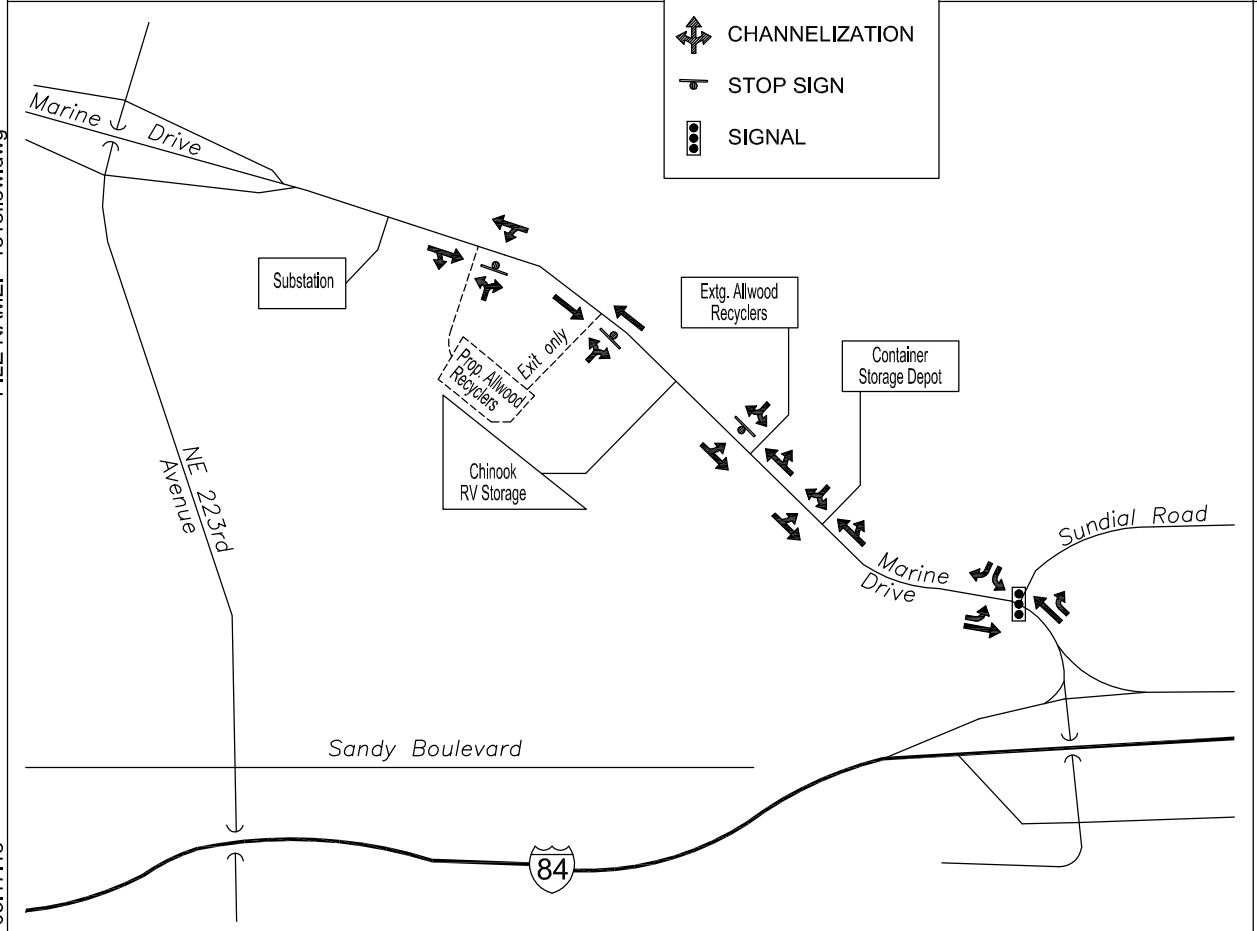
EXISTING

LEGEND

CHANNELIZATION

STOP SIGN

SIGNAL



PROPOSED

FILE NAME: 1818flow.dwg

PLOT DATE: 05.17.18

CHARBONNEAU ENGINEERING LLC

PROJECT: 18-18

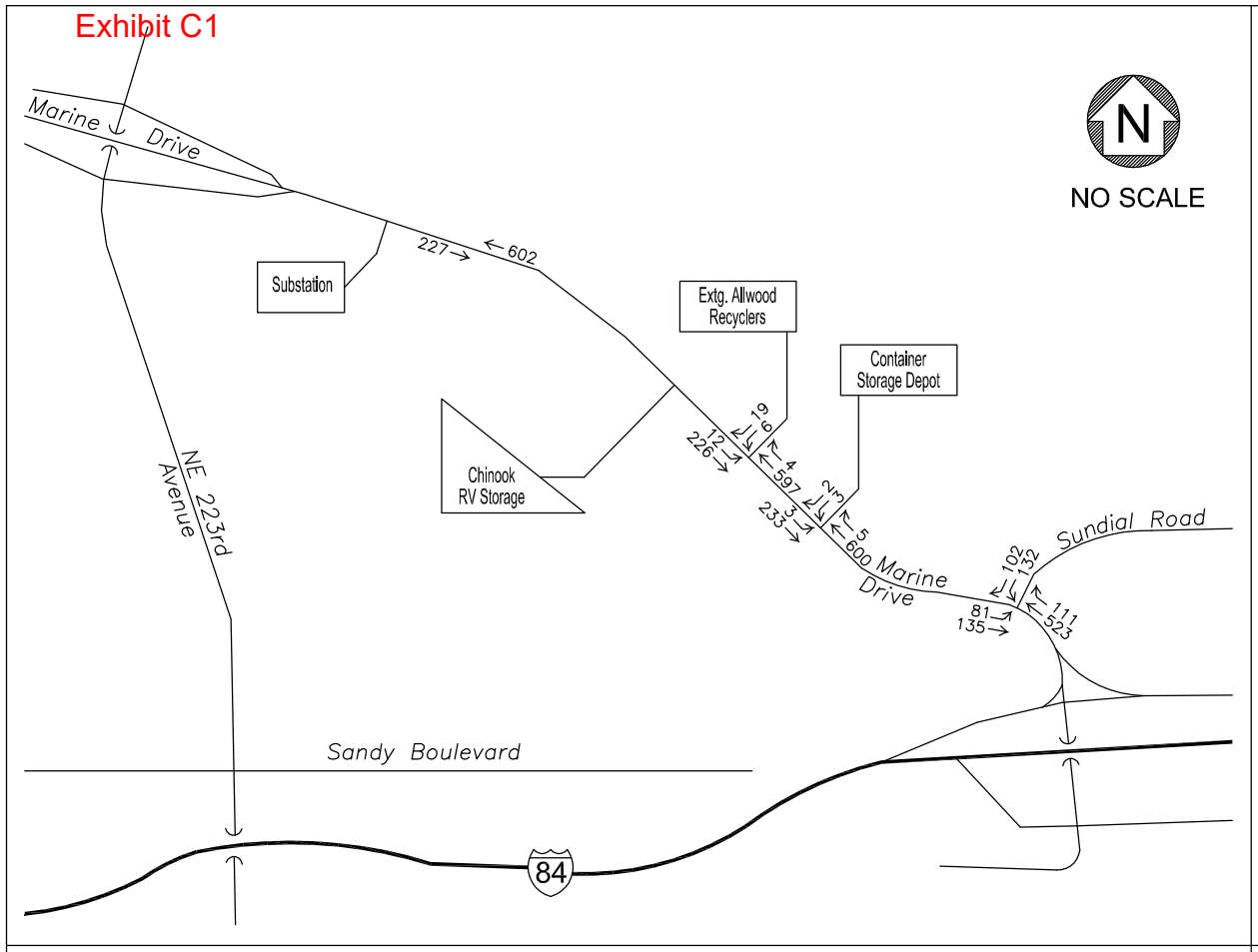
NOTES:

LANE CONFIGURATIONS AND TRAFFIC CONTROL ALLWOOD RECYCLERS

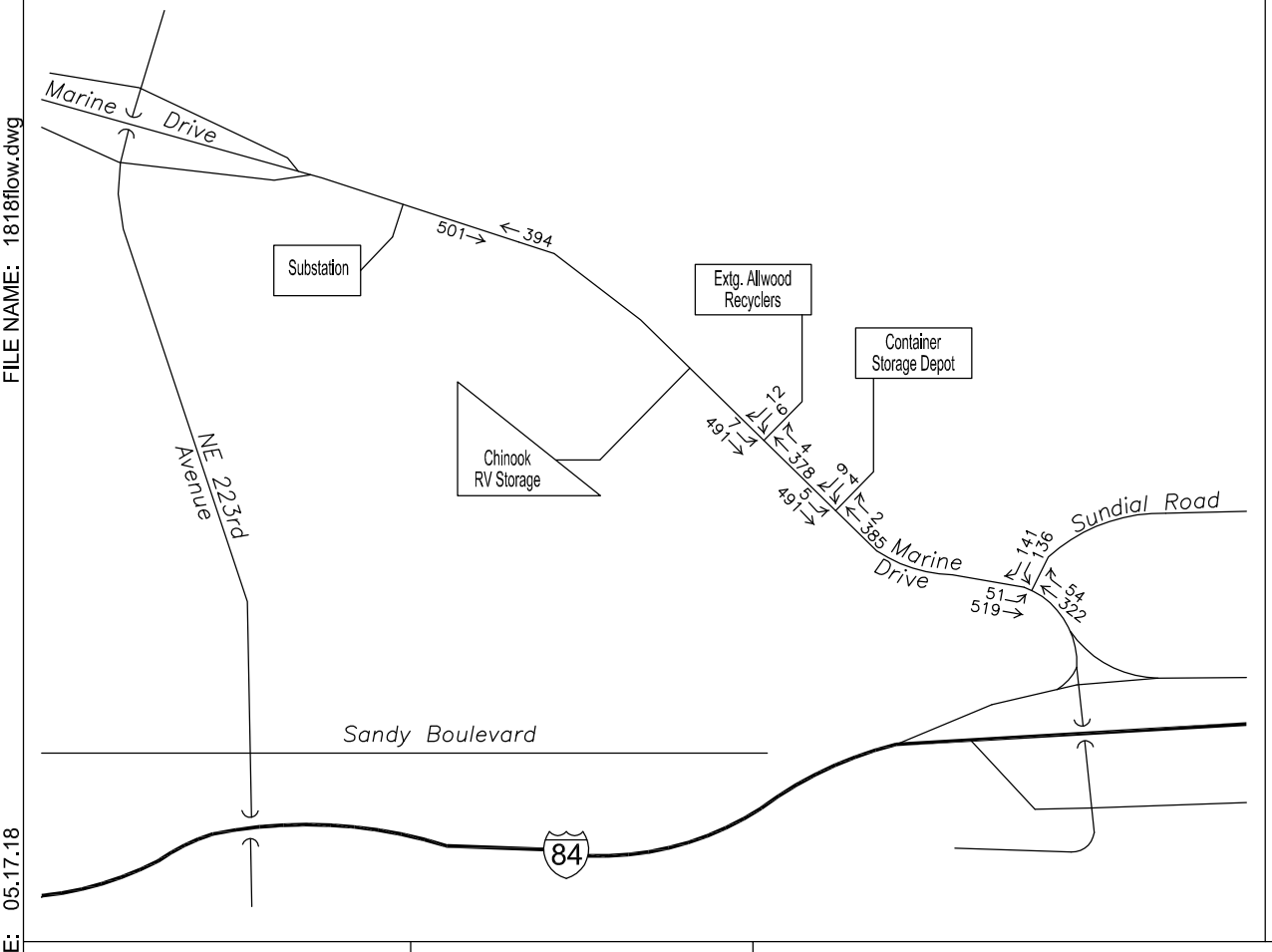
FIGURE

C

Exhibit C1



AM PEAK HOUR



PM PEAK HOUR

FILE NAME: 1818flow.dwg

PLOT DATE: 05.17.18

CHARBONNEAU ENGINEERING LLC

PROJECT: 18-18

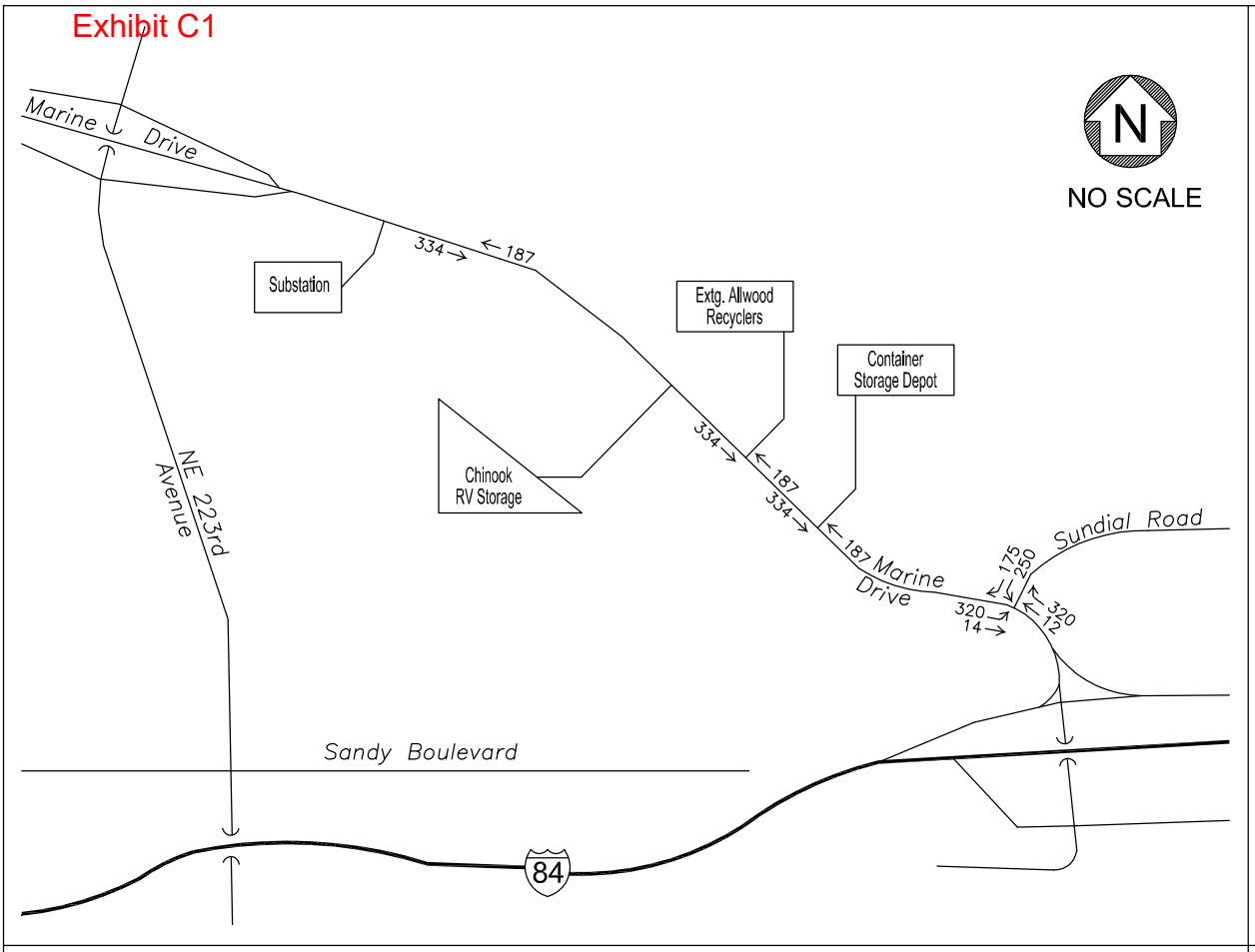
NOTES:

2018 EXISTING TRAFFIC
ALLWOOD RECYCLERS

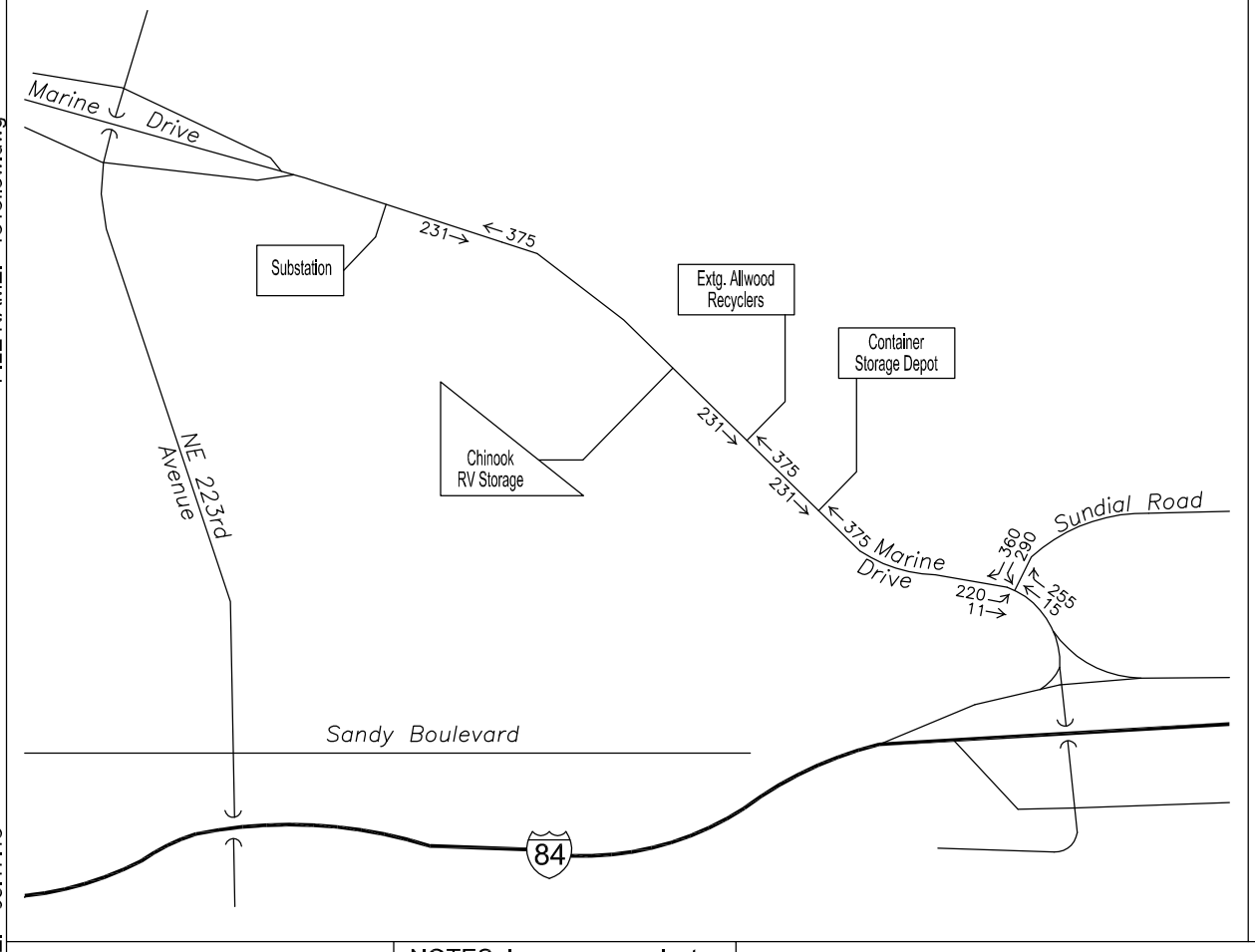
FIGURE

1

Exhibit C1



AM PEAK HOUR



PM PEAK HOUR

FILE NAME: 1818flow.dwg

PLOT DATE: 05.17.18

CHARBONNEAU ENGINEERING LLC

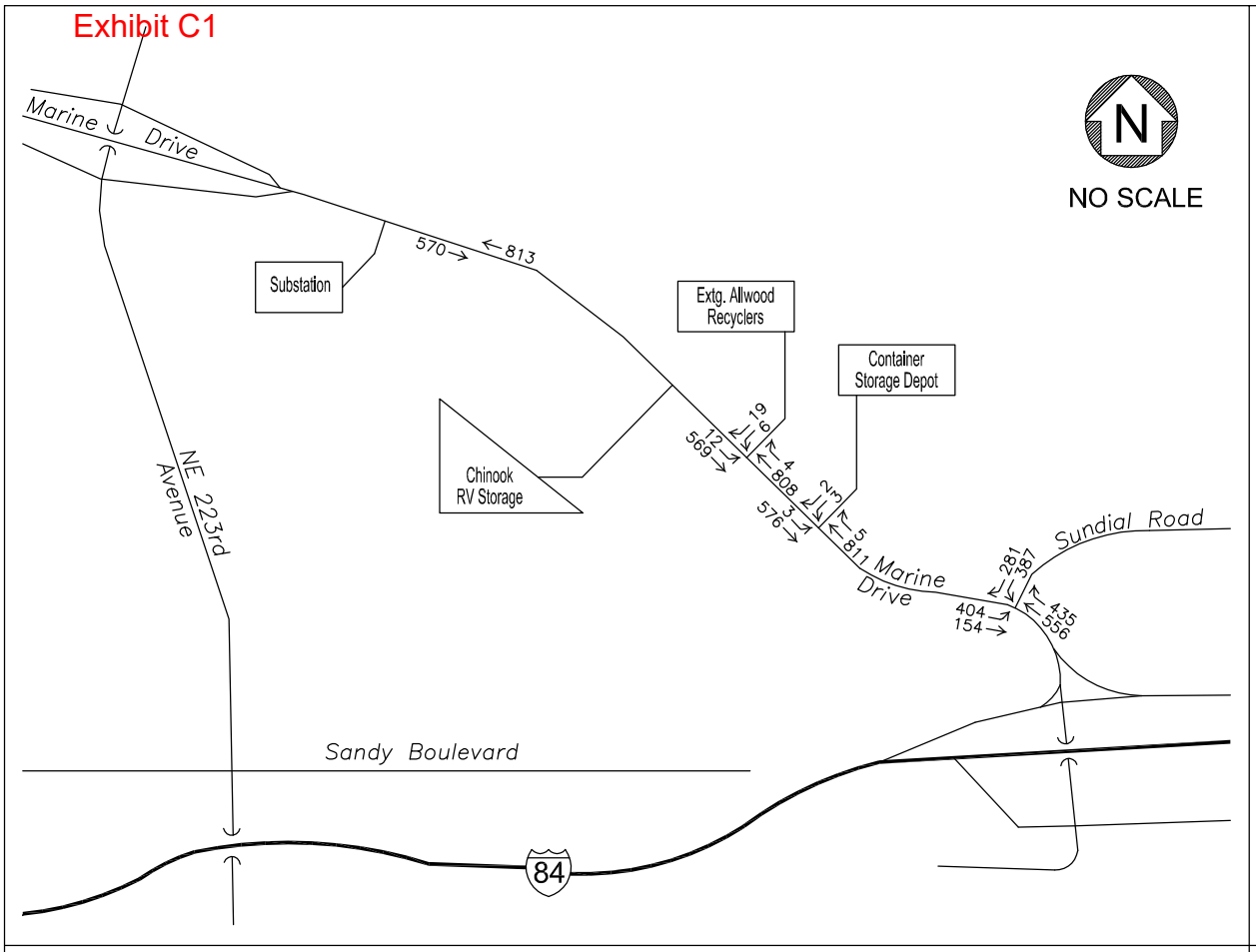
PROJECT: 18-18

NOTES: In-process projects includes NW Freight, Waste Management, & Troutdale Reynolds Industrial Park.

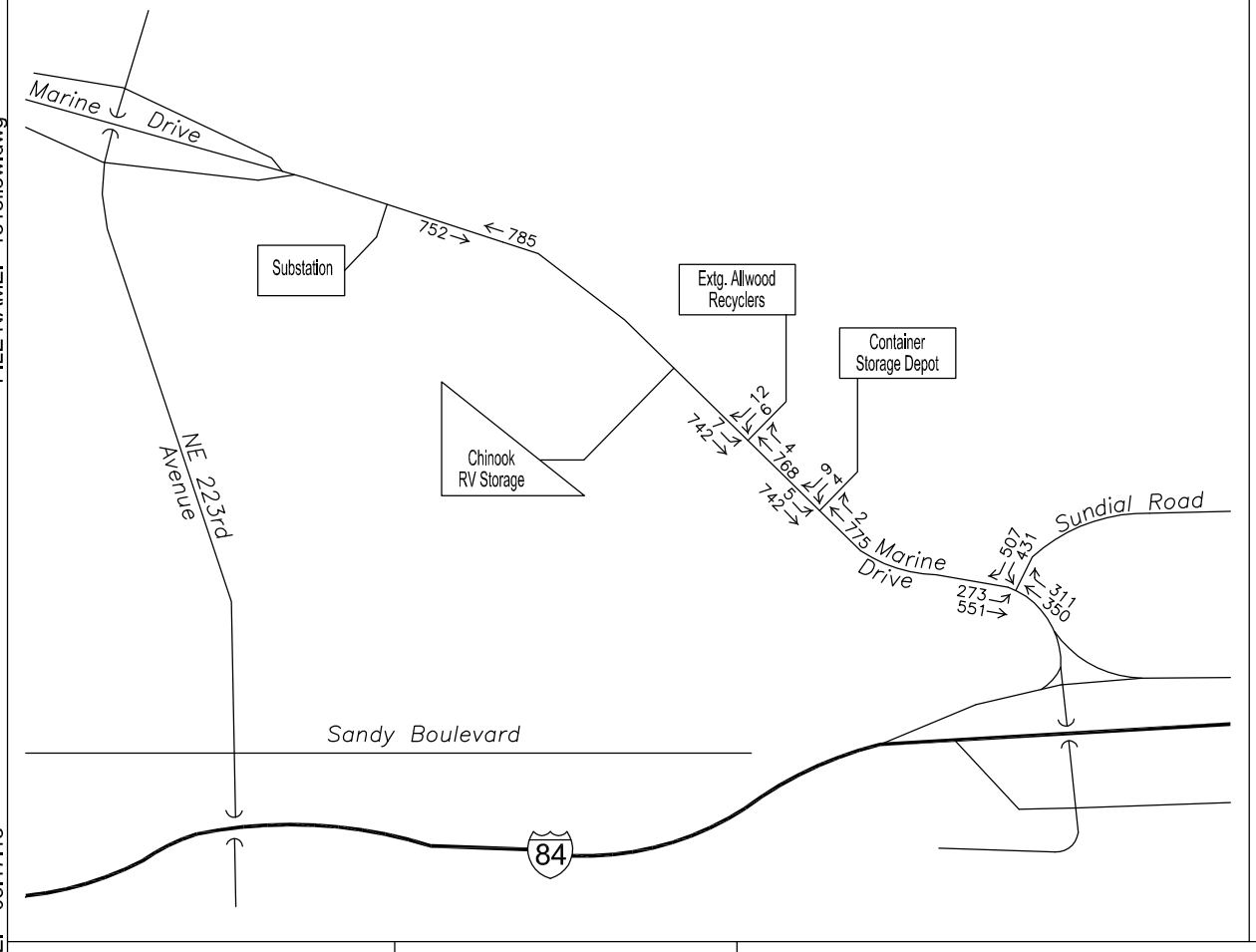
IN-PROCESS TRAFFIC
ALLWOOD RECYCLERS

FIGURE
2

Exhibit C1



AM PEAK HOUR



PM PEAK HOUR

FILE NAME: 1818flow.dwg

PLOT DATE: 05.17.18

CHARBONNEAU ENGINEERING LLC

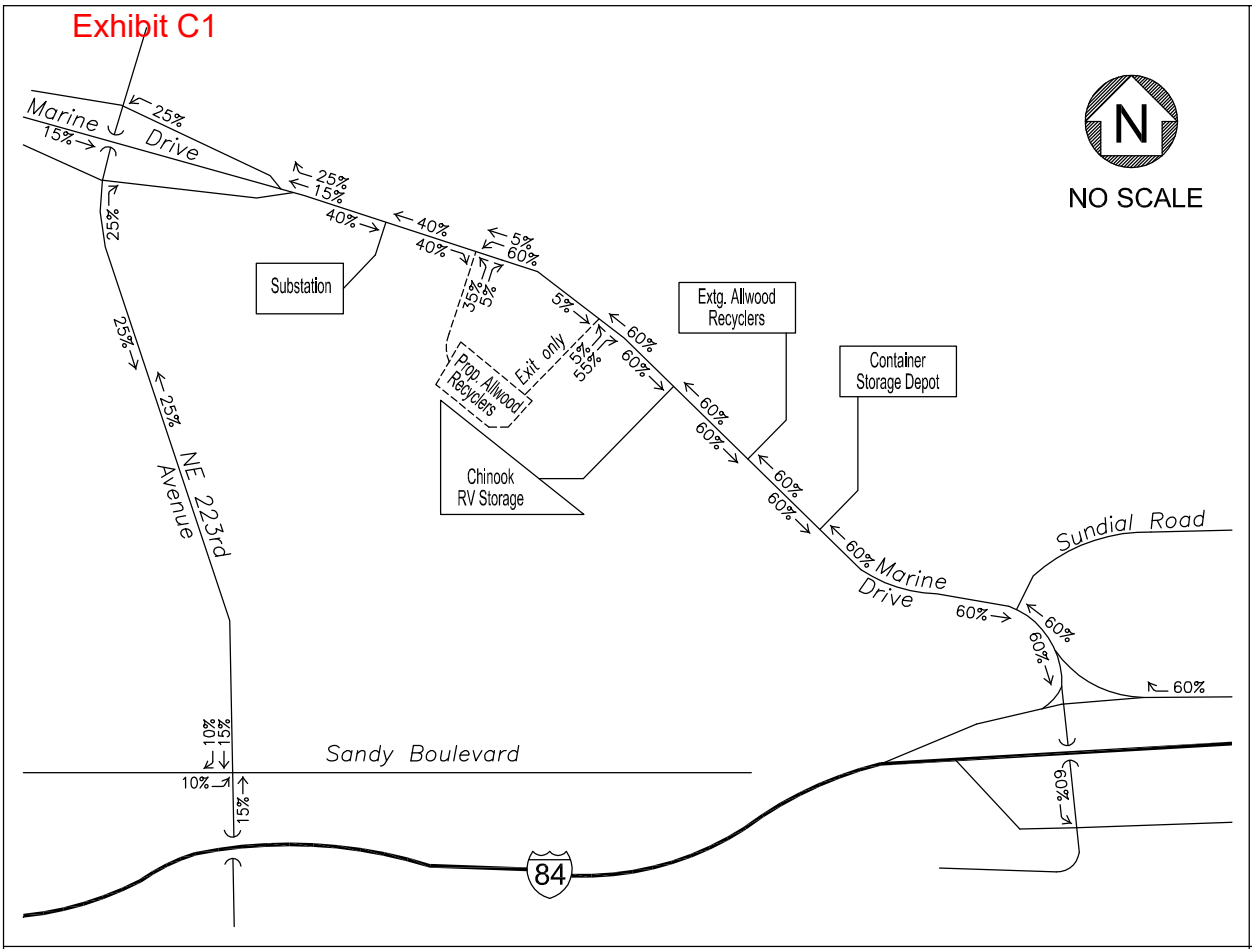
PROJECT: 18-18

NOTES: 2020 Background Traffic= 2018 Existing Traffic + growth (2%/yr for 2 years) + In-process Traffic.

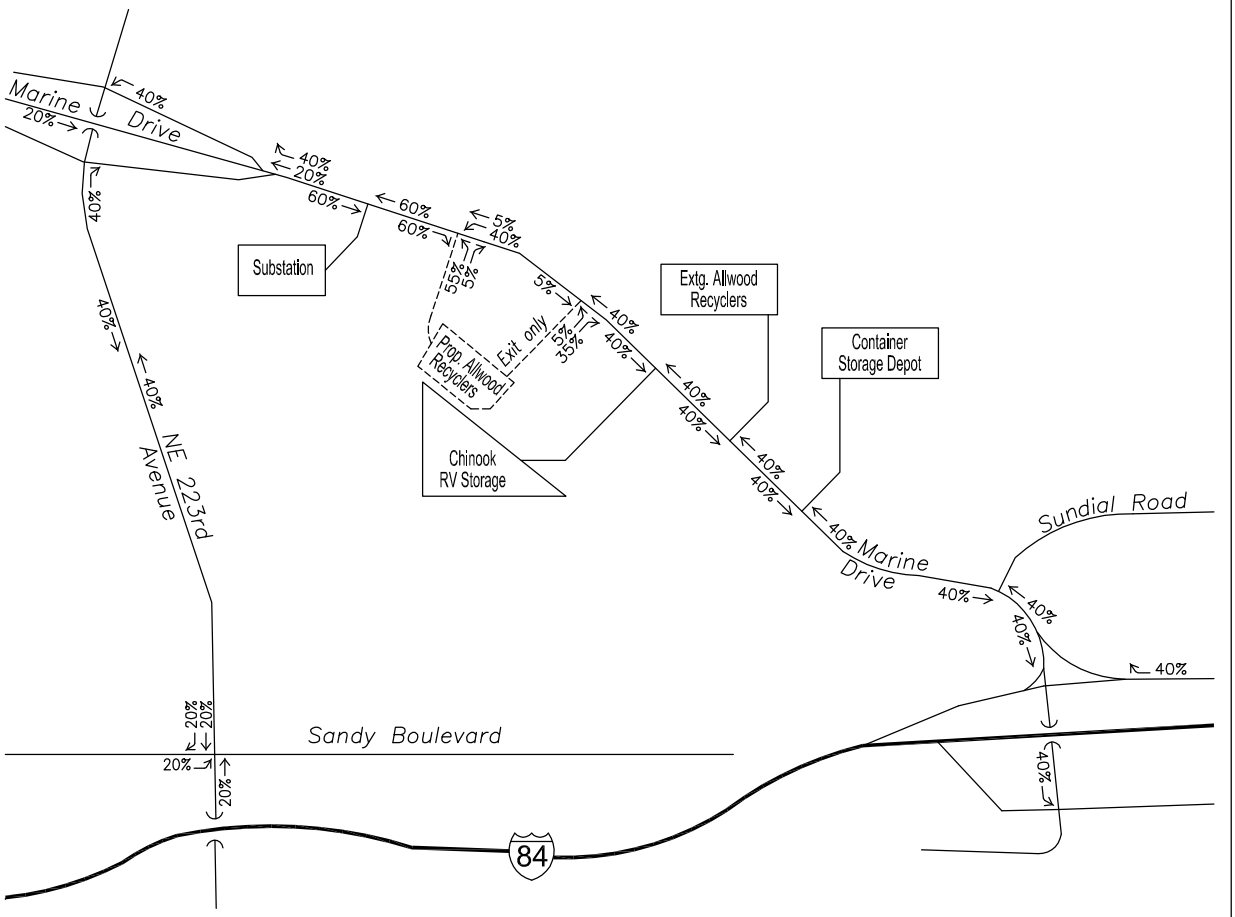
2020 BACKGROUND TRAFFIC
ALLWOOD RECYCLERS

FIGURE 3

Exhibit C1



AM PEAK HOUR



PM PEAK HOUR

FILE NAME: 1818flow.dwg

PLOT DATE: 05.17.18

CHARBONNEAU ENGINEERING LLC

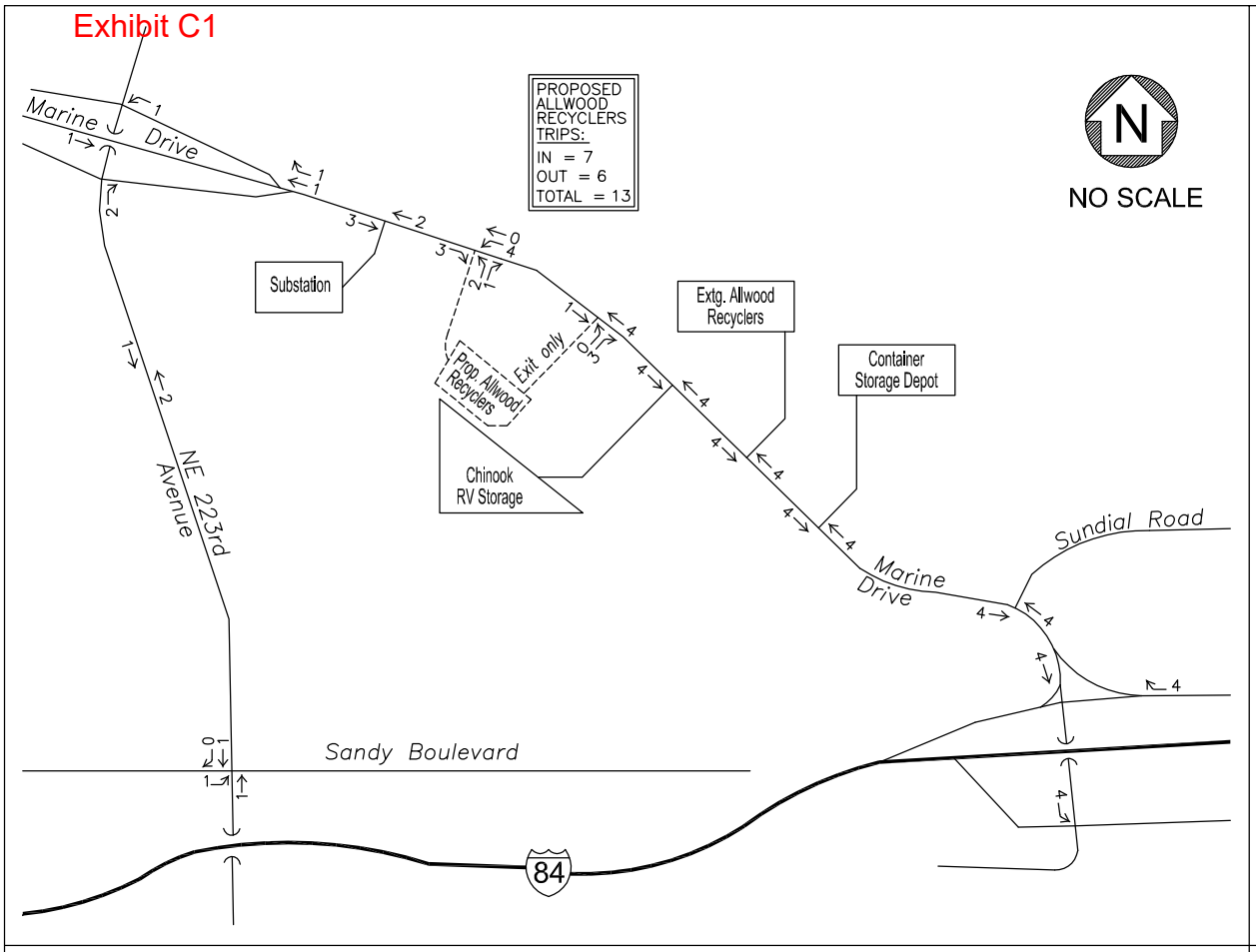
PROJECT: 18-18

NOTES: Trip distribution is based on the site layout and engineering judgment.

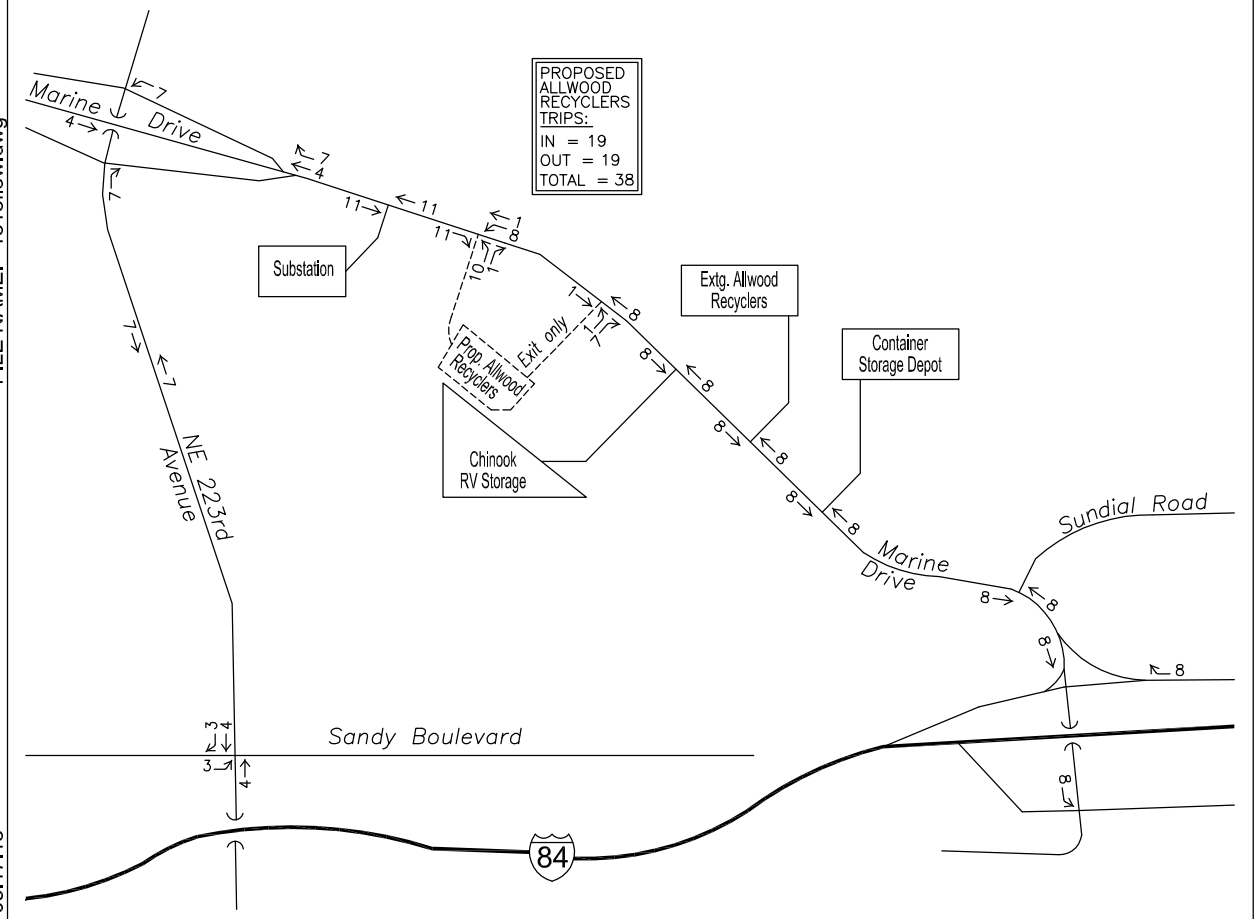
TRIP DISTRIBUTION
ALLWOOD RECYCLERS

FIGURE
4

Exhibit C1



AM PEAK HOUR



PM PEAK HOUR

FILE NAME: 1818flow.dwg

PLOT DATE: 05.17.18

CHARBONNEAU ENGINEERING LLC

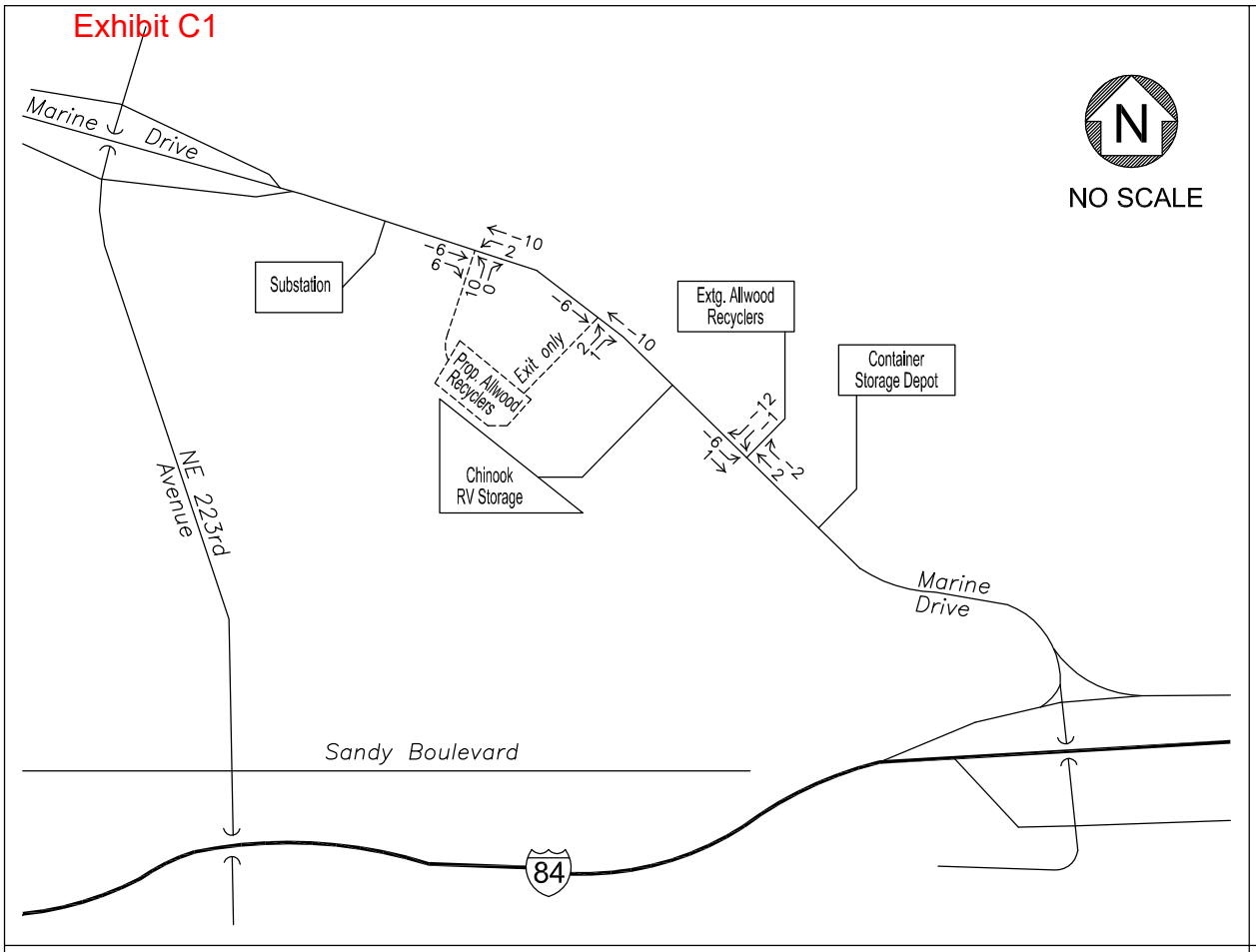
PROJECT: 18-18

NOTES: Trip generation is based on Nursery/Garden Center (ITE 817) trip rates.

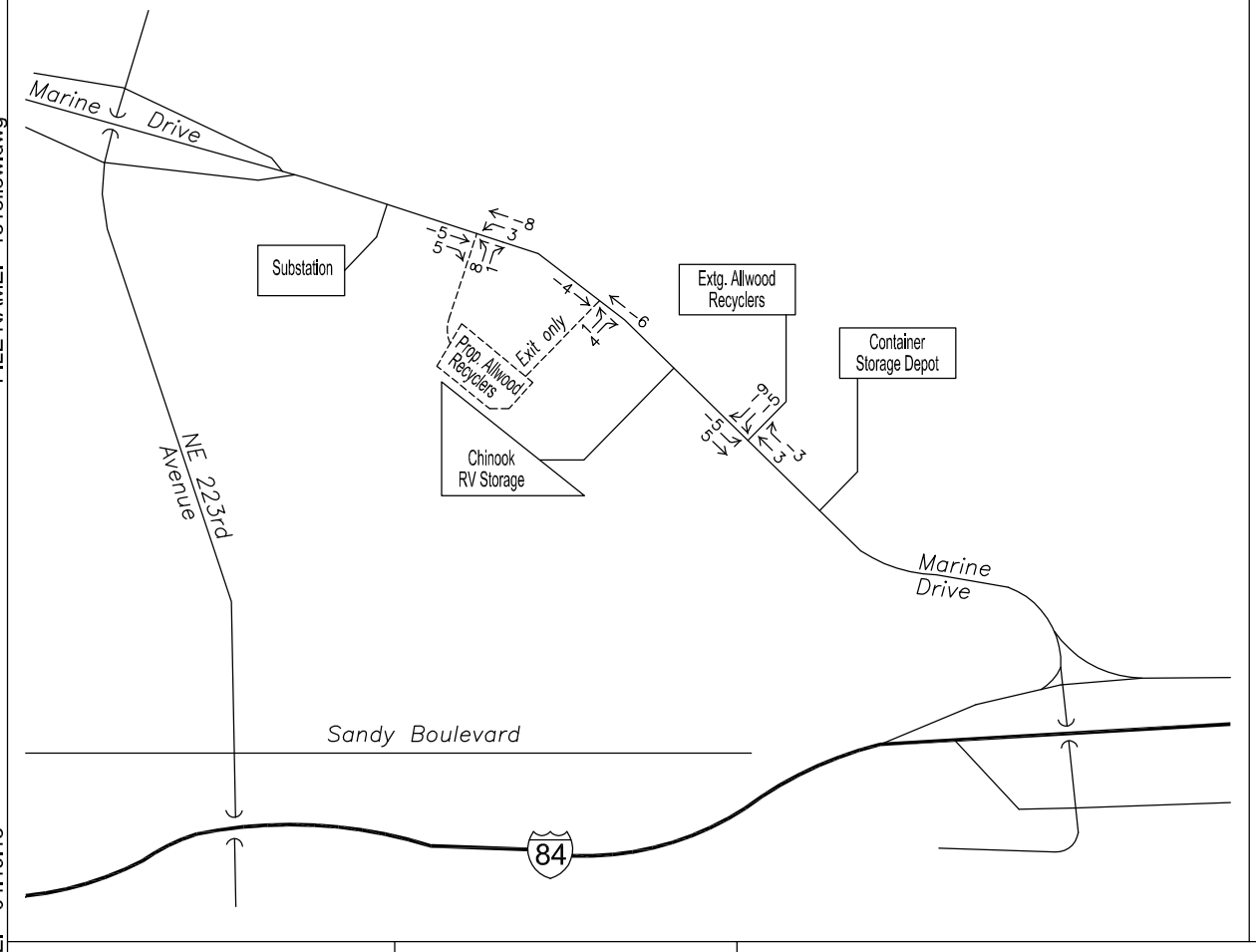
TRIP ASSIGNMENT
ALLWOOD RECYCLERS

FIGURE 5

Exhibit C1



AM PEAK HOUR



PM PEAK HOUR

FILE NAME: 1818flow.dwg

PLOT DATE: 04.19.18

CHARBONNEAU ENGINEERING LLC

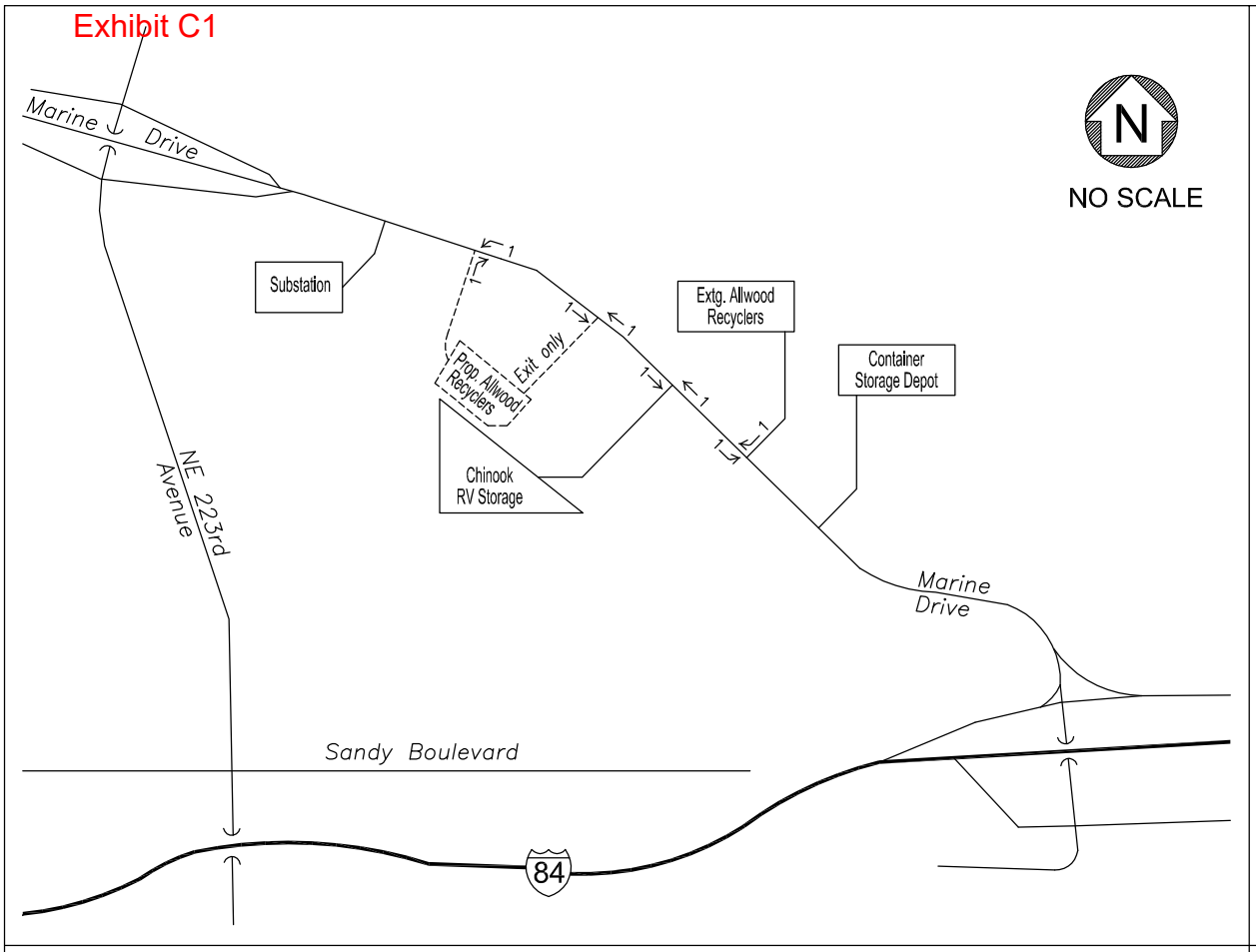
PROJECT: 18-18

NOTES: The existing site's retail trips (non-truck) will be rerouted to the proposed site.

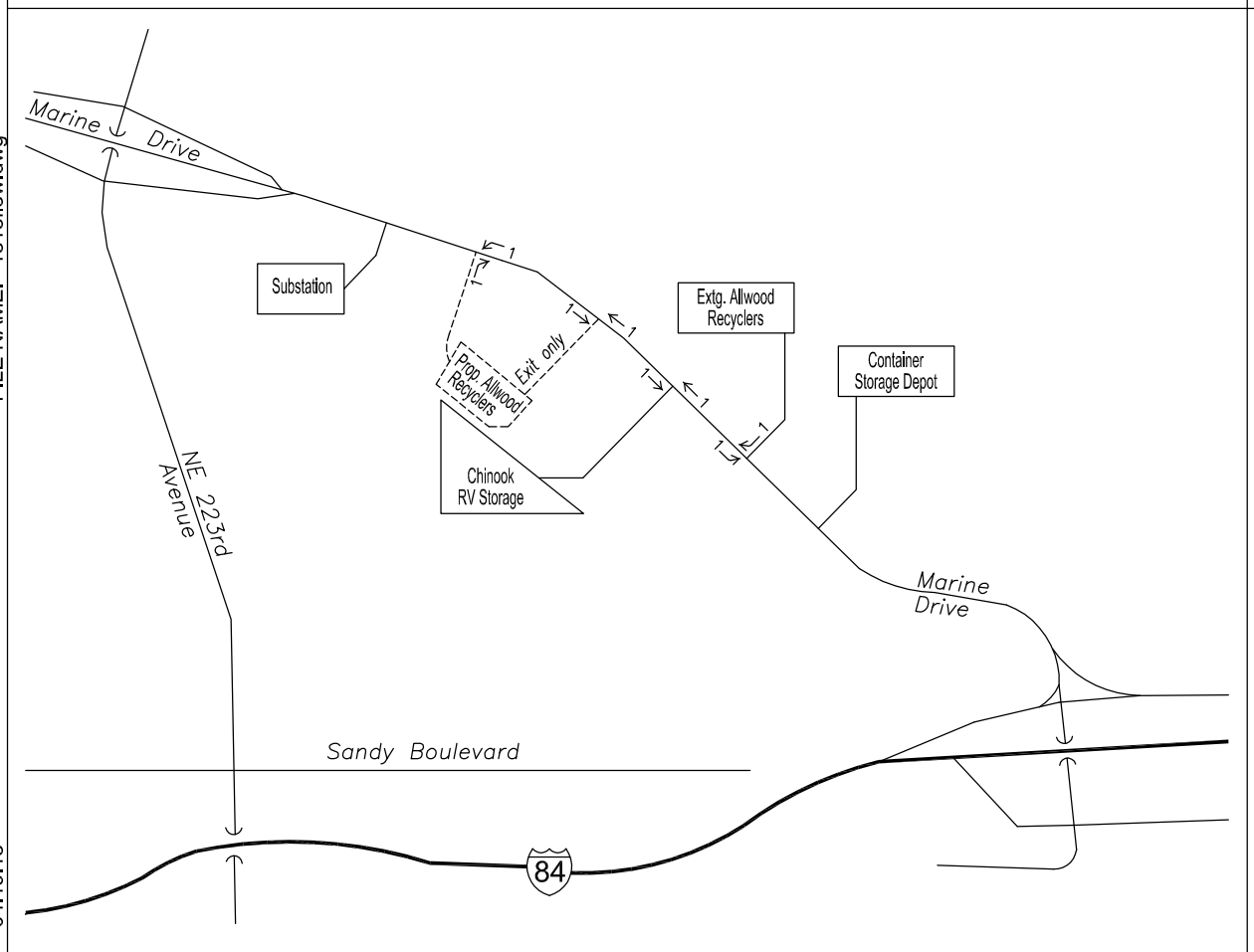
EXISTING SITE REROUTE
ALLWOOD RECYCLERS

FIGURE 6

Exhibit C1



AM PEAK HOUR



PM PEAK HOUR

FILE NAME: 1818flow.dwg

PLOT DATE: 04.19.18

CHARBONNEAU ENGINEERING LLC

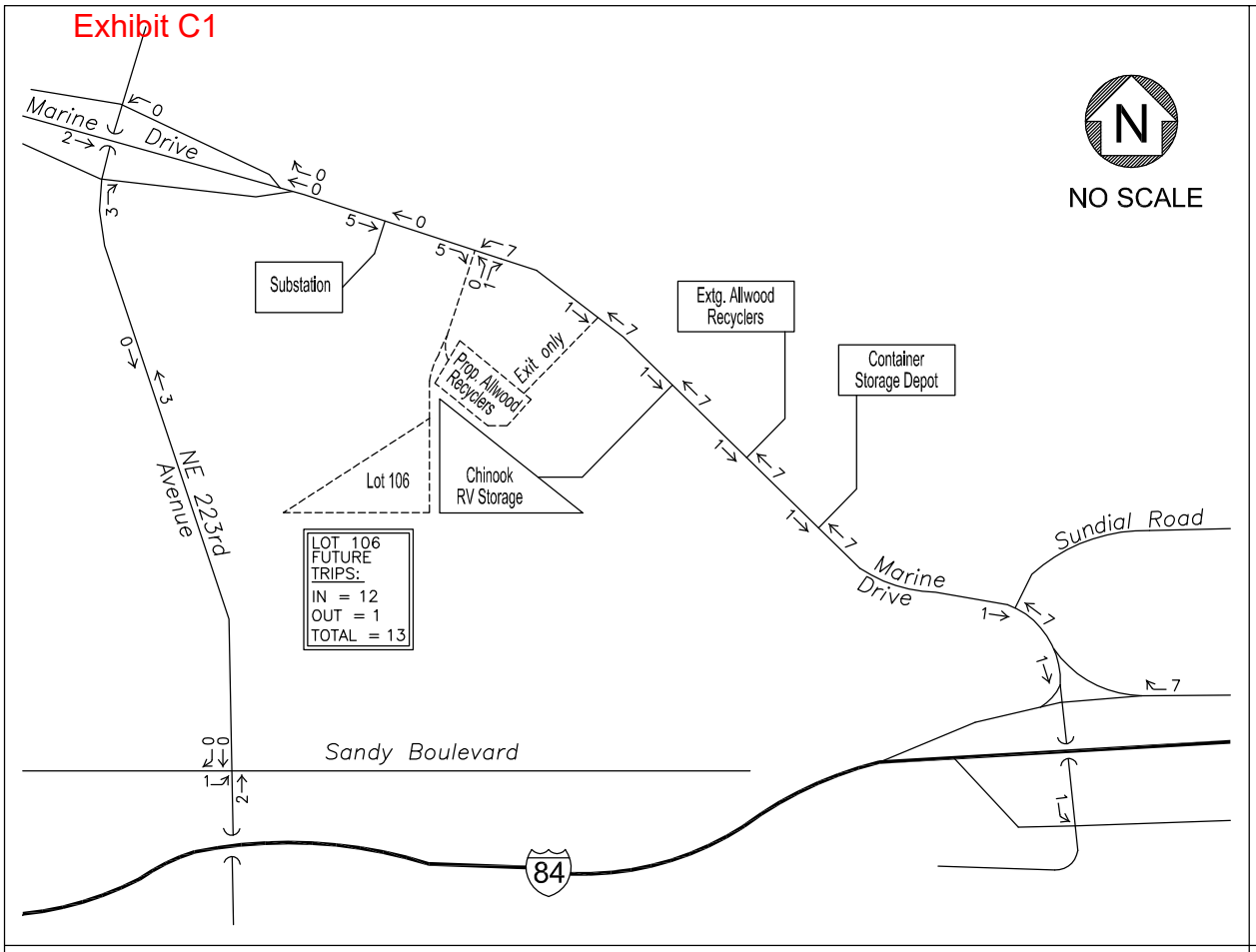
PROJECT: 18-18

NOTES: A truck from the proposed site will haul composted material to the existing site and then the truck will return to the proposed site.

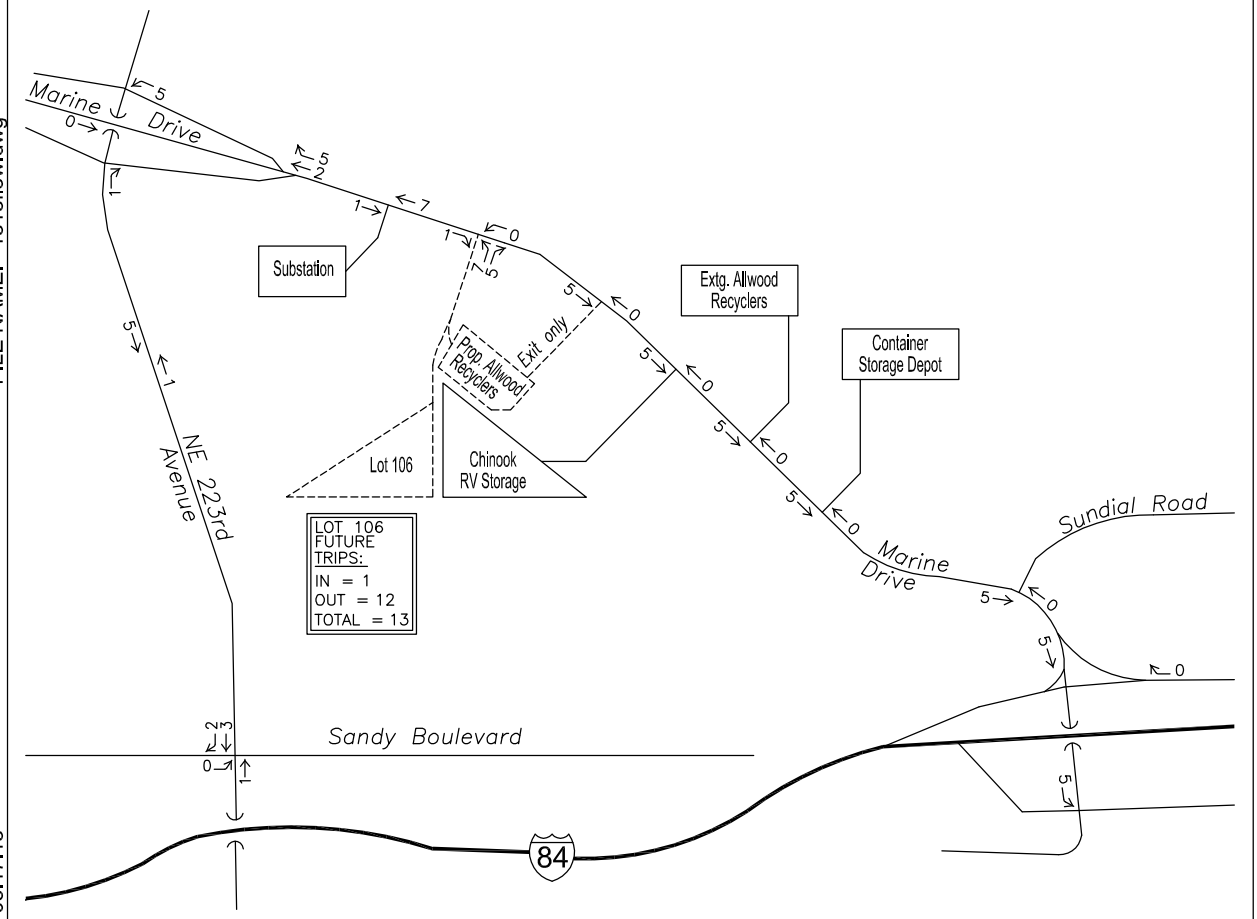
SITE-TO-SITE TRUCK GO-BETWEEN ALLWOOD RECYCLERS

FIGURE 7

Exhibit C1



AM PEAK HOUR



PM PEAK HOUR

FILE NAME: 1818flow.dwg

PLOT DATE: 05.17.18

CHARBONNEAU ENGINEERING LLC

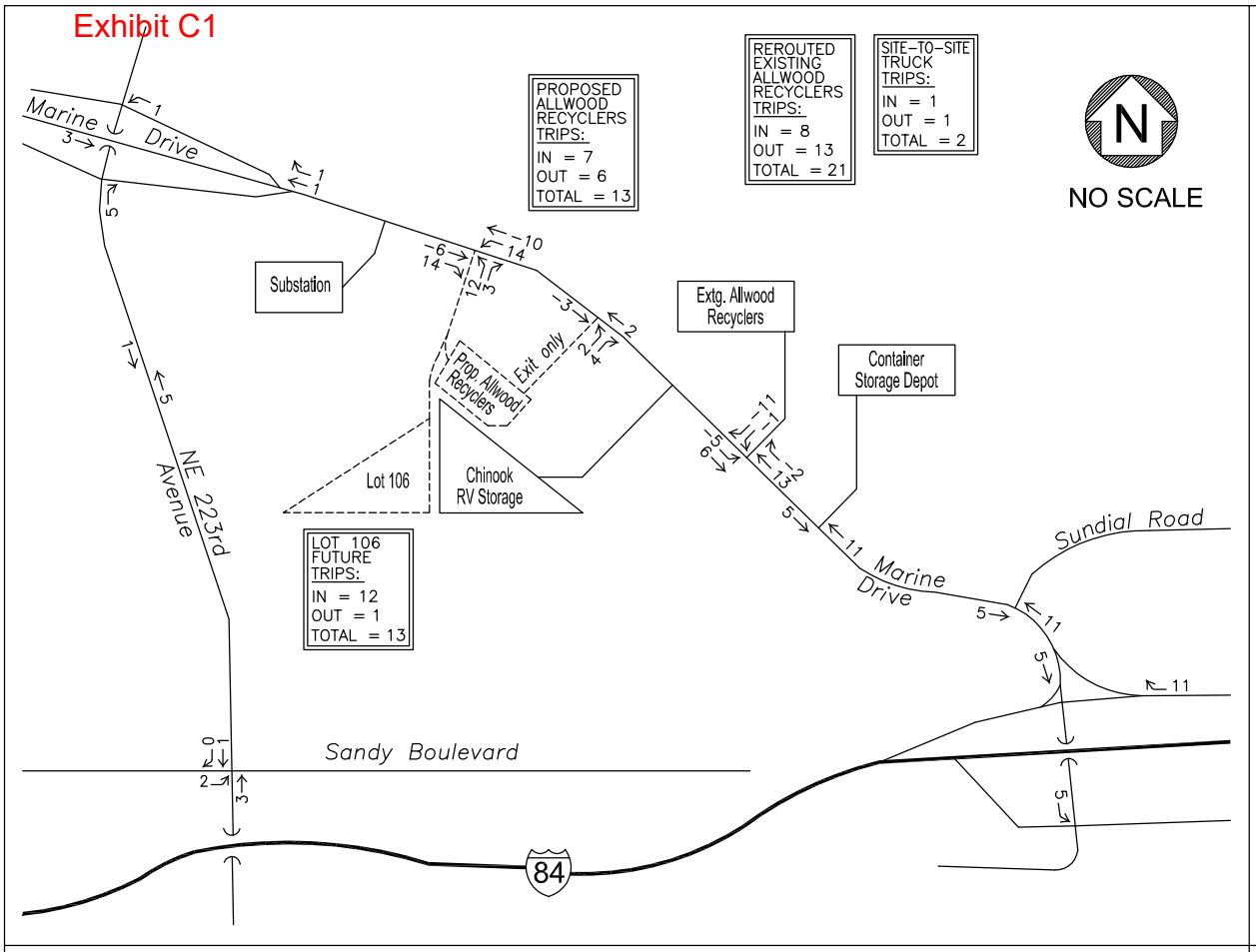
PROJECT: 18-18

NOTES: Lot 106 future trip generation has been calculated with General Office (ITE 710) & Light Industrial (ITE 110) trip rates.

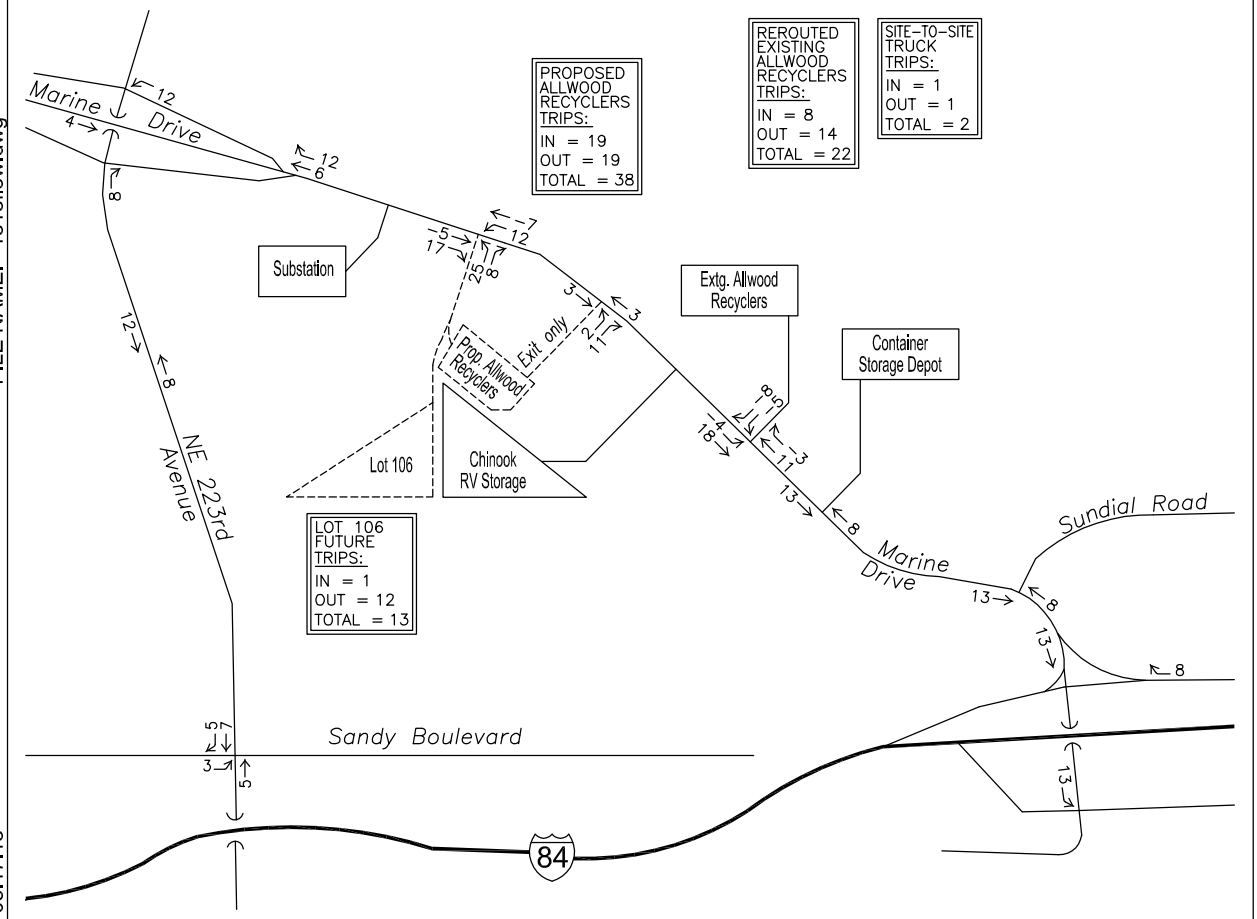
LOT 106
FUTURE TRIP ASSIGNMENT
ALLWOOD RECYCLERS

FIGURE 8

Exhibit C1



AM PEAK HOUR



PM PEAK HOUR

FILE NAME: 1818flow.dwg

PLOT DATE: 05.17.18

CHARBONNEAU ENGINEERING LLC

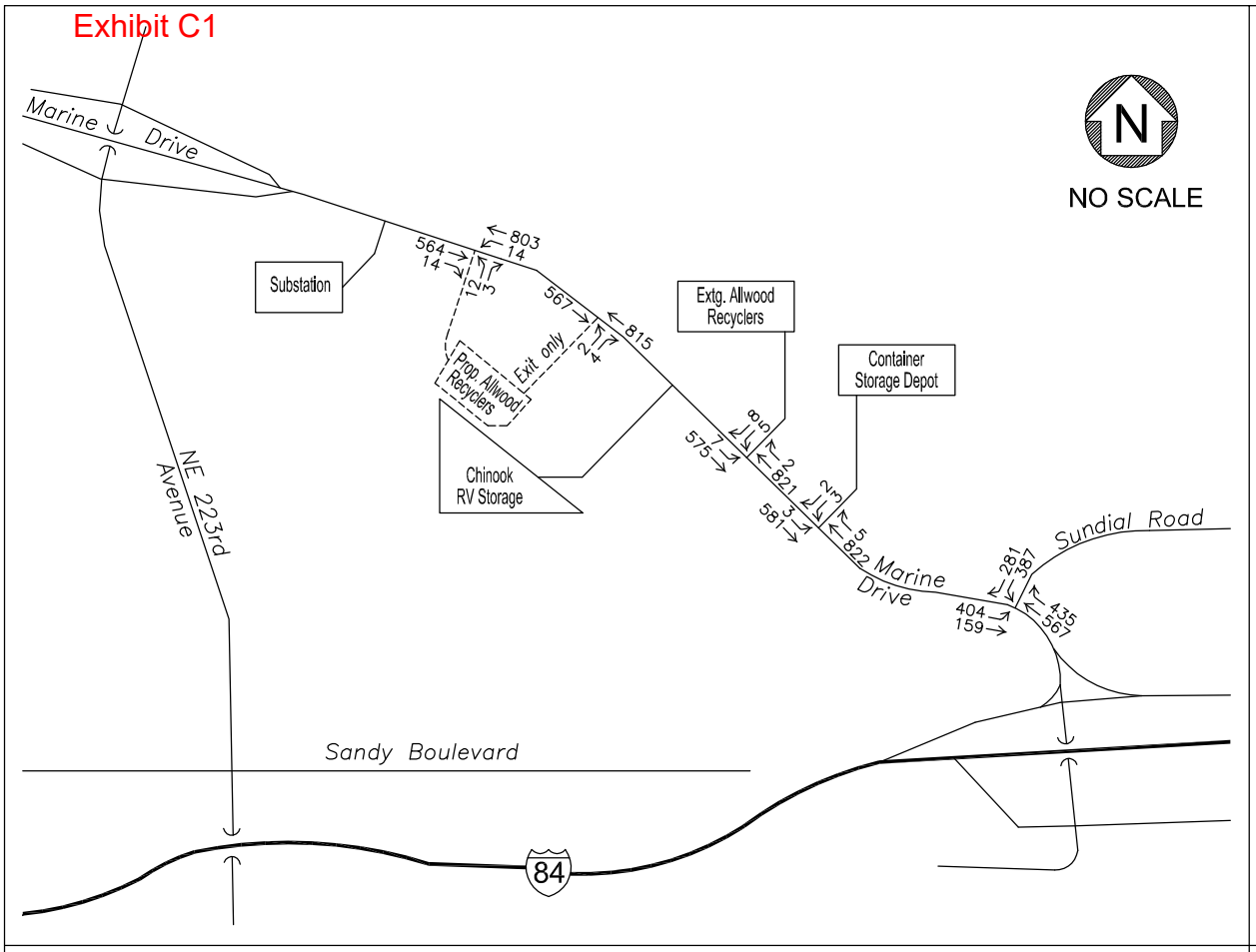
PROJECT: 18-18

NOTES: "Added Traffic" is the summary of the site's proposed traffic + Lot 106 future traffic. (Fig. 9 = Fig. 5 + Fig. 6 + Fig. 7 + Fig. 8)

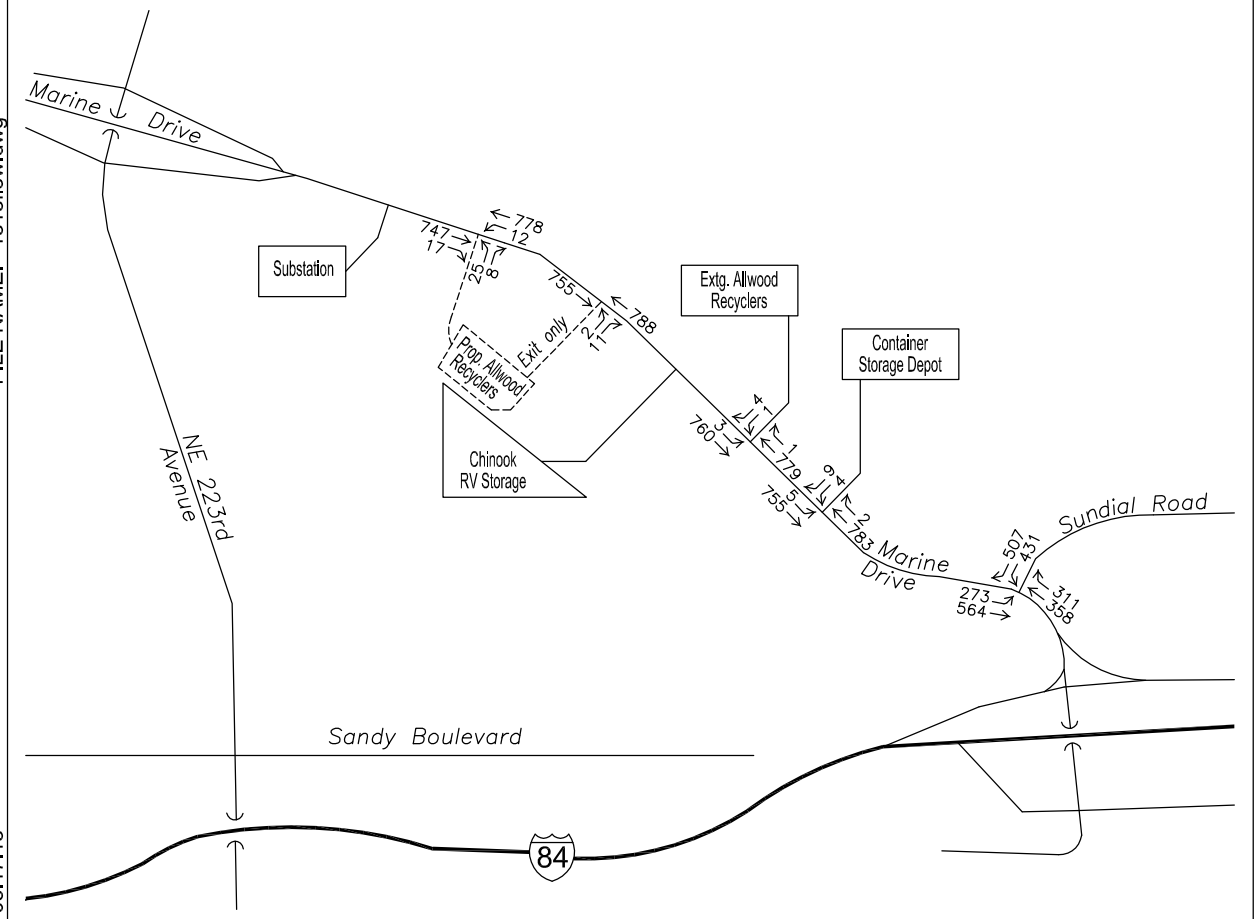
SUMMARY OF ADDED TRAFFIC
ALLWOOD RECYCLERS

FIGURE 9

Exhibit C1



AM PEAK HOUR



PM PEAK HOUR

FILE NAME: 1818flow.dwg

PLOT DATE: 05.17.18

CHARBONNEAU ENGINEERING LLC

PROJECT: 18-18

NOTES:2020 Total Traffic(Fig. 10)= 2020 Background Traffic (Fig. 3)+ Site Traffic Summary (Figure 9).

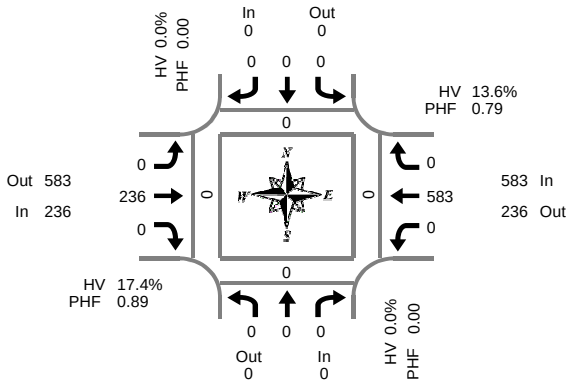
2020 TOTAL TRAFFIC
ALLWOOD RECYCLERS

FIGURE
10

Exhibit C1

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
7:00 AM to 8:00 AM

Substation Access & NE Marine Dr

Tuesday, April 10, 2018
7:00 AM to 9:00 AM

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Substation Access				Southbound Substation Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	0	0	0	0	0	0	0	0	0	53	0	0	0	108	0	0	161	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	54	0	0	0	132	0	0	186	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	63	0	0	0	158	0	0	221	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	66	0	0	0	185	0	0	251	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	54	0	0	0	103	0	0	157	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	36	0	0	0	139	0	0	175	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	36	0	0	0	107	0	0	143	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	47	0	0	0	82	0	0	129	0	0	0	0
Total Survey	0	0	0	0	0	0	0	0	0	409	0	0	0	1,014	0	0	1,423	0	0	0	0

Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound Substation Access				Southbound Substation Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	0	0	0	0	0	0	0	236	583	819	0	583	236	819	0	819	0	0	0	0
%HV	0.0%				0.0%				17.4%				13.6%				14.7%				
PHF	0.00				0.00				0.89				0.79				0.82				

By Movement	Northbound Substation Access				Southbound Substation Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	0	0	0	0	0	236	0	236	0	583	0	583	819
%HV	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	17.4%	0.0%	17.4%	0.0%	13.6%	0.0%	13.6%	14.7%
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.89	0.00	0.89	0.00	0.79	0.00	0.79	0.82

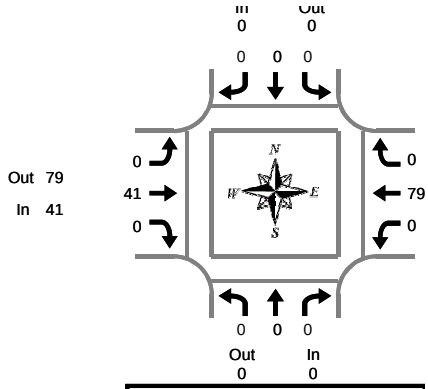
Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Substation Access				Southbound Substation Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	0	0	0	0	0	0	0	0	0	236	0	0	0	583	0	0	819	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	237	0	0	0	578	0	0	815	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	219	0	0	0	585	0	0	804	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	192	0	0	0	534	0	0	726	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	173	0	0	0	431	0	0	604	0	0	0	0

Exhibit C1

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
7:00 AM to 8:00 AM

Substation Access & NE Marine Dr

Tuesday, April 10, 2018
7:00 AM to 9:00 AM

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Substation Access				Southbound Substation Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	0	0	0	0	0	11	0	11	0	17	0	17	28
7:15 AM	0	0	0	0	0	0	0	0	0	7	0	7	0	19	0	19	26
7:30 AM	0	0	0	0	0	0	0	0	0	12	0	12	0	19	0	19	31
7:45 AM	0	0	0	0	0	0	0	0	0	11	0	11	0	24	0	24	35
8:00 AM	0	0	0	0	0	0	0	0	0	11	0	11	0	12	0	12	23
8:15 AM	0	0	0	0	0	0	0	0	0	9	0	9	0	26	0	26	35
8:30 AM	0	0	0	0	0	0	0	0	0	9	0	9	0	18	0	18	27
8:45 AM	0	0	0	0	0	0	0	0	0	12	0	12	0	13	0	13	25
Total Survey	0	0	0	0	0	0	0	0	0	82	0	82	0	148	0	148	230

Heavy Vehicle Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound Substation Access			Southbound Substation Access			Eastbound NE Marine Dr			Westbound NE Marine Dr			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	0	0	0	41	79	120	79	41	120	120
PHF	0.00			0.00			0.30			0.32			0.32

By Movement	Northbound Substation Access				Southbound Substation Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	0	0	0	0	0	41	0	41	0	79	0	79	120
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.00	0.30	0.00	0.32	0.00	0.32	0.32

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Substation Access				Southbound Substation Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	0	0	0	0	0	41	0	41	0	79	0	79	120
7:15 AM	0	0	0	0	0	0	0	0	0	41	0	41	0	74	0	74	115
7:30 AM	0	0	0	0	0	0	0	0	0	43	0	43	0	81	0	81	124
7:45 AM	0	0	0	0	0	0	0	0	0	40	0	40	0	80	0	80	120
8:00 AM	0	0	0	0	0	0	0	0	0	41	0	41	0	69	0	69	110

Exhibit C1

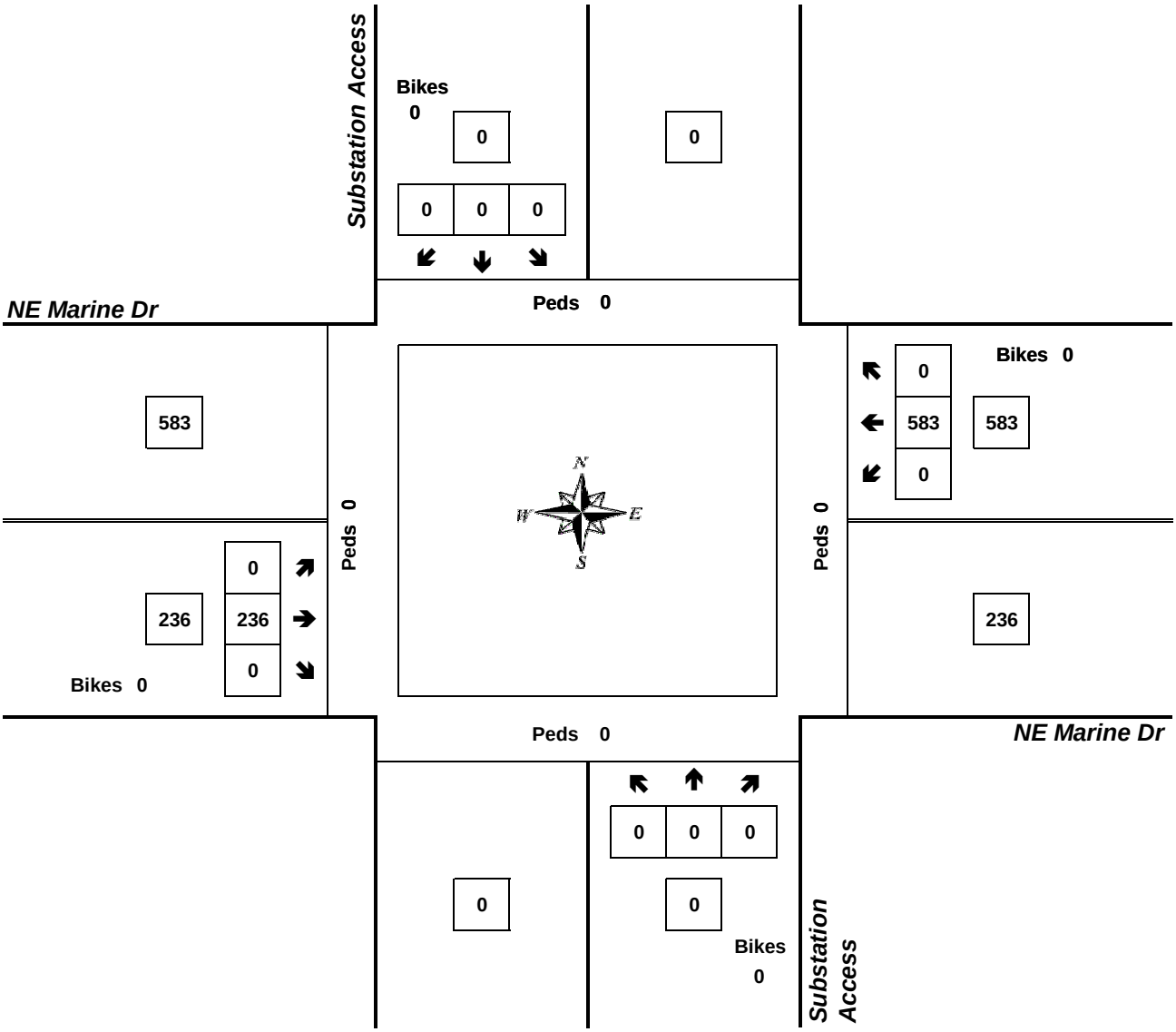
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Substation Access & NE Marine Dr

7:00 AM to 8:00 AM
Tuesday, April 10, 2018



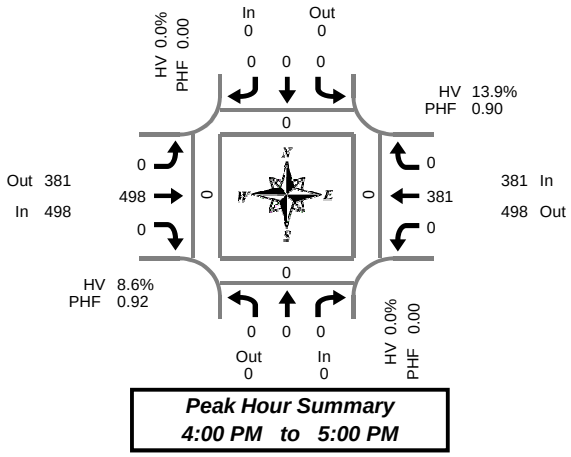
Approach	PHF	HV%	Volume
EB	0.89	17.4%	236
WB	0.79	13.6%	583
NB	0.00	0.0%	0
SB	0.00	0.0%	0
Intersection	0.82	14.7%	819

Count Period: 7:00 AM to 9:00 AM

Exhibit C1

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Substation Access & NE Marine Dr

Tuesday, April 10, 2018
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Substation Access				Southbound Substation Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	0	0	0	0	0	0	0	0	126	0	1	0	96	0	0	222	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	114	0	0	0	106	0	0	220	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	135	0	1	0	77	0	0	212	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	123	0	0	0	102	0	0	225	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	112	0	0	0	97	0	0	209	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	131	0	0	0	80	0	1	211	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	121	0	0	0	71	0	0	192	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	78	0	0	0	61	0	0	139	0	0	0	0
Total Survey	0	0	0	0	0	0	0	0	0	940	0	2	0	690	0	1	1,630	0	0	0	0

Peak Hour Summary
4:00 PM to 5:00 PM

By Approach	Northbound Substation Access				Southbound Substation Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	0	0	0	0	0	0	0	498	381	879	2	381	498	879	0	879	0	0	0	0
%HV	0.0%				0.0%				8.6%				13.9%				10.9%				
PHF	0.00				0.00				0.92				0.90				0.98				

By Movement	Northbound Substation Access				Southbound Substation Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	0	0	0	0	0	498	0	498	0	381	0	381	879
%HV	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	8.6%	0.0%	8.6%	0.0%	13.9%	0.0%	13.9%	10.9%
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.92	0.00	0.92	0.00	0.90	0.00	0.90	0.98

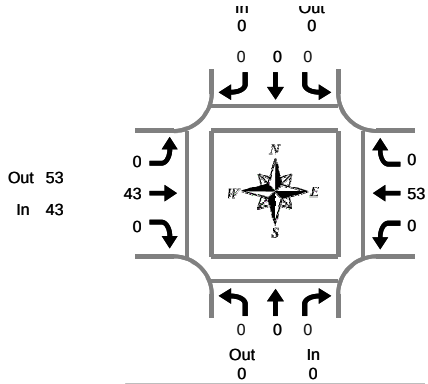
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Substation Access				Southbound Substation Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	0	0	0	0	0	0	0	0	498	0	2	0	381	0	0	879	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	484	0	1	0	382	0	0	866	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	501	0	1	0	356	0	1	857	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	487	0	0	0	350	0	1	837	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	442	0	0	0	309	0	1	751	0	0	0	0

Exhibit C1

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:00 PM to 5:00 PM

Substation Access & NE Marine Dr

Tuesday, April 10, 2018
4:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Substation Access				Southbound Substation Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	0	0	0	13	0	13	0	9	0	9	22
4:15 PM	0	0	0	0	0	0	0	0	0	9	0	9	0	15	0	15	24
4:30 PM	0	0	0	0	0	0	0	0	0	11	0	11	0	11	0	11	22
4:45 PM	0	0	0	0	0	0	0	0	0	10	0	10	0	18	0	18	28
5:00 PM	0	0	0	0	0	0	0	0	0	9	0	9	0	6	0	6	15
5:15 PM	0	0	0	0	0	0	0	0	0	10	0	10	0	9	0	9	19
5:30 PM	0	0	0	0	0	0	0	0	0	6	0	6	0	10	0	10	16
5:45 PM	0	0	0	0	0	0	0	0	0	6	0	6	0	6	0	6	12
Total Survey	0	0	0	0	0	0	0	0	0	74	0	74	0	84	0	84	158

Heavy Vehicle Peak Hour Summary
4:00 PM to 5:00 PM

By Approach	Northbound Substation Access			Southbound Substation Access			Eastbound NE Marine Dr			Westbound NE Marine Dr			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	0	0	0	43	53	96	53	43	96	96
PHF	0.00			0.00			0.33			0.30			0.32

By Movement	Northbound Substation Access				Southbound Substation Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	0	0	0	0	0	43	0	43	0	53	0	53	96
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.33	0.00	0.30	0.00	0.30	0.32

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Substation Access				Southbound Substation Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	0	0	0	43	0	43	0	53	0	53	96
4:15 PM	0	0	0	0	0	0	0	0	0	39	0	39	0	50	0	50	89
4:30 PM	0	0	0	0	0	0	0	0	0	40	0	40	0	44	0	44	84
4:45 PM	0	0	0	0	0	0	0	0	0	35	0	35	0	43	0	43	78
5:00 PM	0	0	0	0	0	0	0	0	0	31	0	31	0	31	0	31	62

Exhibit C1

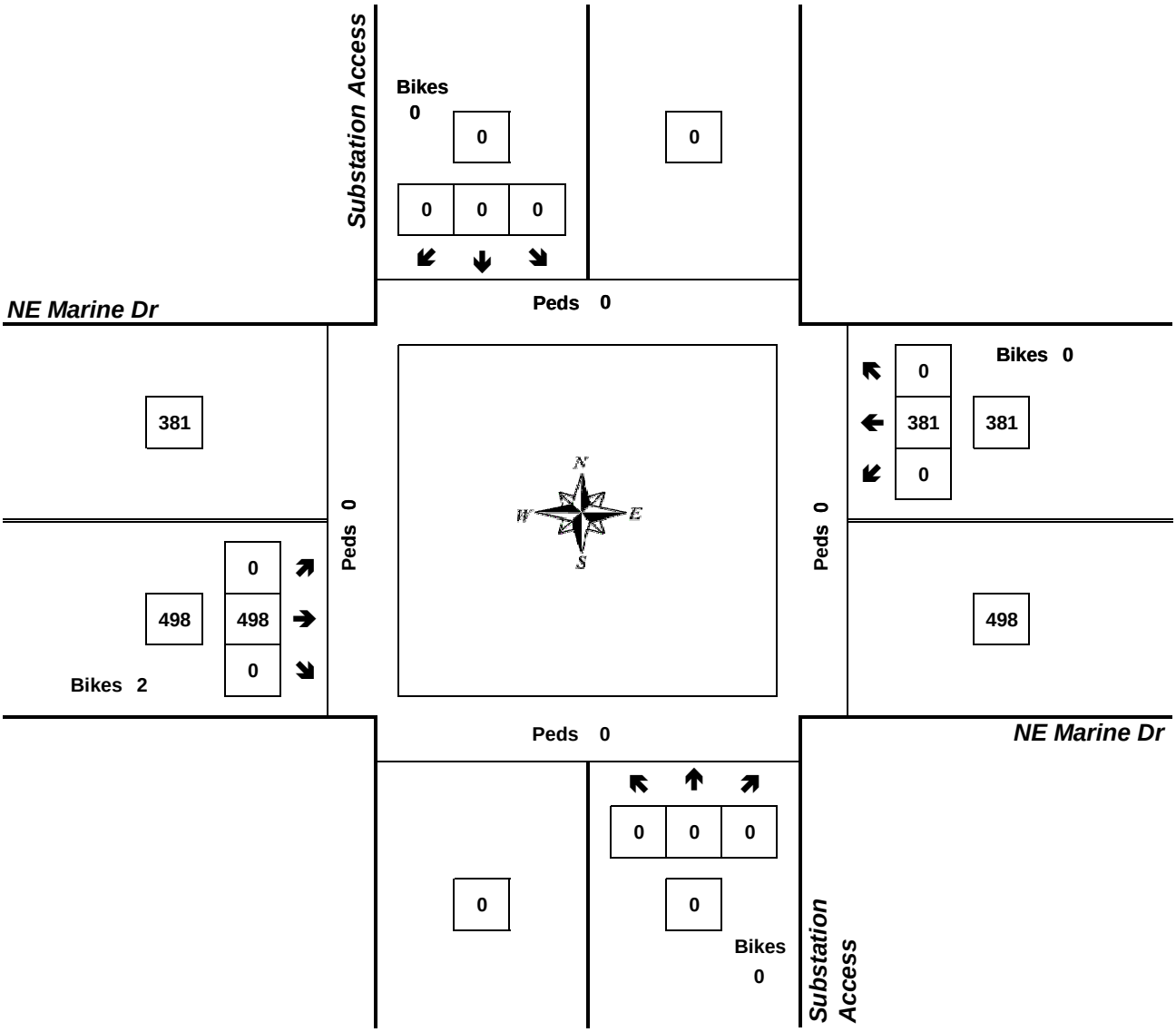
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Substation Access & NE Marine Dr

4:00 PM to 5:00 PM
Tuesday, April 10, 2018



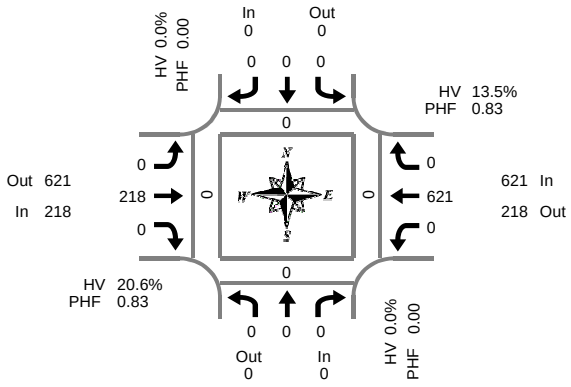
Approach	PHF	HV%	Volume
EB	0.92	8.6%	498
WB	0.90	13.9%	381
NB	0.00	0.0%	0
SB	0.00	0.0%	0
Intersection	0.98	10.9%	879

Count Period: 4:00 PM to 6:00 PM

Exhibit C1

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
7:30 AM to 8:30 AM

Storage Access & NE Marine Dr

Tuesday, April 10, 2018
7:00 AM to 9:00 AM

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Storage Access				Southbound Storage Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	0	0	0	0	0	0	0	0	0	52	0	0	0	112	0	0	164	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	48	0	0	0	120	0	0	168	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	63	0	0	0	172	0	0	235	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	66	0	0	0	188	0	0	254	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	48	0	0	0	131	0	0	179	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	41	0	0	0	130	0	0	171	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	50	0	0	0	114	0	0	164	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	50	0	0	0	81	0	0	131	0	0	0	0
Total Survey	0	0	0	0	0	0	0	0	0	418	0	0	0	1,048	0	0	1,466	0	0	0	0

Peak Hour Summary
7:30 AM to 8:30 AM

By Approach	Northbound Storage Access				Southbound Storage Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	0	0	0	0	0	0	0	218	621	839	0	621	218	839	0	839	0	0	0	0
%HV	0.0%				0.0%				20.6%				13.5%				15.4%				
PHF	0.00				0.00				0.83				0.83				0.83				

By Movement	Northbound Storage Access				Southbound Storage Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	0	0	0	0	0	218	0	218	0	621	0	621	839
%HV	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	20.6%	0.0%	20.6%	0.0%	13.5%	0.0%	13.5%	15.4%
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.00	0.83	0.00	0.83	0.00	0.83	0.83

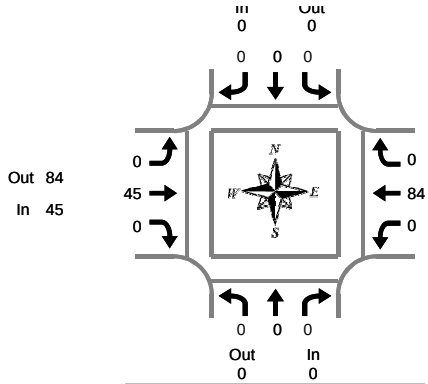
Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Storage Access				Southbound Storage Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	0	0	0	0	0	0	0	0	0	229	0	0	0	592	0	0	821	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	225	0	0	0	611	0	0	836	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	218	0	0	0	621	0	0	839	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	205	0	0	0	563	0	0	768	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	189	0	0	0	456	0	0	645	0	0	0	0

Exhibit C1

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
7:30 AM to 8:30 AM

Storage Access & NE Marine Dr

Tuesday, April 10, 2018
7:00 AM to 9:00 AM

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Storage Access				Southbound Storage Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	0	0	0	0	0	12	0	12	0	16	0	16	28
7:15 AM	0	0	0	0	0	0	0	0	0	5	0	5	0	19	0	19	24
7:30 AM	0	0	0	0	0	0	0	0	0	14	0	14	0	20	0	20	34
7:45 AM	0	0	0	0	0	0	0	0	0	10	0	10	0	22	0	22	32
8:00 AM	0	0	0	0	0	0	0	0	0	10	0	10	0	14	0	14	24
8:15 AM	0	0	0	0	0	0	0	0	0	11	0	11	0	28	0	28	39
8:30 AM	0	0	0	0	0	0	0	0	0	8	0	8	0	17	0	17	25
8:45 AM	0	0	0	0	0	0	0	0	0	11	0	11	0	15	0	15	26
Total Survey	0	0	0	0	0	0	0	0	0	81	0	81	0	151	0	151	232

Heavy Vehicle Peak Hour Summary
7:30 AM to 8:30 AM

By Approach	Northbound Storage Access			Southbound Storage Access			Eastbound NE Marine Dr			Westbound NE Marine Dr			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	0	0	0	45	84	129	84	45	129	129
PHF	0.00			0.00			0.33			0.33			0.34

By Movement	Northbound Storage Access				Southbound Storage Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	0	0	0	0	0	45	0	45	0	84	0	84	129
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.33	0.00	0.33	0.00	0.33	0.34

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Storage Access				Southbound Storage Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	0	0	0	0	0	41	0	41	0	77	0	77	118
7:15 AM	0	0	0	0	0	0	0	0	0	39	0	39	0	75	0	75	114
7:30 AM	0	0	0	0	0	0	0	0	0	45	0	45	0	84	0	84	129
7:45 AM	0	0	0	0	0	0	0	0	0	39	0	39	0	81	0	81	120
8:00 AM	0	0	0	0	0	0	0	0	0	40	0	40	0	74	0	74	114

Exhibit C1

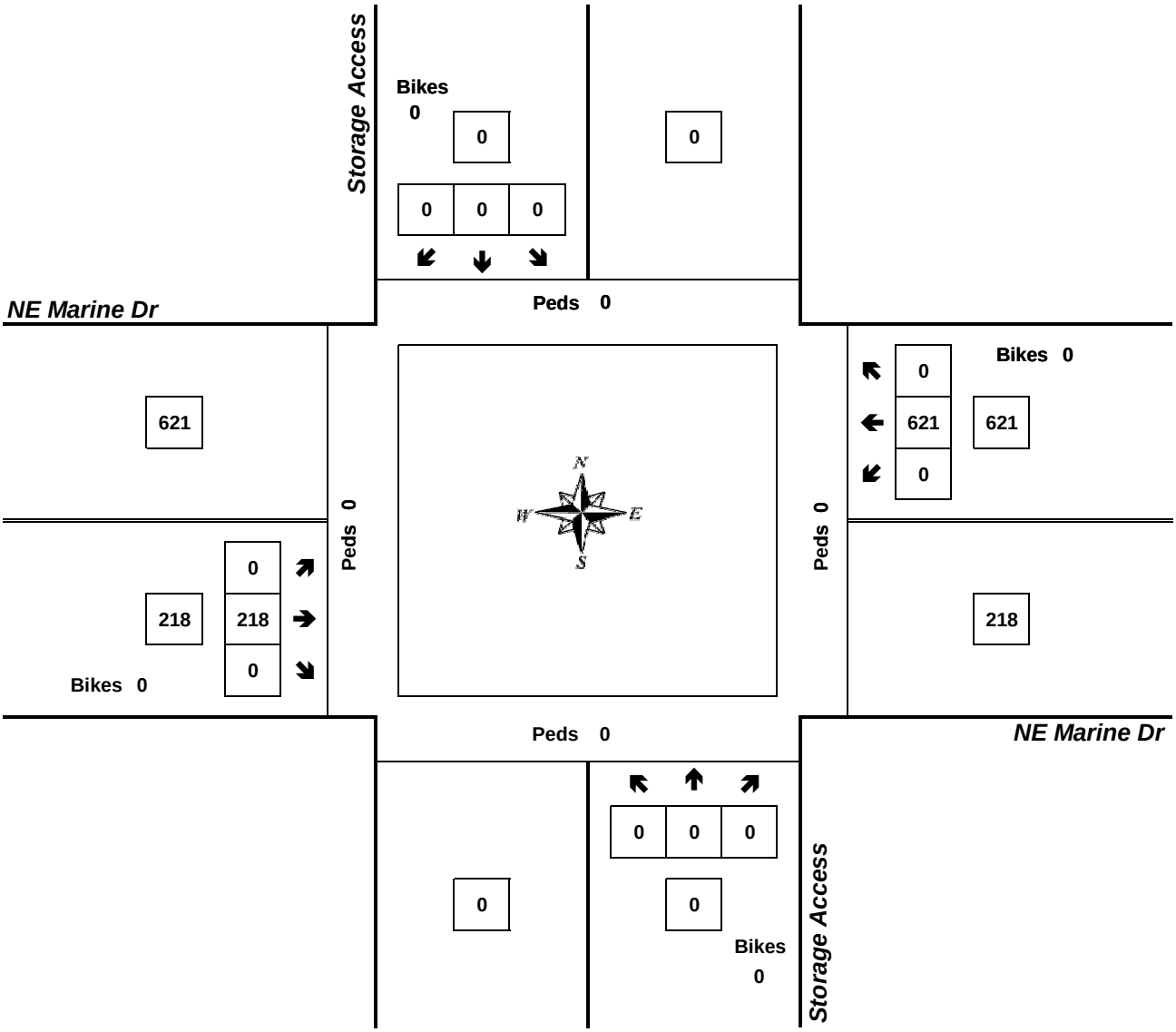
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Storage Access & NE Marine Dr

7:30 AM to 8:30 AM
Tuesday, April 10, 2018



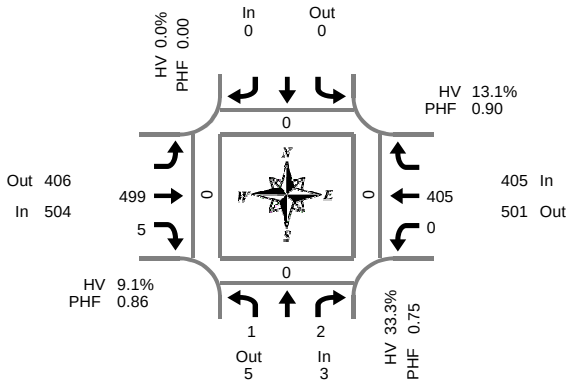
Approach	PHF	HV%	Volume
EB	0.83	20.6%	218
WB	0.83	13.5%	621
NB	0.00	0.0%	0
SB	0.00	0.0%	0
Intersection	0.83	15.4%	839

Count Period: 7:00 AM to 9:00 AM

Exhibit C1

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:00 PM to 5:00 PM

Storage Access & NE Marine Dr

Tuesday, April 10, 2018
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Storage Access				Southbound Storage Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total	Pedestrians Crosswalk			
	L		R	Bikes				Bikes		T	R	Bikes	L	T		Bikes		North	South	East	West
4:00 PM	1		0	0				0		118	2	1	0	105		0	226	0	0	0	0
4:15 PM	0		1	0				0		121	1	0	0	113		1	236	0	0	0	0
4:30 PM	0		0	0				0		145	1	1	0	86		0	232	0	0	0	0
4:45 PM	0		1	0				0		115	1	0	0	101		0	218	0	0	0	0
5:00 PM	0		0	0				0		102	0	0	0	104		0	206	0	0	0	0
5:15 PM	0		0	0				0		142	0	0	0	87		0	229	0	0	0	0
5:30 PM	0		0	0				0		122	0	0	1	65		1	188	0	0	0	0
5:45 PM	2		1	0				0		82	0	0	0	68		0	153	0	0	0	0
Total Survey	3		3	0				0		947	5	2	1	729		2	1,688	0	0	0	0

Peak Hour Summary
4:00 PM to 5:00 PM

By Approach	Northbound Storage Access				Southbound Storage Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	3	5	8	0	0	0	0	0	504	406	910	2	405	501	906	1	912	0	0	0	0
%HV	33.3%				0.0%				9.1%				13.1%				11.0%				
PHF	0.75				0.00				0.86				0.90				0.97				

By Movement	Northbound Storage Access				Southbound Storage Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total
	L		R	Total				Total		T	R	Total	L	T		Total	
Volume	1		2	3				0		499	5	504	0	405		405	912
%HV	0.0%	NA	50.0%	33.3%	NA	NA	NA	0.0%	NA	8.8%	40.0%	9.1%	0.0%	13.1%	NA	13.1%	11.0%
PHF	0.25		0.50	0.75				0.00		0.86	0.63	0.86	0.00	0.90		0.90	0.97

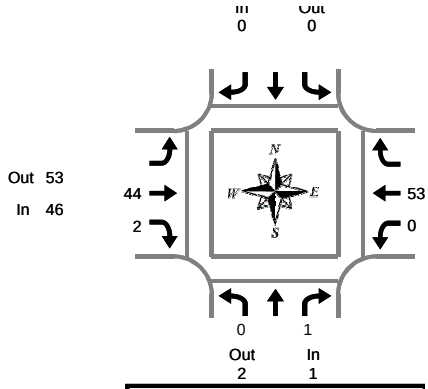
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Storage Access				Southbound Storage Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total	Pedestrians Crosswalk			
	L		R	Bikes				Bikes		T	R	Bikes	L	T		Bikes		North	South	East	West
4:00 PM	1		2	0				0		499	5	2	0	405		1	912	0	0	0	0
4:15 PM	0		2	0				0		483	3	1	0	404		1	892	0	0	0	0
4:30 PM	0		1	0				0		504	2	1	0	378		0	885	0	0	0	0
4:45 PM	0		1	0				0		481	1	0	1	357		1	841	0	0	0	0
5:00 PM	2		1	0				0		448	0	0	1	324		1	776	0	0	0	0

Exhibit C1

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:00 PM to 5:00 PM

Storage Access & NE Marine Dr

Tuesday, April 10, 2018
4:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Storage Access				Southbound Storage Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total
	L		R	Total				Total		T	R	Total	L	T		Total	
4:00 PM	0		0	0				0		10	0	10	0	10		10	20
4:15 PM	0		0	0				0		12	1	13	0	14		14	27
4:30 PM	0		0	0				0		15	1	16	0	13		13	29
4:45 PM	0		1	1				0		7	0	7	0	16		16	24
5:00 PM	0		0	0				0		11	0	11	0	8		8	19
5:15 PM	0		0	0				0		9	0	9	0	8		8	17
5:30 PM	0		0	0				0		7	0	7	0	9		9	16
5:45 PM	0		0	0				0		5	0	5	0	7		7	12
Total Survey	0		1	1				0		76	2	78	0	85		85	164

Heavy Vehicle Peak Hour Summary
4:00 PM to 5:00 PM

By Approach	Northbound Storage Access			Southbound Storage Access			Eastbound NE Marine Dr			Westbound NE Marine Dr			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	1	2	3	0	0	0	46	53	99	53	45	98	100
PHF	0.25			0.00			0.29			0.31			0.31

By Movement	Northbound Storage Access				Southbound Storage Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total
	L		R	Total				Total		T	R	Total	L	T		Total	
Volume	0		1	1				0		44	2	46	0	53		53	100
PHF	0.00		0.25	0.25				0.00		0.30	0.25	0.29	0.00	0.31		0.31	0.31

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Storage Access				Southbound Storage Access				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total
	L		R	Total				Total		T	R	Total	L	T		Total	
4:00 PM	0		1	1				0		44	2	46	0	53		53	100
4:15 PM	0		1	1				0		45	2	47	0	51		51	99
4:30 PM	0		1	1				0		42	1	43	0	45		45	89
4:45 PM	0		1	1				0		34	0	34	0	41		41	76
5:00 PM	0		0	0				0		32	0	32	0	32		32	64

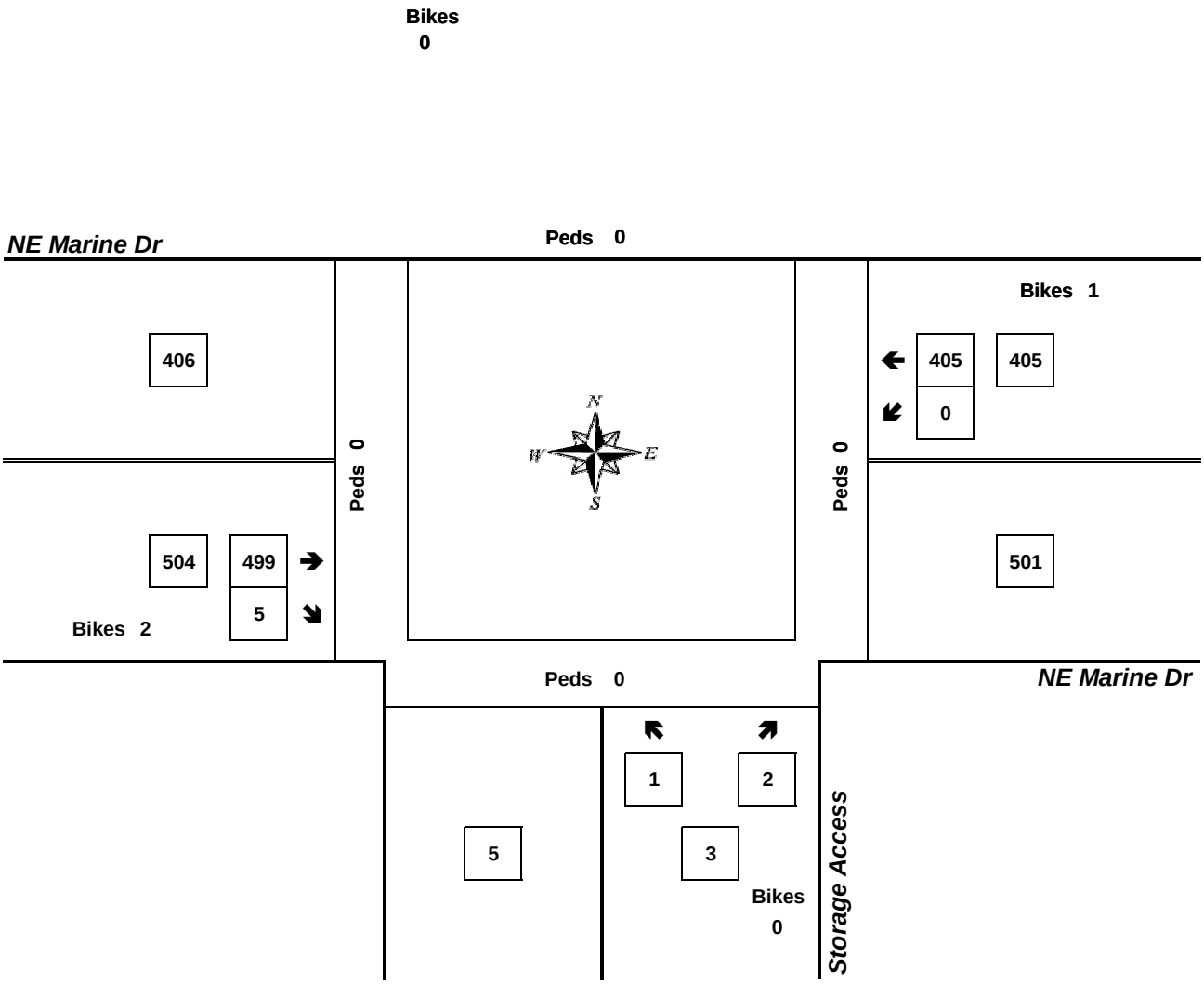
Exhibit C1

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Storage Access & NE Marine Dr

4:00 PM to 5:00 PM
Tuesday, April 10, 2018



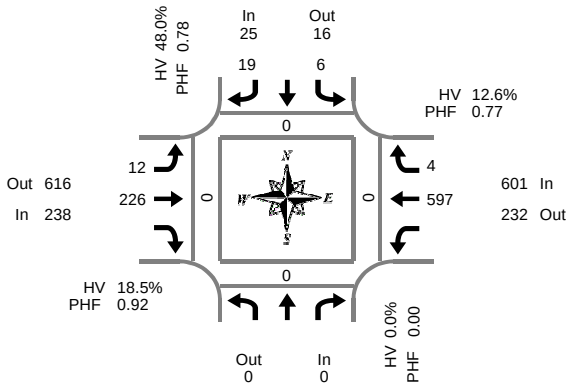
Approach	PHF	HV%	Volume
EB	0.86	9.1%	504
WB	0.90	13.1%	405
NB	0.75	33.3%	3
SB	0.00	0.0%	0
Intersection	0.97	11.0%	912

Count Period: 4:00 PM to 6:00 PM

Exhibit C1

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
7:30 AM to 8:30 AM

All Wood Recycle & NE Marine Dr

Tuesday, April 10, 2018
7:00 AM to 9:00 AM

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound All Wood Recycle				Southbound All Wood Recycle				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	0		3	0	3	42		0		107	2	0	157	0	0	0	0
7:15 AM				0	1		0	0	4	53		0		132	0	0	190	0	0	0	0
7:30 AM				0	1		4	0	2	56		0		160	0	0	223	0	0	0	0
7:45 AM				0	2		2	0	1	63		0		193	2	0	263	0	0	0	0
8:00 AM				0	0		8	0	4	61		0		111	2	0	186	0	0	0	0
8:15 AM				0	3		5	0	5	46		0		133	0	0	192	0	0	0	0
8:30 AM				0	2		2	0	3	32		0		110	0	0	149	0	0	0	0
8:45 AM				0	1		3	0	2	42		0		85	2	0	135	0	0	0	0
Total Survey				0	10		27	0	24	395		0		1,031	8	0	1,495	0	0	0	0

Peak Hour Summary
7:30 AM to 8:30 AM

By Approach	Northbound All Wood Recycle				Southbound All Wood Recycle				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	0	0	0	25	16	41	0	238	616	854	0	601	232	833	0	864	0	0	0	0
%HV	0.0%				48.0%				18.5%				12.6%				15.3%				
PHF	0.00				0.78				0.92				0.77				0.82				

By Movement	Northbound All Wood Recycle				Southbound All Wood Recycle				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	6		19	25	12	226		238		597	4	601	864
%HV	NA	NA	NA	0.0%	83.3%	NA	36.8%	48.0%	50.0%	16.8%	NA	18.5%	NA	12.4%	50.0%	12.6%	15.3%
PHF				0.00	0.50		0.59	0.78	0.60	0.90		0.92		0.77	0.50	0.77	0.82

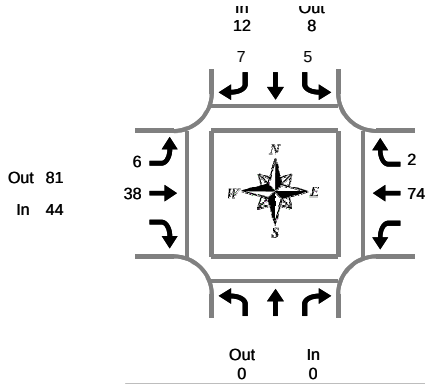
Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound All Wood Recycle				Southbound All Wood Recycle				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	4		9	0	10	214		0		592	4	0	833	0	0	0	0
7:15 AM				0	4		14	0	11	233		0		596	4	0	862	0	0	0	0
7:30 AM				0	6		19	0	12	226		0		597	4	0	864	0	0	0	0
7:45 AM				0	7		17	0	13	202		0		547	4	0	790	0	0	0	0
8:00 AM				0	6		18	0	14	181		0		439	4	0	662	0	0	0	0

Exhibit C1

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
7:30 AM to 8:30 AM

All Wood Recycle & NE Marine Dr

Tuesday, April 10, 2018
7:00 AM to 9:00 AM

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound All Wood Recycle				Southbound All Wood Recycle				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	0		2	2	2	9		11		16	1	17	30
7:15 AM				0	1		0	1	4	3		7		16	0	16	24
7:30 AM				0	0		2	2	0	9		9		17	0	17	28
7:45 AM				0	2		1	3	1	12		13		22	0	22	38
8:00 AM				0	0		3	3	2	10		12		12	2	14	29
8:15 AM				0	3		1	4	3	7		10		23	0	23	37
8:30 AM				0	0		0	0	2	8		10		18	0	18	28
8:45 AM				0	1		2	3	1	7		8		14	1	15	26
Total Survey				0	7		11	18	15	65		80		138	4	142	240

Heavy Vehicle Peak Hour Summary
7:30 AM to 8:30 AM

By Approach	Northbound All Wood Recycle			Southbound All Wood Recycle			Eastbound NE Marine Dr			Westbound NE Marine Dr			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	12	8	20	44	81	125	76	43	119	132
PHF	0.00			0.30			0.31			0.32			0.32

By Movement	Northbound All Wood Recycle				Southbound All Wood Recycle				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	5		7	12	6	38		44		74	2	76	132
PHF				0.00	0.25		0.29	0.30	0.21	0.31		0.31		0.32	0.25	0.32	0.32

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound All Wood Recycle				Southbound All Wood Recycle				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	3		5	8	7	33		40		71	1	72	120
7:15 AM				0	3		6	9	7	34		41		67	2	69	119
7:30 AM				0	5		7	12	6	38		44		74	2	76	132
7:45 AM				0	5		5	10	8	37		45		75	2	77	132
8:00 AM				0	4		6	10	8	32		40		67	3	70	120

Exhibit C1

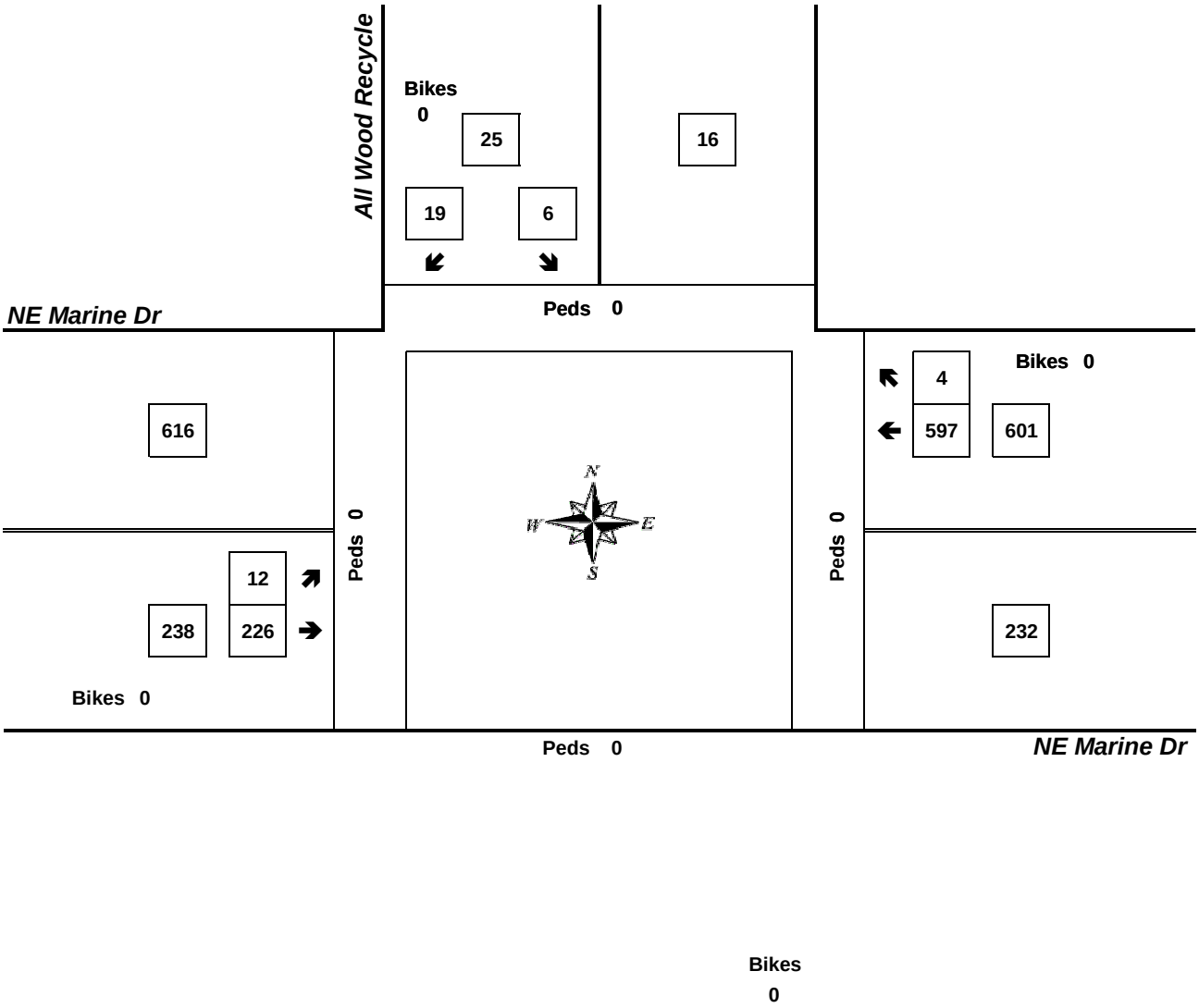
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

All Wood Recycle & NE Marine Dr

7:30 AM to 8:30 AM
Tuesday, April 10, 2018



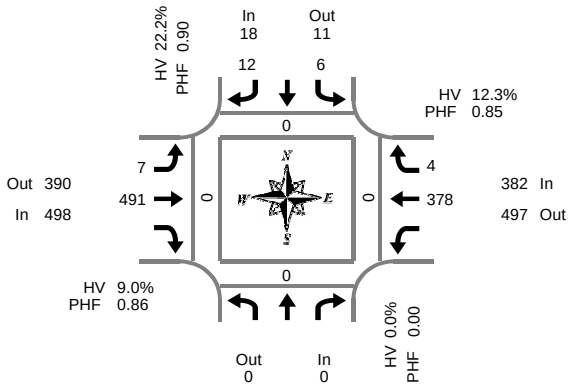
Approach	PHF	HV%	Volume
EB	0.92	18.5%	238
WB	0.77	12.6%	601
NB	0.00	0.0%	0
SB	0.78	48.0%	25
Intersection	0.82	15.3%	864

Count Period: 7:00 AM to 9:00 AM

Exhibit C1

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:15 PM to 5:15 PM

All Wood Recycle & NE Marine Dr

Tuesday, April 10, 2018
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound All Wood Recycle				Southbound All Wood Recycle				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	1		3	0	0	108		1		98	0	0	210	0	0	0	0
4:15 PM				0	4		1	0	3	122		0		109	3	1	242	0	0	0	0
4:30 PM				0	0		5	0	0	145		1		82	1	0	233	0	0	0	0
4:45 PM				0	1		3	0	1	112		0		88	0	0	205	0	0	0	0
5:00 PM				0	1		3	0	3	112		0		99	0	0	218	0	0	0	0
5:15 PM				0	1		5	0	0	133		0		70	1	0	210	0	0	0	0
5:30 PM				0	0		2	0	3	103		0		72	1	1	181	0	0	0	0
5:45 PM				0	0		1	0	0	90		0		67	0	0	158	0	0	0	0
Total Survey				0	8		23	0	10	925		2		685	6	2	1,657	0	0	0	0

Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound All Wood Recycle				Southbound All Wood Recycle				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	0	0	0	18	11	29	0	498	390	888	1	382	497	879	1	898	0	0	0	0
%HV	0.0%				22.2%				9.0%				12.3%				10.7%				
PHF	0.00				0.90				0.86				0.85				0.93				

By Movement	Northbound All Wood Recycle				Southbound All Wood Recycle				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	6		12	18	7	491		498		378	4	382	898
%HV	NA	NA	NA	0.0%	16.7%	NA	25.0%	22.2%	28.6%	8.8%	NA	9.0%	NA	12.2%	25.0%	12.3%	10.7%
PHF				0.00	0.38		0.60	0.90	0.58	0.85		0.86		0.87	0.33	0.85	0.93

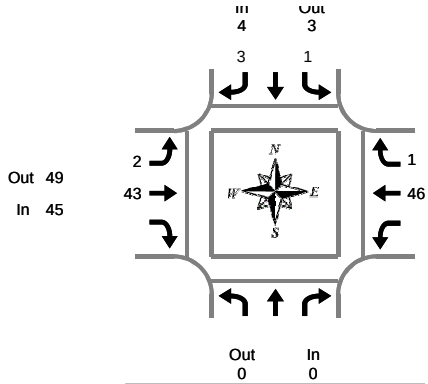
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound All Wood Recycle				Southbound All Wood Recycle				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	6		12	0	4	487		2		377	4	1	890	0	0	0	0
4:15 PM				0	6		12	0	7	491		1		378	4	1	898	0	0	0	0
4:30 PM				0	3		16	0	4	502		1		339	2	0	866	0	0	0	0
4:45 PM				0	3		13	0	7	460		0		329	2	1	814	0	0	0	0
5:00 PM				0	2		11	0	6	438		0		308	2	1	767	0	0	0	0

Exhibit C1

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:15 PM to 5:15 PM

All Wood Recycle & NE Marine Dr

Tuesday, April 10, 2018
4:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound All Wood Recycle				Southbound All Wood Recycle				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	1		1	2	0	9		9		9	0	9	20
4:15 PM				0	0		0	0	1	11		12		14	1	15	27
4:30 PM				0	0		1	1	0	11		11		15	0	15	27
4:45 PM				0	0		0	0	1	11		12		13	0	13	25
5:00 PM				0	1		2	3	0	10		10		4	0	4	17
5:15 PM				0	0		0	0	0	9		9		9	0	9	18
5:30 PM				0	0		1	1	2	4		6		6	1	7	14
5:45 PM				0	0		0	0	0	7		7		10	0	10	17
Total Survey				0	2		5	7	4	72		76		80	2	82	165

Heavy Vehicle Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound All Wood Recycle			Southbound All Wood Recycle			Eastbound NE Marine Dr			Westbound NE Marine Dr			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	4	3	7	45	49	94	47	44	91	96
PHF	0.00			0.25			0.32			0.27			0.30

By Movement	Northbound All Wood Recycle				Southbound All Wood Recycle				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	1		3	4	2	43		45		46	1	47	96
PHF				0.00	0.25		0.25	0.25	0.25	0.33		0.32		0.27	0.25	0.27	0.30

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound All Wood Recycle				Southbound All Wood Recycle				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	1		2	3	2	42		44		51	1	52	99
4:15 PM				0	1		3	4	2	43		45		46	1	47	96
4:30 PM				0	1		3	4	1	41		42		41	0	41	87
4:45 PM				0	1		3	4	3	34		37		32	1	33	74
5:00 PM				0	1		3	4	2	30		32		29	1	30	66

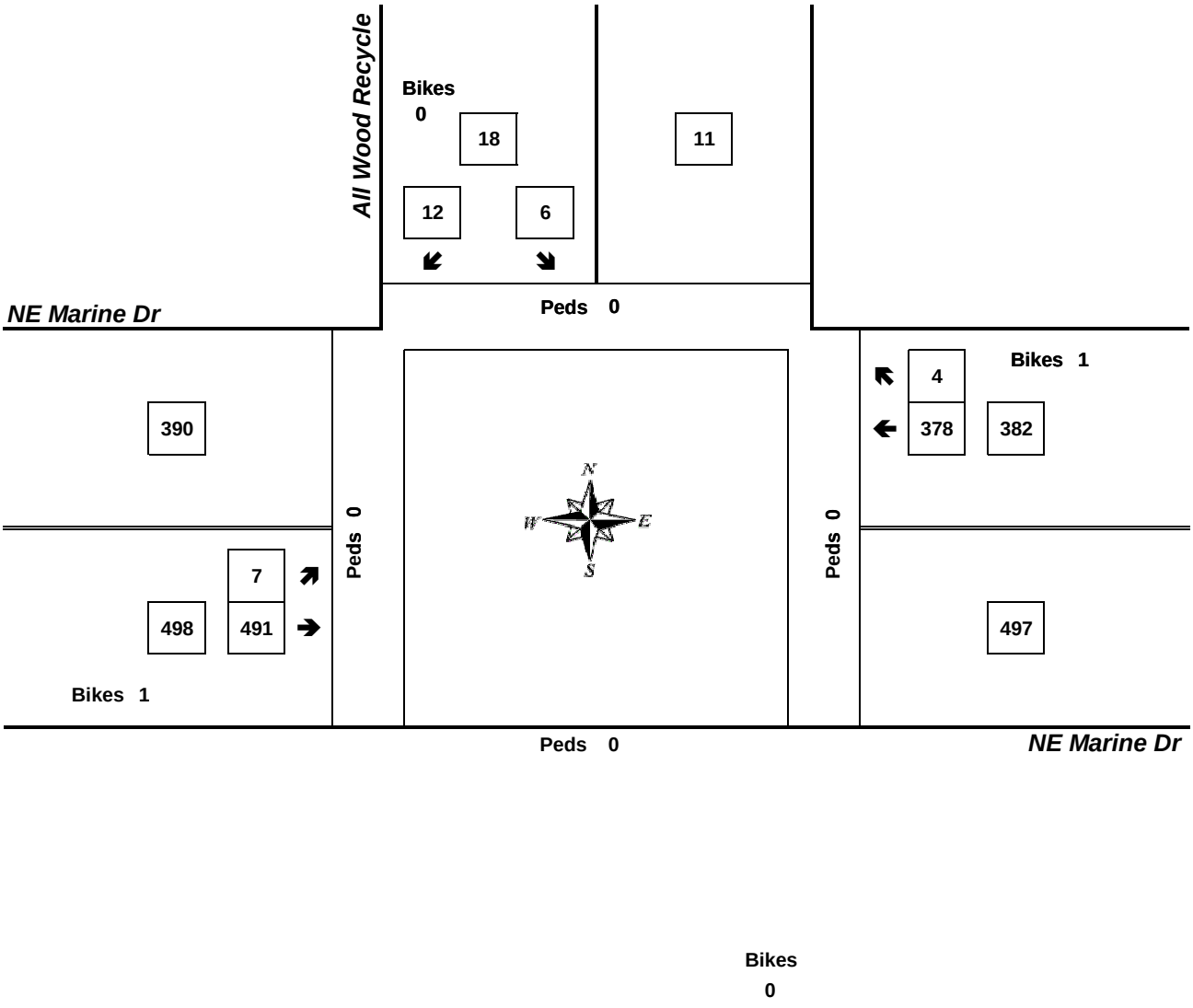
Exhibit C1

Peak Hour Summary

Clay Carney
(503) 833-2740

All Wood Recycle & NE Marine Dr

4:15 PM to 5:15 PM
Tuesday, April 10, 2018



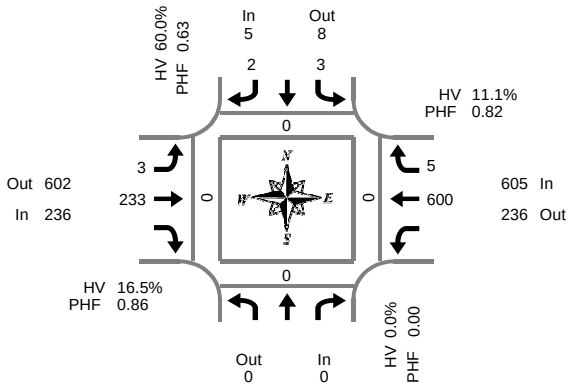
Approach	PHF	HV%	Volume
EB	0.86	9.0%	498
WB	0.85	12.3%	382
NB	0.00	0.0%	0
SB	0.90	22.2%	18
Intersection	0.93	10.7%	898

Count Period: 4:00 PM to 6:00 PM

Exhibit C1

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
7:15 AM to 8:15 AM

Auto Salvage & NE Marine Dr

Tuesday, April 10, 2018
7:00 AM to 9:00 AM

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Auto Salvage				Southbound Auto Salvage				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	0		0	0	1	51		0		109	1	0	162	0	0	0	0
7:15 AM				0	0		0	0	2	56		0		125	2	0	185	0	0	0	0
7:30 AM				0	1		1	0	0	63		0		172	0	0	237	0	0	0	0
7:45 AM				0	0		1	0	0	69		0		183	1	0	254	0	0	0	0
8:00 AM				0	2		0	0	1	45		0		120	2	0	170	0	0	0	0
8:15 AM				0	1		2	0	2	41		0		121	2	0	169	0	0	0	0
8:30 AM				0	1		0	0	3	39		0		132	3	0	178	0	0	0	0
8:45 AM				0	1		1	0	1	42		0		86	1	0	132	0	0	0	0
Total Survey				0	6		5	0	10	406		0		1,048	12	0	1,487	0	0	0	0

Peak Hour Summary
7:15 AM to 8:15 AM

By Approach	Northbound Auto Salvage				Southbound Auto Salvage				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	0	0	0	5	8	13	0	236	602	838	0	605	236	841	0	846	0	0	0	0
%HV	0.0%				60.0%				16.5%				11.1%				12.9%				
PHF	0.00				0.63				0.86				0.82				0.83				

By Movement	Northbound Auto Salvage				Southbound Auto Salvage				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	3		2	5	3	233		236		600	5	605	846
%HV	NA	NA	NA	0.0%	33.3%	NA	#####	60.0%	0.0%	16.7%	NA	16.5%	NA	11.0%	20.0%	11.1%	12.9%
PHF				0.00	0.38		0.50	0.63	0.38	0.84		0.86		0.82	0.63	0.82	0.83

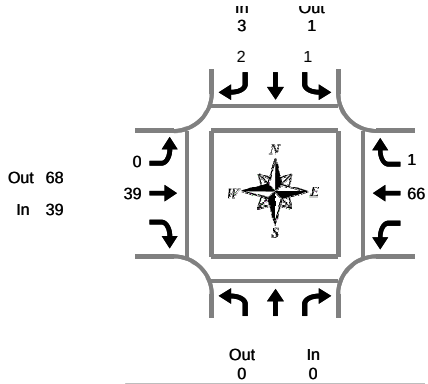
Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Auto Salvage				Southbound Auto Salvage				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	1		2	0	3	239		0		589	4	0	838	0	0	0	0
7:15 AM				0	3		2	0	3	233		0		600	5	0	846	0	0	0	0
7:30 AM				0	4		4	0	3	218		0		596	5	0	830	0	0	0	0
7:45 AM				0	4		3	0	6	194		0		556	8	0	771	0	0	0	0
8:00 AM				0	5		3	0	7	167		0		459	8	0	649	0	0	0	0

Exhibit C1

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Auto Salvage & NE Marine Dr

Tuesday, April 10, 2018
7:00 AM to 9:00 AM

Peak Hour Summary
7:15 AM to 8:15 AM

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Auto Salvage				Southbound Auto Salvage				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	0		0	0	0	9		9		17	0	17	26
7:15 AM				0	0		0	0	0	5		5		15	0	15	20
7:30 AM				0	0		1	1	0	10		10		16	0	16	27
7:45 AM				0	0		1	1	0	14		14		21	0	21	36
8:00 AM				0	1		0	1	0	10		10		14	1	15	26
8:15 AM				0	0		1	1	0	9		9		22	0	22	32
8:30 AM				0	1		0	1	2	6		8		19	2	21	30
8:45 AM				0	0		1	1	0	8		8		14	0	14	23
Total Survey				0	2		4	6	2	71		73		138	3	141	220

Heavy Vehicle Peak Hour Summary
7:15 AM to 8:15 AM

By Approach	Northbound Auto Salvage			Southbound Auto Salvage			Eastbound NE Marine Dr			Westbound NE Marine Dr			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	3	1	4	39	68	107	67	40	107	109
PHF	0.00			0.25			0.29			0.29			0.29

By Movement	Northbound Auto Salvage				Southbound Auto Salvage				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	1		2	3	0	39		39		66	1	67	109
PHF				0.00	0.13		0.25	0.25	0.00	0.29		0.29		0.29	0.08	0.29	0.29

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Auto Salvage				Southbound Auto Salvage				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	0		2	2	0	38		38		69	0	69	109
7:15 AM				0	1		2	3	0	39		39		66	1	67	109
7:30 AM				0	1		3	4	0	43		43		73	1	74	121
7:45 AM				0	2		2	4	2	39		41		76	3	79	124
8:00 AM				0	2		2	4	2	33		35		69	3	72	111

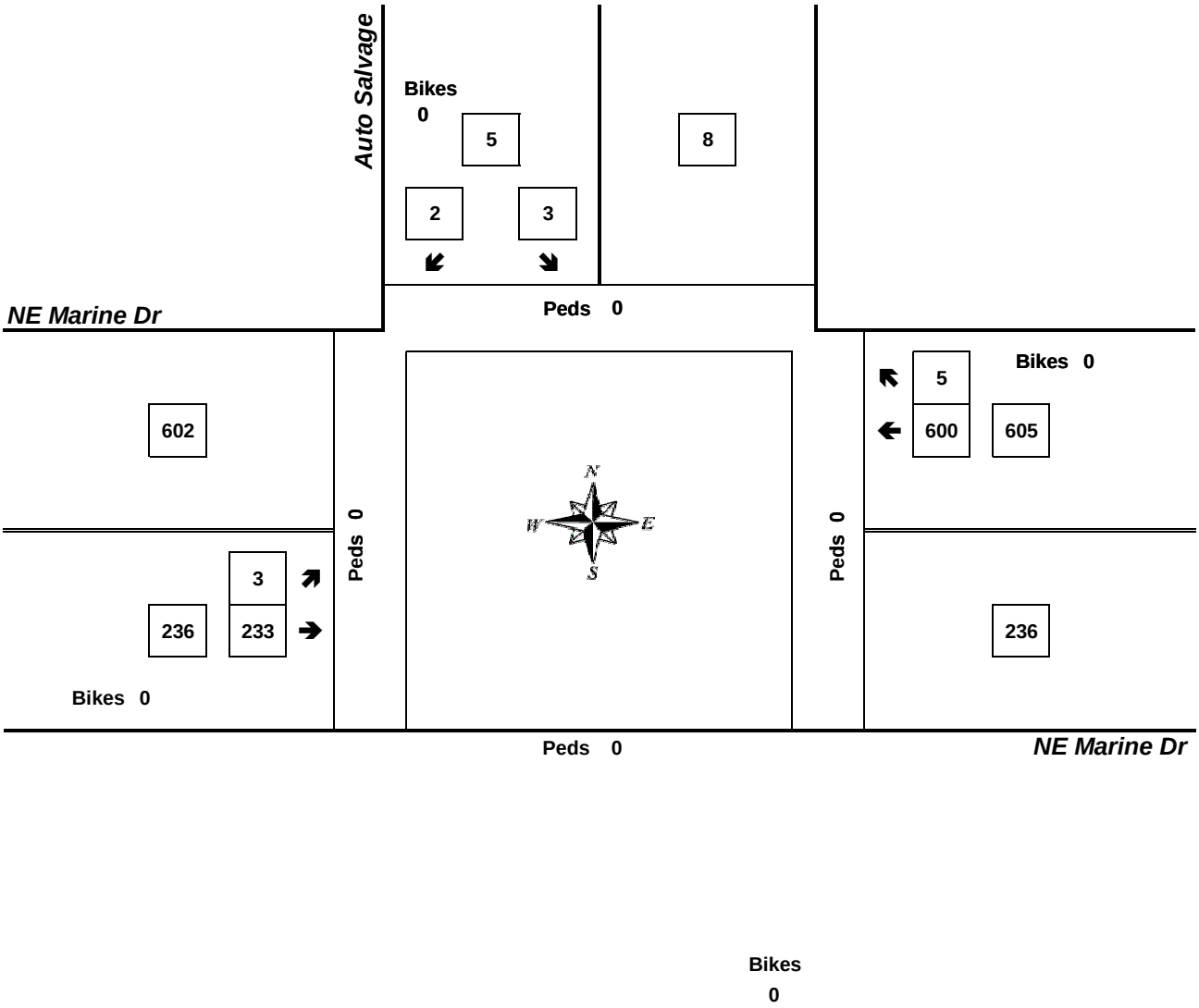
Exhibit C1

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Auto Salvage & NE Marine Dr

7:15 AM to 8:15 AM
Tuesday, April 10, 2018



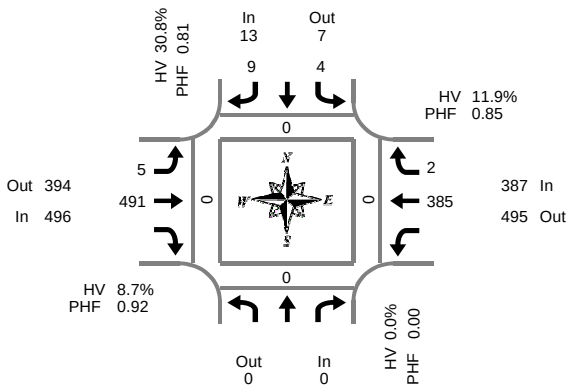
Approach	PHF	HV%	Volume
EB	0.86	16.5%	236
WB	0.82	11.1%	605
NB	0.00	0.0%	0
SB	0.63	60.0%	5
Intersection	0.83	12.9%	846

Count Period: 7:00 AM to 9:00 AM

Exhibit C1

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:15 PM to 5:15 PM

Auto Salvage & NE Marine Dr

Tuesday, April 10, 2018
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Auto Salvage				Southbound Auto Salvage				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	1		2	0	0	107		0		99	0	0	209	0	0	0	0
4:15 PM				0	2		1	0	1	133		0		114	0	1	251	0	0	0	0
4:30 PM				0	0		3	0	0	135		1		89	2	0	229	0	0	0	0
4:45 PM				0	2		1	0	0	119		0		81	0	0	203	0	0	0	0
5:00 PM				0	0		4	0	4	104		0		101	0	0	213	0	0	0	0
5:15 PM				0	1		4	0	0	142		0		86	0	0	233	0	0	0	0
5:30 PM				0	2		1	0	1	127		0		74	0	1	205	0	0	0	0
5:45 PM				0	1		2	0	1	78		0		66	0	0	148	0	0	0	0
Total Survey				0	9		18	0	7	945		1		710	2	2	1,691	0	0	0	0

Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound Auto Salvage				Southbound Auto Salvage				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	0	0	0	13	7	20	0	496	394	890	1	387	495	882	1	896	0	0	0	0
%HV	0.0%				30.8%				8.7%				11.9%				10.4%				
PHF	0.00				0.81				0.92				0.85				0.89				

By Movement	Northbound Auto Salvage				Southbound Auto Salvage				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	4		9	13	5	491		496		385	2	387	896
%HV	NA	NA	NA	0.0%	50.0%	NA	22.2%	30.8%	20.0%	8.6%	NA	8.7%	NA	11.9%	0.0%	11.9%	10.4%
PHF				0.00	0.50		0.56	0.81	0.31	0.91		0.92		0.84	0.25	0.85	0.89

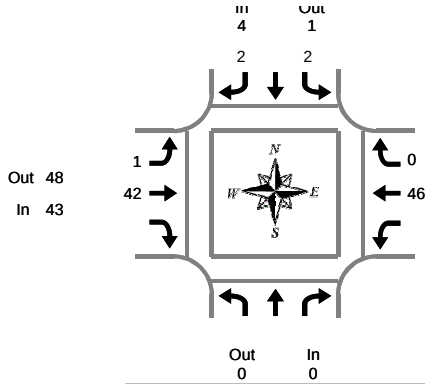
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Auto Salvage				Southbound Auto Salvage				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	5		7	0	1	494		1		383	2	1	892	0	0	0	0
4:15 PM				0	4		9	0	5	491		1		385	2	1	896	0	0	0	0
4:30 PM				0	3		12	0	4	500		1		357	2	0	878	0	0	0	0
4:45 PM				0	5		10	0	5	492		0		342	0	1	854	0	0	0	0
5:00 PM				0	4		11	0	6	451		0		327	0	1	799	0	0	0	0

Exhibit C1

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:15 PM to 5:15 PM

Auto Salvage & NE Marine Dr

Tuesday, April 10, 2018
4:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Auto Salvage				Southbound Auto Salvage				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	0		0	0	0	9		9		12	0	12	21
4:15 PM				0	2		0	2	0	12		12		11	0	11	25
4:30 PM				0	0		1	1	0	11		11		15	0	15	27
4:45 PM				0	0		0	0	0	10		10		13	0	13	23
5:00 PM				0	0		1	1	1	9		10		7	0	7	18
5:15 PM				0	0		0	0	0	10		10		9	0	9	19
5:30 PM				0	0		0	0	0	6		6		10	0	10	16
5:45 PM				0	0		0	0	1	6		7		6	0	6	13
Total Survey				0	2		2	4	2	73		75		83	0	83	162

Heavy Vehicle Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound Auto Salvage			Southbound Auto Salvage			Eastbound NE Marine Dr			Westbound NE Marine Dr			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	4	1	5	43	48	91	46	44	90	93
PHF	0.00			0.33			0.33			0.29			0.31

By Movement	Northbound Auto Salvage				Southbound Auto Salvage				Eastbound NE Marine Dr				Westbound NE Marine Dr				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	2		2	4	1	42		43		46	0	46	93
PHF				0.00	0.25		0.25	0.33	0.25	0.32		0.33		0.29	0.00	0.29	0.31

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Auto Salvage				Southbound Auto Salvage				Eastbound NE Marine Dr				Westbound NE Marine Dr				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	2		1	3	0	42		42		51	0	51	96
4:15 PM				0	2		2	4	1	42		43		46	0	46	93
4:30 PM				0	0		2	2	1	40		41		44	0	44	87
4:45 PM				0	0		1	1	1	35		36		39	0	39	76
5:00 PM				0	0		1	1	2	31		33		32	0	32	66

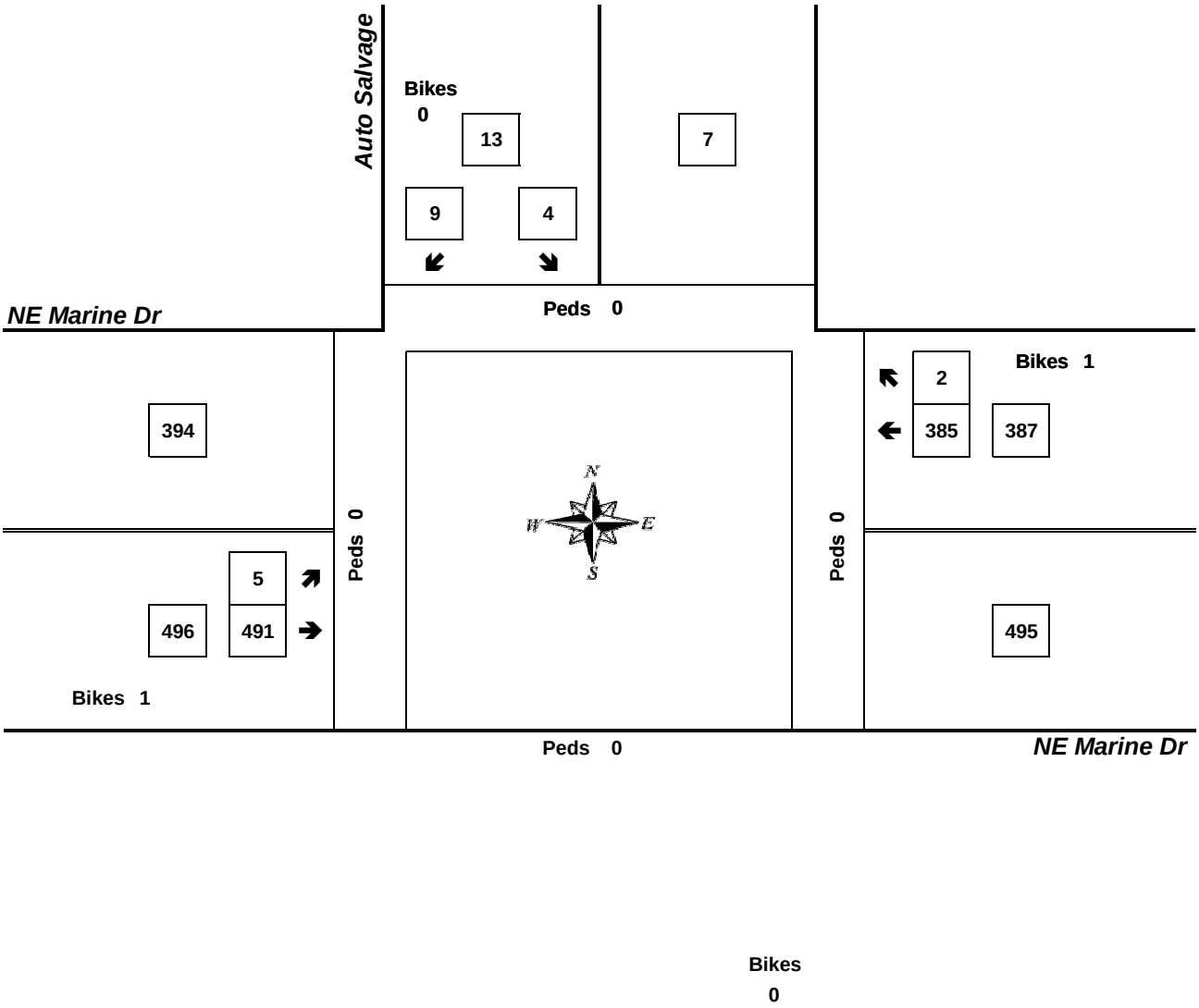
Exhibit C1

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Auto Salvage & NE Marine Dr

4:15 PM to 5:15 PM
Tuesday, April 10, 2018



Bikes
0

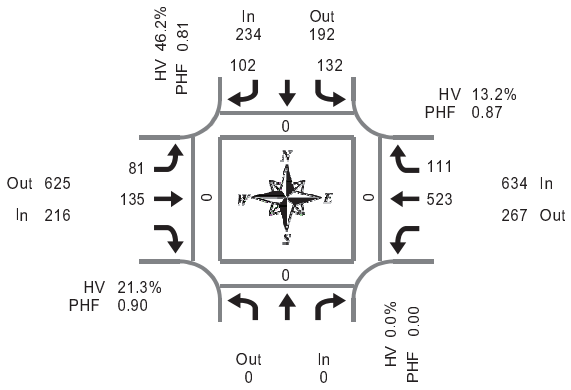
Approach	PHF	HV%	Volume
EB	0.92	8.7%	496
WB	0.85	11.9%	387
NB	0.00	0.0%	0
SB	0.81	30.8%	13
Intersection	0.89	10.4%	896

Count Period: 4:00 PM to 6:00 PM

Exhibit C1

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
7:15 AM to 8:15 AM

NW Sundial Rd & NW Marine Dr

Thursday, May 03, 2018
7:00 AM to 9:00 AM

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound NW Sundial Rd				Southbound NW Sundial Rd				Eastbound NW Marine Dr				Westbound NW Marine Dr				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	26		20	0	33	21		0		107	34	0	241	0	0	0	0
7:15 AM				0	22		14	0	22	36		0		122	29	0	245	0	0	0	0
7:30 AM				0	45		27	0	20	31		1		150	33	0	306	0	0	0	0
7:45 AM				0	32		31	0	15	32		0		149	22	0	281	0	0	0	0
8:00 AM				0	33		30	0	24	36		0		102	27	0	252	0	0	0	0
8:15 AM				0	27		29	0	16	33		0		82	23	0	210	0	0	0	0
8:30 AM				0	32		21	0	18	39		0		68	14	0	192	0	0	0	0
8:45 AM				0	36		20	0	21	52		0		60	17	0	206	0	0	0	0
Total Survey				0	253		192	0	169	280		1		840	199	0	1,933	0	0	0	0

Peak Hour Summary
7:15 AM to 8:15 AM

By Approach	Northbound NW Sundial Rd				Southbound NW Sundial Rd				Eastbound NW Marine Dr				Westbound NW Marine Dr				Total
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	
Volume	0	0	0	0	234	192	426	0	216	625	841	1	634	267	901	0	1,084
%HV	0.0%				46.2%				21.3%				13.2%				22.0%
PHF	0.00				0.81				0.90				0.87				0.89

Pedestrians Crosswalk			
North	South	East	West
0	0	0	0

By Movement	Northbound NW Sundial Rd				Southbound NW Sundial Rd				Eastbound NW Marine Dr				Westbound NW Marine Dr				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	132		102	234	81	135		216		523	111	634	1,084
%HV	NA	NA	NA	0.0%	49.2%	NA	42.2%	46.2%	12.3%	26.7%	NA	21.3%	NA	8.6%	35.1%	13.2%	22.0%
PHF				0.00	0.73		0.82	0.81	0.84	0.94		0.90		0.87	0.84	0.87	0.89

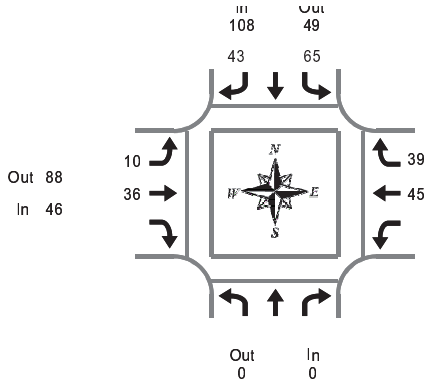
Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound NW Sundial Rd				Southbound NW Sundial Rd				Eastbound NW Marine Dr				Westbound NW Marine Dr				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	125		92	0	90	120		1		528	118	0	1,073	0	0	0	0
7:15 AM				0	132		102	0	81	135		1		523	111	0	1,084	0	0	0	0
7:30 AM				0	137		117	0	75	132		1		483	105	0	1,049	0	0	0	0
7:45 AM				0	124		111	0	73	140		0		401	86	0	935	0	0	0	0
8:00 AM				0	128		100	0	79	160		0		312	81	0	860	0	0	0	0

Exhibit C1

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



NW Sundial Rd & NW Marine Dr

Thursday, May 03, 2018
7:00 AM to 9:00 AM

Peak Hour Summary
7:15 AM to 8:15 AM

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound NW Sundial Rd				Southbound NW Sundial Rd				Eastbound NW Marine Dr				Westbound NW Marine Dr				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	10		10	20	4	5		9		12	8	20	49
7:15 AM				0	16		9	25	1	12		13		12	9	21	59
7:30 AM				0	21		11	32	0	9		9		14	11	25	66
7:45 AM				0	11		13	24	2	7		9		12	7	19	52
8:00 AM				0	17		10	27	7	8		15		7	12	19	61
8:15 AM				0	11		12	23	4	11		15		9	10	19	57
8:30 AM				0	11		11	22	6	11		17		9	5	14	53
8:45 AM				0	16		7	23	7	14		21		11	7	18	62
Total Survey				0	113		83	196	31	77		108		86	69	155	459

Heavy Vehicle Peak Hour Summary
7:15 AM to 8:15 AM

By Approach	Northbound NW Sundial Rd			Southbound NW Sundial Rd			Eastbound NW Marine Dr			Westbound NW Marine Dr			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	108	49	157	46	88	134	84	101	185	238
PHF	0.00			0.33			0.22			0.32			0.33

By Movement	Northbound NW Sundial Rd				Southbound NW Sundial Rd				Eastbound NW Marine Dr				Westbound NW Marine Dr				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	65		43	108	10	36		46		45	39	84	238
PHF				0.00	0.33		0.31	0.33	0.15	0.25		0.22		0.30	0.33	0.32	0.33

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound NW Sundial Rd				Southbound NW Sundial Rd				Eastbound NW Marine Dr				Westbound NW Marine Dr				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	58		43	101	7	33		40		50	35	85	226
7:15 AM				0	65		43	108	10	36		46		45	39	84	238
7:30 AM				0	60		46	106	13	35		48		42	40	82	236
7:45 AM				0	50		46	96	19	37		56		37	34	71	223
8:00 AM				0	55		40	95	24	44		68		36	34	70	233

Exhibit C1

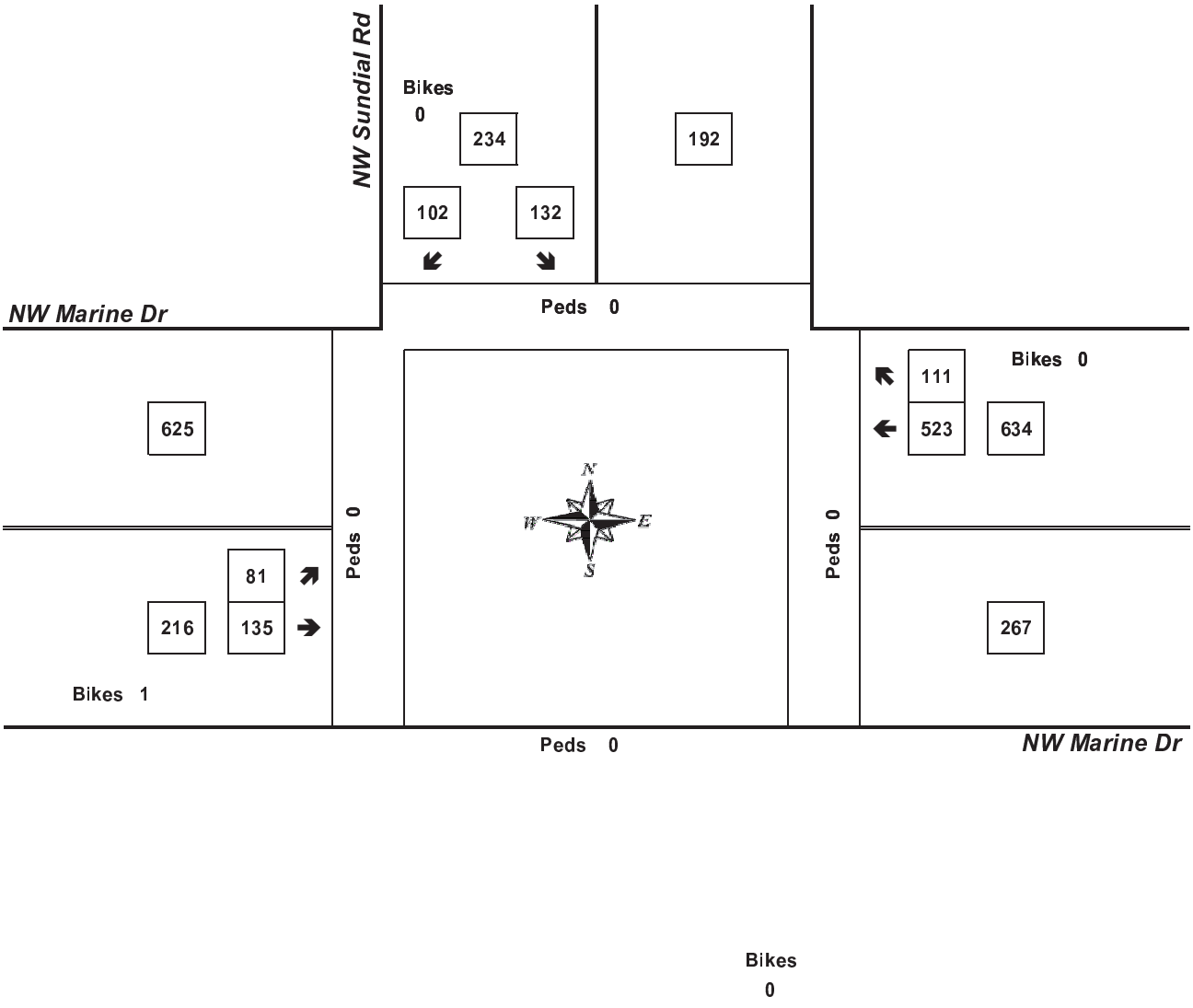
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

NW Sundial Rd & NW Marine Dr

7:15 AM to 8:15 AM
Thursday, May 03, 2018



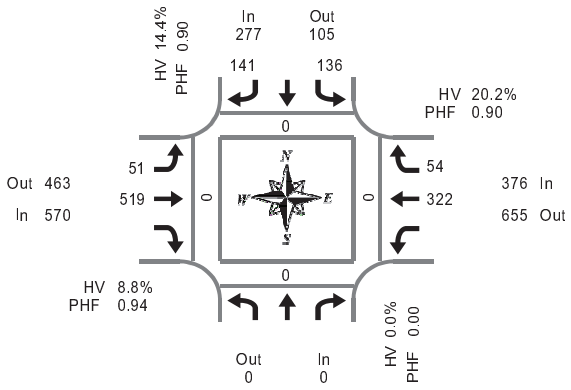
Approach	PHF	HV%	Volume
EB	0.90	21.3%	216
WB	0.87	13.2%	634
NB	0.00	0.0%	0
SB	0.81	46.2%	234
Intersection	0.89	22.0%	1,084

Count Period: 7:00 AM to 9:00 AM

Exhibit C1

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:00 PM to 5:00 PM

NW Sundial Rd & NW Marine Dr

Wednesday, May 02, 2018
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound NW Sundial Rd				Southbound NW Sundial Rd				Eastbound NW Marine Dr				Westbound NW Marine Dr				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	37		40	0	12	123		0		90	15	0	317	0	0	0	0
4:15 PM				0	21		35	0	14	138		1		81	13	0	302	0	0	0	0
4:30 PM				0	40		31	0	11	128		0		77	12	0	299	0	0	0	0
4:45 PM				0	38		35	1	14	130		0		74	14	0	305	0	0	0	0
5:00 PM				0	39		48	0	16	133		0		71	8	0	315	0	0	0	0
5:15 PM				0	32		29	0	12	127		0		56	13	0	269	0	0	0	0
5:30 PM				0	49		41	0	34	101		0		44	24	0	293	0	0	0	0
5:45 PM				0	39		30	0	29	110		0		60	35	0	303	0	0	0	0
Total Survey				0	295		289	1	142	990		1		553	134	0	2,403	0	0	0	0

Peak Hour Summary
4:00 PM to 5:00 PM

By Approach	Northbound NW Sundial Rd				Southbound NW Sundial Rd				Eastbound NW Marine Dr				Westbound NW Marine Dr				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	0	0	0	277	105	382	1	570	463	1,033	1	376	655	1,031	0	1,223	0	0	0	0
%HV	0.0%				14.4%				8.8%				20.2%				13.6%				
PHF	0.00				0.90				0.94				0.90				0.96				

By Movement	Northbound NW Sundial Rd				Southbound NW Sundial Rd				Eastbound NW Marine Dr				Westbound NW Marine Dr				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	136		141	277	51	519		570		322	54	376	1,223
%HV	NA	NA	NA	0.0%	16.9%	NA	12.1%	14.4%	41.2%	5.6%	NA	8.8%	NA	14.6%	53.7%	20.2%	13.6%
PHF				0.00	0.85		0.88	0.90	0.91	0.94		0.94		0.89	0.90	0.90	0.96

Rolling Hour Summary
4:00 PM to 6:00 PM

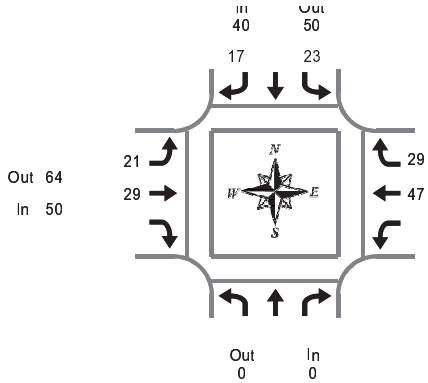
Interval Start Time	Northbound NW Sundial Rd				Southbound NW Sundial Rd				Eastbound NW Marine Dr				Westbound NW Marine Dr				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	136		141	1	51	519		1		322	54	0	1,223	0	0	0	0
4:15 PM				0	138		149	1	55	529		1		303	47	0	1,221	0	0	0	0
4:30 PM				0	149		143	1	53	518		0		278	47	0	1,188	0	0	0	0
4:45 PM				0	158		153	1	76	491		0		245	59	0	1,182	0	0	0	0
5:00 PM				0	159		148	0	91	471		0		231	80	0	1,180	0	0	0	0

Exhibit C1

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



NW Sundial Rd & NW Marine Dr

Wednesday, May 02, 2018
4:00 PM to 6:00 PM

Peak Hour Summary
4:00 PM to 5:00 PM

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound NW Sundial Rd				Southbound NW Sundial Rd				Eastbound NW Marine Dr				Westbound NW Marine Dr				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	10		5	15	5	4		9		15	11	26	50
4:15 PM				0	4		8	12	6	9		15		16	7	23	50
4:30 PM				0	5		2	7	4	9		13		8	6	14	34
4:45 PM				0	4		2	6	6	7		13		8	5	13	32
5:00 PM				0	7		2	9	6	10		16		3	4	7	32
5:15 PM				0	4		2	6	4	15		19		4	7	11	36
5:30 PM				0	3		2	5	5	5		10		4	7	11	26
5:45 PM				0	6		1	7	4	8		12		5	2	7	26
Total Survey				0	43		24	67	40	67		107		63	49	112	286

Heavy Vehicle Peak Hour Summary
4:00 PM to 5:00 PM

By Approach	Northbound NW Sundial Rd			Southbound NW Sundial Rd			Eastbound NW Marine Dr			Westbound NW Marine Dr			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	40	50	90	50	64	114	76	52	128	166
PHF	0.00			0.29			0.26			0.30			0.31

By Movement	Northbound NW Sundial Rd				Southbound NW Sundial Rd				Eastbound NW Marine Dr				Westbound NW Marine Dr				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	23		17	40	21	29		50		47	29	76	166
PHF				0.00	0.30		0.28	0.29	0.33	0.23		0.26		0.30	0.30	0.30	0.31

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound NW Sundial Rd				Southbound NW Sundial Rd				Eastbound NW Marine Dr				Westbound NW Marine Dr				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	23		17	40	21	29		50		47	29	76	166
4:15 PM				0	20		14	34	22	35		57		35	22	57	148
4:30 PM				0	20		8	28	20	41		61		23	22	45	134
4:45 PM				0	18		8	26	21	37		58		19	23	42	126
5:00 PM				0	20		7	27	19	38		57		16	20	36	120

Exhibit C1

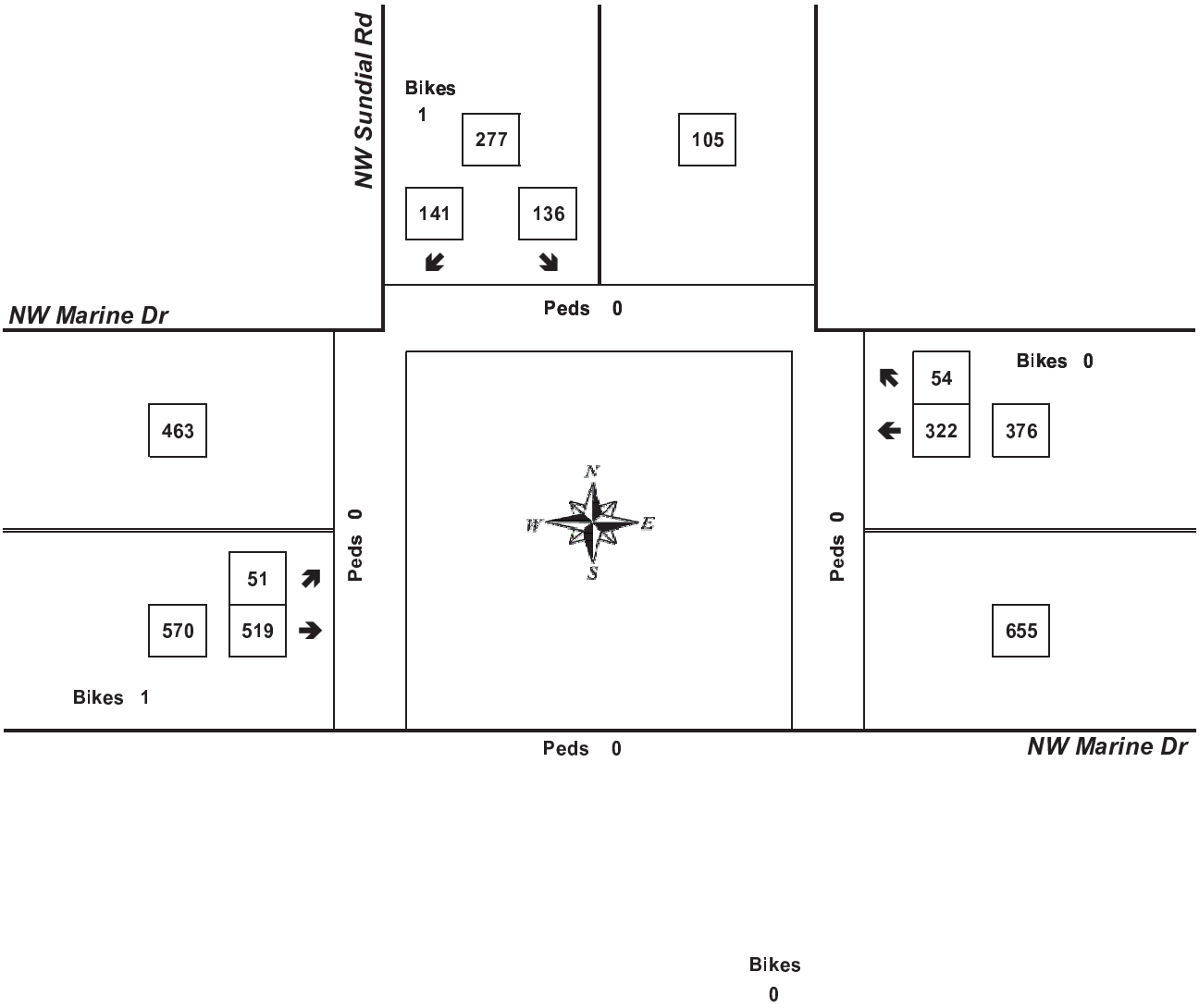
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

NW Sundial Rd & NW Marine Dr

4:00 PM to 5:00 PM
Wednesday, May 02, 2018

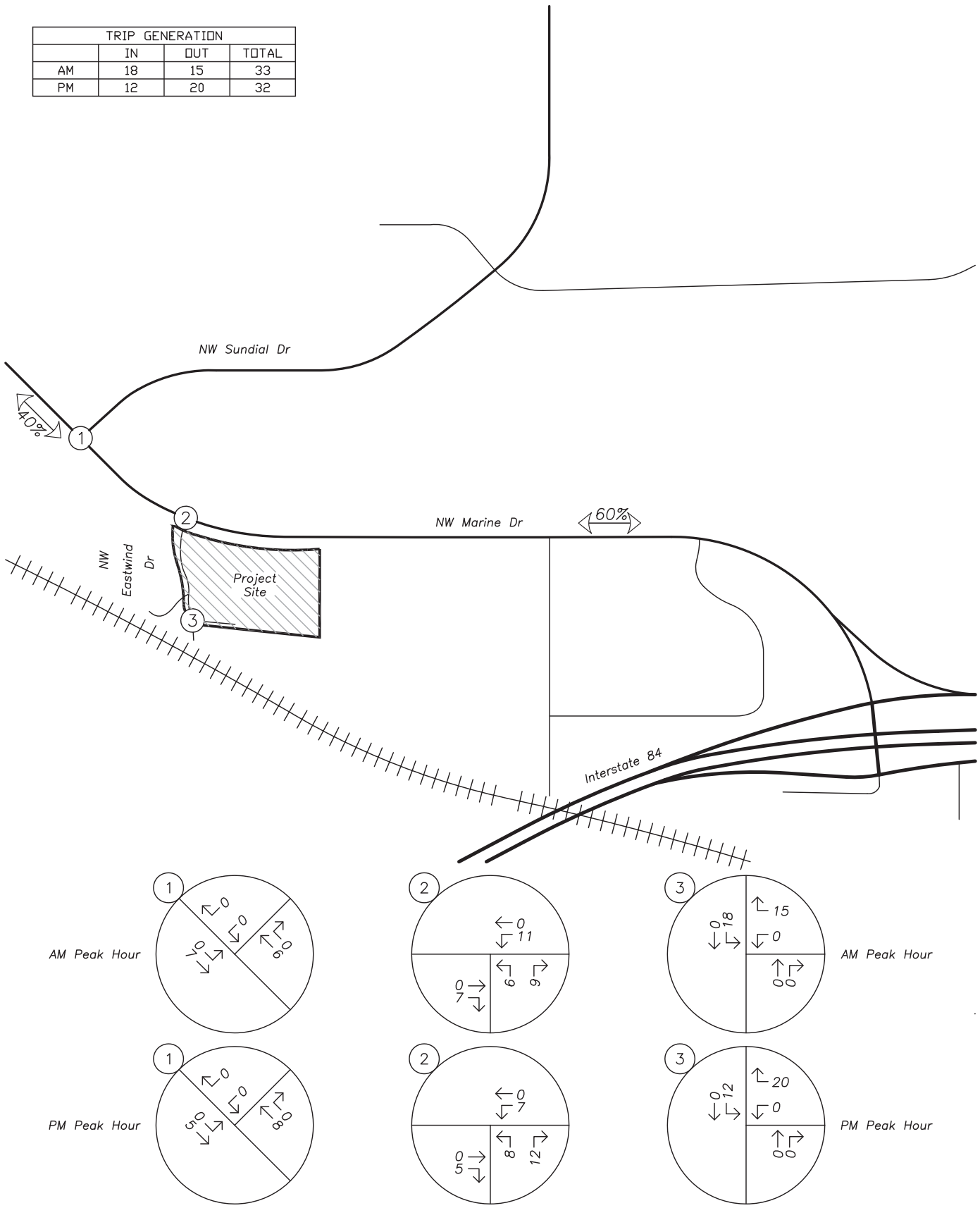


Approach	PHF	HV%	Volume
EB	0.94	8.8%	570
WB	0.90	20.2%	376
NB	0.00	0.0%	0
SB	0.90	14.4%	277
Intersection	0.96	13.6%	1,223

Count Period: 4:00 PM to 6:00 PM

Exhibit C1

TRIP GENERATION			
	IN	OUT	TOTAL
AM	18	15	33
PM	12	20	32

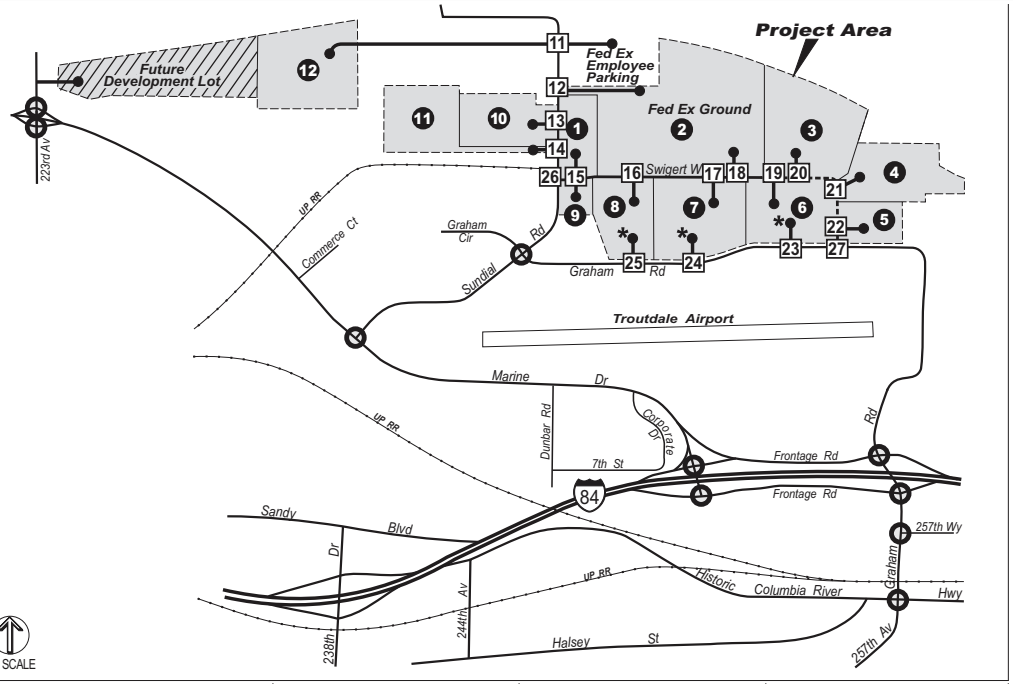


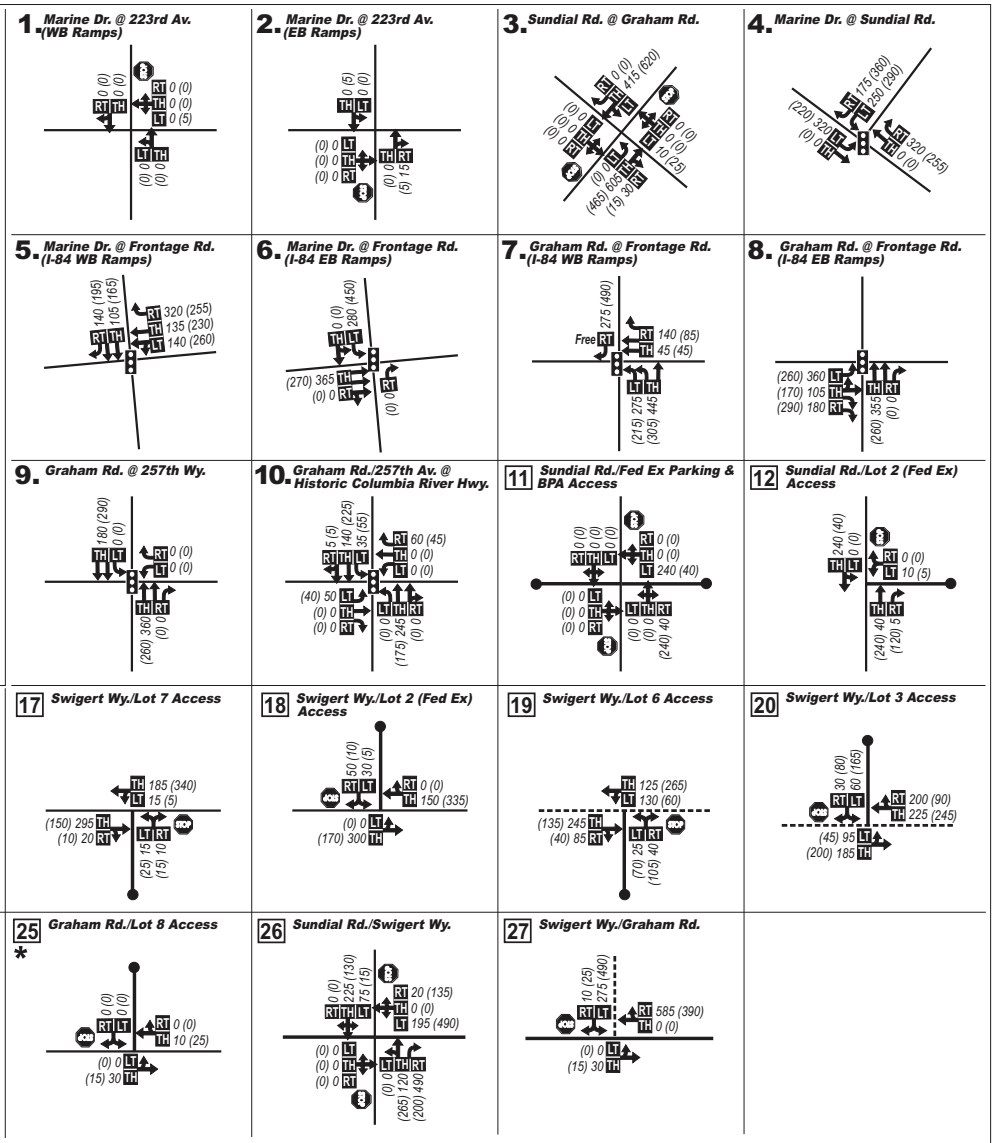
SITE TRIP DISTRIBUTION & ASSIGNMENT
Proposed Development Plan – Site Trips
AM & PM Peak Hours

no scale

FIGURE 3

Exhibit C1





LEGEND

1. - Study Intersection & Number
00 - Study Driveway & Number
0 - Parcel Number
- - - - - Potential Road Extension
* - For lots 6,7, & 8 access to Graham Road is provided in Circulation Option #2.

- Assumed Parcel Access to Street
- Phases 1 & 2
- Phase 3

- Traffic Signal
- Stop Sign
- Lane Configuration
AM (PM) - Peak Hour Traffic Volume
LT TH RT - Volume Turn Movement
Left•Thru•Right

General Notes:

- All future year volumes are rounded to the nearest multiple of 5.

DKS

Figure 6

CIRCULATION OPTION 1 - ADDED PROJECT AM/PM PEAK HOUR TRAFFIC VOLUMES

NO SCALE

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	431	11	11	860	9	6
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	474	12	12	945	10	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			486		1449	480
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			486		1449	480
tC, single (s)			4.2		7.1	6.9
tC, 2 stage (s)						
tF (s)			2.3		4.1	3.9
p0 queue free %			99		90	99
cM capacity (veh/h)			1037		101	468

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	486	957	16
Volume Left	0	12	10
Volume Right	12	0	7
cSH	1700	1037	147
Volume to Capacity	0.29	0.01	0.11
Queue Length 95th (ft)	0	1	9
Control Delay (s)	0.0	0.3	32.5
Lane LOS		A	D
Approach Delay (s)	0.0	0.3	32.5
Approach LOS			D

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	64.0%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	843	2	1	634	3	5
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	926	2	1	697	3	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			929		1626	927
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			929		1626	927
tC, single (s)			4.3		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.4		3.5	3.3
p0 queue free %			100		97	98
cM capacity (veh/h)			668		113	328

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	929	698	9
Volume Left	0	1	3
Volume Right	2	0	5
cSH	1700	668	192
Volume to Capacity	0.55	0.00	0.05
Queue Length 95th (ft)	0	0	4
Control Delay (s)	0.0	0.0	24.7
Lane LOS		A	C
Approach Delay (s)	0.0	0.0	24.7
Approach LOS			C

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	431	18	21	860	15	15
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	474	20	23	945	16	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			493		1475	484
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			493		1475	484
tC, single (s)			4.2		7.1	6.9
tC, 2 stage (s)						
tF (s)			2.3		4.1	3.9
p0 queue free %			98		83	96
cM capacity (veh/h)			1030		96	465

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	493	968	33
Volume Left	0	23	16
Volume Right	20	0	16
cSH	1700	1030	159
Volume to Capacity	0.29	0.02	0.21
Queue Length 95th (ft)	0	2	19
Control Delay (s)	0.0	0.6	33.5
Lane LOS		A	D
Approach Delay (s)	0.0	0.6	33.5
Approach LOS			D

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	843	8	10	634	10	15
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	926	9	11	697	11	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			935		1649	931
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			935		1649	931
tC, single (s)			4.3		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.4		3.5	3.3
p0 queue free %			98		90	95
cM capacity (veh/h)			664		108	326

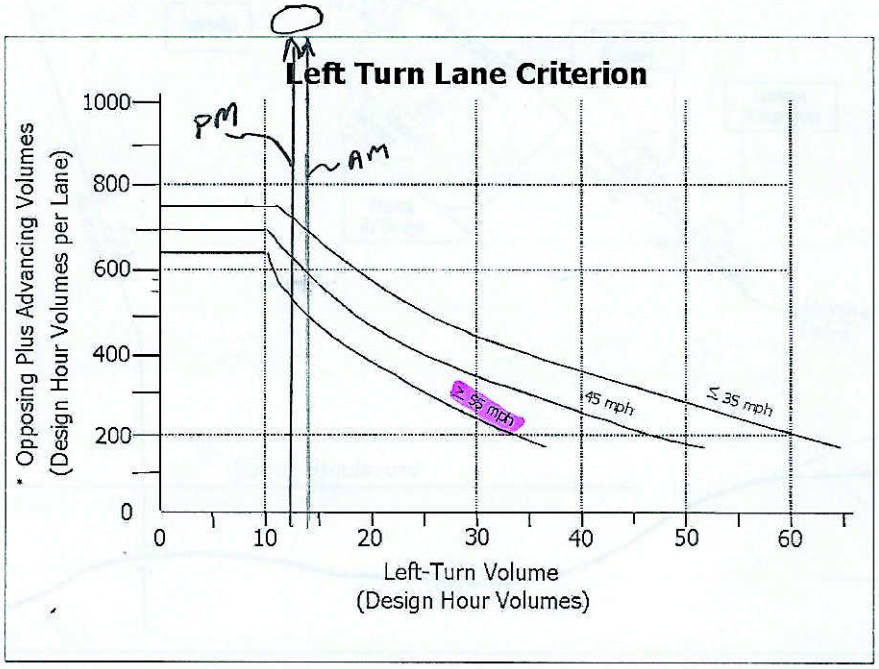
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	935	708	27
Volume Left	0	11	11
Volume Right	9	0	16
cSH	1700	664	181
Volume to Capacity	0.55	0.02	0.15
Queue Length 95th (ft)	0	1	13
Control Delay (s)	0.0	0.5	28.5
Lane LOS		A	D
Approach Delay (s)	0.0	0.5	28.5
Approach LOS			D

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

Exhibit C1

may require installation of a left turn. The final determination will be based on a field study.

Exhibit 7-1 Left Turn Lane Criterion (TTI)



West Site Access
Yr. 2020
TOTAL TRAFFIC

AM PK HR.

LT Vol = 14
Opposing + Advancing
817 + 578 = 1,395
LTL Warrant Met

PM PK HR.

LT Vol = 12
Opposing + Advancing
764 + 790 = 1554
LTL Warrant Met

*(Advancing Volume/Number of Advancing Through Lanes) + (Opposing Volume/Number of Opposing Through Lanes)

Criterion 2: Crash Experience

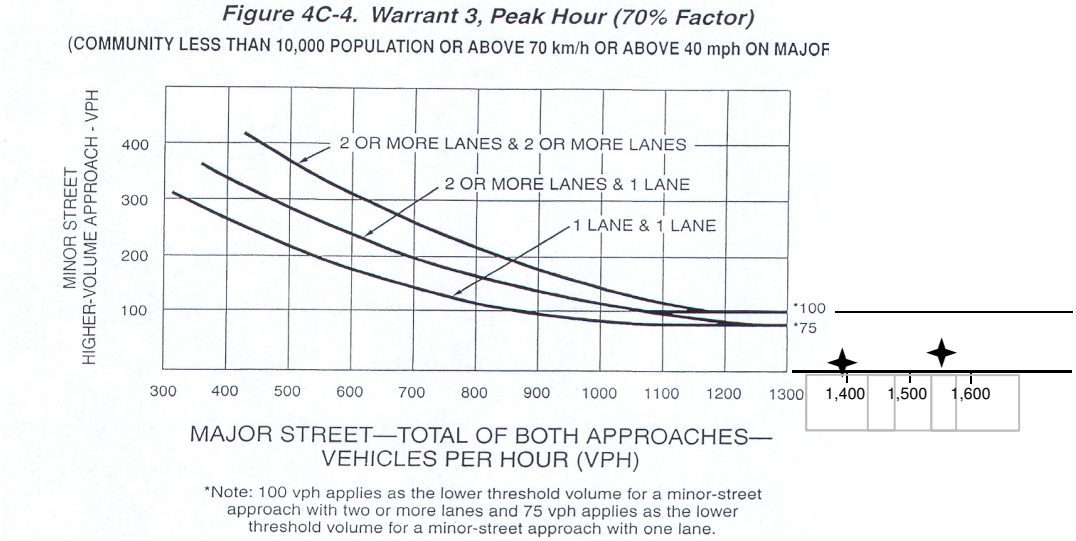
The crash experience criteria are satisfied when:

1. Adequate trial of other remedies with satisfactory observance and enforcement has failed to reduce the accident frequency; and
2. A history of crashes of the type susceptible to correction by a left turn lane (such as where a vehicle waiting to make a left turn from a through lane was struck from the rear); and
3. The safety benefits outweigh the associated improvement costs; and
4. The installation of the left turn lane does not adversely impact the operations of the roadway.

Criterion 3: Special Cases

1. **Railroad Crossings**: If a railroad is parallel to the roadway and adversely affects left turns, a worst case scenario should be used in determining the storage requirements for the left turn lane design. The left turn lane storage length depends on the amount of time the roadway is closed, the expected number of vehicle arrivals and the location of the crossing or other obstruction. The analysis should consider all of the variables influencing the design of the left turn lane and may allow a design for conditions other than the worst case storage requirements, providing safety is not compromised.
2. **Passing Lane**: Special consideration must be given to installing a left turn lane for those locations where left turns may occur and other mitigation options are not acceptable.
3. **Geometric/Safety Concerns**: Consider sight distance, alignment, operating speeds, nearby access movements and other safety related concerns.

Exhibit C1



Peak hour volume warrant for signalization data.

Intersection	Analysis Period	Major Street Speed (mph)	Major Street		Minor Street High Volume Approach		Signal Warranted?
			Volume (vph)	Lanes (#)	Volume (vph)	Lanes (#)	
Proposed West Site Access & Marine Drive	2020 Total Traffic - AM Peak	45	1,395	1	15	1	No
	2020 Total Traffic - PM Peak		1,554		33		No

Source: *Manual on Uniform Traffic Control Devices (MUTCD)*, 2003 Edition.

Charbonneau
Engineering LLC

PROJECT: #18-18 Allwood Recyclers DATE: 04.26.18

Exhibit C1

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF FAIRVIEW, MULTNOMAH COUNTY

NE Marine Dr between NE 223rd Ave (eastern ramps) and NW Commerce Ct
January 1, 2011 through December 31, 2015

SER# INVEST UNLOC?	SPED	ALC	DRUG	SCHL	WORK	DATE DAY/TIME *LAT/LONG*	FC DISTNC	CITY STREET FIRST STREET SECOND STREET INTERSECTION SEQ #	RD CHAR DIRECT LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL TRAF-CONTL	OFF-RD RNDBT DRVWY	WTHR SURF LIGHT	CRASH TYP COLL TYP SVRTY	V#	SPCL USE TRLR QTY OWNER VEH TYPE	MOVE FROM TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
13779	Y	N	N	N	N	12/07/2015	17	MARINE DR	STRGHT		N	N	RAIN	O-STRGHT	01	NONE 0	STRGHT										124	01,05
CITY						Mon 7A	60	WB EX MARINE DR	E	(NONE)	UNKNOWN	N	WET	HEAD		PRVTE	E W									000		00
No						*45 33 23.68*		*-122 25 52.64* 1	08	(02)		N	DAWN	INJ		PSNGR CAR		01	DRVR	INJC	23	M	OR-Y OR<25		000	000		00
															02	NONE 0	STRGHT											
																PRVTE	W E									000	124	00
																PSNGR CAR		01	DRVR	INJA	64	M	OTH-Y N-RES		047,080	017		01,05

Exhibit C1

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CITY STREET LOCATIONS BY COUNTY - DRIVER BEHAVIOR FORMAT

NE Marine Dr between NE 223rd Ave (eastern ramps) and NW Commerce Ct
January 1, 2011 through December 31, 2015

MULTNOMAH COUNTY

SERIAL NO	DATE	TIME	DAY	*COUNTY OR CITY NAME	CRASH LOCATION	COLL TYPE	EVENT	CAUSE	ERROR	SURF	TOTVEH	VEHICLE TYP/OWN #1	#2	PEOPLE KILL	INJ	ALC	SPED
13779	12/07/2015	7A	MO	Fairview	MARINE DR 60 FT E OF WB EX MARINE DR	HEAD	124	01,05	047,080	WET	2	011	011	0	2	N	Y
00422	01/12/2013	1A	SA	Troutdale	NW MARINE DR 800 FT NW OF NW COMMERCE CT	FIX	062	01		DRY	1	011		0	1	N	Y

Exhibit C1

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF TROUTDALE, MULTNOMAH COUNTY

MARINE DR at SUNDIAL RD, City of Troutdale, Multnomah County, 01/01/2010 to 12/31/2014

Total crash records: 3

SER# INVEST	S P E D	A L C	U G S	R H L	S C K	W O R K	DATE DAY TIME	CLASS DIST FROM	CITY STREET FIRST STREET SECOND STREET	RD CHAR DIRECT LOCTN	INT-TYPE (MEDIAN) LEGS (#LANES)	INT-REL TRAF-CONTL	OFFRD RNDBT DRVWY	WTHR SURF LIGHT	CRASH COLL SVRTY	V#	SPCL USE TRLR QTY OWNER TYPE	MOVE FROM TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
12613	Y	N	N	N	N		11/23/2014	17	MARINE DR	INTER	3-LEG	N	N	RAIN	ANGL-OTH	01	NONE 0	TURN-L										010	32,31
CITY							SU	0	NW SUNDIAL RD	SE		TRF SIGNAL	N	WET	TURN		PRVTE	NE-SE									000		00
							12P			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	23	M	OR-Y OR<25		052,053,080	017		32,31
																02	NONE 0	STRGHT											
																	PRVTE	SE-NW									000	010	00
																	PSNGR CAR		01	DRVR	INJC	37	M	OR-Y OR>25		000	000		00
																02	NONE 0	STRGHT											
																	PRVTE	SE-NW									000	010	00
																	PSNGR CAR		02	PSNG	INJC	34	M			000	000		00
07429	Y	N	N	N	N		07/22/2014	17	MARINE DR	INTER	3-LEG	N	N	RAIN	ANGL-STP	01	NONE 0	TURN-R											01,08
CITY							TU	0	NW SUNDIAL RD	NW		TRF SIGNAL	N	WET	TURN		PRVTE	NE-NW									000		00
							7A			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	22	M	NONE OR<25		001,047,080	017		01,08
																02	NONE 0	STOP											
																	PRVTE	NW-SE									012		00
																	PSNGR CAR		01	DRVR	NONE	52	M	OR-Y OR<25		000	000		00
12580	N	N	N				11/21/2014	17	MARINE DR	INTER	3-LEG	N	N	CLR	ANGL-STP	01	NONE 1	TURN-R											08
NO RPT							FR	0	NW SUNDIAL RD	NW		TRF SIGNAL	N	WET	TURN		PRVTE	NE-NW									000		00
							12A			06	0		N	DLIT	INJ		SEMI TOW		01	DRVR	NONE	56	M	OTH-Y N-RES		001	000		08
																02	NONE 0	STOP											
																	PRVTE	NW-SE									012		00
																	PSNGR CAR		01	DRVR	INJC	58	M	OR-Y OR<25		000	000		00

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	12	226	597	4	6	19
Future Volume (vph)	12	226	597	4	6	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45	45		30	
Link Distance (ft)		470	531		467	
Travel Time (s)		7.1	8.0		10.6	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	19%	19%	13%	13%	48%	48%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 41.7%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	226	597	4	6	19
Future Vol, veh/h	12	226	597	4	6	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	19	19	13	13	48	48
Mvmt Flow	15	276	728	5	7	23

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	733	0	-	0	1035	730
Stage 1	-	-	-	-	730	-
Stage 2	-	-	-	-	305	-
Critical Hdwy	4.29	-	-	-	6.88	6.68
Critical Hdwy Stg 1	-	-	-	-	5.88	-
Critical Hdwy Stg 2	-	-	-	-	5.88	-
Follow-up Hdwy	2.371	-	-	-	3.932	3.732
Pot Cap-1 Maneuver	799	-	-	-	211	355
Stage 1	-	-	-	-	403	-
Stage 2	-	-	-	-	654	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	799	-	-	-	206	355
Mov Cap-2 Maneuver	-	-	-	-	206	-
Stage 1	-	-	-	-	403	-
Stage 2	-	-	-	-	640	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	18.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	799	-	-	-	302
HCM Lane V/C Ratio	0.018	-	-	-	0.101
HCM Control Delay (s)	9.6	0	-	-	18.3
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	3	233	600	5	3	2
Future Volume (vph)	3	233	600	5	3	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45	45		30	
Link Distance (ft)		488	528		474	
Travel Time (s)		7.4	8.0		10.8	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	17%	17%	11%	11%	60%	60%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	41.9%	ICU Level of Service A	
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	233	600	5	3	2
Future Vol, veh/h	3	233	600	5	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	17	17	11	11	60	60
Mvmt Flow	4	281	723	6	4	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	729	0	-	0	1014	726
Stage 1	-	-	-	-	726	-
Stage 2	-	-	-	-	288	-
Critical Hdwy	4.27	-	-	-	7	6.8
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	2.353	-	-	-	4.04	3.84
Pot Cap-1 Maneuver	810	-	-	-	208	342
Stage 1	-	-	-	-	389	-
Stage 2	-	-	-	-	645	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	810	-	-	-	207	342
Mov Cap-2 Maneuver	-	-	-	-	207	-
Stage 1	-	-	-	-	389	-
Stage 2	-	-	-	-	641	-

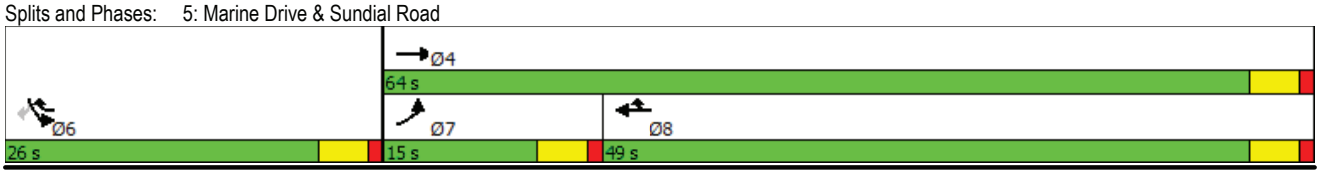
Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	20
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	810	-	-	-	246
HCM Lane V/C Ratio	0.004	-	-	-	0.024
HCM Control Delay (s)	9.5	0	-	-	20
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	81	135	523	111	132	102
Future Volume (vph)	81	135	523	111	132	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120			135	0	0
Storage Lanes	1			1	1	1
Taper Length (ft)	25				25	
Right Turn on Red				Yes		Yes
Link Speed (mph)		45	45		45	
Link Distance (ft)		637	775		740	
Travel Time (s)		9.7	11.7		11.2	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	21%	21%	13%	13%	46%	46%
Shared Lane Traffic (%)						
Turn Type	Prot	NA	NA	pt+ov	Prot	Perm
Protected Phases	7	4	8	8 6	6	
Permitted Phases						6
Detector Phase	7	4	8	8 6	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	22.5		22.5	22.5
Total Split (s)	15.0	64.0	49.0		26.0	26.0
Total Split (%)	16.7%	71.1%	54.4%		28.9%	28.9%
Maximum Green (s)	10.5	59.5	44.5		21.5	21.5
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	9.0	41.2	30.8	59.7	22.7	22.7
Actuated g/C Ratio	0.12	0.56	0.42	0.81	0.31	0.31
v/c Ratio	0.50	0.17	0.84	0.11	0.39	0.27
Control Delay	44.5	6.9	30.9	0.7	29.7	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.5	6.9	30.9	0.7	29.7	7.8
LOS	D	A	C	A	C	A
Approach Delay		21.0	25.6		20.1	
Approach LOS		C	C		C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 73.5			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 23.5		Intersection LOS: C	
Intersection Capacity Utilization 50.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 5: Marine Drive & Sundial Road



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	81	135	523	111	132	102
Future Volume (veh/h)	81	135	523	111	132	102
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1570	1570	1681	1681	1301	1301
Adj Flow Rate, veh/h	91	152	588	0	148	115
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	21	21	13	13	46	46
Cap, veh/h	111	865	691	1039	392	350
Arrive On Green	0.07	0.55	0.41	0.00	0.32	0.32
Sat Flow, veh/h	1495	1570	1681	1429	1239	1106
Grp Volume(v), veh/h	91	152	588	0	148	115
Grp Sat Flow(s),veh/h/ln	1495	1570	1681	1429	1239	1106
Q Serve(g_s), s	4.1	3.3	21.5	0.0	6.3	5.4
Cycle Q Clear(g_c), s	4.1	3.3	21.5	0.0	6.3	5.4
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	111	865	691	1039	392	350
V/C Ratio(X)	0.82	0.18	0.85	0.00	0.38	0.33
Avail Cap(c_a), veh/h	231	1375	1101	1388	392	350
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	31.0	7.6	18.1	0.0	18.0	17.7
Incr Delay (d2), s/veh	13.7	0.1	3.8	0.0	2.8	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	1.4	10.7	0.0	2.4	3.9
LnGrp Delay(d),s/veh	44.7	7.7	21.9	0.0	20.8	20.2
LnGrp LOS	D	A	C		C	C
Approach Vol, veh/h		243	588		263	
Approach Delay, s/veh		21.5	21.9		20.5	
Approach LOS		C	C		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				41.9		26.0	9.5	32.4
Change Period (Y+Rc), s				4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s				59.5		21.5	10.5	44.5
Max Q Clear Time (g_c+I1), s				5.3		8.3	6.1	23.5
Green Ext Time (p_c), s				5.0		0.7	0.1	4.4

Intersection Summary	
HCM 2010 Ctrl Delay	21.5
HCM 2010 LOS	C

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	7	491	378	4	6	12
Future Volume (vph)	7	491	378	4	6	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45	45		30	
Link Distance (ft)		470	531		467	
Travel Time (s)		7.1	8.0		10.6	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	9%	9%	12%	12%	22%	22%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	491	378	4	6	12
Future Vol, veh/h	7	491	378	4	6	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	9	9	12	12	22	22
Mvmt Flow	8	528	406	4	6	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	411	0	-	0	952	409
Stage 1	-	-	-	-	409	-
Stage 2	-	-	-	-	543	-
Critical Hdwy	4.19	-	-	-	6.62	6.42
Critical Hdwy Stg 1	-	-	-	-	5.62	-
Critical Hdwy Stg 2	-	-	-	-	5.62	-
Follow-up Hdwy	2.281	-	-	-	3.698	3.498
Pot Cap-1 Maneuver	1111	-	-	-	265	601
Stage 1	-	-	-	-	630	-
Stage 2	-	-	-	-	544	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1111	-	-	-	262	601
Mov Cap-2 Maneuver	-	-	-	-	262	-
Stage 1	-	-	-	-	630	-
Stage 2	-	-	-	-	539	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	14
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1111	-	-	-	420
HCM Lane V/C Ratio	0.007	-	-	-	0.046
HCM Control Delay (s)	8.3	0	-	-	14
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	491	385	2	4	9
Future Volume (vph)	5	491	385	2	4	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45	45		30	
Link Distance (ft)		488	528		474	
Travel Time (s)		7.4	8.0		10.8	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	9%	9%	12%	12%	31%	31%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	491	385	2	4	9
Future Vol, veh/h	5	491	385	2	4	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	9	9	12	12	31	31
Mvmt Flow	6	552	433	2	4	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	435	0	-	0	997	434
Stage 1	-	-	-	-	434	-
Stage 2	-	-	-	-	563	-
Critical Hdwy	4.19	-	-	-	6.71	6.51
Critical Hdwy Stg 1	-	-	-	-	5.71	-
Critical Hdwy Stg 2	-	-	-	-	5.71	-
Follow-up Hdwy	2.281	-	-	-	3.779	3.579
Pot Cap-1 Maneuver	1088	-	-	-	240	565
Stage 1	-	-	-	-	596	-
Stage 2	-	-	-	-	517	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1088	-	-	-	238	565
Mov Cap-2 Maneuver	-	-	-	-	238	-
Stage 1	-	-	-	-	596	-
Stage 2	-	-	-	-	513	-

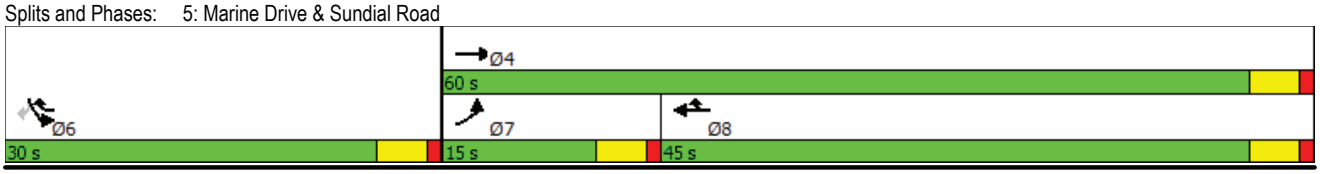
Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	14.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1088	-	-	-	397
HCM Lane V/C Ratio	0.005	-	-	-	0.037
HCM Control Delay (s)	8.3	0	-	-	14.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	51	519	322	54	136	141
Future Volume (vph)	51	519	322	54	136	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120			135	0	0
Storage Lanes	1			1	1	1
Taper Length (ft)	25				25	
Right Turn on Red				Yes		Yes
Link Speed (mph)		45	45		45	
Link Distance (ft)		657	760		584	
Travel Time (s)		10.0	11.5		8.8	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	9%	9%	20%	20%	14%	14%
Shared Lane Traffic (%)						
Turn Type	Prot	NA	NA	pt+ov	Prot	Perm
Protected Phases	7	4	8	8 6	6	
Permitted Phases						6
Detector Phase	7	4	8	8 6	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	22.5		22.5	22.5
Total Split (s)	15.0	60.0	45.0		30.0	30.0
Total Split (%)	16.7%	66.7%	50.0%		33.3%	33.3%
Maximum Green (s)	10.5	55.5	40.5		25.5	25.5
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	7.6	27.8	20.7	53.9	26.3	26.3
Actuated g/C Ratio	0.12	0.44	0.33	0.85	0.41	0.41
v/c Ratio	0.27	0.71	0.65	0.05	0.22	0.22
Control Delay	32.1	19.1	26.0	0.9	16.8	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.1	19.1	26.0	0.9	16.8	4.7
LOS	C	B	C	A	B	A
Approach Delay		20.3	22.4		10.6	
Approach LOS		C	C		B	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 63.4	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 18.7	Intersection LOS: B
Intersection Capacity Utilization 42.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 5: Marine Drive & Sundial Road



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	51	519	322	54	136	141
Future Volume (veh/h)	51	519	322	54	136	141
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1743	1743	1583	1583	1667	1667
Adj Flow Rate, veh/h	53	541	335	0	142	147
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	9	9	20	20	14	14
Cap, veh/h	81	753	490	981	666	595
Arrive On Green	0.05	0.43	0.31	0.00	0.42	0.42
Sat Flow, veh/h	1660	1743	1583	1346	1587	1417
Grp Volume(v), veh/h	53	541	335	0	142	147
Grp Sat Flow(s),veh/h/ln	1660	1743	1583	1346	1587	1417
Q Serve(g_s), s	1.9	15.5	11.3	0.0	3.5	4.1
Cycle Q Clear(g_c), s	1.9	15.5	11.3	0.0	3.5	4.1
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	81	753	490	981	666	595
V/C Ratio(X)	0.66	0.72	0.68	0.00	0.21	0.25
Avail Cap(c_a), veh/h	287	1593	1056	1463	666	595
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	14.2	18.4	0.0	11.2	11.4
Incr Delay (d2), s/veh	8.7	1.3	1.7	0.0	0.7	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	7.6	5.2	0.0	1.6	4.1
LnGrp Delay(d),s/veh	37.1	15.5	20.1	0.0	12.0	12.4
LnGrp LOS	D	B	C		B	B
Approach Vol, veh/h		594	335		289	
Approach Delay, s/veh		17.4	20.1		12.2	
Approach LOS		B	C		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				30.7		30.0	7.5	23.3
Change Period (Y+Rc), s				4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s				55.5		25.5	10.5	40.5
Max Q Clear Time (g_c+I1), s				17.5		6.1	3.9	13.3
Green Ext Time (p_c), s				5.8		0.8	0.0	5.5

Intersection Summary	
HCM 2010 Ctrl Delay	16.9
HCM 2010 LOS	B

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	12	569	808	4	6	19
Future Volume (vph)	12	569	808	4	6	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45	45		30	
Link Distance (ft)		470	531		467	
Travel Time (s)		7.1	8.0		10.6	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	19%	19%	13%	13%	48%	48%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 52.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	569	808	4	6	19
Future Vol, veh/h	12	569	808	4	6	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	19	19	13	13	48	48
Mvmt Flow	15	694	985	5	7	23

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	990	0	-	0	1711	988
Stage 1	-	-	-	-	988	-
Stage 2	-	-	-	-	723	-
Critical Hdwy	4.29	-	-	-	6.88	6.68
Critical Hdwy Stg 1	-	-	-	-	5.88	-
Critical Hdwy Stg 2	-	-	-	-	5.88	-
Follow-up Hdwy	2.371	-	-	-	3.932	3.732
Pot Cap-1 Maneuver	635	-	-	-	77	246
Stage 1	-	-	-	-	298	-
Stage 2	-	-	-	-	407	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	635	-	-	-	74	246
Mov Cap-2 Maneuver	-	-	-	-	74	-
Stage 1	-	-	-	-	298	-
Stage 2	-	-	-	-	392	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	33.2
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	635	-	-	-	158
HCM Lane V/C Ratio	0.023	-	-	-	0.193
HCM Control Delay (s)	10.8	0	-	-	33.2
HCM Lane LOS	B	A	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	3	576	811	5	3	2
Future Volume (vph)	3	576	811	5	3	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45	45		30	
Link Distance (ft)		488	528		474	
Travel Time (s)		7.4	8.0		10.8	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	17%	17%	11%	11%	60%	60%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 53.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	576	811	5	3	2
Future Vol, veh/h	3	576	811	5	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	17	17	11	11	60	60
Mvmt Flow	4	694	977	6	4	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	983	0	-	0	1681	980
Stage 1	-	-	-	-	980	-
Stage 2	-	-	-	-	701	-
Critical Hdwy	4.27	-	-	-	7	6.8
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	2.353	-	-	-	4.04	3.84
Pot Cap-1 Maneuver	646	-	-	-	75	237
Stage 1	-	-	-	-	287	-
Stage 2	-	-	-	-	400	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	646	-	-	-	74	237
Mov Cap-2 Maneuver	-	-	-	-	74	-
Stage 1	-	-	-	-	287	-
Stage 2	-	-	-	-	396	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	42.5
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	646	-	-	-	102
HCM Lane V/C Ratio	0.006	-	-	-	0.059
HCM Control Delay (s)	10.6	0	-	-	42.5
HCM Lane LOS	B	A	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	404	154	556	435	387	281
Future Volume (vph)	404	154	556	435	387	281
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120			135	0	0
Storage Lanes	1			1	1	1
Taper Length (ft)	25				25	
Right Turn on Red				Yes		Yes
Link Speed (mph)		45	45		45	
Link Distance (ft)		637	760		770	
Travel Time (s)		9.7	11.5		11.7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	21%	21%	13%	13%	46%	46%
Shared Lane Traffic (%)						
Turn Type	Prot	NA	NA	pt+ov	Prot	Perm
Protected Phases	7	4	8	8 6	6	
Permitted Phases						6
Detector Phase	7	4	8	8 6	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	22.5		22.5	22.5
Total Split (s)	35.0	78.0	43.0		42.0	42.0
Total Split (%)	29.2%	65.0%	35.8%		35.0%	35.0%
Maximum Green (s)	30.5	73.5	38.5		37.5	37.5
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	30.5	73.5	38.5	80.5	37.5	37.5
Actuated g/C Ratio	0.25	0.61	0.32	0.67	0.31	0.31
v/c Ratio	1.20	0.18	1.16	0.49	1.13	0.56
Control Delay	151.5	10.7	128.5	9.3	123.7	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	151.5	10.7	128.5	9.3	123.7	7.7
LOS	F	B	F	A	F	A
Approach Delay		112.6	76.2		74.9	
Approach LOS		F	E		E	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.20	
Intersection Signal Delay: 85.0	Intersection LOS: F
Intersection Capacity Utilization 84.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Marine Drive & Sundial Road

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	404	154	556	435	387	281
Future Volume (veh/h)	404	154	556	435	387	281
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1570	1570	1681	1681	1301	1301
Adj Flow Rate, veh/h	454	173	625	0	435	316
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	21	21	13	13	46	46
Cap, veh/h	380	962	539	905	387	346
Arrive On Green	0.25	0.61	0.32	0.00	0.31	0.31
Sat Flow, veh/h	1495	1570	1681	1429	1239	1106
Grp Volume(v), veh/h	454	173	625	0	435	316
Grp Sat Flow(s),veh/h/ln	1495	1570	1681	1429	1239	1106
Q Serve(g_s), s	30.5	5.8	38.5	0.0	37.5	33.0
Cycle Q Clear(g_c), s	30.5	5.8	38.5	0.0	37.5	33.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	380	962	539	905	387	346
V/C Ratio(X)	1.19	0.18	1.16	0.00	1.12	0.91
Avail Cap(c_a), veh/h	380	962	539	905	387	346
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	44.8	10.1	40.8	0.0	41.3	39.7
Incr Delay (d2), s/veh	110.5	0.1	90.6	0.0	83.5	30.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	24.2	2.5	31.4	0.0	21.8	20.6
LnGrp Delay(d),s/veh	155.3	10.2	131.3	0.0	124.8	70.5
LnGrp LOS	F	B	F		F	E
Approach Vol, veh/h		627	625		751	
Approach Delay, s/veh		115.2	131.3		102.0	
Approach LOS		F	F		F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				78.0		42.0	35.0	43.0
Change Period (Y+Rc), s				4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s				73.5		37.5	30.5	38.5
Max Q Clear Time (g_c+I1), s				7.8		39.5	32.5	40.5
Green Ext Time (p_c), s				5.6		0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	115.3
HCM 2010 LOS	F

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	7	742	768	4	6	12
Future Volume (vph)	7	742	768	4	6	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45	45		30	
Link Distance (ft)		470	531		467	
Travel Time (s)		7.1	8.0		10.6	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	9%	9%	12%	12%	22%	22%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 54.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	742	768	4	6	12
Future Vol, veh/h	7	742	768	4	6	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	9	9	12	12	22	22
Mvmt Flow	8	798	826	4	6	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	830	0	-	0	1641	828
Stage 1	-	-	-	-	828	-
Stage 2	-	-	-	-	813	-
Critical Hdwy	4.19	-	-	-	6.62	6.42
Critical Hdwy Stg 1	-	-	-	-	5.62	-
Critical Hdwy Stg 2	-	-	-	-	5.62	-
Follow-up Hdwy	2.281	-	-	-	3.698	3.498
Pot Cap-1 Maneuver	772	-	-	-	99	342
Stage 1	-	-	-	-	397	-
Stage 2	-	-	-	-	404	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	772	-	-	-	97	342
Mov Cap-2 Maneuver	-	-	-	-	97	-
Stage 1	-	-	-	-	397	-
Stage 2	-	-	-	-	396	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	26.6
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	772	-	-	-	186
HCM Lane V/C Ratio	0.01	-	-	-	0.104
HCM Control Delay (s)	9.7	0	-	-	26.6
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	742	775	2	4	9
Future Volume (vph)	5	742	775	2	4	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45	45		30	
Link Distance (ft)		488	528		474	
Travel Time (s)		7.4	8.0		10.8	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	9%	9%	12%	12%	31%	31%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 53.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	742	775	2	4	9
Future Vol, veh/h	5	742	775	2	4	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	9	9	12	12	31	31
Mvmt Flow	6	834	871	2	4	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	873	0	-	0	1717	872
Stage 1	-	-	-	-	872	-
Stage 2	-	-	-	-	845	-
Critical Hdwy	4.19	-	-	-	6.71	6.51
Critical Hdwy Stg 1	-	-	-	-	5.71	-
Critical Hdwy Stg 2	-	-	-	-	5.71	-
Follow-up Hdwy	2.281	-	-	-	3.779	3.579
Pot Cap-1 Maneuver	744	-	-	-	84	311
Stage 1	-	-	-	-	365	-
Stage 2	-	-	-	-	376	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	744	-	-	-	83	311
Mov Cap-2 Maneuver	-	-	-	-	83	-
Stage 1	-	-	-	-	365	-
Stage 2	-	-	-	-	370	-

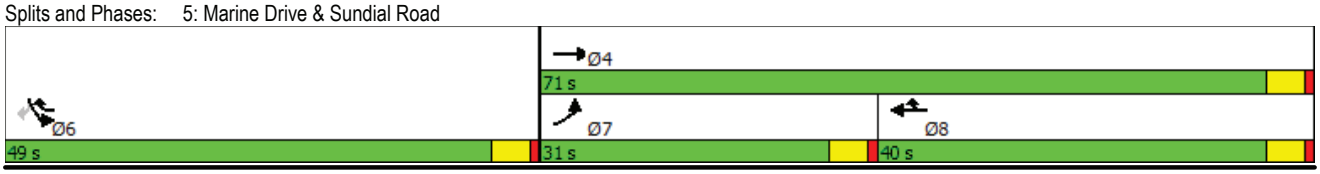
Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	28.3
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	744	-	-	-	169
HCM Lane V/C Ratio	0.008	-	-	-	0.086
HCM Control Delay (s)	9.9	0	-	-	28.3
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	273	551	350	311	431	507
Future Volume (vph)	273	551	350	311	431	507
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120			135	0	0
Storage Lanes	1			1	1	1
Taper Length (ft)	25				25	
Right Turn on Red				Yes		Yes
Link Speed (mph)		45	45		45	
Link Distance (ft)		692	844		892	
Travel Time (s)		10.5	12.8		13.5	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	9%	9%	20%	20%	14%	14%
Shared Lane Traffic (%)						
Turn Type	Prot	NA	NA	pt+ov	Prot	Perm
Protected Phases	7	4	8	8 6	6	
Permitted Phases						6
Detector Phase	7	4	8	8 6	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	22.5		22.5	22.5
Total Split (s)	31.0	71.0	40.0		49.0	49.0
Total Split (%)	25.8%	59.2%	33.3%		40.8%	40.8%
Maximum Green (s)	26.5	66.5	35.5		44.5	44.5
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	22.8	57.2	29.8	79.3	44.9	44.9
Actuated g/C Ratio	0.21	0.51	0.27	0.71	0.40	0.40
v/c Ratio	0.84	0.64	0.86	0.32	0.70	0.60
Control Delay	65.0	22.9	59.3	3.2	37.0	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.0	22.9	59.3	3.2	37.0	5.4
LOS	E	C	E	A	D	A
Approach Delay		36.8	32.9		19.9	
Approach LOS		D	C		B	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 111.2	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 29.2	Intersection LOS: C
Intersection Capacity Utilization 68.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: Marine Drive & Sundial Road



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	273	551	350	311	431	507
Future Volume (veh/h)	273	551	350	311	431	507
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1743	1743	1583	1583	1667	1667
Adj Flow Rate, veh/h	284	574	365	0	449	528
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	9	9	20	20	14	14
Cap, veh/h	315	879	432	922	655	584
Arrive On Green	0.19	0.50	0.27	0.00	0.41	0.41
Sat Flow, veh/h	1660	1743	1583	1346	1587	1417
Grp Volume(v), veh/h	284	574	365	0	449	528
Grp Sat Flow(s),veh/h/ln	1660	1743	1583	1346	1587	1417
Q Serve(g_s), s	18.0	26.3	23.5	0.0	25.0	37.7
Cycle Q Clear(g_c), s	18.0	26.3	23.5	0.0	25.0	37.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	315	879	432	922	655	584
V/C Ratio(X)	0.90	0.65	0.85	0.00	0.69	0.90
Avail Cap(c_a), veh/h	408	1074	521	998	655	584
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	42.7	19.8	37.1	0.0	26.0	29.7
Incr Delay (d2), s/veh	19.1	1.0	10.5	0.0	5.8	19.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.0	12.8	11.5	0.0	12.0	28.2
LnGrp Delay(d),s/veh	61.8	20.8	47.6	0.0	31.8	49.6
LnGrp LOS	E	C	D		C	D
Approach Vol, veh/h		858	365		977	
Approach Delay, s/veh		34.4	47.6		41.4	
Approach LOS		C	D		D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				58.9		49.0	25.0	33.9
Change Period (Y+Rc), s				4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s				66.5		44.5	26.5	35.5
Max Q Clear Time (g_c+I1), s				28.3		39.7	20.0	25.5
Green Ext Time (p_c), s				6.4		1.7	0.4	3.9

Intersection Summary	
HCM 2010 Ctrl Delay	39.7
HCM 2010 LOS	D

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	7	575	821	2	5	8
Future Volume (vph)	7	575	821	2	5	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45	45		30	
Link Distance (ft)		470	531		467	
Travel Time (s)		7.1	8.0		10.6	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	19%	19%	13%	13%	48%	48%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 53.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	575	821	2	5	8
Future Vol, veh/h	7	575	821	2	5	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	19	19	13	13	48	48
Mvmt Flow	9	701	1001	2	6	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1004	0	-	0	1720	1002
Stage 1	-	-	-	-	1002	-
Stage 2	-	-	-	-	718	-
Critical Hdwy	4.29	-	-	-	6.88	6.68
Critical Hdwy Stg 1	-	-	-	-	5.88	-
Critical Hdwy Stg 2	-	-	-	-	5.88	-
Follow-up Hdwy	2.371	-	-	-	3.932	3.732
Pot Cap-1 Maneuver	627	-	-	-	76	242
Stage 1	-	-	-	-	293	-
Stage 2	-	-	-	-	409	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	627	-	-	-	74	242
Mov Cap-2 Maneuver	-	-	-	-	74	-
Stage 1	-	-	-	-	293	-
Stage 2	-	-	-	-	399	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	36.8
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	627	-	-	-	129
HCM Lane V/C Ratio	0.014	-	-	-	0.123
HCM Control Delay (s)	10.8	0	-	-	36.8
HCM Lane LOS	B	A	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	3	581	822	5	3	2
Future Volume (vph)	3	581	822	5	3	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45	45		30	
Link Distance (ft)		488	528		474	
Travel Time (s)		7.4	8.0		10.8	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	17%	17%	11%	11%	60%	60%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 53.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	581	822	5	3	2
Future Vol, veh/h	3	581	822	5	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	17	17	11	11	60	60
Mvmt Flow	4	700	990	6	4	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	996	0	-	0	1700	993
Stage 1	-	-	-	-	993	-
Stage 2	-	-	-	-	707	-
Critical Hdwy	4.27	-	-	-	7	6.8
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	2.353	-	-	-	4.04	3.84
Pot Cap-1 Maneuver	639	-	-	-	73	233
Stage 1	-	-	-	-	282	-
Stage 2	-	-	-	-	397	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	639	-	-	-	72	233
Mov Cap-2 Maneuver	-	-	-	-	72	-
Stage 1	-	-	-	-	282	-
Stage 2	-	-	-	-	393	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	43.3
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	639	-	-	-	100
HCM Lane V/C Ratio	0.006	-	-	-	0.06
HCM Control Delay (s)	10.7	0	-	-	43.3
HCM Lane LOS	B	A	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	564	14	14	803	12	3
Future Volume (vph)	564	14	14	803	12	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	45			45	30	
Link Distance (ft)	493			518	481	
Travel Time (s)	7.5			7.8	10.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	17%	17%	14%	14%	0%	0%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 63.5%	ICU Level of Service B
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	564	14	14	803	12	3
Future Vol, veh/h	564	14	14	803	12	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	17	17	14	14	0	0
Mvmt Flow	627	16	16	892	13	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	642	0	1557	634
Stage 1	-	-	-	-	634	-
Stage 2	-	-	-	-	923	-
Critical Hdwy	-	-	4.24	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.326	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	888	-	125	483
Stage 1	-	-	-	-	532	-
Stage 2	-	-	-	-	390	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	888	-	121	483
Mov Cap-2 Maneuver	-	-	-	-	121	-
Stage 1	-	-	-	-	532	-
Stage 2	-	-	-	-	376	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	33.7
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	142	-	-	888	-
HCM Lane V/C Ratio	0.117	-	-	0.018	-
HCM Control Delay (s)	33.7	-	-	9.1	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	567	0	0	815	2	4
Future Volume (vph)	567	0	0	815	2	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	45			45	30	
Link Distance (ft)	471			542	487	
Travel Time (s)	7.1			8.2	11.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	17%	17%	14%	14%	0%	0%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 52.9%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↰	↱
Traffic Vol, veh/h	567	0	0	815	2	4
Future Vol, veh/h	567	0	0	815	2	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	17	17	14	14	0	0
Mvmt Flow	630	0	0	906	2	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	1536	630
Stage 1	-	-	-	-	630	-
Stage 2	-	-	-	-	906	-
Critical Hdwy	-	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	0	0	-	129	485
Stage 1	-	0	0	-	535	-
Stage 2	-	0	0	-	398	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	129	485
Mov Cap-2 Maneuver	-	-	-	-	129	-
Stage 1	-	-	-	-	535	-
Stage 2	-	-	-	-	398	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	19.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBT
Capacity (veh/h)	129	485	-	-
HCM Lane V/C Ratio	0.017	0.009	-	-
HCM Control Delay (s)	33.4	12.5	-	-
HCM Lane LOS	D	B	-	-
HCM 95th %tile Q(veh)	0.1	0	-	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	404	159	567	435	387	281
Future Volume (vph)	404	159	567	435	387	281
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120			135	0	0
Storage Lanes	1			1	1	1
Taper Length (ft)	25				25	
Right Turn on Red				Yes		Yes
Link Speed (mph)		45	45		45	
Link Distance (ft)		684	747		656	
Travel Time (s)		10.4	11.3		9.9	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	21%	21%	13%	13%	46%	46%
Shared Lane Traffic (%)						
Turn Type	Prot	NA	NA	pt+ov	Prot	Perm
Protected Phases	7	4	8	8 6	6	
Permitted Phases						6
Detector Phase	7	4	8	8 6	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	22.5		22.5	22.5
Total Split (s)	35.0	78.0	43.0		42.0	42.0
Total Split (%)	29.2%	65.0%	35.8%		35.0%	35.0%
Maximum Green (s)	30.5	73.5	38.5		37.5	37.5
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	30.5	73.5	38.5	80.5	37.5	37.5
Actuated g/C Ratio	0.25	0.61	0.32	0.67	0.31	0.31
v/c Ratio	1.20	0.19	1.18	0.49	1.13	0.56
Control Delay	151.5	10.8	136.7	9.3	123.7	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	151.5	10.8	136.7	9.3	123.7	7.7
LOS	F	B	F	A	F	A
Approach Delay		111.7	81.4		74.9	
Approach LOS		F	F		E	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 130	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.20	
Intersection Signal Delay: 87.1	Intersection LOS: F
Intersection Capacity Utilization 84.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Marine Drive & Sundial Road

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	404	159	567	435	387	281
Future Volume (veh/h)	404	159	567	435	387	281
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1570	1570	1681	1681	1301	1301
Adj Flow Rate, veh/h	454	179	637	0	435	316
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	21	21	13	13	46	46
Cap, veh/h	380	962	539	905	387	346
Arrive On Green	0.25	0.61	0.32	0.00	0.31	0.31
Sat Flow, veh/h	1495	1570	1681	1429	1239	1106
Grp Volume(v), veh/h	454	179	637	0	435	316
Grp Sat Flow(s),veh/h/ln	1495	1570	1681	1429	1239	1106
Q Serve(g_s), s	30.5	6.0	38.5	0.0	37.5	33.0
Cycle Q Clear(g_c), s	30.5	6.0	38.5	0.0	37.5	33.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	380	962	539	905	387	346
V/C Ratio(X)	1.19	0.19	1.18	0.00	1.12	0.91
Avail Cap(c_a), veh/h	380	962	539	905	387	346
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	44.8	10.2	40.8	0.0	41.3	39.7
Incr Delay (d2), s/veh	110.5	0.1	99.2	0.0	83.5	30.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	24.2	2.6	32.7	0.0	21.8	20.6
LnGrp Delay(d),s/veh	155.3	10.3	140.0	0.0	124.8	70.5
LnGrp LOS	F	B	F		F	E
Approach Vol, veh/h		633	637		751	
Approach Delay, s/veh		114.3	140.0		102.0	
Approach LOS		F	F		F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				78.0		42.0	35.0	43.0
Change Period (Y+Rc), s				4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s				73.5		37.5	30.5	38.5
Max Q Clear Time (g_c+I1), s				8.0		39.5	32.5	40.5
Green Ext Time (p_c), s				5.7		0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	117.8
HCM 2010 LOS	F

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	3	760	779	1	1	4
Future Volume (vph)	3	760	779	1	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45	45		30	
Link Distance (ft)		470	531		467	
Travel Time (s)		7.1	8.0		10.6	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	9%	9%	12%	12%	22%	22%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 52.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	760	779	1	1	4
Future Vol, veh/h	3	760	779	1	1	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	9	9	12	12	22	22
Mvmt Flow	3	817	838	1	1	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	839	0	-	0	1662	838
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	824	-
Critical Hdwy	4.19	-	-	-	6.62	6.42
Critical Hdwy Stg 1	-	-	-	-	5.62	-
Critical Hdwy Stg 2	-	-	-	-	5.62	-
Follow-up Hdwy	2.281	-	-	-	3.698	3.498
Pot Cap-1 Maneuver	766	-	-	-	96	338
Stage 1	-	-	-	-	392	-
Stage 2	-	-	-	-	399	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	766	-	-	-	95	338
Mov Cap-2 Maneuver	-	-	-	-	95	-
Stage 1	-	-	-	-	392	-
Stage 2	-	-	-	-	396	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	21.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	766	-	-	-	224
HCM Lane V/C Ratio	0.004	-	-	-	0.024
HCM Control Delay (s)	9.7	0	-	-	21.5
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	755	783	2	4	9
Future Volume (vph)	5	755	783	2	4	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45	45		30	
Link Distance (ft)		488	528		474	
Travel Time (s)		7.4	8.0		10.8	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	9%	9%	12%	12%	31%	31%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 53.7%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	755	783	2	4	9
Future Vol, veh/h	5	755	783	2	4	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	9	9	12	12	31	31
Mvmt Flow	6	848	880	2	4	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	882	0	-	0	1741	881
Stage 1	-	-	-	-	881	-
Stage 2	-	-	-	-	860	-
Critical Hdwy	4.19	-	-	-	6.71	6.51
Critical Hdwy Stg 1	-	-	-	-	5.71	-
Critical Hdwy Stg 2	-	-	-	-	5.71	-
Follow-up Hdwy	2.281	-	-	-	3.779	3.579
Pot Cap-1 Maneuver	738	-	-	-	81	307
Stage 1	-	-	-	-	361	-
Stage 2	-	-	-	-	370	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	738	-	-	-	80	307
Mov Cap-2 Maneuver	-	-	-	-	80	-
Stage 1	-	-	-	-	361	-
Stage 2	-	-	-	-	364	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	29.1
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	738	-	-	-	164
HCM Lane V/C Ratio	0.008	-	-	-	0.089
HCM Control Delay (s)	9.9	0	-	-	29.1
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	747	17	12	778	25	8
Future Volume (vph)	747	17	12	778	25	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	45			45	30	
Link Distance (ft)	493			518	481	
Travel Time (s)	7.5			7.8	10.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	9%	9%	13%	13%	0%	0%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	747	17	12	778	25	8
Future Vol, veh/h	747	17	12	778	25	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	9	9	13	13	0	0
Mvmt Flow	830	19	13	864	28	9

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	849	0	1730	839
Stage 1	-	-	-	-	839	-
Stage 2	-	-	-	-	891	-
Critical Hdwy	-	-	4.23	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.317	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	744	-	98	369
Stage 1	-	-	-	-	427	-
Stage 2	-	-	-	-	404	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	744	-	95	369
Mov Cap-2 Maneuver	-	-	-	-	95	-
Stage 1	-	-	-	-	427	-
Stage 2	-	-	-	-	390	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	49.8
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	116	-	-	744	-
HCM Lane V/C Ratio	0.316	-	-	0.018	-
HCM Control Delay (s)	49.8	-	-	9.9	0
HCM Lane LOS	E	-	-	A	A
HCM 95th %tile Q(veh)	1.2	-	-	0.1	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	755	0	0	788	2	11
Future Volume (vph)	755	0	0	788	2	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	45			45	30	
Link Distance (ft)	471			542	487	
Travel Time (s)	7.1			8.2	11.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	9%	9%	13%	13%	0%	0%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 51.5%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↰	↱
Traffic Vol, veh/h	755	0	0	788	2	11
Future Vol, veh/h	755	0	0	788	2	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	9	9	13	13	0	0
Mvmt Flow	839	0	0	876	2	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	1715	839
Stage 1	-	-	-	-	839	-
Stage 2	-	-	-	-	876	-
Critical Hdwy	-	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	0	0	-	100	369
Stage 1	-	0	0	-	427	-
Stage 2	-	0	0	-	411	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	100	369
Mov Cap-2 Maneuver	-	-	-	-	100	-
Stage 1	-	-	-	-	427	-
Stage 2	-	-	-	-	411	-

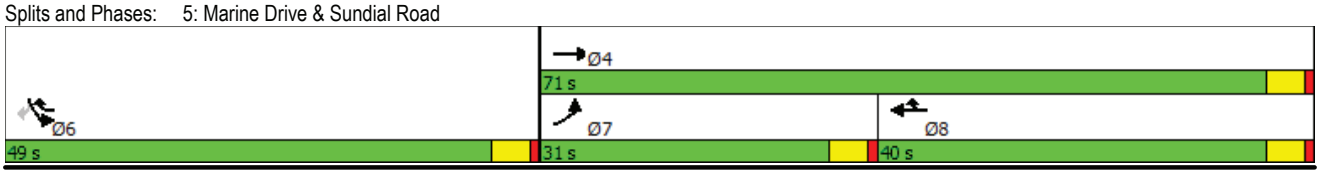
Approach	EB	WB	NB
HCM Control Delay, s	0	0	19.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	WBT
Capacity (veh/h)	100	369	-	-
HCM Lane V/C Ratio	0.022	0.033	-	-
HCM Control Delay (s)	41.8	15.1	-	-
HCM Lane LOS	E	C	-	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	273	564	358	311	431	507
Future Volume (vph)	273	564	358	311	431	507
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120			135	0	0
Storage Lanes	1			1	1	1
Taper Length (ft)	25				25	
Right Turn on Red				Yes		Yes
Link Speed (mph)		45	45		45	
Link Distance (ft)		735	835		582	
Travel Time (s)		11.1	12.7		8.8	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	9%	9%	20%	20%	14%	14%
Shared Lane Traffic (%)						
Turn Type	Prot	NA	NA	pt+ov	Prot	Perm
Protected Phases	7	4	8	8 6	6	
Permitted Phases						6
Detector Phase	7	4	8	8 6	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	22.5		22.5	22.5
Total Split (s)	31.0	71.0	40.0		49.0	49.0
Total Split (%)	25.8%	59.2%	33.3%		40.8%	40.8%
Maximum Green (s)	26.5	66.5	35.5		44.5	44.5
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)	22.8	57.7	30.3	79.8	44.9	44.9
Actuated g/C Ratio	0.20	0.52	0.27	0.71	0.40	0.40
v/c Ratio	0.84	0.65	0.87	0.32	0.71	0.60
Control Delay	65.3	23.2	60.2	3.2	37.4	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.3	23.2	60.2	3.2	37.4	5.4
LOS	E	C	E	A	D	A
Approach Delay		36.9	33.7		20.1	
Approach LOS		D	C		C	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 111.7	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 29.6	Intersection LOS: C
Intersection Capacity Utilization 69.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: Marine Drive & Sundial Road



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	273	564	358	311	431	507
Future Volume (veh/h)	273	564	358	311	431	507
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1743	1743	1583	1583	1667	1667
Adj Flow Rate, veh/h	284	588	373	0	449	528
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	9	9	20	20	14	14
Cap, veh/h	315	885	438	923	650	580
Arrive On Green	0.19	0.51	0.28	0.00	0.41	0.41
Sat Flow, veh/h	1660	1743	1583	1346	1587	1417
Grp Volume(v), veh/h	284	588	373	0	449	528
Grp Sat Flow(s),veh/h/ln	1660	1743	1583	1346	1587	1417
Q Serve(g_s), s	18.2	27.2	24.2	0.0	25.3	38.1
Cycle Q Clear(g_c), s	18.2	27.2	24.2	0.0	25.3	38.1
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	315	885	438	923	650	580
V/C Ratio(X)	0.90	0.66	0.85	0.00	0.69	0.91
Avail Cap(c_a), veh/h	405	1067	517	991	650	580
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	43.0	19.9	37.2	0.0	26.4	30.2
Incr Delay (d2), s/veh	19.4	1.2	11.3	0.0	5.9	20.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.1	13.4	11.9	0.0	12.2	28.6
LnGrp Delay(d),s/veh	62.5	21.1	48.5	0.0	32.4	51.0
LnGrp LOS	E	C	D		C	D
Approach Vol, veh/h		872	373		977	
Approach Delay, s/veh		34.6	48.5		42.4	
Approach LOS		C	D		D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				59.7		49.0	25.1	34.6
Change Period (Y+Rc), s				4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s				66.5		44.5	26.5	35.5
Max Q Clear Time (g_c+I1), s				29.2		40.1	20.2	26.2
Green Ext Time (p_c), s				6.6		1.6	0.4	3.8

Intersection Summary	
HCM 2010 Ctrl Delay	40.4
HCM 2010 LOS	D

Exhibit C1

Queues

5: Marine Drive & Sundial Road

2018 Existing Traffic, AM Peak Hour

05/18/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	91	152	588	125	148	115
v/c Ratio	0.50	0.17	0.84	0.11	0.39	0.27
Control Delay	44.5	6.9	30.9	0.7	29.7	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.5	6.9	30.9	0.7	29.7	7.8
Queue Length 50th (ft)	41	29	245	0	58	0
Queue Length 95th (ft)	97	50	370	9	133	41
Internal Link Dist (ft)		557	695		660	
Turn Bay Length (ft)	120			135		
Base Capacity (vph)	225	1252	1077	1175	382	421
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	0.40	0.12	0.55	0.11	0.39	0.27

Intersection Summary

Exhibit C1

Queues

5: Marine Drive & Sundial Road

2018 Existing Traffic, PM Peak Hour

05/18/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	53	541	335	56	142	147
v/c Ratio	0.27	0.71	0.65	0.05	0.22	0.22
Control Delay	32.1	19.1	26.0	0.9	16.8	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.1	19.1	26.0	0.9	16.8	4.7
Queue Length 50th (ft)	20	155	120	0	37	0
Queue Length 95th (ft)	56	243	211	7	96	38
Internal Link Dist (ft)		577	680		504	
Turn Bay Length (ft)	120			135		
Base Capacity (vph)	282	1515	1042	1152	656	673
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	0.19	0.36	0.32	0.05	0.22	0.22

Intersection Summary

Exhibit C1

Queues

5: Marine Drive & Sundial Road

2020 Background Traffic, AM Peak Hour

05/18/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	454	173	625	489	435	316
v/c Ratio	1.20	0.18	1.16	0.49	1.13	0.56
Control Delay	151.5	10.7	128.5	9.3	123.7	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	151.5	10.7	128.5	9.3	123.7	7.7
Queue Length 50th (ft)	~426	55	~573	130	~390	0
Queue Length 95th (ft)	#621	88	#786	200	#582	72
Internal Link Dist (ft)		557	680		690	
Turn Bay Length (ft)	120			135		
Base Capacity (vph)	379	961	539	992	386	562
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	1.20	0.18	1.16	0.49	1.13	0.56

Intersection Summary

~ 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.

Exhibit C1

Queues

5: Marine Drive & Sundial Road

2020 Background Traffic, PM Peak Hour

05/18/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	284	574	365	324	449	528
v/c Ratio	0.84	0.64	0.86	0.32	0.70	0.60
Control Delay	65.0	22.9	59.3	3.2	37.0	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.0	22.9	59.3	3.2	37.0	5.4
Queue Length 50th (ft)	203	282	256	27	289	0
Queue Length 95th (ft)	#337	396	#401	59	437	81
Internal Link Dist (ft)		612	764		812	
Turn Bay Length (ft)	120			135		
Base Capacity (vph)	398	1052	510	1013	639	887
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	0.71	0.55	0.72	0.32	0.70	0.60

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Exhibit C1

Queues

5: Marine Drive & Sundial Road

2020 Total Traffic, AM Peak Hour

05/18/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	454	179	637	489	435	316
v/c Ratio	1.20	0.19	1.18	0.49	1.13	0.56
Control Delay	151.5	10.8	136.7	9.3	123.7	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	151.5	10.8	136.7	9.3	123.7	7.7
Queue Length 50th (ft)	~426	57	~592	130	~390	0
Queue Length 95th (ft)	#621	91	#805	200	#582	72
Internal Link Dist (ft)		604	667		576	
Turn Bay Length (ft)	120			135		
Base Capacity (vph)	379	961	539	992	386	562
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	1.20	0.19	1.18	0.49	1.13	0.56

Intersection Summary

~ 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.

Exhibit C1

Queues

5: Marine Drive & Sundial Road

2020 Total Traffic, PM Peak Hour

05/18/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	284	588	373	324	449	528
v/c Ratio	0.84	0.65	0.87	0.32	0.71	0.60
Control Delay	65.3	23.2	60.2	3.2	37.4	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.3	23.2	60.2	3.2	37.4	5.4
Queue Length 50th (ft)	205	293	264	27	295	0
Queue Length 95th (ft)	#337	410	#416	59	437	81
Internal Link Dist (ft)		655	755		502	
Turn Bay Length (ft)	120			135		
Base Capacity (vph)	396	1047	507	1012	636	885
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	0.72	0.56	0.74	0.32	0.71	0.60

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Exhibit C2

CHARBONNEAU
ENGINEERING LLC

MEMORANDUM

Date: October 12, 2018

To: Travis Johnson, PE
PLS Engineering
2008 `C` Street
Vancouver WA 98663

From: Frank Charbonneau, PE, PTOE

Subject: Trip Generation Update FL1895
Allwood Recyclers
NE Marine Drive

As requested a trip generation update has been prepared for the proposed Allwood Recyclers (AWR) site being planned on the south side of NE Marine Drive in the City of Fairview and Multnomah County.

This memorandum responds to the Multnomah County email from Scott Adams dated 10/3/18 and the follow-up conference call with Scott, Mark, Frank, and Travis.

Included within this report is a summary of the trip generation comparison between the existing AWR facility located on the north side of Marine Drive and the proposed development plan. Development of lot #106 is not included with the development application and therefore is not addressed in the trip generation report.

The existing AWR site consists of a nursery-garden center operations having a small office building totaling 560 square feet with 3.70 acres devoted to open space materials storage and stockpile. The proposed AWR development will include a nursery-garden center with an office building totaling 924 square feet and 3.45 acres devoted to open space materials storage and stockpile.

The table on page 2 tabulates the trip generation and lists the trip changes between the existing and new facilities.

The results show that new AWR site will generate 23 fewer trips per weekday than the existing facility. There will be no change in the trip generation within the AM peak hour and two fewer trips will occur during the PM peak hour. The ITE Trip Generation manual (9th edition, year 2012) was used to calculate the trip generation.

Trip Generation Summary

ITE Land Use	Units	Weekday						
		ADT	AM Peak Hour			PM Peak Hour		
			Total	Enter	Exit	Total	Enter	Exit
EXISTING SITE								
Nursery-Garden Center (#817)	3.70							
Generation Rate [1]	acres	108.10	2.82	50%	50%	8.06	50%	50%
Site Trips		400	10	5	5	30	15	15
General Office (#710)	560							
Generation Rate [1]		11.03	1.56	88%	12%	1.49	17%	83%
Site Trips	sq. ft.	6	1	1	0	1	0	1
Total Existing Trips		**406**	**11**	**6**	**5**	**31**	**15**	**16**
PROPOSED SITE								
Nursery-Garden Center (#817)	3.45							
Generation Rate [1]	acres	108.10	2.82	50%	50%	8.06	50%	50%
Site Trips		373	10	5	5	28	14	14
General Office (#710)	924							
Generation Rate [1]		11.03	1.56	88%	12%	1.49	17%	83%
Site Trips	sq. ft.	10	1	1	0	1	0	1
Total Existing Trips		**383**	**11**	**6**	**5**	**29**	**14**	**15**
Net Trip Generation		**-23**	**0**	**0**	**0**	**-2**	**-1**	**-1**

[1] Source: Trip Generation, 9th Edition, ITE, 2012, average rates

The County has also indicated that the existing paved trail along the south side of Marine Drive needs to be widened from nine feet to 10 feet within the project's frontage length. This improvement would upgrade the trail to meet the minimum standard according to the agency. It must be pointed out that development of the nursery/garden center will not result in any additional usage of the trail system as the business is not expected to attract any walk-in customers or bicyclists. Therefore, widening the trail should not be a condition associated with the proposed development.

Based on the project's projected trip generation it is recommended that Multnomah County find that there is no transportation impact associated with the development as proposed and support the application without any potential transportation mitigation.

If you should have any questions, please contact Frank Charbonneau, PE, PTOE at 503.293.1118 or email Frank@CharbonneauEngineer.com.

Exhibit C3

STORMWATER MANAGEMENT REPORT

TO

CITY OF FAIRVIEW

FOR

AWR SITE PLAN

(PROJECT #2761)

22800 NE Marine Drive, Fairview, OR 97024

MAY 2018

PREPARED BY:

PLS ENGINEERING

Contact: David G. Spencer, P.E.

(360) 944-6519

david@plsengineering.com

Exhibit C3

DESIGNER'S CERTIFICATION AND STATEMENT

"I hereby certify that this Stormwater Management Report for AWR Site Plan has been prepared by me or under my supervision and meets minimum standards of the City of Fairview and normal standards of engineering practice. I hereby acknowledge and agree that the jurisdiction does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities designed by me."

REGISTERED PROFESSIONAL ENGINEER
74948PE
OREGON
SEPT. 14, 2004
DAVID GLEN SPENCER

5/10/18

EXPIRES: 06 / 30 / 20 18

Exhibit C3

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Exhibit C3

A. PROJECT OVERVIEW AND DESCRIPTION

This project is for the AWR Site Plan which includes a 4,000 SF retail/office building, and landscape materials storage yard and associated parking, walkways, landscaping, utilities, etc. See attached preliminary civil plans including a vicinity map in the appendix for more information.

This stormwater report is for the water quality treatment of runoff from the proposed project site and stormwater flow control exemptions as allowed by the City of Portland Environmental Services' Stormwater Management Manual.

The proposed impervious surfaces being collected and treated as a part of this stormwater design include new roof, paving, curb, sidewalks and driveways.

The stormwater runoff will be routed to a planter, where it will be treated for water quality, and then released directly without flow control to Salmon Creek, which is under the control of the Multnomah County Drainage District.

Conveyance calculations of the off-site pipe that will carry stormwater to the discharge point at Salmon Creek have been included in this report.

The planter will be planted with vegetation per the City of Portland's standards, in an 18" depth growing medium, in order to provide water quality treatment of stormwater runoff prior to discharge to Salmon Creek.

B. METHODOLOGY

For this project, the stormwater presumptive approach calculator has been utilized to determine the required treatment area for a shallow infiltration planter.

This project has been designed so that all new impervious surfaces drain toward catch basins, and are conveyed via underground storm drainage pipe to a planter, which will treat the water as required for water quality treatment. This basin has an impervious surface area of approximately 183,645 SF. Please see the attached basin area map.

Columbia West has performed a geotechnical investigation of the project

Exhibit C3

site, and it is anticipated that infiltration rates will be low for the underlying native soils. Therefore, under the presumptive approach calculator, a stormwater hierarchy of 3 has been utilized, and flow control standards are not applicable since this project directly discharges to a river or Multnomah County Drainage District facilities.

This project is considered a stormwater hierarchy category 3.a, per the City of Portland Environmental Services' Stormwater Management Manual. See below chart from that manual.

A-5. Stormwater Management Requirements by Stormwater Hierarchy Category

Hierarchy Category	SWMM Requirement	Meets Pollution Reduction Requirements	Flow Control Requirement
1	Onsite infiltration with a surface infiltration facility	Yes	Infiltration the 10-year design storm
2	Onsite infiltration with a surface infiltration facility with overflow to an approved UIC facility	Yes	Infiltration the 10-year design storm or use UIC
3.a	Off-site flow to Willamette River, Columbia River, or Columbia Slough, or discharge to a storm-only piping system or Multnomah County Drainage District system (with capacity) that directly discharges to one of the above water bodies	Yes	None

C. ANALYSIS

As mentioned previously, there will be one stormwater planter basin that will provide water quality treatment for the entire project site. See below a summary of the catchment and facility:

Table 1
Catchment and Facility Table

Catchment/ Facility ID	Source (roof/road/other)	Impervious Area (sf)	Ownership (private/public)	Facility Type	Facility Size (sf)	Curve #
Total Site	roof/road	183,645 *	private	Planter (Flat)**	2,445 SF***	98

* Impervious areas include roof, pavement, curbs, sidewalks, and concrete areas.
** Flat bottom basin, facility size is flat bottom area, 3:1 side slopes, 18" min. depth, 12" storage, 6" freeboard, 18" growing medium below
*** Sizing calculated at 580 SF per acre, impervious is 4.21 acres, therefore 2,445 SF

Exhibit C3

The proposed planter will include an area of rock and underdrain in order to drain down the planter after water has had opportunity to pass through the bioretention soil mixture. The planter will also include an overflow at 1' above the planter bottom for larger storm events. Rip-rap will be placed for flow dissipation as water enters into the planter.

Table 2
Pre vs. Post Construction Flow Rates

Facility ID	Peak Flow Rate (cfs)				Tc (min)	
	10 yr		25 yr			
	Pre	Post	Pre	Post	Pre	Post
Total Site	0.887	3.73	1.022	4.292	N/A	5 min.

***These calculations shown in Table 2 are from the City of Portland Presumptive Approach Calculator (and flow rates for 1 acre were multiplied by 4.21 acres)

The above pre vs post construction flow rates are shown because conveyance calculations for the on-site piping as well as off-site piping for the 10-year flow without surcharge must be shown. The 25 year flow may surcharge. It is anticipated that stormwater runoff from this project resulting from larger storm events such as the 100-year, 24-hour event will remain in the planter area or in adjacent landscaping area, without flooding structures. With proper facility installation and maintenance, after the stormwater event, the floodwater will dissipate, and any inundation that occurs during the larger storm events should be considered temporary.

The design storm used in conveyance analysis is the 10-year and 25-year storm event, utilizing the SBUH methodology. See stormwater conveyance calculations printout for the basin in the appendix.

D. ENGINEERING CONCLUSIONS

For the stormwater design, one planter has been proposed which will treat stormwater runoff from building roofs, pavement, sidewalks, and driveways. This planter basin has been preliminarily sized to be 2,445 SF of flat bottom area (see plan). The basin will have 3:1 side slopes in the area of the ponding water and will be planted with vegetation in an 18" growing medium in order to provide water quality treatment per the City of Portland Environmental Services' Stormwater Management Manual.

The site will discharge to Salmon Creek via a new 15" off-site stormwater pipe, to be installed parallel with the existing 12" stormwater pipe. As

Exhibit C3

previously mentioned, conveyance calculations are included in the appendix. This is a Multnomah County Drainage District operated facility with capacity and therefore this project is flow control exempt according to the Portland Stormwater Management Manual.

E. STORMWATER FACILITY DETAILS / EXHIBITS

For stormwater facility details and exhibits, please see the construction plans and exhibits in the Appendix.

F. DRAFT OPERATIONS AND MAINTENANCE PLAN

All maintenance of the private stormwater facilities will be the responsibility of the private land owner. Please see the operations and maintenance plan information in the appendix of this report.

G. ADDITIONAL FORMS

Not applicable.

H. ASSOCIATED REPORTS SUBMITTED

See the Geotechnical Investigation by Columbia West Engineering in the appendix dated May 2018.

Exhibit C3

FIGURE A

PRELIMINARY CIVIL PLANS

AWR Site Plan

Located in the SE 1/4 & SW 1/4 of Section 22, T1N, R3E, W.M.
Fairview, Oregon

SITE STATISTICS		
ZONE: GI		
Gross Site Area	202,003 SQ FT	4.64 AC
Building Square Footage		4,000 sq ft
Total Landscaping		30,244 sq ft (15.0%)
Total Parking Spaces		53
Standard Parking Spaces		25
Yard Parking Spaces		26
ADA Parking Spaces		2

Legend	
Proposed Asphalt Concrete	
Proposed Building	
Proposed Concrete	
Proposed Landscaping	

PARKING REQUIREMENT SUMMARY

		Areas & Qty	Spaces
Office	~ 2.7 spaces per 1,000 SF	2,500 SF	6.8
Retail	~ 4.1 spaces per 1,000 SF	1,750 SF	7.2
Industrial	~ 1.6 spaces per 1,000 SF	1,250 SF	2
Retail Nursery	~ 1 space per 1,000 SF	10,000 SF	10
Retail Nursery	~ 1 space per 5,000 SF	57,650 SF	12
Retail Nursery	~ 1 space per 2 employees	4 employees	2
		Min. Required:	40 Spaces
		Provided:	53 Spaces
Bicycle Parking	~ General Industrial Use	2 spaces minimum provided	

PROJECT NOTES:

The site is located at 22800 NE Marine Drive in Fairview, Oregon. The parcel is identified as Map Tax Lot 1N3E22C -00109, property ID R575270.

This project is within the GI zone of the City of Fairview, a General Industrial District site. The comprehensive plan designation for the site is General Industrial. The site is currently a grassed field. Site Area - 4.64 acres (202,003 sq ft).

Boundary data shown on the site plan was prepared by PLS Engineering.

Proposed use will be a sales and storage yard for landscape materials (bark, mulch, soil, rock, etc.) and other construction materials (pavers, boulders, wall rock, etc.). Site will provide a building with an office, a weight scale, and bins for storage of materials.

There are 3 existing fire hydrants along NE Marine Drive.

Stormwater will be treated by a stormwater facility planter, to be designed per City of Portland Stormwater Manual, to treat and release without detention to the Salmon Creek (Multnomah County Drainage District).

Erosion control will conform to Oregon DEQ standards and details. Coverage under a 1200-C permit will be required for this project (land disturbance > 1 acre).

Cut and Fill amounts are unknown at this time.

5% Landscaping is provided in parking area as required per Code.

Parking dimensions meet or exceed the minimum size requirements.

VICINITY MAP
NOT TO SCALE

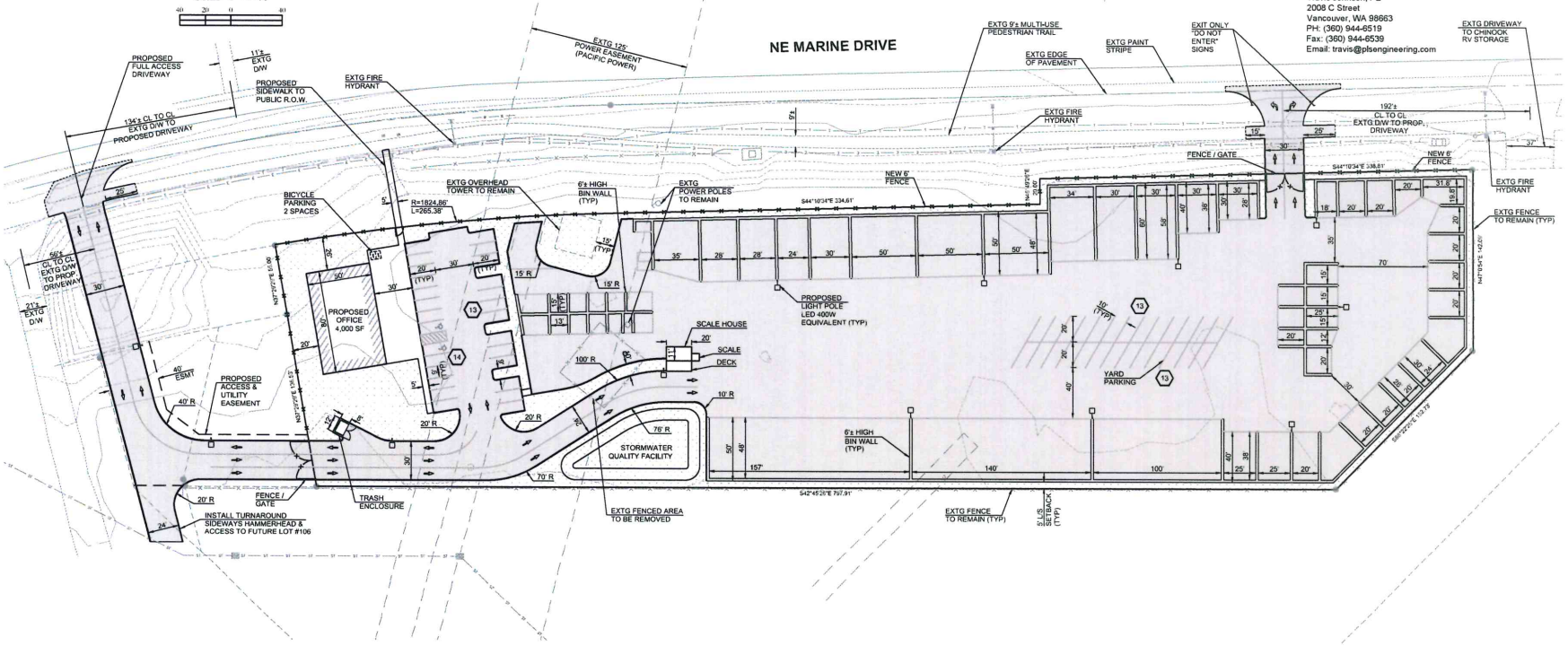
Sheet Index	
1.	Preliminary Site Plan
2.	Preliminary Grading Plan
3.	Preliminary Utility Plan
4.	Existing Conditions / Site Analysis Map
L1.	Preliminary Landscape Plan

CONTACT INFO:

Property Owner / Project Contact:
MRW Properties LLC
PO Box 115
Fairview, OR 97024
PH: (360) 921-4528
Email: markwubben.awr@gmail.com

Planning / Engineering Contact:
PLS Engineering
Travis Johnson, PE
2008 C Street
Vancouver, WA 98663
PH: (360) 944-6519
Fax: (360) 944-6539
Email: travis@plsengineering.com

Scale 1" = 40'



PLS ENGINEERING

Preliminary Site Plan For:

AWR Site Plan

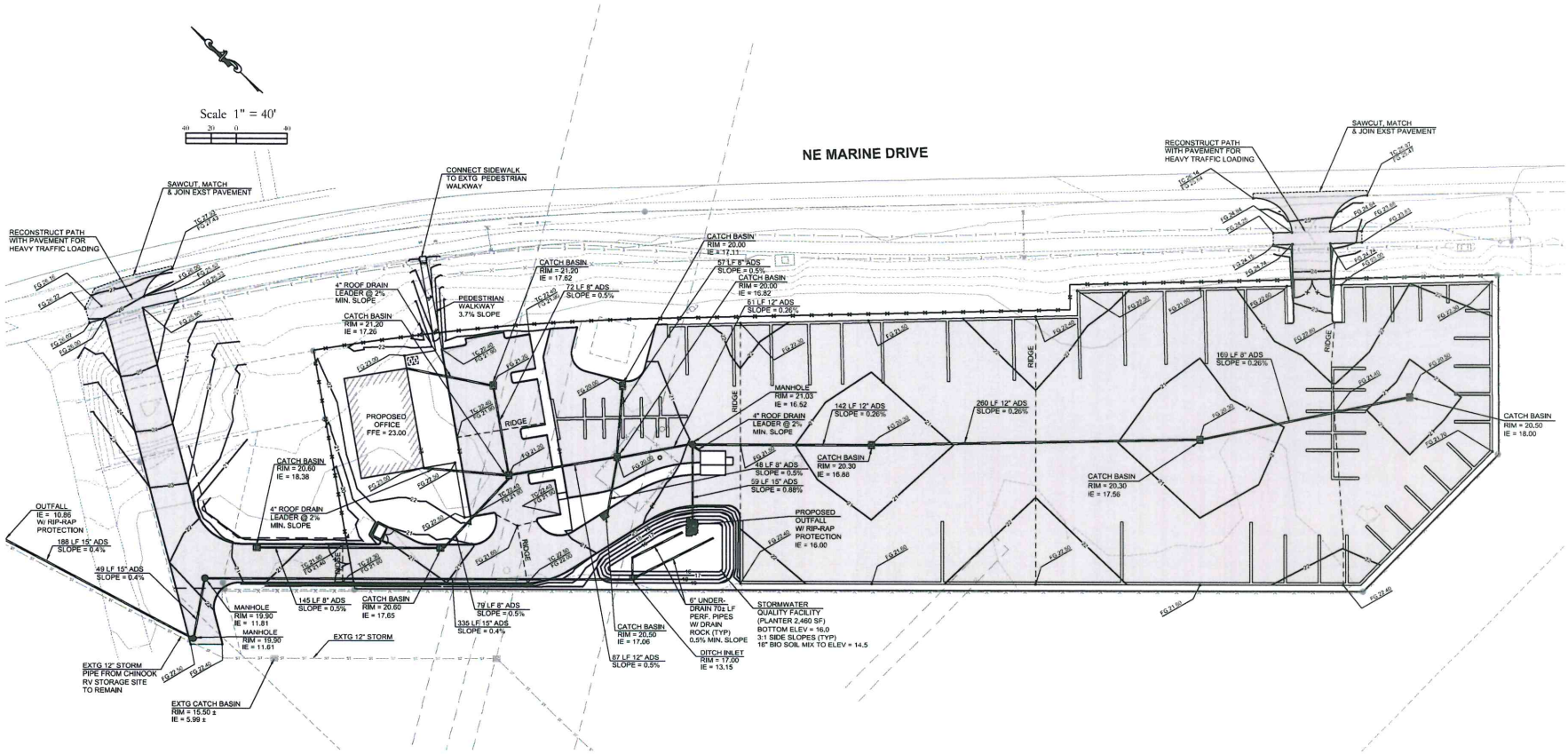
A Site Located In Fairview, Oregon

Revisions		
A	5/10/2018	Site Design Review
B		
1		
2		
3		
4		

Project No.	2761
SCALE:	H: 1" = 40' V: N/A
DESIGNED BY:	TGJ
DRAFTED BY:	DGS
REVIEWED BY:	AJG

1 / 4

Exhibit 3



Preliminary Grading Plan For:

AWR Site Plan

A Site Located In Fairview, Oregon

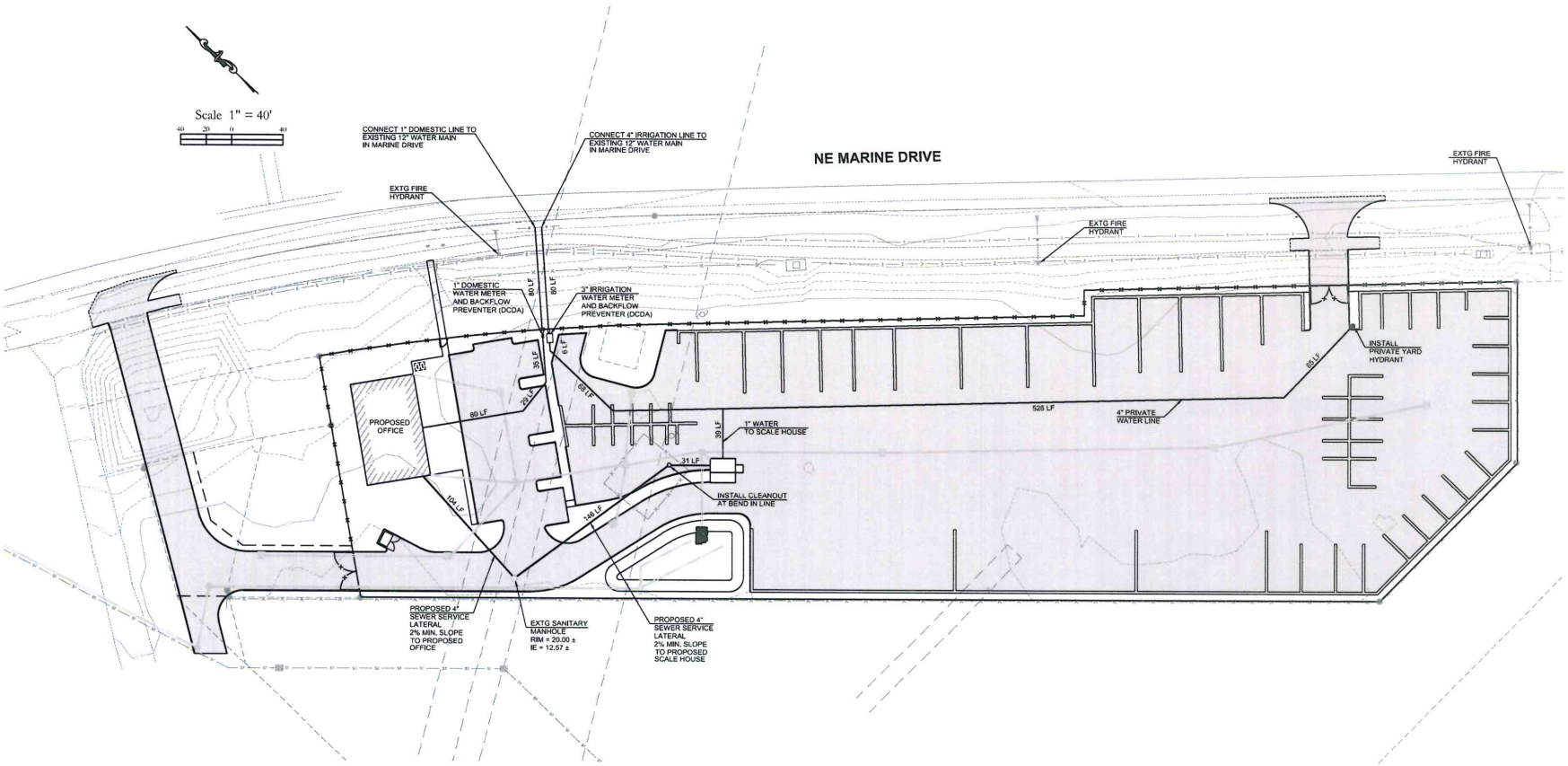
Revisions		
A	5/10/2018	Site Design Review
B		
C		
D		
E		
F		

Project No.	2761
SCALE:	H: 1" = 40' V: N/A
DESIGNED BY:	TGJ
DRAFTED BY:	DGS
REVIEWED BY:	AJG

2 / 4

PLS ENGINEERING

Exhibit C3



Preliminary Utility Plan For:

AWR Site Plan

A Site Located In Fairview, Oregon

Revisions

A	5/10/2018	Site Design Review
B		
1		
2		
3		
4		

Project No. 2761	
SCALE:	H: 1" = 40' V: N/A
DESIGNED BY:	TGJ
DRAFTED BY:	DGS
REVIEWED BY:	AJG

3 / 4

PLS ENGINEERING

Exhibit C

AWR Site Plan

Located in the SE 1/4 & SW 1/4 of Section 22, T1N, R3E, W.M.
Fairview, Oregon

The site is located at 22800 NE Marine Drive in Fairview, Oregon. The parcel is identified as Map Tax Lot 1N3E22C -00109, property ID R575270.

This project is within the GI zone of the City of Fairview, a General Industrial District site. The comprehensive plan designation for the site is General Industrial. The site is currently a grassed field. Site Area - 4.64 acres (202,003 sq ft).

Boundary data shown on the site plan was prepared by PLS Engineering.

Existing topographic contour lines are shown at 1 foot intervals.

There are no slopes on-site greater than 25%. The steepest area of the project is located near the northwest corner in the public right-of-way. There is a depression that slopes down at approximately 25% and will be levelled out with this project. See grading plan.

The project site is located in an area that is protected from the 1-percent annual chance or greater flood hazard by a levee system. Overtopping or failure of any levee system is possible. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. FEMA mapping shows Zone AE Base Flood Elevations determined in the vicinity of this site, however these areas are within the levee protected area.

A geotechnical site investigation has been prepared for this site and has been included with this application. This geotechnical investigation includes regional geology discussion, soil conditions, and discusses regional seismology.

There are no known resource areas such as marsh, wetland, streams, wildlife habitat areas requiring protection.

All site features are shown on the map below.

There are no known historic or cultural resources on the site and adjacent parcels or lots.

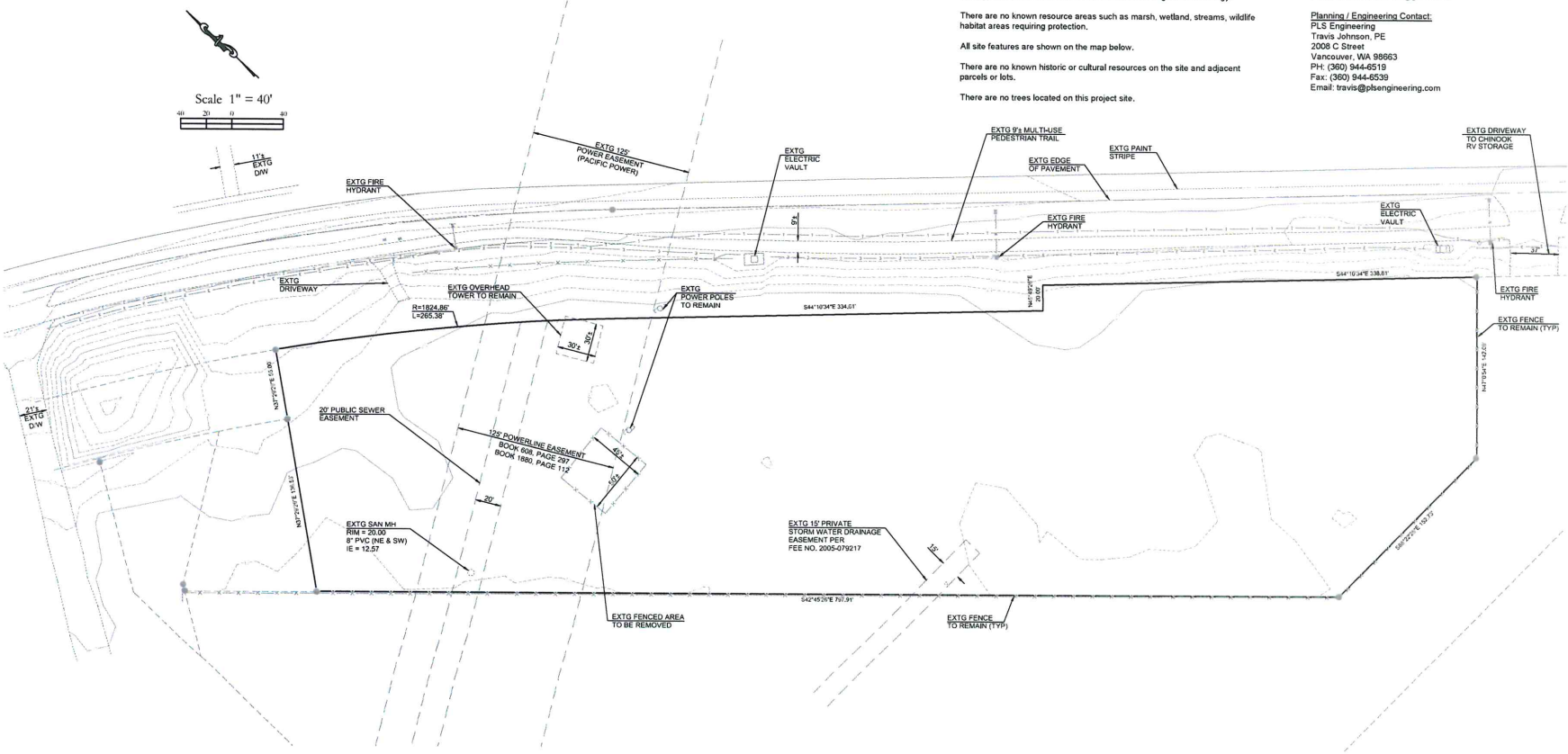
There are no trees located on this project site.

VICINITY MAP
NOT TO SCALE

CONTACT INFO:

Property Owner / Project Contact:
MRW Properties LLC
PO Box 115
Fairview, OR 97024
PH: (360) 921-4528
Email: markwubben.awr@gmail.com

Planning / Engineering Contact:
PLS Engineering
Travis Johnson, PE
2008 C Street
Vancouver, WA 98663
PH: (360) 944-6519
Fax: (360) 944-6539
Email: travis@plsengineering.com



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Existing Conditions / Site Analysis Map For:
AWR Site Plan
A Site Located In Fairview, Oregon

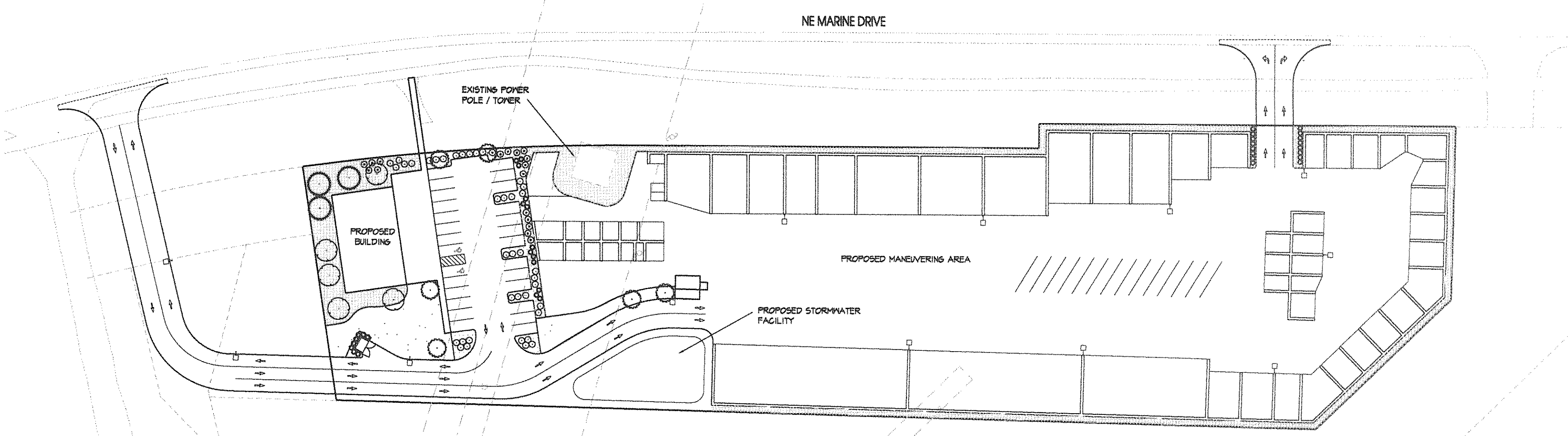
Revisions		
A	5/10/2018	Site Design Review
B		
1		
2		
3		
4		

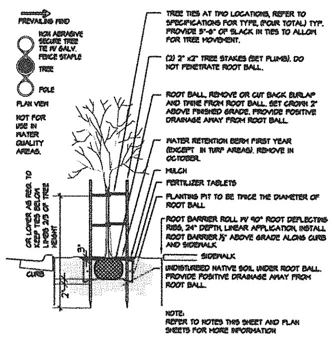
Project No.	2761
SCALE:	H: 1" = 40' V: N/A
DESIGNED BY:	TGJ
DRAFTED BY:	DGS
REVIEWED BY:	AJG

4 / 4

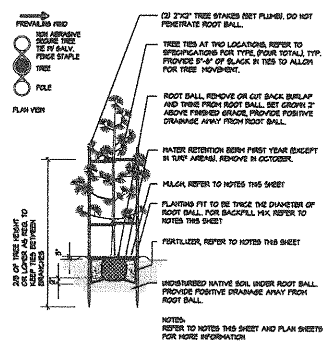
Exhibit 3

Exhibit C3

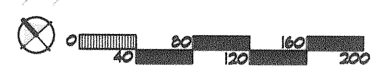




A B & B Tree Planting Detail
Not To Scale

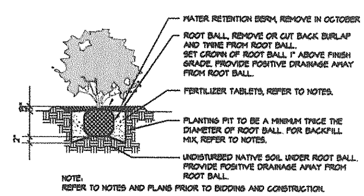


B B & B Tree Planting Detail: Evergreen under 8' Height
Not To Scale

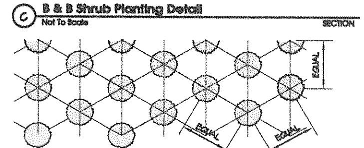


PLANT LEGEND

SYMBOL	BOTANICAL / COMMON NAME	SIZE	QUANTITY
TREES			
⊙	ACER RUBRUM 'ARMSTRONG' ARMSTRONG MAPLE	1 1/2" cal. min.	6
⊙	THUJA PLICATA WESTERN RED CEDAR	6' ht. min.	3
⊙	ZELKOVA SERRATA 'GREEN VASE' GREEN VASE ZELKOVA	1 1/2" cal. min.	5
SHRUBS			
⊙	MAHONIA AQUIFOLIUM 'COMPACTA' COMPACT OREGON GRAPE	1 GAL.	37
⊙	MYRICA CALIFORNICA PACIFIC WAXMYRTLE	1 GAL.	18
⊙	VIBURNUM DAVIDII DAVID VIBURNUM	1 GAL.	34
GROUNDCOVER			
	ARCTOSTAPHYLOS UVA URSI 'MASS.' MASSACHUSETTS KINNICKINNICK	1 GAL.	24" O.C.
	MAHONIA NERVOSA OREGON GRAPE	1 GAL.	24" O.C.
	TURF, DROUGHT RESISTANT, SUN & SHADE MIX AT RATE OF 2-3 LBS PER 1,000 SF		
	BARK, TYP.		
	STORMWATER FACILITY, REFER TO CIVIL PLANS		



C B & B Shrub Planting Detail
Not To Scale
SECTION



NOTES:

ALL GROUND COVER SHALL BE PLANTED AT EQUAL TRIANGULAR SPACING AS SPECIFIED IN PLANTING LEGEND.

GROUND COVER TO BE LOCATED ONE HALF OF SPECIFIED SPACING DISTANCE FROM ANY HARD SURFACE, UNLESS OTHERWISE SPECIFIED.

D Ground Cover Planting Detail
Not To Scale
PLAN VIEW

IRRIGATION NOTE

ALL LANDSCAPE AREAS SHALL BE IRRIGATED WITH AN AUTOMATIC DRIP AND/OR SPRAY IRRIGATION SYSTEM. REFER TO CIVIL ENGINEERING PLANS FOR WATER SOURCE.

PLANTING NOTES

1. ALL BOUNDARIES, EASEMENTS, UTILITIES AND LEGAL ENCUMBRANCES TO BE CONFIRMED WITH OWNER PRIOR TO BEGINNING WORK. PROPERTY LINES AND SURVEY INFORMATION PROVIDED BY PLS ENGINEERING INC.
2. IN NO WAY IS THIS PLAN TO BE INTERPRETED TO EXCEED THE LEGAL BOUNDARIES OF THE OWNER'S REAL PROPERTY.
3. THE LANDSCAPE DESIGNER ASSUMES NO RESPONSIBILITY FOR THE LOCATION OF BOUNDARIES, UTILITIES AND WETLANDS.
4. THIS PLAN SHALL BE INSTALLED TO MEET ALL APPLICABLE CITY, COUNTY, STATE AND FEDERAL CODES.
5. THIS PLAN SHALL BE CONSIDERED PRELIMINARY UNTIL APPROVED BY ALL GOVERNING AGENCIES. IMPLEMENTATION OF THIS PLAN SHALL NOT PROCEED UNTIL ISSUANCE OF ALL RELATED PERMITS.
6. PLANT QUANTITIES ARE FOR INFORMATION ONLY. IN CASE OF ANY DISCREPANCY, THE PLAN SHALL GOVERN.
7. ALL WORK IS TO BE PERFORMED BY LICENSED CONTRACTORS AND EXPERIENCED WORKERS.
8. THE CONTRACTOR IS TO VERIFY THE LOCATION OF EXISTING UNDERGROUND UTILITIES AND STRUCTURES PRIOR TO PERFORMING ANY EXCAVATION. CONTRACTOR SHALL REPAIR ANY DAMAGE TO UTILITIES CAUSED BY THE CONTRACTOR'S WORK, AT NO ADDITIONAL COST TO THE OWNER. CONTACT ALL UTILITY PROVIDERS SERVING THE SITE AREA 48 HOURS PRIOR TO ANY EXCAVATION.
9. ALL PLANT MATERIALS SHALL MATCH SPECIFICATIONS PER SPECIES AND SHALL COMPLY WITH ANSI Z60.1 'STANDARD FOR NURSERY STOCK'.
10. THE CONTRACTOR SHALL ADHERE TO THE OREGON ASSOCIATION OF NURSERYMENS GUIDELINES FOR PLANTING PRACTICES.
11. THE CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING ELEMENTS ON AND OFF SITE, RESULTING FROM THE CONTRACTOR'S WORK.
12. THE CONTRACTOR IS RESPONSIBLE FOR THE VIABILITY OF ALL PLANT MATERIAL FOR 2 YEARS AFTER COMPLETION OF PLANTING. DISEASED, DYING, OR DEAD PLANT MATERIAL SHALL BE REPLACED BY THE CONTRACTOR DURING THE TWO YEAR PERIOD AND MAINTAINED FOR AN ADDITIONAL 2 YEAR PERIOD.
13. IMMEDIATELY UPON BID AWARD, CONTRACTOR SHALL SECURE THE PLANT MATERIALS AS SPECIFIED FROM AVAILABLE SOURCES. IN THE EVENT THAT PLANT MATERIALS ARE NOT AVAILABLE, CONTACT LANDSCAPE ARCHITECT FOR APPROVED SUBSTITUTIONS. NO SUBSTITUTION FOR PLANT MATERIAL WILL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF THE LANDSCAPE ARCHITECT.
14. TOP DRESS ALL SHRUB AND GROUND COVER AREAS (NOT LAWN) WITH 3" OF FIR BARK MULCH. SUBMIT SAMPLE TO THE LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO CONSTRUCTION.
15. TREE LOCATIONS MAY BE ADJUSTED IN THE FIELD TO SUIT SITE REQUIREMENTS AS DIRECTED BY THE LANDSCAPE ARCHITECT.
16. THE CONTRACTOR SHALL ENSURE THAT ALL EXCAVATED PLANTING PITS HAVE POSITIVE DRAINAGE. PLANT PITS FULLY FLOODED WITH WATER SHALL DRAIN WITHIN (12) HOURS OF FILLING.
17. FINISH GRADE SHALL BE SET TO ALLOW POSITIVE DRAINAGE.
18. ROTOTILL 2" OF COMPOST INTO ALL PLANTED AREAS.
19. INCORPORATE PEAT INTO THE ROOT ZONE OF RHODODENDRONS, AZALEAS AND OTHER ACID LOVING PLANTS.
20. INCORPORATE 10-20-20 FERTILIZER INTO THE ROOT ZONE OF ALL NEW PLANTINGS.
21. RONSTAR, OR APPROVED EQUAL, PREEMERGENT HERBICIDE TO BE APPLIED TO ALL PLANTED AREAS PER MANUFACTURERS INSTRUCTIONS.
22. EXISTING VEGETATION TO BE SPRAYED WITH ROUNDUP, OR APPROVED EQUAL, PER MANUFACTURERS INSTRUCTIONS. SUFFICIENT TIME SHALL BE GIVEN TO ALLOW EXISTING MATERIAL TO DIE. REMOVE EXISTING 27. THE PROPERTY OWNER IS RESPONSIBLE FOR MAINTAINING TURF PLANTED WITHIN THE RIGHT OF WAY.
23. CROWN LAWN AREAS AND GRADE TO PROVIDE POSITIVE DRAINAGE.
24. ROLL LAWN AREA TO INSURE PROPER COMPACTION TO MINIMIZE SETTLING.
25. AMEND SOIL IN LAWN AREAS WITH 80 LBS. OF DOLOMITE LIME AND 40 LBS. OF 10-20-20 SLOW RELEASE FERTILIZER OR EQUIVALENT. PROVIDE A 3" LAYER OF SANDY LOAM TOPSOIL FOR LAWN AND BED AREA.
26. SEED LAWN AREAS WITH GRASS SEED MANUFACTURER'S RECOMMENDATIONS. COVER SEED WITH FINE MULCH APPLIED WITH ROLLER OR HYDROSEED.
27. THE PROPERTY OWNER IS RESPONSIBLE FOR MAINTAINING TURF PLANTED WITHIN THE RIGHT OF WAY.
28. PLANT MATERIAL SHALL BE PLANTED W/ ROOT CROWN 1" ABOVE FINISHED GRADE TO ALLOW POSITIVE DRAINAGE AWAY FROM CROWN.
29. STAKE ALL TREES OVER 6 FT. IN HEIGHT PER DETAILS ON THIS SHEET.
30. REFER TO DETAILS FOR ADDITIONAL INFORMATION.
31. ALL PLANTING SHALL BE IRRIGATED BY AN AUTOMATIC UNDERGROUND SPRINKLER SYSTEM.
32. ALL PLANT MATERIALS FURNISHED ARE TO BE HEALTHY, UNIFORMLY BRANCHED AND WITH WELL DEVELOPED FIBROUS ROOT SYSTEMS.
33. ALL PLANT MATERIALS FURNISHED ARE TO BE FREE FROM DEAD OR BROKEN BRANCHES, LICHENS, SCARS, BROKEN BARK OR WOUNDS. ALL PLANT MATERIALS WILL BE INSECT, WEED, AND DISEASE FREE ACCORDING TO THE REQUIREMENTS OF THE OREGON STATE DEPARTMENT OF AGRICULTURE FOR NURSERY PLANT MATERIALS SOLD FOR WHOLESALE OR RETAIL. ALL PRUNING WOUNDS MUST BE WELL HEALED WITH NO EVIDENCE OF DECAY.

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PRELIMINARY
SUBJECT TO APPROVAL
NOT FOR CONSTRUCTION

REGISTERED LANDSCAPE ARCHITECT
Christopher A. Baumann
354
OREGON
07/26/96

AWR Site Plan

22800 NE Marine Drive
Fairview, Oregon

DRAWN: VH	CHECKED: CB
SCALE: 1" = 40'-0"	DATE: 04-21-16
JOB #: 16-1456	
ISSUED FOR: SPR	
REVISIONS:	

SHEET NAME: LANDSCAPE PLAN

SHEET #: L1

SHEET 1 OF 1

Exhibit C3

FIGURE B

BASIN MAP

Exhibit C3

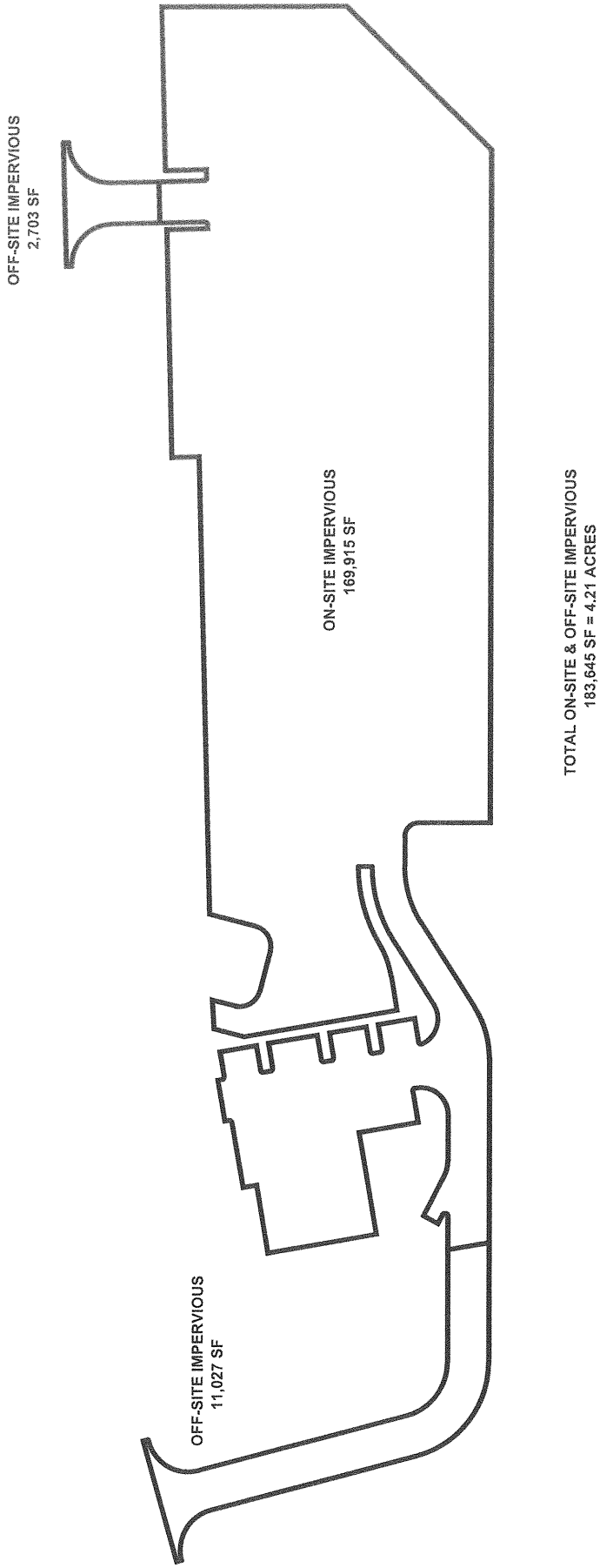

OFF-SITE IMPERVIOUS
2,703 SF
ON-SITE IMPERVIOUS
169,915 SF
OFF-SITE IMPERVIOUS
11,027 SF
TOTAL ON-SITE & OFF-SITE IMPERVIOUS
183,645 SF = 4.21 ACRES

Exhibit C3

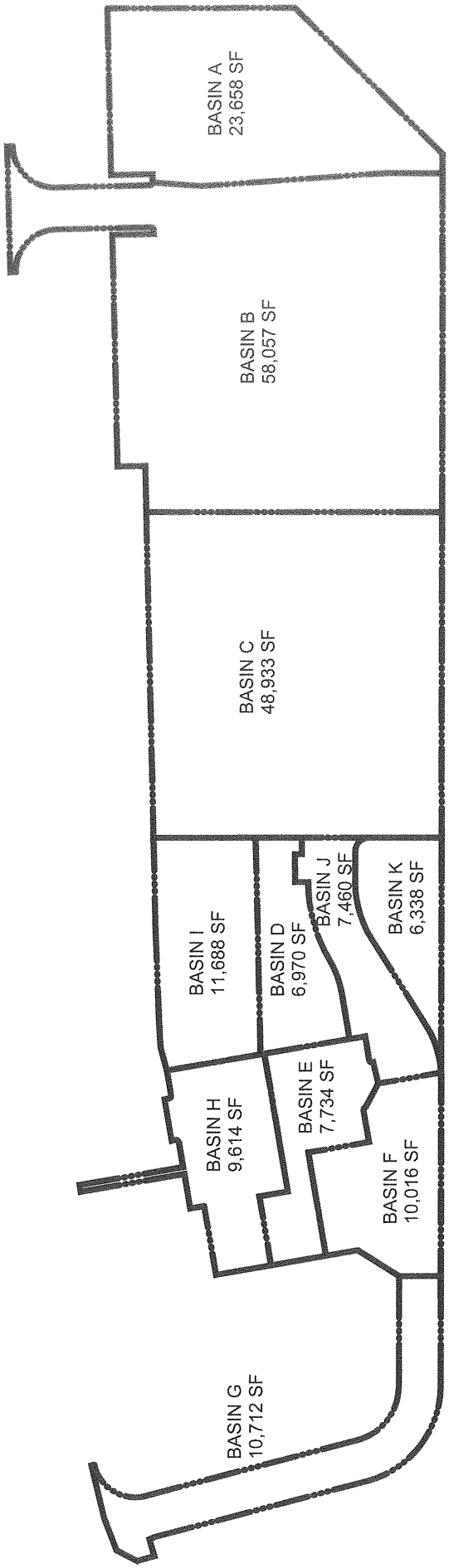

BASIN A
23,658 SF
BASIN B
58,057 SF
BASIN C
48,933 SF
BASIN I
11,688 SF
BASIN D
6,970 SF
BASIN J
7,460 SF
BASIN K
6,338 SF
BASIN H
9,614 SF
BASIN E
7,734 SF
BASIN F
10,016 SF
BASIN G
10,712 SF

Exhibit C3

FIGURE C

INFILTRATION TESTING REPORT

Exhibit C3

SEE GEOTECH REPORT

BY COLUMBIA WEST ENGINEERING

DATED MAY 7, 2018 (UNDER SEPARATE COVER)

Exhibit C3

FIGURE D

STORMWATER CALCULATIONS

Exhibit C3

PAC Report

Project Name AWR Site Plan - Fairview OR	Permit No. TBD	Created 3/2/18 3:14 PM
Project Address Marine Drive Fairview, OR 97024	Designer David	Last Modified 5/1/18 11:47 AM
	Company PLS Engineering	Report Generated 5/1/18 11:47 AM

Project Summary

Pre-App for AWR Site Plan

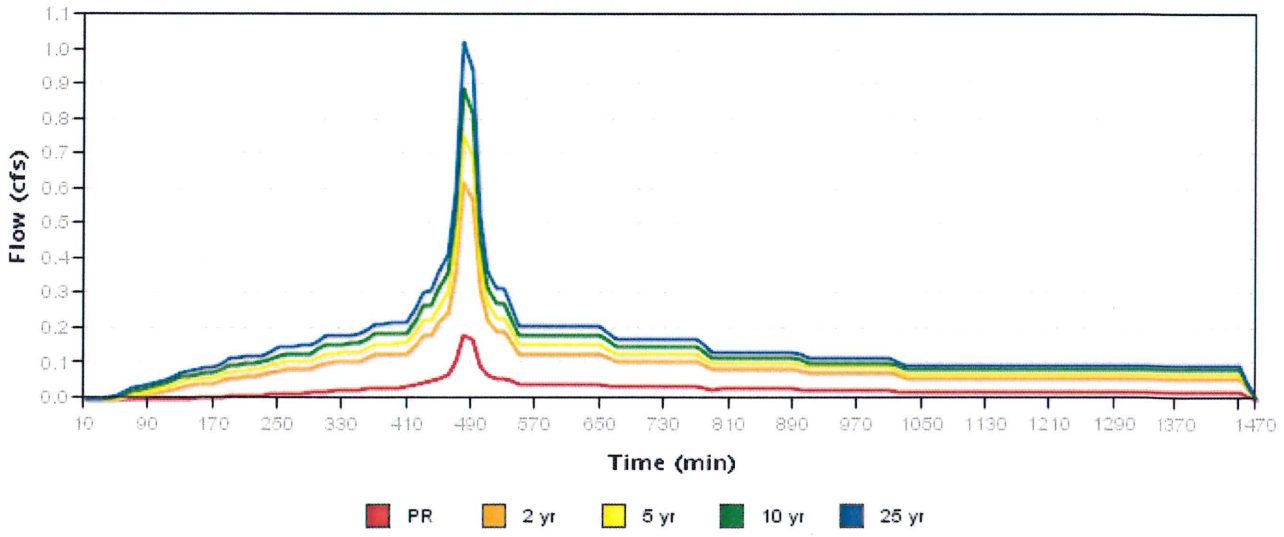
Catchment Name	Impervious Area (sq ft)	Native Soil Design Infiltration Rate	Hierarchy Category	Facility Type	Facility Config	Facility Size (sq ft)	Facility Sizing Ratio	PR Results	Flow Control Results
Prelim Site	43560	~~4.00~~ N/A - Underdrain	3	Planter (Flat)	B	580	1.3%	Pass	Not Used

Exhibit C3

Catchment Prelim Site

Site Soils & Infiltration Testing Data	Infiltration Testing Procedure	**Open Pit Falling Head**
	Native Soil Infiltration Rate (I_{test})	**4.00**
Correction Factor	CF_{test}	**2**
Design Infiltration Rates	Native Soil (I_{dsgn})	~~**2.00 in/hr**~~ N/A - Underdrain
	Imported Growing Medium	**2.00 in/hr**
Catchment Information	Hierarchy Category	**3**
	Disposal Point	**A**
	Hierarchy Description	**Off-site flow to drainageway, river, or storm-only pipe system**
	Pollution Reduction Requirement	**Pass**
	10-year Storm Requirement	**N/A**
	Flow Control Requirement	**N/A**
	Impervious Area	**43560 sq ft** **1.000 acre**
	Time of Concentration (Tc)	**5**
	Pre-Development Curve Number (CN_{pre})	**79**
	Post-Development Curve Number (CN_{post})	**98**

SBUH Results



	Pre-Development Rate and Volume		Post-Development Rate and Volume	
	Peak Rate (cfs)	**Volume (cf)**	**Peak Rate (cfs)**	**Volume (cf)**
PR	0.004	109.29	0.18	2276.133

Exhibit C3

2 yr	0.155	2799.334	0.615	7882.003
5 yr	0.249	4050.673	0.751	9687.375
10 yr	0.353	5404.003	0.887	11495.45
25 yr	0.467	6833.939	1.022	13305.229

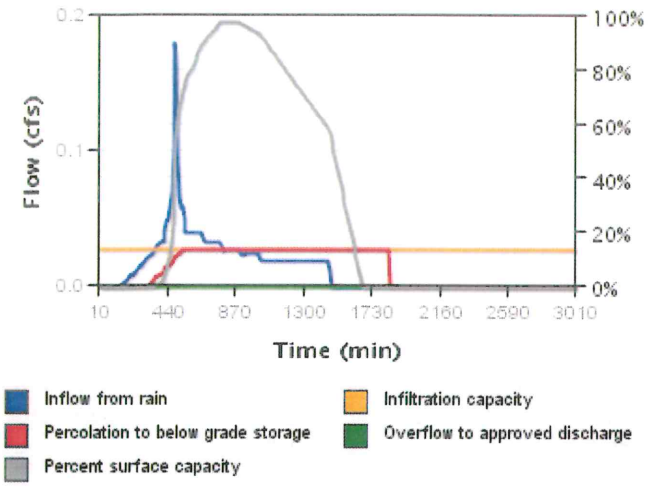
Exhibit C3

Facility Prelim Site

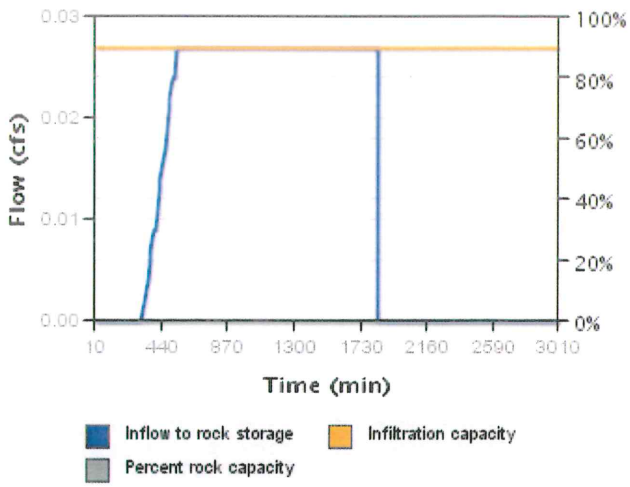
Facility Details	Facility Type	**Planter (Flat)**
	Facility Configuration	**B: Infl. with rock storage (RS)**
	Facility Shape	**Planter**
	Above Grade Storage Data	
	Bottom Area	**580 sq ft**
	Bottom Width	**30.00 ft**
	Storage Depth 1	**12.0 in**
	Growing Medium Depth	**18 in**
	Surface Capacity at Depth 1	**580.0 cu ft**
	Design Infiltration Rate for Native Soil	~~**0.027 in/hr**~~ N/A - Underdrain
	Infiltration Capacity	**0.027 cfs**
	Below Grade Storage Data	
	Rock Storage Depth	**12 in**
	Rock Porosity	**0.30 in**
Facility Facts	Total Facility Area Including Freeboard	**580.00 sq ft**
	Sizing Ratio	**1.3%**
Pollution Reduction Results	Pollution Reduction Score	**Pass**
	Overflow Volume	**0.000 cf**
	Surface Capacity Used	**98%**
	Rock Capacity Used	**0%**
Flow Control Results	Flow Control Score	**Not Used**
	Overflow Volume	**8667.499 cf**
	Surface Capacity Used	**100%**
	Rock Capacity Used	**0%**

Exhibit C3

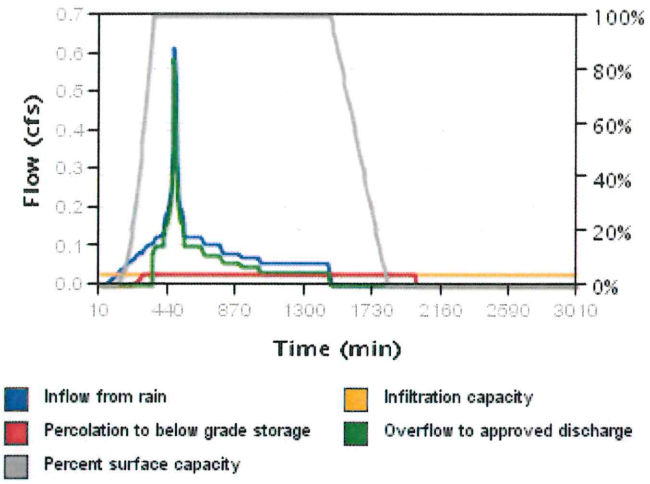
Pollution Reduction Event Surface Facility Modeling



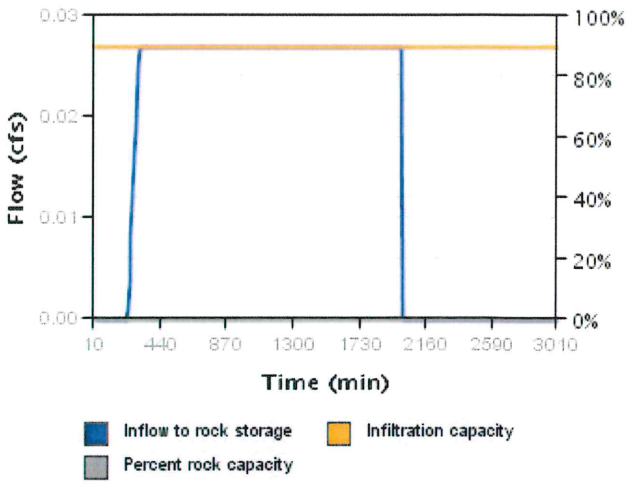
Pollution Reduction Event Below Grade Modeling



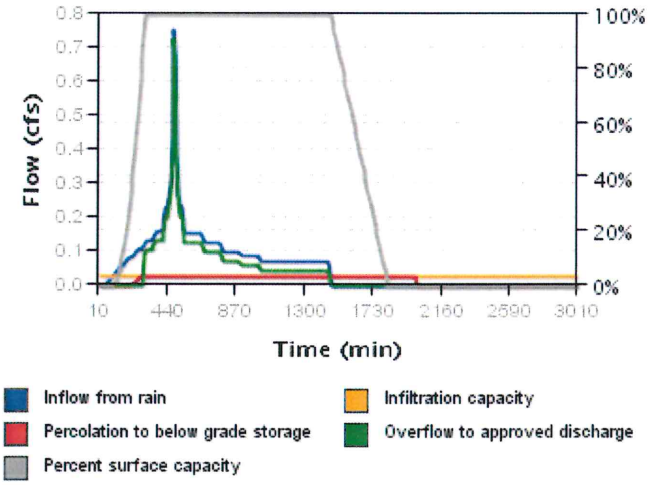
2 Year Event Surface Facility Modeling



2 Year Event Below Grade Modeling



5 Year Event Surface Facility Modeling



5 Year Event Below Grade Modeling

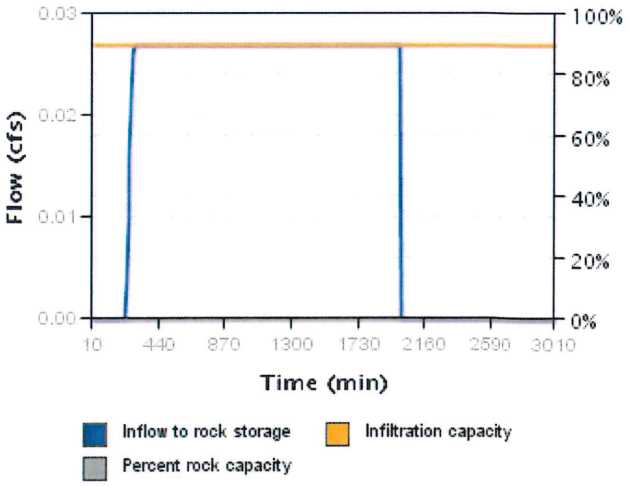
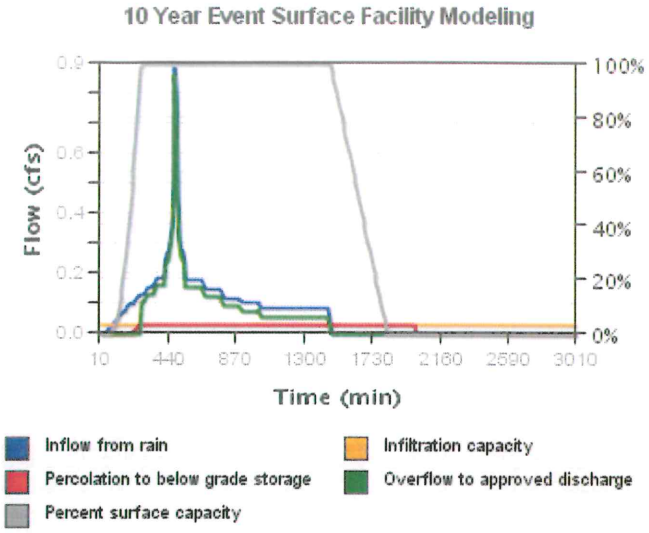
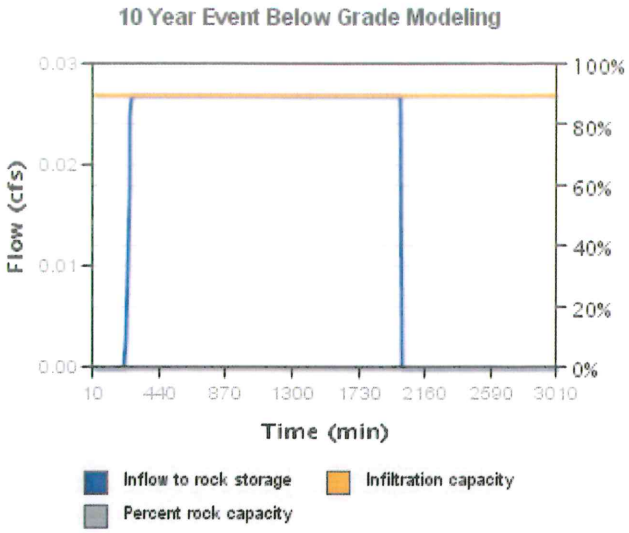
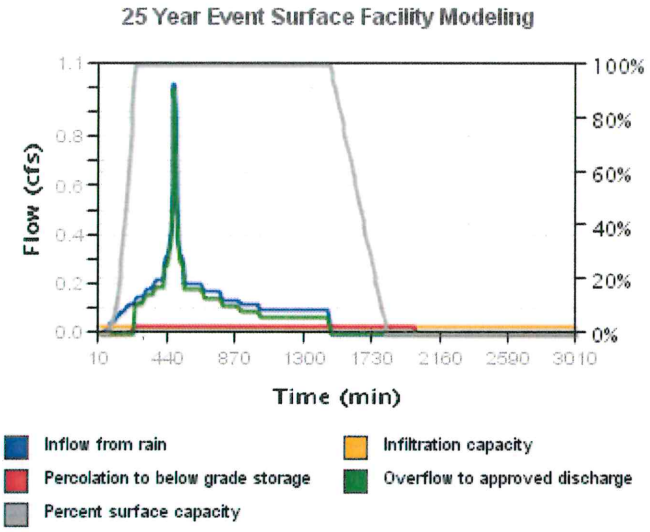


Exhibit C3


10 Year Event Surface Facility Modeling
Flow (cfs)
0.0
0.2
0.4
0.6
0.8
100%
80%
60%
40%
20%
0%
10
440
870
1300
1730
2160
2590
3010
Time (min)
Inflow from rain
Infiltration capacity
Percolation to below grade storage
Overflow to approved discharge
Percent surface capacity


10 Year Event Below Grade Modeling
Flow (cfs)
0.00
0.01
0.02
0.03
100%
80%
60%
40%
20%
0%
10
440
870
1300
1730
2160
2590
3010
Time (min)
Inflow to rock storage
Infiltration capacity
Percent rock capacity


25 Year Event Surface Facility Modeling
Flow (cfs)
0.0
0.2
0.4
0.6
0.8
1.1
100%
80%
60%
40%
20%
0%
10
440
870
1300
1730
2160
2590
3010
Time (min)
Inflow from rain
Infiltration capacity
Percolation to below grade storage
Overflow to approved discharge
Percent surface capacity

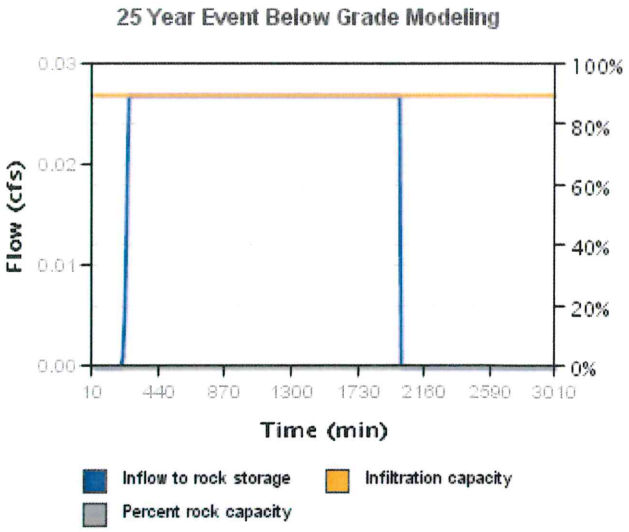
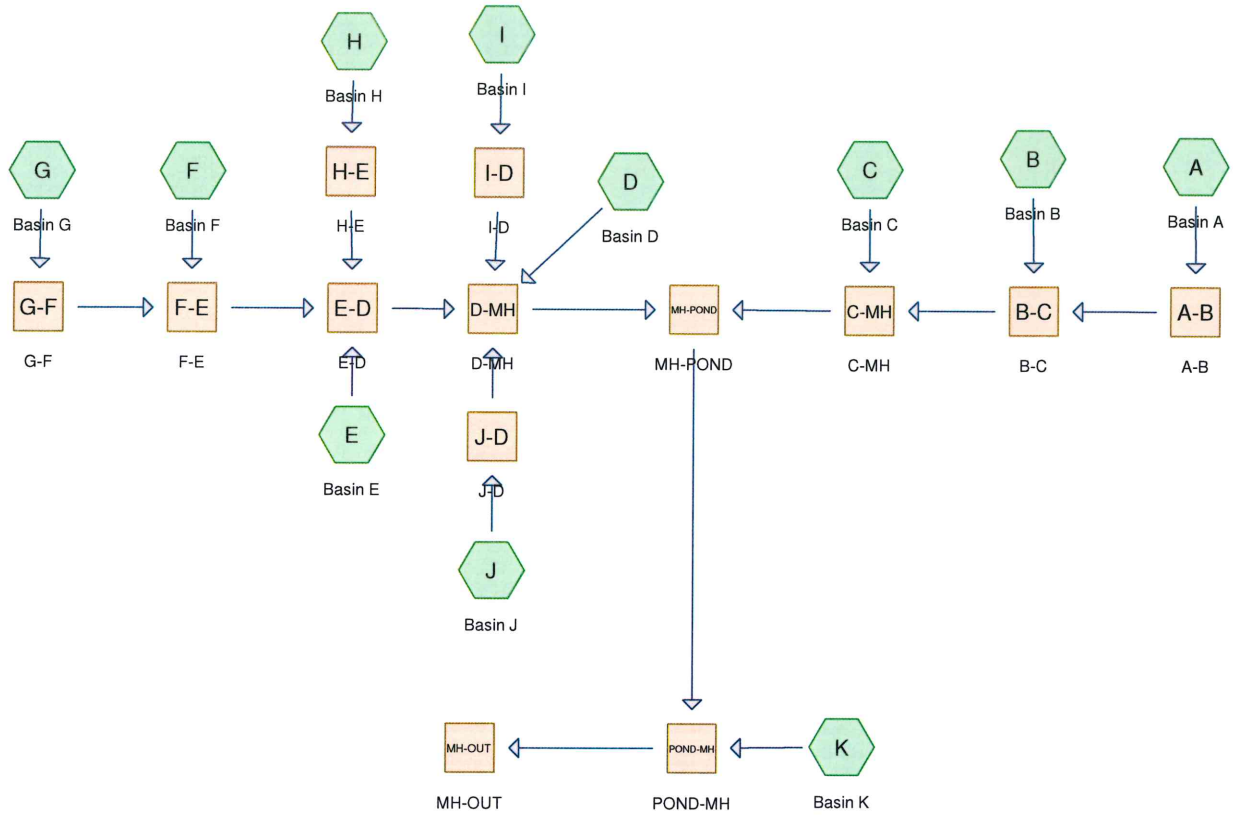

25 Year Event Below Grade Modeling
Flow (cfs)
0.00
0.01
0.02
0.03
100%
80%
60%
40%
20%
0%
10
440
870
1300
1730
2160
2590
3010
Time (min)
Inflow to rock storage
Infiltration capacity
Percent rock capacity

Exhibit C3



Subcat Reach Pond Link

Routing Diagram for 2761 HydroCAD Model
Prepared by Hewlett-Packard Company, Printed 5/2/2018
HydroCAD® 10.00 s/n 04953 © 2011 HydroCAD Software Solutions LLC

Exhibit C3

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment A: Basin A Runoff Area=23,658 sf 100.00% Impervious Runoff Depth=3.17"
Tc=5.0 min CN=0/98 Runoff=0.432 cfs 0.143 af

Subcatchment B: Basin B Runoff Area=58,057 sf 100.00% Impervious Runoff Depth=3.17"
Tc=5.0 min CN=0/98 Runoff=1.060 cfs 0.352 af

Subcatchment C: Basin C Runoff Area=48,933 sf 100.00% Impervious Runoff Depth=3.17"
Tc=5.0 min CN=0/98 Runoff=0.893 cfs 0.296 af

Subcatchment D: Basin D Runoff Area=6,970 sf 100.00% Impervious Runoff Depth=3.17"
Tc=5.0 min CN=0/98 Runoff=0.127 cfs 0.042 af

Subcatchment E: Basin E Runoff Area=7,734 sf 100.00% Impervious Runoff Depth=3.17"
Tc=5.0 min CN=0/98 Runoff=0.141 cfs 0.047 af

Subcatchment F: Basin F Runoff Area=10,016 sf 100.00% Impervious Runoff Depth=3.17"
Tc=5.0 min CN=0/98 Runoff=0.183 cfs 0.061 af

Subcatchment G: Basin G Runoff Area=10,712 sf 100.00% Impervious Runoff Depth=3.17"
Tc=5.0 min CN=0/98 Runoff=0.196 cfs 0.065 af

Subcatchment H: Basin H Runoff Area=9,614 sf 100.00% Impervious Runoff Depth=3.17"
Tc=5.0 min CN=0/98 Runoff=0.176 cfs 0.058 af

Subcatchment I: Basin I Runoff Area=11,688 sf 100.00% Impervious Runoff Depth=3.17"
Tc=5.0 min CN=0/98 Runoff=0.213 cfs 0.071 af

Subcatchment J: Basin J Runoff Area=7,460 sf 100.00% Impervious Runoff Depth=3.17"
Tc=5.0 min CN=0/98 Runoff=0.136 cfs 0.045 af

Subcatchment K: Basin K Runoff Area=6,338 sf 100.00% Impervious Runoff Depth=3.17"
Tc=5.0 min CN=0/98 Runoff=0.116 cfs 0.038 af

Reach A-B: A-B Avg. Flow Depth=0.39' Max Vel=2.03 fps Inflow=0.432 cfs 0.143 af
8.0" Round Pipe n=0.012 L=169.0' S=0.0026 '/' Capacity=0.668 cfs Outflow=0.431 cfs 0.143 af

Reach B-C: B-C Avg. Flow Depth=0.65' Max Vel=2.76 fps Inflow=1.489 cfs 0.495 af
12.0" Round Pipe n=0.012 L=260.0' S=0.0026 '/' Capacity=1.974 cfs Outflow=1.485 cfs 0.495 af

Reach C-MH: C-MH Avg. Flow Depth=0.36' Max Vel=2.40 fps Inflow=2.374 cfs 0.792 af
142.0" Round Pipe n=0.012 L=142.0' S=0.0025 '/' Capacity=1,413.124 cfs Outflow=2.370 cfs 0.792 af

Reach D-MH: D-MH Avg. Flow Depth=0.46' Max Vel=3.32 fps Inflow=1.169 cfs 0.389 af
12.0" Round Pipe n=0.012 L=61.0' S=0.0049 '/' Capacity=2.707 cfs Outflow=1.168 cfs 0.389 af

Reach E-D: E-D Avg. Flow Depth=0.34' Max Vel=2.91 fps Inflow=0.694 cfs 0.231 af
12.0" Round Pipe n=0.012 L=87.0' S=0.0051 '/' Capacity=2.745 cfs Outflow=0.693 cfs 0.231 af

Exhibit C3

Reach F-E: F-E Avg. Flow Depth=0.30' Max Vel=2.50 fps Inflow=0.378 cfs 0.126 af
8.0" Round Pipe n=0.012 L=79.0' S=0.0049 '/' Capacity=0.920 cfs Outflow=0.377 cfs 0.126 af

Reach G-F: G-F Avg. Flow Depth=0.21' Max Vel=2.11 fps Inflow=0.196 cfs 0.065 af
8.0" Round Pipe n=0.012 L=145.0' S=0.0050 '/' Capacity=0.929 cfs Outflow=0.195 cfs 0.065 af

Reach H-E: H-E Avg. Flow Depth=0.20' Max Vel=2.04 fps Inflow=0.176 cfs 0.058 af
8.0" Round Pipe n=0.012 L=72.0' S=0.0050 '/' Capacity=0.926 cfs Outflow=0.175 cfs 0.058 af

Reach I-D: I-D Avg. Flow Depth=0.22' Max Vel=2.17 fps Inflow=0.213 cfs 0.071 af
8.0" Round Pipe n=0.012 L=57.0' S=0.0051 '/' Capacity=0.934 cfs Outflow=0.213 cfs 0.071 af

Reach J-D: J-D Avg. Flow Depth=0.17' Max Vel=1.90 fps Inflow=0.136 cfs 0.045 af
8.0" Round Pipe n=0.012 L=48.0' S=0.0050 '/' Capacity=0.926 cfs Outflow=0.136 cfs 0.045 af

Reach MH-OUT: MH-OUT Avg. Flow Depth=0.86' Max Vel=4.02 fps Inflow=3.639 cfs 1.219 af
15.0" Round Pipe n=0.012 L=188.0' S=0.0040 '/' Capacity=4.420 cfs Outflow=3.630 cfs 1.219 af

Reach MH-POND: MH-POND Avg. Flow Depth=0.65' Max Vel=5.45 fps Inflow=3.536 cfs 1.180 af
15.0" Round Pipe n=0.012 L=59.0' S=0.0088 '/' Capacity=6.570 cfs Outflow=3.535 cfs 1.180 af

Reach POND-MH: POND-MH Avg. Flow Depth=0.86' Max Vel=4.03 fps Inflow=3.649 cfs 1.219 af
15.0" Round Pipe n=0.012 L=384.0' S=0.0040 '/' Capacity=4.432 cfs Outflow=3.639 cfs 1.219 af

Total Runoff Area = 4.618 ac Runoff Volume = 1.219 af Average Runoff Depth = 3.17"
0.00% Pervious = 0.000 ac 100.00% Impervious = 4.618 ac

Exhibit C3

Summary for Subcatchment A: Basin A

Runoff = 0.432 cfs @ 7.90 hrs, Volume= 0.143 af, Depth= 3.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	23,658	98	Impervious
	23,658	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment A: Basin A

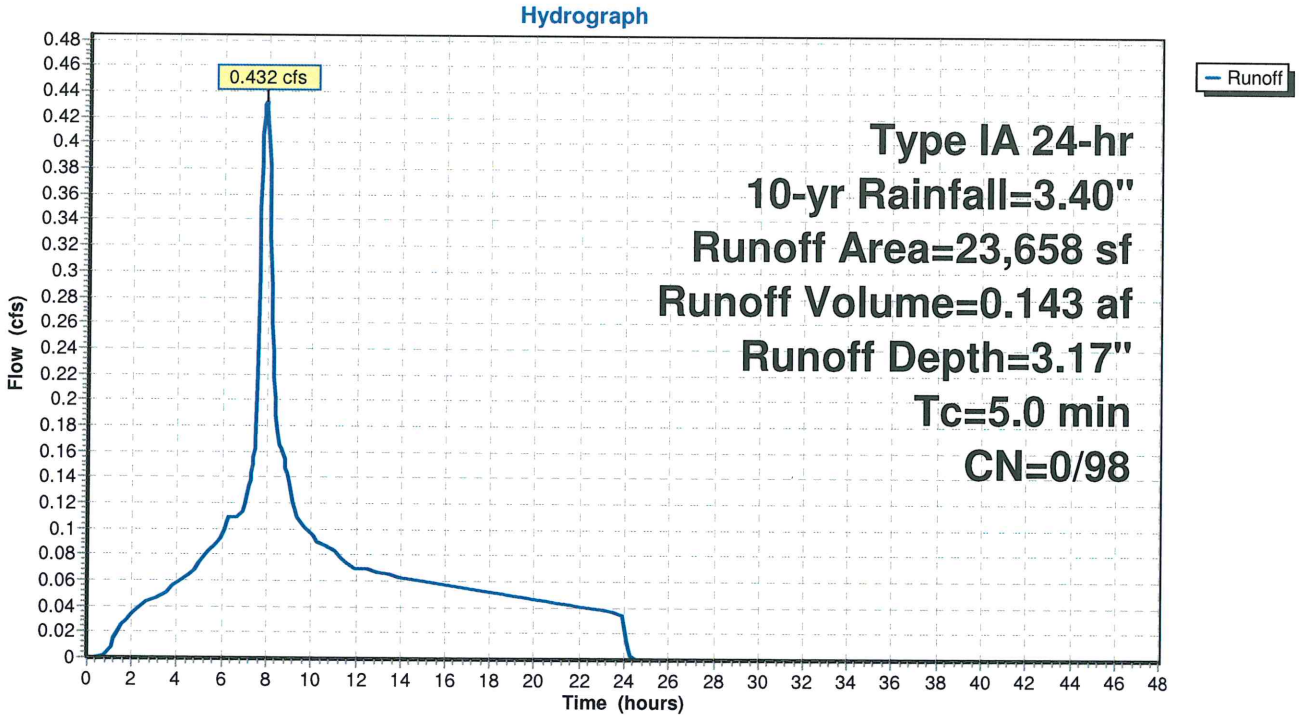


Exhibit C3

Summary for Subcatchment B: Basin B

Runoff = 1.060 cfs @ 7.90 hrs, Volume= 0.352 af, Depth= 3.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	58,057	98	Impervious
	58,057	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment B: Basin B

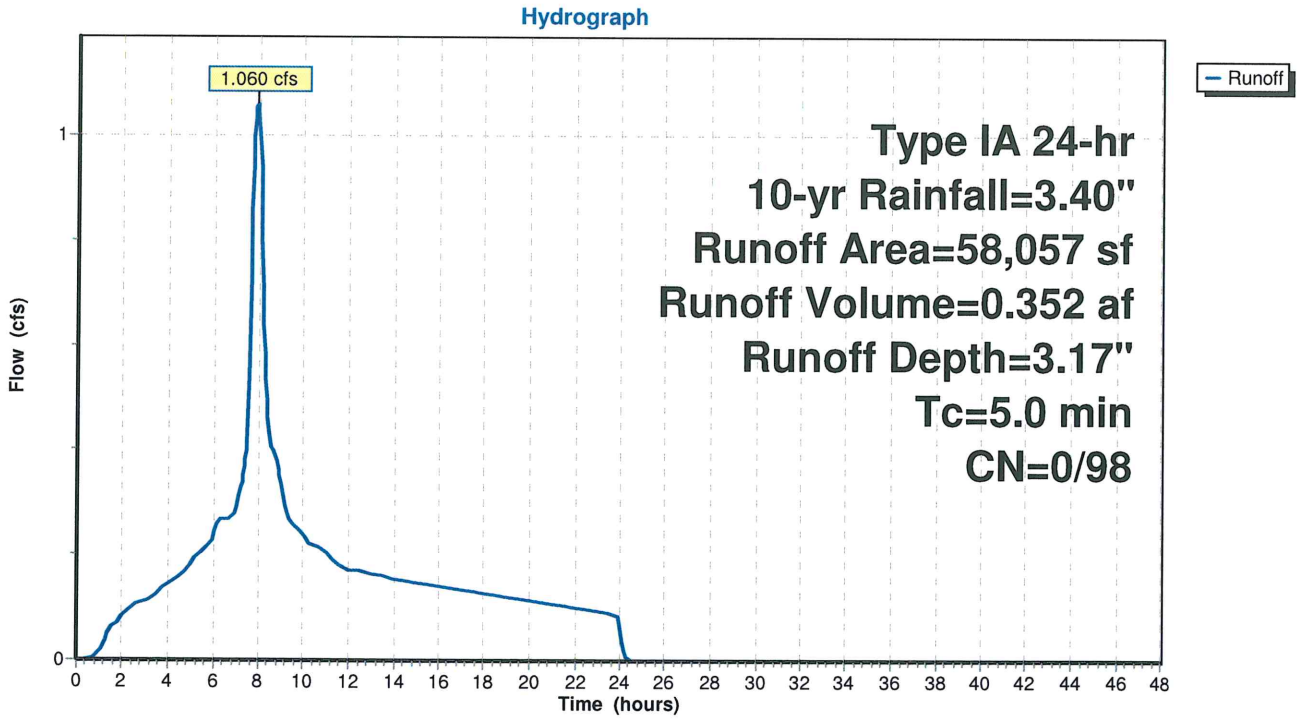


Exhibit C3

Summary for Subcatchment C: Basin C

Runoff = 0.893 cfs @ 7.90 hrs, Volume= 0.296 af, Depth= 3.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	48,933	98	Impervious
	48,933	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment C: Basin C

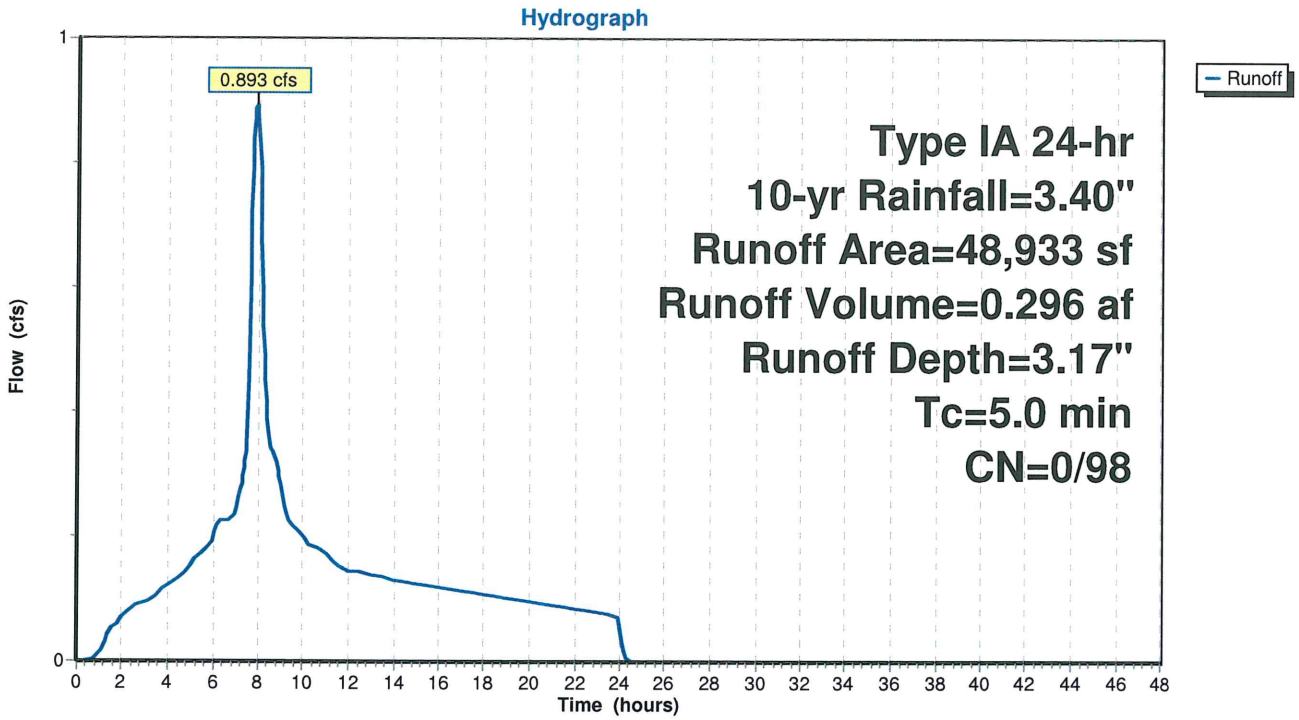


Exhibit C3

Summary for Subcatchment D: Basin D

Runoff = 0.127 cfs @ 7.90 hrs, Volume= 0.042 af, Depth= 3.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	6,970	98	Impervious
	6,970	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment D: Basin D

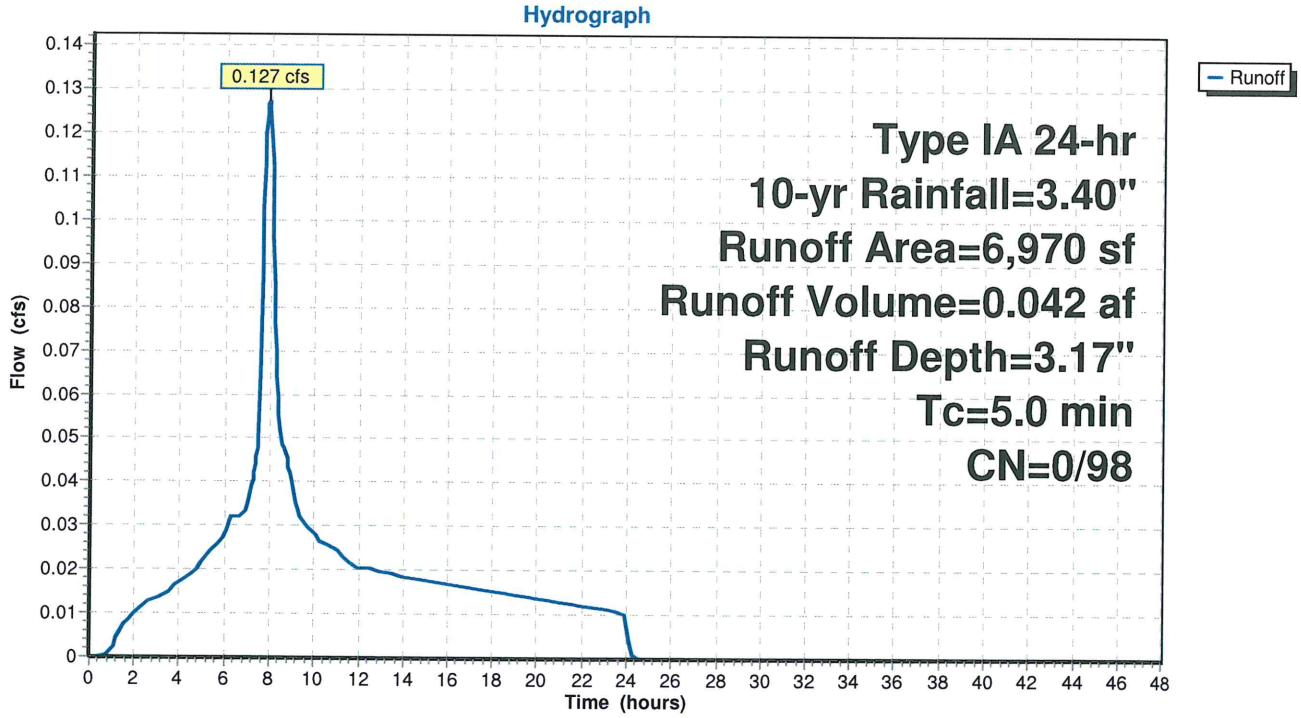


Exhibit C3

Summary for Subcatchment E: Basin E

Runoff = 0.141 cfs @ 7.90 hrs, Volume= 0.047 af, Depth= 3.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	7,734	98	Impervious
	7,734	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment E: Basin E

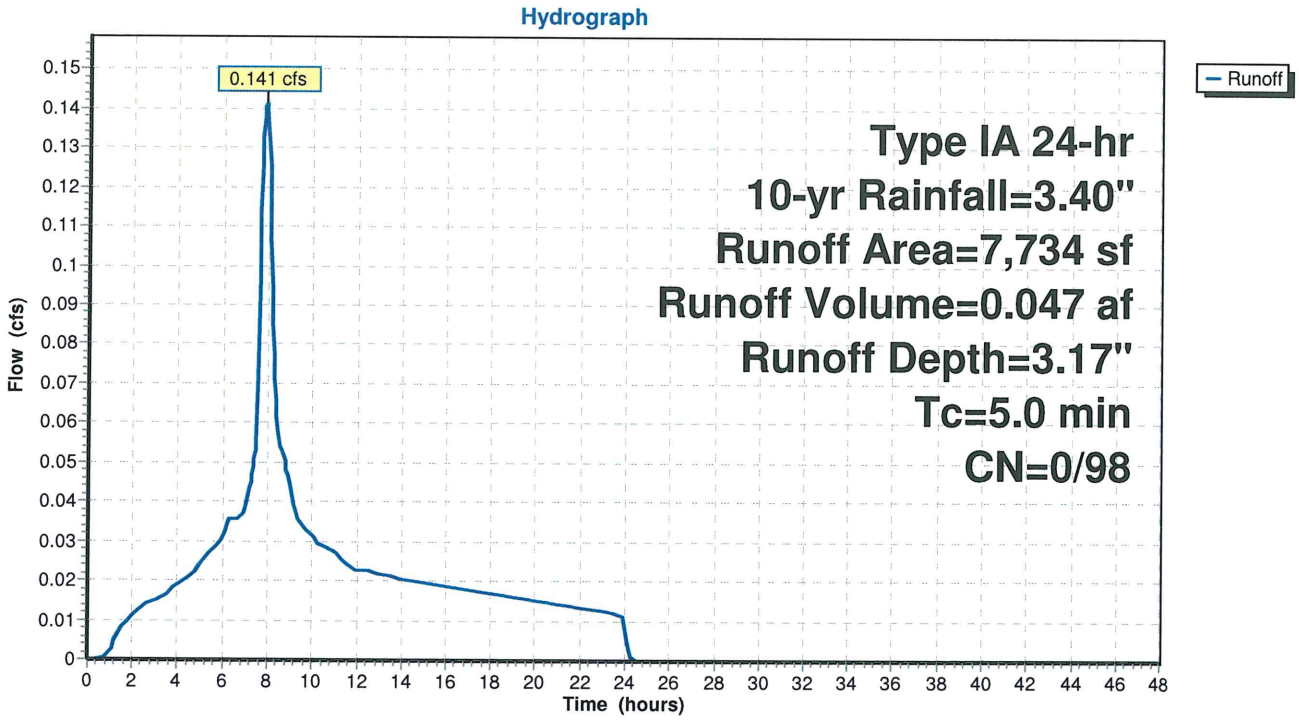


Exhibit C3

Summary for Subcatchment F: Basin F

Runoff = 0.183 cfs @ 7.90 hrs, Volume= 0.061 af, Depth= 3.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	10,016	98	Impervious
	10,016	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment F: Basin F

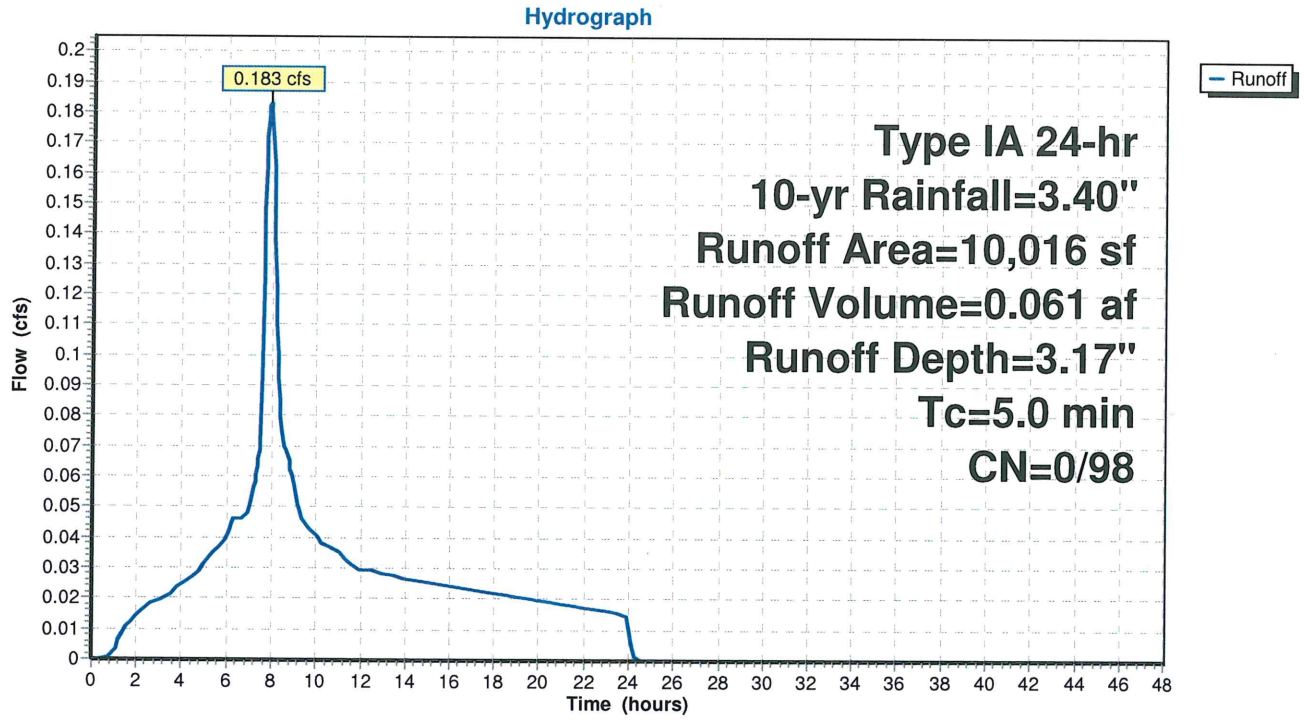


Exhibit C3

Summary for Subcatchment G: Basin G

Runoff = 0.196 cfs @ 7.90 hrs, Volume= 0.065 af, Depth= 3.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	10,712	98	Impervious
	10,712	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment G: Basin G

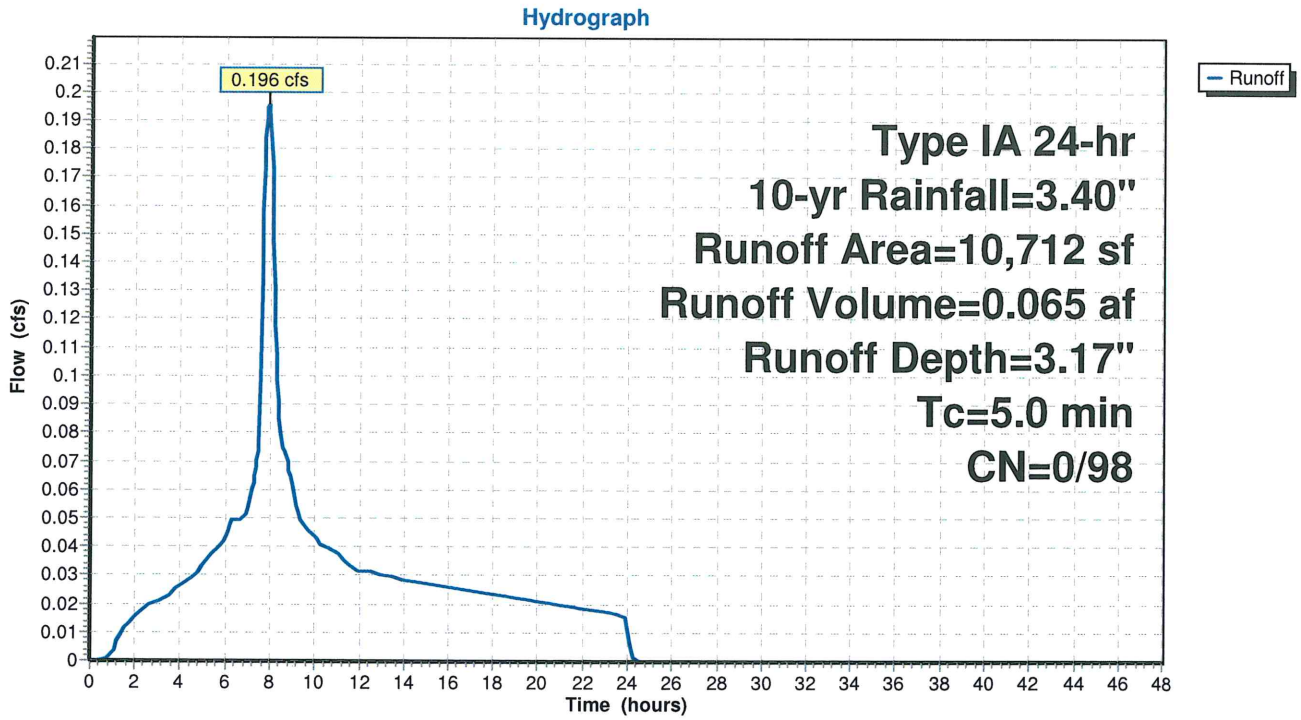


Exhibit C3

Summary for Subcatchment H: Basin H

Runoff = 0.176 cfs @ 7.90 hrs, Volume= 0.058 af, Depth= 3.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	9,614	98	Impervious
	9,614	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment H: Basin H

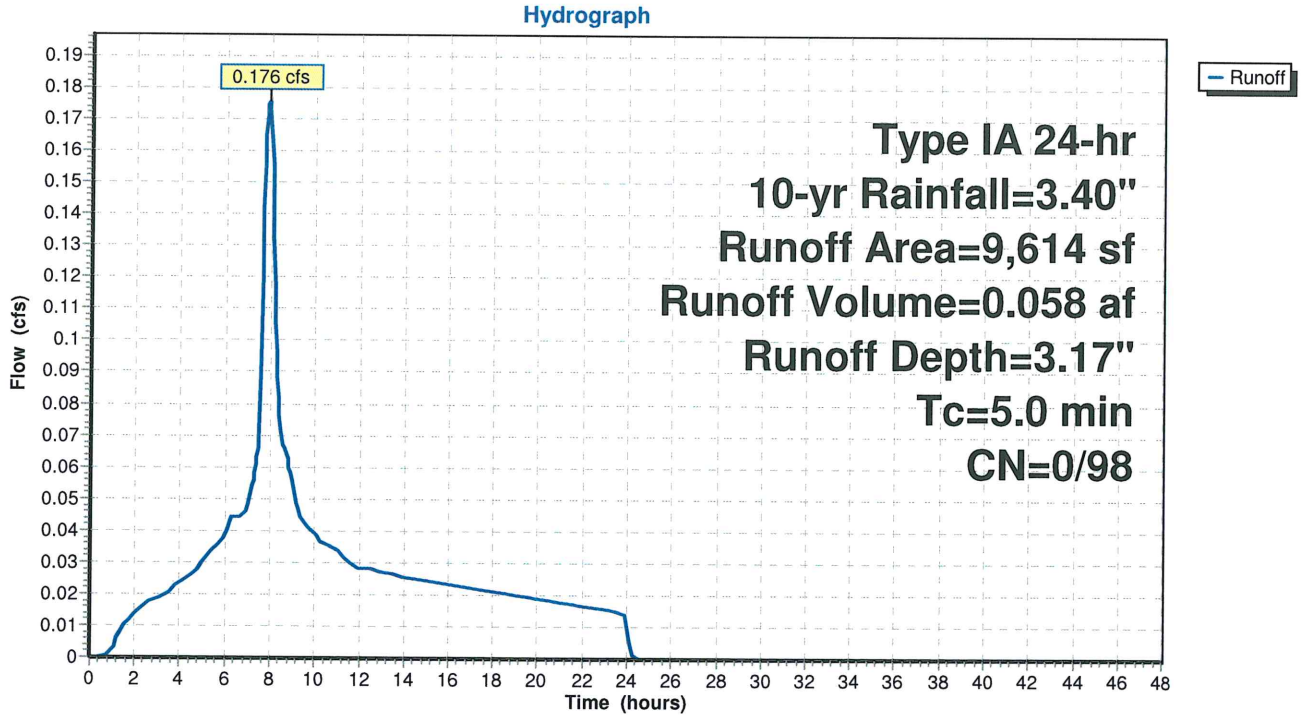


Exhibit C3

Summary for Subcatchment I: Basin I

Runoff = 0.213 cfs @ 7.90 hrs, Volume= 0.071 af, Depth= 3.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	11,688	98	Impervious
	11,688	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment I: Basin I

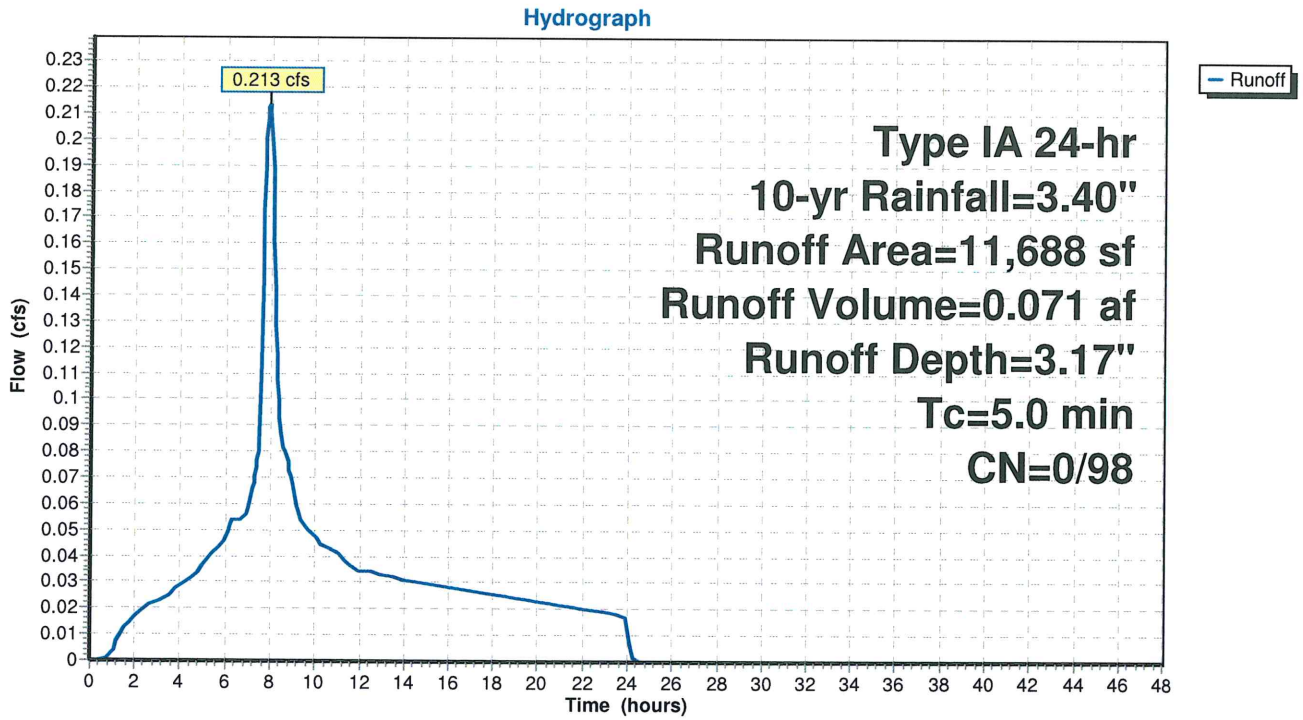


Exhibit C3

Summary for Subcatchment J: Basin J

Runoff = 0.136 cfs @ 7.90 hrs, Volume= 0.045 af, Depth= 3.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	7,460	98	Impervious
	7,460	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment J: Basin J

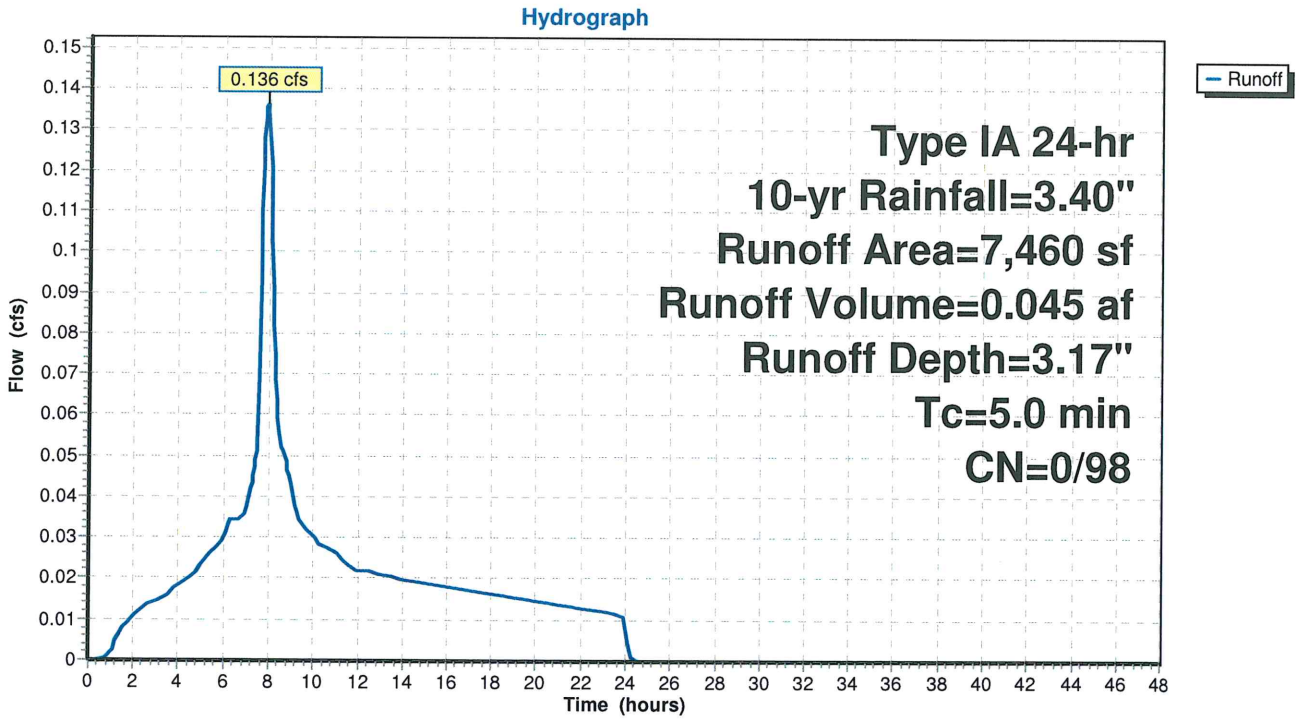


Exhibit C3

Summary for Subcatchment K: Basin K

Runoff = 0.116 cfs @ 7.90 hrs, Volume= 0.038 af, Depth= 3.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	6,338	98	Impervious
	6,338	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment K: Basin K

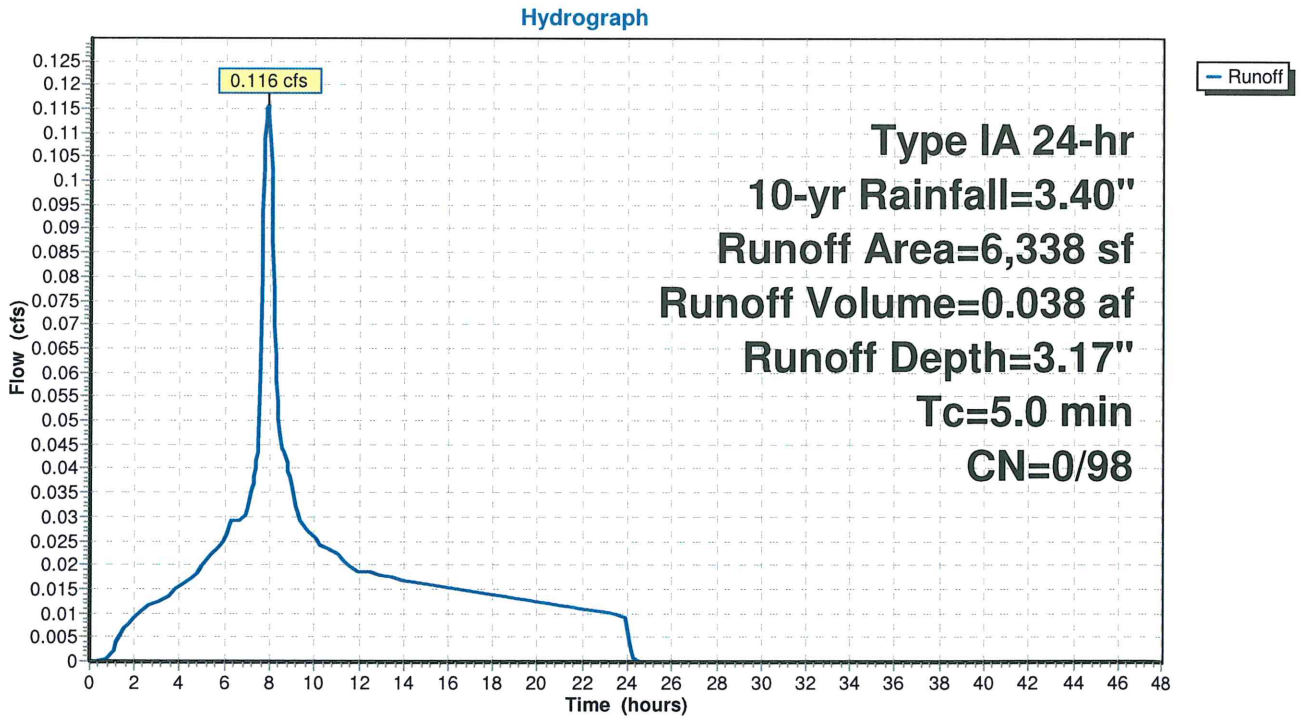


Exhibit C3

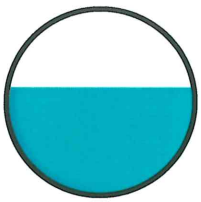
Summary for Reach A-B: A-B

Inflow Area = 0.543 ac,100.00% Impervious, Inflow Depth = 3.17" for 10-yr event
Inflow = 0.432 cfs @ 7.90 hrs, Volume= 0.143 af
Outflow = 0.431 cfs @ 7.94 hrs, Volume= 0.143 af, Atten= 0%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.03 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.16 fps, Avg. Travel Time= 2.4 min

Peak Storage= 36 cf @ 7.92 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.668 cfs

8.0" Round Pipe
n= 0.012
Length= 169.0' Slope= 0.0026 '/'
Inlet Invert= 18.00', Outlet Invert= 17.56'



Reach A-B: A-B

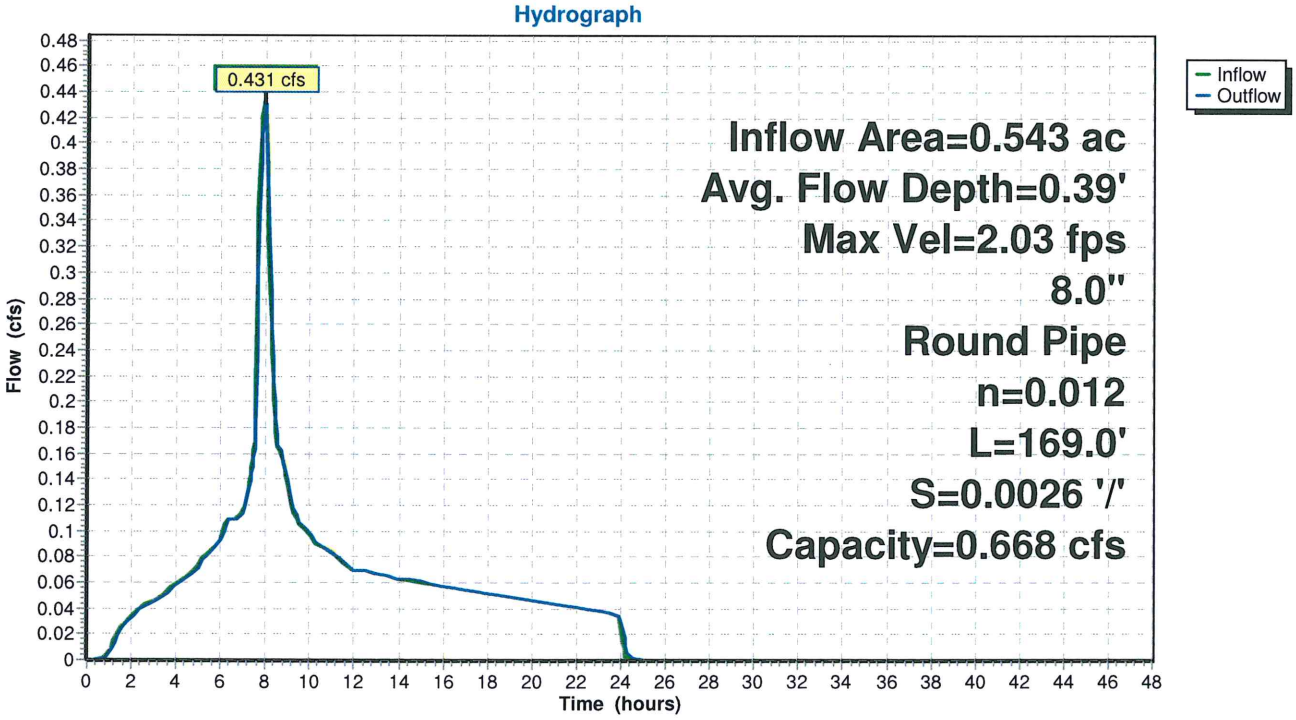


Exhibit C3

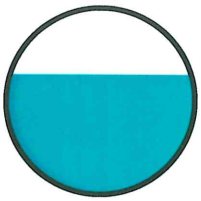
Summary for Reach B-C: B-C

Inflow Area = 1.876 ac,100.00% Impervious, Inflow Depth = 3.17" for 10-yr event
Inflow = 1.489 cfs @ 7.91 hrs, Volume= 0.495 af
Outflow = 1.485 cfs @ 7.96 hrs, Volume= 0.495 af, Atten= 0%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.76 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.56 fps, Avg. Travel Time= 2.8 min

Peak Storage= 140 cf @ 7.93 hrs
Average Depth at Peak Storage= 0.65'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 1.974 cfs

12.0" Round Pipe
n= 0.012
Length= 260.0' Slope= 0.0026 '/'
Inlet Invert= 17.56', Outlet Invert= 16.88'



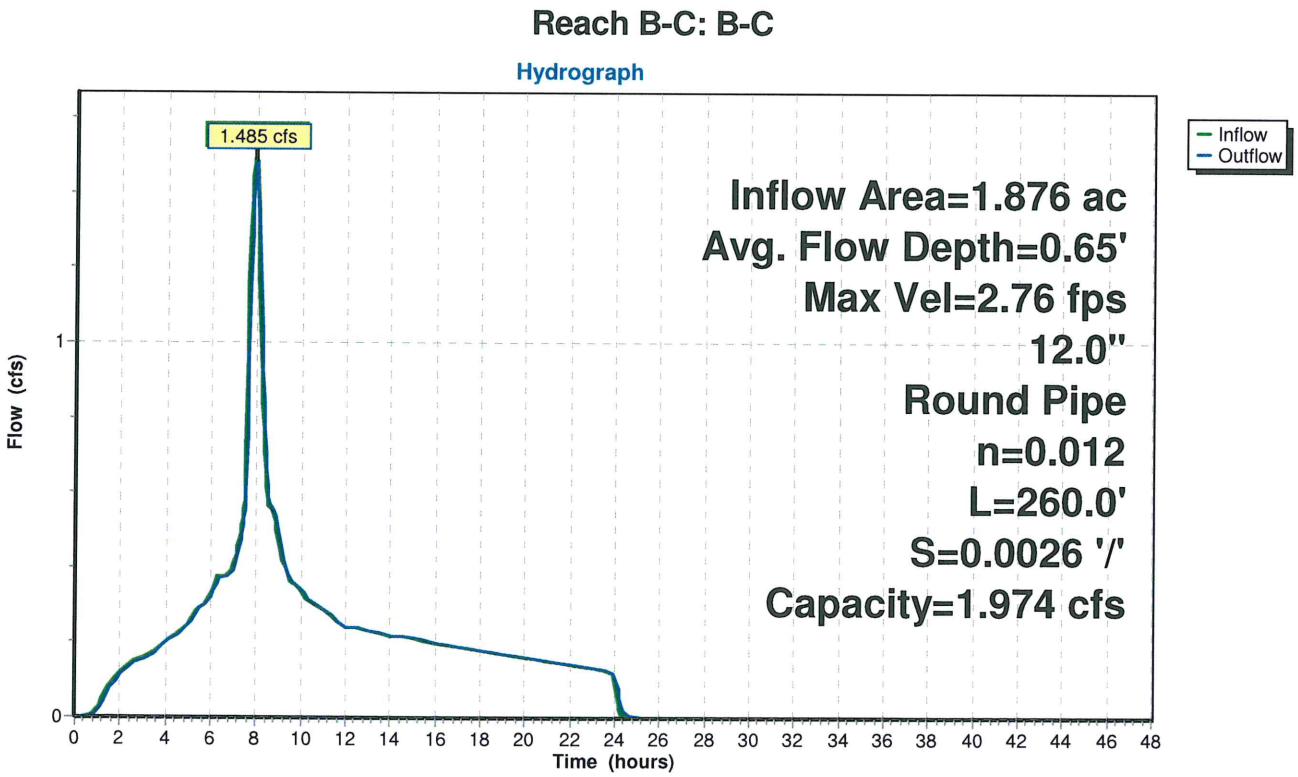


Exhibit C3

Summary for Reach C-MH: C-MH

Inflow Area = 2.999 ac,100.00% Impervious, Inflow Depth = 3.17" for 10-yr event
Inflow = 2.374 cfs @ 7.94 hrs, Volume= 0.792 af
Outflow = 2.370 cfs @ 7.96 hrs, Volume= 0.792 af, Atten= 0%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.40 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 1.7 min

Peak Storage= 140 cf @ 7.95 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 11.83' Flow Area= 110.0 sf, Capacity= 1,413.124 cfs

142.0" Round Pipe
n= 0.012
Length= 142.0' Slope= 0.0025 '/'
Inlet Invert= 16.88', Outlet Invert= 16.52'

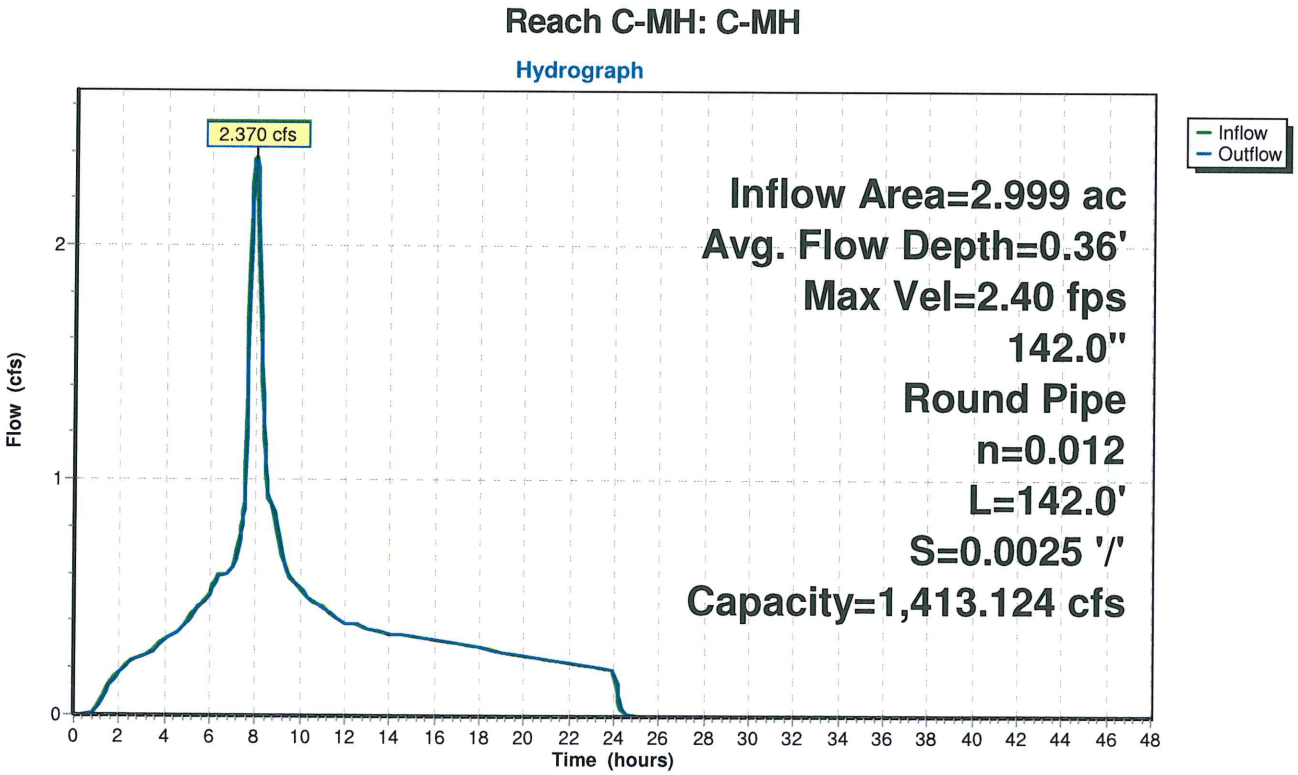


Exhibit C3

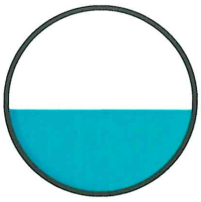
Summary for Reach D-MH: D-MH

Inflow Area = 1.474 ac,100.00% Impervious, Inflow Depth = 3.17" for 10-yr event
Inflow = 1.169 cfs @ 7.92 hrs, Volume= 0.389 af
Outflow = 1.168 cfs @ 7.93 hrs, Volume= 0.389 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.32 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.87 fps, Avg. Travel Time= 0.5 min

Peak Storage= 21 cf @ 7.93 hrs
Average Depth at Peak Storage= 0.46'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.707 cfs

12.0" Round Pipe
n= 0.012
Length= 61.0' Slope= 0.0049 '/'
Inlet Invert= 16.82', Outlet Invert= 16.52'



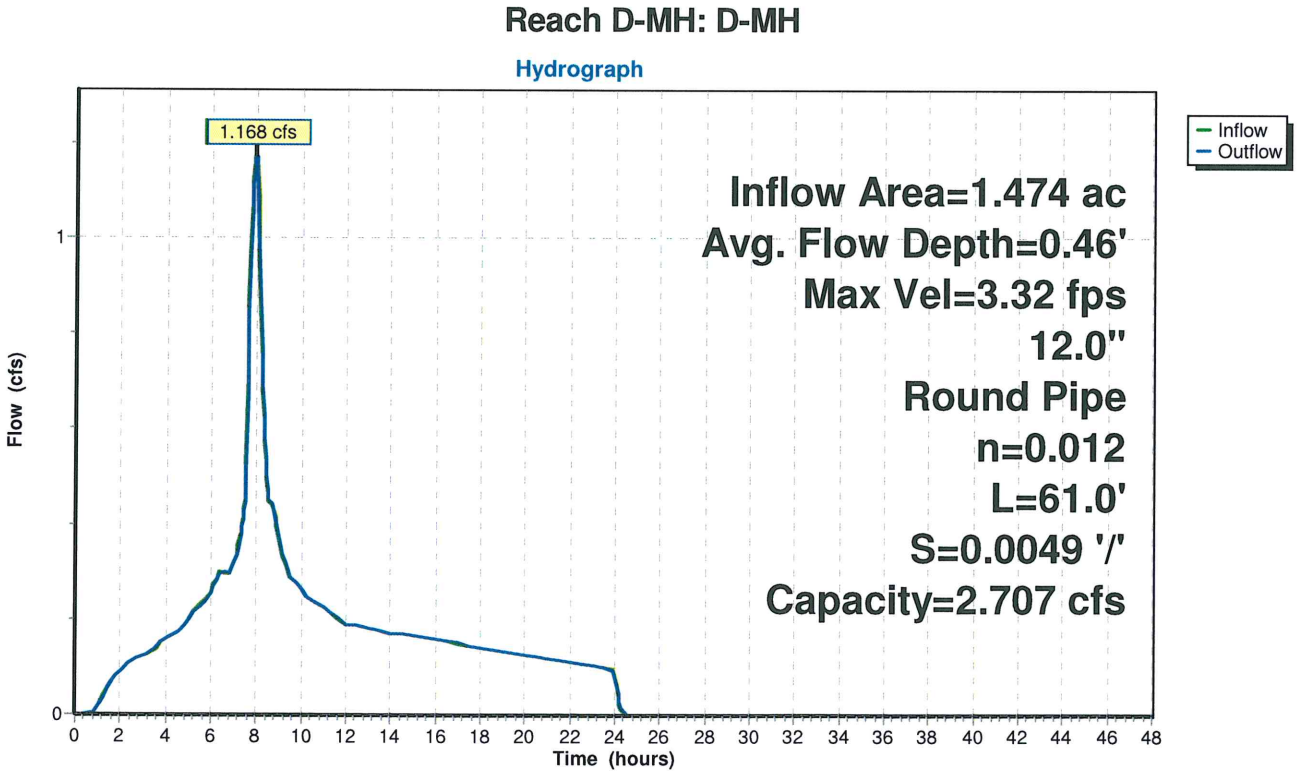


Exhibit C3

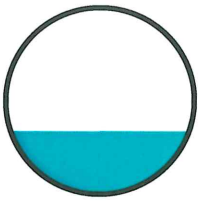
Summary for Reach E-D: E-D

Inflow Area = 0.874 ac,100.00% Impervious, Inflow Depth = 3.17" for 10-yr event
Inflow = 0.694 cfs @ 7.92 hrs, Volume= 0.231 af
Outflow = 0.693 cfs @ 7.93 hrs, Volume= 0.231 af, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.91 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.62 fps, Avg. Travel Time= 0.9 min

Peak Storage= 21 cf @ 7.92 hrs
Average Depth at Peak Storage= 0.34'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.745 cfs

12.0" Round Pipe
n= 0.012
Length= 87.0' Slope= 0.0051 '/'
Inlet Invert= 17.26', Outlet Invert= 16.82'



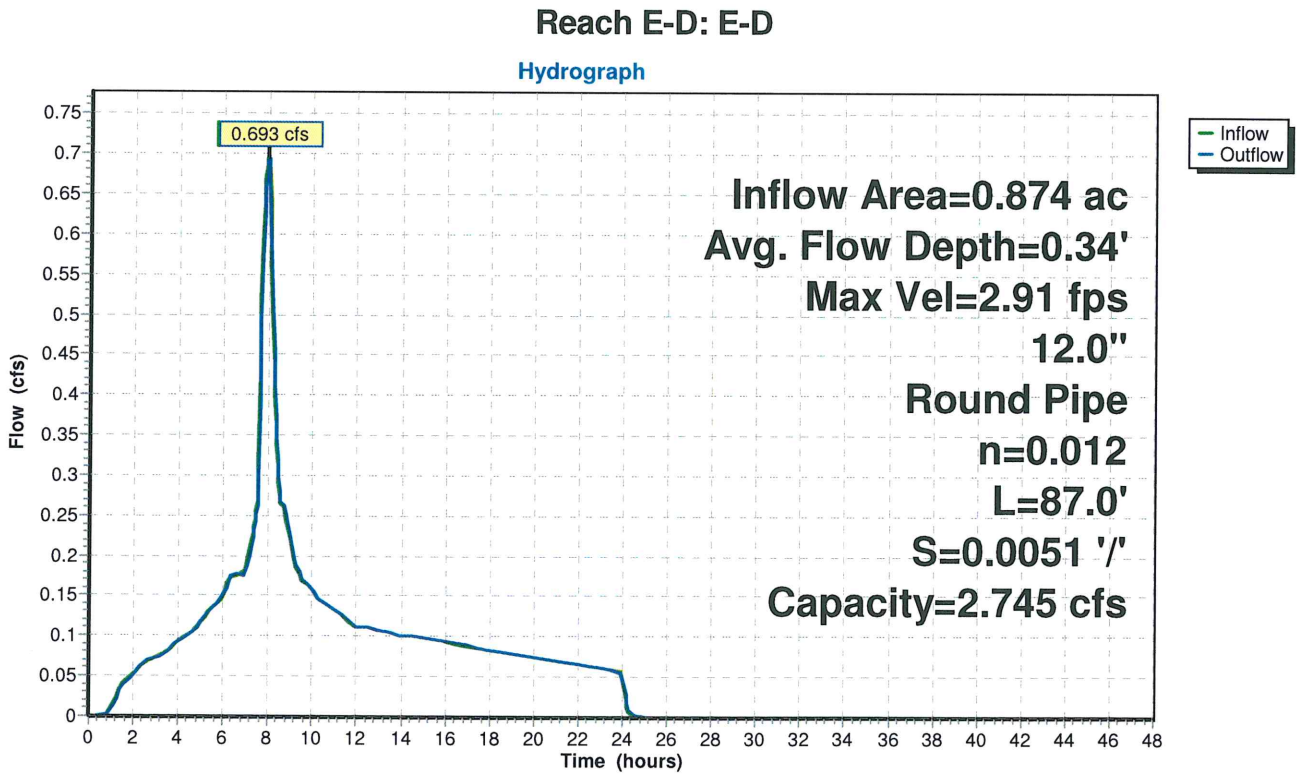


Exhibit C3

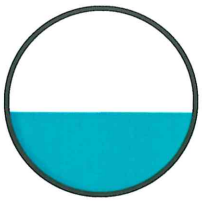
Summary for Reach F-E: F-E

Inflow Area = 0.476 ac,100.00% Impervious, Inflow Depth = 3.17" for 10-yr event
Inflow = 0.378 cfs @ 7.91 hrs, Volume= 0.126 af
Outflow = 0.377 cfs @ 7.93 hrs, Volume= 0.126 af, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.50 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.41 fps, Avg. Travel Time= 0.9 min

Peak Storage= 12 cf @ 7.92 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.920 cfs

8.0" Round Pipe
n= 0.012
Length= 79.0' Slope= 0.0049 '/'
Inlet Invert= 17.65', Outlet Invert= 17.26'



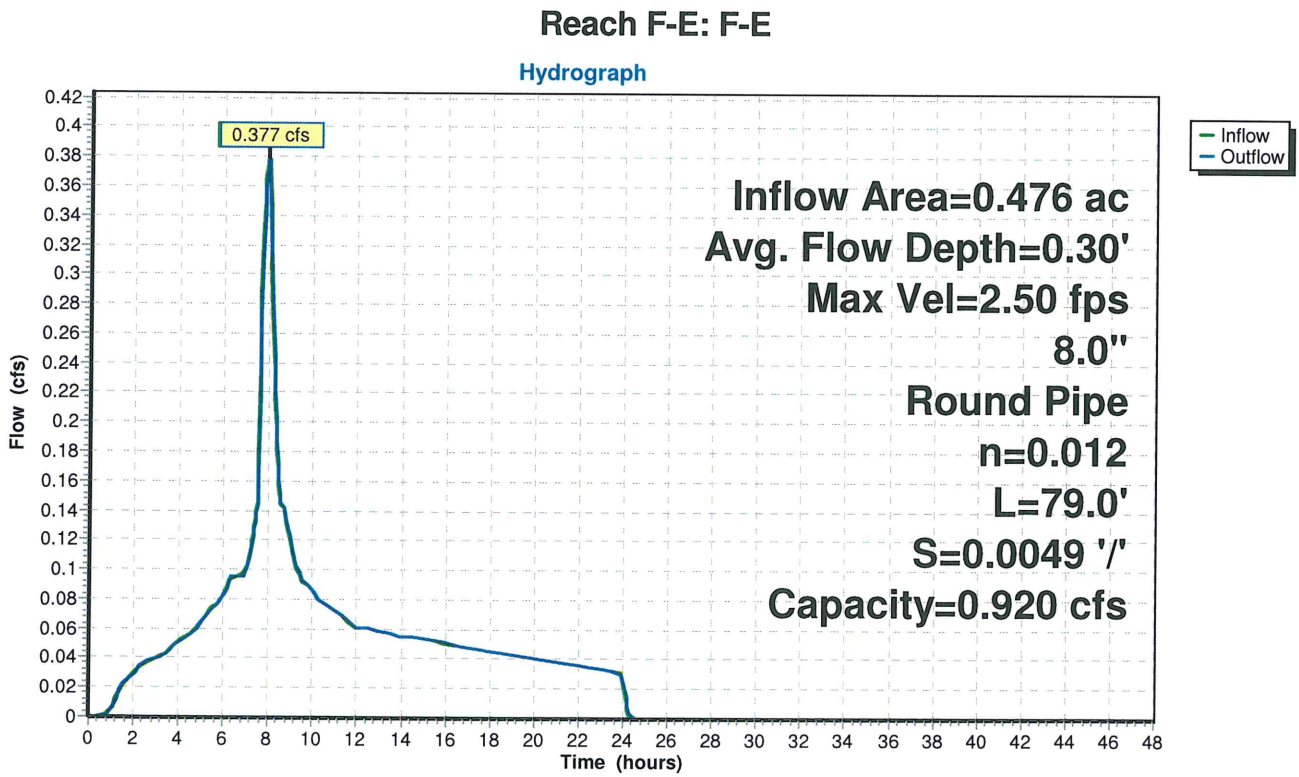


Exhibit C3

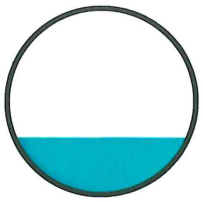
Summary for Reach G-F: G-F

Inflow Area = 0.246 ac,100.00% Impervious, Inflow Depth = 3.17" for 10-yr event
Inflow = 0.196 cfs @ 7.90 hrs, Volume= 0.065 af
Outflow = 0.195 cfs @ 7.93 hrs, Volume= 0.065 af, Atten= 0%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.11 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.18 fps, Avg. Travel Time= 2.1 min

Peak Storage= 13 cf @ 7.91 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.929 cfs

8.0" Round Pipe
n= 0.012
Length= 145.0' Slope= 0.0050 '/'
Inlet Invert= 18.38', Outlet Invert= 17.65'



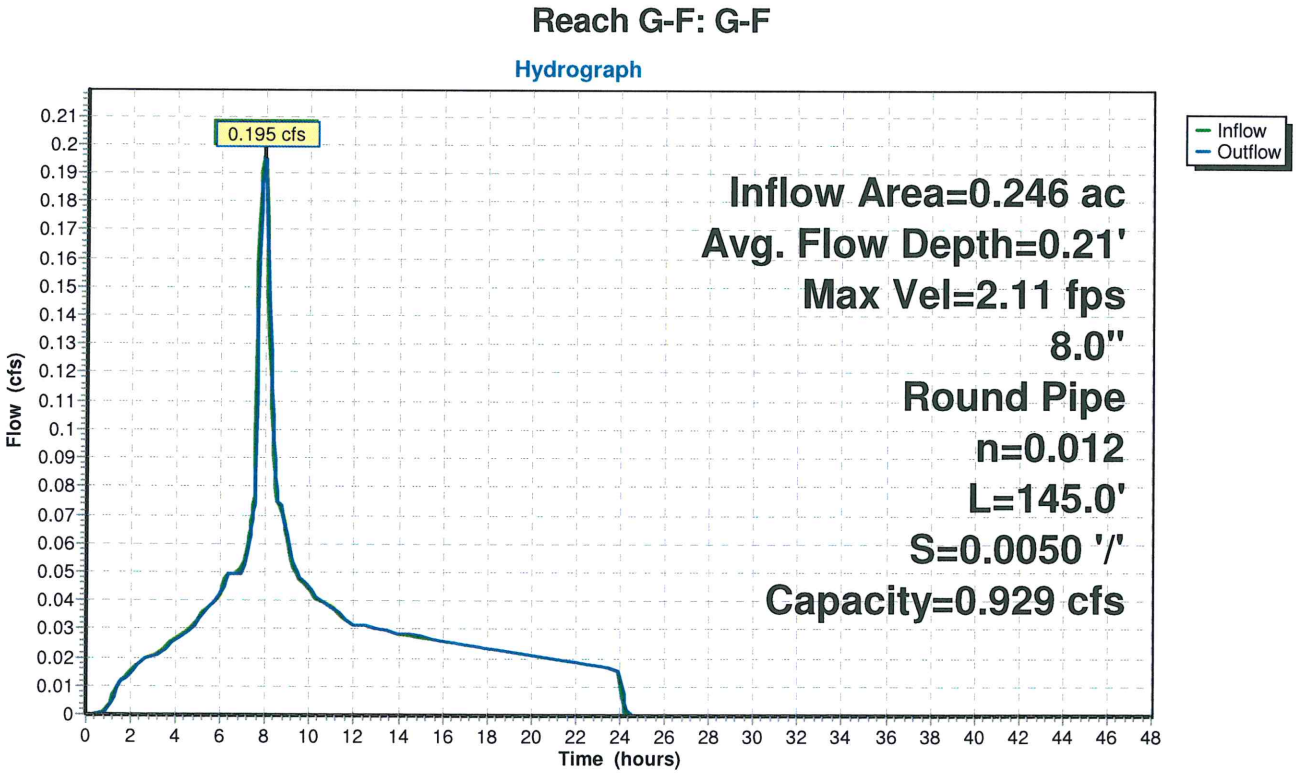


Exhibit C3

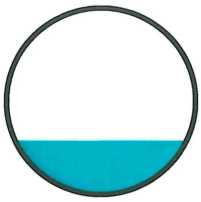
Summary for Reach H-E: H-E

Inflow Area = 0.221 ac,100.00% Impervious, Inflow Depth = 3.17" for 10-yr event
Inflow = 0.176 cfs @ 7.90 hrs, Volume= 0.058 af
Outflow = 0.175 cfs @ 7.91 hrs, Volume= 0.058 af, Atten= 0%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.04 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.14 fps, Avg. Travel Time= 1.0 min

Peak Storage= 6 cf @ 7.90 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.926 cfs

8.0" Round Pipe
n= 0.012
Length= 72.0' Slope= 0.0050 '/'
Inlet Invert= 17.62', Outlet Invert= 17.26'



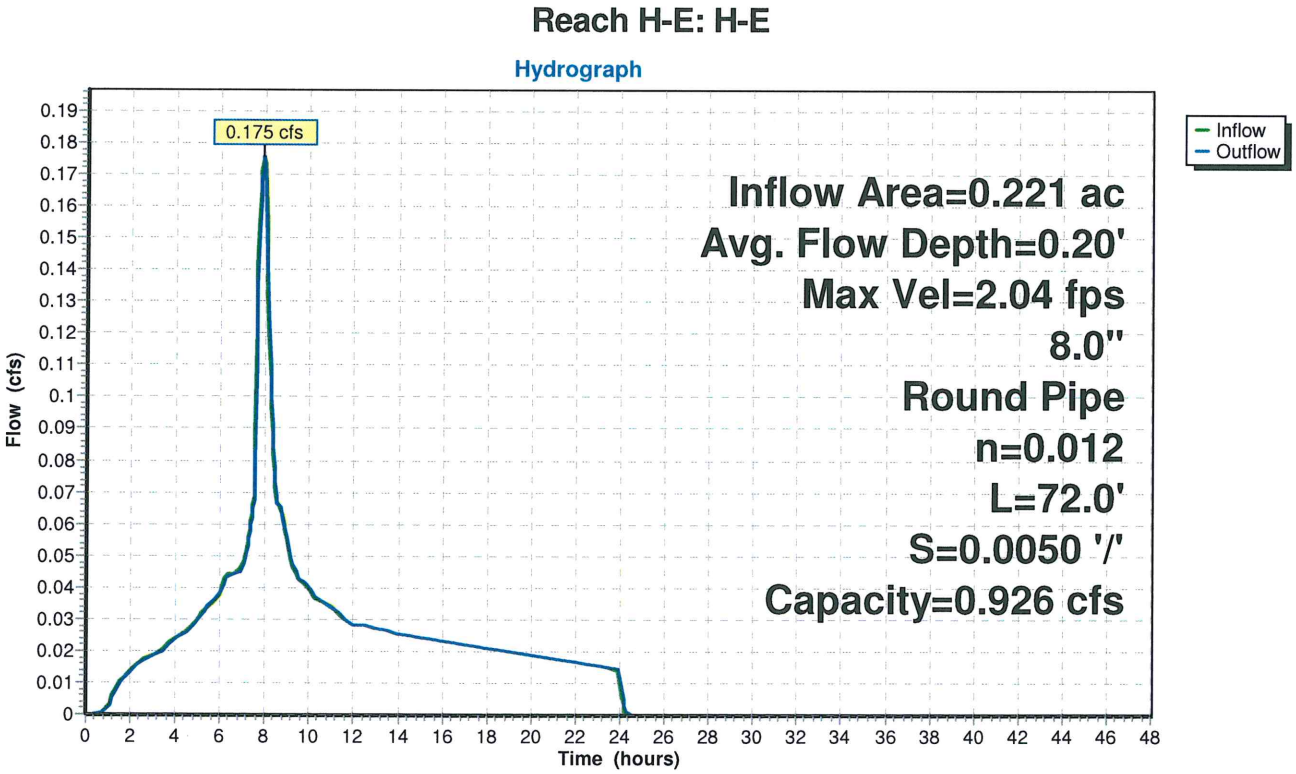


Exhibit C3

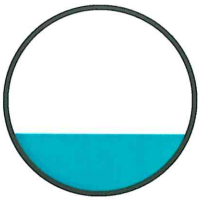
Summary for Reach I-D: I-D

Inflow Area = 0.268 ac,100.00% Impervious, Inflow Depth = 3.17" for 10-yr event
Inflow = 0.213 cfs @ 7.90 hrs, Volume= 0.071 af
Outflow = 0.213 cfs @ 7.91 hrs, Volume= 0.071 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.17 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.22 fps, Avg. Travel Time= 0.8 min

Peak Storage= 6 cf @ 7.90 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.934 cfs

8.0" Round Pipe
n= 0.012
Length= 57.0' Slope= 0.0051 '/'
Inlet Invert= 17.11', Outlet Invert= 16.82'



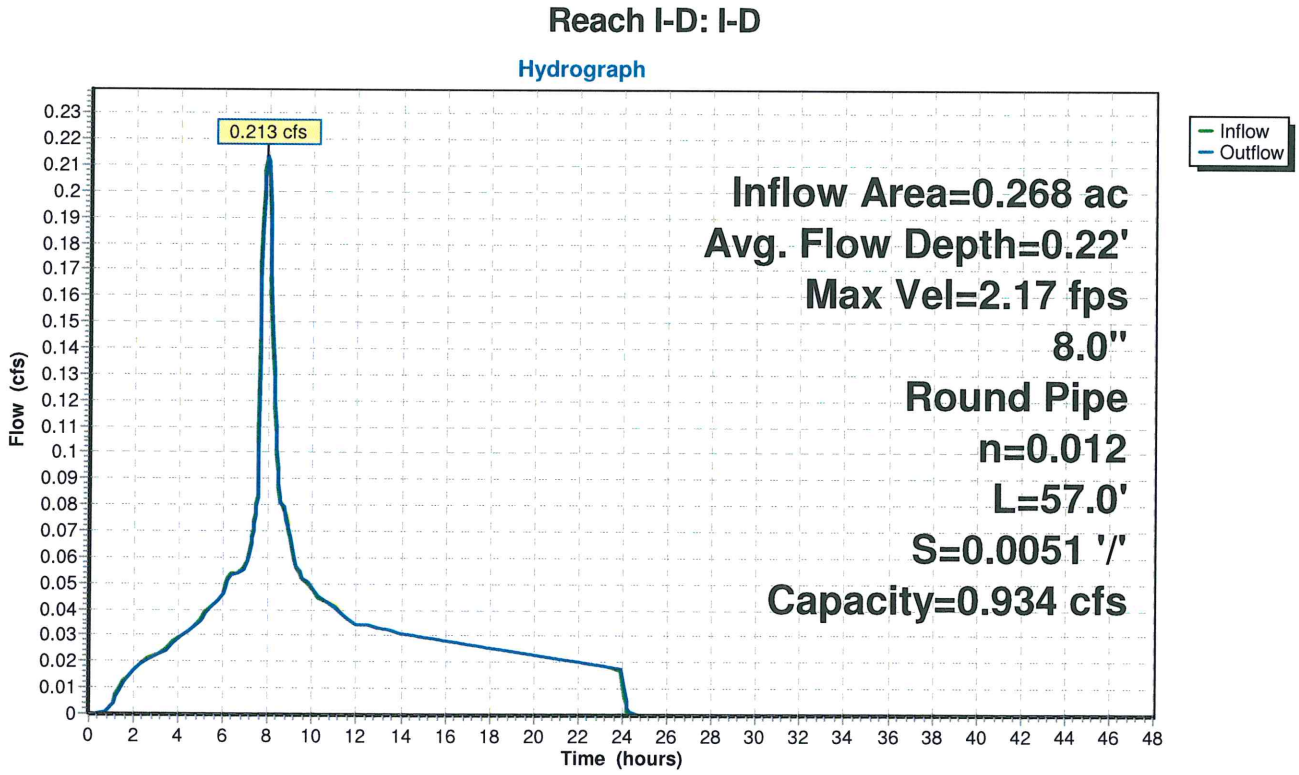


Exhibit C3

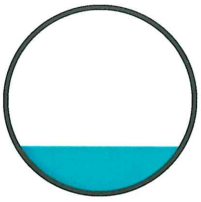
Summary for Reach J-D: J-D

Inflow Area = 0.171 ac,100.00% Impervious, Inflow Depth = 3.17" for 10-yr event
Inflow = 0.136 cfs @ 7.90 hrs, Volume= 0.045 af
Outflow = 0.136 cfs @ 7.91 hrs, Volume= 0.045 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.90 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.06 fps, Avg. Travel Time= 0.8 min

Peak Storage= 3 cf @ 7.90 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.926 cfs

8.0" Round Pipe
n= 0.012
Length= 48.0' Slope= 0.0050 '/'
Inlet Invert= 17.06', Outlet Invert= 16.82'



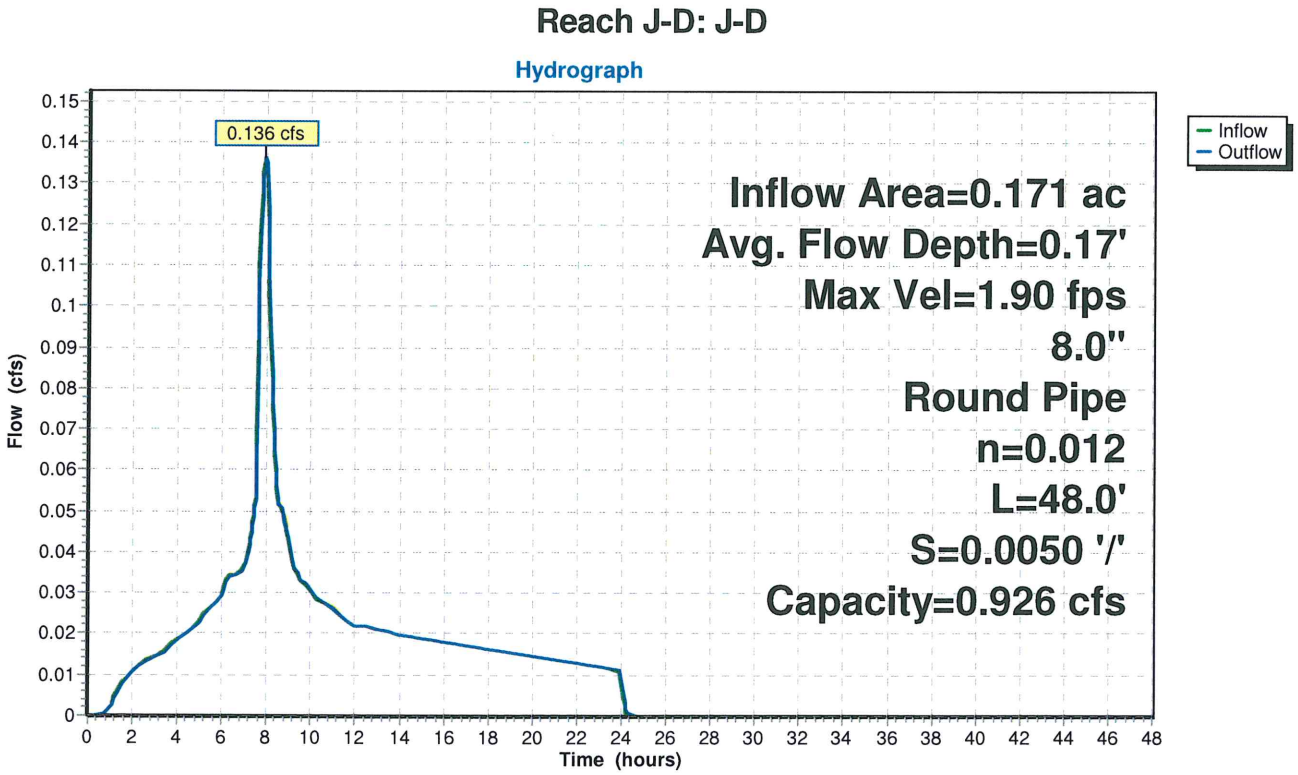


Exhibit C3

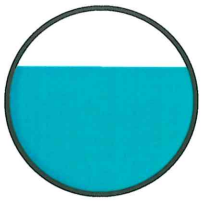
Summary for Reach MH-OUT: MH-OUT

Inflow Area = 4.618 ac,100.00% Impervious, Inflow Depth = 3.17" for 10-yr event
Inflow = 3.639 cfs @ 8.00 hrs, Volume= 1.219 af
Outflow = 3.630 cfs @ 8.02 hrs, Volume= 1.219 af, Atten= 0%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.02 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 2.24 fps, Avg. Travel Time= 1.4 min

Peak Storage= 170 cf @ 8.01 hrs
Average Depth at Peak Storage= 0.86'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 4.420 cfs

15.0" Round Pipe
n= 0.012
Length= 188.0' Slope= 0.0040 '/'
Inlet Invert= 11.61', Outlet Invert= 10.86'



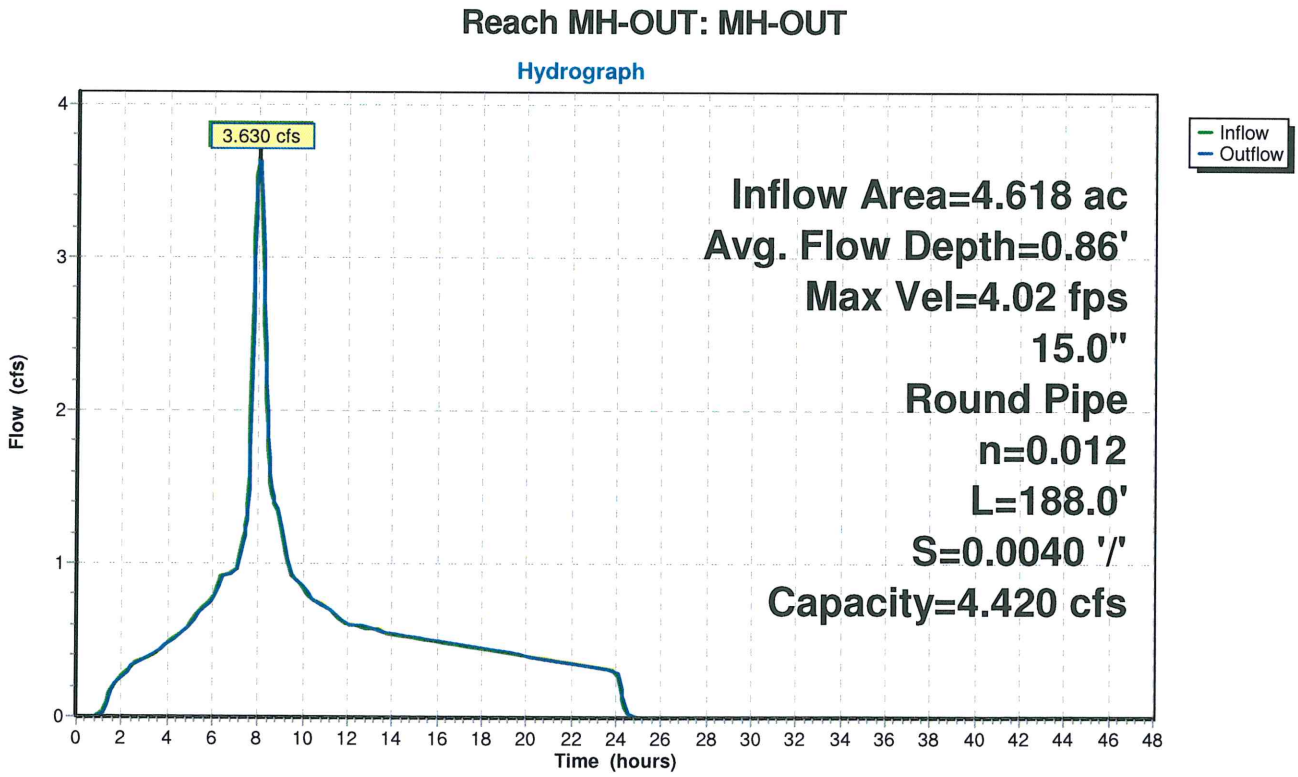


Exhibit C3

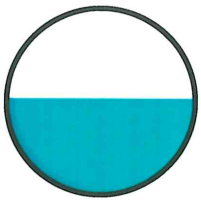
Summary for Reach MH-POND: MH-POND

Inflow Area = 4.473 ac,100.00% Impervious, Inflow Depth = 3.17" for 10-yr event
Inflow = 3.536 cfs @ 7.95 hrs, Volume= 1.180 af
Outflow = 3.535 cfs @ 7.96 hrs, Volume= 1.180 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.45 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.03 fps, Avg. Travel Time= 0.3 min

Peak Storage= 38 cf @ 7.96 hrs
Average Depth at Peak Storage= 0.65'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 6.570 cfs

15.0" Round Pipe
n= 0.012
Length= 59.0' Slope= 0.0088 '/'
Inlet Invert= 16.52', Outlet Invert= 16.00'



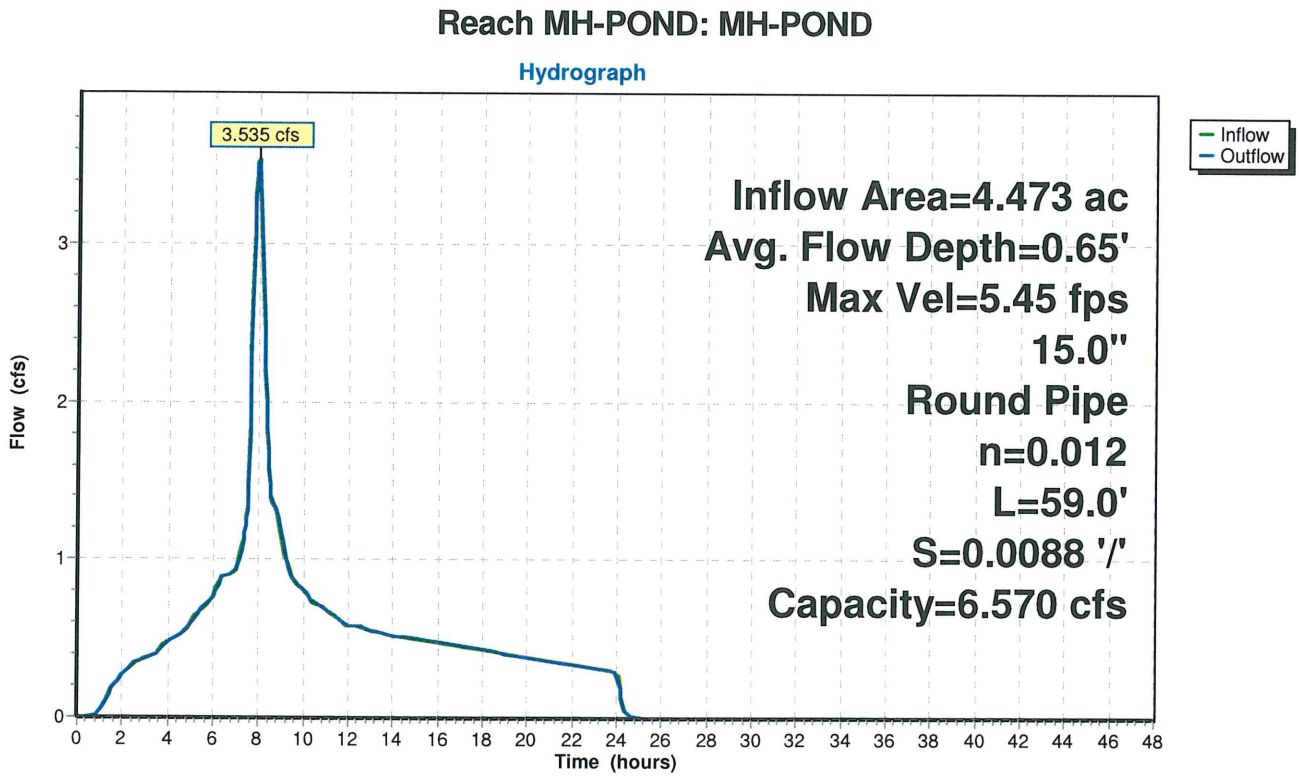


Exhibit C3

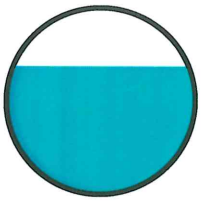
Summary for Reach POND-MH: POND-MH

Inflow Area = 4.618 ac,100.00% Impervious, Inflow Depth = 3.17" for 10-yr event
Inflow = 3.649 cfs @ 7.96 hrs, Volume= 1.219 af
Outflow = 3.639 cfs @ 8.00 hrs, Volume= 1.219 af, Atten= 0%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.03 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 2.26 fps, Avg. Travel Time= 2.8 min

Peak Storage= 347 cf @ 7.98 hrs
Average Depth at Peak Storage= 0.86'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 4.432 cfs

15.0" Round Pipe
n= 0.012
Length= 384.0' Slope= 0.0040 '/'
Inlet Invert= 13.15', Outlet Invert= 11.61'



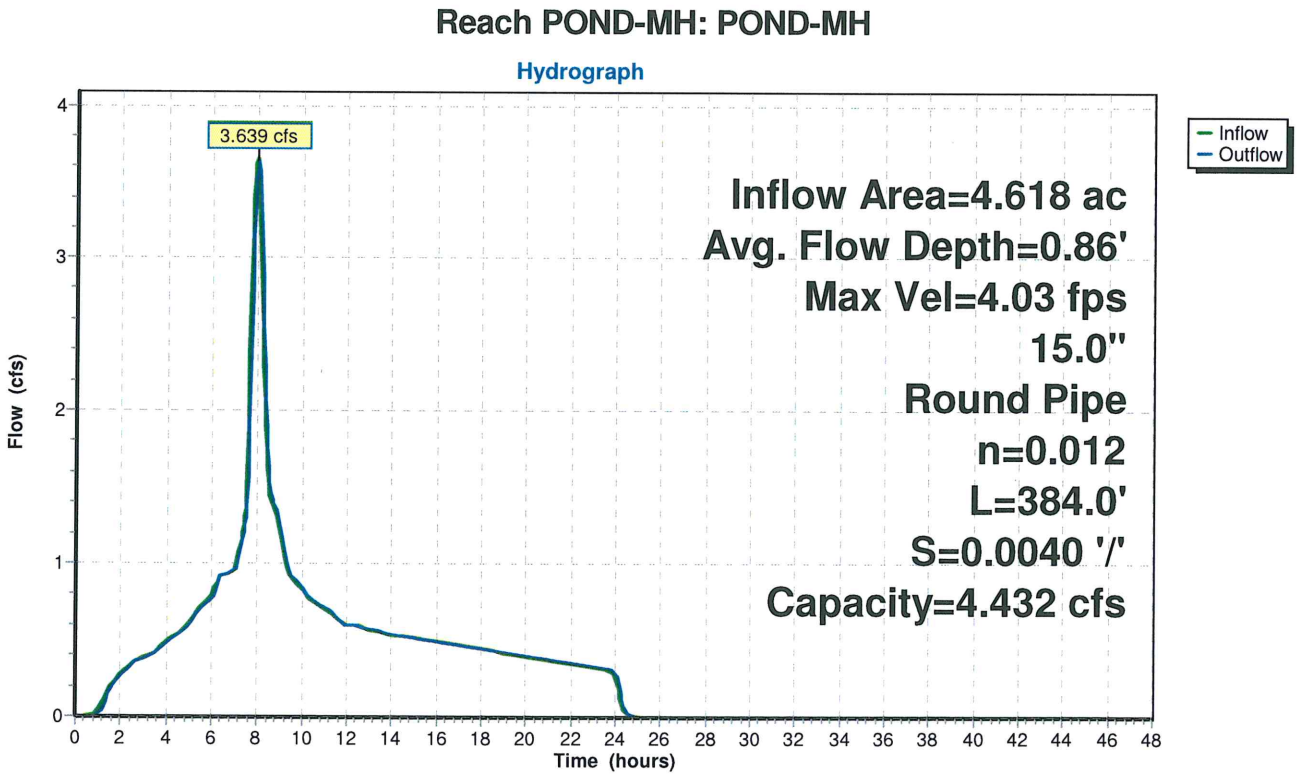


Exhibit C3

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment A: Basin A Runoff Area=23,658 sf 100.00% Impervious Runoff Depth=3.67"
Tc=5.0 min CN=0/98 Runoff=0.498 cfs 0.166 af

Subcatchment B: Basin B Runoff Area=58,057 sf 100.00% Impervious Runoff Depth=3.67"
Tc=5.0 min CN=0/98 Runoff=1.221 cfs 0.407 af

Subcatchment C: Basin C Runoff Area=48,933 sf 100.00% Impervious Runoff Depth=3.67"
Tc=5.0 min CN=0/98 Runoff=1.029 cfs 0.343 af

Subcatchment D: Basin D Runoff Area=6,970 sf 100.00% Impervious Runoff Depth=3.67"
Tc=5.0 min CN=0/98 Runoff=0.147 cfs 0.049 af

Subcatchment E: Basin E Runoff Area=7,734 sf 100.00% Impervious Runoff Depth=3.67"
Tc=5.0 min CN=0/98 Runoff=0.163 cfs 0.054 af

Subcatchment F: Basin F Runoff Area=10,016 sf 100.00% Impervious Runoff Depth=3.67"
Tc=5.0 min CN=0/98 Runoff=0.211 cfs 0.070 af

Subcatchment G: Basin G Runoff Area=10,712 sf 100.00% Impervious Runoff Depth=3.67"
Tc=5.0 min CN=0/98 Runoff=0.225 cfs 0.075 af

Subcatchment H: Basin H Runoff Area=9,614 sf 100.00% Impervious Runoff Depth=3.67"
Tc=5.0 min CN=0/98 Runoff=0.202 cfs 0.067 af

Subcatchment I: Basin I Runoff Area=11,688 sf 100.00% Impervious Runoff Depth=3.67"
Tc=5.0 min CN=0/98 Runoff=0.246 cfs 0.082 af

Subcatchment J: Basin J Runoff Area=7,460 sf 100.00% Impervious Runoff Depth=3.67"
Tc=5.0 min CN=0/98 Runoff=0.157 cfs 0.052 af

Subcatchment K: Basin K Runoff Area=6,338 sf 100.00% Impervious Runoff Depth=3.67"
Tc=5.0 min CN=0/98 Runoff=0.133 cfs 0.044 af

Reach A-B: A-B Avg. Flow Depth=0.43' Max Vel=2.10 fps Inflow=0.498 cfs 0.166 af
8.0" Round Pipe n=0.012 L=169.0' S=0.0026 '/' Capacity=0.668 cfs Outflow=0.496 cfs 0.166 af

Reach B-C: B-C Avg. Flow Depth=0.72' Max Vel=2.83 fps Inflow=1.716 cfs 0.573 af
12.0" Round Pipe n=0.012 L=260.0' S=0.0026 '/' Capacity=1.974 cfs Outflow=1.711 cfs 0.573 af

Reach C-MH: C-MH Avg. Flow Depth=0.38' Max Vel=2.52 fps Inflow=2.735 cfs 0.916 af
142.0" Round Pipe n=0.012 L=142.0' S=0.0025 '/' Capacity=1,413.124 cfs Outflow=2.730 cfs 0.916 af

Reach D-MH: D-MH Avg. Flow Depth=0.50' Max Vel=3.44 fps Inflow=1.347 cfs 0.450 af
12.0" Round Pipe n=0.012 L=61.0' S=0.0049 '/' Capacity=2.707 cfs Outflow=1.346 cfs 0.450 af

Reach E-D: E-D Avg. Flow Depth=0.37' Max Vel=3.03 fps Inflow=0.799 cfs 0.267 af
12.0" Round Pipe n=0.012 L=87.0' S=0.0051 '/' Capacity=2.745 cfs Outflow=0.798 cfs 0.267 af

Exhibit C3

Reach F-E: F-E Avg. Flow Depth=0.32' Max Vel=2.60 fps Inflow=0.435 cfs 0.145 af
8.0" Round Pipe n=0.012 L=79.0' S=0.0049 '/' Capacity=0.920 cfs Outflow=0.435 cfs 0.145 af

Reach G-F: G-F Avg. Flow Depth=0.22' Max Vel=2.19 fps Inflow=0.225 cfs 0.075 af
8.0" Round Pipe n=0.012 L=145.0' S=0.0050 '/' Capacity=0.929 cfs Outflow=0.225 cfs 0.075 af

Reach H-E: H-E Avg. Flow Depth=0.21' Max Vel=2.12 fps Inflow=0.202 cfs 0.067 af
8.0" Round Pipe n=0.012 L=72.0' S=0.0050 '/' Capacity=0.926 cfs Outflow=0.202 cfs 0.067 af

Reach I-D: I-D Avg. Flow Depth=0.23' Max Vel=2.26 fps Inflow=0.246 cfs 0.082 af
8.0" Round Pipe n=0.012 L=57.0' S=0.0051 '/' Capacity=0.934 cfs Outflow=0.246 cfs 0.082 af

Reach J-D: J-D Avg. Flow Depth=0.19' Max Vel=1.98 fps Inflow=0.157 cfs 0.052 af
8.0" Round Pipe n=0.012 L=48.0' S=0.0050 '/' Capacity=0.926 cfs Outflow=0.157 cfs 0.052 af

Reach MH-OUT: MH-OUT Avg. Flow Depth=0.97' Max Vel=4.10 fps Inflow=4.192 cfs 1.411 af
15.0" Round Pipe n=0.012 L=188.0' S=0.0040 '/' Capacity=4.420 cfs Outflow=4.182 cfs 1.411 af

Reach MH-POND: MH-POND Avg. Flow Depth=0.71' Max Vel=5.64 fps Inflow=4.074 cfs 1.366 af
15.0" Round Pipe n=0.012 L=59.0' S=0.0088 '/' Capacity=6.570 cfs Outflow=4.072 cfs 1.366 af

Reach POND-MH: POND-MH Avg. Flow Depth=0.97' Max Vel=4.11 fps Inflow=4.205 cfs 1.411 af
15.0" Round Pipe n=0.012 L=384.0' S=0.0040 '/' Capacity=4.432 cfs Outflow=4.192 cfs 1.411 af

Total Runoff Area = 4.618 ac Runoff Volume = 1.411 af Average Runoff Depth = 3.67"
0.00% Pervious = 0.000 ac 100.00% Impervious = 4.618 ac

Exhibit C3

Summary for Subcatchment A: Basin A

Runoff = 0.498 cfs @ 7.90 hrs, Volume= 0.166 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-yr Rainfall=3.90"

	Area (sf)	CN	Description
*	23,658	98	Impervious
	23,658	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment A: Basin A

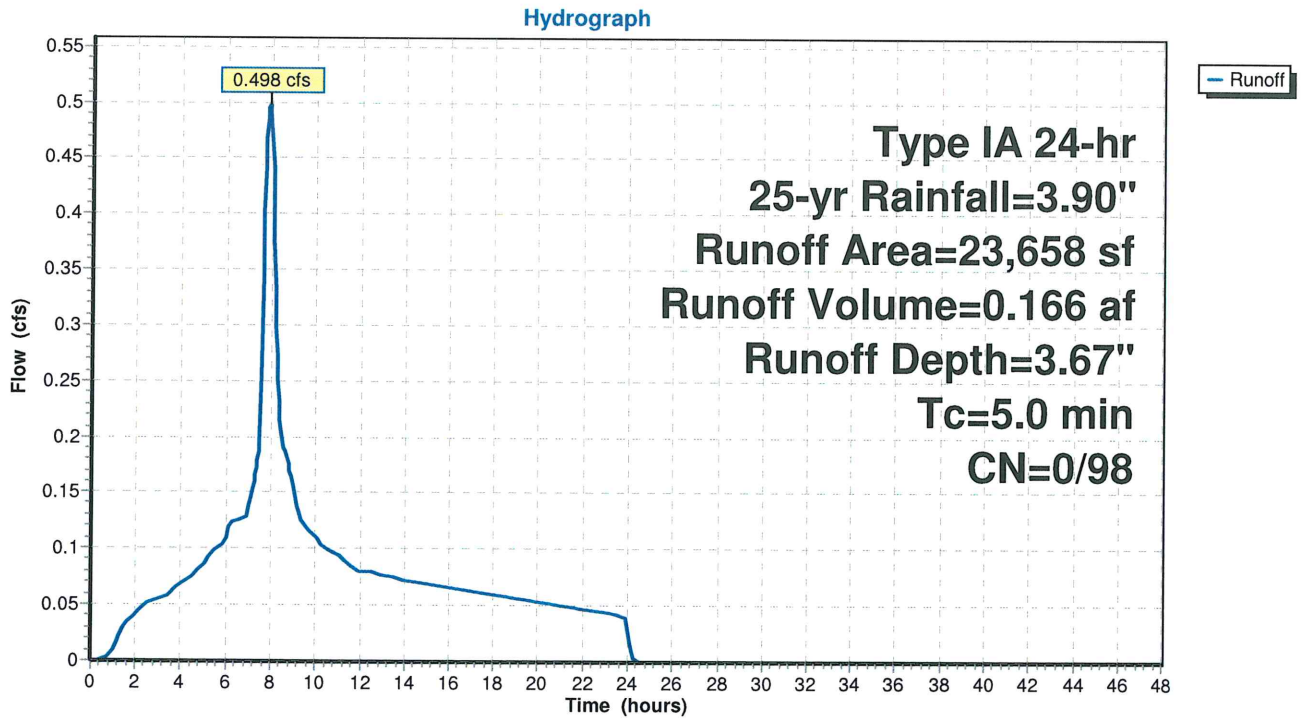


Exhibit C3

Summary for Subcatchment B: Basin B

Runoff = 1.221 cfs @ 7.90 hrs, Volume= 0.407 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-yr Rainfall=3.90"

	Area (sf)	CN	Description
*	58,057	98	Impervious
	58,057	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment B: Basin B

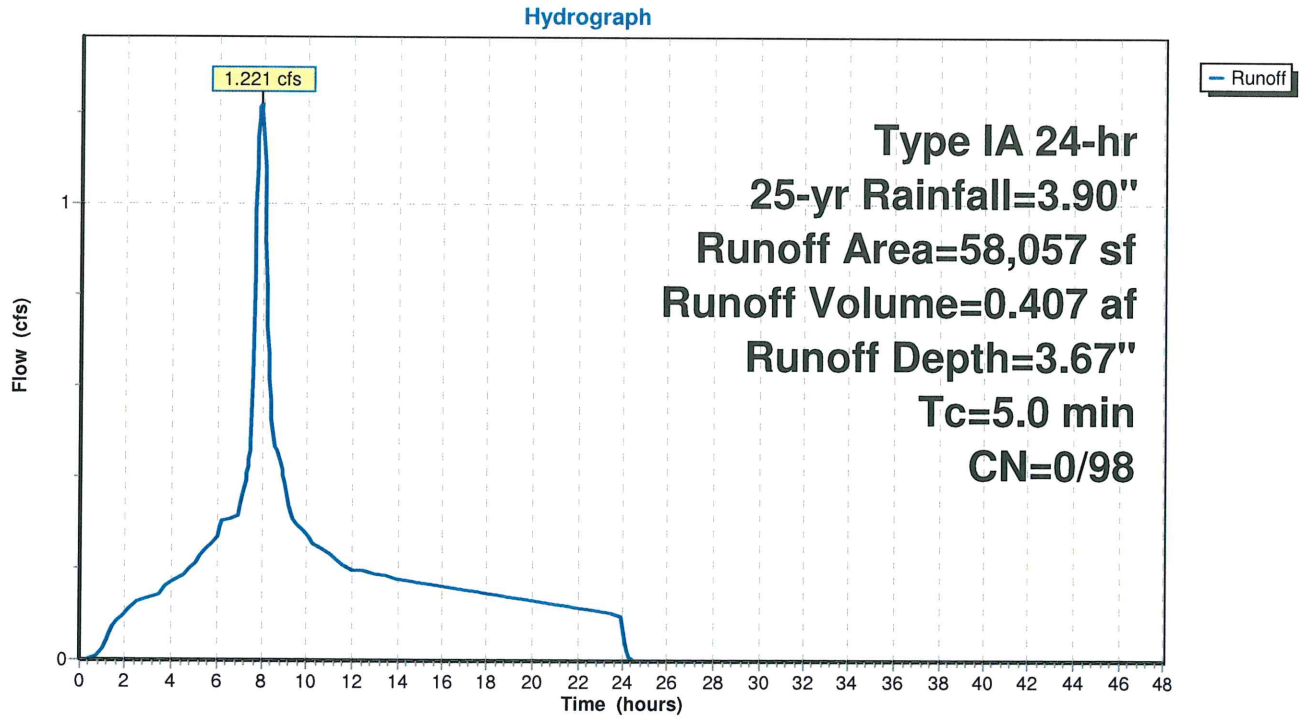


Exhibit C3

Summary for Subcatchment C: Basin C

Runoff = 1.029 cfs @ 7.90 hrs, Volume= 0.343 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-yr Rainfall=3.90"

	Area (sf)	CN	Description
*	48,933	98	Impervious
	48,933	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment C: Basin C

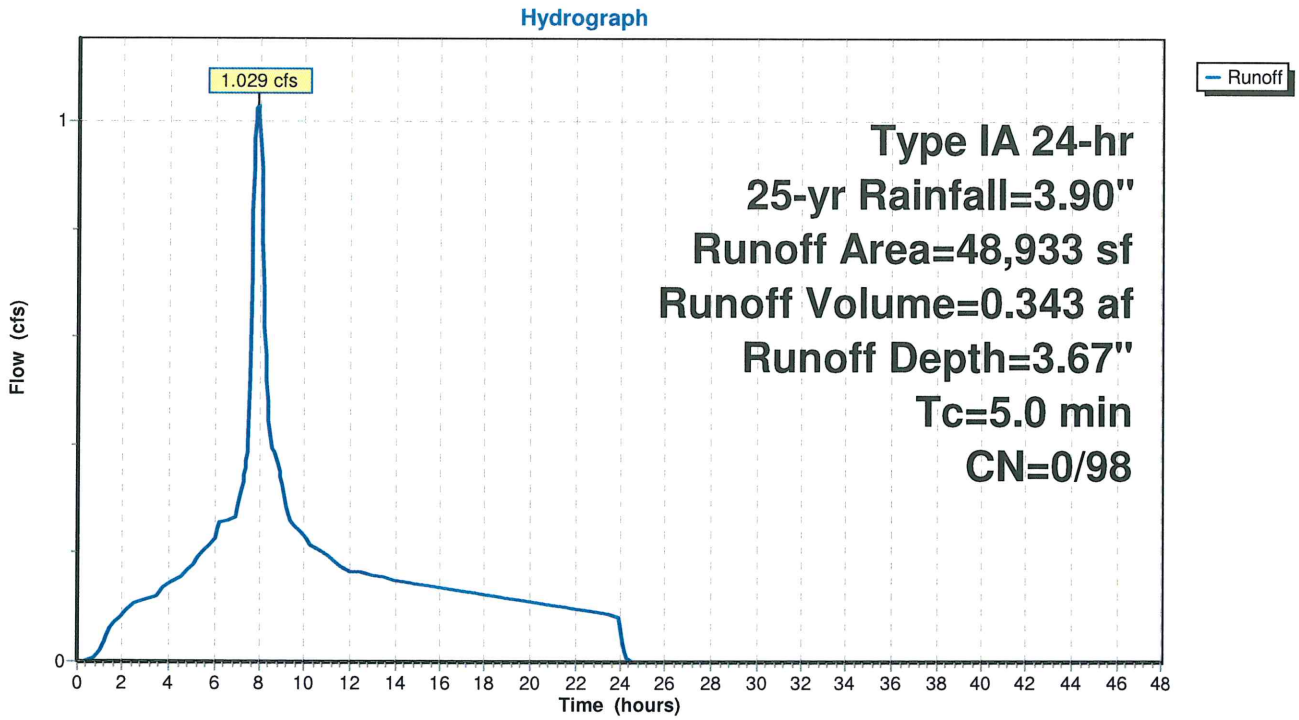


Exhibit C3

Summary for Subcatchment D: Basin D

Runoff = 0.147 cfs @ 7.90 hrs, Volume= 0.049 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-yr Rainfall=3.90"

	Area (sf)	CN	Description
*	6,970	98	Impervious
	6,970	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment D: Basin D

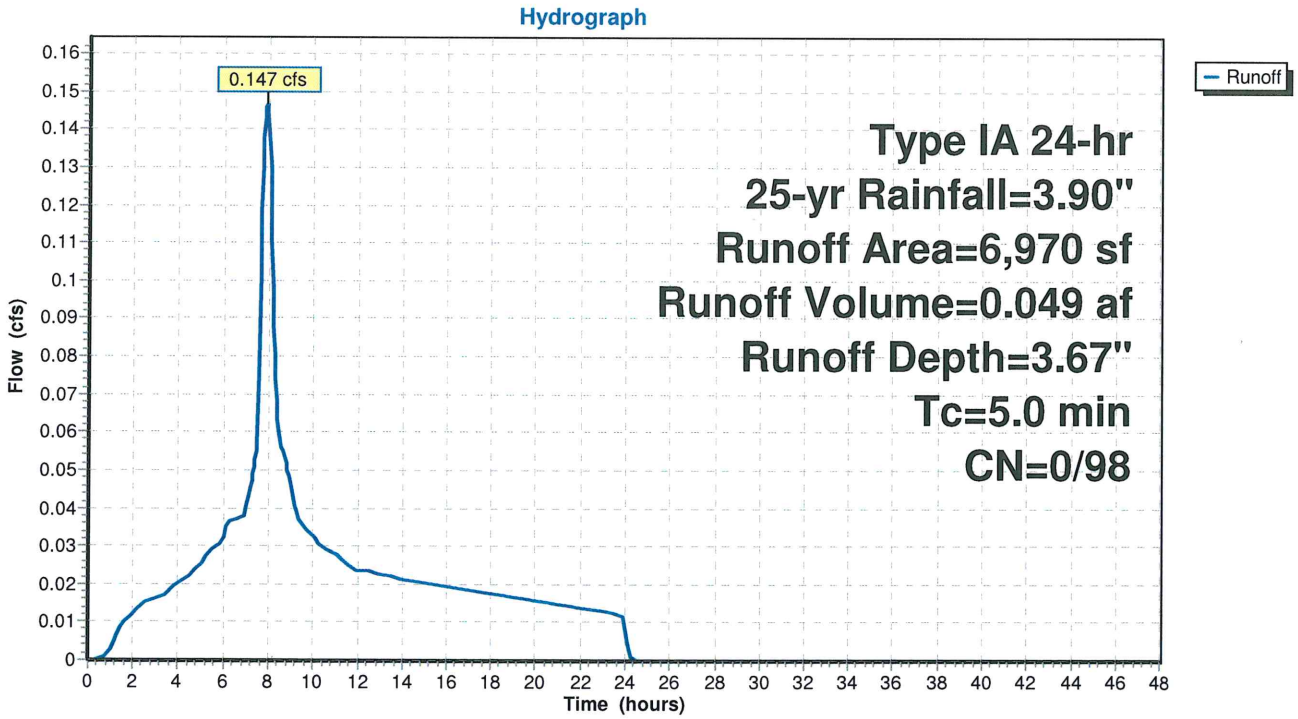


Exhibit C3

Summary for Subcatchment E: Basin E

Runoff = 0.163 cfs @ 7.90 hrs, Volume= 0.054 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-yr Rainfall=3.90"

	Area (sf)	CN	Description
*	7,734	98	Impervious
	7,734	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment E: Basin E

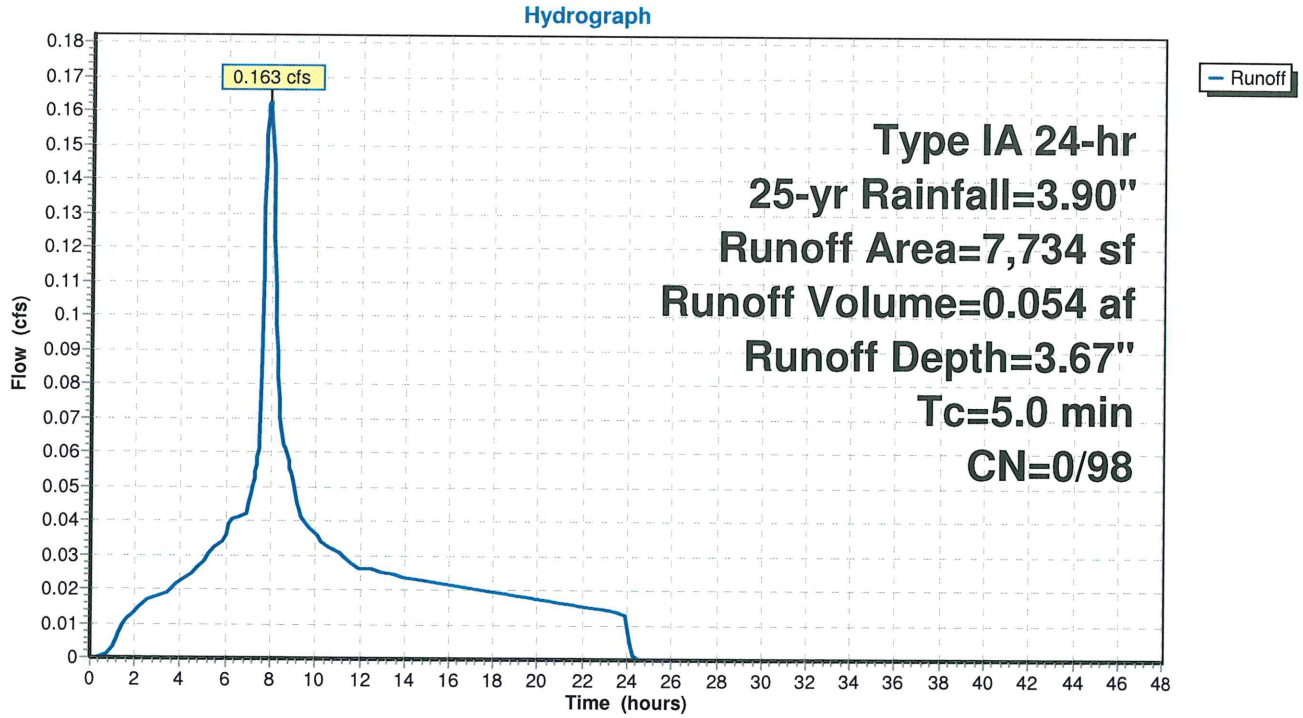


Exhibit C3

Summary for Subcatchment F: Basin F

Runoff = 0.211 cfs @ 7.90 hrs, Volume= 0.070 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-yr Rainfall=3.90"

	Area (sf)	CN	Description
*	10,016	98	Impervious
	10,016	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment F: Basin F

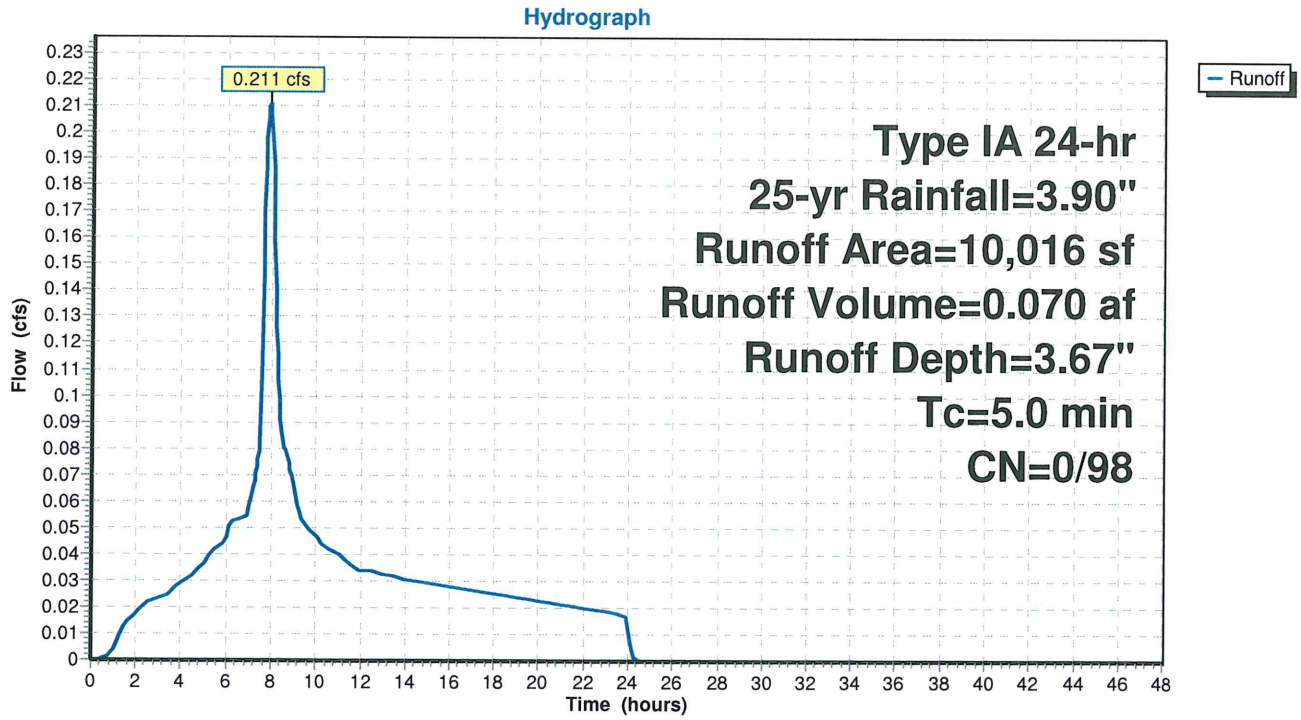


Exhibit C3

Summary for Subcatchment G: Basin G

Runoff = 0.225 cfs @ 7.90 hrs, Volume= 0.075 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-yr Rainfall=3.90"

	Area (sf)	CN	Description
*	10,712	98	Impervious
	10,712	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment G: Basin G

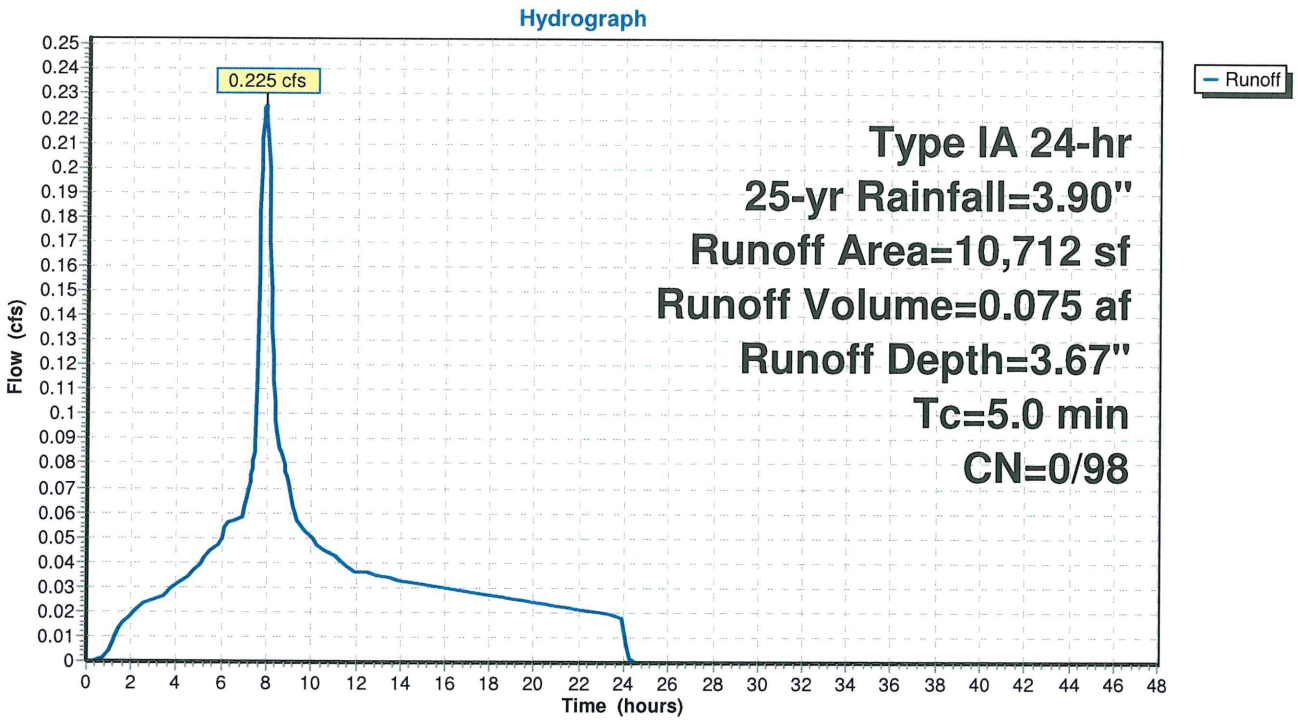


Exhibit C3

Summary for Subcatchment H: Basin H

Runoff = 0.202 cfs @ 7.90 hrs, Volume= 0.067 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-yr Rainfall=3.90"

	Area (sf)	CN	Description
*	9,614	98	Impervious
	9,614	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment H: Basin H

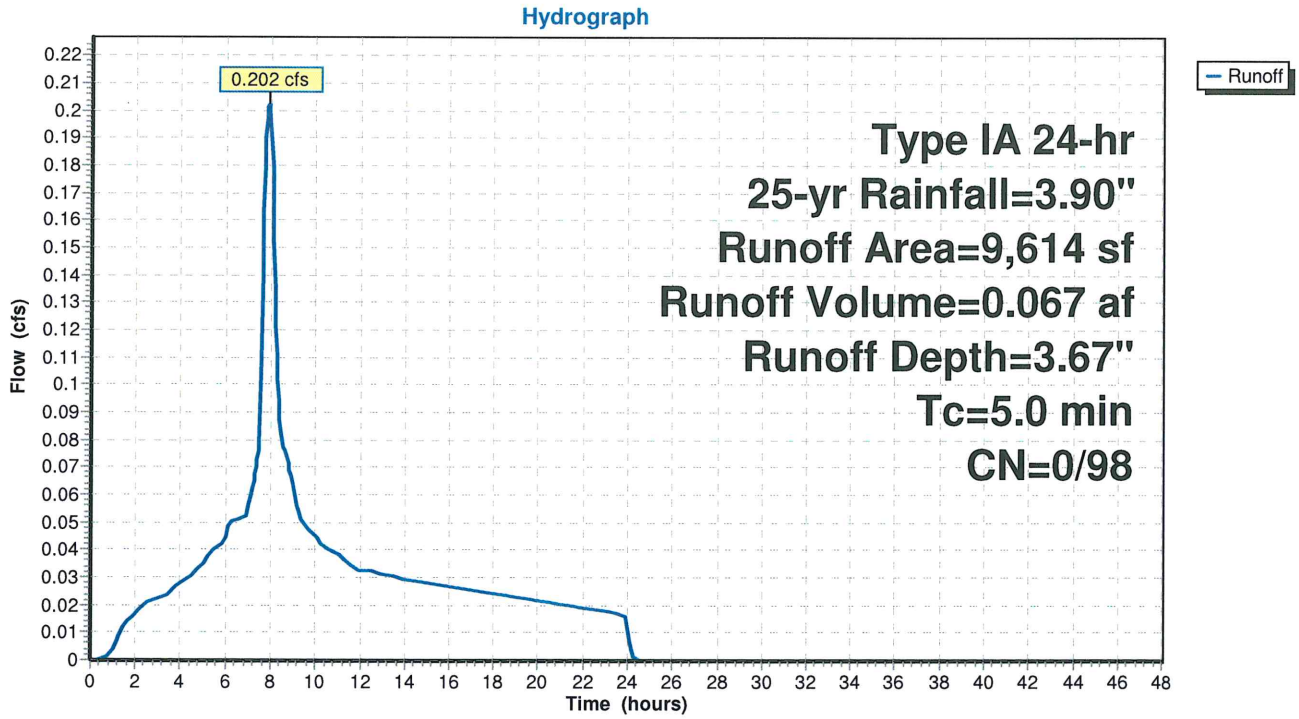


Exhibit C3

Summary for Subcatchment I: Basin I

Runoff = 0.246 cfs @ 7.90 hrs, Volume= 0.082 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-yr Rainfall=3.90"

	Area (sf)	CN	Description
*	11,688	98	Impervious
	11,688	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment I: Basin I

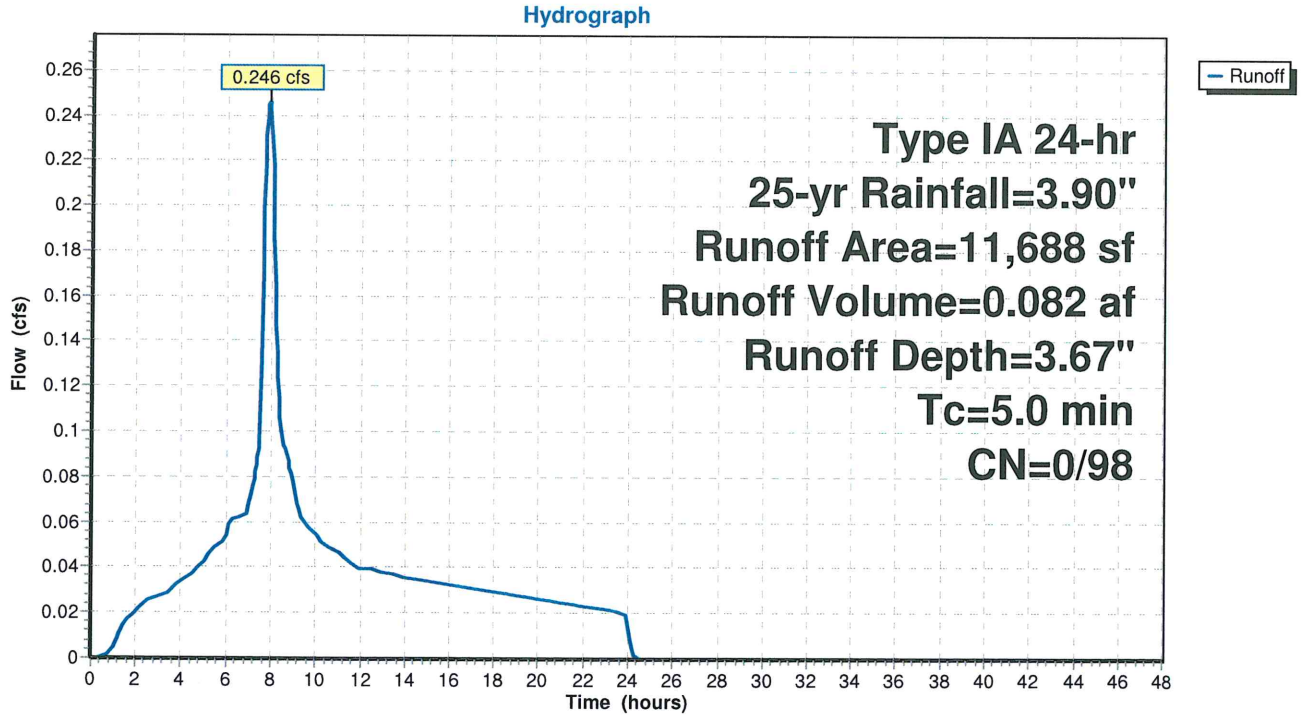


Exhibit C3

Summary for Subcatchment J: Basin J

Runoff = 0.157 cfs @ 7.90 hrs, Volume= 0.052 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-yr Rainfall=3.90"

	Area (sf)	CN	Description
*	7,460	98	Impervious
	7,460	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment J: Basin J

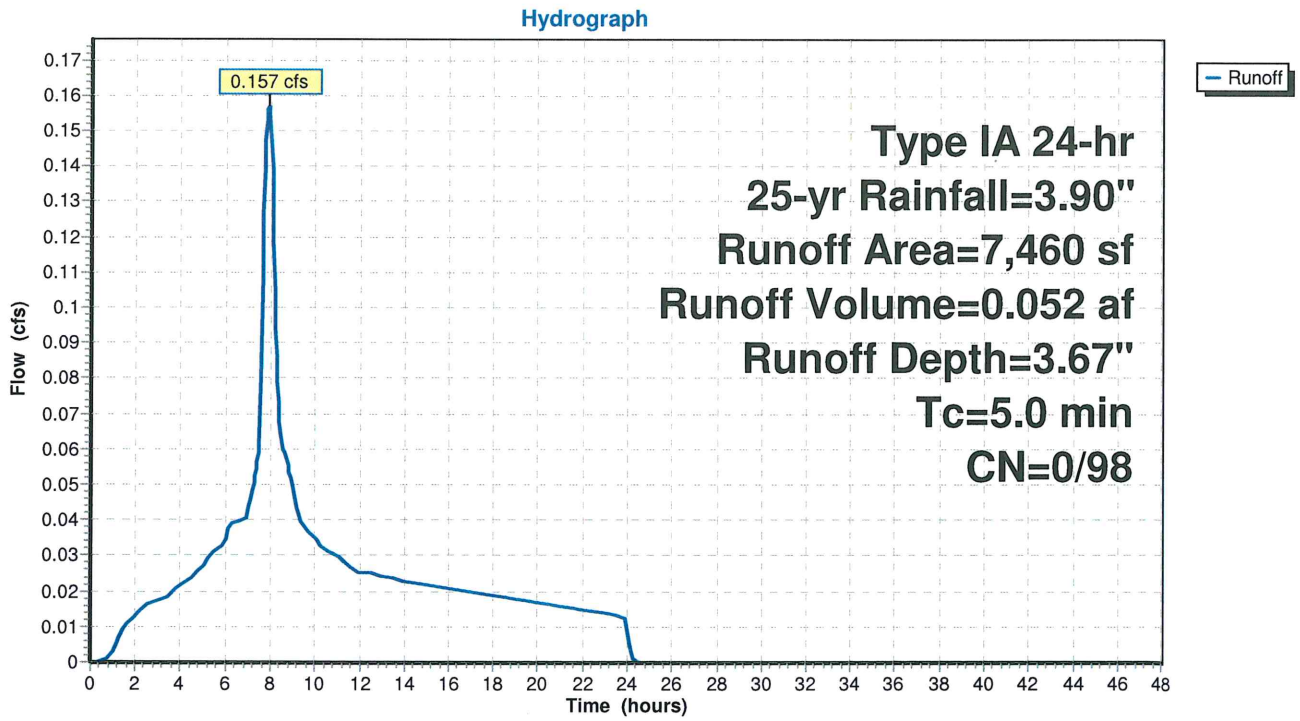


Exhibit C3

Summary for Subcatchment K: Basin K

Runoff = 0.133 cfs @ 7.90 hrs, Volume= 0.044 af, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-yr Rainfall=3.90"

	Area (sf)	CN	Description
*	6,338	98	Impervious
	6,338	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum Tc**

Subcatchment K: Basin K

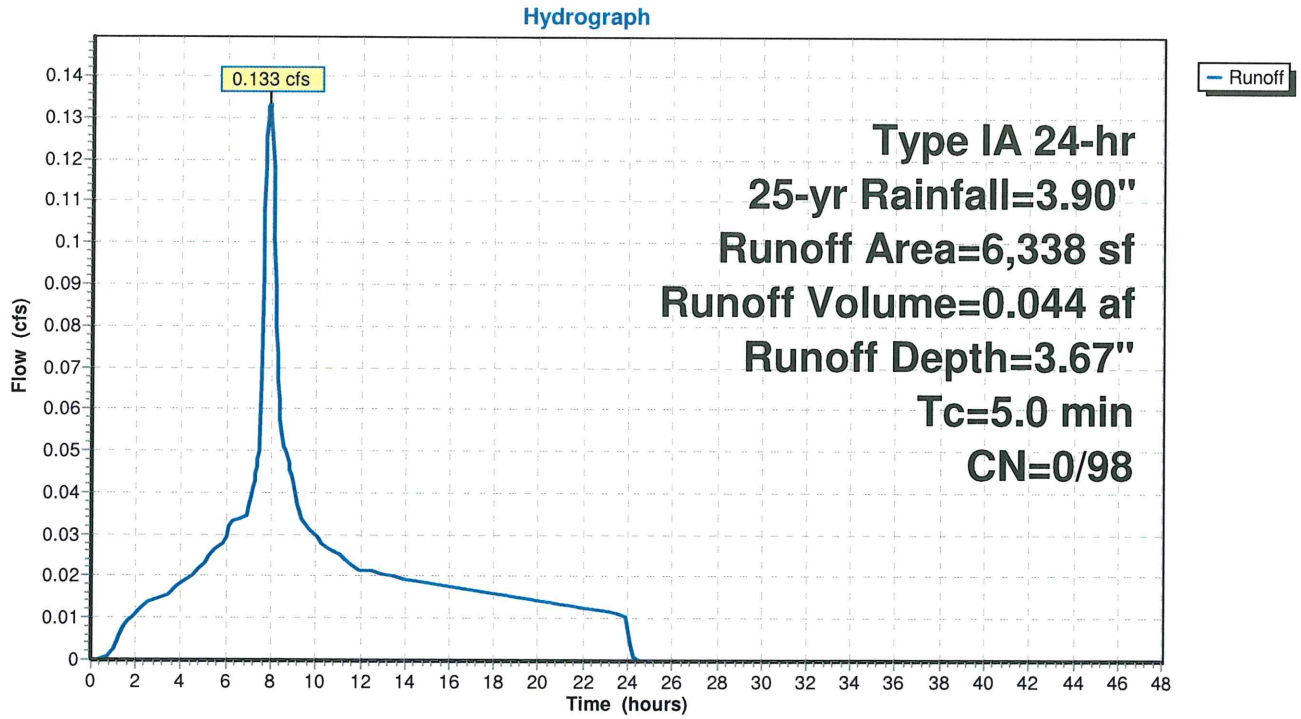


Exhibit C3

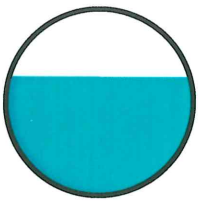
Summary for Reach A-B: A-B

Inflow Area = 0.543 ac,100.00% Impervious, Inflow Depth = 3.67" for 25-yr event
Inflow = 0.498 cfs @ 7.90 hrs, Volume= 0.166 af
Outflow = 0.496 cfs @ 7.94 hrs, Volume= 0.166 af, Atten= 0%, Lag= 2.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.10 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.21 fps, Avg. Travel Time= 2.3 min

Peak Storage= 40 cf @ 7.91 hrs
Average Depth at Peak Storage= 0.43'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.668 cfs

8.0" Round Pipe
n= 0.012
Length= 169.0' Slope= 0.0026 '/'
Inlet Invert= 18.00', Outlet Invert= 17.56'



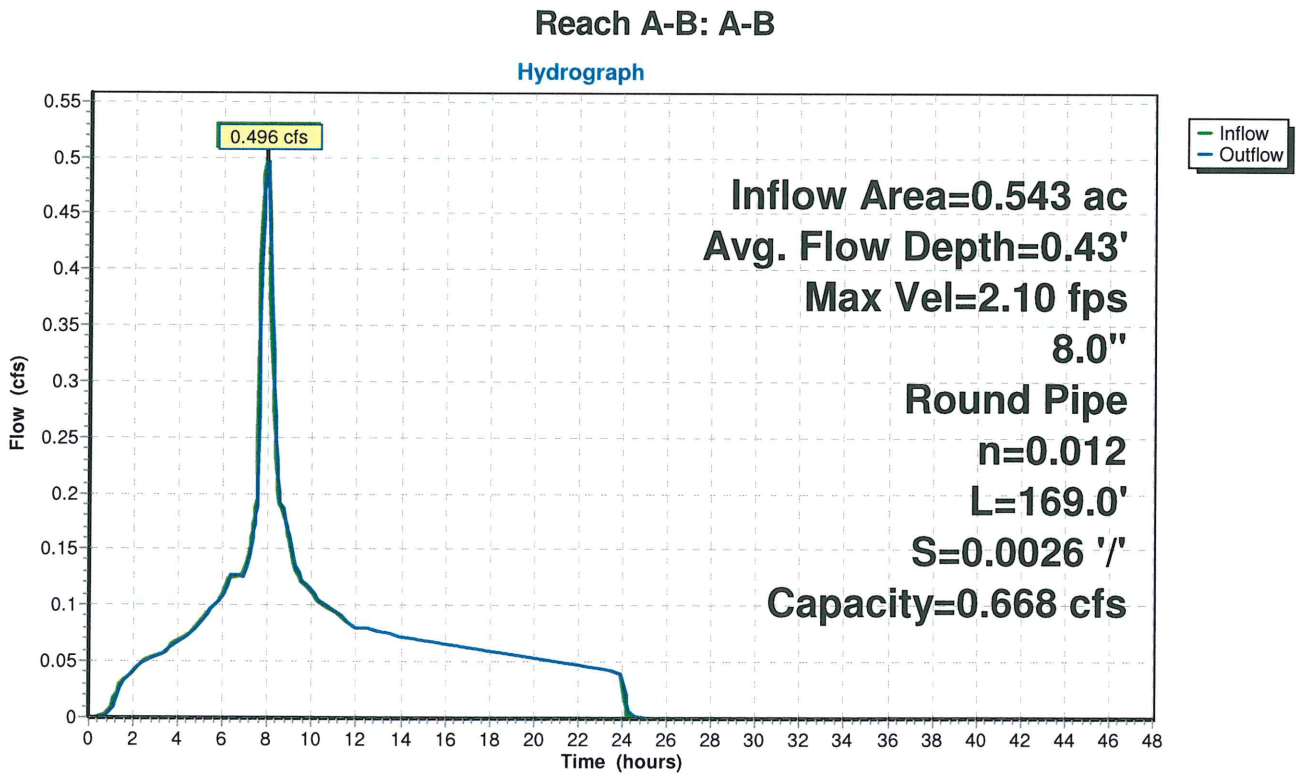


Exhibit C3

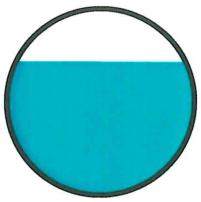
Summary for Reach B-C: B-C

Inflow Area = 1.876 ac,100.00% Impervious, Inflow Depth = 3.67" for 25-yr event
Inflow = 1.716 cfs @ 7.91 hrs, Volume= 0.573 af
Outflow = 1.711 cfs @ 7.96 hrs, Volume= 0.573 af, Atten= 0%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.83 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 1.62 fps, Avg. Travel Time= 2.7 min

Peak Storage= 157 cf @ 7.93 hrs
Average Depth at Peak Storage= 0.72'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 1.974 cfs

12.0" Round Pipe
n= 0.012
Length= 260.0' Slope= 0.0026 '/'
Inlet Invert= 17.56', Outlet Invert= 16.88'



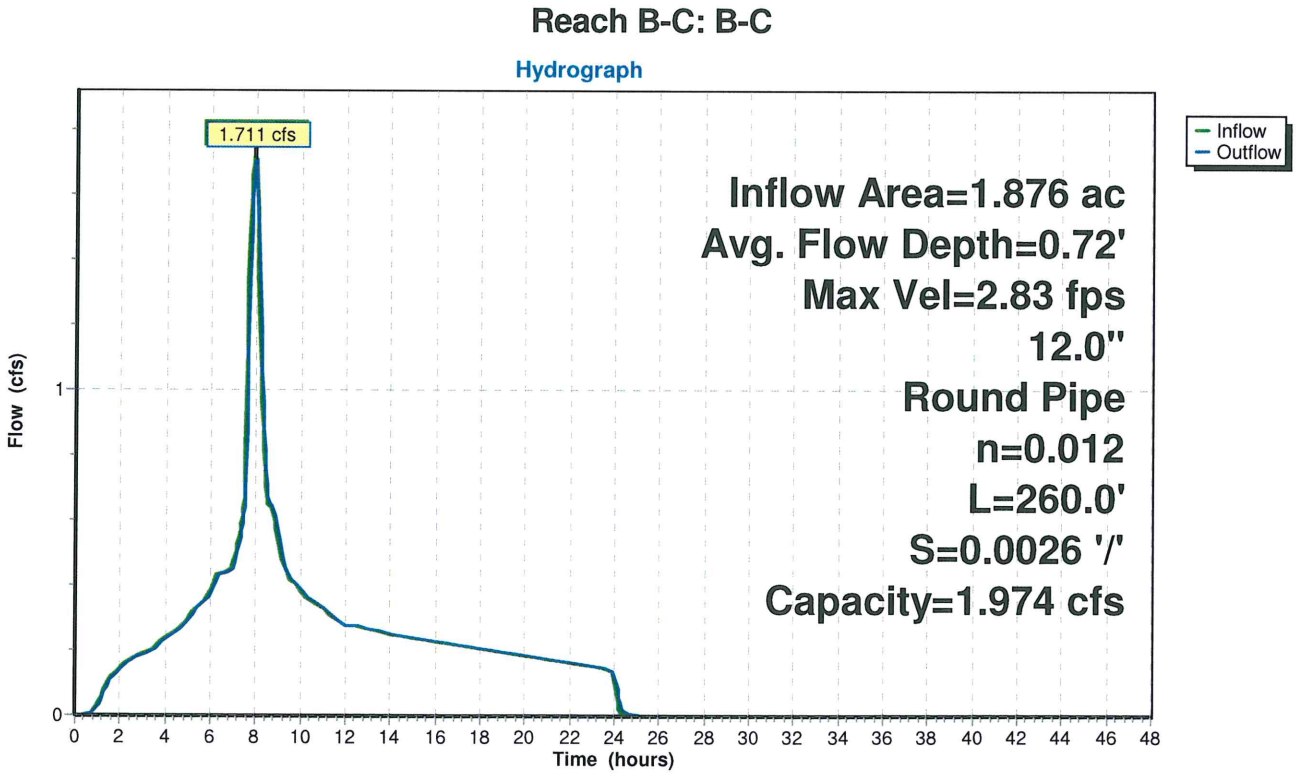


Exhibit C3

Summary for Reach C-MH: C-MH

Inflow Area = 2.999 ac,100.00% Impervious, Inflow Depth = 3.67" for 25-yr event
Inflow = 2.735 cfs @ 7.93 hrs, Volume= 0.916 af
Outflow = 2.730 cfs @ 7.96 hrs, Volume= 0.916 af, Atten= 0%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.52 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.45 fps, Avg. Travel Time= 1.6 min

Peak Storage= 154 cf @ 7.94 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 11.83' Flow Area= 110.0 sf, Capacity= 1,413.124 cfs

142.0" Round Pipe
n= 0.012
Length= 142.0' Slope= 0.0025 '/'
Inlet Invert= 16.88', Outlet Invert= 16.52'

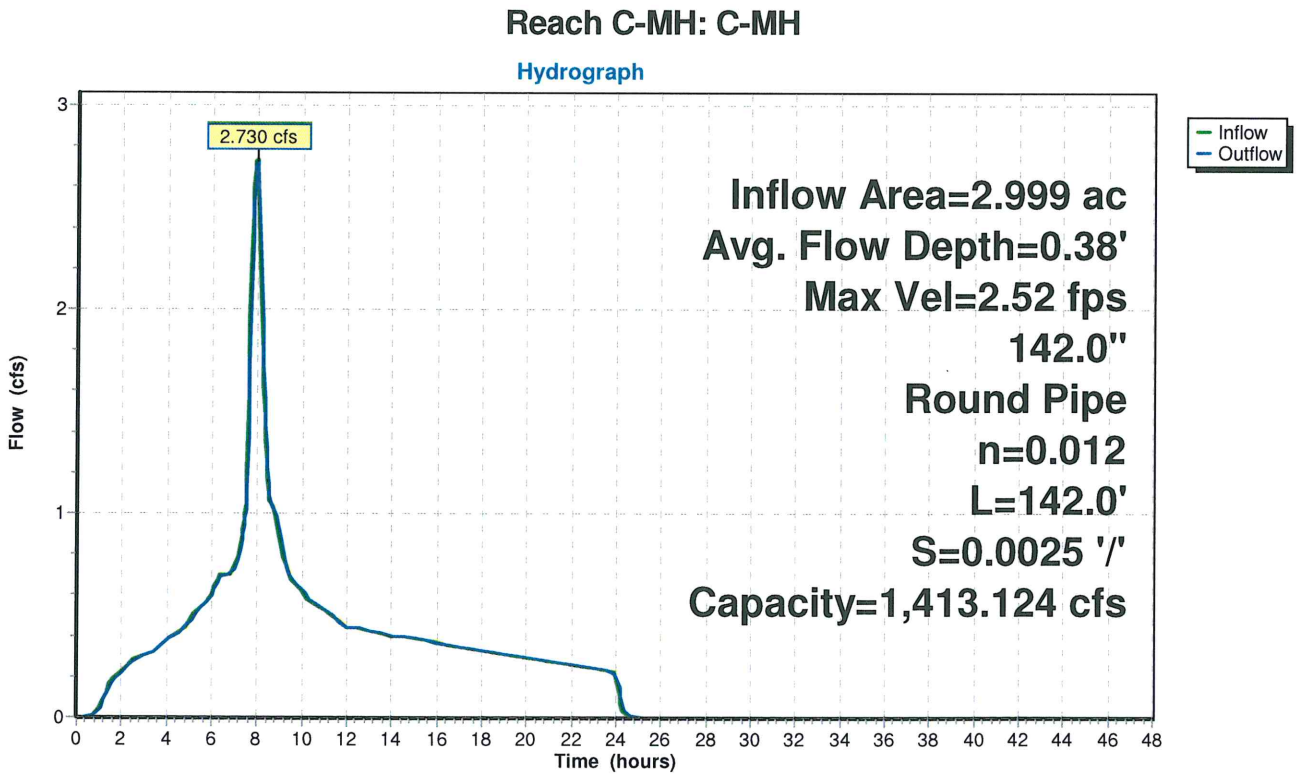


Exhibit C3

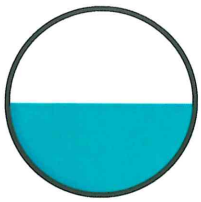
Summary for Reach D-MH: D-MH

Inflow Area = 1.474 ac,100.00% Impervious, Inflow Depth = 3.67" for 25-yr event
Inflow = 1.347 cfs @ 7.92 hrs, Volume= 0.450 af
Outflow = 1.346 cfs @ 7.93 hrs, Volume= 0.450 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.44 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.95 fps, Avg. Travel Time= 0.5 min

Peak Storage= 24 cf @ 7.92 hrs
Average Depth at Peak Storage= 0.50'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.707 cfs

12.0" Round Pipe
n= 0.012
Length= 61.0' Slope= 0.0049 '/'
Inlet Invert= 16.82', Outlet Invert= 16.52'



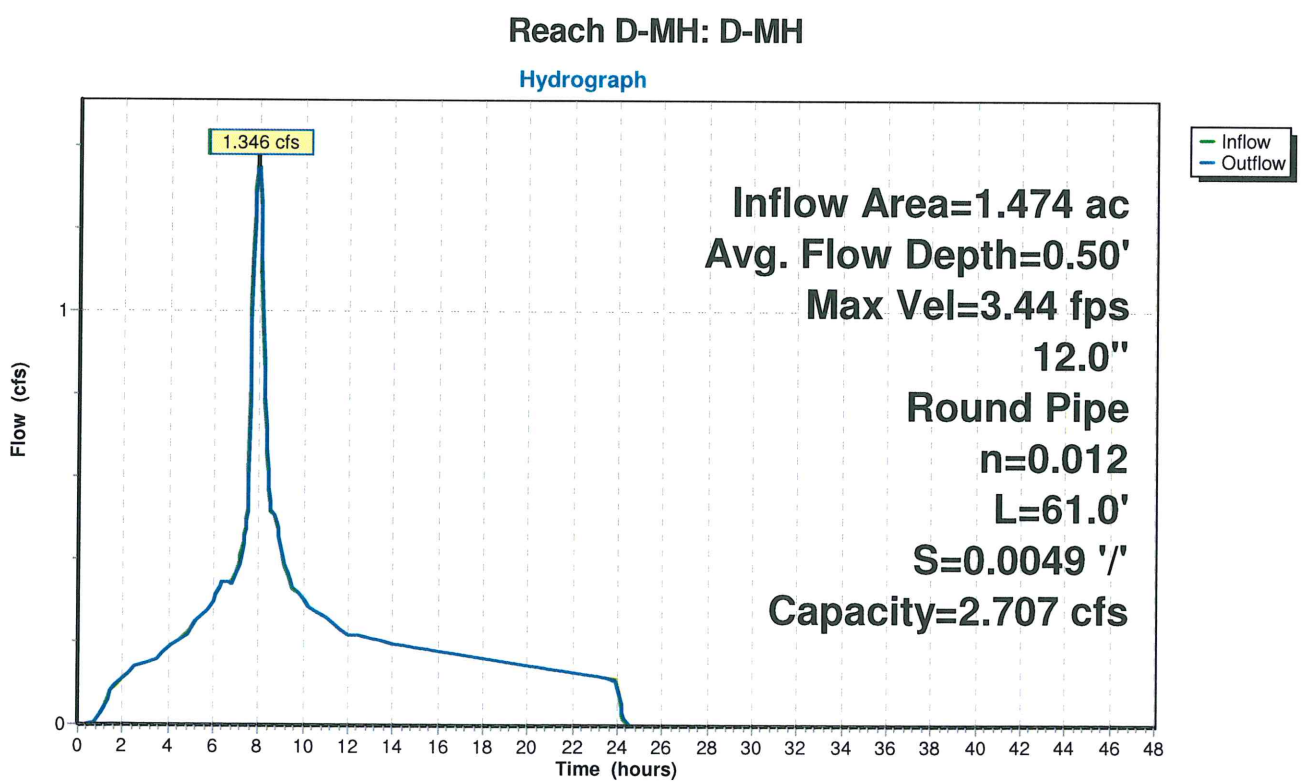


Exhibit C3

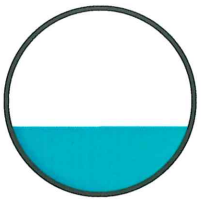
Summary for Reach E-D: E-D

Inflow Area = 0.874 ac,100.00% Impervious, Inflow Depth = 3.67" for 25-yr event
Inflow = 0.799 cfs @ 7.92 hrs, Volume= 0.267 af
Outflow = 0.798 cfs @ 7.93 hrs, Volume= 0.267 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.03 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.69 fps, Avg. Travel Time= 0.9 min

Peak Storage= 23 cf @ 7.92 hrs
Average Depth at Peak Storage= 0.37'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.745 cfs

12.0" Round Pipe
n= 0.012
Length= 87.0' Slope= 0.0051 '/'
Inlet Invert= 17.26', Outlet Invert= 16.82'



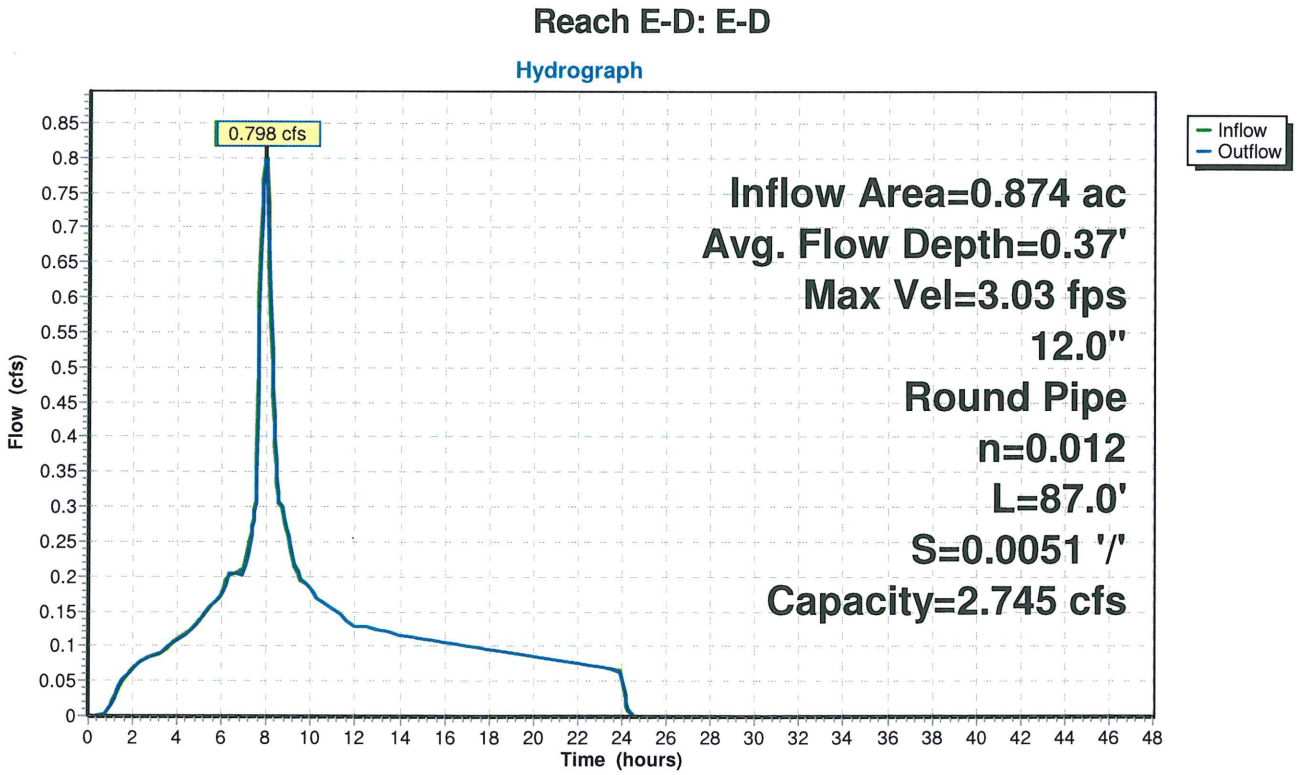


Exhibit C3

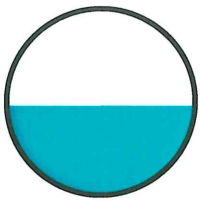
Summary for Reach F-E: F-E

Inflow Area = 0.476 ac,100.00% Impervious, Inflow Depth = 3.67" for 25-yr event
Inflow = 0.435 cfs @ 7.91 hrs, Volume= 0.145 af
Outflow = 0.435 cfs @ 7.93 hrs, Volume= 0.145 af, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.60 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.47 fps, Avg. Travel Time= 0.9 min

Peak Storage= 13 cf @ 7.92 hrs
Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.920 cfs

8.0" Round Pipe
n= 0.012
Length= 79.0' Slope= 0.0049 '/'
Inlet Invert= 17.65', Outlet Invert= 17.26'



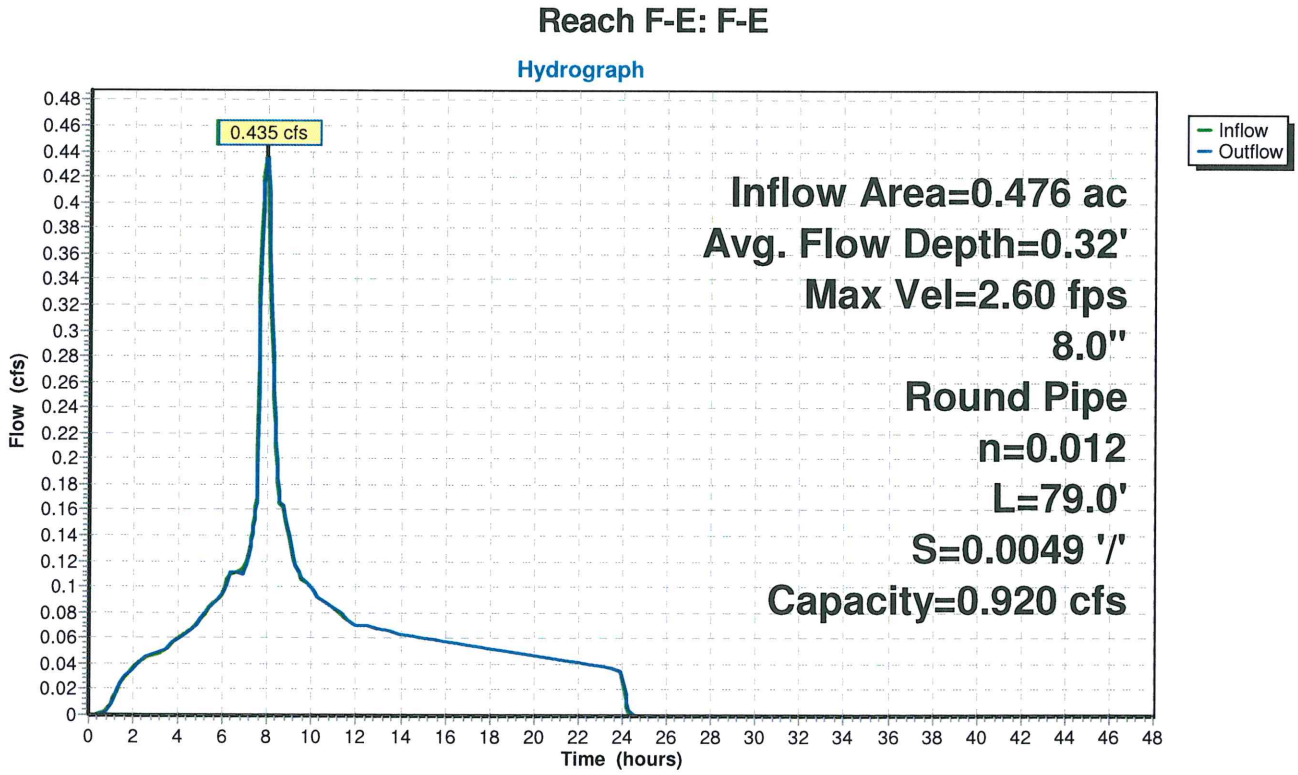


Exhibit C3

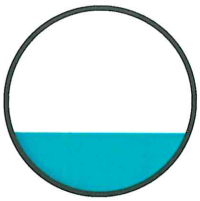
Summary for Reach G-F: G-F

Inflow Area = 0.246 ac,100.00% Impervious, Inflow Depth = 3.67" for 25-yr event
Inflow = 0.225 cfs @ 7.90 hrs, Volume= 0.075 af
Outflow = 0.225 cfs @ 7.93 hrs, Volume= 0.075 af, Atten= 0%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.19 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.23 fps, Avg. Travel Time= 2.0 min

Peak Storage= 15 cf @ 7.91 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.929 cfs

8.0" Round Pipe
n= 0.012
Length= 145.0' Slope= 0.0050 '/'
Inlet Invert= 18.38', Outlet Invert= 17.65'



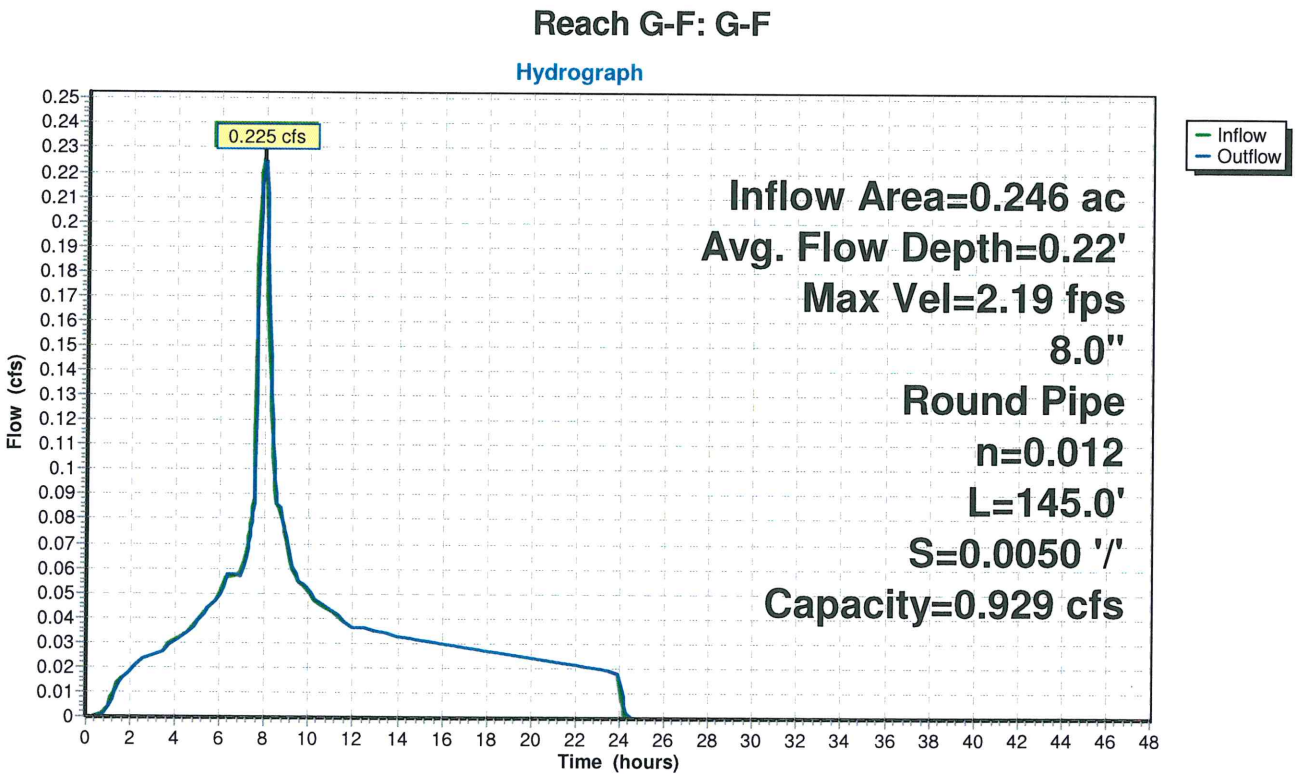


Exhibit C3

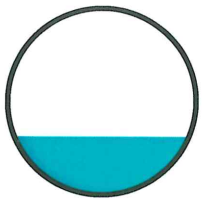
Summary for Reach H-E: H-E

Inflow Area = 0.221 ac,100.00% Impervious, Inflow Depth = 3.67" for 25-yr event
Inflow = 0.202 cfs @ 7.90 hrs, Volume= 0.067 af
Outflow = 0.202 cfs @ 7.91 hrs, Volume= 0.067 af, Atten= 0%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.12 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.19 fps, Avg. Travel Time= 1.0 min

Peak Storage= 7 cf @ 7.90 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.926 cfs

8.0" Round Pipe
n= 0.012
Length= 72.0' Slope= 0.0050 '/'
Inlet Invert= 17.62', Outlet Invert= 17.26'



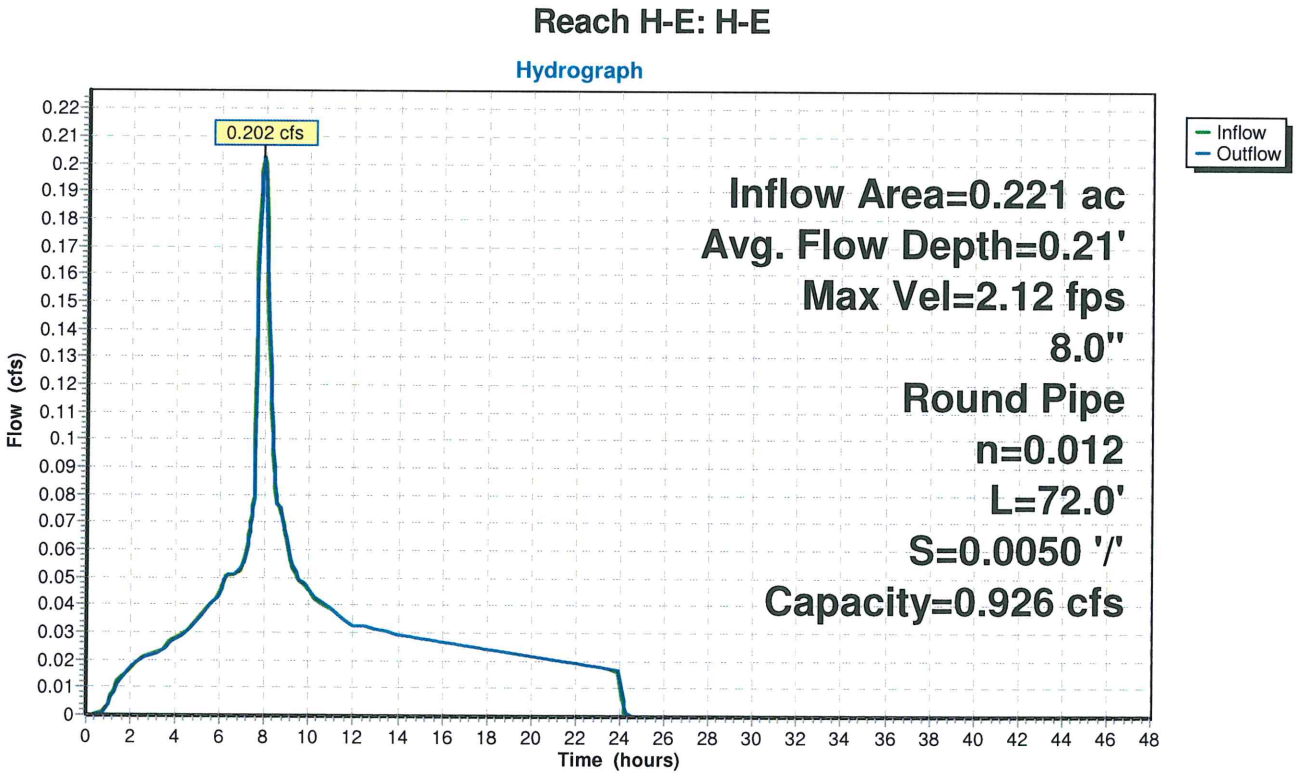


Exhibit C3

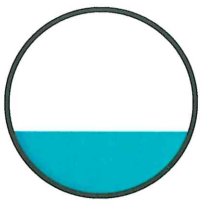
Summary for Reach I-D: I-D

Inflow Area = 0.268 ac,100.00% Impervious, Inflow Depth = 3.67" for 25-yr event
Inflow = 0.246 cfs @ 7.90 hrs, Volume= 0.082 af
Outflow = 0.246 cfs @ 7.91 hrs, Volume= 0.082 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.26 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 0.7 min

Peak Storage= 6 cf @ 7.90 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.934 cfs

8.0" Round Pipe
n= 0.012
Length= 57.0' Slope= 0.0051 '/'
Inlet Invert= 17.11', Outlet Invert= 16.82'



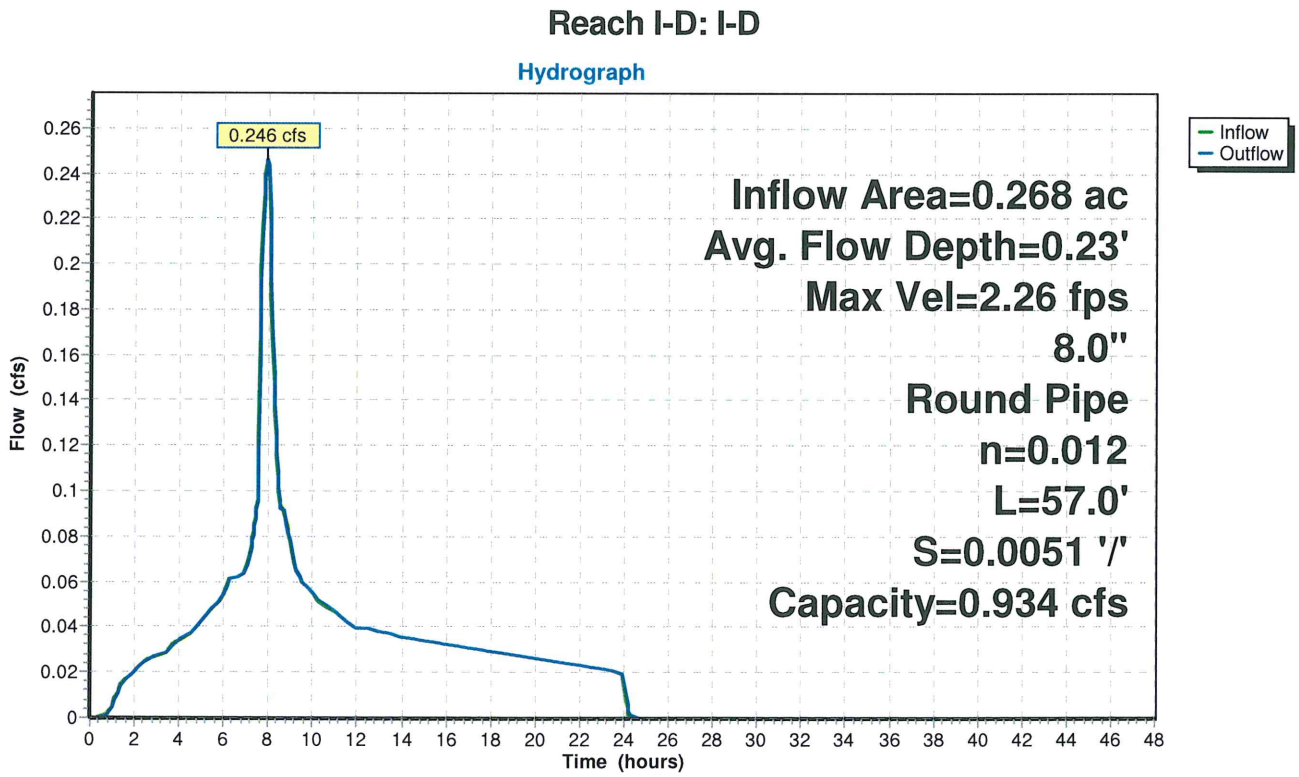


Exhibit C3

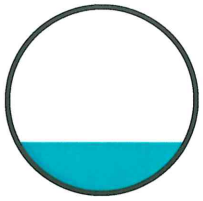
Summary for Reach J-D: J-D

Inflow Area = 0.171 ac,100.00% Impervious, Inflow Depth = 3.67" for 25-yr event
Inflow = 0.157 cfs @ 7.90 hrs, Volume= 0.052 af
Outflow = 0.157 cfs @ 7.91 hrs, Volume= 0.052 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.98 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.11 fps, Avg. Travel Time= 0.7 min

Peak Storage= 4 cf @ 7.90 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 0.926 cfs

8.0" Round Pipe
n= 0.012
Length= 48.0' Slope= 0.0050 '/'
Inlet Invert= 17.06', Outlet Invert= 16.82'



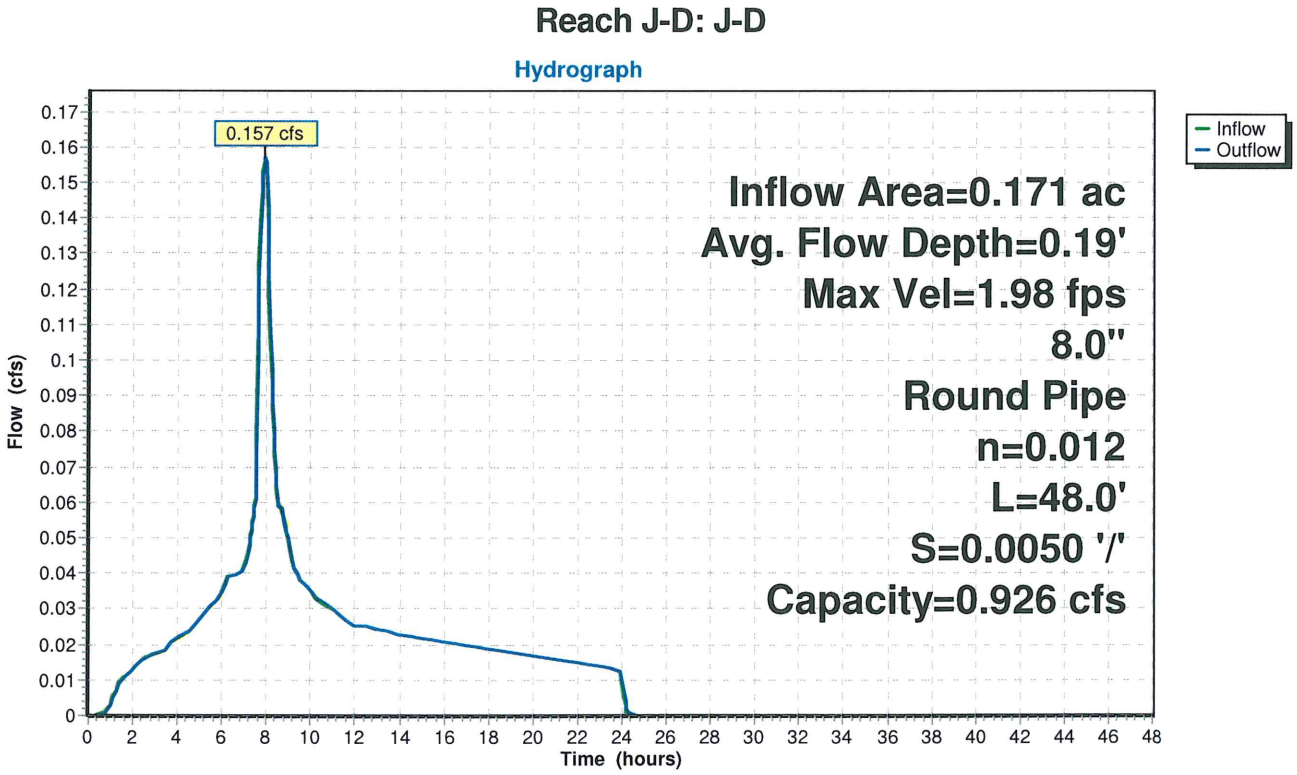


Exhibit C3

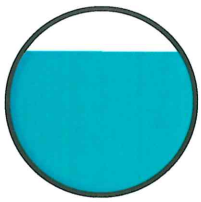
Summary for Reach MH-OUT: MH-OUT

Inflow Area = 4.618 ac,100.00% Impervious, Inflow Depth = 3.67" for 25-yr event
Inflow = 4.192 cfs @ 8.00 hrs, Volume= 1.411 af
Outflow = 4.182 cfs @ 8.02 hrs, Volume= 1.411 af, Atten= 0%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.10 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 2.33 fps, Avg. Travel Time= 1.3 min

Peak Storage= 192 cf @ 8.01 hrs
Average Depth at Peak Storage= 0.97'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 4.420 cfs

15.0" Round Pipe
n= 0.012
Length= 188.0' Slope= 0.0040 '/'
Inlet Invert= 11.61', Outlet Invert= 10.86'



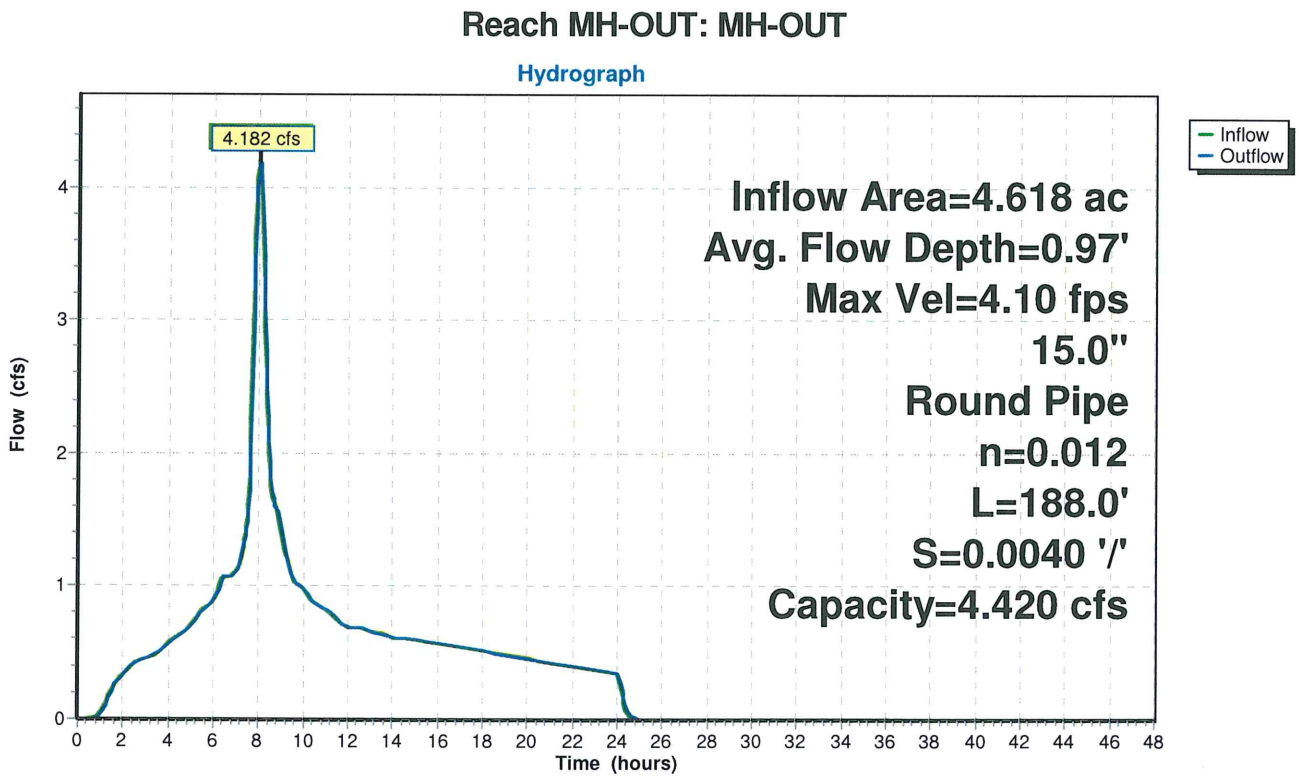


Exhibit C3

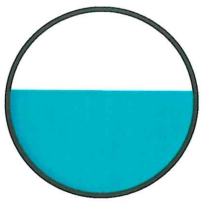
Summary for Reach MH-POND: MH-POND

Inflow Area = 4.473 ac,100.00% Impervious, Inflow Depth = 3.67" for 25-yr event
Inflow = 4.074 cfs @ 7.95 hrs, Volume= 1.366 af
Outflow = 4.072 cfs @ 7.96 hrs, Volume= 1.366 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.64 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.16 fps, Avg. Travel Time= 0.3 min

Peak Storage= 43 cf @ 7.95 hrs
Average Depth at Peak Storage= 0.71'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 6.570 cfs

15.0" Round Pipe
n= 0.012
Length= 59.0' Slope= 0.0088 '/'
Inlet Invert= 16.52', Outlet Invert= 16.00'



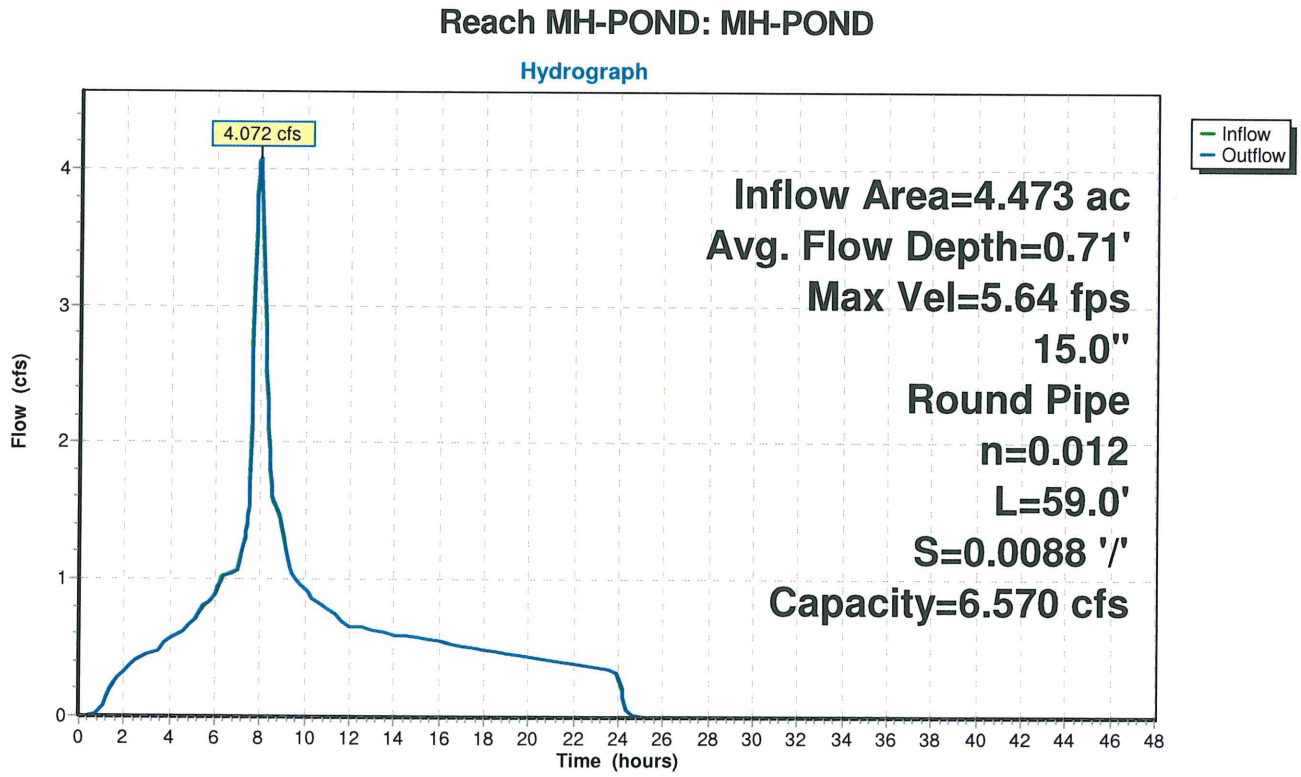


Exhibit C3

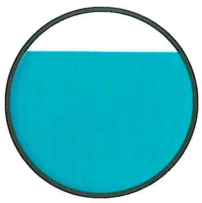
Summary for Reach POND-MH: POND-MH

Inflow Area = 4.618 ac,100.00% Impervious, Inflow Depth = 3.67" for 25-yr event
Inflow = 4.205 cfs @ 7.95 hrs, Volume= 1.411 af
Outflow = 4.192 cfs @ 8.00 hrs, Volume= 1.411 af, Atten= 0%, Lag= 2.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.11 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 2.35 fps, Avg. Travel Time= 2.7 min

Peak Storage= 393 cf @ 7.98 hrs
Average Depth at Peak Storage= 0.97'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 4.432 cfs

15.0" Round Pipe
n= 0.012
Length= 384.0' Slope= 0.0040 '/'
Inlet Invert= 13.15', Outlet Invert= 11.61'



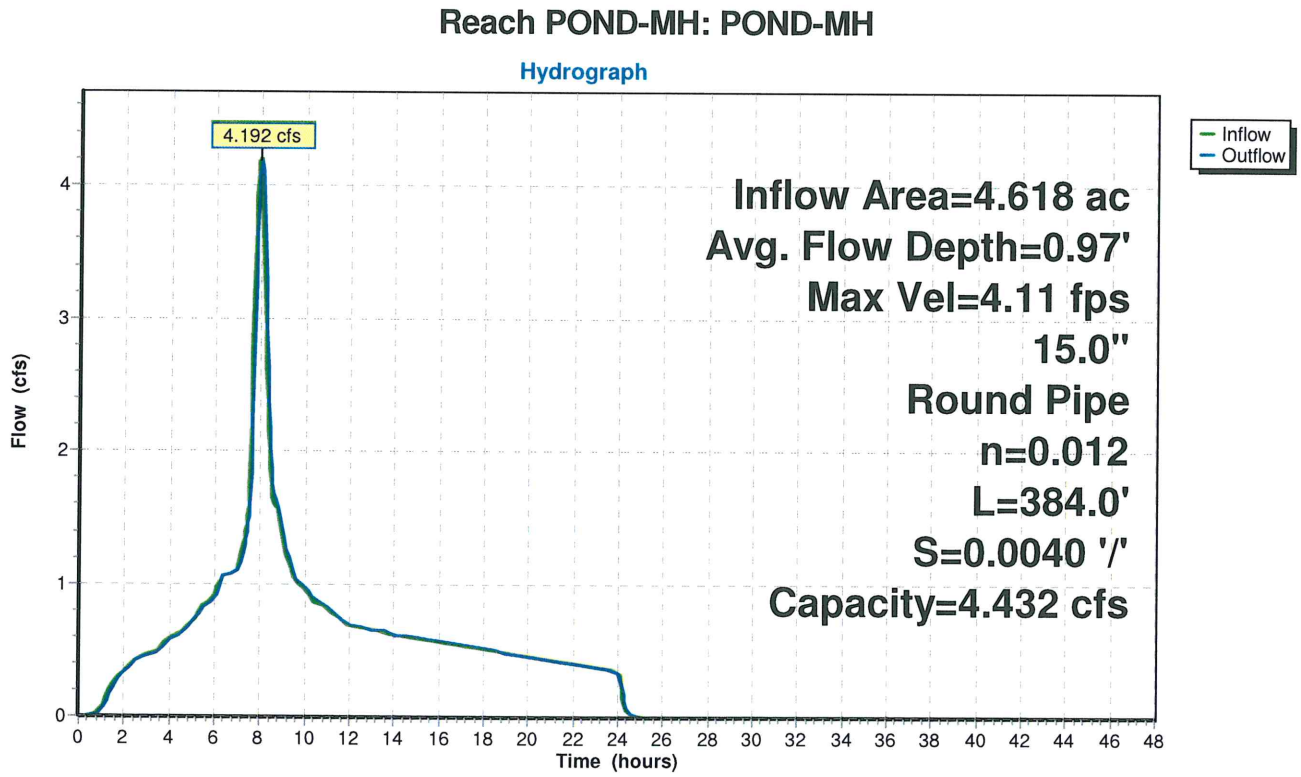


Exhibit C3

FIGURE E

OPERATION AND MAINTENANCE PLAN

Exhibit C3

3.1.1.8. Planters

Structural components must be operated and maintained in accordance with the design specifications.		
	MAINTENANCE INDICATOR	CORRECTIVE ACTION
	Clogged inlets or outlets	Remove sediment and debris from catch basins, trench drains, curb inlets, and pipes; maintain at least 50% conveyance at all times.
	Broken inlets or outlets	Repair/replace broken downspouts, curb cuts, standpipes, and screens.
	Damaged liners and walls	Extend and secure liner to planter walls above the high water mark. The facility must be water tight to protect abutting foundations from moisture damage.
	Cracked or exposed drain pipes	Repair or seal cracks. Replace when repair is insufficient. Cover with 6 inches of growing medium to prevent freeze/thaw and UV damage
Vegetation must cover at least 90% of the facility at maturity.		
	MAINTENANCE INDICATOR	CORRECTIVE ACTION
	Dead or stressed vegetation	Replant per original planting plan, or substitute from the plant list in Section 2.4.1. Irrigate and mulch as needed; prune tall, dry grasses and remove clippings.
	Tall grass and vegetation	Maintain grass height at 6"-9". Trim to allow sight lines and foot traffic, also to ensure inlets and outlets freely convey stormwater into and/or out of facility.
	Weeds	Manually remove weeds.
Growing medium must sustain healthy plant cover and infiltrate within 48 hours.		
	MAINTENANCE INDICATOR	CORRECTIVE ACTION
	Gullies, erosion, exposed soils, sediment accumulations	Fill in and lightly compact areas of erosion with City-approved soil mix (see Section 2.3.6) and replant according to planting plan or substitute from the plant list in Section 2.4.1. Sediment more than 4 inches deep must be removed.
	Scouring at the inlet(s)	Ensure splash blocks or inlet gravel/rock are adequate.
	Ponding	Rake, till, or amend soil surface with City-approved soil mix to restore infiltration rate. Remove and replace sediment at entrances.

Annual Maintenance Schedule

Summer	Make structural repairs; clean gutters and downspouts; remove any build-up of weeds or organic debris.
Fall	Replant exposed soil and replace dead plants. Remove sediment and plant debris.
Winter	Clear gutters and downspouts.
Spring	Remove sediment and plant debris. Replant exposed soil and replace dead plants.
All seasons	Weed as necessary.

Maintenance Records: All facility operators are required to keep an inspection and maintenance log. Record date, description, and contractor (if applicable) for all repairs, landscape maintenance, and facility cleanout activities. Keep work orders and invoices on file and make available upon request of the City inspector.

Fertilizers/Pesticides/Herbicides: Their use is strongly discouraged because of the potential for damage to downstream systems. If pesticides or herbicides are required, use the services of a licensed applicator and products approved for aquatic use.

Access: Maintain ingress/egress per design standards.

Infiltration/Flow Control: All facilities must drain within 48 hours. Record time/date, weather, and conditions when ponding occurs.

Pollution Prevention: All sites must implement Best Management Practices to prevent contamination of stormwater. Call 503-823-7180 to report spills. Never wash spills into a stormwater facility. If contamination occurs, document the circumstances and the corrective action taken; include the time/date, weather, and site conditions.

Vectors (Mosquitoes and Rats): Stormwater facilities must not harbor mosquito larvae or rodents that pose a threat to public health or that undermine facility structures. Record the time/date, weather, and site conditions when vector activity observed. Record when vector abatement started and ended.

Exhibit C3

3.1.3 Stormwater Conveyance Features

Stormwater conveyance features include drainageways, culverts, and outfalls that are used to transport drainage, stormwater and surface waters. Conveyance features serve important hydrologic, hydraulic, and water quality functions for Portland's waterways and stormwater systems.

Drainageways and any related encroachments must be maintained to preserve key watershed processes. In addition to ecological benefits, they provide beneficial functions such as flood attenuation and water quality treatment. Culverts and outfalls must be maintained to minimize negative effects on watershed processes and ecological functions while adequately conveying flows downstream.

The private property owner is responsible for preserving and maintaining conveyance features as protected or constructed to approved plans. Any future development proposals must protect stormwater conveyance features to ensure continuation of flow conveyance and other benefits. Stormwater Conveyance features require an O&M submittal to BES that includes:

- A Standard O&M Plan for conveyance features; and
- A completed O&M Form that has been recorded with the appropriate county. A Site Plan (either sketched or attached) must be included.

O&M submittal requirements are listed in Section 3.1.4. Specific requirements for conveyance features are outlined below.

Drainageways, Drainage Reserves, and related Encroachments

An Operations and Maintenance (O&M) plan is required for drainageways on properties undergoing development proposal review, regardless of whether the drainageway is being impacted by the development proposal. O&M plans are required when drainage reserves are being applied to a drainageway during development proposal review or for a permitted improvement or encroachment to a drainage reserve. Operations and Maintenance Plans must be recorded with an O&M Form in the county of the subject property.

Culverts and Outfalls

An O&M Plan is required for culverts and outfalls on properties undergoing development proposal review, regardless of whether or not the culvert or outfall is directly associated with a stormwater management facility.

Exhibit C3

STANDARD OPERATIONS AND MAINTENANCE PLAN

3.1.3.1. Drainageway and Drainage Reserves

The limits of the drainage reserve must remain in natural topographic condition.		
	MAINTENANCE INDICATOR	CORRECTIVE ACTION
	Existing encroachments or modifications to drainage reserve.	Document existing encroachments (such as fences, rock walls or pipes) on the operations and maintenance site plan.
	New encroachments or modifications to the drainageways that have not undergone review or approval.	Remove encroachments and return drainageway to natural topographic condition.
No vegetation in the drainageway or drainage reserve limits can be on Portland's lists of nuisance or prohibited plants.		
	MAINTENANCE INDICATOR	CORRECTIVE ACTION
	Nuisance or prohibited plants are discovered within the drainage reserve.	• Manually remove weeds. Do not use fertilizers, herbicides or pesticides. • Nuisance and prohibited vegetation from the Portland Plant List (such as Himalayan blackberries and English Ivy) must be removed when discovered. • Invasive vegetation contributing to more than 25% of vegetation of all species must be removed and replaced. • Mulch as needed outside of the drainage channel. Stabilize soils with plants from the Portland Plant List.

Exhibit C3

STANDARD OPERATIONS AND MAINTENANCE PLAN

3.1.3.2. Drainage Reserve or Channel Encroachment

Natural and structural components, including inlets and outlets/overflows, must freely convey stormwater.	
MAINTENANCE INDICATOR	**CORRECTIVE ACTION**
Clogged inlets or outlets	• Remove sediment, vegetation, and debris from catch basins, trench drains, curb inlets, and pipes; maintain at least 50% conveyance capacity at all times. • Identify obstructions and clear them immediately.
Clogged conveyance capacity	• Hand-remove sediment, minimizing damage to native vegetation and using proper erosion control measures. • Trim vegetation, large shrubs, or trees that can flood structures or increase bank erosion.
Erosion	• Control erosion when native soil is exposed or erosion channels are forming. • Maintain rock splash pads or energy dissipaters to prevent erosion. • Stabilize soils with plants from the Portland Plant List. • Use biodegradable erosion control materials. Remove non-biodegradable erosion control materials within 3 years or when plantings are established. • Thoroughly irrigate planted areas until vegetation is well established.
Bank/Side Slope maintenance	• Stabilize and plant slopes using appropriate erosion control measures when native soil is exposed or erosion channels form.
Obstructed or non-functioning check-dams	• Clear and repair check dams to control and distribute flow. • Identify and repair causes for channelization causing erosion.
Within 2 years at least 90% native vegetation coverage within the drainage reserve area must be well-maintained and healthy; vegetation must be healthy and dense enough to provide filtering while protecting underlying soils from erosion.	
MAINTENANCE INDICATOR	**CORRECTIVE ACTION**
Dead or dying vegetation	• Remove dead vegetation and woody material from drainageways when flow is impeded. • Replace vegetation to maintain 90% cover density within one year and control erosion where soils are exposed.
Nuisance or prohibited plants are discovered within the drainage reserve	• Manually remove weeds. • Do not use fertilizers, herbicides or pesticides. • Remove nuisance and prohibited vegetation from the Portland Plant List (such as Himalayan blackberries and English Ivy) on discovery. • Remove and replace invasive vegetation when it comprises more than 25% of the total vegetative cover. • Mulch as needed outside of the drainage channel.

Maintenance Records: Training and/or written guidance for protecting and maintaining drainage reserves (including this O&M Plan) must be provided to all property owners and tenants. The property owner must keep a log, recording all inspection dates, observations, and maintenance activities. This log must be available to City inspectors on request.

Pesticides and Herbicides: The use of pesticides and herbicides is strongly discouraged due to the potential negative impacts to downstream systems. If pesticides and herbicides are required, use the service of a licensed applicator and a product approved for aquatic use.

Inspections: Drainage reserves which have been modified through a City permit process must be inspected and maintained by the property owner in order to ensure proper function. All facility components, vegetation, and source controls must be inspected for proper operations and structural stability, at a minimum, quarterly for the first 2 years from the date of installation, 2 times per year thereafter, and within 48 hours after each major storm event (defined as 1" in 24 hours).

Access: Access to the drainageway must be safe and efficient. Egress and ingress routes must be maintained to design standards. Maintain roadways to accommodate the size and weight of vehicles, if applicable. Obstacles preventing maintenance personnel and/or equipment access to the drainageway must be removed. Gravel or ground cover must be added if erosion occurs, e.g., due to vehicular or pedestrian traffic.

Pollution Prevention: Spill Prevention measures must be exercised when handling substances that contaminate stormwater. Releases of pollutants must be corrected as soon as identified.

Exhibit C3

STANDARD OPERATIONS AND MAINTENANCE PLAN

3.1.3.3. Culverts

Structural components must be operated and maintained in accordance with the design specifications. Culvert inlets and outlets must maintain an unimpeded and controlled flow of water.	
MAINTENANCE INDICATOR	**CORRECTIVE ACTION**
Clogged conveyance capacity	• Clear pipes when conveyance capacity is compromised. • Remove accumulated debris and sediment when it blocks 1-foot or 50% of conveyance capacity, whichever is smaller.
Sediment accumulation	• Remove sediment accumulations in pipes using proper erosion control measures.
Erosion or exposed soils	• Control erosion when native soil is exposed or erosion channels are forming. • Use biodegradable erosion control materials. • Remove non-biodegradable erosion control devices within 3 years or when the erosion control plantings are established. • Stabilize soils with plants from the Portland Plants List referenced in Appendix B.
Cracked or broken pipe/structure	• Repair or replace broken or cracked components.
Scouring at the entrance or exit	• Ensure adequate scour protection is provided at the inlet and outlet.
Bank/side slope stabilization	• Stabilize sloped banks with plantings from the Portland Plant List.

Maintenance records: Training and/or written guidance for protecting and maintaining culverts (including this O&M Plan) must be provided to all property owners and tenants. The property owner must keep a log, recording all inspection dates, observations, and maintenance activities. This log must be available to City inspector upon request.

Inspections: Culverts must be inspected and maintained by the property owner to ensure proper function. Inspect facility components for proper operation and structural stability, at a minimum, quarterly for the first 2 years from the date of installation, 2 times per year thereafter, and within 48 hours after each major storm event (defined as 1" in 24 hours).

Access: Access to the culvert must be safe and efficient. Egress and ingress routes must be maintained to design standards. Roadways must be maintained to accommodate size and weight of vehicles, if applicable.

Pollution Prevention: Implement spill prevention measures when handling substances that could contaminate stormwater. Releases of pollutants must be corrected as soon as identified.

Exhibit C3

STANDARD OPERATIONS AND MAINTENANCE PLAN
3.1.3.4. Outfalls

Structural components must be operated and maintained in accordance with the design specifications. Outfall inlet & outlet must maintain an unimpeded and controlled flow of water.	
MAINTENANCE INDICATOR	CORRECTIVE ACTION
Clogged inlets or outlets	• Clear inlets and outlets including piped outfalls they are plugged. • Address sources of sediment and debris.
Clogged conveyance capacity	• Clear overland flow paths and drains when conveyance capacity is diminished by 50%. • Identify causes for altered flow; clear obstructions on discovery.
Sediment accumulation	• Remove sediment from pipes using proper erosion control measures.
Erosion or exposed soils	• Identify and control sources of erosion when native soil is exposed or erosion channels are forming. • Maintain rock splash pads or energy dissipation structures. • Use biodegradable materials. • Remove non-biodegradable erosion control devices within 3 years or when the erosion control plantings are established. • Stabilize soils with plants from the Portland Plant List.
Cracked or broken pipe/structure	Repair or replace broken or cracked components when necessary.
Check dams missing, scattered or with gaps	Maintain check dams as per standard details.
Scouring at the entrance or exit	Ensure energy dissipation structures such as splash pads, rock rip-rap, gravel, and log check dams are properly installed and replenish materials as necessary.
Bank/side slope stabilization	Stabilize sloped banks with plantings from the Portland Plant List.

Maintenance Records: Training and/or written guidance for protecting and maintaining outfalls (including this O&M Plan) must be provided to all property owners and tenants. The property owner must keep a log, recording all inspection dates, observations, and maintenance activities. This log must be available to City inspector upon request.

Inspections: Outfall must be inspected and maintained by the property owner in order to ensure proper function. All facility components must be inspected for proper operations and structural stability, at a minimum, quarterly for the first 2 years from the date of installation, 2 times per year thereafter, and within 48 hours after each major storm event (defined as 1" in 24 hours).

Access: Access to the outfall must be safe and efficient. Egress and ingress routes must be maintained to design standards. Roadways must be maintained to accommodate size and weight of vehicles, if applicable.

Pollution Prevention: Spill Prevention measures must be exercised when handling substances that contaminate stormwater. Releases of pollutants must be corrected as soon as identified.

Exhibit C3

3.1.4 Private O&M Submittal Requirements

For private stormwater facilities and conveyance features which are implemented or protected under the requirements of the *Stormwater Management Manual*, Operations and maintenance (O&M) is the responsibility of the property owner or designated responsible party. O&M responsibilities and requirements are identified and enforced through an Operations and Maintenance Form and an Operations and Maintenance Plan submitted for BES review and approval prior to permit issuance.

An Operations and Maintenance Plan must meet the requirements of this chapter. For stormwater facilities designed under the Simplified and Presumptive approach, a Standard O&M Plan must be used. For stormwater facilities designed under the Performance Approach, a site-specific plan must be developed. For conveyance features, a Standard O&M Plan may be used to meet the requirements of this chapter or a site-specific plan must be used.

The Bureau of Environmental Services (BES) must review and approve the submittals as part of the development review process (e.g. building or site development permits). Maintaining the stormwater management facilities and conveyance features shown on the site plan is a required condition of the City's approval of the building permit for the identified property.

The applicant must sign the Form and the signature must be notarized. The O&M Form and Plan must be recorded and filed with the county Department of Assessment and Taxation in the county where the property site is located. When completed accurately, the O&M Form meets the recording requirements in Multnomah, Clackamas, and Washington counties.

Failure to properly operate or maintain a stormwater management facility according to the O&M Plan may result in a civil penalty, as specified in Portland City Code 17.38.045: Enforcement. This requirement is binding on all current and future owners of the property. Failure to comply with the O&M Plan can trigger an enforcement action, including penalties.

Exhibit C3

How to complete the Operations and Maintenance Form

The O&M Form must be completed in full as listed below.

Site Legal Description

The Site Legal Description must include all of the tax lots (parcels) with stormwater runoff managed by the onsite stormwater management system. The information must be accurate and correctly filled out on the Form prior to submittal to the County for recording.

To find a property's legal description, visit https://www.portlandmaps.com/ and browse to the property using the exact address. To locate the Site Legal Description at PortlandMaps.com, select the "Assessor" link on the top menu and locate the boxes labeled "Tax Roll" and "Instrument Number" on the page. If the Tax Roll description has "TL" in it, include the Instrument Number where indicated on Form 2. This information is intended as guidance; it may not be adequate to be accepted for filing by Multnomah County.

Site Plan

The O&M Form includes a small space for a sketched site plan. If the space is not sufficient to include all of the below information, attach a separate site plan. The site plan must include:

- Property boundaries and a north arrow.
- The locations of all of the stormwater facilities and conveyance features in relation to labeled streets, buildings, or other permanent features.
- The locations of utilities including existing-to-remain and proposed water, sanitary, and storm sewers.
- Facility dimensions and setback distances from property lines and structures;
- All stormwater piping associated with the facility including pipe sizes, materials, slopes, and invert elevations.
- Flow arrows illustrating the direction of flow and the order in which stormwater passes through the system if there is a sequence of facilities ("treatment train").
- A cross section for each facility with general dimensions and subsurface elements such as liners, layers of soil and aggregate, and pipes.
- Identify any offsite discharge locations. Include a label indicating the location, ownership, and type of the system to which the discharge drains.

Exhibit C3

- Additional information may be required on the drawings during permit review, depending on individual site conditions.

If the stormwater system design needs to be modified during the course of a project, and prior to Substantial Completion, please contact BES at 503-823-7761 for guidance on how best to modify and update the O&M Form and/or Plan to reflect the system as built. If the O&M Form and/or Plan requires revision, either because the O&M Form and/or Plan on file with the City is inaccurate or because the owner(s) request and receive City approval to revise it, the owner must record a new O&M Form or Plan with the County. Call the Maintenance Inspection Program at (503) 823-5600 for guidance.

Completed and Recorded O&M Forms and Plans must be filed with BES at the following address:

City of Portland, BES
1900 SW Fourth Ave., Suite 5000
Portland, OR 97201

County Recorder's Office Information

Multnomah County Recorder
501 SE Hawthorne St.
Suite 175
Portland, OR 97214
https://multco.us/recording/recording-documents
Phone: 503-988-3326

Clackamas County Recording Division
1710 Red Soils Ct., #110
Oregon City, OR 97045
http://www.clackamas.us/recording/
Phone: 503-655-8551

Washington County Recording Division
155 N. First Ave.
Suite 130, MS 9
Hillsboro, OR 97124
http://www.co.washington.or.us/AssessmentTaxation/Recording/
Phone: 503-846-8752

Exhibit C3

CITY OF PORTLAND
Stormwater
Management
Manual

OPERATIONS & MAINTENANCE FORM

PRIVATE STORMWATER MANAGEMENT FACILITIES

☐ This O&M Form supercedes document number _____

(for official county use only)

PROJECT NAME _____

PERMIT INFORMATION

Permit # _____

Permit Submittal Date _____

SITE INFORMATION *(include all parcels)*

R# (6 Digits) _____

Site Address _____

City / State / Zip _____

Preparation Date: _____

OWNER INFORMATION (ALL LEGAL OWNERS)

Name (1) _____

Name (2) _____

Address *(Mailing)* _____

City / State / Zip _____

O&M PREPARER INFORMATION

Name _____

Address *(Mailing)* _____

City / State / Zip _____

Phone *(area code required)* _____

Email _____

Site Legal Description:

Responsible Party for Maintenance *(check one)*

☐ Homeowners Association ☐ Property Owner

☐ Property Management Company ☐ Tenant

☐ Other (describe) _____
(not Contractor or Consultant)

Contact Information for Responsible Party

Contact Name _____

Contact Organization _____

Phone *(area code required)* _____

Email: _____

Maintenance Practices and Schedule

These operation and maintenance practices are required in accordance with Portland City Code, Chapter 17.38.

The requirements are based on the current version of the *City of Portland Stormwater Management Manual* on the date of permit submittal.

For the **Simplified Approach and Presumptive Approach,** please attach the Standard O&M Plan for each facility type from the *Stormwater Management Manual*, Chapter 3.1.1

For the **Performance Approach,** please attach the approved, site specific O&M Plan per the *Stormwater Management Manual*, Chapter 3.1.2

Exhibit C3

OPERATIONS & MAINTENANCE FORM

PRIVATE STORMWATER MANAGEMENT FACILITIES

SITE PLAN

Provide a site plan sketch in the area provided below, or attach a scaled site plan to this submittal that includes all of the information required as shown in Chapter 3.1.4, in Operations & Maintenance, Submittal Requirements, Site Plan.

STEP 1 – COMPLETE THE FOLLOWING TABLE

Stormwater Facility Type (Chapter 2)	Stormwater Facility Size (sf)	Drainage is from Roof or Lot?	Impervious Area Treated (sf)	Discharge Point
Totals				

Maintaining the stormwater management facility or facilities listed above shown on the following (or attached) site plan is a required condition of building permit approval for the identified property. Property owners are required to operate and maintain facilities in accordance with the O&M plan on file with the City of Portland. This requirement is binding on all current and future owners of the property. Failure to comply with the O&M plan can trigger an enforcement action, including penalties. The O&M plan may be modified by written consent of current owners and written approval of the Bureau of Environmental Services.

STEP 2 – REQUIRED SITE PLAN

(insert or draw here, or attach separate sheet)

☐ I Have Attached a Site Plan

Exhibit C3

OPERATIONS & MAINTENANCE FORM

PRIVATE STORMWATER MANAGEMENT FACILITIES

SIGNATURE AND ACKNOWLEDGEMENT

By signing below, the owner accepts and agrees to the terms and conditions contained in this O&M Form and in any document executed by filer and recorded with it. The owner further acknowledges that this documentation has been prepared on their behalf and that they are responsible for the quality and completeness of the O&M Plan. Any failure to comply with the terms of these plans may result in enforcement actions by BES requiring the property owner to restore the stormwater facilities to a functional state as approved under original requirements.

The owner also accepts that the City requires property owners to submit and record, with the County, complete and accurate O&Ms enforceable under City Code 17.38 and that substantial changes to the O&M require City approval prior to County recording. A revised O&M must state that it supersedes a previous O&M (with cited county document number; See Page 1).

THIS PAGE MUST BE SIGNED IN THE PRESENCE OF A NOTARY.

_____ _____

Property Owner or Authorized Representative (1) Signature *Property Owner or Authorized Representative (2) Signature*

NOTARY SIGNATURE AND STAMP

☐ INDIVIDUAL Acknowledgement

This acknowledgement is intended for property owned by individuals or trusts.

STATE of OREGON county of: _____

This instrument was acknowledged before me on: *(date)* _____

By: *(owner 1)* _____

By: *(owner 2)* _____

Notary Signature _____

My Commission Expires _____

Notary Seal:

OR

☐ CORPORATE Acknowledgement

This acknowledgement is intended for corporation, government agencies, school districts, or other formal entities

STATE of OREGON county of: _____

This instrument was acknowledged before me on: *(date)* _____

By: *(representative)* _____

As: *(Title)* _____

Of: *(Corporation)* _____

Notary Signature _____

My Commission Expires _____

Notary Seal:

Exhibit C4

Geotechnical Site Investigation

Allwood Recyclers

Fairview, Oregon

May 7, 2018

Geotechnical ■ Environmental ■ Special Inspections

Columbia West
Engineering, Inc

11917 NE 95th Street
Vancouver, Washington
98682
Phone: 360-823-2900
Fax: 360-823-2901

www.columbiawestengineering.com

Exhibit C4

Geotechnical ■ Environmental ■ Special Inspections

Columbia West Engineering, Inc

GEOTECHNICAL SITE INVESTIGATION
ALLWOOD RECYCLERS
FAIRVIEW, OREGON

Prepared For:	**MRW Properties, LLC** **Mr. Mark Wubben** **PO Box 115** **Fairview, Oregon 97024**
Site Location:	**22800 NE Marine Drive** **Parcel No. R649856490** **Fairview, Oregon**
Prepared By:	**Columbia West Engineering, Inc.** **11917 NE 95th Street** **Vancouver, Washington 98682** **Phone: 360-823-2900** **Fax: 360-823-2901**
Date Prepared:	**May 7, 2018**

Exhibit C4

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Exhibit C4

GEOTECHNICAL SITE INVESTIGATION
ALLWOOD RECYCLERS
FAIRVIEW, OREGON

1.0 INTRODUCTION

Columbia West Engineering, Inc. (Columbia West) was retained by MRW Properties, LLC to conduct a geotechnical site investigation for the Allwood Recyclers project located in Fairview, Oregon. The purpose of the investigation was to observe and assess subsurface soil conditions at specific locations and provide geotechnical engineering analyses, planning, and design recommendations for proposed development. The specific scope of services was outlined in a proposal contract dated February 19th, 2018. This report summarizes the investigation and provides field assessment documentation and laboratory analytical test reports. This report is subject to the limitations expressed in Section 6.0, *Conclusion and Limitations*, and Appendix F.

1.1 General Site Information

As indicated on Figures 1 and 2, the subject site is located at 22800 NE Marine Drive in Fairview, Oregon. The site consists of tax parcel R649856490 totaling approximately 4.90 acres. The regulatory jurisdictional agency is the City of Fairview, Oregon. The approximate latitude and longitude are N 45° 33’ 14” and W 122° 25’ 32”, and the legal description is a portion of Section 22, T1N, R3E, Willamette Meridian.

1.2 Proposed Development

Correspondence with the design team indicates that proposed development will likely include construction of a pre-manufactured steel building with office and storage space, landscaping product stalls, essential underground utilities, paved parking and access drives, and stormwater management facilities. Proposed development is shown on Figure 2. Columbia West has not reviewed a preliminary grading plan but understands that cut and fill will likely be proposed. This report is based upon proposed development as described above and may not be applicable if modified.

2.0 REGIONAL GEOLOGY AND SOIL CONDITIONS

The subject site lies within the Willamette Valley/Puget Sound Lowland, a wide physiographic depression flanked by the mountainous Coast Range on the west and the Cascade Range on the east. Inclined or uplifted structural zones within the Willamette Valley/Puget Sound Lowland constitute highland areas and depressed structural zones form sediment-filled basins. The site is located in the southern area of the Portland/Vancouver Basin, an open, somewhat elliptical, northwest-trending syncline approximately 60 miles wide.

According to the *Geologic Map of the Camas Quadrangle, Clark County, Washington, and Multnomah County, Oregon* (U.S. Geological Survey, SIM 3017), near-surface soils are

expected to consist of Holocene and Pleistocene-aged unconsolidated fine-grained, sand, silt, and clay alluvium of Columbia River floodplain and channel (Qac).

The *Web Soil Survey* (United States Department of Agriculture, Natural Resource Conservation Service [USDA NRCS], 2018 Website*)* identifies surface soils as Sauvie silty clay loam. Although soil conditions may vary from the broad USDA descriptions, Sauvie series soils are generally fine-textured sands, silts, and clays with low permeability, low to moderate shrink-swell potential, and low shear strength. Sauvie soils are generally moisture sensitive and exhibit a slight erosion hazard based primarily upon slope grade.

3.0 REGIONAL SEISMOLOGY

Recent research and subsurface mapping investigations within the Pacific Northwest appear to suggest the historic potential risk for a large earthquake event with strong localized ground movement may be underestimated. Past earthquakes in the Pacific Northwest appear to have caused landslides and ground subsidence, in addition to severe flooding near coastal areas. Earthquakes may also induce soil liquefaction, which occurs when elevated horizontal ground acceleration and velocity cause soil particles to interact as a fluid as opposed to a solid. Liquefaction of soil can result in lateral spreading and temporary loss of bearing capacity and shear strength.

There are at least four major known fault zones in the vicinity of the site that may be capable of generating potentially destructive horizontal accelerations. These fault zones are described briefly in the following text.

<u>Portland Hills Fault Zone</u>

The Portland Hills Fault Zone consists of several northwest-trending faults located along the northeastern margin of the Tualatin Mountains, also known as the Portland Hills, and the southwest margin of the Portland Basin. The fault zone is approximately 25 to 30 miles in length and is located approximately 14 miles west of the site. According to *Seismic Design Mapping, State of Oregon* (Geomatrix Consultants, 1995)*,* there is no definitive consensus among geologists as to the zone fault type. Several alternate interpretations have been suggested.

According to the *USGS Earthquake Hazards Program*, the fault was originally mapped as a down-to-the-northeast normal fault, but has also been mapped as part of a regional-scale zone of right-lateral, oblique slip faults, and as a steep escarpment caused by asymmetrical folding above a south-west dipping, blind thrust fault. The Portland Hills fault offsets Miocene-aged Columbia River Basalts, and Miocene- to Pliocene-aged sedimentary rocks of the Troutdale Formation. No fault scarps on surficial Quaternary-aged deposits have been described along the fault trace, and the fault is mapped as buried by the Pleistocene-aged Missoula flood deposits.

However, evidence suggests that fault movement has impacted shallow Holocene-aged deposits and deeper Pleistocene-aged sediments. Seismologists recorded a magnitude (M) 3.2 earthquake in November 2012, and a M3.9 earthquake in April 2003 thought to be associated with the fault zone near Kelly Point Park. A M3.5 earthquake also possibly associated with the Portland Hills Fault Zone occurred approximately 1.3 miles east of the

fault in 1991. Therefore, the Portland Hills Fault Zone is generally thought to be potentially active and capable of producing potentially damaging earthquakes.

Gales Creek-Newberg-Mt. Angel Fault Zone

Located approximately 36 miles west of the site, the northwest-striking, approximately 50-mile long Gales Creek-Newberg-Mt. Angel Structural Zone forms the northwestern boundary between the Oregon Coast Range and the Willamette Valley, and consists of a series of discontinuous northwest-trending faults. The southern end of the fault zone forms the southwest margin of the Tualatin basin. Possible late-Quaternary-aged geomorphic surface deformation may exist along the structural zone (Geomatrix Consultants, 1995).

According to the *USGS Earthquake Hazards Program*, the Mount Angel fault is mapped as a high-angle, reverse-oblique fault, which offsets Miocene-aged rocks of the Columbia River Basalts, and Miocene and Pliocene-aged sedimentary rocks. The fault appears to have controlled emplacement of the Frenchman Spring Member of the Wanapum Basalts, and thus must have a history that predates the Miocene age of these rocks. No unequivocal evidence of deformation of Quaternary-aged deposits has been described, but a thick sequence of sediments deposited by the Missoula floods covers much of the southern part of the fault trace.

Although no definitive evidence of impacts to Holocene-aged sediments have clearly been identified, the Mount Angel fault appears to have been the location of minor earthquake swarms in 1990 near Woodburn, Oregon, and a M5.6 earthquake in March 1993 near Scotts Mills, approximately four miles south of the mapped extent of the Mt. Angel fault. It is unclear if the earthquake occurred along the fault zone or a parallel structure. Therefore, the Gales Creek-Newberg-Mt. Angel Structural Zone is considered potentially active.

Lacamas Lake-Sandy River Fault Zone

The northwest-trending Lacamas Lake Fault and northeast-trending Sandy River Fault intersect north of Camas, Washington approximately 3 miles north-northeast of the site, and form part of the northeastern margin of the Portland basin. According to *Geology and Groundwater Conditions of Clark County Washington* (USGS Water Supply Paper 1600, Mundorff, 1964) and the *Geologic Map of the Lake Oswego Quadrangle* (Oregon DOGAMI Series GMS-59, 1989), the Lacamas Lake fault zone consists of shear contact between the Troutdale Formation and underlying Oligocene-aged andesite-basalt bedrock. Secondary shear contact associated with the fault zone may have produced a series of prominent northwest-southeast geomorphic lineaments in proximity to the site.

According to the *USGS Earthquake Hazards Program* the fault has been mapped as a normal fault with down-to-the-southwest displacement and has also been described as a steeply northeast or southwest-dipping, oblique, right-lateral, slip-fault. The trace of the Lacamas Lake fault is marked by the very linear lower reach of Lacamas Creek. No fault scarps on Quaternary-aged surficial deposits have been described. The Lacamas Lake fault offsets Pliocene-aged sedimentary conglomerates generally identified as the Troutdale formation, and Pliocene- to Pleistocene-aged basalts generally identified as the Boring Lava formation.

Recent seismic reflection data across the probable trace of the fault under the Columbia River yielded no unequivocal evidence of displacement underlying the Missoula flood deposits, however, recorded mild seismic activity during the recent past indicates this area may be potentially seismogenic.

Cascadia Subduction Zone

The Cascadia Subduction Zone has recently been recognized as a potential source of strong earthquake activity in the Portland/Vancouver Basin. This phenomenon is the result of the earth's large tectonic plate movement. Geologic evidence indicates that volcanic ocean floor activity along the Juan de Fuca ridge in the Pacific Ocean causes the Juan de Fuca Plate to perpetually move east and subduct under the North American Continental Plate. The subduction zone results in historic volcanic and potential earthquake activity in proximity to the plate interface, believed to lie approximately 20 to 50 miles west of the general location of the Oregon and Washington coast (Geomatrix Consultants, 1995).

4.0 GEOTECHNICAL AND GEOLOGIC FIELD INVESTIGATION

A geotechnical field investigation consisting of visual reconnaissance, five test pit explorations (TP-1 through TP-5), two cone penetration tests (CPT-1 and CPT-2), and one infiltration test (IT-2.1) was conducted at the site on February 23rd and February 26th, 2018. Test pits were explored with a track-mounted excavator. Cone penetration testing was conducted with a track-mounted CPT rig. Subsurface soil profiles were logged in accordance with Unified Soil Classification System (USCS) specifications. Disturbed soil samples were collected from relevant soil horizons and submitted for laboratory analysis. Analytical laboratory test results are presented in Appendix A. Exploration locations are indicated on Figure 2. Subsurface exploration logs are presented in Appendix B. Soil descriptions and classification information are provided in Appendix C. A Photo log is presented in Appendix D.

4.1 Surface Investigation and Site Description

Located on a broad alluvial plain adjacent to the Columbia River, the 4.9-acre subject site is relatively flat with site elevations ranging from approximately 17 to 25 feet above mean sea level (amsl). The site is bounded by NE Marine Drive to the east, undeveloped acreage to the north, and an RV storage facility to the south and west. The site is primarily covered in grass with the exception of numerous debris stockpiles observed throughout the site. A PGE power tower was observed in the northern area of the site.

4.2 Subsurface Exploration and Investigation

Cone penetration tests CPT-1 and CPT-2 were advanced at the site to a maximum depth of approximately 49 feet below ground surface (bgs). Test pit explorations TP-1 through TP-5 were advanced to a maximum depth of approximately 13 feet bgs. Subsurface exploration locations were selected to observe subsurface soil characteristics in proximity to proposed development areas and are indicated on Figure 2.

4.2.1 Soil Type Description

Subsurface exploration indicated that the presence of approximately 6 to 10 inches of grass and topsoil in the observed locations. Underlying the topsoil layer, approximately 10 to 28 inches of disturbed sand and silt was observed. Underlying the topsoil and disturbed sand and silt layers, subsurface soils resembling native USDA Sauvie soil series descriptions were encountered. Subsurface lithology was reasonably consistent at all explored locations and may generally be described by soil types identified in the following text.

Soil Type 1 – SILT

Soil Type 1 was observed to primarily consist of light brown, orange, and grey, mottled, moist to wet, soft to medium stiff SILT. Soil Type 1 was encountered below the topsoil and disturbed sand and silt layers in explorations TP-1 and TP-2 and below Soil Type 2 in TP-5 and extended to a depth of approximately 3 feet bgs in TP-1 and to the maximum depth of exploration in TP-2 and TP-5.

Analytical laboratory testing conducted upon representative soil samples obtained from exploration TP-2 indicated approximately 98 to 99 percent by weight passing the No. 200 sieve and in situ moisture contents ranging from 37 to 55 percent. Atterberg Limits analysis indicated a liquid limit ranging from non-plastic to 42 percent and a plasticity index of 13 percent. Laboratory tested samples of Soil Type 1 are classified ML according to USCS specifications and A-4(0) and A-7-6(16) according to AASHTO specifications.

Soil Type 2 – Poorly-Graded SAND / Silty SAND

Soil Type 2 was observed to primarily consist of grey, mottled, damp to wet, medium dense, poorly-graded SAND / silty SAND. Soil Type 2 was encountered below Soil Type 1 in exploration TP-1 and below the topsoil layer in explorations TP-3 through TP-5. Soil Type 2 extended to the maximum depth of exploration in TP-1, TP-3, and TP-4 and extended to an observed depth of approximately two feet bgs in TP-5 where it was underlain by Soil Type 1.

Analytical laboratory testing conducted upon representative soil samples obtained from explorations TP-1 and TP-5 indicated approximately 2 to 17 percent by weight passing the No. 200 sieve and in situ moisture contents ranging from 36 to 42 percent. Atterberg Limits analysis indicated the samples were non-plastic. Laboratory tested samples of Soil Type 2 are classified SP and SM according to USCS specifications and A-2-4(0) and A-3(0) according to AASHTO specifications.

4.2.2 Groundwater

Groundwater was encountered within all test pit explorations at depths ranging from two to six feet bgs. Pore-water pressure measurements obtained from cone penetration tests CPT-1 and CPT-2 indicated the presence of groundwater at approximately 10 feet bgs. The presence of wetlands and the proximity to Columbia River indicates that groundwater levels are generally shallow in the vicinity of the subject site.

Groundwater levels are subject to seasonal variance and may rise during extended periods of increased precipitation. Perched groundwater may also be present in localized areas. Seeps and springs may become evident during site grading, primarily along slopes or in

areas cut below existing grade. Structures, roads, and drainage design should be planned accordingly. Mitigation of shallow groundwater within proposed development areas is discussed in greater detail in Section 5.11, *Dewatering*, and Section 5.13, *Drainage*.

5.0 DESIGN RECOMMENDATIONS

The geotechnical site investigation suggests the proposed development is generally compatible with surface and subsurface soils, provided the recommendations presented in this report are utilized and incorporated into the design and construction processes. The primary geotechnical concerns associated with the site are shallow groundwater, fine-textured soils, static settlement, areal settlement, and liquefaction-induced settlement. Design recommendations are presented in the following text sections.

5.1 Site Preparation and Grading

Vegetation, organic material, unsuitable fill, and deleterious material that may be encountered should be cleared from areas identified for structures and site grading. Vegetation, other organic material, and debris should be removed from the site. Stripped topsoil should also be removed, or used only as landscape fill in nonstructural areas with slopes less than 25 percent. The stripping depth for sod and highly organic topsoil is anticipated to vary between 6 to 10 inches. The required stripping depth may increase in areas of existing fill, heavy organics, or previously existing structures. Actual stripping depths should be determined based upon visual observations made during construction when soil conditions are exposed. The post construction maximum depth of landscape fill placed or spread at any location onsite should not exceed one foot.

Previously disturbed soil, debris, or unconsolidated fill encountered during grading or construction activities should be removed completely and thoroughly from structural areas. Test pits excavated during site exploration were backfilled loosely with onsite soils. These test pits should be located and properly backfilled with structural fill during site improvements construction. Trees, stumps, and associated roots should also be removed from structural areas, individually and carefully. Resulting cavities and excavation areas should be backfilled with engineered structural fill.

Due to the presence of moisture sensitive soils and potentially shallow groundwater, installation of a granular working blanket may be necessary to construct site improvements. Specific recommendations for construction in wet conditions are presented in Section 5.16, *Wet Weather Construction Methods and Techniques.*

Site grading activities should be performed in accordance with requirements specified in the 2015 *International Building Code* (IBC), Chapter 18 and Appendix J, with exceptions noted in the text herein. Site preparation, soil stripping, and grading activities should be observed and documented by Columbia West.

5.2 Engineered Structural Fill

Areas proposed for fill placement should be appropriately prepared as described in the preceding text. Surface soils should then be scarified and compacted prior to additional fill placement. Engineered structural fill should be placed in loose lifts not exceeding 12 inches

in depth and compacted using standard conventional compaction equipment. The soil moisture content should be within two percentage points of optimum conditions. A field density at least equal to 95 percent of the maximum dry density, obtained from the standard Proctor moisture-density relationship test (ASTM D698), is recommended for structural fill placement. For engineered structural fill placed on sloped grades, the area should be benched to provide a horizontal surface for compaction.

Compaction of engineered structural fill should be verified by nuclear gauge field compaction testing performed in accordance with ASTM D6938. Field compaction testing should be performed for each vertical foot of engineered fill placed. Engineered fill placement should be observed by Columbia West.

Engineered structural fill placement activities should be performed during dry summer months if possible. Clean native soils may be suitable for use as structural fill if adequately moisture-conditioned to achieve recommended compaction specifications. Native fine-textured soils may require addition of moisture during late summer months or after extended periods of warm dry weather. Compacted fine-textured fill soils should be covered shortly after placement.

Because they are moisture-sensitive, fine-textured soils are often difficult to excavate and compact during wet weather conditions. If adequate compaction is not achievable with clean native soils, import structural fill consisting of well-graded granular material with a maximum particle size of three inches and no more than five percent passing the No. 200 sieve is recommended.

Representative samples of proposed engineered structural fill should be submitted for laboratory analysis and approval by Columbia West prior to placement. Laboratory analyses should include particle-size gradation and standard Proctor moisture-density analysis.

5.3 Cut and Fill Slopes

Fill placed on existing grades steeper than 5H:1V should be horizontally benched at least 10 feet into the slope. Fill slopes greater than six feet in height should be vertically keyed into existing subsurface soil. A typical fill slope cross-section is shown in Figure 3. Drainage implementations, including subdrains or perforated drain pipe trenches, may also be necessary in proximity to cut and fill slopes if seeps or springs are encountered. Drainage design may be performed on a case-by-case basis. Extent, depth, and location of drainage may be determined in the field by Columbia West during construction when soil conditions are exposed. Failure to provide adequate drainage may result in soil sloughing, settlement, or erosion.

Final cut or fill slopes at the site should not exceed 2H:1V or 10 feet in height without individual slope stability analysis. The values above assume a minimum horizontal setback for loads of 10 feet from top of cut or fill slope face or overall slope height divided by three (H/3), whichever is greater. A typical foundation slope setback detail is provided in Figure 4.

Concentrated drainage or water flow over the face of slopes should be prohibited, and adequate protection against erosion is required. Fill slopes should be constructed by placing fill material in maximum 12-inch level lifts, compacting as described in Section 5.2,

Engineered Structural Fill and horizontally benching where appropriate. Fill slopes should be overbuilt, compacted, and trimmed at least two feet horizontally to provide adequate compaction of the outer slope face. Proper cut and fill slope construction is critical to overall project stability and should be observed by Columbia West.

5.4 Foundations

Based upon preliminary correspondence with the design team, foundations are anticipated to consist of shallow continuous perimeter or column spread footings. Foundation recommendations and associated settlement estimates presented in this report are applicable to footing loads up to 2 kips per foot for perimeter footings or 36 kips per column. Foundation loads exceeding these values should be evaluated by Columbia West as additional information becomes available. Future evaluation of loads may require additional exploration and testing, outside the scope of this investigation, depending upon footing location, configuration with adjacent footings, and other considerations. Footings should be designed by a licensed structural engineer and conform to the recommendations below.

Due to presence of thick layers of loose sand and soft, fine-textured soils, ground improvement methods or specialized foundation design may be necessary to mitigate for potentially large settlements. Recommendations regarding ground improvement programs or specialized foundation design should be developed in close cooperation between the client, structural engineer, and Columbia West prior to construction. These recommendations may require additional subsurface exploration and engineering analysis outside the scope of this investigation. If shallow foundations are proposed, footings should be designed by a licensed structural engineer and conform to the recommendations below.

The existing ground surface should be prepared as described in Section 5.1, *Site Preparation and Grading*, and Section 5.2, *Engineered Structural Fill*. If shallow foundations are selected for building construction, they should be constructed as detailed in Section 5.6, *Static Settlement*. If encountered, disturbed soils and unsuitable fill should be removed from foundation alignments and replaced with granular structural fill.

To evaluate bearing capacity for proposed structures, serviceability and reliability of shear resistance for subsurface soils was considered. Allowable bearing capacity is typically a function of footing dimension and subsurface soil properties, including settlement and shear resistance. Based upon in situ field testing and laboratory analysis, the estimated allowable bearing capacity for well-drained foundations prepared as described herein is 1,000 psf. The allowable bearing capacity is based upon foundations bearing on mechanically stabilized earth (MSE) mats as recommended in Section 5.6, *Static Settlement*. Bearing capacity may be increased by one-third for transient lateral forces such as seismic or wind. The modulus of subgrade reaction is estimated to be 50 psi/inch. The estimated coefficient of friction between in situ compacted native soil or engineered structural fill and in-place poured concrete is 0.35. Lateral forces may also be resisted by an assumed passive soil equivalent fluid pressure of 250 psf/f against embedded footings. The upper six inches of soil should be neglected in passive pressure calculations.

Footings should extend to a depth at least 24 inches below lowest adjacent grade to provide adequate bearing capacity and protection against frost heave. Foundations constructed during wet weather conditions may require over-excavation of saturated subgrade soils and granular structural backfill prior to concrete placement. Over-excavation recommendations should be provided by Columbia West during foundation excavation and construction. Excavations adjacent to foundations should not extend within a 1.5H:1V angle projected down from the outside bottom footing edge without additional geotechnical analysis.

Foundations should not be permitted to bear upon existing fill or disturbed soil. Because soil is often heterogeneous and anisotropic, Columbia West should observe foundation subgrade soils prior to placing forms or reinforcing bar to verify subgrade support conditions are as anticipated in this report. If supported by shallow foundations designed in accordance with the recommendations identified above, proposed structures remain susceptible to liquefaction-induced settlement. Static settlement is discussed later in Section 5.6, *Static Settlement*. Liquefaction-induced settlement is discussed in Section 5.8, *Soil Liquefaction and Dynamic Settlement*.

5.5 Slabs on Grade

Proposed structures may have slab-on-grade floors. Slabs should be supported by a minimum of 18-inches of compacted 1¼”-0 crushed aggregate. Crushed aggregate placed under slab areas shall be compacted to at least 95 percent of the modified Proctor dry density, as determined by ASTM D1557. Disturbed soils and unsuitable fills in proposed slab locations should be removed and replaced with structural fill.

Preparation and compaction beneath slabs should be performed in accordance with the recommendations presented in Section 5.1, *Site Preparation and Grading* and Section 5.2, *Engineered Structural Fill*. Geotextile filter fabric may be used below the crushed aggregate to increase subgrade support. If desired, a moisture barrier may be constructed beneath the slabs. Slabs should be appropriately waterproofed in accordance with the desired type of finished flooring. Slab thickness and reinforcement should be designed by an experienced structural engineer in accordance with anticipated loads.

5.6 Static Settlement

Columbia West analyzed anticipated static settlement for proposed development at the project site. Settlement analysis was conducted using Schmertmann’s method to calculate vertical foundation displacement using CPT results. This method for estimating settlement of structures on sand is based on elastic theory and the strain influence approach where the largest displacements do not occur immediately under the footing, but at the depth of the peak strain influence.

Analysis was conducted for proposed columns using dimensions of 4 feet by 4 feet, and 6 feet by 6 feet based upon maximum allowable bearing pressure of 1,000psf and maximum allowable column loads of 36 kips. Settlement analysis indicated that column footings may be subject to static settlement of approximately 2 to 3 inches under the anticipated structural column loads. To assess if static settlement could be reduced to one inch or less, Columbia West evaluated settlement of proposed column footings underlain by mechanically stabilized

earth mats as discussed below. Results of the analysis indicated that estimated total and static settlement for the column footings may be reduced to one inch or less provided the following recommendations are followed.

As indicated in Table 1, proposed column footings should be underlain by a mechanically-stabilized earth mat of compacted crushed aggregate and two layers of biaxial geo-grid measuring twice the specific column length and width by three feet deep. Geotextile fabric overlain by geo-grid should be placed in the bottom of the excavation, prior to placement of aggregate. The second layer of geo-grid should be placed at the mid-point of the aggregate section (i.e., 1.5 feet below the footing elevation). Geo-grid shall consist of Alliance Geo BX2020 or an approved equivalent. Geotextile fabric shall consist of Mirafi 500X or approved equivalent. All aggregate, geo-grid, and geotextile fabric shall be placed under the direction of the site geotechnical engineer. Crushed aggregate placed in footing areas shall be compacted to at least 95 percent of the modified Proctor dry density, as determined by ASTM D1557. A detail drawing of the recommended mechanically stabilized earth mat is presented in Figure 8.

Table 1. Mechanically Stabilized Earth Mats for Individual Column Loads

Column Width	Over Excavation Dimensions	Geotextile Reinforcement
4 foot by 4 foot	8 foot by 8 foot by 3 feet deep	Place Mirafi 500x directly on subgrade soil in bottom of excavation. Place Alliance Geo BX 2020 directly onto the Mirafi 500x, and at midpoint of rock section (i.e., 1.5 feet below the footing elevation).
6 foot by 6 foot	12 foot by 12 foot by 3 feet deep	

Estimating time rate of settlement is beyond the scope of this investigation. Some expansion of subgrade may also occur due to uplift rebound forces after unloading of native soils in deep cut areas. In addition, the settlement estimates described above are based upon foundations constructed at, or near, existing site grades. If structural fill placement is necessary to meet proposed finished grades, structures and structural facilities may be subject to areal settlement associated with large-area surcharge loading. Areal settlement is discussed in the section below.

Additional settlement risk related to potential seismic events and dynamic loads is discussed in Section 5.8, *Soil Liquefaction and Dynamic Settlement*. Settlement mitigation for both static and dynamic settlement is discussed later in Section 5.9, *Settlement Mitigation and Soil Improvements*.

5.6.1 Areal Settlement

Columbia West has not reviewed preliminary grading plans but understands that cut and fill will likely be proposed at the property. Columbia West evaluated areal ground displacements that may result from large-area surcharge loading associated with engineered fill placement. Engineering analysis was conducted using various empirical and theoretical models, including elastic theory, the strain influence method (Schmertman, 1978), and one-dimensional consolidation theory. Soil compressibility parameters were primarily based upon consolidation testing conducted upon a representative sample of Soil Type 1.

Based upon the analytical laboratory testing, in situ soil measurements, and engineering analysis as described, subsurface soils are anticipated to exhibit static settlement exceeding one-inch under wide-load areal fill of one-foot or more in thickness. If fill is planned for the site, the total thickness should be evaluated along with the project serviceability limits for static settlement.

To mitigate potential concerns arising from fill-induced static settlement, preconsolidation of the site as discussed in Section 5.9.1, *Mitigation of Areal Settlement* should be considered.

5.7 Seismic Design Considerations

According to the *United States Geologic Survey* (USGS) *Seismic Design Maps 2018 Web Application Summary Report,* the anticipated peak ground and maximum considered earthquake spectral response accelerations resulting from seismic activity for the subject site are summarized in Table 2.

Table 2. Approximate Probabilistic Ground Motion Values for 'firm rock' sites based on subject property longitude and latitude

	2% Probability of Exceedance in 50 yrs
Peak Ground Acceleration	0.40 g
0.2 sec Spectral Acceleration	0.93 g
1.0 sec Spectral Acceleration	0.38 g

The listed probabilistic ground motion values are based upon "firm rock" sites with an assumed shear wave velocity of 2,500 ft/s in the upper 100 feet of soil profile. These values should be adjusted for site class effects by applying site coefficients Fa and Fv as defined in 2015 IBC Tables 1613.3.3(1) and (2); the PGA should be adjusted by applying the site coefficient F_{PGA} as defined by *ASCE 7, Chapter 11, Table 11.8-1.* The site coefficients are intended to more accurately characterize estimated peak ground and respective earthquake spectral response accelerations by considering site-specific soil characteristics and index properties.

According to Oregon Revised Statutes (ORS) 455.447, the proposed facilities do not classify as essential or hazardous facilities, major structures, or special occupancy structures. Seismic evaluation of the property was conducted in general accordance with Section 1803 of the 2017 Oregon Structural Specialty Code (OSSC) and the 2015 IBC. The site is not located in a tsunami inundation zone.

Based upon site-specific testing, site soils may be considered to be Site Class E as defined in *2015 IBC Table 1613.3.2*. This site class designation indicates that some amplification of seismic energy may occur during a seismic event because of subsurface conditions.

Localized peak ground accelerations exceeding the adjusted values may occur in some areas in direct proximity to an earthquake's origin. This may be a result of amplification of seismic energy due to depth to competent bedrock, compression and shear wave velocity

of bedrock, presence and thickness of loose, unconsolidated alluvial deposits, soil plasticity, grain size, and other factors.

Due to the presence of potentially liquefiable soils at the site, Site Class F criteria may be met if the fundamental period of vibration for proposed structures is greater than 0.5 seconds. These site class designations indicate that amplification of seismic energy may occur during a seismic event because of subsurface conditions. Additional seismic information is presented in Section 5.8, *Soil Liquefaction and Dynamic Settlement*.

Localized peak ground accelerations exceeding the adjusted values may occur in some areas in direct proximity to an earthquake's origin. This may be a result of amplification of seismic energy due to depth to competent bedrock, compression and shear wave velocity of bedrock, presence and thickness of loose, unconsolidated alluvial deposits, soil plasticity, grain size, and other factors.

Identification of specific seismic response spectra is beyond the scope of this investigation. If site structures are designed in accordance with recommendations specified in the *2015 IBC*, the potential for peak ground accelerations in excess of the adjusted and amplified values should be understood.

5.8 Soil Liquefaction and Dynamic Settlement

Liquefaction, defined as the transformation of the behavior of a granular material from a solid to a liquid due to increased pore-water pressure and reduced effective stress, may occur when granular materials quickly compact under cyclic stresses caused by a seismic event. The effects of liquefaction may include immediate ground settlement and lateral spreading.

Procedures for evaluation of liquefaction resistance of soils have been developed based upon empirical data from liquefaction case studies and have become standard of practice in the United States. These empirical procedures are based upon correlation with SPT data or CPT data. CPT data obtained in the field are used in a series of empirical equations developed using previous data from liquefaction case studies. The procedure uses the CPT data to calculate two variables: the cyclic stress ratio (CSR), or the demand imposed on the soil layer due to an expected seismic event; and the cyclic resistance ratio (CRR), or the capacity of the soil to resist liquefaction. The ability of a soil to resist liquefaction can be calculated as the ratio of CRR to CSR and represented as a factor of safety. In general, a factor of safety greater than 1.3 is considered an acceptable risk.

Soils most susceptible to liquefaction are generally saturated, cohesionless, loose to medium-dense sands within 50 feet of the ground surface. Recent research has also indicated that low plasticity silts and clays may also be subject to sand-like liquefaction behavior if the plasticity index determined by the Atterberg Limits analysis is less than 8. Potentially liquefiable soils located above the existing, historic, or expected groundwater levels do not generally pose a liquefaction hazard. It is important to note that changes in perched groundwater elevation may occur due to project development or other factors not observed at the time of investigation.

The liquefaction potential for soils underlying the site was analyzed using the CLiq program and the Robertson NCEER method of analysis. Liquefaction analysis was conducted to a

critical analysis depth of 43 and 48 feet on the soil profiles obtained from explorations CPT-1 and CPT-2 where cone penetration testing was terminated due to practical refusal. Using a peak horizontal ground acceleration of 0.40g, an earthquake moment magnitude of 7.11 (based upon deaggregation of seismic hazards for the site using the *National Seismic Hazards Mapping Project, USGS 2014*), and a design groundwater depth of two feet below existing grade, the factor of safety was less than 1.3 for several soil layers, indicating high potential for liquefaction during a seismic event.

Based upon the empirical procedures and input data described above, the total estimated settlement due to liquefaction at the analyzed location is presented in Table 3. The analysis output of CLiq is presented in Appendix E. Note that dynamic settlement induced by liquefaction occurs via different mechanisms than the estimated static settlement described in Section 5.6, *Static Settlement*.

Table 3. Estimated Settlement Induced by Liquefaction

Exploration	Liquefaction Evaluation Method	Anticipated Vertical Settlement with Depth Weighting Factor Applied
CPT-1	Robertson (NCEER 1998, 2009)	2.1 inches
CPT-2	Robertson (NCEER 1998, 2009)	1.2 inches

According to Cetin et al, a depth weighting factor may be applied to the analysis of dynamic settlement. The depth weighting factor captures the effects of void ratio redistribution in shallower sublayers, reduced shear stresses and number of shear cycles transmitted to deeper soils due to the liquefaction of shallower soils, and arching of non-liquefiable soil layers.

5.9 Settlement Mitigation and Soil Improvements

As described below, potential static and earthquake-induced liquefaction settlements may be reduced by soil improvements. One or a combination of these soil improvement or mitigation methods may be desired to increase soil shear strength and reduce the amount of potential settlement.

5.9.1 Mitigation of Areal Settlement

To reduce long-term, areal settlement of compressible site soils, proposed development areas may be pre-consolidated through a phased approach to construction or through placement of a temporary surcharge load. Pre-consolidation of site soils must occur prior to construction of underground utilities, pavements, and structures. Pre-consolidation settlement should be evaluated by periodically monitoring settlement plates prior to, during, and after fill placement. A phased approach to construction would typically consist of grading the site to proposed finished grade and allowing the underlying native soils to consolidate over a period of several months to a year. Once settlement monitoring data has indicated completion of primary consolidation, construction may resume at the discretion of the geotechnical engineer.

If a phased approach to construction is infeasible due to project scheduling considerations, the time needed to complete primary consolidation may be reduced by placing a temporary surcharge load over engineered structural fills. Because the grading plan, proposed fill thickness, surcharge material type, moisture conditions, and other considerations are currently unknown, surcharge recommendations should be determined by Columbia West at a later date when additional details become available. Recommendations should be developed by Columbia West in close cooperation with the civil/site plan engineer and contractor prior to site improvements construction. Specific design criteria, outside the scope of this investigation, should include recommendations for surcharge load and lateral extent, locations and specifications for settlement plates, and plate survey frequency. Development of final recommendations may require additional subsurface exploration, including cone penetrometer testing (CPT) and pore pressure dissipation tests, to compute time-rate of settlement estimates and evaluate associated impacts to the proposed mitigation plan.

5.9.2 Mitigation of Liquefaction Settlement

In-situ soil densification may be considered to reduce potential liquefaction settlement. A variety of soil improvement methods are available. Some improvement methods, such as dynamic compaction, may not be feasible due to observed subsurface conditions. However, other improvement methods such as compaction grouting, rammed-aggregate piers, or stone columns may be possible. The compaction grouting process consists of injecting pressurized grout into the loose or weak soil layer in a closely-spaced grid pattern. Stone columns and rammed-aggregate piers are similarly constructed in a grid pattern and may be installed by vibratory or other methods. Both methods increase relative density by densifying the soil between the grout or stone column locations, thereby reducing potential for liquefaction. Stone columns may also provide drainage pathways to allow pore pressures in potentially liquefiable layers to dissipate more quickly. Other mitigation techniques may include driven grout piles or standard steel or concrete piles. Proposed soil improvement programs should be developed by a specialized contractor working in cooperation with licensed geotechnical and structural engineers.

Soil improvements may reduce the potential liquefaction-induced movements to an acceptable level of risk. After an appropriate mitigation plan is selected, additional in-situ testing prior to construction may be conducted to determine the level of improvement achieved and reevaluate the liquefaction potential. Selection of an appropriate mitigation plan may depend upon site planning, architectural, and structural engineering factors in addition to geotechnical concerns. All parties involved should work closely together to develop a suitable improvement plan with a clear understanding of the risks.

5.10 Excavation

Soils at the site were explored to a maximum depth of approximately 49 feet within cone penetration test CPT-2. Bedrock was not encountered and blasting or specialized rock-excavation techniques are not anticipated. Groundwater was observed at depths ranging from approximately two to six feet bgs in test pit explorations and at approximately 10 feet bgs in the CPT locations. Recommendations as described in Section 5.11,

Dewatering should be considered in locations where subsurface construction activities intersect the water table.

Based upon laboratory analysis and field testing, near-surface soils may be Washington State Industrial Safety and Health Administration (WISHA) Type C. For temporary open-cut excavations deeper than four feet, but less than 20 feet in soils of these types, the maximum allowable slope is 1.5H:1V. WISHA soil type should be confirmed during field construction activities by the contractor. Soil is often anisotropic and heterogeneous, and it is possible that WISHA soil types determined in the field may differ from those described above.

Site-specific shoring design may be required if open-cut excavations are infeasible or if excavations are proposed adjacent to existing infrastructure. Typical methods for stabilizing excavations consist of solider piles and timber lagging, sheet pile walls, tiebacks and shotcrete, or pre-fabricated hydraulic shoring. Because lateral earth pressure distributions acting on below-grade structures are dependent upon the type of shoring system used, Columbia West should be contacted to conduct additional analysis when shoring type, excavation depths, and locations are known.

The contractor should be held responsible for site safety, sloping, and shoring. Columbia West is not responsible for contractor activities and in no case should excavation be conducted in excess of all applicable local, state, and federal laws.

5.11 Dewatering

Groundwater elevation and hydrostatic pressure should be carefully considered during design of utilities, retaining walls, or other structures that require below-grade excavation. As described previously, shallow groundwater may be encountered in proposed development areas. Utility trenches in shallow groundwater areas or excavations and cuts that remain open for even short periods of time may undermine or collapse due to groundwater effects. Placement of layers of riprap or quarry spalls in localized areas on shallow excavation side slopes may be required to limit instability. Over-excavation and stabilization of pipe trenches or other excavations with imported crushed aggregate or gabion rock may also be necessary to provide adequate subgrade support.

Significant pumping and dewatering may be required to temporarily reduce the groundwater elevation to allow construction of proposed below-grade structures, installation of utilities, or placement of structural fills. Dewatering via a sump within excavation zones may be insufficient to control groundwater and provide excavation side slope stability. Dewatering may be more feasibly conducted by installing a system of temporary well points and pumps around proposed excavation areas or utility trenches. Depending on proposed utility depths, a site-specific dewatering plan may be necessary. Well pumps should remain functioning at all times during the excavation and construction period. Suitable back-up pumps and power supply should be available to prevent unanticipated shut-down of dewatering equipment. Failure to operate pumps full-time may result in flooding of the excavation zones, resulting in damage to forms, slopes, or equipment.

5.12 Lateral Earth Pressure

If retaining walls are proposed, lateral earth pressures should be carefully considered in the design process. Hydrostatic pressure and additional surcharge loading should also be considered. Retained material may include engineered structural backfill or undisturbed native soil. Structural wall backfill should consist of imported granular material meeting *Section 02630 Base Aggregate, and Table 02630-1* of ODOT Standard Specifications. Backfill should be prepared and compacted to at least 95 percent of the modified Proctor dry density, as determined by ASTM D1557. Recommended parameters for lateral earth pressures for engineered structural fill consisting of imported granular fill are presented in Table 4.

The design parameters presented in Table 4 are valid for static loading cases only and are based upon in situ native soils or compacted granular fill. The recommended earth pressures do not include surcharge loads, dynamic loading, hydrostatic pressure, or seismic design.

If seismic design is required for unrestrained walls, seismic forces may be calculated by superimposing a uniform lateral force of $10H^2$ pounds per lineal foot of wall, where H is the total wall height in feet. For restrained walls, seismic forces may be calculated by superimposing a uniform lateral force of $25H^2$ pounds per lineal foot of wall, where H is the total wall height in feet. The resultant force should be applied at 0.6H from the base of the wall.

Table 4. Lateral Earth Pressure Parameters for Level Backfill

Backfill Material	Equivalent Fluid Pressure for Level Backfill			Wet Density	Drained Internal Angle of Friction
	At-rest	Active	Passive		
In situ native SILT (Soil Type 1)	60 pcf	41 pcf	293 pcf	110 pcf	27°
In situ native Poorly-Graded Sand / Silty Sand (Soil Type 2)	52 pcf	34 pcf	358 pcf	110 pcf	32°
ODOT 02630-1 Imported Granular Backfill	62 pcf	40 pcf	495 pcf	140 pcf	34°

* The upper 6 inches of soil should be neglected in passive pressure calculations. If exterior grade from top or toe of retaining wall is sloped, Columbia West should be contacted to provide location-specific lateral earth pressures.

A continuous one-foot-thick zone of free-draining, washed, open-graded 1-inch by 2-inch drain rock and a 4-inch perforated gravity drain pipe is assumed behind retaining walls. Geotextile filter fabric should be placed between the drain rock and backfill soil. Specifications for drainpipe design are presented in Section 5.13, *Drainage*. If walls cannot be gravity drained, saturated base conditions and/or applicable hydrostatic pressures should be assumed.

Final retaining wall design should be reviewed and approved by Columbia West. Retaining wall subgrade and backfill activities should also be observed and tested for compliance with recommended specifications by Columbia West during construction.

5.13 Drainage

At a minimum, site drainage should include surface water collection and conveyance to properly designed stormwater management structures and facilities. Drainage design in general should conform to City of Fairview regulations. Finished site grading should be conducted with positive drainage away from structures. Depressions or shallow areas that may retain ponding water should be avoided. Roof drains, low-point drains, and perimeter foundation drains are recommended for structures. Drains should consist of separate systems and gravity flow with a minimum two-percent slope away from foundations into the stormwater system or approved discharge location. Concentrated discharge of water should be prohibited across slopes and water should not be diverted, routed, or allowed to flow over or across slope faces.

Perimeter foundation drains should consist of 3-inch perforated PVC pipe surrounded by a minimum of 1 ft^3 of clean, washed drain rock per linear foot of pipe and wrapped with geotextile filter fabric. Open-graded drain rock with a maximum particle size of 3 inches and less than 2 percent passing the No. 200 sieve is recommended. Geotextile filter fabric should consist of Mirafi 140N or approved equivalent, with AOS between No. 70 and No. 100 sieve. The water permittivity should be greater than 1.5/sec. Figure 5 presents a typical foundation drain. Perimeter drains may limit increased hydrostatic pressure beneath footings and assist in reducing potential perched moisture areas.

Subdrains should also be considered if portions of the site are cut below surrounding grades. Shallow groundwater, springs, or seeps should be conveyed via drainage channel or perforated pipe into the stormwater management system or an approved discharge. Recommendations for design and installation of perforated drainage pipe may be performed on a case-by-case basis by Columbia West during construction. Failure to provide adequate surface and sub-surface drainage may result in soil slumping or unanticipated settlement of structures exceeding tolerable limits. A typical perforated drain pipe trench detail is presented in Figure 6.

Site improvements construction in some areas may occur at or near the shallow seasonal groundwater table, particularly if work is conducted during wet-weather conditions. Dewatering may be necessary and a drainage mat may be required to achieve sufficient elevation for fill placement. A typical drainage mat is shown on Figure 7. Columbia West should determine drainage mat location, extent, and thickness when subsurface conditions are exposed. Drainage mats may need to be constructed in conjunction with subdrains to convey captured water to an approved discharge location.

Drains should be closely monitored after construction to assess their effectiveness. If additional surface or shallow subsurface seeps become evident, the drainage provisions may require modification or additional drains. Columbia West should be consulted to provide appropriate recommendations.

5.14 Infiltration Testing Results

To investigate the feasibility of subsurface disposal of stormwater, Columbia West conducted in situ infiltration testing at one location within the project area on February 23rd,

2018. Results of in situ infiltration testing are presented in Table 5. Soil samples were obtained from depths of approximately four feet below ground surface elevation at or near the infiltration test location.

The soil classification presented in Table 5 is based upon laboratory analysis. The infiltration rate is presented as a recommended coefficient of permeability (k) and has been reported without application of a factor of safety. An appropriate factor of safety should be developed for proposed stormwater facilities and applied to the indicated infiltration rate prior to use in design calculations.

As indicated in Table 5, the infiltration test was conducted in test pit TP-2 at approximately four feet below ground surface. Soils in the infiltration test location were observed and sampled where appropriate to adequately characterize the subsurface profile. Tested native soil is classified as SILT (ML). Soil laboratory analytical test reports are provided in Appendix A.

Single-ring, falling head infiltration testing was performed by inserting a three-inch diameter pipe into relatively undisturbed native soil at the indicated depth. The test was conducted by filling the pipe with water and measuring time relative to changes in hydraulic head. Using Darcy's Law for saturated flow in homogeneous media, the coefficient of permeability (k) was then calculated.

Table 5. Infiltration Test Data

Test Number	Location	Approximate Test Depth (feet bgs)	Soil Type *	Passing No. 200 Sieve (%)	Depth to Groundwater (feet bgs)	Infiltration Rate (Coefficient of Permeability, k) (in/hr)
IT-2.1	TP-2 (See Figure 2)	4	ML, SILT	97.6	6	<0.1

Infiltration facilities should be protected from erosion, especially during construction. Improperly designed or constructed systems may become fouled or plugged with mud or micaceous sediment. Excavation and preparation of stormwater disposal facilities should be closely monitored by Columbia West. An emergency overflow discharge point should be provided.

It is important to note that site soil conditions and localized infiltration capability may be variable. Therefore, infiltration rates should be verified by additional testing during construction when subgrade soils are exposed. Subgrade soils should also be observed by Columbia West to verify soil index properties pertaining to infiltration are similar to those at the tested locations. The observed infiltration rate provided in Table 5 is based upon an assumed adequate separation distance between the infiltrating surface and the ground water table and Columbia West's observations during limited subsurface exploration. Therefore, they may not be an accurate indicator of post-developed long-term system performance. It should be understood that systems may require additional infiltration capacity if submerged or mounded conditions are present, or construction verification testing

or future performance indicate the system is not functioning according to original tested and designed parameters.

5.15 Bituminous Asphalt and Portland Cement Concrete

Based upon review of preliminary site plans, proposed development will include new private asphalt concrete parking areas and access drives. Columbia West recommends adherence to City of Fairview standards if improvements are made to public streets.

Columbia West conducted engineering analysis for flexible pavement design for the employee parking area expansion using the 1993 *AASHTO Guide for Design of Pavement Structures*. General onsite flexible pavement section design recommendations are summarized below in Table 6. Design and construction recommendations are summarized in the following text. The design is based upon the assumption that heavy truck traffic will not impact the employee parking area.

Table 6. Flexible Pavement Section Recommendations

Pavement Section Layer	Minimum Layer Thickness for Expected Traffic Loads	Specifications
	Passenger Car Traffic and Parking	
Asphalt concrete surface Level 3 HMAC	3 inches	91 percent of maximum Rice density (AASHTO T-209)
Base course (ODOT SSCS Section 02630.10) ¾”- 0 crushed aggregate	8 inches	95 percent of maximum standard Proctor density (AASHTO T-180)
Scarified and compacted existing subgrade material	12 inches	Compacted to 95 percent of maximum modified Proctor density (AASHTO T-180)

For dry weather construction, pavement surface sections should bear upon competent subgrade consisting of scarified and compacted native soil or engineered structural fill. Wet weather pavement construction is discussed later in Section 5.16, *Wet Weather Construction Methods and Techniques*. Subgrade conditions should be evaluated and tested by a licensed geotechnical engineer or designated representative prior to placement of crushed aggregate base. Subgrade evaluation should include nuclear gauge density testing and wheel proof-roll observations conducted with a loaded 12-cubic yard, double-axle dump truck or equivalent. Nuclear gauge density testing should be conducted at 250-foot intervals or as determined by the onsite geotechnical engineer. Subgrade soil should be compacted to at least 95 percent of the modified Proctor dry density, as determined by AASHTO T-180. Areas of observed deflection or rutting during proof-roll evaluation should be excavated to a firm surface and replaced with compacted crushed aggregate.

Crushed aggregate base should be compacted and tested in accordance with the specifications outlined above. Asphalt concrete pavement should be compacted to at least 91 percent of maximum Rice density, as determined by AASHTO T-209. Nuclear gauge density testing should be conducted to verify adherence to recommended specifications. Testing frequency should be in accordance with City of Fairview specifications..

5.16 Wet Weather Construction Methods and Techniques

Wet weather construction often results in significant shear strength reduction and soft areas that may rut or deflect. Installation of granular working layers may be necessary to provide a firm support base and sustain construction equipment. Granular layers should consist of all-weather gravel, 2x4-inch gabion, or other similar material (six-inch maximum size with less than five percent passing the No. 200 sieve).

Construction equipment traffic across exposed soil should be minimized. Equipment traffic induces dynamic loading, which may result in weak areas and significant reduction in shear strength for wet soils. Wet weather construction may also result in generation of significant excess quantities of soft wet soil. This material should be removed from the site or stockpiled in a designated area.

Construction during wet weather conditions may require increased base thickness. Over-excavation of subgrade soils or subgrade amendment with lime and/or cement may be necessary to provide a firm base upon which to place crushed aggregate. Geotextile filter fabric is also recommended. If soil amendment with lime or cement is considered, Columbia West should be contacted to provide appropriate recommendations based upon observed field conditions and desired performance criteria.

Crushed aggregate base should be installed in a single lift with trucks end-dumping from an advancing pad of granular fill. During extended wet periods, stripping activities may also need to be conducted from an advancing pad of granular fill. Once installed, the crushed aggregate base should be compacted with several passes from a static drum roller. A vibratory compactor is not recommended because it may further disturb the subgrade. Subdrains may also be necessary to provide subgrade drainage and maintain structural integrity.

Crushed aggregate base should be compacted to at least 95 percent of the modified Proctor dry density, as determined by ASTM D1557. Compaction should be verified by nuclear gauge density testing. Observation of a proof-roll with a loaded dump truck is also recommended as an indication of the compacted aggregate's performance.

It should be understood that wet weather construction is risky and costly. Columbia West should observe and document wet weather construction activities. Proper construction methods and techniques are critical to overall project integrity.

5.17 Erosion Control Measures

Based upon field observations and laboratory testing, the erosion hazard for site soils in flat to shallow-gradient portions of the property is likely to be low. The potential for erosion generally increases in sloped areas. Therefore, disturbance to vegetation in sloped areas should be minimized during construction activities. Soil is also prone to erosion if

unprotected and unvegetated during periods of increased precipitation. Erosion can be minimized by performing construction activities during dry summer months.

Site-specific erosion control measures should be implemented to address the maintenance of exposed areas. This may include silt fence, biofilter bags, straw wattles, or other suitable methods. During construction activities, exposed areas should be well-compacted and protected from erosion with visqueen, surface tactifier, or other means, as appropriate. Temporary slopes or exposed areas may be covered with straw, crushed aggregate, or riprap in localized areas to minimize erosion. Erosion and water runoff during wet weather conditions may be controlled by application of strategically placed channels and small detention depressions with overflow pipes.

After grading, exposed surfaces should be vegetated as soon as possible with erosion-resistant native vegetation. Jute mesh or straw may be applied to enhance vegetation. Once established, vegetation should be properly maintained. Disturbance to existing native vegetation and surrounding organic soil should also be minimized during construction activities.

5.18 Utility Installation

Utility installation may require subsurface excavation and trenching. Excavation, trenching and shoring should conform to federal (Occupational Safety and Health Administration) (OSHA) (29 CFR, Part 1926) and *OR-OSHA* regulations. Site soils may slough when cut vertically and sudden precipitation events or perched groundwater may result in accumulation of water within excavation zones and trenches.

Utilities should be installed in general accordance with manufacturer's recommendations. Utility trench backfill should consist of crushed aggregate or other coarse-textured, free-draining material acceptable to the client, City of Fairview, and the site geotechnical engineer. Trench backfill material within 18 inches of the top of utility pipes should be hand compacted (i.e., no heavy compaction equipment). The remaining backfill should be compacted to at least 95 percent of maximum dry density as determined by the standard Proctor moisture-density test (ASTM D698). Clean, free-draining, fine bedding sand is recommended for use in the pipe zone. With exception of the pipe zone, backfill should be placed in loose lifts not exceeding 12 inches in thickness.

Compaction of utility trench backfill material should be verified by nuclear gauge field compaction testing performed in accordance with ASTM D6938. It is recommended that field compaction testing be performed at 200-foot intervals along the utility trench centerline at the surface and midpoint depth of the trench. Compaction frequency and specifications may be modified for non-structural areas in accordance with recommendations of the site geotechnical engineer.

6.0 CONCLUSION AND LIMITATIONS

This geotechnical site investigation report was prepared in accordance with accepted standard conventional principles and practices of geotechnical engineering. This investigation pertains only to material tested and observed as of the date of this report, and is based upon proposed site development as described in the text herein. This report is a

professional opinion containing recommendations established by engineering interpretations of subsurface soils based upon conditions observed during site exploration. Soil conditions may differ between tested locations or over time. Slight variations may produce impacts to the performance of structural facilities if not adequately addressed. This underscores the importance of diligent QA/QC construction observation and testing to verify soil conditions are as anticipated in this report.

Therefore, this report contains several recommendations for field observation and testing by Columbia West personnel during construction activities. Columbia West cannot accept responsibility for deviations from recommendations described in this report. Future performance of structural facilities is often related to the degree of construction observation by qualified personnel. These services should be performed to the full extent recommended.

This report is not an environmental assessment and should not be construed as a representative warranty of site subsurface conditions. The discovery of adverse environmental conditions, or subsurface soils that deviate significantly from those described in this report, should immediately prompt further investigation. The above statements are in lieu of all other statements expressed or implied.

This report was prepared solely for the client and is not to be reproduced without prior authorization from Columbia West. Final engineering plans and specifications for the project should be reviewed and approved by Columbia West as they relate to geotechnical and grading issues prior to final design approval. Columbia West is not responsible for independent conclusions or recommendations made by other parties based upon information presented in this report. Unless a particular service was expressly included in the scope, it was not performed and there should be no assumptions based upon services not provided. Additional report limitations and important information about this document are presented in Appendix F. This information should be carefully read and understood by the client and other parties reviewing this document.

Sincerely,

COLUMBIA WEST ENGINEERING, Inc.

Daniel E. Lehto, PE, GE
Principal

REGISTERED PROFESSIONAL ENGINEER
82088PE
OREGON
MARCH 10, 2008
DANIEL E. LEHTO

5/7/18

Exp: 12/31/18

REFERENCES

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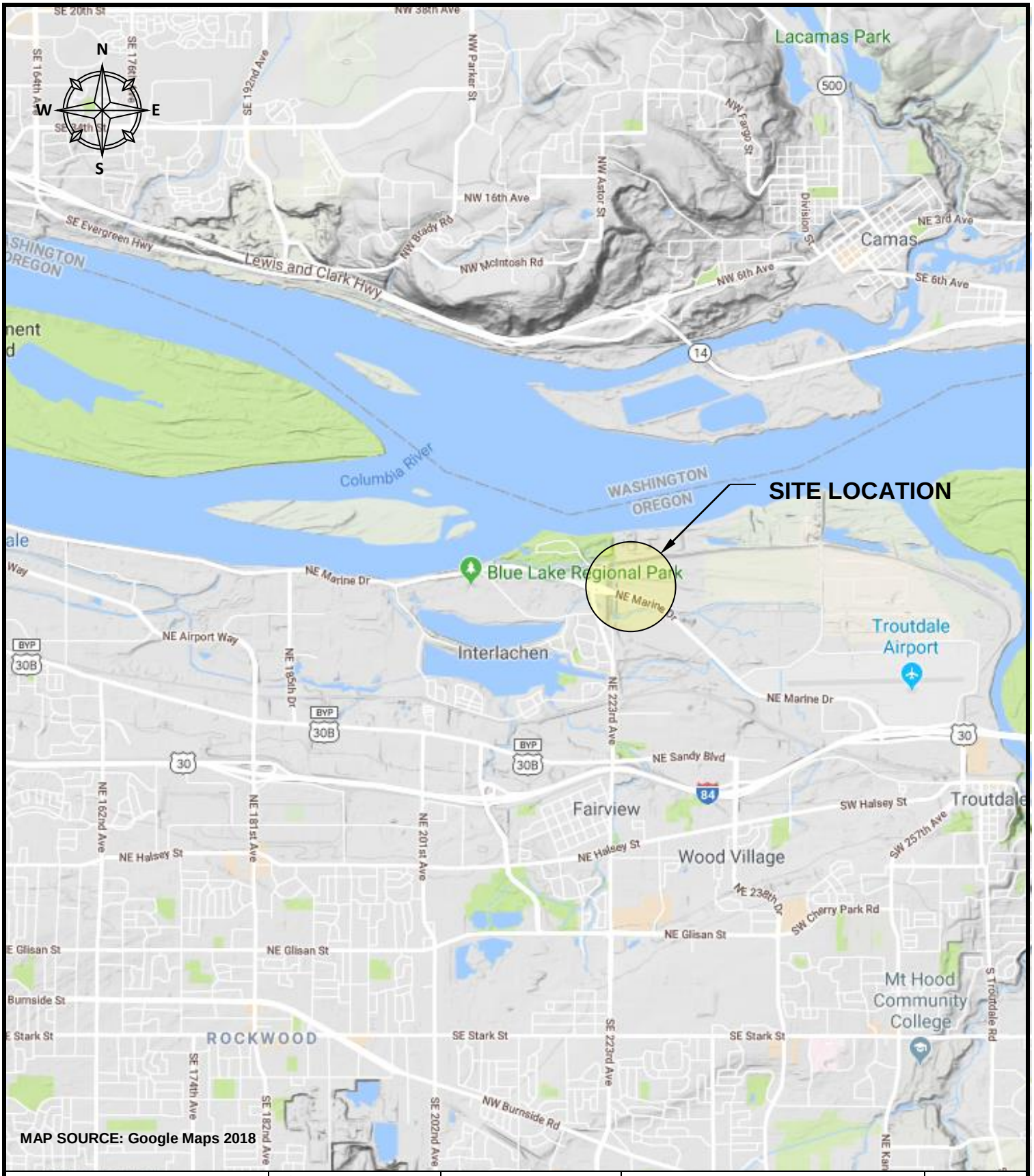
Exhibit C4

FIGURES

Exhibit C4



MAP SOURCE: Google Maps 2018

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Design	Drawn: CWS			SITE LOCATION MAP
Checked: DEL	Date: 05/1/2018			
Client: MRW	Rev	By	Date	ALLWOOD RECYCLERS FAIRVIEW, OREGON
Job No.: 18052				
CAD File: FIGURE 1				
Scale: ~1:50,000				

FIGURE 1

Exhibit C4

Infiltration Test Data						
Test Number	Location	Approximate Test Depth (feet bgs)	Soil Type	Passing No. 200 Sieve (%)	Depth to Groundwater (feet bgs)	Infiltration Rate (Coefficient of Permeability, k) (inches/hour)
IT-2.1	TP-2	4	ML, SILT	97.6	6	<0.1

NOTES:
1. SITE LOCATION: 22800 NE MARINE DRIVE, FAIRVIEW, OREGON.
2. SITE CONSISTS OF TAX PARCEL R649856490 TOTALLING APPROXIMATELY 4.9 ACRES IN SIZE.
3. DRAWING IS NOT TO SCALE.
4. BASE MAP PROVIDED BY PORTLAND MAPS 2018. SITE PLAN PROVIDED BY PLS ENGINEERING.
5. EXPLORATION LOCATIONS ARE APPROXIMATE AND NOT SURVEYED.
6. CPT EXPLORATIONS BACKFILLED WITH BENTONITE ON 2/26/18.
7. TEST PITS BACKFILLED LOOSELY WITH ONSITE SOIL ON 2/23/18.

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Design:	Drawn: CWS		
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Client: MRW	Rev	By	Date
Job No: 18052			
CAD File: FIGURE 2			
Scale: NONE			

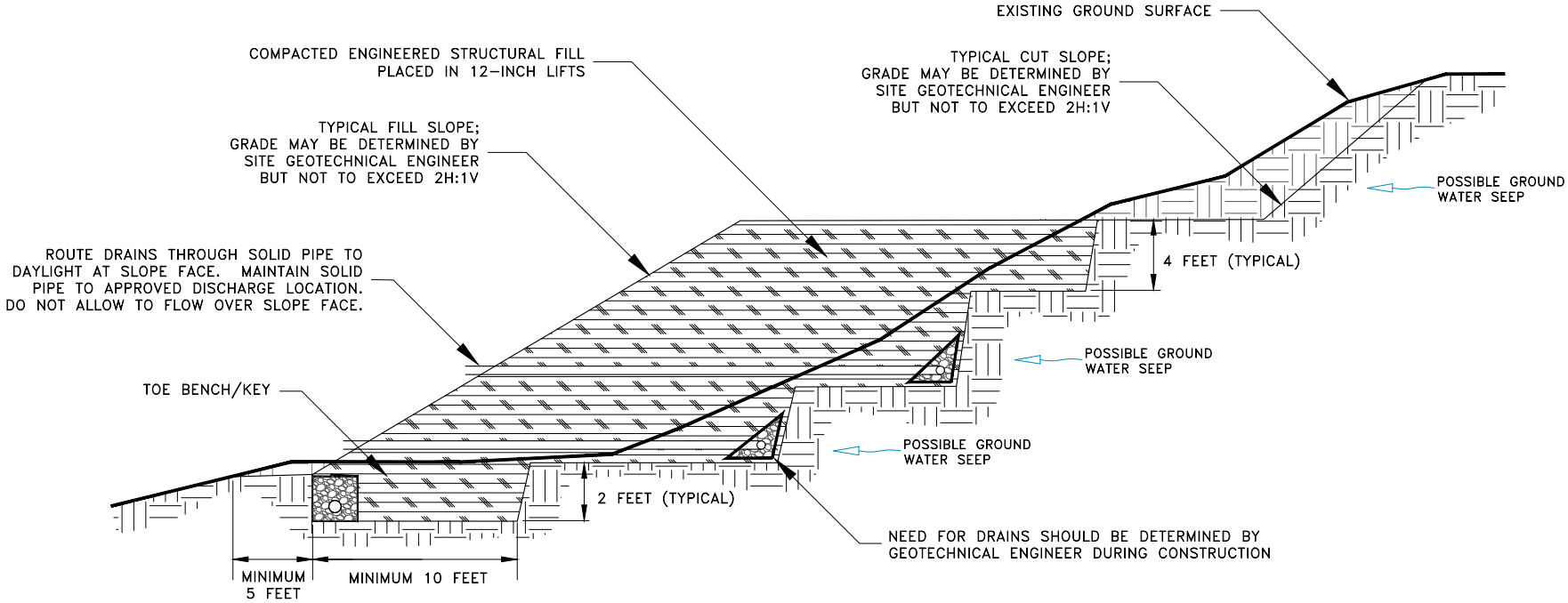
EXPLORATION LOCATION MAP

ALLWOOD RECYCLERS
FAIRVIEW, OREGON

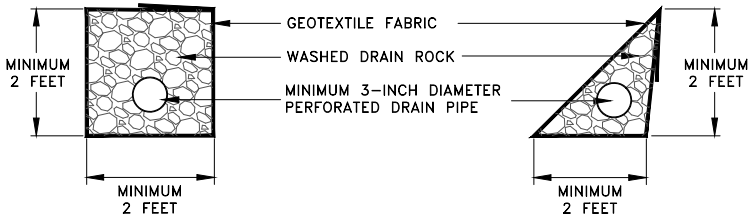
FIGURE 2

Exhibit C4

TYPICAL CUT AND FILL SLOPE CROSS-SECTION



TYPICAL DRAIN SECTION DETAIL



DRAIN SPECIFICATIONS

GEOTEXTILE FABRIC SHALL CONSIST OF MIRAFI 140N OR APPROVED EQUIVALENT WITH AOS BETWEEN No. 70 AND No. 100 SIEVE.

WASHED DRAIN ROCK SHALL BE OPEN-GRADED ANGULAR DRAIN ROCK WITH LESS THAN 2 PERCENT PASSING THE No. 200 SIEVE AND A MAXIMUM PARTICLE SIZE OF 3 INCHES.

NOTES:
1. DRAWING IS NOT TO SCALE.
2. SLOPES AND PROFILES SHOWN ARE APPROXIMATE.
3. DRAWING REPRESENTS TYPICAL FILL AND CUT SLOPE SECTION, AND MAY NOT BE SITE-SPECIFIC.

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Client: MRW	Rev	By	Date	
Job No: 18052				
CAD File: FIGURE 3				
Scale: NONE				

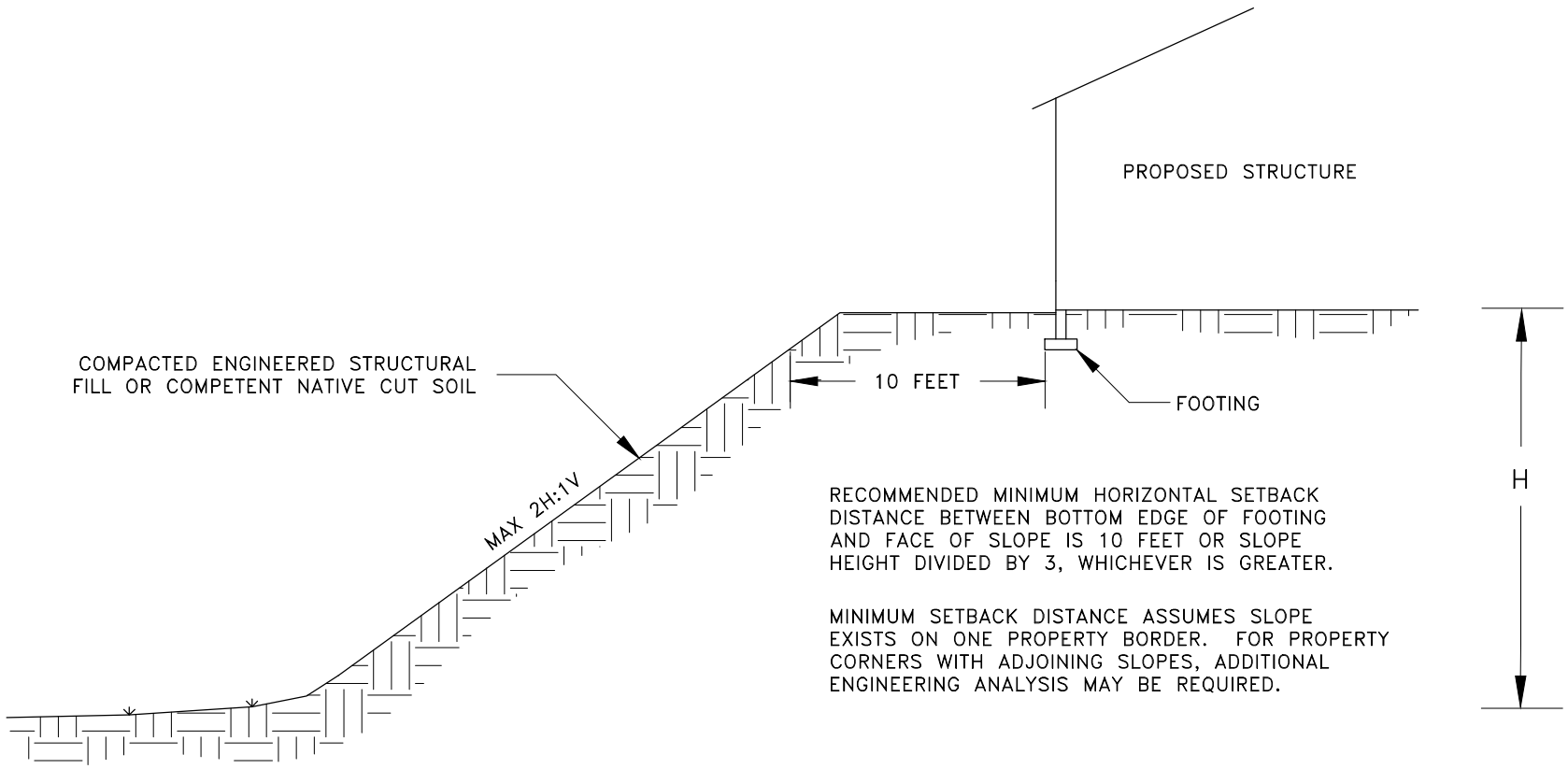
TYPICAL CUT AND FILL SLOPE CROSS-SECTION

ALLWOOD RECYCLERS
FAIRVIEW, OREGON

FIGURE 3

Exhibit C4

MINIMUM FOUNDATION SLOPE SETBACK DETAIL



RECOMMENDED MINIMUM HORIZONTAL SETBACK DISTANCE BETWEEN BOTTOM EDGE OF FOOTING AND FACE OF SLOPE IS 10 FEET OR SLOPE HEIGHT DIVIDED BY 3, WHICHEVER IS GREATER.

MINIMUM SETBACK DISTANCE ASSUMES SLOPE EXISTS ON ONE PROPERTY BORDER. FOR PROPERTY CORNERS WITH ADJOINING SLOPES, ADDITIONAL ENGINEERING ANALYSIS MAY BE REQUIRED.

NOTES:
1. DRAWING IS NOT TO SCALE.
2. SLOPES AND PROFILES SHOWN ARE APPROXIMATE.
3. DRAWING REPRESENTS TYPICAL FOUNDATION SETBACK DETAIL, AND MAY NOT BE SITE-SPECIFIC.

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Checked: DEL	Date: 04/26/18			
Client: MRW	Rev	By	Date	
Job No: 18052				
CAD File: FIGURE 4				
Scale: NONE				

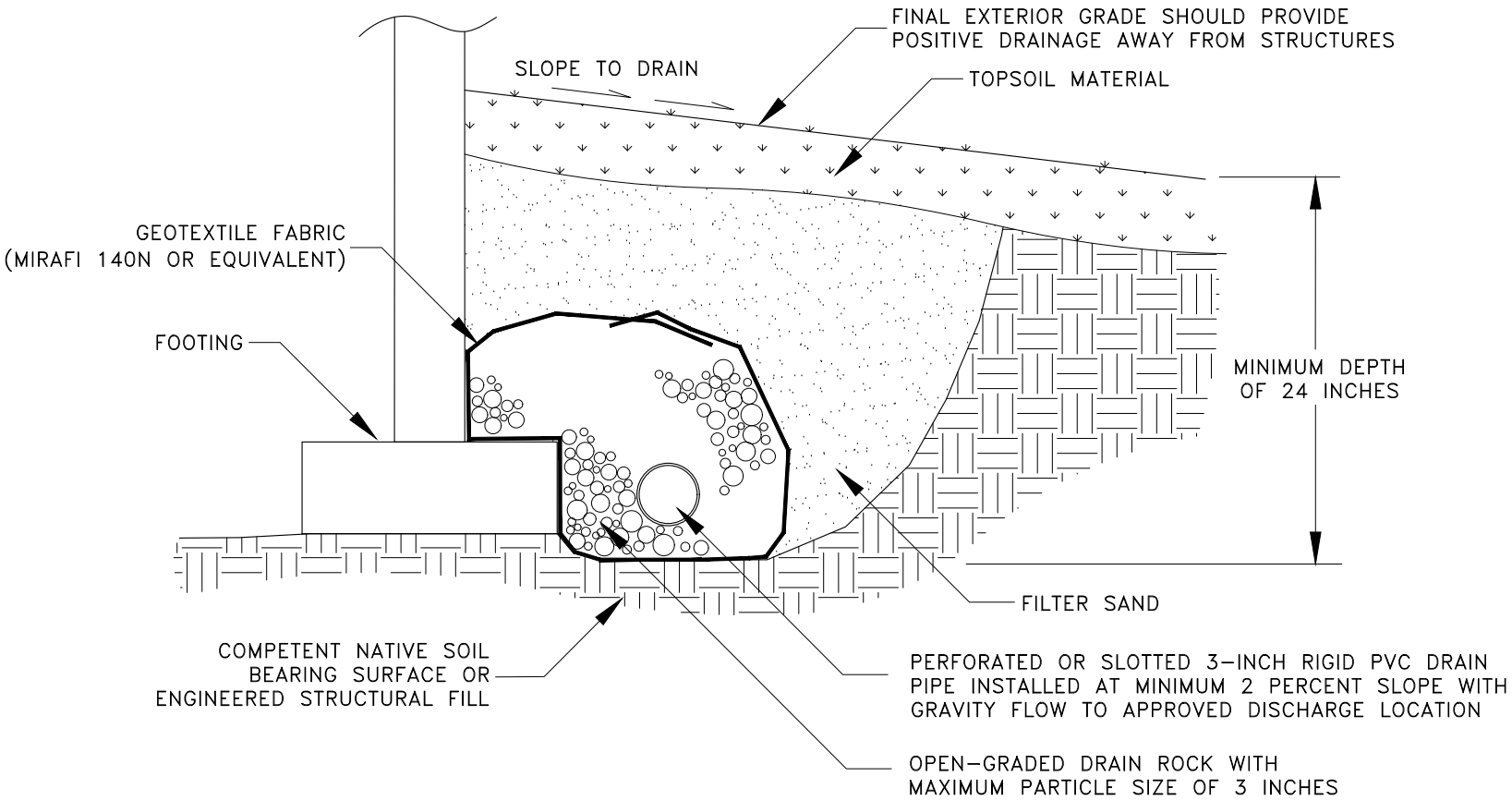
MINIMUM FOUNDATION SLOPE SETBACK DETAIL

ALLWOOD RECYCLERS
FAIRVIEW, OREGON

FIGURE 4

Exhibit C4

TYPICAL PERIMETER FOOTING DRAIN DETAIL



NOTES:
1. DRAWING IS NOT TO SCALE.
2. DRAWING REPRESENTS TYPICAL FOOTING DRAIN DETAIL AND MAY NOT BE SITE-SPECIFIC.

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Client: MRW	Rev	By	Date	
Job No: 18052				
CAD File: FIGURE 5				
Scale: NONE				

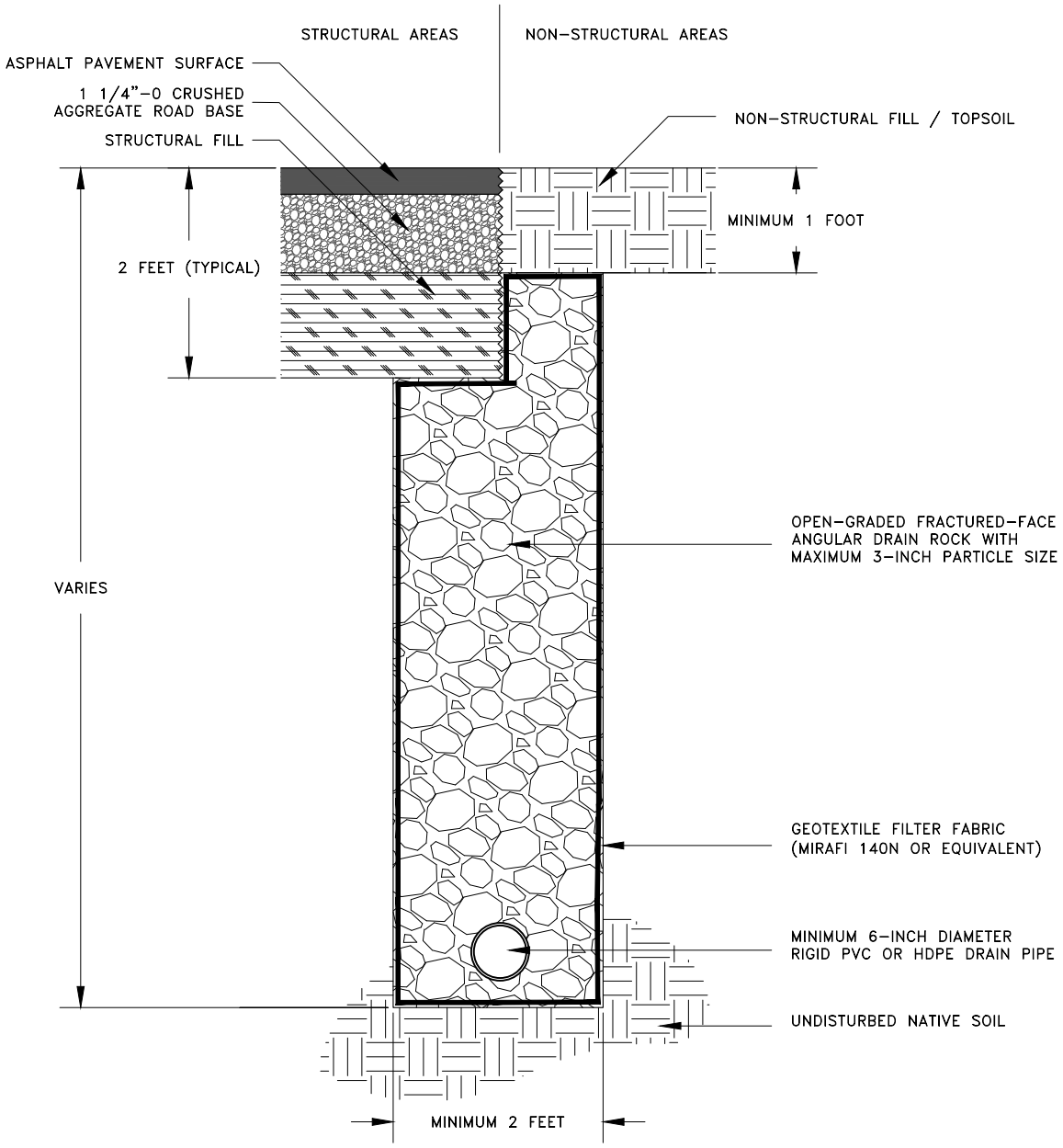
TYPICAL PERIMETER FOOTING DRAIN DETAIL

ALLWOOD RECYCLERS
FAIRVIEW, OREGON

FIGURE
5

Exhibit C4

TYPICAL PERFORATED DRAIN PIPE TRENCH DETAIL



NOTE: LOCATION, INVERT ELEVATION, DEPTH OF TRENCH, AND EXTENT OF PERFORATED PIPE REQUIRED MAY BE MODIFIED BY THE GEOTECHNICAL ENGINEER DURING CONSTRUCTION BASED UPON FIELD OBSERVATION AND SITE-SPECIFIC SOIL CONDITIONS.

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Client: MRW	Rev	By	Date
Job No: 18052			
CAD File: FIGURE 6			
Scale: NONE			

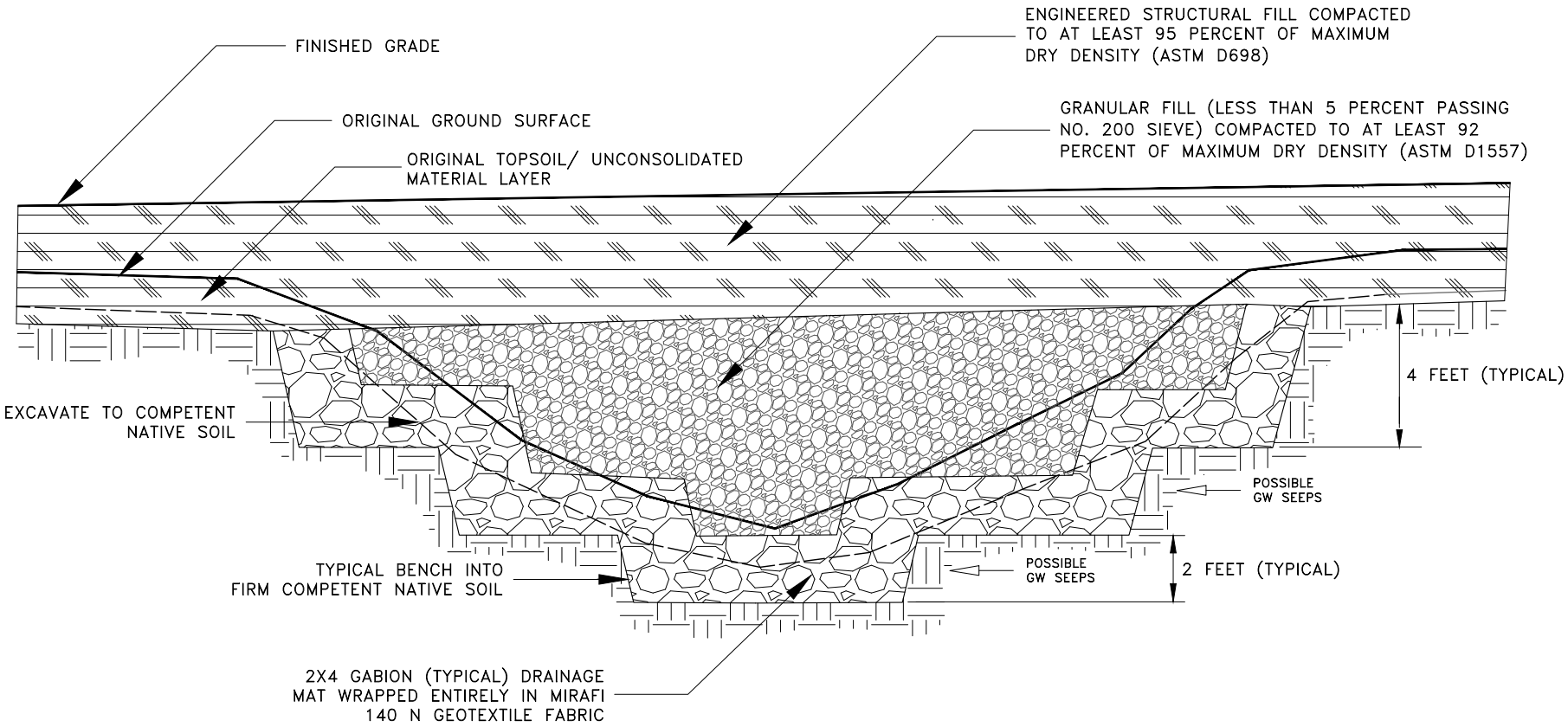
TYPICAL PERFORATED DRAIN PIPE TRENCH DETAIL

ALLWOOD RECYCLERS
FAIRVIEW, OREGON

FIGURE 6

Exhibit C4

TYPICAL DRAINAGE MAT CROSS-SECTION



NOTES:
1. DRAWING IS NOT TO SCALE.
2. SLOPES AND PROFILES SHOWN ARE APPROXIMATE.
3. DRAWING REPRESENTS TYPICAL DRAINAGE MAT SECTION AND MAY NOT BE SITE-SPECIFIC.
4. DEPTH, LOCATION, EXTENT, AND THICKNESS OF GABION MAT AND GRANULAR FILL LAYER SHOULD BE DETERMINED IN THE FIELD BY COLUMBIA WEST.
5. DRAIN PIPE MAY BE NEEDED AT LOWEST GRADIENT POINT OF DRAINAGE MAT TO CONTROL AND DIRECT FLOW.

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CAD File: FIGURE 7				
Scale: NONE				

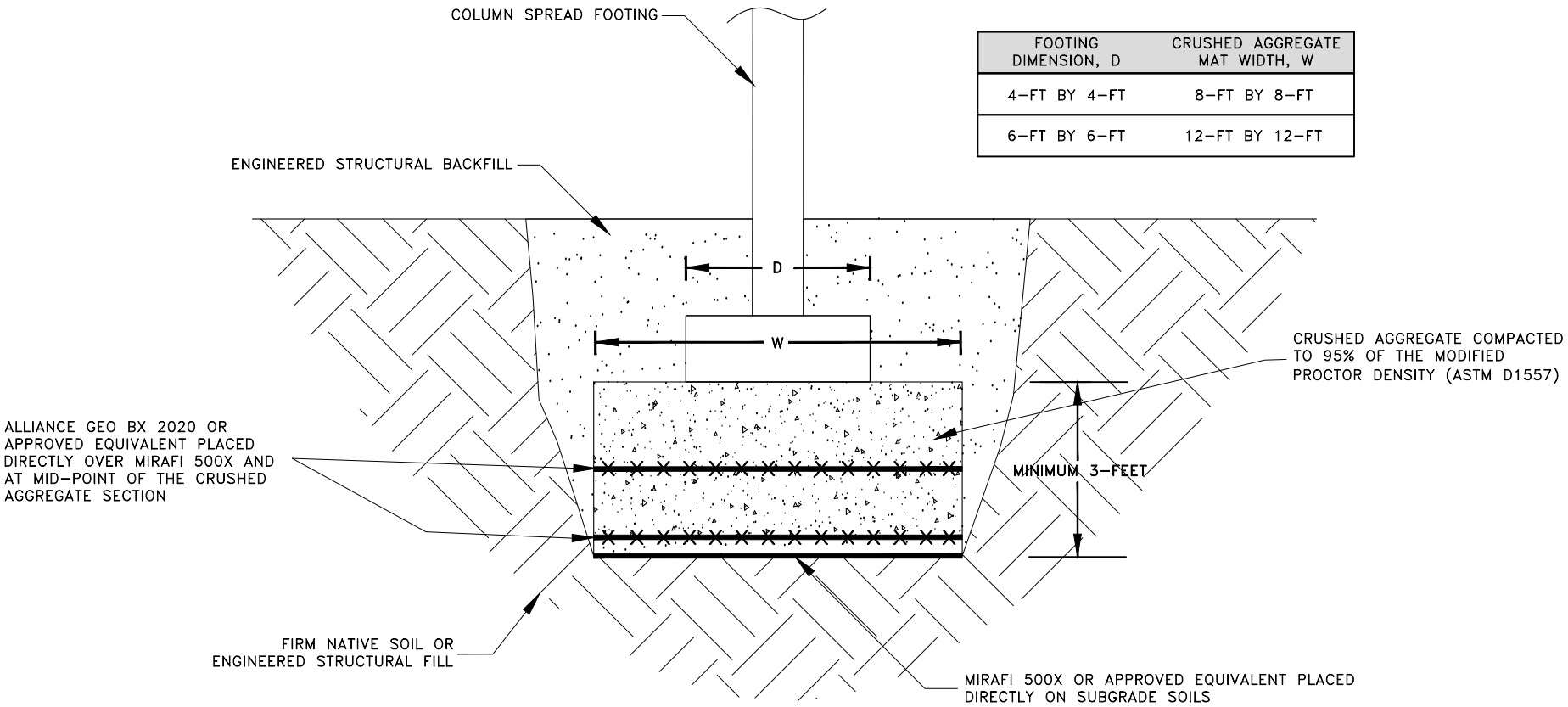
TYPICAL DRAINAGE MAT SECTION

ALLWOOD RECYCLERS
FAIRVIEW, OREGON

FIGURE 7

Exhibit C4

COLUMN FOOTING MSE MAT DETAIL



FOOTING DIMENSION, D	CRUSHED AGGREGATE MAT WIDTH, W
4-FT BY 4-FT	8-FT BY 8-FT
6-FT BY 6-FT	12-FT BY 12-FT

NOTES:
1. DRAWING IS NOT TO SCALE.
2. RECOMMENDATIONS ARE BASED UPON MAXIMUM ANTICIPATED COLUMN LOADS OF 36 KIPS.

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Client: MRW	Rev	By	Date	
Job No: 18052				
CAD File: FIGURE 8				
Scale: NONE				

COLUMN FOOTING MSE MAT DETAIL

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FIGURE 8

Exhibit C4

APPENDIX A
LABORATORY TEST RESULTS

Exhibit C4
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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Allwood Recyclers 22800 NE Marine Drive Fairview, Oregon	Mr. Mark Wubben MRW Properties, LLC PO Box 115 Fairview, Oregon 97024	18052	S18-152
		REPORT DATE 03/08/18	FIELD ID TP1.2
		DATE SAMPLED 02/23/18	SAMPLED BY GLW/MCK

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Poorly graded SAND	Test Pit TP-01 depth = 3 feet	SP, Poorly graded Sand
SPECIFICATIONS none		AASHTO SOIL TYPE A-3(0)

LABORATORY TEST DATA

LABORATORY EQUIPMENT	TEST PROCEDURE
Rainhart "Mary Ann" Sifter 637	ASTM D6913

ADDITIONAL DATA

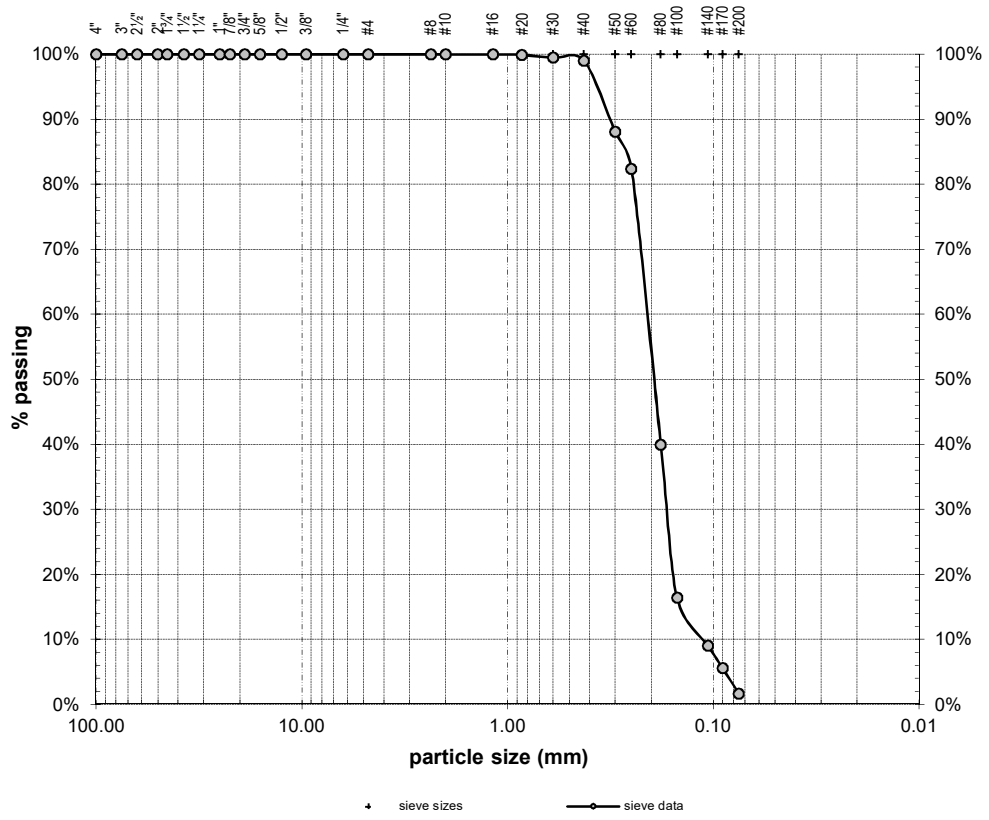
initial dry mass (g) =	165.09		
as-received moisture content =	41.9%	coefficient of curvature, C_C =	1.19
liquid limit =	-	coefficient of uniformity, C_U =	1.89
plastic limit =	-	effective size, $D_{(10)}$ =	0.111 mm
plasticity index =	NP	$D_{(30)}$ =	0.167 mm
fineness modulus =	n/a	$D_{(60)}$ =	0.210 mm

SIEVE DATA

% gravel =	0.0%
% sand =	98.4%
% silt and clay =	1.6%

	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	PERCENT PASSING SPECS max	PERCENT PASSING SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0		100.0%		
	7/8"	22.4		100.0%		
	3/4"	19.0		100.0%		
	5/8"	16.0		100.0%		
	1/2"	12.5		100.0%		
	3/8"	9.50		100.0%		
	1/4"	6.30		100.0%		
	#4	4.75	100.0%			
SAND	#8	2.36		100.0%		
	#10	2.00	100.0%			
	#16	1.18		99.9%		
	#20	0.850	99.9%			
	#30	0.600		99.4%		
	#40	0.425	99.0%			
	#50	0.300		88.1%		
	#60	0.250	82.4%			
	#80	0.180		39.9%		
	#100	0.150	16.4%			
	#140	0.106		9.0%		
	#170	0.090		5.5%		
	#200	0.075	1.6%			

GRAIN SIZE DISTRIBUTION



DATE TESTED	TESTED BY
03/05/18	JJC

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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Allwood Recyclers 22800 NE Marine Drive Fairview, Oregon	Mr. Mark Wubben MRW Properties, LLC PO Box 115 Fairview, Oregon 97024	18052	S18-153
		REPORT DATE: 03/08/18	FIELD ID: TP2.1
		DATE SAMPLED: 02/23/18	SAMPLED BY: GLW/MCK

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
SILT	Test Pit TP-02 depth = 4 feet	ML, Silt
SPECIFICATIONS: none		AASHTO SOIL TYPE: A-4(0)

LABORATORY TEST DATA

LABORATORY EQUIPMENT	TEST PROCEDURE
Rainhart "Mary Ann" Sifter 637	ASTM D6913

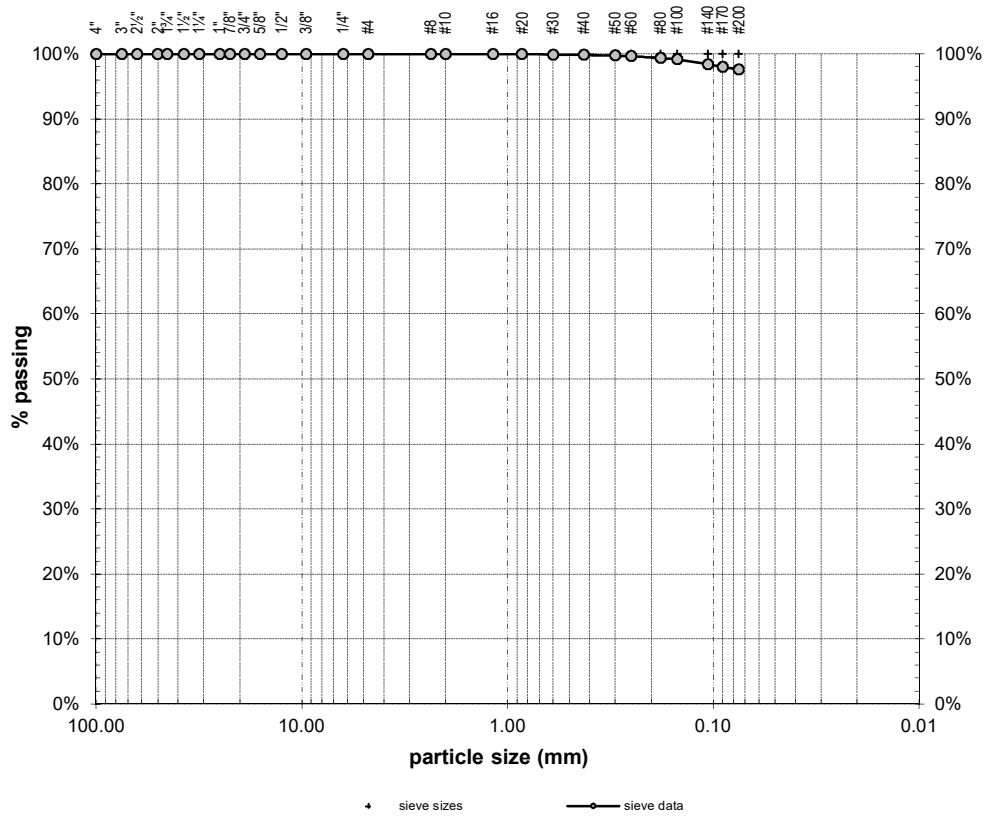
ADDITIONAL DATA

initial dry mass (g) =	171.96		
as-received moisture content =	36.5%	coefficient of curvature, C_C =	n/a
liquid limit =	-	coefficient of uniformity, C_U =	n/a
plastic limit =	-	effective size, $D_{(10)}$ =	n/a
plasticity index =	NP	$D_{(30)}$ =	n/a
fineness modulus =	n/a	$D_{(60)}$ =	n/a

SIEVE DATA

% gravel =	0.0%
% sand =	2.4%
% silt and clay =	97.6%

GRAIN SIZE DISTRIBUTION



	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	PERCENT PASSING SPECS max	PERCENT PASSING SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0		100.0%		
	7/8"	22.4		100.0%		
	3/4"	19.0		100.0%		
	5/8"	16.0		100.0%		
	1/2"	12.5		100.0%		
	3/8"	9.50		100.0%		
	1/4"	6.30		100.0%		
	#4	4.75	100.0%			
SAND	#8	2.36		100.0%		
	#10	2.00	100.0%			
	#16	1.18		100.0%		
	#20	0.850	99.9%			
	#30	0.600		99.9%		
	#40	0.425	99.8%			
	#50	0.300		99.7%		
	#60	0.250	99.7%			
	#80	0.180		99.3%		
	#100	0.150	99.2%			
	#140	0.106		98.4%		
	#170	0.090		98.0%		
	#200	0.075	97.6%			

DATE TESTED	TESTED BY
03/05/18	JJC

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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Allwood Recyclers 22800 NE Marine Drive Fairview, Oregon	Mr. Mark Wubben MRW Properties, LLC PO Box 115 Fairview, Oregon 97024	18052	S18-154
		REPORT DATE 03/08/18	FIELD ID TP2.4
		DATE SAMPLED 02/23/18	SAMPLED BY GLW/MCK

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
SILT	Test Pit TP-02 depth = 8 feet	ML, Silt
SPECIFICATIONS none		AASHTO SOIL TYPE A-7-6(16)

LABORATORY TEST DATA

LABORATORY EQUIPMENT	TEST PROCEDURE
Rainhart "Mary Ann" Sifter 637	ASTM D6913

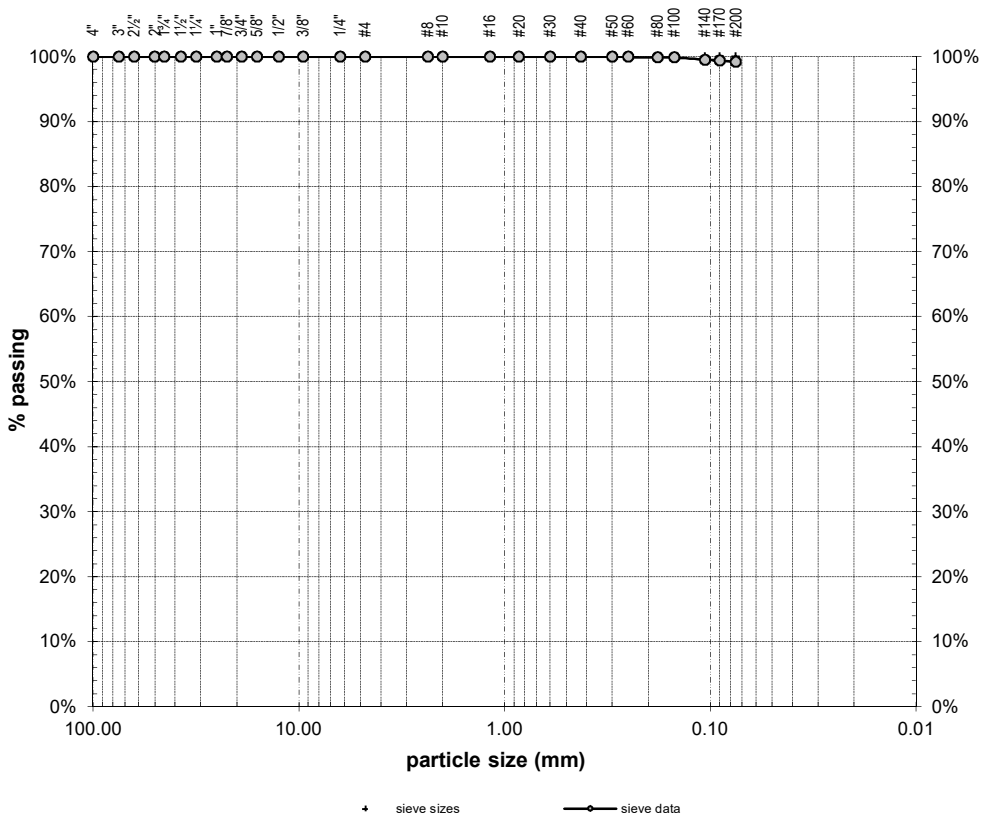
ADDITIONAL DATA

initial dry mass (g) =	161.97		
as-received moisture content =	55.2%	coefficient of curvature, C_C =	n/a
liquid limit =	42	coefficient of uniformity, C_U =	n/a
plastic limit =	29	effective size, $D_{(10)}$ =	n/a
plasticity index =	13	$D_{(30)}$ =	n/a
fineness modulus =	n/a	$D_{(60)}$ =	n/a

SIEVE DATA

% gravel =	0.0%
% sand =	0.8%
% silt and clay =	99.2%

GRAIN SIZE DISTRIBUTION



	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	PERCENT PASSING SPECS max	PERCENT PASSING SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0		100.0%		
	7/8"	22.4		100.0%		
	3/4"	19.0		100.0%		
	5/8"	16.0		100.0%		
	1/2"	12.5		100.0%		
	3/8"	9.50		100.0%		
	1/4"	6.30		100.0%		
	#4	4.75	100.0%			
SAND	#8	2.36		100.0%		
	#10	2.00	100.0%			
	#16	1.18		100.0%		
	#20	0.850	100.0%			
	#30	0.600		100.0%		
	#40	0.425	100.0%			
	#50	0.300		99.9%		
	#60	0.250	99.9%			
	#80	0.180		99.9%		
	#100	0.150	99.8%			
	#140	0.106		99.5%		
	#170	0.090		99.4%		
	#200	0.075	99.2%			

DATE TESTED	TESTED BY
03/05/18	JJC

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ATTERBERG LIMITS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Allwood Recyclers 22800 NE Marine Drive Fairview, Oregon	Mr. Mark Wubben MRW Properties, LLC PO Box 115 Fairview, Oregon 97024	18052	S18-154
		REPORT DATE: 03/08/18	FIELD ID: TP2.4
		DATE SAMPLED: 02/23/18	SAMPLED BY: GLW/MCK

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
SILT	Test Pit TP-02 depth = 8 feet	ML, Silt

LABORATORY TEST DATA

LABORATORY EQUIPMENT	TEST PROCEDURE
Liquid Limit Machine, Hand Rolled	ASTM D4318

ATTERBERG LIMITS

liquid limit =	42
plastic limit =	29
plasticity index =	13

LIQUID LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	31.88	31.39	34.04	
dry soil + pan weight, g =	28.62	28.28	29.90	
pan weight, g =	20.76	20.92	20.60	
N (blows) =	30	23	15	
moisture, % =	41.5 %	42.3 %	44.5 %	

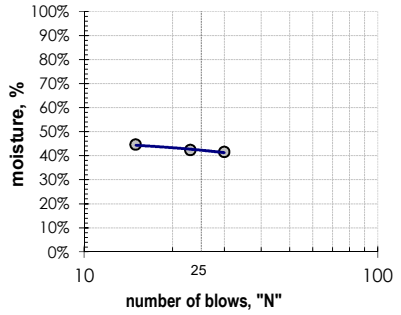
SHRINKAGE

shrinkage limit =	n/a
shrinkage ratio =	n/a

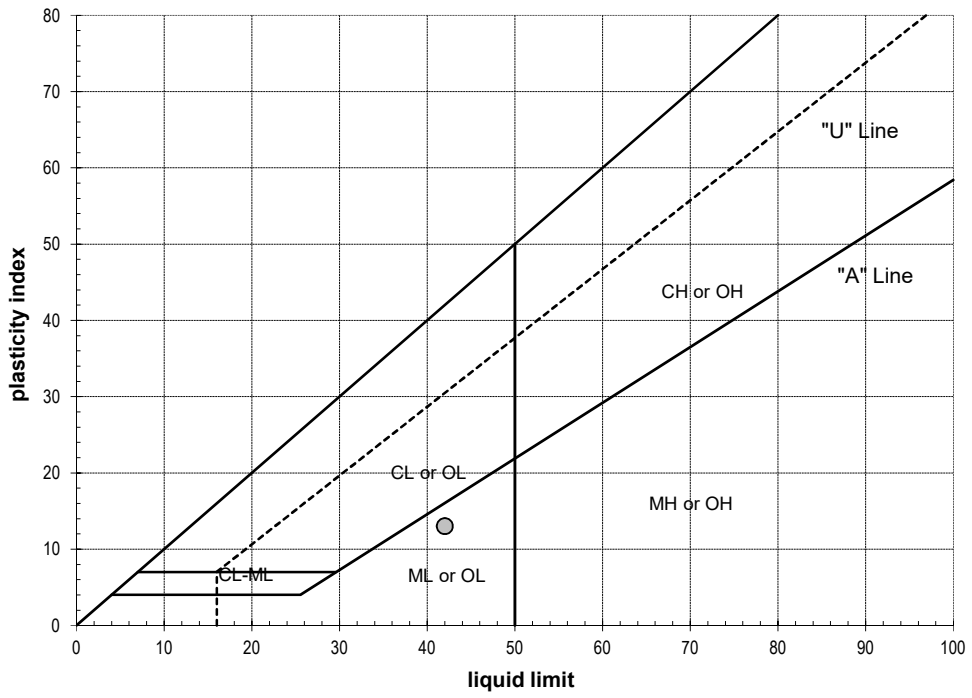
PLASTIC LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	28.79	28.70		
dry soil + pan weight, g =	26.96	26.92		
pan weight, g =	20.71	20.85		
moisture, % =	29.3 %	29.3 %		

LIQUID LIMIT



PLASTICITY CHART



ADDITIONAL DATA

% gravel =	0.0%
% sand =	0.8%
% silt and clay =	99.2%
% silt =	n/a
% clay =	n/a
moisture content =	55.2%

DATE TESTED	TESTED BY
03/07/18	RTT

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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Allwood Recyclers 22800 NE Marine Drive Fairview, Oregon	Mr. Mark Wubben MRW Properties, LLC PO Box 115 Fairview, Oregon 97024	18052	S18-155
		REPORT DATE 03/08/18	FIELD ID TP5.1
		DATE SAMPLED 02/23/18	SAMPLED BY GLW/MCK

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Silty SAND	Test Pit TP-05 depth = 2 feet	SM, Silty Sand
SPECIFICATIONS none		AASHTO SOIL TYPE A-2-4(0)

LABORATORY TEST DATA

LABORATORY EQUIPMENT	TEST PROCEDURE
Rainhart "Mary Ann" Sifter 637	ASTM D6913

ADDITIONAL DATA

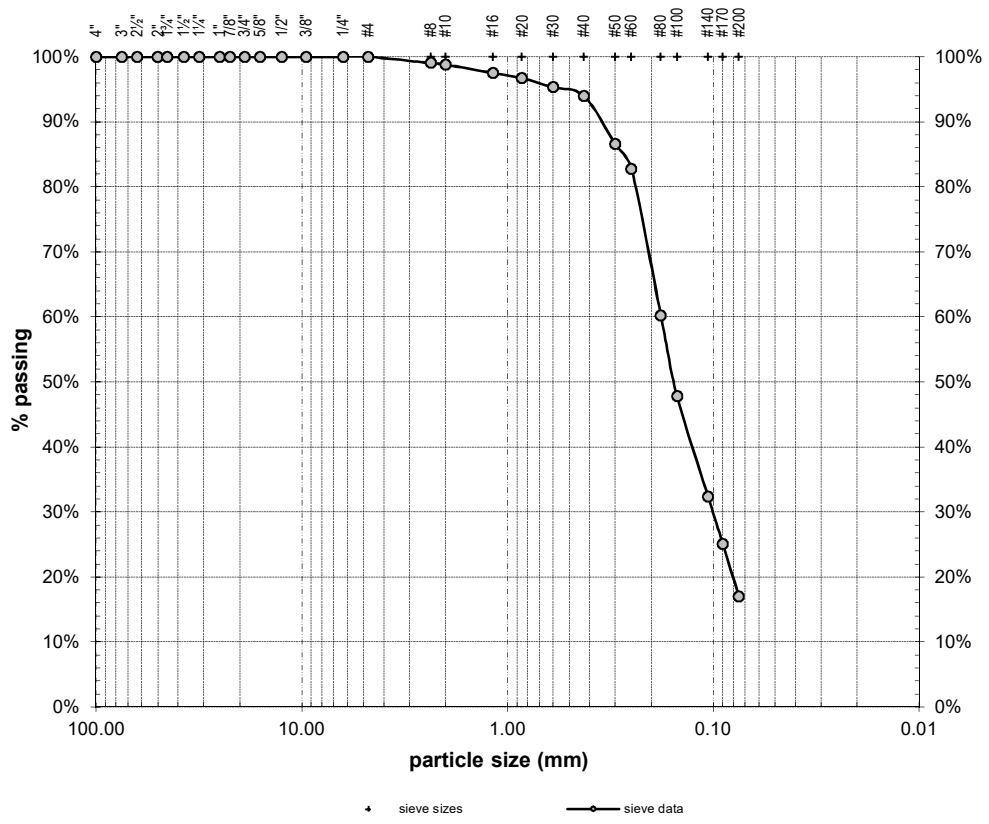
initial dry mass (g) =	175.63		
as-received moisture content =	35.7%	coefficient of curvature, C_C =	n/a
liquid limit =	-	coefficient of uniformity, C_U =	n/a
plastic limit =	-	effective size, $D_{(10)}$ =	n/a
plasticity index =	NP	$D_{(30)}$ =	0.101 mm
fineness modulus =	n/a	$D_{(60)}$ =	0.179 mm

SIEVE DATA

% gravel =	0.0%
% sand =	83.0%
% silt and clay =	17.0%

	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	PERCENT PASSING SPECS max	PERCENT PASSING SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0		100.0%		
	7/8"	22.4		100.0%		
	3/4"	19.0		100.0%		
	5/8"	16.0		100.0%		
	1/2"	12.5		100.0%		
	3/8"	9.50		100.0%		
	1/4"	6.30		100.0%		
	#4	4.75	100.0%			
SAND	#8	2.36		99.0%		
	#10	2.00	98.8%			
	#16	1.18		97.5%		
	#20	0.850	96.7%			
	#30	0.600		95.3%		
	#40	0.425	93.9%			
	#50	0.300		86.6%		
	#60	0.250	82.7%			
	#80	0.180		60.2%		
	#100	0.150	47.7%			
	#140	0.106		32.4%		
	#170	0.090		25.1%		
	#200	0.075	17.0%			

GRAIN SIZE DISTRIBUTION



DATE TESTED	TESTED BY
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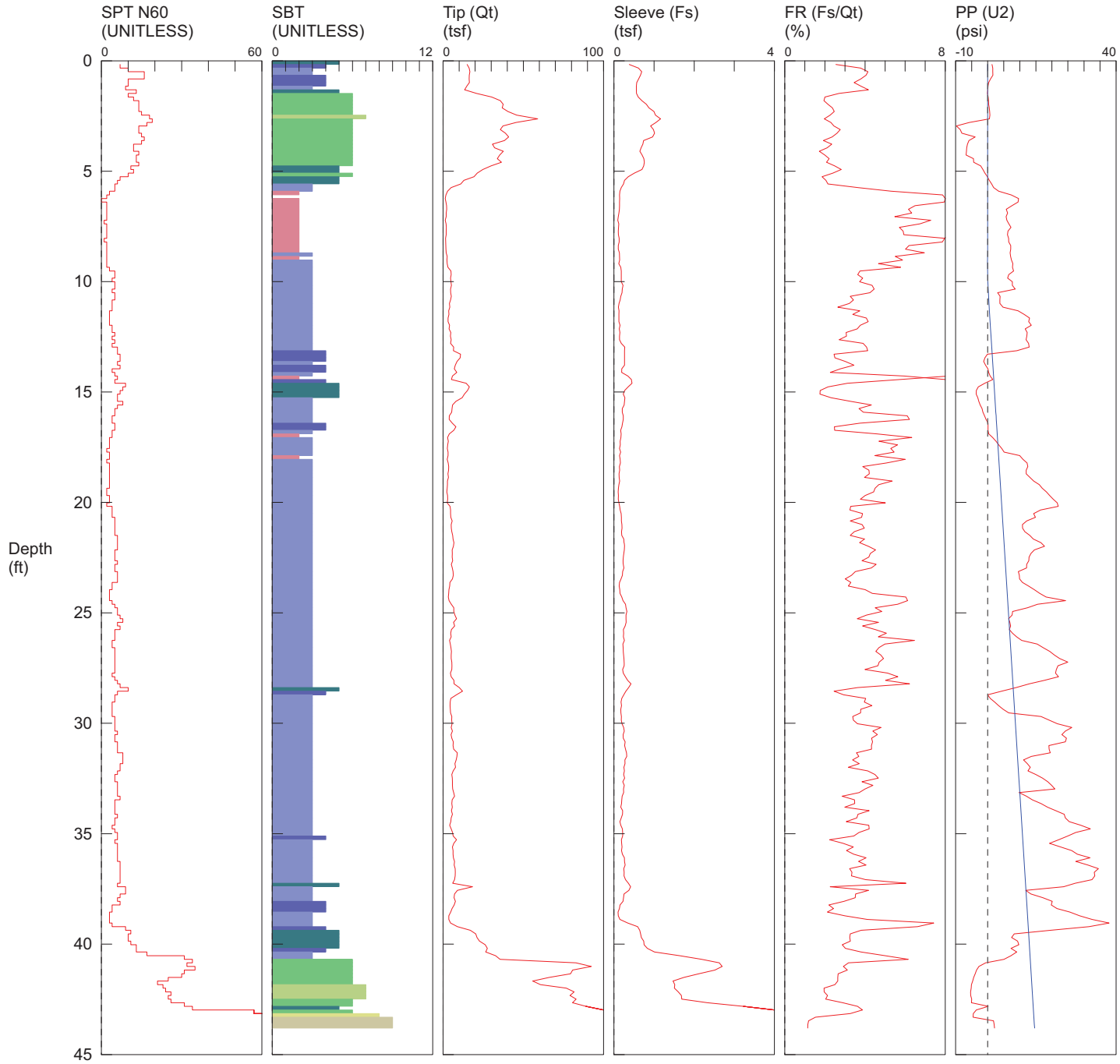
APPENDIX B
SUBSURFACE EXPLORATION LOGS

Exhibit C4

Columbia West / CPT-1 / 22800 NE Marine Dr Fairview, Or

OPERATOR: OGE DMM
CONE ID: DDG1415
HOLE NUMBER: CPT-1
TEST DATE: 2/26/2018 9:46:16 AM
TOTAL DEPTH: 43.799 ft



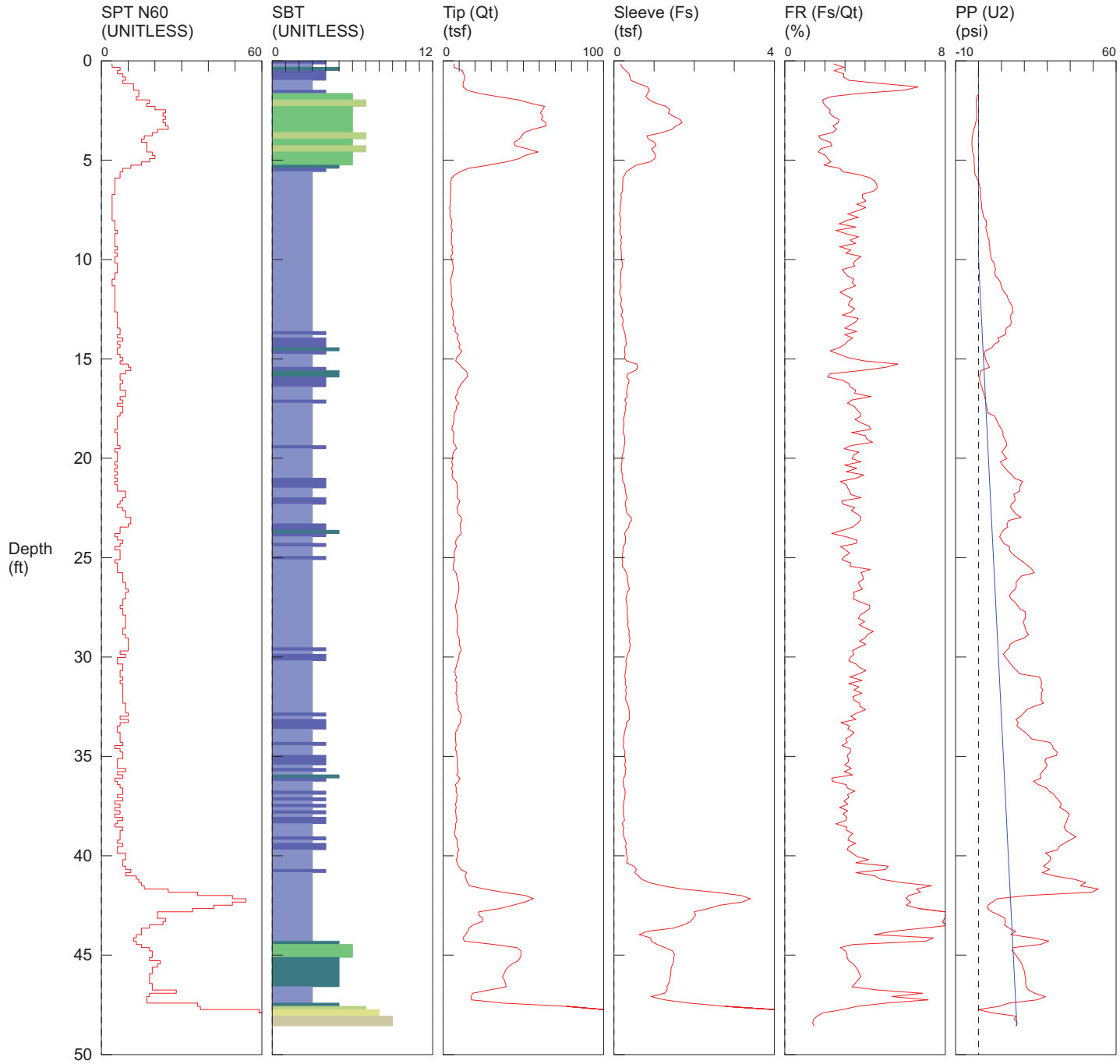
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

Exhibit C4

Columbia West / CPT-2 / 22800 NE Marine Dr Fairview, Or

OPERATOR: OGE DMM
CONE ID: DDG1415
HOLE NUMBER: CPT-2
TEST DATE: 2/26/2018 11:20:58 AM
TOTAL DEPTH: 48.556 ft



1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
Allwood Recyclers	MRW Properties		18052	TP-1
PROJECT LOCATION	**CONTRACTOR**	**EQUIPMENT**	**ENGINEER**	**DATE**
Fairview, Oregon	Allwood Recyclers	Excavator	GLW	2/23/18
TEST PIT LOCATION	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**START TIME**	**FINISH TIME**
See Figure 2	20 feet amsl	3 feet bgs	0815	1030

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 6 to 8 inches of grass and topsoil underlain by approximately 10 to 12 inches of disturbed sand and silt.					
			A-4	ML		Orange/grey, moist to wet, medium stiff, low to medium plasticity, SILT (Soil Type 1).					
▼	TP1.2		A-3(0)	SP		Grey, wet, loose to medium dense, poorly-graded SAND (Soil Type 2).	41.9	1.6	NP	NP	
5											
						Test pit terminated at 7 feet bgs. due to heavy seeps and unstable side walls. Groundwater encountered at 3 feet bgs.					
10											
15											

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
Allwood Recyclers	MRW Properties		18052	TP-2
PROJECT LOCATION	**CONTRACTOR**	**EQUIPMENT**	**ENGINEER**	**DATE**
Fairview, Oregon	Allwood Recyclers	Excavator	GLW	2/23/18
TEST PIT LOCATION	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**START TIME**	**FINISH TIME**
See Figure 2	21 feet amsl	6 feet bgs	0855	1130

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 8 to 10 inches of grass and topsoil underlain by approximately 26 to 28 inches of disturbed sand and silt.					
	TP-2.1		A-4(0)	ML		Light brown with mottling, moist to wet, medium stiff, SILT (Soil Type 1).	36.5	97.6	NP	NP	IT 2.1 Depth = 4 ft. k < 0.1 in/hr
5											
	TP-2.4		A-7-6(16)	ML		Grey, wet, soft, medium plasticity, medium stiff, SILT (Soil Type 1).	55.2	99.2	42	13	
10											
						Bottom of test pit at 13 feet bgs. Groundwater encountered at 6 feet bgs.					
15											

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
Allwood Recyclers	MRW Properties		18052	TP-3
PROJECT LOCATION	**CONTRACTOR**	**EQUIPMENT**	**ENGINEER**	**DATE**
Fairview, Oregon	Allwood Recyclers	Excavator	GLW	2/23/18
TEST PIT LOCATION	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**START TIME**	**FINISH TIME**
See Figure 2	19 feet amsl	2 feet bgs	0920	1045

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 8 to 10 inches of grass and topsoil underlain by approximately 14 to 16 inches of disturbed sand and silt.					
			A-3	SP		Grey, wet, loose to medium dense, poorly-graded SAND (Soil Type 2).					
5						Test pit terminated at 5 feet bgs. due to heavy seeps and unstable side walls. Groundwater encountered at 2 feet bgs.					
10											
15											

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
Allwood Recyclers	MRW Properties		18052	TP-4
PROJECT LOCATION	**CONTRACTOR**	**EQUIPMENT**	**ENGINEER**	**DATE**
Fairview, Oregon	Allwood Recyclers	Excavator	GLW	2/23/18
TEST PIT LOCATION	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**START TIME**	**FINISH TIME**
See Figure 2	20 feet amsl	2.5 feet bgs	0940	1100

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 6 to 8 inches of grass and topsoil underlain by approximately 16 to 18 inches of disturbed sand and silt.					
▼			A-3	SP		Grey, wet, loose, medium dense, poorly-graded SAND (Soil Type 2).					
5						Test pit terminated at 5 feet bgs. due to heavy seeps and unstable side walls. Groundwater encountered at 2.5 feet bgs.					
10											
15											

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
Allwood Recyclers	MRW Properties		18052	TP-5
PROJECT LOCATION	**CONTRACTOR**	**EQUIPMENT**	**ENGINEER**	**DATE**
Fairview, Oregon	Allwood Recyclers	Excavator	GLW	2/23/18
TEST PIT LOCATION	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**START TIME**	**FINISH TIME**
See Figure	20 feet amsl	5 feet bgs	1000	1115

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 6 to 8 inches of grass and topsoil underlain by approximately 10 to 12 inches of disturbed sand and silt.					
	TP-5.1		A-2-4(0)	SM		Grey with mottling, damp to moist, medium dense, weathered silty SAND (Soil Type 2).	35.7	17.0	NP	NP	
			A-4	ML		Grey, moist to wet, soft, SILT (Soil Type 1).					
5											
						Bottom of test pit at 8 feet bgs. Groundwater encountered at 5 feet bgs.					
10											
15											

Exhibit C4

APPENDIX C
SOIL CLASSIFICATION INFORMATION

Exhibit C4

SOIL DESCRIPTION AND CLASSIFICATION GUIDELINES

Particle-Size Classification

COMPONENT	ASTM/USCS		AASHTO	
	size range	sieve size range	size range	sieve size range
Cobbles	> 75 mm	greater than 3 inches	> 75 mm	greater than 3 inches
Gravel	75 mm – 4.75 mm	3 inches to No. 4 sieve	75 mm – 2.00 mm	3 inches to No. 10 sieve
Coarse	75 mm – 19.0 mm	3 inches to 3/4-inch sieve	-	-
Fine	19.0 mm – 4.75 mm	3/4-inch to No. 4 sieve	-	-
Sand	4.75 mm – 0.075 mm	No. 4 to No. 200 sieve	2.00 mm – 0.075 mm	No. 10 to No. 200 sieve
Coarse	4.75 mm – 2.00 mm	No. 4 to No. 10 sieve	2.00 mm – 0.425 mm	No. 10 to No. 40 sieve
Medium	2.00 mm – 0.425 mm	No. 10 to No. 40 sieve	-	-
Fine	0.425 mm – 0.075 mm	No. 40 to No. 200 sieve	0.425 mm – 0.075 mm	No. 40 to No. 200 sieve
Fines (Silt and Clay)	< 0.075 mm	Passing No. 200 sieve	< 0.075 mm	Passing No. 200 sieve

Consistency for Cohesive Soil

CONSISTENCY	SPT N-VALUE (BLOWS PER FOOT)	POCKET PENETROMETER (UNCONFINED COMPRESSIVE STRENGTH, tsf)
Very Soft	2	less than 0.25
Soft	2 to 4	0.25 to 0.50
Medium Stiff	4 to 8	0.50 to 1.0
Stiff	8 to 15	1.0 to 2.0
Very Stiff	15 to 30	2.0 to 4.0
Hard	30 to 60	greater than 4.0
Very Hard	greater than 60	-

Relative Density for Granular Soil

RELATIVE DENSITY	SPT N-VALUE (BLOWS PER FOOT)
Very Loose	0 to 4
Loose	4 to 10
Medium Dense	10 to 30
Dense	30 to 50
Very Dense	more than 50

Moisture Designations

TERM	FIELD IDENTIFICATION
Dry	No moisture. Dusty or dry.
Damp	Some moisture. Cohesive soils are usually below plastic limit and are moldable.
Moist	Grains appear darkened, but no visible water is present. Cohesive soils will clump. Sand will bulk. Soils are often at or near plastic limit.
Wet	Visible water on larger grains. Sand and silt exhibit dilatancy. Cohesive soil can be readily remolded. Soil leaves wetness on the hand when squeezed. Soil is much wetter than optimum moisture content and is above plastic limit.

Exhibit C4

AASHTO SOIL CLASSIFICATION SYSTEM

TABLE 1. Classification of Soils and Soil-Aggregate Mixtures

General Classification	Granular Materials (35 Percent or Less Passing .075 mm)				Silt-Clay Materials (More than 35 Percent Passing 0.075)		
Group Classification	A-1	A-3	A-2	A-4	A-5	A-6	A-7
Sieve analysis, percent passing:							
2.00 mm (No. 10)	-	-	-				
0.425 mm (No. 40)	50 max	51 min	-	-	-	-	-
0.075 mm (No. 200)	25 max	10 max	35 max	36 min	36 min	36 min	36 min
Characteristics of fraction passing 0.425 mm (No. 40)							
Liquid limit				40 max	41 min	40 max	41 min
Plasticity index	6 max	N.P.		10 max	10 max	11 min	11 min
General rating as subgrade	Excellent to good				Fair to poor		

Note: The placing of A-3 before A-2 is necessary in the "left to right elimination process" and does not indicate superiority of A-3 over A-2.

TABLE 2. Classification of Soils and Soil-Aggregate Mixtures

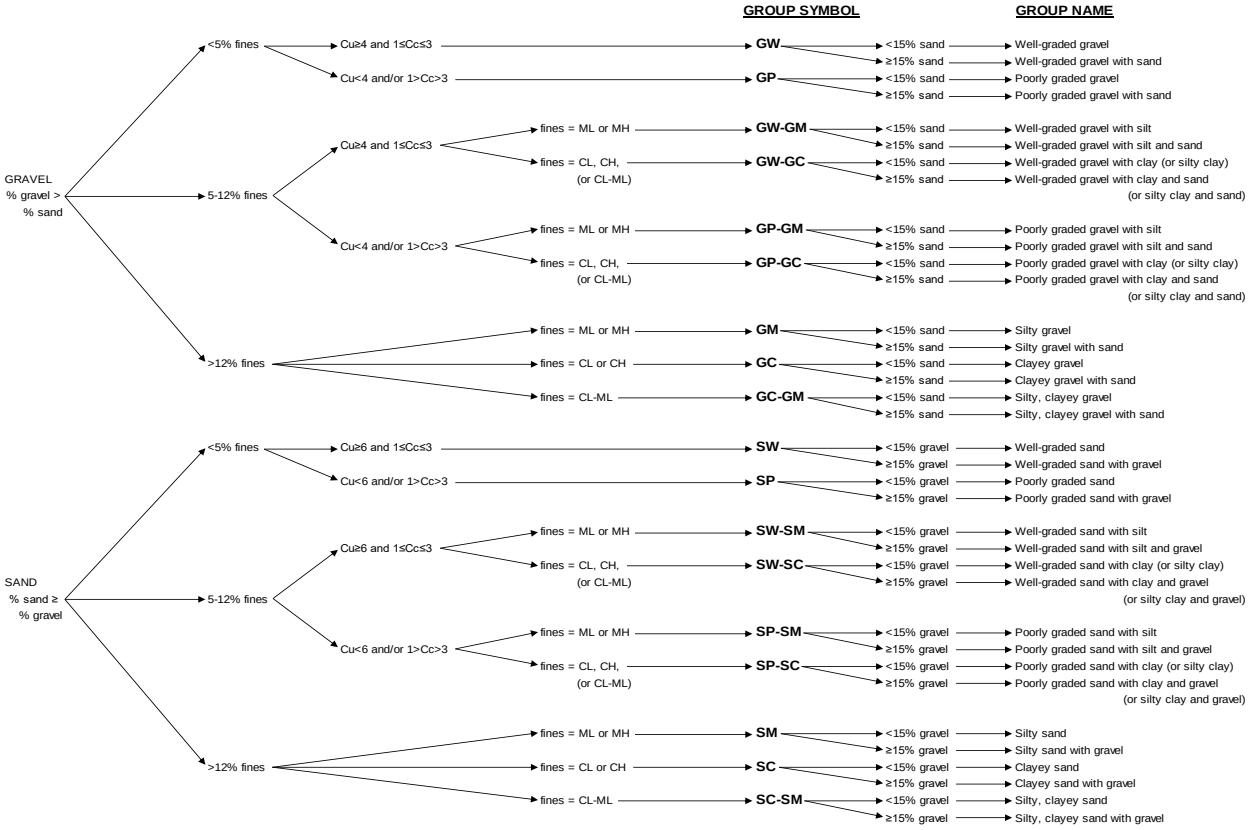
General Classification	Granular Materials (35 Percent or Less Passing 0.075 mm)							Silt-Clay Materials (More than 35 Percent Passing 0.075 mm)			
	A-1			A-2							A-7
Group Classification	A-1-a	A-1-b	A-3	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7-5, A-7-6
Sieve analysis, percent passing:											
2.00 mm (No. 10)	50 max	-	-	-	-	-	-	-	-	-	-
0.425 mm (No. 40)	30 max	50 max	51 min	-	-	-	-	-	-	-	-
0.075 mm (No. 200)	15 max	25 max	10 max	35 max	35 max	35 max	35 max	36 min	36 min	36 min	36 min
Characteristics of fraction passing 0.425 mm (No. 40)											
Liquid limit				40 max	41 min	40 max	41 min	40 max	41 min	40 max	41 min
Plasticity index	6 max		N.P.	10 max	10 max	11 min	11 min	10 max	10 max	11 min	11min
Usual types of significant constituent materials	Stone fragments, gravel and sand		Fine sand	Silty or clayey gravel and sand				Silty soils		Clayey soils	
General ratings as subgrade	Excellent to Good							Fair to poor			

Note: Plasticity index of A-7-5 subgroup is equal to or less than LL minus 30. Plasticity index of A-7-6 subgroup is greater than LL minus 30 (see Figure 2).

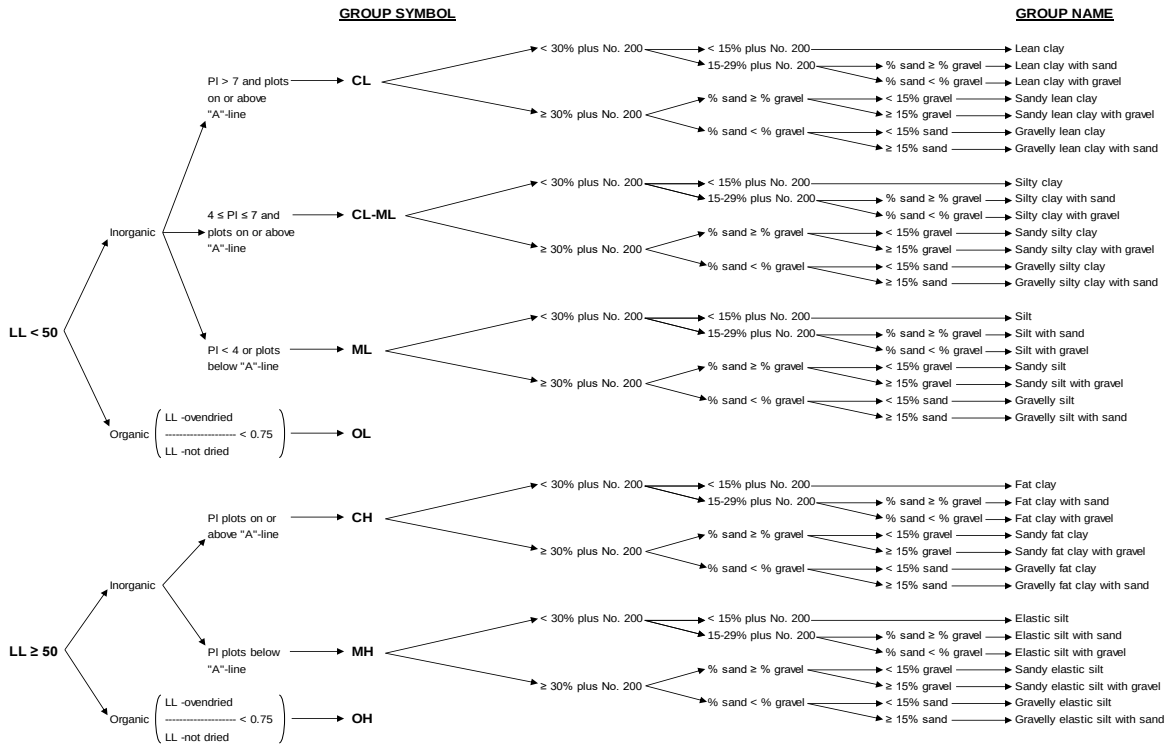
AASHTO = American Association of State Highway and Transportation Officials

Exhibit C4

USCS SOIL CLASSIFICATION SYSTEM



Flow Chart for Classifying Coarse-Grained Soils (More Than 50% Retained on No. 200 Sieve)



Flow Chart for Classifying Fine-Grained Soil (50% or More Passes No. 200 Sieve)

Exhibit C4

APPENDIX D
PHOTO LOG

Exhibit C4

Geotechnical ▪ Environmental ▪ Special Inspections
Columbia West Engineering, Inc

ALLWOOD RECYCLERS
FAIRVIEW, OREGON
PHOTO LOG

Aerial Site View, Facing Northwest.

Typical Site Conditions and Shallow Groundwater Observed, TP-3.

ALLWOOD RECYCLERS
FAIRVIEW, OREGON
PHOTO LOG

Cone Penetration Testing Conducted with Track-Mounted CPT Rig.

Debris Stockpiles Observed throughout the Site.

ALLWOOD RECYCLERS
FAIRVIEW, OREGON
PHOTO LOG

Debris Stockpiles Observed throughout the Site.

Power Tower Observed in the Northern Area of the Site.

Exhibit C4

APPENDIX E
LIQUEFACTION EVALUATION

Exhibit C4

GeoLogismiki
Geotechnical Engineers
Merarhias 56
http://www.geologismiki.gr

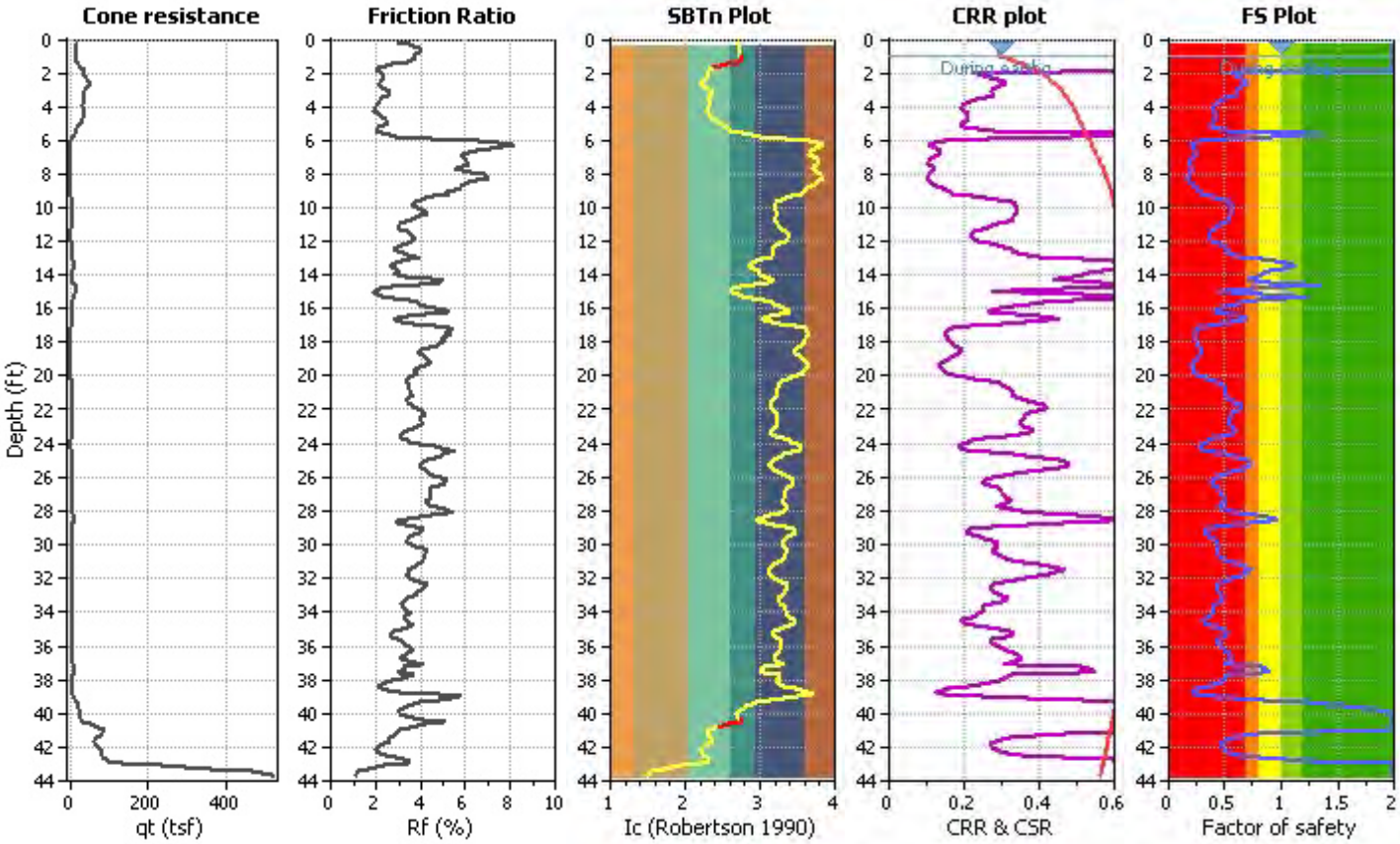
LIQUEFACTION ANALYSIS REPORT

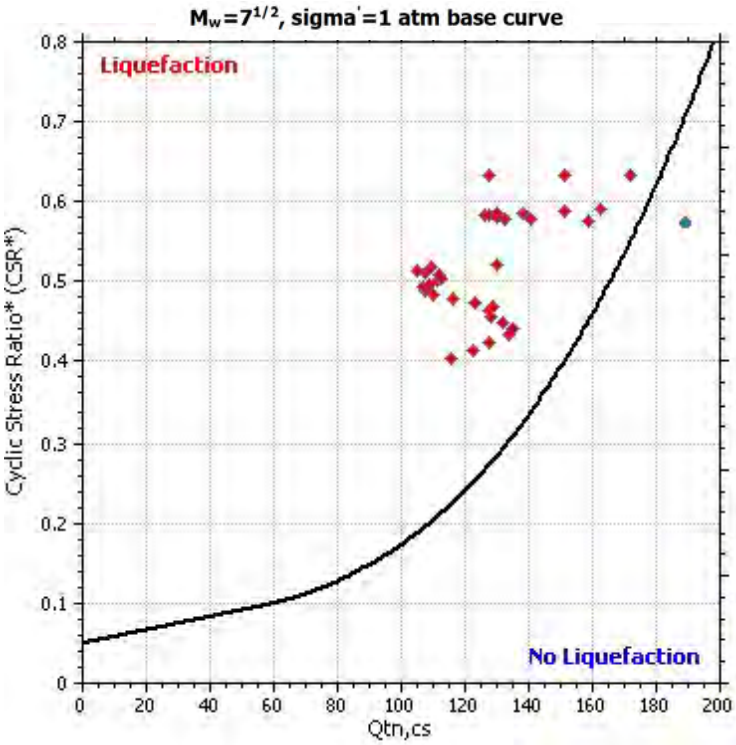
Project title : Allwood Recyclers **Location : Fairview, Oregon**

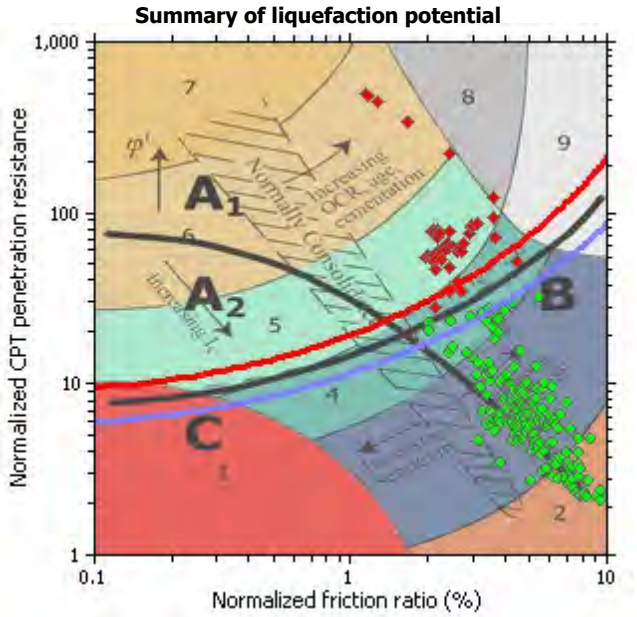
CPT file : 18052 CPT-1

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	2.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	1.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	43.00 ft
Earthquake magnitude M_w:	7.11	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.40	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

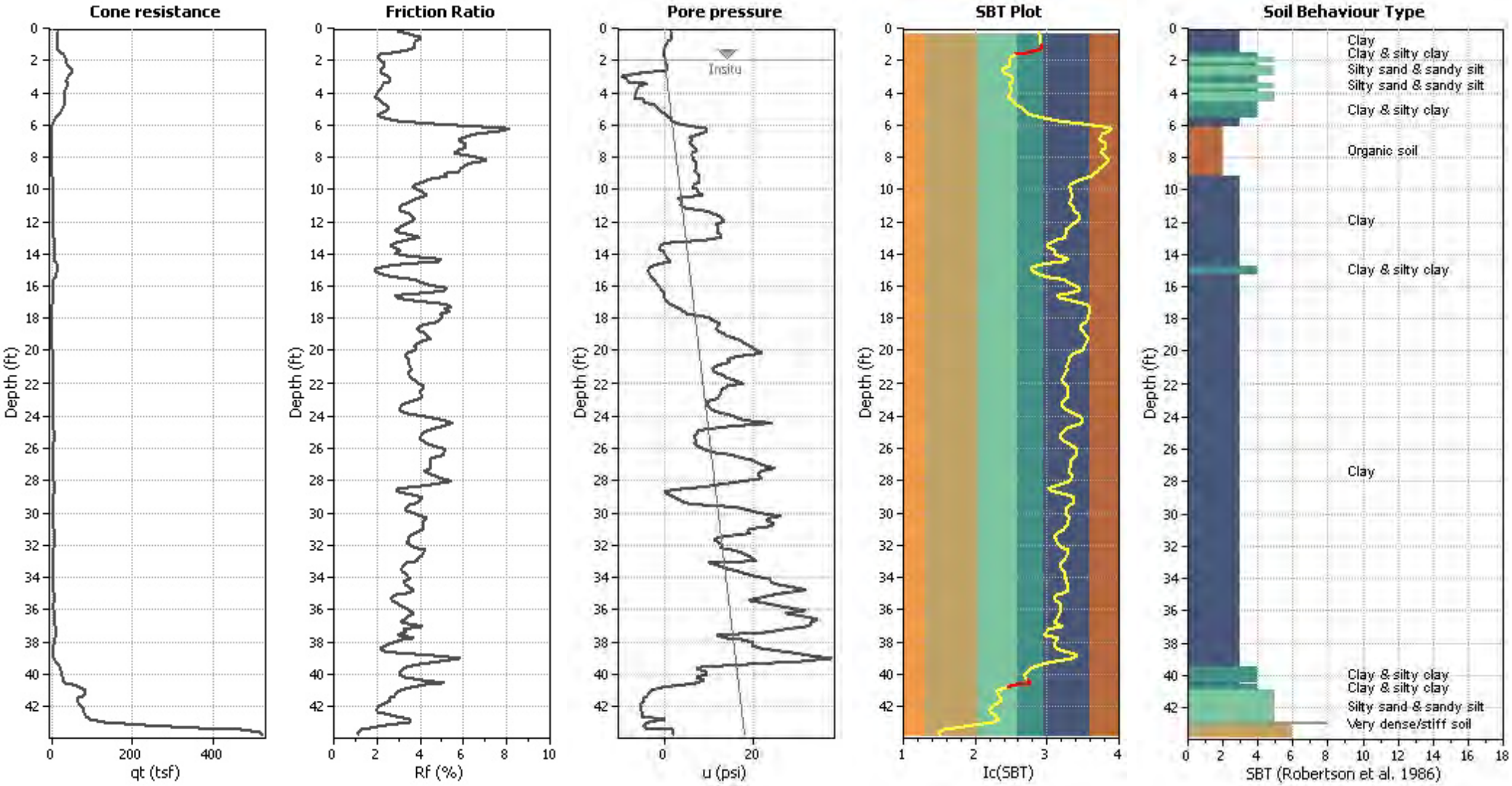






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plo



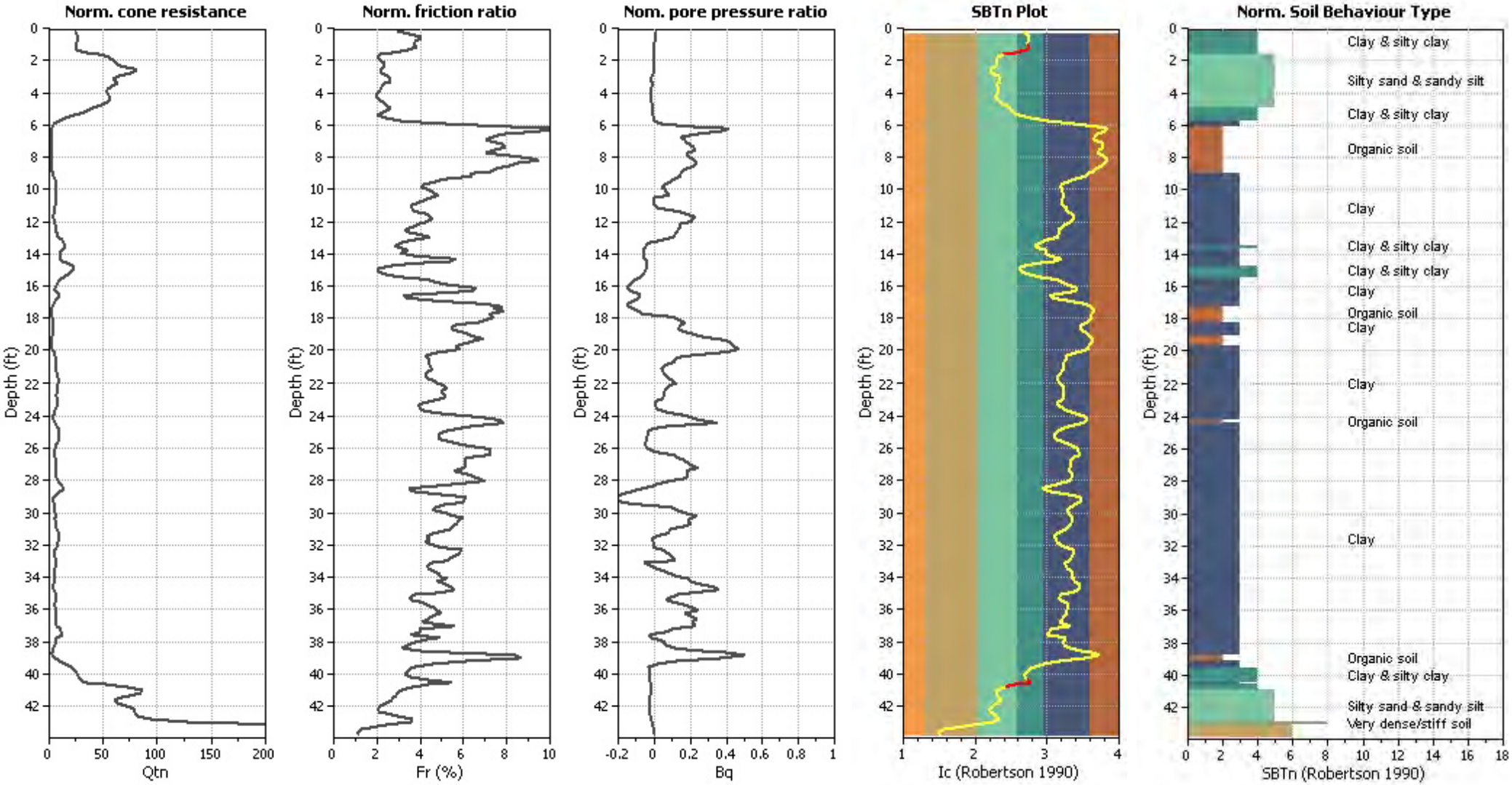
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	1.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.11	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.00 ft	Fill height:	N/A	Limit depth:	43.00 ft

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

CPT basic interpretation plots (normaliz



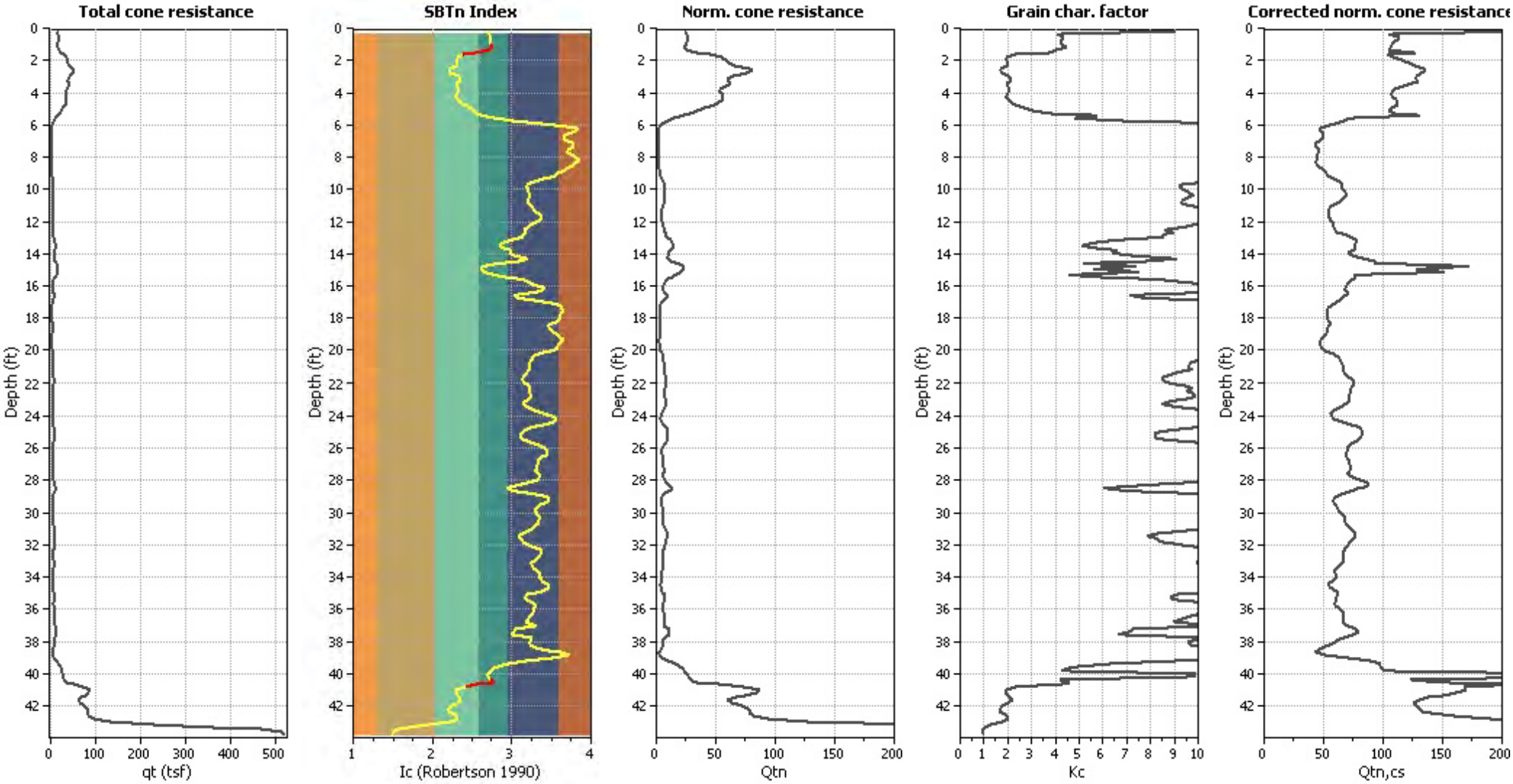
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	1.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.11	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.00 ft	Fill height:	N/A	Limit depth:	43.00 ft

SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

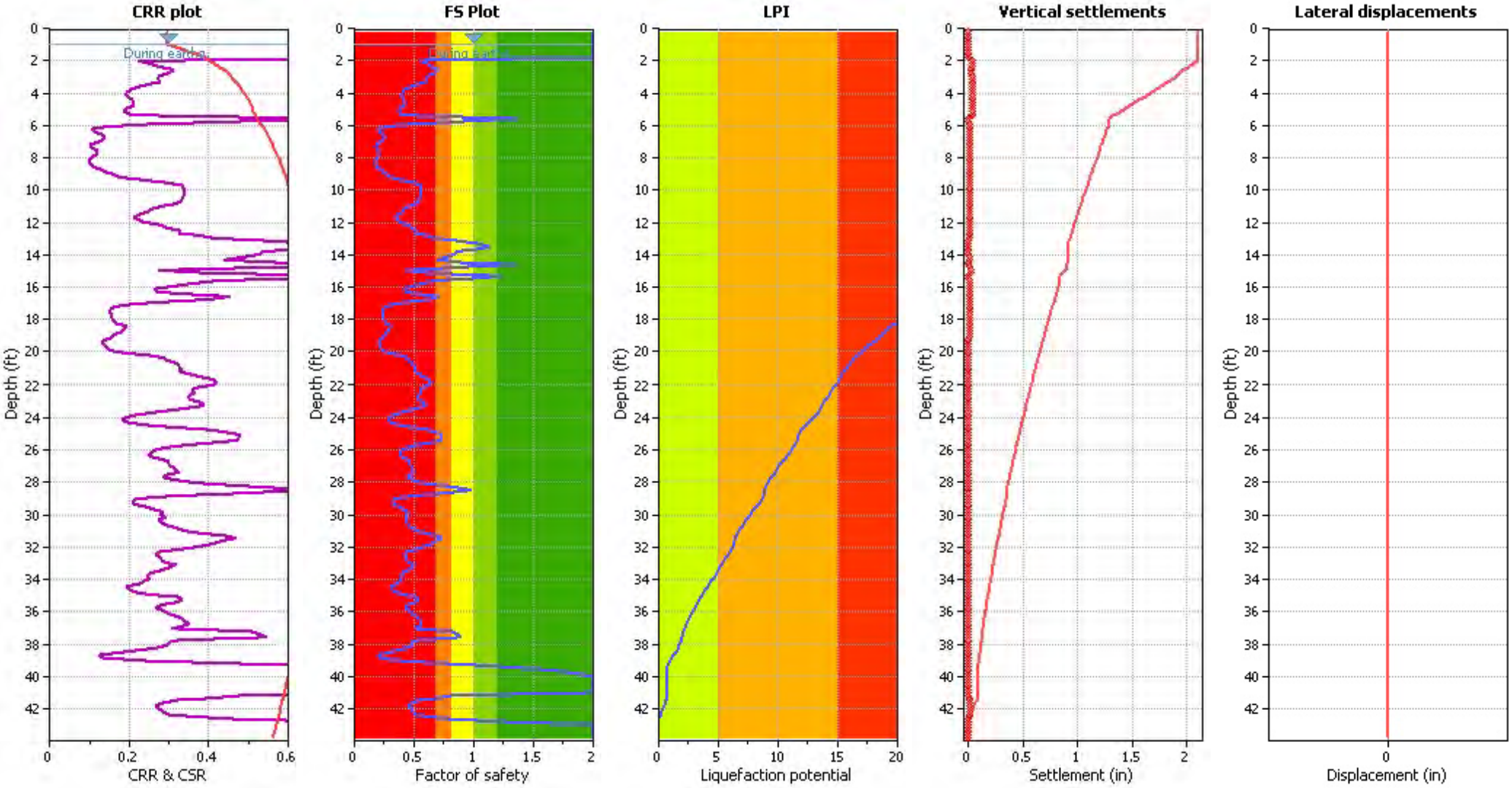
Liquefaction analysis overall plots (intermediate resu



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	1.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.11	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.00 ft	Fill height:	N/A	Limit depth:	43.00 ft

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	1.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.11	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.00 ft	Fill height:	N/A	Limit depth:	43.00 ft

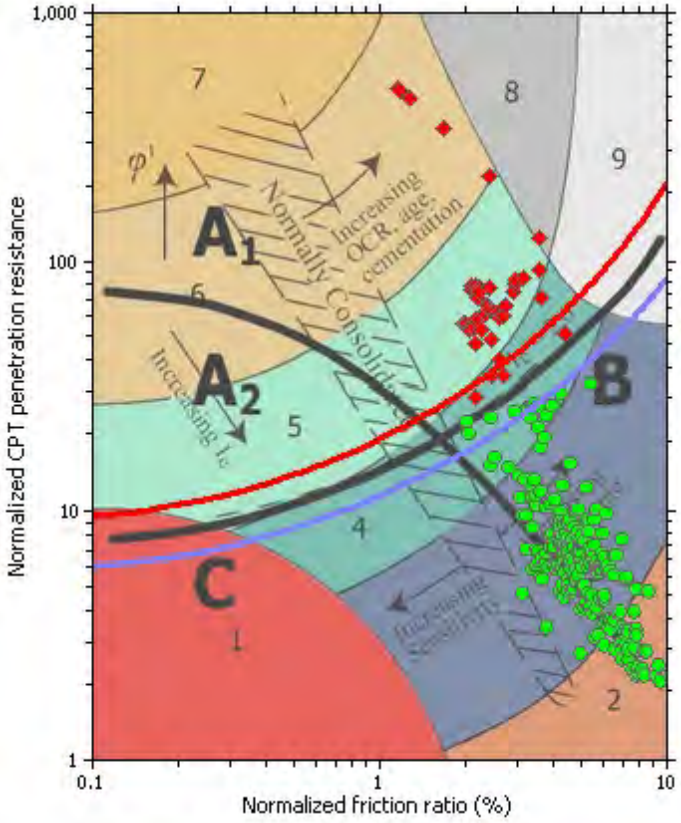
F.S. color scheme

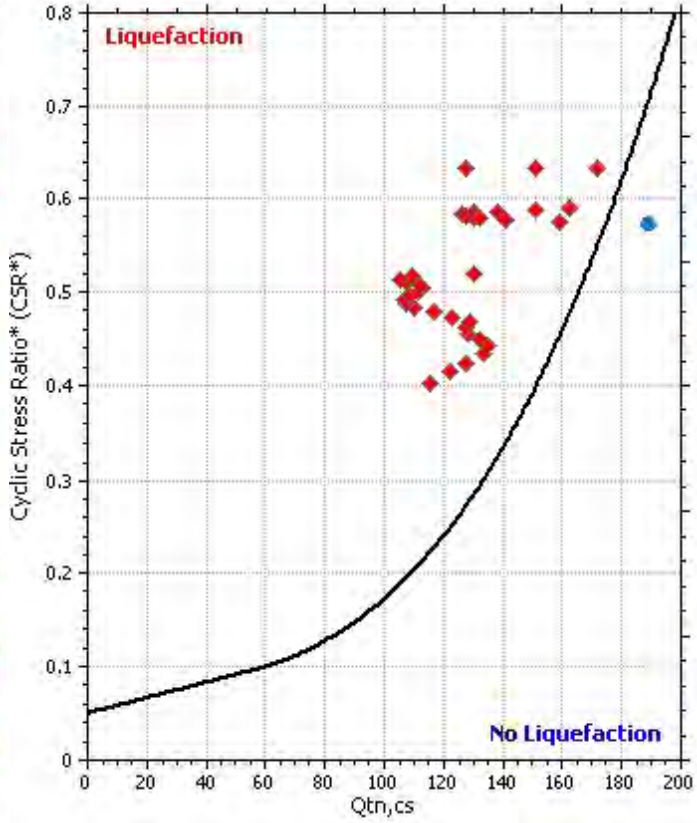
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

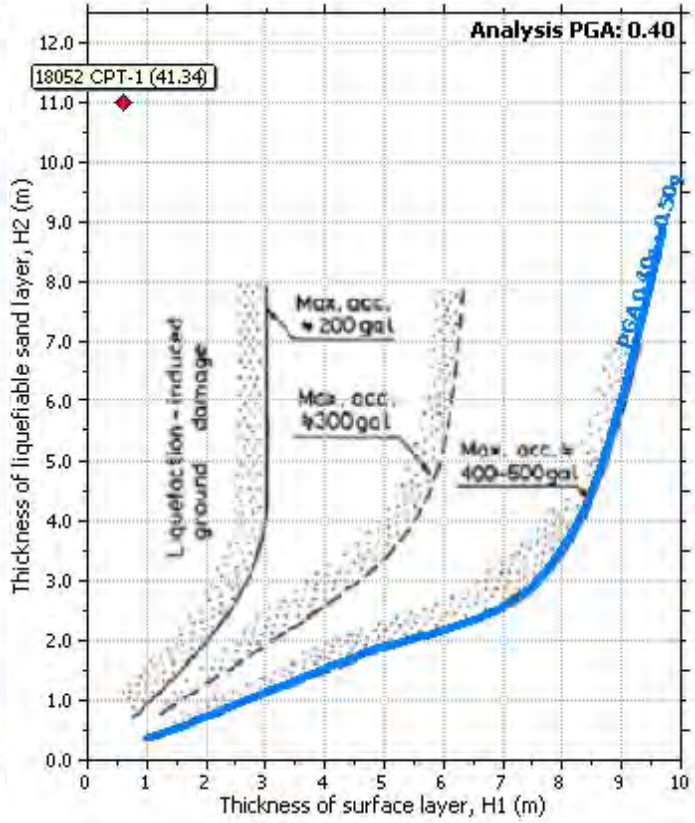
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plo



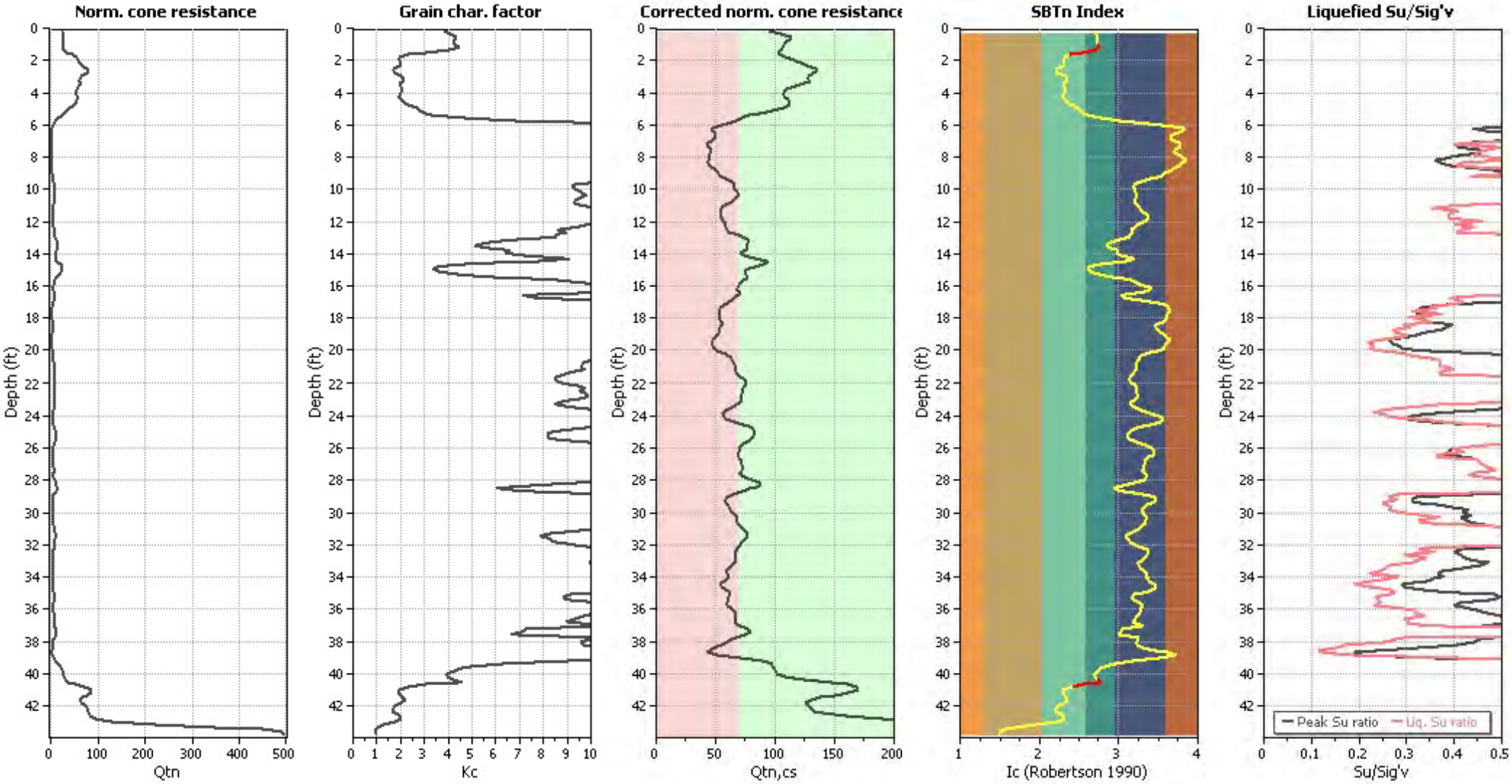




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	1.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.11	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.00 ft	Fill height:	N/A	Limit depth:	43.00 ft

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	1.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.11	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.00 ft	Fill height:	N/A	Limit depth:	43.00 ft

Exhibit C4

GeoLogismiki
Geotechnical Engineers
Merarhias 56
http://www.geologismiki.gr

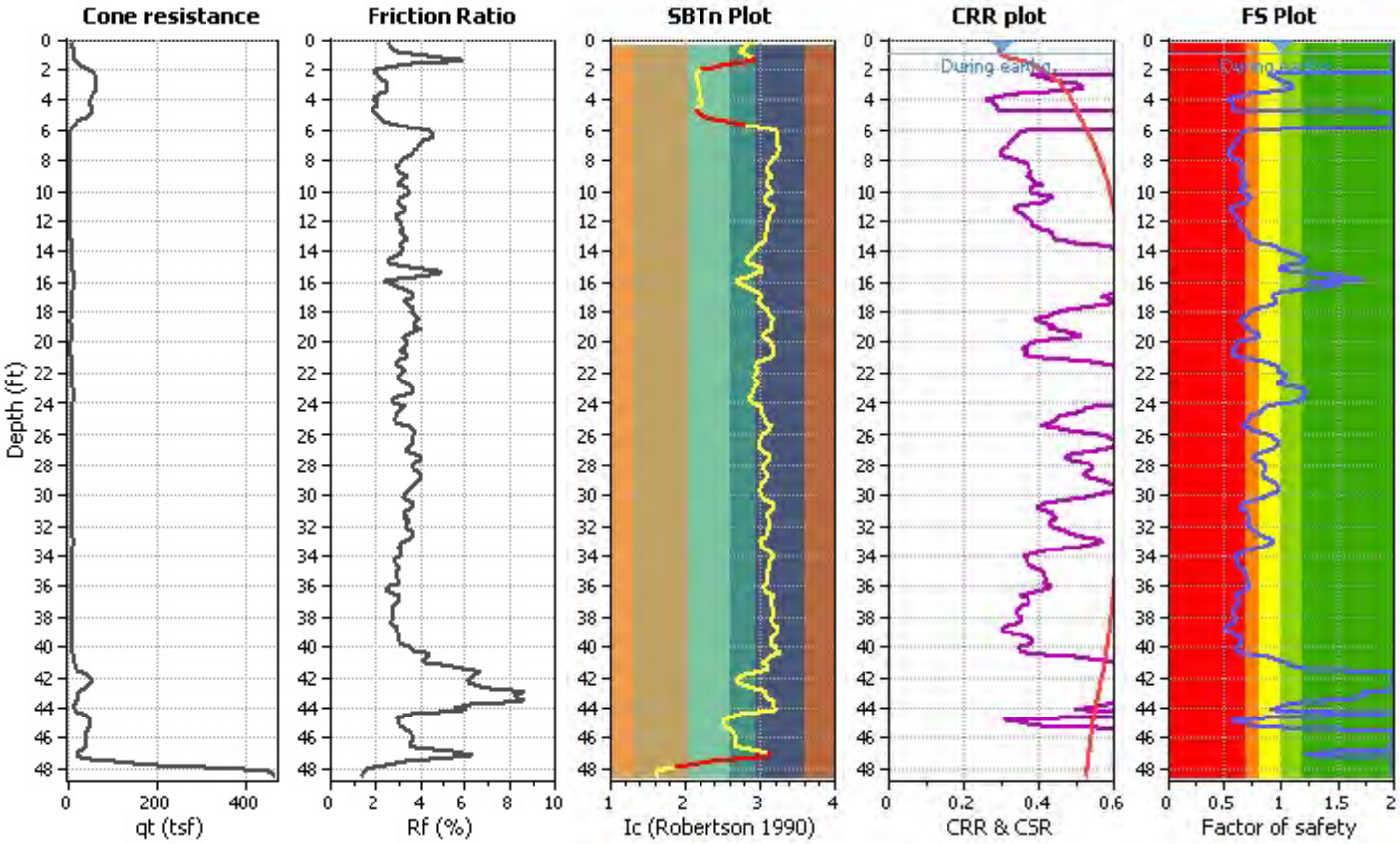
LIQUEFACTION ANALYSIS REPORT

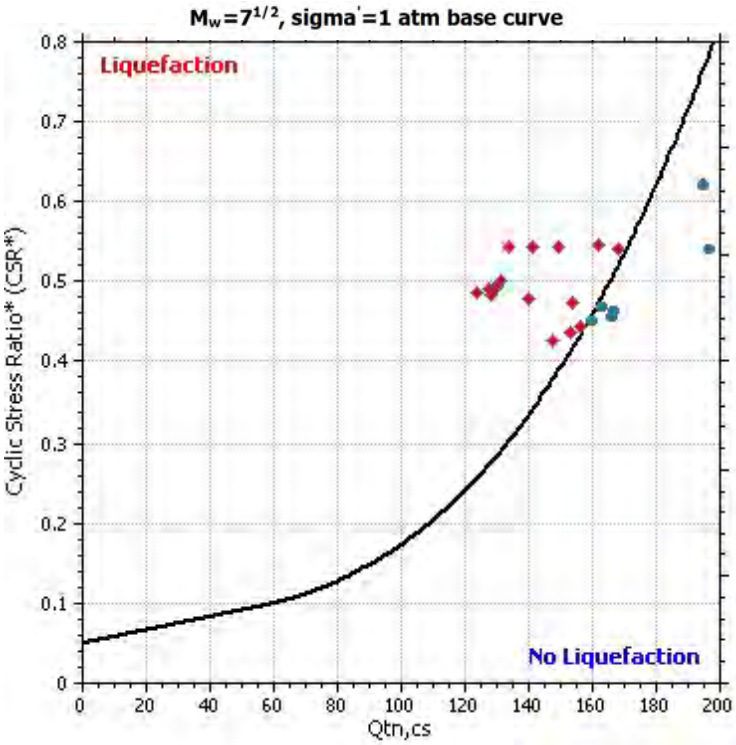
Project title : Allwood Recyclers **Location : Fairview, Oregon**

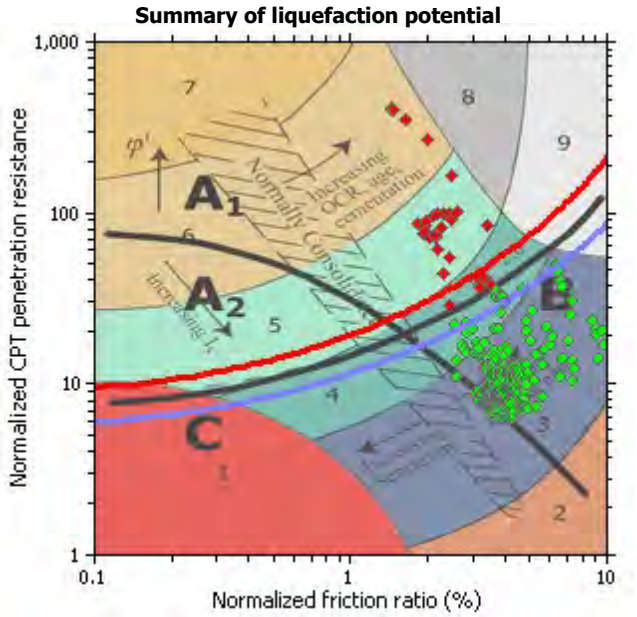
CPT file : 18052 CPT-2

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	2.00 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	1.00 ft	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	48.00 ft
Earthquake magnitude M_w:	7.11	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.40	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

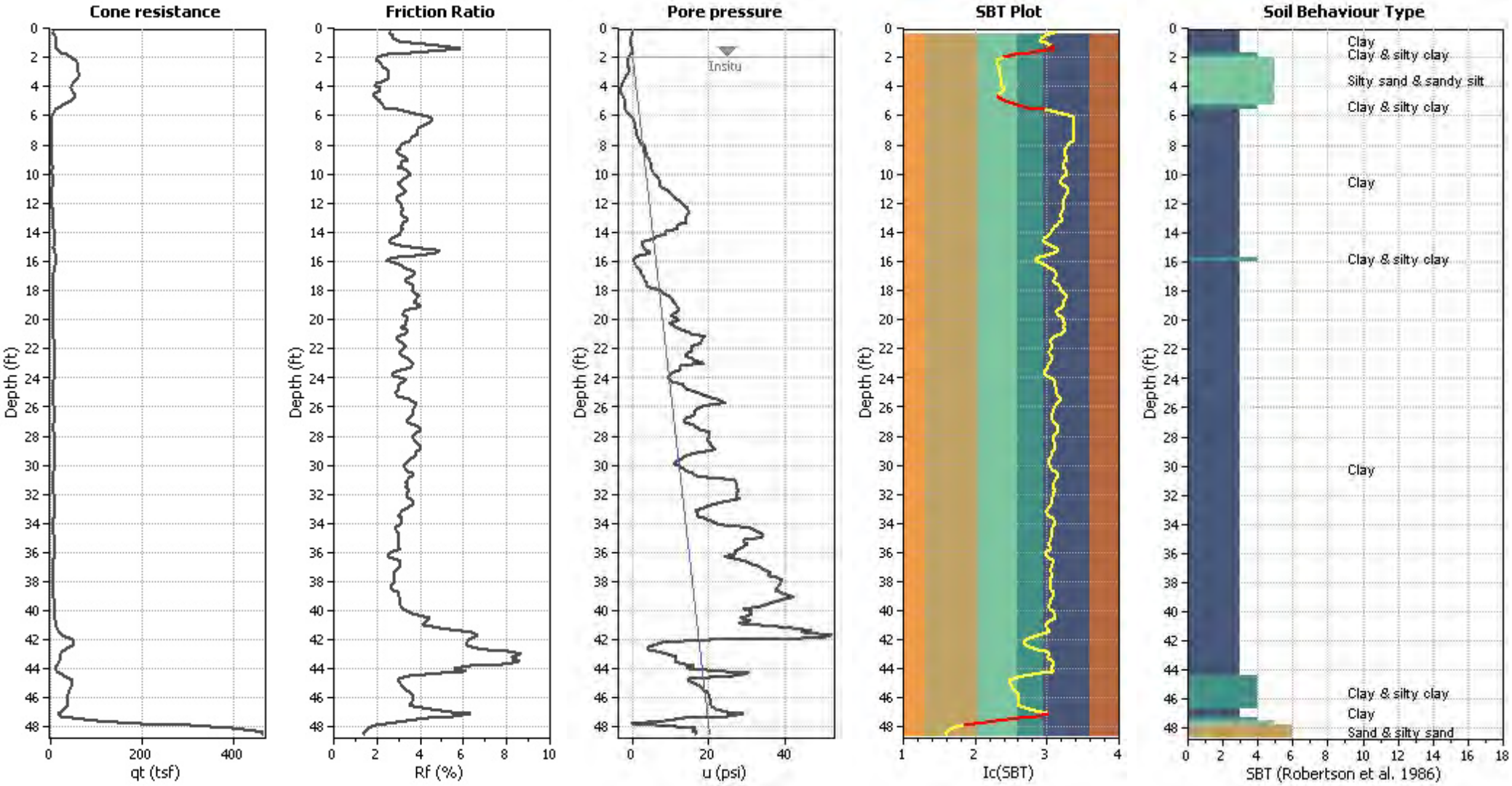






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plo



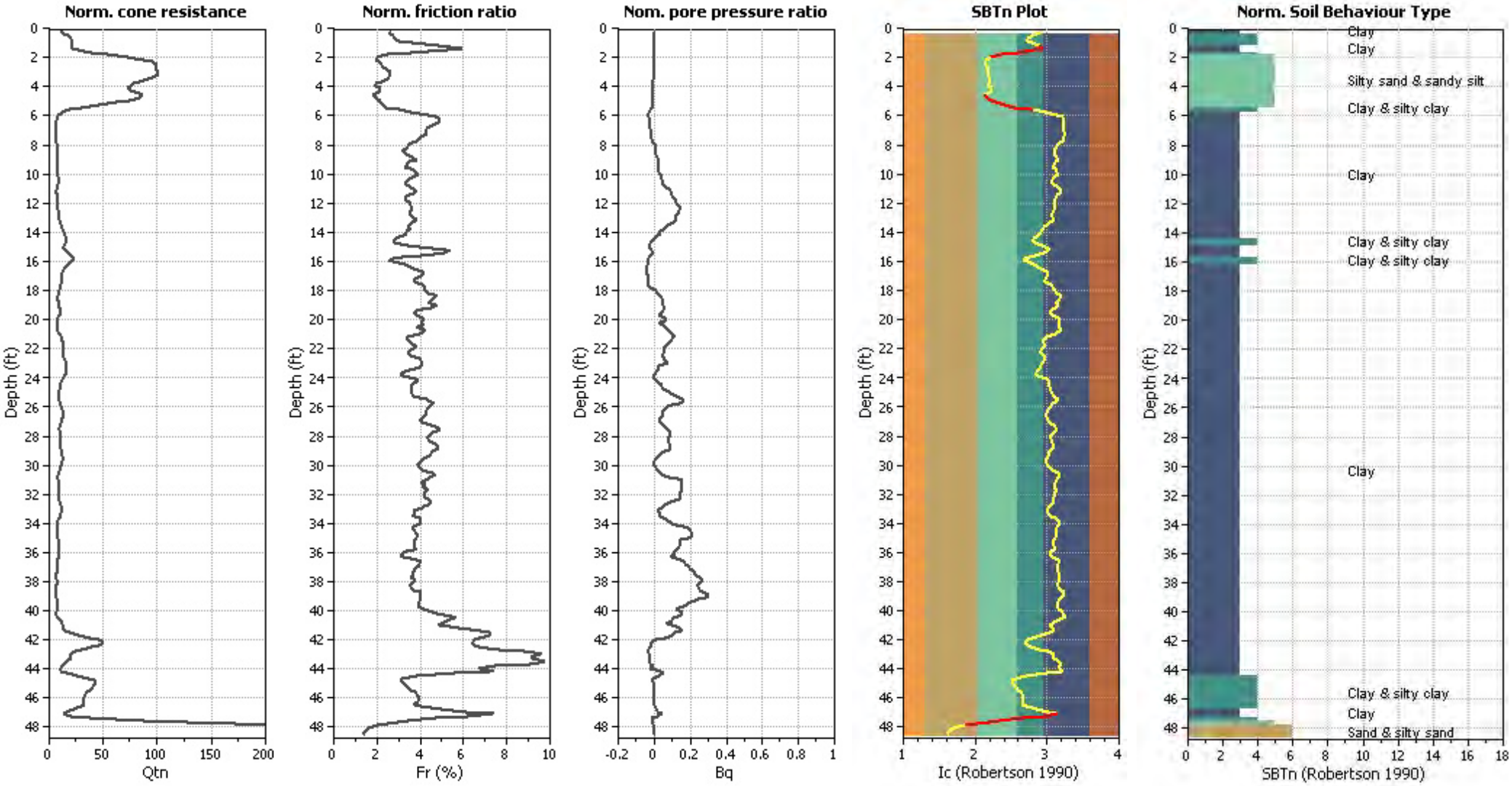
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	1.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.11	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.00 ft	Fill height:	N/A	Limit depth:	48.00 ft

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

CPT basic interpretation plots (normaliz



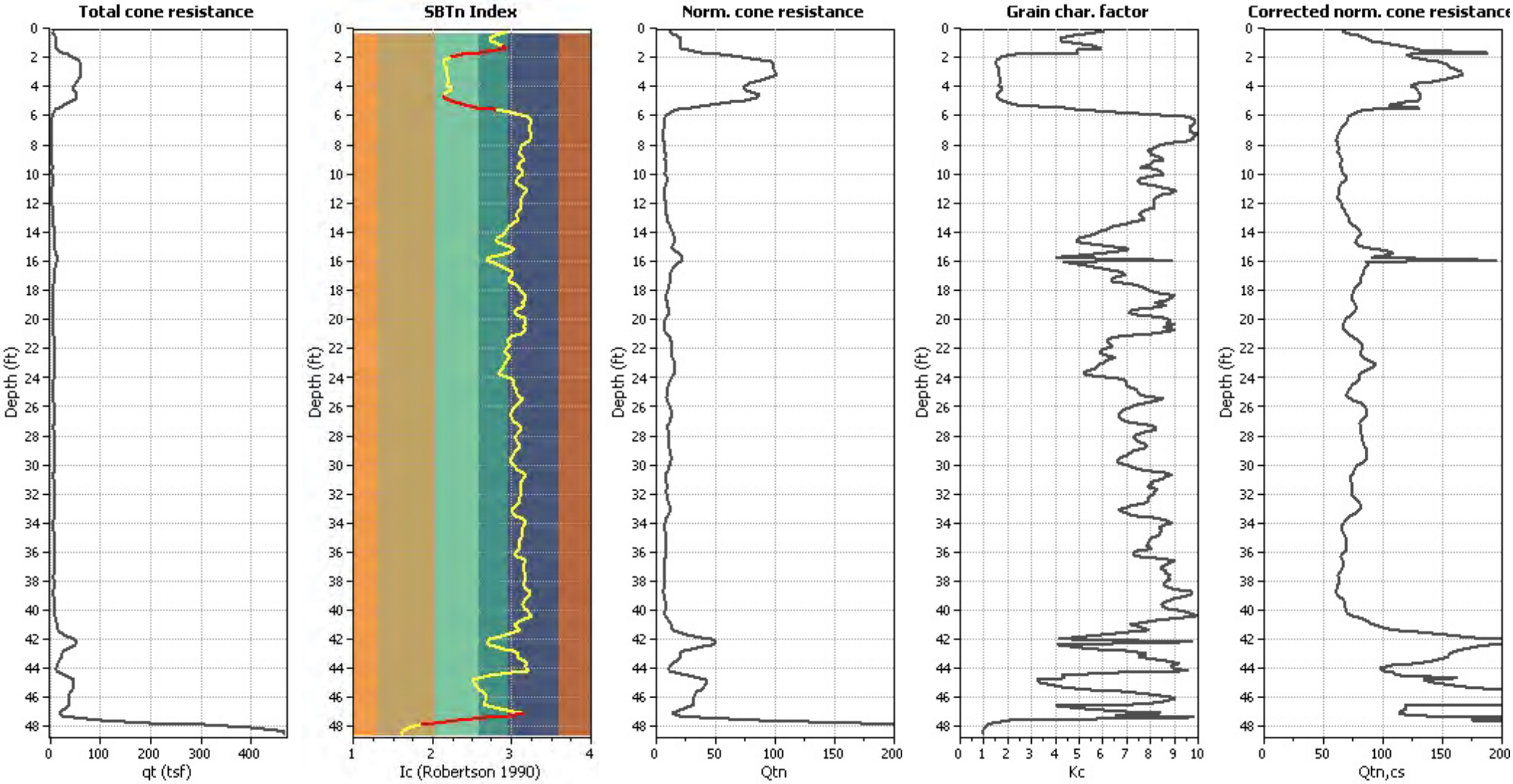
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	1.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.11	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.00 ft	Fill height:	N/A	Limit depth:	48.00 ft

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

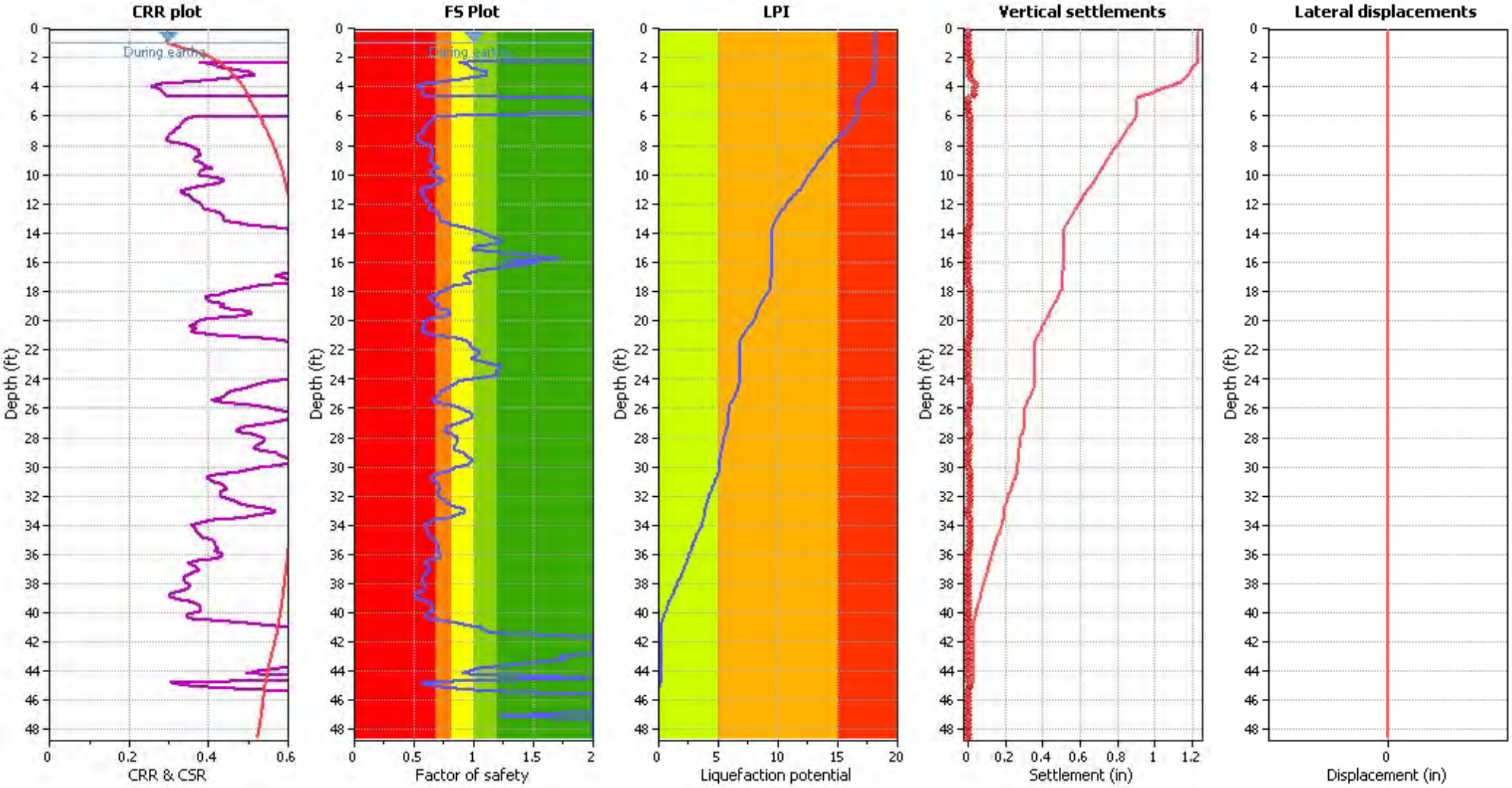
Liquefaction analysis overall plots (intermediate resu



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	1.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.11	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.00 ft	Fill height:	N/A	Limit depth:	48.00 ft

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	1.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.11	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.00 ft	Fill height:	N/A	Limit depth:	48.00 ft

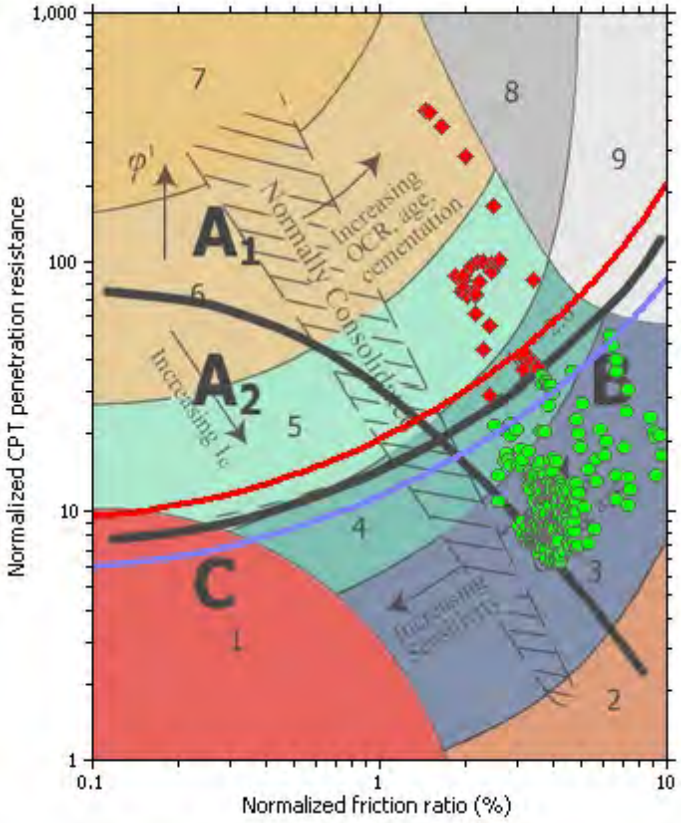
F.S. color scheme

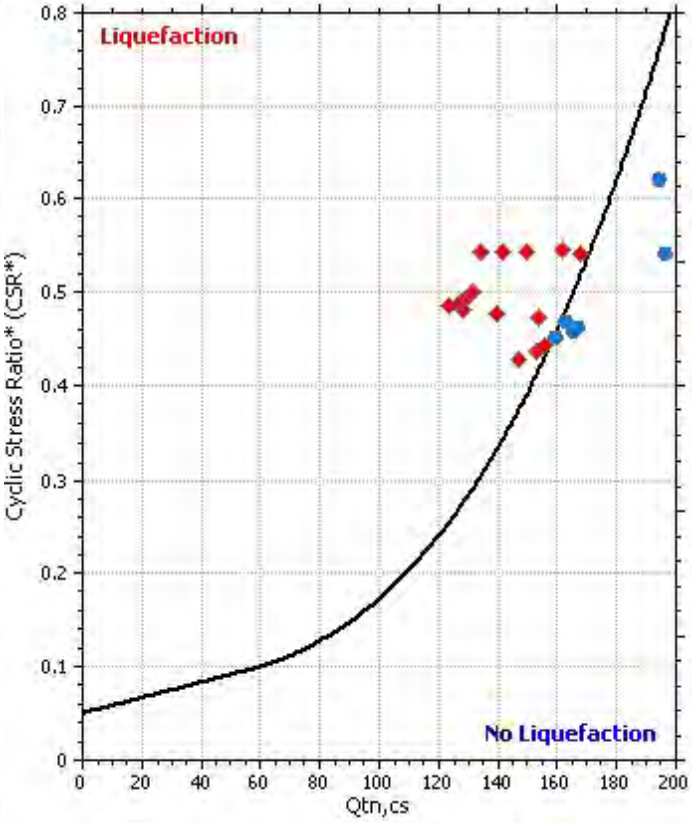
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

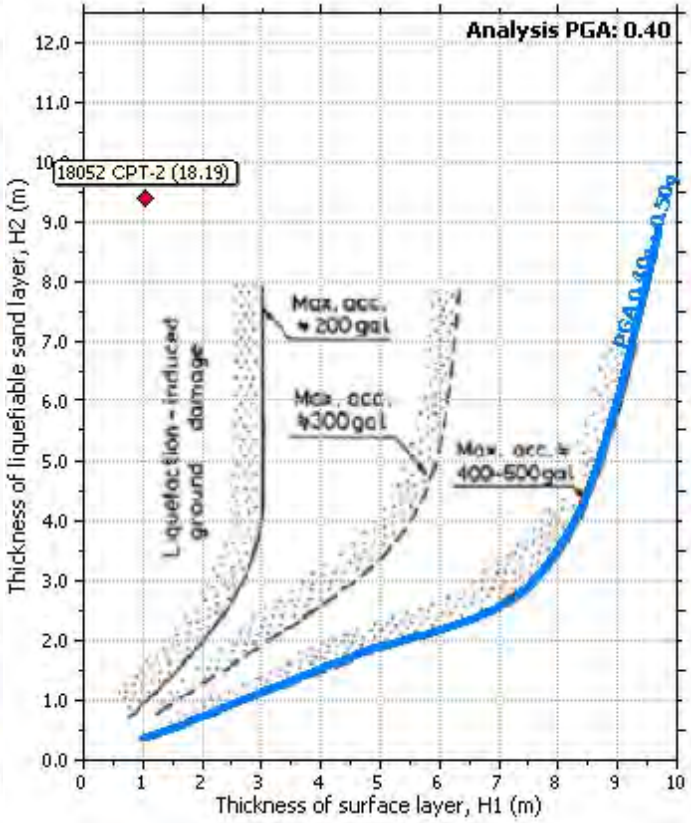
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plo



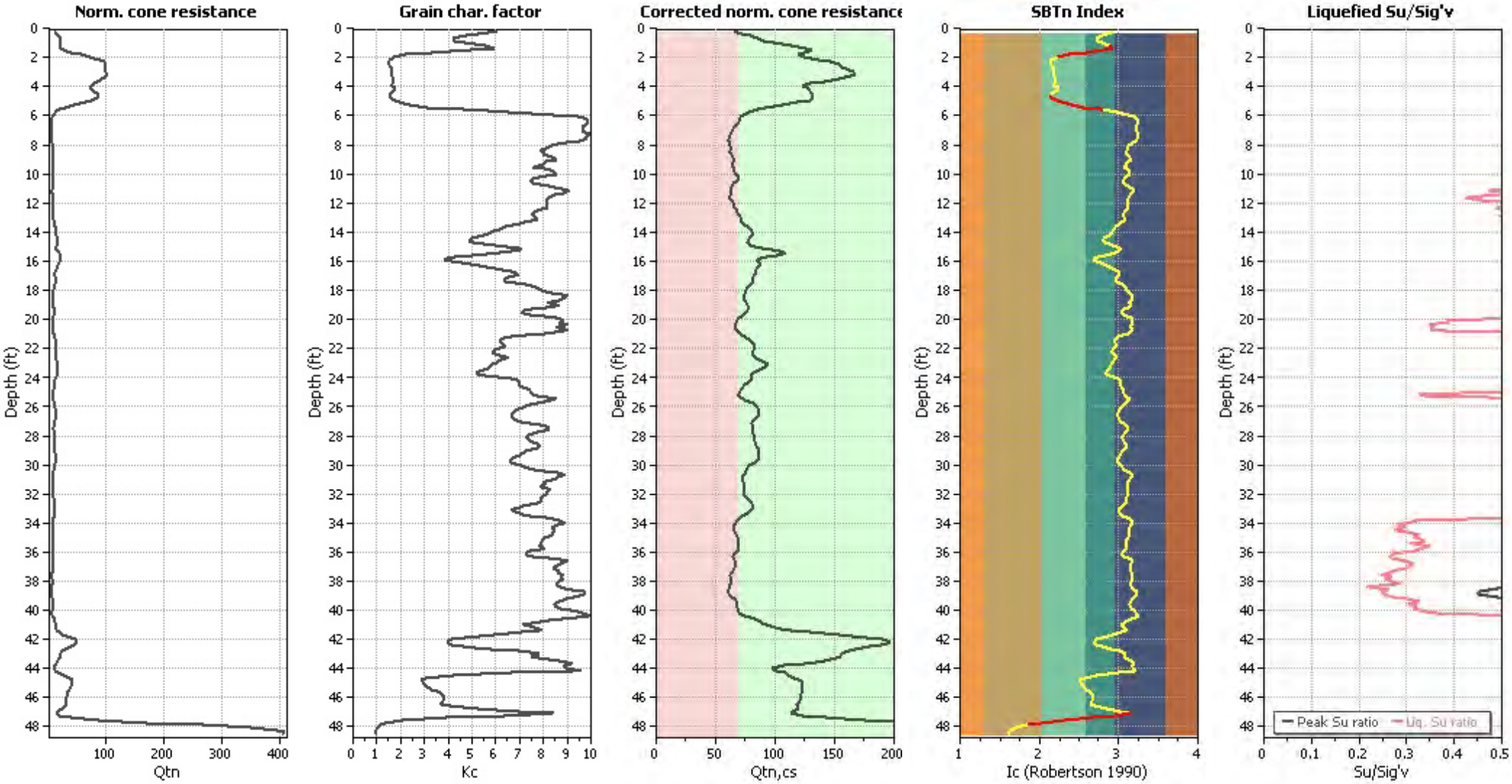




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	1.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.11	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.00 ft	Fill height:	N/A	Limit depth:	48.00 ft

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	1.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.11	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	2.00 ft	Fill height:	N/A	Limit depth:	48.00 ft

Exhibit C4

APPENDIX F
REPORT LIMITATIONS AND IMPORTANT INFORMATION

Exhibit C4

Geotechnical ■ Environmental ■ Special Inspections
Columbia West Engineering, Inc

Date: May 7, 2018
Project: Allwood Recyclers
Fairview, Oregon

Geotechnical and Environmental Report Limitations and Important Information

Report Purpose, Use, and Standard of Care

This report has been prepared in accordance with standard fundamental principles and practices of geotechnical engineering and/or environmental consulting, and in a manner consistent with the level of care and skill typical of currently practicing local engineers and consultants. This report has been prepared to meet the specific needs of specific individuals for the indicated site. It may not be adequate for use by other consultants, contractors, or engineers, or if change in project ownership has occurred. It should not be used for any other reason than its stated purpose without prior consultation with Columbia West Engineering, Inc. (Columbia West). It is a unique report and not applicable for any other site or project. If site conditions are altered, or if modifications to the project description or proposed plans are made after the date of this report, it may not be valid. Columbia West cannot accept responsibility for use of this report by other individuals for unauthorized purposes, or if problems occur resulting from changes in site conditions for which Columbia West was not aware or informed.

Report Conclusions and Preliminary Nature

This geotechnical or environmental report should be considered preliminary and summary in nature. The recommendations contained herein have been established by engineering interpretations of subsurface soils based upon conditions observed during site exploration. The exploration and associated laboratory analysis of collected representative samples identifies soil conditions at specific discreet locations. It is assumed that these conditions are indicative of actual conditions throughout the subject property. However, soil conditions may differ between tested locations at different seasonal times of the year, either by natural causes or human activity. Distinction between soil types may be more abrupt or gradual than indicated on the soil logs. This report is not intended to stand alone without understanding of concomitant instructions, correspondence, communication, or potential supplemental reports that may have been provided to the client.

Because this report is based upon observations obtained at the time of exploration, its adequacy may be compromised with time. This is particularly relevant in the case of natural disasters, earthquakes, floods, or other significant events. Report conclusions or interpretations may also be subject to revision if significant development or other manmade impacts occur within or in proximity to the subject property. Groundwater conditions, if presented in this report, reflect observed conditions at the time of investigation. These conditions may change annually, seasonally or as a result of adjacent development.

Additional Investigation and Construction QA/QC

Columbia West should be consulted prior to construction to assess whether additional investigation above and beyond that presented in this report is necessary. Even slight variations in soil or site conditions may produce impacts to the performance of structural facilities if not adequately addressed. This underscores the importance of diligent QA/QC construction observation and testing to verify soil conditions do not differ materially or significantly from the interpreted conditions utilized for preparation of this report.

Therefore, this report contains several recommendations for field observation and testing by Columbia West personnel during construction activities. Actual subsurface conditions are more readily observed and discerned during the earthwork phase of construction when soils are exposed. Columbia West cannot accept responsibility for deviations from recommendations described in this report or future

performance of structural facilities if another consultant is retained during the construction phase or Columbia West is not engaged to provide construction observation to the full extent recommended.

Collected Samples

Uncontaminated samples of soil or rock collected in connection with this report will be retained for thirty days. Retention of such samples beyond thirty days will occur only at client's request and in return for payment of storage charges incurred. All contaminated or environmentally impacted materials or samples are the sole property of the client. Client maintains responsibility for proper disposal.

Report Contents

This geotechnical or environmental report should not be copied or duplicated unless in full, and even then only under prior written consent by Columbia West, as indicated in further detail in the following text section entitled *Report Ownership*. The recommendations, interpretations, and suggestions presented in this report are only understandable in context of reference to the whole report. Under no circumstances should the soil boring or test pit excavation logs, monitor well logs, or laboratory analytical reports be separated from the remainder of the report. The logs or reports should not be redrawn or summarized by other entities for inclusion in architectural or civil drawings, or other relevant applications.

Report Limitations for Contractors

Geotechnical or environmental reports, unless otherwise specifically noted, are not prepared for the purpose of developing cost estimates or bids by contractors. The extent of exploration or investigation conducted as part of this report is usually less than that necessary for contractor's needs. Contractors should be advised of these report limitations, particularly as they relate to development of cost estimates. Contractors may gain valuable information from this report, but should rely upon their own interpretations as to how subsurface conditions may affect cost, feasibility, accessibility and other components of the project work. If believed necessary or relevant, contractors should conduct additional exploratory investigation to obtain satisfactory data for the purposes of developing adequate cost estimates. Clients or developers cannot insulate themselves from attendant liability by disclaiming accuracy for subsurface ground conditions without advising contractors appropriately and providing the best information possible to limit potential for cost overruns, construction problems, or misunderstandings.

Report Ownership

Columbia West retains the ownership and copyright property rights to this entire report and its contents, which may include, but may not be limited to, figures, text, logs, electronic media, drawings, laboratory reports, and appendices. This report was prepared solely for the client, and other relevant approved users or parties, and its distribution must be contingent upon prior express written consent by Columbia West. Furthermore, client or approved users may not use, lend, sell, copy, or distribute this document without express written consent by Columbia West. Client does not own nor have rights to electronic media files that constitute this report, and under no circumstances should said electronic files be distributed or copied. Electronic media is susceptible to unauthorized manipulation or modification, and may not be reliable.

Consultant Responsibility

Geotechnical and environmental engineering and consulting is much less exact than other scientific or engineering disciplines, and relies heavily upon experience, judgment, interpretation, and opinion often based upon media (soils) that are variable, anisotropic, and non-homogenous. This often results in unrealistic expectations, unwarranted claims, and uninformed disputes against a geotechnical or environmental consultant. To reduce potential for these problems and assist relevant parties in better understanding of risk, liability, and responsibility, geotechnical and environmental reports often provide definitive statements or clauses defining and outlining consultant responsibility. The client is encouraged to read these statements carefully and request additional information from Columbia West if necessary.

Exhibit C5

After recording return to:
Pacific Power
Attn: Right of Way, Ste. 1700
825 NE Multnomah Street
Portland, OR 97232

Pacific Power File Number: **RW20180243**

CONSENT TO USE AGREEMENT

THIS CONSENT TO USE AGREEMENT (the "Agreement") is entered into by and between PacifiCorp, an Oregon corporation ("PacifiCorp"), and MRW Properties LLC (the "User"), with reference to the following:

A. The real property to which this Agreement applies is described as follows and further depicted on the attached Exhibit A (the "Property").

A portion of Parcel 1, PARTITION PLAT NO. 2005-163, a duly recorded plat situated in the Southwest one-quarter of Section 22, Township 1 North, Range 3 East of the Willamette Meridian, in the City of Fairview, County of Multnomah and State of Oregon, being more particularly described as follows:

Beginning at the most Easterly corner of said Parcel 1, said point also being the Southerly right-of-way line of N.E. Marine Drive (County Road N0. 3385 – variable width); thence South 45°38'03" West, along the Southeasterly line of said Parcel 1 a distance of 142.09 feet to an angle corner therein; thence North 89°45'16" West, continuing along said Southeasterly line, a distance of 152.73 feet to a point in the Southwesterly line of said Parcel 1; thence North 44°08'17" West, along said Southwesterly line, a distance of 797.91 feet to a 5/8 inch iron rod with yellow plastic cap stamper "Marx Assoc"; thence North 36°06'38" East, a distance of 136.52 feet to an angle point in the Southerly right-of-way line of said N.E. Marine Drive; thence continuing North 36°06'38" East, along said Southerly right-of-way line, a distance of 55 feet to an angle point therein and point of curvature; thence Southeasterly, along said southerly right-of-way line, on the arc of a 1,824.26 foot radius curve to the right, through a central angle of 8°19'57", an arc distance of 265.39 feet (the chord bears South 49°43'24" East 265.15 feet), to a point of tangency; thence South 45°33'25" East, continuing along said Southerly right-of-way line, a distance of 334.61 feet to an angle point therein; thence North 44°26'35" East, continuing along said Southerly right-of-way line, a distance of 20 feet to an angle point therein; thence South 45°33'25" East, continuing along said Southerly right-of-way line, a distance of 338.81 feet to the point of beginning.

Assessor's Map / Tax Lot No.:1N 3E 22C 00109

B. PacifiCorp is the grantee under that certain right of way easement granted by Sun-Dial Ranch, dated December 30, 1912 and recorded on February 14, 1913 in book 608, page 297, as Document No. 3706 and, that certain right of way easement granted by Florence M. Townshend, dated December 20, 1957 and recorded on January 17, 1958 in book 1880, page 112, as Document No. 1878, all in Multnomah County, State of Oregon (the "Easement").

C. PacifiCorp has the right to own, operate and maintain certain 115kV and 230kV transmission line facilities ("PacifiCorp Facilities") in an area described in the Easement (the "Easement Area").

D. User has requested PacifiCorp's permission to use a portion of the Easement Area, as depicted on Exhibits A1 – A5 (the "Use Area") for the installation, use and maintenance of User's Improvements, as defined below.

E. PacifiCorp grants such permission subject to the terms and conditions set forth herein.

AGREEMENT

NOW THEREFORE, PacifiCorp and User agree to the following terms and conditions:

1. PacifiCorp consents to User's non-exclusive use of the Use Area solely for the purpose of installation, use and maintenance and removal of the following improvements:
    a. A paved asphalt parking surface;
    b. storage bins with six (6) foot tall walls;
    c. Curbs to be no taller than six (6) inches tall;
    d. A six (6) foot tall perimeter chain link fence;
    e. A portion of a storm-water quality facility (bioswale);
    f. Low-growing landscaping including shrubs (compact Oregon grape, Pacific waxmyrtle and David viburnum) and ground covers (Massachusetts kinickinnick, Oregon grape, turf and bark dust),
    g. Surface mounted storm-water catch basins and associated underground storm-water pipes four (4), eight (8) and twelve (12) inches in diameter buried at a minimum depth of twenty-four (24) inches;
    h. Domestic water line one (1) inch diameter, Irrigation line four (4) inches in diameter buried at a depth of thirty-six (36) inches;
    i. Sanitary manhole and associated sewer service line four (4) inches in diameter buried to a minimum depth of twenty-four (24) inches;

    All in the locations shown on Exhibits A1 – A5, (such improvements, "User's Improvements" and such use, the "Permitted Use"), such consent is expressly conditioned on the ongoing satisfaction of the following:

    a. User's Improvements and the Permitted Use must be in compliance with all applicable regulations, codes and laws, including, without limitation, those promulgated by utility commissions or boards that regulate such use.

b. User shall locate User's Improvements in the location specifically identified in Exhibits A1 – A5. PacifiCorp must approve any modifications in writing in advance.

c. User will be responsible for adherence to all conditions and requirements of this Agreement by User and all User's contractors, employees, agents and representatives who will access the Use Area.

d. User will defend, indemnify, protect and hold harmless PacifiCorp and its directors, officers, employees, contractors representatives and agents (collectively "PacifiCorp Indemnified Parties") against and from any and all claims, demands, suits, losses, costs and damages of every kind and description, including attorneys' fees and/or litigation expenses brought or made against or incurred by the PacifiCorp Indemnified Parties resulting from, arising out of, or in any way connected to User's or any User's Representative's use of the Use Area or adjacent property or User's Improvements. This section shall survive any termination of this consent.

e. User will conduct the Permitted Use at User's sole risk and expense. User shall be responsible for any damage to PacifiCorp Facilities, which, at PacifiCorp's election, will be repaired at PacifiCorp's direction or by PacifiCorp. In the event PacifiCorp performs the repairs, User will promptly reimburse PacifiCorp for all costs associated with such repairs.

f. All equipment, machinery and vehicles must at all times maintain a minimum distance of twenty (20) feet from PacifiCorp's overhead conductors (wires).

g. All equipment, machinery, and vehicles must maintain a minimum distance of fifteen (15) feet from any of PacifiCorp's structure(s) or guy anchor ground attachment point.

h. The Use Area may be traversed by PacifiCorp's heavy vehicles, which may be in excess of thirty-five (35) tons, and User will install User's Improvements in a manner able to withstand such weight.

i. User will not place or store any flammable materials nor refuel vehicles or equipment within the Use Area.

j. User agrees and accepts that nuisance shocks may occur within the Use Area and will ground metal objects to help reduce the level of shock.

k. User's Improvements must be buried at a minimum depth of two (2) feet.

l. User's Improvements placed underground must be placed at least ten (10) feet away from any PacifiCorp facilities.

m. No grade changes shall be allowed within the Use Area.

n. PacifiCorp's need for immediate access could result in the destruction or removal of fences or other structures in the Easement Area.

o. PacifiCorp will not be liable for any damage to User's Improvements which might occur as a result of the PacifiCorp's use of its Easement.

2. PacifiCorp may immediately terminate this Agreement for any reason at any time. User will be responsible for any costs incurred by PacifiCorp resulting from any default. User shall promptly remove all User's Improvements in the Use Area all at User's sole cost and expense upon any termination.

3. TO THE FULLEST EXTENT PERMITTED BY LAW, EACH OF THE PARTIES HERETO WAIVES ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY IN RESPECT OF LITIGATION DIRECTLY OR INDIRECTLY ARISING OUT OF, UNDER OR IN CONNECTION WITH THIS AGREEMENT. EACH PARTY FURTHER WAIVES ANY RIGHT TO CONSOLIDATE, OR TO REQUEST THE CONSOLIDATION OF, ANY ACTION IN WHICH A JURY TRIAL HAS BEEN WAIVED WITH ANY OTHER ACTION IN WHICH A JURY TRIAL CANNOT BE OR HAS NOT BEEN WAIVED. THIS PROVISION SHALL SURVIVE THE TERMINATION OF THIS AGREEMENT.

4. This Agreement may be recorded at any time by either party in the real property records of Multnomah County, Oregon.

5. All notices must be in writing and be sent to the following addresses:

If to PacifiCorp:	**If to User:**
PacifiCorp **Attn: Right of Way** **825 NE Multnomah St, Ste. 1700** **Portland, OR 97232**	**MRW Properties LLC** **P.O. Box 115** **Fairview, OR 97024**

Either party may designate a different address for itself by notice similarly given. Any notice sent hereunder shall be deemed effective when received by the receiving party.

[SIGNATURE PAGE FOLLOWS]

The parties have executed this Agreement as of the dates below, and the effective date of the Agreement is the date on which this Agreement is signed on behalf of both parties.

USER:
MRW Properties LLC

By: _____

Printed: _____

Its: _____
Title

Date: _____

REPRESENTATIVE ACKNOWLEDGEMENT

STATE OF _____)
)ss
COUNTY OF _____)

This instrument was acknowledged before me on this _____ day of _____, 2____,
by _____, as _____,
of _____.

_____
Notary Public
My commission expires: _____

Exhibit C5

PACIFICORP

PACIFICORP, an Oregon corporation

_____
Deanna Adams
Director, Real Estate Management

Dated_____

STATE OF OREGON)
)ss
COUNTY OF MULTNOMAH)

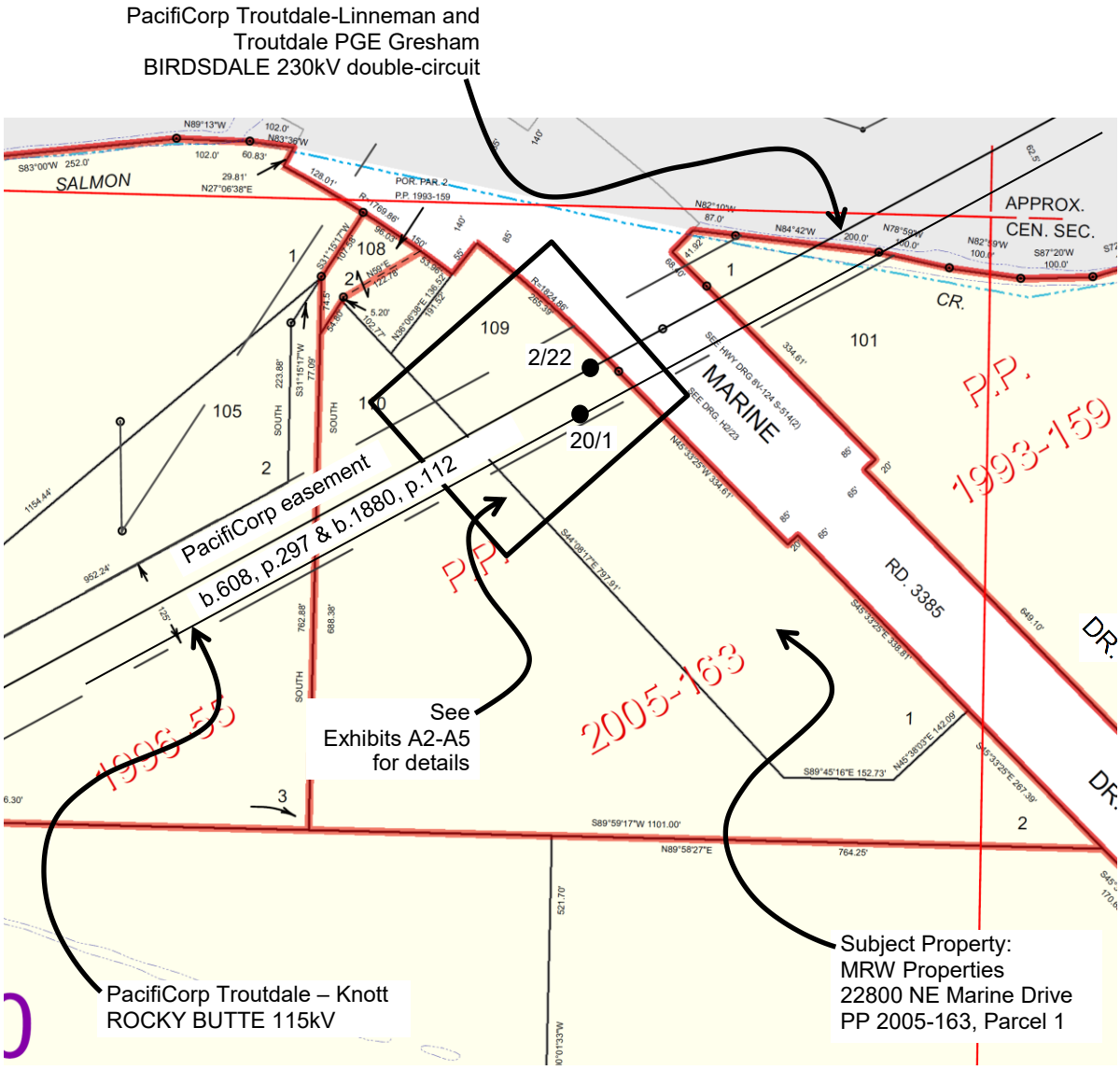
This instrument was acknowledged before me on this _____ day of _____, 2____,
by Deanna Adams, Director, Real Estate Management, of PacifiCorp, an Oregon corporation.

_____
Notary Public
My commission expires: _____

PROPERTY DESCRIPTION

In the NE/4 SW/4 of Section 22, Township 1 North, Range 3 East
of the Willamette Meridian, Fairview, Multnomah County, State of Oregon.
Map / Tax Lot: 1N 3E 22C 00109; Partition Plat 2005-163, Parcel 1

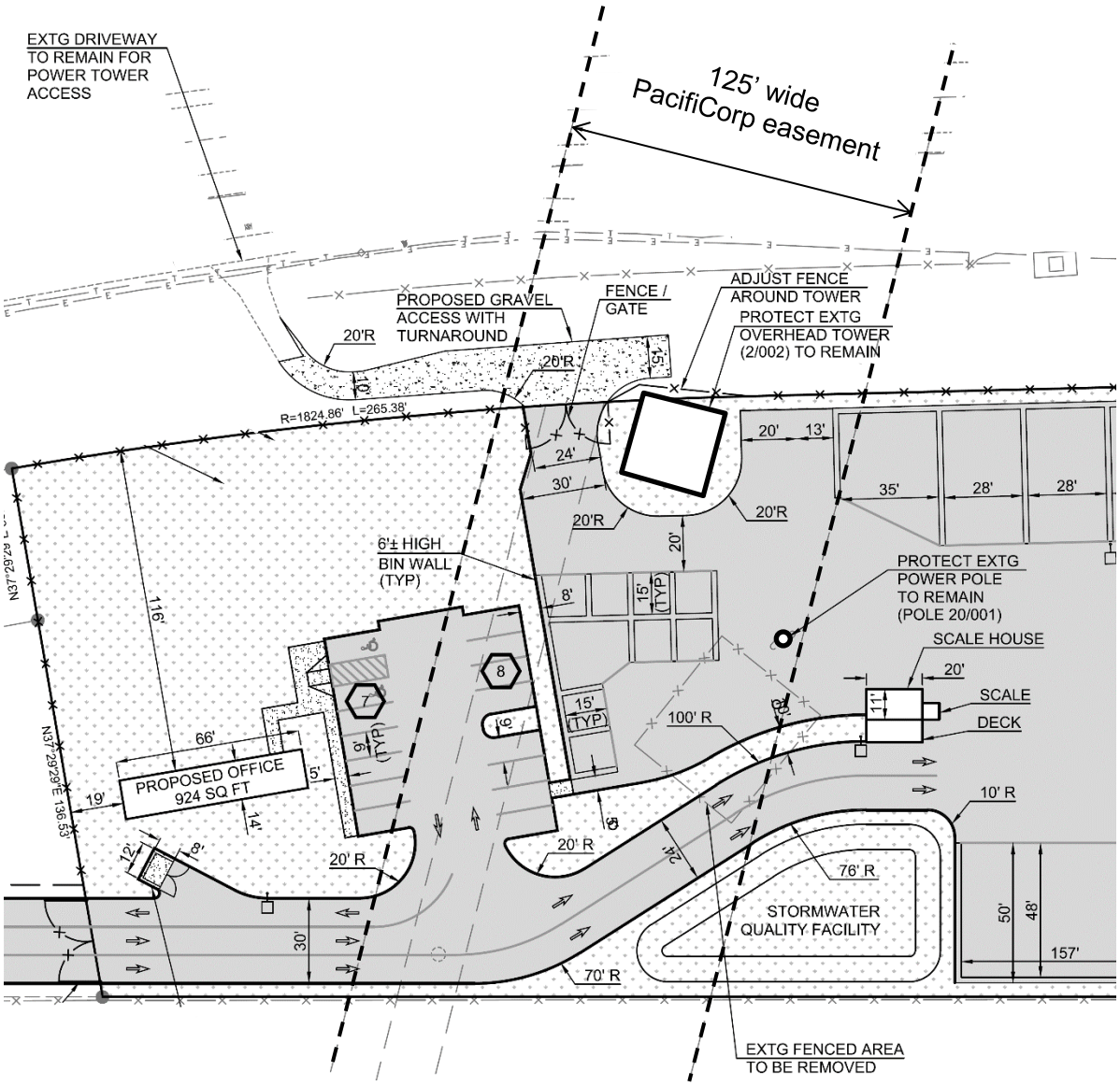
N



ROW#: 20180243	This drawing should be used only as a representation of the location of the easement area. No warranties, express or implied, are provided for the accuracy, reliability, or completeness of this data for individual or aggregate use with other data.
Landowner: MRW Properties LLC	
EXHIBIT A1	PACIFIC POWER A DIVISION OF PACIFICORP

PROPERTY DESCRIPTION

In the NE/4 SW/4 of Section 22, Township 1 North, Range 3 East
of the Willamette Meridian, Fairview, Multnomah County, State of Oregon.
Map / Tax Lot: 1N 3E 22C 00109; Partition Plat 2005-163, Parcel 1

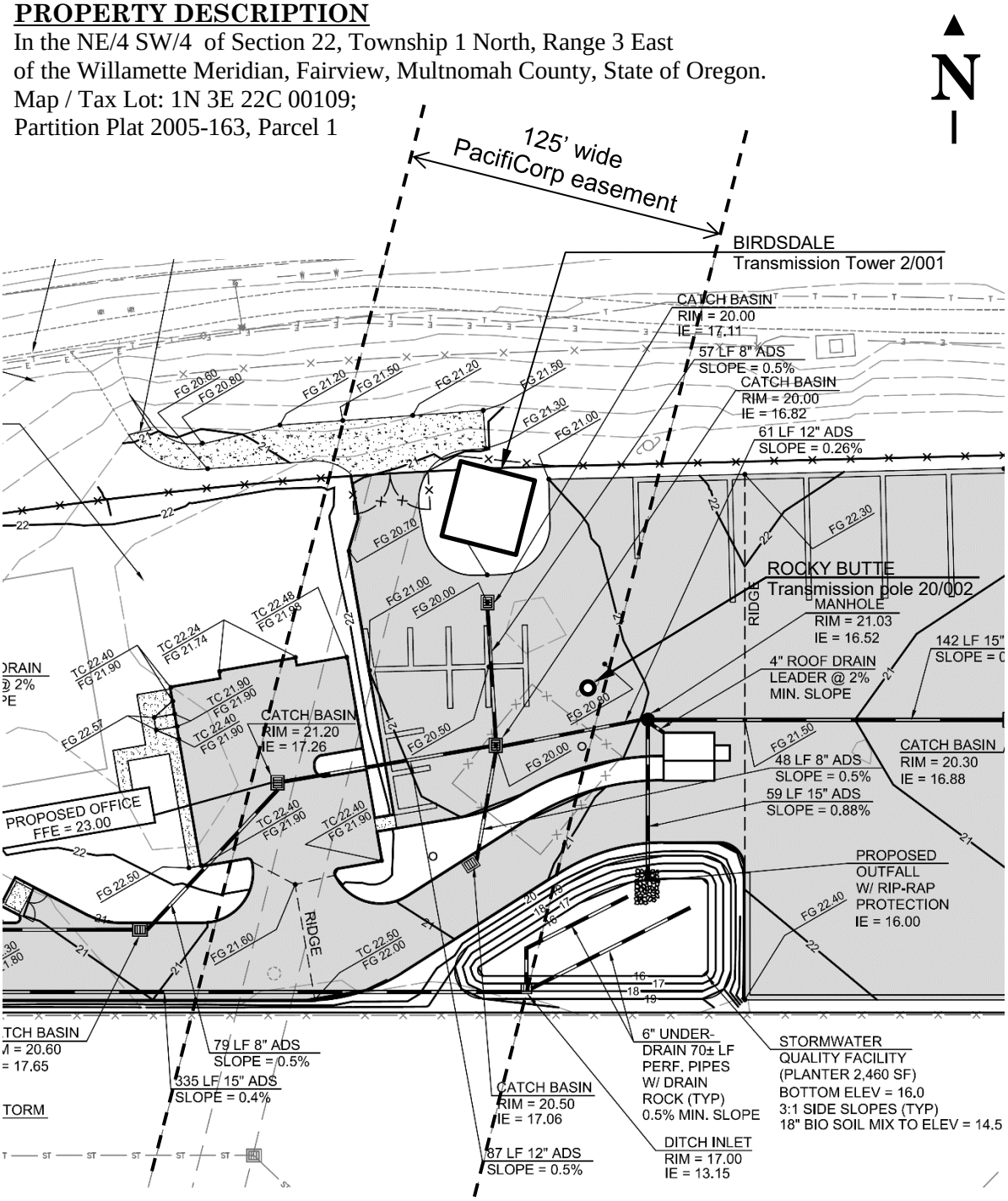


Asphalt surface, bins, parking, curbs, fences, gates

ROW#: 20180243	This drawing should be used only as a representation of the location of the easement area. No warranties, express or implied, are provided for the accuracy, reliability, or completeness of this data for individual or aggregate use with other data.
Landowner: MRW Properties LLC	
EXHIBIT A2	PACIFIC POWER A DIVISION OF PACIFICORP

PROPERTY DESCRIPTION

In the NE/4 SW/4 of Section 22, Township 1 North, Range 3 East
of the Willamette Meridian, Fairview, Multnomah County, State of Oregon.
Map / Tax Lot: 1N 3E 22C 00109;
Partition Plat 2005-163, Parcel 1

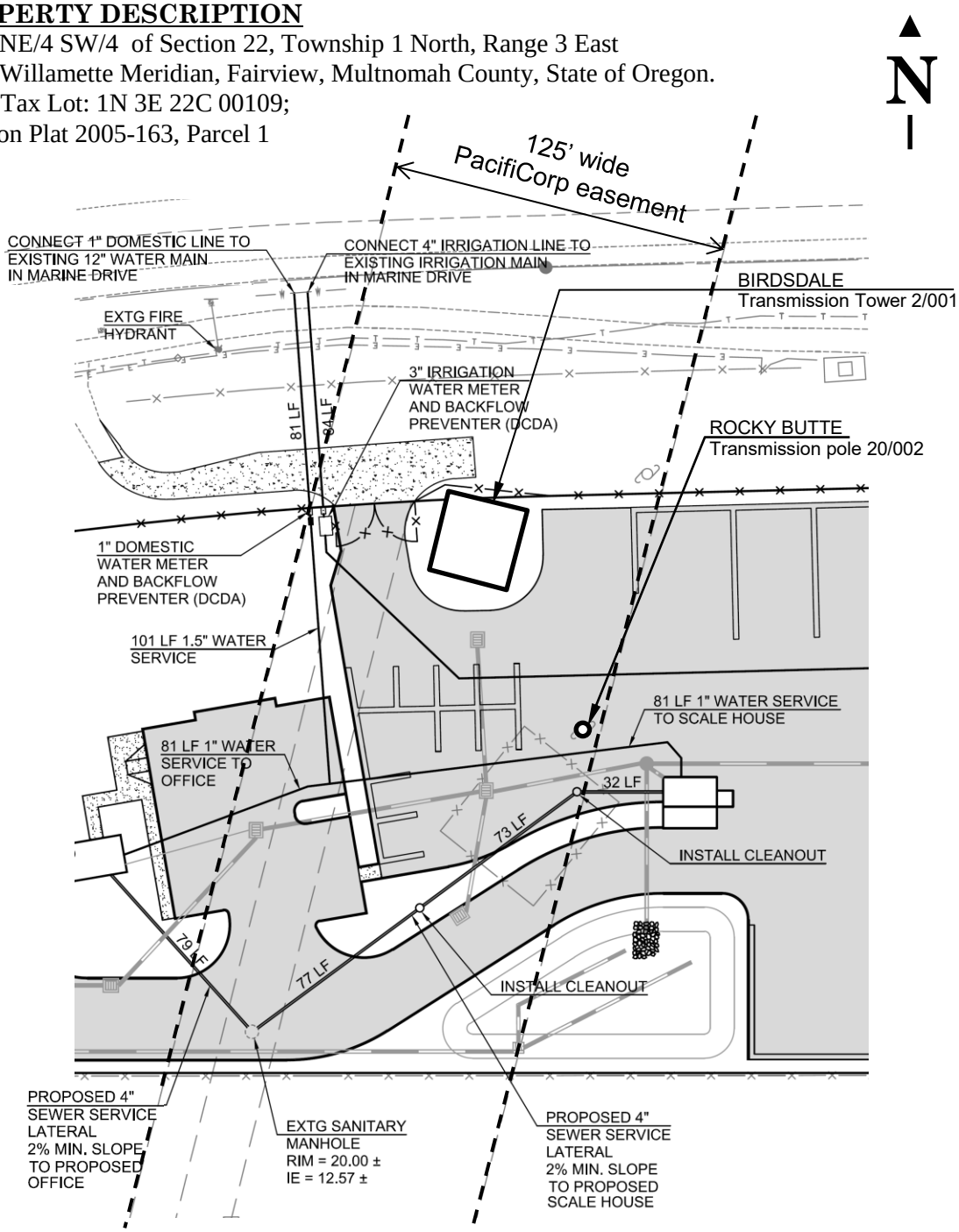


Catch basins, manhole covers, storm-water pipes

ROW#: 20180243	This drawing should be used only as a representation of the location of the easement area. No warranties, express or implied, are provided for the accuracy, reliability, or completeness of this data for individual or aggregate use with other data.
Landowner: MRW Properties LLC	
EXHIBIT A3	PACIFIC POWER A DIVISION OF PACIFICORP

PROPERTY DESCRIPTION

In the NE/4 SW/4 of Section 22, Township 1 North, Range 3 East
of the Willamette Meridian, Fairview, Multnomah County, State of Oregon.
Map / Tax Lot: 1N 3E 22C 00109;
Partition Plat 2005-163, Parcel 1

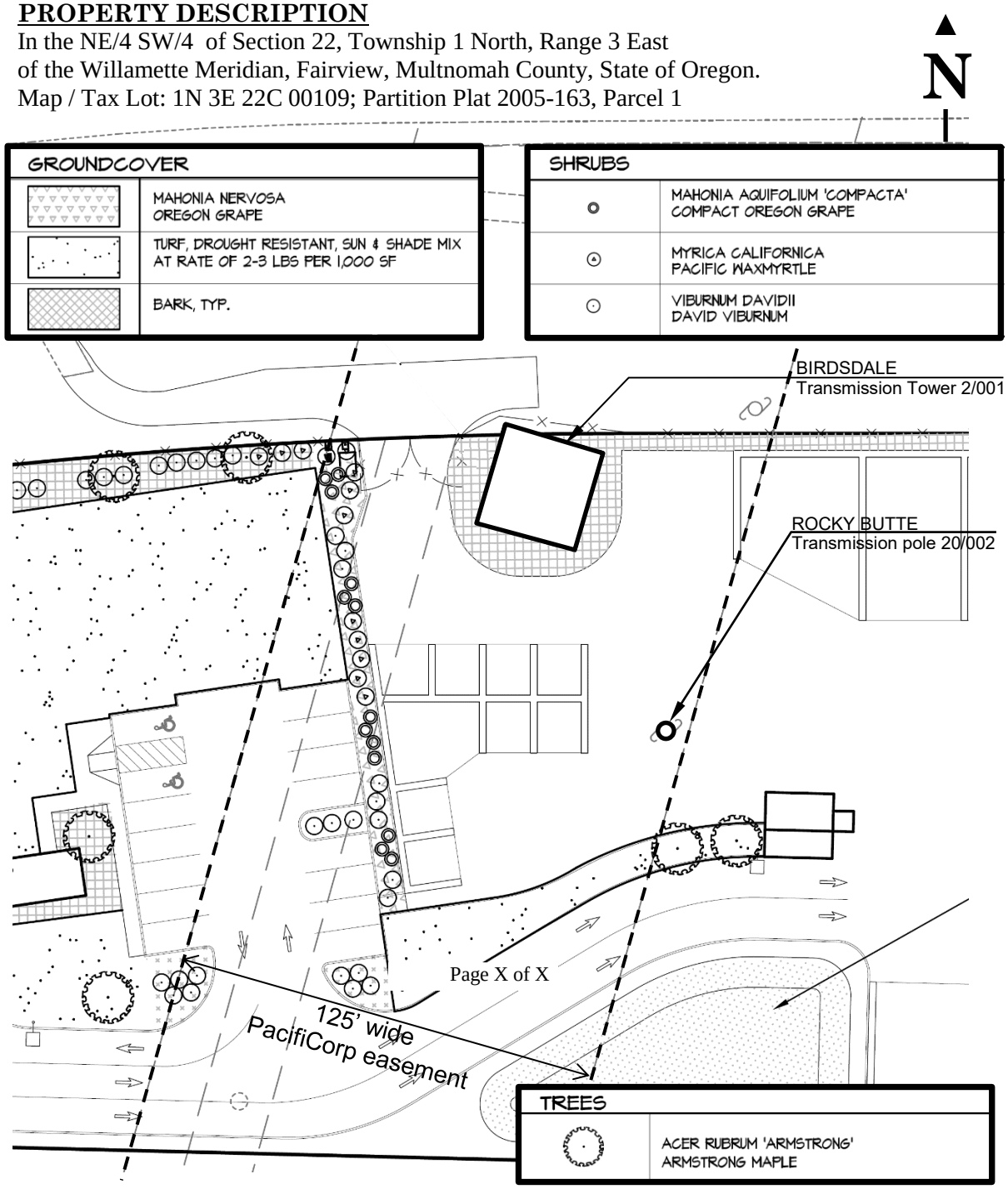


Domestic and irrigation water lines, water meters, sewer lines

ROW#: 20180243	This drawing should be used only as a representation of the location of the easement area. No warranties, express or implied, are provided for the accuracy, reliability, or completeness of this data for individual or aggregate use with other data.
Landowner: MRW Properties LLC	
EXHIBIT A4	PACIFIC POWER A DIVISION OF PACIFICORP

PROPERTY DESCRIPTION

In the NE/4 SW/4 of Section 22, Township 1 North, Range 3 East
of the Willamette Meridian, Fairview, Multnomah County, State of Oregon.
Map / Tax Lot: 1N 3E 22C 00109; Partition Plat 2005-163, Parcel 1



Landscaping

ROW#: 20180243	This drawing should be used only as a representation of the location of the easement area. No warranties, express or implied, are provided for the accuracy, reliability, or completeness of this data for individual or aggregate use with other data.
Landowner: MRW Properties LLC	
EXHIBIT A5	PACIFIC POWER A DIVISION OF PACIFICORP

Exhibit C6

Portland General Electric

After Recording Please Return To:
Portland General Electric Company
Attn: Property Services
121 SW Salmon Street, 3WTC0406
Portland, Oregon 97204-9951

Grantor's Mailing address:
Same as above

(Space above this line for Recorder's use)

Grantor: **Portland General Electric Company**

Grantee: MRW Properties, LLC and Gary Dempsey

APN/APN: **1N3E22C 00104/R239084**
1N3E22C 00105/R239085

ACCESS EASEMENT

For good and valuable consideration, ***PORTLAND GENERAL ELECTRIC COMPANY***, an Oregon Corporation, 121 SW Salmon Street, Portland, Oregon 97204 ("Grantor") hereby grants and conveys to, MRW Properties, LLC, an Oregon limited liability company, and Gary Dempsey, an individual, PO Box 115, Fairview, Oregon 97024 (jointly and severally "Grantee"), a nonexclusive perpetual easement and right-of-way through and across a portion of Tax Lot 104 and 105 situated in Multnomah County, Oregon (described in *Exhibit "A"* hereto) with the portion of such Tax Lot 104 and 105 subject to this Easement consisting of a strip of land specifically described and generally depicted in *Exhibit "B"* hereto (the "Easement Area").

TERMS, CONDITIONS, AND COVENANTS

1. **Grantee's Rights.** Grantee shall have the nonexclusive right to enter upon the Easement Area for the sole and limited purpose of access to Grantee's adjoining property interests, together with the rights directly necessary for the exercise of Grantee's rights under this Easement. Grantee is not acquiring any interest in or right to use any other property interest of Grantor.

2. **AS IS**. Grantee accepts the Easement Area in its present condition, "*AS IS*", without any representation or warranty whatsoever, including without limitation, any representation or warranty concerning the fitness, suitability, or viability of the Easement Area for any particular purpose. This Easement is subject to the operation and effect of any and all instruments and matters of record or in fact (including without limitation all easements, interests, encumbrances, liens, and all other limitations and exceptions of record) applicable to the subject property. Any rights acquired by Grantee pursuant hereto are subject the necessary approval of all applicable governmental entities as well as to existing rights, if any, of other parties, and this Easement is granted to the extent that Grantor has authority to do so and shall not be construed as consent of governmental entities, the landowner (if different than Grantor), or any other interest holder, which consent(s) Grantee shall obtain at Grantee's expense, in each case upon terms and conditions acceptable to Grantor.

Exhibit C6

3. **Grantor's Use.** Grantor shall have and retain the right to use the Easement Area for all purposes provided that such use shall not, materially interfere with the exercise by Grantee of Grantee's rights under this Easement, including the right of Grantor to grant to third parties any such rights to use and to convey the same. No right of Grantor shall lapse or be waived in the event Grantor fails to use the Easement Area, or any portion thereof, on a continuous basis.

4. **Grantee's Use.** Grantee shall not install, build, erect, or maintain any structures, improvements, or obstructions of any type or nature upon, over or under the Easement Area and will not impede, impair or interfere with Grantor's use of and/or access to Grantor's property interests (including without limitation the Easement Area) and/or facilities at any time or in any fashion. If Grantee shall fail to use this Easement for a continuous period of two (2) years after the date hereof, then this Easement shall terminate, and all rights granted hereunder shall revert to Grantor. Upon written request of Grantor, Grantee will promptly deliver to Grantor in recordable form any document reasonably required to remove this Easement from the record of title to the subject property.

4.1 Grantee acknowledges that Grantor maintains and operates facilities (Blue Lake Substation) on Grantor's property for the production, transmission, distribution and sale of electricity, and communications (Grantor's Facilities) and that it is imperative that Grantor have unobstructed access to Grantor 's Facilities at all times. Grantee shall not impede or interfere with Grantor's access to Grantor's Facilities in any fashion. In the event such access is obstructed by Grantee or any employee, agent, licensee, representative, contractor or invitee of Grantee, Grantor shall have the right to remove the obstruction at Licensee's expense.

4.2 Grantee acknowledges that Grantee's use of the Easement Area is subject to Grantor's superior right to to construction, maintenance, operation and upgrade of Grantor's Facilities. Grantee further acknowledges and agrees that metallic structures which come into contact with any forms of electrically conducting environments (i.e., environments containing enough ions to conduct electricity such as soils, seawater and basically all natural waters) will corrode and deteriorate at an accelerated pace. All clearances (equipment, fences, facilities and structures) and the grounding of all structures, equipment and personnel shall satisfy the requirements established by the National Electrical Safety Code and by Grantor. All materials must be of non-conductive material or appropriately grounded by licensed electrician. Grantee shall be responsible for determining, implementing, monitoring, and maintaining all means of grounding and cathodic protection with respect to any of Grantee's personnel or properties in or along the subject property and, shall indemnify and hold Grantor harmless therefrom.

4.3 Grantee is allowed to expand and construct a 30-foot paved driveway in the easement area (and fill to grade) and relocate the existing Blue Lake Substation access gate to the location identified on Exhibit B.

4.4 All construction and maintenance activities shall be coordinated with Grantor in advance in each instance. Grantee will give advance notice to Grantor and coordinate all such activities by contacting PGE Property Services, Tina Tippin 503.464.7672 or tina.tippin@pgn.com.

5. **Risk/Indemnification**. Grantee assumes all risk arising out or in any way related to the presence on and/or use of the subject property by Grantee or Grantee's officers, directors, employees, agents, contractors, and invitees and Grantor shall have no liability to Grantee or others from any condition existing thereon except to the extent a claim against Grantor directly results from Grantor's gross negligence or intentional misconduct. Grantee shall indemnify and hold Grantor, and Grantor's officers, directors, employees, agents, contractors, and invitees harmless against and from all liabilities, obligations, damages, penalties, claims, costs, charges, and expenses, including reasonable attorney fees, that may be imposed on or incurred by or asserted against Grantor by reason of any of the following occurrences: Any work or thing done in, on, or about all or any part of the subject property by Grantee or any party other than Grantor; Any use, nonuse, possession, occupation, condition, operation, maintenance, or management of all or any part of the subject property or any adjacent alley, sidewalk, curb, vault, passageway, or space; Any negligence on the part of Grantee or any of its agents, contractors, servants, employees, sublessees, licensees, or invitees; Any accident, injury, or damage to any person or property occurring in, on, or about the subject property; or Any failure on the part of Grantee to promptly perform or comply with any of the covenants, agreements, terms, provisions, conditions, or limitations contained in this Easement on its part to be performed or complied with.

6. **Insurance.** Grantee shall provide to Grantor proof of and continuously maintain comprehensive broad-form general liability insurance which shall insure against claims and liability for personal injury, death, or property damage arising from the use, occupancy, disuse or condition of the Easement Area including any improvements or adjoining areas or ways, or from any other cause. The insurance shall have a combined single limit of not less than $2,000,000 per occurrence and be written in companies acceptable to Grantor, with Grantor, its affiliates and their directors, officers, employees and agents, named as additional insureds. If Grantee shall fail for any reason to procure any such insurance and to deliver certificates of such to Grantor at least fifteen (15) days prior to the expiration of any such policy of insurance, Grantor may procure the same at Grantee's expense. Grantor, in its sole discretion, may waive or modify the requirements for insurance described in this paragraph, by written notice to Grantee.

Exhibit C6

7. **Limitation of Damages.** IN NO EVENT SHALL GRANTOR BE LIABLE TO GRANTEE OR TO ANY THIRD PARTY FOR ANY LOST OR PROSPECTIVE PROFITS OR ANY OTHER SPECIAL, PUNITIVE, EXEMPLARY, CONSEQUENTIAL, INCIDENTAL OR INDIRECT LOSSES OR DAMAGES (IN TORT, CONTRACT OR OTHERWISE) UNDER OR IN RESPECT OF THIS AGREEMENT OR FOR ANY FAILURE OF PERFORMANCE RELATED HERETO HOWSOEVER CAUSED, WHETHER OR NOT ARISING FROM GRANTOR'S SOLE, JOINT OR CONCURRENT NEGLIGENCE.

8. **Relocation.** The Easement Area may be relocated at any time at Grantor's sole discretion, provided that Grantor shall bear the cost of providing Grantee reasonable alternative access in connection with such relocation. In such event, Grantee shall promptly execute and deliver to Grantor an instrument in recordable for relocating the Easement to the new easement area designated by Grantor and terminating the Easement granted in this instrument.

9. **Miscellaneous.**

9.1 **Time of Essence.** Grantor and Grantee each hereby acknowledge and agree that time is strictly of the essence with respect to every term, condition, obligation, and provision contained in this Easement.

9.2 **Governing Law.** The parties acknowledge that this Easement has been negotiated and entered into in the state of Oregon, is governed by and should be interpreted in accordance with the laws of the state of Oregon. Exclusive venue for any action shall be Multnomah County Circuit Court.

9.3 **Context.** As used herein and where the context so requires, the singular includes the plural and all grammatical changes shall be implied to make the provisions hereof apply equally to corporations and to individuals.

9.4 **Liability.** Each Grantee shall be jointly and severally liable for performing Grantee's obligations hereunder and each irrevocably waives, disclaims and relinquishes all claims against one another which each such party has or would otherwise have by virtue of payment of any sums to Grantor, specifically including but not limited to all rights of indemnity, subrogation, contribution or exoneration.

9.5 **Counterparts.** This Easement may be executed in counterparts, and such counterparts together shall constitute but one original of the Easement. Each counterpart shall be equally admissible in evidence, and each original shall fully bind each party who has executed it.

9.6 **Entire Agreement.** This instrument, along with any exhibits and attachments or other documents affixed hereto or referred to herein, constitute the entire and exclusive agreement between Grantee and Grantor relative to the Easement. Grantee and Grantor hereby agree that all prior written and oral agreements, understandings and/or practices relative to the Easement are superseded by this instrument.

This Easement inures to the benefit of and binds the parties hereto, their heirs, devisees, administrators, executors, successors and assigns.

IN WITNESS WHEREOF, Grantor has executed this Easement effective as of the ___ day of _____, 2018.

GRANTOR:

PORTLAND GENERAL ELECTRIC COMPANY,
An Oregon corporation

By: _____
Printed Name: Mark Lindley
Title: Property Services Manager

GRANTEE:

MRW Properties, LLC
an Oregon limited liability company

By: _____
Printed Name:
Title:

By: _____
Gary Dempsey

Exhibit C6

ACKNOWLEDGMENT

STATE OF OREGON)
) ss.
COUNTY OF _____)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that s/he signed this instrument, on oath stated that s/he was authorized to execute the instrument as Member of MRW Properties, LLC and acknowledged it to be his/her free and voluntary act for the uses and purposes mentioned in the instrument.

Dated: _____, 20___.

_____
Notary Public for the State of Oregon
Printed Name: _____
My Commission expires on: _____

STATE OF OREGON)
) ss.
COUNTY OF _____)

I certify that I know or have satisfactory evidence that Gary Dempsey is the person who appeared before me, and said person acknowledged that he signed this instrument, on oath stated that he was authorized to execute the instrument individually and acknowledged it to be his or her free and voluntary act for the uses and purposes mentioned in the instrument.

Dated: _____, 20___.

_____
Notary Public for the State of Oregon
Printed Name: _____
My Commission expires on: _____

Exhibit C6

STATE OF OREGON)
) ss.
COUNTY OF _____)

I certify that I know or have satisfactory evidence that Mark Lindley is the person who appeared before me, and said person acknowledged that he signed this instrument, on oath stated that s/he was authorized to execute the instrument as Manager, Property Services of Portland General Electric Company and acknowledged it to be his/her free and voluntary act for the uses and purposes mentioned in the instrument.

Dated: _____, 20___.

_____
Notary Public for the State of Oregon
Printed Name: _____
My Commission expires on: _____

Exhibit C6

EXHIBIT "A"
PROPERTY DESCRIPTION

Parcel 1 and 2 of Partition Plat No. 1996-55 recorded April 2, 1996 in the City of Faiview, Oregon, County of Multnomah, Oregon.

Exhibit D1

Department of Community Services
Transportation Division
http://multco.us/transportation-planning

1620 SE 190th Avenue, Portland, Oregon 97233-5910 • Phone (503) 988-5050 • Fax (503) 988-3321

M E M O R A N D U M

TO: Eric Rutledge, Associate Planner, City of Fairview
Sarah Selden, Senior Planner, City of Fairview
Joanna Valencia, AICP, Manager, MultCo. Transportation Planning & Development

FROM: Scott Adams, AICP, Transportation Planner, MultCo. Transportation Planning and Development

DATE: November 1, 2018

SUBJECT: **EP-2018-10502 / 2018-37-DR Allwood Recycling**
22800 NE Marine Dr., Fairview, OR 97024
R649856490, R649736326

Multnomah County Transportation Planning and Development has reviewed the above referenced application and provides the following **Findings and Conditions of approval** in support of approving the project.

The comments provided in this memorandum are based on materials provided by the applicant and City of Fairview. While every effort has been made to identify all related standards and issues, additional issues may arise and other standards not listed may become applicable as more information becomes available.

The subject application proposal consists of Allwood Recyclers, Inc. proposing a sales and storage yard for landscape materials (bark, mulch, soil, rock, etc.). The site will provide a 924 sq. ft. office building, a weight scale, and bins for storage of materials, and employee and customer parking covering 3.45 acres. Two access points are proposed on Marine Drive, one full access and one exit only proposed to be located on two different properties. As we understand it, this essentially moves the retail operations from their existing operations across the street to this site that is currently vacant. With this, the traffic impact has been reviewed with this scope in mind.

The subject property is located at 22800 NE Marine Drive. The property has frontage on Marine Drive which is a Multnomah County jurisdictional road classified as a Major Collector facility. Access is proposed off of Marine Drive.

Findings

FINDINGS: Written findings are contained herein. The Multnomah County Road Rules are in **bold** font. Staff analysis and comments are identified as '**Staff:**' and address the applicable criteria. Staff comments may include a conclusionary statement in italic.

MCRR 4.000 Access to County Roads

MCRR 4.100 Application for New or Reconfigured Access: Applicants for a new, altered or reconfigured access onto a road under County Jurisdiction are required to submit a site plan. Applicants may be required to provide all or some of the following:

Exhibit D1

A. Traffic Study-completed by a registered traffic engineer;
B. Access Analysis-completed by a registered traffic engineer;
C. Sight Distance Certification from a registered traffic engineer; and
D. Other site-specific information requested by the County Engineer including a survey.

Staff: The applicant has proposed to use an existing driveway on the site's northern end and construct a new driveway on the site's southern end. Both driveways access NE Marine Dr., a Major Collector road under County Jurisdiction. The existing and new driveways are shown on the applicant's site plans. All required information has been submitted.

Criterion is met.

MCRR 4.200 Number of Accesses Allowed: Reducing the number of existing and proposed access points on Arterials and Collectors and improving traffic flow and safety on all County roads will be the primary consideration when reviewing access proposals for approval. One driveway access per property is the standard for approval pursuant to the Multnomah County Code. Double frontage lots will be limited to access from the lower classification street. Shared access may be required in situations where spacing standards cannot be met or where there is a benefit to the transportation system. If more than one access is desired, a land use application must be submitted in compliance with applicable Multnomah County Codes.

Staff: The subject site is served by one driveway per property. Per the applicant's site plan, the project is is comprised of two separate properties, including one with an existing driveway.

Criterion is met.

MCRR 4.300 Location: All new access points shall be located so as to meet the access spacing standards laid out in the Design and Construction Manual.

Staff: For a road classified as a Major Collector, the spacing standard is 148 feet. (MCDCM, Table 1.2.5, Minimum Private Access Driveway Spacing Standards). The minimum distance is applied to both driveways on the same side of the street as well as driveways opposite to the site.

The existing northern driveway is 186 feet from the driveway to its immediate south (opposite side of street) and the proposed southern driveway is 192 feet from an existing driveway for Chinook RV Storage to the south.

Criterion is met.

MCRR 4.400 Width: Driveway, Private road and Accessway widths shall conform to the dimensions laid out in the Design and Construction Manual.

Staff: For a Commercial use, a new or reconfigured driveway must be a minimum 20 feet wide and maximum 34 feet wide ((MCDCM, Table 1.2.4, Private Access Driveway Width Standards) The new driveways will each be 30 feet wide.

Criterion is met.

MCRR 4.500 Sight Distance: All new or altered access points to roads under the County's jurisdiction must have a minimum sight distance equal to the standards in the Design and Construction Manual and AASHTO's A Policy on Geometric Design of Highways and Streets.

Staff: Multnomah County Road Rules Section 4.500 states that access points to roads under the County's jurisdiction must have a minimum sight distance equal to the standards in the County Design and Construction Manual or AASHTO's A Policy on Geometric Design of Highway and Streets. The applicant has submitted for the review of the County Transportation Division a sight distance certification, which provides an assessment of sight distance at the intersection in question consistent with AASHTO standards.

In the absence of a posted speed (per ORS 811.100 (1), Oregon Basic Speed Rule), NE Marine Dr. has an assumed 55 mph speed limit and needs 500 feet of sight distance per AASHTO standards. Over 500 feet of sight distance is available in both directions from the proposed driveways.

Criterion is met.

MCRR 5.000 Transportation Impact

MCRR 5.100 To determine if a Transportation Impact is caused by a proposed development, the County Engineer will determine the number of new trips generated by a site by one of the following methods:

A. Calculations from the most recent edition of the Institute of Transportation Engineers' Trip Generation (ITE); or

B. A site development transportation impact study conducted by a professional engineer registered in the State of Oregon and accepted by the County.

MCRR 5.200 The County Engineer will use the information obtained pursuant to sub-section 5.100 and/or the frontage length of the subject property to determine the pro-rata share of the requirements set forth in Section 6.000. The County Engineer determination of pro-rata share of improvements will expire twelve months from the date of the County Engineer's determination or after the associated land use permit is granted or closed. If expired, a review process and new determination will be required.

MCRR 5.300 Except where special circumstances require the County Engineer to make an alternate determination, any new construction or alteration which will increase the number of trips generated by a site by more than 20 percent, by more than 100 trips per day or by more than 10 trips in the peak hour shall be found to have a Transportation Impact. A minimum increase of 10 new trips per day is required to find a Transportation Impact.

Staff: The Multnomah County Road Rules defines a Transportation Impact as the effect of any new construction or alteration which will increase the number of trips generated by a site by more than 20 percent, by more than 100 trips per day or by more than 10 trips in the peak hour [MCRR 3.000]. A minimum increase of 10 new trips per day is required to find a transportation impact.

The applicant's October 12, 2018 Trip Generation Memo notes that Allwood's current site generates 406 trips per day and the proposed site will generate 383 trips per day, with a net reduction of 23 trips per day on the proposed site. It is the understanding of the county that this is due to operations moving from one site to another site and net size decreasing slightly.

Multnomah County Transportation staff accept the findings of no Traffic Impact from the site, but have noted the site's conversion from vacant land to active uses whose impacts will need to be addressed via Conditions of Approval to address safety and increased traffic and impacts over the multi-use path adjacent to this property. (**see Conditions of Approval**).

Criterion is met.

26.000 Stormwater and Drainage
26.100 Onsite management of Stormwater is a priority for County.

Staff: As noted in a May 2018 Stormwater Report, the proposed project has a 2,640 sq. ft. Stormwater Quality Facility located on its southern border. Additionally, the applicant has provided documentation from Multnomah County Drainage District (MCDD) (August 24, 2018 letter from MCDD) of adequate stormwater capacity in adjoining culverts.

Criterion is met.

26.150 Applicants for a development or redevelopment that impacts impervious surface will be required to provide a Stormwater certificate and/or analysis showing method of and ability to retain Stormwater on site. Stormwater solutions must be consistent with Multnomah County Design and Construction Manual standards.

Staff: As noted in a May 2018 Stormwater Report, the proposed project has a 2,640 sq. ft. Stormwater Quality Facility located on its southern border. Additionally, the applicant has provided documentation from Multnomah County Drainage District (MCDD) (August 24, 2018 letter from MCDD) of adequate stormwater capacity in adjoining culverts.

Criterion is met.

Exhibit D1

26.200 Any development or redevelopment of a site which proposes Discharge of Stormwater onto County right of way is subject to Stormwater Discharge permit requirements outlined below, and must comply with drainage requirements identified in the Multnomah County Design and Construction Manual.

Staff: As noted in a May 2018 Stormwater Report, the proposed project has a 2,640 sq. ft. Stormwater Quality Facility located on its southern border. Additionally, the applicant has provided documentation from Multnomah County Drainage District (MCDD) (August 24, 2018 letter from MCDD) of adequate stormwater capacity in adjoining culverts.

Criterion is met.

26.300 Stormwater Discharge permit requirements: The County Engineer may allow drainage of Stormwater to County right of way when the following standards are met:

A. Applicant demonstrates that they are not able to meet the Discharge hierarchy of the Portland Stormwater Manual.
B. An Analysis conducted by a registered engineer shows that soil infiltration is not feasible.
C. A Drainage analysis is conducted by a registered engineer that ensures the storm sewer pipe/system can handle conveyance of a 25-year storm event or another storm event as identified by the County Engineer based on site/area/facility conditions.
D. Standards under Section 16.200 of these rules are addressed.

Staff: As noted in a May 2018 Stormwater Report, the proposed project has a 2,640 sq. ft. Stormwater Quality Facility located on its southern border. Additionally, the applicant has provided documentation from Multnomah County Drainage District (MCDD) (August 24, 2018 letter from MCDD) of adequate stormwater capacity in adjoining culverts.

Criterion is met.

Conditions of Approval:

1. **Pavement Markings/Signs:** Applicant will need to submit detailed Pavement Markings/Signs plans to Multnomah County Transportation for review of planned installations along NE Marine Dr. and at the site's driveway crossings with the Marine Dr. Trail (multi-use path) and NE Marine Dr. The applicant will be responsible for implementing the plan and obtaining a Construction Permit for the upgrades to the signage and striping of the trail crossings at the driveways.

2. **Pavement Upgrades at Driveways:** Applicant will need to submit detailed paving plans for heavy-traffic paving materials at the driveway crossings of the Marine Dr. Trail. The applicant will be responsible for implementing the plan and obtaining a Construction Permit for the upgrades to the trail crossings to strengthen the driveway crossing for a 20-year design for trucks.

3. **Lighting:** Applicant will need to submit detailed lighting plans to the Mid-County Lighting District for street lighting along the site's frontage and at its driveway crossings with the Marine Dr. Trail. Prior to issuance of the Certificate of Occupancy, the applicant will need to submit concurrence from Mid-County Lighting District that their requirements have been met to Multnomah County Transportation and the City of Fairview Land Use Department.

Exhibit D2

Fairview File #: 18-17
Allwood Recyclers.
FROM: Kyle Stuart, Gresham Fire (kyle.stuart@GreshamOregon.gov)
DATE: 3/14/2018
FIRE COMMENTS:

NOTE: Limited information at this time. All of the following will need to be provided on a separate FIRE ACCESS and WATER SUPPLY page with the building permit plans.

1. Provide fire flow per Oregon Fire Code Appendix B. Required fire flow for buildings varies based on construction and square footage. If this building s of type IIIB construction the required flow will be 1500GPM ***OFC App B Table B105.1.***

2. A temporary address of 6" shall be provided at each construction entrance prior to the arrival of materials or workers. ***OFC 505 & 3301***

3. The site addressing shall meet the Gresham Fire Addressing Policy. Each building shall have a sign placard with a minimum 6" address numbers. ***OFC 505.1***

4. Public fire hydrant locations are not indicated on the plans. They must be shown. All fire hydrants shall have STORZ quick adapters on the large port. The model required is Harrington HPHA50-45NHWCAP. ***OFC 507***

5. Limited information at this time but if fire flow cannot be met a fire sprinkler system MAY be required. ***OFC 903***

6. Fire hydrant locations shall be identified by the installation of reflective markers. The markers shall be BLUE. They shall be located adjacent and to the side of the centerline of the access road way that the fire hydrant is located on. In case that there is no center line, then assume a centerline, and place the marker accordingly. ***OFC 508.5.4***

7. Prior to applying for a building permit provide a fire flow test and report. The fire flow report will verify that the correct fire flow is available and will be required to have been conducted within the last 12 months. NOTE: If minimum fire flow cannot be met fire sprinklers may be required. ***OFC 507.3 & B-101.1***

8. All Fire Dept. Access Roads shall be drawn to scale and shown clearly on plans. The access roads shall be constructed and maintained prior to and during construction. The minimum width is 20' wide. ***OFC 1410, 503.2.1 & D103.1***

9. Required Fire Dept. Access Roads on site shall be designed to support an apparatus weighing 75,000 lb. gross vehicle weight. Provide an engineer's letter stating the access

road meets those requirements at time of building permit submittal. ***OFC, Appendix D, Section D102.1***

10. Gates located on fire access roads must eb equipped with a KNOX brand lockbox that meets Gresham Fires gate policy. Bothe the policy and order from have been provided. ***OFC 5***

11. No Parking Fire Lane signage or curb marking will be required. Fire access roads 20' – 26' wide do not allow parking on either side within that space. Parking spaces outside that space are acceptable. Indicate signage or curb marking on the building permit plans. I can email you our policy. ***OFC D 103.6***

12. Fire access roads that exceed 150 ft in length and are a dead end are required to be equipped with an approved turn around. I can email our policy to you. ***OFC D103.4***

13. A fire alarm system MAY be required if sprinklers are required. ***OFC 903.4 and 907***

Exhibit D2

GRESHAM FIRE & EMERGENCY SERVICES				
STANDARD OPERATING GUIDELINES				
EFFECTIVE DATE: 4/1/11	SOG NUMBER: 3.1.4	ARTICLE - SECTION: Life Safety	REPLACES: 3/15/06	PAGE: 1 OF 1
APPROVED: CHIEF:		TITLE: **Fire Access Gates**		

POLICY STATEMENT

It will be the policy of Gresham Fire and Emergency Services to allow gates across fire access roads when, in the opinion of the Fire Marshal, the gates would not create an unreasonable impact to fire and life safety. Gates will be installed so as to not reduce the required access width (20' min) or height (13'6" min) and be signed as NO PARKING FIRE LANE.

Primary access gates that are not electrically operated shall have a Supra Lock Box with a C4447 cylinder positioned on the latch side at a maximum of 48" high or in the most convenient location as determined by the Fire Marshal for fire department access.

Primary access gates that are electrically operated shall be designed with a fire department access button or toggle switch contained inside a Supra Lock Box with a C4447 cylinder. The lock box will be positioned immediately adjacent the access pad / card panel or in the most convenient location as determined by the Fire Marshal for fire department access. Gates shall "fail" open when activated by the button or switch and remain open until the system is reset. All electronic gates shall "fail" open during power outages.

Secondary access gates may be secured with a non-hardened chain and lock when so approved.

Contact Fire Administration at 503-618-2355 to obtain a Supra Lock Box order form.

Exhibit D2

Gresham Fire & Emergency Services
Online Order Instructions
KNOX-BOX® Rapid Entry System

Step 1
Go to **www.knoxbox.com/ greshamfd**

Step 2
Find your product from photos or the "Search by Product Number" dropdown list.

Step 3
Select & configure product and add to cart.

Step 4
Confirm product installation address, then complete your purchase or continue shopping.

KNOX-BOX® Rapid Entry System Product Examples

Image	Description	Part Number	Price	Quantity Needed
	Commercial KnoxBoxes Model 3261 – Surface Mount, Hinged, Black	3261	$308.00	
	Commercial KnoxBoxes Model 3270 – Recess Mount, Hinged, Black	3270	$348.00	
	Commercial KnoxBoxes Model 4401 – Surface Mount, Single Lock, Black	4401	$498.00	
	Commercial KnoxBoxes Model 4430 – Recess Mount, Single Lock, Black	4430	$548.00	
	FDC Locking Caps Model 3041 - Knox FDC Plug with Swivel-Guard™ - Bright Stainless Finish	3041	$177.00	
	FDC Locking Caps Model 3043 - Knox FDC Plug - Bright Stainless Finish	3043	$137.00	
	FDC Locking Caps Model 5002 – StorzGuard® 5" Cap	5002	$313.00	
	Gate & Key Switches Model 3501 - Knox KeySwitch	3501	$94.00	
	Gate & Key Switches Model 3502 - Knox Key Switch on Mounting Plate	3502	$115.00	
	Padlocks Knox Padlock Model 3770 - Exterior All Conditions	3770	$94.00	

Gresham Fire & Emergency Services
Knox Program Coordinator: Robert Mottice, 503-618-2355, Robert.Mottice@GreshamOregon.gov

For online ordering assistance, please contact Knox at 800-552-5669 ext. 450.
* **Prices subject to change.**

Exhibit D3

Eric Rutledge

From: Reviews <reviews@mcdd.org>
Sent: Wednesday, June 6, 2018 9:53 AM
To: Eric Rutledge; Reviews
Subject: RE: Land Use Routing - 22800 NE Marine

Follow Up Flag: Follow up
Flag Status: Flagged

The application contains all of the information we require.

The stormwater outfall discharges into a ditch maintained by MCDD. The property owner is the owner of the stormwater system and is responsible for maintaining the stormwater system and outfall, keeping it clear of debris and flowing. If the owner would like MCDD to maintain this outfall, they need to reach out to us to discuss further.

We have no further comments on the proposed development.

Andrew Riggs
Engineering Tech

MCDD
1917 | 100 YEARS OF SERVICE | 2017

Multnomah County Drainage District #1 | Peninsula Drainage District #1 | Peninsula Drainage District #2 | Sandy Drainage Improvement Company

1880 NE Elrod Drive Portland, OR 97211
503.281.5675 ext. 305
ariggs@mcdd.org
www.mcdd.org

What is MCDD? MCDD provides flood protection by maintaining the Columbia River Corridor levee system and removing stormwater for residents and businesses. MCDD also serves three other drainage districts along the south shore of the Columbia River (Peninsula Drainage District #1, Peninsula Drainage District #2 and the Sandy Drainage Improvement Company). The four districts collectively extend from the edge of Smith and Bybee Lakes on the west, to the Sandy River on the east.

From: Eric Rutledge [mailto:rutledgee@ci.fairview.or.us]
Sent: Friday, May 25, 2018 10:03 AM
To: Reviews <reviews@mcdd.org>
Subject: Land Use Routing - 22800 NE Marine

Hi MCDD,

Please see the attached routing form for a development proposal at 22800 NE Marine Drive. We are seeking comments on **application completeness** at this time. Please let us know if you require additional information from the applicant. If no additional information is needed, full comments are welcome.

Exhibit D3

Dropbox link to project files:
https://www.dropbox.com/sh/o5n4jnvak6o96ri/AACl1__ETi_BoGwRPayG0eyfa?dl=0

Thank you,

Eric Rutledge
Associate Planner
Code Compliance Officer
City of Fairview
503.674.6205

This message is intended only for the individual(s) named. If you are not the named addressee you should not disseminate, distribute or copy this e-mail. Please notify the sender immediately by e-mail if you have received this e-mail by mistake and delete this e-mail from your system.