

Columbia Estates Subdivision

Supplemental Response to
Subdivision Application

August 29, 2017

MEMO



To: Newberg Planning Division

From: Daniel Danicic, PE

Date: 9/16/16

Re: Columbia Estates File SUB2-16-002

Anticipating a late fall start for construction, the applicant proposes to build the subdivision in 2 phases.



Supplemental Response – Columbia Estates Subdivision

- a. Pursuant to Newberg Code Section 15.100.040(F), please consider this communication as Applicant's request that this Application for Subdivision be processed as a Type III application.

- b. Please note that this subdivision will not be subject to Conditions Covenants and Restrictions.

- c. As to the third subdivision criterion: We will substantially complete, as defined by city policies, required improvements prior to final plat approval, and enter into a performance agreement to complete the remaining improvements. The performance agreement shall include security in a form acceptable to the city in sufficient amount to insure completion of all required improvements.

Supplemental Response – Columbia Estates Subdivision

15.505.090 Intersections of streets.

A. Angles. Streets shall intersect one another at an angle as near to the right angle as is practicable considering topography of the area and previous adjacent layout; where not so practicable, the right-of-way and street paving within the acute angle shall have a minimum of 30 feet centerline radius where such angle is not less than 75 degrees. In the case of streets intersecting at an angle of less than 75 degrees, then of such minimum as the director may determine in accordance with the purpose of this code.

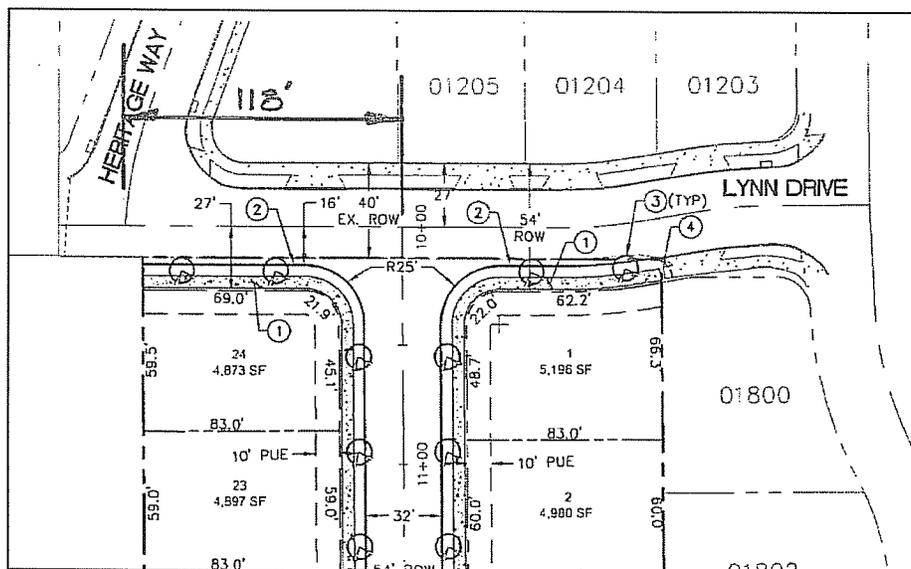
B. Offsets. Intersections shall be so designed that no offset dangerous to the traveling public is created as a result of staggering of intersections, and in no case shall there be an offset of less than 100 feet centerline to centerline.

C. New or improved intersection construction shall incorporate the minimum intersection curb return radii requirements shown in the following table:

Minimum Curb Return Radii (Feet)	Edge of Pavement/Curb
Lowest Street Classification of Two Intersection Streets	
Local residential street	15 feet

RESPONSE:

- A. All proposed street intersections are at right angles.
- B. All proposed street intersections are greater than 100 feet. The nearest intersection is Heritage Way and Lynn Drive. The new street will be offset 118 feet, see diagram below.



- C. All new curb returns will have a radius of 25 feet, exceeding the 15 foot minimum.

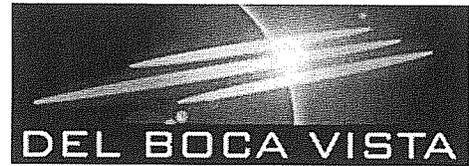
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Modifications to the plan set:

1. Existing Conditions and Grading Plan.
Sheet P500 has been revised to include the contours adjacent to the proposed project. The contours are based on available LIDAR data.
2. Surface Water Control
Sheet P500 shows how the lots are graded so that the majority of surface water drains towards the street. The fill portion of the lots do not fill all the way to the property line. Rather the toe of the fill stops short of the property line so that the minor accumulation of surface runoff from the fill slope is contained on the proposed development site which then flows south towards Columbia Drive without encroaching on adjacent properties.
3. Surrounding Development Drawing
Sheet P601 was revised to more clearly highlight the existing structures adjacent to the proposed development. Unfortunately, the aerial photo itself could not be improved.
4. Sanitary Sewer Plan
Lots which will need individual sewer pumps will each have a separate force-main lines located within easements on private property and will each discharge into the public sanitary sewer system such that the entire public system will operate under gravity flow conditions.

Supplemental Response – Columbia Estates Subdivision

MEMO



To: Steve Olson, City of Newberg
From: Daniel Danicic, PE
Date: 8/22/16
Re: Columbia Estates Subdivision Application – File
HYW 240 Pump Station Analysis

The Staff completeness check comments on 7/31/16, the Engineering Division noted:

Hwy 240 pump station: One annexation condition was “At the time of development, a detailed analysis of the Highway 240 sanitary sewer pump station is required, and any necessary upgrades to the pump station would be completed by the developer.” This needs to be supplied as part of the subdivision application.

On 8/22/16 the Engineering Division reported that the current peak flow of the pump station is 825 GPM.

The proposed subdivision contains 24 lots. The City of Newberg’s sanitary master plan from 2007 (Chapter 4 – Flow Projections) estimates 91.2 GCD (Gallons per capita per day) for R-2 zoning. Per the city it should be assumed that each lot will contain an average of 2.75 persons, therefore the average daily flow is approximately 251 GPD. This gives a total of approximately 6,024 GPD of additional sanitary flow from the proposed subdivision per the City of Newberg Sanitary Sewer Master Plan. This equates to 4.18 GPM if additional flow.

The design report for the HWY 240 Pump Station provided by the City, states that the initial pump design shall be for 1,000 GPM capacity. With the proposed subdivision, the flow will be 825 GPM plus 4.18 GPM equaling 829.18 GPM which is less than 1,000 GPM design capacity.

The pump station therefore has capacity.

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Please replace Page 11 in the initial application narrative with the following page.

15.505 STREET AND TRANSPORTATION IMPROVEMENTS DESIGN STANDARDS

15.505.020 Layout of streets, alleys, bikeways, and walkways.

A. Streets, alleys, bikeways, and walkways shall be laid out and constructed as shown in the Newberg transportation system plan or in adopted future street plans.

B. In areas where the transportation system plan or future street plans do not show specific transportation improvements, roads and streets shall be laid out so as to conform to subdivisions, partitions, and developments previously approved for adjoining property as to width, general direction and in other aspects, unless it is found in the public interest to modify these patterns. In addition, transportation improvements shall conform to the standards within this code.

RESPONSE: Not applicable.

15.505.030 Construction of new streets and alleys.

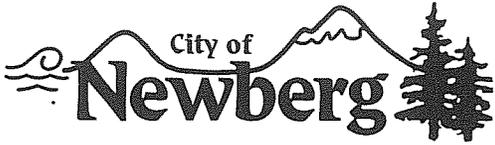
The land divider or developer shall grade and pave all streets and alleys in the subdivision, partition or development to the width specified in NMC 15.505.060, and provide for drainage of all such streets and alleys, construct curbs and gutters within the subdivision, partition or development in accordance with specifications adopted by the city council under NMC 15.510.030. Such improvements shall be constructed to specifications of the city under the supervision and direction of the director. It shall be the responsibility of the land divider or developer to provide street signs.

RESPONSE: These provisions will be met with the submission of subdivision plans.

15.505.040 Improvements to existing streets.

A subdivision, partition or development requiring a Type II design review abutting or adjacent to an existing road of inadequate width shall dedicate additional right-of-way to and improve the street to the width specified in NMC 15.505.060.

RESPONSE: A 10-foot dedication along Columbia frontage will be provided to allow for a full 30-foot right-of-way width from centerline.



Community Development Department

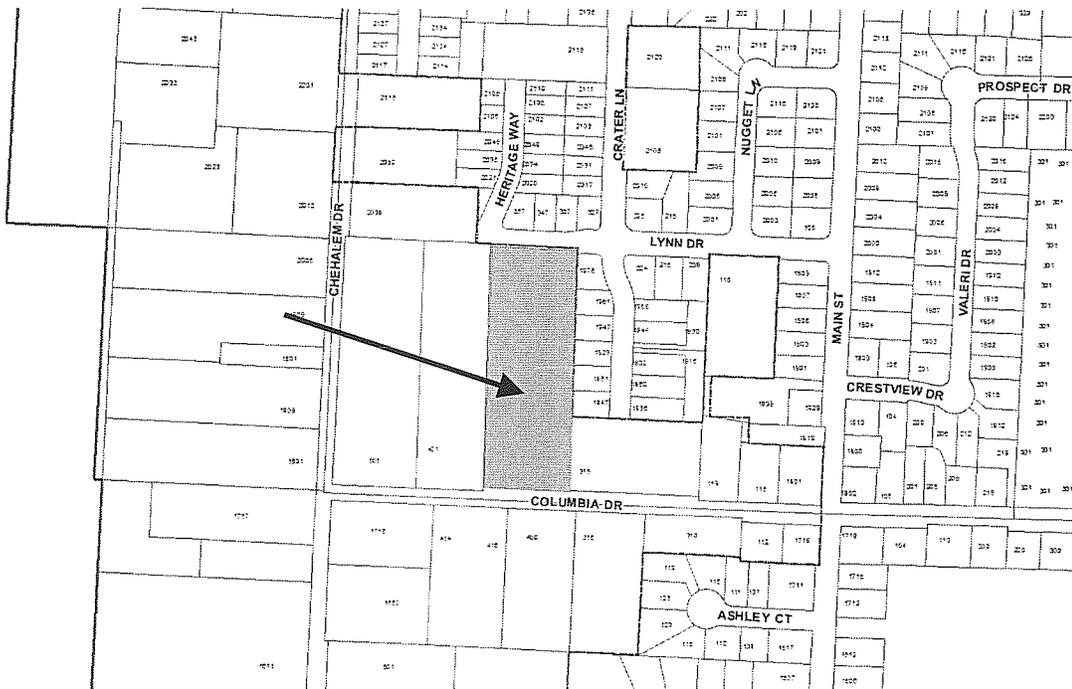
P.O. Box 970 • 414 E First Street • Newberg, Oregon 97132
503-537-1240. Fax 503-537-1272 www.newbergoregon.gov

NOTICE OF PLANNING COMMISSION HEARING ON A PROPOSED SUBDIVISION TENTATIVE PLAN

A property owner in your neighborhood submitted an application to the City of Newberg for Subdivision for 3.06 acres located north of Columbia Drive and south of Lynn Drive, Yamhill County tax lots 3218AB-1700, -1701, and -1702. The Newberg Planning Commission will hold a hearing on _____, at 7pm at the Newberg Public Safety Building, 401 E. Third Street, Newberg, OR, to evaluate the proposal. You are invited to take part in the City's review of this project by sending in your written comments or testifying before the Planning Commission. For more details about giving comments, please see the back of this sheet.

The application is a Tentative Plan for Subdivision for a 24 lot subdivision

APPLICANT: *Del Boca Vista, LLC*
TELEPHONE: *503-590-8600*
PROPERTY OWNER: *Jo Daklin (taxlots 1700 & 1701),
Richard & Merrilee Lee (tax lot 1702)*
LOCATION: *North of Columbia Drive, south of Lynn Drive*
TAX LOT NUMBER: *Yamhill County tax lot number 3218AB-1700, -1701, -1702*



We are mailing you information about this project because you own land within 500 feet of the proposed annexation. We invite you to participate in the land use hearing scheduled before the Planning Commission. If you wish to participate in the hearing, you may do so in person or be represented by someone else. You also may submit written comments. Oral testimony is typically limited to five minutes per speaker.

If you mail your comments to the City, please put the following information on the outside of the envelope:

Written Comments: File No.
City of Newberg
Community Development Department
PO Box 970
Newberg, OR 97132

Persons who wish to submit written testimony must submit 12 copies of any written material by 12:00 p.m. (noon) the day of the meeting. Lengthy materials should be submitted prior to the deadline to ensure sufficient time for Council review. Written testimony submitted after the deadline will be accepted only by affirmative vote of the majority of the council.

You can look over all the information about this project or drop comments off at Newberg City Hall, 414 E. First Street. A copy of the application is also available online at www.newbergoregon.gov/planning. You can also buy copies of the information for a cost of 25 cents a page. A staff report relating to the proposal will be available for inspection at no cost seven days prior to the public hearing. If you have any questions about the project, you can call the Newberg Planning Division at 503-537-1240.

Any issue which might be raised in an appeal of this case to the Land Use Board of Appeals (LUBA) must be raised during the public hearing process. You must include enough detail to enable the decision maker an opportunity to respond. The applicable criteria used to make a decision on this application for annexation & zone change are found in Newberg Development Code Sections 15.250.030 and 15.302.030.

Failure of an issue to be raised in the 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 to the State Land Use Board of Appeals based on that issue.

The Planning Commission will make a decision on the application at the end of the public hearing process. If you participate in the public hearing process, either by testifying at the public hearing, or by sending in written comments, you will be sent information about any decision made by the City relating to this project.

Date Mailed: *Insert date.*

ACCOMMODATION OF PHYSICAL IMPAIRMENTS:

In order to accommodate persons with physical impairments, please notify the City Recorder's office of any special physical or language accommodations you may need as far in advance of the meeting as possible and no later than 48 hours prior to the meeting. To request these arrangements, please contact the City Recorder at 503-537-1283. For TTY services please dial 711.

DRAFT POSTED NOTICE

Land Use Notice

FILE #

PROPOSAL: Subdivision Tentative Plan to
develop a 24 lot subdivision

FOR FURTHER INFORMATION, CONTACT:

City of Newberg
Community Development Department
414 E First Street
Phone: 503-537-1240

2'

3'

Notice must be white with black letters, and must be landscape orientation, as shown above.
The notice must be lettered using block printing or a "sans-serif" font, such as Arial.

Columbia Estates Subdivision

Subdivision Application

July 7, 2016

Development Application – Columbia Estates Subdivision

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<u>EXHIBIT</u>	<u>CONTENTS</u>
A	Application Form
B	Traffic Study
C	Tentative Plan
D	Storm Drainage Report
E	Current Title Report
F	Public Notice Information

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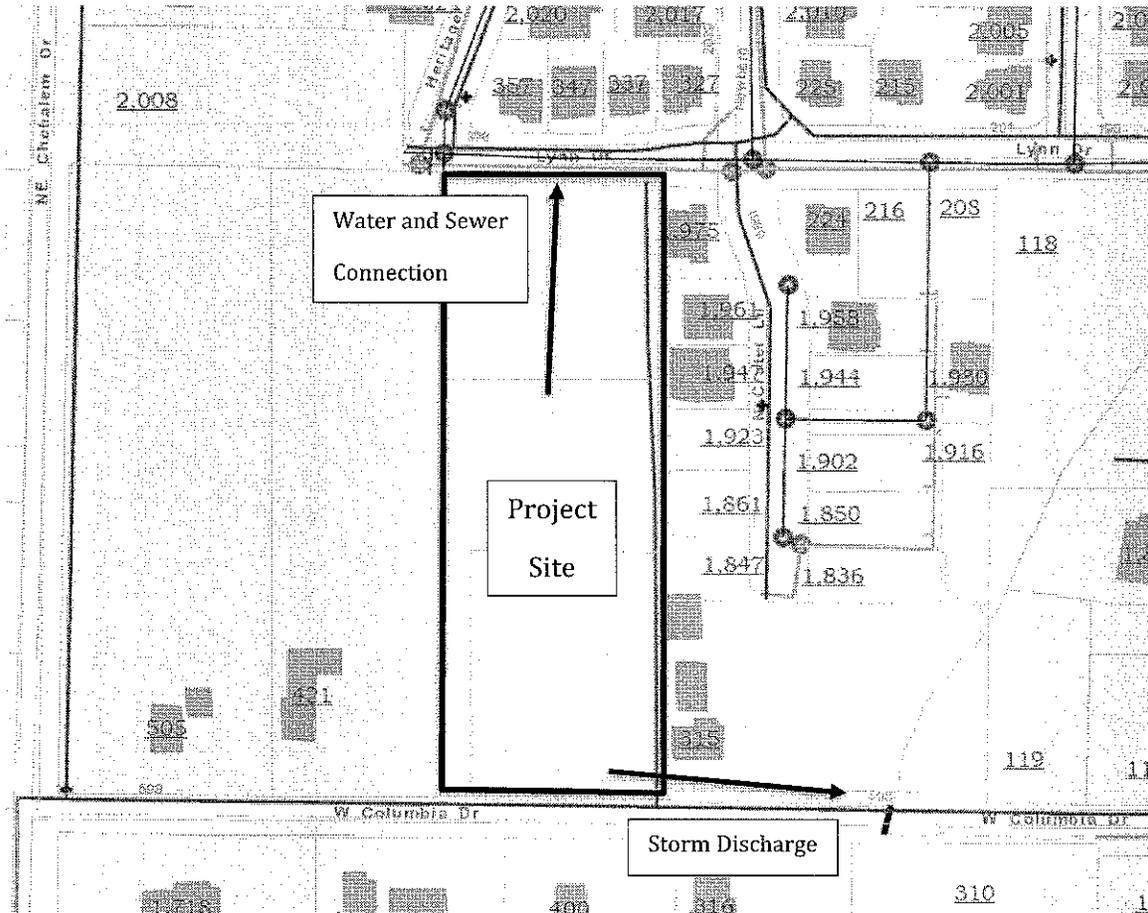
DATA SHEET

Property Owner	Jo Dacklin 11990 SW King James Place King City, OR 97224
Applicant	Del Boca Vista, LLC PO Box 486 Newberg, OR 97132 Phone: 971-706-2058
Property Description	3218AB-1700, 1701, and 1702 North of Columbia Dr. between Chehalem Dr. and Main St.
Zoning:	MDR Medium Density Residential
Lot Size:	3.06 ac
Proposal:	24-Lot Subdivision
Minimum Lot Size per Code:	3,000sf
Proposed Lots sizes:	3,071-5,196 sf
Average Lot Size:	3,902 sf
Target Density:	9 units per acre
Proposed Density:	7.84 units/acre

PROJECT OVERVIEW

Del Boca Vista, LLC is proposing a 24-lot subdivision for a detached single-family residential development. This subdivision will occur on tax lots 3218AB-1700, 1701, and 1702 which are located north of Columbia Dr. between Chehalem Dr. and Main St. Newberg, OR 97132. The property currently is vacant land. Access to the new lots will be by public road from Columbia Dr. to Lynn Drive that meets Public Works standards.

PUBLIC SERVICES



Sanitary Sewer

An 8-inch PVC sanitary sewer exists in Lynn Drive. This will be used to serve the proposed subdivision. Lots 1 – 7 and 18 – 24 will be served by gravity to the public sanitary sewer. The remaining lots near Columbia will utilize individual house pumps to discharge into the gravity system.

Water Supply

Municipal water is available to the site by an 8-inch line in Lynn Drive. The new waterline through the proposed subdivision from Lynn to Columbia Drive to allow for future extension.

There is an existing water line along Columbia Drive that belongs to the Chehalis Valley Water District. No connections will be made to this system. Care will be taken to protect the line during construction. The water district reports that there is an abandoned service line along the east side of the proposed development. This line will be removed when encountered during construction.

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Storm Drainage

Stormwater will be collected by catch basins conveyed through a pipe network to a regional water quality and quantity facility. Orifices will be set to release post-developed peak flows to pre-developed rates. Stormwater leaves the site at the southeast property corner and will be piped to an existing roadside ditch to the east of the subject property. Refer to Exhibit D for the preliminary storm report.

The proposed water quantity and quality facilities will meet City of Newberg Stormwater Management Manual standards. A vegetated water quality swale will treat the water and an infiltration/detention pond in conjunction with individual lot infiltration planters will detain post-developed peak flow rates to pre-developed peak flow rates for ½ of the 2, 2, 10, and 25-year design storms.

Transportation

Columbia Dr. is classified as a Minor Collector in the Transportation System Plan. The frontage along Columbia Dr. already provides 30 feet of public right-of-way from the centerline to allow for the full development of Columbia Drive. Lynn Drive is classified as a Local Residential in the Transportation System Plan. Approximately 310 feet of lot frontage along Lynn Dr. will be dedicate a varying amount so as to provide a total 54-foot public right-of-way to allow for the full development of Lynn Dr.

The City's street system will serve the traffic from Columbia Estates with acceptable performance metrics when complete. Refer to Exhibit B for the Traffic Impact Analysis. There is adequate capacity at the intersection of the Lynn Dr at Main St intersection for the traffic Columbia Estates will generate. Warrants in the 2009 MUTCD for a stop sign on Lynn Dr at Main St are not met, but the City has exercised engineering judgment and installed a TWSC sign on the Lynn Dr approach, which appears to be serving the community well. The intersection of Columbia and Main is currently a four-way stop. There is significant capacity to serve additional traffic with the addition of traffic from Columbia Estates

SUBDIVISION CRITERIA

1. FUTURE USE

Approval does not impede the future best use of the property under the same ownership as the full extent of the property is being developed to its maximum extent practicable.

Adjoining land will not be adversely affected. Adjacent properties are zoned as follows: to the North: City R-2, to the South: County VLDR-1, to the West: County VLDR-1 and to the East: City R-2 and County VLDR-1.

2. APPLICABLE SUBDIVISION CRITERIA

15.405 LOT REQUIREMENTS

15.405.010 Lot area – Lot areas per dwelling unit.

A. In the following districts, each lot or development site shall have an area as shown below except as otherwise permitted by this code:

1. In the R-1 district, each lot or development site shall have a minimum area of 5,000 square feet or as may be established by a subdistrict. The average size of lots in a subdivision intended for single-family development shall not exceed 10,000 square feet.

2. In the R-2, R-3, and RP districts, each lot or development site shall have a minimum area of 3,000 square feet or as may be established by a subdistrict. In the R-2 and R-P districts, the average size of lots in a subdivision intended for single-family development shall not exceed 5,000 square feet.

3. In the AI, AR, C-1, C-2, and C-3 districts, each lot or development site shall have a minimum area of 5,000 square feet or as may be established by a subdistrict.

4. In the M-1, M-2 and M-3 districts, each lot or development site shall have a minimum area of 20,000 square feet.

5. Institutional districts shall have a minimum size of five contiguous acres in order to create a large enough campus to support institutional uses; however, additions to the district may be made in increments of any size.

6. Within the commercial zoning district(s) of the riverfront overlay subdistrict, there is no minimum lot size required, provided the other standards of this code can be met.

B. Lot or Development Site Area per Dwelling Unit.

1. In the R-1 district, there shall be a minimum of 5,000 square feet per dwelling unit.

2. In the R-2, AR, and R-P districts, there shall be a minimum of 3,000 square feet of lot or development site area per dwelling unit. In the R-2 and R-P districts, lots or development sites in excess of 15,000 square feet used for multiple single-family, duplex or multifamily dwellings shall be developed at a minimum of one dwelling per 5,000 square feet lot area.

3. In the R-3 district, there shall be a minimum of 1,500 square feet of lot or development site area per dwelling unit. Lots or development sites in excess of

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15,000 square feet used for multiple single-family, duplex or multifamily dwellings shall be developed at a minimum of one dwelling per 2,500 square feet lot area.

C. In calculating lot area for this section, lot area does not include land within public or private streets. In calculating lot area for maximum lot area/minimum density requirements, lot area does not include land within stream corridors, land reserved for public parks or open spaces, commons buildings, land for preservation of natural, scenic, or historic resources, land on slopes exceeding 15 percent or for avoidance of identified natural hazards, land in shared access easements, public walkways, or entirely used for utilities, land held in reserve in accordance with a future development plan, or land for uses not appurtenant to the residence.

D. Lot size averaging is allowed for any subdivision. Some lots may be under the minimum lot size required in the zone where the subdivision is located, as long as the average size of all lots is at least the minimum lot size.

RESPONSE:

Lot Number	Lot Size (SF)	Lot Number	Lot Size (SF)
1	5196	13	3071
2	4980	14	3071
3	4980	15	3071
4	4980	16	3071
5	4150	17	3071
6	4150	18	3071
7	3569	19	3071
8	3320	20	4340
9	3071	21	4896
10	3071	22	4896
11	3071	23	4897
12	3732	24	4873
		Total	93648
		Average	3902

The table above demonstrates that the proposed lot areas meet the code standard when taking into account lot size averaging.

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15.405.030 Lot dimensions and frontage.

B. Depth to Width Ratio. Each lot and parcel shall have an average depth between the front and rear lines of not more than two and one-half times the average width between the side lines. Depths of lots shall conform to the standards of this code. Development of lots under 15,000 square feet are exempt from the lot depth to width ratio requirement.

C. Area. Lot sizes shall conform to standards set forth in this code. Lot area calculations shall not include area contained in public or private streets as defined by this code.

D. Frontage.

1. No lot or development site shall have less than the following lot frontage standards:

b. Each lot in an R-2 and R-3 zone shall have a minimum width of 30 feet at the front building line.

RESPONSE: The proposed lot configuration meets all of the provisions of this code section for depth to width ratio, area, and minimum frontage at front building line.

15.405.040 Lot coverage and parking coverage requirements.

B. Residential uses in residential zones shall meet the following maximum lot coverage and parking coverage standards. See the definitions in NMC 15.05.030 and Appendix A, Figure 4.

1. Maximum Lot Coverage.

b. R4-2 and RP: 50 percent.

2. Maximum Parking Coverage. R-1, R-2, R-3, and RP: 30 percent.

3. Combined Maximum Lot and Parking Coverage.

a. R-1, R-2 and RP: 60 percent.

RESPONSE: The development of the individual lots will meet this criterion.

15.410 YARD SETBACK REQUIREMENTS

15.410.020 Front yard setback.

15.410.030 Interior yard setback.

15.410.040 Setback and yard restrictions as to schools, churches, public buildings.

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15.410.050 Special setback requirements to planned rights-of-way.

15.410.060 Vision clearance setback.

15.410.070 Yard exceptions and permitted intrusions into required yard setbacks.

RESPONSE: These provisions will be met with the submission of subdivision plans.

15.415 BUILDING AND SITE DESIGN STANDARDS

15.415.010 Main buildings and uses as accessory buildings.

15.415.020 Building height limitation.

15.415.030 Building height exemptions.

15.415.040 Public access required.

15.415.050 Rules and exceptions governing single-family attached dwellings.

15.415.060 Home occupation.

RESPONSE: These provisions will be met with the submission of subdivision plans.

15.420 LANDSCAPING AND OUTDOOR AREAS

RESPONSE: These provisions will be met with the submission of subdivision plans.

Chapter 15.425 EXTERIOR LIGHTING

RESPONSE: These provisions will be met with the submission of subdivision plans.

15.430 UNDERGROUND UTILITY INSTALLATION

Sections:

15.430.010 Undergound utility installation.

15.430.010 Undergound utility installation.

A. All new utility lines, including but not limited to electric, communication, natural gas, and cable television transmission lines, shall be placed underground. This does not include surface-mounted transformers, connections boxes, meter cabinets, service cabinets, temporary facilities during construction, and high-capacity electric lines operating at 50,000 volts or above.

B. Existing utility lines shall be placed underground when they are relocated, or when an addition or remodel requiring a Type II design review is proposed, or when a developed area is annexed to the city.

C. The director may make exceptions to the requirement to underground utilities based on one or more of the following criteria:

1. The cost of undergrounding the utility is extraordinarily expensive.
2. There are physical factors that make undergrounding extraordinarily difficult.
3. Existing utility facilities in the area are primarily overhead and are unlikely to be changed.

RESPONSE: These provisions will be met with the submission of subdivision plans.

Chapter 15.435 SIGNS

RESPONSE: No signs are proposed for this development.

Chapter 15.440 OFF-STREET PARKING, BICYCLE PARKING, AND PRIVATE WALKWAYS

RESPONSE: No off-street parking, bicycle parking or private walkways are proposed for this development.

15.505 STREET AND TRANSPORTATION IMPROVEMENTS DESIGN STANDARDS

15.505.020 Layout of streets, alleys, bikeways, and walkways.

A. Streets, alleys, bikeways, and walkways shall be laid out and constructed as shown in the Newberg transportation system plan or in adopted future street plans.

B. In areas where the transportation system plan or future street plans do not show specific transportation improvements, roads and streets shall be laid out so as to conform to subdivisions, partitions, and developments previously approved for adjoining property as to width, general direction and in other aspects, unless it is found in the public interest to modify these patterns. In addition, transportation improvements shall conform to the standards within this code.

RESPONSE: Not applicable.

15.505.030 Construction of new streets and alleys.

The land divider or developer shall grade and pave all streets and alleys in the subdivision, partition or development to the width specified in NMC 15.505.060, and provide for drainage of all such streets and alleys, construct curbs and gutters within the subdivision, partition or development in accordance with specifications adopted by the city council under NMC 15.510.030. Such improvements shall be constructed to specifications of the city under the supervision and direction of the director. It shall be the responsibility of the land divider or developer to provide street signs.

RESPONSE: These provisions will be met with the submission of subdivision plans.

15.505.040 Improvements to existing streets.

A subdivision, partition or development requiring a Type II design review abutting or adjacent to an existing road of inadequate width shall dedicate additional right-of-way to and improve the street to the width specified in NMC 15.505.060.

RESPONSE: A 10-foot dedication along Wyooski Street frontage will be provided to allow for a full 30-foot right-of-way width from centerline.

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15.505.060 Street width and design standards.

A. Design Standards. All streets shall conform with the standards contained in Table 15.505.060. Where a range of values is listed, the director shall determine the width based on a consideration of the total street section width needed, existing street widths, and existing development patterns. Preference shall be given to the higher value. Where values may be modified by the director, the overall width shall be determined using the standards under subsections (B) through (I) of this section.

RESPONSE: These provisions will be met with the submission of subdivision plans.

B. Motor Vehicle Travel Lanes. Collector and arterial streets shall have a minimum width of 12 feet. Where circumstances warrant, the director may allow a reduction of this width to 11 feet.

RESPONSE: These provisions will be met with the submission of subdivision plans.

C. Bike Lanes. Striped bike lanes shall be a minimum of five feet wide. Where circumstances warrant, the director may allow a reduction of this width to four feet. Bike lanes shall be provided where shown in the Newberg transportation system plan.

RESPONSE: Not applicable.

D. Parking Lanes. Where on-street parking is allowed on collector and arterial streets, the parking lane shall be a minimum of eight feet wide. Where circumstances warrant, the director may allow a reduction of this width to seven feet.

RESPONSE: These provisions will be met with the submission of subdivision plans.

G. Sidewalks. Sidewalks shall be provided on both sides of all public streets. Minimum width is five feet.

RESPONSE: These provisions will be met with the submission of subdivision plans.

H. Planter Strips. Except where infeasible, a planter strip shall be provided between the sidewalk and the curb line. This strip shall be landscaped in accordance with the standards in NMC 15.420.020. Curb-side sidewalks may be allowed on limited

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residential streets. Where curb-side sidewalks are allowed, the following shall be provided where possible:

1. Additional reinforcement is done to the sidewalk section at corners.
2. Sidewalk width is six feet.

RESPONSE: Not applicable

15.505.090 Intersections of streets.

A. Angles. Streets shall intersect one another at an angle as near to the right angle as is practicable considering topography of the area and previous adjacent layout; where not so practicable, the right-of-way and street paving within the acute angle shall have a minimum of 30 feet centerline radius where such angle is not less than 75 degrees. In the case of streets intersecting at an angle of less than 75 degrees, then of such minimum as the director may determine in accordance with the purpose of this code.

B. Offsets. Intersections shall be so designed that no offset dangerous to the traveling public is created as a result of staggering of intersections, and in no case shall there be an offset of less than 100 feet centerline to centerline.

C. New or improved intersection construction shall incorporate the minimum intersection curb return radii requirements shown in the following table:

Minimum Curb Return Radii (Feet)	Edge of Pavement/Curb
	Lowest Street Classification of Two Intersection Streets
	Local residential street
15 feet	

RESPONSE: These provisions will be met with the submission of subdivision plans.

15.505.110 Future extension of streets.

Where the subdivision or partition is adjacent to land likely to be divided in the future, streets shall continue through to the boundary lines of the area under the same ownership of which the subdivision or partition is a part, where the director determines that such continuation is necessary to provide for the orderly division of such adjacent land or the transportation and access needs of the community

RESPONSE: Not applicable.

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15.505.120 Cul-de-sacs.

A. Cul-de-sacs shall only be permitted when one or more of the circumstances listed in this section exist. When cul-de-sacs are justified, public walkway connections shall be provided to connect with another street, greenway, school, or similar destination unless one or more of the circumstances listed in this section exist.

1. Physical or topographic conditions make a street or walkway connection impracticable. These conditions include but are not limited to controlled access streets, railroads, steep slopes, wetlands, or water bodies where a connection could not be reasonably made.

2. Buildings or other existing development on adjacent lands physically preclude a connection now or in the future considering the potential for redevelopment.

3. Where streets or accessways would violate provisions of leases, easements, or similar restrictions.

4. Where the streets or accessways abut the urban growth boundary and rural resource land in farm or forest use, except where the adjoining land is designated as an urban reserve area.

B. There shall be no cul-de-sacs more than 400 feet long (measured from the centerline of the intersection to the radius point of the bulb) or serving more than 18 single-family dwellings.

C. Each cul-de-sac shall have a circular end with a minimum diameter of 90 feet, curb-to-curb, within a 103-foot minimum diameter right-of-way. For residential uses, a 35-foot radius may be allowed if the street has no parking, a mountable curb, attached sidewalks, and sprinkler systems in every building along the street.

RESPONSE: Not applicable

15.505.130 Street names and street signs.

Streets that are in alignment with existing named streets shall bear the names of such existing streets. Names for streets that are not in alignment with existing streets are subject to approval by the director and the fire chief and shall not unnecessarily duplicate or resemble the name of any existing or platted street in the city. It shall be the responsibility of the land divider to provide street signs.

RESPONSE: These provisions will be met with the submission of subdivision plans.

15.505.140 Grades and curves.

Unless otherwise approved by the director because topographical conditions will not reasonably permit, grades shall not exceed six percent on arterials, 10 percent

Development Application – Columbia Estates Subdivision

on collector streets, or 12 percent on all other streets. Centerline radii on curves shall not be less than 300 feet on arterials, or 230 feet on all other streets

RESPONSE: These provisions will be met with the submission of subdivision plans.

15.505.200 Vehicular access standards.

A. Purpose. The purpose of these standards is to manage vehicle access to maintain traffic flow, safety, roadway capacity, and efficiency. They help to maintain an adequate level of service consistent with the functional classification of the street. Major roadways, including arterials, and collectors serve as the primary system for moving people and goods within and through the city. Access is limited and managed on these roads to promote efficient through movement. Local streets and alleys provide access to individual properties. Access is managed on these roads to maintain safe maneuvering of vehicles in and out of properties and to allow safe through movements. 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.

B. Access Spacing Standards. Public street intersection and driveway spacing shall follow the table below...

RESPONSE: These provisions will be met with the submission of subdivision plans.

F. Shared Driveways.

1. The number of driveways onto arterial 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. Where there is an abutting developable property, a shared driveway shall be provided. When shared driveways are required, they shall be stubbed to adjacent developable parcels to indicate future extension. "Stub" means that a driveway temporarily ends at the property line, but may be accessed or 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).

RESPONSE: Not applicable.

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

RESPONSE: These provisions will be met with the submission of subdivision plans.

Development Application – Columbia Estates Subdivision

3. No more than three lots may access one shared driveway.

RESPONSE: These provisions will be met with the submission of subdivision plans.

4. Shared driveways shall be posted as no parking fire lanes where required by the fire marshal.

RESPONSE: These provisions will be met with the submission of subdivision plans.

5. Where three lots or three dwellings share one driveway, one additional parking space over those otherwise required shall be provided for each dwelling. Where feasible, this shall be provided as a common use parking space adjacent to the driveway.

RESPONSE: Not applicable.

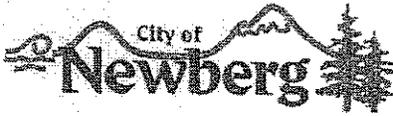
15.505.210 Sidewalks.

Sidewalks shall be located and constructed in accordance with the provisions of NMC 15.510.030. Minimum width is five feet.

RESPONSE: These provisions will be met with the submission of subdivision plans.

Columbia Estates Subdivision

Exhibit A Application Form



TYPE II APPLICATION (LAND USE) -- 2016

File #: _____

TYPES -- PLEASE CHECK ONE:

- Design review
- Tentative Plan for Partition
- Tentative Plan for Subdivision
- Type II Major Modification
- Variance
- Other: (Explain) _____

APPLICANT INFORMATION:

APPLICANT: Del Boca Vista LLC
 ADDRESS: 645 NE Third Street Suite 200 McMinnville, OR 97128
 EMAIL ADDRESS: jessica@dbvcorp.com
 PHONE: 971-706-2058 MOBILE: 971-996-7507 FAX: _____
 OWNER (if different from above): See attached documents PHONE: none
 ADDRESS: _____
 ENGINEER/SURVEYOR: Westlake Consultants PHONE: none
 ADDRESS: 15115 SW Sequoia Pkwy Tigard OR 97224

GENERAL INFORMATION:

PROJECT NAME: Columbia Estates PROJECT LOCATION: Lynn Dr and Prospect Way
 PROJECT DESCRIPTION/USE: Subdivision of bare land to 24 lots
 MAP/TAX LOT NO. (i.e. 3200AB-400): R3218 AB-1706, 1701 & 1702 ZONE: R-2 SITE SIZE: 3.06 SQ. FT. ACRE
 COMP PLAN DESIGNATION: MDR TOPOGRAPHY: Flat
 CURRENT USE: Vacant
 SURROUNDING USES:
 NORTH: R2 (Newberg) SOUTH: VLDR-1 (County)
 EAST: VLDR-1 (Newberg) WEST: VLDR-1 (County)

SPECIFIC PROJECT CRITERIA AND REQUIREMENTS ARE ATTACHED

General Checklist: Fees Public Notice Information Current Title Report Written Criteria Response Owner Signature

For detailed checklists, applicable criteria for the written criteria response, and number of copies per application type, turn to:

- Design Reviewp. 12
- Partition Tentative Platp. 14
- Subdivision Tentative Platp. 17
- Variance Checklistp. 20

The above statements and information herein contained are in all respects true, complete, and correct to the best of my knowledge and belief. Tentative plans must substantially conform to all standards, regulations, and procedures officially adopted by the City of Newberg. All owners must sign the application or submit letters of consent. Incomplete or missing information may delay the approval process.

[Signature] 7/1/16
 Applicant Signature Date

[Signature] 7/5/16
 Owner Signature Date

Marc Willcuts, Del Boca Vista, Member
 Print Name

Merrilee A. Lee
 Print Name

Attachments: General Information, Fee Schedule, Criteria, Checklists

Columbia Estates Subdivision

Exhibit B Traffic Study

Traffic Impact Analysis Columbia Estates

Newberg, Oregon

May 12, 2016

completed with
Del Boca Vista
McMinnville, Oregon

Prepared by:
Associated Transportation Engineering & Planning, Inc.
Salem, Oregon
May 10, 2016



**ASSOCIATED
TRANSPORTATION
ENGINEERING &
PLANNING INC.**

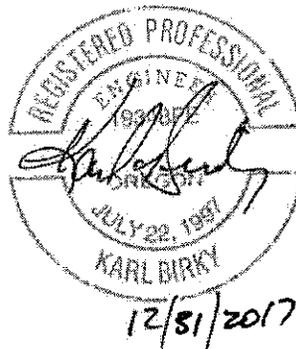
A.T.E.P., Inc.
1155 13th St. S.E.
Salem, OR. 97302

Tel.: 503-364-5066
FAX: 503-364-1260
e-mail: kburky@atepinc.com

Traffic Impact Analysis Columbia Estates

Newberg, Oregon

May 12, 2016



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Del Boca Vista
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Salem, OR 97302

Tel: 503-364-5066
FAX: 503-364-1260
e-mail: kbirky@atepinc.com

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Figure 7 - 2017 PM Peak hour Counts and Metrics with Columbia Estates 6

Appendices

- Turning Movement Counts
- ODOT Crash Data
- Computer Modeling Printouts

Traffic Impact Analysis Columbia Estates Newberg, Oregon



ASSOCIATED
TRANSPORTATION
ENGINEERING &
PLANNING Inc.

A.T.E.P., Inc. Tel.: 503.364.5066
P.O. Box 3047 FAX: 503.364.1260
Salem, OR. 97302 e-mail: kbirky@atepinc.com

Introduction:

Del Boca Vista, LLC intends to develop 29 attached single family home lots on tax lots 1700, 1701 and 1702 of tax map 3S 2W Sec 18AB in Newberg, Oregon. The 3 acre site is between Columbia Dr and Lynn Dr about 500 feet east of Chehalem Dr. The new street through the project will connect to Columbia Dr on the south and Lynn Dr on the north.

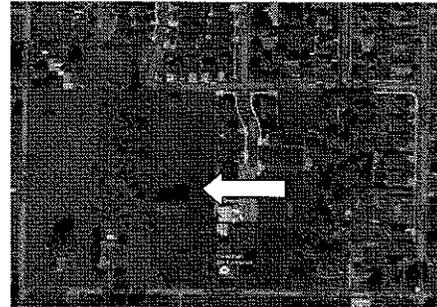


Figure 1 - Vicinity Map

Residents of Columbia Estates will travel north to Lynn Dr and then to Main St or south to Columbia Dr and to Chehalem Dr or Main St to access the larger transportation network in the City of Newberg. This analysis will consider the traffic impacts at the intersections of Lynn Dr at Main St and Columbia Dr at Main St. The analysis will assume that 60% of the traffic will use Columbia Dr and the remaining 40% of the traffic will use Lynn Dr. Crash data was provided by the City of Newberg Police Department for the most recent 5 years.

Summary of Findings:

The homes in Columbia Estates will be considered single family homes in this analysis. If 29 homes are built in the development they will generate an estimated 276 trips each day. 22 of those trips will be in the AM Peak hour and 29 trips will be in the PM Peak hour. The City's street system will serve this traffic with acceptable performance metrics when complete. The transportation system development charges (TSDCs) the developer pays the City will continue to be used to make offsite improvements to the City's street system.

There were no reported accidents at the intersection of Lynn Dr at Main St in the past 5 years. It is noted that there have been 2 reported accidents at the intersection of Main St at Mountainview Dr. There is adequate capacity at the intersection of the Lynn Dr at Main St intersection for the traffic Columbia Estates will generate. Warrants in the 2009 MUTCD for a stop sign on Lynn Dr at Main St are not met, but the City has exercised engineering judgment and installed a TWSC sign on the Lynn Dr approach, which appears to be serving the community well. Traffic impacts from developments like Columbia Estates have been anticipated by the City and should not require offsite changes to convey the traffic.

History and Existing Conditions:

The site is currently a vacant parcel in the City with frontage onto Columbia Dr and Lynn Dr. The plan is to extend a street through the parcel connecting Columbia Dr and Lynn Dr. Turning movement counts

were obtained by Quality Counts on Wed and Thurs April 13 and 14, 2016. The turning movements counts were adjusted to estimate the 30 highest hour annual traffic volumes and added to a computer model to estimate the performance metrics at the studied intersections. Cities and traffic engineers generally use the volume to capacity ratio (v/c) or the Level of Service (LOS) to measure performance. LOS A is very good and LOS F is failing. v/c ratios range from 0.000 to 1.000 and generally v/c ratios below 0.800 are acceptable. The performance metrics for the studied intersections is shown in Figure 2. Both intersections are serving drivers well and have significant capacity for additional traffic.

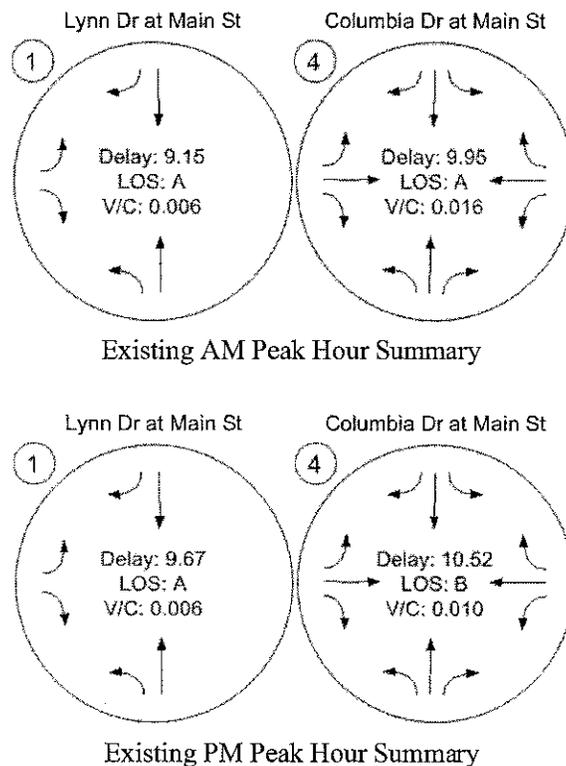
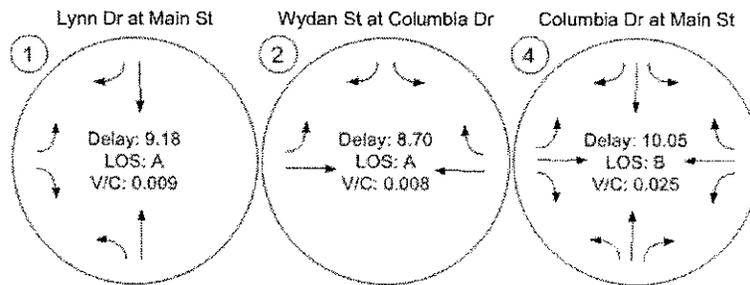


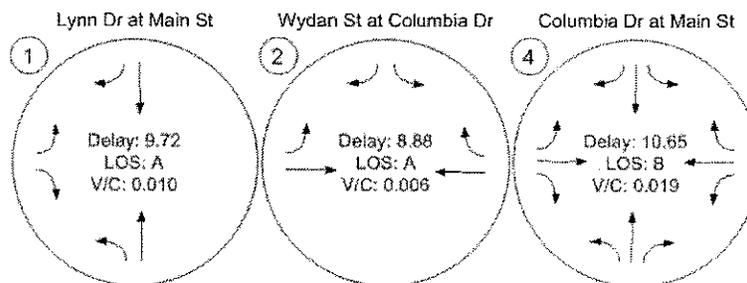
Figure 2 - Existing Traffic Conditions

Traffic Conditions when Columbia Estates is Complete:

The new street through Columbia Estates as Chandler Dr. Traffic from the planned development was added to the computer model and analyzed. The performance metrics of the studied intersections is shown in Figure 3. There is significant capacity to serve additional traffic with the addition of traffic from Columbia Estates.



2017 AM Peak Hour Summary with Columbia Estates



2017 PM Peak Hour Summary with Columbia Estates

Figure 3 - 2017 Traffic Conditions with Columbia Estates**Crash Data:**

The Newberg Police Department provided information about reported crashes at the intersections in this study for the past 5 years. There were no reported crashes at the Lynn Dr at Main St intersection in that time period. There were 2 reported crashes at Main St at Mountain View in 2012.

Summary:

The City's street system will serve the traffic from Columbia Estates with acceptable performance metrics when complete. There is significant remaining capacity at the studied intersections to serve existing drivers, drivers from Columbia Estates and future traffic from undeveloped projects. The transportation system development charges (TSDCs) the developer pays the City will continue to be used to make offsite improvements to the City's street system.

There were no reported accidents at the intersection of Lynn Dr at Main St in the past 5 years. It is noted that there have been 2 reported accidents at the intersection of Main St at Mountainview Dr. There is adequate capacity at the intersection of the Lynn Dr at Main St intersection for the traffic Columbia Estates will generate. Warrants in the 2009 MUTCD for a stop sign on Lynn Dr at Main St are not met, but the City has exercised engineering judgment and installed a TWSC sign on the Lynn Dr approach, which appears to be serving the community well. Traffic impacts from developments like Columbia Estates have been anticipated by the City and should not require offsite changes to convey the traffic.

There is vegetation in the vision sight triangle at the intersection of Nuggett Ln at Lynn Dr. Consideration should be given to removing these sight obscuring trees and shrubs to improving vision opportunities for drivers at the intersection.

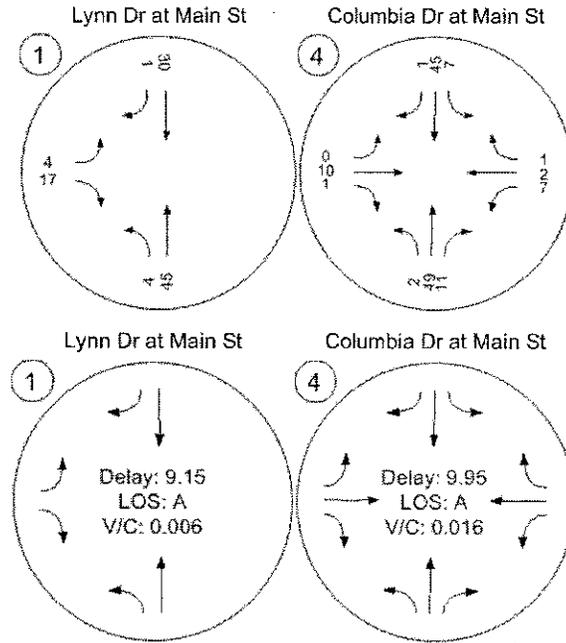


Figure 4 - Existing AM Peak hour Counts and Metrics

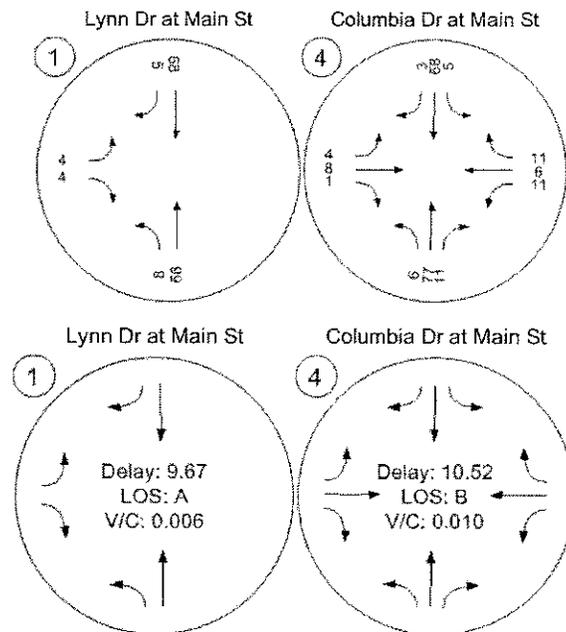


Figure 5 - Existing PM Peak hour Counts and Metrics

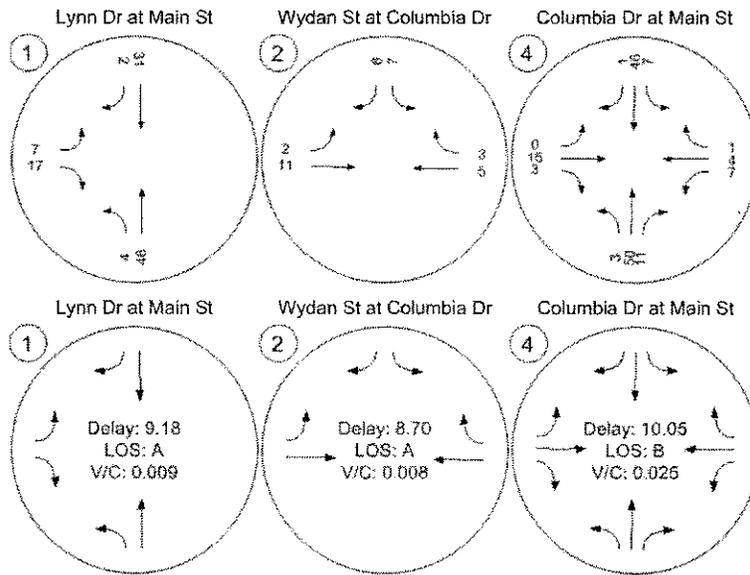


Figure 6 - 2017 AM Peak hour Counts and Metrics with Columbia Estates

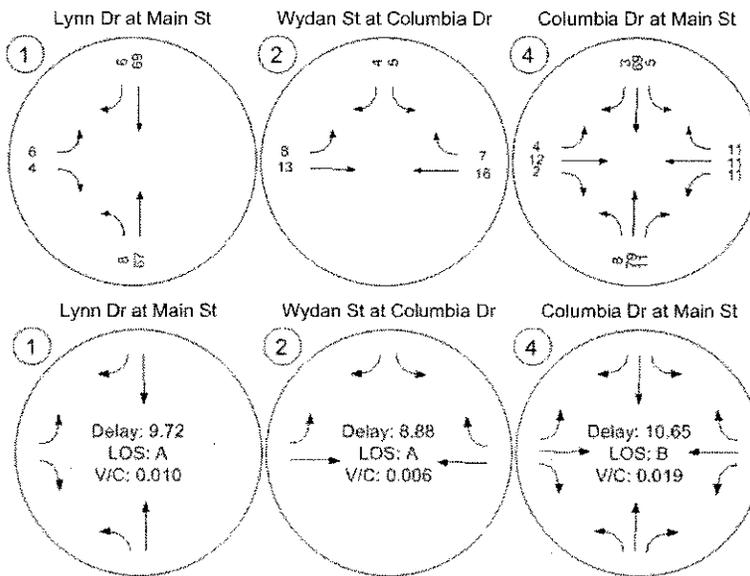


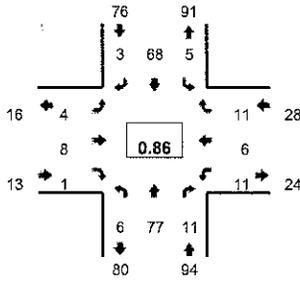
Figure 7 - 2017 PM Peak hour Counts and Metrics with Columbia Estates

Type of peak hour being reported: Intersection Peak

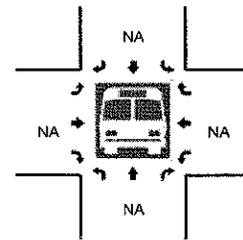
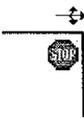
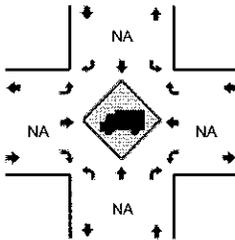
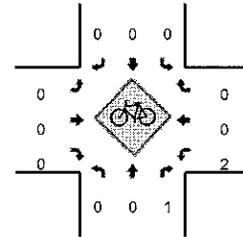
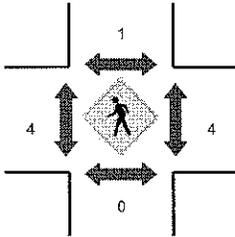
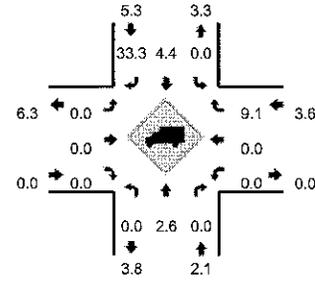
Method for determining peak hour: Total Entering Volume

LOCATION: N Main St -- Columbia Dr
 CITY/STATE: Newberg, OR

QC JOB #: 13782802
 DATE: Wed, Apr 13 2016



Peak-Hour: 4:35 PM -- 5:35 PM
 Peak 15-Min: 4:35 PM -- 4:50 PM



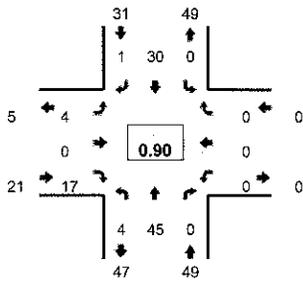
5-Min Count Period	N Main St (Northbound)				N Main St (Southbound)				Columbia Dr (Eastbound)				Columbia Dr (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
4:00 PM	0	4	0	0	0	3	0	0	0	2	2	0	0	3	1	2	0	17	
4:05 PM	0	3	0	0	0	5	0	0	0	2	0	0	0	0	0	0	0	10	
4:10 PM	0	7	1	0	1	6	1	0	2	0	0	0	0	0	3	0	0	21	
4:15 PM	0	7	2	0	0	3	0	0	0	0	0	0	0	0	2	2	0	16	
4:20 PM	0	6	2	0	1	3	0	0	0	1	0	0	0	0	1	0	0	14	
4:25 PM	1	7	1	0	1	3	0	0	0	1	0	0	0	1	0	1	0	16	
4:30 PM	1	4	0	0	0	4	0	0	1	0	0	0	0	1	2	1	0	14	
4:35 PM	0	9	1	0	1	9	1	0	0	0	1	0	0	1	0	2	0	25	
4:40 PM	0	7	2	0	1	4	0	0	0	0	0	0	0	0	0	1	0	15	
4:45 PM	2	6	0	0	1	4	0	0	1	2	0	0	1	1	1	2	0	21	
4:50 PM	0	1	2	0	0	6	1	0	1	0	0	0	0	0	0	1	0	12	
4:55 PM	2	6	0	0	0	7	0	0	0	0	0	0	0	1	0	2	0	18	199
5:00 PM	0	2	0	0	1	6	0	0	0	3	0	0	0	2	1	1	0	16	198
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5:10 PM	1	12	0	0	0	8	0	0	0	0	0	0	0	1	1	0	0	23	204
5:15 PM	0	8	0	0	0	6	0	0	0	0	0	0	0	1	0	1	0	16	204
5:20 PM	0	8	1	0	0	7	0	0	0	0	0	0	0	2	0	0	0	18	208
5:25 PM	1	5	2	0	1	4	0	0	0	1	0	0	0	1	1	0	0	16	208
5:30 PM	0	9	1	0	0	2	1	0	1	2	0	0	0	1	0	0	0	17	211
5:35 PM	1	8	1	0	1	0	0	0	0	0	1	0	0	0	2	0	0	14	200
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5:50 PM	0	2	2	0	0	2	0	0	0	0	0	0	0	1	0	0	0	7	192
5:55 PM	0	8	0	0	1	2	0	0	0	0	0	0	0	0	1	3	0	15	189
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total		
All Vehicles	8	88	12	0	12	68	4	0	4	8	4	4	8	4	20	0	244		
Heavy Trucks	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	8		
Pedestrians	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	0	4		
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Railroad																			
Stopped Buses																			

Comments:

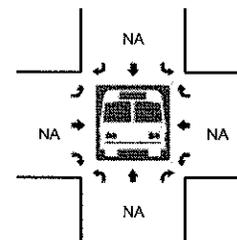
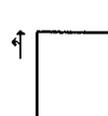
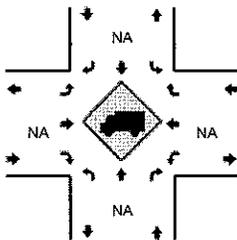
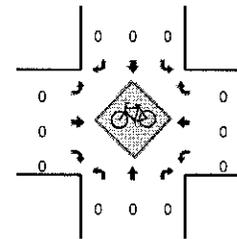
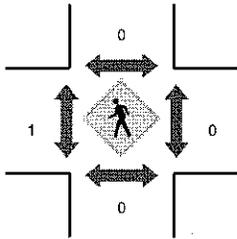
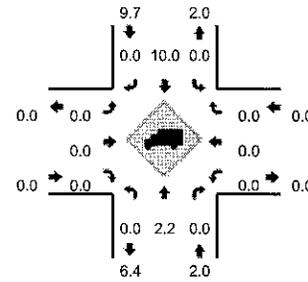
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: N Main St -- Lynn Dr
 CITY/STATE: Newberg, OR
 QC JOB #: 13782803
 DATE: Thu, Apr 14 2016



Peak-Hour: 7:20 AM -- 8:20 AM
 Peak 15-Min: 7:55 AM -- 8:10 AM



5-Min Count Period	N Main St (Northbound)				N Main St (Southbound)				Lynn Dr (Eastbound)				Lynn Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	3	0	0	0	1	0	0	1	0	1	0	0	0	0	0	6	
7:05 AM	0	4	0	0	0	1	0	0	0	0	1	0	0	0	0	0	6	
7:10 AM	0	5	0	0	0	1	0	0	0	0	0	0	0	0	0	0	6	
7:15 AM	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	5	
7:20 AM	2	3	0	0	0	1	0	0	0	0	2	0	0	0	0	0	8	
7:25 AM	0	6	0	0	0	1	0	0	0	0	1	0	0	0	0	0	8	
7:30 AM	1	6	0	0	0	2	0	0	0	0	2	0	0	0	0	0	11	
7:35 AM	1	1	0	0	0	3	0	0	1	0	1	0	0	0	0	0	7	
7:40 AM	0	4	0	0	0	3	0	0	1	0	0	0	0	0	0	0	8	
7:45 AM	0	4	0	0	0	3	0	0	2	0	1	0	0	0	0	0	10	
7:50 AM	0	3	0	0	0	2	0	0	0	0	3	0	0	0	0	0	8	
7:55 AM	0	2	0	0	0	4	0	0	0	0	2	0	0	0	0	0	8	91
8:00 AM	0	7	0	0	0	2	0	0	0	0	2	0	0	0	0	0	11	96
8:05 AM	0	4	0	0	0	3	1	0	0	0	1	0	0	0	0	0	9	99
8:10 AM	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	6	99
8:15 AM	0	2	0	0	0	3	0	0	0	0	2	0	0	0	0	0	7	101
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8:25 AM	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	8	98
8:30 AM	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	5	92
8:35 AM	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0	0	5	90
8:40 AM	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	6	88
8:45 AM	1	3	0	0	0	2	0	0	0	0	0	0	0	0	0	0	6	84
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Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	52	0	0	0	36	4	0	0	0	20	0	0	0	0	0	112	
Heavy Trucks	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	8	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																	0	
Stopped Buses																		

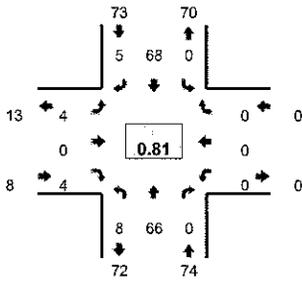
Comments:

Type of peak hour being reported: Intersection Peak

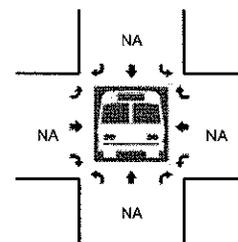
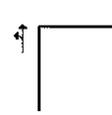
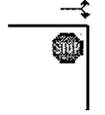
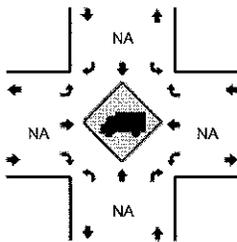
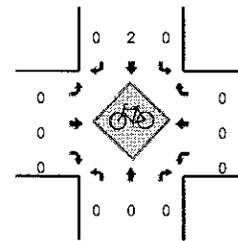
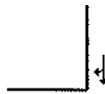
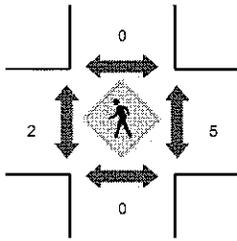
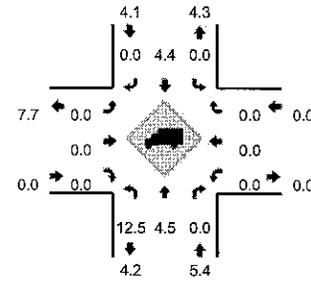
Method for determining peak hour: Total Entering Volume

LOCATION: N Main St -- Lynn Dr
 CITY/STATE: Newberg, OR

QC JOB #: 13782804
 DATE: Wed, Apr 13 2016



Peak-Hour: 4:25 PM -- 5:25 PM
 Peak 15-Min: 5:10 PM -- 5:25 PM



5-Min Count Period	N Main St (Northbound)				N Main St (Southbound)				Lynn Dr (Eastbound)				Lynn Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	7	0	0	0	3	0	0	0	0	0	0	0	0	0	0	10	
4:05 PM	0	3	0	0	0	4	0	0	0	0	0	0	0	0	0	0	7	
4:10 PM	2	6	0	0	0	9	0	0	0	0	0	0	0	0	0	0	17	
4:15 PM	1	7	0	0	0	3	1	0	0	0	0	0	0	0	0	0	12	
4:20 PM	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	8	
4:25 PM	2	8	0	0	0	3	0	0	1	0	0	0	0	0	0	0	12	
4:30 PM	0	5	0	0	0	4	1	0	0	0	0	0	0	0	0	0	10	
4:35 PM	1	9	0	0	0	8	1	0	0	0	0	0	0	0	0	0	19	
4:40 PM	1	6	0	0	0	4	0	0	1	0	2	0	0	0	0	0	14	
4:45 PM	1	5	0	0	0	6	0	0	1	0	0	0	0	0	0	0	13	
4:50 PM	0	0	0	0	0	8	0	0	1	0	0	0	0	0	0	0	9	
4:55 PM	2	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	12	143
5:00 PM	0	3	0	0	0	6	0	0	0	0	1	0	0	0	0	0	10	143
5:05 PM	0	2	0	0	0	6	0	0	0	0	0	0	0	0	0	0	8	144
5:10 PM	1	11	0	0	0	6	0	0	0	0	1	0	0	0	0	0	19	146
5:15 PM	0	10	0	0	0	6	1	0	0	0	0	0	0	0	0	0	17	151
5:20 PM	0	4	0	0	0	6	2	0	0	0	0	0	0	0	0	0	12	155
5:25 PM	1	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	9	152
5:30 PM	2	8	0	0	0	3	0	0	0	0	0	0	0	0	0	0	13	155
5:35 PM	1	8	0	0	0	1	0	0	1	0	0	0	0	0	0	0	11	147
5:40 PM	1	6	0	0	0	4	0	0	0	0	0	0	0	0	0	0	11	144
5:45 PM	0	6	0	0	0	3	0	0	0	0	0	0	0	0	0	0	9	140
5:50 PM	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0	0	5	136
5:55 PM	0	9	0	0	0	2	2	0	0	0	0	0	0	0	0	0	13	137
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
Beginning At	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	4	100	0	0	0	72	12	0	0	0	4	0	0	0	0	0	192	
Heavy Trucks	4	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	12	
Pedestrians	0	0	0	0	0	0	0	0	0	4	0	0	0	8	0	0	12	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Comments:

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE
Columbia Dr & Chehalem Dr
January 1, 2010 through December 31, 2014

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
----------------	------------------	--------------------------	----------------------------	------------------	------------------	-------------------	--------	-------------	-------------	-----	------	-------------------	------------------------------	--------------

YEAR:

TOTAL

FINAL TOTAL

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

Hi Karl,

Attached are the crash summary and crash detail reports you requested. There were two intersections with no crashes reported for the time period requested (Chehalem Dr & Foothills, Columbia Dr & Chehalem Dr) and one intersection (Chehalem Dr & Mountainview Dr) with no data at all.

Thank you Karl and hope you are getting to enjoy this beautiful weather we are having !

Kim

Kim Ward

Crash Reporting Technician
Crash Analysis and Reporting Unit
Transportation Data Section
555 13th Street NE, Suite 2
Salem, Oregon 97301-4178
ph: (503) 986-4237
fax: (503) 986-4249
mailto: kimberlee.s.ward@odot.state.or.us

Hi Karl,

There have been no accidents at or near that intersection in the past 5 years, the closest would be 2 crashes at Main and Mountainview in 2012.

Let me know if you have any further questions!

Melissa Ferguson

Newberg-Dundee Police Department
401 E. Third St.
P.O. Box 970
Newberg, OR 97132
Phone: 503-537-1169
Fax: 503-538-5393

From: Karan Frketich
Sent: Wednesday, April 13, 2016 10:01 AM
To: 'Karl Birky, P.E.' <kbirky@atepinc.com>
Cc: Melissa Ferguson <melissa.ferguson@newbergoregon.gov>
Subject: RE: Checking In

Carl, I have cc'd Melissa who is our records clerk. She should be able to help you.

Thank you.

From: Karl Birky, P.E. [<mailto:kbirky@atepinc.com>]
Sent: Wednesday, April 13, 2016 8:52 AM
To: Karan Frketich <karan.frketich@newbergoregon.gov>
Subject: RE: Checking In

Karan:

I am working on a traffic study for a parcel between Columbia Dr and Lynn Lane in Newberg. The City has asked that we look at the intersection of Lynn Lane at Main St. Can you point me in the direction where I can get a 5 year summary of crashes at or near this intersection.

Thank you,

Karl Birky, PE, PTOE

Columbia Dr Estates TIA

Vistro File: J:\...\Columbia Dr TIA.vistro

Scenario 1: Existing AM Peak

Report File: J:\...\2016 AM Columbia Dr TIA.pdf

4/21/2016

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Lynn Dr at Main St	Two-way stop	HCM2010	EBL	0.006	9.1	A
4	Columbia Dr at Main St	Two-way stop	HCM2010	EBT	0.016	10.0	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value; for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report
#1: Lynn Dr at Main St**

Control Type:	Two-way stop	Delay (sec / veh):	9.1
Analysis Method:	HCM2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.006

Intersection Setup

Name	Main St		Main St		Lynn Dr	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration	↰		↱		↗	
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Main St		Main St		Lynn Dr	
Base Volume Input [veh/h]	4	45	30	1	4	17
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	7.10	7.10	7.10	7.10	7.10	7.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	45	30	1	4	17
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345
Total 15-Minute Volume [veh/h]	1	13	9	0	1	5
Total Analysis Volume [veh/h]	5	52	34	1	5	20
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			no
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			no
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.01	0.02
d_M, Delay for Movement [s/veh]	7.34	0.00	0.00	0.00	9.15	8.61
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.11	0.11	0.00	0.00	0.08	0.08
95th-Percentile Queue Length [ft]	2.87	2.87	0.00	0.00	1.93	1.93
d_A, Approach Delay [s/veh]	0.64		0.00		8.72	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.18					
Intersection LOS	A					

Intersection Level Of Service Report
#4: Columbia Dr at Main St

Control Type:	Two-way stop	Delay (sec / veh):	10.0
Analysis Method:	HCM2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

Intersection Setup

Name	Main St			Main St			Columbia Dr			Columbia Dr		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Main St			Main St			Columbia Dr			Columbia Dr		
Base Volume Input [veh/h]	2	49	11	7	45	1	0	10	1	7	2	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	49	11	7	45	1	0	10	1	7	2	1
Peak Hour Factor	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700
Other Adjustment Factor	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345
Total 15-Minute Volume [veh/h]	1	15	3	2	13	0	0	3	0	2	1	0
Total Analysis Volume [veh/h]	2	58	13	8	54	1	0	12	1	8	2	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			no	no
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			no	no
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.00
d_M, Delay for Movement [s/veh]	7.33	0.00	0.00	7.37	0.00	0.00	9.47	9.95	8.65	9.52	9.89	8.67
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.15	0.15	0.15	0.13	0.13	0.13	0.05	0.05	0.05	0.04	0.04	0.04
95th-Percentile Queue Length [ft]	3.71	3.71	3.71	3.23	3.23	3.23	1.31	1.31	1.31	1.03	1.03	1.03
d_A, Approach Delay [s/veh]	0.20			0.94			9.85			9.51		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	1.91											
Intersection LOS	A											

Columbia Dr Estates TIA

Vistro File: J:\...\Columbia Dr TIA.vistro

Scenario 1: Existing AM Peak

Report File: J:\...\2016 AM Columbia Dr TIA.pdf

4/21/2016

Turning Movement Volume: Summary

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
1	Lynn Dr at Main St	4	45	30	1	4	17	101

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Columbia Dr at Main St	2	49	11	7	45	1	0	10	1	7	2	1	136

Columbia Dr Estates TIA

Vistro File: J:\...\Columbia Dr TIA.vistro

Scenario 1: Existing AM Peak

Report File: J:\...\2016 AM Columbia Dr TIA.pdf

4/21/2016

Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Northbound		Southbound		Eastbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
1	Lynn Dr at Main St	Final Base	4	45	30	1	4	17	101
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	4	45	30	1	4	17	101

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Columbia Dr at Main St	Final Base	2	49	11	7	45	1	0	10	1	7	2	1	136
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	2	49	11	7	45	1	0	10	1	7	2	1	136

Columbia Dr Estates TIA

Vistro File: J:\...\Columbia Dr TIA.vistro

Scenario 1: Existing AM Peak

Report File: J:\...\2016 AM Columbia Dr TIA.pdf

4/21/2016

Trip generation summary

Added Trips

Zone ID: Name	Land Use variables	Code	Ind. Var.	Rate	Quantity	% In	% Out	Trips In	Trips Out	Total trips	% of Total Trips
1: Columbia Estates	Single Family Homes	ITE 210	homes	0.750	0.000	50.00	50.00	0	0	0	0.00
Added Trips Total								0	0	0	0.00

Trip distribution summary

Zone / Gate	Zone 1: Columbia Estates			
	To Columbia Estates:		From Columbia Estates:	
	Share %	Trips	Share %	Trips
2: Gate	20.00	0	20.00	0
3: Gate	20.00	0	20.00	0
4: Gate	30.00	0	30.00	0
5: Gate	20.00	0	20.00	0
6: Gate	10.00	0	10.00	0
Total	100.00	0	100.00	0

Report Figure 1: Study Intersections

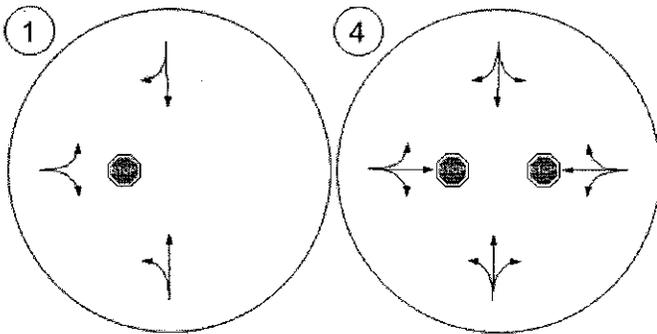


Report Figure 2: Lane Configuration and Traffic Control



Lynn Dr at Main St

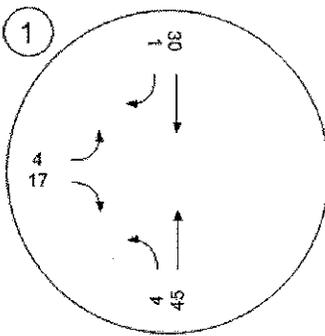
Columbia Dr at Main St



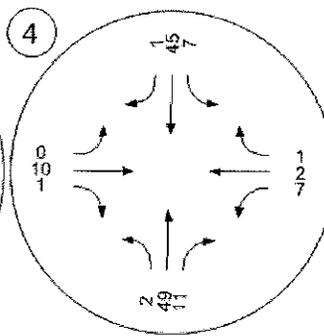
Report Figure 3e: Traffic Volume - Future Total Volume



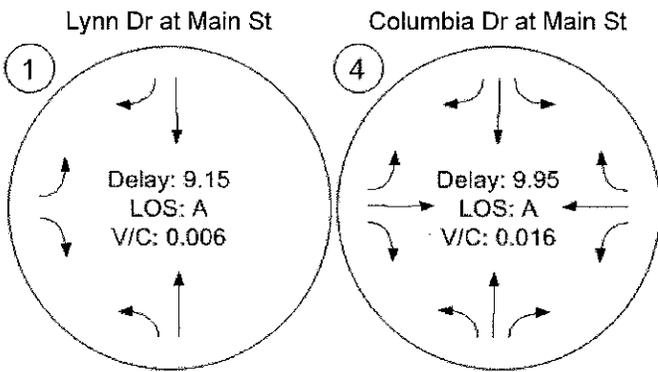
Lynn Dr at Main St



Columbia Dr at Main St



Report Figure 4: Traffic Conditions



Columbia Dr Estates TIA

Vistro File: J:\...\Columbia Dr TIA.vistro

Scenario 2: Existing PM Peak

Report File: J:\...\2016 PM Columbia Dr TIA.pdf

4/21/2016

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Lynn Dr at Main St	Two-way stop	HCM2010	EBL	0.006	9.7	A
4	Columbia Dr at Main St	Two-way stop	HCM2010	WBT	0.010	10.5	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value; for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
#1: Lynn Dr at Main St

Control Type:	Two-way stop	Delay (sec / veh):	9.7
Analysis Method:	HCM2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.006

Intersection Setup

Name	Main St		Main St		Lynn Dr	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration	↰		↱		↷	
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Main St		Main St		Lynn Dr	
Base Volume Input [veh/h]	8	66	68	5	4	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	6.30	6.30	6.30	6.30	6.30	6.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	66	68	5	4	4
Peak Hour Factor	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100
Other Adjustment Factor	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345
Total 15-Minute Volume [veh/h]	3	21	22	2	1	1
Total Analysis Volume [veh/h]	10	84	87	6	5	5
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			no
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			no
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.01	0.01
d_M, Delay for Movement [s/veh]	7.46	0.00	0.00	0.00	9.67	8.81
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.20	0.20	0.00	0.00	0.04	0.04
95th-Percentile Queue Length [ft]	5.10	5.10	0.00	0.00	0.88	0.88
d_A, Approach Delay [s/veh]	0.79		0.00		9.24	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.85					
Intersection LOS	A					

**Intersection Level Of Service Report
#4: Columbia Dr at Main St**

Control Type: Two-way stop
 Analysis Method: HCM2010
 Analysis Period: 15 minutes

Delay (sec / veh): 10.5
 Level Of Service: B
 Volume to Capacity (v/c): 0.010

Intersection Setup

Name	Main St			Main St			Columbia Dr			Columbia Dr		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Main St			Main St			Columbia Dr			Columbia Dr		
Base Volume Input [veh/h]	6	77	11	5	68	3	4	8	1	11	6	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	77	11	5	68	3	4	8	1	11	6	11
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345
Total 15-Minute Volume [veh/h]	2	23	3	2	20	1	1	2	0	3	2	3
Total Analysis Volume [veh/h]	7	93	13	6	82	4	5	10	1	13	7	13
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			no	no
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			no	no
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.02	0.01	0.01
d_M, Delay for Movement [s/veh]	7.41	0.00	0.00	7.45	0.00	0.00	10.17	10.47	8.83	10.17	10.52	8.98
Movement LOS	A	A	A	A	A	A	B	B	A	B	B	A
95th-Percentile Queue Length [veh]	0.24	0.24	0.24	0.20	0.20	0.20	0.07	0.07	0.07	0.13	0.13	0.13
95th-Percentile Queue Length [ft]	6.09	6.09	6.09	4.98	4.98	4.98	1.76	1.76	1.76	3.28	3.28	3.28
d_A, Approach Delay [s/veh]	0.46			0.49			10.27			9.77		
Approach LOS	A			A			B			A		
d_I, Intersection Delay [s/veh]	2.30											
Intersection LOS	B											

Columbia Dr Estates TIA

Vistro File: J:\...\Columbia Dr TIA.vistro

Scenario 2: Existing PM Peak

Report File: J:\...\2016 PM Columbia Dr TIA.pdf

4/21/2016

Turning Movement Volume: Summary

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
1	Lynn Dr at Main St	8	66	68	5	4	4	155

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Columbia Dr at Main St	6	77	11	5	88	3	4	8	1	11	6	11	211

Columbia Dr Estates TIA

Vistro File: J:\...\Columbia Dr TIA.vistro
Report File: J:\...\2016 PM Columbia Dr TIA.pdf

Scenario 2: Existing PM Peak
4/21/2016

Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Northbound		Southbound		Eastbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
1	Lynn Dr at Main St	Final Base	8	66	68	5	4	4	155
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	8	66	68	5	4	4	155

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Columbia Dr at Main St	Final Base	6	77	11	5	68	3	4	8	1	11	6	11	211
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	6	77	11	5	68	3	4	8	1	11	6	11	211

Columbia Dr Estates TIA

Vistro File: J:\...\Columbia Dr TIA.vistro
Report File: J:\...\2016 PM Columbia Dr TIA.pdf

Scenario 2: Existing PM Peak
4/21/2016

Trip generation summary

Added Trips

Zone ID: Name	Land Use variables	Code	Ind. Var.	Rate	Quantity	% In	% Out	Trips In	Trips Out	Total trips	% of Total Trips
1: Columbia Estates	Single Family Homes	ITE 210	homes	0.750	0.000	50.00	50.00	0	0	0	0.00
Added Trips Total								0	0	0	0.00

Columbia Dr Estates TIA

Vistro File: J:\...\Columbia Dr TIA.vistro
Report File: J:\...\2016 PM Columbia Dr TIA.pdf

Scenario 2: Existing PM Peak
4/21/2016

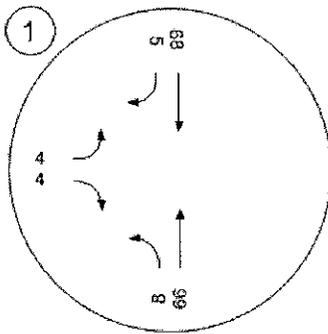
Trip distribution summary

Zone / Gate	Zone 1: Columbia Estates			
	To Columbia Estates:		From Columbia Estates:	
	Share %	Trips	Share %	Trips
2: Gate	20.00	0	20.00	0
3: Gate	20.00	0	20.00	0
4: Gate	30.00	0	30.00	0
5: Gate	20.00	0	20.00	0
6: Gate	10.00	0	10.00	0
Total	100.00	0	100.00	0

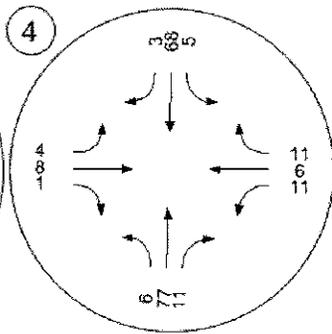
Report Figure 3e: Traffic Volume - Future Total Volume



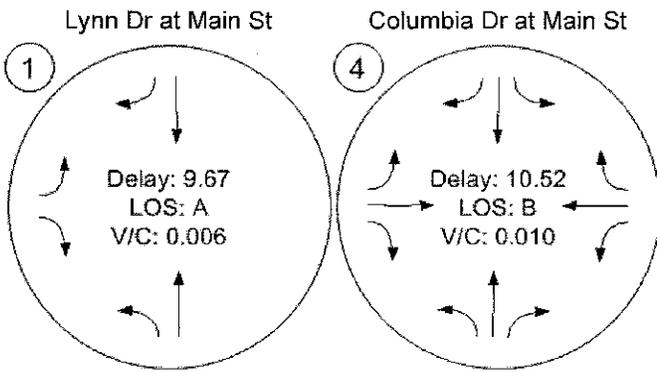
Lynn Dr at Main St



Columbia Dr at Main St



Report Figure 4: Traffic Conditions



Columbia Dr Estates TIA

Vistro File: J:\...\Columbia Dr TIA.vistro

Scenario 3: 2017 Developed AM Peak

Report File: J:\...\2017 AM Columbia Dr TIA.pdf

4/21/2016

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Lynn Dr at Main St	Two-way stop	HCM2010	EBL	0.009	9.2	A
2	Wydan St at Columbia Dr	Two-way stop	HCM2010	SBL	0.008	8.7	A
4	Columbia Dr at Main St	Two-way stop	HCM2010	EBT	0.025	10.0	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value; for all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report
#1: Lynn Dr at Main St**

Control Type: Two-way stop
 Analysis Method: HCM2010
 Analysis Period: 15 minutes

Delay (sec / veh): 9.2
 Level Of Service: A
 Volume to Capacity (v/c): 0.009

Intersection Setup

Name	Main St		Main St		Lynn Dr	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration	↰		↳		↱	
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Main St		Main St		Lynn Dr	
Base Volume Input [veh/h]	4	45	30	1	4	17
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	7.10	7.10	7.10	7.10	7.10	7.10
Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	1	3	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	46	31	2	7	17
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345
Total 15-Minute Volume [veh/h]	1	13	9	1	2	5
Total Analysis Volume [veh/h]	5	53	36	2	8	20
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			no
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			no
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.01	0.02
d_M, Delay for Movement [s/veh]	7.35	0.00	0.00	0.00	9.18	8.64
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.12	0.12	0.00	0.00	0.09	0.09
95th-Percentile Queue Length [ft]	2.93	2.93	0.00	0.00	2.21	2.21
d_A, Approach Delay [s/veh]	0.63		0.00		8.79	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.28					
Intersection LOS	A					

**Intersection Level Of Service Report
#2: Wydan St at Columbia Dr**

Control Type:	Two-way stop	Delay (sec / veh):	8.7
Analysis Method:	HCM2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.008

Intersection Setup

Name	Wydan St		Columbia Dr		Columbia Dr	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration	←		↑		→	
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Wydan St		Columbia Dr		Columbia Dr	
Base Volume Input [veh/h]	0	0	0	11	5	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.60	2.60	2.60	2.60	2.60	2.60
Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	7	6	2	0	0	3
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	7	6	2	11	5	3
Peak Hour Factor	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700
Other Adjustment Factor	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345
Total 15-Minute Volume [veh/h]	2	2	1	3	1	1
Total Analysis Volume [veh/h]	8	7	2	13	6	4
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	no		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	no		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.01	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.70	8.41	7.24	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.04	0.04	0.03	0.03	0.00	0.00
95th-Percentile Queue Length [ft]	1.11	1.11	0.71	0.71	0.00	0.00
d_A, Approach Delay [s/veh]	8.56		0.97		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	3.57					
Intersection LOS	A					

**Intersection Level Of Service Report
#4: Columbia Dr at Main St**

Control Type: Two-way stop
Analysis Method: HCM2010
Analysis Period: 15 minutes

Delay (sec / veh): 10.0
Level Of Service: B
Volume to Capacity (v/c): 0.025

Intersection Setup

Name	Main St			Main St			Columbia Dr			Columbia Dr		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Main St			Main St			Columbia Dr			Columbia Dr		
Base Volume Input [veh/h]	2	49	11	7	45	1	0	10	1	7	2	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	0	0	0	0	0	0	5	2	0	2	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	50	11	7	46	1	0	15	3	7	4	1
Peak Hour Factor	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700
Other Adjustment Factor	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345
Total 15-Minute Volume [veh/h]	1	15	3	2	14	0	0	4	1	2	1	0
Total Analysis Volume [veh/h]	4	59	13	8	55	1	0	18	4	8	5	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			no	no
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			no	no
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.00	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	7.34	0.00	0.00	7.37	0.00	0.00	9.59	10.05	8.70	9.67	9.96	8.70
Movement LOS	A	A	A	A	A	A	A	B	A	A	A	A
95th-Percentile Queue Length [veh]	0.16	0.16	0.16	0.13	0.13	0.13	0.09	0.09	0.09	0.05	0.05	0.05
95th-Percentile Queue Length [ft]	3.88	3.88	3.88	3.28	3.28	3.28	2.20	2.20	2.20	1.37	1.37	1.37
d_A, Approach Delay [s/veh]	0.39			0.92			9.80			9.70		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	2.50											
Intersection LOS	B											

Columbia Dr Estates TIA

Vistro File: J:\...\Columbia Dr TIA.vistro

Scenario 3: 2017 Developed AM Peak

Report File: J:\...\2017 AM Columbia Dr TIA.pdf

4/21/2016

Turning Movement Volume: Summary

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
1	Lynn Dr at Main St	4	46	31	2	7	17	107

ID	Intersection Name	Southbound		Eastbound		Westbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
2	Wydan St at Columbia Dr	7	6	2	11	5	3	34

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Columbia Dr at Main St	3	50	11	7	46	1	0	15	3	7	4	1	148

Columbia Dr Estates TIA

Vistro File: J:\...\Columbia Dr TIA.vistro

Scenario 3: 2017 Developed AM Peak

Report File: J:\...\2017 AM Columbia Dr TIA.pdf

4/21/2016

Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Northbound		Southbound		Eastbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
1	Lynn Dr at Main St	Final Base	4	45	30	1	4	17	101
		Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	1	3	0	4
		Other	0	0	0	0	0	0	0
		Future Total	4	46	31	2	7	17	107

ID	Intersection Name	Volume Type	Southbound		Eastbound		Westbound		Total Volume
			Left	Right	Left	Thru	Thru	Right	
2	Wydan St at Columbia Dr	Final Base	0	0	0	11	5	0	16
		Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	7	6	2	0	0	3	18
		Other	0	0	0	0	0	0	0
		Future Total	7	6	2	11	5	3	34

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Columbia Dr at Main St	Final Base	2	49	11	7	45	1	0	10	1	7	2	1	136
		Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	1	0	0	0	0	0	0	5	2	0	2	0	10
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	3	50	11	7	46	1	0	15	3	7	4	1	148

Columbia Dr Estates TIA

Vistro File: J:\...\Columbia Dr TIA.vistro

Scenario 3: 2017 Developed AM Peak

Report File: J:\...\2017 AM Columbia Dr TIA.pdf

4/21/2016

Trip generation summary

Added Trips

Zone ID: Name	Land Use variables	Code	Ind. Var.	Rate	Quantity	% In	% Out	Trips In	Trips Out	Total trips	% of Total Trips
1: Columbia Estates	Single Family Homes	ITE 210	homes	0.750	29.000	25.00	75.00	6	16	22	100.00
Added Trips Total								6	16	22	100.00

Columbia Dr Estates TIA

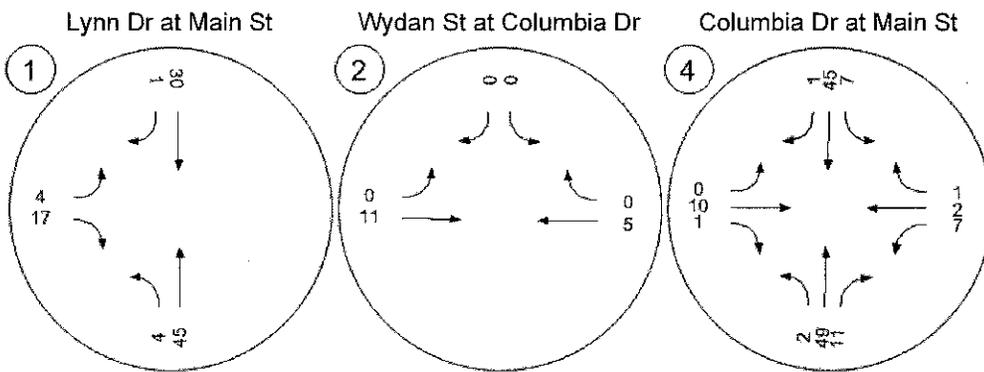
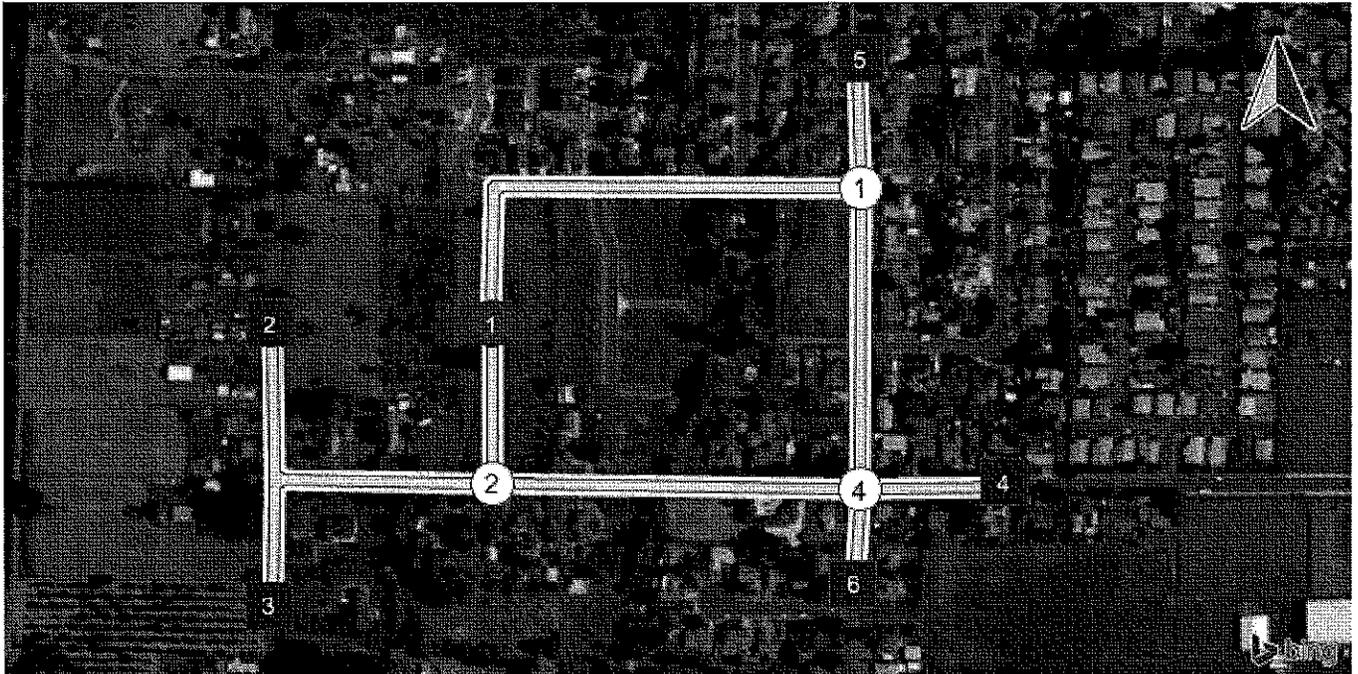
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Report File: J:\...\2017 AM Columbia Dr TIA.pdf

Scenario 3: 2017 Developed AM Peak
4/21/2016

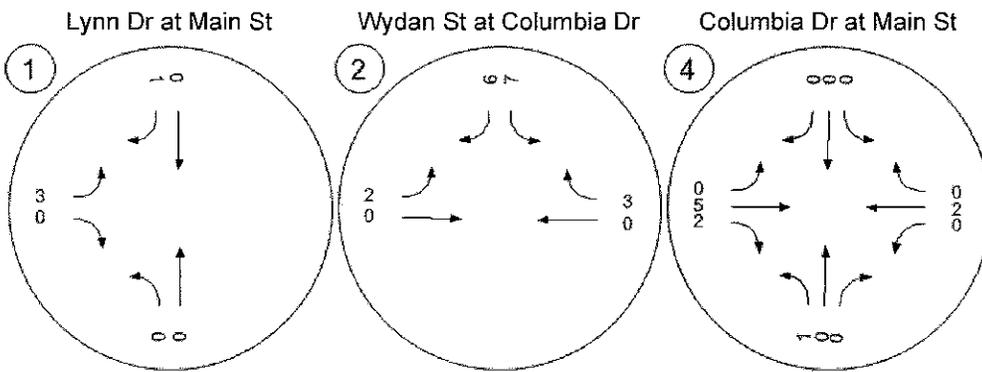
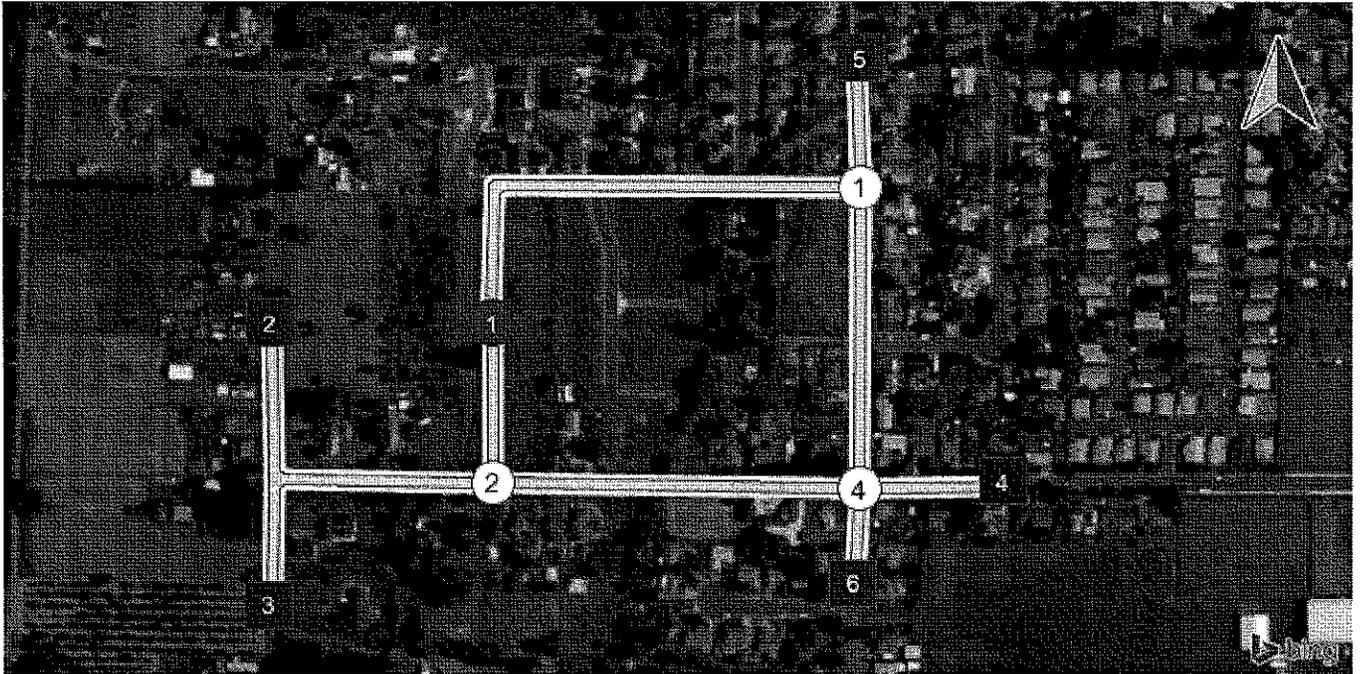
Trip distribution summary

Zone / Gate	Zone 1: Columbia Estates			
	To Columbia Estates:		From Columbia Estates:	
	Share %	Trips	Share %	Trips
2: Gate	20.00	1	20.00	3
3: Gate	20.00	1	20.00	3
4: Gate	30.00	2	30.00	5
5: Gate	20.00	1	20.00	3
6: Gate	10.00	1	10.00	2
Total	100.00	6	100.00	16

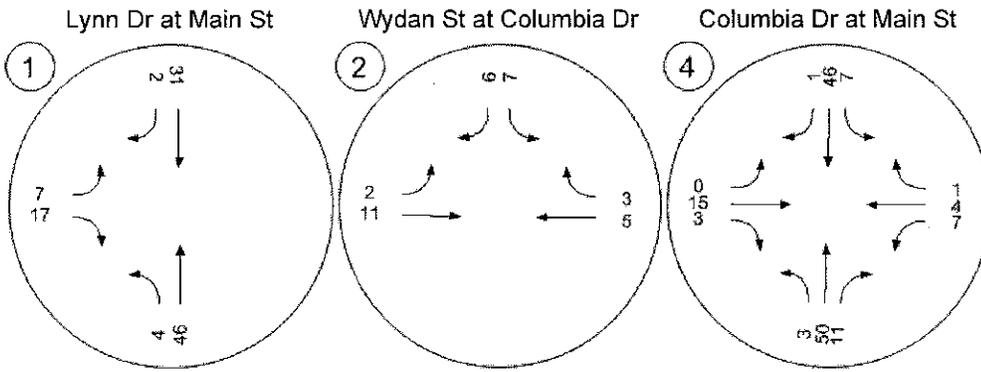
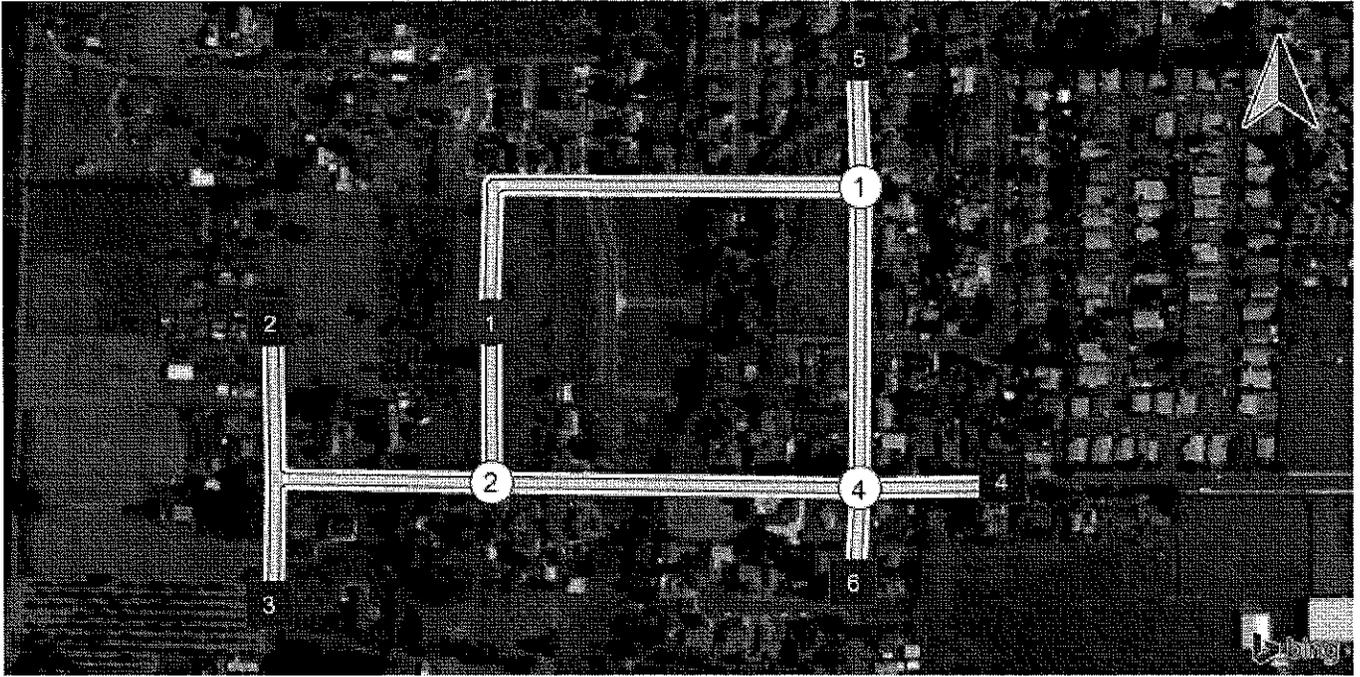
Report Figure 3a: Traffic Volume - Base Volume



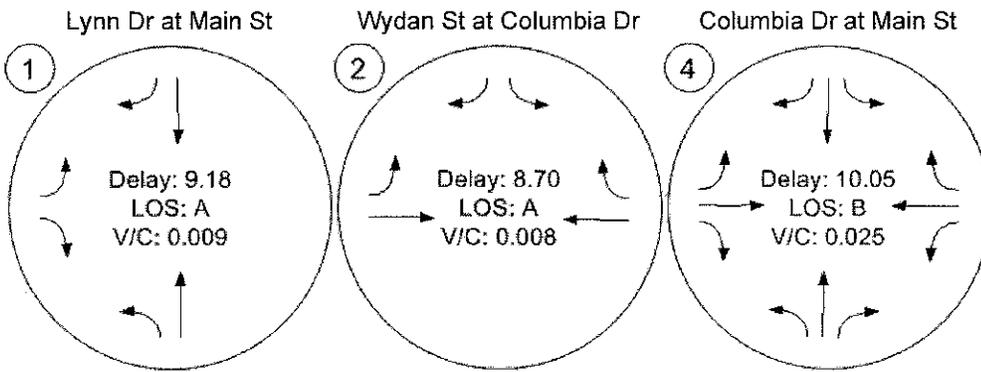
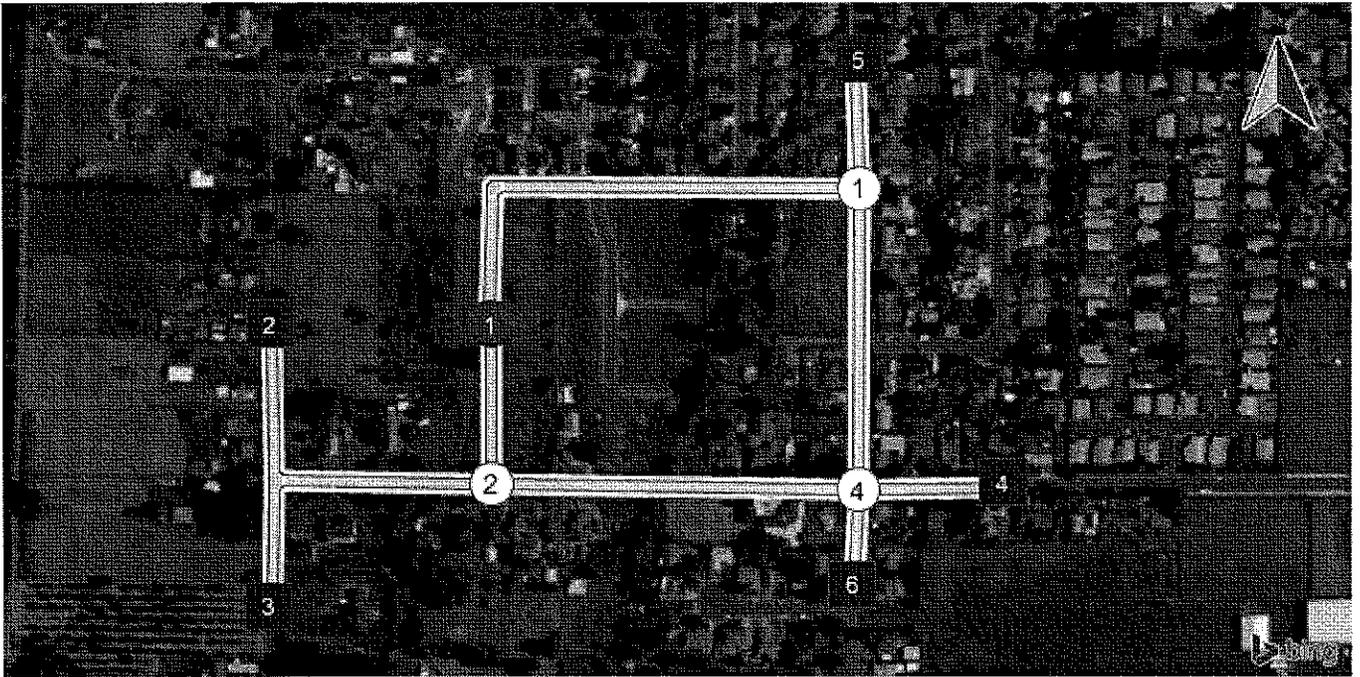
Report Figure 3c: Traffic Volume - Net New Site Trips



Report Figure 3e: Traffic Volume - Future Total Volume



Report Figure 4: Traffic Conditions



Columbia Dr Estates TIA

Vistro File: J:\...\Columbia Dr TIA.vistro

Scenario 4: 2017 Developed PM Peak

Report File: J:\...\2017 PM Columbia Dr TIA.pdf

4/21/2016

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Lynn Dr at Main St	Two-way stop	HCM2010	EBL	0.010	9.7	A
2	Wydan St at Columbia Dr	Two-way stop	HCM2010	SBL	0.006	8.9	A
4	Columbia Dr at Main St	Two-way stop	HCM2010	WBT	0.019	10.6	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value; for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
#1: Lynn Dr at Main St

Control Type:	Two-way stop	Delay (sec / veh):	9.7
Analysis Method:	HCM2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.010

Intersection Setup

Name	Main St		Main St		Lynn Dr	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration	↑		↓		↔	
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Main St		Main St		Lynn Dr	
Base Volume Input [veh/h]	8	66	68	5	4	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	6.30	6.30	6.30	6.30	6.30	6.30
Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	4	2	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	67	69	9	6	4
Peak Hour Factor	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100
Other Adjustment Factor	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345
Total 15-Minute Volume [veh/h]	3	21	22	3	2	1
Total Analysis Volume [veh/h]	10	86	88	11	8	5
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			no
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			no
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.01	0.01
d_M, Delay for Movement [s/veh]	7.47	0.00	0.00	0.00	9.72	8.85
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.21	0.21	0.00	0.00	0.05	0.05
95th-Percentile Queue Length [ft]	5.24	5.24	0.00	0.00	1.19	1.19
d_A, Approach Delay [s/veh]	0.78		0.00		9.39	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.95					
Intersection LOS	A					

**Intersection Level Of Service Report
#2: Wydan St at Columbia Dr**

Control Type:	Two-way stop	Delay (sec / veh):	8.9
Analysis Method:	HCM2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.006

Intersection Setup

Name	Wydan St		Columbia Dr		Columbia Dr	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration	T		←		→	
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Wydan St		Columbia Dr		Columbia Dr	
Base Volume Input [veh/h]	0	0	0	13	16	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.28	3.28	3.28	3.28	3.28	3.28
Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	4	8	0	0	7
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	4	8	13	16	7
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345
Total 15-Minute Volume [veh/h]	2	1	2	4	5	2
Total Analysis Volume [veh/h]	6	5	10	16	19	8
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	no		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	no		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.88	8.47	7.30	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.03	0.03	0.05	0.05	0.00	0.00
95th-Percentile Queue Length [ft]	0.85	0.85	1.26	1.26	0.00	0.00
d_A, Approach Delay [s/veh]	8.69		2.81		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.63					
Intersection LOS	A					

**Intersection Level Of Service Report
#4: Columbia Dr at Main St**

Control Type:	Two-way stop	Delay (sec / veh):	10.6
Analysis Method:	HCM2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.019

Intersection Setup

Name	Main St			Main St			Columbia Dr			Columbia Dr		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Main St			Main St			Columbia Dr			Columbia Dr		
Base Volume Input [veh/h]	6	77	11	5	68	3	4	8	1	11	6	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28
Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	0	0	0	0	0	0	4	1	0	5	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	79	11	5	69	3	4	12	2	11	11	11
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345	1.0345
Total 15-Minute Volume [veh/h]	2	24	3	2	21	1	1	4	1	3	3	3
Total Analysis Volume [veh/h]	10	95	13	6	83	4	5	14	2	13	13	13
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			no	no
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			no	no
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.02	0.02	0.01
d_M, Delay for Movement [s/veh]	7.41	0.00	0.00	7.45	0.00	0.00	10.35	10.58	8.87	10.35	10.65	9.05
Movement LOS	A	A	A	A	A	A	B	B	A	B	B	A
95th-Percentile Queue Length [veh]	0.26	0.26	0.26	0.20	0.20	0.20	0.09	0.09	0.09	0.16	0.16	0.16
95th-Percentile Queue Length [ft]	6.39	6.39	6.39	5.04	5.04	5.04	2.34	2.34	2.34	4.07	4.07	4.07
d_A, Approach Delay [s/veh]	0.63			0.48			10.36			10.02		
Approach LOS	A			A			B			B		
d_I, Intersection Delay [s/veh]	2.68											
Intersection LOS	B											

Columbia Dr Estates TIA

Vistro File: J:\...\Columbia Dr TIA.vistro

Scenario 4: 2017 Developed PM Peak

Report File: J:\...\2017 PM Columbia Dr TIA.pdf

4/21/2016

Turning Movement Volume: Summary

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
1	Lynn Dr at Main St	8	67	69	9	6	4	163

ID	Intersection Name	Southbound		Eastbound		Westbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
2	Wydan St at Columbia Dr	5	4	8	13	16	7	53

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Columbia Dr at Main St	8	79	11	5	69	3	4	12	2	11	11	11	226

Columbia Dr Estates TIA

Vistro File: J:\...\Columbia Dr TIA.vistro

Scenario 4: 2017 Developed PM Peak

Report File: J:\...\2017 PM Columbia Dr TIA.pdf

4/21/2016

Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Northbound		Southbound		Eastbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
1	Lynn Dr at Main St	Final Base	8	66	68	5	4	4	155
		Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	4	2	0	6
		Other	0	0	0	0	0	0	0
	Future Total	8	67	69	9	6	4	163	

ID	Intersection Name	Volume Type	Southbound		Eastbound		Westbound		Total Volume
			Left	Right	Left	Thru	Thru	Right	
2	Wydan St at Columbia Dr	Final Base	0	0	0	13	16	0	29
		Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	5	4	8	0	0	7	24
		Other	0	0	0	0	0	0	0
	Future Total	5	4	8	13	16	7	53	

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Columbia Dr at Main St	Final Base	6	77	11	5	68	3	4	8	1	11	6	11	211
		Growth Rate	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	2	0	0	0	0	0	0	4	1	0	5	0	12
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
	Future Total	8	79	11	5	69	3	4	12	2	11	11	11	226	

Columbia Dr Estates TIA

Vistro File: J:\...\Columbia Dr TIA.vistro

Scenario 4: 2017 Developed PM Peak

Report File: J:\...\2017 PM Columbia Dr TIA.pdf

4/21/2016

Trip generation summary

Added Trips

Zone ID: Name	Land Use variables	Code	Ind. Var.	Rate	Quantity	% In	% Out	Trips In	Trips Out	Total trips	% of Total Trips
1: Columbia Estates	Single Family Homes	ITE 210	Homes	1.000	29.000	63.00	37.00	18	11	29	100.00
Added Trips Total								18	11	29	100.00

Columbia Dr Estates TIA

Vistro File: J:\...\Columbia Dr TIA.vistro

Scenario 4: 2017 Developed PM Peak

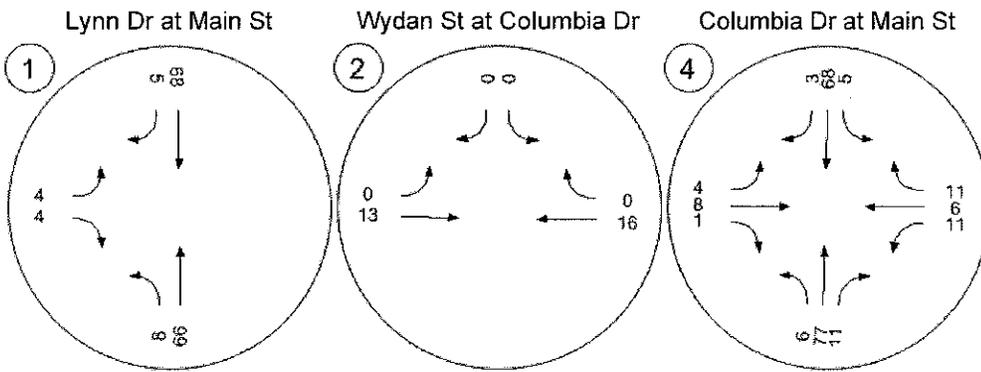
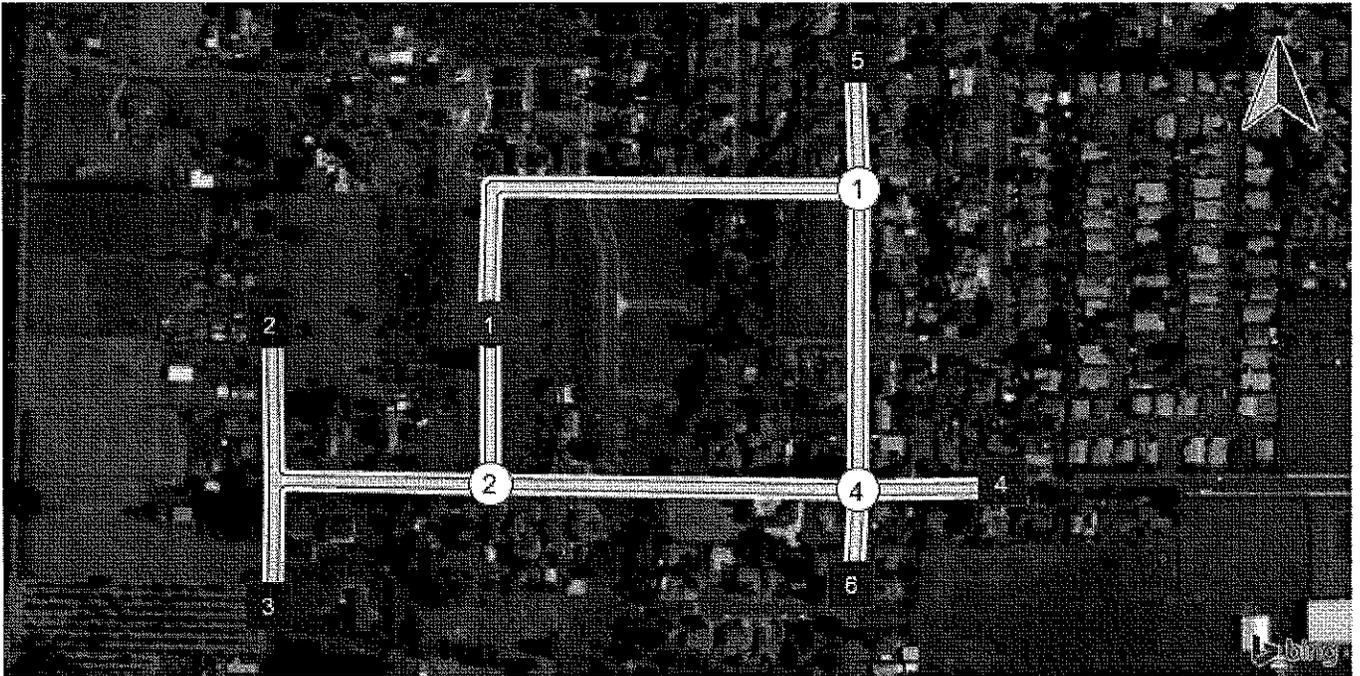
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4/21/2016

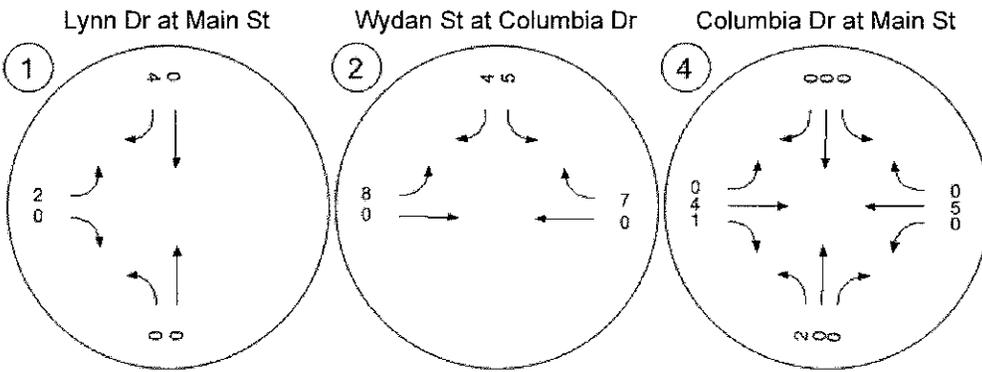
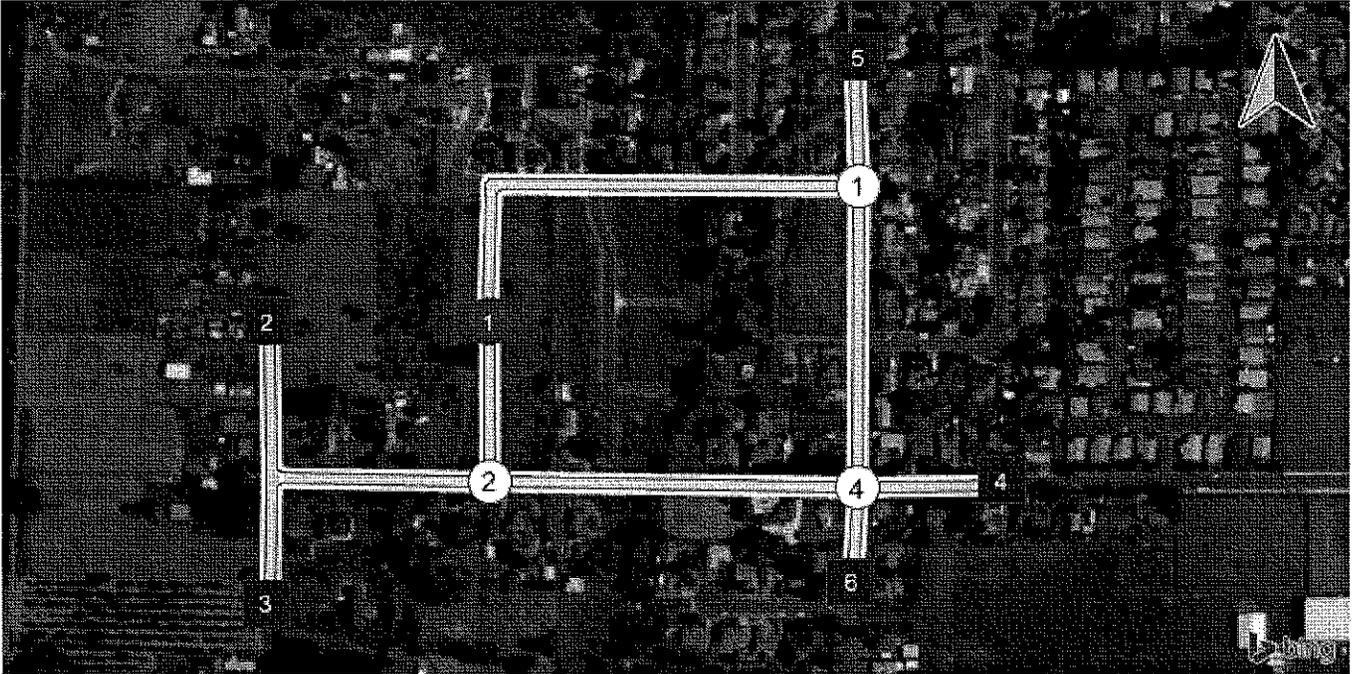
Trip distribution summary

Zone / Gate	Zone 1: Columbia Estates			
	To Columbia Estates:		From Columbia Estates:	
	Share %	Trips	Share %	Trips
2: Gate	20.00	4	20.00	2
3: Gate	20.00	4	20.00	2
4: Gate	30.00	5	30.00	4
5: Gate	20.00	4	20.00	2
6: Gate	10.00	2	10.00	1
Total	100.00	19	100.00	11

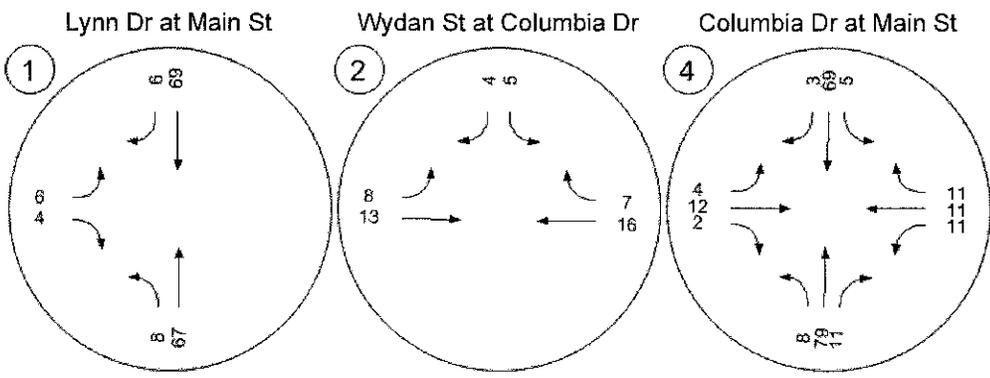
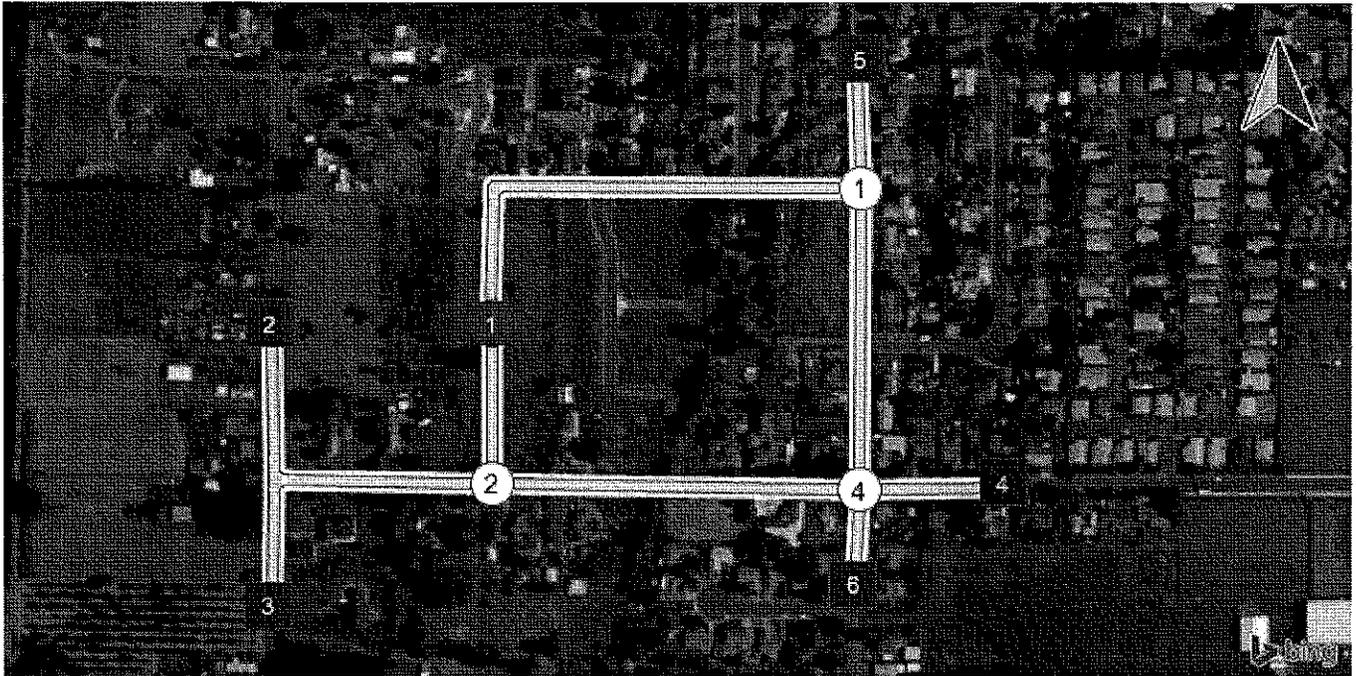
Report Figure 3a: Traffic Volume - Base Volume



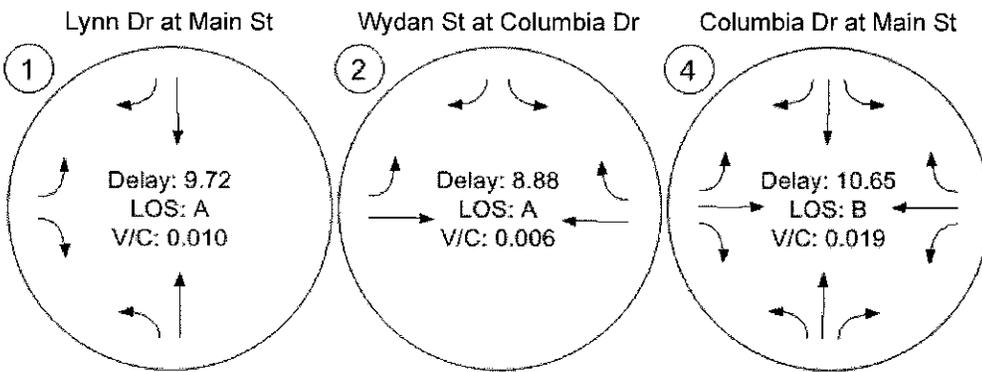
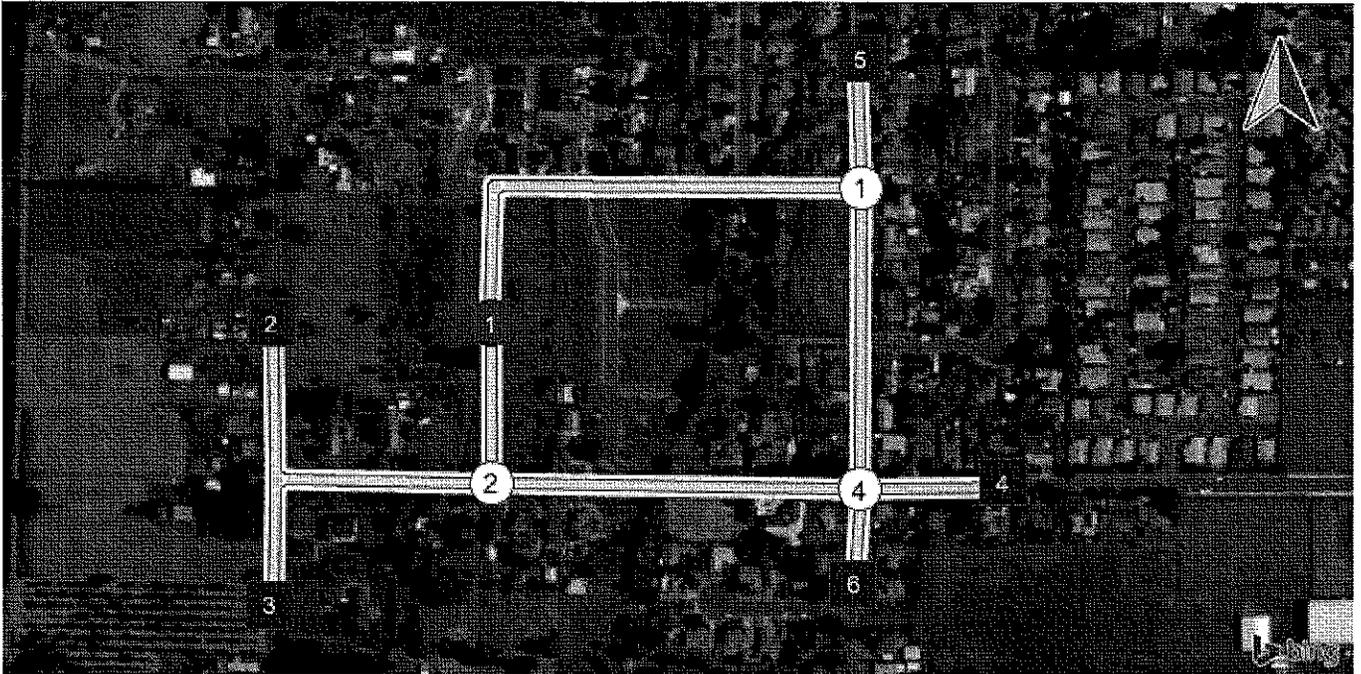
Report Figure 3c: Traffic Volume - Net New Site Trips



Report Figure 3e: Traffic Volume - Future Total Volume



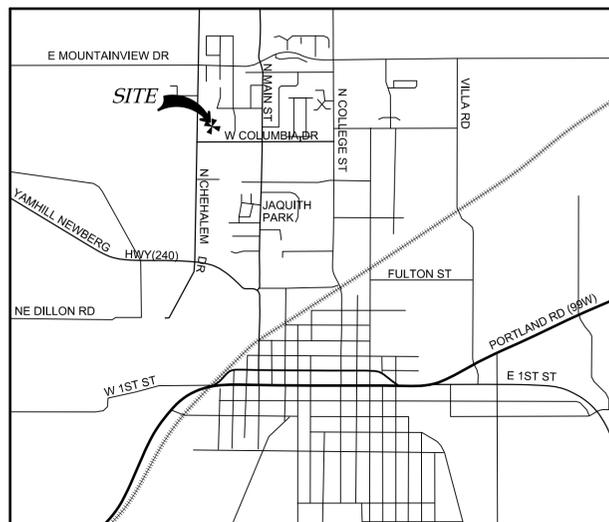
Report Figure 4: Traffic Conditions



Columbia Estates Subdivision

Exhibit C Tentative Plan

PRELIMINARY PLANS FOR COLUMBIA ESTATES NEWBERG, OR



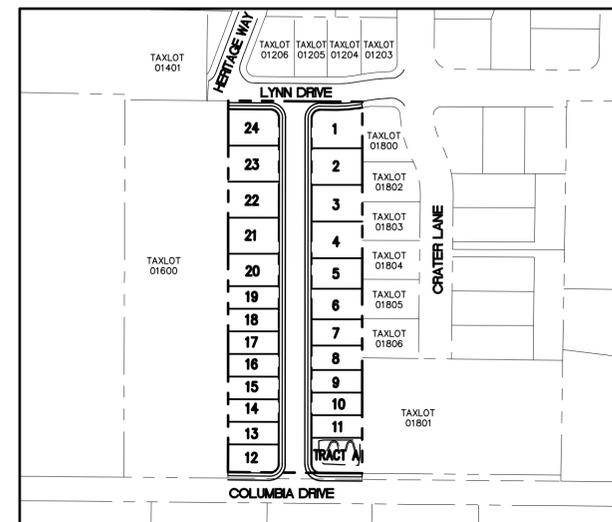
VICINITY MAP

NOT TO SCALE



SHEET INDEX

NAME:	NO.
COVER SHEET	P100
EXISTING CONDITIONS	P200
SITE PLAN / PRELIMINARY PLAT	P300
PRELIMINARY STREET AND SANITARY PLAN AND PROFILE	P301
PRELIMINARY UTILITY PLAN	P400
PRELIMINARY GRADING PLAN	P500
FUTURE STREETS PLAN	P600
SURROUNDING DEVELOPMENT - AERIAL	P601



LOCATION MAP

SCALE: 1"=150'



PROPERTY DESCRIPTION

TAX MAP & LOT:
TAX MAP 3S2W18AB, TAX LOTS 1700, 1701, 1702

SITE SIZE:
3.069 ACRES

PROPOSAL:
24 LOT RESIDENTIAL SUBDIVISION
(SINGLE FAMILY DETACHED)

STREET ADDRESS

421 W COLUMBIA DRIVE
NEWBERG, OR 97132

OWNER

DEL BOCA VISTA LLC
P.O. BOX 486
NEWBERG, OR 97132

APPLICANT

DEL BOCA VISTA LLC
P.O. BOX 486
NEWBERG, OR 97132
PHONE: (971) 706-2058

ENGINEER / SURVEYOR

WESTLAKE CONSULTANTS, INC.
PACIFIC CORPORATE CENTER
15115 S.W. SEQUOIA PARKWAY,
SUITE 150 TIGARD, OREGON 97224
PHONE: (503) 684-0652
FAX: (503) 624-0157
CONTACT: JEFF VANDERDASSON
RYAN CROWTHER

DATUM

ELEVATIONS ARE BASED ON YAMHILL COUNTY
GEODETIC CONTROL POINT NO. 167. MARK IS
AN IRON PIPE IN A MONUMENT BOX AT THE
CENTERLINE OF HOLVACK CT. AND FOOTHILLS
DR. PUBLISHED ELEVATION IS 230.80' (NGVD29).
VERTCON WAS USED TO CALCULATE A +3.41'
ADJUSTMENT TO CONVERT TO NAVD88 DATUM.
HELD ELEVATION = 234.21' (NAVD88).

LEGEND

EXISTING

- WATER METER
- FIRE HYDRANT
- WATER VALVE
- STORM CATCH BASIN
- STORM MANHOLE
- SEWER MANHOLE
- STORM LINE
- WATER LINE
- SANITARY LINE
- BUILDING FOOTPRINT
- 2-FOOT CONTOUR

PROPOSED

- INLET MANHOLE
- MANHOLE
- STORM LINE
- WATER LINE
- SANITARY LINE
- SIDEWALK
- 1-FOOT CONTOUR

ATTENTION: OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0090. YOU MAY OBTAIN COPIES OF THESE RULES BY CALLING THE CENTER. (NOTE: THE TELEPHONE NUMBER FOR THE OREGON UTILITY NOTIFICATION CENTER IS (503) 232-1987).

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UTILITY VERIFICATION: CONTRACTOR SHALL POTHOLE TO VERIFY LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION AND SHALL PROVIDE WESTLAKE CONSULTANTS, INC. 72-HOURS NOTICE OF ANY POTENTIAL CONFLICTS.

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COLUMBIA ESTATES
NEWBERG, OR

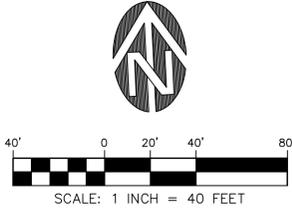
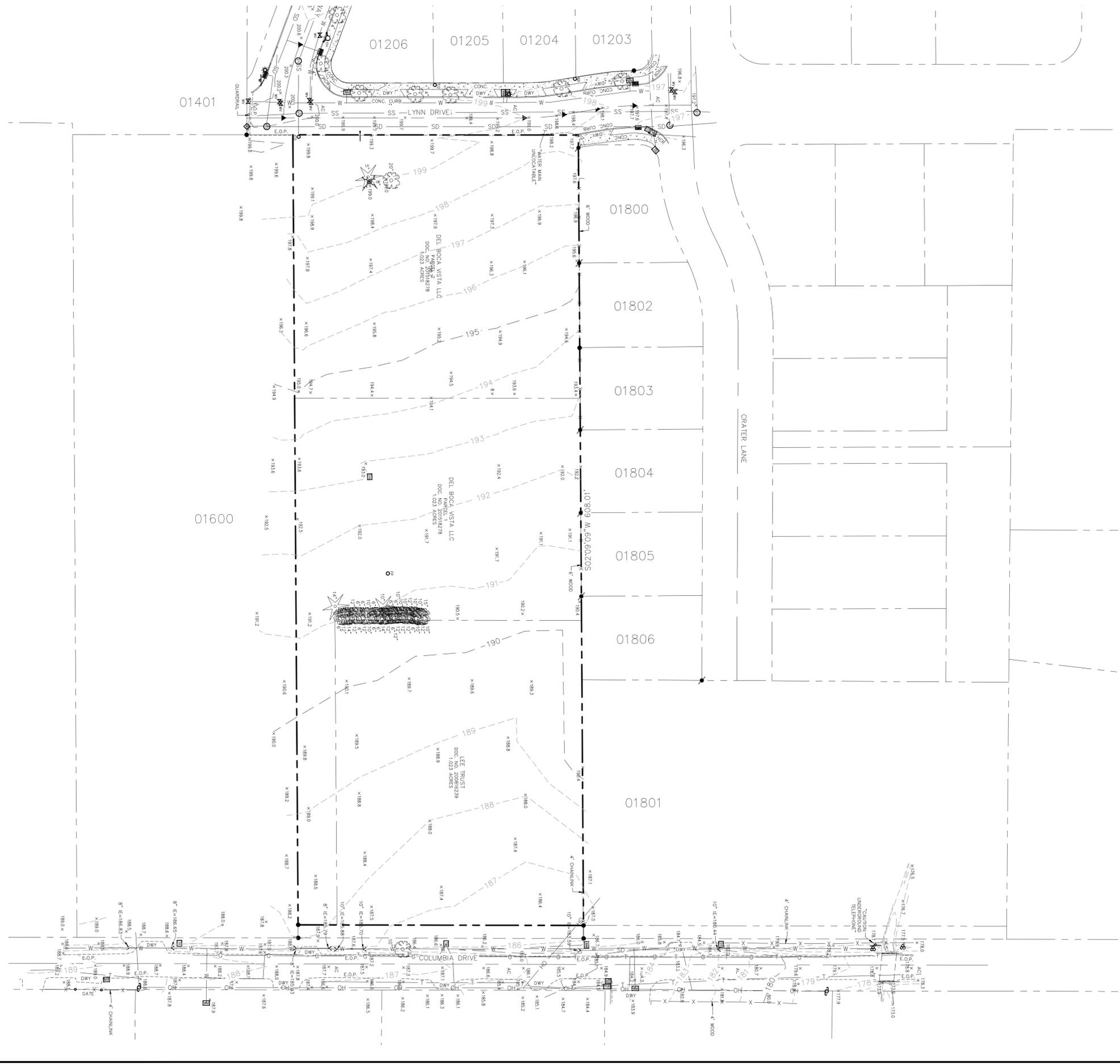
COVER SHEET

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COLUMBIA ESTATES

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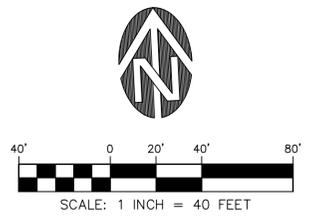
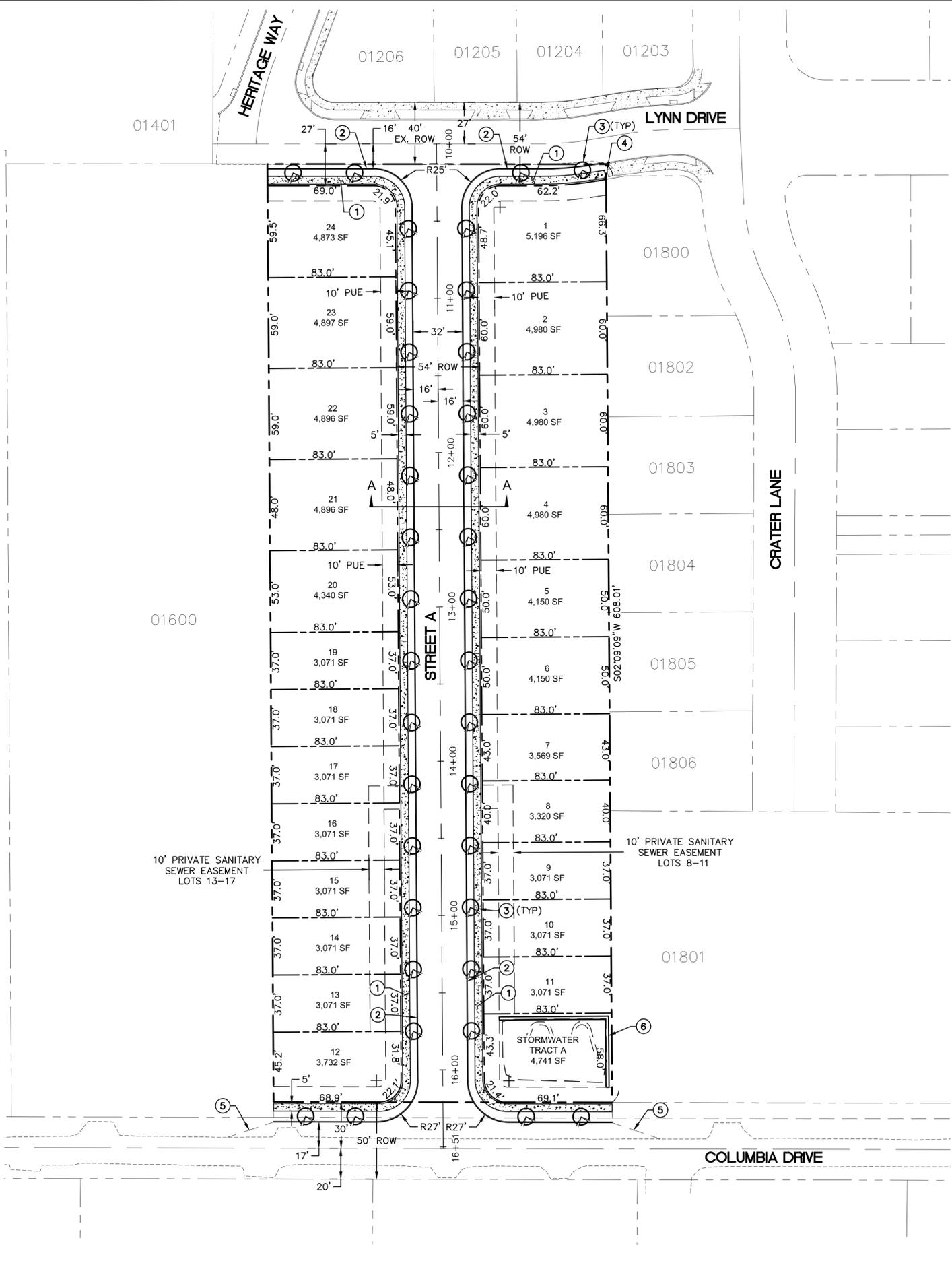
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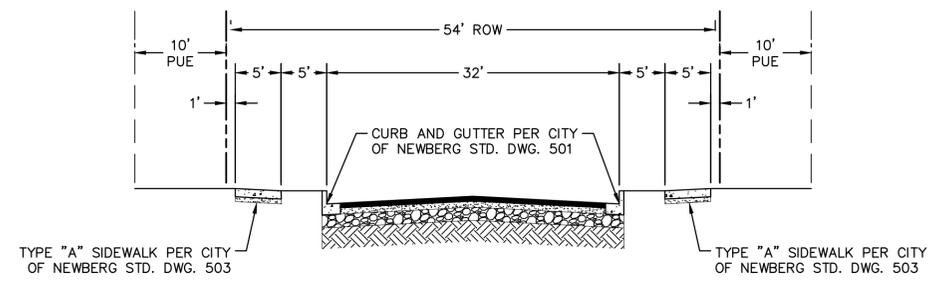
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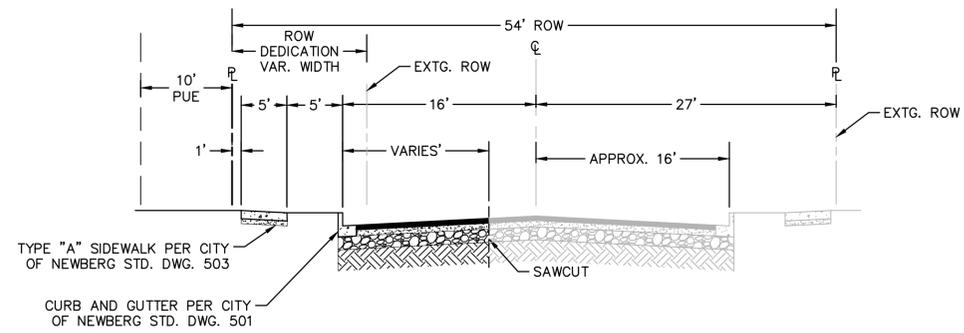


CONSTRUCTION KEYNOTES:

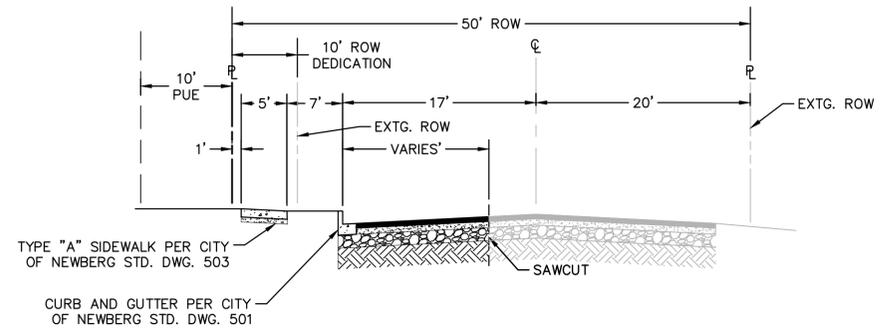
- ① INSTALL 5' CONCRETE SIDEWALK.
- ② INSTALL STANDARD CURB & GUTTER.
- ③ PROPOSED STREET TREE AT 35' - 40' ON CENTER. STREET TREES TO BE LOCATED DURING DESIGN TO AVOID CONFLICTS.
- ④ MATCH EXISTING SIDEWALK, CURB & GUTTER.
- ⑤ AC TAPER TO EXISTING EDGE OF PAVEMENT.
- ⑥ INSTALL RETAINING WALL.



TYPICAL STREET SECTION 'A' - SIDEWALK WITH PLANTER STRIP
SCALE: NOT TO SCALE



TYPICAL HALF STREET SECTION - LYNN DRIVE
SCALE: NOT TO SCALE



TYPICAL HALF STREET SECTION - COLUMBIA DRIVE
SCALE: NOT TO SCALE

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COLUMBIA ESTATES
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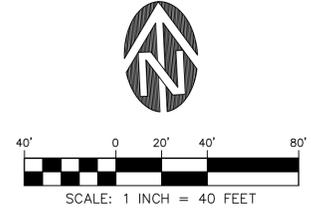
SITE PLAN / PRELIMINARY PLAN

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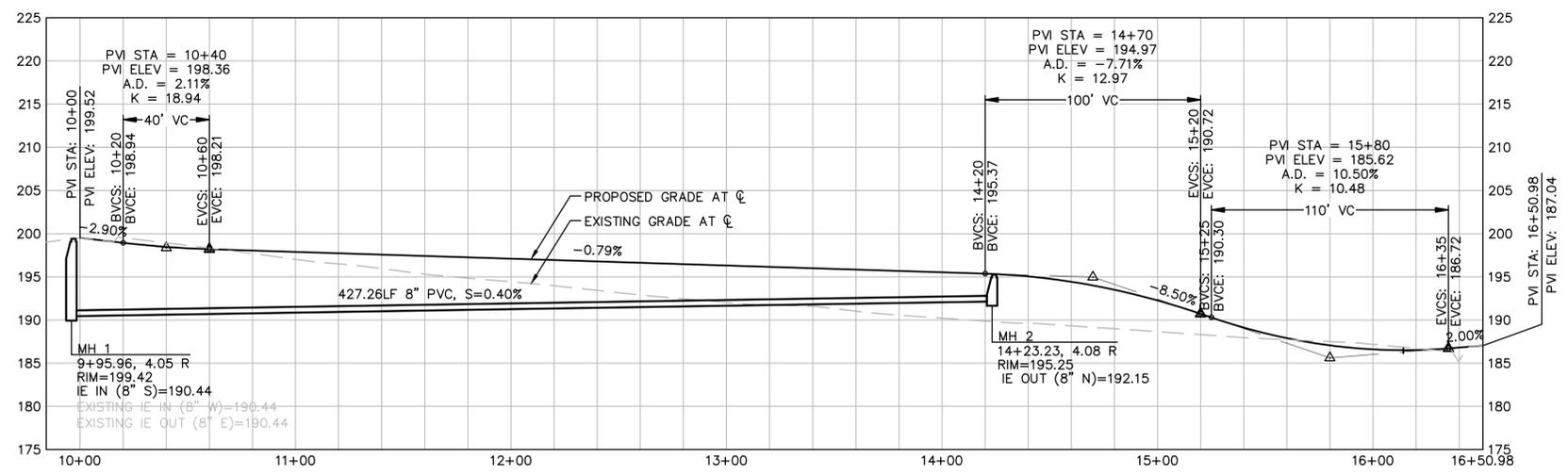
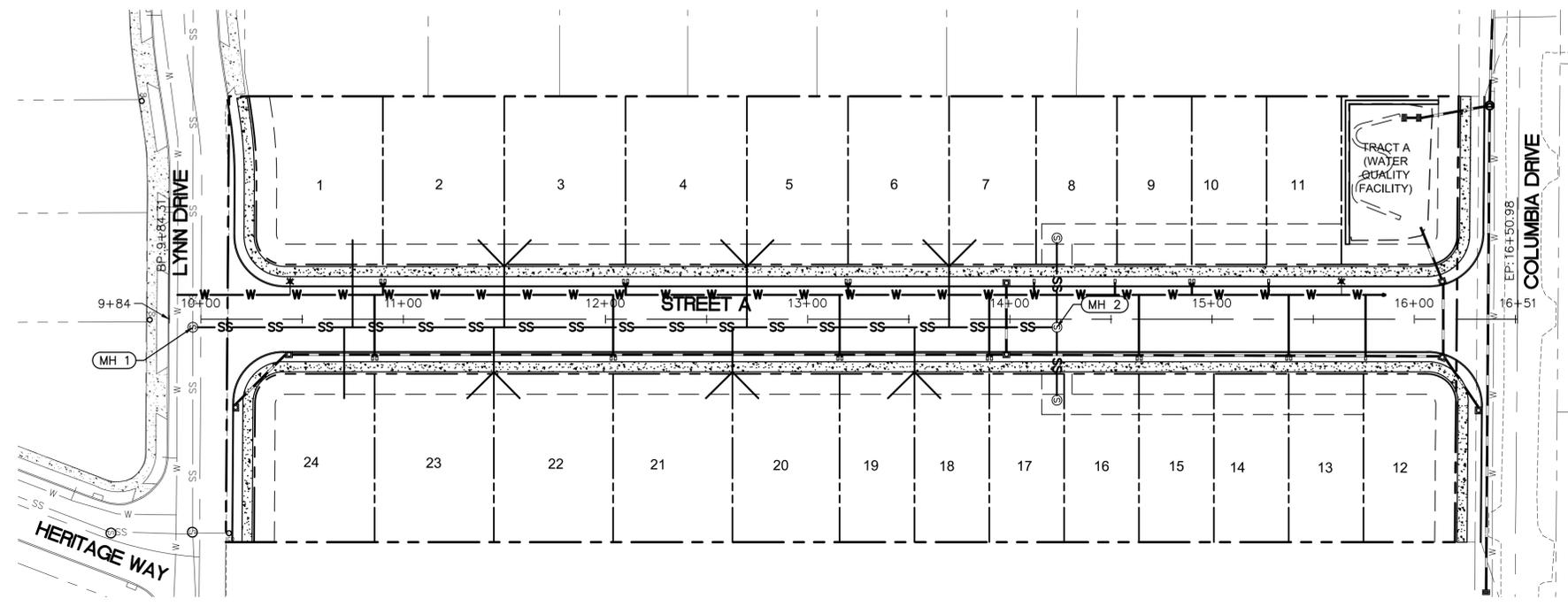
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CONSTRUCTION KEYNOTES:

- ① INSTALL 5' CONCRETE SIDEWALK.
- ② INSTALL STANDARD CURB & GUTTER.
- ③ INSTALL 4.5' LANDSCAPE.
- ④ MATCH EXISTING SIDEWALK, CURB & GUTTER.



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COLUMBIA ESTATES
NEWBERG, OR

**PRELIMINARY STREET AND SANITARY
PLAN AND PROFILE**

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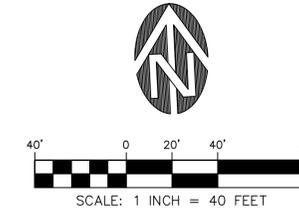
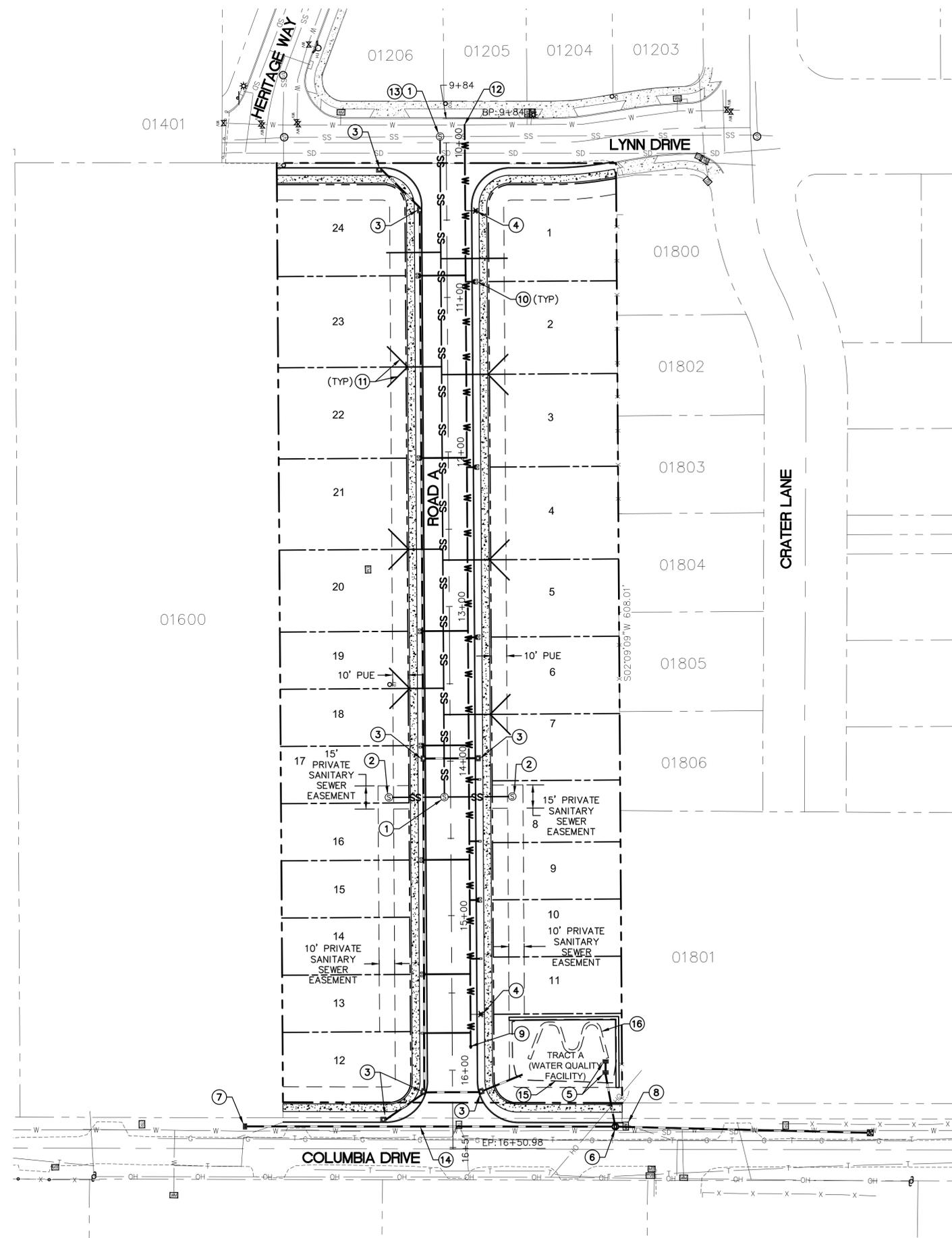
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CONSTRUCTION KEYNOTES:

- ① INSTALL 48" STANDARD SANITARY MANHOLE.
- ② INSTALL PRIVATE SANITARY SEWER MANHOLE. LOTS SOUTH OF MANHOLE TO BE PUMPED USING PRIVATE GRINDER PUMPS TO PRIVATE MANHOLE BEFORE CONNECTION TO PUBLIC MAIN.
- ③ INSTALL INLET MANHOLE.
- ④ INSTALL FIRE HYDRANT.
- ⑤ INSTALL OUTFLOW CONTROL STRUCTURE.
- ⑥ INSTALL 48" STANDARD STORMWATER MANHOLE.
- ⑦ INSTALL DITCH INLET IN EXISTING ROADSIDE SWALE.
- ⑧ RELOCATE WATER SERVICE AS REQUIRED.
- ⑨ INSTALL BLOW OFF.
- ⑩ INSTALL DOMESTIC WATER METER.
- ⑪ INSTALL 4" SANITARY SEWER LATERAL.
- ⑫ CONNECT TO EXISTING WATERMAIN.
- ⑬ CONNECT TO EXISTING SANITARY SEWER.
- ⑭ INSTALL STORM BY-PASS LINE.
- ⑮ APPROXIMATE DETENTION POND PERIMETER.
- ⑯ APPROXIMATE WATER QUALITY SWALE LOCATION.

NOTES:

- 1. ALL LOTS TO UTILIZE CURB WEEPS FOR STORMWATER DRAINAGE.
- 2. ALL SANITARY SEWER MAINS TO BE 8" DIAMETER. ALL SANITARY SEWER LATERALS TO BE 4" DIAMETER.
- 3. STORM MAINS TO BE A MINIMUM OF 12" DIAMETER.
- 4. WATER MAINS TO BE 8" DIAMETER.
- 5. ON SITE LIDA INFILTRATION FACILITIES TO BE UTILIZED ON A MINIMUM OF 3 LOTS PER THE PRELIMINARY STORMWATER REPORT. FINAL STORMWATER REPORT WILL IDENTIFY THE ACTUAL NUMBER OF LIDA FACILITIES REQUIRED.

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COLUMBIA ESTATES
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PRELIMINARY UTILITY PLAN

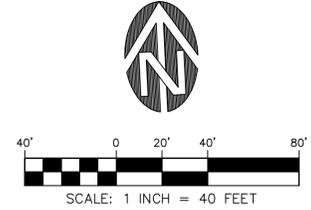
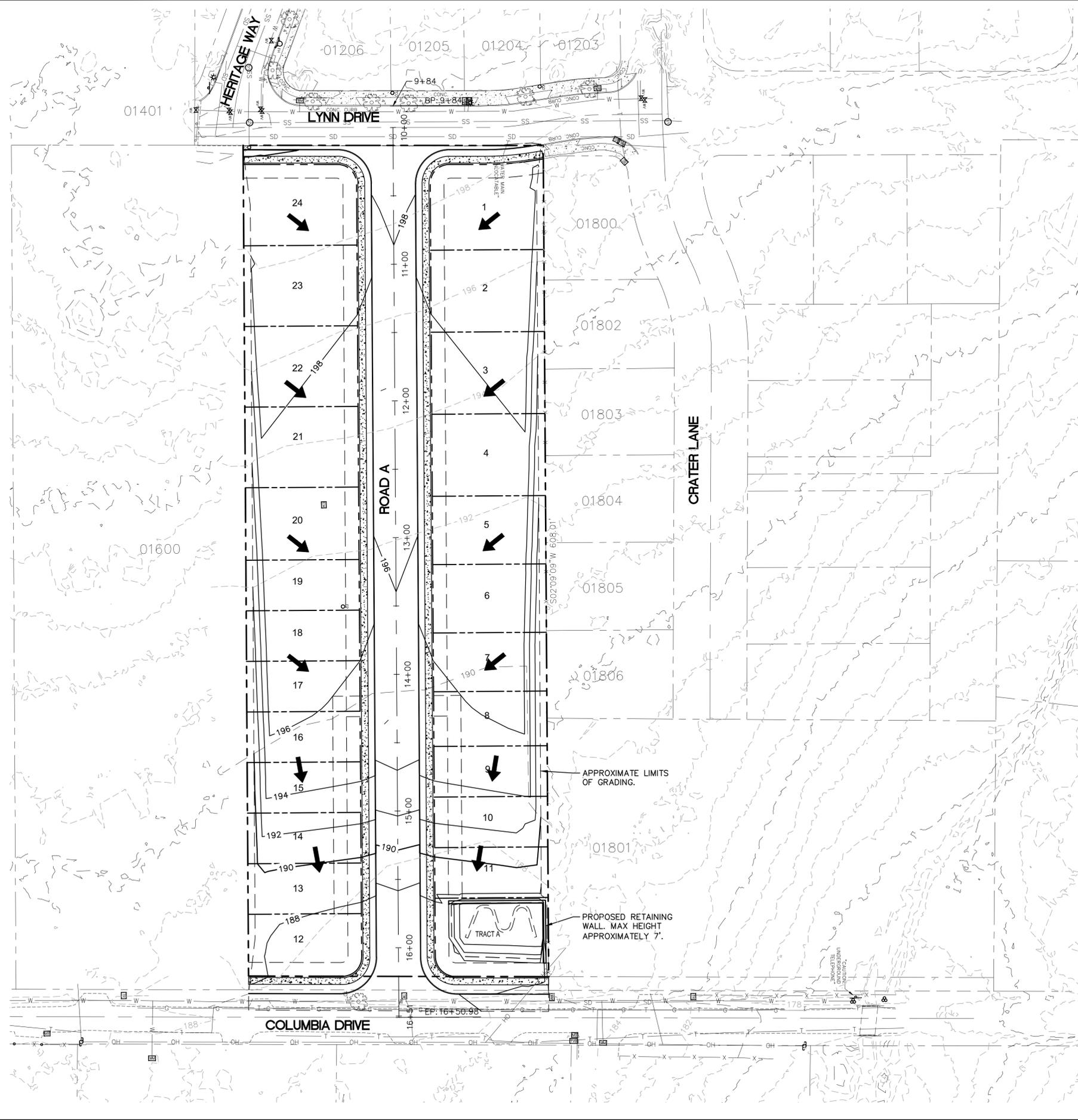
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NOTE:

1. CONTOURS ON ADJACENT PROPERTIES OBTAINED FROM AVAILABLE NOAA LIDAR DATA.
2. PROPOSED LOT DRAINAGE TO SLOPE TO DRAIN TO ROAD A. SEE PROPOSED SLOPE ARROWS FOR ADDITIONAL INFORMATION.

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COLUMBIA ESTATES
NEWBERG, OR

PRELIMINARY GRADING PLAN

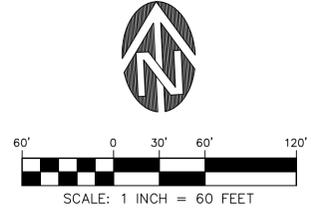
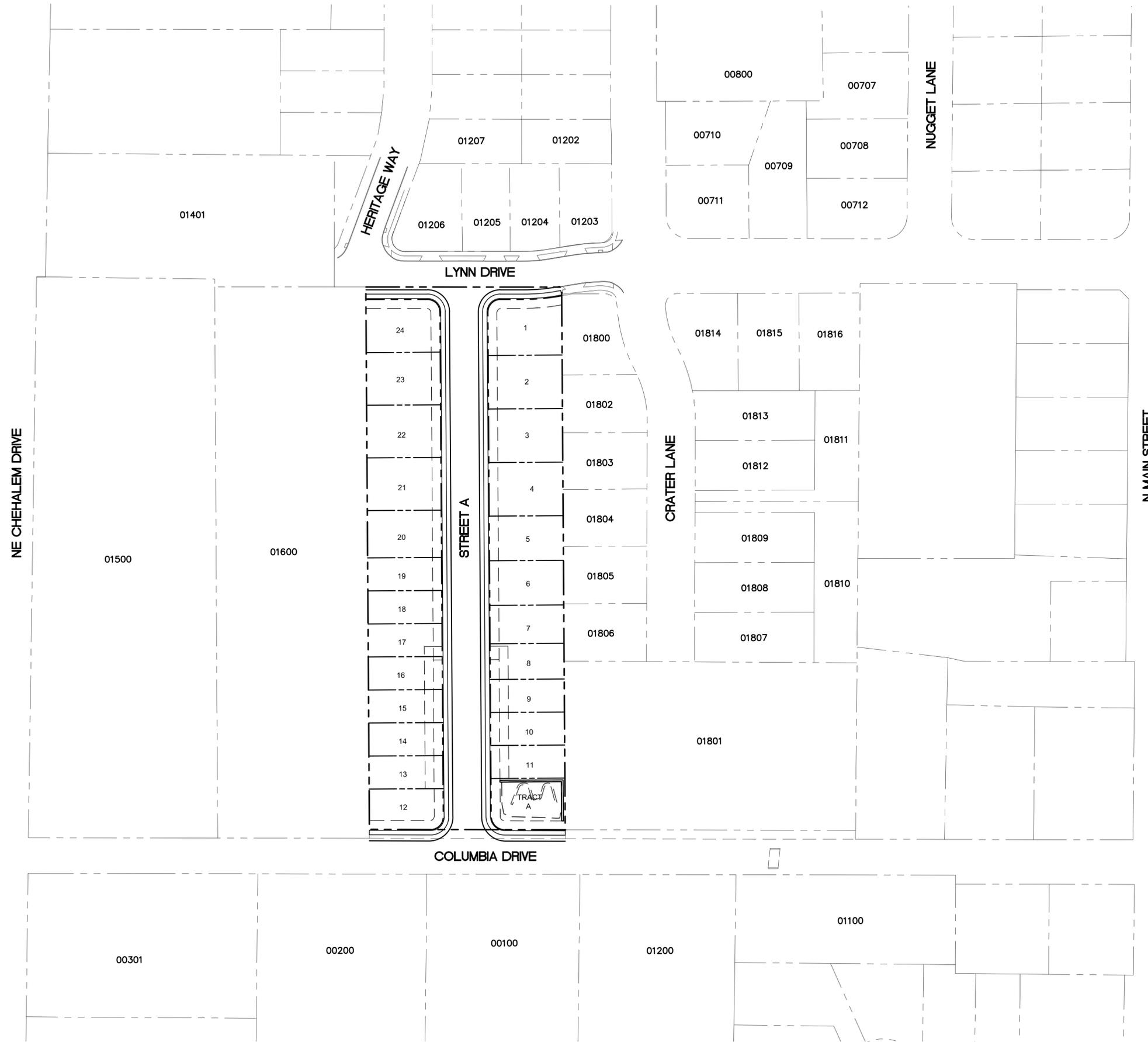
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COLUMBIA ESTATES

NEWBERG, OR

FUTURE STREETS PLAN

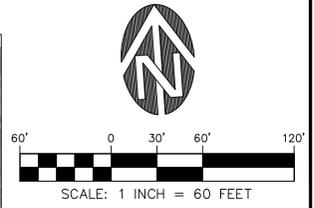
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COLUMBIA ESTATES
NEWBERG, OR
SURROUNDING DEVELOPMENT

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JOB NO.
2657-001

Columbia Estates Subdivision

Exhibit D

Stormwater Drainage Report

COLUMBIA ESTATES PRELIMINARY STORMWATER NARRATIVE

Newberg, Oregon

For:
Del Boca Vista LLC
P.O. Box 486
Newberg, Oregon 97132

Prepared By:
Westlake Consultants Inc.
15115 SW Sequoia Parkway, Suite 150
Tigard, OR 97224
Phone: (503) 684-0652
Fax: (503) 624-0157

June 15th, 2016
WCI #2657-001



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 City of Newberg Private/Public Water Quality & Quantity Treatment Detail No. 453 5

 City of Newberg Vegetated Swale Detail No. 460 5

 City of Newberg Outflow Control Structure Detail No. 417 5

 City of Newberg Oriface Plate and Guide Detail No. 418 5

 Geotechnical Report Columbia Drive subdivision by Rapid Soil Solutions LLC 5

Introduction/Purpose:

The proposed project is a 24 lot single family detached residential subdivision. The site layout runs north and south and is located between existing Lynn Drive Columbia Drive.

Stormwater will be collected by catch basins conveyed through a pipe network to a regional water quality and quantity facility. Orifices will be set to release post-developed peak flows to pre-developed rates. Stormwater leaves the site at the southeast property corner and will be piped to an existing roadside ditch to the east of the subject property.

The purpose of this preliminary Stormwater Report is to demonstrate compliance with City of Newberg drainage requirements and design criteria.

Jurisdictional Standards:

The stormwater management facility was designed according to the requirements set forth in “2015 Public Works Design and Construction Standards - City of Newberg, dated August 2015”. The on-site stormwater management facility will released peak post-developed flows to pre-developed peak flow rates for the ½ of the 2, 2, 10, and 25 year, 24 hour runoff events. Water quality facilities will be designed to treat the water quality storm of 1.0 inch in 24 hours with an average storm return period of 96 hours.

Stormwater Management Calculations:

Pre-Developed:

Total Site Area = 133,731 sf = 3.07 acres
 Removal of On-site area not detained = 1,129 sf = 0.03 acres
 Additional Off-site Area = 1520.01 sf = 0.03 acres
 → Effective Site Area = 3.07 – 0.03 + 0.03 = 3.07 acres
 Impervious Area Total = 0.0 acres, CN = 98
 Pervious Area = 3.07 acres, C/D soils → CN = 80

Table -1: Pre-Developed Peak Flow Rates

DESIGN STORM EVENT	DEPTH (IN)	PEAK FLOW RATE (CFS)
½ of the 2 Year	1.25	0.04
2 Year	2.5	0.37
10 Year	3.5	0.83
25 Year	4.0	1.08

Post-Developed:

Total Site Area = 133,731 sf = 3.07 acres
 Removal of On-site area not detained = 1,129 sf = 0.03 acres
 Additional Off-site Area = 1520.01 sf = 0.03 acres
 → Effective Site Area = 3.07 – 0.03 + 0.03 = 3.07 acres
 Impervious Area Total = 2.24 acres, CN = 98

- Sidewalk, Curbs, and Street = 26,981 sf = 0.62 acres, CN = 98
- Houses = 24 * 2,877 sf = 69,048 sf = 1.59 acres, CN = 98
- Additional Off-site Area = 1,520 sf = 0.03 acres, CN = 98

Pervious Area Total = 3.07 acres – 2.24 acres = 0.83 acres, CN = 61

Table -2: Post-Developed Peak Flow Rates

DESIGN STORM EVENT	DEPTH (IN)	INFILTRATION LOTS PEAK FLOW RATE (CFS)	REST OF THE DEVELOPMENT PEAK FLOW RATE (CFS)	TOTAL DEVELOPED PEAK FLOW RATE (CFS)
½ of the 2 Year	1.25	0.06	0.55	0.61
2 Year	2.5	0.12	1.18	1.30
10 Year	3.5	0.15	1.68	1.83
25 Year	4.0	0.18	1.97	2.15

Water Quality Calculations:

A vegetated swale will be utilized to meet water quality design criteria. The swale will be located running along the bottom of the detention pond. Design of the vegetated swale is based on the requirements set forth in 2015 Public Works Design and Construction Standards - City of Newberg, dated August 2015, standard detail No. 460. A 2.0 wide swale with 100.0 LF is required to treat the anticipated water quality flow.

Detention Calculations:

A regional infiltration/detention basin as well as three individual lot infiltration planters will be utilized to meet the flow control criteria. Individual planter infiltration footprints were calculated using standard detail No. 451. The infiltration rates were determined using the EPA falling head method. The rate calculated near Lynn Drive was 6 in/hr and for the detention facility the rate was reported as 1.7 in/hr. A factor of safety of 2 was utilized in the HydroCAD model for exfiltration into the subsoils. For the flow control structure the maximum orifice size is 6” based on standard detail No. 417 and No. 418.

Table -3: Infiltration/Detention Facility Peak Flow Release Rates

DESIGN STORM EVENT	INFILTRATION		PRE-DEVELOPED PEAK FLOW RATE (CFS)	POST-DEVELOPED RELEASED FLOW RATE (CFS)	MEET MAX. RELEASE RATE ?
	PLANTER (CFS) THREE LOTS	POND (CFS)			
½ of the 2 Year	0.03	0.04	0.04	0.04	YES!
2 Year	0.03	0.04	0.37	0.37	YES!
10 Year	0.03	0.05	0.83	0.83	YES!
25 Year	0.03	0.05	1.08	1.08	YES!

Computer Modeling:

The analysis of the stormwater conditions was completed using HydroCAD 10. This program uses site conditions, such as soil types, storm characteristics, and impervious areas, to determine runoff rates and volumes for a site for different storm events. A Type-1A storm event was modeled with a ½ of the 2, 2, 10 and 25 year storm events. Rain depths for 24-hour storms are based on *Table 4.2 Rainfall Depths*.

The United States Department of Agriculture Natural Resources Conservation Service (NRCS) websoil survey was utilized to determine the hydrological soil group for the project site. The site falls within hydrological soils group C/D.
<http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>

Summary:

The proposed water quantity and quality facilities will meet City of Newberg Stormwater Management Manual standards. A vegetated water quality swale will treat the water and an infiltration/detention pond in conjunction with individual lot infiltration planters will detain post-developed peak flow rates to pre-developed peak flow rates for ½ of the 2, 2, 10, and 25 year design storms.

Appendix:

Developed Site Map with Impervious Areas

Vegetated Swale Calculations

HydroCAD Report

NRCS Soils Report

City of Newberg LIDA Sizing Form Detail No. 451

City of Newberg Private/Public Water Quality & Quantity Treatment Detail No. 453

City of Newberg Vegetated Swale Detail No. 460

City of Newberg Outflow Control Structure Detail No. 417

City of Newberg Oriface Plate and Guide Detail No. 418

Geotechnical Report Columbia Drive subdivision by Rapid Soil Solutions LLC

BIO-FILTRATION SWALE DESIGN - CITY OF NEWBERG

Location: COLUMBIA ESTATES

Date: 6/10/2016

Job #: 2657-001

Water Quality Flow:

A = 94,525 sf
I = 1 inches
WQF = 0.09 cfs

Swale Design Data:

Q = 0.09 Design flow rate (c.f.s.)
n = 0.24 manning's n
S = 0.005 longitudinal slope of swale (ft/ft)
b = 2.00 width of bottom (ft.)
Z = 4.00 side slope (ft/ft)

Solve for flow depth by trial and error:

y (ft)	b (ft)	T (ft)
0.2120	1.92	3.62
0.2100	1.97	3.65
0.2000	2.25	3.85
0.2050	2.11	3.75
0.2090	2.00	3.67

Determine velocity due to design storm:

y = 0.209 found from trial and error
A = 0.59 sq. ft.
V = Q/A
V = 0.15 ft/s < 0.9 ft/s OK

Determine required length:

L=(V)(t)(60)
t = 9.00 min (minimum required)
V = 0.15 ft/s
L = 83.06 Use Minimum Swale Length



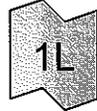
Existing Conditions



Proposed Conditions



Detention Pond



UPPER LOT FLOW



Infiltration Planter



Infiltration Planter



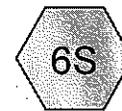
Infiltration Planter



house



house



house



Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
 Runoff by SBUH method, Split Pervious/Imperv.
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing Conditions Runoff Area=3.070 ac 0.00% Impervious Runoff Depth=0.17"
 Flow Length=650' Slope=0.0200 '/' Tc=25.4 min CN=80/0 Runoff=0.04 cfs 0.044 af

Subcatchment 2S: Proposed Conditions Runoff Area=2.870 ac 71.08% Impervious Runoff Depth=0.74"
 Tc=5.0 min CN=61/98 Runoff=0.55 cfs 0.176 af

Subcatchment 3S: house Runoff Area=2,877 sf 100.00% Impervious Runoff Depth=1.03"
 Tc=5.0 min CN=0/98 Runoff=0.02 cfs 0.006 af

Subcatchment 4S: house Runoff Area=2,877 sf 100.00% Impervious Runoff Depth=1.03"
 Tc=5.0 min CN=0/98 Runoff=0.02 cfs 0.006 af

Subcatchment 6S: house Runoff Area=2,877 sf 100.00% Impervious Runoff Depth=1.03"
 Tc=5.0 min CN=0/98 Runoff=0.02 cfs 0.006 af

Pond 1P: Detention Pond Peak Elev=182.59' Storage=2,617 cf Inflow=0.57 cfs 0.178 af
 Discarded=0.04 cfs 0.089 af Primary=0.04 cfs 0.088 af Outflow=0.08 cfs 0.178 af

Pond 2P: Infiltration Planter Peak Elev=198.54' Storage=5 cf Inflow=0.02 cfs 0.006 af
 Discarded=0.01 cfs 0.005 af Primary=0.01 cfs 0.001 af Outflow=0.02 cfs 0.006 af

Pond 5P: Infiltration Planter Peak Elev=198.54' Storage=5 cf Inflow=0.02 cfs 0.006 af
 Discarded=0.01 cfs 0.005 af Primary=0.01 cfs 0.001 af Outflow=0.02 cfs 0.006 af

Pond 7P: Infiltration Planter Peak Elev=198.54' Storage=5 cf Inflow=0.02 cfs 0.006 af
 Discarded=0.01 cfs 0.005 af Primary=0.01 cfs 0.001 af Outflow=0.02 cfs 0.006 af

Link 1L: UPPER LOT FLOW Inflow=0.02 cfs 0.002 af
 Primary=0.02 cfs 0.002 af

Total Runoff Area = 6.138 ac Runoff Volume = 0.237 af Average Runoff Depth = 0.46"
63.54% Pervious = 3.900 ac 36.46% Impervious = 2.238 ac

Summary for Subcatchment 1S: Existing Conditions

Runoff = 0.04 cfs @ 17.34 hrs, Volume= 0.044 af, Depth= 0.17"

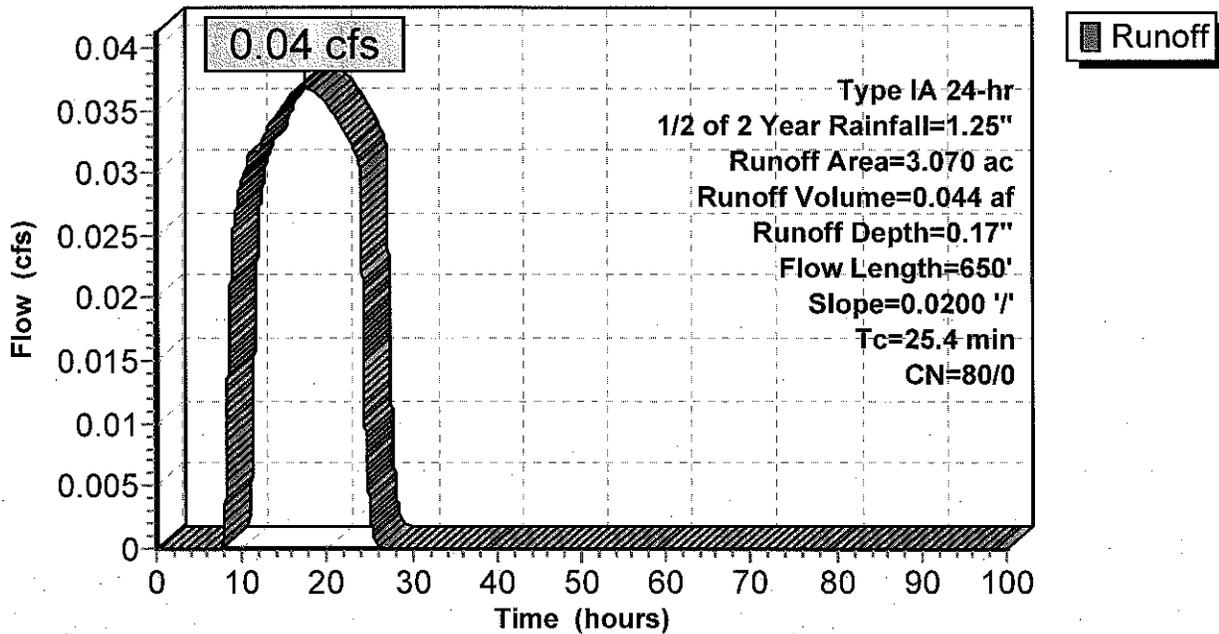
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 1/2 of 2 Year Rainfall=1.25"

Area (ac)	CN	Description
3.070	80	Pasture/grassland/range, Good, HSG D
3.070	80	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0200	0.10		Sheet Flow, Sheet Flow
					Grass: Dense n= 0.240 P2= 2.50"
9.3	550	0.0200	0.99		Shallow Concentrated Flow, Shallow Concentrated Flow
					Short Grass Pasture Kv= 7.0 fps
25.4	650	Total			

Subcatchment 1S: Existing Conditions

Hydrograph



Summary for Subcatchment 2S: Proposed Conditions

Runoff = 0.55 cfs @ 7.89 hrs, Volume= 0.176 af, Depth= 0.74"

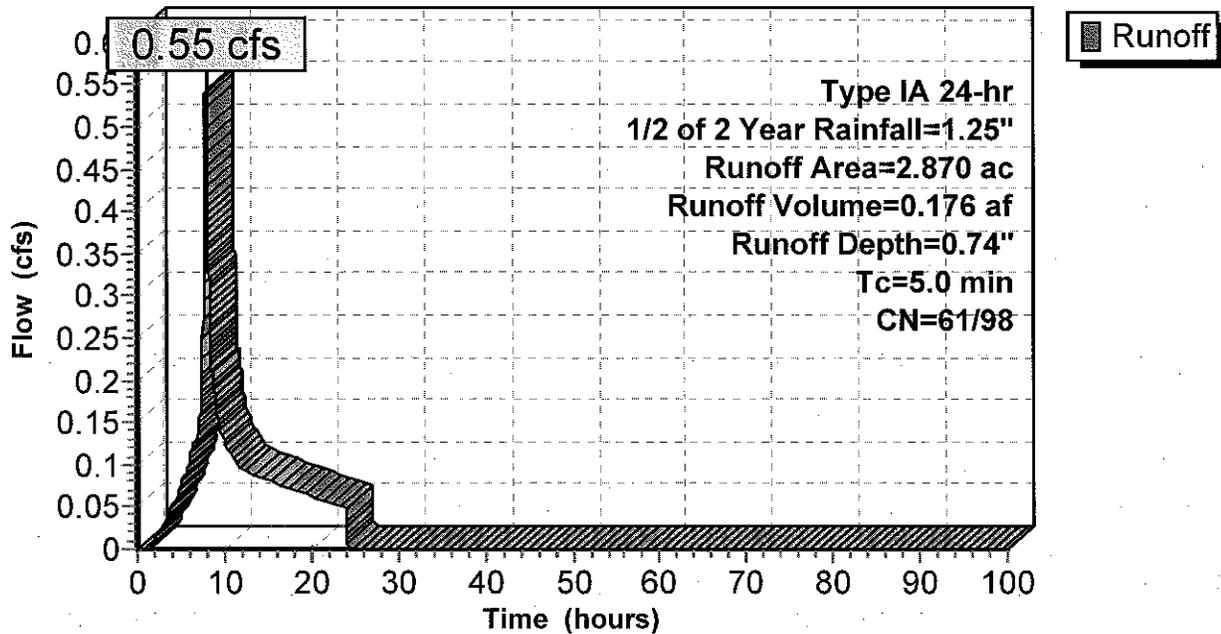
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 1/2 of 2 Year Rainfall=1.25"

Area (ac)	CN	Description
* 2.040	98	Impervious Area
0.830	61	>75% Grass cover, Good, HSG B
2.870	87	Weighted Average
0.830	61	28.92% Pervious Area
2.040	98	71.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 2S: Proposed Conditions

Hydrograph



Summary for Subcatchment 3S: house

Runoff = 0.02 cfs @ 7.89 hrs, Volume= 0.006 af, Depth= 1.03"

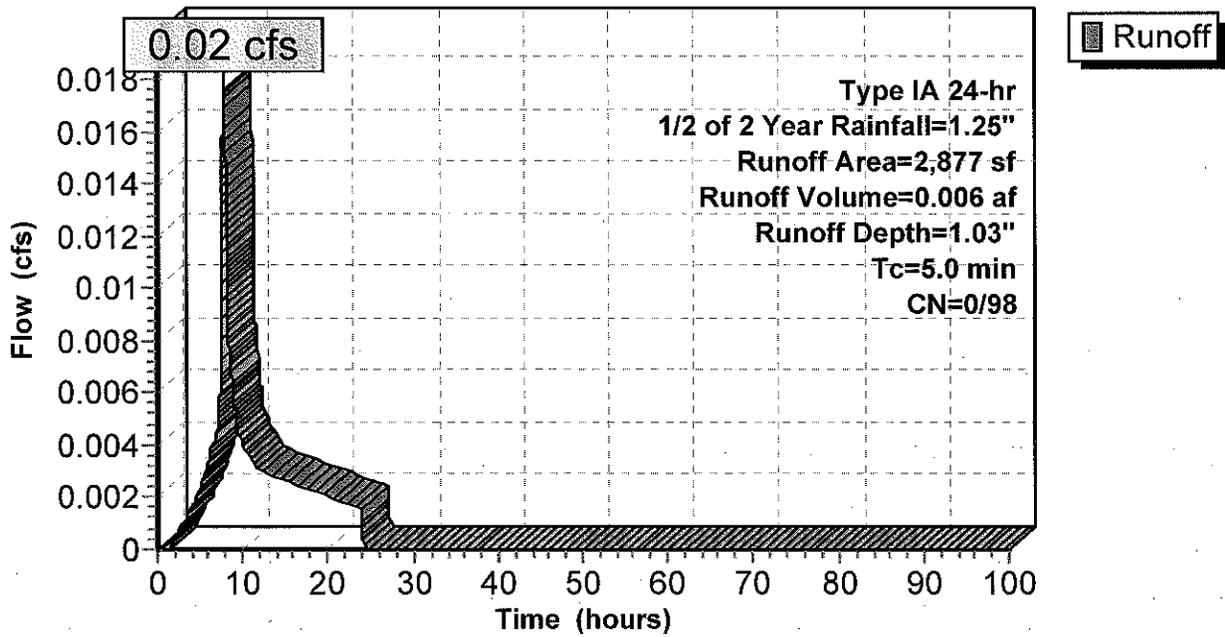
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 1/2 of 2 Year Rainfall=1.25"

Area (sf)	CN	Description
2,877	98	Water Surface, HSG C
2,877	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 3S: house

Hydrograph



Summary for Subcatchment 4S: house

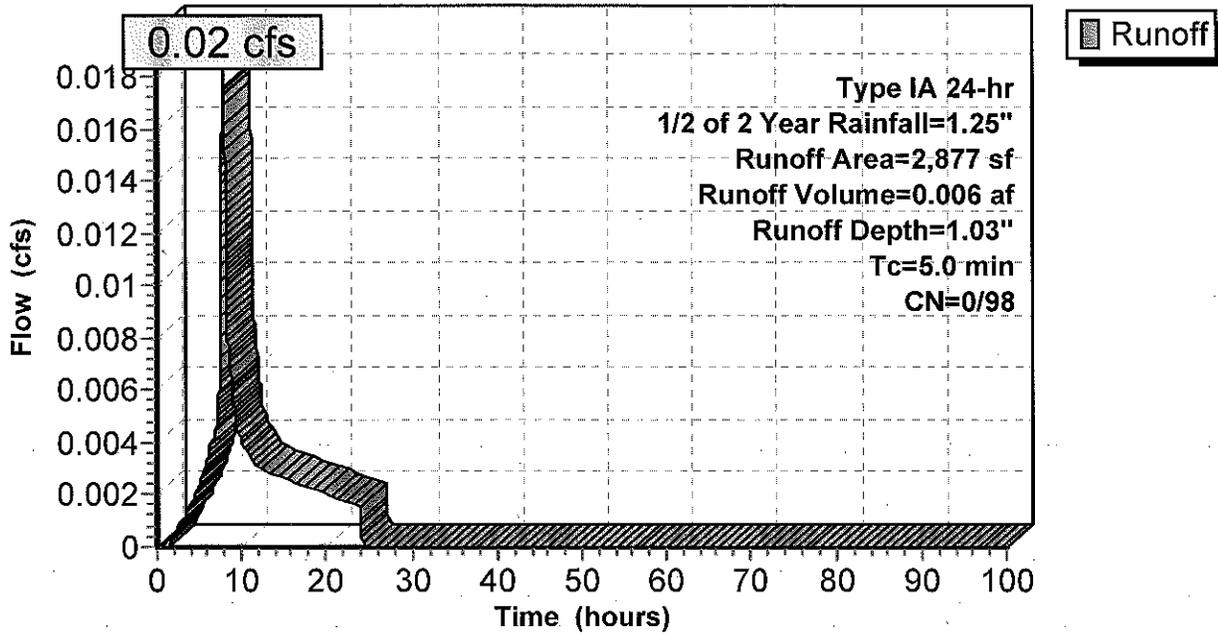
Runoff = 0.02 cfs @ 7.89 hrs, Volume= 0.006 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 1/2 of 2 Year Rainfall=1.25"

Area (sf)	CN	Description
2,877	98	Water Surface, HSG C
2,877	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 4S: house
 Hydrograph**



Summary for Subcatchment 6S: house

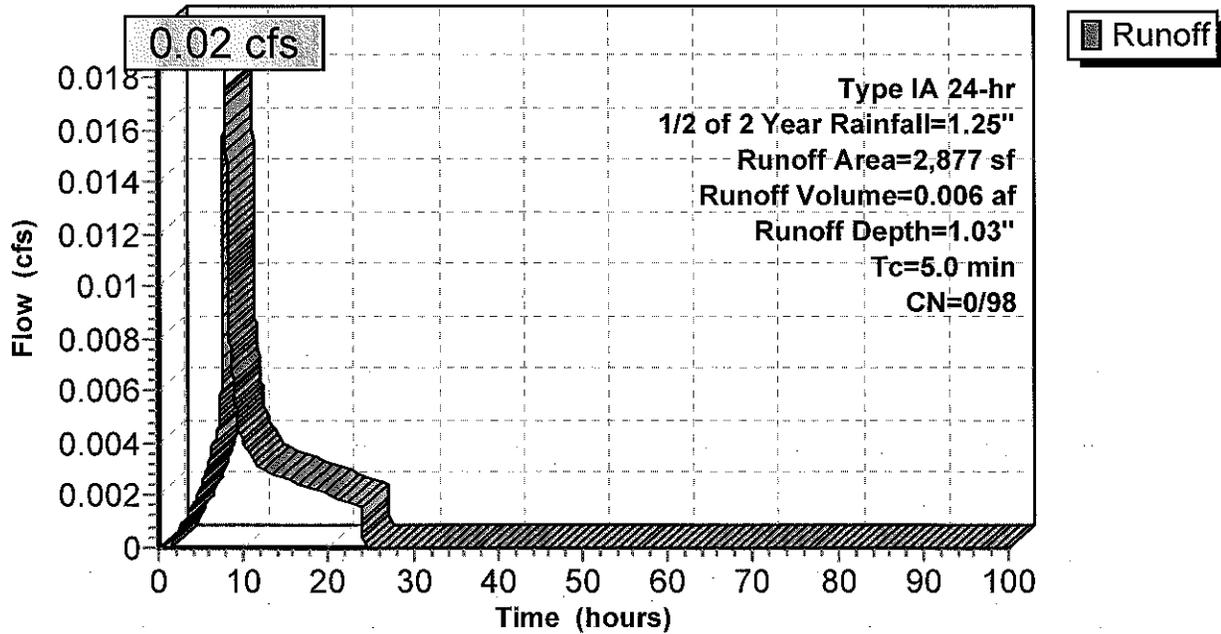
Runoff = 0.02 cfs @ 7.89 hrs, Volume= 0.006 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 1/2 of 2 Year Rainfall=1.25"

Area (sf)	CN	Description
2,877	98	Water Surface, HSG C
2,877	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 6S: house
 Hydrograph**



Summary for Pond 1P: Detention Pond

Inflow Area = 3.068 ac, 72.95% Impervious, Inflow Depth = 0.69" for 1/2 of 2 Year event
 Inflow = 0.57 cfs @ 7.91 hrs, Volume= 0.178 af
 Outflow = 0.08 cfs @ 14.35 hrs, Volume= 0.178 af, Atten= 85%, Lag= 386.7 min
 Discarded = 0.04 cfs @ 14.35 hrs, Volume= 0.089 af
 Primary = 0.04 cfs @ 14.35 hrs, Volume= 0.088 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 182.59' @ 14.35 hrs Surf.Area= 1,868 sf Storage= 2,617 cf

Plug-Flow detention time= 389.8 min calculated for 0.177 af (100% of inflow)
 Center-of-Mass det. time= 389.9 min (1,089.7 - 699.9)

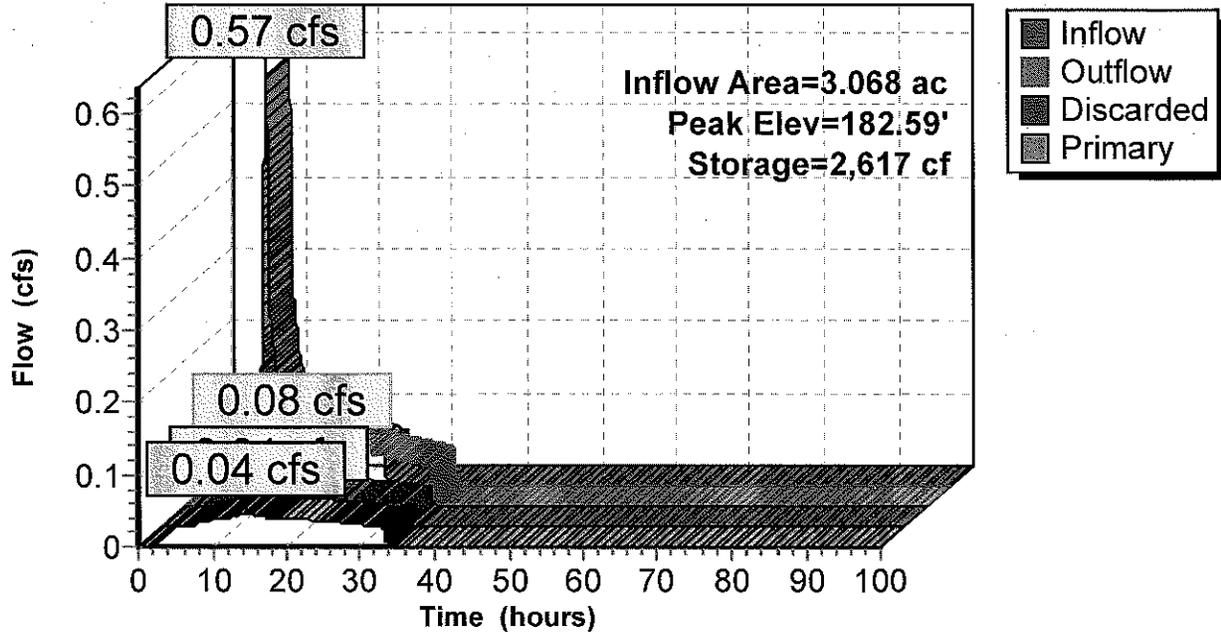
Volume #1	Invert 181.00'	Avail.Storage 7,847 cf	Storage Description Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
181.00	1,391	0	0
182.00	1,723	1,557	1,557
183.00	1,969	1,846	3,403
184.00	2,220	2,095	5,498
185.00	2,478	2,349	7,847

Device	Routing	Invert	Outlet Devices
#1	Discarded	181.00'	0.900 in/hr Exfiltration over Horizontal area
#2	Primary	179.53'	0.9" Vert. Orifice/Grate C= 0.620
#3	Primary	182.54'	3.4" Vert. Orifice/Grate C= 0.620
#4	Primary	183.73'	4.5" Vert. Orifice/Grate C= 0.620
#5	Primary	184.38'	3.0" Vert. Orifice/Grate C= 0.620

Discarded OutFlow Max=0.04 cfs @ 14.35 hrs HW=182.59' (Free Discharge)
 ↳ **1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.04 cfs @ 14.35 hrs HW=182.59' (Free Discharge)
 ↳ **2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 8.65 fps)
 ↳ **3=Orifice/Grate** (Orifice Controls 0.01 cfs @ 0.79 fps)
 ↳ **4=Orifice/Grate** (Controls 0.00 cfs)
 ↳ **5=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: Detention Pond Hydrograph



Summary for Pond 2P: Infiltration Planter

Inflow Area = 0.066 ac, 100.00% Impervious, Inflow Depth = 1.03" for 1/2 of 2 Year event
 Inflow = 0.02 cfs @ 7.89 hrs, Volume= 0.006 af
 Outflow = 0.02 cfs @ 8.00 hrs, Volume= 0.006 af, Atten= 4%, Lag= 6.6 min
 Discarded = 0.01 cfs @ 7.58 hrs, Volume= 0.005 af
 Primary = 0.01 cfs @ 8.00 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 198.54' @ 8.00 hrs Surf.Area= 130 sf Storage= 5 cf

Plug-Flow detention time= 2.7 min calculated for 0.006 af (100% of inflow)
 Center-of-Mass det. time= 2.7 min (703.5 - 700.8)

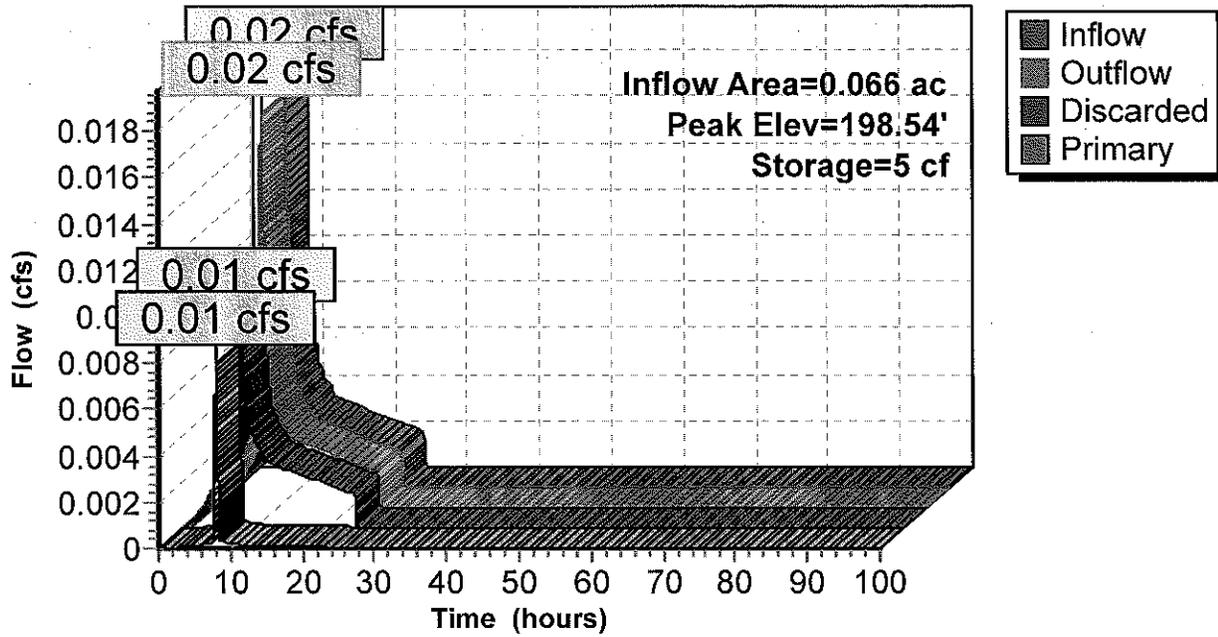
Volume	Invert	Avail.Storage	Storage Description
#1	198.50'	130 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
198.50	130	0	0
199.50	130	130	130

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.50'	3.000 in/hr Exfiltration over Horizontal area
#2	Primary	198.50'	12.0" Vert. Orifice/Grate C= 0.620

Discarded OutFlow Max=0.01 cfs @ 7.58 hrs HW=198.51' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.01 cfs @ 8.00 hrs HW=198.54' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 0.01 cfs @ 0.72 fps)

Pond 2P: Infiltration Planter Hydrograph



Summary for Pond 5P: Infiltration Planter

Inflow Area = 0.066 ac, 100.00% Impervious, Inflow Depth = 1.03" for 1/2 of 2 Year event
 Inflow = 0.02 cfs @ 7.89 hrs, Volume= 0.006 af
 Outflow = 0.02 cfs @ 8.00 hrs, Volume= 0.006 af, Atten= 4%, Lag= 6.6 min
 Discarded = 0.01 cfs @ 7.58 hrs, Volume= 0.005 af
 Primary = 0.01 cfs @ 8.00 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 198.54' @ 8.00 hrs Surf.Area= 130 sf Storage= 5 cf

Plug-Flow detention time= 2.7 min calculated for 0.006 af (100% of inflow)
 Center-of-Mass det. time= 2.7 min (703.5 - 700.8)

Volume	Invert	Avail.Storage	Storage Description
#1	198.50'	130 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

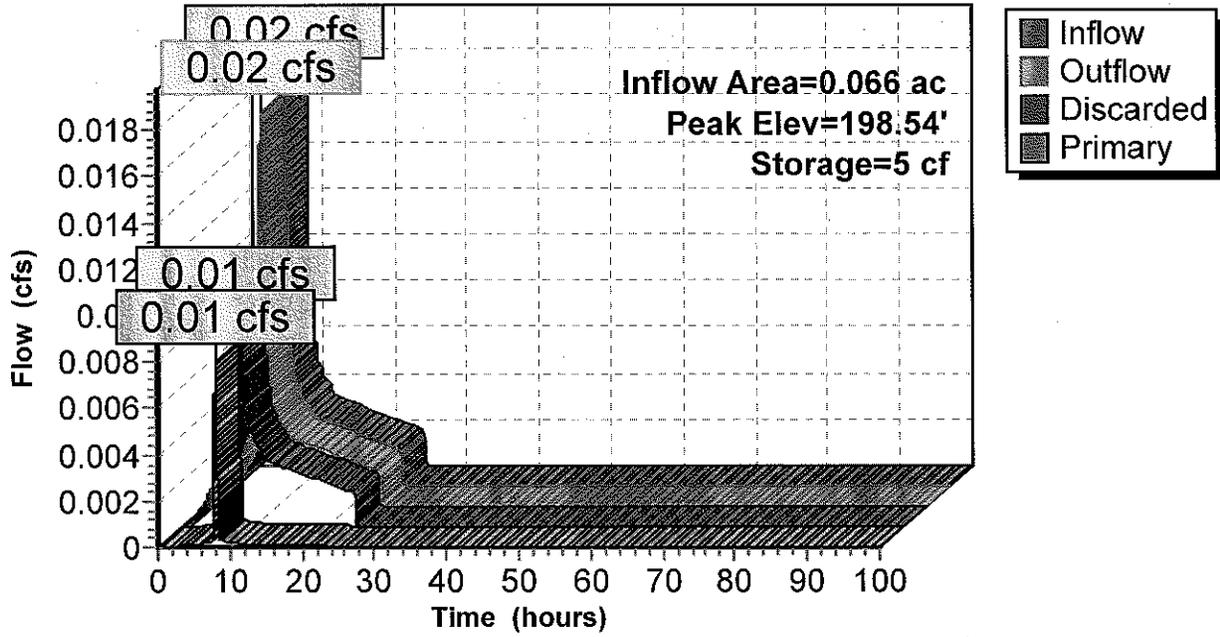
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
198.50	130	0	0
199.50	130	130	130

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.50'	3.000 in/hr Exfiltration over Horizontal area
#2	Primary	198.50'	12.0" Vert. Orifice/Grate C= 0.620

Discarded OutFlow Max=0.01 cfs @ 7.58 hrs HW=198.51' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.01 cfs @ 8.00 hrs HW=198.54' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 0.01 cfs @ 0.72 fps)

Pond 5P: Infiltration Planter Hydrograph



Summary for Pond 7P: Infiltration Planter

Inflow Area = 0.066 ac, 100.00% Impervious, Inflow Depth = 1.03" for 1/2 of 2 Year event
 Inflow = 0.02 cfs @ 7.89 hrs, Volume= 0.006 af
 Outflow = 0.02 cfs @ 8.00 hrs, Volume= 0.006 af, Atten= 4%, Lag= 6.6 min
 Discarded = 0.01 cfs @ 7.58 hrs, Volume= 0.005 af
 Primary = 0.01 cfs @ 8.00 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 198.54' @ 8.00 hrs Surf.Area= 130 sf Storage= 5 cf

Plug-Flow detention time= 2.7 min calculated for 0.006 af (100% of inflow)
 Center-of-Mass det. time= 2.7 min (703.5 - 700.8)

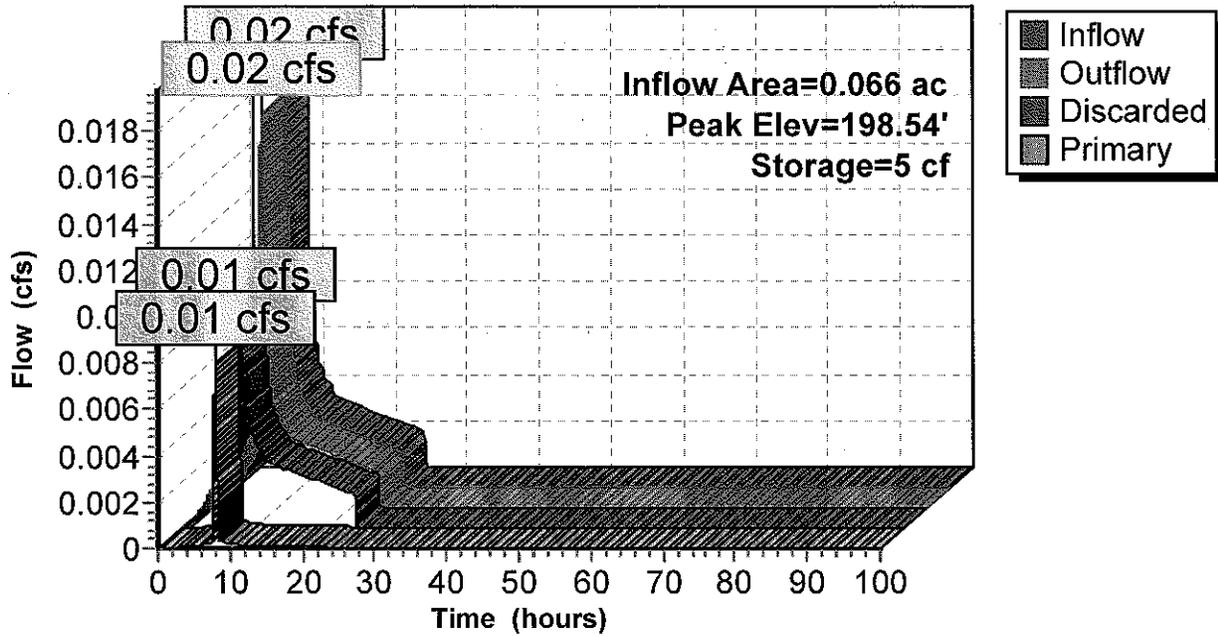
Volume #1	Invert 198.50'	Avail.Storage 130 cf	Storage Description
Custom Stage Data (Prismatic) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
198.50	130	0	0
199.50	130	130	130

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.50'	3.000 in/hr Exfiltration over Horizontal area
#2	Primary	198.50'	12.0" Vert. Orifice/Grate C= 0.620

Discarded OutFlow Max=0.01 cfs @ 7.58 hrs HW=198.51' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.01 cfs @ 8.00 hrs HW=198.54' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 0.01 cfs @ 0.72 fps)

Pond 7P: Infiltration Planter Hydrograph



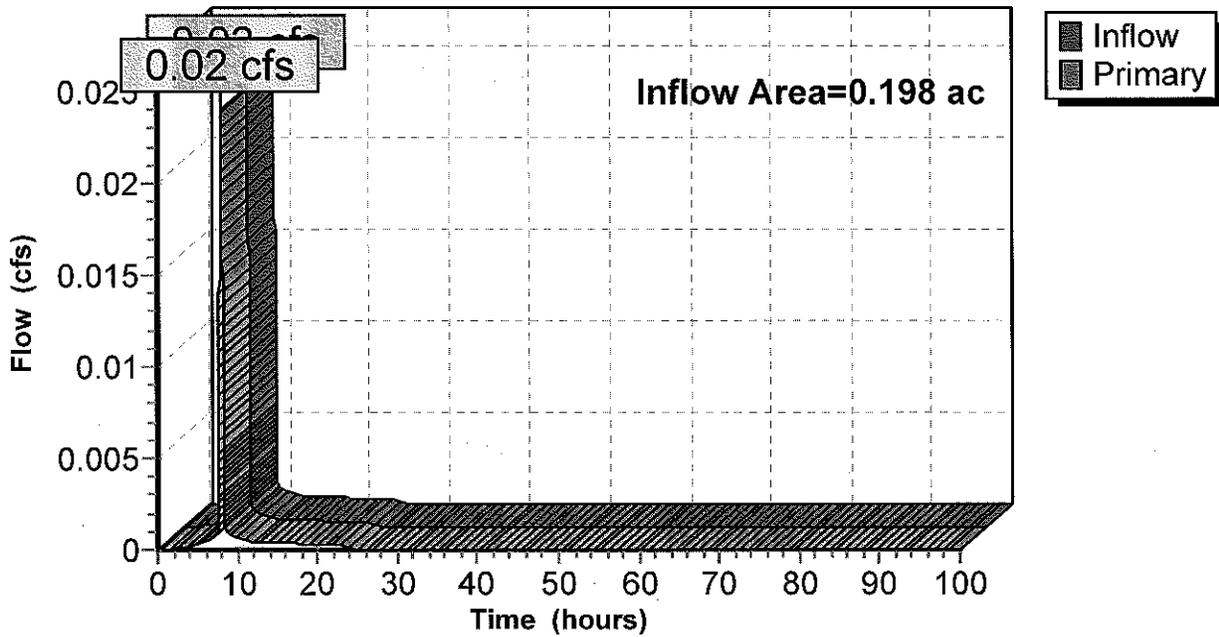
Summary for Link 1L: UPPER LOT FLOW

Inflow Area = 0.198 ac, 100.00% Impervious, Inflow Depth = 0.10" for 1/2 of 2 Year event
Inflow = 0.02 cfs @ 8.00 hrs, Volume= 0.002 af
Primary = 0.02 cfs @ 8.00 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 1L: UPPER LOT FLOW

Hydrograph



Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
 Runoff by SBUH method, Split Pervious/Imperv.
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing Conditions Runoff Area=3.070 ac 0.00% Impervious Runoff Depth=0.89"
 Flow Length=650' Slope=0.0200 '/' Tc=25.4 min CN=80/0 Runoff=0.37 cfs 0.227 af

Subcatchment 2S: Proposed Conditions Runoff Area=2.870 ac 71.08% Impervious Runoff Depth=1.67"
 Tc=5.0 min CN=61/98 Runoff=1.18 cfs 0.400 af

Subcatchment 3S: house Runoff Area=2,877 sf 100.00% Impervious Runoff Depth=2.27"
 Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.012 af

Subcatchment 4S: house Runoff Area=2,877 sf 100.00% Impervious Runoff Depth=2.27"
 Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.012 af

Subcatchment 6S: house Runoff Area=2,877 sf 100.00% Impervious Runoff Depth=2.27"
 Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.012 af

Pond 1P: Detention Pond Peak Elev=183.73' Storage=4,899 cf Inflow=1.26 cfs 0.407 af
 Discarded=0.04 cfs 0.105 af Primary=0.37 cfs 0.302 af Outflow=0.41 cfs 0.407 af

Pond 2P: Infiltration Planter Peak Elev=198.58' Storage=10 cf Inflow=0.04 cfs 0.012 af
 Discarded=0.01 cfs 0.010 af Primary=0.03 cfs 0.002 af Outflow=0.04 cfs 0.012 af

Pond 5P: Infiltration Planter Peak Elev=198.58' Storage=10 cf Inflow=0.04 cfs 0.012 af
 Discarded=0.01 cfs 0.010 af Primary=0.03 cfs 0.002 af Outflow=0.04 cfs 0.012 af

Pond 7P: Infiltration Planter Peak Elev=198.58' Storage=10 cf Inflow=0.04 cfs 0.012 af
 Discarded=0.01 cfs 0.010 af Primary=0.03 cfs 0.002 af Outflow=0.04 cfs 0.012 af

Link 1L: UPPER LOT FLOW Inflow=0.09 cfs 0.007 af
 Primary=0.09 cfs 0.007 af

Total Runoff Area = 6.138 ac Runoff Volume = 0.664 af Average Runoff Depth = 1.30"
63.54% Pervious = 3.900 ac 36.46% Impervious = 2.238 ac

Summary for Subcatchment 1S: Existing Conditions

Runoff = 0.37 cfs @ 8.07 hrs, Volume= 0.227 af, Depth= 0.89"

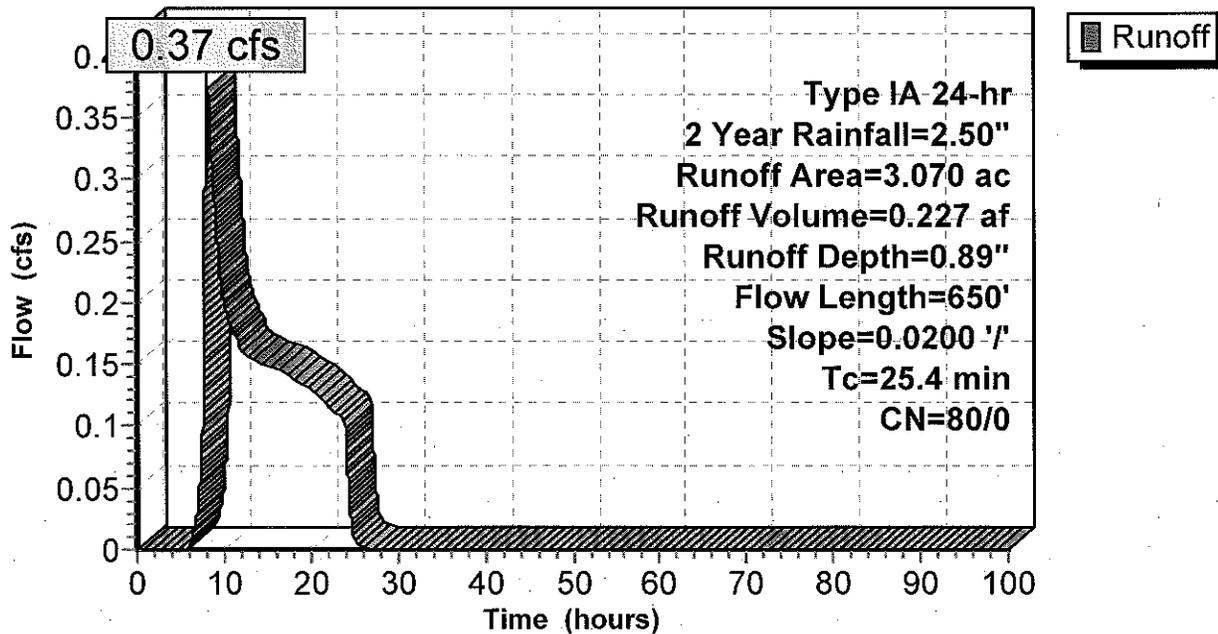
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 2 Year Rainfall=2.50"

Area (ac)	CN	Description
3.070	80	Pasture/grassland/range, Good, HSG D
3.070	80	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0200	0.10		Sheet Flow, Sheet Flow Grass: Dense n= 0.240 P2= 2.50"
9.3	550	0.0200	0.99		Shallow Concentrated Flow, Shallow Concentrated Flow Short Grass Pasture Kv= 7.0 fps
25.4	650	Total			

Subcatchment 1S: Existing Conditions

Hydrograph



Summary for Subcatchment 2S: Proposed Conditions

Runoff = 1.18 cfs @ 7.88 hrs, Volume= 0.400 af, Depth= 1.67"

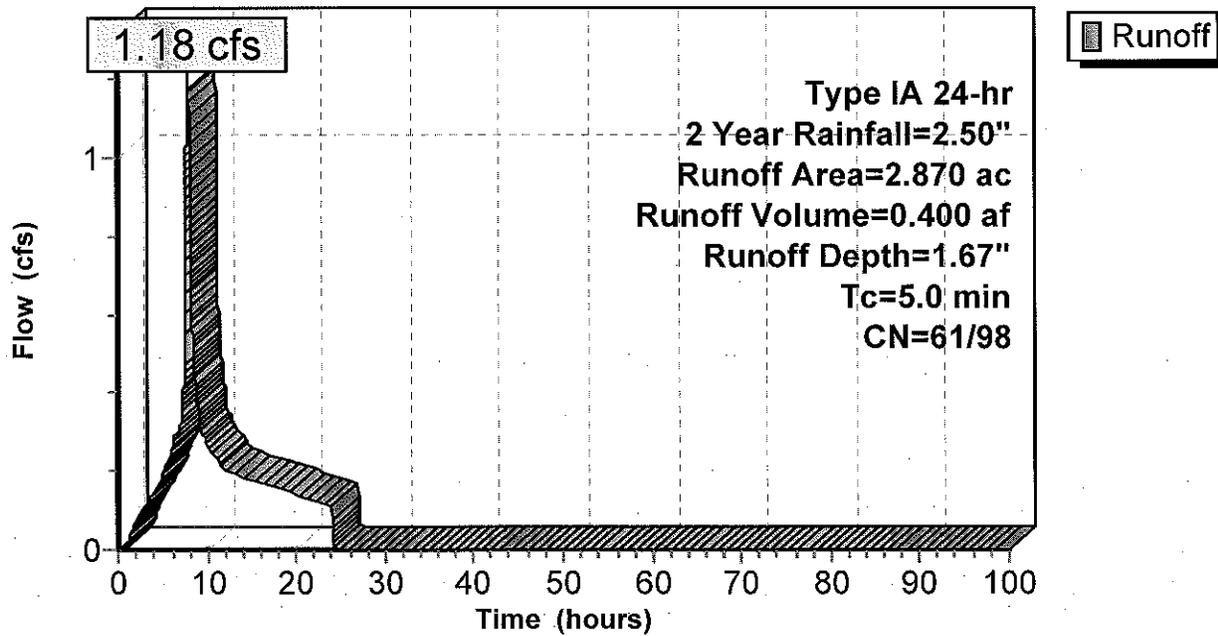
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 2 Year Rainfall=2.50"

Area (ac)	CN	Description
* 2.040	98	Impervious Area
0.830	61	>75% Grass cover, Good, HSG B
2.870	87	Weighted Average
0.830	61	28.92% Pervious Area
2.040	98	71.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 2S: Proposed Conditions

Hydrograph



Summary for Subcatchment 3S: house

Runoff = 0.04 cfs @ 7.88 hrs, Volume= 0.012 af, Depth= 2.27"

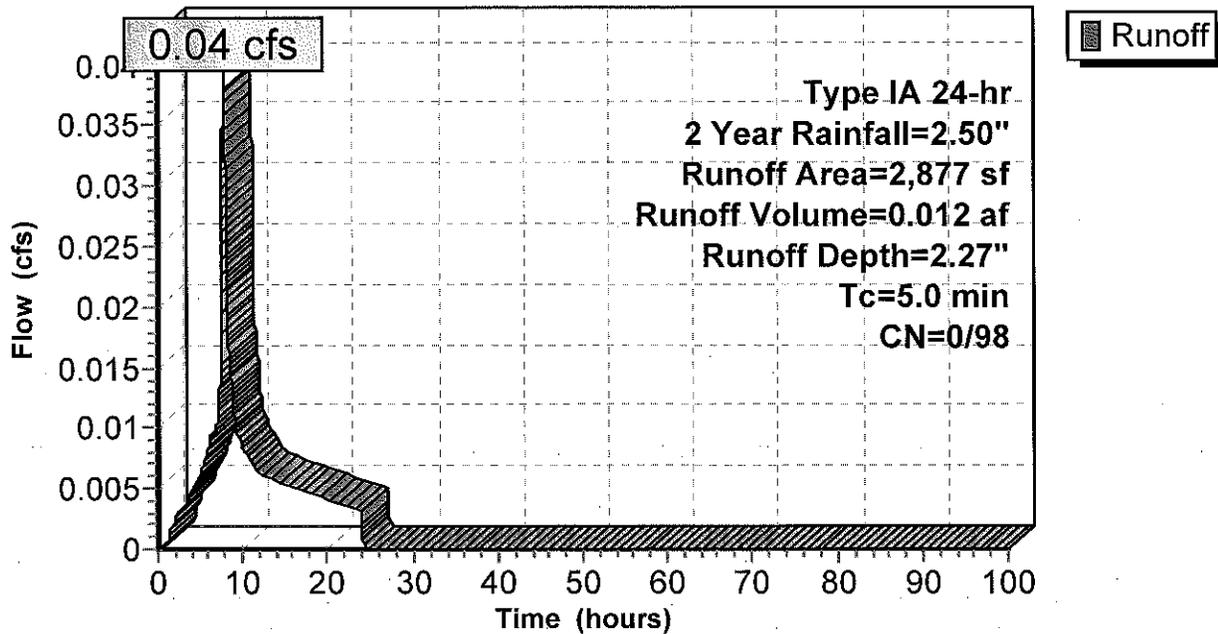
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 2 Year Rainfall=2.50"

Area (sf)	CN	Description
2,877	98	Water Surface, HSG C
2,877	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 3S: house

Hydrograph



Summary for Subcatchment 4S: house

Runoff = 0.04 cfs @ 7.88 hrs, Volume= 0.012 af, Depth= 2.27"

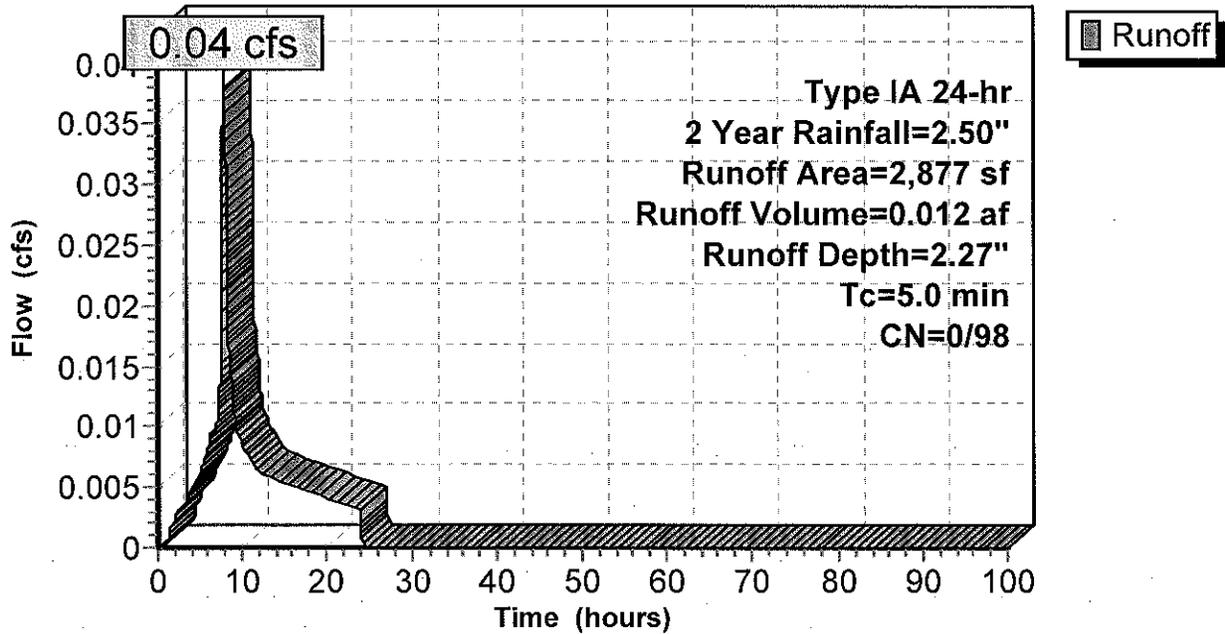
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 2 Year Rainfall=2.50"

Area (sf)	CN	Description
2,877	98	Water Surface, HSG C
2,877	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 4S: house

Hydrograph



Summary for Subcatchment 6S: house

Runoff = 0.04 cfs @ 7.88 hrs, Volume= 0.012 af, Depth= 2.27"

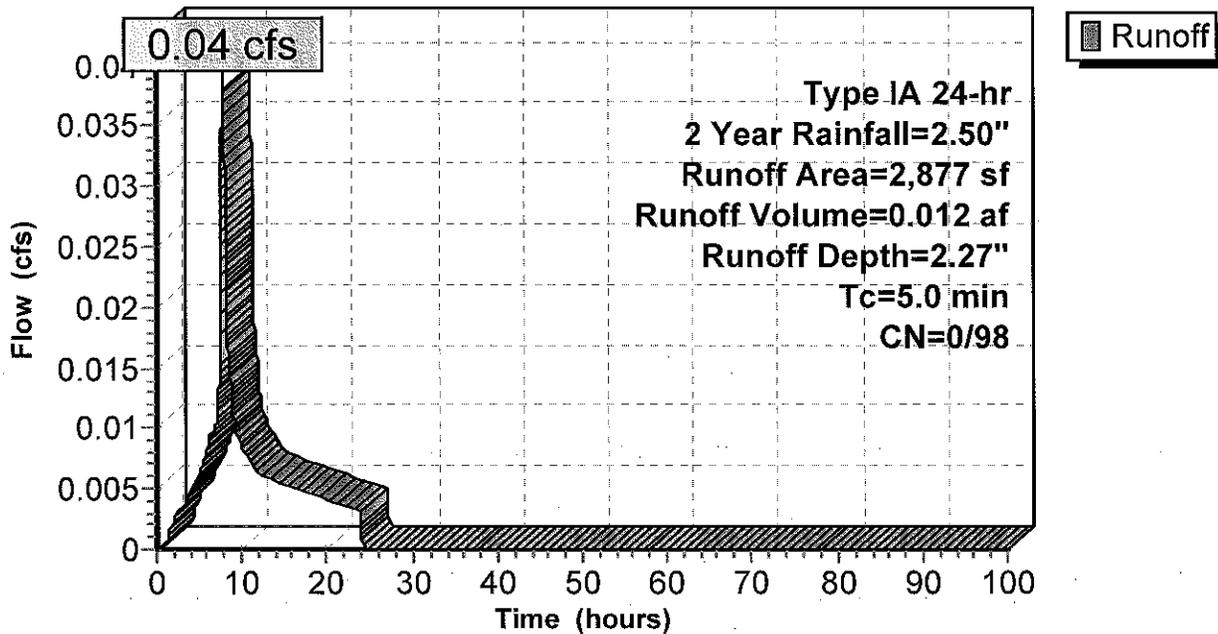
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 2 Year Rainfall=2.50"

Area (sf)	CN	Description
2,877	98	Water Surface, HSG C
2,877	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 6S: house

Hydrograph



Summary for Pond 1P: Detention Pond

Inflow Area = 3.068 ac, 72.95% Impervious, Inflow Depth = 1.59" for 2 Year event
 Inflow = 1.26 cfs @ 7.89 hrs, Volume= 0.407 af
 Outflow = 0.41 cfs @ 8.86 hrs, Volume= 0.407 af, Atten= 67%, Lag= 58.2 min
 Discarded = 0.04 cfs @ 8.86 hrs, Volume= 0.105 af
 Primary = 0.37 cfs @ 8.86 hrs, Volume= 0.302 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 183.73' @ 8.86 hrs Surf.Area= 2,151 sf Storage= 4,899 cf

Plug-Flow detention time= 257.0 min calculated for 0.407 af (100% of inflow)
 Center-of-Mass det. time= 257.0 min (939.8 - 682.8)

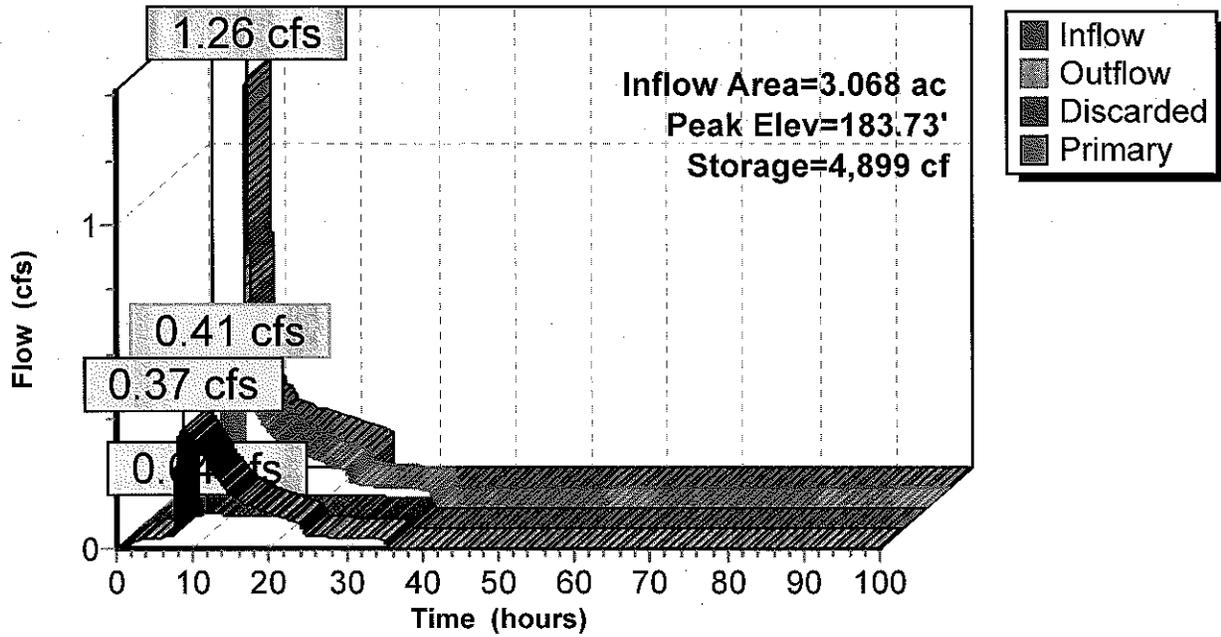
Volume	Invert	Avail.Storage	Storage Description
#1	181.00'	7,847 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
181.00	1,391	0	0
182.00	1,723	1,557	1,557
183.00	1,969	1,846	3,403
184.00	2,220	2,095	5,498
185.00	2,478	2,349	7,847

Device	Routing	Invert	Outlet Devices
#1	Discarded	181.00'	0.900 in/hr Exfiltration over Horizontal area
#2	Primary	179.53'	0.9" Vert. Orifice/Grate C= 0.620
#3	Primary	182.54'	3.4" Vert. Orifice/Grate C= 0.620
#4	Primary	183.73'	4.5" Vert. Orifice/Grate C= 0.620
#5	Primary	184.38'	3.0" Vert. Orifice/Grate C= 0.620

Discarded OutFlow Max=0.04 cfs @ 8.86 hrs HW=183.73' (Free Discharge)
 ↳1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.37 cfs @ 8.86 hrs HW=183.73' (Free Discharge)
 ↳2=Orifice/Grate (Orifice Controls 0.04 cfs @ 10.15 fps)
 ↳3=Orifice/Grate (Orifice Controls 0.32 cfs @ 5.08 fps)
 ↳4=Orifice/Grate (Controls 0.00 cfs)
 ↳5=Orifice/Grate (Controls 0.00 cfs)

Pond 1P: Detention Pond Hydrograph



Summary for Pond 2P: Infiltration Planter

Inflow Area = 0.066 ac, 100.00% Impervious, Inflow Depth = 2.27" for 2 Year event
 Inflow = 0.04 cfs @ 7.88 hrs, Volume= 0.012 af
 Outflow = 0.04 cfs @ 7.94 hrs, Volume= 0.012 af, Atten= 1%, Lag= 3.5 min
 Discarded = 0.01 cfs @ 6.37 hrs, Volume= 0.010 af
 Primary = 0.03 cfs @ 7.94 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 198.58' @ 7.94 hrs Surf.Area= 130 sf Storage= 10 cf

Plug-Flow detention time= 3.0 min calculated for 0.012 af (100% of inflow)
 Center-of-Mass det. time= 3.0 min (675.6 - 672.6)

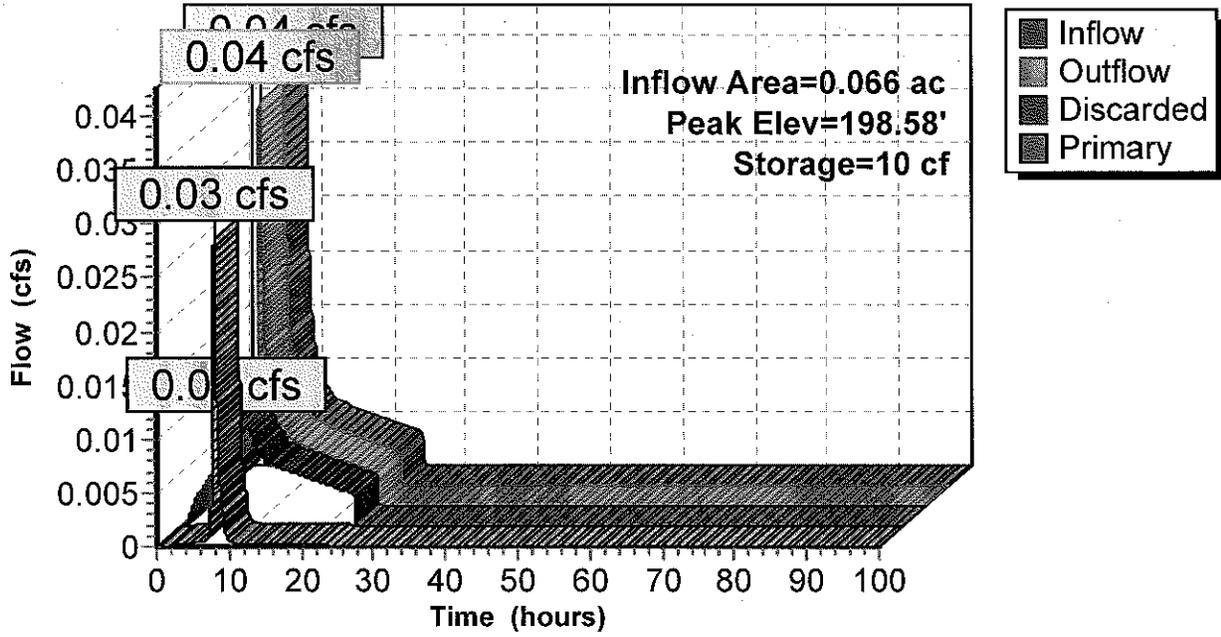
Volume #1	Invert 198.50'	Avail.Storage 130 cf	Storage Description
Custom Stage Data (Prismatic) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
198.50	130	0	0
199.50	130	130	130

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.50'	3.000 in/hr Exfiltration over Horizontal area
#2	Primary	198.50'	12.0" Vert. Orifice/Grate C= 0.620

Discarded OutFlow Max=0.01 cfs @ 6.37 hrs HW=198.51' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.03 cfs @ 7.94 hrs HW=198.58' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 0.03 cfs @ 0.99 fps)

Pond 2P: Infiltration Planter
Hydrograph



Summary for Pond 5P: Infiltration Planter

Inflow Area = 0.066 ac, 100.00% Impervious, Inflow Depth = 2.27" for 2 Year event
 Inflow = 0.04 cfs @ 7.88 hrs, Volume= 0.012 af
 Outflow = 0.04 cfs @ 7.94 hrs, Volume= 0.012 af, Atten= 1%, Lag= 3.5 min
 Discarded = 0.01 cfs @ 6.37 hrs, Volume= 0.010 af
 Primary = 0.03 cfs @ 7.94 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 198.58' @ 7.94 hrs Surf.Area= 130 sf Storage= 10 cf

Plug-Flow detention time= 3.0 min calculated for 0.012 af (100% of inflow)
 Center-of-Mass det. time= 3.0 min (675.6 - 672.6)

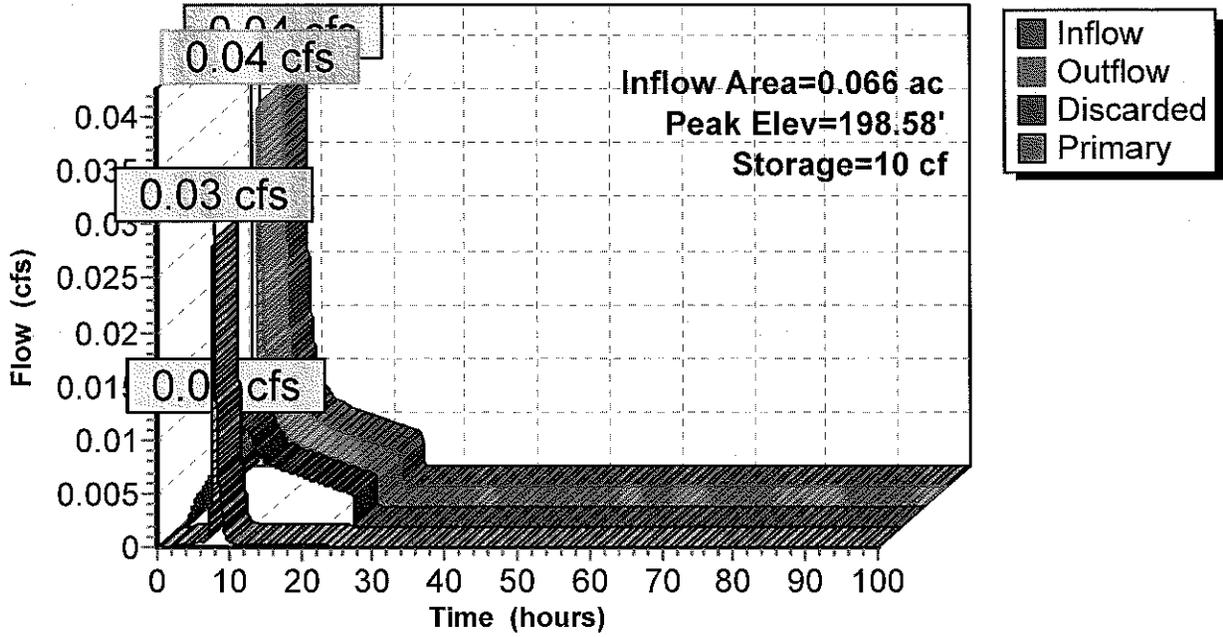
Volume #1	Invert 198.50'	Avail.Storage 130 cf	Storage Description
Custom Stage Data (Prismatic) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
198.50	130	0	0
199.50	130	130	130

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.50'	3.000 in/hr Exfiltration over Horizontal area
#2	Primary	198.50'	12.0" Vert. Orifice/Grate C= 0.620

Discarded OutFlow Max=0.01 cfs @ 6.37 hrs HW=198.51' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.03 cfs @ 7.94 hrs HW=198.58' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 0.03 cfs @ 0.99 fps)

Pond 5P: Infiltration Planter Hydrograph



Summary for Pond 7P: Infiltration Planter

Inflow Area = 0.066 ac, 100.00% Impervious, Inflow Depth = 2.27" for 2 Year event
 Inflow = 0.04 cfs @ 7.88 hrs, Volume= 0.012 af
 Outflow = 0.04 cfs @ 7.94 hrs, Volume= 0.012 af, Atten= 1%, Lag= 3.5 min
 Discarded = 0.01 cfs @ 6.37 hrs, Volume= 0.010 af
 Primary = 0.03 cfs @ 7.94 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 198.58' @ 7.94 hrs Surf.Area= 130 sf Storage= 10 cf

Plug-Flow detention time= 3.0 min calculated for 0.012 af (100% of inflow)
 Center-of-Mass det. time= 3.0 min (675.6 - 672.6)

Volume #1	Invert	Avail.Storage	Storage Description
	198.50'	130 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

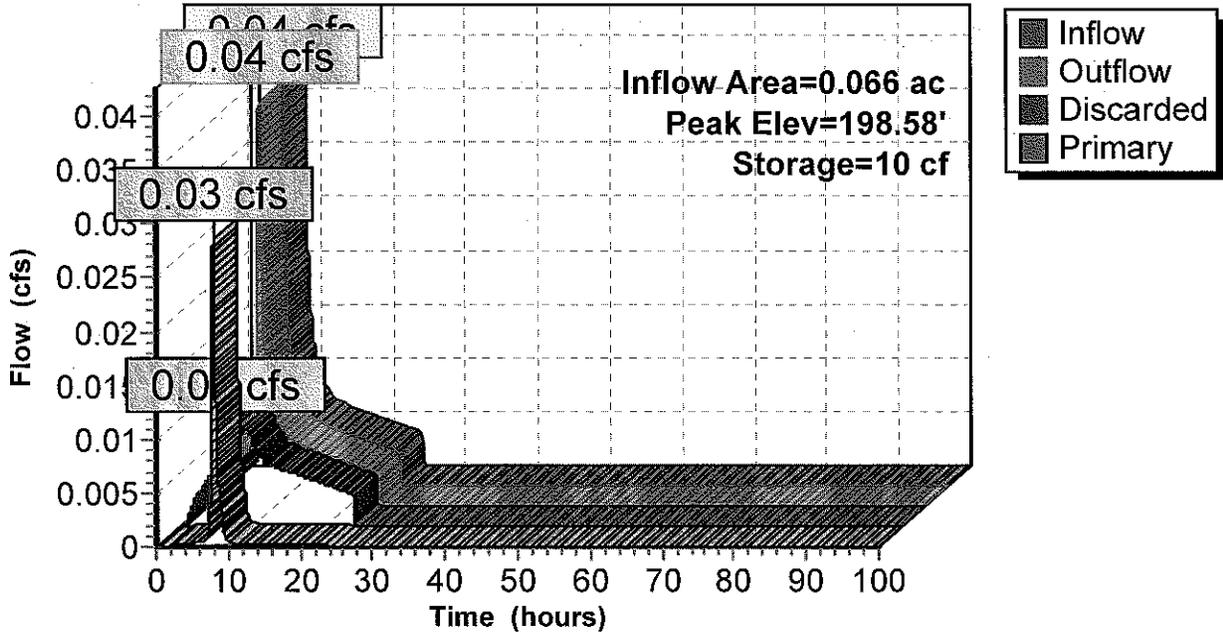
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
198.50	130	0	0
199.50	130	130	130

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.50'	3.000 in/hr Exfiltration over Horizontal area
#2	Primary	198.50'	12.0" Vert. Orifice/Grate C= 0.620

Discarded OutFlow Max=0.01 cfs @ 6.37 hrs HW=198.51' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.03 cfs @ 7.94 hrs HW=198.58' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 0.03 cfs @ 0.99 fps)

Pond 7P: Infiltration Planter Hydrograph

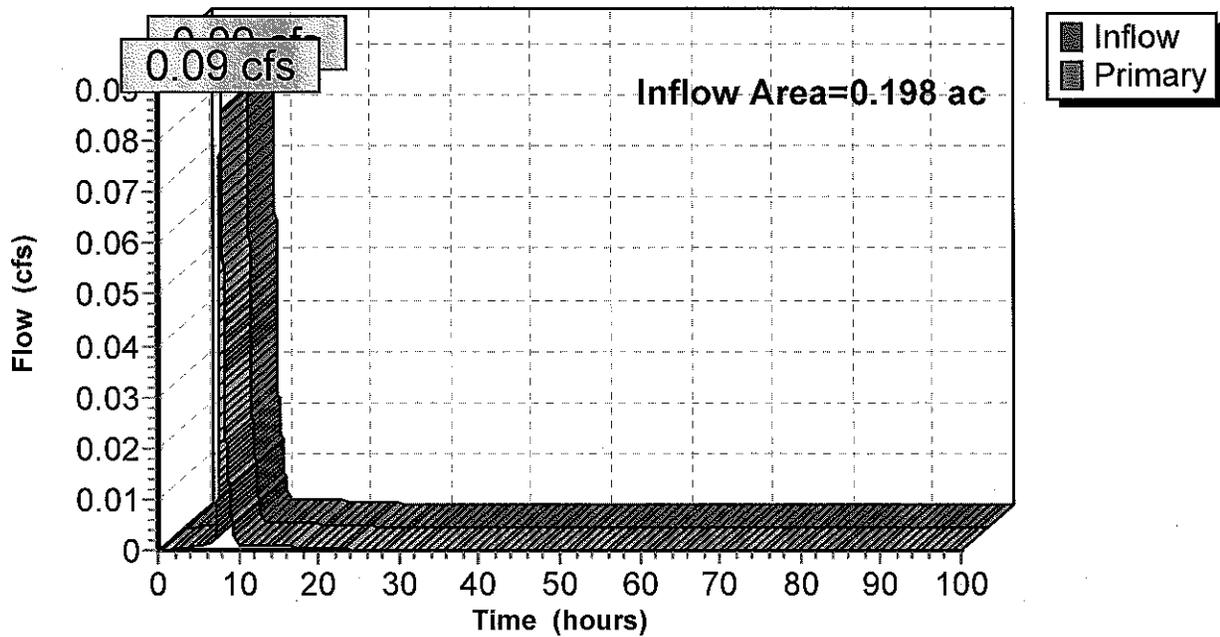


Summary for Link 1L: UPPER LOT FLOW

Inflow Area = 0.198 ac, 100.00% Impervious, Inflow Depth = 0.42" for 2 Year event
Inflow = 0.09 cfs @ 7.94 hrs, Volume= 0.007 af
Primary = 0.09 cfs @ 7.94 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 1L: UPPER LOT FLOW Hydrograph



Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
 Runoff by SBUH method, Split Pervious/Imperv.
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing Conditions Runoff Area=3.070 ac 0.00% Impervious Runoff Depth=1.64"
 Flow Length=650' Slope=0.0200 '/ Tc=25.4 min CN=80/0 Runoff=0.83 cfs 0.419 af

Subcatchment 2S: Proposed Conditions Runoff Area=2.870 ac 71.08% Impervious Runoff Depth=2.49"
 Tc=5.0 min CN=61/98 Runoff=1.68 cfs 0.595 af

Subcatchment 3S: house Runoff Area=2,877 sf 100.00% Impervious Runoff Depth=3.27"
 Tc=5.0 min CN=0/98 Runoff=0.05 cfs 0.018 af

Subcatchment 4S: house Runoff Area=2,877 sf 100.00% Impervious Runoff Depth=3.27"
 Tc=5.0 min CN=0/98 Runoff=0.05 cfs 0.018 af

Subcatchment 6S: house Runoff Area=2,877 sf 100.00% Impervious Runoff Depth=3.27"
 Tc=5.0 min CN=0/98 Runoff=0.05 cfs 0.018 af

Pond 1P: Detention Pond Peak Elev=184.38' Storage=6,369 cf Inflow=1.82 cfs 0.609 af
 Discarded=0.05 cfs 0.110 af Primary=0.83 cfs 0.499 af Outflow=0.88 cfs 0.609 af

Pond 2P: Infiltration Planter Peak Elev=198.60' Storage=13 cf Inflow=0.05 cfs 0.018 af
 Discarded=0.01 cfs 0.013 af Primary=0.04 cfs 0.005 af Outflow=0.05 cfs 0.018 af

Pond 5P: Infiltration Planter Peak Elev=198.60' Storage=13 cf Inflow=0.05 cfs 0.018 af
 Discarded=0.01 cfs 0.013 af Primary=0.04 cfs 0.005 af Outflow=0.05 cfs 0.018 af

Pond 7P: Infiltration Planter Peak Elev=198.60' Storage=13 cf Inflow=0.05 cfs 0.018 af
 Discarded=0.01 cfs 0.013 af Primary=0.04 cfs 0.005 af Outflow=0.05 cfs 0.018 af

Link 1L: UPPER LOT FLOW Inflow=0.13 cfs 0.014 af
 Primary=0.13 cfs 0.014 af

Total Runoff Area = 6.138 ac Runoff Volume = 1.067 af Average Runoff Depth = 2.09"
63.54% Pervious = 3.900 ac 36.46% Impervious = 2.238 ac

Summary for Subcatchment 1S: Existing Conditions

Runoff = 0.83 cfs @ 8.01 hrs, Volume= 0.419 af, Depth= 1.64"

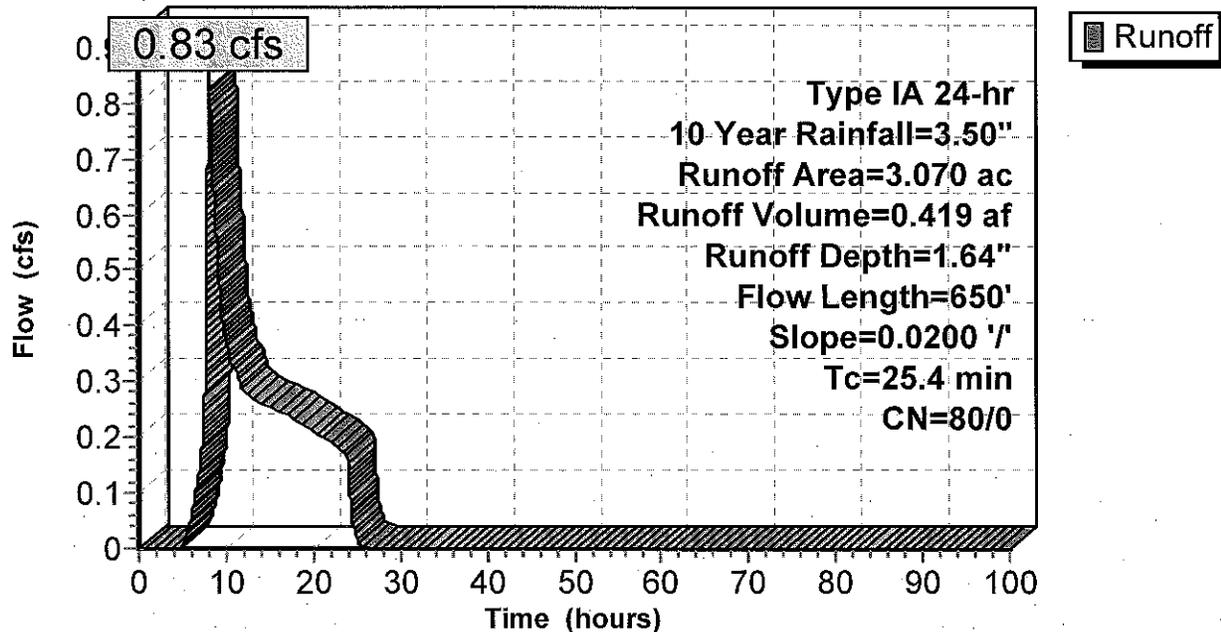
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 10 Year Rainfall=3.50"

Area (ac)	CN	Description
3.070	80	Pasture/grassland/range, Good, HSG D
3.070	80	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0200	0.10		Sheet Flow, Sheet Flow Grass: Dense n= 0.240 P2= 2.50"
9.3	550	0.0200	0.99		Shallow Concentrated Flow, Shallow Concentrated Flow Short Grass Pasture Kv= 7.0 fps
25.4	650	Total			

Subcatchment 1S: Existing Conditions

Hydrograph



Summary for Subcatchment 2S: Proposed Conditions

Runoff = 1.68 cfs @ 7.89 hrs, Volume= 0.595 af, Depth= 2.49"

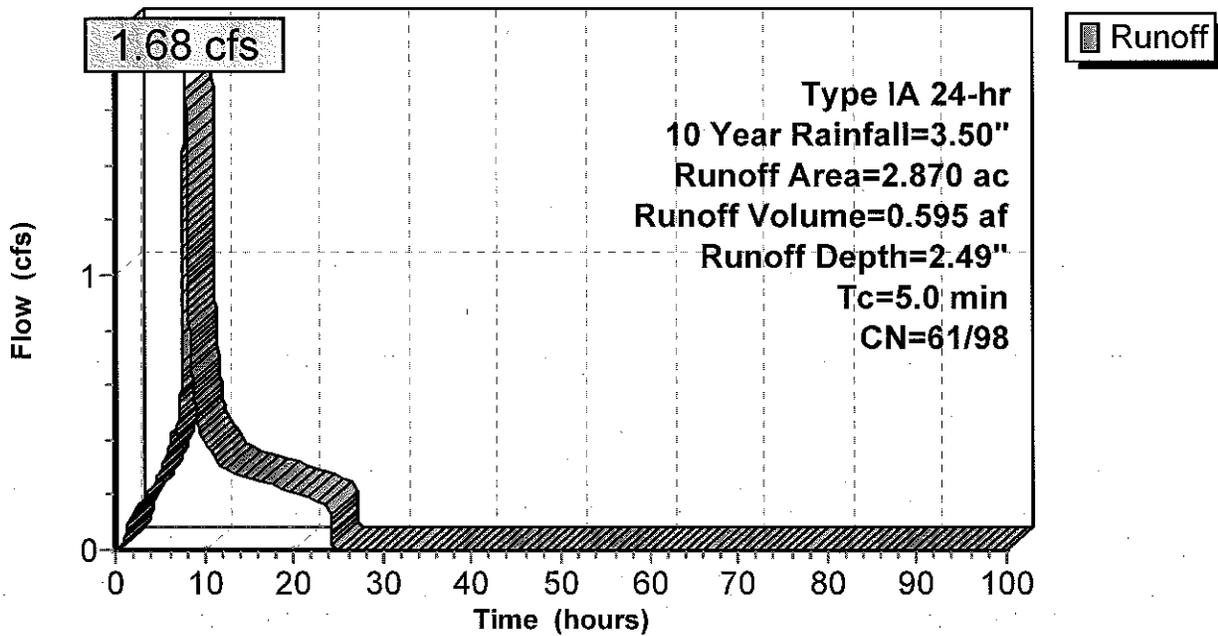
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 10 Year Rainfall=3.50"

Area (ac)	CN	Description
* 2.040	98	Impervious Area
0.830	61	>75% Grass cover, Good, HSG B
2.870	87	Weighted Average
0.830	61	28.92% Pervious Area
2.040	98	71.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 2S: Proposed Conditions

Hydrograph



Summary for Subcatchment 3S: house

Runoff = 0.05 cfs @ 7.88 hrs, Volume= 0.018 af, Depth= 3.27"

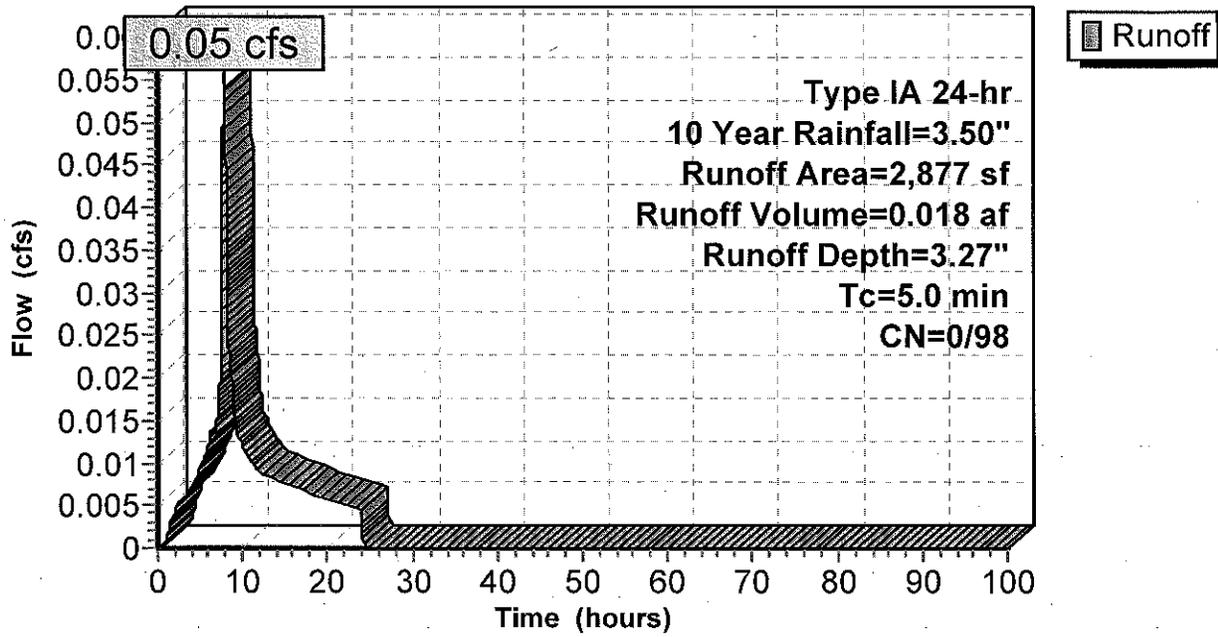
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 10 Year Rainfall=3.50"

Area (sf)	CN	Description
2,877	98	Water Surface, HSG C
2,877	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 3S: house

Hydrograph



Summary for Subcatchment 4S: house

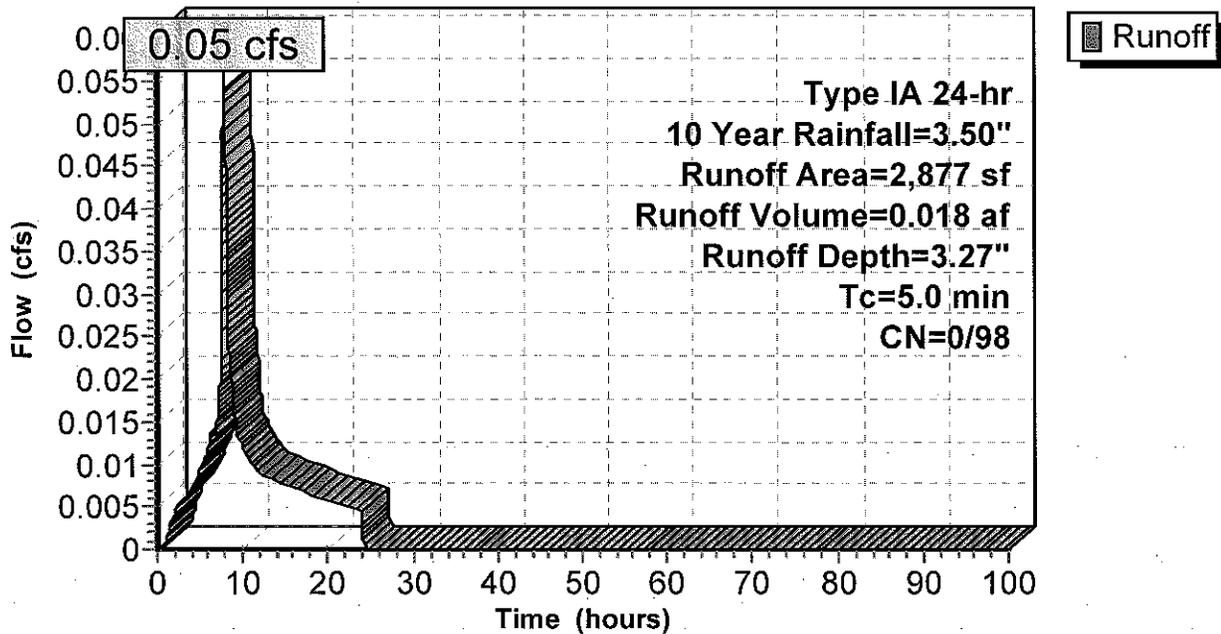
Runoff = 0.05 cfs @ 7.88 hrs, Volume= 0.018 af, Depth= 3.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr. 10 Year Rainfall=3.50"

Area (sf)	CN	Description
2,877	98	Water Surface, HSG C
2,877	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 4S: house
 Hydrograph**



Summary for Subcatchment 6S: house

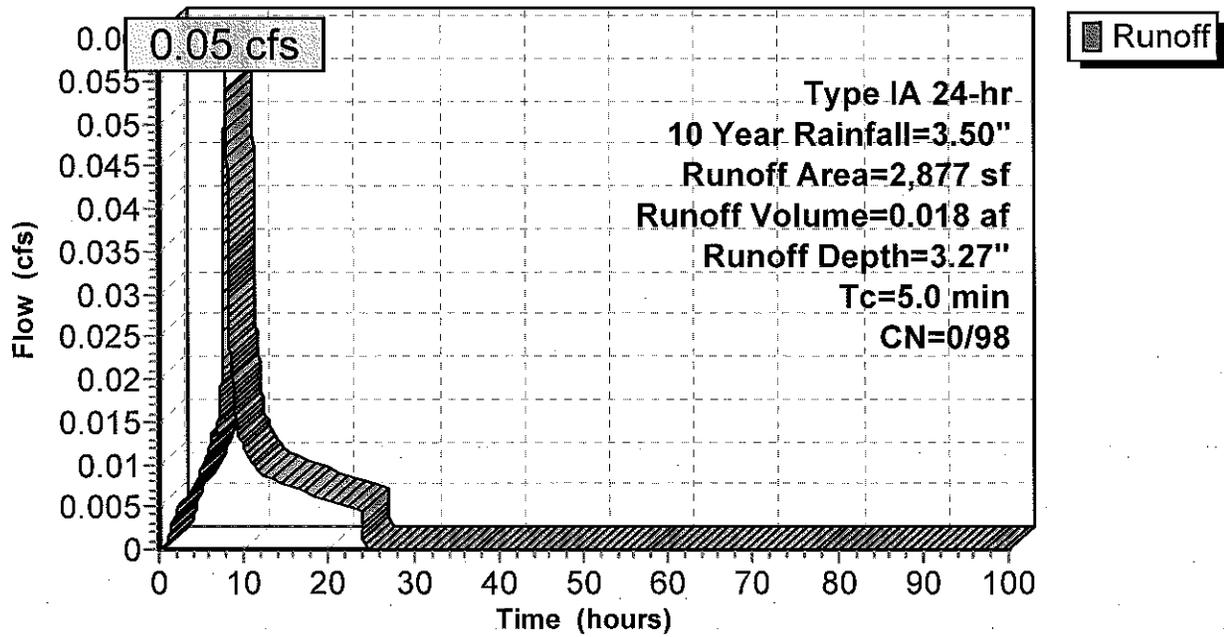
Runoff = 0.05 cfs @ 7.88 hrs, Volume= 0.018 af, Depth= 3.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 10 Year Rainfall=3.50"

Area (sf)	CN	Description
2,877	98	Water Surface, HSG C
2,877	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 6S: house
 Hydrograph**



Summary for Pond 1P: Detention Pond

Inflow Area = 3.068 ac, 72.95% Impervious, Inflow Depth = 2.38" for 10 Year event
 Inflow = 1.82 cfs @ 7.90 hrs, Volume= 0.609 af
 Outflow = 0.88 cfs @ 8.32 hrs, Volume= 0.609 af, Atten= 52%, Lag= 25.3 min
 Discarded = 0.05 cfs @ 8.32 hrs, Volume= 0.110 af
 Primary = 0.83 cfs @ 8.32 hrs, Volume= 0.499 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 184.38' @ 8.32 hrs Surf.Area= 2,319 sf Storage= 6,369 cf

Plug-Flow detention time= 209.9 min calculated for 0.609 af (100% of inflow)
 Center-of-Mass det. time= 210.0 min (888.3 - 678.4)

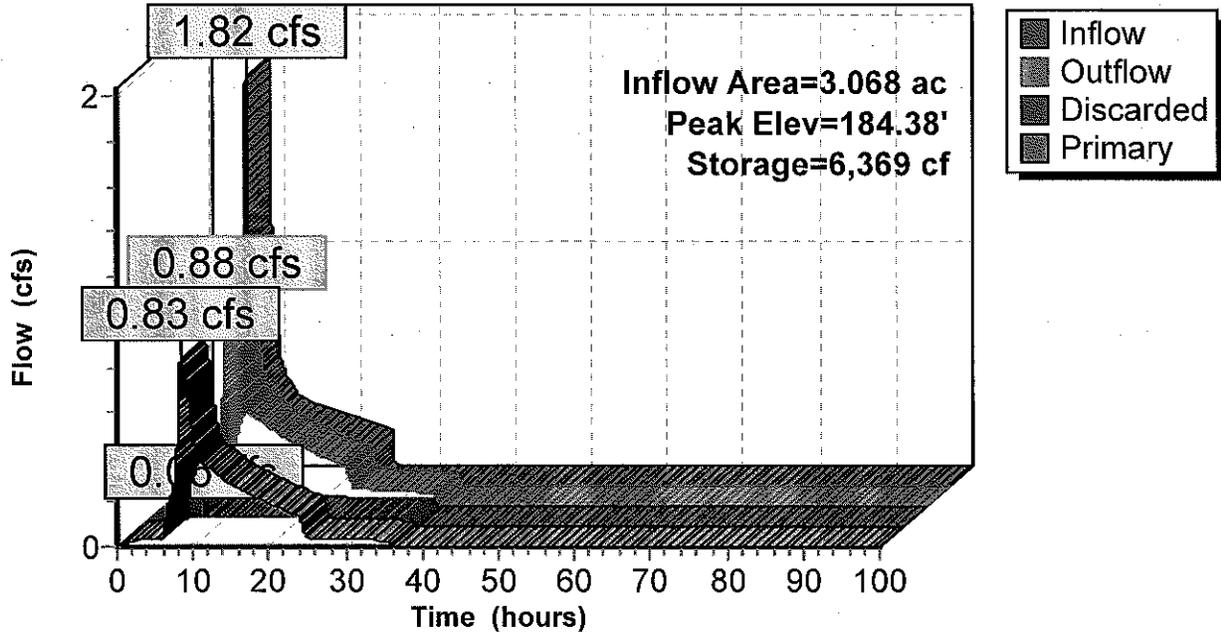
Volume #1	Invert 181.00'	Avail.Storage 7,847 cf	Storage Description Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
181.00	1,391	0	0
182.00	1,723	1,557	1,557
183.00	1,969	1,846	3,403
184.00	2,220	2,095	5,498
185.00	2,478	2,349	7,847

Device	Routing	Invert	Outlet Devices
#1	Discarded	181.00'	0.900 in/hr Exfiltration over Horizontal area
#2	Primary	179.53'	0.9" Vert. Orifice/Grate C= 0.620
#3	Primary	182.54'	3.4" Vert. Orifice/Grate C= 0.620
#4	Primary	183.73'	4.5" Vert. Orifice/Grate C= 0.620
#5	Primary	184.38'	3.0" Vert. Orifice/Grate C= 0.620

Discarded OutFlow Max=0.05 cfs @ 8.32 hrs HW=184.38' (Free Discharge)
 1=Exfiltration (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.83 cfs @ 8.32 hrs HW=184.38' (Free Discharge)
 2=Orifice/Grate (Orifice Controls 0.05 cfs @ 10.92 fps)
 3=Orifice/Grate (Orifice Controls 0.41 cfs @ 6.49 fps)
 4=Orifice/Grate (Orifice Controls 0.38 cfs @ 3.40 fps)
 5=Orifice/Grate (Orifice Controls 0.00 cfs @ 0.22 fps)

Pond 1P: Detention Pond
Hydrograph



Summary for Pond 2P: Infiltration Planter

Inflow Area = 0.066 ac, 100.00% Impervious, Inflow Depth = 3.27" for 10 Year event
 Inflow = 0.05 cfs @ 7.88 hrs, Volume= 0.018 af
 Outflow = 0.05 cfs @ 7.92 hrs, Volume= 0.018 af, Atten= 0%, Lag= 2.7 min
 Discarded = 0.01 cfs @ 5.09 hrs, Volume= 0.013 af
 Primary = 0.04 cfs @ 7.92 hrs, Volume= 0.005 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 198.60' @ 7.92 hrs Surf.Area= 130 sf Storage= 13 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 3.4 min (666.2 - 662.8)

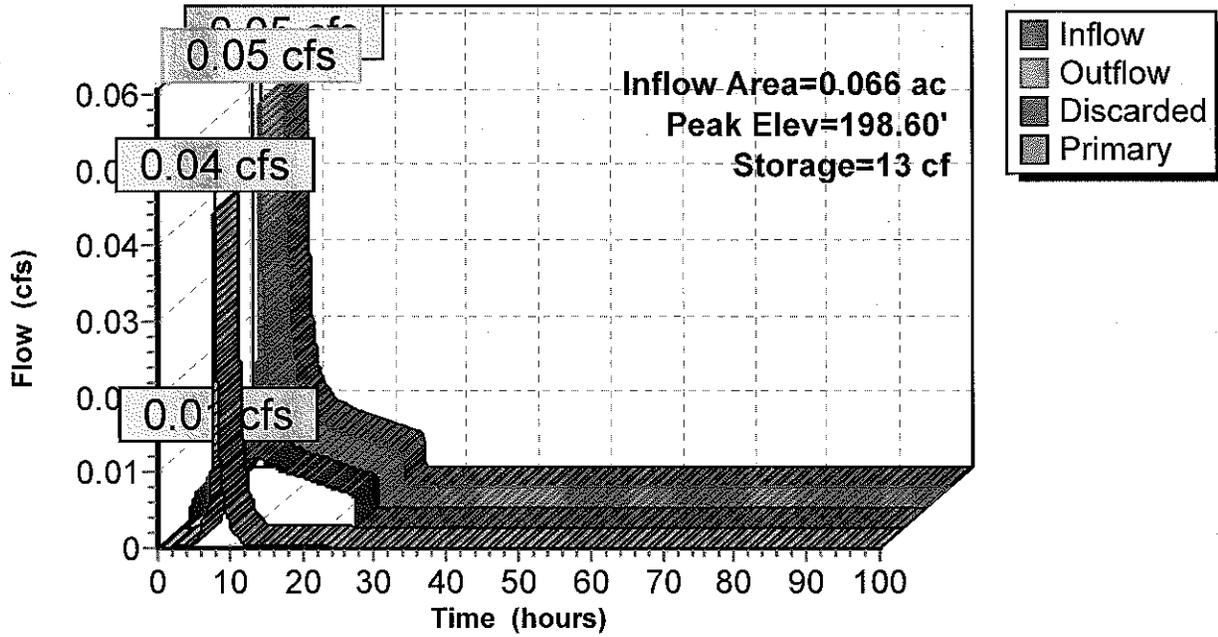
Volume #1	Invert 198.50'	Avail.Storage 130 cf	Storage Description
Custom Stage Data (Prismatic) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
198.50	130	0	0
199.50	130	130	130

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.50'	3.000 in/hr Exfiltration over Horizontal area
#2	Primary	198.50'	12.0" Vert. Orifice/Grate C= 0.620

Discarded OutFlow Max=0.01 cfs @ 5.09 hrs HW=198.51' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.04 cfs @ 7.92 hrs HW=198.60' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 0.04 cfs @ 1.11 fps)

Pond 2P: Infiltration Planter Hydrograph



Summary for Pond 5P: Infiltration Planter

Inflow Area = 0.066 ac, 100.00% Impervious, Inflow Depth = 3.27" for 10 Year event
 Inflow = 0.05 cfs @ 7.88 hrs, Volume= 0.018 af
 Outflow = 0.05 cfs @ 7.92 hrs, Volume= 0.018 af, Atten= 0%, Lag= 2.7 min
 Discarded = 0.01 cfs @ 5.09 hrs, Volume= 0.013 af
 Primary = 0.04 cfs @ 7.92 hrs, Volume= 0.005 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 198.60' @ 7.92 hrs Surf.Area= 130 sf Storage= 13 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 3.4 min (666.2 - 662.8)

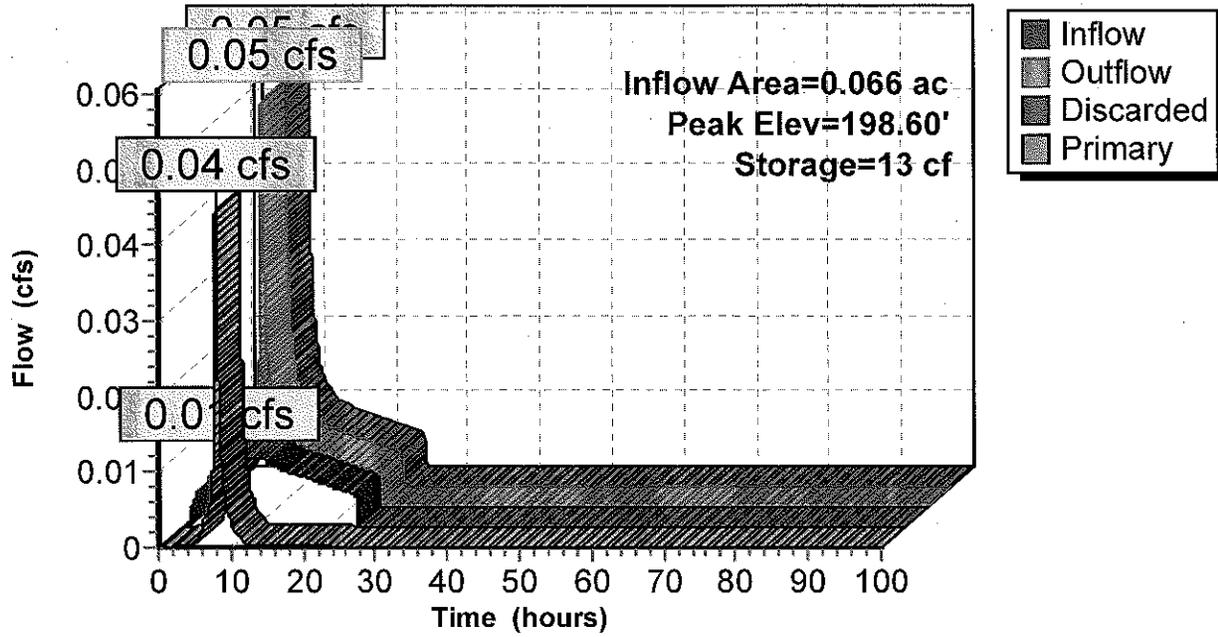
Volume #1	Invert 198.50'	Avail.Storage 130 cf	Storage Description
Custom Stage Data (Prismatic) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
198.50	130	0	0
199.50	130	130	130

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.50'	3.000 in/hr Exfiltration over Horizontal area
#2	Primary	198.50'	12.0" Vert. Orifice/Gate C= 0.620

Discarded OutFlow Max=0.01 cfs @ 5.09 hrs HW=198.51' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.04 cfs @ 7.92 hrs HW=198.60' (Free Discharge)
 ↑2=Orifice/Gate (Orifice Controls 0.04 cfs @ 1.11 fps)

Pond 5P: Infiltration Planter Hydrograph



Summary for Pond 7P: Infiltration Planter

Inflow Area = 0.066 ac, 100.00% Impervious, Inflow Depth = 3.27" for 10 Year event
 Inflow = 0.05 cfs @ 7.88 hrs, Volume= 0.018 af
 Outflow = 0.05 cfs @ 7.92 hrs, Volume= 0.018 af, Atten= 0%, Lag= 2.7 min
 Discarded = 0.01 cfs @ 5.09 hrs, Volume= 0.013 af
 Primary = 0.04 cfs @ 7.92 hrs, Volume= 0.005 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 198.60' @ 7.92 hrs Surf.Area= 130 sf Storage= 13 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 3.4 min (666.2 - 662.8)

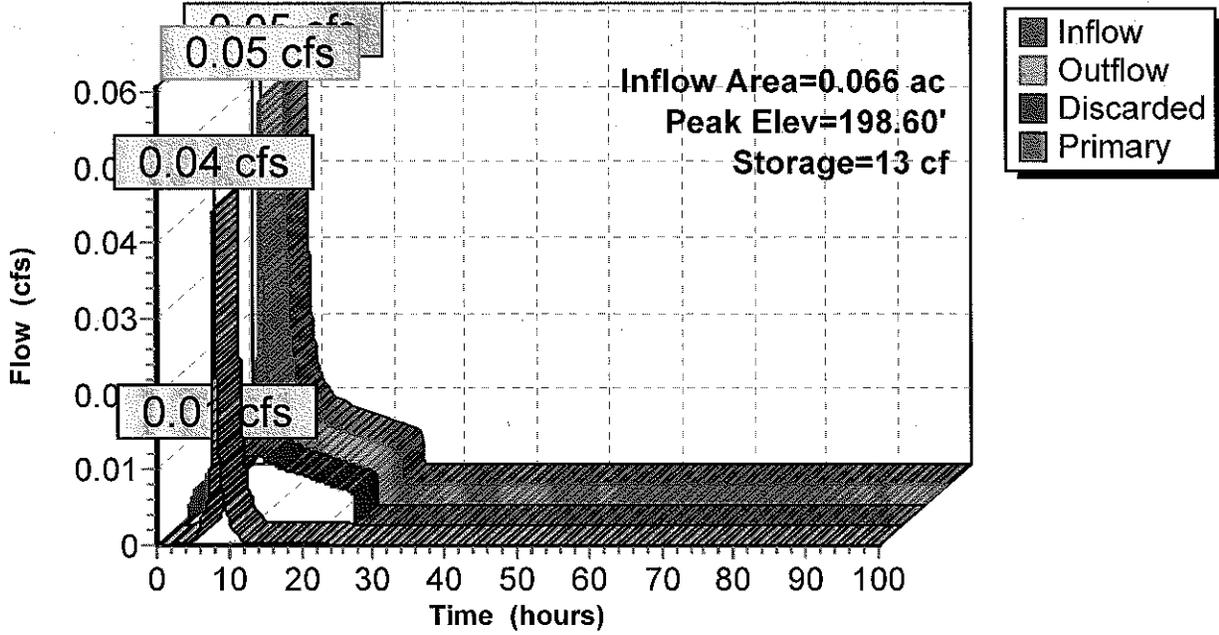
Volume #	Invert	Avail.Storage	Storage Description
#1	198.50'	130 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
198.50	130	0	0
199.50	130	130	130

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.50'	3.000 in/hr Exfiltration over Horizontal area
#2	Primary	198.50'	12.0" Vert. Orifice/Grate C= 0.620

Discarded OutFlow Max=0.01 cfs @ 5.09 hrs HW=198.51' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.04 cfs @ 7.92 hrs HW=198.60' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 0.04 cfs @ 1.11 fps)

Pond 7P: Infiltration Planter Hydrograph

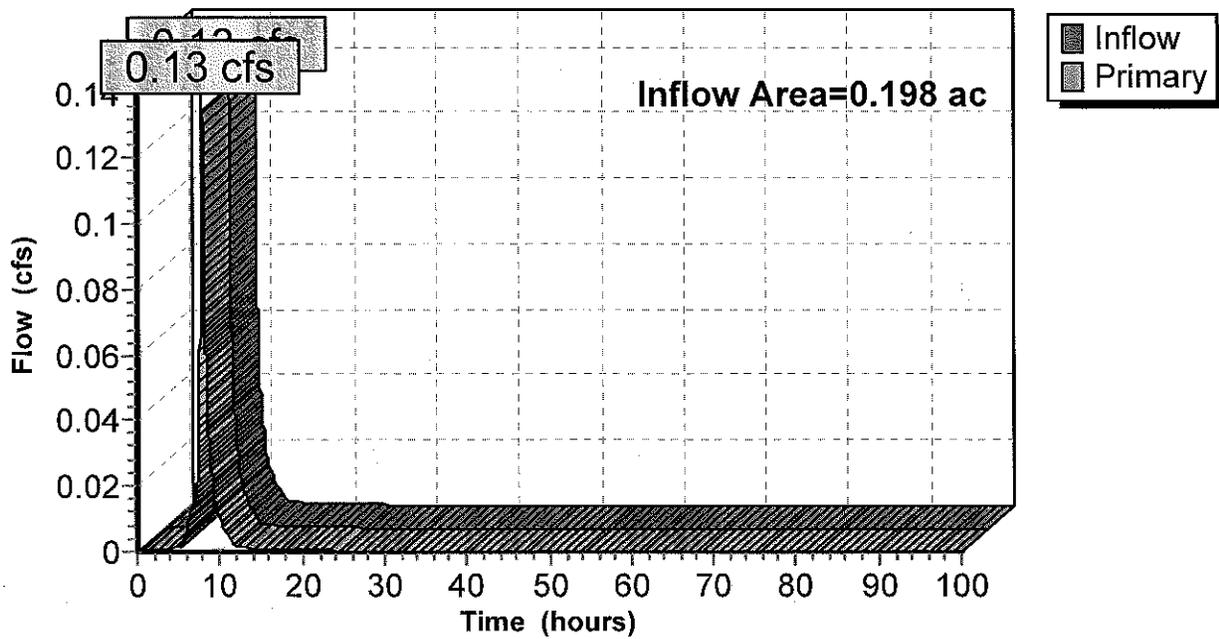


Summary for Link 1L: UPPER LOT FLOW

Inflow Area = 0.198 ac, 100.00% Impervious, Inflow Depth = 0.87" for 10 Year event
Inflow = 0.13 cfs @ 7.92 hrs, Volume= 0.014 af
Primary = 0.13 cfs @ 7.92 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 1L: UPPER LOT FLOW Hydrograph



Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
 Runoff by SBUH method, Split Pervious/Imperv.
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing Conditions Runoff Area=3.070 ac 0.00% Impervious Runoff Depth=2.04"
 Flow Length=650' Slope=0.0200 '/' Tc=25.4 min CN=80/0 Runoff=1.08 cfs 0.522 af

Subcatchment 2S: Proposed Conditions Runoff Area=2.870 ac 71.08% Impervious Runoff Depth=2.91"
 Tc=5.0 min CN=61/98 Runoff=1.97 cfs 0.696 af

Subcatchment 3S: house Runoff Area=2,877 sf 100.00% Impervious Runoff Depth=3.77"
 Tc=5.0 min CN=0/98 Runoff=0.06 cfs 0.021 af

Subcatchment 4S: house Runoff Area=2,877 sf 100.00% Impervious Runoff Depth=3.77"
 Tc=5.0 min CN=0/98 Runoff=0.06 cfs 0.021 af

Subcatchment 6S: house Runoff Area=2,877 sf 100.00% Impervious Runoff Depth=3.77"
 Tc=5.0 min CN=0/98 Runoff=0.06 cfs 0.021 af

Pond 1P: Detention Pond Peak Elev=184.68' Storage=7,072 cf Inflow=2.13 cfs 0.715 af
 Discarded=0.05 cfs 0.113 af Primary=1.08 cfs 0.602 af Outflow=1.13 cfs 0.715 af

Pond 2P: Infiltration Planter Peak Elev=198.61' Storage=14 cf Inflow=0.06 cfs 0.021 af
 Discarded=0.01 cfs 0.014 af Primary=0.05 cfs 0.006 af Outflow=0.06 cfs 0.021 af

Pond 5P: Infiltration Planter Peak Elev=198.61' Storage=14 cf Inflow=0.06 cfs 0.021 af
 Discarded=0.01 cfs 0.014 af Primary=0.05 cfs 0.006 af Outflow=0.06 cfs 0.021 af

Pond 7P: Infiltration Planter Peak Elev=198.61' Storage=14 cf Inflow=0.06 cfs 0.021 af
 Discarded=0.01 cfs 0.014 af Primary=0.05 cfs 0.006 af Outflow=0.06 cfs 0.021 af

Link 1L: UPPER LOT FLOW Inflow=0.16 cfs 0.019 af
 Primary=0.16 cfs 0.019 af

Total Runoff Area = 6.138 ac Runoff Volume = 1.281 af Average Runoff Depth = 2.50"
63.54% Pervious = 3.900 ac 36.46% Impervious = 2.238 ac

Summary for Subcatchment 1S: Existing Conditions

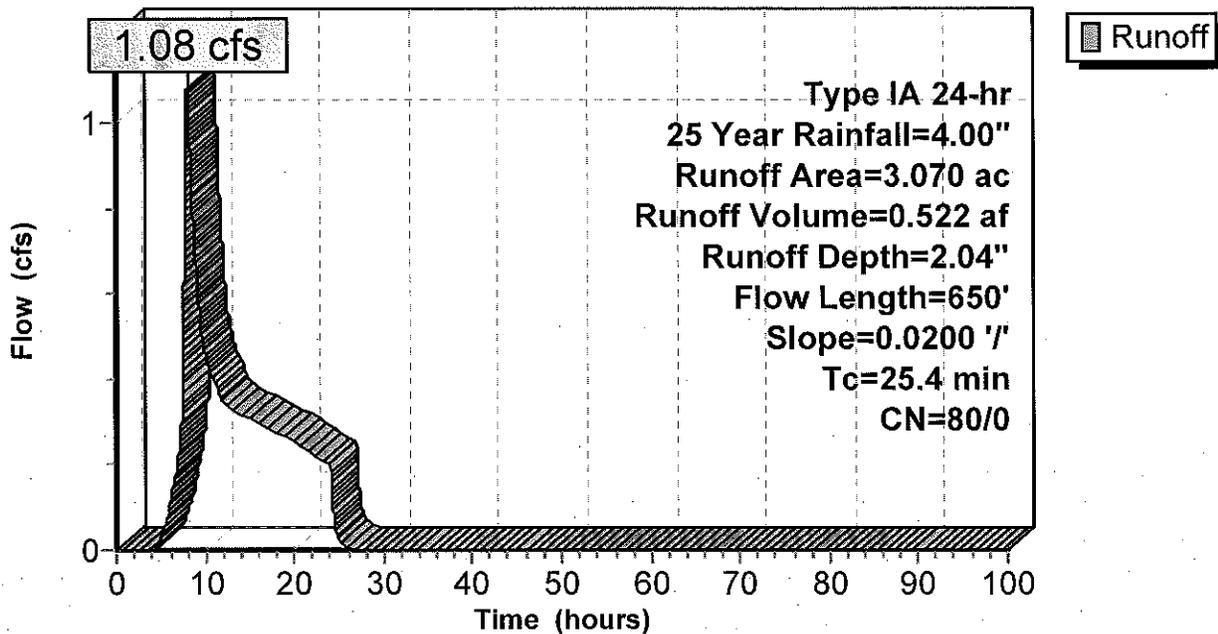
Runoff = 1.08 cfs @ 8.01 hrs, Volume= 0.522 af, Depth= 2.04"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 25 Year Rainfall=4.00"

Area (ac)	CN	Description
3.070	80	Pasture/grassland/range, Good, HSG D
3.070	80	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	100	0.0200	0.10		Sheet Flow, Sheet Flow Grass: Dense n= 0.240 P2= 2.50"
9.3	550	0.0200	0.99		Shallow Concentrated Flow, Shallow Concentrated Flow Short Grass Pasture Kv= 7.0 fps
25.4	650	Total			

Subcatchment 1S: Existing Conditions
Hydrograph



Summary for Subcatchment 2S: Proposed Conditions

Runoff = 1.97 cfs @ 7.90 hrs, Volume= 0.696 af, Depth= 2.91"

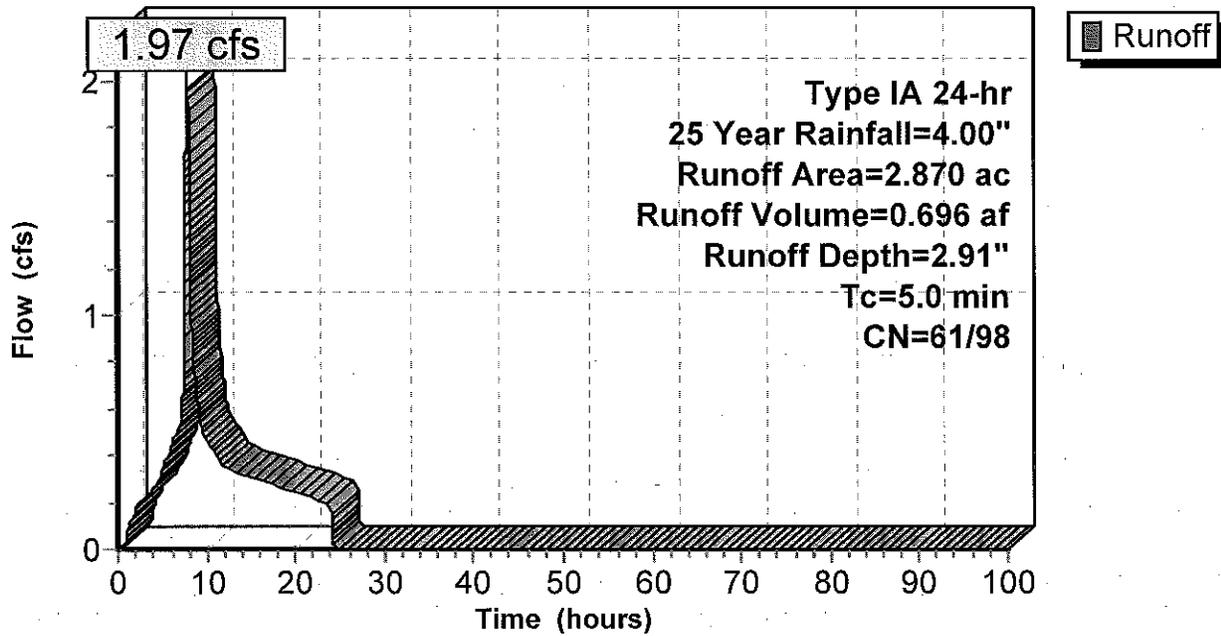
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 25 Year Rainfall=4.00"

Area (ac)	CN	Description
* 2.040	98	Impervious Area
0.830	61	>75% Grass cover, Good, HSG B
2.870	87	Weighted Average
0.830	61	28.92% Pervious Area
2.040	98	71.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 2S: Proposed Conditions

Hydrograph



Summary for Subcatchment 3S: house

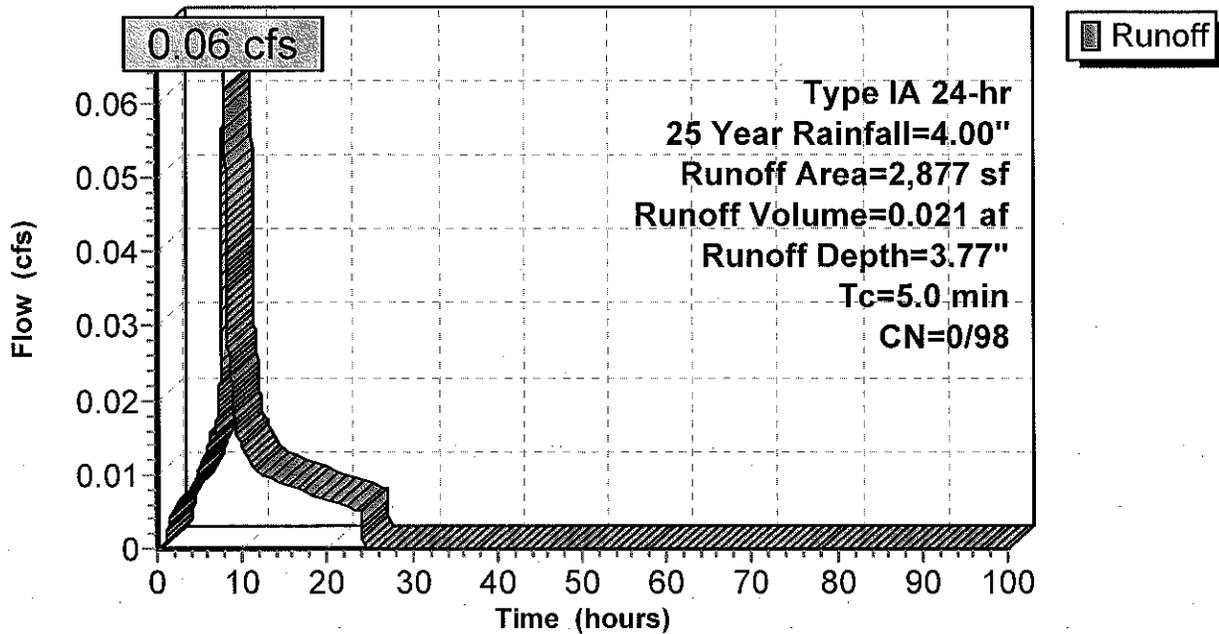
Runoff = 0.06 cfs @ 7.88 hrs, Volume= 0.021 af, Depth= 3.77"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 25 Year Rainfall=4.00"

Area (sf)	CN	Description
2,877	98	Water Surface, HSG C
2,877	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 3S: house
 Hydrograph**



Summary for Subcatchment 4S: house

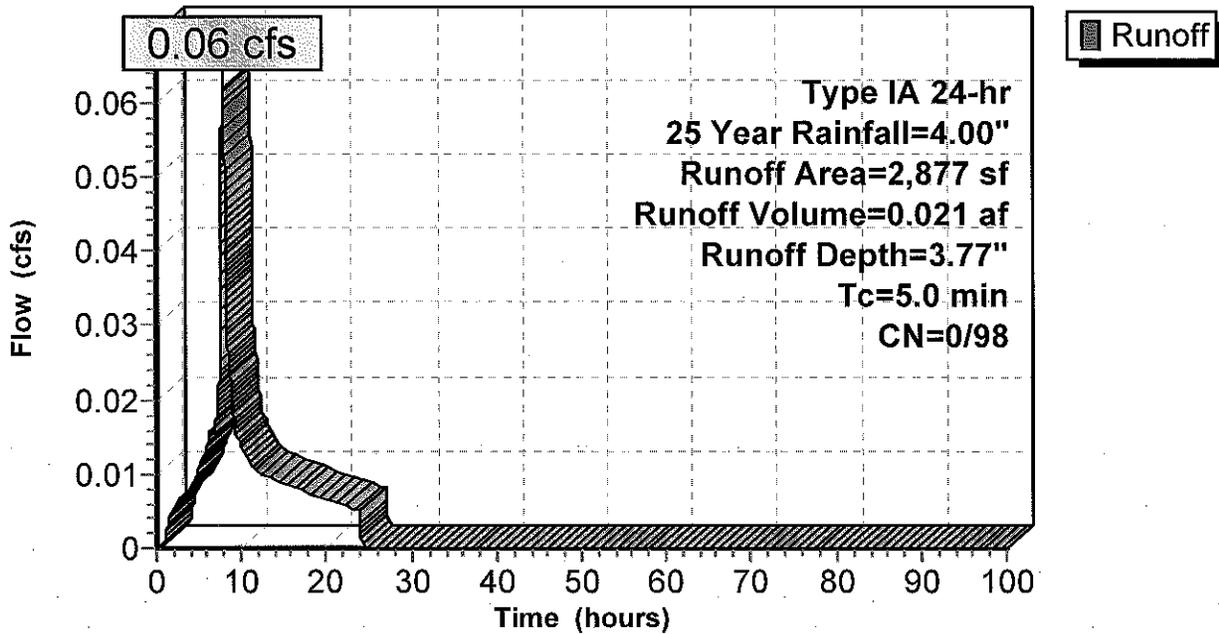
Runoff = 0.06 cfs @ 7.88 hrs, Volume= 0.021 af, Depth= 3.77"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 25 Year Rainfall=4.00"

Area (sf)	CN	Description
2,877	98	Water Surface, HSG C
2,877	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

**Subcatchment 4S: house
 Hydrograph**



Summary for Subcatchment 6S: house

Runoff = 0.06 cfs @ 7.88 hrs, Volume= 0.021 af, Depth= 3.77"

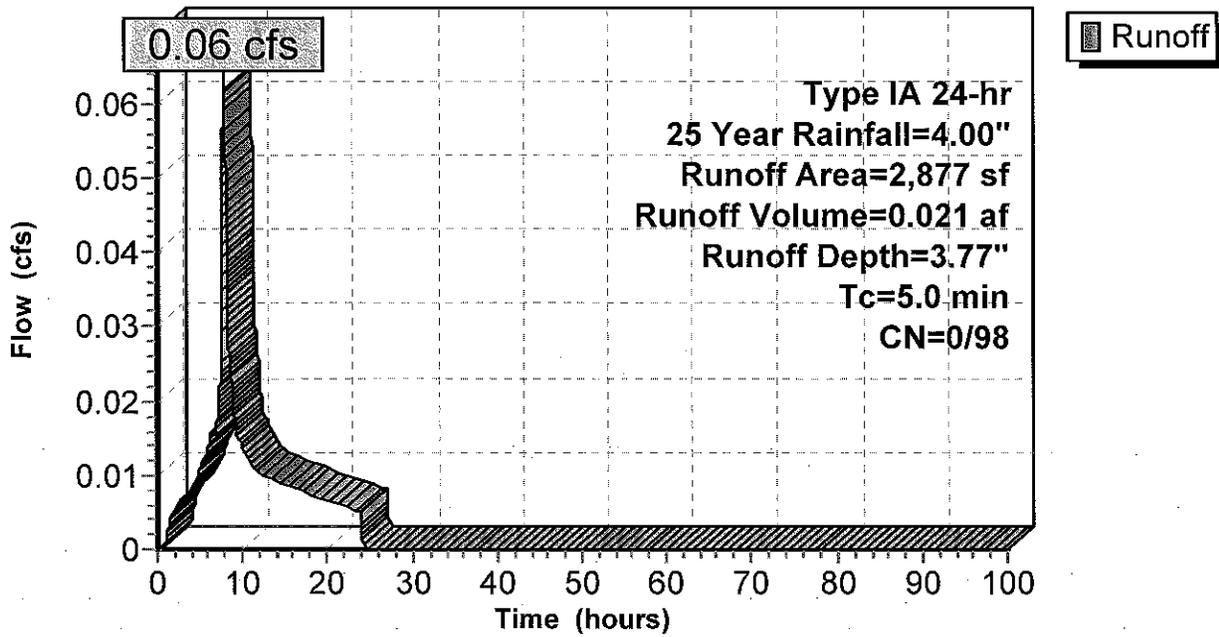
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 25 Year Rainfall=4.00"

Area (sf)	CN	Description
2,877	98	Water Surface, HSG C
2,877	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 6S: house

Hydrograph



Summary for Pond 1P: Detention Pond

Inflow Area = 3.068 ac, 72.95% Impervious, Inflow Depth = 2.80" for 25 Year event
 Inflow = 2.13 cfs @ 7.90 hrs, Volume= 0.715 af
 Outflow = 1.13 cfs @ 8.26 hrs, Volume= 0.715 af, Atten= 47%, Lag= 22.0 min
 Discarded = 0.05 cfs @ 8.26 hrs, Volume= 0.113 af
 Primary = 1.08 cfs @ 8.26 hrs, Volume= 0.602 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 184.68' @ 8.26 hrs Surf.Area= 2,396 sf Storage= 7,072 cf

Plug-Flow detention time= 195.6 min calculated for 0.715 af (100% of inflow)
 Center-of-Mass det. time= 195.7 min (872.3 - 676.7)

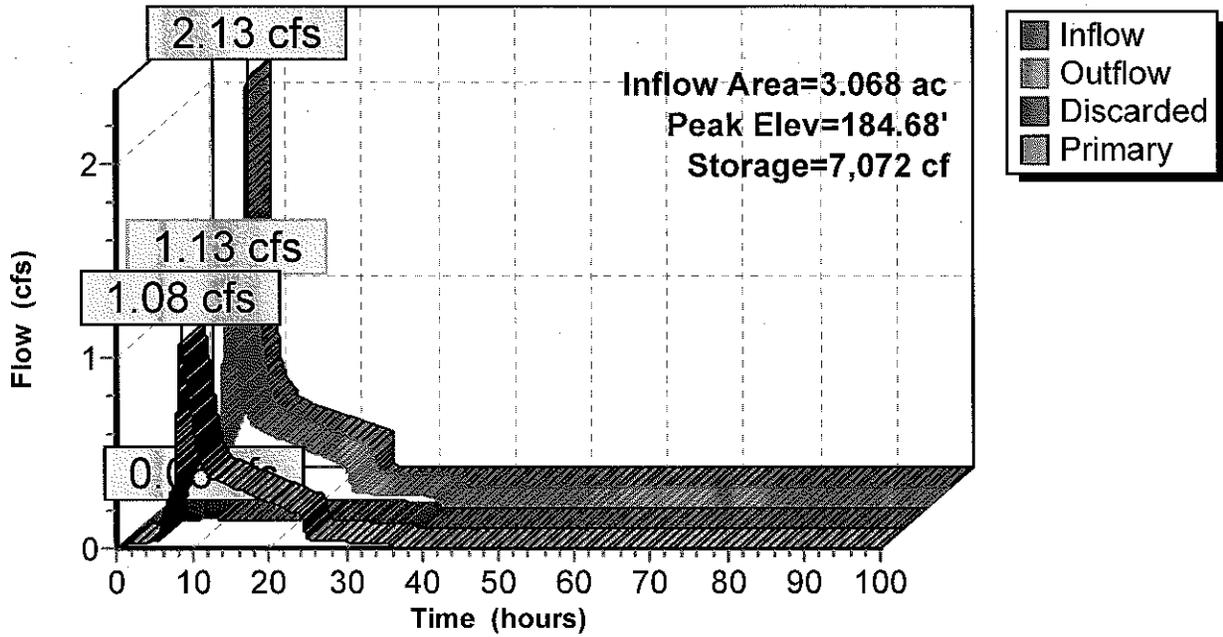
Volume	Invert	Avail.Storage	Storage Description
#1	181.00'	7,847 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
181.00	1,391	0	0
182.00	1,723	1,557	1,557
183.00	1,969	1,846	3,403
184.00	2,220	2,095	5,498
185.00	2,478	2,349	7,847

Device	Routing	Invert	Outlet Devices
#1	Discarded	181.00'	0.900 in/hr Exfiltration over Horizontal area
#2	Primary	179.53'	0.9" Vert. Orifice/Grate C= 0.620
#3	Primary	182.54'	3.4" Vert. Orifice/Grate C= 0.620
#4	Primary	183.73'	4.5" Vert. Orifice/Grate C= 0.620
#5	Primary	184.38'	3.0" Vert. Orifice/Grate C= 0.620

Discarded OutFlow Max=0.05 cfs @ 8.26 hrs HW=184.68' (Free Discharge)
 ↳1=Exfiltration (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=1.08 cfs @ 8.26 hrs HW=184.68' (Free Discharge)
 ↳2=Orifice/Grate (Orifice Controls 0.05 cfs @ 11.25 fps)
 ↳3=Orifice/Grate (Orifice Controls 0.44 cfs @ 7.04 fps)
 ↳4=Orifice/Grate (Orifice Controls 0.48 cfs @ 4.35 fps)
 ↳5=Orifice/Grate (Orifice Controls 0.10 cfs @ 2.09 fps)

Pond 1P: Detention Pond
Hydrograph



Summary for Pond 2P: Infiltration Planter

Inflow Area = 0.066 ac, 100.00% Impervious, Inflow Depth = 3.77" for 25 Year event
 Inflow = 0.06 cfs @ 7.88 hrs, Volume= 0.021 af
 Outflow = 0.06 cfs @ 7.92 hrs, Volume= 0.021 af, Atten= 0%, Lag= 2.4 min
 Discarded = 0.01 cfs @ 4.55 hrs, Volume= 0.014 af
 Primary = 0.05 cfs @ 7.92 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 198.61' @ 7.92 hrs Surf.Area= 130 sf Storage= 14 cf

Plug-Flow detention time= 3.6 min calculated for 0.021 af (100% of inflow)
 Center-of-Mass det. time= 3.6 min (663.1 - 659.5)

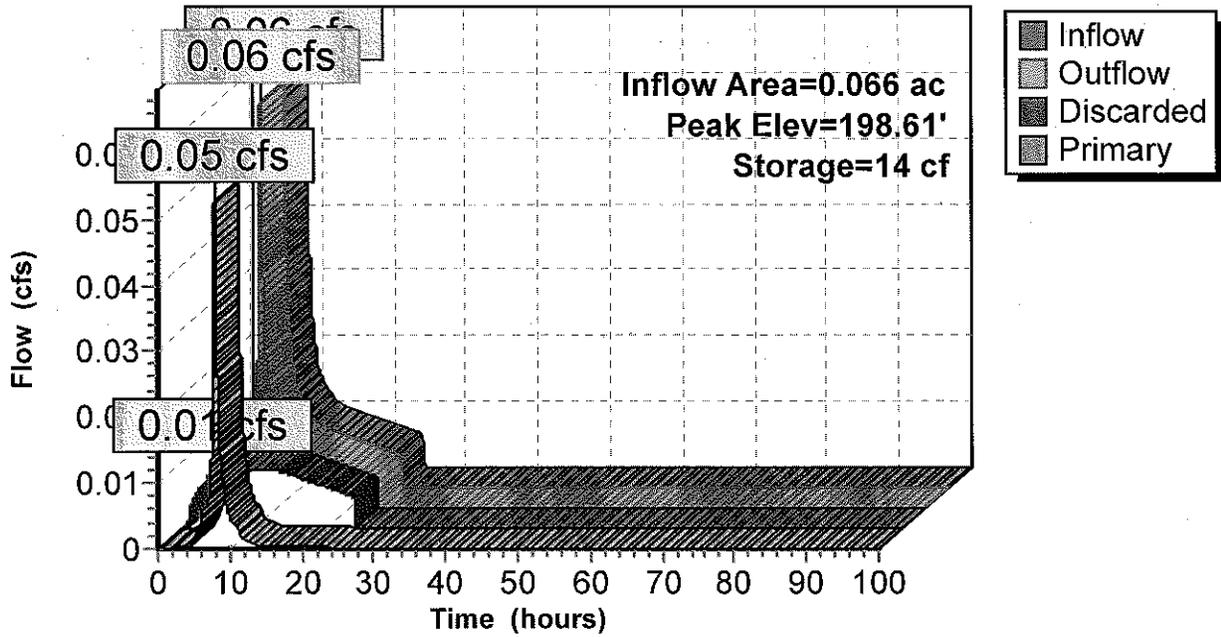
Volume #1	Invert 198.50'	Avail.Storage 130 cf	Storage Description Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	
198.50	130	0	0	
199.50	130	130	130	

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.50'	3.000 in/hr Exfiltration over Horizontal area
#2	Primary	198.50'	12.0" Vert. Orifice/Grate C= 0.620

Discarded OutFlow Max=0.01 cfs @ 4.55 hrs HW=198.51' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.05 cfs @ 7.92 hrs HW=198.61' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 0.05 cfs @ 1.16 fps)

Pond 2P: Infiltration Planter Hydrograph



Summary for Pond 5P: Infiltration Planter

Inflow Area = 0.066 ac, 100.00% Impervious, Inflow Depth = 3.77" for 25 Year event
 Inflow = 0.06 cfs @ 7.88 hrs, Volume= 0.021 af
 Outflow = 0.06 cfs @ 7.92 hrs, Volume= 0.021 af, Atten= 0%, Lag= 2.4 min
 Discarded = 0.01 cfs @ 4.55 hrs, Volume= 0.014 af
 Primary = 0.05 cfs @ 7.92 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 198.61' @ 7.92 hrs Surf.Area= 130 sf Storage= 14 cf

Plug-Flow detention time= 3.6 min calculated for 0.021 af (100% of inflow)
 Center-of-Mass det. time= 3.6 min (663.1 - 659.5)

Volume #1	Invert 198.50'	Avail.Storage 130 cf	Storage Description
			Custom Stage Data (Prismatic) Listed below (Recalc)

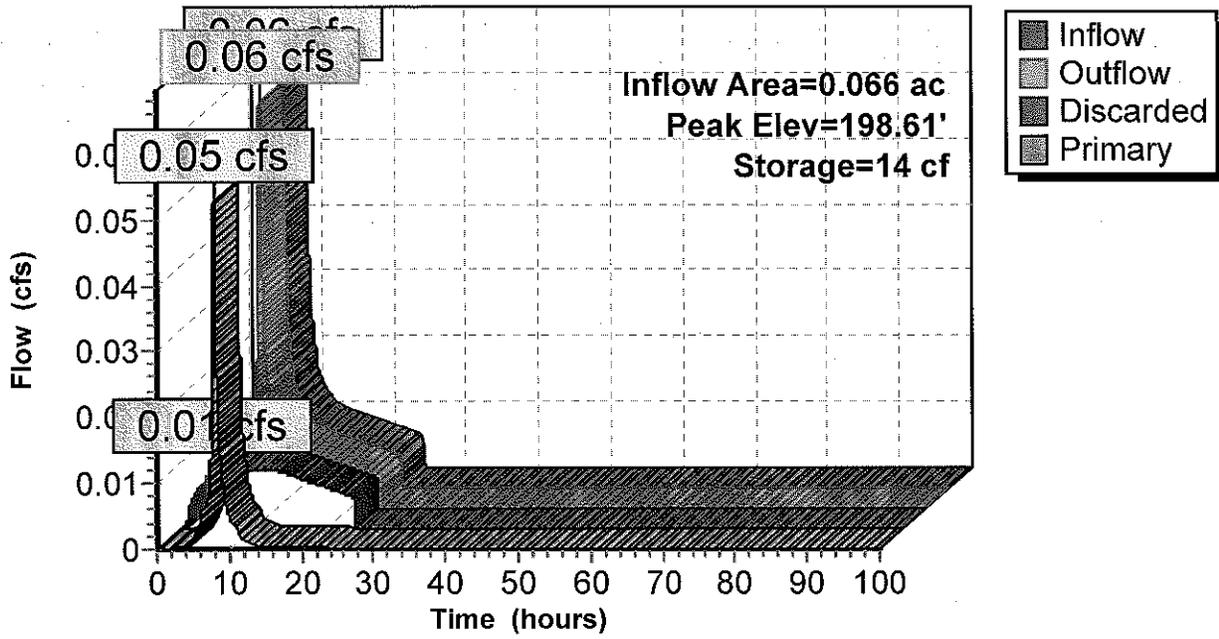
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
198.50	130	0	0
199.50	130	130	130

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.50'	3.000 in/hr Exfiltration over Horizontal area
#2	Primary	198.50'	12.0" Vert. Orifice/Grate C= 0.620

Discarded OutFlow Max=0.01 cfs @ 4.55 hrs HW=198.51' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.05 cfs @ 7.92 hrs HW=198.61' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 0.05 cfs @ 1.16 fps)

Pond 5P: Infiltration Planter Hydrograph



Summary for Pond 7P: Infiltration Planter

Inflow Area = 0.066 ac, 100.00% Impervious, Inflow Depth = 3.77" for 25 Year event
 Inflow = 0.06 cfs @ 7.88 hrs, Volume= 0.021 af
 Outflow = 0.06 cfs @ 7.92 hrs, Volume= 0.021 af, Atten= 0%, Lag= 2.4 min
 Discarded = 0.01 cfs @ 4.55 hrs, Volume= 0.014 af
 Primary = 0.05 cfs @ 7.92 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 198.61' @ 7.92 hrs Surf.Area= 130 sf Storage= 14 cf

Plug-Flow detention time= 3.6 min calculated for 0.021 af (100% of inflow)
 Center-of-Mass det. time= 3.6 min (663.1 - 659.5)

Volume	Invert	Avail.Storage	Storage Description
#1	198.50'	130 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

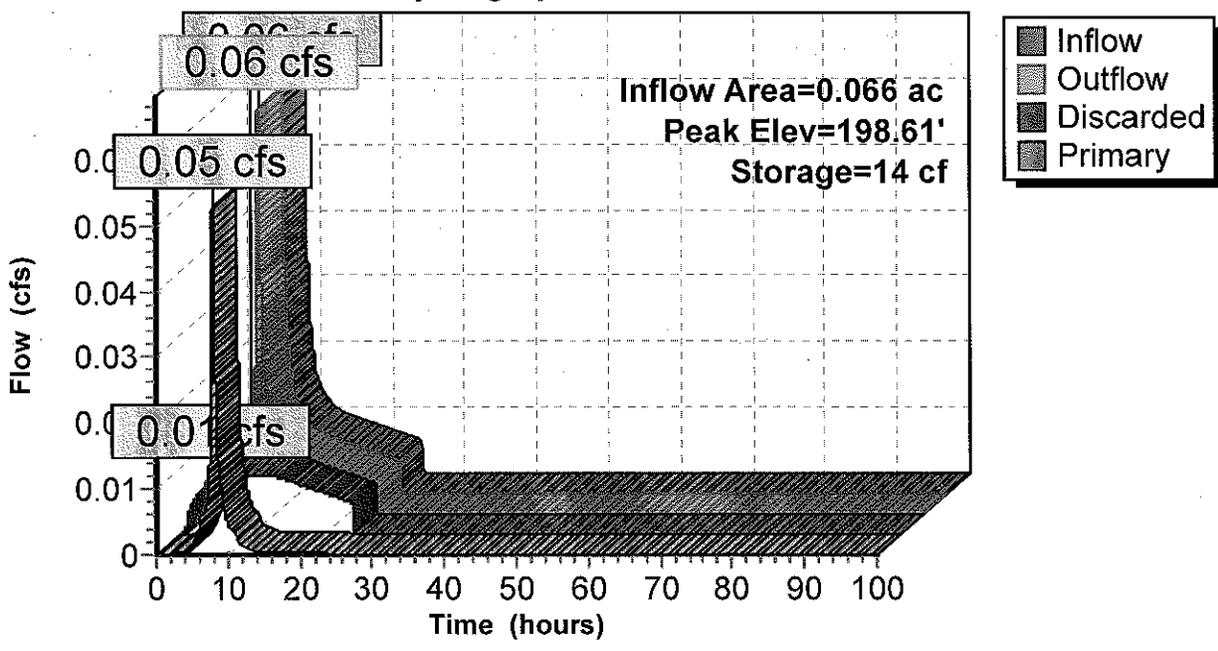
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
198.50	130	0	0
199.50	130	130	130

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.50'	3.000 in/hr Exfiltration over Horizontal area
#2	Primary	198.50'	12.0" Vert. Orifice/Grate C= 0.620

Discarded OutFlow Max=0.01 cfs @ 4.55 hrs HW=198.51' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.05 cfs @ 7.92 hrs HW=198.61' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 0.05 cfs @ 1.16 fps)

Pond 7P: Infiltration Planter Hydrograph



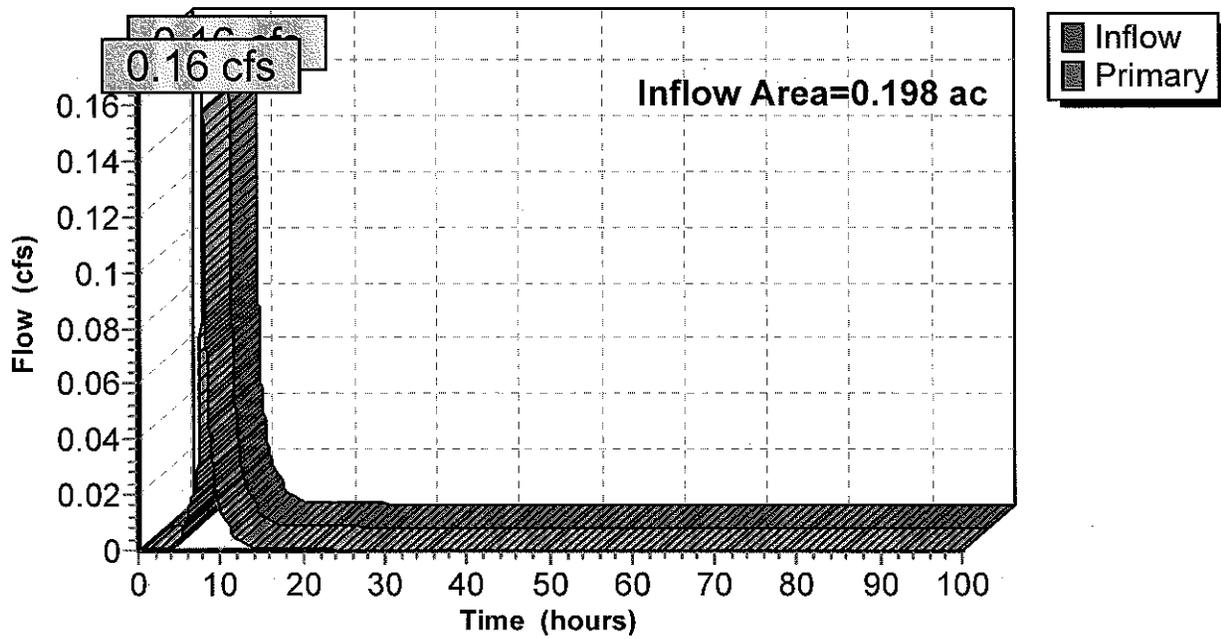
Summary for Link 1L: UPPER LOT FLOW

Inflow Area = 0.198 ac, 100.00% Impervious, Inflow Depth = 1.14" for 25 Year event
Inflow = 0.16 cfs @ 7.92 hrs, Volume= 0.019 af
Primary = 0.16 cfs @ 7.92 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 1L: UPPER LOT FLOW

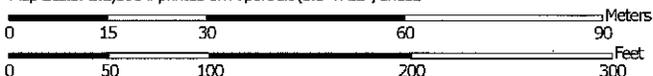
Hydrograph



Hydrologic Soil Group—Yamhill County, Oregon
(PL)



Map Scale: 1:1,090 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

Hydrologic Soil Group—Yamhill County, Oregon
(PL)

MAP LEGEND

- Area of Interest (AOI)**
-  Area of Interest (AOI)
- Soils**
- Soil Rating Polygons**
-  A
 -  A/D
 -  B
 -  B/D
 -  C
 -  C/D
 -  D
 -  Not rated or not available
- Soil Rating Lines**
-  A
 -  A/D
 -  B
 -  B/D
 -  C
 -  C/D
 -  D
 -  Not rated or not available
- Soil Rating Points**
-  A
 -  A/D
 -  B
 -  B/D
-  C
 -  C/D
 -  D
 -  Not rated or not available
- Water Features**
-  Streams and Canals
- Transportation**
-  Rails
 -  Interstate Highways
 -  US Routes
 -  Major Roads
 -  Local Roads
- Background**
-  Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.
Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Yamhill County, Oregon
Survey Area Data: Version 3, Sep 18, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 8, 2010—Sep 4, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Yamhill County, Oregon (OR071)				
Map unit symbol	Map unit name	Rating	Acres In AOI	Percent of AOI
2300A	Aloha silt loam, 0 to 3 percent slopes	C/D	3.1	100.0%
Totals for Area of Interest			3.1	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

City of Newberg LIDA Sizing Form

(Include this form with plan submittal)

Project Title: _____

Project Address: _____

Project Taxlot/ Taxmap#: _____

Project Location: _____

Contact Name/Title/Company: _____

Phone/e-mail: _____

STEP 1: Determine Impervious Area Requiring Treatment

Total Gross Site Area (acres):		Pre. Dev. Impervious Area (ft):		(X)
Proposed Net New Impervious Area (ft):		Post Dev. Impervious Area (ft):		(Y)
$(PA) = (Y) - (X)$				

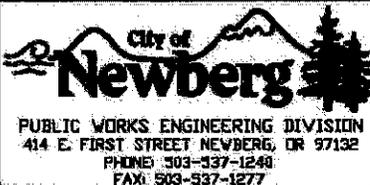
STEP 2: Deduct Impervious Area LIDA Credits

Porous Pavement (sq. ft.):		(P)
Green Roof (sq. ft.):		(G)
Other Credits as approved (sq. ft.):		(O)
Total Credits (sq. ft.):		(C)
$(C) = (P) + (G) + (O)$		
Impervious Area Requiring Treatment (sq. ft.):		(IA)
$(IA) = (PA) - (C)$		

STEP 3: Size LIDA Facilities for Remaining Impervious Area

	Impervious Area Treated (sq. ft.)	SF, Sizing Factor	LIDA Facility Size (sq. ft.)
Infiltration Planters/ Rain Garden	2,877 sf	0.045	130 sf
Flow-through Planter		0.060	
Public Flow-through Planter		0.060	

Total Impervious Area Treated (sq. ft.) **MUST BE EQUAL TO (IA)**

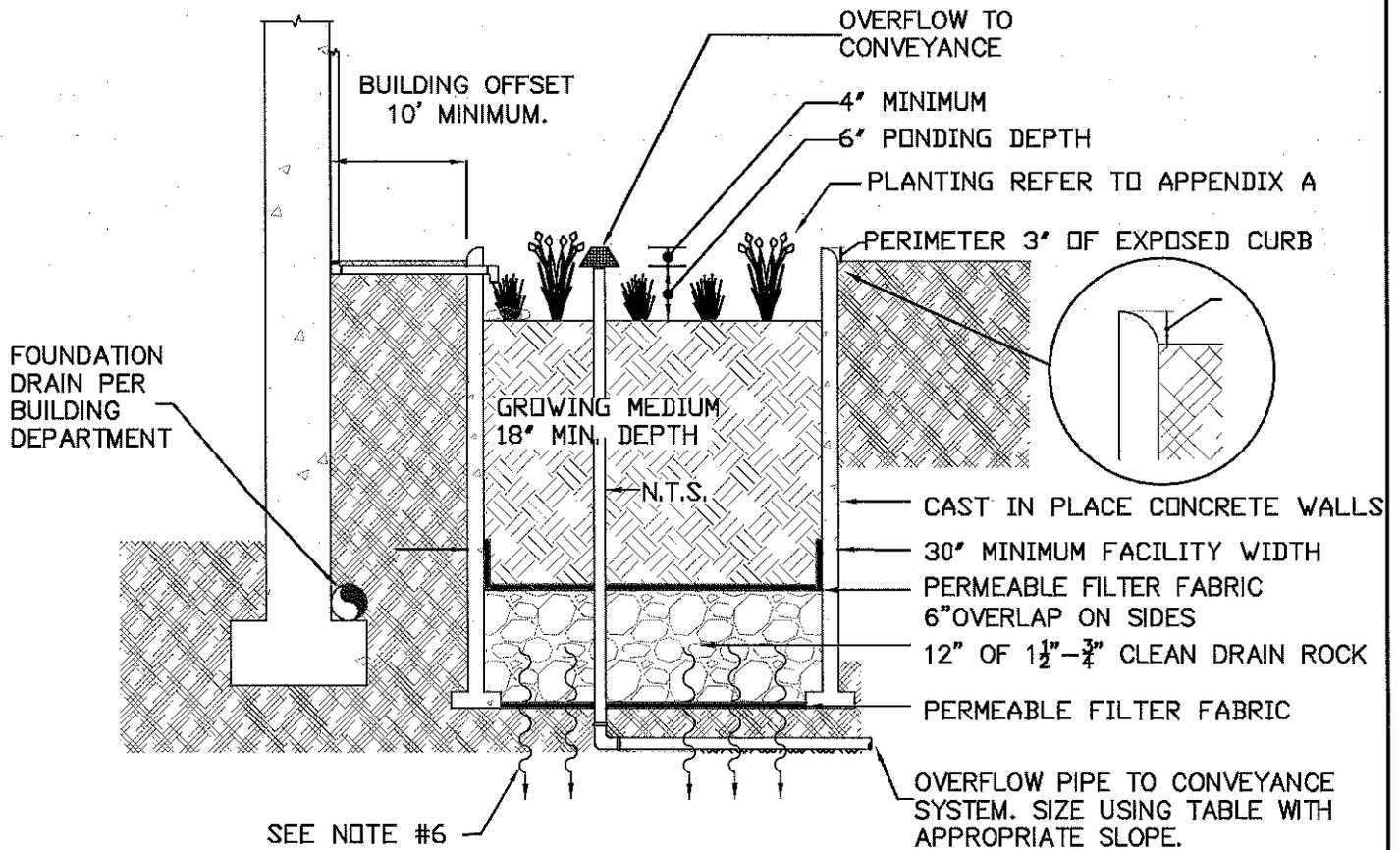


REVISIONS:

LIDA SIZING FORM

SCALE:	N.T.S.
DATE:	MARCH 2014
APPROVED BY:	JAY H.
STANDARD DRAWING	451

PRIVATE/ PUBLIC WATER QUALITY & QUANTITY TREATMENT

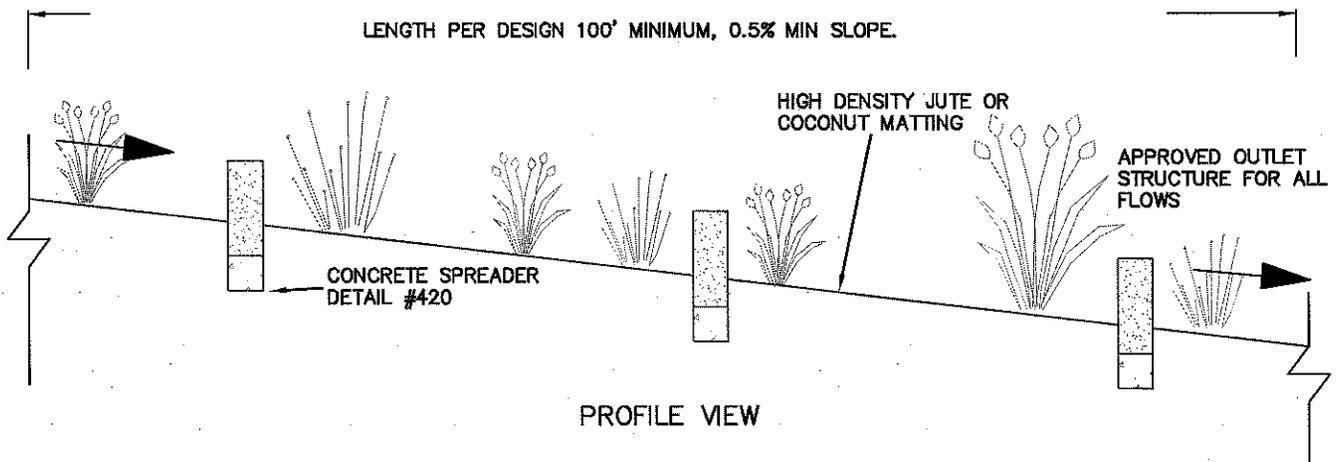


OVERFLOW PIPE SIZE (1/8 in./ft. SLOPE)	
MAX PROJECT ROOF AREA (ft.)	OVERFLOW PIPE SIZE (in.)
822	3
1,880	4
3,340	6

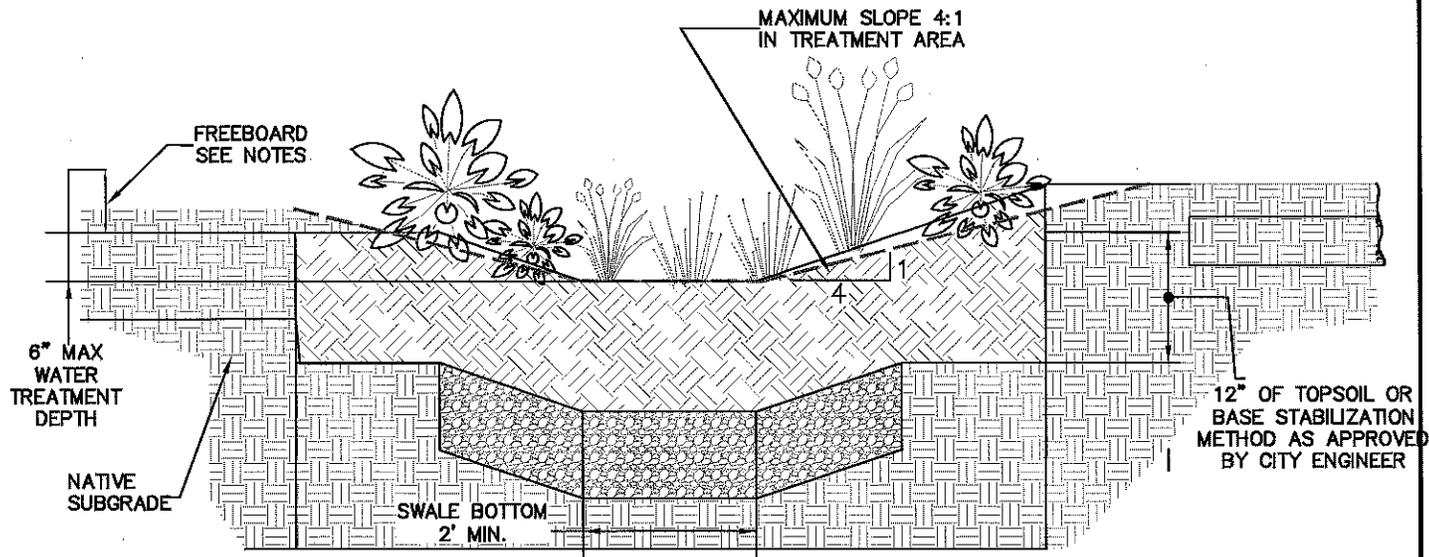
OVERFLOW PIPE SIZE (1/4 in./ft. SLOPE)	
MAX PROJECT ROOF AREA (ft.)	OVERFLOW PIPE SIZE (in.)
1,160	3
2,650	4
4,720	6

NOTES:

1. MAXIMUM SLOPE OF PLANTER 0.5%.
2. NO TREES OR DEEP ROOTED VEGETATION OVER PIPING IS ALLOWED IN FACILITY.
3. STORM FLOW INLETS THROUGH WALL CUT OUTS, BOTH TO MAINTAIN MAXIMUM LINEAR DISTANCE FROM THE OVERFLOW PIPE.
4. PRIVATE OVERFLOW PIPE TO BE MINIMUM SPECIFIED IN THE PLUMBING CODE, SEE TABLE. PUBLIC FACILITIES SHALL BE SIZED TO CONVEY THE 25 YEAR STORM.
5. ENERGY DISSIPATERS REQUIRED AT WATER ENTRANCES MINIMUM 18"X18"X6" OF 4 TO 6 INCH ANGULAR RIPRAP.
6. SIZING FACTORS, FOR INFILTRATION FACILITIES ASSUME AN UNFACTORED INFILTRATION RATE GREATER THAN 2 IN PER HOUR.
7. MUST BE LOCATED 3' MINIMUM FROM ADJACENT PROPERTY LINE.



PROFILE VIEW



CROSS-SECTIONAL VIEW WITH ON STREET PARKING

HYDRAULIC DESIGN CRITERIA:

1. DESIGN FLOW: WATER QUALITY FLOW
2. MIN. HYDRAULIC RESIDENCE TIME: 9 MINUTES
3. MAXIMUM WATER DESIGN DEPTH: 0.5 FEET
4. MINIMUM FREE BOARD: 1.0 FOOT (FOR FACILITIES NOT NOT PROTECTED FROM HIGH FLOWS)
5. MANNING "n" VALUE: 0.24
6. MAXIMUM VELOCITY: 2.0 fps BASED ON 25-YEAR FLOW

FACILITY DESIGN CRITERIA:

1. UP UNTIL THE MAX WATER SURFACE, INTERIOR SIDE SLOPES, MAX SLOPE IS 4H:1V
2. ABOVE MAX WATER SURFACE, INTERIOR SIDE SLOPES, MAX SLOPE IS 2H:1V
3. IF INTERIOR SIDE SLOPES MUST BE MOWED SIDE SLOPE THEN THE MAX SLOPE IS 4H:1V
4. EXTERIOR SIDE SLOPES MAX 2H:1V
5. MINIMUM FREEBOARD 1 FOOT FROM 25 YEAR DESIGN WATER SURFACE ELEVATION
6. PROVIDE AN ENERGY DISSIPATER AT THE ENTRANCE OF SWALE, WITH A MINIMUM LENGTH OF 4 FEET. IT WILL BE DESIGNED TO REDUCE VELOCITIES AND SPREAD THE FLOW ACROSS THE TREATMENT CROSS SECTION.

FACILITY DESIGN CRITERIA:

7. THE USE OF INTERMEDIATE FLOW SPREADERS IS REQUIRED, SPACING FOR CONCRETE SPREADERS TO BE DETERMINED BY DESIGN ENGINEER.
8. EXTEND RIVER ROCK, TOPSOIL, AND HIGH DENSITY JUTE OR COCONUT MATTING TO TOP OF TREATMENT AREA (OR WQV LEVEL). EXTEND TOPSOIL AND LOW DENSITY JUTE MATTING TO THE EDGE OF WATER QUALITY TRACT.
9. WHERE SWALES WRAP 180-DEGREES FORMING PARALLEL CHANNELS, FREEBOARD SHALL BE PROVIDED BETWEEN EACH OF THE PARALLEL CHANNELS. A 1 FOOT WALL ABOVE GROUND SURFACE MAY ALSO BE USED. ALTERNATIVE: A SOIL BASED BERM WITH A MIN. TOP WIDTH OF 1 FOOT & MAX 2.5H:1V SIDE SLOPES MAY BE USED.
10. WHERE SWALES ARE DESIGNED WITH DITCH INLETS & OUTLET STRUCTURES & DESIGN OF MAINTENANCE ACCESS TO SUCH STRUCTURES MAY BE DIFFICULT DUE TO SWALE LOCATION, SWALES MAYBE DESIGNED AS FLOW THROUGH FACILITIES WITH UNSUMPED STRUCTURES. MAINTENANCE ACCESS TO STRUCTURE END OF THE FACILITY IS REQUIRED.

City of Newberg
 PUBLIC WORKS ENGINEERING DIVISION
 414 E. FIRST STREET NEWBERG, OR 97132
 PHONE: 503-537-1240
 FAX: 503-537-1277

REVISIONS:

VEGETATED SWALE

SCALE:	N.T.S.
DATE:	MARCH 2014
APPROVED BY:	JAY H.
STANDARD DRAWING	460

WALL SECTIONS AND INTERIOR DIMENSIONS IN ACCORDANCE WITH STANDARD DRAWING NO. 403.

STORM SEWER OUT

PLATE & GUIDE DRAWING NO.418

MAXIMUM WATER SURFACE ELEVATION

3" MINIMUM

SWALE BOTTOM

WHEN USED WITH EXTENDED DRY POND PROVIDE .4' (APPROX. PERMANENT POOL DEPT)

POND BOTTOM

4'-5"

ANCHOR TO WALL WITH STAINLESS STEEL RISER CLAMP OR 2" MIN. STAINLESS STEEL BAND AND STAINLESS STEEL ANCHORS. MINIMUM OF 2 PLACES.

6" MIN.

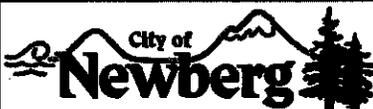
18"

SECTION A-A CLAMP DETAIL

1/2" SELF TAPPING CONCRETE ANCHORS, PHILLIPS 5-12 OR APPROVED EQUAL.
1/2" X 1-1/2" STAINLESS STEEL BOLT.

NOTES:

1. CONNECTING PIPE AND TEE SHALL BE 4", 6", OR 8" AWWA C-900 OR ASTM 3034 PVC, AND ONE SIZE LARGER THAN THE ORIFICE OPENING.
2. MAXIMUM ORIFICE OPENING SHALL BE 6" DIAMETER.
3. STRUCTURES SHALL CONFORM TO STANDARD DRAWING NO. 390 DITCH INLET.
4. FRAME AND GRATE SHALL CONFORM TO STANDARD DRAWING NO.403, DITCH INLET FRAME AND GRATE.
5. PLATE AND GUIDE SHALL BE SECURED FLUSH AGAINST WALL OF STRUCTURE AS APPROVED.
6. MAINTAINANCE ACCESS REQUIRED TO WITHIN 10' OF CENTER OF BOTH STRUCTURES.



City of Newberg
PUBLIC WORKS ENGINEERING DIVISION
414 E. FIRST STREET NEWBERG, OR 97132
PHONE: 503-537-1240
FAX: 503-537-1277

REVISIONS:

**OUTFLOW CONTROL
STRUCTURE**

SCALE:	N.T.S.
DATE:	MARCH 2014
APPROVED BY:	JAY H.
STANDARD DRAWING	417

SLOT SHALL BE
1"X5" CENTERED

3/16" STAINLESS STEEL CHAIN OR CABLE
ATTACHED TO ORIFICE PLATE AND
STRUCTURE AS APPROVED. CHAIN OR CABLE
SHALL BE SMALL ENOUGH TO ALLOW ORIFICE
PLATE TO BE REMOVED FROM GUIDE. ORIFICE
PLATE AND GUIDE TO BE MANUFACTURED
FROM 1/2" HDPE OR 1/4" STAINLESS STEEL.

DESIGN ENGINEER TO SPECIFY:

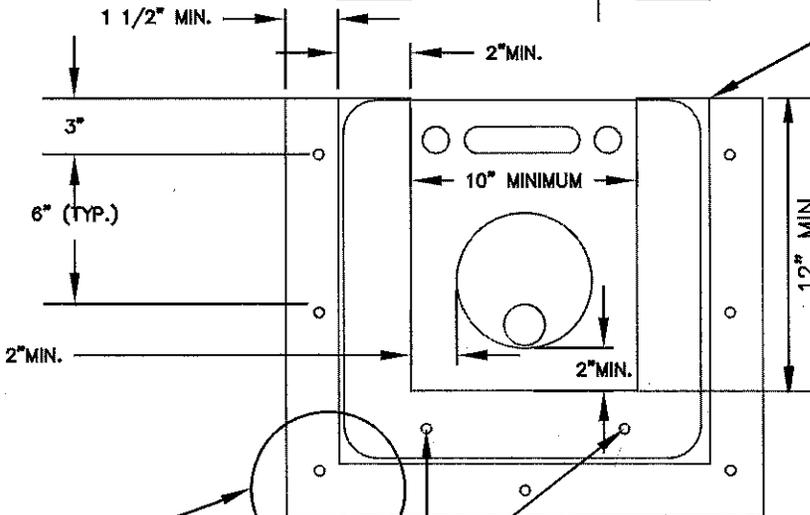
ORIFICE SIZE _____
ORIFICE ELEVATION _____

ALIGN INVERT OF ORIFICE TO
INVERT OF PIPE.

SPACER REQUIRED FOR
MULTIPLE ORIFICES

PLATE THICKNESS +1/4"

TOP OF GUIDE
±3" BELOW GRATE



ORIFICE PLATE GUIDE SHALL FIT STOP
GATE AND INCLUDE BOTTOM CHANNEL
ORIFICE PLATE GUIDE.

1/2" DIA. WEEPHOLES

1/2" SELF TAPPING CONCRETE
ANCHORS, PHILLIPS 5-12 OR
APPROVED EQUAL.
1/2" X 1-1/2" STAINLESS STEEL
BOLT.

NOTE:

FOR MULTIPLE ORIFICE APPLICATION
A 3" MIN. SPACER IS REQUIRED AS
SHOWN. SPACER TO MATCH PLATE GUIDE
DIMENSIONS, WIDTH, MATERIAL
WITH A WATER TIGHT SEAL.



PUBLIC WORKS ENGINEERING DIVISION
414 E. FIRST STREET NEWBERG, OR 97132
PHONE: 503-537-1240
FAX: 503-537-1277

REVISIONS:

ORIFACE PLATE
AND GUIDE

SCALE: N.T.S.

DATE: MARCH 2014

APPROVED BY: JAY H.

STANDARD DRAWING

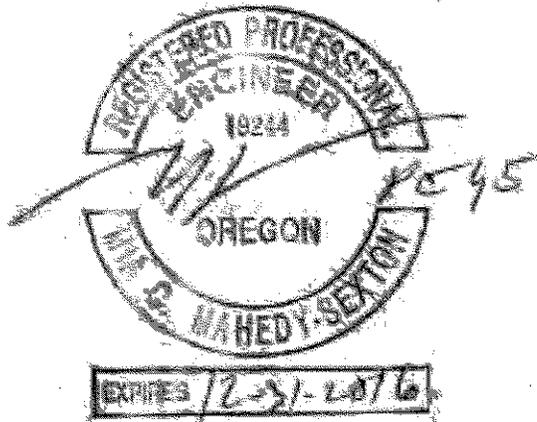
418

Geotechnical Report

Columbia Drive subdivision
Newberg, Oregon

Prepared for:
Del Bocco Vista

28 April 2016



Rapid
Soil Solutions LLC

3915 SW Plum Street
Portland, OR 97219
503-816-3689

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SUPPORTING DATA

Appendix A - Figures

- Figure 1 Location Plan
- Figure 2 Tax map
- Figure 3 Site plan with testing locations
- Photo of existing test pit

Appendix B – Laboratory data, soils logs and infiltration sheet

1.0 PROJECT AND SITE DESCRIPTIONS

Rapid Soil Solutions (RSS) has prepared this geotechnical report for the proposed development of three parcels between Lynn Drive and Columbia Drive, in Nehalem, and assigned the tax lot IDs of R3218AB 01700, R3218AB 01701, and R3218AB 01702. The site is comprised of a large field with generally southeast-descending slopes and intermittent trees. The site is bound to the south by Columbia Drive and to the north by Lynn Drive. A single parcel (R3218AB 01600) containing a single family residence assigned the street address of 421 W Columbia Drive. To the east is a set of single family residences with house numbers including 308 Lynn Drive, 1961 through 1847 Crater Lane and 315 Columbia Drive. The site is situated roughly 500' east of NE Chehalem Drive, 770' west of N Main Street, 0.41 miles west of N College Street (OR-219), 0.50 miles north of Yamhill-Newberg Highway (OR-240), 0.94 miles north of 99W (Pacific Highway W), and is roughly 1.09 miles south of NE North Valley Road. The site can be found in the northwest quarter of the northeast quarter of Section 18, Township 3-South, Range 2-West W.M. in Yamhill County, and can be distinguished by the tax lot numbers 1700, 1701 and 1702 (R3218AB 01700, R3218AB 01701, and R3218AB 01702). The latitude and longitude of the site are 45.313905 and -122.981887 (45°18'50.1"N, 122°58'54.8"W). See Appendix A, Figure 1 for site location indicated on a USGS 7.5 minute topographic map. Subsequent figures include additional site location information.

2.0 SITE CONDITIONS

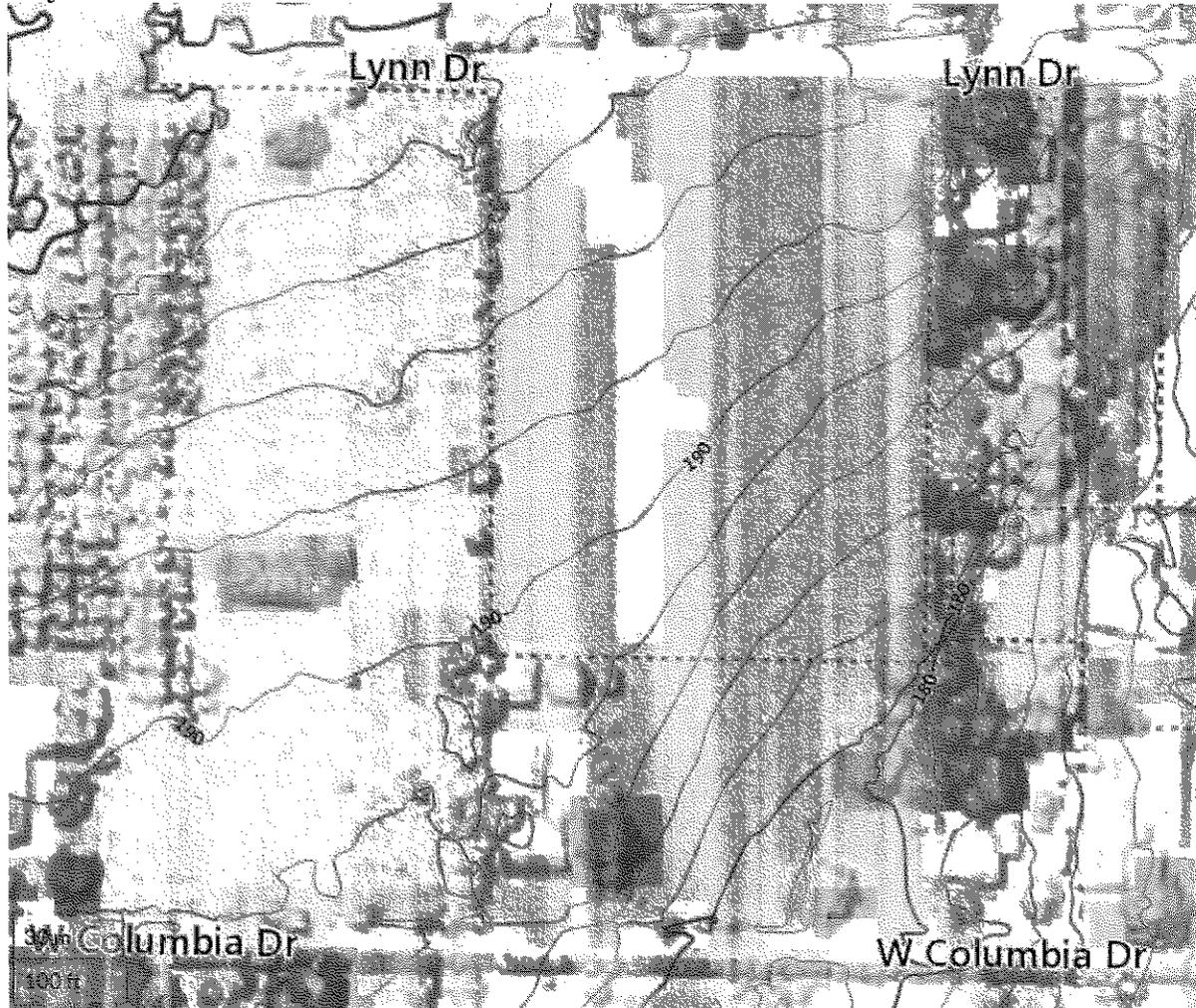
2.1 Surface Conditions

This 3.06-acre subject site is situated just below the southwestern-descending slopes of the Chehalem Mountains. The site is mapped by Coe (2011: Open File Report O-11-06) as falling within the lowlands of the Willamette River Basin with slopes that descend towards the Chehalem Creek, a tributary to the Willamette River. The site is classified as situated within 100' elevation of local waterways; the closest down-slope waterway, is a south-flowing tributary to Chehalem Creek that passes roughly 250' beyond the southeastern corner of the subject site. Lidar imagery indicates that the slopes on site are generally all descending southeast towards the previously noted, un-named, south-flowing tributary to Chehalem Creek. Historical aerial imagery indicates that there were two structures on the site, constructed prior to 1994 and were demolished or fell down between 2002 and 2003. The spot where the larger of the two structures once stood now contains a dense blackberry thicket. A row of trees is present roughly on the western half of the parcel in the center of the subject site. Other trees on site can be found in the southeastern corner of the site and along the southern edge. Two power poles can be seen in aerial imagery, within the northeastern quarter of the site, but appear to have been removed between 2013 and 2014. One pole with a meter still remains on site, near the center of the parcel.

The majority of the site currently contains tall grasses. Additionally there are some trees in various locations on the parcel and a large blackberry thicket situated within the site's northeastern quarter. Historical aerial imagery indicates that the northern half of the site

was used to grow a field crop such as grass, while the southern portion of the site may have also once been used for agricultural purposes, but no evidence indicates a previous application as a tree farm or orchard.

RSS understands that the proposed work will establish a 29-lot subdivision within the subject site.



2.2 Regional Geology

Current geologic literature¹⁻²⁻³⁻⁴ classifies the slopes underlying the subject site as

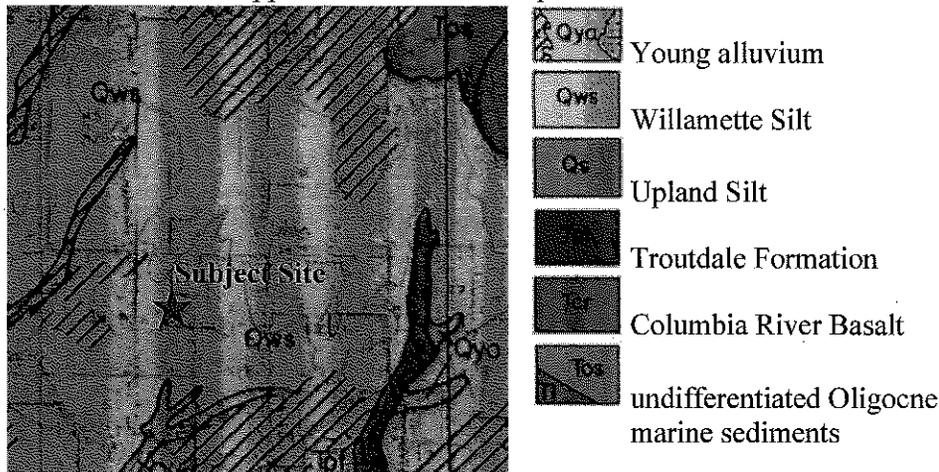
1 Burns, Scott, Growney, Larry, Brodersen, B., Yeats, R.S., and Popowski, T.A., 1997, Map showing faults, bedrock geology, and sediment thickness of the western half of the Oregon City 1:100,000 quadrangle, Washington, Multnomah, and Marion Counties: Oregon Department of Geology and Mineral Industries, Interpretive Map Series 4, scale 1:100,000.

2 Hart, D.H. and Newcomb, R.C., 1965, Geology and ground water of the Tualatin Valley, Oregon: U.S. Geological Survey, Water-Supply Paper 1697, scale 1:48,000.

3 Schlicker, H.G. and Deacon, R.J., 1967, Engineering geology of the Tualatin Valley region: Oregon Department of Geology and Mineral Industries, Bulletin 60, scale 1:48,000.

4 Gannett, M.W. and Caldwell, R.R., 1998, Geologic framework of the Willamette lowland aquifer system,

Missoula floods deposits. These periglacial sediments were emplaced from about 21,000 to 12,000 years ago when dozens of gigantic floods burst through the ice dam that retained Glacial Lake Missoula. The floodwaters, which reached an elevation of 400 feet above sea level, soured many areas down to bedrock and buried others beneath thick layers of gravel, sand and silt that can be divided into a fine-grained and course-grained units. Additionally the slopes underlying the site are mapped as fine-grained deposits. This fine-grained unit is comprised primarily of unconsolidated clay, silt, and fine to medium grained white or tan sand. The sediments are deposited in a series of distinct layers, a few inches to a few feet thick, each of which represents a single flood. The finer sediments are predominantly quartz and feldspar and also contain white mica. The coarser sediments can be comprised of Columbia River Basalt fragments. Poorly defined beds of 1- to 3-feet thickness are observed in outcrops, and complex layering has been recorded in boreholes. The clay phase of the deposit is mapped just northeast of the subject site. The total thickness of the unconsolidated sedimentary deposits at the subject site falls between 0 and 99 meters. Soil development commonly introduces significant clay and iron oxides into the upper 6-10 feet of the deposit.



2.3 Field Exploration and Subsurface Conditions

2.3.1 Field Explorations

Four (4) test pits were excavated with an excavator and two (2) hand auger holes. The location of the test pits are shown on Figure 4 in Appendix A. A GIT observed the excavation of the pits and logged the subsurface materials with them reviewed by a registered professional engineer. Soil logs detailing materials encountered are Appendix B. The logs were created using the Unified Soil Classification and Visual Manual Procedure (ASTM-D 2488). Samples were transported to the laboratory ACS Testing of Tigard, Oregon for further classification in seal bags. Please see Appendix B for further laboratory results.

Oregon and Washington: U.S. Geological Survey, Professional Paper 1424-A, scale 1:250,000.

2.3.1 Subsurface Conditions

The soil conditions were stiff silty to CLAY at 6 feet. With moisture contents ranging from 29% to 39.4%

2.3.2 Groundwater

Groundwater was encountered in TP #2 at 4ft and TP #4 at 5.5ft. Existing test pit (shown on figure 3) on site confirms shallow ground water during the winter months as found in TP's 2 and 4.

3.0 GEOTECHNICAL DESIGN RECOMMENDATIONS

3.1 Foundation Design

The building foundations may be installed on either engineered fill or firm native sub-grade that is found at a depth of about 2 feet. This depth may be locally variable and should be confirmed by a geotechnical engineer or their representative at the time of construction.

Continuous wall and isolated spread footings should be at least 16 and 24 inches wide, respectively. The bottom of exterior footings should be at least 16 inches below the lowest adjacent exterior grade. The bottom of interior footings should be at least 12 inches below the base of the floor slab.

Footings placed on engineered fill or firm native sub-grade should be designed for an allowable bearing capacity of 2000 *pounds per square foot (psf)*. The recommended allowable bearing pressure can be doubled for short-term loads such as those resulting from wind or seismic forces.

Based on our analysis the total post-construction settlement is calculated to be less than 1 inch, with differential settlement of less than 0.5 inch over a 50-foot span for maximum column, perimeter footing loads of less than 100 kips and 6.0 kips per linear foot.

Lateral loads on footings can be resisted by passive earth pressure on the sides of the structures and by friction at the base of the footings. An allowable lateral bearing pressure of 100 *pounds per cubic foot (psf/ft)* below grade may be used. Adjacent floor slabs, pavements or the upper 12-inch depth of adjacent, unpaved areas should not be considered when calculating passive resistance. An angle of internal friction of 32 degrees can be used.

If construction is undertaken during wet weather, we recommend a thin layer of compacted, crushed rock be placed over the footing sub-grades to help protect them from disturbance due to the elements and foot traffic.

3.2 Floor Slabs

Satisfactory sub-grade support for building floor slabs can be obtained from the native sub-grade prepared in accordance with our recommendations presented below. A 6-inch-thick layer of imported granular material should be placed and compacted over the prepared sub-grade. Imported granular material should be crushed rock or crushed gravel that is fairly well graded between coarse and fine, contains no deleterious materials, have a maximum particle size of 1 inch, have less than 5 percent by weight passing the U.S. Standard No. 200 Sieve, and meet OSSC 02630.10 – Dense Graded Aggregate 1”-0”. The imported granular material should be placed in 6-inch-thick lifts and compacted to at least 95 percent of the maximum dry density as determined by American Society for Testing and Materials (ASTM) D 1557. A sub-grade modulus of 125 pounds per cubic inch (pci) may be used to design the floor slab.

Installation of a vapor barrier is required for all the houses built on this lot. It will reduce the potential for moisture transmission through, and efflorescence growth on, the floor slabs. Additionally, flooring manufacturers often require vapor barriers to protect flooring and flooring adhesives and will warrant their product only if a vapor barrier is installed according to their recommendations. The selection and design of an appropriate vapor barrier, if needed, should be based on discussions among members of the design team.

3.3 Seismic Design Criteria

The seismic design criteria for this project found herein is based on the ASCE 7-10 and from the USGS Earthquake Hazards Program. A summary of seismic design criterion below: using a Lat of 45.31305 and Long of -122.981887

	Short Period	1 Second
Maximum Credible Earthquake Spectral Acceleration	Ss = 0.956g	S1 = 0.438 g
Adjusted Spectral Acceleration	Sms = 1.068	Sm1 = 0.684
Design Spectral Response Acceleration Perimeters	Sds = 0.712	Sd1 = 0.456

3.4 GeoHazard Review

The Oregon HazVu: Statewide Geohazard Viewer⁵ and Metromap⁶ were reviewed on 26 April 2016 to investigate mapped geological hazards. This review indicates that the subject site is situated just beyond the northeastern edge of the 100-year floodplain, as mapped by FEMA. The expected earthquake-shaking hazard is classified as ‘very strong’ with a liquefaction hazard classification of ‘low’. The nearest mapped active fault is a NW-SE oriented fault that passes by the subject site approximately 0.38 miles to the southwest. Other, inactive faults are mapped further away. There are no landslides on or in close proximity to the subject site. The nearest mapped landslide is along the edge of steep slopes of the Chehalem Mountains, roughly 1.90 miles north of the subject site. The landslide susceptibility for the site is classified as low (landsliding unlikely) to moderate (landsliding possible).

5 <http://www.oregongeology.org/hazvu/>

6 <http://gis.oregonmetro.gov/metromap/>

3.5 Roadway Design

Our pavement design recommendations are based on the clayey SILT, 6" of 1 1/2" minus rock with 2" of 3/4" minus with 4in of AC will meet 25 year traffic growth for interior street design. RSS shall be called to proof roll the sub-grade before rock is placed. Please allow 24hours for all inspections.

Wet weather section for winter work: RSS recommends an over excavation of 18in of and replacing with 3in minus rock. The wet weather section shall be constructed using only tracked vehicles. No wheeled vehicles shall be allowed on the grade until the full rock section is placed. In lieu of the large 3in rock the contractor can cement treat the base to a depth of 18in. A sample three (3) 5 gallon buckets of the soil and sample of the cement shall be given to RSS at least a week's prior to CTB work. RSS will have its lab run a proctor with the soil and 3 different percentages of cement. The lab will then will break the samples to giving us the most cost effective cement percentage with the highest strength. RSS lab will need to be onsite during CTB operations to provide moisture percentages to CTB operator and measure the cement mixed to ensure it meets our lab values.

3.6 Infiltration testing

Two (2) hand augur holes were excavated as shown on figure 3 in the appendix A for infiltration tests for storm water design. See attached spread sheet in appendix B. RSS found at 2ft neat Lynn Drive we had 6in/hr drainage after 3 hour test. In the proposed pond we had 1.7in/hr of water drainage. Infiltration tests were conducted using the EPA falling head method. The reported rate is the last test after 3 hours.

4.0 CONSTRUCTION RECOMMENDATIONS

4.1 Site Preparation

Demolition should include removal of existing improvements throughout the project site. Underground utility lines, vaults, basement walls or tanks should be removed or grouted full if left in place. I recommend that soil disturbed during grubbing operations be removed to firm, undisturbed sub-grade. RSS will need to supply a stripping inspection prior to any other work taking place. Please allow 24hours notice for all inspections.

4.1.1 Proof Rolling

Following stripping and prior to placing aggregate base course, pavement the exposed sub-grade should be evaluated by proof rolling. The sub-grade should be proof rolled to identify soft, loose, or unsuitable areas. Please give 24 hour notice to observe the proof rolling. Soft or loose zones identified during the field evaluation should be compacted to an unyielding condition or be excavated and replaced with structural fill, as discussed in the *Structural Fill* section of this report.

4.1.2 Wet Weather Conditions

The near-surface soils will be difficult during or after extended wet periods when the moisture content of the surface soil is more than a few percentage points above optimum. See above roadway design section.

4.1.3 Test pit backfilling

RSS excavated a total of four (4) tests pits to evaluate the site soils. They were backfilled and compacted with the machine. It will need to be re-excavated at time of construction and backfilled as per the standards in this report.

4.2 Excavation

Subsurface conditions of accessible cleared areas of the project site show predominately SILT to a depth explored (8 feet). Excavations in the upper soils may be readily accomplished with conventional earthwork equipment with smooth faced bucket.

4.3 Structural Fills

Fills should be placed over sub-grade prepared in compliance with Section 4.1 of this report. Material used, as structural fill should be free of organic matter or other unsuitable materials and should meet specifications provided in OSSC, depending upon the application. A discussion of these materials is in the following sections.

4.3.1 Native Soils

Laboratory testing indicates that the moisture content of the typical for optimum moisture content of the soil required for satisfactory compaction. This is depending on the weather conditions at the time of excavation. Native soils can use ASTM D698 and 95% compaction is required. Please supply the engineer with a 5gallon bucket of material 48hours prior to any compaction tests required. Compaction tests are required every 500 cu feet of fill or every 1.5 feet of elevation.

4.3.2 Imported Granular Fill

The imported granular material must be reasonably well graded to between coarse and fine material and have less than 5% by weight passing the US Standard No.200 Sieve. Imported granular material should be placed in lifts 8 to 12 inches and be compacted to at least 92% of the maximum dry density, as determined by ASTM D 1557. Where imported granular material is placed over wet or soft soil sub-grades, we recommend that a geo-textile serve as a barrier between the sub-grade and imported granular material. Please supply the engineer with a 5gallon bucket of material 48hours prior to any compaction tests required. Compaction tests are required every 500 cu feet of fill or every 1.5 feet of elevation

4.3.3 Pavement Base Aggregate

Imported base aggregate for roads and parking lots should be clean, crushed rock or crushed gravel. The base aggregate should meet the gradation defined in OSSC 02630.10 – Dense Graded Aggregate 1 1/2”-0,” with the exception that the

aggregate should have less than 5% passing a US Standard No. 200 Sieve. The base aggregate should be compacted to at least 92% of the maximum dry density, as determined by ASTM D 1557. Please supply the engineer with a 5 gallon bucket of material 48 hours prior to any compaction tests required.

4.4 Drainage Considerations

The Contractor shall be made responsible for temporary drainage of surface water and groundwater as necessary to prevent standing water and/or erosion at the working surface. We recommend removing only the foliage necessary for construction to help minimize erosion. Slope the ground surface around the structures to create a minimum gradient of 2% away from the building foundations for a distance of at least 5 feet. Surface water should be directed away from all buildings into drainage swales or into a storm drainage system.

5.0 CONSTRUCTION OBSERVATIONS

Satisfactory pavement and earthwork performance depends on the quality of construction. Sufficient monitoring of the activities of the contractor is a key part of determining that the work is completed in accordance with the construction drawings and specifications. I recommend that a geotechnical engineer observe general excavation, stripping, fill placement, and sub-grades in addition to base. Subsurface conditions observed during construction should be compared with those encountered during the subsurface explorations. Recognition of changed conditions requires experience. Therefore, qualified personnel should visit the site with sufficient frequency to detect whether subsurface conditions changes significantly from those anticipated.

6.0 LIMITATIONS

This report has been prepared for the exclusive use of the addressee, and their architects and engineers for aiding in the design and construction of the proposed development. It is the addressee's responsibility to provide this report to the appropriate design professionals, building officials, and contractors to ensure correct implementation of the recommendations. The opinions, comments and conclusions presented in this report were based upon information derived from our literature review, field investigation, and laboratory testing. Conditions between, or beyond, our exploratory borings may vary from those encountered. Unanticipated soil conditions and seasonal soil moisture variations are commonly encountered and cannot be fully determined by merely taking soil samples or soil borings. Such variations may result in changes to our recommendations and may require that additional expenditures be made to attain a properly constructed project. Therefore, some contingency fund is recommended to accommodate such potential extra costs.

If there is a substantial lapse of time between the submission of this report and the start of work at the site; if conditions have changed due to natural causes or construction operations at, or adjacent to, the site; or, if the basic project scheme is significantly modified from that assumed, it is recommended this report be reviewed to determine the applicability of the conclusions and recommendations.

The work has been conducted in general conformance with the standard of care in the field of geotechnical engineering currently in practice in the Pacific Northwest for projects of this nature and magnitude. No warranty, express or implied, exists on the information presented in this report. By utilizing the design recommendations within this report, the addressee acknowledges and accepts the risks and limitations of development at the site, as outlined within the report.

APPENDIX A



Figure 1: Subject site location on the NW quarter of the Newberg Quadrangle

N.W. 1/4 N.E. 1/4 SEC. 18 T.3S. R.2W. W.M.
YAMHILL COUNTY OREGON



Figure 2: Subject site location on the Yamhill County Assessor's Map

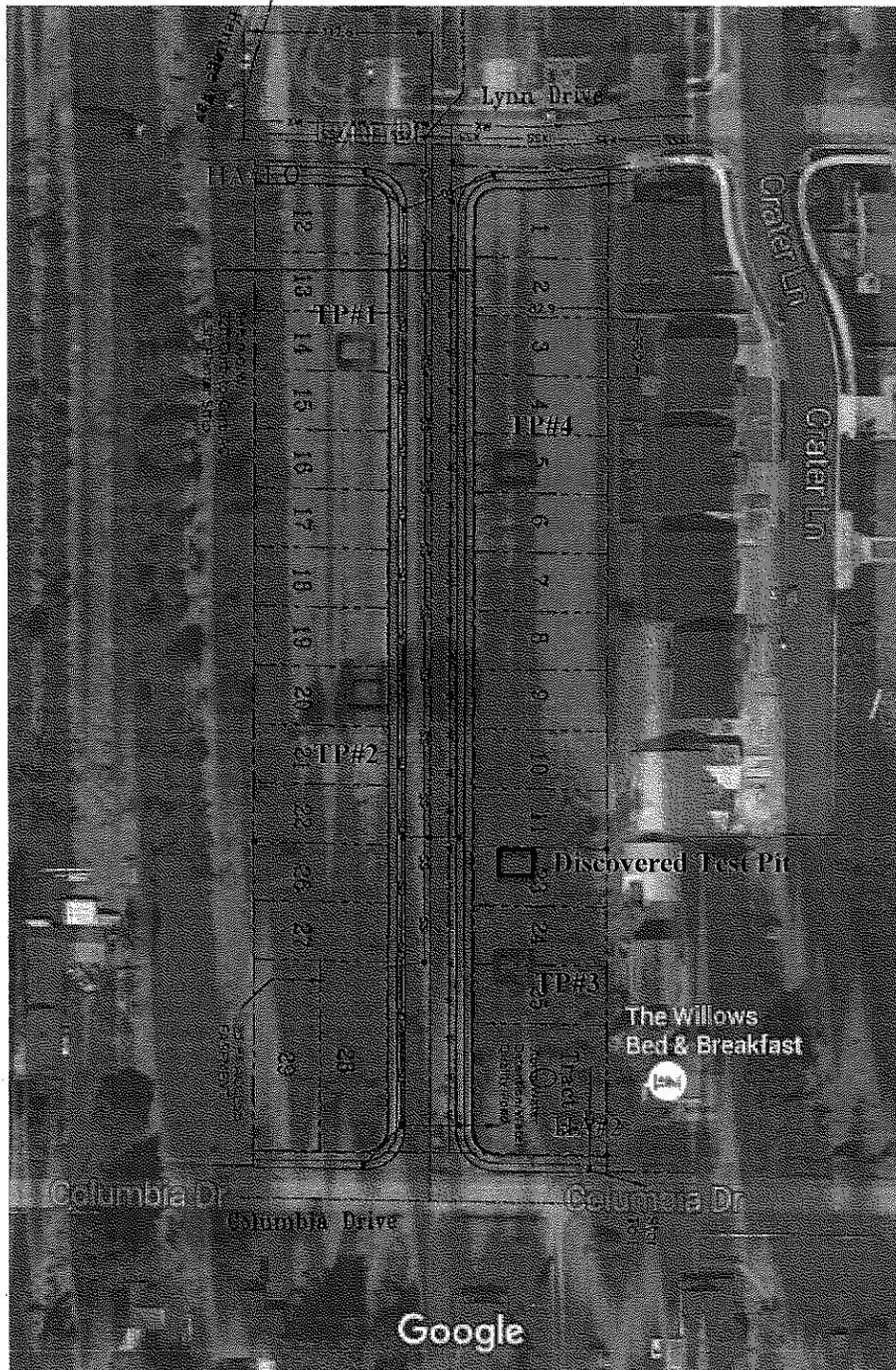


Figure 3: Site plan and aerial imagery with test pit and hand auger locations overlaid



Image of a discovered test pit in the southern half of the subject site. A thin layer of water remained in the bottom of the test pit at the time of the site visit. A layer of dried material spans the top of the test pit. This material is likely the dried remnants of a scum mat that grew on top of accumulated water in the test pit. This would indicate high water levels for an extended period of time since the creation of this test pit.

APPENDIX B



7409 SW Tech Center Dr. #145
 Tigard, OR 97223
 phn: 503-443-3799
 fax: 503-620-2748

RAPID SOIL SOLUTIONS
3915 SW PLUM STREET
PORTLAND, OR 97219-6018

PROJECT: RSS 2016 LAB SERVICES
 LOCATION: COLUMBIA SUBDIVISION
 SAMPLE SOURCE: SEE BELOW

JOB NO: 16-6172
 WORK ORDER NO: N/A
 DATE SAMPLED: 4/21/16

MECHANICAL SIEVE ANALYSIS
GROUP SYMBOL, USCS (ASTM D-2487)

Location & Depth	USCS	LL	PI	Silt or Clay	SAND								GRAVEL					COBBLES	Lab #
					Fine			Medium			Coarse		Fine			Coarse			
					#200	#100	#50	#40	#30	#16	#10	#8	#4	1/4"	3/8"	1/2"	3/4"		

PERCENT PASSING BY WEIGHT

Location & Depth	USCS	LL	PI	#200	#100	#50	#40	#30	#16	#10	#8	#4	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	3"	6"	Lab #		
TP1 @6'		38	14																					8890	
TP3 @2'		29	8																					8890	

BORING	DEPTH	MC%
TP1	6'	34.8
TP2	4'	35.3
TP3	2'	29.0
TP4	8'	39.3

REVIEWED BY  DEjs
 Doug Esquivel VP

TP#1

Surface Elevation: 198
 Boring Date: 4/21/16
 Boring Location: Newberg, OR
 Drilling Method: Excavator

SuperLog CivilTech Software, USA www.civiltech.com File: D:\Users\jma\Desktop\1018\Reports\12nd Quarter\Newburg\Columbia TP1.log Date: 4/20/2016

Depth	Remarks	Moisture (%)	Dry Density	Blow Counts	Sample Type	Water Table
0					TP	Topsoil
1					ML-CL	Damp, tan - medium brown, stiff SILT, PP = 1
2						
3						
4					ML-CL	Damp, tan medium brown, very stiff CLAY, PP= 2
5						
6	PI=14, LL=38	34.8			CL	Damp, medium brown, very stiff, CLAY, end test pit at 6ft
7						

LOG OF BORING

TP#2

Surface Elevation: 193
 Boring Date: 4/21/16
 Boring Location: Newberg, OR
 Drilling Method: Excavator

SuperLog CivilTech Software USA www.civiltech.com
 File: D:\Users\Mia\Desktop\MIA WORK\2016\Reports\2nd Quarter\Newberg\Columbia TP2.log
 Date: 4/28/2016

Depth	Remarks	Moisture (%)	Dry Density	Blow Counts	Sample Type	Water Table
0					TP	Topsoil
1					ML-CL	Damp, tan - medium brown, stiff silty CLAY
2						
3					ML-CL	Damp, medium brown with some redox coloration, stiff silty CLAY, PP=1
4	35.3				ML-CL	Wet, medium brown, hard CLAY
5						End test pit at 4ft
6						
7						

LOG OF BORING

TP#3

Surface Elevation: 139
 Boring Date: 4/21/16
 Boring Location: Newberg, OR
 Drilling Method: Excavator

Support Log CivilTech Software, USA www.civiltech.com
 File: D:\Users\Mja\Desktop\WIA WORK\2016\Reports\2nd Quarter\Newburg\Columbia TP3.log
 Date: 4/28/2016

Depth	Remarks	Moisture (%)	Dry Density	Blow Counts	Sample Type	Water Table
0					TP	Topsoil
1					CL-ML	Damp, medium brown, stiff clayey SILT, difficult to roll
2	29					
3						
4						
5						
6						
7						

LOG OF BORING

TP#4

Surface Elevation: 195
 Boring Date: 4/21/16
 Boring Location: Newberg, OR
 Drilling Method: Excavator

SuperLog CivilTech Software, USA www.civiltech.com
 Filer: D:\Users\Wial\Desktop\WIA WORK\2016\Reports\12nd Quarter\Newburg\Columbia TP4.log
 Date: 4/20/2016

Depth	Remarks	Moisture (%)	Dry Density	Blow Counts	Sample Type	Water Table
0					TP	
					CL-ML	
2						
4						
6	39.3				CL-ML	
8						
10						
12						
14						

Topsoil

Damp, medium brown, stiff clayey SILT, difficult to roll

Wet, medium brown, hard clayey SILT

Test pit completed at depth of 8ft

LOG OF BORING

Infiltration Test Results

Address: Columbia Drive Subdivision 4/26/2016

By: Wilton Roberts, supervised by Mia Mahedy-Sexton, PE GE

Purpose: Infiltration Test Hand Auger

HA#1 Depth = 2'

#1		#2		#3	
Time	Measurement	Time	Measurement	Time	Measurement
12:18	9.6 In.	13:18	9.5 In.	14:18	13.0 In.
12:38	16.7 In.	13:38	15.5 In.	14:38	16.0 In.
12:58	19.0 In.	13:58	17.2 In.	14:58	17.5 In.
13:18	20.7 In.	14:18	18.9 In.	15:18	19.0 In.
Rate	11.1 In./Hr		9.4 In./Hr		6.0 In./Hr

Soils:

0-2' Silty clay

HA#2 Depth = 2'

#1		#2		#3	
Time	Measurement	Time	Measurement	Time	Measurement
12:28	9.0 In.	13:28	9.0 In.	14:28	8.8 In.
12:48	10.0 In.	13:48	9.7 In.	14:48	9.0 In.
13:08	11.2 In.	14:08	10.3 In.	15:08	9.8 In.
13:28	12.0 In.	14:28	11.0 In.	15:28	10.5 In.
	3.0 In./Hr		2.0 In./Hr		1.7 In./Hr

Soils:

0-2' Silty clay



3915 SW Plum Street
Portland, OR 97219
503-816-3689

Columbia Estates Subdivision

Exhibit E Current Title Report



First American

First American Title Company of Oregon

825 NE Evans Street
McMinnville, OR 97128
Phn - (503)376-7363
Fax - (866)800-7294

**REVISED PUBLIC RECORD REPORT
FOR NEW SUBDIVISION OR LAND PARTITION
(COLUMBIA SUBDIVISION)**

THIS REPORT IS ISSUED BY THE ABOVE-NAMED COMPANY ("THE COMPANY") FOR THE EXCLUSIVE USE OF:

Del Boca Vista LLC
645 NE Third Street, Suite 200
McMinnville, OR 97128
Phone: (503)590-8600

Date Prepared : July 06, 2016
Effective Date : 8:00 A.M on July 01, 2016
Order No. : 1039-2529663
Reference : Columbia

The information contained in this report is furnished by First American Title Insurance Company of Oregon (the "Company") as an information service based on the records and indices maintained by the Company for the county identified below. This report is not title insurance, is not a preliminary title report for title insurance, and is not a commitment for title insurance. No examination has been made of the Company's records, other than as specifically set forth in this report. Liability for any loss arising from errors and/or omissions is limited to the lesser of the fee paid or the actual loss to the Customer, and the Company will have no greater liability by reason of this report. This report is subject to the Definitions, Conditions and Stipulations contained in it.

REPORT

- A. The Land referred to in this report is located in the County of Yamhill, State of Oregon, and is described as follows:

As fully set forth on Exhibit "A" attached hereto and by this reference made a part hereof.
- B. As of the Effective Date, the tax account and map references pertinent to the Land are as follows:

As fully set forth on Exhibit "A" attached hereto and by this reference made a part hereof.
- C. As of the Effective Date and according to the Public Records, we find title to the land apparently vested in:

As fully set forth on Exhibit "B" attached hereto and by this reference made a part hereof.
- D. As of the Effective Date and according to the Public Records, the Land is subject to the following liens and encumbrances, which are not necessarily shown in the order of priority:

As fully set forth on Exhibit "C" attached hereto and by this reference made a part hereof.

EXHIBIT "A"
(Land Description Map Tax and Account)

PARCEL 1

Beginning at a point on the East line of Tract 32 NORTHWEST NEWBERG SUBDIVISION, a plat of record in Yamhill County, Oregon said point bears North 00° 02' 28" East 264.54 feet from the Southeast corner of said Tract 32, and running thence along the East line thereof, North 00° 02' 28" East 170.73 feet to a point; thence North 89° 32' 47" West, 220.00 feet to a point thence South 00° 02' 28" West 435.06 feet to a point in the center of Walker Drive, being also the South line of said Tract 32; thence along said South line South 89° 29' 32" East 30.00 feet to a point; thence North 00° 02' 28" East 264.54 feet to a point; thence South 89° 29' 32" East 190.00 feet to the point of beginning.

PARCEL 2

Beginning at a point on the East line of Tract 32 NORTHWEST NEWBERG SUBDIVISION, a plat of record in Yamhill County, Oregon, said point bears North 00° 02' 28" East 435.27 feet from the Southeast corner of Tract 32, running thence along the East line thereof, North 00° 02' 28" East 202.55 feet to a point, which point is the Northeast corner of Tract 32; thence North 89° 32' 47" West 220.0 feet to a point; thence South 00° 02' 28" West 202.55 feet to a point; thence South 89° 32' 47" East 220.0 feet to the point of beginning.

PARCEL 3

Beginning at a point on the East line of Tract 32, NORTHWEST NEWBERG SUBDIVISION, a plat of record in Yamhill County, Oregon, said point bears North 00° 02' 28" East 264.54 feet from the Southeast corner of said Tract 32, and running thence North 89° 29' 32" West 190.0 feet to a point; thence South 00° 02' 28" West 264.54 to a point in the center of Walker Drive, being also the South line of said Tract 32; thence along said South line South 89° 29' 32" East 190.0 feet to a point, which is also the Southeast corner of Tract 32; thence North 00° 02' 28" East 264.54 feet to the point of beginning.

Map No.: R3218AB-01701

Tax Account No.: 276891

EXHIBIT "B"
(Vesting)

Del Boca Vista, LLC, an Oregon limited liability company as to Parcel 1 and 2, and Richard T. Lee and
Merrilee A. Lee Revocable Living Trust dated September 18, 2008 as to Parcel 3

EXHIBIT "C"
(Liens and Encumbrances)

1. Taxes for the fiscal year 2016-2017 a lien due, but not yet payable.
2. The rights of the public in and to that portion of the premises herein described lying within the limits of streets, roads and highways.
3. Electric Power Line Easement recorded May 08, 1979 in Film Volume 139 and Page 1551

NOTE: Taxes for the year 2015-2016 PAID IN FULL

Tax Amount: \$556.60
Map No.: R3218AB-01701
Property ID: 276891
Tax Code No.: 29.2
(Affects Parcel 1)

NOTE: Taxes for the year 2015-2016 PAID IN FULL

Tax Amount: \$552.06
Map No.: R3218AB-01700
Property ID: 41644
Tax Code No.: 29.2
(Affects Parcel 2)

NOTE: Taxes for the year 2015-2016 PAID IN FULL

Tax Amount: \$687.47
Map No.: R3218AB-01702
Property ID: 276908
Tax Code No.: 29.2
(Affects Parcel 3)

4. Deed of Trust and the terms and conditions thereof.
Grantor/Trustor: Del Boca Vista, LLC, an Oregon limited liability company
Grantee/Beneficiary: Barbara K. Morton, Trustee of the Barbara K. Morton Trust
Trustee: First American Title Company of Oregon
Amount: \$150,000.00
Recorded: November 20, 2015
Recording Information: Instrument No. 201518279, Deed and Mortgage Records+
(Affects Parcel 1)

The beneficial interest under said Deed of Trust has been assigned to Richard W. Morton, by Assignment recorded May 19, 2016, as 201607056 .

(NOTE: Assignment 201607056 erroneously refers to Trust Deed instrument number as 201518280)

5. Deed of Trust and the terms and conditions thereof.
- | | |
|------------------------|---|
| Grantor/Trustor: | Del Boca Vista, LLC, an Oregon limited liability company |
| Grantee/Beneficiary: | Barbara K. Morton, Trustee of the Barbara K. Morton Trust |
| Trustee: | First American Title Company of Oregon |
| Amount: | \$150,000.00 |
| Recorded: | November 20, 2015 |
| Recording Information: | Instrument No. 201518280 |
- (Affects Parcel 2)

The beneficial interest under said Deed of Trust has been assigned to Robert C. Morton, by Assignment recorded May 19, 2016, as 201607055 .

DEFINITIONS, CONDITIONS AND STIPULATIONS

1. **Definitions.** The following terms have the stated meaning when used in this report:
 - (a) "Customer": The person or persons named or shown as the addressee of this report.
 - (b) "Effective Date": The effective date stated in this report.
 - (c) "Land": The land specifically described in this report and improvements affixed thereto which by law constitute real property.
 - (d) "Public Records": Those records which by the laws of the state of Oregon impart constructive notice of matters relating to the Land.

2. **Liability of the Company.**
 - (a) This is not a commitment to issue title insurance and does not constitute a policy of title insurance.
 - (b) The liability of the Company for errors or omissions in this public record report is limited to the amount of the charge paid by the Customer, provided, however, that the Company has no liability in the event of no actual loss to the Customer.
 - (c) No costs (including, without limitation attorney fees and other expenses) of defense, or prosecution of any action, is afforded to the Customer.
 - (d) In any event, the Company assumes no liability for loss or damage by reason of the following:
 - (1) Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records.
 - (2) Any facts, rights, interests or claims which are not shown by the Public Records but which could be ascertained by an inspection of the land or by making inquiry of persons in possession thereof.
 - (3) Easements, liens or encumbrances, or claims thereof, which are not shown by the Public Records.
 - (4) Discrepancies, encroachments, shortage in area, conflicts in boundary lines or any other facts which a survey would disclose.
 - (5) (i) Unpatented mining claims; (ii) reservations or exceptions in patents or in Acts authorizing the issuance thereof, (iii) water rights or claims or title to water.
 - (6) Any right, title, interest, estate or easement in land beyond the lines of the area specifically described or referred to in this report, or in abutting streets, roads, avenues, alleys, lanes, ways or waterways.
 - (7) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use or enjoyment on the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the Public Records at the effective date hereof.
 - (8) Any governmental police power not excluded by 2(d)(7) above, except to the extent that notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the Public Records at the effective date hereof.
 - (9) Defects, liens, encumbrances, adverse claims or other matters created, suffered, assumed, agreed to or actually known by the Customer.

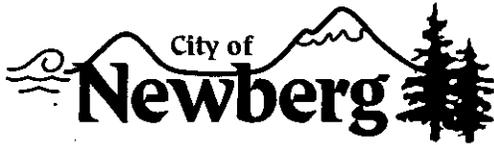
3. **Report Entire Contract.** Any right or action or right of action that the Customer may have or may bring against the Company arising out of the subject matter of this report must be based on the provisions of this report. No provision or condition of this report can be waived or changed except by a writing signed by an authorized officer of the Company. By accepting this form report, the Customer acknowledges and agrees that the Customer has elected to utilize this form of public record report and accepts the limitation of liability of the Company as set forth herein.

4. **Charge.** The charge for this report does not include supplemental reports, updates or other additional services of the Company.

Columbia Estates Subdivision

Exhibit F

Public Notice Information



Community Development Department

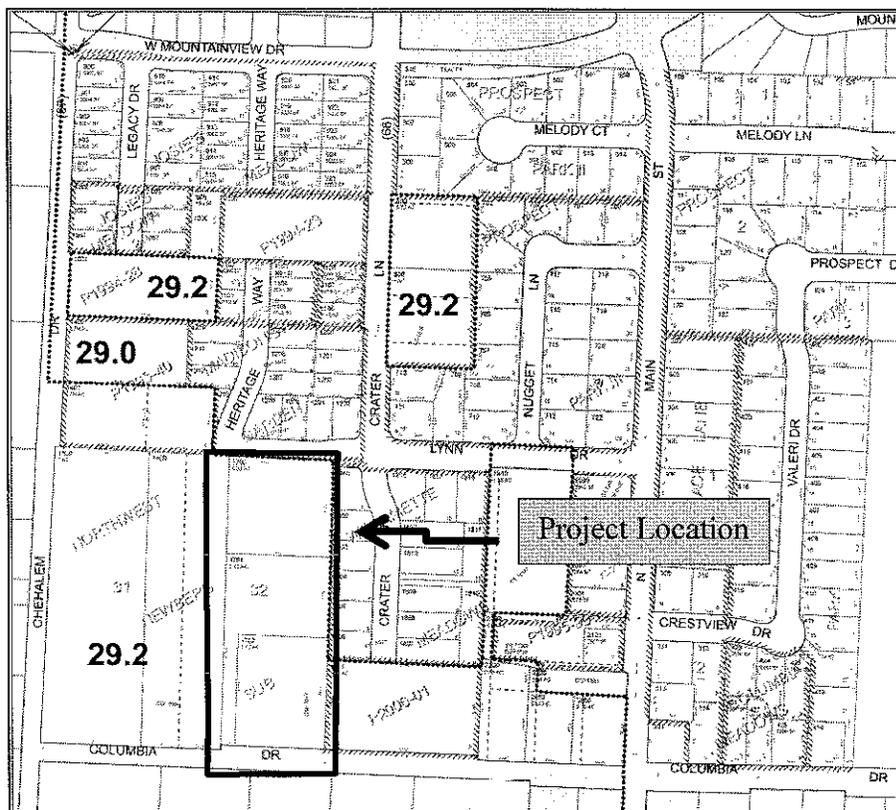
P.O. Box 970 • 414 E First Street • Newberg, Oregon 97132
503-537-1240. Fax 503-537-1272 www.newbergoregon.gov

WE WANT YOUR COMMENTS ON A PROPOSED NEW DEVELOPMENT IN YOUR NEIGHBORHOOD

A property owner in your neighborhood submitted an application to the City of Newberg to subdivide a parcel of land from three lots into 24 separate lots. You are invited to take part in the City's review of this project by sending in your written comments. You also may request that the Planning Commission hold a hearing on the application. For more details about giving comments, please see the back of this sheet.

The application would subdivide the R-2 zoned property in 24 residential lots with lots varying in size from 3,071-5,196 square feet and access to the new lots will be by public road from Columbia Dr. to Lynn Drive.

- APPLICANT: *Del Boca Vista, LLC*
- TELEPHONE: *503 590-8600*
- PROPERTY OWNERS: *Jo Daklin (TL 1700 and 1701)*
Richard and Merrilee Lee (Tax Lot 1702)
- LOCATION: *See map below*
- TAX LOT NUMBER: *Yamhill County Tax Map 3218AB Tax Lot Numbers 1700, 1701 and 1702*



We are mailing you information about this project because you own land within 500 feet of the proposed new project. We invite you to send any written comments for or against the proposal within 14 days from the date this notice is mailed. You also may request that the Newberg Planning Commission hold a hearing on the application by sending a written request during this 14-day period and identifying the issues you would like the Planning Commission to address.

If you mail your comments to the City, please put the following information on the outside of the envelope:

Written Comments: File No. XX
City of Newberg
Planning & Building Department
PO Box 970
Newberg, OR 97132

All written comments must be turned in by 4:30 p.m. on enter date two weeks from date you mailed notice. Any issue which might be raised in an appeal of this case to the Land Use Board of Appeals (LUBA) must be submitted to the City in writing before this date. You must include enough detail to enable the decision maker an opportunity to respond. The applicable criteria used to make a decision on this application for preliminary subdivision plan approval are found in Newberg Development Code 15.235.060(A). You can look over all the information about this project or drop comments off at Newberg City Hall, 414 E. First Street. You can also buy copies of the information for a cost of 25 cents a page. If you have any questions about the project, you can call the Newberg Planning Division at 503-537-1240. The City Planning director will make a decision at the end of a 14-day comment period. If you send in written comments about this project, you will be sent information about any decision made by the City relating to this project.

Date Mailed: Date notice is mailed

DRAFT POSTED NOTICE

Land Use Notice

FILE #

PROPOSAL: Subdivision of three lots into 24 detached residential lots

FOR FURTHER INFORMATION, CONTACT:

City of Newberg
Community Development Department
414 E First Street
Phone: 503-537-1240

2'

3'

Notice must be white with black letters, and must be landscape orientation, as shown above.
The notice must be lettered using block printing or a "sans-serif" font, such as Arial.

Eugene & Concejo Zirschky
2120 NE Crater Ln
Newberg, OR 97132

Milford & Carol Schroeder
2009 Nugget Ln
Newberg, OR 97132

Joshua Legler
2010 Crater Ln
Newberg, OR 97132

Shawn & Julie Bishop
2000 Nugget Ln
Newberg, OR 97132

Ron Manning
PO Box 605
Newberg, OR 97132

G Vern & Debby Rabe
19791 NE Sunnycrest Rd
Newberg, OR 97132

Lori Witcosky
2105 Heritage Way
Newberg, OR 97132

Susan Knight
2102 Heritage Way
Newberg, OR 97132

Daniel Boyes
2103 Crater Ln
Newberg, OR 97132

Peter & Darla Petrillo
2107 N Crater Ln
Newberg, OR 97132

Jeffrey & Stacey
2107 Nugget Ln
Newberg, OR 97132

Ralph & Brenda Thorp
2005 Nugget Ln
Newberg, OR 97132

John & Eva Gussenhoven
225 Lynn Dr
Newberg, OR 97132

Scott & Denise Downey
2006 Nugget Ln
Newberg, OR 97132

Lee Johnson
2116 NE Chehalem Dr
Newberg, OR 97132

Jodi Tautfest
2114 Legacy Dr
Newberg, OR 97132

Brian Tower
2109 Heritage Way
Newberg, OR 97132

Heinrich & Joy Weyer
2106 Heritage Way
Newberg, OR 97132

David Todd
23445 NE Sunnycrest Rd
Newberg, OR 97132

Bjorn M & Margaret Skyberg
327 Lynn Dr
Newberg, OR 97132

Howard & Patricia Decassios
2101 Nugget Ln
Newberg, OR 97132

Jerry McClellan
215 Lynn Dr
Newberg, OR 97132

Greg & Elizabeth Sharp
2001 Nugget Ln
Newberg, OR 97132

Terri & John Andries
210 Nugget Ln
Newberg, OR 97132

Dixie Reeve
2117 Legacy Dr
Newberg, OR 97132

David & Elizabeth Hancock
2119 N Crater Ln
Newberg, OR 97132

Mike & Kimberly Gayman
2110 Heritage Way
Newberg, OR 97132

Adam & Jennifer Lundstrom
2045 N Crater Ln
Newberg, OR 97132

Rex & Jennifer Philips
2031 N Crater Ln
Newberg, OR 97132

Nadine Brood
1909 NE Chehalem Dr
Newberg, OR 97132

Brian Tower 2109 Heritage Way Newberg, OR 97132	Mike & Kimberly Gayman 2110 Heritage Way Newberg, OR 97132	Heinrich & Joy Weyer 2106 Heritage Way Newberg, OR 97132
Susan Knight 2102 Heritage Way Newberg, OR 97132	Daniel Boyes 2103 Crater Ln Newberg, OR 97132	David Todd 23445 NE Sunnycrest Rd Newberg, OR 97132
Adam & Jennifer Lundstrom 2045 N Crater Ln Newberg, OR 97132	Rex & Jennifer Philips 2031 N Crater Ln Newberg, OR 97132	Peter & Darla Petrillo 2107 N Crater Ln Portland, OR 97225
Bjorn M & Margaret Skyberg 327 Lynn Dr Newberg, OR 0	Anthony Davies 337 Lynn Dr Newberg, OR 97132	Derik Stone 347 Lynn Dr Newberg, OR 97132
Scott & Misako Murphy 357 Lynn Dr Newberg, OR 97132	Bryce Kurtz 2020 Heritage Way Newberg, OR 97132	Scott & Carrie Fowles 2034 Heritage Way Newberg, OR 97132
Bruce & Linda Gillespie 2048 Heritage Way Newberg, OR 97132	Shelley A Hughes 2049 Heritage Way Newberg, OR 97132	Joshua & Miklyn Perdue 2035 Heritage Way Newberg, OR 97132
Kent Winter 2021 Heritage Way Newberg, OR 97132	Coyote Homes Inc PO Box 490 Newberg, OR 97132	David & Kristine Nelson PO Box 490 Newberg, OR 97132
Trevor & Jacki Snyder 2008 NE Chehalem Dr Newberg, OR 97132	Carl Ehry 505 W Columbia Dr Newberg, OR 97132	Joseph Ladd 421 W Columbia Dr Newberg, OR 97132
Jo Dacklin 11990 SW King James Pl Newberg, OR 97132	Brenda Haugen 1947 N Crater Ln Newberg, OR 97132	Colin & Amy Sorensen 308 Lynn Dr Newberg, OR 97132
Michelle Vondrachek 351 NE Columbia Dr Newberg, OR 97132	Brian Snider 1961 N Crater Ln Newberg, OR 97132	

Christie Living Trust PO Box 3190 Newberg, OR 97132	Michael Brown 1861 Crater Lane Newberg, OR 97132	William Haines 98 Ewelani St Aiea, HI 96701
Roger Nelson PO Box 760 Wilsonville, OR 97070	Jo Dacklin 11990 SW King James Pl, King City, OR 97224	Richard & Merrilee Lee PO Box 275 Ridgefield, WA 98642
Robert & Dawn Raymond 1930 Crater Ln Newberg, OR 97132	Roger Nelson PO Box 760 Wilsonville, OR 97070	Robert & Tanya Gore 1958 Crater Ln Newberg, OR 97132
David & Alexis MacKie 224 Lynn Dr Newberg, OR 97132	Perry Mick PO Box 564 Newberg, OR 97132	Frederick P & Linda Boetsch PO Box 191 Centralia, WA 98531
Oliver & Dawn Hall 119 NE Columbia Dr Newberg, OR 97132	Tina Kasuba PO Box 269 Newberg, OR 97132	Cecil & Alma Loggains 115 W Columbia Dr Newberg, OR 97132
Frank & Caroleta Piscitelli 112 W Columbia Dr Newberg, OR 97132	Michele Vondrachek 315 NE Columbia Dr Newberg, OR 97132	Bill & Maureen Rogers 316 NE Columbia Dr Newberg, OR 97132
Michael & Sarah Owen 107 Ashley Ct Newberg, OR 97132	George Piper Jr 605 Holly Dr Newberg, OR 97132	Alan & Minnie Halstead 119 Ashley Ct Newberg, OR 97132
David Jarvis 132 Ashley Ct Newberg, OR 97123	Todd Erickson 102 Ashley Ct Newberg, OR 97132	Kenneth & Linda Woodward 112 Ashley Ct Newberg, OR 97132
Thomas D Jr & Lois Ruiz 211 Pinehurst Ct Newberg, OR 97132	William & Brenda Jolliff 207 Pinehurst Ct Newberg, OR 97132	Eldin & Sylvia Hunt 107 Pinehurst Ct Newberg, OR 97132
Equity Trust Company Custodian Fbo 9163 NE Broadacres Rd Aurora, OR 97002	Wells Fargo Bank Na 2007 -rfc1 Tr 1600 S Douglas Rd #200-a Anaheim, CA 92806-5948	Michael & Judith Huelsman 2005 NE Chehalem Dr Newberg, OR 97132

Elizabeth Watson
1611 NE Chehalem Dr
Newberg, OR 97132

Dale & Alvina M Self
PO Box 297
Newberg, OR 97132

Robert & Cheryl Fletcher
1650 NE Chehalem Dr
Newberg, OR 97132

Anna Laakso
1717 NE Chehalem Dr
Newberg, OR 97132

Danny Tatman
1909 NE Chehalem Dr
Newberg, OR 97132

Yvonne L & Arvid Alen
11316 NW 6th Ave
Vancouver, WA 98685

Mildred A Weatherly
1718 NE Chehalem Dr
Newberg, OR 97132

Michael & Bonnie Klohs
17710 NE Hillsboro Hwy
Newberg, OR 97132

Wanda & Ronald Wayman
416 NE Columbia Dr
Newberg, OR 97132

Gregg & Kathy S Blume
400 NE Blume Ln
Newberg, OR 97132