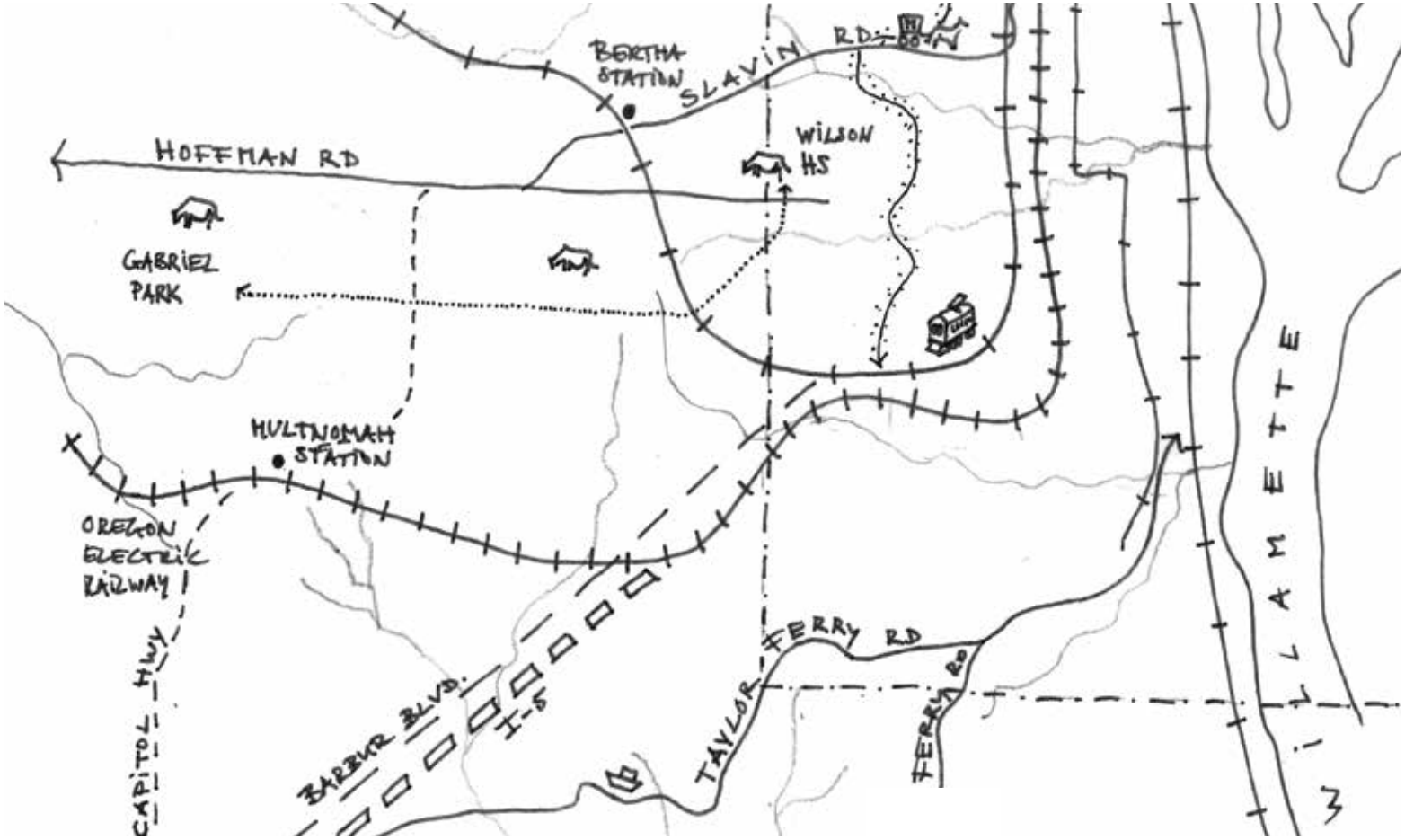
Tryon-Stephens Headwaters Neighborhood Street Plan



PBOT
PORTLAND BUREAU OF TRANSPORTATION

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
CLEAN RIVER WORKS

TRANSPORTATION AND GROWTH MANAGEMENT

Final Plan

adopted November 2015
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Executive Summary

1

The Tryon-Stephens Headwaters Neighborhood Street Plan is the result of a unique cross-bureau collaboration by the Portland Bureau of Transportation (PBOT) and the Bureau of Environmental Services (BES), to plan for completion of the transportation network and stormwater system within the study area. The Tryon-Stephens Plan provides a tailored strategy for enhancing neighborhood access to local destinations by looking comprehensively at street and drainage issues.

Streets, active transportation networks, and the stormwater system in Southwest Portland are not fully connected due to historical development patterns and natural features. The area's green setting and hilly topography create unique challenges for locating infrastructure in places with steep slopes, open streams, ravines and forested areas. While the semirural character of many Southwest Portland neighborhoods is valued by residents, gaps in active transportation and stormwater systems create barriers to travel, development, and watershed health.

Until 2012, the only option for street improvement was to build out the full right-of-way with curbs, parking and sidewalks on both sides of a paved street. This one-size-fits-all approach is not only expensive for adjacent property owners, it does not allow the flexibility to adapt improvements to the character of a given street. In 2012 the City adopted Street-by-Street standards allowing low-traffic residential streets to be built with a narrow curbless roadway which could be paired with a single sidewalk on one side, if needed. Local residential streets that serve less intense uses and have lower traffic volumes can be "rightsized" to occupy a smaller portion of the right-of-way, resulting in a smaller roadway footprint, less impervious surface and fewer impacts to existing natural features.

Runoff from impervious surfaces, which cover nearly 37% of the study


DEAD
END

area, particularly roads, picks up and conveys pollutants into streams. To mitigate these impacts, all development projects, on public or private property and in the right-of-way, must meet the requirements of the City of Portland Stormwater Management Manual (2014), which include infiltrating stormwater on-site with vegetated facilities to the maximum extent feasible. Curbs are often used to convey stormwater to a pipe or vegetated facility. The new, curbless Street-by-Street standards require new approaches to stormwater management. The Tryon-Stephens Plan is the first to jointly address street and stormwater issues simultaneously. The Tryon-Stephens Street Plan sets a framework for tailoring improvements to individual streets based on the adjacent land use, street character, and natural setting. This Plan proposes the recommendations outlined below, which includes a Neighborhood Street Typology and a Street and Stormwater Facility Concept Flow Chart as methods for defining the unique street context and the suitability of different street and stormwater management tools.

Street and Stormwater Concepts

- Set typologies to define street contexts
- Establish process for selecting street and stormwater concepts
- Design streets to enhance safe access and minimize the roadway footprint
- Fill gaps in the active transportation network

System Recommendation

- Coordinate to address system gaps
- Add connections to the Southwest Master Street Plan
- Implement the Stephens Creek Stormwater System Plan
- Implement watershed management plans
- Establish criteria to allow non-motorized access only
- Close urban trails system gaps

Further implementation strategies

- Develop criteria for interim shoulder widening on streets without curbs
- Conduct stormwater system alternatives analysis along Capitol Highway
- Explore opportunities for neighborhood facilities within the right-of-way
- Coordination and funding strategies

The Tryon-Stephens Plan will provide a common framework for PBOT and BES to coordinate work within the study area, and to apply these tools in other parts of the city. Ongoing coordination amongst partners and engagement of neighborhood stakeholders will need to continue through the implementation of the Tryon-Stephens Plan.

Introduction

2

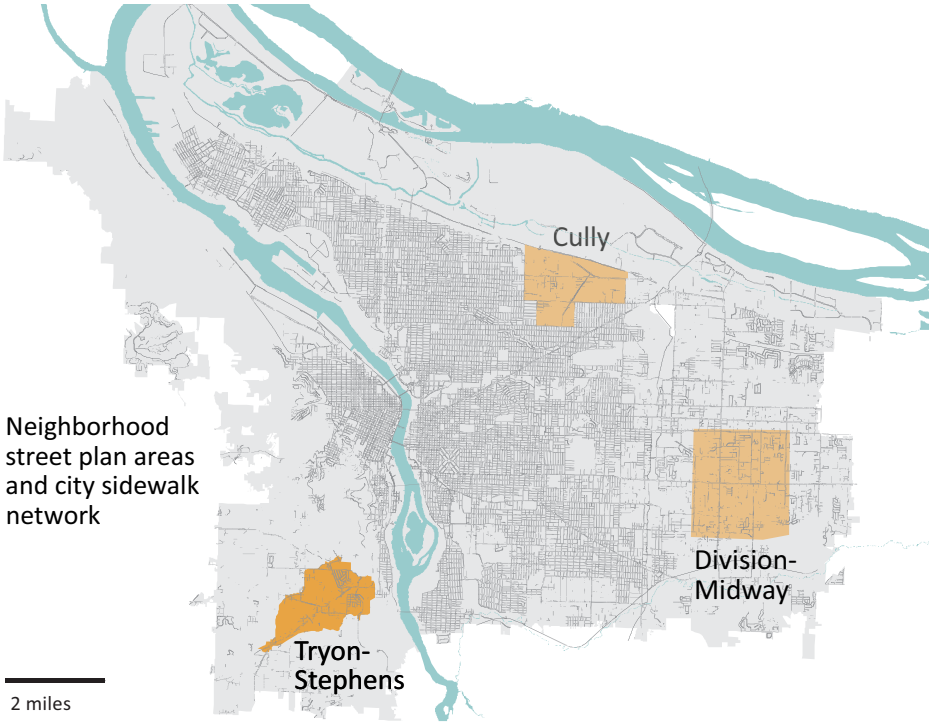
Street and trail networks in Southwest Portland are poorly connected as a result of historical development patterns and barriers formed by terrain, highways, streams, and other natural features. The area lacks safe connections for walking, bicycling, and accessing transit and insufficiently manages stormwater runoff. The Tryon-Stephens Plan provides a tailored strategy for enhancing neighborhood access to local destinations by looking comprehensively at street and stormwater issues simultaneously.

What is a Neighborhood Street Plan?

Neighborhood Street Plans aim to create a unique strategy for an area with significant street network deficiencies. Neighborhood Street Plans seek to improve local street connectivity, determine suitable improvements for streets based on their context, enhance local access to neighborhood destinations and address stormwater needs specific to the watershed and enhance local access to neighborhood destinations. The Tryon-Stephens Plan is the first to jointly address stormwater needs.

The emphasis of neighborhood street planning is on local, residential streets. Portland's citywide Transportation System Plan already identifies unfunded "major" system improvements, mostly on arterial streets. Local streets are an important part of the street network serving short trips which connect neighborhood destinations to the places people live.

Focusing on a compact geographic area enables staff to collect more data at a local level and conduct analysis on the functions of individual streets within the defined neighborhood. It also allows staff to engage more of



the people who live on these streets and inquire about their preferences for preserving or improving conditions on their streets.

Prior Neighborhood Street Plans

This Plan follows in the footsteps of two neighborhood street planning efforts in other parts of Portland, which possess similar challenges to multi-modal access: the **Cully Commercial Corridor and Local Street Plan** and the **Division-Midway Neighborhood Street Plan** (see map above). Both of these plans helped define the process and methodology for local street planning. The first plan adopted, the Cully Commercial Corridor and Local Street Plan, set the stage for approving new residential street standards citywide as part of the Street by Street Initiative. Since the Cully Local Street Plan was adopted in 2012, the City has:

- Adopted new street improvement options for residential streets to be applied citywide as part of the Street by Street Inititative.
- Obtained a state grant for approximately $3 million to make priority pedestrian and bicycle improvements identified in the Plan.

The City also developed the Division-Midway Neighborhood Street Plan to address street and pathway connectivity issues in East Portland neighborhoods near SE Division Street. The final Plan will go before City Council later this year.

Relationship to broader citywide goals and policies

The long range plan guiding future growth and development within the city, i.e. Portland's Comprehensive (Comp) Plan, is in the process of being updated. A number of "emerging" policies within the Comp Plan support the work of the Tryon-Stephens Plan and have implications for future system expansion and uses of the public rights-of-way. Two of the seven key directions to achieve the plan's vision, specifically to "create complete neighborhoods" and "one size does not fit all," are foundational to this Plan's aim of establishing a tailored strategy to improve multimodal access within the neighborhood. The following proposed Comp Plan policies are directly advanced by the Tryon-Stephens Plan:

- Policy 3.16: Connect centers to each other and to other key local and regional destinations.
- Policy 3.6: Integrate nature and use appropriate green infrastructure throughout Portland.

- Policy 4.10: Encourage development and building and site design that promotes a healthy level of physical activity in daily life.
- Policy 4.58: Encourage design and site development practices that enhance, and avoid the degradation of, watershed health and ecosystem services and that incorporate trees and vegetation.
- Policy 8.38: Allow flexibility in right-of-way design and development standards to appropriately reflect the pattern area and other relevant physical, community, and environmental contexts and local needs.
- Policies 7.15 and 7.16: Ensure that plans and investment are consistent with and advance efforts to improve watershed hydrology (7.15) and water quality (7.16).
- Policy 7.24: Limit impervious surfaces.
- Policy 7.32: Coordinate transportation and stormwater system plans and investments, especially in unimproved or substandard rights-of-way, to improve water quality, public safety, including for pedestrians and bicyclists and neighborhood livability.
- Policy 8.39: Stormwater Management: Improve ROW to integrate green infrastructure.
- Policy 9.16: Promote street alignments and designs that respond to topography and natural features, when feasible, and protect streams, wildlife habitat, and native trees.

PBOT and BES coordination

The Portland Bureau of Transportation (PBOT) is the steward of the right-of-way (ROW) and plans, builds, manages, maintains and advocates for an effective and safe transportation system. As the city's sewer and stormwater utility, the Bureau of Environmental Services (BES) administers the federal permit requirements to manage stormwater runoff, protect water quality in rivers and streams, protect watershed health, and protect groundwater within the City of Portland.

The Stormwater Management Manual (SWMM) provides policy and design requirements for stormwater management throughout the City of Portland. All development, redevelopment, and improvement projects within the City of Portland on private and public property and in the public right-of-way must meet regulatory requirements contained in the BES SWMM as required by Title 17.28.040 of City Code. Implementation of the SWMM has required increased coordination between PBOT and BES as vegetated stormwater ("green street") facilities have been installed in public ROW as the primary method to treat stormwater runoff at its source throughout the city.

The Portland Bureau of Transportation (PBOT) and Bureau of Environmental Services (BES) came together to jointly develop this plan aimed at addressing street network and stormwater system deficiencies within the study area. Any improvement to streets in this area, which suffers from poorly infiltrating soils and steep slopes, also requires addressing pressing stormwater issues. More than three-fourths of those who responded to the surveys at our project open house events said that "stormwater runoff causes problems" on their street. It is important that investments made by both bureaus work towards improving both access and drainage. The Tryon-Stephens Plan will provide a common framework for PBOT and the BES to coordinate work within the study area.

Healthy Watersheds and Healthy Walksheds

The Portland Plan, and now the City's Comprehensive Plan, sets forth a vision for creating Healthy Connected Neighborhoods in which all Portlanders live within walking distance of neighborhood hubs that are linked by networks of greenways and habitat corridors.

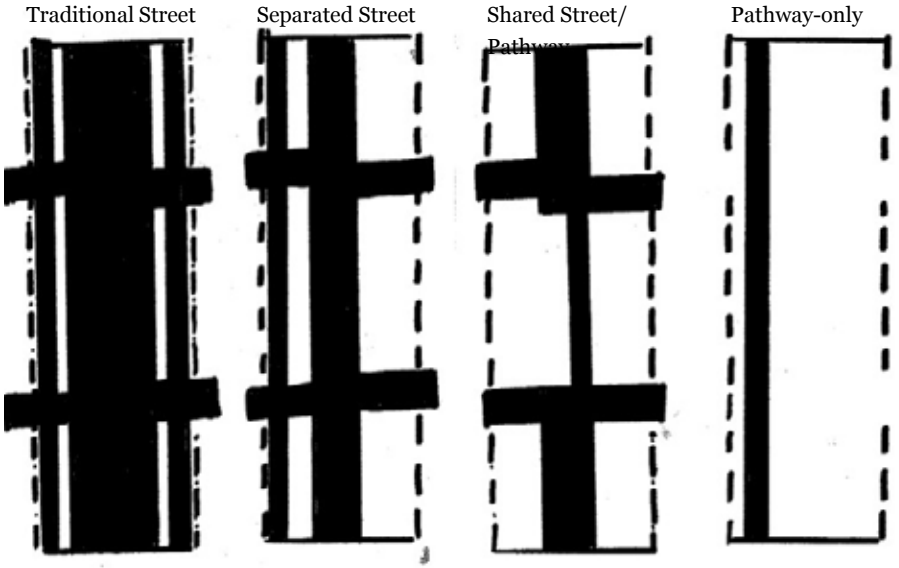
The Tryon-Stephens Plan seeks to advance this theme by emphasizing the importance of both "watersheds" and "walksheds" within the Tryon-Stephens headwaters area. Watersheds encompass the entire area that drains rainfall to a single waterway. Watersheds form an ecosystem linking all living things to the environment. Preserving surface and ground water quality in the study area is essential to promoting the health of Tryon and Stephens creeks.

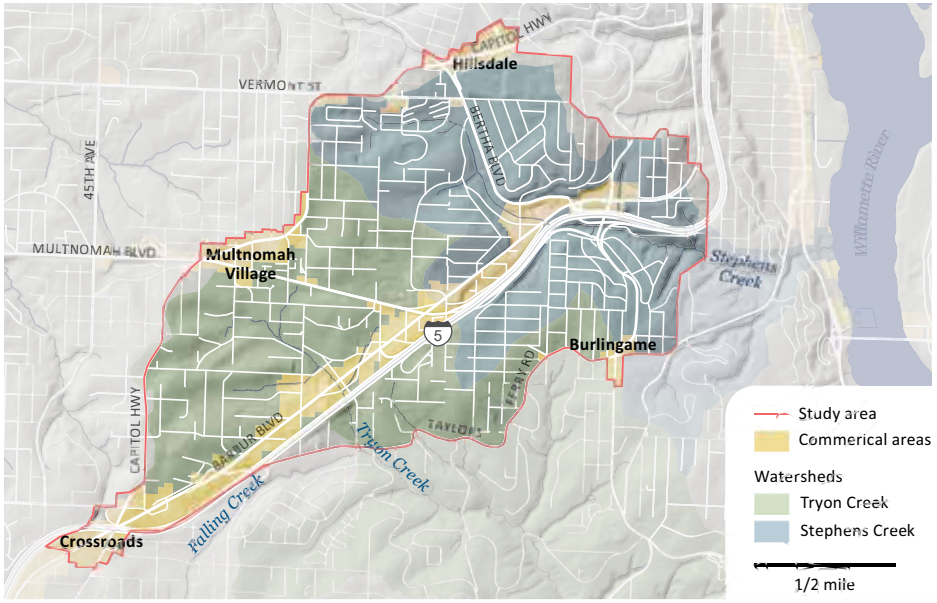
Walksheds encompass the entire area within a walkable distance roughly within a half mile from a particular destination. The concentration of places, such as main streets and centers, and the web of networks that connect them determine how people move around in our communities. Creating safe walking and bicycling connections between neighborhoods and their commercial hubs is essential to promoting multimodal transportation, which increases physical activity and reduces carbon emissions.

Impervious surface and pollutants associated with street infrastructure have significant impacts on watershed health. The Tryon-Stephens Street Plan sets a framework for tailoring improvements to individual streets based on the adjacent land use, street character and natural setting. Local residential streets that serve less intense uses and have lower traffic volumes can be "rightsized" to occupy a smaller portion of the right-of-way, resulting in a smaller roadway footprint, less impervious surface and fewer impacts to existing natural features.

Roadway footprint

Prior to the adoption of the Cully Local Street Plan and subsequent "Street-by-Street" residential street standards, Portland had a one-size-fits-all approach to improving local streets. Typically streets were built to occupy the full width of available right-of-way and generally included curbs, sidewalks, parking and planting-strips on both sides of the street with vegetated stormwater facilities and sewers for stormwater management. Street-by-Street standards, introduced in 2012, allowed low-traffic residential streets to be built with a narrow, curbless roadway which could be paired with a single sidewalk on one side of the street. Street-by-Street options significantly shrink the footprint of impervious surface, reducing stormwater runoff, minimizing impacts to existing trees and other natural features, and providing more flexibility in stormwater solutions. The figure at the top left of page 15 shows general roadway footprints of different residential street options.

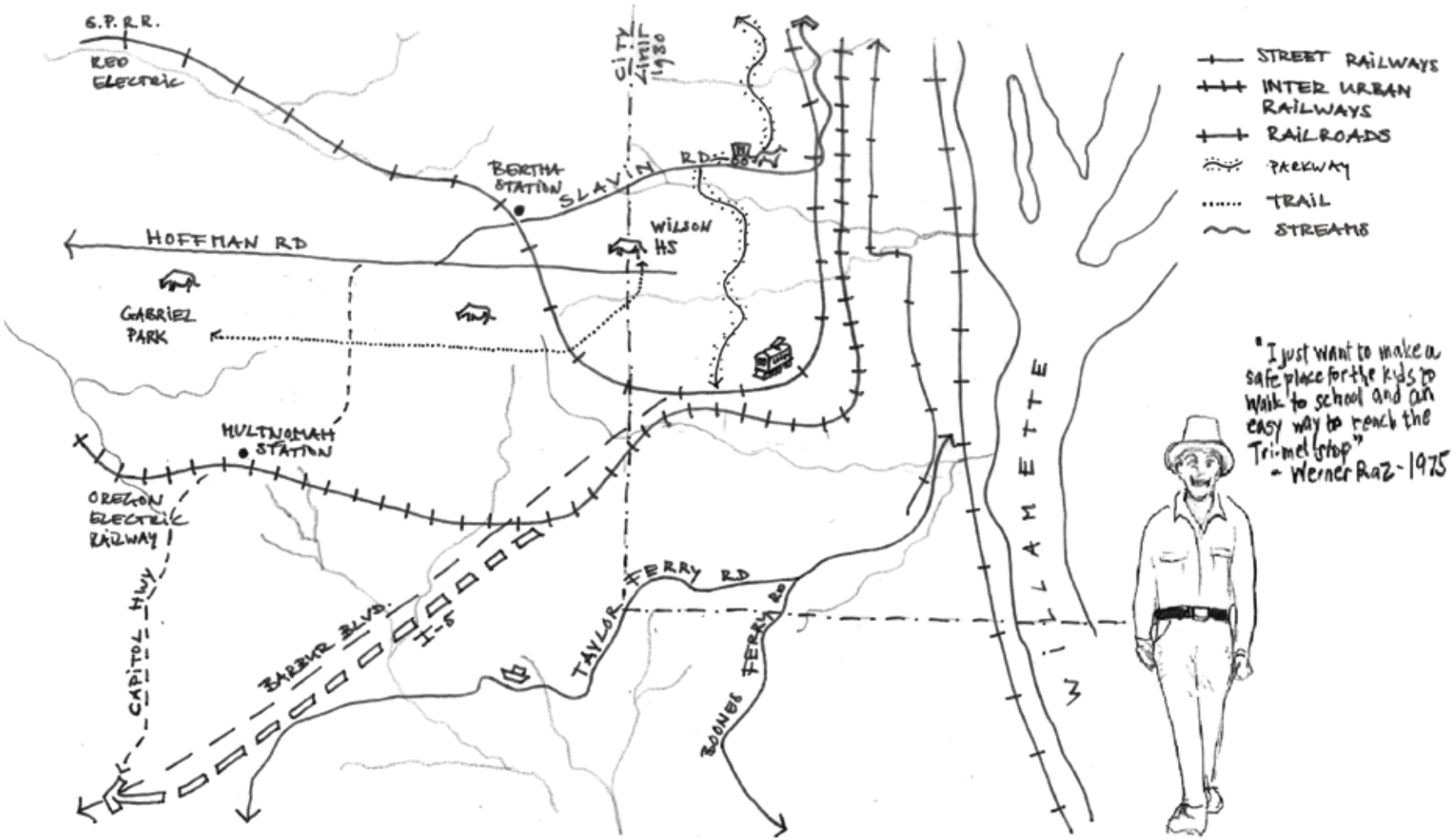




Tryon-Stephens Plan approach

The study area encompasses the upper portions of the Tryon Creek and Stephens Creek subwatersheds and is centered on SW Barbur Boulevard. This focus area allowed the project to build upon recent planning work in the Stephens Creek watershed and as part of the South West Corridor High Capacity Transit project. It stretches from the Hillsdale Town Center on the north end to West Portland Town Center on the south end, and from Multnomah Village on the western edge to the Burlingame Commercial node on the east. Two major streets, Capitol Highway and Taylor's Ferry Road, also defined a logical boundary for analyzing traffic patterns within the neighborhoods adjacent to the Barbur Boulevard/I-5 corridor. The area covers significant sections of the Hillsdale, Markham, Multnomah and South Burlingame neighborhoods, as well as portions of other neighborhoods. No neighborhood is captured completely within the study area.

The Tryon-Stephens Plan focuses on local street connectivity and enhancing multimodal access to neighborhood destinations. It builds upon past plans for major streets in the area, i.e. Barbur Boulevard Streetscape Plan (1997), SW Corridor Plan (Underway), Capitol Highway Plan (1996) and Refinement Plan (2011), which were developed with focused analysis and outreach to define the design of each street. These plans identify major capital projects to address deficiencies and enhance safety and mobility. The 20-year Transportation System Plan lists major capital projects which remain unfunded on Barbur Boulevard, Capitol Highway, Taylors Ferry Road and other arterial streets. Investments on busy streets, which are often the only streets eligible for traditional transportation funds, will continue to be the focus of the City's capital improvement program. Complementing safe arterial streets with connected local streets extends the street system into the neighborhoods linking them to important nearby centers and corridors.



1857 SLAVIN FARM → 1884 SLAVIN ROAD → CAPITOL HWY
1883 NORTH PACIFIC RAILROAD → EARLY SETTLERS → DAIRY FARMS
1903 OLMSTED PLAN OF PARKWAYS
1908 OREGON ELECTRIC RAILWAY → I-5
1910-'12 PARKWAY BECAME REALITY → TERWILLIGER BLVD.
1914 SOUTH PACIFIC RAILWAY → RED ELECTRIC → BARBUR & BERTHA BLVD
HILLSDALE BECAME MARKET FOR FARMERS
HOFFMAN RD → VERMONT STREET
1930 END OF COMMUTER RAIL → TRACKS REMOVED ROADWAY PAVED FOR CARS & BUSES
1945 CITY EXPANDED WITH ANNEXATIONS OF PARTS OF SOUTHWEST
1959 HILLSDALE DESIGNATED COMMERCIAL AREA
1983 TERWILLEGER PARKWAY CORRIDOR PLAN

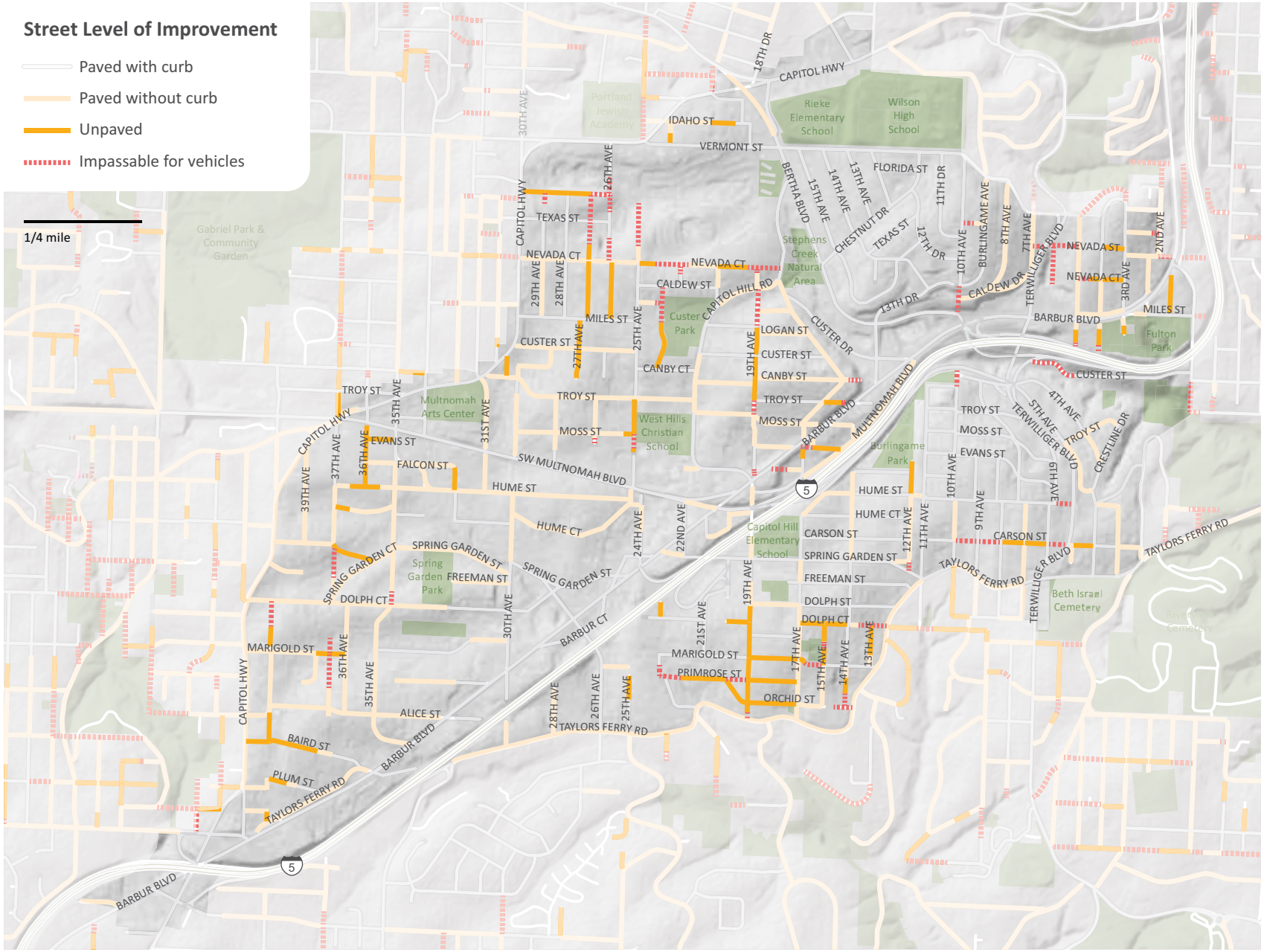
Existing Conditions

3

Southwest Portland's local street system is affected by poor connectivity and lack of safe facilities for active transportation modes (walking, bicycling, and access to transit). Stormwater management in Southwest Portland is affected by an incomplete stormwater system and lack of treatment for runoff. The Tryon-Stephens Plan aims to establish a more connected local street and pathway network by integrating improvements to transportation networks, access to transit, safe routes to schools, Southwest Trails, and the stormwater system within the study area.

The existence of substandard street and stormwater systems does not preclude properties from being developed or redeveloped. Historically, the City of Portland has primarily relied on private development to improve substandard local streets. In 2001, the city adopted a TGM-funded Master Street Plan for Southwest Portland to identify potential new street connections. However, none of the identified missing connections within the Tryon-Stephens Plan study area have been improved due to the built-out nature of the area and small scale of redevelopment. The traditional means of improving local streets (as part of redevelopment or local improvement districts) have thus far failed to produce a connected network of accessible routes.

It is the current policy of the City of Portland that streets are constructed at the expense of abutting property owners and unimproved rights of way are maintained by abutting property owners until street improvements are constructed to the standards of, and accepted for maintenance by, the City [City Code Title 17.42.010 A]. Residential street improvements are most commonly triggered by a land use (conditional use, zone change, land partition or adjustment), or building permit development action [Title 17.88.020], or the formation of a Local Improvement District (LID). Property owners are also responsible for stormwater pipes on private property and in unimproved rights of way.


Street Level of Improvement
Paved with curb
Paved without curb
Unpaved
Impassable for vehicles
1/4 mile
Gabriel Park & Community Garden
Portland Jewish Academy
Rieke Elementary School
Wilson High School
Stephens Creek Natural Area
Custer Park
Multnomah Arts Center
West Hills Christian School
Spring Garden Park
Capitol Hill Elementary School
Burlingame Park
Fulton Park
Beth Israel Cemetery
CAPITOL HWY
18TH DR
IDAHO ST
VERMONT ST
FLORIDA ST
TEXAS ST
NEVADA CT
NEVADA ST
CALDEW ST
CAPITOL HILL RD
CHESTNUT DR
BERTHA BLVD
13TH DR
CUSTER DR
CUSTER ST
MILES ST
LOGAN ST
CANBY CT
CANBY ST
BARBUR BLVD
MULTNOMAH BLVD
SW MULTNOMAH BLVD
TROY ST
MOSS ST
EVANS ST
FALCON ST
HUME ST
HUME CT
SPRING GARDEN CT
SPRING GARDEN ST
FREEMAN ST
DOLPH CT
DOLPH ST
CARSON ST
MARIGOLD ST
PRIMROSE ST
ORCHID ST
ALICE ST
BAIRD ST
PLUM ST
TAYLORS FERRY RD
TERWILLIGER BLVD
CRESTLINE DR
BARBUR CT
2ND AVE
3RD AVE
4TH AVE
5TH AVE
6TH AVE
7TH AVE
8TH AVE
9TH AVE
10TH AVE
11TH AVE
11TH DR
12TH AVE
12TH DR
13TH AVE
14TH AVE
15TH AVE
17TH AVE
19TH AVE
21ST AVE
22ND AVE
24TH AVE
25TH AVE
26TH AVE
27TH AVE
28TH AVE
29TH AVE
30TH AVE
31ST AVE
35TH AVE
36TH AVE
37TH AVE
39TH AVE
BURLINGAME AVE
5

When development occurs on a substandard street, the City uses many codes and rules to require necessary improvements to the street. In cases where developers demonstrate the standard improvement is infeasible due to site constraints, PBOT requires waivers of remonstrance that commit property owners to participate if a future LID is formed. A waiver of remonstrance means that a property is automatically counted in favor of a street improvement for a future LID.

History of the study area

Today's street network was shaped by the transportation patterns of early Southwest Portland settlers and their need to move through the area's challenging topography, hydrology, and natural features. Thoroughfares of today follow historic trails, some of which were converted to commuter rail lines and then later into arterial roadways. Streets often parallel and overlap natural drainages leading to the river and other parts of the city. The illustration on page 16 show the historic locations of past commuter rail and streetcar lines, farm-to-market roads, walking trails, routes to rivers/ferry crossings, and Terwilliger Parkway.

Some neighborhoods developed prior to the Second World War, such as Multnomah Village and Burlingame, and have a historic character. South Burlingame and Wilson Park are two areas which developed within City of Portland limits, and are notable for more complete street grid and sidewalk networks. However, most of the study area developed prior to annexation into the city limits and lacks sidewalks, and in some cases, streets are completely unimproved.

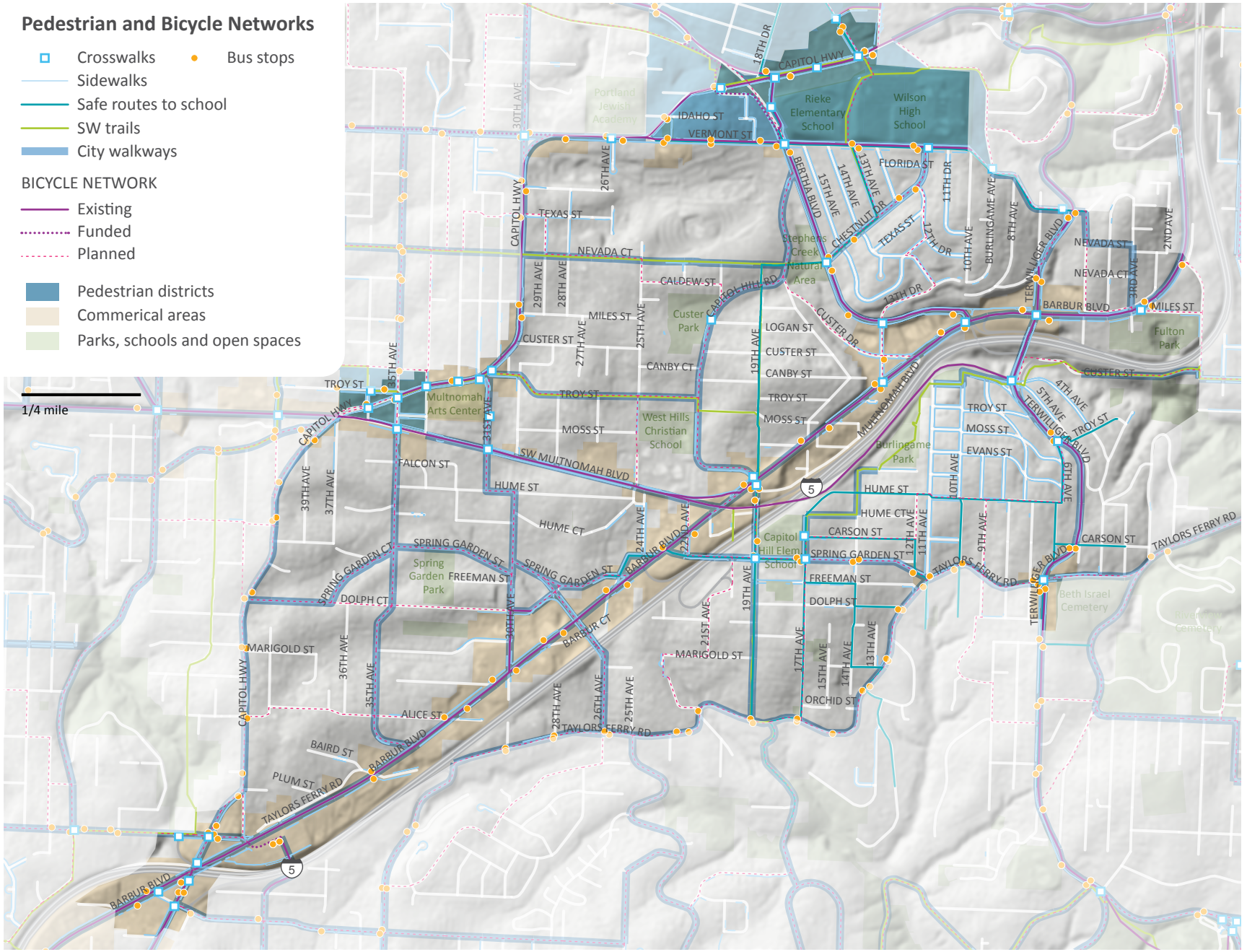
Street Conditions within the Study Area

Condition Type	Miles	Percentage of right-of-way (49.6 mi)
Paved street	43.6	87.9%
Paved street with curb	26.5	
Paved street without curb	17.1	
Unpaved street	3.8	7.6%
ROW only (no street)	2.2	4.4%
Sidewalk (at least one side)	18.5*	37%*

* Estimate based on available GIS mapping data

Existing street conditions

Most of the study area does not meet citywide street connectivity standards, i.e. 530 feet between full streets. Incomplete and disjointed street and land use patterns in this part of Southwest Portland limit opportunities for residents to meet their daily needs and reach nearby destinations even if they are within a short walkable distance. Sidewalk gaps on streets with higher through traffic result in unsafe conditions, deterring trips that could otherwise be made relatively easily on foot, bicycle, or by transit. Limited public parking spaces in neighborhood commercial districts are occupied by nearby residents, who are forced to drive, making businesses less accessible for other visitors outside the area. Although paving of streets increases the amount of impervious surface and therefore the amount of runoff that must be managed, simply allowing all dirt streets to be improved with gravel does not meet the City's needs for several reasons. First, gravel streets deteriorate quickly, thus requiring continual maintenance. Second, gravel streets do not provide accessibility for all in a manner consistent with the Americans with Disabilities Act (ADA) standards. Third, gravel streets generate a

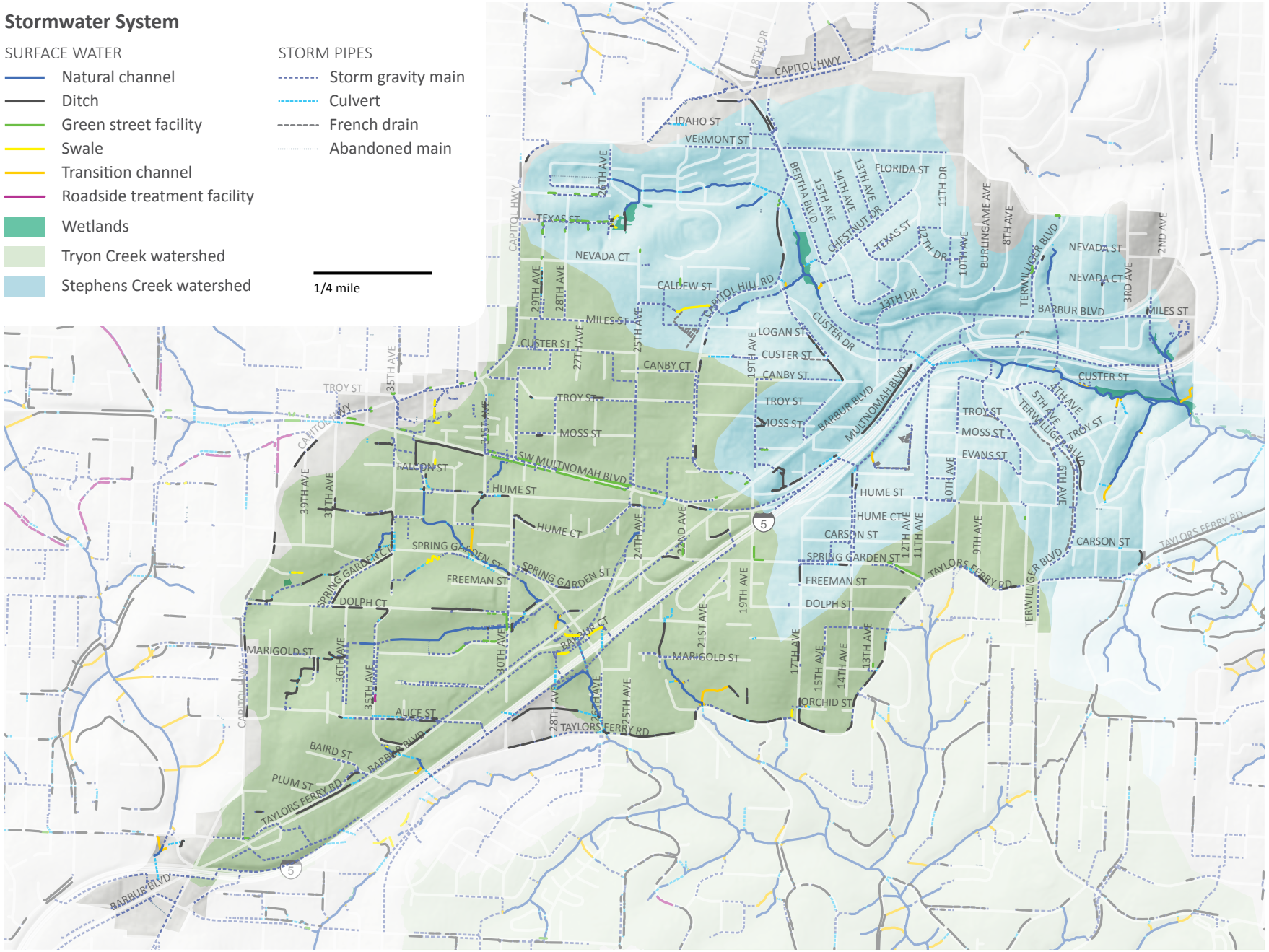

Pedestrian and Bicycle Networks
Crosswalks
Bus stops
Sidewalks
Safe routes to school
SW trails
City walkways
BICYCLE NETWORK
Existing
Funded
Planned
Pedestrian districts
Commerical areas
Parks, schools and open spaces
1/4 mile
Portland Jewish Academy
Rieke Elementary School
Wilson High School
Stephens Creek Natural Area
Custer Park
Multnomah Arts Center
West Hills Christian School
Spring Garden Park
Capitol Hill Elem School
Burlingame Park
Fulton Park
Beth Israel Cemetery
CAPITOL HWY
SW MULTNOMAH BLVD
BARBUR BLVD
TAYLORS FERRY RD
TERWILLIGER BLVD
MULTNOMAH BLVD
BERTHA BLVD
CAPITOL HILL RD
CUSTER DR
IDAHO ST
VERMONT ST
FLORIDA ST
TEXAS ST
NEVADA CT
CALDEW ST
MILES ST
CUSTER ST
LOGAN ST
CANBY CT
TROY ST
MOSS ST
EVANS ST
HUME ST
HUME CT
FALCON ST
SPRING GARDEN CT
SPRING GARDEN ST
FREEMAN ST
DOLPH CT
DOLPH ST
CARSON ST
MARIGOLD ST
ALICE ST
BAIRD ST
PLUM ST
ORCHID ST
BARBUR CT
CHESTNUT DR
BARBUR BLVD
18TH DR
30TH AVE
26TH AVE
29TH AVE
28TH AVE
27TH AVE
25TH AVE
19TH AVE
15TH AVE
14TH AVE
13TH AVE
11TH DR
10TH AVE
8TH AVE
3RD AVE
2ND AVE
5TH AVE
4TH AVE
6TH AVE
39TH AVE
37TH AVE
36TH AVE
35TH AVE
31ST AVE
24TH AVE
22ND AVE
21ST AVE
17TH AVE
12TH AVE
11TH AVE
9TH AVE
5

great deal of sediment which washes into pipes and streams, causing blockages, carrying pollutants, and degrading habitat. Adjacent property owners occasionally decide to illegally pave these streets and fail to manage the stormwater, which could direct runoff to a neighbor's property. When neighbors pave streets without a permit, they are liable for potential problems including the impacts of runoff onto other properties.

Active transportation connections

Existing sidewalks corridors and bicycle facilities within the study area are generally limited to the busy streets. Few connections reach into the neighborhoods where people live. Refer to the map at left (page 20) showing the City's planned pedestrian and bicycle networks. The Tryon-Stephens Plan seeks to increase travel by active modes, including walking, using a wheelchair or other mobility device or riding a bicycle, for short trips to places within the neighborhood. The short distances to local destinations can often be covered on foot, bicycle, or by transit relatively easily if residents are not deterred by difficult crossings, or dangerous walking and bicycling conditions on busy streets. This plan seeks to provide a direct, safe and comfortable access to community destinations and transit, increasing pedestrian and bicycle activity, thereby reducing motor vehicle demand on area arterials and on limited parking in commercial areas.

Throughout the project, community members were given the opportunity to share their regular walking and biking routes and identify where important connections are missing. Staff also worked with the Community Working Group to identify routes to neighborhood commercial districts and gaps in the planned active transportation network.


Stormwater System
SURFACE WATER
Natural channel
Ditch
Green street facility
Swale
Transition channel
Roadside treatment facility
Wetlands
Tryon Creek watershed
Stephens Creek watershed
STORM PIPES
Storm gravity main
Culvert
French drain
Abandoned main
1/4 mile
CAPITOL HWY
IDAHO ST
VERMONT ST
FLORIDA ST
TEXAS ST
NEVADA CT
CALDEW ST
CAPITOL HILL RD
MILES ST
CUSTER ST
CANBY CT
LOGAN ST
CANBY ST
TROY ST
MOSS ST
EVANS ST
HUME ST
HUME CT
SW MULTNOMAH BLVD
BARBUR BLVD
FALCON ST
SPRING GARDEN ST
FREEMAN ST
DOLPH CT
MARIGOLD ST
ALICE ST
BAIRD ST
PLUM ST
TAYLORS FERRY RD
CARSON ST
ORCHID ST
NEVADA ST
BARBUR BLVD
MILES ST
CUSTER ST
TROY ST
MOSS ST
EVANS ST
HUME ST
CARSON ST
SPRING GARDEN ST
FREEMAN ST
DOLPH ST
TAYLORS FERRY RD
MARIGOLD ST
ORCHID ST
BERTHA BLVD
CHESTNUT DR
BURLINGAME AVE
TERWILLIGER BLVD
MULTNOMAH BLVD
CAPITOL HILL RD
CUSTER DR
26TH AVE
29TH AVE
28TH AVE
27TH AVE
25TH AVE
19TH AVE
39TH AVE
36TH AVE
35TH AVE
33RD AVE
32ND AVE
30TH AVE
24TH AVE
22ND AVE
21ST AVE
19TH AVE
17TH AVE
15TH AVE
14TH AVE
13TH AVE
12TH AVE
11TH AVE
10TH AVE
9TH AVE
8TH AVE
5TH AVE
4TH AVE
3RD AVE
2ND AVE
5

Existing stormwater conditions

The project study area is located in the upper portions of the Stephens Creek and Tryon Creek watersheds. The northeastern portion of the study area drains to Stephens Creek and the southwestern portion drains to Tryon Creek. Stephens and Tryon creeks are two of the few remaining open streams in the City that flow to the Willamette River, and their confluences with the Willamette River provide important habitat for salmonids and other wildlife. While these confluences are outside of the TSHNSP plan area, all actions in the headwaters of a watershed affect the land and water downstream. Additionally, BES is working to replace the highway 43 culvert, which would open over 2.7 additional miles of Tryon Creek to salmonids.

Impervious surfaces cover approximately 500 acres, nearly 37% of the study area. Streets comprise about 40% (200 acres) of these impervious surfaces. Stormwater runoff is collected and conveyed through a highly varied drainage system composed of sheet flow, roadside ditches, curbs and gutters, inlets, and pipes that all drain to surface streams. Water that flows over impervious surfaces and into streams without treatment negatively impacts stream health and wildlife habitat in two main ways, 1) The volume and rate of water entering streams is increased, leading to stream bank erosion and 2) Runoff from impervious surfaces, particularly roads, conveys pollutants such as heavy metals and petroleum products into streams. Runoff from unpaved streets also contributes pollutants to streams in the form of fine sediments. Unmanaged runoff can also create potholes on unpaved streets and problems on private property such as flooding and erosion.

Land development and redevelopment increases impervious surface, which impacts watershed and stream health, infrastructure, and nearby properties. To mitigate these impacts, all development and redevelopment projects within the City of Portland, on public and private property and in the right-of-way, must meet the requirements of the SWMM (www.portlandoregon.gov/bes/swmm). The SWMM is part of the City's compliance with the requirements of the National Pollutant Discharge Elimination System (NPDES) permit, which requires cities such as Portland to establish controls on stormwater runoff and industrial pollution. The SWMM requires that development and redevelopment projects infiltrate stormwater on-site with vegetated facilities to the maximum extent feasible. If total stormwater infiltration is not feasible on-site, runoff from vegetated facilities can overflow to a drainageway, river, or storm-only pipe. Overflow must meet flow and volume control requirements with the idea that runoff from the site mimics natural runoff (volume and rate) prior to development.

In the Tryon Stephens Headwaters plan area, as is the case in much of Portland west of the Willamette River, the infiltration of stormwater is difficult and sometimes not feasible due to poor infiltration rates and/or steep slopes. Some areas in southwest Portland have the added difficulty of not having ready access to the stormwater system because there is no drainageway or river adjacent to the property, no stormwater pipe in the street, and no curb and gutter to guide stormwater to the nearest pipe, drainageway, or river (see map on page 22). In these cases, city staff work with developers to find solutions on a case-by-case basis. By looking at unimproved streets and stormwater system needs together, this plan identifies creative solutions for areas lacking both transportation and stormwater infrastructure.

Six core project needs

Address gaps in the transportation networks to improve access to neighborhood destinations.

Address gaps in the stormwater system.

Balance motor vehicle speeds and volumes with pedestrian and bicycle needs on the active transportation network and when gravel streets are improved.

Tailor options for integrating street and stormwater improvements to existing neighborhood and street character.

Manage stormwater runoff to preserve natural hydrology, enhance water quality, and to fix and prevent problems caused by stormwater runoff.

Identify ways to create new connections without fully relying on redevelopment.

Needs, Opportunities and Constraints

4

Needs:
What is needed to create a street network and stormwater system that will serve the community today and into the future?

Opportunities:
What are the existing strengths and opportunities in the area that will help to meet these needs?

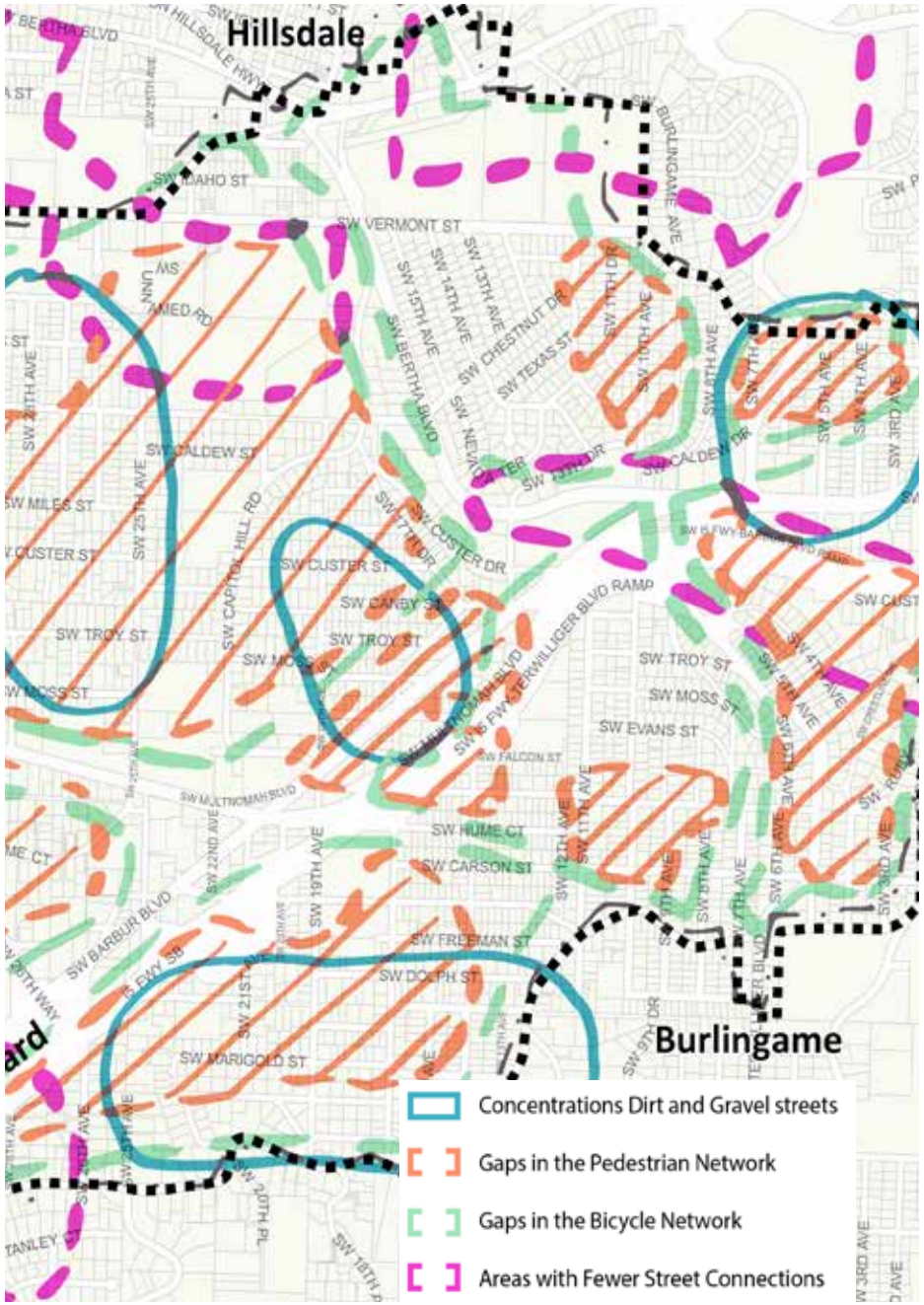
Constraints:
What are the barriers to meeting these needs?

Six core project needs

Based on the findings of the area's existing conditions, an analysis of needs, opportunities and constraints was carried out to document the transportation and stormwater needs within the project area and identify the opportunities and constraints to addressing those needs.

The Tryon-Stephens Plan seeks to address the six core transportation/ stormwater needs on page 22. Needs may include known issues with the existing system, a lack of infrastructure, and gaps in existing policies. These needs were identified based on findings in the Existing Conditions Report, discussions with BES and PBOT staff, and public feedback compiled to date, including at the SW Sunday Parkways Roll and Stroll event, Community Working Group meeting and other community meetings. Addressing these six needs was the core task in developing local street and stormwater solutions for this plan.

Staff produced a series of maps to document the needs, opportunities and constraints then shared them and collected community feedback at the project open house. This analysis laid the groundwork for the development of combined street and stormwater solutions.



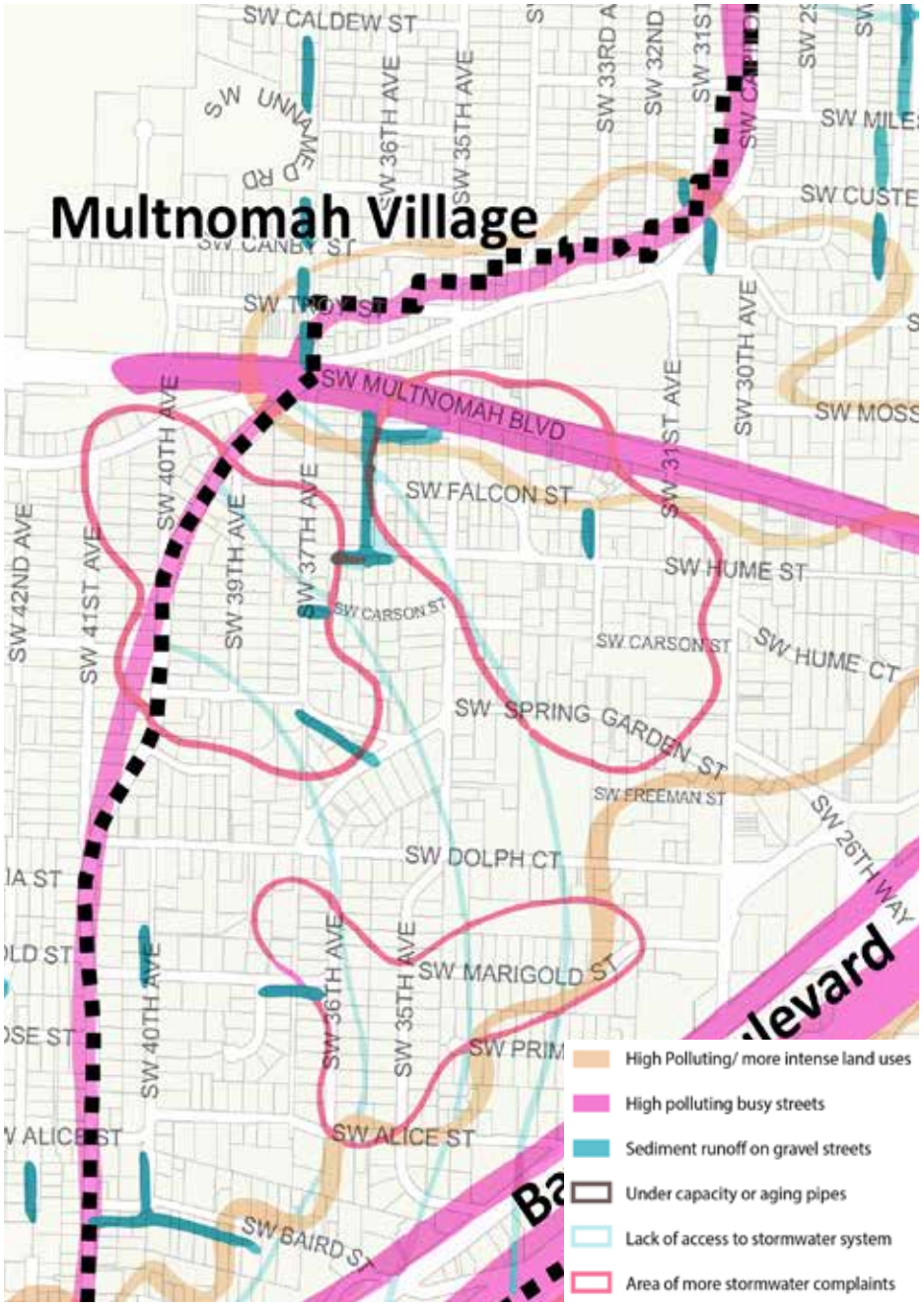
Street and stormwater analysis maps

A key to understanding how street and stormwater needs relate to each other is determining where they overlap. Individual maps were created for both street and stormwater need to show geographically where issues exist. Maps were also produced locating where opportunities and constraints exist to address both the street and the stormwater needs. Finally, the series of maps were used to produce the "system gap overlap" map shown in Chapter 6 with the System Recommendations.

Street and stormwater needs maps

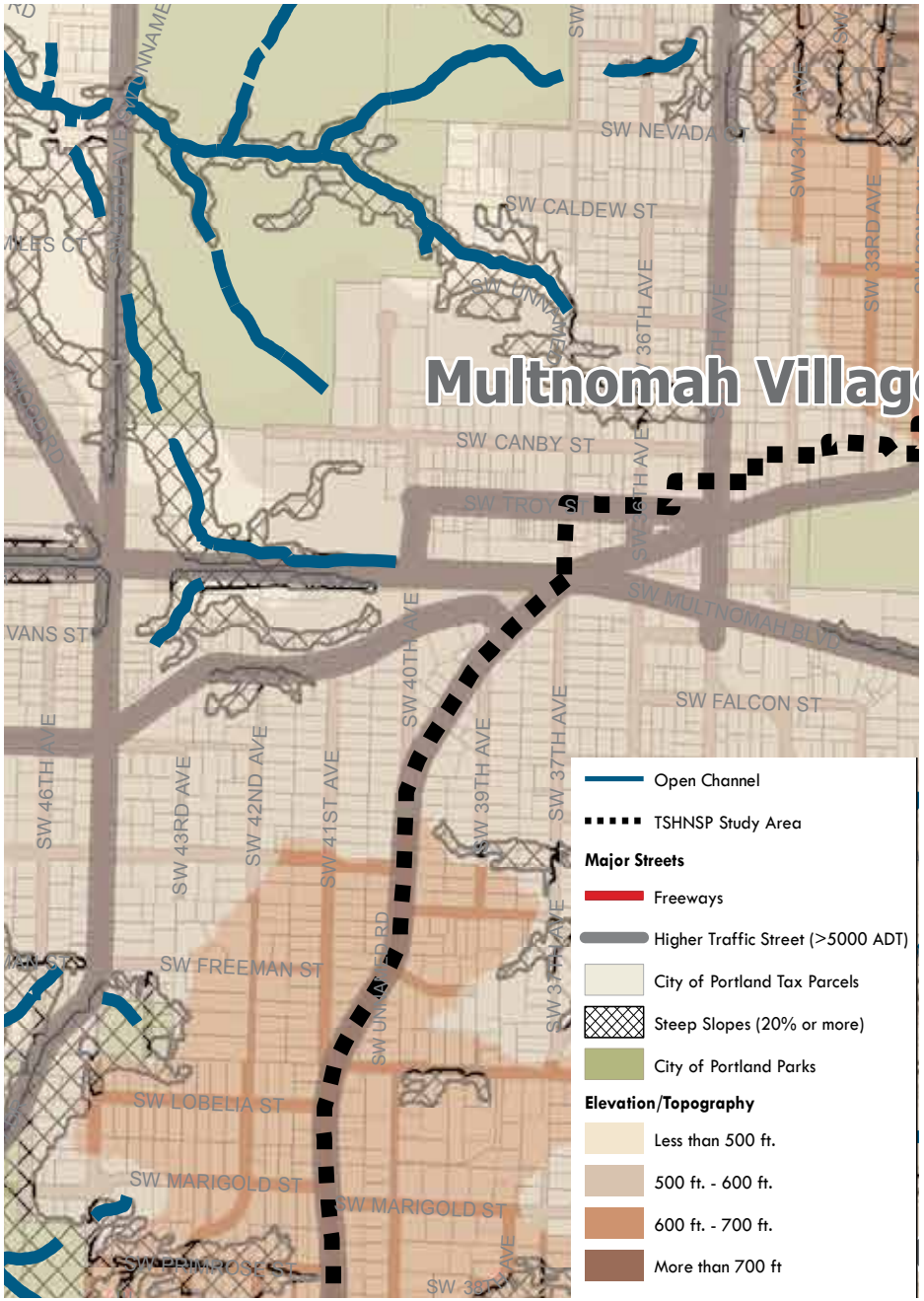
Map 1: Transportation needs

1. **Concentrations of dirt and gravel streets** – these streets provide poor accessibility, particularly for pedestrians, and create a variety of nuisances for neighbors, such as dust, damage to vehicles, attracting off-road vehicles and serving as dumping space for garbage.
2. **Gaps in the pedestrian network** – neighbors are unable to access nearby destinations by foot even if they are within a short walkable distance.
3. **Gaps in the bicycle network** – bicycle routes are limited to a few busier streets and there is a lack of connections through neighborhoods or along flatter more direct routes.
4. **Areas with fewer street connections** – these areas offer few alternative route options through the neighborhood resulting in more traffic and out of direction travel.



Map 2: Stormwater needs - highlighting the parts of the study area that contribute to degraded watershed health or an incomplete stormwater system. Specifically,

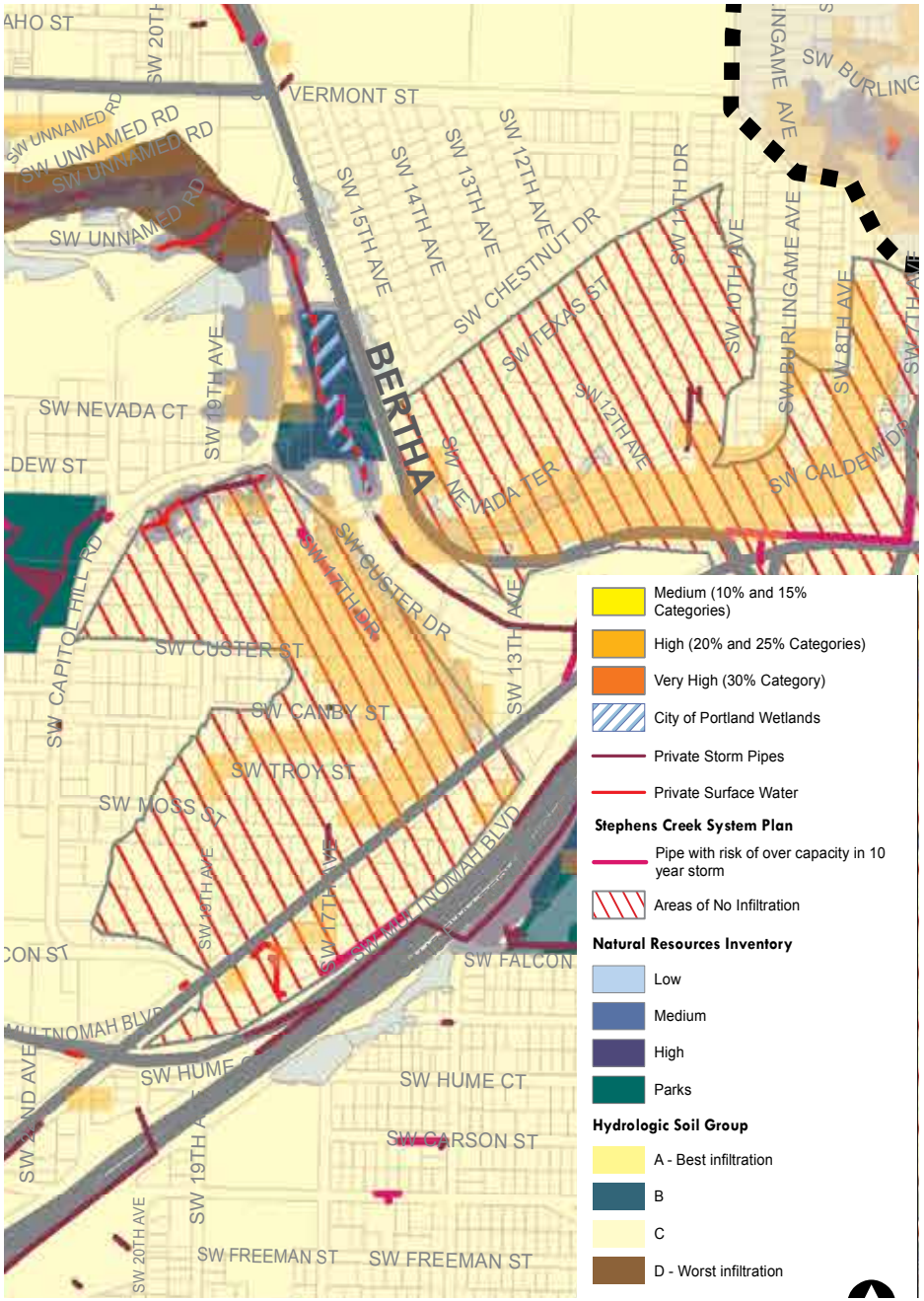
1. **High polluting / more intense land uses**: are found in commercial or industrial areas. These areas are more densely developed and have more impervious surface than residential areas, resulting in greater volumes of stormwater runoff.
2. **High polluting busy streets**: The study area contains several busy streets, which generate more pollutants, such as metals and motor oil, than lower traffic streets. These pollutants degrade water quality and aquatic habitat when they washed into streams.
3. **Sediment runoff on gravel streets**: Stormwater running down gravel streets picks up sediment which gets deposited on other streets, private property, and eventually in streams where it degrades water quality and aquatic habitat.
4. **Under-capacity or aging pipes**: Some stormwater pipes are too small to convey the flow of stormwater, which can lead to flooding in streets or on private property.
5. **Lack of access to stormwater system**: In some parts of SW Portland, stormwater flows over land for one or more blocks before it has an opportunity to enter the piped stormwater system. This can cause problems such as erosion and flooding on private property.
6. **Area of more stormwater complaints**: gathered from public input, BES staff and BES records.



Street and stormwater constraints maps

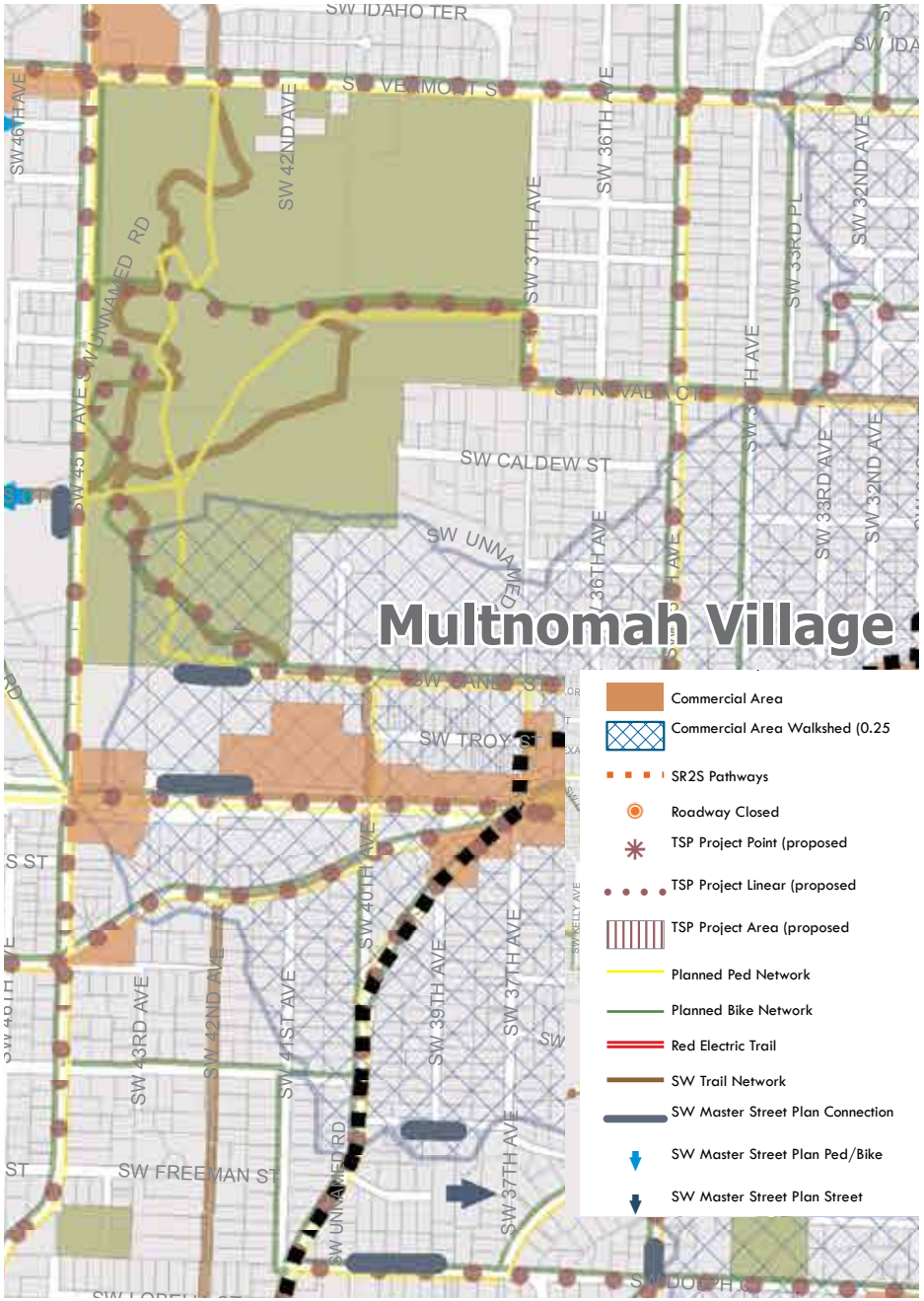
Map 3 illustrates transportation constraints, showing areas where natural and structural features may limit transportation management. Specifically,

1. **Infrastructure barriers** – Interstate 5 runs through the middle of the study area and there are few over crossings to connect the neighborhoods with destinations on either side. Busy arterial streets, such as Barbur Boulevard and Beaverton-Hillsdale Highway, can be difficult or unsafe to cross.
2. **Open channel streams** – streams in Southwest Portland often create breaks in the street network. The distance between stream crossings can result in significant out of direction travel or higher traffic volumes at crossings.
3. **Hills/topography** – routes through hilly terrain can serve as a disincentive for those who are not able or willing to climb while walking or bicycling to their destination.
4. **Steep slopes** – some slopes may be too steep traverse by foot or bicycle or even pose a safety hazard or landslide risk.



Map 4 illustrates stormwater constraints, showing areas where natural and structural features may limit stormwater management. Specifically,

1. **Potential landslide hazard:** The study area falls within the City of Portland Potential Landslide Hazard area due to the steep slopes, soils, and geology of the area. Stormwater infiltration is often limited in these areas.
2. **Private storm pipes and surface water** are parts of the stormwater system that are on private property, which limits the city's ability to manage these assets.
3. **Pipes with capacity risk** are stormwater pipes that may not be large enough to pass flows associated with storms statistically predicted to occur once every 10 years. In large storms with a 10% chance of occurring within any given year this can lead to flooding.
4. **Areas of no infiltration** were identified in the Stephens Creek Stormwater System Plan, based on a geotechnical evaluation of slope stability, soils, and existing features.
5. **Natural resource inventory:** Metro and the City of Portland have identified high value natural resource areas. In the study area, these are riparian (adjacent to streams) and wetland areas. These areas provide important hydrologic functions.
6. **Hydrologic soil group:** soils in the study area fall into group C, which have relatively poor infiltration.

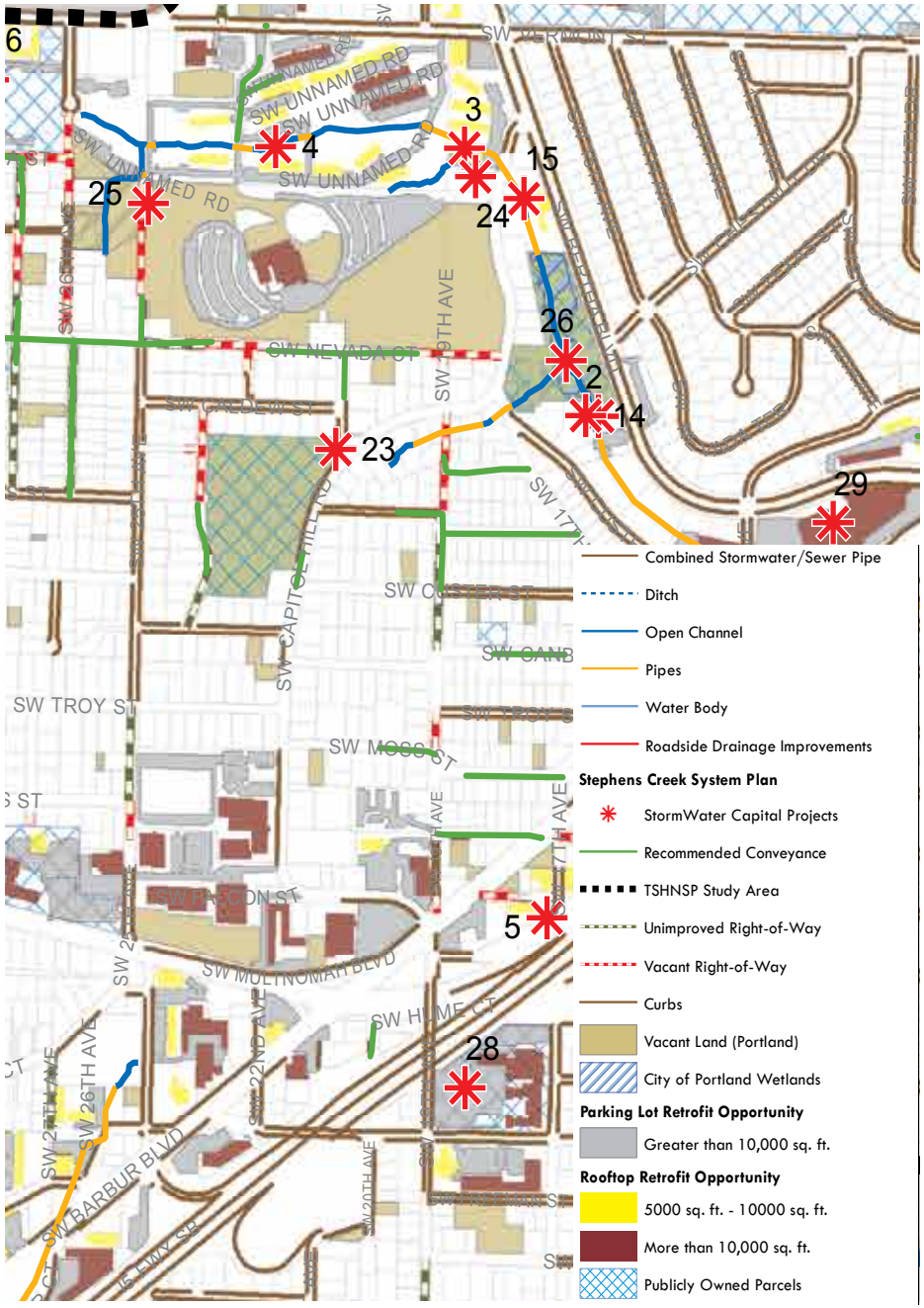


Street and stormwater opportunities maps

A number of opportunities were identified to address area needs. A series of maps to locate project area "opportunities." Refer to the attached Map 5 and Map 6.

Map 5 illustrates Transportation Opportunities, showing areas where opportunities may exist to improve the transportation system and connectivity. Specifically,

1. **Planned pedestrian/bicycle/trail networks** – the City has several adopted plans identifying primary pedestrian and bicycle routes including the Portland Bicycle Plan, Pedestrian Master Plan, SW Urban Trails Plan and Safe Routes to School engineering reports.
2. **Public right-of-way** – publicly owned right-of-way provides opportunities to create connections in the street and pathway system and to provide non-traffic functions such as stormwater conveyance and treatment, utilities and other community uses.
3. **Master Street Plan connections** – Portland's Southwest Street Master Plan (2001) identified locations where right-of-way is needed for future local street connections and bicycle and pedestrian pathways in Southwest Portland.
4. **Roadway closures** – streets that are closed to motor vehicles may serve as safe and comfortable, low-traffic routes for people walking, rolling or bicycling away from busy arterial streets.
5. **Projects in Portland's Transportation System Plan (TSP)** – The TSP major transportation improvements – the primary source for PBOT's Capital Improvement Program (CIP) – identifies several new large-scale projects within the study area.
6. **Walksheds for commercial areas (0.25 mile)** – residents who live within a short walkable distance from commercial areas, where neighborhood destinations are concentrated, may choose to walk instead of driving if there is a safe and comfortable route available.



Map 6 illustrates stormwater opportunities, showing areas where opportunities may exist to improve the stormwater system and watershed health. Specifically,

1. **Stormwater capital projects** indicate locations where projects to improve the stormwater system are recommended in the Stephens Creek watershed.
2. **Roadside drainage improvements:** indicate areas where improvements may be made to roadside drainage in the Tryon Creek watershed.
3. **Unimproved and vacant right-of-way** show potential opportunities to improve streets and stormwater when street improvements are made.
4. **Curbed streets** convey stormwater better than uncurbed streets.
5. **Vacant land, publicly owned parcels, and parks** may provide opportunities for neighborhood-scale stormwater facilities and partnerships within city bureaus.
6. **Redevelopment or potential partnership opportunities** to manage stormwater on private property. Large building and parking lots are potentially cost effective options to manage stormwater runoff on site before leaving the property.
7. **Streams and wetlands** are the backbone of the stormwater system, and provide opportunities to increase stormwater and watershed function through enhancement projects.

Developing Solutions

Context-based street and stormwater solutions

5

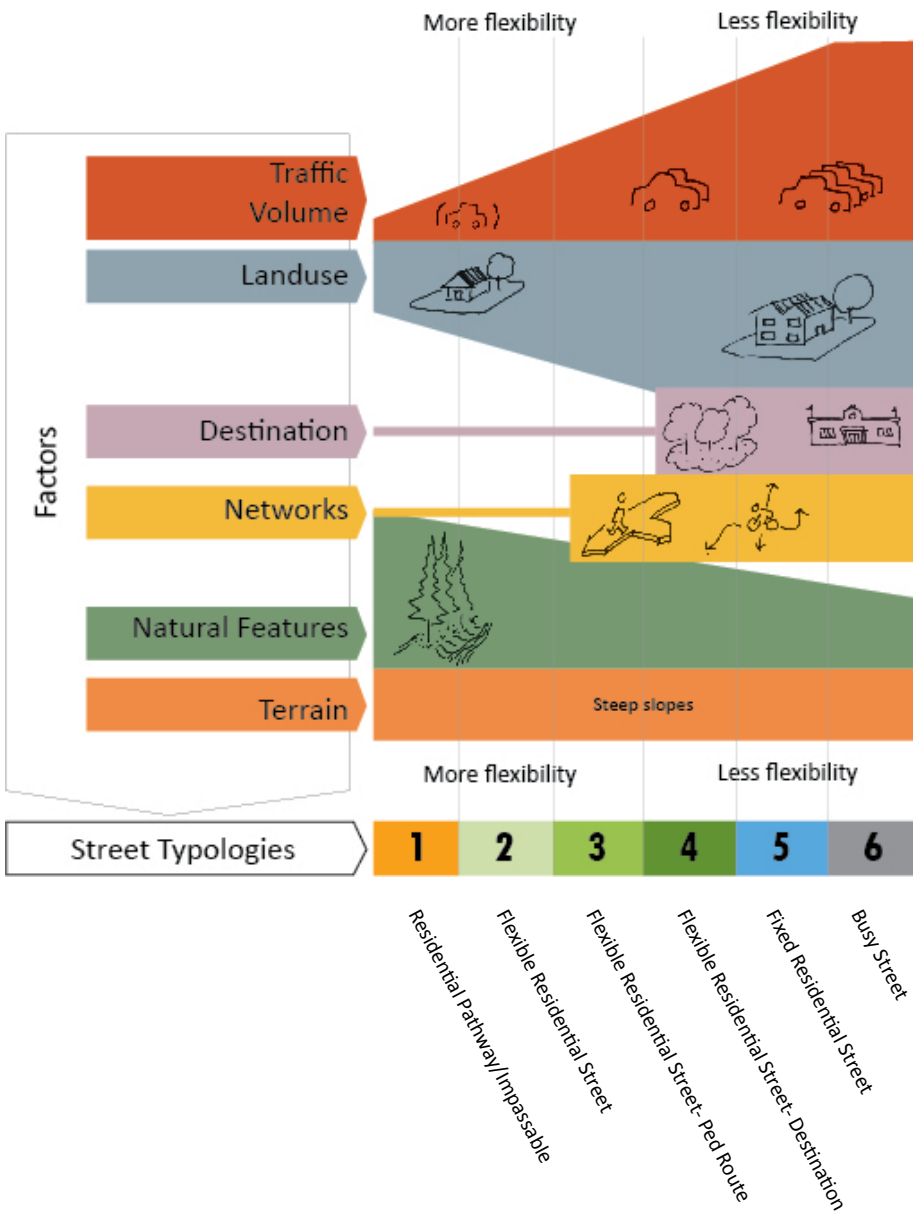
Prior to the adoption of new residential 'Street by Street' standards in November 2012, property owners who wanted to form a Local Improvement District (LID) to improve their streets had for the most part, just one option—the 'traditional residential street' standard, regardless of the part of the City in which the street was located. The 'Street by Street' Initiative provided a shift away from the one-size-fits-all approach and allows for lower-cost improvements that can be easily adapted to unique contexts thereby limiting impacts to natural features and neighborhood character.

Portland's new proposed Comprehensive Plan directs the City to "plan and design to fit local conditions" and meet the specific needs of each of Portland's designated pattern areas. It states that "new development in Western Neighborhoods should respond to the area's hilly topography, streams, ravines and forested slopes," which includes improvements to complete the street and stormwater systems.

The Tryon-Stephens plan lays out three general solutions: a typology to define street context, street and stormwater tools, and a flowchart to match tools based on the street context.

Typology: Defining street context

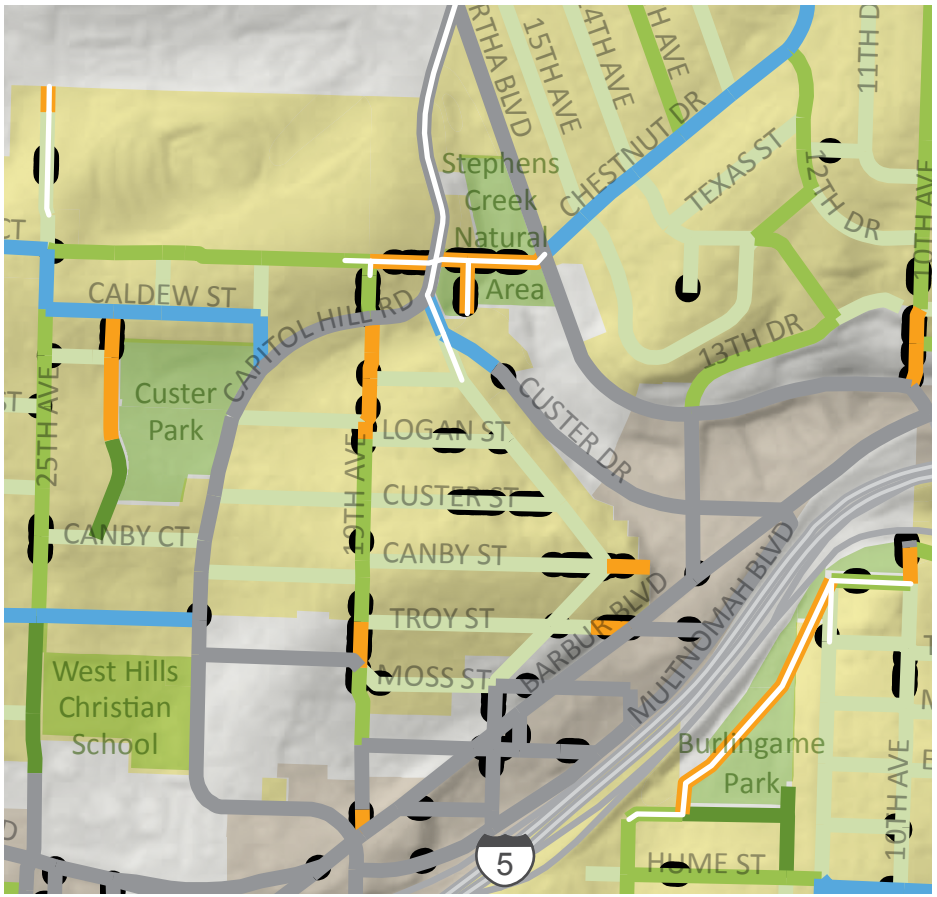
This Plan proposes a Neighborhood Street Typology as the primary way of defining the unique street context and the suitability of different street and stormwater management tools. The typology was based on input from community members and city staff during the existing conditions phase and analysis of local needs, opportunities and constraints. Identifying the Typology of a given street is important to understanding not only the unique functions and character of a street but also the degree of flexibility available to adapt the roadway design to the specific context. The relative flexibility for each factor is illustrated on page 34. Roughly half of the streets in the study area have lower traffic volumes and primarily provide access to adjacent properties. Streets which function at a lower level for traffic, generally offer more flexibility in selecting design options for improvement.



The six factors used to define the Street Typology included:

- **Traffic function:** streets with higher level classifications generally have higher demands and less design flexibility.
- **Land use:** streets adjacent to areas with more intense land uses, such as commercial uses or higher density zoning, have less flexibility from traditional street designs.
- **Adjacent destinations:** streets serving important destinations function at a higher level for multiple modes of travel and often have a higher demand for on-street parking.
- **Pedestrian and bicycle networks:** require higher quality facilities to ensure comfort and safety for more active transportation users than streets not on those networks.
- **Natural features:** areas with higher value natural resources constrain other right-of-way uses and are candidates for improvements that have minimal environmental impacts.
- **Terrain:** steep slopes increase challenges in street construction and controlling the speed of motor vehicles and stormwater runoff.

The purpose of the Street Typology is to define street contexts and determine flexibility for making improvements, not to assign specific street or stormwater tools to a given street.



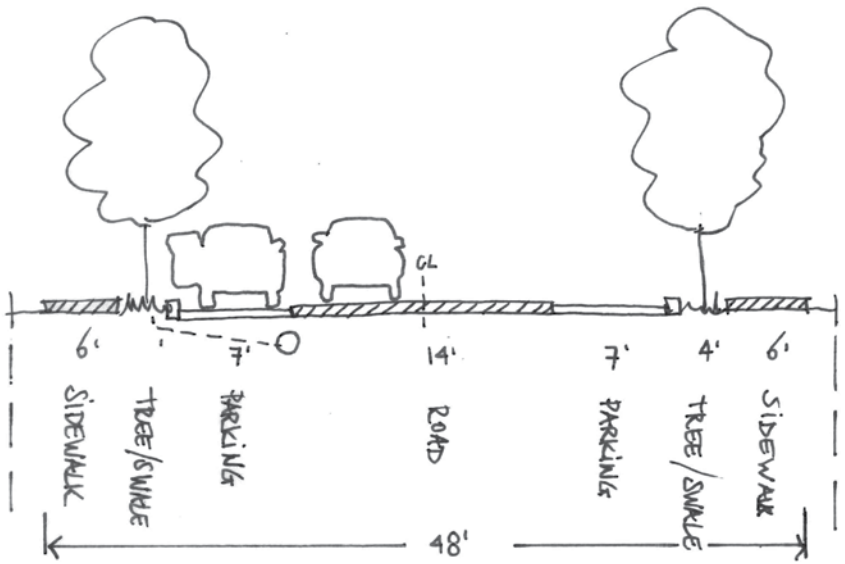
Residential pathway/impassable for motor vehicles
Flexible residential street
Flexible residential street (pedestrian route)
Flexible residential street (destination)
Fixed residential street
Busy street (arterial/commercial/higher density)
Natural resource area
Steep slope (20% or greater)

The Tryon-Stephens Plan designates six categories of streets within the Tryon-Stephens study area:

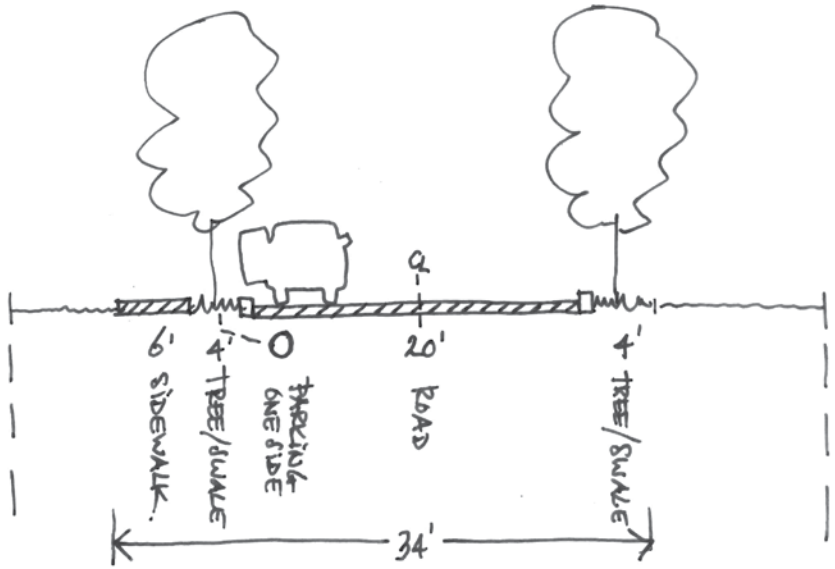
		Percentage of length of each street typology in the study area
1.	**Residential pathway/impassable**: Right-of-way in single-family residential areas (zoned R5 or lower) that does not provide motor vehicle access and may be completely vacant of improvements or traverse natural resource areas. Right-of-way may be a candidate for multiuse paths or community built trails.	4.5%
2.	**Flexible residential street:** Local service traffic streets in single-family residential areas (zoned R5 or lower) with less than 500 motor vehicles per day.	33.3%
3.	**Flexible residential street – pedestrian route**: Local Service Traffic Streets on the Pedestrian Network in single-family residential areas (zoned R5 or lower) with less than 500 motor vehicles per day.	10.3%
4.	**Flexible residential street – destination**: Local service traffic streets adjacent to a school or park in single-family residential areas (zoned R5 or lower) with less than 500 motor vehicles per day.	1.2%
5.	**Fixed residential street:** Local service traffic streets in single-family residential areas (zoned R5 or lower) with more than 500 motor vehicles per day. These streets often coincide with bicycle and pedestrian routes through neighborhoods.	8.8%
6.	**Busy Street:** Arterial streets* (higher than local service traffic) and streets in higher density residential and commercial areas.	41.9%

* Arterial: Any street that is not a local service traffic street according to the TSP traffic classification maps.

Traditional Residential Street



Skinny Traditional Street



Street and Stormwater Tools

In 2012, City Council authorized the City to adopt new residential 'Street by Street' standards, in addition to the traditional street standards, allowing improvements to better match street function, providing design flexibility, and meeting basic needs for local access. Additionally these new standards, 'Separated Residential' Street and 'Shared Residential' Street provide lower cost design options.

STREET STANDARDS, PRE-2012 (see figures at left)

Traditional Residential Street – curbs on both sides of the street and are typically 26-feet wide (with some as wide as 32-feet) allowing for parking on both sides. Sidewalks are required on both sides of the street and stormwater management facilities to mitigate the increase in impervious surface.

Skinny Traditional Streets – curbs on both sides of the street but are 20-feet wide curb to curb, which allows parking on one side only. Sidewalks are required one side of the street and stormwater management facilities are installed to mitigate the increase in impervious surface.

'STREET BY STREET' STANDARDS, ADOPTED 2012

Separated Residential Streets – have the basic elements of an improved street but differ in requiring a more narrow paved width, not requiring curbs, and allowing features such as parking, stormwater management, and a sidewalk on one side of the street.

Shared Residential Streets – nominal traffic volumes (500 vehicles per day or less), are narrow roadways designed to ensure slow travel speeds (15 mph limit) and allow pedestrians to use the roadway rather than a sidewalk.

Pathway Only – simply improving access for people on foot or bicycle may be an appropriate option on some unimproved rights-of-way that serve as access to few or no adjacent properties.

In 2013 BES and PBOT staff worked together to develop stormwater tools that could be matched with Street by Street designs (Investigation of Alternative Stormwater Facility Design for the R.O.W., 2013). Traditional street designs include curb and gutter, which can capture and convey stormwater for several hundred feet. Street by Street designs are curbless, which opened up new possibilities for managing stormwater from these streets.

STORMWATER TOOLS

As described in Chapter 3, projects in the City of Portland that add impervious surface are required to infiltrate stormwater on-site with vegetated facilities to the maximum extent feasible. If total stormwater infiltration is not feasible on-site, runoff from vegetated facilities can overflow to an approvable discharge point (such as a drainageway, river, or storm-only pipe). If an approvable discharge point is not readily available, stormwater must be conveyed safely to an approved discharge point. The following stormwater tools are organized to address these requirements:

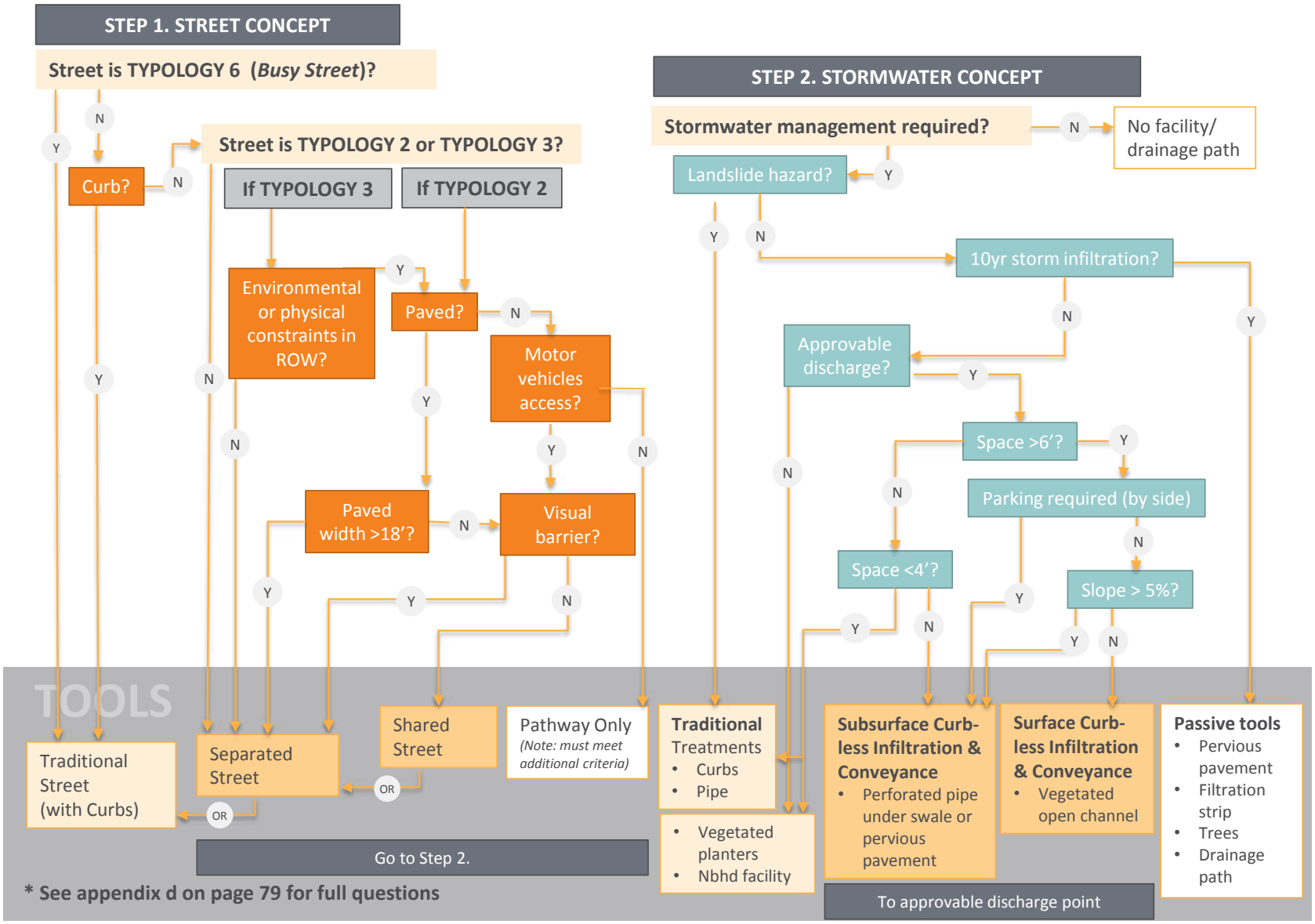
Passive Tools such as permeable pavement, filtration strips, and street trees can be used where conditions (slope, soil, etc.) allow for stormwater to infiltrate. Alternate routes of conveyance must still be identified to avoid nuisance and damage from flooding from larger storms.

Surface Curbless Conveyance facilities such as valley gutter roadways and vegetated open channels are used to convey stormwater on the ground surface to a place where the water can fully infiltrate or enter the stormwater system. These would be used in areas where conditions (slope, soil, etc.) prevent water from fully infiltrating on-site, or to provide an alternate route of conveyance.

Subsurface Curbless Conveyance facilities such as porous fill and French drain e.g. pervious parking above a perforated pipe, convey stormwater below the ground surface to a place where the water can fully infiltrate or enter the stormwater system. These would be used in areas where conditions (slope, soil, etc.) prevent water from fully infiltrating on-site, and slope, space, or use constraints limit surface conveyance.

STREET AND STORMWATER FACILITY CONCEPT FLOW CHART *

September 2015



Steps to match BES and PBOT tools

The street and stormwater facility concept flow chart at left (page 38) serves as a preliminary guide for City staff or neighbors to identify tools that may and may not be options for improving a specific street. PBOT and BES staff developed the flow chart to document the factors that drive applicability of the street and stormwater tools described above. Project staff revised the flow chart after a workshop including staff from PBOT's Development Services, Traffic, Civil Design, Planning, Active Transportation, Project Management, and Maintenance Operations Groups, and BES's System Development, Stormwater System Planning, Watershed Services, Stormwater Operations and Maintenance, Engineering Design, and Development Engineering Groups. It was again revised after further comments received from PBOT and BES staff.
The flow chart is not meant to determine exactly which tools apply to a given street. Rather, it is intended to show which tools are not suitable and to provide several options that may be taken further into design. Detailed explanations of the questions in each box can be found in the appendix d (p.79). This does not replace the permitting process. Improvements must meet applicable City requirements.

The first step in the flow chart is to take the street typology identified in the previous section and proceed to answering the step 1 questions about the typology and current characteristics of the street. This will lead to one of the four street concepts at the bottom of the step 1 section. Note that a street that could apply the shared street option also has the opportunity to apply separated or traditional street options, and that a street that could apply separated street option has the opportunity to be improved as a traditional street.

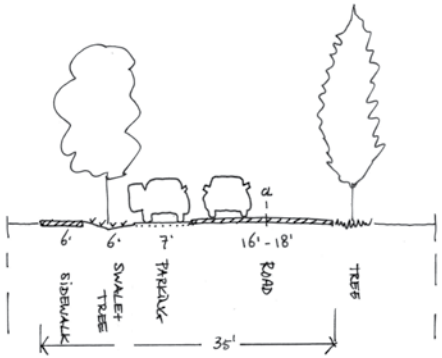
Once street tool options are identified, the process moves on to step 2 to match stormwater tools. The first question asks whether greater than 500 square feet of impervious surface is being added or redeveloped. If not, the city did not require a stormwater management facility is required. If stormwater treatment or flow control requirements are triggered, site conditions such as slope, soil, proximity of existing stormwater infrastructure, and ROW space will lead to one of the four stormwater tools at the bottom of the step 2 section. The stormwater tools are organized according to the requirements described above: full infiltration on-site (passive tools), conveyance through open channels, conveyance underground, creation of a neighborhood facility to treat or attenuate runoff for multiple blocks, or traditional treatments such as curbs, pipes, and curbed vegetated stormwater planters. Many designs can meet the intent of the SWMM. These tools are offered as a guide on the path to identifying specific stormwater management designs.

Conceptual street and stormwater combinations

Street cross sections are visual representations of the important elements of the street design viewed as if the street were sliced vertically. On the following pages, project staff developed cross-sections of "conceptual" street and stormwater combinations to illustrate how these tools may come together in the right of way. Rather than an exhaustive illustration of all possible combinations, these are meant to provide a vision of several likely combinations. When these concepts are taken to the next step toward application (design), additional factors (e.g., driveways, other uses of the ROW) will have to be taken into consideration. Sections may vary along the corridor depending on constraints and the location of driveways and parking. Traditional street cross sections are shown on page 34.

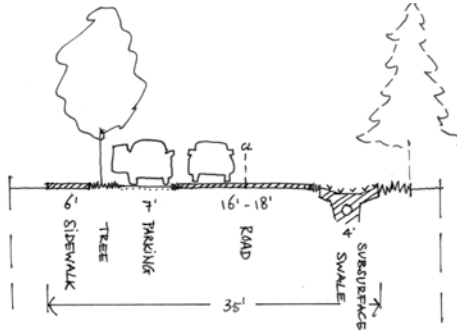
Street and Stormwater Combinations

Separated Curbless + Surface Conveyance, one side or two sides



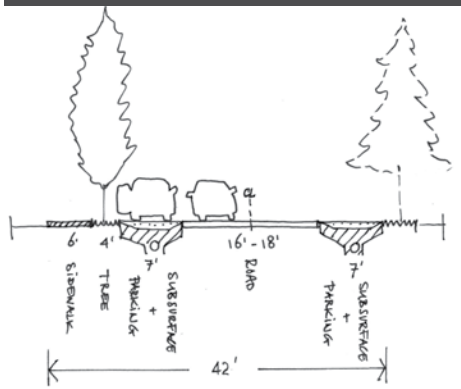
The sidewalk is separated from the street on one side of this low-traffic road. Parking is available on one side. There is space for trees on both sides, but on one side the tree is in the vegetated surface swale, which infiltrates and conveys all of the street runoff to a place where it can fully infiltrate or enter the stormwater network at an approved point of connection.

Separated Curbless + Subsurface Conveyance



The sidewalk is separated from the street on one side of this low-traffic road. Parking is available on one side, and space for trees on both. Stormwater runoff flows towards one side of the street into a vegetated swale and into a perforated pipe which allows for further infiltration and conveys the water to a place where it can fully infiltrate or enter the stormwater network at an approved point of connection.

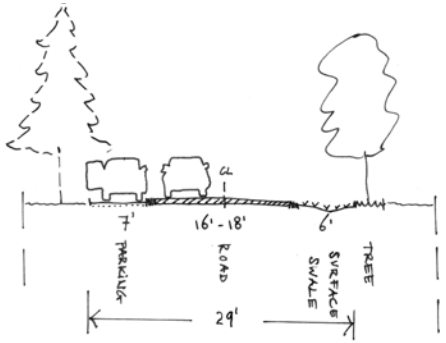
Separated Curbless + Subsurface Conveyance + Parking



The sidewalk is separated from the street on one side of this low-traffic road. Space for trees is available on both sides of the street. Parking is also available on both sides of the street, on a hard pervious surface that allows stormwater to infiltrate and enter a perforated pipe which allows for further infiltration and conveys the water to a place where it can fully infiltrate or enter the stormwater network at an approved point of connection.

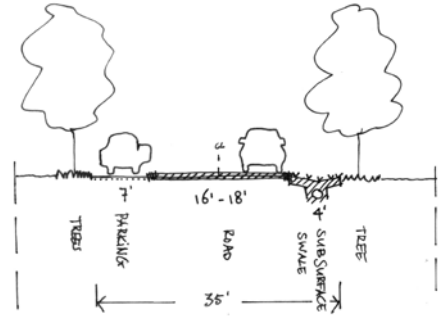
Shared Residential Streets Combinations

Shared Curbless + Surface Conveyance



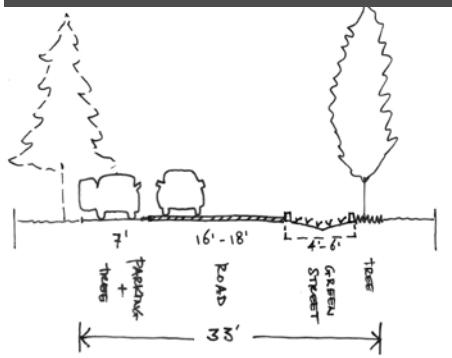
Pedestrians, bicycles, and cars share the paved surface on this low-traffic road. Parking is available on one side, and space for trees on both. Stormwater runoff flows towards one side of the street into a vegetated surface swale which infiltrates and conveys the street runoff to a place where it can fully infiltrate or enter the stormwater network at an approved point of connection.

Shared Curbless + Subsurface Conveyance



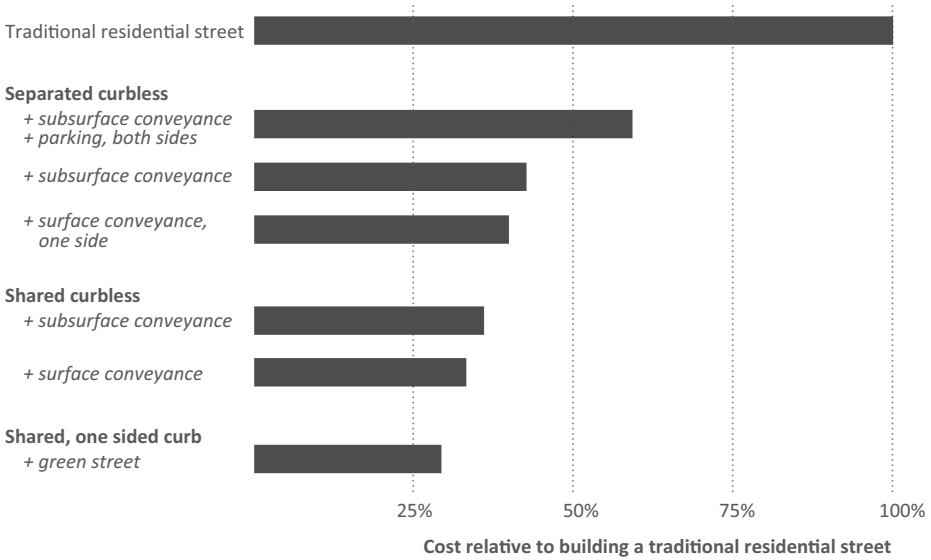
Pedestrians, bicycles, and cars share the paved surface on this low-traffic road. Parking is available on one side, and space for trees on both. Stormwater runoff flows towards one side of the street into a vegetated subsurface swale and into a perforated pipe which allows for further infiltration and conveys the water to a place where it can fully infiltrate or enter the stormwater network at an approved point of connection.

Shared One side Curb + Green Street



Pedestrians, bicycles, and cars share the paved surface on this low-traffic road. Parking is available on one side, and space for trees on both. Stormwater runoff flows towards one side of the street and is conveyed along a curb to a stormwater facility located down-hill.

Conceptual street and stormwater combination costs



Additional concepts for consideration

In addition to the conceptual combinations of street and stormwater facilities on the previous pages, there are a number of other variations to cross sections above that can be considered as part the subsequent design of residential street improvements.

Road surface drainage (cross-slope) options:

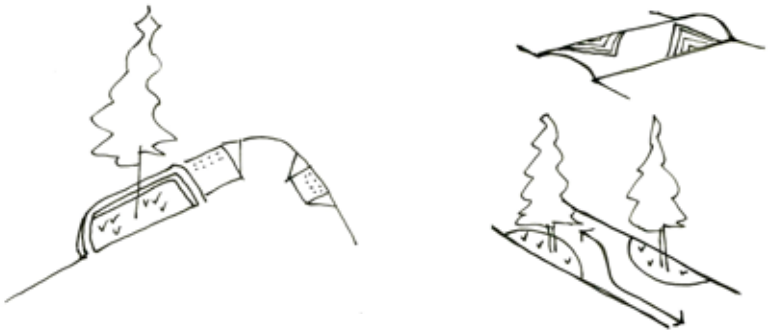
crown section

valley gutter

shed section

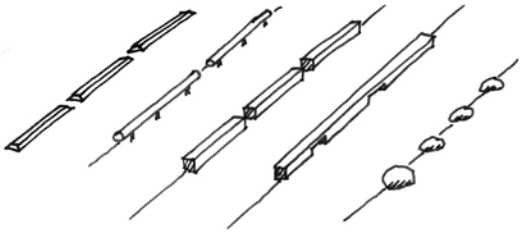
Traffic calming options:

- speed bump
- chicane
- curb extensions



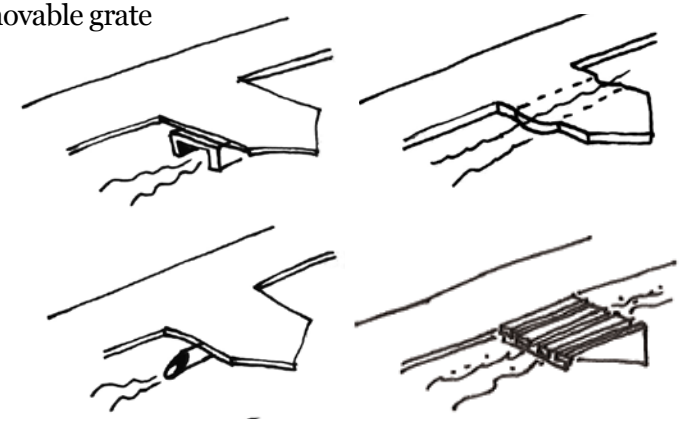
Roadway edge barrier options:

- scupper (intermittent curb)
- wheel stops
- boulders or rocks



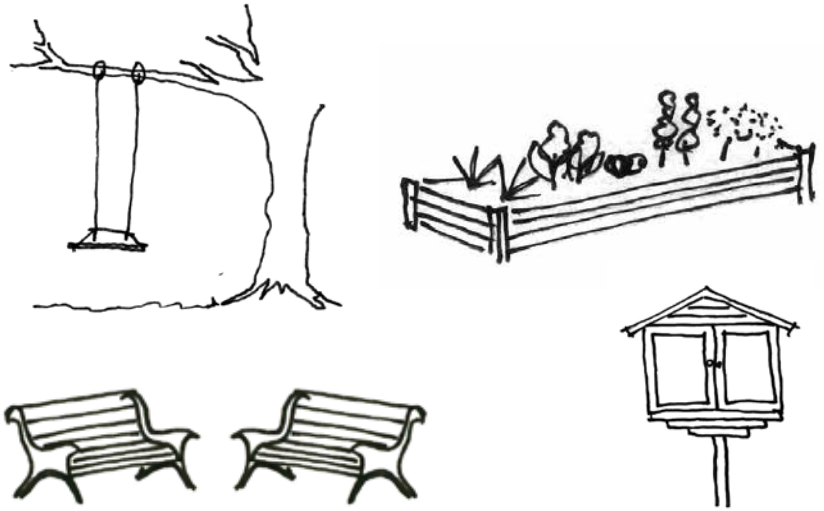
Driveway transition and sidewalk access options:

- box culvert
- pipe culvert
- at-grade dip
- removable grate



Community uses:

- play space
- gathering space
- gardening and landscaping space
- sharing and information/education

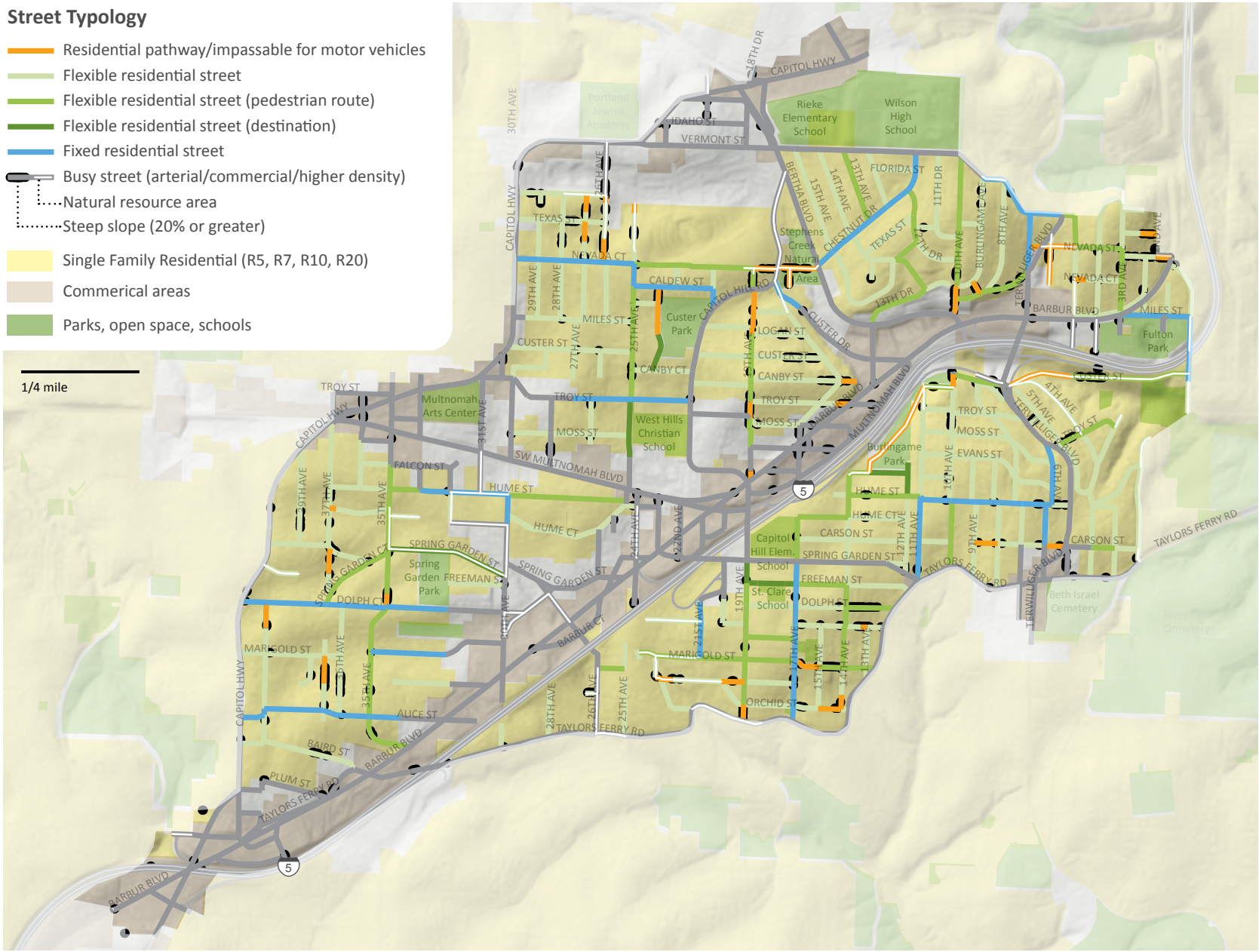


Plan Recommendations

6

The Tryon-Stephens Plan is the product of an innovative cross-bureau collaboration planning for future street and stormwater system completion. Ongoing coordination amongst partners and engagement of neighborhood stakeholders will need to continue through the implementation of the Plan. The following recommendations form a tailored strategy to address the unique challenges and opportunities within the study area by taking a coordinated approach to addressing gaps in both street connectivity and the stormwater system. These recommendations are grouped into three sections:

- **Street and Stormwater Concepts**
- **System Recommendations**
- **Further Implementation Strategies**


Street Typology
Residential pathway/impassable for motor vehicles
Flexible residential street
Flexible residential street (pedestrian route)
Flexible residential street (destination)
Fixed residential street
Busy street (arterial/commercial/higher density)
Natural resource area
Steep slope (20% or greater)
Single Family Residential (R5, R7, R10, R20)
Commerical areas
Parks, open space, schools
1/4 mile
CAPITOL HWY
SW MULTNOMAH BLVD
BARBUR BLVD
TAYLORS FERRY RD
MULTNOMAH BLVD
Rieke Elementary School
Wilson High School
Portland Jewish Academy
Stephens Creek Natural Area
Custer Park
Multnomah Arts Center
West Hills Christian School
Spring Garden Park
Capitol Hill Elem. School
St. Clare School
Burlingame Park
Fulton Park
Beth Israel Cemetery
IDAHO ST
VERMONT ST
FLORIDA ST
TEXAS ST
NEVADA CT
CALDEW ST
MILES ST
CUSTER ST
CANBY CT
CANBY ST
TROY ST
MOSS ST
EVANS ST
HUME ST
HUME CT
FALCON ST
SPRING GARDEN ST
FREEMAN ST
DOLPH CT
MARIGOLD ST
ALICE ST
BAIRD ST
PLUM ST
ORCHID ST
CARSON ST
BARBUR CT
CHESTNUT DR
CUSTER DR
CAPITOL HILL RD
BERTHA BLVD
BURLINGAME AVE
TERWILLIGER BLVD
BARBUR BLVD
NEVADA ST
NEVADA CT
MILES ST
CORBETT ST
TROY ST
MOSS ST
EVANS ST
HUME ST
HUME CT
CARSON ST
SPRING GARDEN ST
FREEMAN ST
DOLPH CT
MARIGOLD ST
ORCHID ST
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11TH AVE
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7TH AVE
6TH AVE
5TH AVE
4TH AVE
3RD AVE
18TH DR
15TH DR
13TH DR
11TH DR
7TH DR
5
5

Set typologies to define street contexts

Categorize streets into six groups identified in the recommended Street Typology, based on the adjacent land use, destinations, natural areas, terrain, motor vehicle traffic, and multimodal functions of the ROW. The Neighborhood Street Typology Map at left (page 46) shows the recommended typology in the study area.

Establish process for selecting street and stormwater concepts

Incorporate the street and stormwater facility concept flow chart into the process of determining suitable street and stormwater tools for a given street. This flow chart is intended to be used by city staff or neighbors, to aid in paring down options in the conceptual planning phase.

Design streets to enhance safe access and minimize the roadway footprint

On *Flexible Residential Streets (Typologies 2-4)* requiring curbs, determine whether it is adequate to build to the "skinny street" standard.

On *Fixed Residential Streets (Typology 5)* and *Busy Streets (Typology 6)* determine whether it is adequate to have parking or a sidewalk on one side only.

On *Fixed Residential Streets (Typology 5)* lacking planned sidewalks or bike lanes:

- Consider using pervious pavement.
- On Fixed streets lacking sidewalks that are excessively wide (greater than 30-feet (curb to curb), consider installing a walkway on one side (inside the curb) ensuring a minimum of 26-feet for the roadway with parking on both sides.
- On Fixed streets lacking "planned" bike lanes (e.g. SW Brier Place/ SW Miles Street and SW Hume Street) ensure separation of bicycle facility from pedestrians and motor vehicles.

Planned Active Transportation Network

NUMBER OF ACTIVE TRANSPORTATION NETWORK ROUTES* ON STREET SEGMENT

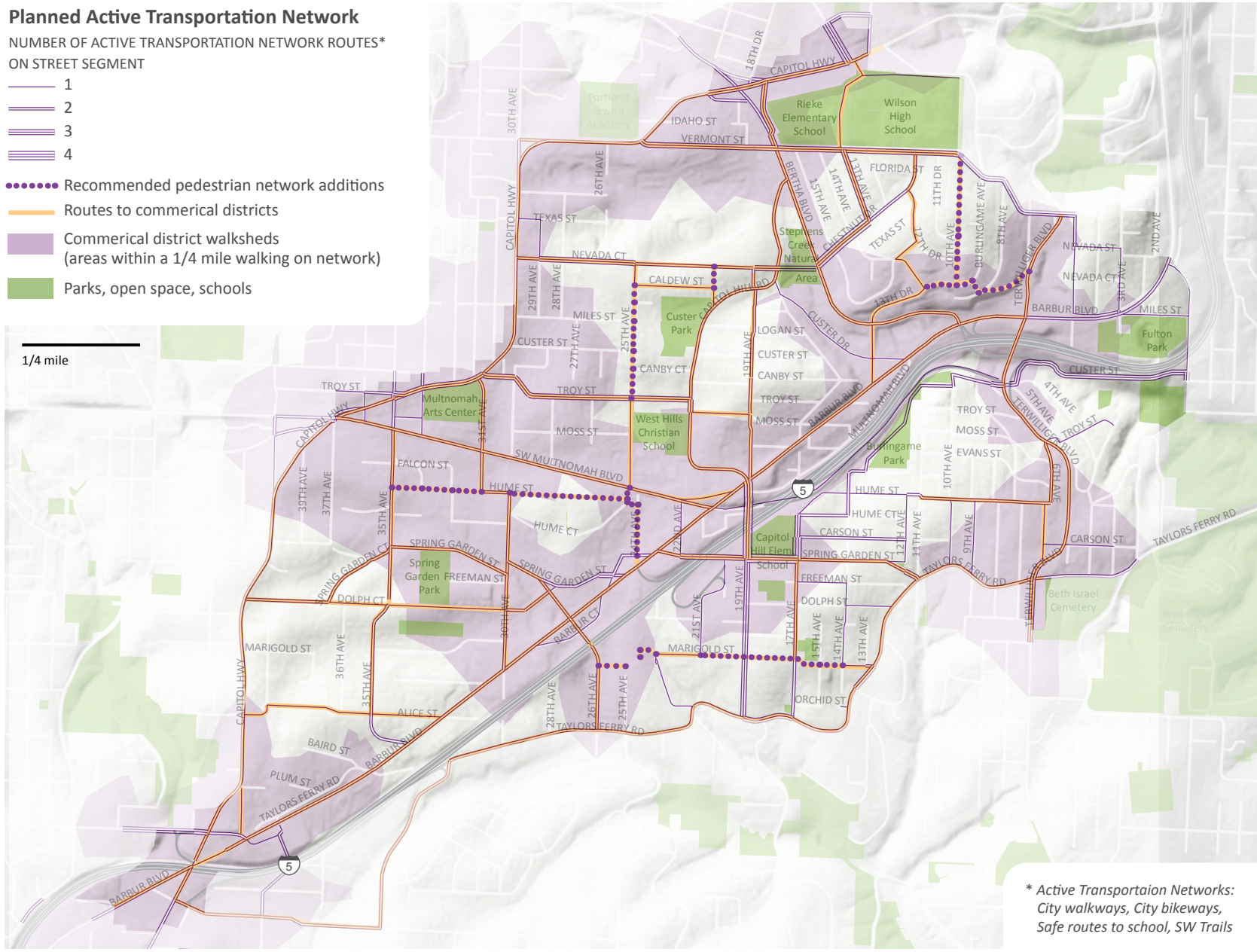
- 1
- 2
- 3
- 4

Recommended pedestrian network additions

Routes to commerical districts

Commerical district walksheds (areas within a 1/4 mile walking on network)

Parks, open space, schools



* *Active Transportaion Networks: City walkways, City bikeways, Safe routes to school, SW Trails*

Fill gaps in the active transportation network

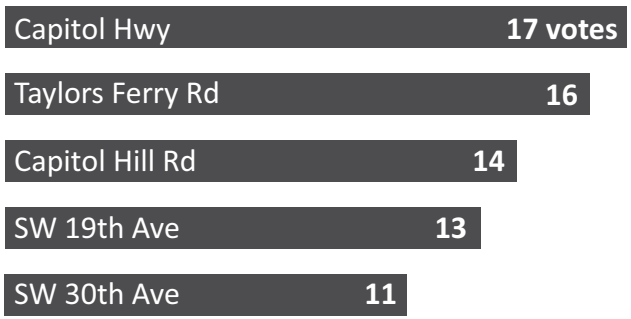
Create safe pedestrian and bicycle connections for residents to access neighborhood destinations by addressing gaps in the networks.

The Tryon-Stephens Plan expanded upon the existing planned pedestrian and bicycle networks, i.e. TSP city walkways, city bikeways, safe routes to school and Southwest Trails, identifying the safe "Routes to Commercial Districts" and, as a result, where important gaps in the planned network exist. The Active Transportation network map on the facing page (p. 48) identifies the number of pedestrian and bicycle networks (listed above) served by each street segment and shows recommended additions to the pedestrian network. Appendix B includes the important crossing locations within the study area. Consider new recommended walking routes with future updates of the City's TSP and Pedestrian Master Plan.

At two public open house events – on January 26th and May 7th, 2015 – community members had the opportunity to identify the street they would like to see improved first if money became available. The table at right shows the top five responses that each received more than ten votes. These streets generally have higher traffic volumes and lack basic infrastructure. These priorities reflect the input of those who submitted open house comments, not necessarily the priorities of all the residents of the study area.

PBOT is preparing to initiate a planning process, the Southwest In-Motion (SWIM), which will identify a five year active transportation implementation strategy for all of Southwest Portland. It will incorporate several projects identified in plans, including the TSP, Portland Bicycle Plan for 2030 and the Barbur Concept Plan. Once adopted, the SWIM strategy will prioritize investments in pedestrian, bicycle and access to transit project over the coming years.

What street(s) would you like to see improved, if money becomes available?



Stormwater and Transportation Systems Gaps

- Streets without stormwater system or curbs
- Gaps in bicycle facitilies and sidewalk networks
- Overlap in systems gaps

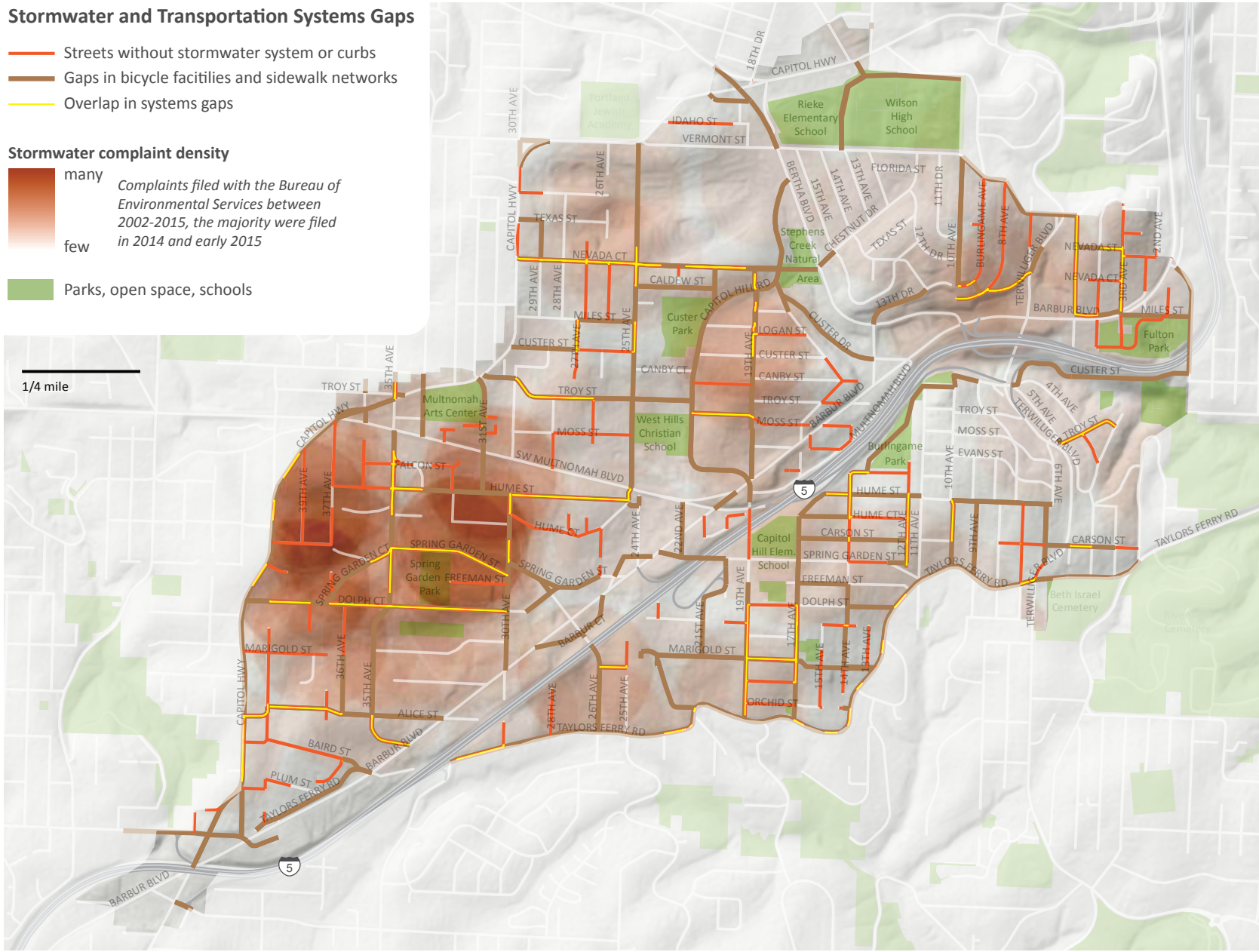
Stormwater complaint density

many

few

Complaints filed with the Bureau of Environmental Services between 2002-2015, the majority were filed in 2014 and early 2015

Parks, open space, schools



Coordinate to address system gaps

The map to the left (page 50) shows a preliminary analysis of streets where gaps in PBOT and BES system gaps overlap. Streets that are part of the Pedestrian and Bicycle Networks (including City Walkways and City Bikeways in the TSP and Safe Routes to Schools and Commercial Districts and Southwest Trails) but need improvement to fully serve those purposes are shown in purple. Streets that have no clear method to manage stormwater (no curb or ditch to convey the water, no pipe to receive stormwater runoff) are shown in red dashed lines. Streets where the PBOT and BES system gaps overlap are highlighted yellow. The backdrop of the map shows areas where stormwater complaints are concentrated. The southwestern portion of the study area shows not only a concentration of complaints about stormwater (in yellow and red), but also many streets that lack PBOT and BES systems. This area and the gaps identified in yellow may be ripe for joint implementation of street and stormwater improvements.

Updates to Southwest Master Street Plan

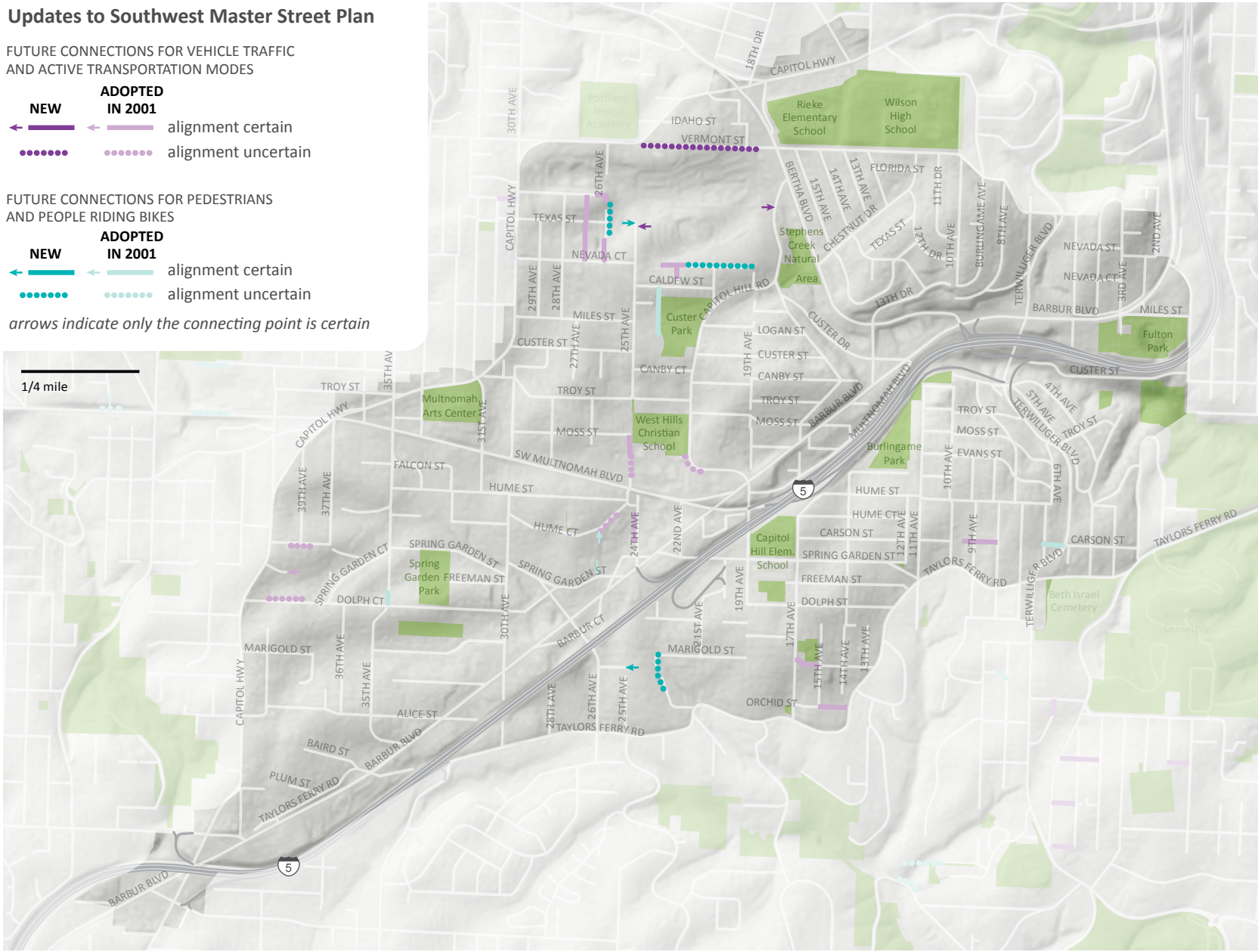
FUTURE CONNECTIONS FOR VEHICLE TRAFFIC
AND ACTIVE TRANSPORTATION MODES

NEW	ADOPTED IN 2001	
← ———	← ———	alignment certain
●●●●●●●	●●●●●●●	alignment uncertain

FUTURE CONNECTIONS FOR PEDESTRIANS
AND PEOPLE RIDING BIKES

NEW	ADOPTED IN 2001	
← ———	← ———	alignment certain
●●●●●●●	●●●●●●●	alignment uncertain

arrows indicate only the connecting point is certain



Add connections to the Southwest Master Street Plan

Modify the City of Portland's Southwest Master Street Plan (2001) to add future local street/pathway connections in two locations within the study area, as shown on the map to the left (page 52). Recommended new connections are in the Hillsdale neighborhood linking SW Nevada Court to SW Vermont Street between SW 26th Avenue and Capitol Hill Road, and in the Markham Neighborhood linking SW Marigold Street between SW 23rd and SW 26th Avenues.

Implement the Stephens Creek Stormwater System Plan

BES is currently implementing Phase 1 of the Stephens Creek Stormwater System Plan (SCSWSP) recommendations. These include repairing several outfalls along SW Taylors Ferry Road that discharge to a tributary of Stephens Creek, design and construction of three "neighborhood facilities"(scale stormwater detention and pollution reduction facilities), and the ROW Retrofit Shell (described later in this chapter). Phases 2 and 3 of the SCSWSP are not yet funded but will be implemented in the future. Phase 2 projects include more stormwater detention and pollution reduction facilities, habitat restoration on Stephens Creek tributaries, and funding for stormwater management projects on private property (including retrofiting properties with large parking lots and roofs to manage stormwater on-site). Phase 3 projects include stream enhancement and daylighting in the upper part of Stephens Creek, and replacement of the culvert under SW Macadam Avenue.

Implement watershed management plans

BES is currently implementing the recommendations of the Fanno and Tryon Creeks Watershed Management Plan (2005) and the Fanno/Tryon Water Quality and TMDL CIP pre-design #7622 (2008). In Tryon Creek, the focus has been on stormwater management in the upper watershed and aquatic and terrestrial habitat protection and improvement in the lower watershed. In the upper watershed, stormwater management projects constructed to date manage stormwater runoff from 43 acres of impervious area. The Terraced Rain Gardens Project (I-5 & SW 26th Avenue) constructed stormwater management facilities to detain and treat stormwater runoff from approximately 24 acres of impervious area that includes portions of I-5, SW Barbur Boulevard, and nearby commercial areas. In the lower watershed projects have improved habitat in Tryon Creek near the confluence of the Willamette River and several locations upstream, particularly in Tryon Creek State Natural Area. Fish passage improvements have been made at the Highway 43 culvert and replacement of the culvert under Boones Ferry Road is in design and construction is anticipated in 2017. Roadside ditch and shoulder widening improvements to convert ditches to swales have been identified throughout the watershed. Construction of 2,700 feet of swales along SW Stephenson Street between SW 35th Avenue and SW Boones Ferry Road is planned in summer/fall 2015.


SW Trails
6

Establish criteria to allow non-motorized access only

In the Tryon-Stephens area, as with much of Southwest Portland, there are many vacant and unpaved rights-of-way where the city has not constructed roads. Some undeveloped rights-of-way cover steep topography, streams or high-value natural resource areas that will not be improved for motor vehicle access in the future. Others may not be used by motor vehicles to cut through or to access adjacent properties; however, they are used for pedestrian and bicycle access. If there is a nearby parallel street, the ROW may not be a critical part of the street system. Simply improving access for people on foot or bicycle may be an appropriate option on some unimproved rights-of-way that serve as access to few or no adjacent properties.

Establish criteria for determining if streets are good candidates for non-motorized access only using the following factors:

- Prerequisites: adjacent property owner support, existing unpaved surface conditions, local service street for motor vehicles
- Circulation: number of properties with direct access, on pedestrian/bike networks, number of existing driveways at closure, distance to and function of next parallel improved street, length of dead-end street
- Adjacent land uses: single family residential areas, infill potential at closure, no destinations on the block.
- Safety: visibility barriers/sight distance
- Natural features: steep topography, high value natural resources, environmental overlay zones (P- or C- zones)

Close urban trails system gaps

Urban trails in Southwest Portland provide safe, and often low traffic, walking routes for both transportation and recreational use. In 2000, the City of Portland adopted the Southwest Urban Trails Plan (Resolution #35907) to increase pedestrian access throughout Southwest Portland. Only two gaps remain in the Tryon-Stephens study area, which are not signed per the adopted trail network. One route in the northern end of Trail #6 on SW 19th Avenue just south of existing Trail #3 along the SW Nevada Court public right-of-way. Neighbors are interested in extending the trail north on SW 19th Avenue and clearing non-native vegetation within the rights-of-way. A group of 17 community members met with staff on June 22nd to walk the segment of Trail #6 and brainstorm ideas for connecting it to Trail #3.

Pilot: Trail #6 connection on SW 19th Avenue south of Nevada Court

Develop criteria for interim shoulder widening on streets without curbs

In 2010, the Portland Bicycle Plan recommended installing interim bicycle facilities where it is not feasible to construct the preferred bikeway facility due to insufficient funds or other constraints. Several streets that carry moderate levels of traffic in the area still lack sidewalks, such as Capitol Hill Road, SW Hume west of SW 30th Avenue and Taylors Ferry Road. Since the Bicycle Plan was adopted in 2010, PBOT and BES have worked on projects to extend the paved shoulder and added stormwater facilities on Stephenson Street and Maplewood Road in Southwest Portland. This plan recommends identifying criteria to evaluate the suitability of interim shoulder widening on paved collector streets and high-traffic local streets without curbs. Factors to consider may include street classification, traffic speed and volume and visibility barriers. Depending on conditions, street may or may not be good candidates or may require a barrier between the roadway and widened shoulder. Interim improvements, such as widened shoulders, are only intended to improve conditions until a more permanent improvement can be made.

Conduct stormwater system alternative analysis along Capitol Highway

Improvements to Capitol Highway are part of a BES project that is moving forward independent of the Tryon-Stephens Plan project. However, alternatives that are developed to manage stormwater runoff from improvements to Capitol Highway may include stormwater infrastructure (e.g., vegetated stormwater facilities, pipes, subsurface detention) in the neighborhood and side streets adjacent to Capitol Highway which are located in the part of the Tryon Stephens Plan area which has a high concentration of stormwater/drainage complaints. Thus, as Capitol Highway alternatives are developed, they will be coordinated with tools and recommendations from this plan.

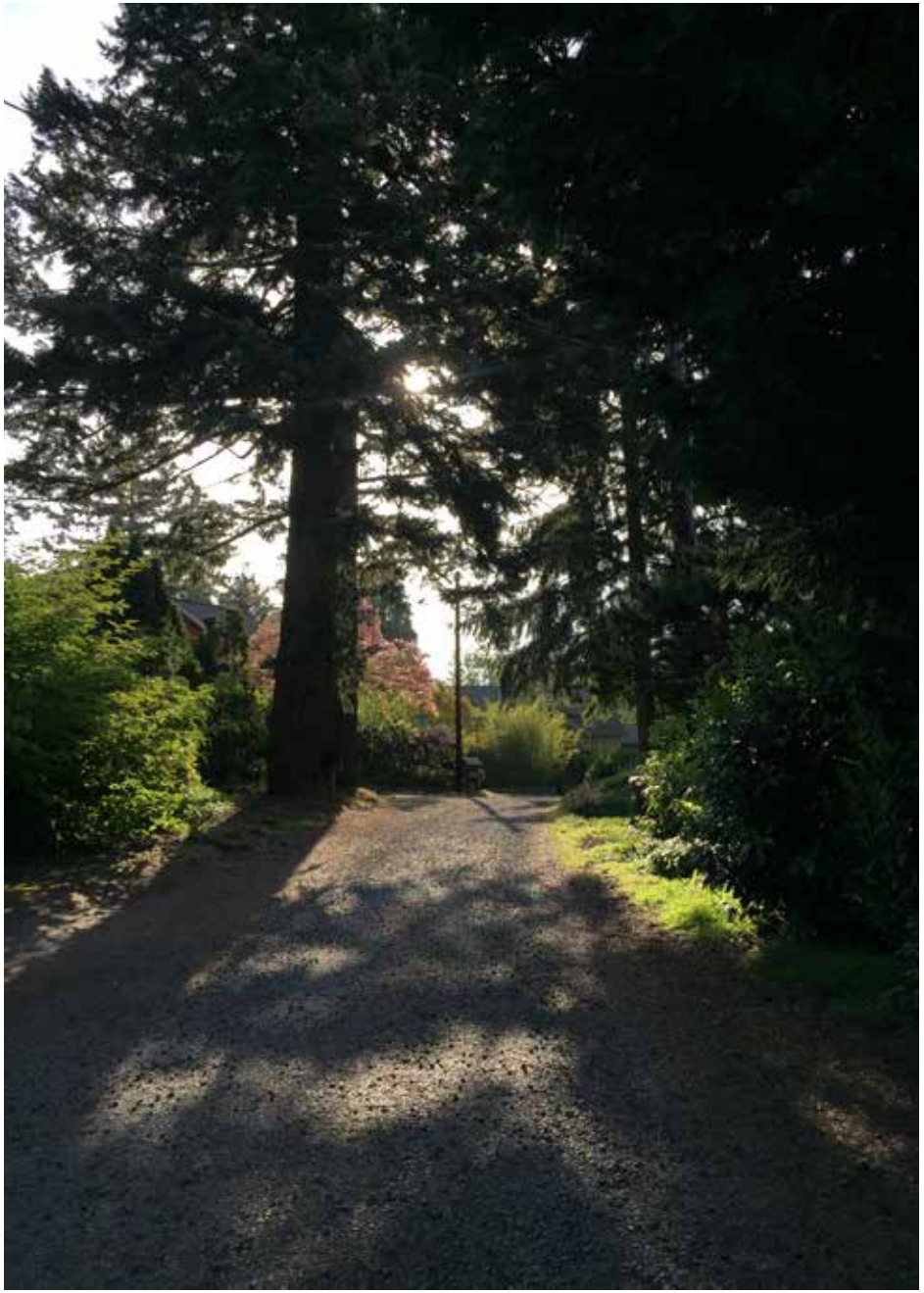
Pilot: Tryon Creek headwaters (near Capitol Highway) stormwater system alternative analysis.

Explore opportunities for neighborhood facilities within the right-of-way

As BES and PBOT have demonstrated through construction of green streets the ROW can be used to meet both BES and PBOT needs. Stormwater management facilities in the ROW treat and detain stormwater, calm traffic, and improve pedestrian safety at street crossings. To date, BES has built the majority of stormwater management facilities in the ROW on a single block within the planting strip or in the space of a parking spot on the street. These facilities, called green streets, typically manage street runoff from one or two blocks. However, certain streets with excess ROW provide an opportunity to use more of the ROW to manage stormwater from a greater drainage area. A neighborhood facility is larger and manages stormwater runoff from multiple blocks.

Example: SW 21st Avenue & Custer Park—This location provides a good opportunity to meet both bureaus' goals by adding a stormwater management facility (or facilities) in the ROW of SW 21st Avenue which would serve as an extension of the facility in Custer Park, manage stormwater runoff from SW 21st Avenue, and calm traffic on residential streets.

Example: SW 19th Avenue and Taylors Ferry Road—The block of SW 19th Avenue north of Taylors Ferry Road is gravel and stormwater runoff has created ruts and potholes in the street such that the street is currently closed to vehicles. Since the street is not currently needed for vehicle access … but is used by pedestrians, BES and PBOT may use the ROW for a path and neighborhood stormwater management facility.



Coordination and funding strategies

Pursuing opportunities for utility coordination within the public right-of-way

PBOT has initiated a project to improve coordination opportunities with its partner bureaus, such as BES and the Water Bureau, which also work within the public right-of-way, referred to as the Utility Coordination Project. The Utility Coordination project aims to better coordinate work in the right-of-way, better maintain city streets and improve public information on projects in the right-of-way. This collaborative approach formed the basis for PBOT and BES staff to collaborate on the Tryon-Stephens Plan and serves as a solid foundation for further coordination in the implementation of the Plan and other cross-bureau projects.

Pursue all potential sources of funding for local street improvements, including a local transportation infrastructure charge (PBOT)

The Street by Street Initiative Report to City Council (Nov. 2012) proposed introducing more flexibility in terms of how in-fill development participates in the improvement of local streets. Currently, in-fill development on an unimproved street is required to either build frontage improvements or sign a waiver of remonstrance, which waives the property owner's right to object to the formation of future Local Improvement District (LID) to improve the street. The issue with frontage improvements is that often their functionality is limited if there are not frontage improvements on adjacent sites. A Local Transportation Infrastructure Charge (LTIC) would allow developers to pay a fee rather than building required frontage improvements. Collected fees could be set aside as leverage funds for forming an LID to improve an entire block.

Form a residential street program to substantially reduce the number of gravel streets in Portland (PBOT)

The City of Portland FY 2015-16 Budget established ongoing funding for the purpose of paving the dirt and gravel streets within the City of Portland. Unimproved streets, are primarily located in residential areas and provide poor accessibility, particularly for pedestrians, and negatively impact neighborhood livability. This new ongoing budget, starting in FY 2015-16, presents the opportunity to establish a more programmatic approach to reducing the city's roughly 50-mile backlog of unimproved streets.

Stephens creek ROW retrofit (BES)

Implementation of the SCSWSP includes a ROW Retrofit Shell, which provides a flexible means to construct stormwater management facilities in areas where opportunities exist to expand upon projects from other BES efforts, other city bureaus (such as PBOT), or even private development. This fund allows BES to take advantage of cost-effective opportunities to construct needed system improvements. Criteria for use of ROW Retrofit Shell funds will be developed as part of SCSWSP implementation. Funds may be used for stormwater improvements on streets identified in this plan.

Stephens Creek neighborhood stormwater facilities

The SCSWSP recommended construction of three neighborhood scale stormwater facilities in the headwaters of the Stephens Creek subwatershed and design is currently underway. These are called neighborhood facilities to distinguish them from larger regional detention ponds or smaller on-site facilities, and will better manage stormwater that is negatively impacting water quality and hydrology, leading to degraded stream health.

Collaborate on priority investments for streets and stormwater in the study area

The Tryon-Stephens Plan recommends referencing the following when identifying opportunities for investment in projects that benefit PBOT and BES:

- Stormwater and Transportation System Gaps Overlap Map (on page 48)
- Active Transportation Network and Walkshed Map (on page 46)
- Concentrations of Stormwater Complaints (see Appendix c Stormwater Needs Map) for example the area bounded by SW Dolph Court, SW Multnomah Boulevard, SW Capitol Highway, SW 30th Avenue
- Concentration of Gravel Streets (see Appendix c Transportation Needs Map) for example the area bounded by SW Taylors Ferry Road, SW Dolph Street, SW 13th and SW 23rd Avenue.

Consider applying recommended solutions in other areas

The project team developed recommendations outlined in this plan to meet the street and stormwater needs within the Tryon-Stephens Headwaters area; however many of these solutions could be applied to address challenges in other parts of the city with similar issues. Identify the tools and lessons that came out of the Tryon-Stephens planning process that could be applied in other parts of SW Portland and beyond.

Appendix

7

a. Public Involvement Timeline and Summary
b. Traffic Count Map and Arterial Crossing Map
c. Needs, Opportunities and Constraints Maps
d. Streets and stormwater Flow Chart Questions
e. Implementation Reference Guide

Public Involvement Timeline and Summary

Introduction

Public Involvement was a major part of the Tryon Stephens Plan. From the first public event at SW Sunday Parkways, to the formation of the Community Working Group (CWG) and Open Houses, to inter- and intra-bureau coordination, this plan reflects the input of community members and staff from several city bureaus. This memo summarizes our public involvement efforts in the format of a timeline.

Timeline and Summary

September 2014

1. Staffed a Tryon-Stephens Plan booth at SW Sunday Parkways on September 28, 2015. We talked to neighbors about the plan, gathered information on routes they use to walk and bike around the neighborhood, and documented places where stormwater causes problems on streets or private property. We did a short Roll and Stroll to look at examples of gravel streets and stormwater management facilities.
2. Set up a project website at www.portlandoregon.gov/transportation/65574

October 2014

1. Created a two page project summary with staff contact information.
2. Created a Community Working Group (CWG) to inform the project. The CWG included a diverse range of stakeholders. Their role was to review project materials, participate in the community involvement process, and advise project staff on Plan Development.
3. The CWG met for the first time on Monday October 13 2014 at the Multnomah Arts Center. We shared information about the project and gathered input on walking and biking routes, improved connections needs and locations where stormwater runoff causes problems.
4. Completed the draft Community Outreach Plan.

November 2014

1. The CWG reviewed and commented on the Community Outreach Plan.
2. Compiled notes from the first CWG meeting.

December 2014

1. Project staff recruited representatives from the Hillsdale Business and Professionals Association and the Multnomah Neighborhood Association to serve on the CWG.
2. Project staff organized and arranged the first project Open House at the end of January 2015.

January 2015

1. On Friday 1/9/15, project staff did an info sharing presentation for PBOT, BES and Parks staff interested in learning about the project. It included a general overview of the project, who is involved, the timeline and deliverables. 21 staff attended, evenly split between PBOT and BES plus one person from PP&R.
2. The Project Team held the second CWG meeting on Monday 1/12/15, 6 p.m. to 8 p.m. at the Multnomah Arts Center. Despite overlapping with the big Oregon Ducks football game, 16 community members participated. We opened with an introduction/icebreaker exercise, did a quick review of the Existing Conditions, reviewed the project's Needs, Opportunities, and Constraints, did a small group exercise to map routes between neighborhood centers, and shared information on the upcoming Open House.
3. Project staff held the first project Open House in the evening on Monday 1/26/15, from 5:30 p.m. to 7:30 p.m., at Stephens Creek Crossing in the Community Room. 72 community members attended, and more than 50 submitted comment forms! We did a presentation at 6 p.m. with a general overview of the project, displayed 10 boards summarizing project information (from schedule to Existing Conditions to Needs, Opportunities and Constraints to Next Steps), and gathered input from the community with a mapping exercise and in answering questions.

February 2015

1. Project staff posted materials from the first Open House were posted to the project website: the presentation, display boards, and survey which could be filled out and submitted.
2. Post Open House information sharing included:

- An email to attendees including links to the presentation, display boards, and survey.
- A CityGreen blog post http://www.portlandoregon.gov/bes/article/517431.

3. We received more than 50 completed surveys on paper at the Open House and 28 online after the Open House. Project staff entered data from the paper surveys into an excel spreadsheet. When asked if stormwater runoff causes problems on their street, 80% of responders to the paper survey said yes.
4. BES staff followed up on stormwater complaints received at the Open House.

March and April 2015

1. Project staff compiled results of the online and paper surveys from the first Open House and produced draft pie charts of results.
2. Project staff organized and led two consultations with BES and PBOT staff. Consultation #1 was on 3/6/15 and on the topic of Property Owner-Initiated Street Improvements. Consultation #2 was on 3/12/15 and on the topic of City-Initiated Street Improvements.
3. Project staff organized and led a workshop with BES and PBOT staff to review the draft Typology and Flow Chart on 4/1/15.
4. The third CWG Meeting was on Monday 4/6/15. We recapped the January Open House and reviewed products developed by PBOT and BES staff, including street and stormwater tools, a typology

of streets, and a flow chart to match street and stormwater tools. We also spent time discussing an approach to coordinating bureau investments. Staff shared materials from the meeting on the project ftp site ftp://ftp02.portlandoregon.gov/PBOT/TryonStephensHeadwatersNeighborhoodStreetPlan/

5. Tryon and Willamette watershed team staff provided information and answered questions about this project at the SW Watersheds Open House on 4/22/15.
6. Project staff presented the plan at the SWNI Transportation Committee Meeting on 3/16/15.

May and June 2015

1. Project staff presented the plan at the Watershed Services Group Meeting on 5/6/15.
2. The second project Open House was on Thursday 5/7/15 at the Stephens Creek Crossing Community Room from 5:30 pm to 7:30 pm. We mailed a notice to courier routes with the study area and sent notices electronically through the CWG, project email list, and neighborhood and business associations. The agenda was:

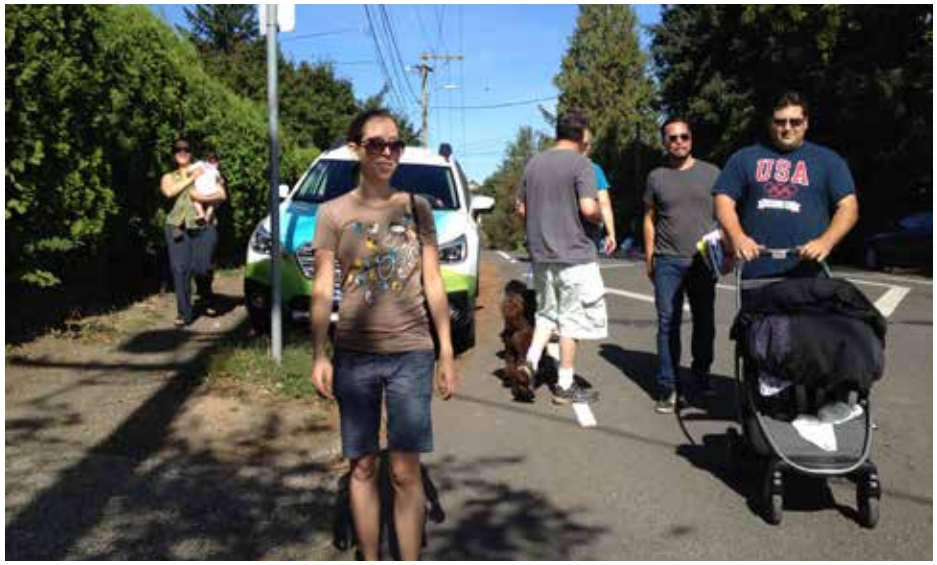
- a. 5:30 p.m. – Doors open
- b. 6:00-6:30 p.m. – Overview presentation
- c. 6:30-7:30 p.m. – Workshop

3. During the workshop, we presented participants with a hypothetical street and given puzzle pieces to show how they would choose to improve the street. The exercise included four different street typologies. We gathered participants' street improvement sheets to document their preferences. Workshop presentation, boards, and survey are on the project website www.portlandoregon.gov/transportation/65586.
4. Project staff met with African Youth Community Organization (AYCO) staff to give a status update on the project and get input on 5/27/15.
5. Project staff presented to the Portland Commission on Disability on 6/8/15.
6. Project staff organized and led a community walking tour of a new trail connection at SW 19th Avenue on 6/22/15.
7. Project staff organized and led a Youth Workshop on 6/25/15. We gathered information on where kids go in their neighborhood and how they get around.
8. Project staff presented to the City of Portland Planning and Development Directors on 7/9/15.

Community engagement

Staff tailored the Community Involvement Plan to the specific community composition in and near the Tryon-Stephens Headwaters Neighborhood Street Plan project area to meet Title VI, Civil Rights, and Equity goals of the City of Portland.

Roll & Stroll @Sunday Parkways



A Roll and Stroll was held in September 2014 at the Southwest Sunday Parkways event. This community event included a project booth, where City staff discussed the plan and offered walking tours. The community input has been used to define existing conditions and identify local transportation and stormwater issues.

Community Working Group

To assist the City in developing the Tryon-Stephens Headwaters Neighborhood Street Plan, a Community Working Group (CWG) was formed with key stakeholders from the area. The purpose of the CWG is to advise the Project Team and review and comment on the Street Plan deliverables.

Other Community Meetings

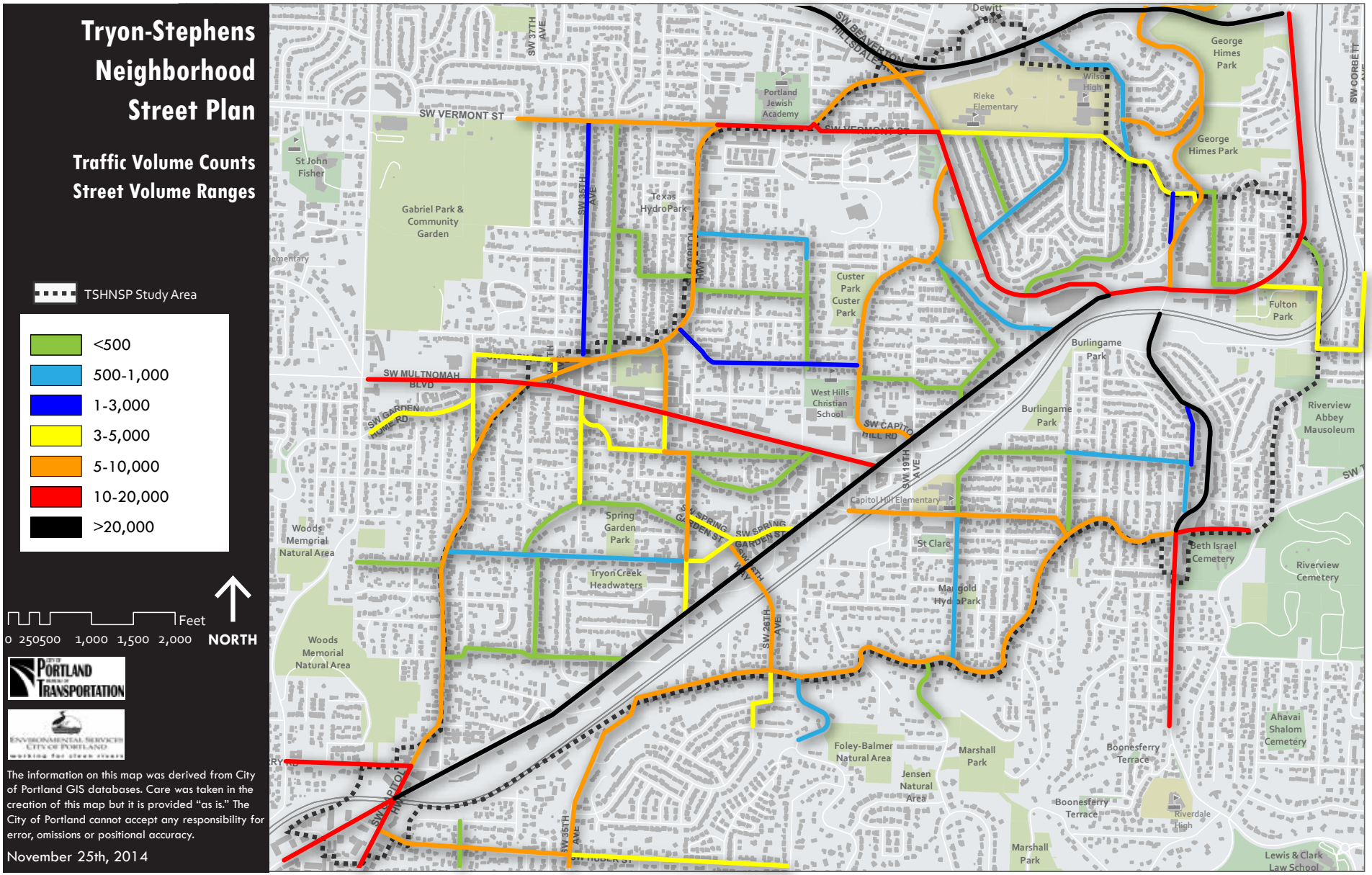
The project team has participated in standing meeting of neighborhood and business associations and other community groups within the study area to inform them about the project and to involve them in the plan development.

Open Houses

This is the first of two Open House events that will be held for the Tryon-Stephens Headwaters project at key decision points in the planning process. The Project Team will also develop materials and strategies for distributing information, soliciting input and recruiting participation, including email lists, website, mailers, newsletters, etc.

Tryon-Stephens Neighborhood Street Plan

Traffic Volume Counts
Street Volume Ranges



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November 25th, 2014


Tryon Stephens Headwaters Neighborhood Street Plan
Active Transportation Network with Crossings
Active Transportation Routes
Crossings
Traffic Signals
Crosswalk
All Way Stops
Crossing Not Improved
Arterial (> local service)
Parks
TSHNSP Study Area
0
750
1,500 Feet
PORTLAND TRANSPORTATION
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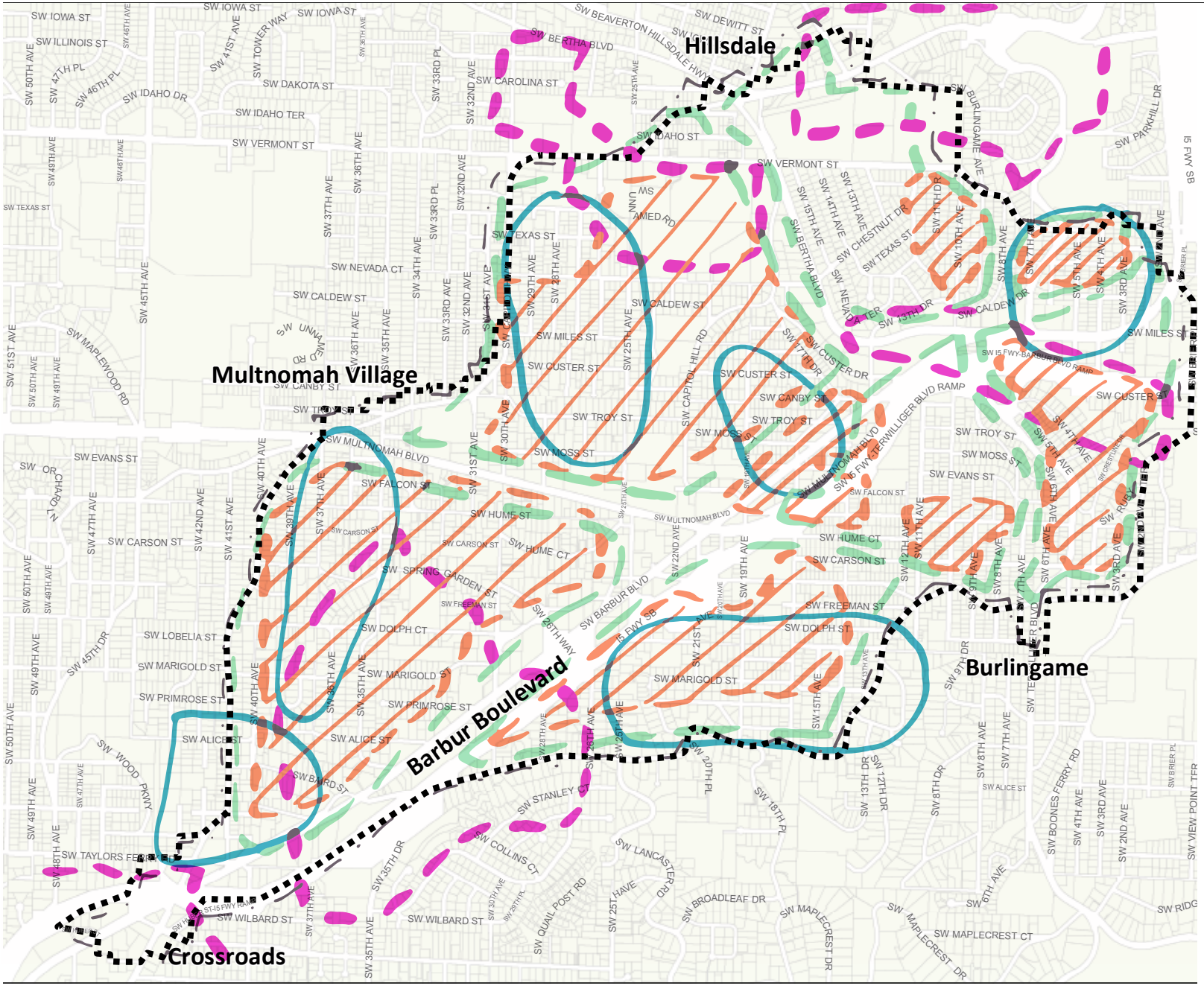
June 1, 2015
DRAFT



Tryon Stephens Headwaters Neighborhood Street Plan

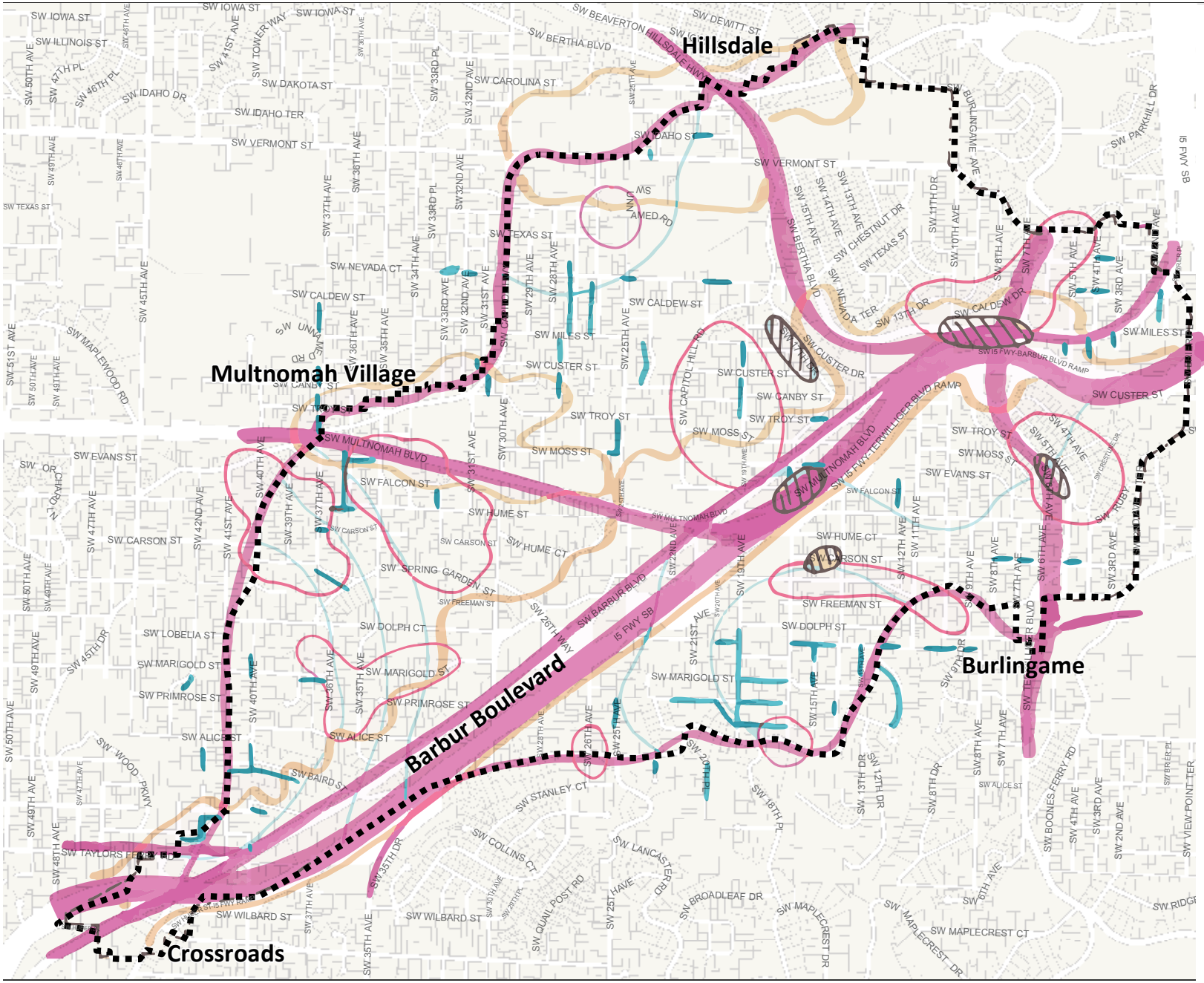
Map 1 - Transportation Needs
DRAFT

- Concentrations Dirt and Gravel streets
- Gaps in the Pedestrian Network
- Gaps in the Bicycle Network
- Areas with Fewer Street Connections

January 7th, 2015

Tryon Stephens Headwaters Neighborhood Street Plan

Map 2 - Stormwater Needs
DRAFT



High Polluting/ more intense land uses

High polluting busy streets

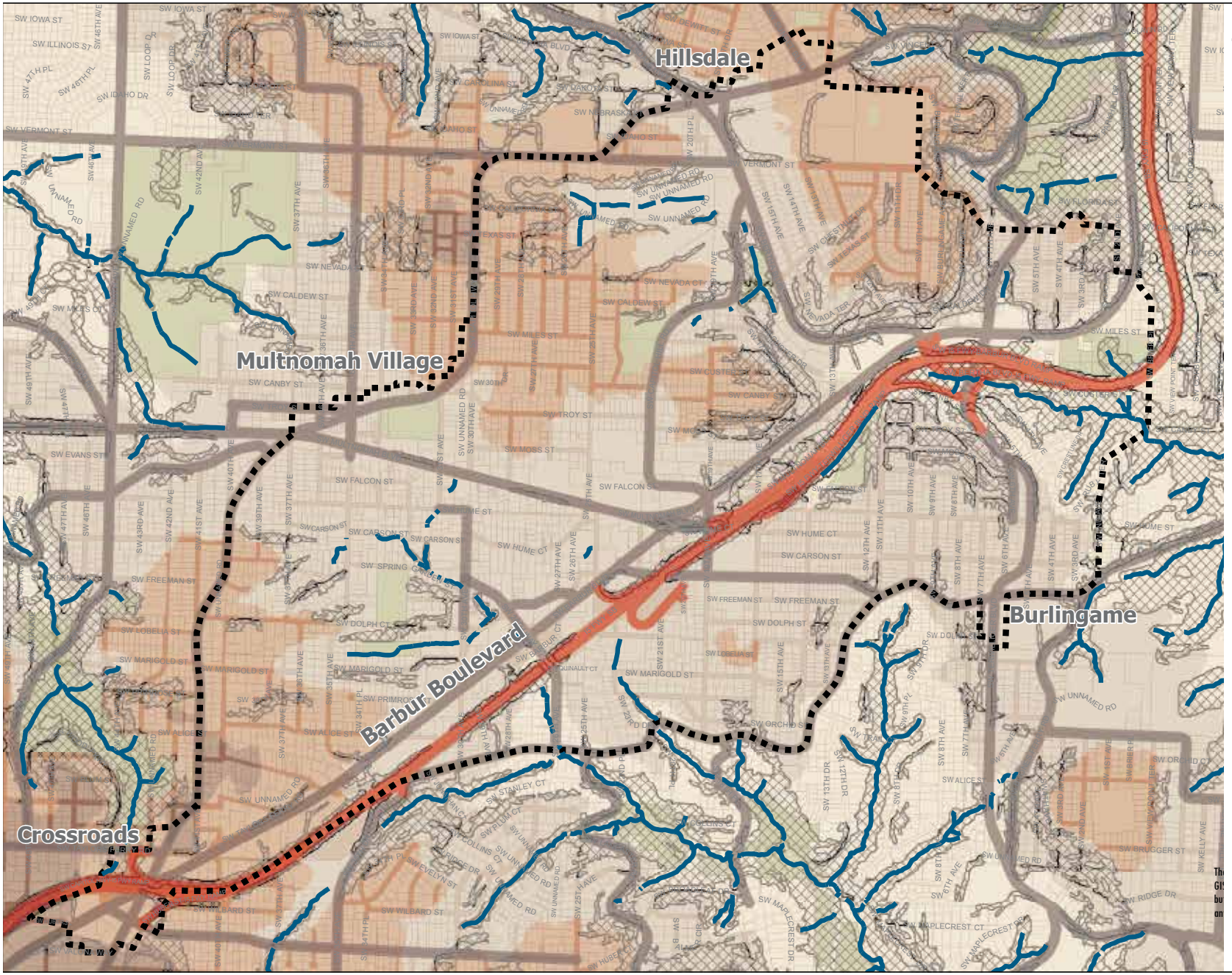
Sediment runoff on gravel streets

Under capacity or aging pipes

Lack of access to stormwater system

Area of more stormwater complaints

January 7th, 2015



Tryon Stephens Headwaters Neighborhood Street Plan

Map 3 - Transportation Constraints

- Open Channel
- TSHNSP Study Area

Major Streets

- Freeways
- Higher Traffic Street (>5000 ADT)
- City of Portland Tax Parcels
- Steep Slopes (20% or more)
- City of Portland Parks

Elevation/Topography

- Less than 500 ft.
- 500 ft. - 600 ft.
- 600 ft. - 700 ft.
- More than 700 ft

0 750 1,500 Feet

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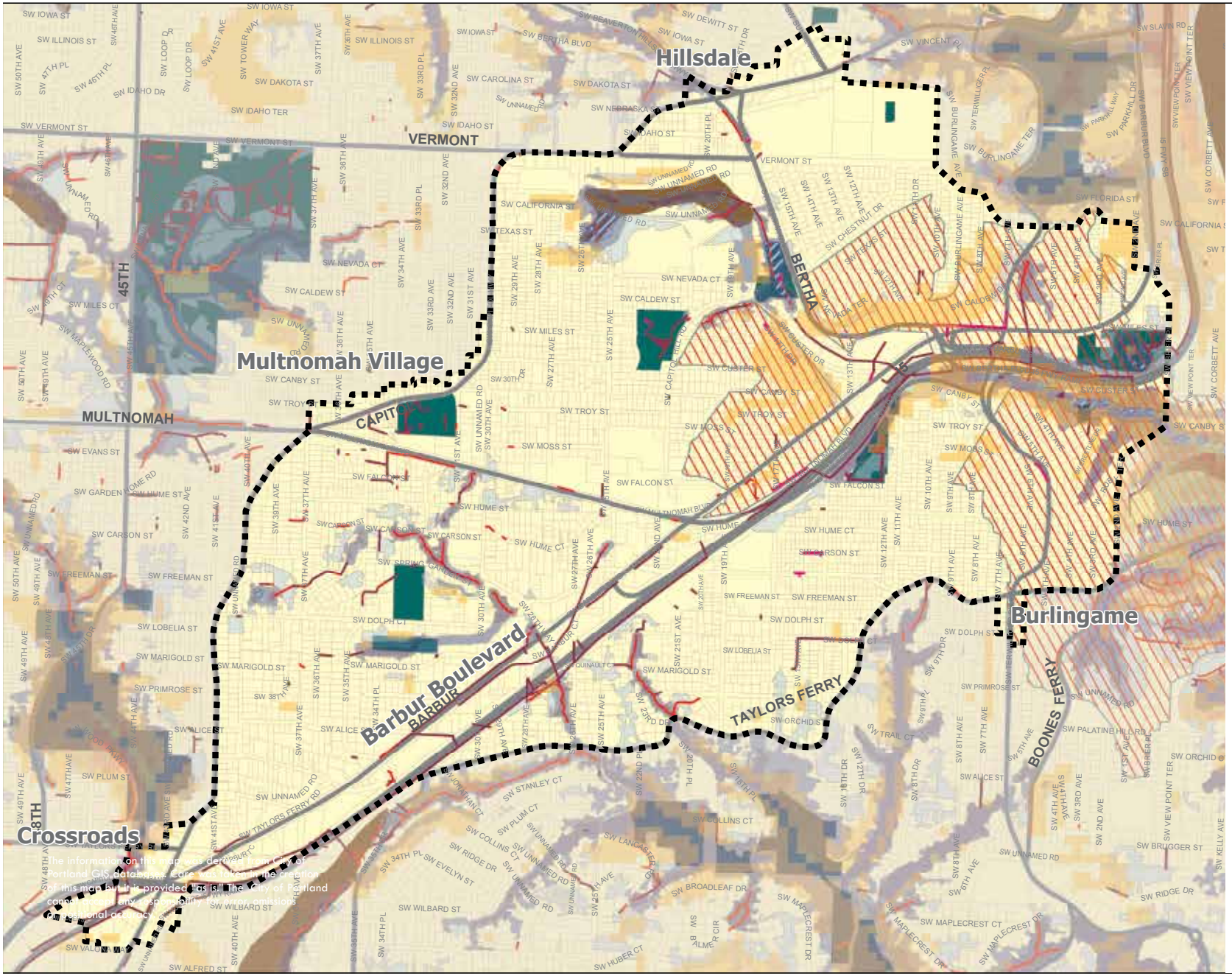
January 7, 2015 ***DRAFT***



Tryon Stephens Headwaters Neighborhood Street Plan

Map 4
Stormwater Constraints

- TSHNSP Study Area
- City of Portland Tax Parcels

M 9.0 Landslide Hazard Probability

- Medium (10% and 15% Categories)
- High (20% and 25% Categories)
- Very High (30% Category)
- City of Portland Wetlands
- Private Storm Pipes
- Private Surface Water

Stephens Creek System Plan

- Pipe with risk of over capacity in 10 year storm
- Areas of No Infiltration

Natural Resources Inventory

- Low
- Medium
- High
- Parks

Hydrologic Soil Group

- A - Best infiltration
- B
- C
- D - Worst infiltration

0 750 1,500 Feet

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January 7, 2015

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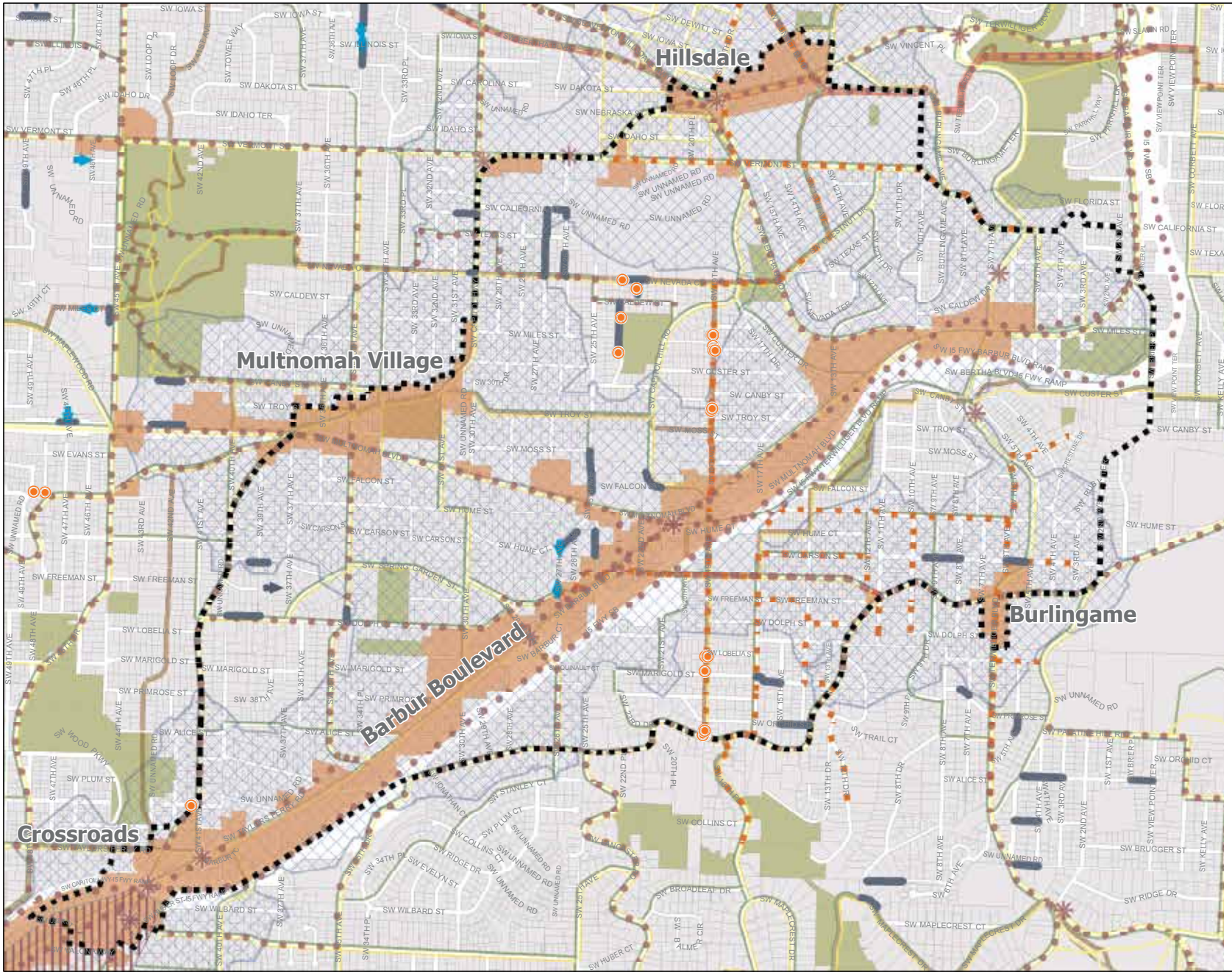

Tryon Stephens Headwaters Neighborhood Street Plan

Map 5
Transportation Opportunities

- TSHNSP Study Area
- Commercial Area
- Commercial Area Walkshed (0.25
- SR2S Pathways
- Roadway Closed
- TSP Project Point (proposed
- TSP Project Linear (proposed
- TSP Project Area (proposed
- Planned Ped Network
- Planned Bike Network
- Red Electric Trail
- SW Trail Network
- SW Master Street Plan Connection
- SW Master Street Plan Ped/Bike
- SW Master Street Plan Street
- City of Portland Parks
- City of Portland Tax Parcels

0 750 1,500 Feet

PORTLAND BUREAU OF TRANSPORTATION

ENVIRONMENTAL SERVICES CITY OF PORTLAND working for clean rivers

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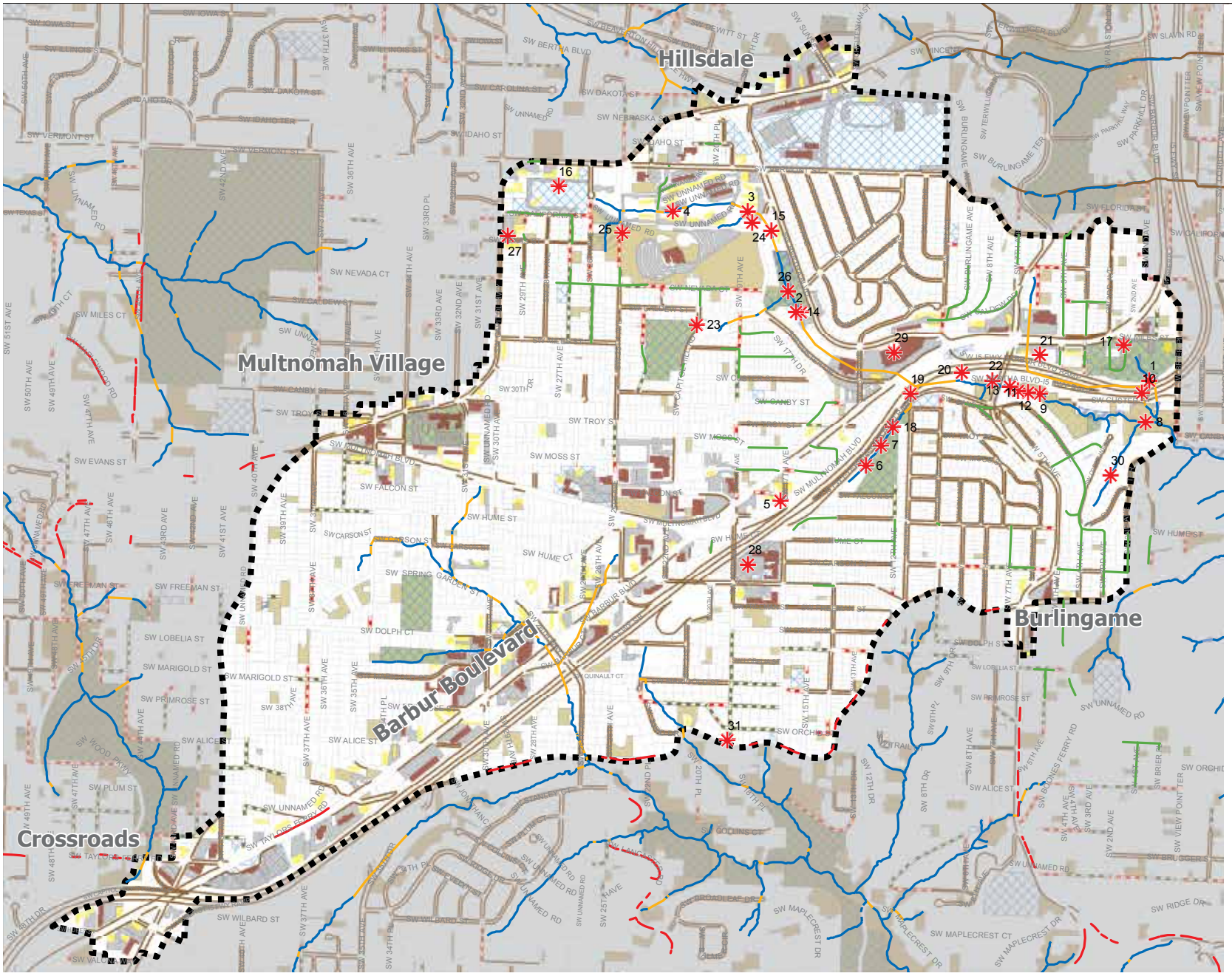
January 7, 2015 ***DRAFT***



Tryon Stephens Headwaters Neighborhood Street Plan

Map 6
Stormwater Opportunities

- Combined Stormwater/Sewer Pipe
- Ditch
- Open Channel
- Pipes
- Water Body
- Roadside Drainage Improvements

Stephens Creek System Plan

- StormWater Capital Projects
- Recommended Conveyance
- TSHNSP Study Area
- Unimproved Right-of-Way
- Vacant Right-of-Way
- Curbs
- Vacant Land (Portland)
- City of Portland Wetlands

Parking Lot Retrofit Opportunity

- Greater than 10,000 sq. ft.

Rooftop Retrofit Opportunity

- 5000 sq. ft. - 10000 sq. ft.
- More than 10,000 sq. ft.
- Publicly Owned Parcels
- City of Portland Parks
- Taxlots

0 750 1,500 Feet

PORTLAND BUREAU OF TRANSPORTATION

ENVIRONMENTAL SERVICES CITY OF PORTLAND

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January 7, 2015 ***DRAFT***

Street and Stormwater Facility Concept Flow Chart Questions

Step 1. Street Concept		
Street is Typology 6:	Yes / No	See Typology Map
Curbs:	Yes / No	Does the street have curbs?
Street is Typology 2 or 3:	Yes / No	See Typology Map
Environmental & Physical constraints in ROW:	Yes / No	Is there a stream, wetland, large tree, steep slope or other constraint within the right-of-way?
Paved:	Yes / No	Is the street paved?
Motor vehicle access:	Yes / No	Will motor vehicles use the street?
Pave width:	Yes / No	Is the pavement greater than 18 ft wide?
Visual barriers:	Yes / No	Are there visual barriers? Sharp curves or steep hills?
Step 2. Stormwater Concept		
Stormwater management required:	Yes / No	Are you adding or redeveloping more than 500 square feet of impervious surface?
Landslide Hazard:	Yes / No	Is the street uphill of steep slopes (20% or greater)? If in Stephens Creek subwatershed, see Landslide Map for Stephens Creek subwatershed.
10 yr storm infiltration:	Yes / No	Can you infiltrate the 10 year storm on site (3.4 inches of water over 24 hours)? This has to be determined by a field test, but we can assume the answer is “no” for the Tryon Stephens study area.
Approvable discharge:	Yes / No	Is there a pipe, ditch, curb, or stormwater facility within 400 feet (an approvable discharge point)? Or, is there opportunity to extend the stormwater system or construct a Neighborhood Facility?
Space: >6 feet	Yes / No	Is there more than 6 feet of space in the road shoulder to allow surface conveyance of stormwater?
Parking required (by side):	Yes / No	Is parking required? Answer for each side of the street.
Slope: 5%	Yes / No	Is the longitudinal slope greater than 5%?
Space <4 feet	Yes / No	Is there less than 4 feet of space in the road shoulder?

Questions	Residential Pathway/ Impassable	Flexible Residential Street	Flexible Residential Street (Ped Route)	Flexible Residential Street (Destination)	Fixed Residential Street	Busy Street
R5 or lower density?	**Y**	**Y**	**Y**	**Y**	**Y**	
Local Service Traffic Street?	**Y**	**Y**	**Y**	**Y**	**Y**	
Less than 500 vpd?	**Y**	**Y**	**Y**	**Y**	**N**	N
Majority of traffic is local?	**Y**	**Y**	**Y**	**Y**	**N**	**N**
Pedestrian route?		**N**	**Y**			
Destination on the block?		**N**	**N**	**Y**		
Natural resources?	If Y: consider tools which minimize impacts and adapt to the context.					
Steep slopes?	If Y: consider tools which reduce traffic speeds and limit infiltration.					

I. Neighborhood Street Typology Check List

The Neighborhood Street Typology Map in Chapter 6 (page 46) designates streets in the Tryon-Stephens Plan study area into six categories, i.e. Residential Pathway/Impassable, Flexible Residential Street, Flexible Residential Street (Pedestrian Route), Flexible Residential Street (Destination), Fixed Residential Street, Busy Street. The following factors were used to determine the typology of each street:

1. Adjacent Land Use

i. Is the adjacent zoning low-density Single Family Residential (R5 or lower density zone)?

2. Traffic functions

i. Is the street classified as a Local Service Traffic Street

ii. Does the street have less than 500 vehicles per day? Will it have more than 500 vehicles per day in the future?

iii. Does the street serve primarily adjacent properties? It is not a heavy cut-through street and more than half of the trips have their origin/destination on the street.

3. Pedestrian networks

i. Is the street designated as a City Walkway, City Bikeway, Safe Route to School or Southwest Trail?

4. Destination on the block

i. Is there a major destination (park, school, shop, etc.) on the block?

5. Natural Resources

i. Are there medium or high value natural resources(designated on Natural Resource Inventory - NRI) in or adjacent to the right-of-way?

6. Terrain/steep slopes

i. Are there slopes 20% or greater on the street?

2. List of Streets on the Street and Stormwater System Gap Overlap Map

In Chapter 6, page 50 shows where gaps in PBOT and BES systems overlap. Streets that have no clear method to manage stormwater and are on designated pedestrian/bicycle networks but still need improvement are listed below.

STREET NAME	GRAVEL?	HIGH COM-PLAINT AREA?	PED ROUTE?	BIKE ROUTE?
SW 3RD AVE	No	No	Yes	No
SW 5TH AVE	No	No	No	Yes
SW 10TH AVE	No	No	Yes	No
SW 12TH AVE	No	No	Yes	Yes
SW 14TH AVE/FALCON	No	No	Yes	No
SW 17TH AVE	No	No	Yes	Yes
SW 19TH AVE	Yes	No	Yes	No
SW 25TH AVE	No	No	Yes	Yes
SW 30TH AVE	No	Yes	Yes	Yes
SW 35TH AVE	No	Yes	Yes	Yes
SW ALICE ST	No	No	No	Yes
SW CALDEW DR	No	No	Yes	No
SW CAPITOL HWY	No	Yes	Yes	Yes
SW DOLPH CT	No	Yes	Yes	Yes
SW HUME ST	No	Yes	Yes	No
SW MARIGOLD ST	Yes	No	Yes	No
SW MOSS ST	Yes	No	Yes	No
SW NEVADA CT	Yes	No	Yes	Yes
SW SPRING GARDEN ST	No	Yes	Yes	Yes
SW TAYLORS FERRY RD	No	No	Yes	Yes
SW TROY ST	No	No	Yes	Yes

3. Near Term (or Early Implementation) Actions

Action	Timeframe	Bureau(s)
Stormwater system alternative analysis for SW Capitol Highway and Errol Heights in SE Portland	2015-2016	BES
Neighborhood facility and street by street improvement: SW 19th Avenue north of Taylors Ferry Road	2015-2016	BES & PBOT
Neighborhood facilities within the right-of-way: SW 21st Avenue and SW Custer (considered as an alternative)	2016	BES
Stephens Creek ROW Retrofits: work will begin to establish criteria for spending BES ROW retrofit funds	2015-2017	BES
Stephens Creek Neighborhood Stormwater Facilities	2015-2018	BES
Southwest In-Motion (SWIM), five-year active transportation implementation strategy	2015-2016	PBOT