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

December 31, 2020

Ethan Stuckmayer
Senior Planner of Housing Program
Oregon Department of Land Conservation and Development
635 Capitol Street NE, Suite 150
Salem, OR 97301-2540

RE: Infrastructure-Based Time Extension Request

Mr. Stuckmayer:

As a city with a population slightly under 25,000 (24,045 per PSU 2019 Certified Population Estimates), the City of Newberg will adopt regulations that will allow for the development of duplexes on lots zoned for residential use and continue to allow for the development of detached single-family dwellings. Newberg will also adopt regulations to allow for the development of duplexes and other middle housing types on lots in areas zoned for residential use that allow for the development of detached single-family dwellings. Through the allowance of middle housing in areas zoned for residential development and the identification of infrastructure constraints, Newberg will be able to address the needed housing types for residents at all income levels. Through analyzing existing infrastructure constraints, the City of Newberg will also be able to address Goal 10: Housing requirements, regulatory streamlining, and socioeconomic gains.

The City of Newberg has identified areas that require upgrades to the existing infrastructure. These areas include land just north of downtown up to the rail line that runs through Newberg and over to N Meridian Street (Figure 1).

Figure 1: North of Downtown Newberg



Another identified area includes land just south of downtown from the Chehalem Creek and railroad line intersection to the WestRock line and over to Hess Creek (Figure 2).

Figure 2: South of Downtown Newberg



The City's water infrastructure has been determined to have a localized significant deficiency that results in unacceptable service levels. The City will be requesting a time extension to comply with HB 2001. The application materials and associated documentation is attached.

Regards,

Doug Rux, AICP
Community Development Director

Attachments:

A. Application Materials
B. Planning Commission Resolution No. 2020-360
C. City Council Resolution No. 2020-3705
D. Transportation System Plan Technical Memorandum on TPR Implications of Middle Housing
E. Middle Housing Infrastructure Based Wastewater Infrastructure Evaluation
F. Stormwater IBTER Technical Memorandum
G. Water System Analysis Results Technical Memorandum

Attachment A

City of Newberg
Infrastructure-Based Time Extension Request

660-046-0350 (3) Required materials. A complete IBTER application from a local government shall include the information described in subsections (a) through (g):

(a) A narrative, graphics, tabular data, and other information as necessary to provide a general description of the significant infrastructure deficiency, including:

(A) A description of the infrastructure and the current system capacity. Relevant information from adopted utility master plans, special area utility plans, capital improvement plans, or similar documents and studies. Also, an identification of the service level that will not be met, including identification of the adopted utility master plan or other authority which establishes the service level.

Transportation: The potential for middle housing does not result in any significant impacts on the transportation system, as defined by Oregon's Transportation Planning Rule (TPR) and as such, no IBTER extension related to transportation is needed. (See the attached analysis for additional information.)

Wastewater: The potential change in development density is not anticipated to cause additional capacity issues in the sewer trunk lines as evaluated in the 2018 WWMP. (See the attached analysis for additional information.)

Stormwater: A significant stormwater infrastructure deficiency is not expected to be caused only by additional middle housing development in the two areas identified in Figures 1 and 2. (See the attached analysis for additional information.)

Water: System performance was evaluated using pressure, pipe velocity, and required fire flow criteria established in the 2017 WMP and summarized in the table below:

Water System Component	Evaluation Criterion	2017 WMP Value	Design Standard/Guideline
Service Pressure	Normal Range, during ADD	40-80 psi	City's 2015 Public Works *Design and Construction Standards*
	Maximum, without PRV	80 psi	Oregon Plumbing Specialty Code 608.2
	Minimum, during emergency or fire flow	20 psi	OAR 333-061
Distribution Mains	Velocity during fire flow	Not to exceed 8 fps	City's 2015 Public Works *Design and Construction Standards*
	Velocity during ADD	Not to exceed 5 fps	
Required Fire Flow and Duration	Low Density – Single-Family and Duplex Residential <= 3,600 sq ft	1,000 gpm for 2 hours	Oregon Fire Code
	Single-Family and Duplex Residential >3,600 sq ft	1,500 gpm for 2 hours	
	Medium Density Residential	1,500 gpm for 2 hours	
	High Density Residential	2,000 gpm for 3 hours	
	Commercial	3,000 gpm for 3 hours	
	Industrial, Institutional, and Hospitality	4,500 gpm for 3 hours	

Fire flow criteria will not be met with the addition of middle housing.

(B) A description of the significant infrastructure deficiency. The application shall clarify if capacity is exceeded currently, or is anticipated by December 31, 2023, based on current development trends; or if the infrastructure is only expected to exceed capacity based on additional impacts from middle housing development pursuant to OAR 660-046-0330(4).

(C) If the local government finds significant infrastructure deficiency would be caused only by additional middle housing development in the area and plans to continue issuing permits for other types of development within the area, a detailed analysis of how and why existing infrastructure can continue to meet the needs of other types of development, but not middle housing.

(D) A description of assumptions used to calculate or estimate system capacity. This includes analysis of current impacts on the infrastructure system; impacts from additional development anticipated to occur based on current zoning; and impacts anticipated from the allowance for middle housing in the areas where it is not currently allowed, as more fully described in OAR 660-046-0330(4).

(E) Documentation of the significant infrastructure deficiency sufficient to allow the department to verify that the deficiency exists, including (but not necessarily limited to) items such as; maintenance and complaint records, photographs, modeling results (if available), crash data, a deficiency documented in an adopted utility master plan, or other evidence of deficiency.

Information to address 660-046-350 (B)- (E) is in the attached memorandum from Murraysmith.

(b) The name of the service provider if the Infrastructure is owned or operated by another provider, along with a description of any agreements between the local government and service provider for infrastructure improvements.

The infrastructure is all owned and operated by the City of Newberg.

(c) A vicinity map showing the boundary of the impacted areas for which the IBTER is requested. If the local government identifies more than one significant infrastructure deficiency (sewer and transportation, for example), the map should show the boundary of each deficiency separately and any areas of overlap.

The vicinity maps showing the boundary of the impacted areas for which the IBTER is requested are Figures 1 and 2 below.

Figure 1: North of Downtown Newberg



Figure 2: South of Downtown Newberg



(d) A regional map, if applicable, showing the significant infrastructure deficiency that otherwise provides service to the area where an IBTER is being requested.

Not applicable.

(e) If the local government is subject to ORS 197.758(2), a description of the local government's plan for middle housing implementation in the impacted area, including identification of areas intended for duplex-only provisions, and, as applicable, standards to be applied in goal-protected and constrained areas, and areas intended to accommodate triplexes, quadplexes, townhomes, and cottage cluster developments.

Newberg is a community under 25,000 in population (24,045 per PSU population estimate July 2019), is not within a metropolitan service district and is not required to comply with ORS 197.758(2) other than requirements for duplexes.

(f) A remediation plan that describes the proposed infrastructure improvement(s) intended to remedy the significant infrastructure deficiency so that the local government may implement middle housing provisions. For each infrastructure improvement project, the description should include, at a minimum:

(A) The proposed period of time needed to address the significant infrastructure deficiency, including phasing and contingencies, if applicable.

The deficiency for the area north of downtown will be addressed by July of 2022. The deficiency for the area south of downtown will be addressed by July 2029. These projects will be implemented in phases over the next nine years.

(B) A discussion of the options initially considered for addressing the significant infrastructure deficiency, along with an explanation of how the proposed approach is the most expeditiously feasible approach available to address the deficiency.

There were no other options considered to address the fire flow concern noted as the infrastructure deficiency.

(C) Explanation of how the improvement project will provide acceptable service levels to anticipated middle housing.

Existing 6-inch diameter mains are recommended to be upsized to 12-inch diameter mains to provide a large diameter backbone for the area to meet 2,000 gpm fire flow requirements for potential higher density development. Additional looping is also recommended to connect larger diameter mains. Table 5 and Figure 4 of the attached memorandum show the projects that will be necessary to achieve the necessary fire flow and not exceed the maximum velocity in the water pipes.

(D) Potential funding source(s), including funding commitments from other governmental agencies or private parties, and schedule for project completion.

The funding sources for the projects will come from water rates, water system development charges and possibly developers. The projects have been inserted into the City's Capital Improvement Plan. This plan shows:

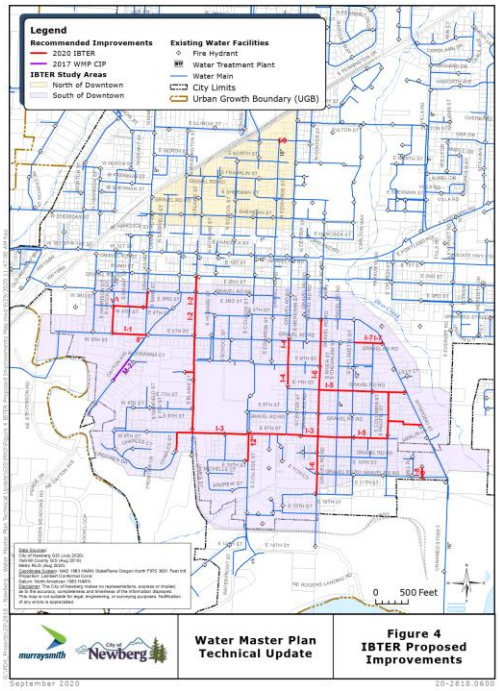
- The project necessary for the area north of downtown will be completed by July 2022.
- The projects necessary for the area south of downtown will be completed over a nine year time span with completion shown in July 2029.

(E) Depiction of the area that will be remedied by the project.

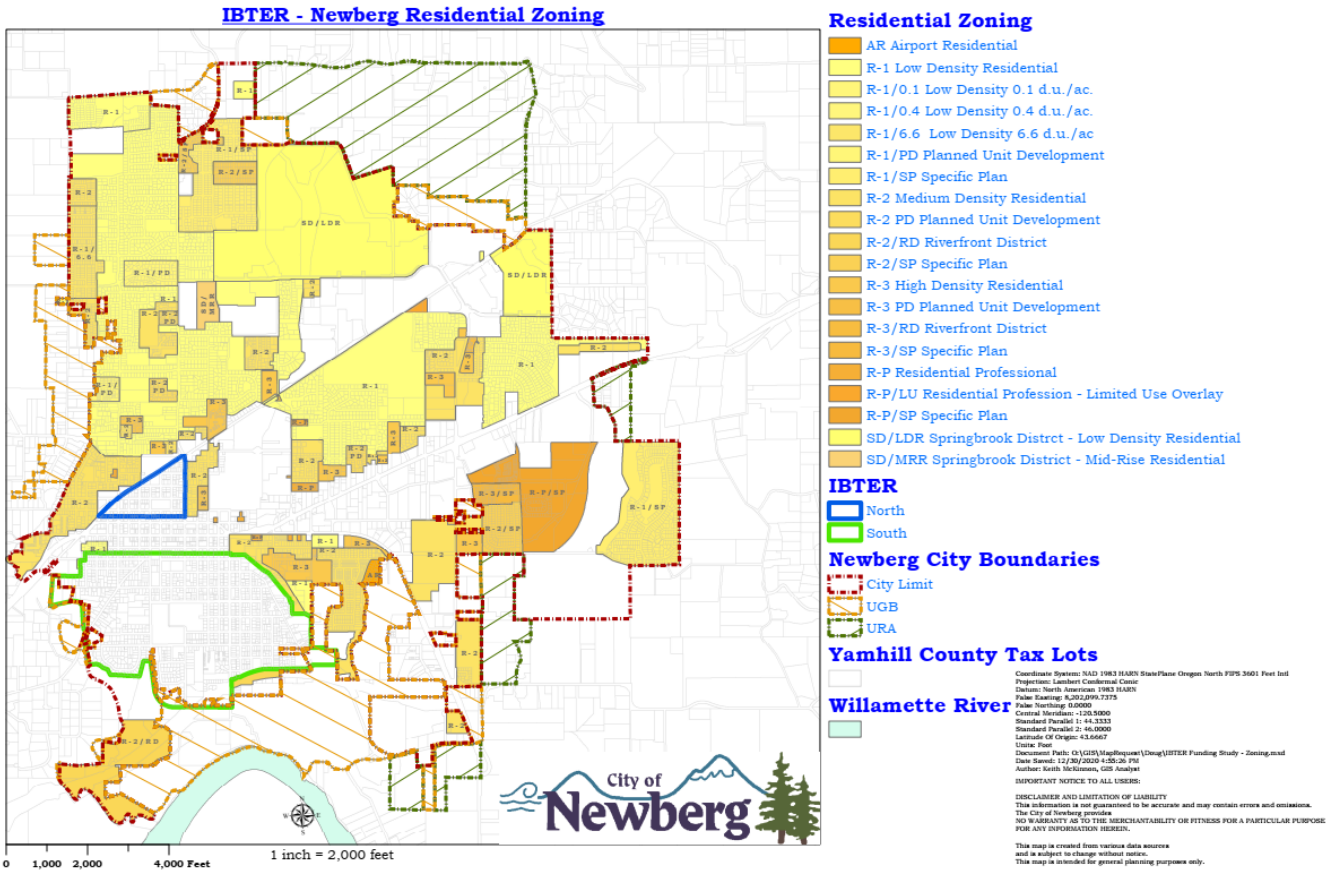
Figure 4 of the attached memorandum shows the projects that will be necessary to achieve the necessary fire flow and not exceed the maximum velocity in the water pipes.

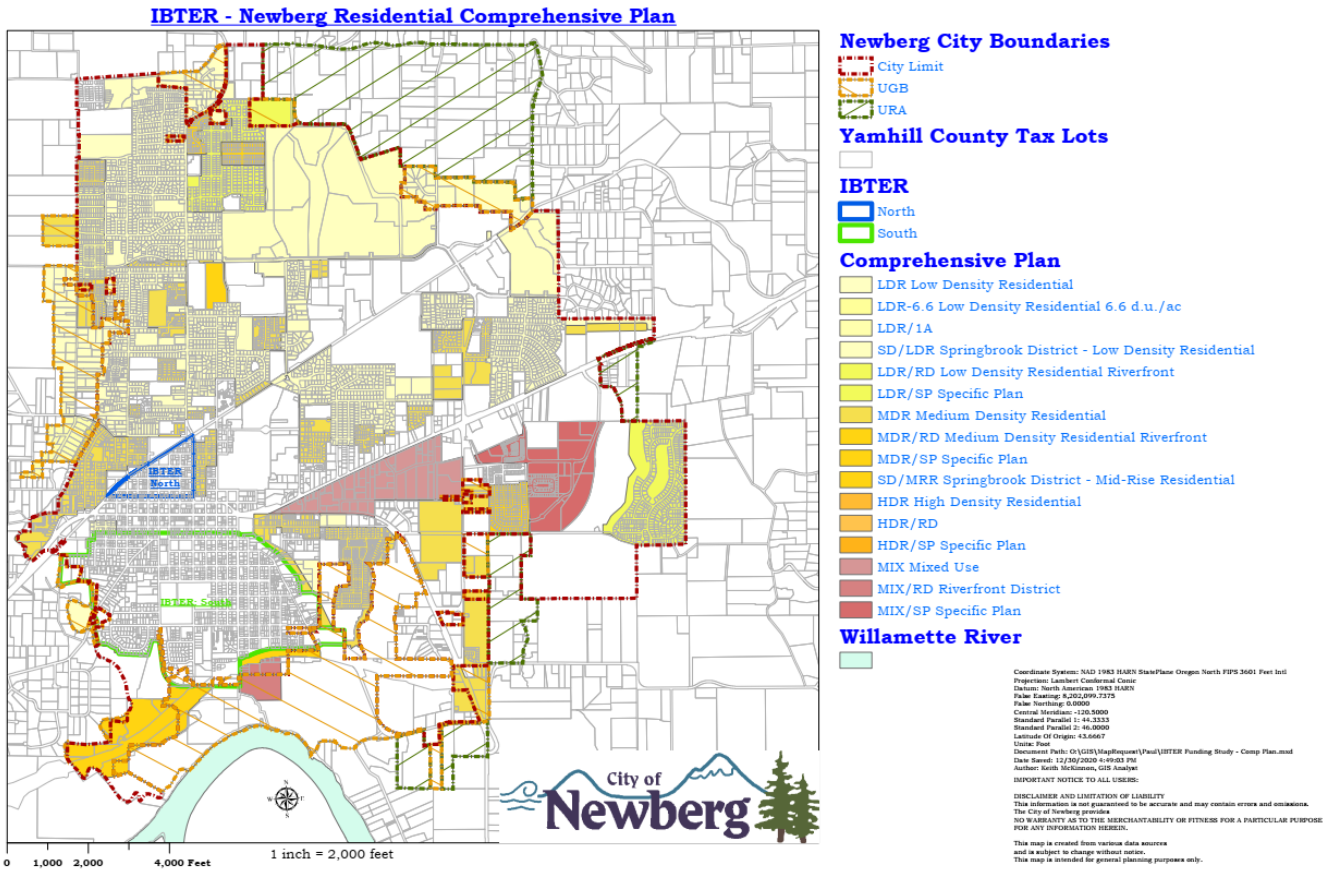
(F) Proposed timeline and associated mapping to demonstrate any phasing of the remediation plan where there are several improvement projects identified.

Project I–1	Main, 4th, Lincoln & 5th	FY22-24
Project I-2	Blaine St	FY25
Project I-3	9th, Charles, & College	FY26-29
Project I–4	Meridian	FY25
Project I–5	7th, Pacific, 9th & Paradise	FY23-26
Project I–6	River	FY22
Project I-7	5th	FY21
Project I-8	11th & Boston Square	FY21
Project I-9	Vermillion	FY21



(G) A map of all other areas within the local government where middle housing will be implemented during the extension period.



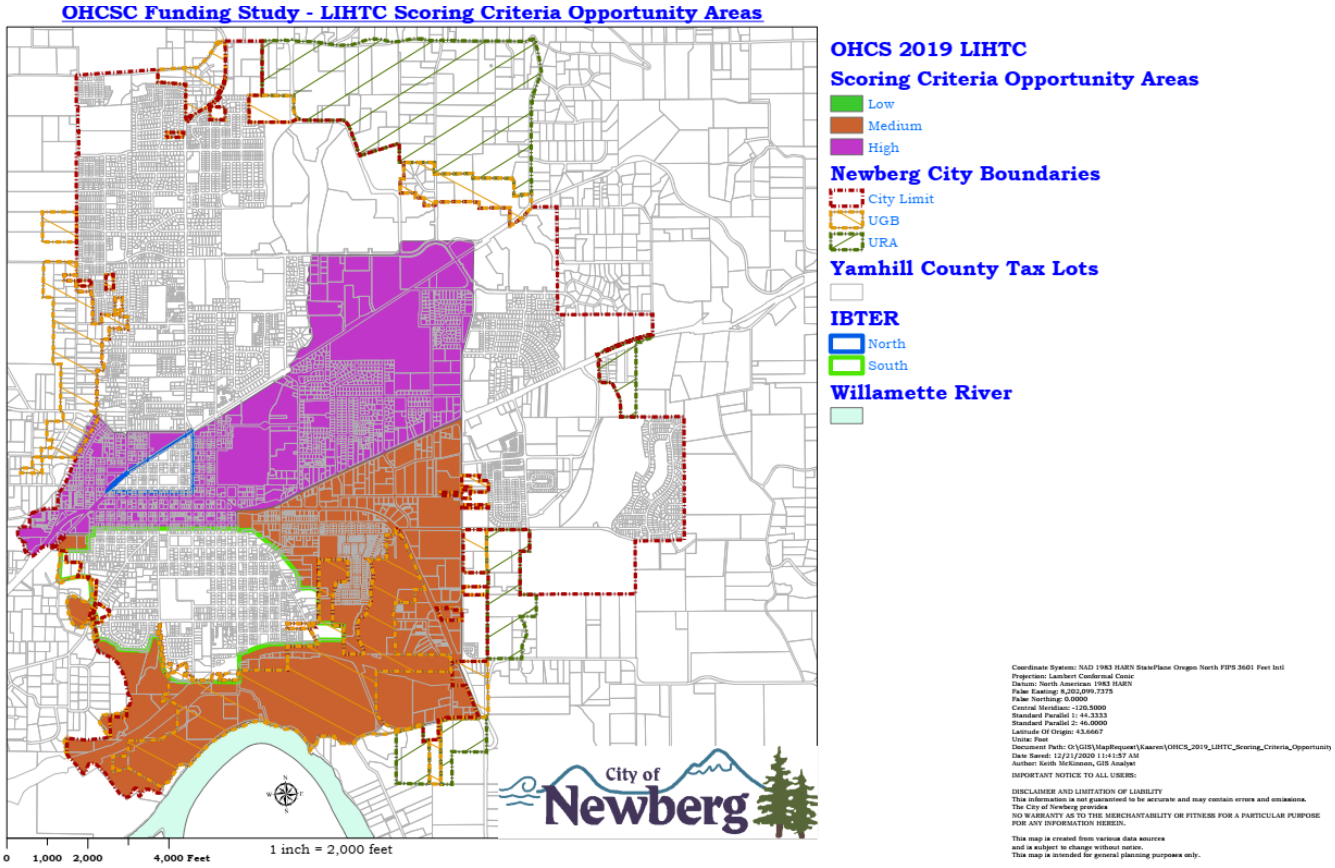


(H) If a local government proposes a bond measure or similar financial mechanism that requires voter approval as a means to fund an infrastructure improvement project, a local government may also propose a contingency plan for funding the infrastructure improvement.

The City is not proposing a bond measure to fund the infrastructure improvement project.

(g) A narrative detailing how the application is in compliance with the Review Criteria in OAR 660-046-0360(3). In response to criterion in OAR 660-046-0360(3)(d), the local government shall provide a map of the local government's jurisdictional area, depicting US Census tract scores based on the Oregon Housing and Community Services Department's Notice of Funding Availability Scoring Criteria Map: (https://geo.maps.arcgis.com/apps/webappviewer/index.html?id=2cb211dbdd3d4cf497d8190283f1402f). The map identifies census tracts within communities that score low, medium, or high in relation to access to opportunity. Those tracts identified as high opportunity areas have a relatively low poverty rate, high labor market engagement index, and a low unemployment rate. Low opportunity areas have a relatively high poverty rate, low labor market engagement index, and a high unemployment rate. The narrative addressing criterion in OAR 660-046-0360(3)(d) must refer to the mapped areas in relation to the review criterion.

See 660-0360 (5)(d) for the written narrative.



660-046-0360

(5) Review criteria. The department shall consider the following criteria in the review of IBTERs:

(a) Whether the identified deficiency is a significant infrastructure deficiency, consistent with the parameters and infrastructure-specific thresholds established in OAR 660-046-0330 and OAR 660-046-0340.

The identified deficiency is a significant infrastructure deficiency directly related to allowing for higher density housing in the City. This higher density leads to a lack of adequate fire flow in 2 areas of the City.

Estimated Dwelling Unit Growth

IBTER Area	Existing Units		Infill Growth	Redevelopment Growth
	Developed Parcels	Underdeveloped Parcels	1% for existing (not underdeveloped)	3% for existing (underdeveloped)
South of Newberg	1,485	36	18	3
Single-Family	879	35	9	2
Multi-Family	428	-	5	-
Duplex	125	1	2	1
Triplex	21	-	1	-
Fourplex	32		1	-
North of Newberg	176	-	3	-
Single-Family	170	-	2	-
Multi-Family	-	-	-	-
Duplex	6	-	1	-
	TOTAL Existing Units	1,697	TOTAL Growth Units	24

Fire flow availability was tested at 2,000 gallons per minute (gpm) consistent with high density residential required fire flow. This 2,000 gpm fire flow may be conservative in some parts of the IBTER study areas where smaller structures with fewer units, like duplexes, are more likely to be developed. However, providing water infrastructure capable of supplying a 2,000 gpm fire flow allows the City to consider a broader range of middle housing options as HB 2001 zoning changes are evaluated. Fire flow availability in the south IBTER study area is constrained by high pipe flow velocity. The primary concern with high pipe velocity is abrasion of the interior pipe coating, which can expose the pipe material to corrosion and lead to potential pipe failure.

(b) Whether the IBTER has adequately described and documented the identified significant infrastructure deficiency and has established a boundary for the requested extension area(s), as required by OAR 660-046-0350. The boundary for the requested time extension is a specific area where there is an identified significant infrastructure deficiency.

The boundary for the requested time extension is shown in Figures 1 and 2.

(c) Whether the proposed remediation plan is likely to be effective and presents the most expeditiously feasible course of action to enable implementation of middle housing provisions.

Eight significant pipe improvement projects are recommended for the south study area and one minor project is recommended for the north study area to provide adequate fire flows for ~~to~~ potential higher density development. These improvements are likely to be effective and present the most expeditiously feasible course of action to enable implementation of middle housing provisions.

(d) Whether, in relation to the opportunity area map provided per OAR 660-046-0350(3)(g) and any other available data sources regarding income, race, or ethnicity within the jurisdiction, the local government has demonstrated that correction of the significant infrastructure deficiency will either help to overcome patterns of

segregation by income, race, or ethnicity, and foster inclusive communities free from barriers that restrict access to opportunity based on protected characteristics, or, at minimum, will not serve to perpetuate these inequities. To assist with this evaluation, local governments may demonstrate that the IBTER is consistent with a plan of actions over time by the local government and community partners that will reduce barriers to opportunity for all community residents, in all areas within the local government's jurisdiction.

The City of Newberg has embarked on a number of initiatives for Diversity, Equity and Inclusion as it relates to income, race, or ethnicity. One of the Newberg City Council Goals for 2020 states "2) Further Develop an Operational Culture that adopts and cherishes Diversity, Equity, and Inclusion as core values." Another Goal states "3) Promote development of housing affordability such as houselessness, transitional housing, workforce housing." A third Goal states "4) Create and support an Urban Renewal Plan and Authority."

The Newberg City Council on November 2, 2020 accepted a five year work program on housing identifying 42 items for the City to work on to address housing affordability.

On August 19, 2019 the City Council adopted the A NewBERG Community Visioning program. One of the identified areas in the Action Plan is Livability and Development. Goal 3 states "Improve Housing Affordability". Three Strategies are identified to implement the Goal. Strategy 3.1: Evaluate zonings changes, fees, and permitting process for housing; Strategy 3.2: Explore crating incentives to encourage alternative housing; Strategy 3.3: Increase access to affordable means of home preservation and maintenance. Implementation of the A NewBERG Community Visioning program is ongoing.

The City is in the process of developing an urban renewal program that will include portions of the South Study area to address blight conditions including infrastructure deficiencies. The proposed urban renewal area includes land south of E Ninth Street along with S Blain Street and S River Street within the Study Area. The City Council accepted the Newberg Urban Renewal Feasibility Study on July 20, 2020. The City Council established an urban renewal agency on August 17, 2020. The City is now in the process of preparing an Urban Renewal Plan & Report to address blight.

The City of Newberg on November 16, 202 adopted a Construction Excise Tax to address housing affordability. The program will allow the City to partner with developers to provide housing for those residents who earn 80% or less of Median Family Income. Finds generated will come from a 1% tax on the permit value on new residential and commercial development.

The Mayor has formed the Equity Task Force which includes stakeholders from across the community to address Diversity, Equity, and Inclusion. The group meets monthly to open avenues for dialogue and trust building with community members. Current discussions have focused on the LatinX community which comprises 14.3% of the population with the intent to create forums for community members to share how they are feeling and how the City can help this portion of our population.

According to the US Census Quick Facts the population estimate as of July 1, 2019 was 23,886. The PSU population estimate as of July 1, 2019 was 20,045.
The Race & Ethnicity comprises Black or African American .4%, American Indian and Alaskan Native .9%, Asian 2.2%, Native Hawaiian and other Pacific Islander .2%, Hispanics or Latino 14.3%, White 87.5%.
The poverty rate is 15.8%.
Median household income (in 2019 dollars), 2015 – 2019 is $64,202
Households - 8,142
Owner Occupied - 65%

Median Value owner occupied - $320,400
Veterans - 1,149

The North Study area is in Census Tract 301.01. This Census Tract covers 1.3 square miles with a population estimate of 6,978 based on ACS 2019 5-year estimates. The Study area within the Census Tract is approximately .07 square miles. Per the OHCS 2019 LITC data this Census Tract ranks as High.
The Race & Ethnicity comprises Black or African American 1%, American Indian and Alaskan Native 2%, Asian 4%, Native Hawaiian and other Pacific Islander 1%, Hispanics or Latino 18%, White 69%.
The poverty rate is 13.7%.
Median household income (in 2019 dollars), 2015 – 2019 is $51,875
Households - 2,046
Housing Units - 2,226
Renter Occupied - 56%
Owner Occupied - 44%
Median Value owner occupied - $295,000
Veterans - 381

The South Study area is in Census Tract 302.02. This Census Tract covers 2 square miles with a population estimate of 5,917 based on ACS 2019 5-year estimates. The Study area within the Census Tract is approximately .62 square miles. . Per the OHCS 2019 LITC data this Census Tract ranks as Medium.
The Race & Ethnicity comprises Black or African American 0%, American Indian and Alaskan Native 1%, Asian 1%, Native Hawaiian and other Pacific Islander 0%, Hispanics or Latino 17%, White 78%.
The poverty rate is 25.2%.
Median household income (in 2019 dollars), 2015 – 2019 is $56,996
Households - 2,267
Housing Units - 2,445
Renter Occupied - 41%
Owner Occupied - 59%
Median Value owner occupied - $264,600
Veterans - 420

The City of Newberg is addressing Diversity, Equity and Inclusion efforts on a variety of fronts. The Newberg IBTER Study has identified deficiencies in the water system that need to be addressed to allow Middle Housing to occur within the two study areas. As noted in the responses to the criteria a timeline has been identified to correct these deficiencies help overcome potential patterns of segregation by income, race, or ethnicity, and foster inclusive communities free from barriers that restrict access to opportunity based on protected characteristics as noted by the US Census data that covers the two Census Tracts within the Study Areas.

(e) Whether the time period proposed for the IBTER is the minimum necessary to remedy the significant infrastructure deficiency.

The projects have been inserted into the City's Capital Improvement Plan with no proposed rate increase to facilitate these projects. This plan shows:

- The project necessary for the area north of downtown will be completed by July 2022.
- The projects necessary for the area south of downtown will be completed over nine year time span with completion shown in July 2029.

660-046-0370

Duration of Time Extension

(1) As provided in OAR 660-046-0350(3)(f)(A), the IBTER must specify when the local government intends to correct the significant infrastructure deficiency. The IBTER must provide a detailed timeline for a complete plan of action that will remedy the significant infrastructure deficiency, which may include phased infrastructure improvements and contingent actions and timelines based on circumstances outside the control of the local government.

The projects have been inserted into the City's Capital Improvement Plan with no proposed rate increase to facilitate these projects. This plan shows:

- The project necessary for the area north of downtown will be completed by July 2022.
- The projects necessary for the area south of downtown will be completed over nine year time span with completion shown in July 2029.

Project I–1	Main, 4th, Lincoln & 5th	FY22-24
Project I-2	Blaine St	FY25
Project I-3	9th, Charles, & College	FY26-29
Project I–4	Meridian	FY25
Project I–5	7th, Pacific, 9th & Paradise	FY23-26
Project I–6	River	FY22
Project I-7	5th	FY21
Project I-8	11th & Boston Square	FY21
Project I-9	Vermillion	FY21

(3) Upon the expiration date of a time extension, the local government must either enact development code regulations implementing middle housing or apply the model code, as applicable, per OAR 660-046-0100 or OAR 660-046-0200.

PLANNING COMMISSION RESOLUTION 2020-360

A RESOLUTION RECOMMENDING CITY COUNCIL ACCEPT THE INFRASTRUCTURE BASED TIME EXTENSION REQUEST TECHNICAL MEMORANDUMS

RECITALS

1. The 2019 Oregon Legislature passed HB 2001 regarding Middle Housing.

2. The Department of Land Conservation and Development and the Land Conservation and Development Commission adopted new Oregon Administrative Rules to implement HB 2001 Infrastructure Based Time Extension Request on August 5, 2020.

3. The City of Newberg was awarded a $25,000 grant from the Department of Land Conservation and Development to evaluate infrastructure in two areas north and south of downtown.

4. The City of Newberg engaged Kittelson and Associates, HBH Consulting Engineers, Keller Associates, and Murrysmith, to analyze two areas of Newberg to determine if there are infrastructure deficiencies to accommodate Middle Housing.

5. The Newberg Planning Commission functioned as the Project Advisory Committee for the evaluation.

The Newberg Planning Commission resolves as follows:

1. The Planning Commission of the City of Newberg recommends the City Council accept the Infrastructure Based Time Extension Technical Memorandums included as Exhibits "A", "B", "C", and "D" and forward a final package of the Infrastructure Based Time Extension Technical Memorandums to the Department of Land Conservation and Development by December 31, 2020.

Adopted by the Newberg Planning Commission this 12th day of November, 2020.

Planning Commission Chair

ATTEST:

Bobbie Morgan

Planning Commission Secretary

List of Exhibits:

Exhibit "A": Transportation Technical Memorandum
Exhibit "B": Stormwater Technical Memorandum
Exhibit "C": Wastewater Technical Memorandum
Exhibit "D": Water Technical Memorandum

KITTELSON & ASSOCIATES

851 SW 6th AVENUE, SUITE 600
PORTLAND, OR 97204
P 503.228.5230 F 503.273.8169

MEMORANDUM

Date: October 21, 2020 Project #: 24611.001

To: Brett Musick, Doug Rux, & Kaaren Hofmann, City of Newberg

From: Julia Kuhn

Project: Transportation System Plan (TSP) Technical Update

Subject: Transportation Planning Rule (TPR) Implications of Middle Housing

Per Oregon House Bills 2001 and 2003, the City of Newberg is planning to allow for more housing choices for its existing and future residents. To help cities implement these bills, the Oregon Land Conservation and Development Commission (LCDC) adopted administrative rules (i.e., Oregon Administrative Rule 660-046) to guide the development of the middle housing and also adopted administrative rules to allow cities to apply for an Infrastructure-Based Time Extension (IBTER) to delay the enactment of middle housing requirements if there are any significant deficiencies caused by the needs of the additional housing on the City's wastewater, water, storm drainage and/or transportation facilities. In accordance with the DLCD rule-making, this memorandum provides a brief summary of the impacts of middle housing related to the City's transportation system. As concluded herein, the potential for middle housing does not result in any significant impacts on the transportation system, as defined by Oregon's Transportation Planning Rule (TPR) and as such, no IBTER extension related to transportation is needed.

Transportation-Related Administrative Rule Requirements

For analyzing the provision of additional middle housing beyond that currently planned, the Transportation Planning Rule (TPR), as defined by Oregon Administrative Rule 660-012-0060 establishes a two-step process for evaluating an amendment's impacts on the transportation system. This amendment defines a two-step process for determining whether an amendment has the potential to "significantly affect" the transportation system. First, the incremental difference in vehicular trips associated with the amendment is calculated and a determination is made as to whether the anticipated conditions at any collector/arterial intersections within the City could be measurably affected by the added trips associated with the amendment. If no measurable impacts are identified, no additional analyses are needed to demonstrate that the proposed amendments would not "significantly affect" the transportation system.

This project is funded by Oregon general fund dollars through the Department of Land Conservation and Development. The contents of this document do not necessarily reflect the views or policies of the State of Oregon.

Potential Change Middle Housing

Per the IBTER requirements, the City performed an analysis of potential infill areas that could allow for middle housing. As defined in the rule-making, Cities can plan for a one percent increase in the "number of dwelling units produced due to middle housing allowances within specified residential zones." For transportation planning purposes, the TPR requires that we compare the vehicular trip making associated with the additional one percent growth in housing to that evaluated as part of the "baseline," which was assessed for the purposes of establishing the needs, deficiencies and projects identified in the City's Transportation System Plan (TSP).

In accordance with the IBTER requirements, the City identified eight areas of the City where infill residential development could occur. These areas and the baseline housing units as well as the anticipated increase in housing units is summarized in Table 1.

Table 1. Potential Housing Increase

Area	Existing Dwelling Units	Anticipated Increase in Dwelling Units*
Areas South of Downtown		
South Single Family	914	10
South Multi-Family	428	5
South Duplex	126	2
South Triplex	21	1
South Quadplex	32	1
Total South Area	1,521	19
Areas North of Downtown		
North Single Family	170	2
North Multi-Family	0	0
North Duplex	6	1
Total North Area	176	3
Total Housing		
Total North and South	1,697	22

*Rounded to the nearest dwelling unit.

Potential Trip Generation Impacts

To assess the TPR-related impacts associated with 22 potential new middle housing dwelling units, we calculated the anticipated trip generation of each of the potential areas in accordance with the single family housing rates provided in the *Trip Generation Manual, 10th Edition*, as published by the Institute of Transportation Engineers. Table 2 compares the potential increase in daily trips for each of the identified infill areas whereas Table 3 presents the new weekday AM and PM peak hour trips that could result from the middle housing.

Table 2. Potential Increase in Vehicular Trips

Area	Existing Dwelling Units	Anticipated Increase in Dwelling Units	ITE Land Use Code	Existing Baseline Daily Trips	Increase In Daily Trips	Percent Increase
Areas South of Downtown						
South Single Family	914	10	210	8,628	94	1.1%
South Multi-Family	428	5	210	4,040	48	1.2%
South Duplex	126	2	210	1,190	18	1.5%
South Triplex	21	1	210	198	10	5.1%
South Quadplex	32	1	210	302	10	3.3%
Total South Area	1,521	19	210	14,358	180	1.3%
Areas North of Downtown						
North Single Family	170	2	210	1,604	18	1.1%
North Multi-Family	0	0	210	0	0	N/A
North Duplex	6	1	210	56	10	17.9%
Total North Area	176	3	210	1,662	28	1.7%
Total Housing						
Total North and South	1,697	22	210	16,020	208	1.3%

Table 3. Potential Additional Peak Hour Trip-Making

Area	Anticipated Increase in Dwelling Units	Weekday AM Peak Hour Trip Increase			Weekday PM Peak Hour Trip Increase		
		Total Trips	In	Out	Total Trips	In	Out
Areas South of Downtown							
South Single Family	10	7	2	5	10	6	4
South Multi-Family	5	4	1	3	5	3	2
South Duplex	2	1	0	1	2	1	1
South Triplex	1	1	0	1	1	1	0
South Quadplex	1	1	0	1	1	1	0
Total South Area	19	14	4	10	19	12	7
Areas North of Downtown							
North Single Family	2	1	0	1	2	1	1
North Multi-Family	0	0	0	0	0	0	0
North Duplex	1	1	0	1	1	1	0
Total North Area	3	2	1	1	3	2	1
Total Housing							
Total North and South	22	16	4	12	22	14	8

As shown in Table 3, the potential city-wide increase in peak hour trip making is less than 22 vehicles per hour. Given that the infill areas are dispersed both north and south of downtown and will use a variety of collector and arterial streets for their travel, we conclude that no one intersection will experience a measurable increase in trips. As such, the proposed middle housing does not constitute a "significant impact" on transportation facilities and the facilities identified in the City's TSP are adequate to support the potential middle housing.

Summary of TPR Criteria

OAR Section 660-12-0060 of the TPR sets forth the relative criteria for evaluating plan and land use regulation amendments. Table 4 summarizes the criteria in Section 660-012-0060 and the applicability to the proposed middle housing provisions.

Table 4. Summary of Criteria in OAR 660-012-0060

Section	Criteria	Applicable?
1	Describes how to determine if a proposed land use action results in a significant effect.	Yes
2	Describes measures for complying with Criteria #1 where a significant effect is determined.	No
3	Describes measures for complying with Criteria #1 and #2 without assuring that the allowed land uses are consistent with the function, capacity and performance standards of the facility.	No
4	Determinations under Criteria #1, #2, and #3 are coordinated with other local agencies.	Yes
5	Indicates that the presence of a transportation facility shall not be the basis for an exception to allow development on rural lands.	No
6	Indicates that local agencies should credit developments that provide a reduction in trips.	No
7	Outlines requirements for a local street plan, access management plan, or future street plan.	No
8	Defines a mixed-use, pedestrian-friendly neighborhood.	No
9	A significant effect may not occur if the rezone is identified on the City's Comprehensive Plan and assumed in the adopted Transportation System Plan.	No
10	Agencies may consider measures other than vehicular capacity if within an identified multimodal mixed-use area (MMA).	No
11	Allows agencies to override the finding of a significant effect if the application meets the balancing test.	No

As shown in Table 4, there are eleven criteria that apply to Plan and Land Use Regulation Amendments. Of these, only Criteria #1 and #4 are applicable to the proposed middle housing provision. These criteria are provided below in italics with our response shown in standard font.

> *OAR 660-12-0060(1) If an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation (including a zoning map) would significantly affect an existing or planned transportation facility, then the local government must put in place measures as provided in section (2) of this rule, unless the amendment is allowed under section (3), (9) or (10) of this rule. A plan or land use regulation amendment significantly affects a transportation facility if it would:*
>
> > *(a) Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors in an adopted plan);*
> >
> > *(b) Change standards implementing a functional classification system; or*

(c) Result in any of the effects listed in paragraphs (A) through (C) of this subsection based on projected conditions measured at the end of the planning period identified in the adopted TSP. As part of evaluating projected conditions, the amount of traffic projected to be generated within the area of the amendment may be reduced if the amendment includes an enforceable, ongoing requirement that would demonstrably limit traffic generation, including, but not limited to, transportation demand management. This reduction may diminish or completely eliminate the significant effect of the amendment.

(A) Types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;

(B) Degrade the performance of an existing or planned transportation facility such that it would not meet the performance standards identified in the TSP or comprehensive plan; or

(C) Degrade the performance of an existing or planned transportation facility that is otherwise projected to not meet the performance standards identified in the TSP or comprehensive plan.

Response: The potential for middle housing in the infill areas has the potential to result in a 22 vehicles per hour increase city-wide during the PM peak hour. Given that the infill areas are dispersed both north and south of downtown and will use a variety of collector and arterial streets for their travel, we conclude that no one intersection will increase a measurable increase in trips and there is no significant impact on any facility. Further, the potential new housing is located in residential areas and therefore the street classifications remain appropriate for the land use designations. Finally, the insignificant increase in trip-making does not degrade the performance relative to the conditions anticipated in the TSP. Therefore, this criterion is met and there is no significant impact.

OAR 660-12-0060 (4) Determinations under sections (1)–(3) of this rule shall be coordinated with affected transportation facility and service providers and other affected local governments.

Response: The City of Newberg is coordinating the IBTER analysis with the state of Oregon. As such, this criterion is met.

Based on our review, the potential for middle housing does not result in any significant impacts on the transportation system, as defined by Oregon's Transportation Planning Rule (TPR) and as such, no IBTER extension related to transportation is needed. Please let us know if you have any questions regarding our analysis.

HBH CONSULTING ENGINEERS

MEMORANDUM

501 E First Street Newberg, Oregon 97132 | Ph. 503-554-9553 | Fax 503-537-9554

Date: **September 29, 2020** Project Number: **2020-014**
To: **Brett Musick, PE - Senior Engineer, City or Newberg**
From: **Andrey Chernishov, PE**
RE: **Stormwater IBTER Tech Memo**

This project is funded by Oregon general fund dollars through the Department of Land Conservation and Development. The contents of this document do not necessarily reflect the views or policies of the State of Oregon.

Introduction

The purpose of this technical memo is to assist the City of Newberg in the implementation of House Bill 2001 and House Bill 2003 and prepare an Infrastructure-Based Time Extension Request by statutory deadlines identified in House Bill 2001.

The City of Newberg will adopt regulations that will allow for the development of duplexes on lots zoned for residential use and continue to allow for the development of detached single-family dwellings. The City will also adopt regulations to allow for the development of duplexes and other middle housing types on lots in areas zoned for residential use that allow for the development of detached single-family dwellings.

The allowance of duplexes and other types of middle housing on lots zoned for residential development will likely have significant impact on existing infrastructure, as increases in housing types will lead to increases in density. To ensure the best livability in the City, it is important to consider the needed upgrades to existing infrastructure and identify areas that will see increased development in the future.

Through the allowance of middle housing in areas zoned for residential development and the identification of infrastructure constraints, the City will be able to address the needed housing types for residents at all income levels.

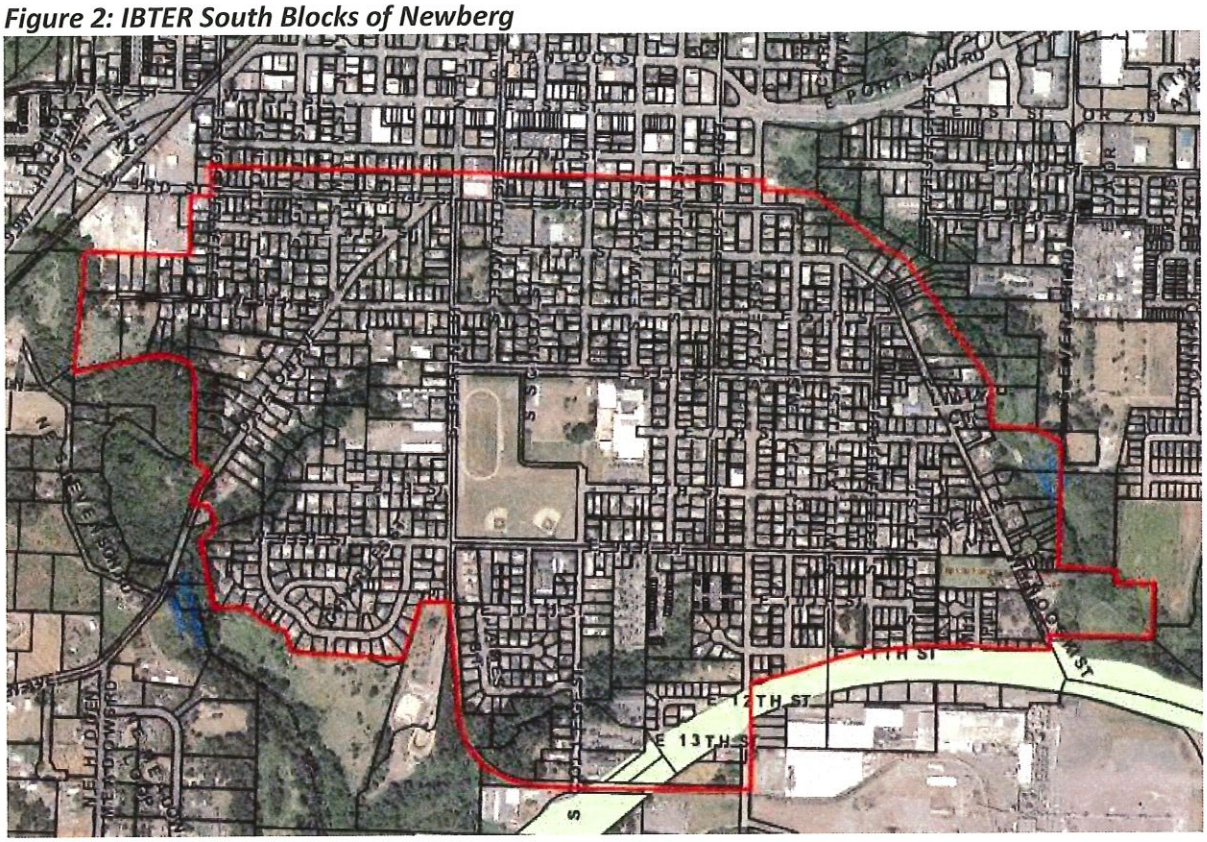
This technical memo will identify the stormwater infrastructure constraints around the downtown Newberg area in order to ensure these areas will be able to handle the increases in density allowed by HB 2001. The City of Newberg has identified two areas that may require upgrades to the existing infrastructure. The North Blocks area includes land just north of downtown Newberg up to the rail line that runs through the City and over to N Meridian Street as shown in Figure 1.

Figure 1: IBTER North Blocks of Newberg



The South Block area includes land just south of downtown Newberg from Chehalem Creek and railroad line intersection to the WestRock line and over to Hess Creek as shown in Figure 2. These areas are zoned predominantly R-1, R-2, and R-3, with very small portions zoned M-1, M-2, I, and C-1.

Figure 2: IBTER South Blocks of Newberg



Existing Dwelling Units and 1% IBTER EDU Increase

Per the Oregon Administrative Rules (OAR) 660-046, for IBTER the infill and redevelopment areas may assume a one percent increase in the number of dwelling units from the existing, applicable dwelling units. The City identified existing, applicable dwelling units within the areas identified for infill or redevelopment increases in density proposed by HB 2001 and HB 2003 (Figures 1 and 2). There were no undeveloped or underdeveloped areas identified by the City to be impacted by the proposed developments from HB 2001 and 2003. The existing dwelling units and 1% increase in equivalent dwelling units (EDU) for the areas identified are summarized in Table 1. EDU's have been rounded up to the nearest integer.

Table 1: Existing Dwelling Units And 1% IBTER EDU Increase

Area	Existing # of Dwelling Units	IBTER 1% Increase (EDU, rounded)
South Single Family	914	10
South Multi	428	5
South Duplex	126	2
South Triplex	21	1
South Fourplex	32	1
South Subtotal	**1,521**	**19**
North Single Family	170	2
North Multi	-	-
North Duplex	6	1
North Subtotal	**176**	**3**
Total	**1,697**	**22**

Infrastructure-Specific Application Thresholds

According to OAR 660-046-0340, the City may use the following circumstances to justify a stormwater-based IBTER:

(a) Lack of stormwater infrastructure, or adequately-sized stormwater infrastructure, such as storm drainage pipes, curb and gutters, catch basins and inlets, lateral storm connections, regional stormwater facilities, and discharge outfalls that results in not meeting an acceptable service level. An acceptable service level may include metrics for water quantity discharge, water quality, or both.

(b) A downstream stormwater conveyance system deficiency, resulting in localized ponding or flooding and storm pipe back-ups caused by pipes, culverts, or catch basins in disrepair; these problems may be compounded by high groundwater; compacted underlying soils; or backwater from nearby waterways during high flows; any of which that results in not meeting an acceptable service level.

Description of Stormwater Infrastructure Deficiencies

This section describes the significant stormwater infrastructure deficiencies via narrative, graphics, and tabular data within the two identified areas in the City of Newberg.

Description, Capacity, & Service Level

The current adopted City of Newberg 2014 Stormwater Master Plan (SWMP) is utilized in this tech memo. According to Section 3.2 "Evaluation Criteria" of the City of Newberg 2014 SWMP, the following evaluation criteria was utilized to establish service levels for the stormwater system.

At the time of the 2014 SWMP, the City was using the 2010 Standard Design Manual, so that manual was referenced for establishing the design standards for evaluating the capacity of the stormwater infrastructure. Section 4 of the City's 2010 Standard Design Manual included design requirements for storm drainage systems in Newberg. In the 2014 SWMP the existing and future storm drainage pipe network was evaluated for capacity based on the following conditions:

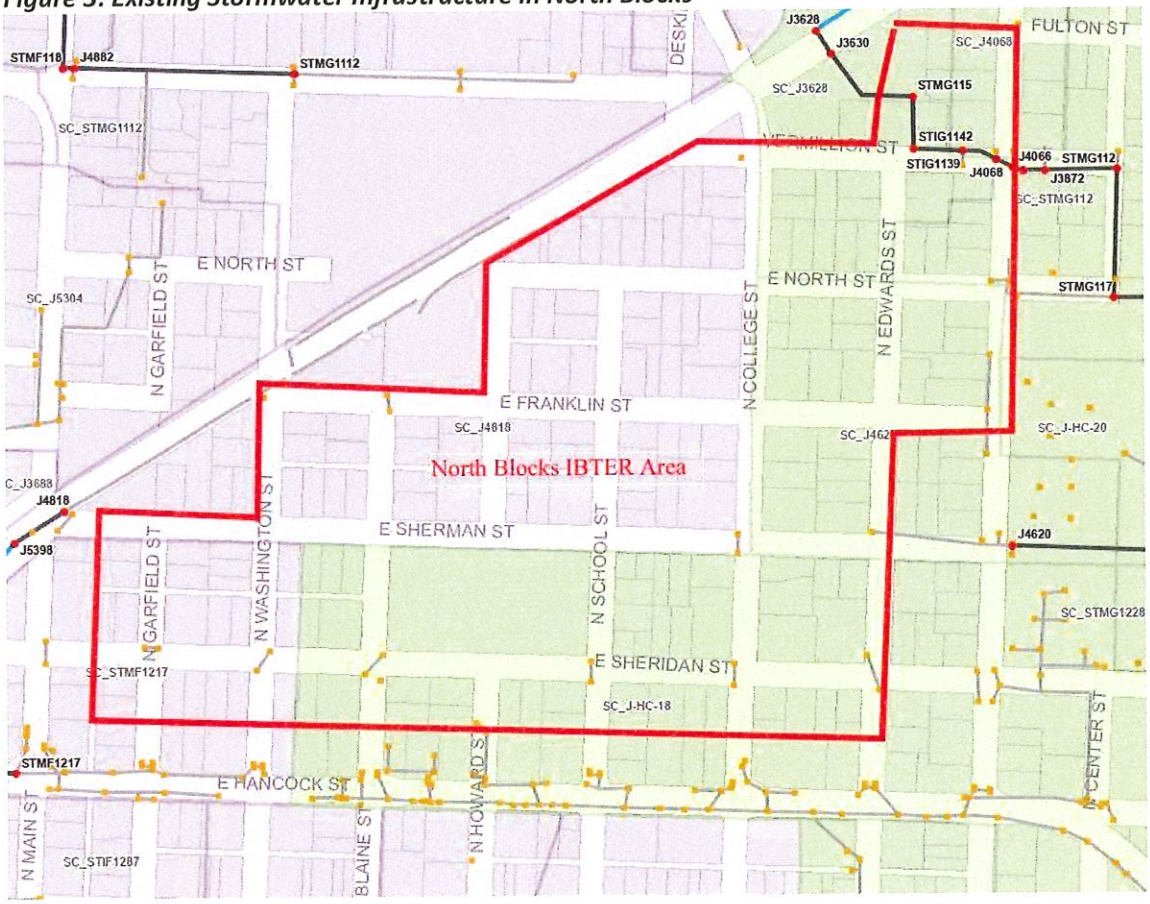
- Minor drainage system elements (streets, curbs, gutters, inlets, catch basins, and collector drains): Capacity for the 10-year design storm.
- Major laterals (laterals and collectors with less than 250 acres tributary area): Capacity for the 10-year design storm.
- Major trunk lines (trunk lines with greater than 250 acres of tributary area and drainage systems under arterial streets): Capacity for the 50-year design storm.
- Culverts on creek systems: Capacity for the 50-year design storm.

For the purpose of evaluating the capacity of the existing and future storm drainage infrastructure in the 2014 SWMP, flooding was defined as any surcharge over the rim elevation of a manhole or above the bank elevation of open channels. Minor flooding is defined as flooding that occurs for less than 2-hours during the peak 24-hour design storm. Major flooding is defined as flooding that occurs for more than 2-hours during the peak 24-hour design storm.

During the development of 2014 SWMP, the City was in the process of updating the Stormwater Design Standards. The current 2015 standards included a change to using the 25-year, 24-hour design storm for sizing stormwater pipes conveying water from drainage areas less than 250 acres in size. The 2014 SWMP capital improvement projects (CIPs) in drainage areas less than 250 acres have been sized for the 25-year design storm.

The existing stormwater infrastructure in the North Blocks area is shown in Figure 3. Most the North Blocks area does not have an existing stormwater collection system, such as catch basins, inlets, and storm pipes. This results in localized ponding and flooding of streets during 25-year storm events.

Figure 3: Existing Stormwater Infrastructure in North Blocks



The 2014 SWMP shows modelled stormwater pipes in the North Blocks area have capacity issues, which result in flooding at the 10-design storm service level (see Figure 4). The flooding occurs along Vermillion St between manhole STMG115 and J4068 located between N Edwards St and N Meridian St. The yellow dots represent flooding that lasts less than one hour, and the reds dots represent flooding that lasts more than one hour.

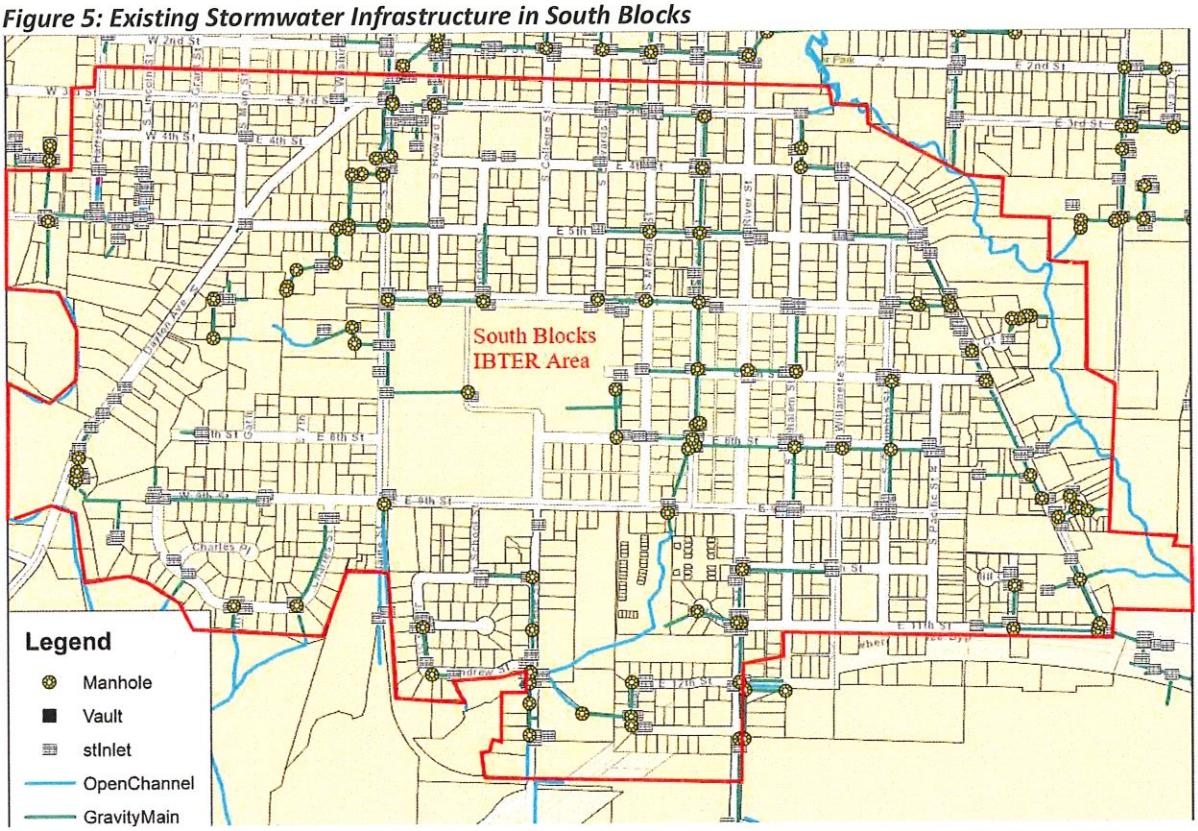
Figure 4: Existing Stormwater Flooding in North Blocks



In addition, the 2014 SWMP documents the lack of a stormwater collection system (catch basins and storm pipes) along N Edwards St between E Sheridan St and Vermillion St. The lack of a stormwater collection system extends one block west from N Edwards St along the following streets: E Sheridan St, E Sherman St, E Franklin St, E North St, and E Vermillion St.

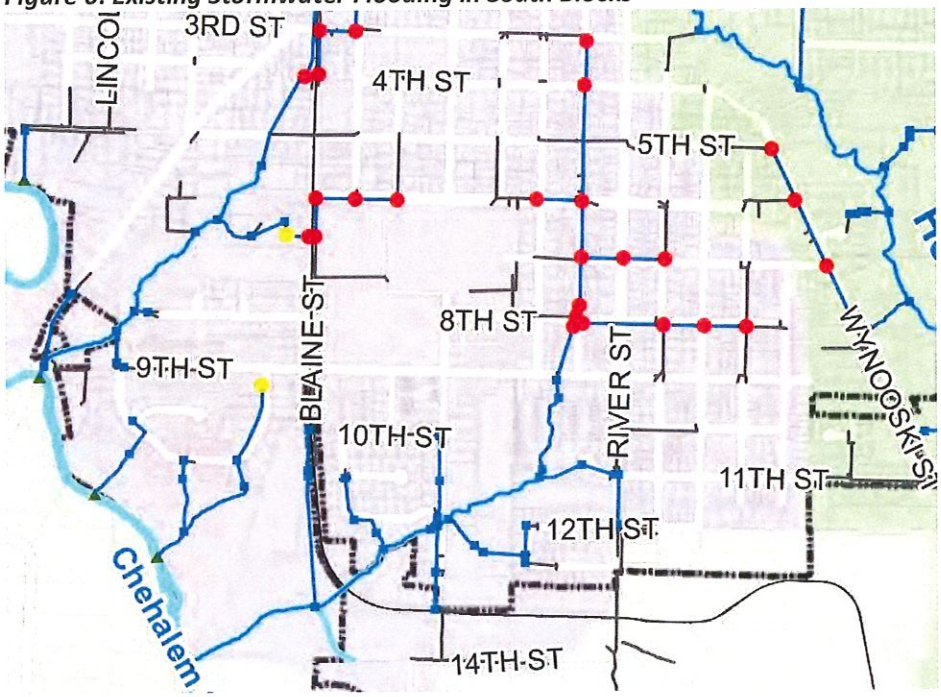
The existing stormwater infrastructure in the South Blocks is shown in Figure 5.

Figure 5: Existing Stormwater Infrastructure in South Blocks



The 2014 SWMP shows modelled stormwater pipes in the North Blocks area have capacity issues, which result in flooding at the 10-design storm service level (see Figure 6). Flooding occurs throughout the South Blocks as shown in the figure. The yellow dots represent flooding that lasts less than one hour, and the reds dots represent flooding that lasts more than one hour.

Figure 6: Existing Stormwater Flooding in South Blocks



According to Section 4.6 of the City of Newberg 2015 Public Works Design and Construction Standards, any development that creates more than 500 sq ft of net new impervious area requires stormwater quantity and quality facilities improvements. This requirement also applies to duplexes and other types of middle housing on lots zoned for residential development.

According to Section 4.6 of the City of Newberg 2015 Public Works Design and Construction Standards, any development that creates more than 500 sq ft of net new impervious area requires stormwater quantity on-site detention facilities designed to capture runoff so the post-development runoff rates from the site do not exceed the predevelopment runoff rates from the site, based on 24-hour storm events ranging from the ½ of the 2-year return storm to the 25-year return storm. Specifically, the ½ of the 2, 2, 10, and 25-year post-development runoff rates will not exceed their respective ½ of the 2, 2, 10, and 25-year pre-development runoff rates.

Most new developments, including duplexes and other types of middle housing on lots zoned for residential development will be required to detain stormwater runoff to pre-developed peak flow rates and treat stormwater. Therefore, the existing capacity in the stormwater system will not be exceeded due to development, unless the system is currently under capacity.

Deficiency in Capacity

Certain locations within the two areas identified in Figures 1 and 2 have a lack of stormwater infrastructure, or adequately-sized stormwater infrastructure, such as storm drainage pipes, catch basins and inlets that results in not meeting an acceptable service level as documented in the adopted 2014 SWMP.

If the anticipated increase of 22 EDU's of middle housing developments all created a net new impervious area of just under 500 sq ft each, which is highly unlikely, the total net new impervious

area would equal 10,978 sq ft. This would be the worst-case scenario of not detained and untreated stormwater for middle housing in the two areas identified in Figures 1 and 2. This would result in a negligible and trivial impact on the existing stormwater system.

Therefore, stormwater infrastructure is not expected to exceed capacity based on additional impacts from middle housing development due to 1% IBTER EDU increases by December 31, 2023, based on current development trends.

Impacts of Additional Middle Housing

A significant stormwater infrastructure deficiency is not expected to be caused only by additional middle housing development in the two areas identified in Figures 1 and 2.

System Capacity Assumptions

The 2014 SWMP modeled current impacts on the existing stormwater pipe capacity by entering pipe diameter, slope, length, roughness coefficient, pipe invert elevation, and ground elevation into a computer model to simulate hydraulic conditions at the 10-year design storm event. The modeling results were reviewed with City staff and compared to known flooding problems reported by the City's maintenance crews. Anecdotal accounts of flooding were generally consistent with the locations where flooding occurred in the modeled system.

Documented Deficiencies

The adopted 2014 SWMP has documented multiple deficiencies in the North and South Blocks of Newberg (see Figures 7 & 8). Each deficiency is described in Table 2.

Figure 7: Reported Stormwater Deficiencies in North Blocks

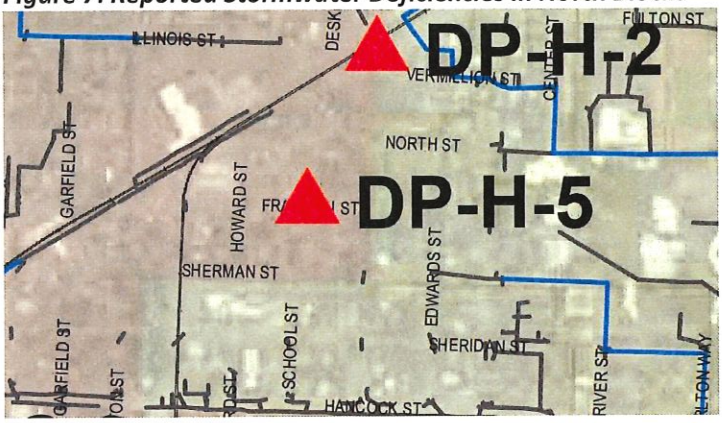


Figure 8: Reported Stormwater Deficiencies in South Blocks

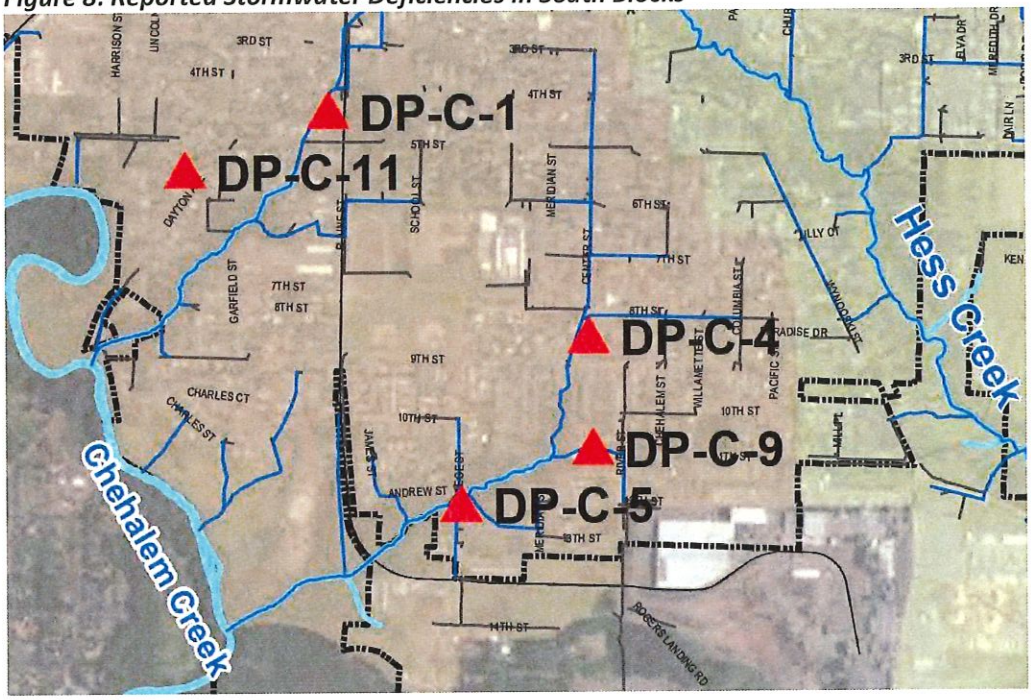


Table 2: 2014 SWMP Problem Area Descriptions in North and South Blocks

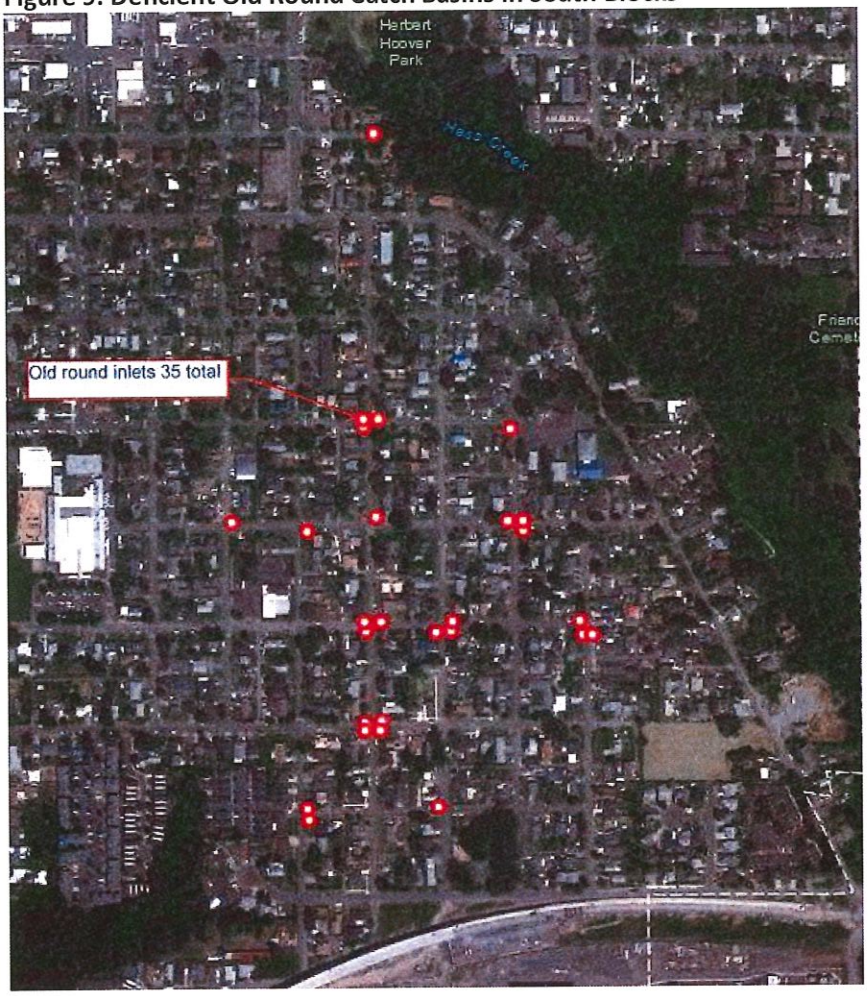
Identifier	Location	Problem description
DP-C-1	Near 5th and Blaine Streets	Hollingsworth drain is CMP/concrete; has roots; is 30' deep, under houses, and failing. When it fails/plugs, all of downtown storm system fails.
DP-C-1	Hollingsworth Storm Line	12" storm line under 5th Street needs realignment.
DP-C-1	Blaine/Hollingsworth	Failed pipe - 18" tin whistle.
DP-C-4	Between 8th and 9th Streets near Center Street	Flat sloped pipe runs under house on private property; needs to be rerouted.
DP-C-5	Natural system crossing College Street, south of Andrew Street	Steep ravine; multiple pipe materials; potential to collapse and fail.
DP-C-5	College Street south of Andrew Street	Existing pipe system under College Street is composed of multiple pipe materials, causing ongoing maintenance problems and concerns over long-term stability.
DP-C-9	9th and River Streets, southeast Corner	Roadway floods 10-12' radius around catch basin.
DP-C-9	S River Street and 11th Court	Two clay sewer tile pipe segments are deteriorating and require replacement. Replacement should be sized to convey future flows.
DP-C-11	Dayton Avenue near Johanna Court	Roadway drainage flows into driveways and causes minor damage of driveways and sidewalk. Report confirmed by maintenance staff.
DP-H-2	Vermillion Street between College Street and railroad tracks	Undersized and flat pipe discharges to tracks with no fall. (Note: GIS data do not show a pipe in this area.)
DP-H-2	College and Vermillion Streets	Intersection ponding
DP-H-2	College and Vermillion Streets	Gravel street area floods.
DP-H-5	College and Franklin Streets	Intersection ponding
DP-H-5	College and Sherman Streets	Bubbler backs up

The current City of Newberg Capital 5-Year Improvement Program (2020-2025) documents other significant infrastructure deficiencies not identified in the 2014 SWMP. Those deficiencies include the following:

- Stormwater pipe and outfall has severely eroded the area east of NE Wynooski Street near the 800 block of NE Wynooski St. This project is located within the South Blocks of Newberg. This project would extend the outfall further down the slope to reduce erosion. The City has budgeted $225,000 for the 2020-2021 fiscal year to complete this project.

- Old round catch basins located within the South Blocks of Newberg frequently plug up with debris during small rainstorms and flood road intersections (see Figure 9). The City has budgeted $375,000 for improving these deficient catch basins for the 2020-2024 fiscal years.

Figure 9: Deficient Old Round Catch Basins in South Blocks



Impacted Areas

Vicinity Map

Figures 10 and 11 are vicinity maps showing the boundary of the impacted areas for which the stormwater IBTER is requested.

Figure 10: Boundary of Stormwater Impacted Areas in North Blocks

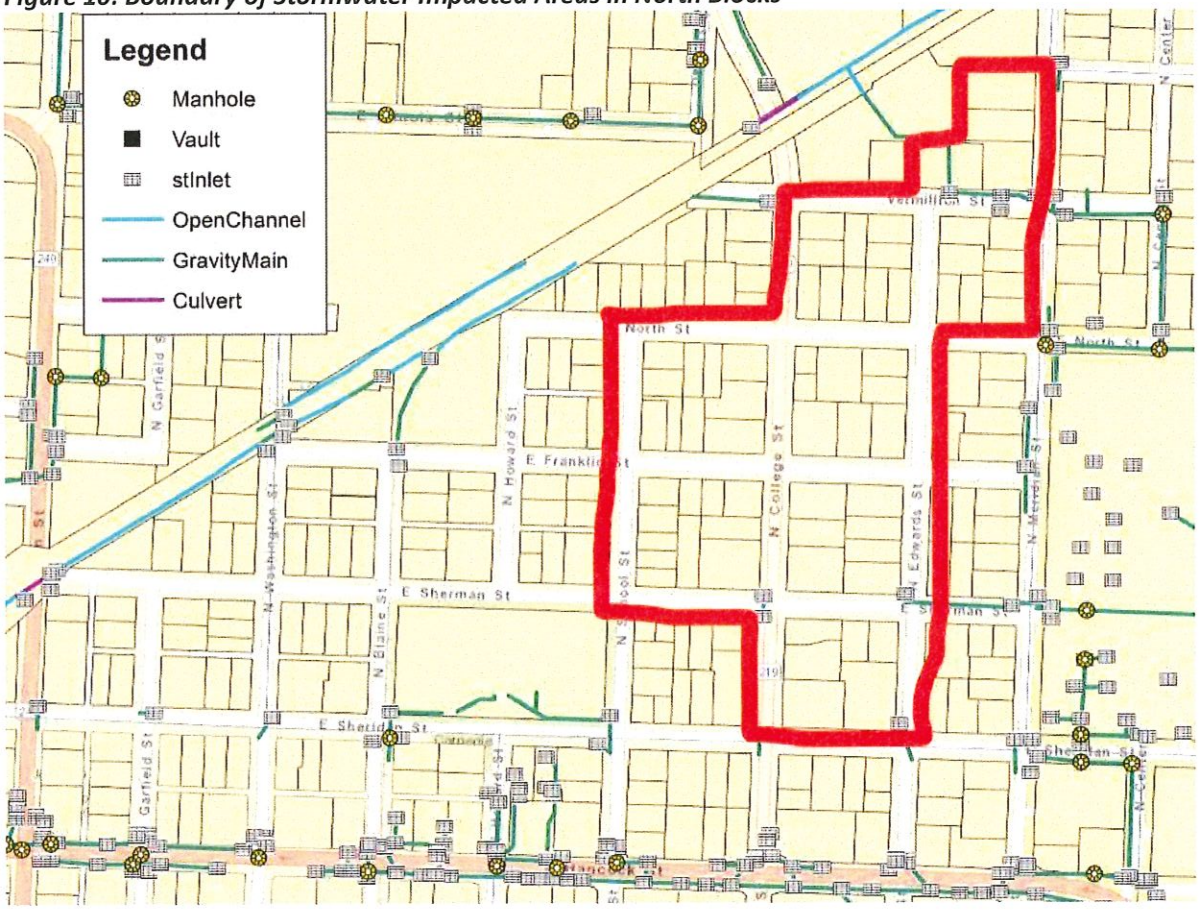
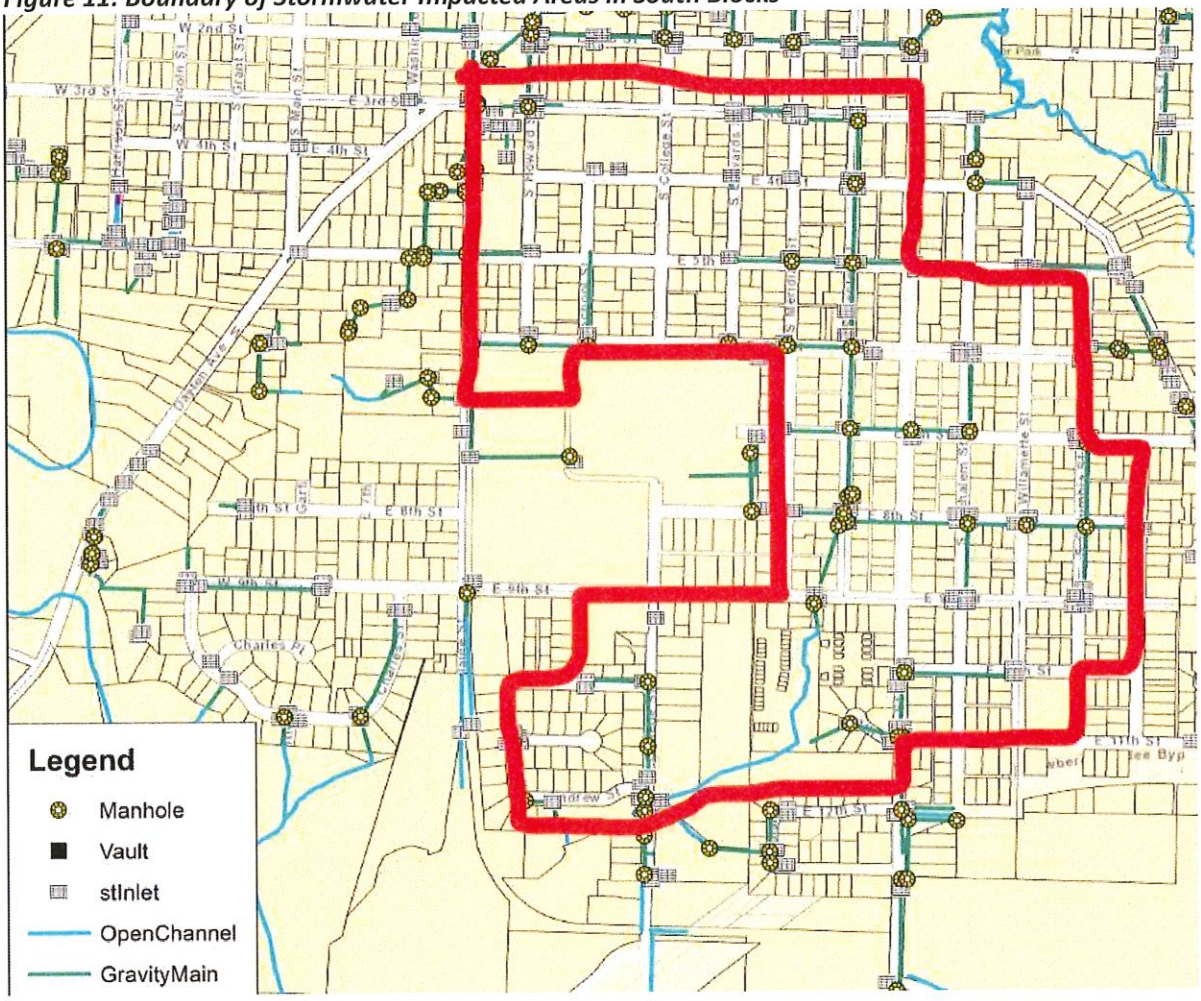


Figure 11: Boundary of Stormwater Impacted Areas in South Blocks



Remediation/Capital Improvement Plan

The remediation/capital improvement plan describes proposed infrastructure improvements intended to remedy the significant infrastructure deficiencies to allow the City to implement middle housing provisions.

Timeline

According to the adopted 2014 SWMP the proposed period of time needed to address the significant infrastructure deficiencies vary from 6 to 20 years, including phasing and contingencies.

Alternatives to Address Deficiencies

The 2014 SWMP considered several alternatives/options to address the modeled and documented significant stormwater infrastructure deficiencies. The proposed capital improvements are the most expeditiously feasible approach available to address the deficiencies. Various constraints such as topography, minimum pipe slope, minimum pipe cover, and ability to obtain public easements the alternatives/options to address the deficencies are limited. The most cost effective and expeditious alternatives were selected to address the deficencies.

Benefits of Improvement Projects for Middle Housing

The proposed stormwater capital improvements in 2014 SWMP will provide acceptable service levels to anticipated middle housing by eliminating flooding at the 25-year storm event. The proposed capital improvements will allow development of anticipated middle housing without causing flooding.

Potential Funding Sources

Two potential funding sources for the proposed remediation and capital improvement plan are the Stormwater Utility Rates and System Development Charges (SDCs) on new development.

Map of Areas Improved by Projects

Figure 12 shows the North Block areas that will be remedied by the proposed 2014 SWMP Capital Improvement Plan. The adopted CIP improvements in the North Blocks area include H-2: N Edwards St Improvements.

Figure 12: 2014 SWMP Capital Improvement Plan in North Blocks

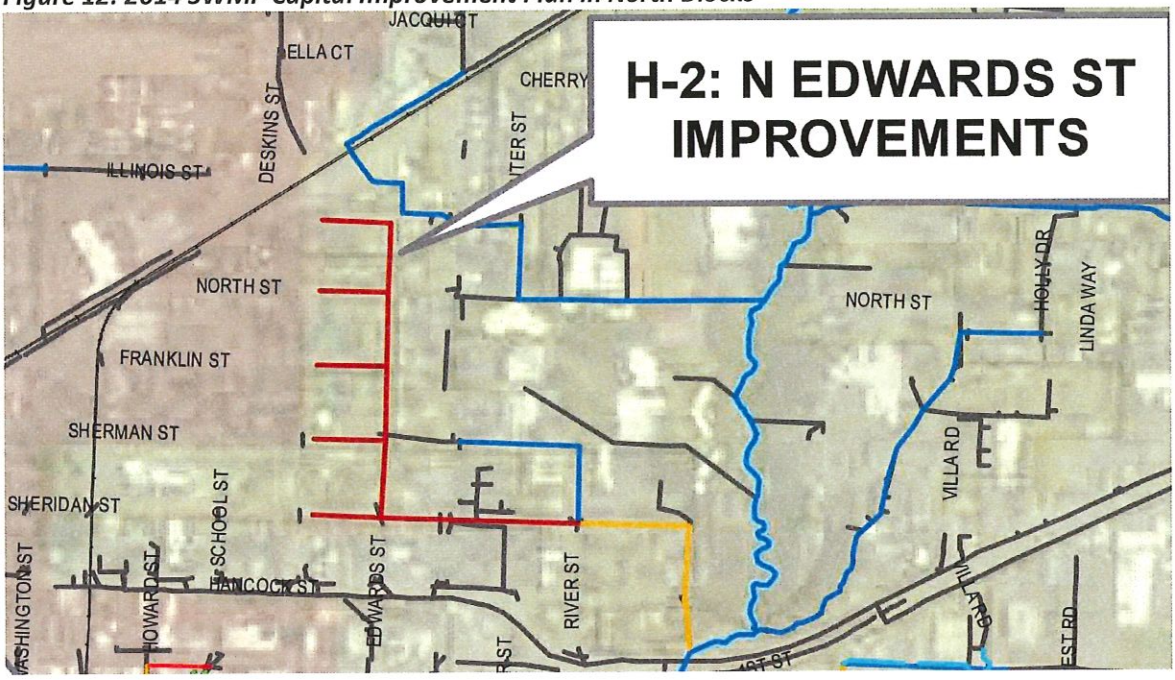
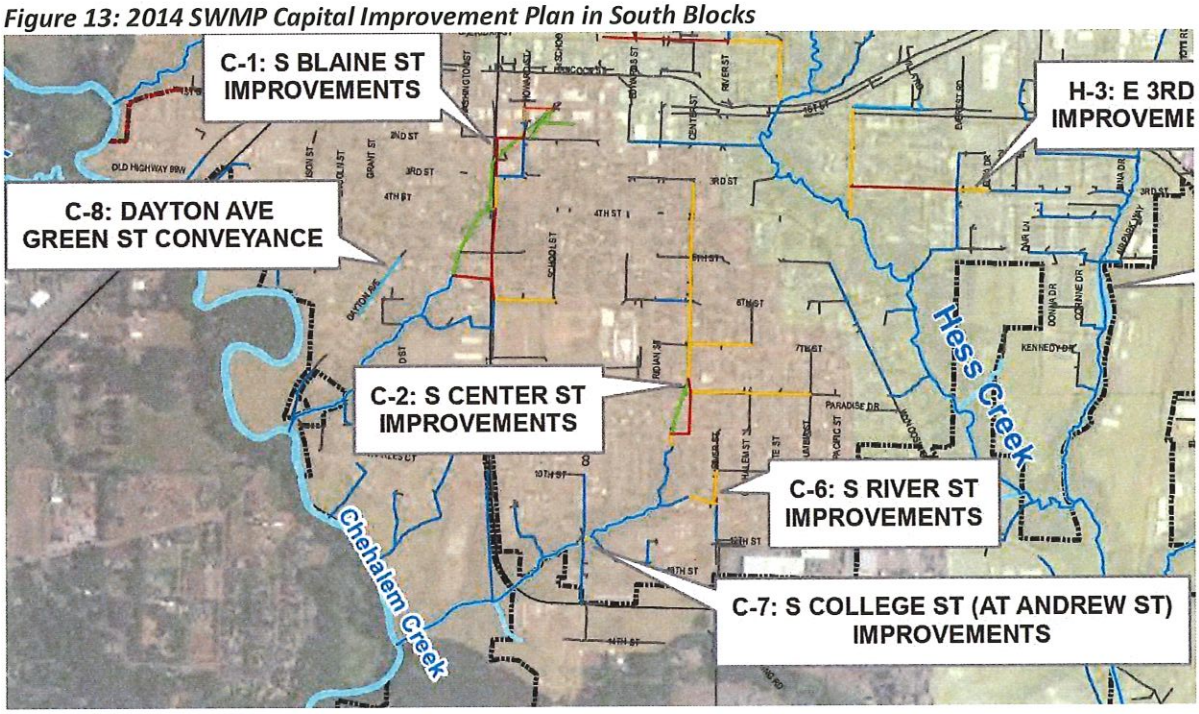


Figure 13 shows the South Block areas that will be remedied by the proposed 2014 SWMP Capital Improvement Plan. The adopted CIP improvements in the South Blocks area include C-1: S Blaine St Improvements, C-2: Center St Improvements, C-6: S River St Improvements, C-7: S College St (At Andrews St) Improvements, and C-8: Dayton Ave Green St Conveyance. It should be noted that a portion of S Blaine St Phase One Improvements have been completed in 2018 south of 401 S Blaine St.

Figure 13: 2014 SWMP Capital Improvement Plan in South Blocks



Timeline of Remediation Plan

According to the 2014 SWMP the proposed timeline and cost of the capital improvement projects located within the South and North Blocks of Newberg are shown in Table 3.

Table 3: 2014 SWMP Capital Improvement Project Cost and Timeline

CIP #	Capital Improvement Project Name	Cost	Estimated timeline
C-1	Blaine Street Improvements - Design	$ 180,000	Short-term (within 6 years)
C-1A	Highway 99W to 2nd Street Parking Lot Pipe Decommissioning/Replacement	$ 131,000	Short-term (within 6 years)
C-1B	S Blaine Street Pipe Replacement	$ 384,000	Short-term (within 6 years)
C-1C	E 2nd Street to E 5th Street Pipe Decommissioning/Replacement	$ 291,000	Short-term (within 6 years)
C-1D	E 6th and S Blaine Streets Pipe Replacement	$ 176,000	Long-term (within 20 years)
C-2	S Center Street Improvements - Design	$ 180,000	Short-term (within 6 years)
C-2A	E 9th Street to S Center Street Pipe Decommissioning	$ 294,000	Short-term (within 6 years)
C-2B	S Center, E 8th, and E 7th Streets Pipe Replacement	$ 930,000	Long-term (within 20 years)
C-6	S River Street Improvements	$ 160,000	Short-term (within 6 years)
C-7	S College Street at Andrew Street Improvements	$ 196,000	Long-term (within 20 years)
C-8	Dayton Avenue Green Streets	$ 125,000	Mid-term (within 12-years)
H-2	N Edwards Street Improvements	$1,217,000	Long-term (within 20 years)

Middle Housing in Other Areas

Middle housing is expected to be implemented in all other areas outside of the IBTER areas during the extension period.

Bond Measure

If the City proposes a bond measure or similar financial mechanism that requires voter approval as a means to fund an infrastructure improvement project, the City may prepare a contingency plan for funding the infrastructure improvement.

EXHIBIT "C"
Resolution No. 2020-360

KELLER ASSOCIATES

Technical Memorandum

TO: Brett Musick, PE
Project Manager
City of Newberg

FROM: Peter Olsen, PE
Emily Flock, PE

DATE: September 29, 2020

This project is funded by Oregon general fund dollars through the Department of Land Conservation and Development. The contents of this document do not necessarily reflect the views or policies of the State of Oregon.

SUBJECT: **Middle Housing Infrastructure-Based Time Extension Request (IBTER) – Wastewater Infrastructure Evaluation**

REGISTERED PROFESSIONAL ENGINEER
87384PE
Emily Flock
OREGON
NOV. 13, 2018
EMILY C. FLOCK
EXPIRES: 12/31/2021

BACKGROUND AND PURPOSE

The City of Newberg (City) will adopt regulations that will allow for development in accordance with House Bill 2001 (HB 2001) and House Bill 2003 (HB 2003). The purpose of this evaluation is to assist in the implementation of HB 2001 and HB 2003 by evaluating the potential impacts on the City's wastewater collection system for the Middle Housing Infrastructure-Based Time Extension Request (IBTER). The City intends to adopt regulations that will allow for the development of duplexes on lots zoned for residential use and continue to allow for the development of detached single-family dwellings. The City will also adopt regulations to allow for the development of duplexes and other middle housing types on lots in areas zoned for residential use that allow for the development of detached single-family dwellings.

The City has preliminarily identified areas that may require upgrades to the existing infrastructure. These areas include land just north of downtown up to the rail line that runs through Newberg and over to North Meridian Street (Figure 1, next page). Another identified area includes land just south of downtown from the Chehalem Creek and railroad line intersection to the West Rock line and over to Hess Creek (Figure 2, next page). This analysis evaluates wastewater conveyance capacities to handle the increases in density allowed by HB 2001 and HB 2003.

FIGURE 1: CITY-IDENTIFIED NORTH AREAS OF POTENTIAL UPGRADES

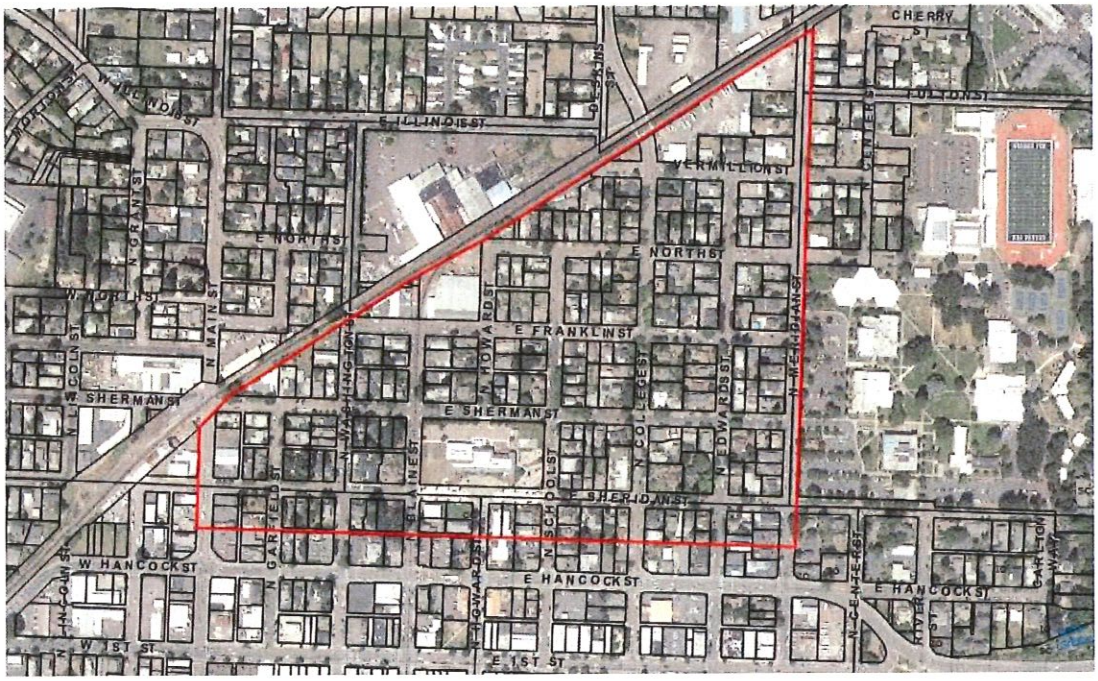
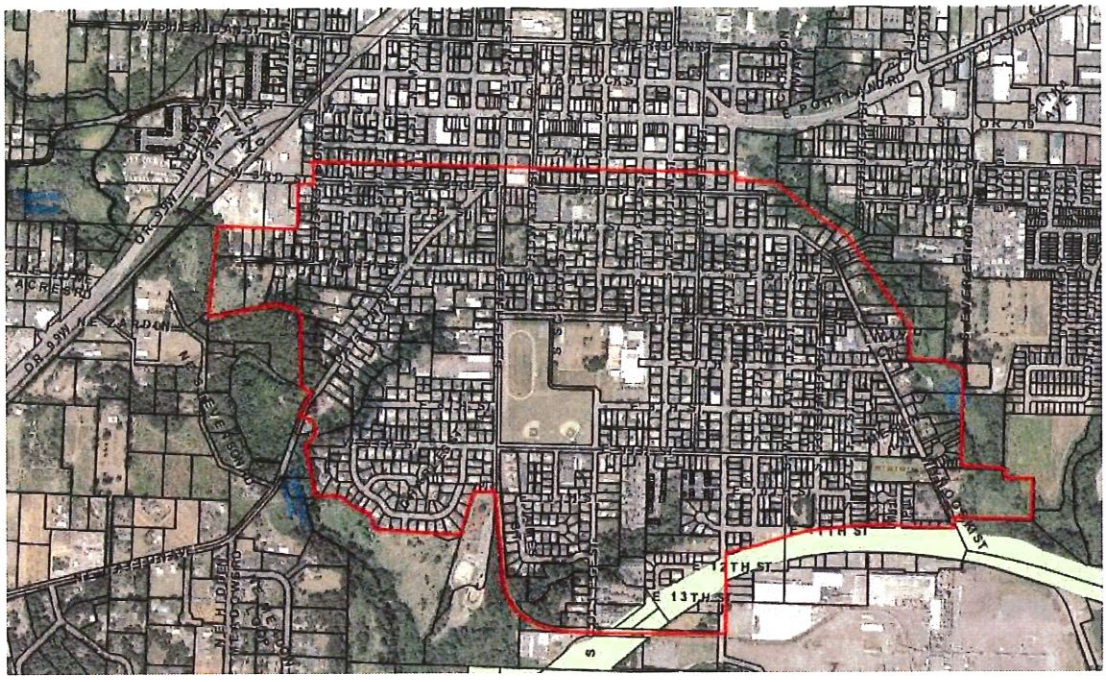


FIGURE 2: CITY-IDENTIFIED SOUTH AREAS OF POTENTIAL UPGRADES



PLANNING CRITERIA AND ESTIMATED SEWER FLOWS

Per the Oregon Administrative Rules (OAR) 660-046, for IBTER the infill and redevelopment areas may assume a one percent increase in the number of dwelling units from the existing, applicable dwelling units. The City identified existing, applicable dwelling units within the areas identified for infill or redevelopment increases in density proposed by HB 2001 and HB 2003 (Figures 1 and 2). There were no undeveloped or underdeveloped areas identified by the City to be impacted by the proposed developments from HB 2001 and 2003. The existing dwelling units and 1% increase in equivalent dwelling units (EDU) for the areas identified are summarized in Table 1. EDU's have been rounded up to the nearest integer.

TABLE 1: EXISTING DWELLING UNITS AND 1% IBTER EDU INCREASE

Area	Existing # of Dwelling Units	IBTER 1% Increase (EDU, rounded)
South Single Family	914	10
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North Subtotal	**176**	**3**
Total	**1,697**	**22**

As shown in Table 1, the additional development afforded from HB 2001 and HB 2003 is estimated to be only 22 EDU's. Criteria established in the 2018 Newberg Wastewater Master Plan (WWMP) were used to estimate the increase in base sewer flows from the potential development using number of EDU, people per EDU, and average dry weather flow allocation (ADWF). A peaking factor of system-wide flows from peak instantaneous flow (PIF) to ADWF was used to estimate the peak flow increase from the potential development. The peaking factor uses system planning flows from the 2018 WWMP. Table 2 summarizes the criteria from the master plan and estimated sewer base flow and peak flow increases from the potential development.

TABLE 2: ESTIMATED INCREASE IN SEWER FLOWS

Parameter/Criteria	Value
IBTER EDU Increase	22
People/EDU[1]	2.69
IBTER Population Increase	60
ADWF (gpcd)[1,2]	74
IBTER Base Flow Increase (gpd)	**4,440**
(gpm)	3.1
Peaking Factor (PIF : ADWF)[1,2]	12.3
IBTER Estimated PIF Flow Increase (gpd)	**54,800**
(gpm)	38

[1]Criteria from 2018 WWMP

[2]ADWF = avg. dry w eather flow ; PIF = peak instantaneous flow

SYSTEM IMPACTS

The areas identified for potential development are served by the River Street sewer trunk line. The majority of the potential EDU and associated flows are in the southern area identified in Figure 2. This area connects to the River Street trunk line south of E 2nd Street. The lowest capacity segment of the River Street trunk line south of E 2nd Street to E 11th Street is approximately 1,800 gpm (2018 WWMP). The estimated potential increase in base flow and PIF from the IBTER development (Table 2) is minimal in comparison to the capacity of the trunk line. The base flow increase from the potential IBTER development is less than 0.2% of the lowest capacity segment of the trunk line and the potential peak flow increase is equivalent to 2% of the lowest capacity segment.

COMPARISON WITH MASTER PLAN

The 2018 WWMP identifies existing capacity issues on the River Street trunk line. The Capital Improvement Plan (CIP) project C.2.b recommends upsizing the existing trunk line on River Street from E 4th Street to E 11th Street, as well as additional improvements on E 11th Street and Wynooski Street, to alleviate capacity issues in the sewer basin. The increased flow from this analysis would not change the recommended future trunk line sizing and would have minimal impact in terms of recommended timing for the improvement.

CONCLUSIONS

There are existing capacity deficiencies identified in the 2018 WWMP on the River Street trunk line that serves the areas identified for potential infill and redevelopment with the implementation of HB 2001 and HB 2003. The estimated sewer flow increase from potential HB 2001 and HB 2003 development is minimal in comparison to the capacity of the River Street trunk line that serves the impacted areas. The potential change in development density is not anticipated to cause additional capacity issues in the sewer trunk lines as evaluated in the 2018 WWMP.

murraysmith

Technical Memorandum

Date: October 30, 2020

Project: Newberg Water Master Plan (WMP) Technical Update

To: Brett Musick, P.E.
City of Newberg Engineering

From: Heidi Springer, P.E.
Murraysmith

Re: Water system analysis results to inform Infrastructure Based Time Extension Request (IBTER) for Oregon House Bill 2001 (HB 2001) Missing Middle Housing

This project is funded by Oregon general fund dollars through the Department of Land Conservation and Development. The contents of this document do not necessarily reflect the views or policies of the State of Oregon.

Introduction and Purpose

This memo documents an analysis of the estimated impact of increased residential housing density on water system infrastructure in two areas of the City of Newberg (City). Increased housing density is anticipated as result of 2019 Oregon legislation, House Bill (HB) 2001 Missing Middle Housing, which requires updates to local laws throughout Oregon that currently limit the types of housing approved for construction in residentially zoned areas. The City will adopt regulations that will allow for the development of duplexes and other types of middle housing in areas zoned for residential development to comply with this legislation and address needed housing types for residents at all income levels.

This analysis was conducted to inform an Infrastructure-Based Time Extension Request (IBTER) as described in Oregon Administrative Rules (OARs) 660-046-0300 to 0370 which became effective August 7, 2020. An approved IBTER would grant the City additional time to comply with the requirements of HB 2001 Missing Middle Housing.

IBTER Study Areas

City staff identified two areas for infrastructure analysis to inform an IBTER:

- North of Downtown Newberg - up to the rail line that runs through Newberg to Hess Creek (**Figure 1**)
- South of Downtown Newberg - from the Chehalem Creek and railroad line intersection to the WestRock line and Hess Creek (**Figure 2**)

Water System Background

The existing Newberg water system is served almost entirely as a single pressure zone, Zone 1. Both IBTER study areas are in Zone 1. Zone 1 customers receive pressure from three finished water storage reservoirs, North Valley Reservoirs 1 and 2 north of downtown and Corral Creek Reservoir east of downtown. These reservoirs are filled through the distribution system pipe network by pumps at the City's Water Treatment Plant on the Willamette River near the former WestRock mill site. The WTP is supplied by the City's wellfield on the south side of the Willamette River across from the WTP.

In general, the City's distribution system runs at relatively high pressures with most customers receiving near 80 pounds per square inch (psi), which is the Oregon Plumbing Code service pressure maximum.

The City adopted the current Water Master Plan (WMP) in 2017. The current WMP identifies a single distribution main capital improvement program (CIP) project within the IBTER south study area, replacement of a 4-inch diameter main on Dayton Avenue to meet fire flow criteria (WMP CIP M-2).

Water System Hydraulic Analysis

Consistent with IBTER state guidelines, the following analysis considers fire flow availability and service pressure impacts, if any, resulting from increased density within the IBTER study areas. Required fire flow by land use type and acceptable service pressure ranges in the distribution system are as established in the 2017 WMP and summarized in the following paragraphs.

IBTER guidelines specify that only localized utility impacts, not system-wide impacts, should be evaluated in support of an IBTER, thus a Zone 1 storage and system-wide supply analysis are not examined in detail. In general, the City's existing Zone 1 storage and supply facilities have adequate surplus capacity, therefore a short-term storage or supply impact is not expected from increased density in these limited areas. Impacts to the distribution system piping to meet fire

flow and pressure criteria are understood to be only those improvements needed beyond what was recommended in the 2017 WMP, WMP CIP M-2.

A distribution system analysis was conducted using a steady-state hydraulic network analysis model developed and calibrated with field flow testing data for the 2017 WMP.

Water Demand

Water demands can be estimated using either water consumption billed to customers or finished water production recorded at the WTP. For planning purposes, water consumption from billing records is used to assign water use geographically throughout the water system model based on service address. However, water consumption data does not capture non-revenue water, such as minor leaks and maintenance uses like hydrant flushing for water quality. To account for non-revenue water uses, distributed demands by customer service address are scaled up in the model to match water produced by the WTP. This approach effectively distributes non-revenue water evenly throughout the distribution system.

Water Demand Metrics

Water demand is described using two metrics:

- Average Daily Demand (ADD) – the total water production for a given year divided by 365 days
- Maximum Day Demand (MDD) – the largest calendar day (24 hours) water production for a given year; in Newberg and western Oregon, maximum day demand occurs between July 1 and September 30th each year (this is referred to as the peak season)

Demand per Dwelling Unit

In systems with primarily residential demands like Newberg, it can be useful to estimate a demand per person per day measured in gallons per capita day (gpcd). This is estimated as system-wide ADD divided by the water service area population. This per capita demand implicitly includes all non-residential water system demands and can be used to forecast future water demands based on population growth or new residential unit construction. **Table 1** summarizes estimated demand per dwelling unit based on historical WTP production records, Newberg population estimates from the Portland State University Population Research Center (PSU PRC), and a 2.66 average number of persons per dwelling unit from US Census data. MDD is approximately two times ADD, consistent with the 2017 WMP.

Table 1
Average Water Demand per Dwelling Unit

Year	ADD (mgd)	Population	ADD/person (gpcd)	ADD/unit (gpd)	MDD/unit (gpd)
2016	2.35	23,465	100	266	532
2017	2.35	23,480	100	266	532
2018	2.39	23,795	101	269	538
2019	2.27	24,045	94	250	500
Average ADD and MDD per Unit in gallons per day (gpd)				**263**	**526**

Estimated Growth from Increased Density due to Middle Housing

Per state IBTER guidelines in OAR 660-046-0320 and 330, the City may consider a one percent growth rate for infill development in the IBTER study areas. The City may consider a three percent growth rate for any properties considered un- or underdeveloped. Underdeveloped is defined in the OARs as a larger than one-half acre parcel zoned for detached single-family housing which has an existing density of less than or equal to two units per acre.

City Planning staff provided detailed parcel information for each area and identified parcels which may be considered underdeveloped. Estimated growth in dwelling units for the IBTER study areas based on this parcel data and the OAR guidelines is summarized in **Table 2**.

Table 2
Estimated Dwelling Unit Growth

	Existing Units			Infill Growth Units	Redevelopment Growth Units
IBTER Area	Developed Parcels	Underdeveloped Parcels	TOTAL Existing Units	(1% for existing developed)	(3% for existing underdeveloped)
South of Newberg	1,485	36	1,521	18	3
Single Family	879	35	914	9	2
Multi Family	428	-	428	5	-
Duplex	125	1	126	2	1
Triplex	21	-	21	1	-
Fourplex	32		32	1	-
North of Newberg	176	-	176	3	-
Single Family	170	-	170	2	-
Multi Family	-	-	-	-	-
Duplex	6	-	6	1	-
		TOTAL Existing Units	**1,697**	**TOTAL Growth**	**24**

Estimated Study Area Demand

Current demand and estimated demand with middle housing growth for the IBTER study areas is summarized in **Table 3**. Current ADD was estimated based on geographic assignment of 2015 billing records in the hydraulic model for the 2017 WMP and 2019 City WTP production. As shown in **Table 1**, ADD has remained relatively constant since 2016.

Table 3
IBTER Study Area Demand Summary

Area	Current Demand (gpd)		Estimated Demand with middle housing growth (gpd)	
	ADD	MDD	ADD	MDD
South of Downtown	336,240	672,480	341,763	683,526
North of Downtown	52,070	104,141	52,859	105,719

Distribution System Performance Criteria

System performance was evaluated using pressure, pipe velocity, and required fire flow criteria established in the 2017 WMP and summarized in **Table 4**.

Table 4
Distribution Performance Criteria

Water System Component	Evaluation Criterion	2017 WMP Value	Design Standard/Guideline
Service Pressure	Normal Range, during ADD	40-80 psi	City's 2015 Public Works *Design and Construction Standards*
	Maximum, without PRV	80 psi	Oregon Plumbing Specialty Code 608.2
	Minimum, during emergency or fire flow	20 psi	OAR 333-061
Distribution Mains	Velocity during fire flow	Not to exceed 8 fps	City's 2015 Public Works *Design and Construction Standards*
	Velocity during ADD	Not to exceed 5 fps	
Required Fire Flow and Duration	Low Density – Single-Family and Duplex Residential <= 3,600 sq ft	1,000 gpm for 2 hours	Oregon Fire Code
	Single-Family and Duplex Residential >3,600 sq ft	1,500 gpm for 2 hours	
	Medium Density Residential	1,500 gpm for 2 hours	
	High Density Residential	2,000 gpm for 3 hours	
	Commercial	3,000 gpm for 3 hours	
	Industrial, Institutional, and Hospitality	4,500 gpm for 3 hours	

Assumptions and Modeling Conditions

For the purposes of this analysis, it is assumed that all Zone 1 reservoirs are operating approximately three-quarters full and the WTP is not actively pumping to fill storage reservoirs.

Analysis Findings and Distribution System Constraints

Service Pressure

Modeled main line pressures under MDD conditions in the IBTER south area are between approximately 90 and 100 psi. Pressures in the north study area range between approximately 80 and 90 psi. These mainline pressure ranges remain the same with the approximately two percent increase in water demand generated by potential middle housing increased density.

Fire Flow Availability

Fire flow availability was tested at 2,000 gallons per minute (gpm) consistent with high density residential required fire flow from **Table 4**. This 2,000 gpm fire flow may be conservative in some parts of the IBTER study areas where smaller structures with fewer units, like duplexes, are more likely to be developed. However, providing water infrastructure capable of supplying a 2,000 gpm fire flow allows the City to consider a broader range of middle housing options as HB 2001 zoning changes are evaluated.

Fire flow availability in the south IBTER study area is constrained by high pipe flow velocity. Adequate pressure is available to supply fire flow and maintain service pressures above 20 psi for public health. However, small diameter 4- and 6-inch diameter pipe grids in the south study area create flow velocities over 20 feet per second (fps) during a fire flow event. Fire flow in the north study area is less constrained with 8-inch diameter well looped existing mains interconnected with the 18-inch diameter North Valley Reservoirs transmission main.

The primary concern with high pipe velocity is abrasion of the interior pipe coating, which can expose the pipe material to corrosion and lead to potential pipe failure. This is generally a greater concern when high flow velocity extends over a long period of time as part of normal system operation. In the case of a fire flow event, these high flow velocities are both infrequent and for a short time when they do occur. Thus, a pipe velocity higher than the 8 fps specified in **Table 4** may be acceptable, provided there is adequate available pressure to supply fire flow as is the case in Newberg's IBTER south study area. According to information from the Ductile Iron Pipe Research Association (DIPRA), 14 fps is a conservative maximum pipe velocity based on satisfactory historical performance of cement mortar lined ductile iron pipe. For the purposes of this analysis available fire flow is evaluated at a flow velocity of 14 fps.

Figure 3 at the end of this memo illustrates available fire flow in the north and south IBTER study areas with existing water mains under max day demand conditions and with a maximum flow velocity of 14 fps.

Recommended Improvements

Eight significant pipe improvement projects are recommended for the south study area and one minor project is recommended for the north study area to provide adequate fire flows to potential higher density development. In the south, existing development is primarily served from a 4- and 6-inch diameter pipe grid. While a 6-inch diameter main can provide a 1,000 gpm single-family residential fire flow, a 6-inch diameter grid is inadequate to provide a 2,000 gpm multi-family residential fire flow.

Existing 6-inch diameter mains along key corridors in the south study area, including S College Street, S River Street, and E 9th Street, are recommended to be upsized to 12-inch diameter mains to provide a large diameter backbone for the area to meet 2,000 gpm fire flow requirements for potential higher density development. Additional looping is also recommended to connect larger diameter mains with the 18-inch diameter transmission main in Wynooski Street and for the W 4th Street neighborhood between Dayton Avenue and Hwy 99W.

Two areas in the southwest corner of the south study area cannot be supplied a 2,000 gpm fire flow without significant or total pipe replacement and upsizing. The first area is the S Charles Street loop, which is bordered by Chehalem Creek to the west making it difficult to connect to the water system outside of the south study area. The second area is between S College Street and S River Street just north of the Newberg Dundee Bypass, which does not have an existing east-west right-of-way to provide additional looping. Rather than replacing these pipes in their current alignments, it is instead recommended that the City assess fire flow to these areas and potential distribution system looping along with future transportation projects associated with the Riverfront area, such as the extension of S Blaine Street south of Ewing Young Park and the extension of a future road across the former WestRock mill property connecting the area around the City's WTP and NE Rogers Landing Road.

Figure 4 at the end of this memo illustrates recommended pipe improvement projects.

Cost Estimates

An estimated cost has been developed for each recommended piping improvement project. New piping is assumed to be ductile iron pipe installed by private contractors.

Cost estimates represent opinions of cost only, acknowledging that final costs of individual projects will vary depending on actual labor and material costs, market conditions for construction, regulatory factors, final project scope, project schedule and other factors. The Association for the Advancement of Cost Engineering International (AACE) classifies cost estimates depending on project definition, end usage, and other factors. The cost estimates presented here are considered Class 4 with an end use being a study or feasibility evaluation and an expected accuracy range of -30 percent to +50 percent. As the project is better defined, the accuracy level of the estimates can be narrowed.

Since construction costs change periodically, an indexing method to adjust present estimates in the future is useful. The Engineering News-Record (ENR) Construction Cost Index (CCI) is a commonly used index for this purpose. For purposes of future cost estimate updating, the current ENR CCI for Seattle, Washington is 12,771.70 (September 2020).

Recommended improvements and estimated costs are summarized in **Table 5**.

Table 5
Recommended Improvements

Project No.	Project Description	Estimated Project Cost[1-6]
I-1	Install 1,733 LF of 8-inch DI Pipe in S Main Street, W 4th Street, S Lincoln Street, and W 5th Street	$486,000
I-2	Install 2,558 LF of 12-inch DI Pipe in S Blaine Street	$812,000
I-3	Install 2,962 LF of 8- and 12-inch DI Pipe in E 9th Street, Charles Street, and S College Street	$1,756,000
I-4	Install 772 LF of 8- and 12-inch DI Pipe in S Meridian Street	$440,000
I-5	Install 3,691 LF of 12-inch DI Pipe in E 7th Street, S Pacific Street, E 9th Street, and Paradise Drive	$1,167,000
I-6	Install 2,736 LF of 12-inch DI Pipe in S River Street	$868,000
I-7	Install 453 LF of 12-inch DI Pipe in E 5th Street	$148,000
I-8	Install 159 LF of 8-inch DI Pipe from E 11th Street to the Boston Square Apartments	$49,000
I-9	Install 15 LF of 8-inch DI Pipe in Vermillion Street	$11,000
	Total Cost	**$5,737,000**

Notes:

1. All costs are in 2020 dollars
2. Includes costs for fittings/valves and connections to existing services and hydrants
3. Includes local street trench patch resurfacing; whole or half street overlays are not included
4. Includes an allowance of 30% for construction contingency, 25% for engineering, permitting and inspection, and 1% for Oregon Corporate Activity Tax (applied to construction costs only)
5. Easement and right-of-way costs are not included
6. City project management and administrative costs are not included

Figure 1: North of Downtown Newberg

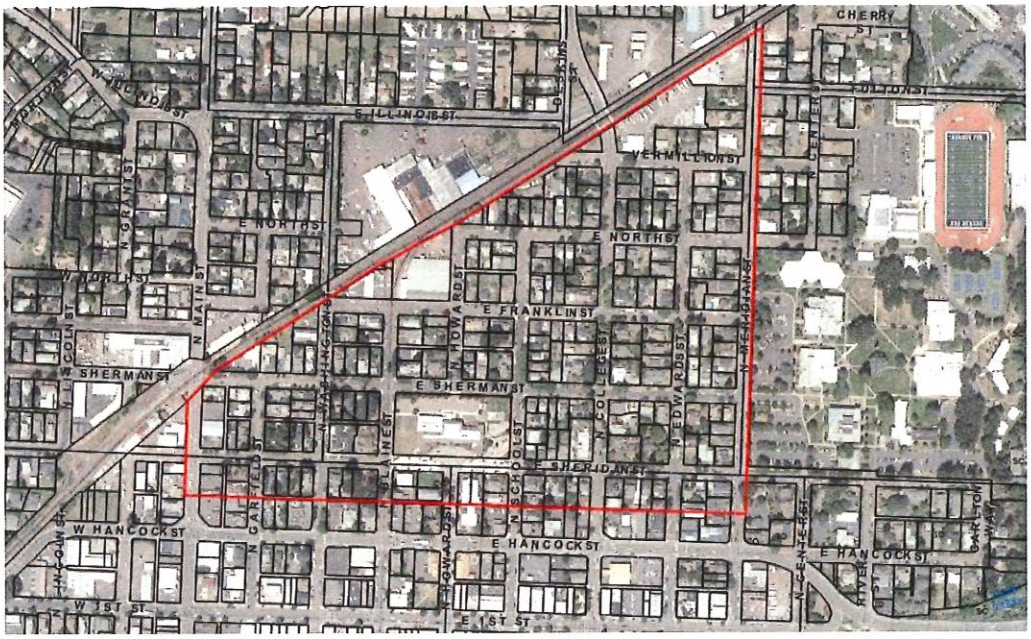
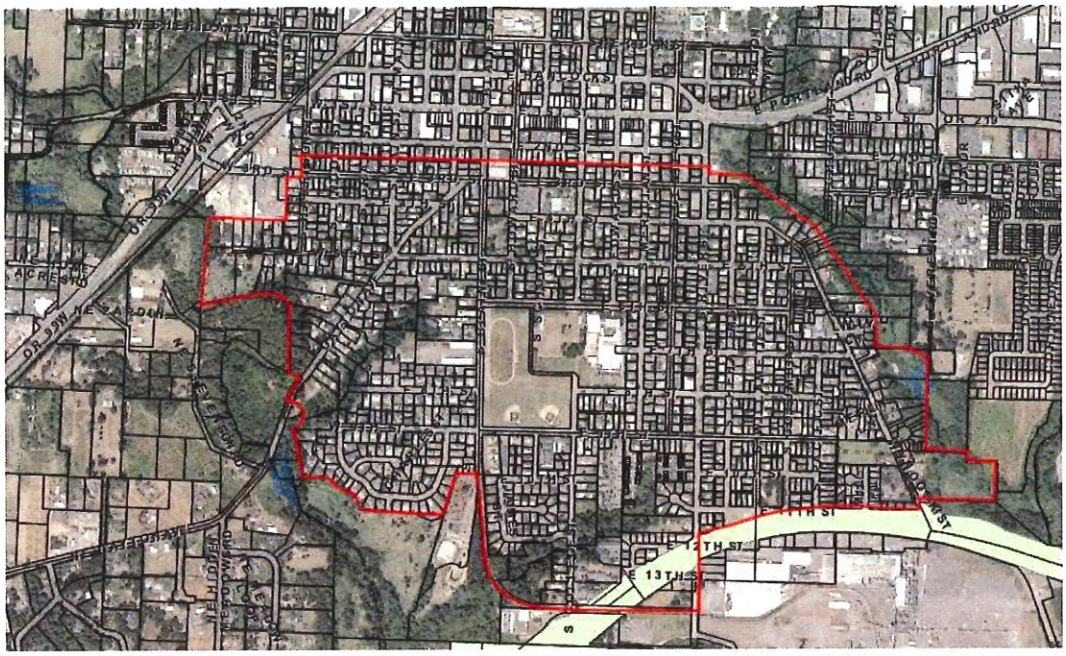
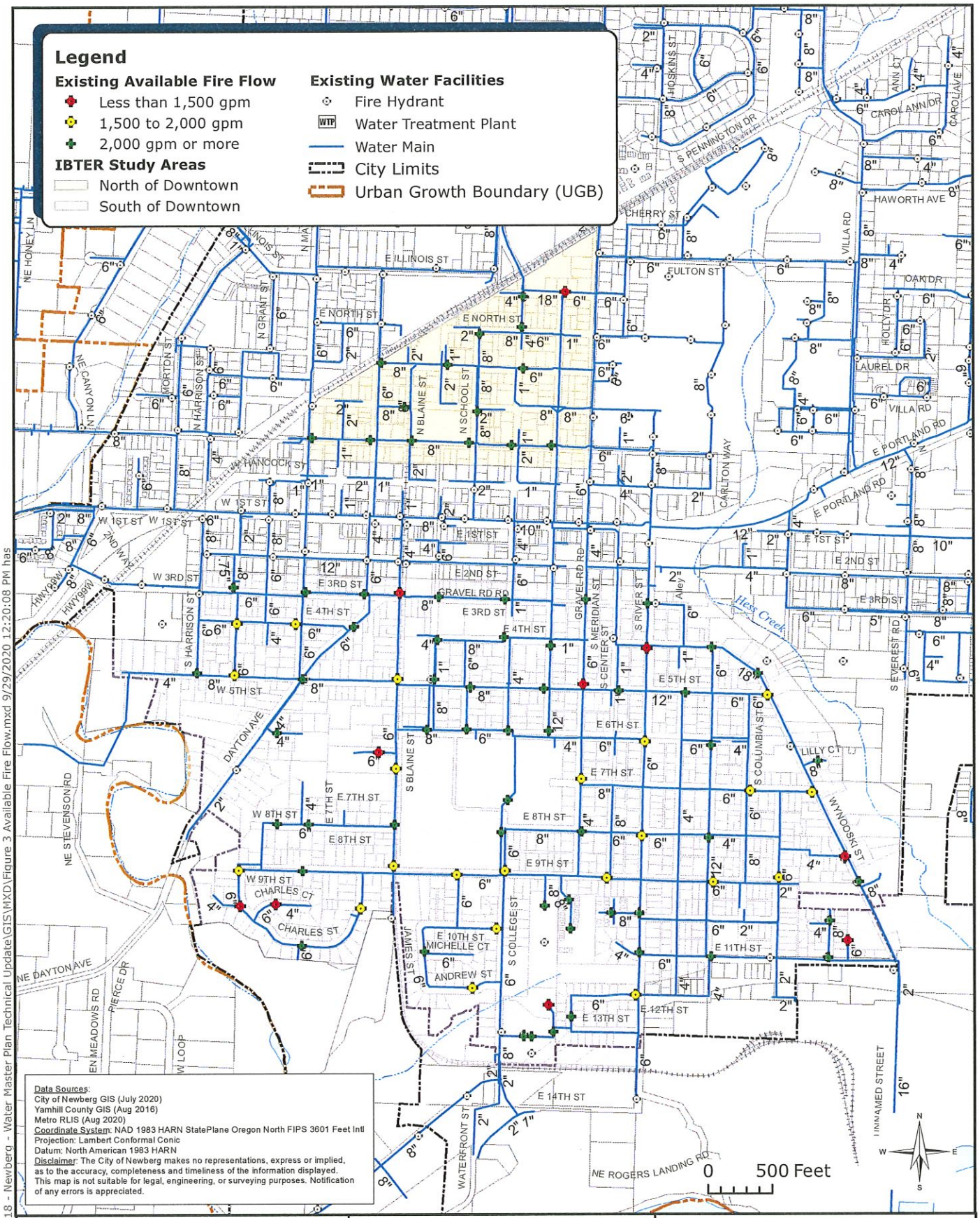


Figure 2: South of Downtown Newberg





Data Sources:
City of Newberg GIS (July 2020)
Yamhill County GIS (Aug 2016)
Metro RLIS (Aug 2020)
Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Projection: Lambert Conformal Conic
Datum: North American 1983 HARN
Disclaimer: The City of Newberg makes no representations, express or implied, as to the accuracy, completeness and timeliness of the information displayed. This map is not suitable for legal, engineering, or surveying purposes. Notification of any errors is appreciated.

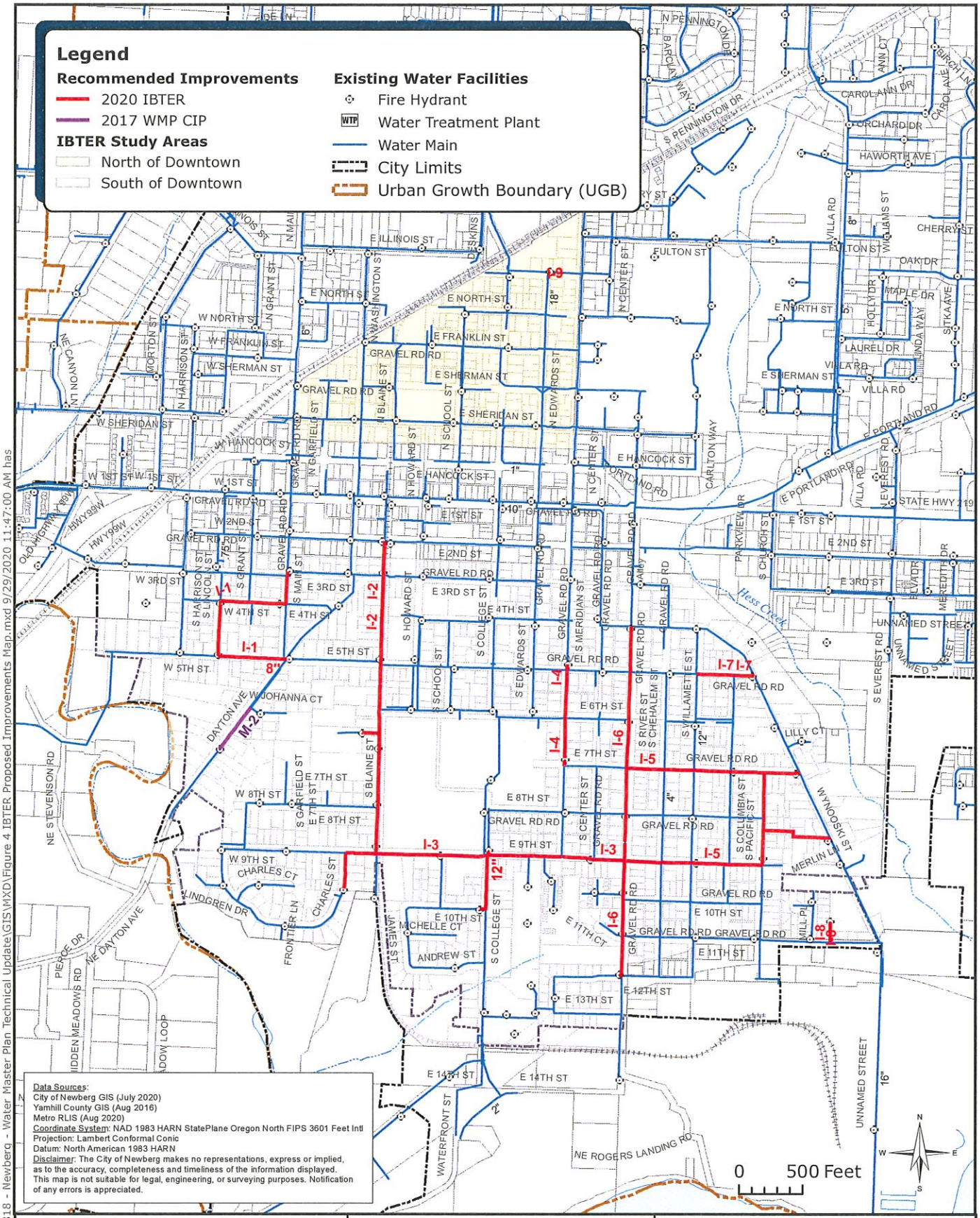
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murraysmith

City of Newberg

Water Master Plan Technical Update

Figure 3 Available Fire Flow



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murraysmith

City of Newberg

Water Master Plan Technical Update

Figure 4 IBTER Proposed Improvements

RESOLUTION NO. 2020-3705

A RESOLUTION ACCEPTING THE INFRASTRUCTURE BASED TIME EXTENSION TECHNICAL MEMORANDUMS

RECITALS:

1. The 2019 Oregon Legislature passed HB 2001 regarding Middle Housing.

2. The Department of Land Conservation and Development and the Land Conservation and Development Commission adopted new Oregon Administrative Rules to implement HB 2001 Infrastructure Based Time Extension Request on August 5, 2020.

3. The City of Newberg was awarded a $25,000 grant from the Department of Land Conservation and Development to evaluate infrastructure in two areas north and south of downtown under the Infrastructure Based Time Extension Request provisions of OAR Chapter 660, Division 046.

4. The City of Newberg engaged Kittelson and Associates, HBH Consulting Engineers, Keller Associates, and Murrysmith, to analyze two areas of Newberg to determine if there are infrastructure deficiencies to accommodate Middle Housing.

5. The Newberg Planning Commission functioned as the Citizens Advisory Committee for the evaluation.

6. The Planning Commission met on November 12, 2020 and adopted Resolution No. 2020-360 recommending the City Council accept the Infrastructure Based Time Extension Technical Memorandums included as Exhibits "A", "B", "C", and "D" and forward a final package of the Infrastructure Based Time Extension Technical Memorandums to the Department of Land Conservation and Development by December 31, 2020.

THE CITY OF NEWBERG RESOLVES AS FOLLOWS:

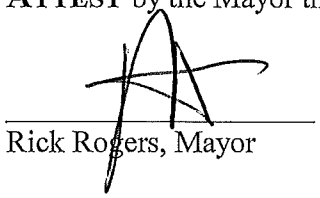
1. The Newberg City Council accepts the Infrastructure Based Time Extension Technical Memorandums included as Exhibits "A", "B", "C", and "D" and directs staff to forward a final package of the Infrastructure Based Time Extension Technical Memorandums to the Department of Land Conservation and Development by December 31, 2020.

- **EFFECTIVE DATE** of this resolution is the day after the adoption date, which is: December 8, 2020.

ADOPTED by the City Council of the City of Newberg, Oregon, this 7th day of December, 2020.

Sue Ryan, City Recorder

ATTEST by the Mayor this 10th day of December, 2020.



Rick Rogers, Mayor

KITTELSON & ASSOCIATES

851 SW 6th AVENUE, SUITE 600
PORTLAND, OR 97204
P 503.228.5230 F 503.273.8169

MEMORANDUM

Date: October 21, 2020 Project #: 24611.001

To: Brett Musick, Doug Rux, & Kaaren Hofmann, City of Newberg

From: Julia Kuhn

Project: Transportation System Plan (TSP) Technical Update

Subject: Transportation Planning Rule (TPR) Implications of Middle Housing

Per Oregon House Bills 2001 and 2003, the City of Newberg is planning to allow for more housing choices for its existing and future residents. To help cities implement these bills, the Oregon Land Conservation and Development Commission (LCDC) adopted administrative rules (i.e., Oregon Administrative Rule 660-046) to guide the development of the middle housing and also adopted administrative rules to allow cities to apply for an Infrastructure-Based Time Extension (IBTER) to delay the enactment of middle housing requirements if there are any significant deficiencies caused by the needs of the additional housing on the City's wastewater, water, storm drainage and/or transportation facilities. In accordance with the DLCD rule-making, this memorandum provides a brief summary of the impacts of middle housing related to the City's transportation system. As concluded herein, the potential for middle housing does not result in any significant impacts on the transportation system, as defined by Oregon's Transportation Planning Rule (TPR) and as such, no IBTER extension related to transportation is needed.

Transportation-Related Administrative Rule Requirements

For analyzing the provision of additional middle housing beyond that currently planned, the Transportation Planning Rule (TPR), as defined by Oregon Administrative Rule 660-012-0060 establishes a two-step process for evaluating an amendment's impacts on the transportation system. This amendment defines a two-step process for determining whether an amendment has the potential to "significantly affect" the transportation system. First, the incremental difference in vehicular trips associated with the amendment is calculated and a determination is made as to whether the anticipated conditions at any collector/arterial intersections within the City could be measurably affected by the added trips associated with the amendment. If no measurable impacts are identified, no additional analyses are needed to demonstrate that the proposed amendments would not "significantly affect" the transportation system.

This project is funded by Oregon general fund dollars through the Department of Land Conservation and Development. The contents of this document do not necessarily reflect the views or policies of the State of Oregon.

Potential Change Middle Housing

Per the IBTER requirements, the City performed an analysis of potential infill areas that could allow for middle housing. As defined in the rule-making, Cities can plan for a one percent increase in the "number of dwelling units produced due to middle housing allowances within specified residential zones." For transportation planning purposes, the TPR requires that we compare the vehicular trip making associated with the additional one percent growth in housing to that evaluated as part of the "baseline," which was assessed for the purposes of establishing the needs, deficiencies and projects identified in the City's Transportation System Plan (TSP).

In accordance with the IBTER requirements, the City identified eight areas of the City where infill residential development could occur. These areas and the baseline housing units as well as the anticipated increase in housing units is summarized in Table 1.

Table 1. Potential Housing Increase

Area	Existing Dwelling Units	Anticipated Increase in Dwelling Units*
Areas South of Downtown		
South Single Family	914	10
South Multi-Family	428	5
South Duplex	126	2
South Triplex	21	1
South Quadplex	32	1
Total South Area	1,521	19
Areas North of Downtown		
North Single Family	170	2
North Multi-Family	0	0
North Duplex	6	1
Total North Area	176	3
Total Housing		
Total North and South	1,697	22

*Rounded to the nearest dwelling unit.

Potential Trip Generation Impacts

To assess the TPR-related impacts associated with 22 potential new middle housing dwelling units, we calculated the anticipated trip generation of each of the potential areas in accordance with the single family housing rates provided in the *Trip Generation Manual, 10th Edition,* as published by the Institute of Transportation Engineers. Table 2 compares the potential increase in daily trips for each of the identified infill areas whereas Table 3 presents the new weekday AM and PM peak hour trips that could result from the middle housing.

Table 2. Potential Increase in Vehicular Trips

Area	Existing Dwelling Units	Anticipated Increase in Dwelling Units	ITE Land Use Code	Existing Baseline Daily Trips	Increase In Daily Trips	Percent Increase
Areas South of Downtown						
South Single Family	914	10	210	8,628	94	1.1%
South Multi-Family	428	5	210	4,040	48	1.2%
South Duplex	126	2	210	1,190	18	1.5%
South Triplex	21	1	210	198	10	5.1%
South Quadplex	32	1	210	302	10	3.3%
Total South Area	1,521	19	210	14,358	180	1.3%
Areas North of Downtown						
North Single Family	170	2	210	1,604	18	1.1%
North Multi-Family	0	0	210	0	0	N/A
North Duplex	6	1	210	56	10	17.9%
Total North Area	176	3	210	1,662	28	1.7%
Total Housing						
Total North and South	1,697	22	210	16,020	208	1.3%

Table 3. Potential Additional Peak Hour Trip-Making

Area	Anticipated Increase in Dwelling Units	Weekday AM Peak Hour Trip Increase			Weekday PM Peak Hour Trip Increase		
		Total Trips	In	Out	Total Trips	In	Out
Areas South of Downtown							
South Single Family	10	7	2	5	10	6	4
South Multi-Family	5	4	1	3	5	3	2
South Duplex	2	1	0	1	2	1	1
South Triplex	1	1	0	1	1	1	0
South Quadplex	1	1	0	1	1	1	0
Total South Area	19	14	4	10	19	12	7
Areas North of Downtown							
North Single Family	2	1	0	1	2	1	1
North Multi-Family	0	0	0	0	0	0	0
North Duplex	1	1	0	1	1	1	0
Total North Area	3	2	1	1	3	2	1
Total Housing							
Total North and South	22	16	4	12	22	14	8

As shown in Table 3, the potential city-wide increase in peak hour trip making is less than 22 vehicles per hour. Given that the infill areas are dispersed both north and south of downtown and will use a variety of collector and arterial streets for their travel, we conclude that no one intersection will experience a measurable increase in trips. As such, the proposed middle housing does not constitute a "significant impact" on transportation facilities and the facilities identified in the City's TSP are adequate to support the potential middle housing.

Summary of TPR Criteria

OAR Section 660-12-0060 of the TPR sets forth the relative criteria for evaluating plan and land use regulation amendments. Table 4 summarizes the criteria in Section 660-012-0060 and the applicability to the proposed middle housing provisions.

Table 4. Summary of Criteria in OAR 660-012-0060

Section	Criteria	Applicable?
1	Describes how to determine if a proposed land use action results in a significant effect.	Yes
2	Describes measures for complying with Criteria #1 where a significant effect is determined.	No
3	Describes measures for complying with Criteria #1 and #2 without assuring that the allowed land uses are consistent with the function, capacity and performance standards of the facility.	No
4	Determinations under Criteria #1, #2, and #3 are coordinated with other local agencies.	Yes
5	Indicates that the presence of a transportation facility shall not be the basis for an exception to allow development on rural lands.	No
6	Indicates that local agencies should credit developments that provide a reduction in trips.	No
7	Outlines requirements for a local street plan, access management plan, or future street plan.	No
8	Defines a mixed-use, pedestrian-friendly neighborhood.	No
9	A significant effect may not occur if the rezone is identified on the City's Comprehensive Plan and assumed in the adopted Transportation System Plan.	No
10	Agencies may consider measures other than vehicular capacity if within an identified multimodal mixed-use area (MMA).	No
11	Allows agencies to override the finding of a significant effect if the application meets the balancing test.	No

As shown in Table 4, there are eleven criteria that apply to Plan and Land Use Regulation Amendments. Of these, only Criteria #1 and #4 are applicable to the proposed middle housing provision. These criteria are provided below in italics with our response shown in standard font.

> *OAR 660-12-0060(1) If an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation (including a zoning map) would significantly affect an existing or planned transportation facility, then the local government must put in place measures as provided in section (2) of this rule, unless the amendment is allowed under section (3), (9) or (10) of this rule. A plan or land use regulation amendment significantly affects a transportation facility if it would:*
>
> > *(a) Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors in an adopted plan);*
> >
> > *(b) Change standards implementing a functional classification system; or*

(c) Result in any of the effects listed in paragraphs (A) through (C) of this subsection based on projected conditions measured at the end of the planning period identified in the adopted TSP. As part of evaluating projected conditions, the amount of traffic projected to be generated within the area of the amendment may be reduced if the amendment includes an enforceable, ongoing requirement that would demonstrably limit traffic generation, including, but not limited to, transportation demand management. This reduction may diminish or completely eliminate the significant effect of the amendment.

(A) Types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;

(B) Degrade the performance of an existing or planned transportation facility such that it would not meet the performance standards identified in the TSP or comprehensive plan; or

(C) Degrade the performance of an existing or planned transportation facility that is otherwise projected to not meet the performance standards identified in the TSP or comprehensive plan.

Response: The potential for middle housing in the infill areas has the potential to result in a 22 vehicles per hour increase city-wide during the PM peak hour. Given that the infill areas are dispersed both north and south of downtown and will use a variety of collector and arterial streets for their travel, we conclude that no one intersection will increase a measurable increase in trips and there is no significant impact on any facility. Further, the potential new housing is located in residential areas and therefore the street classifications remain appropriate for the land use designations. Finally, the insignificant increase in trip-making does not degrade the performance relative to the conditions anticipated in the TSP. Therefore, this criterion is met and there is no significant impact.

OAR 660-12-0060 (4) Determinations under sections (1)–(3) of this rule shall be coordinated with affected transportation facility and service providers and other affected local governments.

Response: The City of Newberg is coordinating the IBTER analysis with the state of Oregon. As such, this criterion is met.

Based on our review, the potential for middle housing does not result in any significant impacts on the transportation system, as defined by Oregon's Transportation Planning Rule (TPR) and as such, no IBTER extension related to transportation is needed. Please let us know if you have any questions regarding our analysis.

HBH CONSULTING ENGINEERS

MEMORANDUM

501 E First Street Newberg, Oregon 97132 | Ph. 503-554-9553 | Fax 503-537-9554

Date: **September 29, 2020** Project Number: **2020-014**
To: **Brett Musick, PE - Senior Engineer, City or Newberg**
From: **Andrey Chernishov, PE**
RE: **Stormwater IBTER Tech Memo**

This project is funded by Oregon general fund dollars through the Department of Land Conservation and Development. The contents of this document do not necessarily reflect the views or policies of the State of Oregon.

Introduction

The purpose of this technical memo is to assist the City of Newberg in the implementation of House Bill 2001 and House Bill 2003 and prepare an Infrastructure-Based Time Extension Request by statutory deadlines identified in House Bill 2001.

The City of Newberg will adopt regulations that will allow for the development of duplexes on lots zoned for residential use and continue to allow for the development of detached single-family dwellings. The City will also adopt regulations to allow for the development of duplexes and other middle housing types on lots in areas zoned for residential use that allow for the development of detached single-family dwellings.

The allowance of duplexes and other types of middle housing on lots zoned for residential development will likely have significant impact on existing infrastructure, as increases in housing types will lead to increases in density. To ensure the best livability in the City, it is important to consider the needed upgrades to existing infrastructure and identify areas that will see increased development in the future.

Through the allowance of middle housing in areas zoned for residential development and the identification of infrastructure constraints, the City will be able to address the needed housing types for residents at all income levels.

This technical memo will identify the stormwater infrastructure constraints around the downtown Newberg area in order to ensure these areas will be able to handle the increases in density allowed by HB 2001. The City of Newberg has identified two areas that may require upgrades to the existing infrastructure. The North Blocks area includes land just north of downtown Newberg up to the rail line that runs through the City and over to N Meridian Street as shown in Figure 1.

Figure 1: IBTER North Blocks of Newberg



The South Block area includes land just south of downtown Newberg from Chehalem Creek and railroad line intersection to the WestRock line and over to Hess Creek as shown in Figure 2. These areas are zoned predominantly R-1, R-2, and R-3, with very small portions zoned M-1, M-2, I, and C-1.

Figure 2: IBTER South Blocks of Newberg



Existing Dwelling Units and 1% IBTER EDU Increase

Per the Oregon Administrative Rules (OAR) 660-046, for IBTER the infill and redevelopment areas may assume a one percent increase in the number of dwelling units from the existing, applicable dwelling units. The City identified existing, applicable dwelling units within the areas identified for infill or redevelopment increases in density proposed by HB 2001 and HB 2003 (Figures 1 and 2). There were no undeveloped or underdeveloped areas identified by the City to be impacted by the proposed developments from HB 2001 and 2003. The existing dwelling units and 1% increase in equivalent dwelling units (EDU) for the areas identified are summarized in Table 1. EDU's have been rounded up to the nearest integer.

Table 1: Existing Dwelling Units And 1% IBTER EDU Increase

Area	Existing # of Dwelling Units	IBTER 1% Increase (EDU, rounded)
South Single Family	914	10
South Multi	428	5
South Duplex	126	2
South Triplex	21	1
South Fourplex	32	1
South Subtotal	**1,521**	**19**
North Single Family	170	2
North Multi	-	-
North Duplex	6	1
North Subtotal	**176**	**3**
Total	**1,697**	**22**

Infrastructure-Specific Application Thresholds

According to OAR 660-046-0340, the City may use the following circumstances to justify a stormwater-based IBTER:

(a) Lack of stormwater infrastructure, or adequately-sized stormwater infrastructure, such as storm drainage pipes, curb and gutters, catch basins and inlets, lateral storm connections, regional stormwater facilities, and discharge outfalls that results in not meeting an acceptable service level. An acceptable service level may include metrics for water quantity discharge, water quality, or both.

(b) A downstream stormwater conveyance system deficiency, resulting in localized ponding or flooding and storm pipe back-ups caused by pipes, culverts, or catch basins in disrepair; these problems may be compounded by high groundwater; compacted underlying soils; or backwater from nearby waterways during high flows; any of which that results in not meeting an acceptable service level.

Description of Stormwater Infrastructure Deficiencies

This section describes the significant stormwater infrastructure deficiencies via narrative, graphics, and tabular data within the two identified areas in the City of Newberg.

Description, Capacity, & Service Level

The current adopted City of Newberg 2014 Stormwater Master Plan (SWMP) is utilized in this tech memo. According to Section 3.2 "Evaluation Criteria" of the City of Newberg 2014 SWMP, the following evaluation criteria was utilized to establish service levels for the stormwater system.

At the time of the 2014 SWMP, the City was using the 2010 Standard Design Manual, so that manual was referenced for establishing the design standards for evaluating the capacity of the stormwater infrastructure. Section 4 of the City's 2010 Standard Design Manual included design requirements for storm drainage systems in Newberg. In the 2014 SWMP the existing and future storm drainage pipe network was evaluated for capacity based on the following conditions:

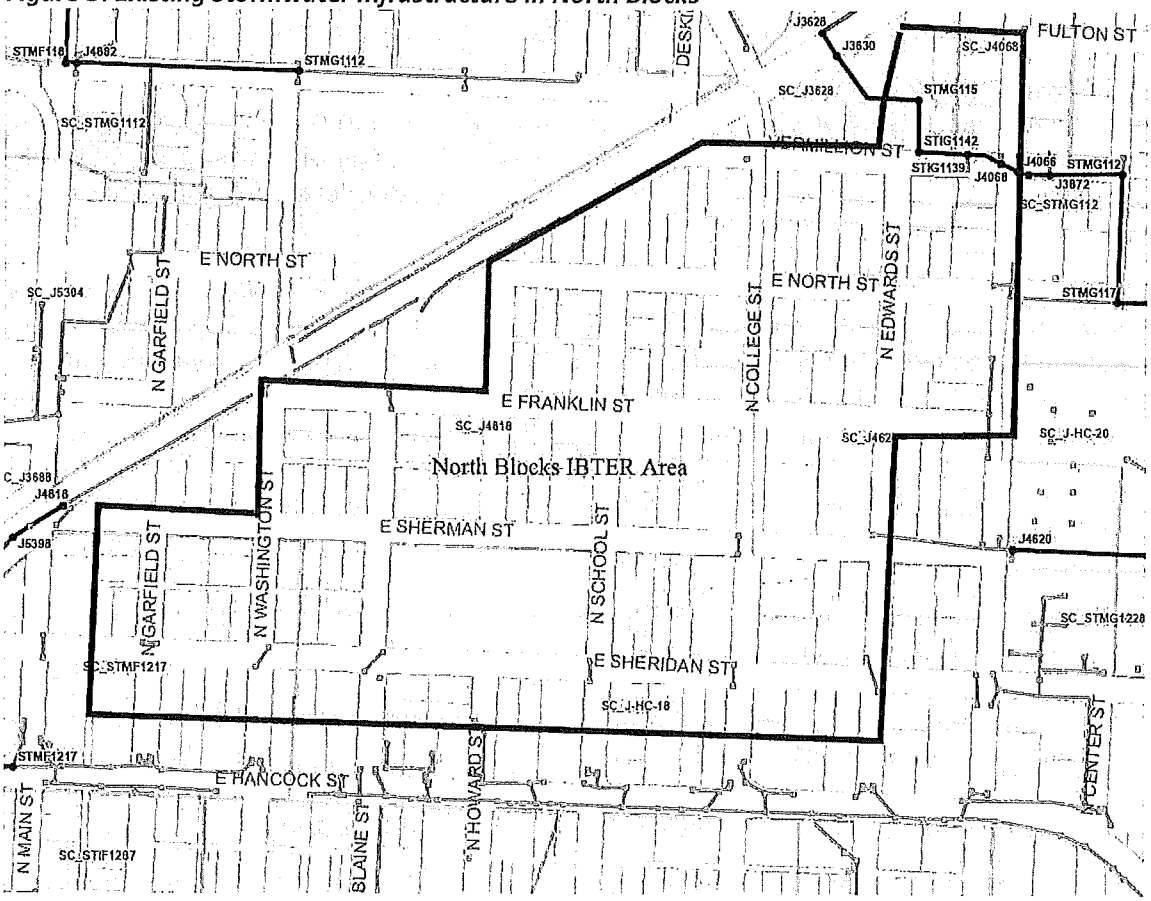
- Minor drainage system elements (streets, curbs, gutters, inlets, catch basins, and collector drains): Capacity for the 10-year design storm.
- Major laterals (laterals and collectors with less than 250 acres tributary area): Capacity for the 10-year design storm.
- Major trunk lines (trunk lines with greater than 250 acres of tributary area and drainage systems under arterial streets): Capacity for the 50-year design storm.
- Culverts on creek systems: Capacity for the 50-year design storm.

For the purpose of evaluating the capacity of the existing and future storm drainage infrastructure in the 2014 SWMP, flooding was defined as any surcharge over the rim elevation of a manhole or above the bank elevation of open channels. Minor flooding is defined as flooding that occurs for less than 2-hours during the peak 24-hour design storm. Major flooding is defined as flooding that occurs for more than 2-hours during the peak 24-hour design storm.

During the development of 2014 SWMP, the City was in the process of updating the Stormwater Design Standards. The current 2015 standards included a change to using the 25-year, 24-hour design storm for sizing stormwater pipes conveying water from drainage areas less than 250 acres in size. The 2014 SWMP capital improvement projects (CIPs) in drainage areas less than 250 acres have been sized for the 25-year design storm.

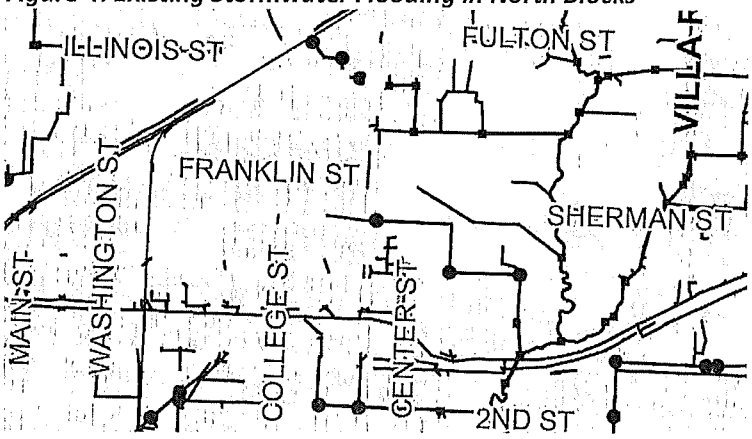
The existing stormwater infrastructure in the North Blocks area is shown in Figure 3. Most the North Blocks area does not have an existing stormwater collection system, such as catch basins, inlets, and storm pipes. This results in localized ponding and flooding of streets during 25-year storm events.

Figure 3: Existing Stormwater Infrastructure in North Blocks



The 2014 SWMP shows modelled stormwater pipes in the North Blocks area have capacity issues, which result in flooding at the 10-design storm service level (see Figure 4). The flooding occurs along Vermillion St between manhole STMG115 and J4068 located between N Edwards St and N Meridian St. The yellow dots represent flooding that lasts less than one hour, and the reds dots represent flooding that lasts more than one hour.

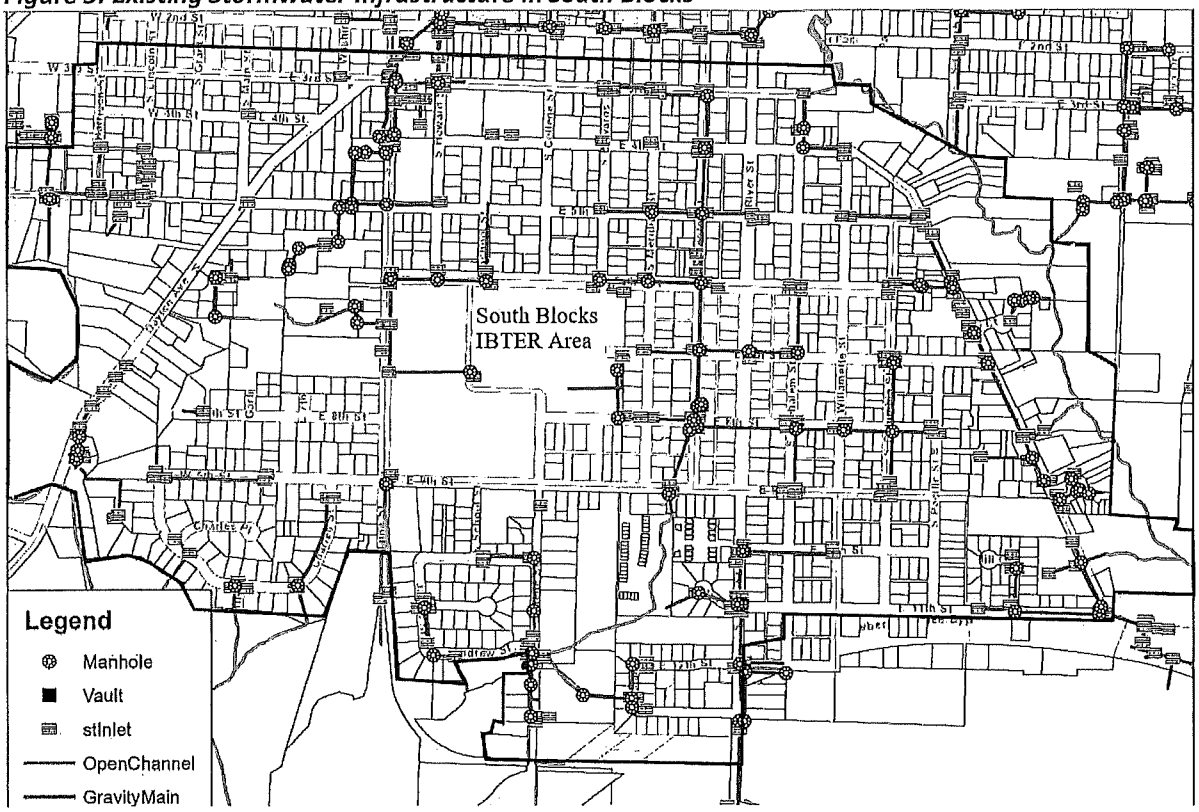
Figure 4: Existing Stormwater Flooding in North Blocks



In addition, the 2014 SWMP documents the lack of a stormwater collection system (catch basins and storm pipes) along N Edwards St between E Sheridan St and Vermillion St. The lack of a stormwater collection system extends one block west from N Edwards St along the following streets: E Sheridan St, E Sherman St, E Franklin St, E North St, and E Vermillion St.

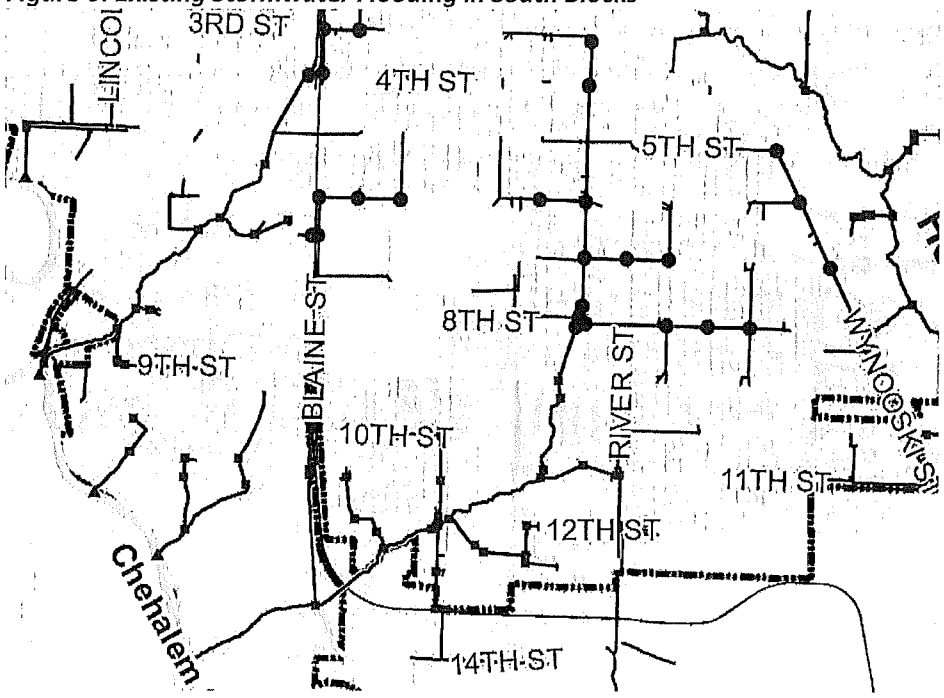
The existing stormwater infrastructure in the South Blocks is shown in Figure 5.

Figure 5: Existing Stormwater Infrastructure in South Blocks



The 2014 SWMP shows modelled stormwater pipes in the North Blocks area have capacity issues, which result in flooding at the 10-design storm service level (see Figure 6). Flooding occurs throughout the South Blocks as shown in the figure. The yellow dots represent flooding that lasts less than one hour, and the reds dots represent flooding that lasts more than one hour.

Figure 6: Existing Stormwater Flooding in South Blocks



According to Section 4.6 of the City of Newberg 2015 Public Works Design and Construction Standards, any development that creates more than 500 sq ft of net new impervious area requires stormwater quantity and quality facilities improvements. This requirement also applies to duplexes and other types of middle housing on lots zoned for residential development.

According to Section 4.6 of the City of Newberg 2015 Public Works Design and Construction Standards, any development that creates more than 500 sq ft of net new impervious area requires stormwater quantity on-site detention facilities designed to capture runoff so the post-development runoff rates from the site do not exceed the predevelopment runoff rates from the site, based on 24-hour storm events ranging from the ½ of the 2-year return storm to the 25-year return storm. Specifically, the ½ of the 2, 2, 10, and 25-year post-development runoff rates will not exceed their respective ½ of the 2, 2, 10, and 25-year pre-development runoff rates.

Most new developments, including duplexes and other types of middle housing on lots zoned for residential development will be required to detain stormwater runoff to pre-developed peak flow rates and treat stormwater. Therefore, the existing capacity in the stormwater system will not be exceeded due to development, unless the system is currently under capacity.

Deficiency in Capacity

Certain locations within the two areas identified in Figures 1 and 2 have a lack of stormwater infrastructure, or adequately-sized stormwater infrastructure, such as storm drainage pipes, catch basins and inlets that results in not meeting an acceptable service level as documented in the adopted 2014 SWMP.

If the anticipated increase of 22 EDU's of middle housing developments all created a net new impervious area of just under 500 sq ft each, which is highly unlikely, the total net new impervious

area would equal 10,978 sq ft. This would be the worst-case scenario of not detained and untreated stormwater for middle housing in the two areas identified in Figures 1 and 2. This would result in a negligible and trivial impact on the existing stormwater system.

Therefore, stormwater infrastructure is not expected to exceed capacity based on additional impacts from middle housing development due to 1% IBTER EDU increases by December 31, 2023, based on current development trends.

Impacts of Additional Middle Housing

A significant stormwater infrastructure deficiency is not expected to be caused only by additional middle housing development in the two areas identified in Figures 1 and 2.

System Capacity Assumptions

The 2014 SWMP modeled current impacts on the existing stormwater pipe capacity by entering pipe diameter, slope, length, roughness coefficient, pipe invert elevation, and ground elevation into a computer model to simulate hydraulic conditions at the 10-year design storm event. The modeling results were reviewed with City staff and compared to known flooding problems reported by the City's maintenance crews. Anecdotal accounts of flooding were generally consistent with the locations where flooding occurred in the modeled system.

Documented Deficiencies

The adopted 2014 SWMP has documented multiple deficiencies in the North and South Blocks of Newberg (see Figures 7 & 8). Each deficiency is described in Table 2.

Figure 7: Reported Stormwater Deficiencies in North Blocks

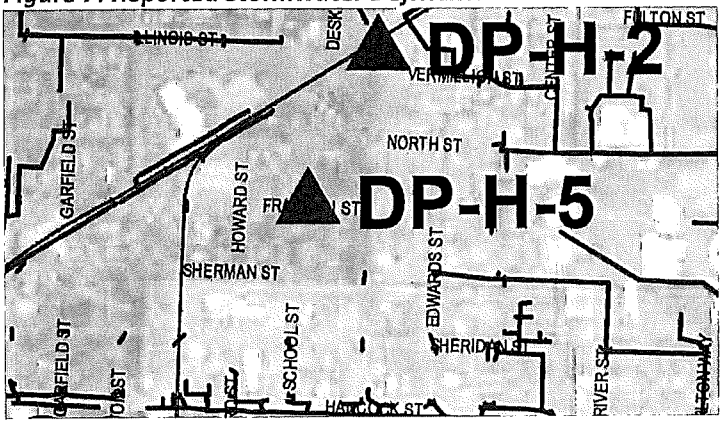


Figure 8: Reported Stormwater Deficiencies in South Blocks

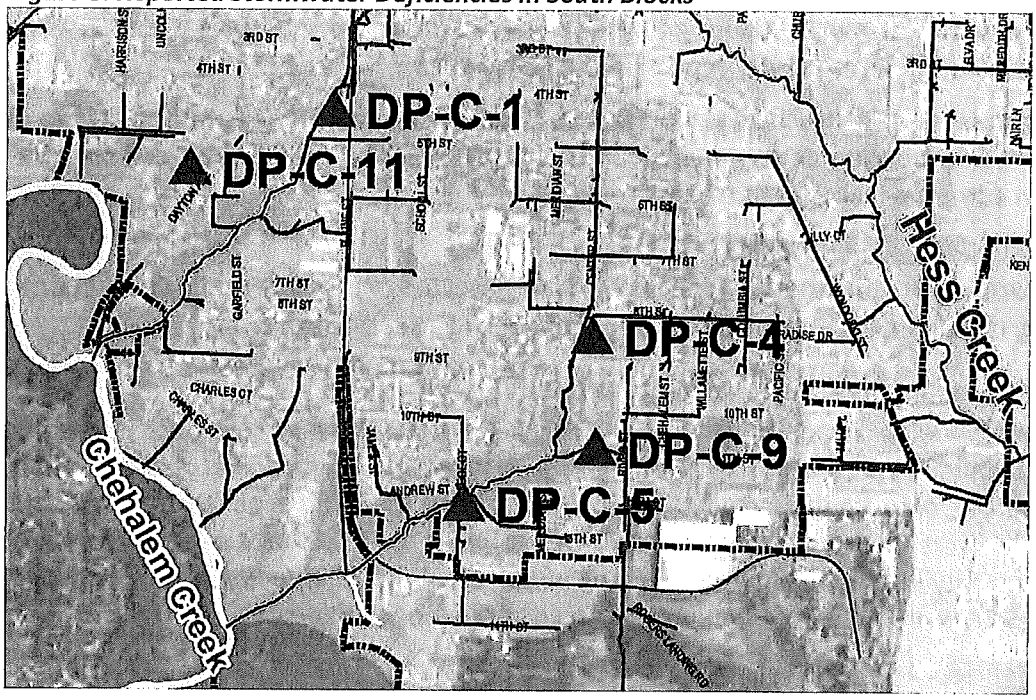


Table 2: 2014 SWMP Problem Area Descriptions in North and South Blocks

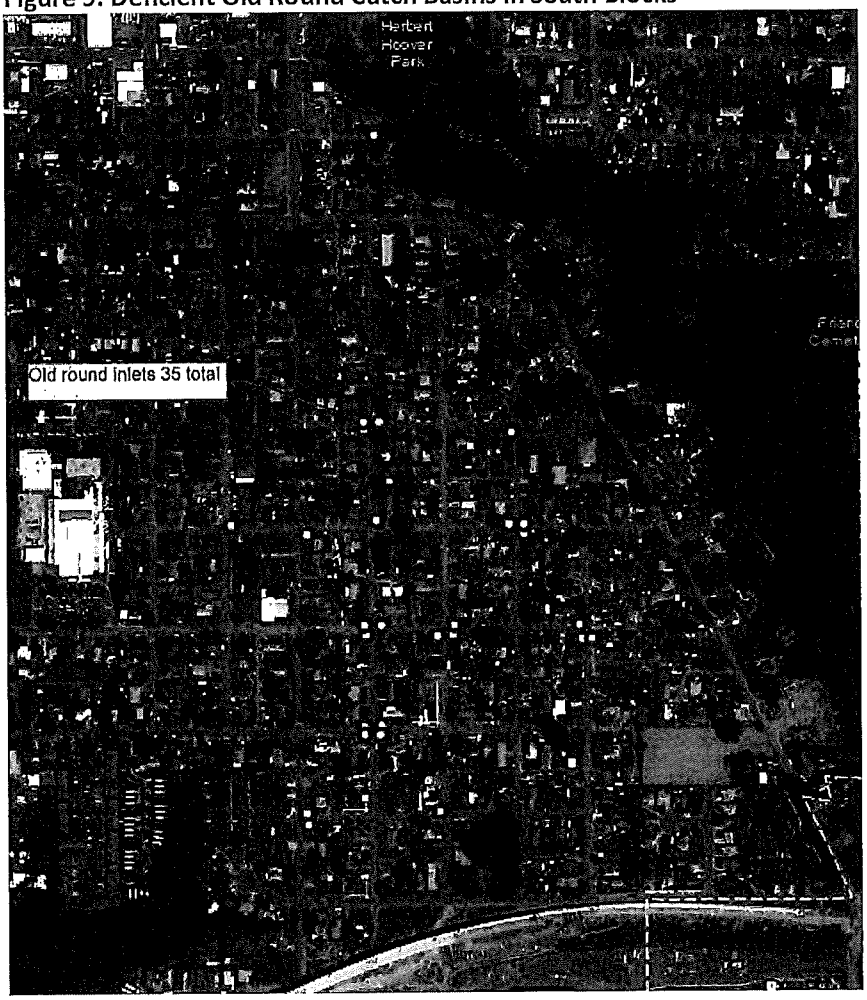
Identifier	Location	Problem description
DP-C-1	Near 5th and Blaine Streets	Hollingsworth drain is CMP/concrete; has roots; is 30' deep, under houses, and failing. When it fails/plugs, all of downtown storm system fails.
DP-C-1	Hollingsworth Storm Line	12" storm line under 5th Street needs realignment.
DP-C-1	Blaine/Hollingsworth	Failed pipe - 18" tin whistle.
DP-C-4	Between 8th and 9th Streets near Center Street	Flat sloped pipe runs under house on private property; needs to be rerouted.
DP-C-5	Natural system crossing College Street, south of Andrew Street	Steep ravine; multiple pipe materials; potential to collapse and fail.
DP-C-5	College Street south of Andrew Street	Existing pipe system under College Street is composed of multiple pipe materials, causing ongoing maintenance problems and concerns over long-term stability.
DP-C-9	9th and River Streets, southeast Corner	Roadway floods 10-12' radius around catch basin.
DP-C-9	S River Street and 11th Court	Two clay sewer tile pipe segments are deteriorating and require replacement. Replacement should be sized to convey future flows.
DP-C-11	Dayton Avenue near Johanna Court	Roadway drainage flows into driveways and causes minor damage of driveways and sidewalk. Report confirmed by maintenance staff.
DP-H-2	Vermillion Street between College Street and railroad tracks	Undersized and flat pipe discharges to tracks with no fall. (Note: GIS data do not show a pipe in this area.)
DP-H-2	College and Vermillion Streets	Intersection ponding
DP-H-2	College and Vermillion Streets	Gravel street area floods.
DP-H-5	College and Franklin Streets	Intersection ponding
DP-H-5	College and Sherman Streets	Bubbler backs up

The current City of Newberg Capital 5-Year Improvement Program (2020-2025) documents other significant infrastructure deficiencies not identified in the 2014 SWMP. Those deficiencies include the following:

- Stormwater pipe and outfall has severely eroded the area east of NE Wynooski Street near the 800 block of NE Wynooski St. This project is located within the South Blocks of Newberg. This project would extend the outfall further down the slope to reduce erosion. The City has budgeted $225,000 for the 2020-2021 fiscal year to complete this project.

- Old round catch basins located within the South Blocks of Newberg frequently plug up with debris during small rainstorms and flood road intersections (see Figure 9). The City has budgeted $375,000 for improving these deficient catch basins for the 2020-2024 fiscal years.

Figure 9: Deficient Old Round Catch Basins in South Blocks



Impacted Areas

Vicinity Map

Figures 10 and 11 are vicinity maps showing the boundary of the impacted areas for which the stormwater IBTER is requested.

Figure 10: Boundary of Stormwater Impacted Areas in North Blocks

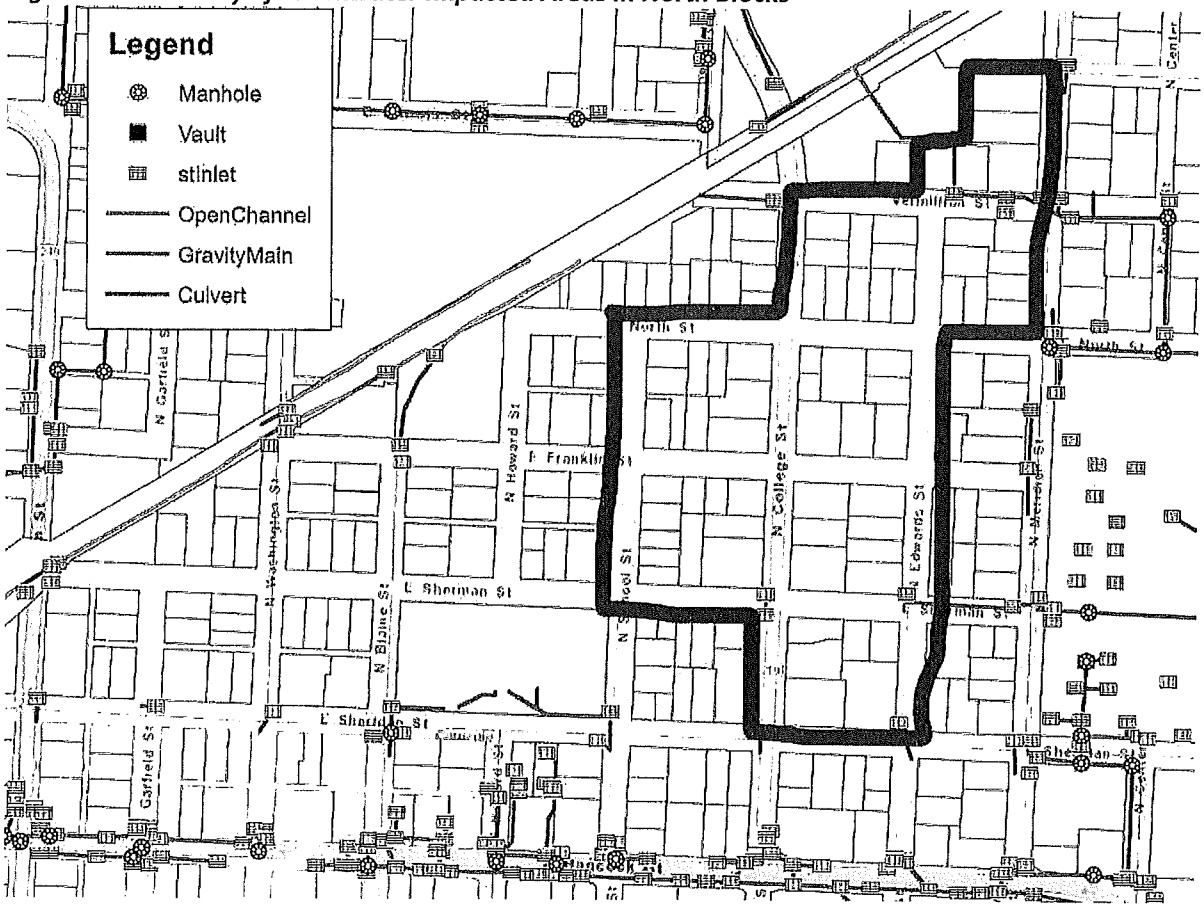
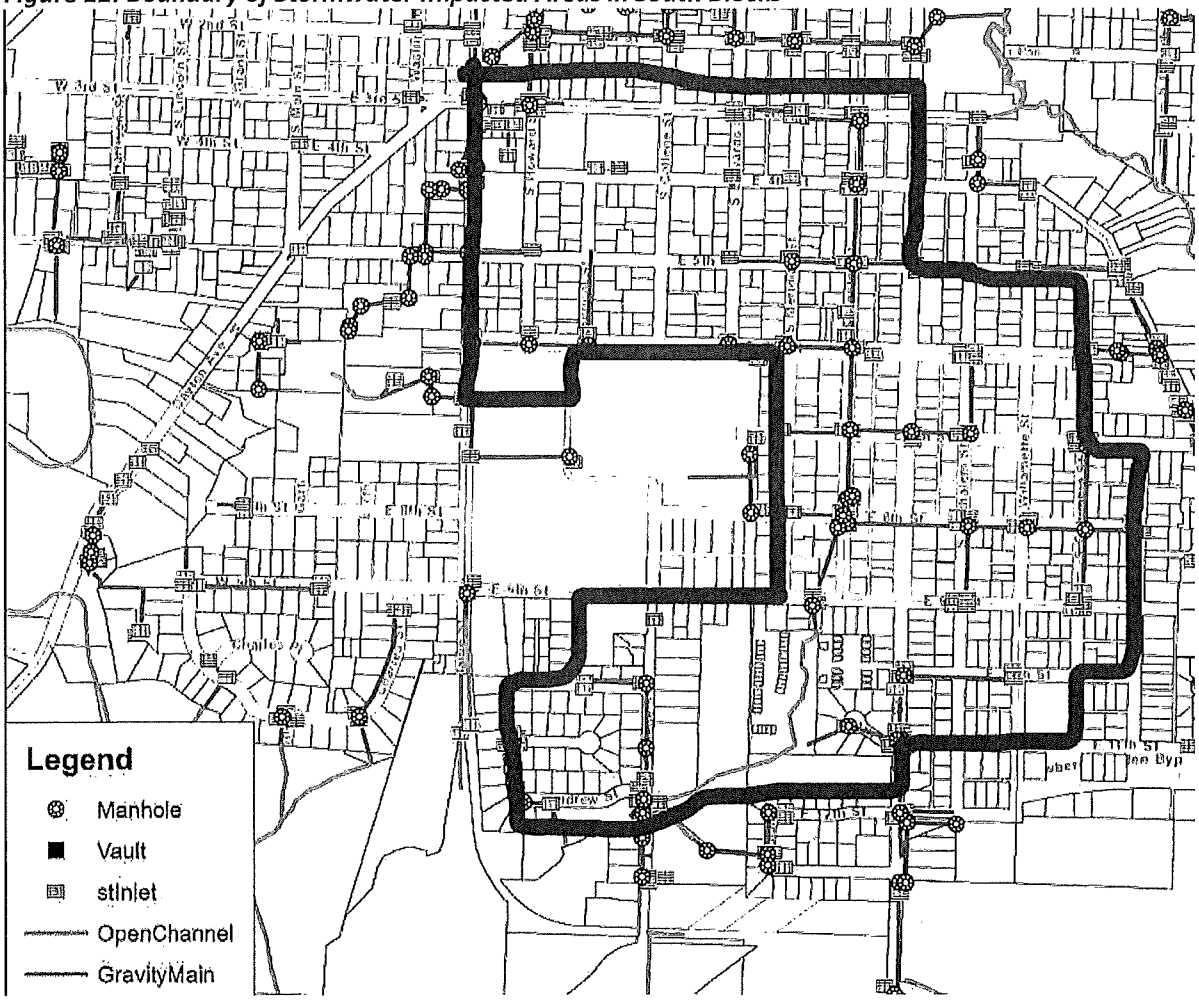


Figure 11: Boundary of Stormwater Impacted Areas in South Blocks



Remediation/Capital Improvement Plan

The remediation/capital improvement plan describes proposed infrastructure improvements intended to remedy the significant infrastructure deficiencies to allow the City to implement middle housing provisions.

Timeline

According to the adopted 2014 SWMP the proposed period of time needed to address the significant infrastructure deficiencies vary from 6 to 20 years, including phasing and contingencies.

Alternatives to Address Deficiencies

The 2014 SWMP considered several alternatives/options to address the modeled and documented significant stormwater infrastructure deficiencies. The proposed capital improvements are the most expeditiously feasible approach available to address the deficiencies. Various constraints such as topography, minimum pipe slope, minimum pipe cover, and ability to obtain public easements the alternatives/options to address the deficencies are limited. The most cost effective and expeditious alternatives were selected to address the deficencies.

Benefits of Improvement Projects for Middle Housing

The proposed stormwater capital improvements in 2014 SWMP will provide acceptable service levels to anticipated middle housing by eliminating flooding at the 25-year storm event. The proposed capital improvements will allow development of anticipated middle housing without causing flooding.

Potential Funding Sources

Two potential funding sources for the proposed remediation and capital improvement plan are the Stormwater Utility Rates and System Development Charges (SDCs) on new development.

Map of Areas Improved by Projects

Figure 12 shows the North Block areas that will be remedied by the proposed 2014 SWMP Capital Improvement Plan. The adopted CIP improvements in the North Blocks area include H-2: N Edwards St Improvements.

Figure 12: 2014 SWMP Capital Improvement Plan in North Blocks

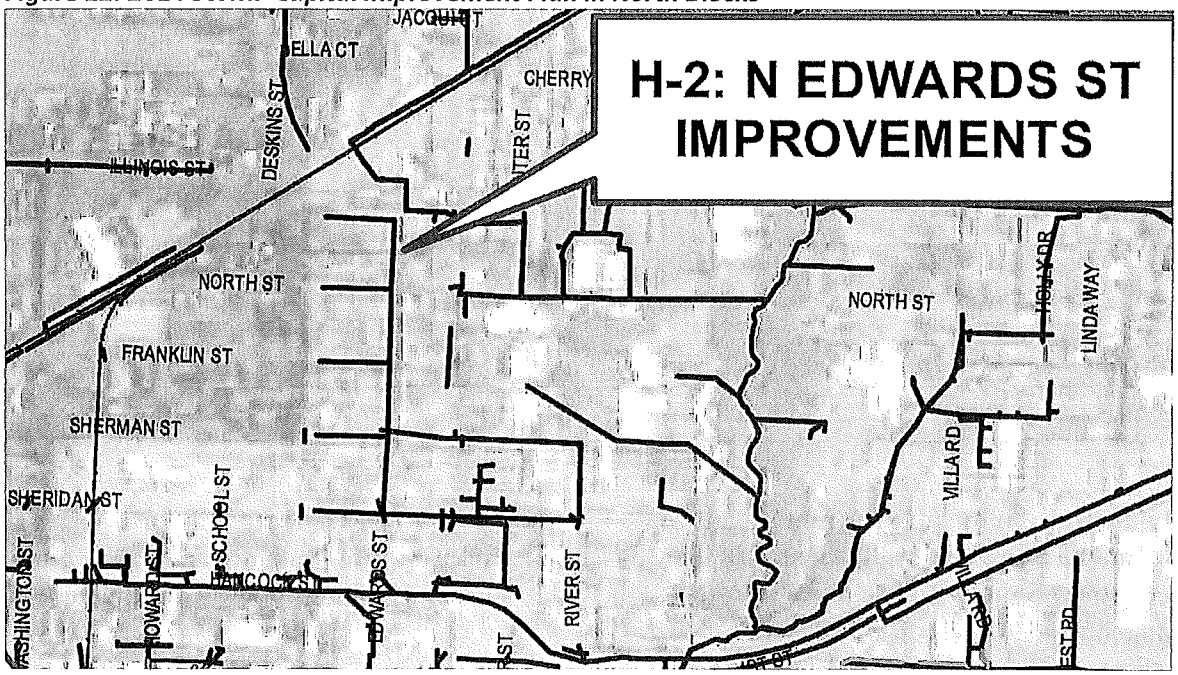
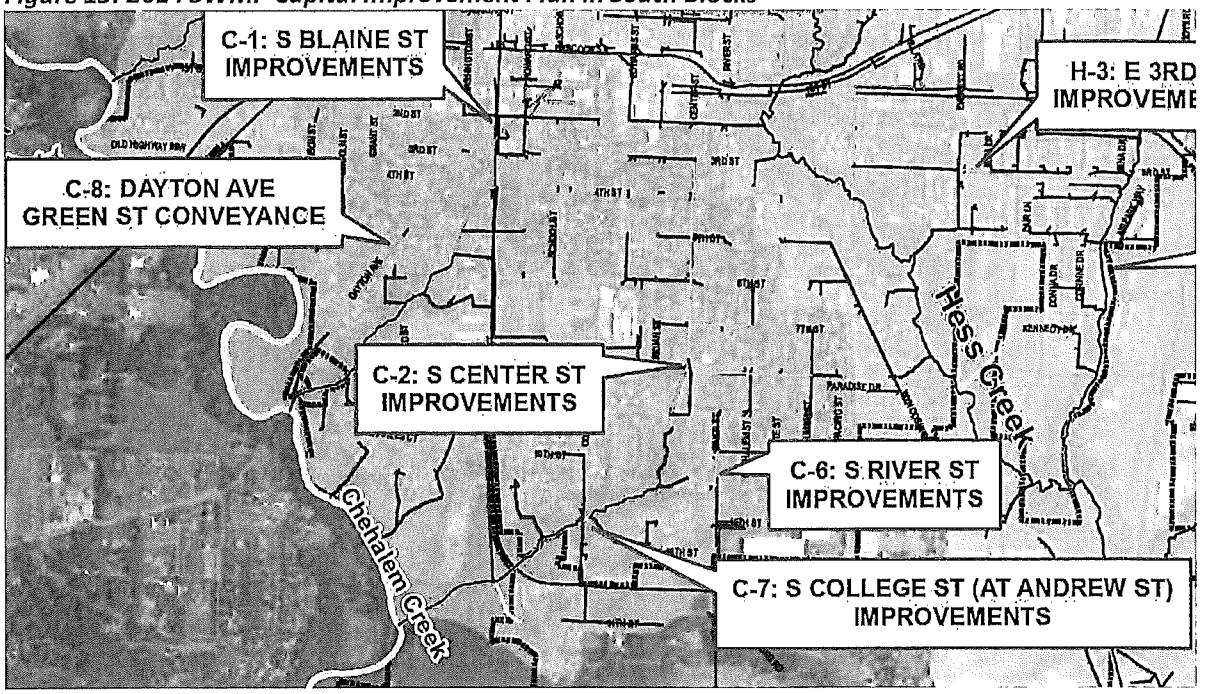


Figure 13 shows the South Block areas that will be remedied by the proposed 2014 SWMP Capital Improvement Plan. The adopted CIP improvements in the South Blocks area include C-1: S Blaine St Improvements, C-2: Center St Improvements, C-6: S River St Improvements, C-7: S College St (At Andrews St) Improvements, and C-8: Dayton Ave Green St Conveyance. It should be noted that a portion of S Blaine St Phase One Improvements have been completed in 2018 south of 401 S Blaine St.

Figure 13: 2014 SWMP Capital Improvement Plan in South Blocks



Timeline of Remediation Plan

According to the 2014 SWMP the proposed timeline and cost of the capital improvement projects located within the South and North Blocks of Newberg are shown in Table 3.

Table 3: 2014 SWMP Capital Improvement Project Cost and Timeline

CIP #	Capital Improvement Project Name	Cost	Estimated timeline
C-1	Blaine Street Improvements - Design	$ 180,000	Short-term (within 6 years)
C-1A	Highway 99W to 2nd Street Parking Lot Pipe Decommissioning/Replacement	$ 131,000	Short-term (within 6 years)
C-1B	S Blaine Street Pipe Replacement	$ 384,000	Short-term (within 6 years)
C-1C	E 2nd Street to E 5th Street Pipe Decommissioning/Replacement	$ 291,000	Short-term (within 6 years)
C-1D	E 6th and S Blaine Streets Pipe Replacement	$ 176,000	Long-term (within 20 years)
C-2	S Center Street Improvements - Design	$ 180,000	Short-term (within 6 years)
C-2A	E 9th Street to S Center Street Pipe Decommissioning	$ 294,000	Short-term (within 6 years)
C-2B	S Center, E 8th, and E 7th Streets Pipe Replacement	$ 930,000	Long-term (within 20 years)
C-6	S River Street Improvements	$ 160,000	Short-term (within 6 years)
C-7	S College Street at Andrew Street Improvements	$ 196,000	Long-term (within 20 years)
C-8	Dayton Avenue Green Streets	$ 125,000	Mid-term (within 12-years)
H-2	N Edwards Street Improvements	$1,217,000	Long-term (within 20 years)

Middle Housing in Other Areas

Middle housing is expected to be implemented in all other areas outside of the IBTER areas during the extension period.

Bond Measure

If the City proposes a bond measure or similar financial mechanism that requires voter approval as a means to fund an infrastructure improvement project, the City may prepare a contingency plan for funding the infrastructure improvement.

KELLER ASSOCIATES

Technical Memorandum

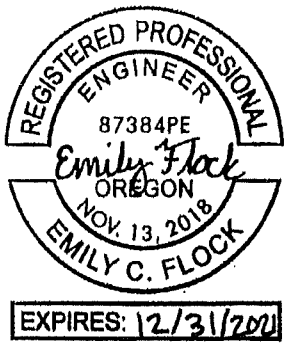
TO: Brett Musick, PE
Project Manager
City of Newberg

FROM: Peter Olsen, PE
Emily Flock, PE

DATE: September 29, 2020

This project is funded by Oregon general fund dollars through the Department of Land Conservation and Development. The contents of this document do not necessarily reflect the views or policies of the State of Oregon.

SUBJECT: **Middle Housing Infrastructure-Based Time Extension Request (IBTER) – Wastewater Infrastructure Evaluation**



BACKGROUND AND PURPOSE

The City of Newberg (City) will adopt regulations that will allow for development in accordance with House Bill 2001 (HB 2001) and House Bill 2003 (HB 2003). The purpose of this evaluation is to assist in the implementation of HB 2001 and HB 2003 by evaluating the potential impacts on the City's wastewater collection system for the Middle Housing Infrastructure-Based Time Extension Request (IBTER). The City intends to adopt regulations that will allow for the development of duplexes on lots zoned for residential use and continue to allow for the development of detached single-family dwellings. The City will also adopt regulations to allow for the development of duplexes and other middle housing types on lots in areas zoned for residential use that allow for the development of detached single-family dwellings.

The City has preliminarily identified areas that may require upgrades to the existing infrastructure. These areas include land just north of downtown up to the rail line that runs through Newberg and over to North Meridian Street (Figure 1, next page). Another identified area includes land just south of downtown from the Chehalem Creek and railroad line intersection to the West Rock line and over to Hess Creek (Figure 2, next page). This analysis evaluates wastewater conveyance capacities to handle the increases in density allowed by HB 2001 and HB 2003.

FIGURE 1: CITY-IDENTIFIED NORTH AREAS OF POTENTIAL UPGRADES

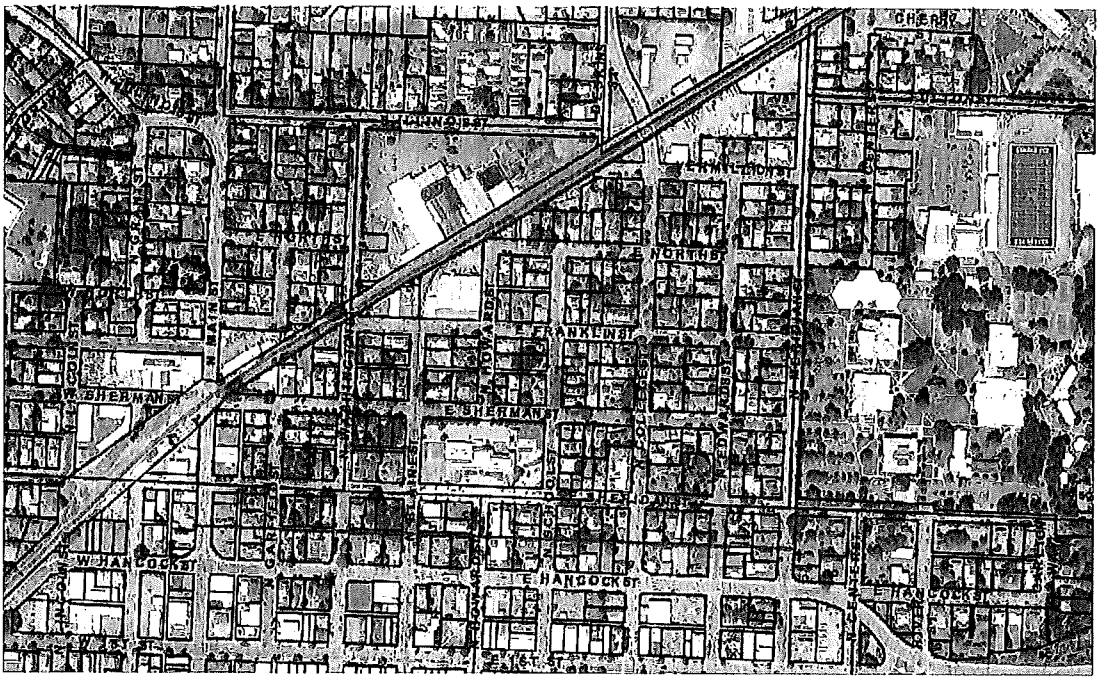
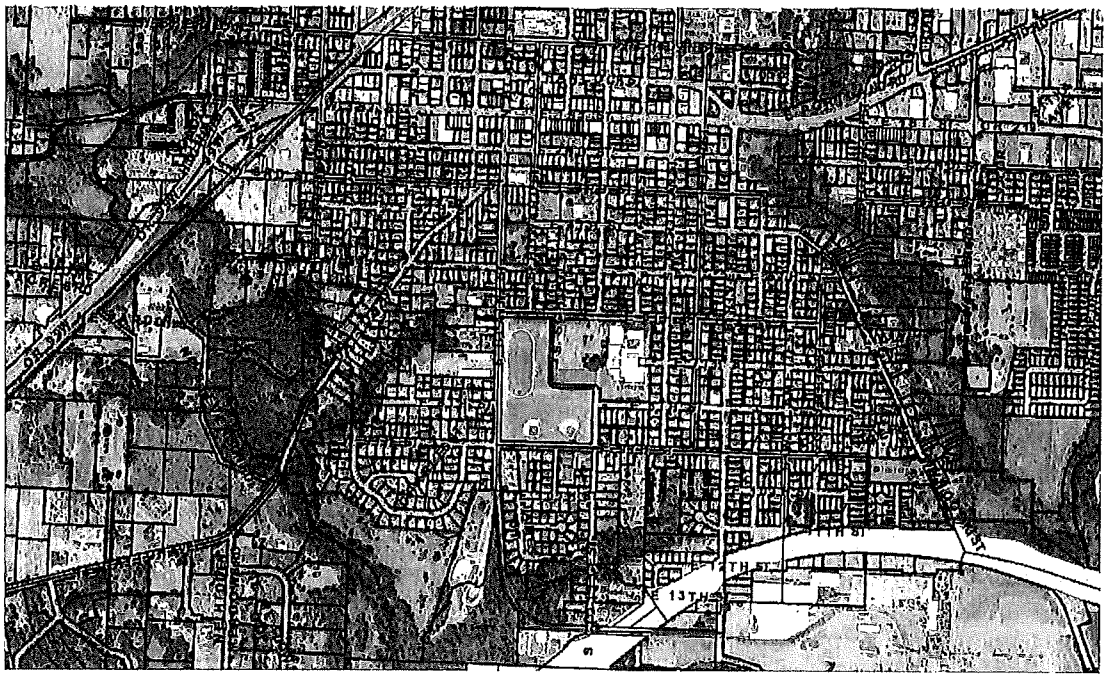


FIGURE 2: CITY-IDENTIFIED SOUTH AREAS OF POTENTIAL UPGRADES



PLANNING CRITERIA AND ESTIMATED SEWER FLOWS

Per the Oregon Administrative Rules (OAR) 660-046, for IBTER the infill and redevelopment areas may assume a one percent increase in the number of dwelling units from the existing, applicable dwelling units. The City identified existing, applicable dwelling units within the areas identified for infill or redevelopment increases in density proposed by HB 2001 and HB 2003 (Figures 1 and 2). There were no undeveloped or underdeveloped areas identified by the City to be impacted by the proposed developments from HB 2001 and 2003. The existing dwelling units and 1% increase in equivalent dwelling units (EDU) for the areas identified are summarized in Table 1. EDU's have been rounded up to the nearest integer.

TABLE 1: EXISTING DWELLING UNITS AND 1% IBTER EDU INCREASE

Area	Existing # of Dwelling Units	IBTER 1% Increase (EDU, rounded)
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North Subtotal	**176**	**3**
Total	**1,697**	**22**

As shown in Table 1, the additional development afforded from HB 2001 and HB 2003 is estimated to be only 22 EDU's. Criteria established in the 2018 Newberg Wastewater Master Plan (WWMP) were used to estimate the increase in base sewer flows from the potential development using number of EDU, people per EDU, and average dry weather flow allocation (ADWF). A peaking factor of system-wide flows from peak instantaneous flow (PIF) to ADWF was used to estimate the peak flow increase from the potential development. The peaking factor uses system planning flows from the 2018 WWMP. Table 2 summarizes the criteria from the master plan and estimated sewer base flow and peak flow increases from the potential development.

TABLE 2: ESTIMATED INCREASE IN SEWER FLOWS

Parameter/Criteria	Value
IBTER EDU Increase	22
People/EDU[1]	2.69
IBTER Population Increase	60
ADWF (gpcd)[1,2]	74
IBTER Base Flow Increase (gpd)	**4,440**
(gpm)	3.1
Peaking Factor (PIF : ADWF)[1,2]	12.3
IBTER Estimated PIF Flow Increase (gpd)	**54,800**
(gpm)	38

[1]Criteria from 2018 WWMP

[2]ADWF = avg. dry weather flow ; PIF = peak instantaneous flow

SYSTEM IMPACTS

The areas identified for potential development are served by the River Street sewer trunk line. The majority of the potential EDU and associated flows are in the southern area identified in Figure 2. This area connects to the River Street trunk line south of E 2nd Street. The lowest capacity segment of the River Street trunk line south of E 2nd Street to E 11th Street is approximately 1,800 gpm (2018 WWMP). The estimated potential increase in base flow and PIF from the IBTER development (Table 2) is minimal in comparison to the capacity of the trunk line. The base flow increase from the potential IBTER development is less than 0.2% of the lowest capacity segment of the trunk line and the potential peak flow increase is equivalent to 2% of the lowest capacity segment.

COMPARISON WITH MASTER PLAN

The 2018 WWMP identifies existing capacity issues on the River Street trunk line. The Capital Improvement Plan (CIP) project C.2.b recommends upsizing the existing trunk line on River Street from E 4th Street to E 11th Street, as well as additional improvements on E 11th Street and Wynooski Street, to alleviate capacity issues in the sewer basin. The increased flow from this analysis would not change the recommended future trunk line sizing and would have minimal impact in terms of recommended timing for the improvement.

CONCLUSIONS

There are existing capacity deficiencies identified in the 2018 WWMP on the River Street trunk line that serves the areas identified for potential infill and redevelopment with the implementation of HB 2001 and HB 2003. The estimated sewer flow increase from potential HB 2001 and HB 2003 development is minimal in comparison to the capacity of the River Street trunk line that serves the impacted areas. The potential change in development density is not anticipated to cause additional capacity issues in the sewer trunk lines as evaluated in the 2018 WWMP.

murraysmith

Technical Memorandum

Date: October 30, 2020

Project: Newberg Water Master Plan (WMP) Technical Update

To: Brett Musick, P.E.
City of Newberg Engineering

From: Heidi Springer, P.E.
Murraysmith

Re: Water system analysis results to inform Infrastructure Based Time Extension Request (IBTER) for Oregon House Bill 2001 (HB 2001) Missing Middle Housing

This project is funded by Oregon general fund dollars through the Department of Land Conservation and Development. The contents of this document do not necessarily reflect the views or policies of the State of Oregon.

Introduction and Purpose

This memo documents an analysis of the estimated impact of increased residential housing density on water system infrastructure in two areas of the City of Newberg (City). Increased housing density is anticipated as result of 2019 Oregon legislation, House Bill (HB) 2001 Missing Middle Housing, which requires updates to local laws throughout Oregon that currently limit the types of housing approved for construction in residentially zoned areas. The City will adopt regulations that will allow for the development of duplexes and other types of middle housing in areas zoned for residential development to comply with this legislation and address needed housing types for residents at all income levels.

This analysis was conducted to inform an Infrastructure-Based Time Extension Request (IBTER) as described in Oregon Administrative Rules (OARs) 660-046-0300 to 0370 which became effective August 7, 2020. An approved IBTER would grant the City additional time to comply with the requirements of HB 2001 Missing Middle Housing.

IBTER Study Areas

City staff identified two areas for infrastructure analysis to inform an IBTER:

- North of Downtown Newberg - up to the rail line that runs through Newberg to Hess Creek (**Figure 1**)
- South of Downtown Newberg - from the Chehalem Creek and railroad line intersection to the WestRock line and Hess Creek (**Figure 2**)

Water System Background

The existing Newberg water system is served almost entirely as a single pressure zone, Zone 1. Both IBTER study areas are in Zone 1. Zone 1 customers receive pressure from three finished water storage reservoirs, North Valley Reservoirs 1 and 2 north of downtown and Corral Creek Reservoir east of downtown. These reservoirs are filled through the distribution system pipe network by pumps at the City's Water Treatment Plant on the Willamette River near the former WestRock mill site. The WTP is supplied by the City's wellfield on the south side of the Willamette River across from the WTP.

In general, the City's distribution system runs at relatively high pressures with most customers receiving near 80 pounds per square inch (psi), which is the Oregon Plumbing Code service pressure maximum.

The City adopted the current Water Master Plan (WMP) in 2017. The current WMP identifies a single distribution main capital improvement program (CIP) project within the IBTER south study area, replacement of a 4-inch diameter main on Dayton Avenue to meet fire flow criteria (WMP CIP M-2).

Water System Hydraulic Analysis

Consistent with IBTER state guidelines, the following analysis considers fire flow availability and service pressure impacts, if any, resulting from increased density within the IBTER study areas. Required fire flow by land use type and acceptable service pressure ranges in the distribution system are as established in the 2017 WMP and summarized in the following paragraphs.

IBTER guidelines specify that only localized utility impacts, not system-wide impacts, should be evaluated in support of an IBTER, thus a Zone 1 storage and system-wide supply analysis are not examined in detail. In general, the City's existing Zone 1 storage and supply facilities have adequate surplus capacity, therefore a short-term storage or supply impact is not expected from increased density in these limited areas. Impacts to the distribution system piping to meet fire

flow and pressure criteria are understood to be only those improvements needed beyond what was recommended in the 2017 WMP, WMP CIP M-2.

A distribution system analysis was conducted using a steady-state hydraulic network analysis model developed and calibrated with field flow testing data for the 2017 WMP.

Water Demand

Water demands can be estimated using either water consumption billed to customers or finished water production recorded at the WTP. For planning purposes, water consumption from billing records is used to assign water use geographically throughout the water system model based on service address. However, water consumption data does not capture non-revenue water, such as minor leaks and maintenance uses like hydrant flushing for water quality. To account for non-revenue water uses, distributed demands by customer service address are scaled up in the model to match water produced by the WTP. This approach effectively distributes non-revenue water evenly throughout the distribution system.

Water Demand Metrics

Water demand is described using two metrics:

- Average Daily Demand (ADD) – the total water production for a given year divided by 365 days
- Maximum Day Demand (MDD) – the largest calendar day (24 hours) water production for a given year; in Newberg and western Oregon, maximum day demand occurs between July 1 and September 30th each year (this is referred to as the peak season)

Demand per Dwelling Unit

In systems with primarily residential demands like Newberg, it can be useful to estimate a demand per person per day measured in gallons per capita day (gpcd). This is estimated as system-wide ADD divided by the water service area population. This per capita demand implicitly includes all non-residential water system demands and can be used to forecast future water demands based on population growth or new residential unit construction. **Table 1** summarizes estimated demand per dwelling unit based on historical WTP production records, Newberg population estimates from the Portland State University Population Research Center (PSU PRC), and a 2.66 average number of persons per dwelling unit from US Census data. MDD is approximately two times ADD, consistent with the 2017 WMP.

Table 1
Average Water Demand per Dwelling Unit

Year	ADD (mgd)	Population	ADD/person (gpcd)	ADD/unit (gpd)	MDD/unit (gpd)
2016	2.35	23,465	100	266	532
2017	2.35	23,480	100	266	532
2018	2.39	23,795	101	269	538
2019	2.27	24,045	94	250	500
Average ADD and MDD per Unit in gallons per day (gpd)				263	526

Estimated Growth from Increased Density due to Middle Housing

Per state IBTER guidelines in OAR 660-046-0320 and 330, the City may consider a one percent growth rate for infill development in the IBTER study areas. The City may consider a three percent growth rate for any properties considered un- or underdeveloped. Underdeveloped is defined in the OARs as a larger than one-half acre parcel zoned for detached single-family housing which has an existing density of less than or equal to two units per acre.

City Planning staff provided detailed parcel information for each area and identified parcels which may be considered underdeveloped. Estimated growth in dwelling units for the IBTER study areas based on this parcel data and the OAR guidelines is summarized in **Table 2**.

Table 2
Estimated Dwelling Unit Growth

	Existing Units			Infill Growth Units	Redevelopment Growth Units
IBTER Area	Developed Parcels	Underdeveloped Parcels	TOTAL Existing Units	(1% for existing developed)	(3% for existing underdeveloped)
South of Newberg	1,485	36	1,521	18	3
Single Family	879	35	914	9	2
Multi Family	428	-	428	5	-
Duplex	125	1	126	2	1
Triplex	21	-	21	1	-
Fourplex	32		32	1	-
North of Newberg	176	-	176	3	-
Single Family	170	-	170	2	-
Multi Family	-	-	-	-	-
Duplex	6	-	6	1	-
TOTAL Existing Units			1,697	TOTAL Growth	24

Estimated Study Area Demand

Current demand and estimated demand with middle housing growth for the IBTER study areas is summarized in **Table 3**. Current ADD was estimated based on geographic assignment of 2015 billing records in the hydraulic model for the 2017 WMP and 2019 City WTP production. As shown in **Table 1**, ADD has remained relatively constant since 2016.

Table 3
IBTER Study Area Demand Summary

Area	Current Demand (gpd)		Estimated Demand with middle housing growth (gpd)	
	ADD	MDD	ADD	MDD
South of Downtown	336,240	672,480	341,763	683,526
North of Downtown	52,070	104,141	52,859	105,719

Distribution System Performance Criteria

System performance was evaluated using pressure, pipe velocity, and required fire flow criteria established in the 2017 WMP and summarized in **Table 4**.

Table 4
Distribution Performance Criteria

Water System Component	Evaluation Criterion	2017 WMP Value	Design Standard/Guideline
Service Pressure	Normal Range, during ADD	40-80 psi	City's 2015 Public Works *Design and Construction Standards*
	Maximum, without PRV	80 psi	Oregon Plumbing Specialty Code 608.2
	Minimum, during emergency or fire flow	20 psi	OAR 333-061
Distribution Mains	Velocity during fire flow	Not to exceed 8 fps	City's 2015 Public Works *Design and Construction Standards*
	Velocity during ADD	Not to exceed 5 fps	
Required Fire Flow and Duration	Low Density – Single-Family and Duplex Residential <= 3,600 sq ft	1,000 gpm for 2 hours	Oregon Fire Code
	Single-Family and Duplex Residential >3,600 sq ft	1,500 gpm for 2 hours	
	Medium Density Residential	1,500 gpm for 2 hours	
	High Density Residential	2,000 gpm for 3 hours	
	Commercial	3,000 gpm for 3 hours	
	Industrial, Institutional, and Hospitality	4,500 gpm for 3 hours	

Assumptions and Modeling Conditions

For the purposes of this analysis, it is assumed that all Zone 1 reservoirs are operating approximately three-quarters full and the WTP is not actively pumping to fill storage reservoirs.

Analysis Findings and Distribution System Constraints

Service Pressure

Modeled main line pressures under MDD conditions in the IBTER south area are between approximately 90 and 100 psi. Pressures in the north study area range between approximately 80 and 90 psi. These mainline pressure ranges remain the same with the approximately two percent increase in water demand generated by potential middle housing increased density.

Fire Flow Availability

Fire flow availability was tested at 2,000 gallons per minute (gpm) consistent with high density residential required fire flow from **Table 4**. This 2,000 gpm fire flow may be conservative in some parts of the IBTER study areas where smaller structures with fewer units, like duplexes, are more likely to be developed. However, providing water infrastructure capable of supplying a 2,000 gpm fire flow allows the City to consider a broader range of middle housing options as HB 2001 zoning changes are evaluated.

Fire flow availability in the south IBTER study area is constrained by high pipe flow velocity. Adequate pressure is available to supply fire flow and maintain service pressures above 20 psi for public health. However, small diameter 4- and 6-inch diameter pipe grids in the south study area create flow velocities over 20 feet per second (fps) during a fire flow event. Fire flow in the north study area is less constrained with 8-inch diameter well looped existing mains interconnected with the 18-inch diameter North Valley Reservoirs transmission main.

The primary concern with high pipe velocity is abrasion of the interior pipe coating, which can expose the pipe material to corrosion and lead to potential pipe failure. This is generally a greater concern when high flow velocity extends over a long period of time as part of normal system operation. In the case of a fire flow event, these high flow velocities are both infrequent and for a short time when they do occur. Thus, a pipe velocity higher than the 8 fps specified in **Table 4** may be acceptable, provided there is adequate available pressure to supply fire flow as is the case in Newberg's IBTER south study area. According to information from the Ductile Iron Pipe Research Association (DIPRA), 14 fps is a conservative maximum pipe velocity based on satisfactory historical performance of cement mortar lined ductile iron pipe. For the purposes of this analysis available fire flow is evaluated at a flow velocity of 14 fps.

Figure 3 at the end of this memo illustrates available fire flow in the north and south IBTER study areas with existing water mains under max day demand conditions and with a maximum flow velocity of 14 fps.

Recommended Improvements

Eight significant pipe improvement projects are recommended for the south study area and one minor project is recommended for the north study area to provide adequate fire flows to potential higher density development. In the south, existing development is primarily served from a 4- and 6-inch diameter pipe grid. While a 6-inch diameter main can provide a 1,000 gpm single-family residential fire flow, a 6-inch diameter grid is inadequate to provide a 2,000 gpm multi-family residential fire flow.

Existing 6-inch diameter mains along key corridors in the south study area, including S College Street, S River Street, and E 9th Street, are recommended to be upsized to 12-inch diameter mains to provide a large diameter backbone for the area to meet 2,000 gpm fire flow requirements for potential higher density development. Additional looping is also recommended to connect larger diameter mains with the 18-inch diameter transmission main in Wynooski Street and for the W 4th Street neighborhood between Dayton Avenue and Hwy 99W.

Two areas in the southwest corner of the south study area cannot be supplied a 2,000 gpm fire flow without significant or total pipe replacement and upsizing. The first area is the S Charles Street loop, which is bordered by Chehalem Creek to the west making it difficult to connect to the water system outside of the south study area. The second area is between S College Street and S River Street just north of the Newberg Dundee Bypass, which does not have an existing east-west right-of-way to provide additional looping. Rather than replacing these pipes in their current alignments, it is instead recommended that the City assess fire flow to these areas and potential distribution system looping along with future transportation projects associated with the Riverfront area, such as the extension of S Blaine Street south of Ewing Young Park and the extension of a future road across the former WestRock mill property connecting the area around the City's WTP and NE Rogers Landing Road.

Figure 4 at the end of this memo illustrates recommended pipe improvement projects.

Cost Estimates

An estimated cost has been developed for each recommended piping improvement project. New piping is assumed to be ductile iron pipe installed by private contractors.

Cost estimates represent opinions of cost only, acknowledging that final costs of individual projects will vary depending on actual labor and material costs, market conditions for construction, regulatory factors, final project scope, project schedule and other factors. The Association for the Advancement of Cost Engineering International (AACE) classifies cost estimates depending on project definition, end usage, and other factors. The cost estimates presented here are considered Class 4 with an end use being a study or feasibility evaluation and an expected accuracy range of -30 percent to +50 percent. As the project is better defined, the accuracy level of the estimates can be narrowed.

Since construction costs change periodically, an indexing method to adjust present estimates in the future is useful. The Engineering News-Record (ENR) Construction Cost Index (CCI) is a commonly used index for this purpose. For purposes of future cost estimate updating, the current ENR CCI for Seattle, Washington is 12,771.70 (September 2020).

Recommended improvements and estimated costs are summarized in **Table 5**.

Table 5
Recommended Improvements

Project No.	Project Description	Estimated Project Cost[1-6]
I-1	Install 1,733 LF of 8-inch DI Pipe in S Main Street, W 4th Street, S Lincoln Street, and W 5th Street	$486,000
I-2	Install 2,558 LF of 12-inch DI Pipe in S Blaine Street	$812,000
I-3	Install 2,962 LF of 8- and 12-inch DI Pipe in E 9th Street, Charles Street, and S College Street	$1,756,000
I-4	Install 772 LF of 8- and 12-inch DI Pipe in S Meridian Street	$440,000
I-5	Install 3,691 LF of 12-inch DI Pipe in E 7th Street, S Pacific Street, E 9th Street, and Paradise Drive	$1,167,000
I-6	Install 2,736 LF of 12-inch DI Pipe in S River Street	$868,000
I-7	Install 453 LF of 12-inch DI Pipe in E 5th Street	$148,000
I-8	Install 159 LF of 8-inch DI Pipe from E 11th Street to the Boston Square Apartments	$49,000
I-9	Install 15 LF of 8-inch DI Pipe in Vermillion Street	$11,000
	Total Cost	$5,737,000

Notes:

1. All costs are in 2020 dollars
2. Includes costs for fittings/valves and connections to existing services and hydrants
3. Includes local street trench patch resurfacing; whole or half street overlays are not included
4. Includes an allowance of 30% for construction contingency, 25% for engineering, permitting and inspection, and 1% for Oregon Corporate Activity Tax (applied to construction costs only)
5. Easement and right-of-way costs are not included
6. City project management and administrative costs are not included

Figure 1: North of Downtown Newberg

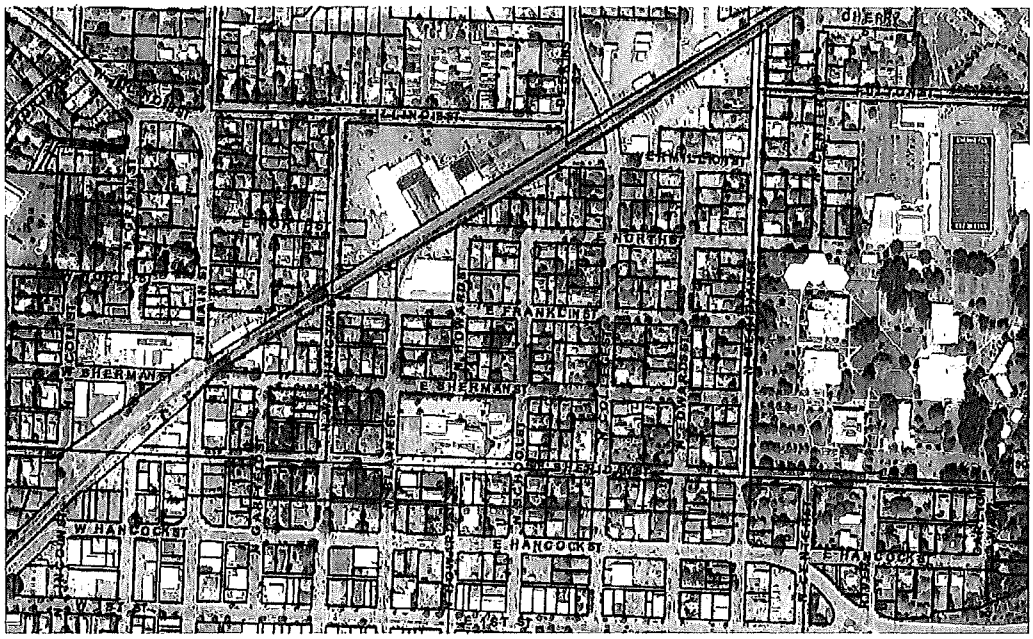
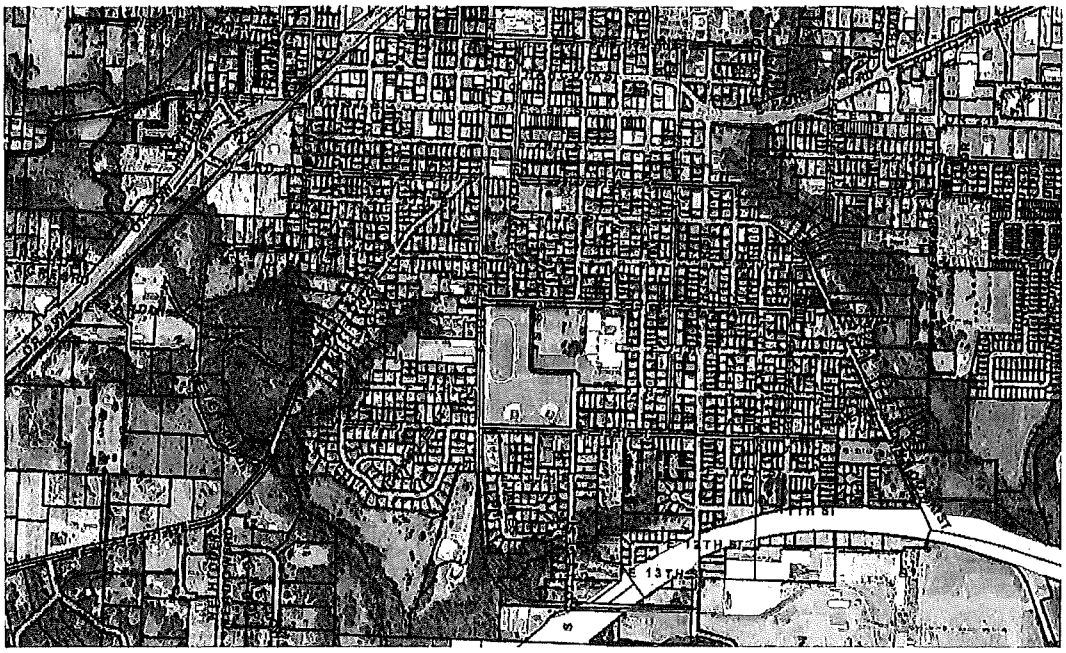
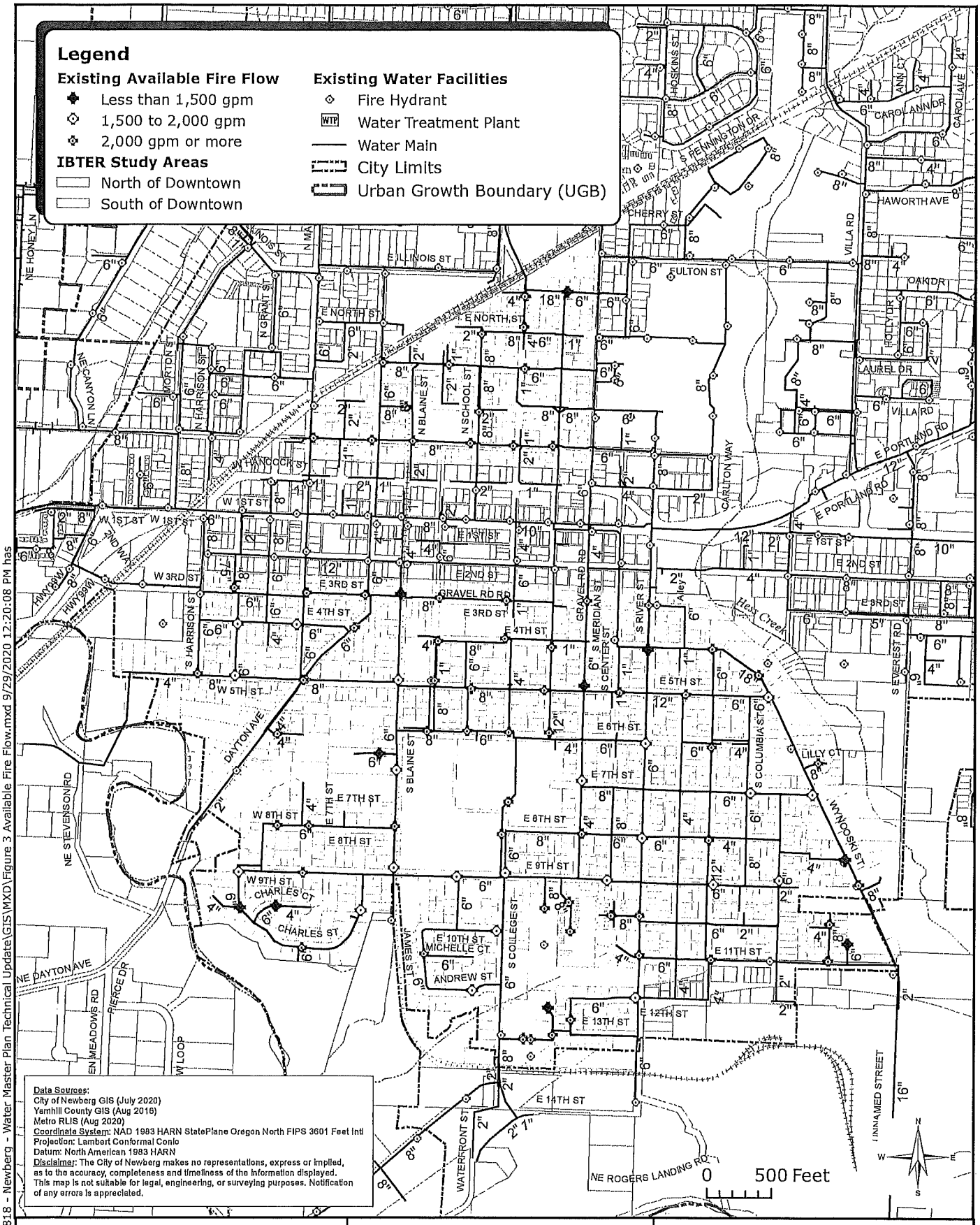


Figure 2: South of Downtown Newberg





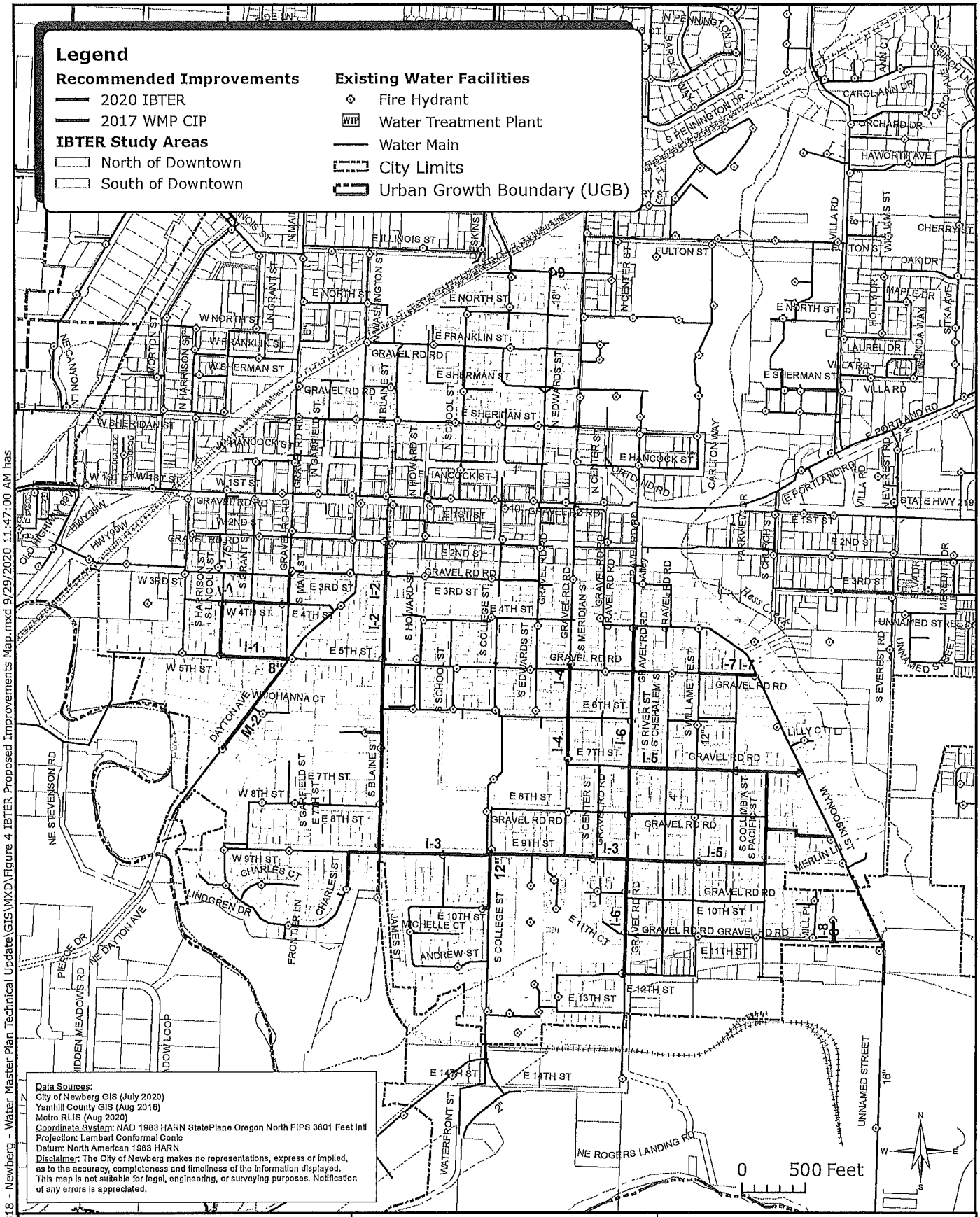
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City of Newberg

Water Master Plan Technical Update

Figure 3 Available Fire Flow



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City of Newberg

Water Master Plan Technical Update

Figure 4 IBTER Proposed Improvements

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MEMORANDUM

Date: October 21, 2020 Project #: 24611.001

To: Brett Musick, Doug Rux, & Kaaren Hofmann, City of Newberg

From: Julia Kuhn

Project: Transportation System Plan (TSP) Technical Update

Subject: Transportation Planning Rule (TPR) Implications of Middle Housing

Per Oregon House Bills 2001 and 2003, the City of Newberg is planning to allow for more housing choices for its existing and future residents. To help cities implement these bills, the Oregon Land Conservation and Development Commission (LCDC) adopted administrative rules (i.e., Oregon Administrative Rule 660-046) to guide the development of the middle housing and also adopted administrative rules to allow cities to apply for an Infrastructure-Based Time Extension (IBTER) to delay the enactment of middle housing requirements if there are any significant deficiencies caused by the needs of the additional housing on the City's wastewater, water, storm drainage and/or transportation facilities. In accordance with the DLCD rule-making, this memorandum provides a brief summary of the impacts of middle housing related to the City's transportation system. As concluded herein, the potential for middle housing does not result in any significant impacts on the transportation system, as defined by Oregon's Transportation Planning Rule (TPR) and as such, no IBTER extension related to transportation is needed.

Transportation-Related Administrative Rule Requirements

For analyzing the provision of additional middle housing beyond that currently planned, the Transportation Planning Rule (TPR), as defined by Oregon Administrative Rule 660-012-0060 establishes a two-step process for evaluating an amendment's impacts on the transportation system. This amendment defines a two-step process for determining whether an amendment has the potential to "significantly affect" the transportation system. First, the incremental difference in vehicular trips associated with the amendment is calculated and a determination is made as to whether the anticipated conditions at any collector/arterial intersections within the City could be measurably affected by the added trips associated with the amendment. If no measurable impacts are identified, no additional analyses are needed to demonstrate that the proposed amendments would not "significantly affect" the transportation system.

This project is funded by Oregon general fund dollars through the Department of Land Conservation and Development. The contents of this document do not necessarily reflect the views or policies of the State of Oregon.

Potential Change Middle Housing

Per the IBTER requirements, the City performed an analysis of potential infill areas that could allow for middle housing. As defined in the rule-making, Cities can plan for a one percent increase in the "number of dwelling units produced due to middle housing allowances within specified residential zones." For transportation planning purposes, the TPR requires that we compare the vehicular trip making associated with the additional one percent growth in housing to that evaluated as part of the "baseline," which was assessed for the purposes of establishing the needs, deficiencies and projects identified in the City's Transportation System Plan (TSP).

In accordance with the IBTER requirements, the City identified eight areas of the City where infill residential development could occur. These areas and the baseline housing units as well as the anticipated increase in housing units is summarized in Table 1.

Table 1. Potential Housing Increase

Area	Existing Dwelling Units	Anticipated Increase in Dwelling Units*
Areas South of Downtown		
South Single Family	914	10
South Multi-Family	428	5
South Duplex	126	2
South Triplex	21	1
South Quadplex	32	1
Total South Area	1,521	19
Areas North of Downtown		
North Single Family	170	2
North Multi-Family	0	0
North Duplex	6	1
Total North Area	176	3
Total Housing		
Total North and South	1,697	22

*Rounded to the nearest dwelling unit.

Potential Trip Generation Impacts

To assess the TPR-related impacts associated with 22 potential new middle housing dwelling units, we calculated the anticipated trip generation of each of the potential areas in accordance with the single family housing rates provided in the *Trip Generation Manual, 10th Edition*, as published by the Institute of Transportation Engineers. Table 2 compares the potential increase in daily trips for each of the identified infill areas whereas Table 3 presents the new weekday AM and PM peak hour trips that could result from the middle housing.

Table 2. Potential Increase in Vehicular Trips

Area	Existing Dwelling Units	Anticipated Increase in Dwelling Units	ITE Land Use Code	Existing Baseline Daily Trips	Increase In Daily Trips	Percent Increase
Areas South of Downtown						
South Single Family	914	10	210	8,628	94	1.1%
South Multi-Family	428	5	210	4,040	48	1.2%
South Duplex	126	2	210	1,190	18	1.5%
South Triplex	21	1	210	198	10	5.1%
South Quadplex	32	1	210	302	10	3.3%
Total South Area	1,521	19	210	14,358	180	1.3%
Areas North of Downtown						
North Single Family	170	2	210	1,604	18	1.1%
North Multi-Family	0	0	210	0	0	N/A
North Duplex	6	1	210	56	10	17.9%
Total North Area	176	3	210	1,662	28	1.7%
Total Housing						
Total North and South	1,697	22	210	16,020	208	1.3%

Table 3. Potential Additional Peak Hour Trip-Making

Area	Anticipated Increase in Dwelling Units	Weekday AM Peak Hour Trip Increase			Weekday PM Peak Hour Trip Increase		
		Total Trips	In	Out	Total Trips	In	Out
Areas South of Downtown							
South Single Family	10	7	2	5	10	6	4
South Multi-Family	5	4	1	3	5	3	2
South Duplex	2	1	0	1	2	1	1
South Triplex	1	1	0	1	1	1	0
South Quadplex	1	1	0	1	1	1	0
Total South Area	19	14	4	10	19	12	7
Areas North of Downtown							
North Single Family	2	1	0	1	2	1	1
North Multi-Family	0	0	0	0	0	0	0
North Duplex	1	1	0	1	1	1	0
Total North Area	3	2	1	1	3	2	1
Total Housing							
Total North and South	22	16	4	12	22	14	8

As shown in Table 3, the potential city-wide increase in peak hour trip making is less than 22 vehicles per hour. Given that the infill areas are dispersed both north and south of downtown and will use a variety of collector and arterial streets for their travel, we conclude that no one intersection will experience a measurable increase in trips. As such, the proposed middle housing does not constitute a "significant impact" on transportation facilities and the facilities identified in the City's TSP are adequate to support the potential middle housing.

Summary of TPR Criteria

OAR Section 660-12-0060 of the TPR sets forth the relative criteria for evaluating plan and land use regulation amendments. Table 4 summarizes the criteria in Section 660-012-0060 and the applicability to the proposed middle housing provisions.

Table 4. Summary of Criteria in OAR 660-012-0060

Section	Criteria	Applicable?
1	Describes how to determine if a proposed land use action results in a significant effect.	Yes
2	Describes measures for complying with Criteria #1 where a significant effect is determined.	No
3	Describes measures for complying with Criteria #1 and #2 without assuring that the allowed land uses are consistent with the function, capacity and performance standards of the facility.	No
4	Determinations under Criteria #1, #2, and #3 are coordinated with other local agencies.	Yes
5	Indicates that the presence of a transportation facility shall not be the basis for an exception to allow development on rural lands.	No
6	Indicates that local agencies should credit developments that provide a reduction in trips.	No
7	Outlines requirements for a local street plan, access management plan, or future street plan.	No
8	Defines a mixed-use, pedestrian-friendly neighborhood.	No
9	A significant effect may not occur if the rezone is identified on the City's Comprehensive Plan and assumed in the adopted Transportation System Plan.	No
10	Agencies may consider measures other than vehicular capacity if within an identified multimodal mixed-use area (MMA).	No
11	Allows agencies to override the finding of a significant effect if the application meets the balancing test.	No

As shown in Table 4, there are eleven criteria that apply to Plan and Land Use Regulation Amendments. Of these, only Criteria #1 and #4 are applicable to the proposed middle housing provision. These criteria are provided below in italics with our response shown in standard font.

> *OAR 660-12-0060(1) If an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation (including a zoning map) would significantly affect an existing or planned transportation facility, then the local government must put in place measures as provided in section (2) of this rule, unless the amendment is allowed under section (3), (9) or (10) of this rule. A plan or land use regulation amendment significantly affects a transportation facility if it would:*
>
> > *(a) Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors in an adopted plan);*
> >
> > *(b) Change standards implementing a functional classification system; or*

(c) Result in any of the effects listed in paragraphs (A) through (C) of this subsection based on projected conditions measured at the end of the planning period identified in the adopted TSP. As part of evaluating projected conditions, the amount of traffic projected to be generated within the area of the amendment may be reduced if the amendment includes an enforceable, ongoing requirement that would demonstrably limit traffic generation, including, but not limited to, transportation demand management. This reduction may diminish or completely eliminate the significant effect of the amendment.

(A) Types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;

(B) Degrade the performance of an existing or planned transportation facility such that it would not meet the performance standards identified in the TSP or comprehensive plan; or

(C) Degrade the performance of an existing or planned transportation facility that is otherwise projected to not meet the performance standards identified in the TSP or comprehensive plan.

Response: The potential for middle housing in the infill areas has the potential to result in a 22 vehicles per hour increase city-wide during the PM peak hour. Given that the infill areas are dispersed both north and south of downtown and will use a variety of collector and arterial streets for their travel, we conclude that no one intersection will increase a measurable increase in trips and there is no significant impact on any facility. Further, the potential new housing is located in residential areas and therefore the street classifications remain appropriate for the land use designations. Finally, the insignificant increase in trip-making does not degrade the performance relative to the conditions anticipated in the TSP. Therefore, this criterion is met and there is no significant impact.

OAR 660-12-0060 (4) Determinations under sections (1)–(3) of this rule shall be coordinated with affected transportation facility and service providers and other affected local governments.

Response: The City of Newberg is coordinating the IBTER analysis with the state of Oregon. As such, this criterion is met.

Based on our review, the potential for middle housing does not result in any significant impacts on the transportation system, as defined by Oregon's Transportation Planning Rule (TPR) and as such, no IBTER extension related to transportation is needed. Please let us know if you have any questions regarding our analysis.

KELLER ASSOCIATES

Technical Memorandum

TO: Brett Musick, PE
Project Manager
City of Newberg

FROM: Peter Olsen, PE
Emily Flock, PE

DATE: September 29, 2020

SUBJECT: **Middle Housing Infrastructure-Based Time Extension Request (IBTER) – Wastewater Infrastructure Evaluation**

This project is funded by Oregon general fund dollars through the Department of Land Conservation and Development. The contents of this document do not necessarily reflect the views or policies of the State of Oregon.

REGISTERED PROFESSIONAL ENGINEER
87384PE
Emily Flock
OREGON
NOV. 13, 2018
EMILY C. FLOCK
EXPIRES: 12/31/2021

BACKGROUND AND PURPOSE

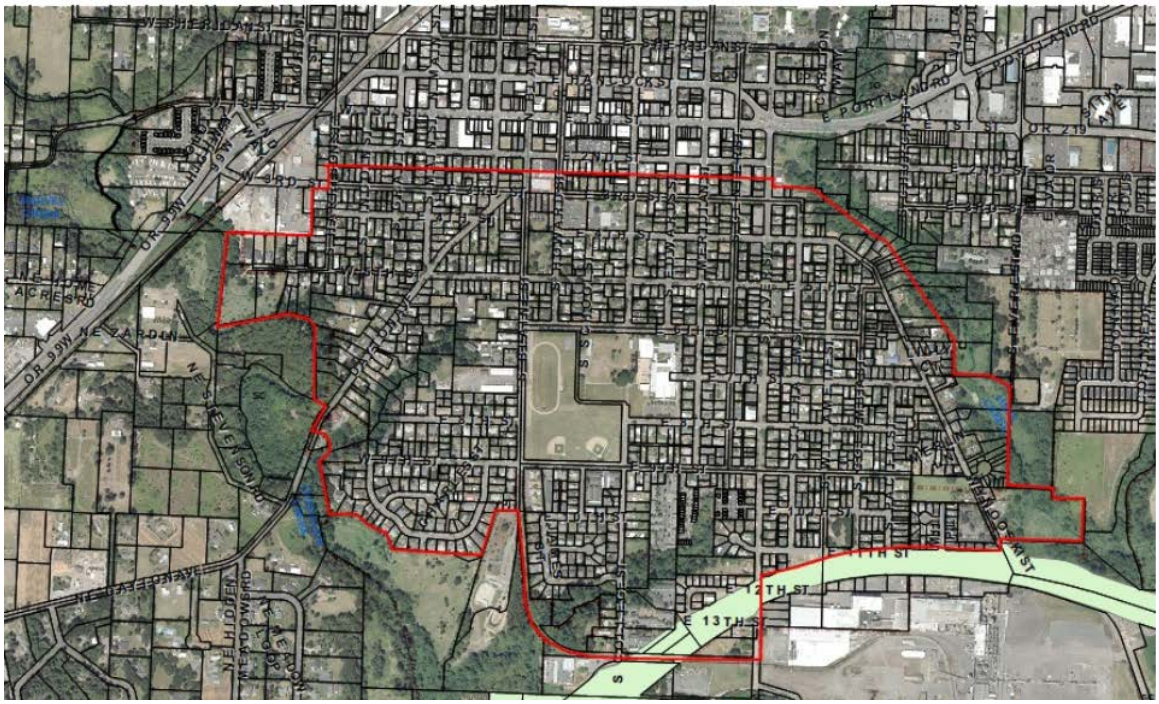
The City of Newberg (City) will adopt regulations that will allow for development in accordance with House Bill 2001 (HB 2001) and House Bill 2003 (HB 2003). The purpose of this evaluation is to assist in the implementation of HB 2001 and HB 2003 by evaluating the potential impacts on the City's wastewater collection system for the Middle Housing Infrastructure-Based Time Extension Request (IBTER). The City intends to adopt regulations that will allow for the development of duplexes on lots zoned for residential use and continue to allow for the development of detached single-family dwellings. The City will also adopt regulations to allow for the development of duplexes and other middle housing types on lots in areas zoned for residential use that allow for the development of detached single-family dwellings.

The City has preliminarily identified areas that may require upgrades to the existing infrastructure. These areas include land just north of downtown up to the rail line that runs through Newberg and over to North Meridian Street (Figure 1, next page). Another identified area includes land just south of downtown from the Chehalem Creek and railroad line intersection to the West Rock line and over to Hess Creek (Figure 2, next page). This analysis evaluates wastewater conveyance capacities to handle the increases in density allowed by HB 2001 and HB 2003.

FIGURE 1: CITY-IDENTIFIED NORTH AREAS OF POTENTIAL UPGRADES



FIGURE 2: CITY-IDENTIFIED SOUTH AREAS OF POTENTIAL UPGRADES



PLANNING CRITERIA AND ESTIMATED SEWER FLOWS

Per the Oregon Administrative Rules (OAR) 660-046, for IBTER the infill and redevelopment areas may assume a one percent increase in the number of dwelling units from the existing, applicable dwelling units. The City identified existing, applicable dwelling units within the areas identified for infill or redevelopment increases in density proposed by HB 2001 and HB 2003 (Figures 1 and 2). There were no undeveloped or underdeveloped areas identified by the City to be impacted by the proposed developments from HB 2001 and 2003. The existing dwelling units and 1% increase in equivalent dwelling units (EDU) for the areas identified are summarized in Table 1. EDU's have been rounded up to the nearest integer.

TABLE 1: EXISTING DWELLING UNITS AND 1% IBTER EDU INCREASE

Area	Existing # of Dwelling Units	IBTER 1% Increase (EDU, rounded)
South Single Family	914	10
South Multi	428	5
South Duplex	126	2
South Triplex	21	1
South Fourplex	32	1
South Subtotal	**1,521**	**19**
North Single Family	170	2
North Multi	-	-
North Duplex	6	1
North Subtotal	**176**	**3**
Total	**1,697**	**22**

As shown in Table 1, the additional development afforded from HB 2001 and HB 2003 is estimated to be only 22 EDU's. Criteria established in the 2018 Newberg Wastewater Master Plan (WWMP) were used to estimate the increase in base sewer flows from the potential development using number of EDU, people per EDU, and average dry weather flow allocation (ADWF). A peaking factor of system-wide flows from peak instantaneous flow (PIF) to ADWF was used to estimate the peak flow increase from the potential development. The peaking factor uses system planning flows from the 2018 WWMP. Table 2 summarizes the criteria from the master plan and estimated sewer base flow and peak flow increases from the potential development.

TABLE 2: ESTIMATED INCREASE IN SEWER FLOWS

Parameter/Criteria	Value
IBTER EDU Increase	22
People/EDU[1]	2.69
IBTER Population Increase	60
ADWF (gpcd)[1, 2]	74
IBTER Base Flow Increase (gpd)	**4,440**
(gpm)	**3.1**
Peaking Factor (PIF : ADWF)[1, 2]	12.3
IBTER Estimated PIF Flow Increase (gpd)	**54,800**
(gpm)	**38**

[1]Criteria from 2018 WWMP

[2]ADWF = avg. dry weather flow ; PIF = peak instantaneous flow

SYSTEM IMPACTS

The areas identified for potential development are served by the River Street sewer trunk line. The majority of the potential EDU and associated flows are in the southern area identified in Figure 2. This area connects to the River Street trunk line south of E 2nd Street. The lowest capacity segment of the River Street trunk line south of E 2nd Street to E 11th Street is approximately 1,800 gpm (2018 WWMP). The estimated potential increase in base flow and PIF from the IBTER development (Table 2) is minimal in comparison to the capacity of the trunk line. The base flow increase from the potential IBTER development is less than 0.2% of the lowest capacity segment of the trunk line and the potential peak flow increase is equivalent to 2% of the lowest capacity segment.

COMPARISON WITH MASTER PLAN

The 2018 WWMP identifies existing capacity issues on the River Street trunk line. The Capital Improvement Plan (CIP) project C.2.b recommends upsizing the existing trunk line on River Street from E 4th Street to E 11th Street, as well as additional improvements on E 11th Street and Wynooski Street, to alleviate capacity issues in the sewer basin. The increased flow from this analysis would not change the recommended future trunk line sizing and would have minimal impact in terms of recommended timing for the improvement.

CONCLUSIONS

There are existing capacity deficiencies identified in the 2018 WWMP on the River Street trunk line that serves the areas identified for potential infill and redevelopment with the implementation of HB 2001 and HB 2003. The estimated sewer flow increase from potential HB 2001 and HB 2003 development is minimal in comparison to the capacity of the River Street trunk line that serves the impacted areas. The potential change in development density is not anticipated to cause additional capacity issues in the sewer trunk lines as evaluated in the 2018 WWMP.

MEMORANDUM

501 E First Street Newberg, Oregon 97132 | Ph. 503-554-9553 | Fax 503-537-9554

Date: **September 29, 2020** Project Number: **2020-014**
To: **Brett Musick, PE - Senior Engineer, City or Newberg**
From: **Andrey Chernishov, PE**
RE: **Stormwater IBTER Tech Memo - DRAFT**

This project is funded by Oregon general fund dollars through the Department of Land Conservation and Development. The contents of this document do not necessarily reflect the views or policies of the State of Oregon.

Introduction

The purpose of this technical memo is to assist the City of Newberg in the implementation of House Bill 2001 and House Bill 2003 and prepare an Infrastructure-Based Time Extension Request by statutory deadlines identified in House Bill 2001.

The City of Newberg will adopt regulations that will allow for the development of duplexes on lots zoned for residential use and continue to allow for the development of detached single-family dwellings. The City will also adopt regulations to allow for the development of duplexes and other middle housing types on lots in areas zoned for residential use that allow for the development of detached single-family dwellings.

The allowance of duplexes and other types of middle housing on lots zoned for residential development will likely have significant impact on existing infrastructure, as increases in housing types will lead to increases in density. To ensure the best livability in the City, it is important to consider the needed upgrades to existing infrastructure and identify areas that will see increased development in the future.

Through the allowance of middle housing in areas zoned for residential development and the identification of infrastructure constraints, the City will be able to address the needed housing types for residents at all income levels.

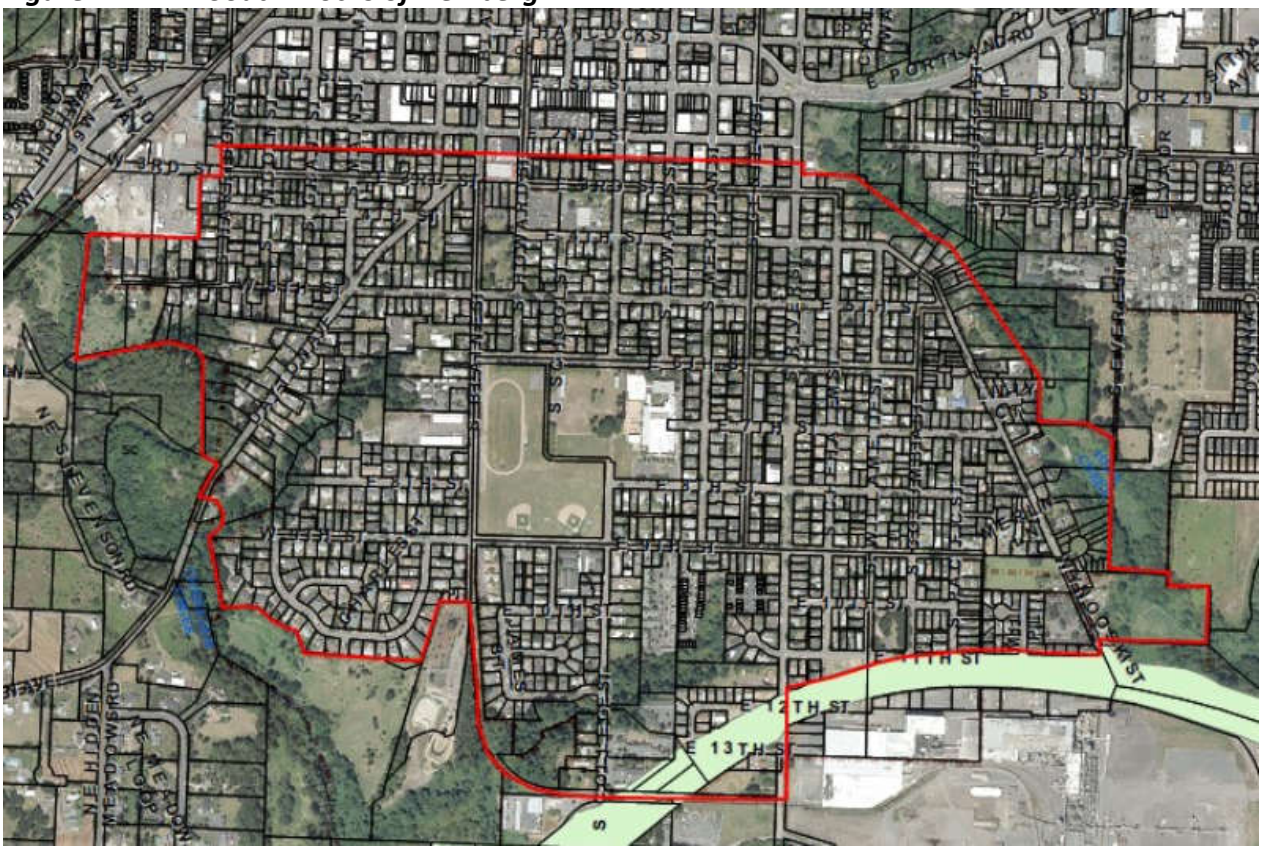
This technical memo will identify the stormwater infrastructure constraints around the downtown Newberg area in order to ensure these areas will be able to handle the increases in density allowed by HB 2001. The City of Newberg has identified two areas that may require upgrades to the existing infrastructure. The North Blocks area includes land just north of downtown Newberg up to the rail line that runs through the City and over to N Meridian Street as shown in Figure 1.

Figure 1: IBTER North Blocks of Newberg



The South Block area includes land just south of downtown Newberg from Chehalem Creek and railroad line intersection to the WestRock line and over to Hess Creek as shown in Figure 2. These areas are zoned predominantly R-1, R-2, and R-3, with very small portions zoned M-1, M-2, I, and C-1.

Figure 2: IBTER South Blocks of Newberg



Existing Dwelling Units and 1% IBTER EDU Increase

Per the Oregon Administrative Rules (OAR) 660-046, for IBTER the infill and redevelopment areas may assume a one percent increase in the number of dwelling units from the existing, applicable dwelling units. The City identified existing, applicable dwelling units within the areas identified for infill or redevelopment increases in density proposed by HB 2001 and HB 2003 (Figures 1 and 2). There were no undeveloped or underdeveloped areas identified by the City to be impacted by the proposed developments from HB 2001 and 2003. The existing dwelling units and 1% increase in equivalent dwelling units (EDU) for the areas identified are summarized in Table 1. EDU's have been rounded up to the nearest integer.

Table 1: Existing Dwelling Units And 1% IBTER EDU Increase

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North Subtotal	**176**	**3**
Total	**1,697**	**22**

Infrastructure-Specific Application Thresholds

According to OAR 660-046-0340, the City may use the following circumstances to justify a stormwater-based IBTER:

(a) Lack of stormwater infrastructure, or adequately-sized stormwater infrastructure, such as storm drainage pipes, curb and gutters, catch basins and inlets, lateral storm connections, regional stormwater facilities, and discharge outfalls that results in not meeting an acceptable service level. An acceptable service level may include metrics for water quantity discharge, water quality, or both.

(b) A downstream stormwater conveyance system deficiency, resulting in localized ponding or flooding and storm pipe back-ups caused by pipes, culverts, or catch basins in disrepair; these problems may be compounded by high groundwater; compacted underlying soils; or backwater from nearby waterways during high flows; any of which that results in not meeting an acceptable service level.

Description of Stormwater Infrastructure Deficiencies

This section describes the significant stormwater infrastructure deficiencies via narrative, graphics, and tabular data within the two identified areas in the City of Newberg.

Description, Capacity, & Service Level

The current adopted City of Newberg 2014 Stormwater Master Plan (SWMP) is utilized in this tech memo. According to Section 3.2 "Evaluation Criteria" of the City of Newberg 2014 SWMP, the following evaluation criteria was utilized to establish service levels for the stormwater system.

At the time of the 2014 SWMP, the City was using the 2010 Standard Design Manual, so that manual was referenced for establishing the design standards for evaluating the capacity of the stormwater infrastructure. Section 4 of the City's 2010 Standard Design Manual included design requirements for storm drainage systems in Newberg. In the 2014 SWMP the existing and future storm drainage pipe network was evaluated for capacity based on the following conditions:

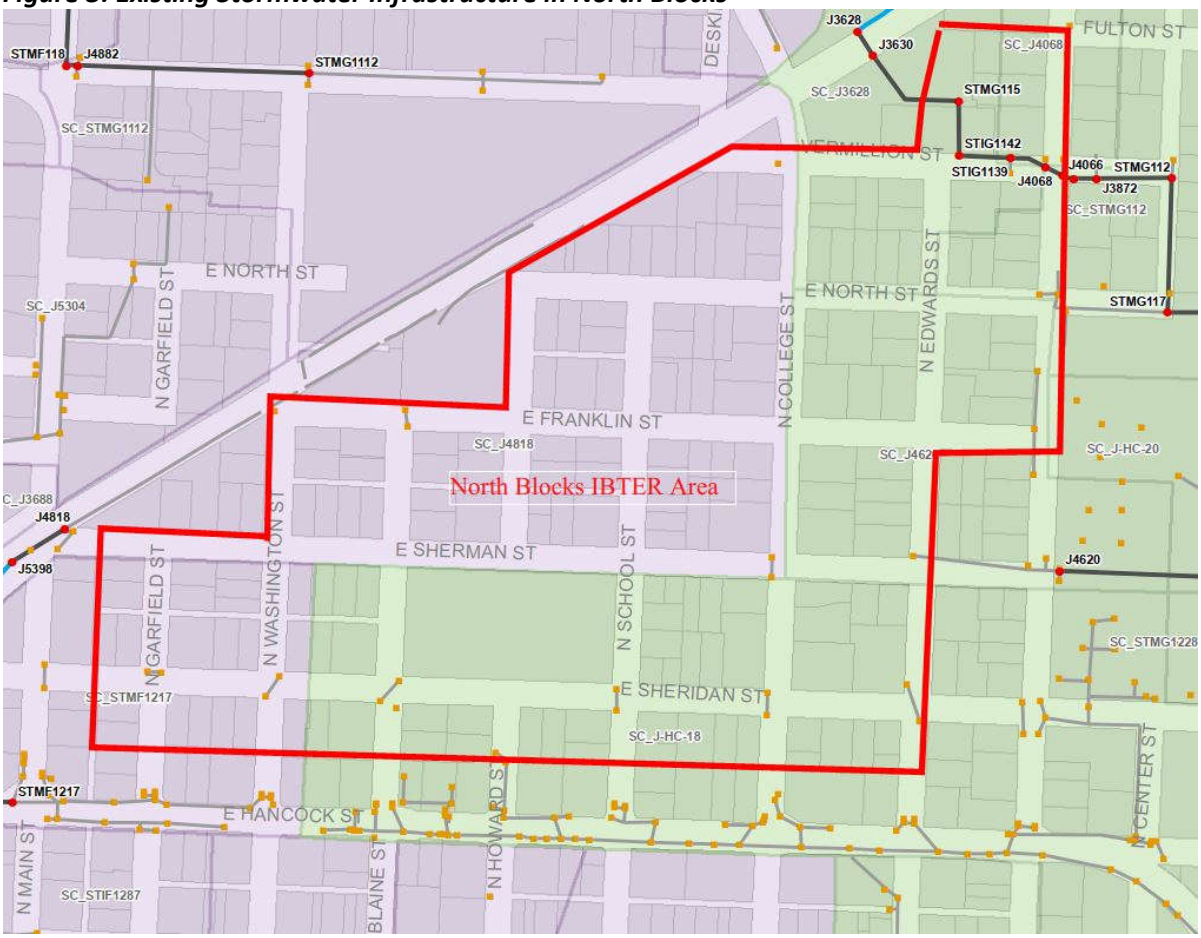
- Minor drainage system elements (streets, curbs, gutters, inlets, catch basins, and collector drains): Capacity for the 10-year design storm.
- Major laterals (laterals and collectors with less than 250 acres tributary area): Capacity for the 10-year design storm.
- Major trunk lines (trunk lines with greater than 250 acres of tributary area and drainage systems under arterial streets): Capacity for the 50-year design storm.
- Culverts on creek systems: Capacity for the 50-year design storm.

For the purpose of evaluating the capacity of the existing and future storm drainage infrastructure in the 2014 SWMP, flooding was defined as any surcharge over the rim elevation of a manhole or above the bank elevation of open channels. Minor flooding is defined as flooding that occurs for less than 2-hours during the peak 24-hour design storm. Major flooding is defined as flooding that occurs for more than 2-hours during the peak 24-hour design storm.

During the development of 2014 SWMP, the City was in the process of updating the Stormwater Design Standards. The current 2015 standards included a change to using the 25-year, 24-hour design storm for sizing stormwater pipes conveying water from drainage areas less than 250 acres in size. The 2014 SWMP capital improvement projects (CIPs) in drainage areas less than 250 acres have been sized for the 25-year design storm.

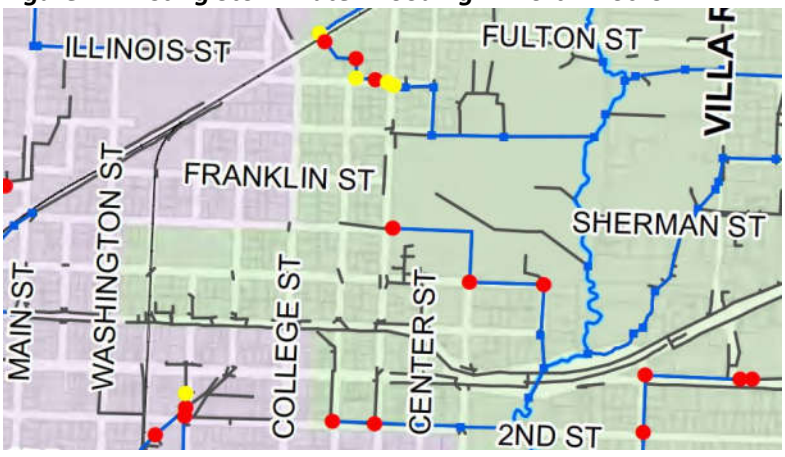
The existing stormwater infrastructure in the North Blocks area is shown in Figure 3. Most the North Blocks area does not have an existing stormwater collection system, such as catch basins, inlets, and storm pipes. This results in localized ponding and flooding of streets during 25-year storm events.

Figure 3: Existing Stormwater Infrastructure in North Blocks



The 2014 SWMP shows modelled stormwater pipes in the North Blocks area have capacity issues, which result in flooding at the 10-design storm service level (see Figure 4). The flooding occurs along Vermillion St between manhole STMG115 and J4068 located between N Edwards St and N Meridian St. The yellow dots represent flooding that lasts less than one hour, and the reds dots represent flooding that lasts more than one hour.

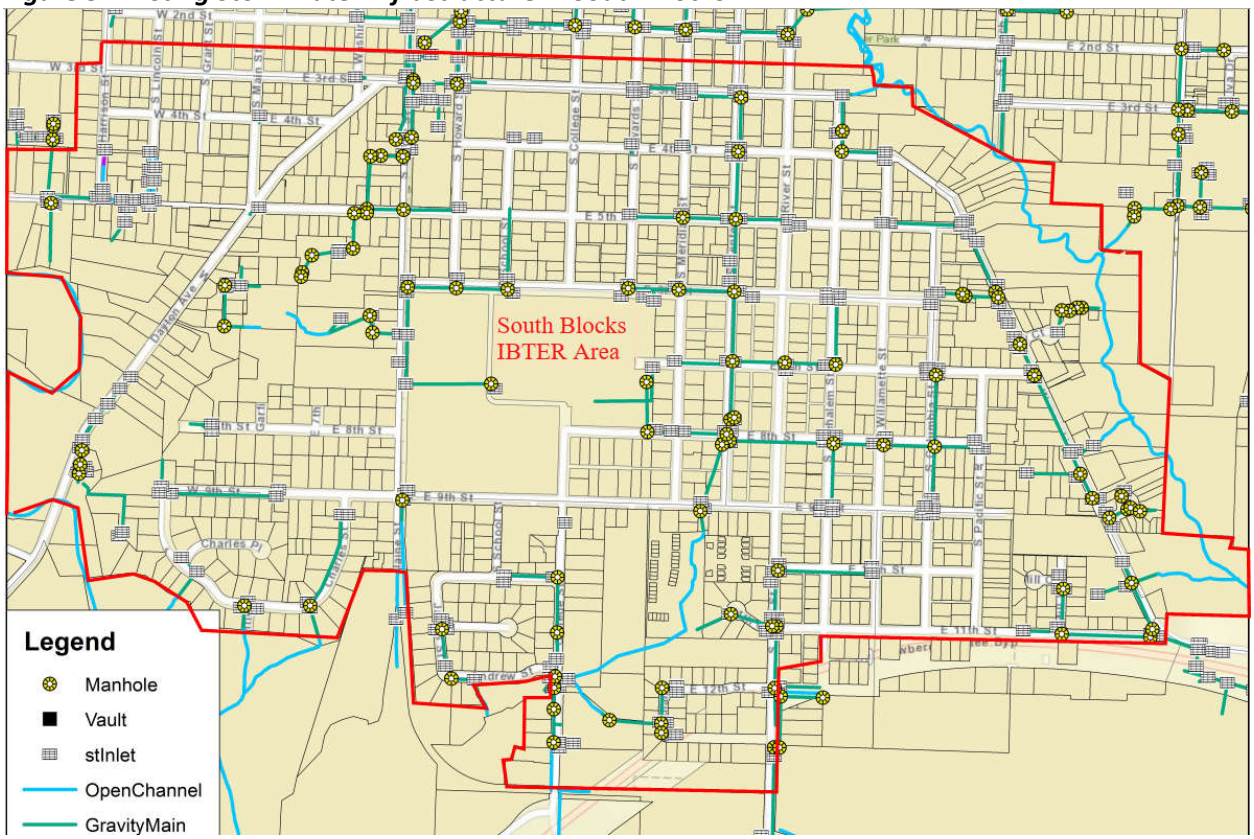
Figure 4: Existing Stormwater Flooding in North Blocks



In addition, the 2014 SWMP documents the lack of a stormwater collection system (catch basins and storm pipes) along N Edwards St between E Sheridan St and Vermillion St. The lack of a stormwater collection system extends one block west from N Edwards St along the following streets: E Sheridan St, E Sherman St, E Franklin St, E North St, and E Vermillion St.

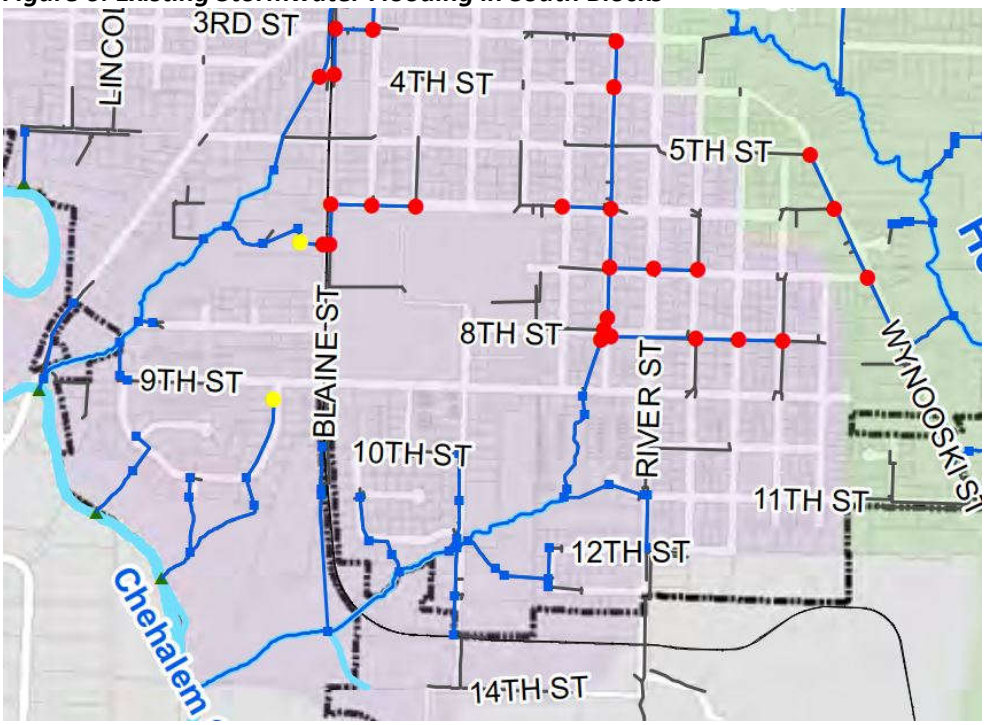
The existing stormwater infrastructure in the South Blocks is shown in Figure 5.

Figure 5: Existing Stormwater Infrastructure in South Blocks



The 2014 SWMP shows modelled stormwater pipes in the North Blocks area have capacity issues, which result in flooding at the 10-design storm service level (see Figure 6). Flooding occurs throughout the South Blocks as shown in the figure. The yellow dots represent flooding that lasts less than one hour, and the reds dots represent flooding that lasts more than one hour.

Figure 6: Existing Stormwater Flooding in South Blocks



According to Section 4.6 of the City of Newberg 2015 Public Works Design and Construction Standards, any development that creates more than 500 sq ft of net new impervious area requires stormwater quantity and quality facilities improvements. This requirement also applies to duplexes and other types of middle housing on lots zoned for residential development.

According to Section 4.6 of the City of Newberg 2015 Public Works Design and Construction Standards, any development that creates more than 500 sq ft of net new impervious area requires stormwater quantity on-site detention facilities designed to capture runoff so the post-development runoff rates from the site do not exceed the predevelopment runoff rates from the site, based on 24-hour storm events ranging from the ½ of the 2-year return storm to the 25-year return storm. Specifically, the ½ of the 2, 2, 10, and 25-year post-development runoff rates will not exceed their respective ½ of the 2, 2, 10, and 25-year pre-development runoff rates.

Most new developments, including duplexes and other types of middle housing on lots zoned for residential development will be required to detain stormwater runoff to pre-developed peak flow rates and treat stormwater. Therefore, the existing capacity in the stormwater system will not be exceeded due to development, unless the system is currently under capacity.

<u>Deficiency in Capacity</u>

Certain locations within the two areas identified in Figures 1 and 2 have a lack of stormwater infrastructure, or adequately-sized stormwater infrastructure, such as storm drainage pipes, catch basins and inlets that results in not meeting an acceptable service level as documented in the adopted 2014 SWMP.

If the anticipated increase of 22 EDU's of middle housing developments all created a net new impervious area of just under 500 sq ft each, which is highly unlikely, the total net new impervious

area would equal 10,978 sq ft. This would be the worst-case scenario of not detained and untreated stormwater for middle housing in the two areas identified in Figures 1 and 2. This would result in a negligible and trivial impact on the existing stormwater system.

Therefore, stormwater infrastructure is not expected to exceed capacity based on additional impacts from middle housing development due to 1% IBTER EDU increases by December 31, 2023, based on current development trends.

Impacts of Additional Middle Housing

A significant stormwater infrastructure deficiency is not expected to be caused only by additional middle housing development in the two areas identified in Figures 1 and 2.

System Capacity Assumptions

The 2014 SWMP modeled current impacts on the existing stormwater pipe capacity by entering pipe diameter, slope, length, roughness coefficient, pipe invert elevation, and ground elevation into a computer model to simulate hydraulic conditions at the 10-year design storm event. The modeling results were reviewed with City staff and compared to known flooding problems reported by the City's maintenance crews. Anecdotal accounts of flooding were generally consistent with the locations where flooding occurred in the modeled system.

Documented Deficiencies

The adopted 2014 SWMP has documented multiple deficiencies in the North and South Blocks of Newberg (see Figures 7 & 8). Each deficiency is described in Table 2.

Figure 7: Reported Stormwater Deficiencies in North Blocks

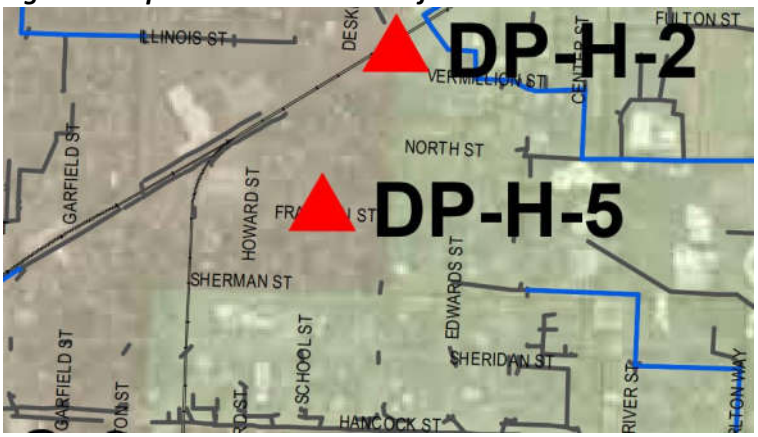


Figure 8: Reported Stormwater Deficiencies in South Blocks

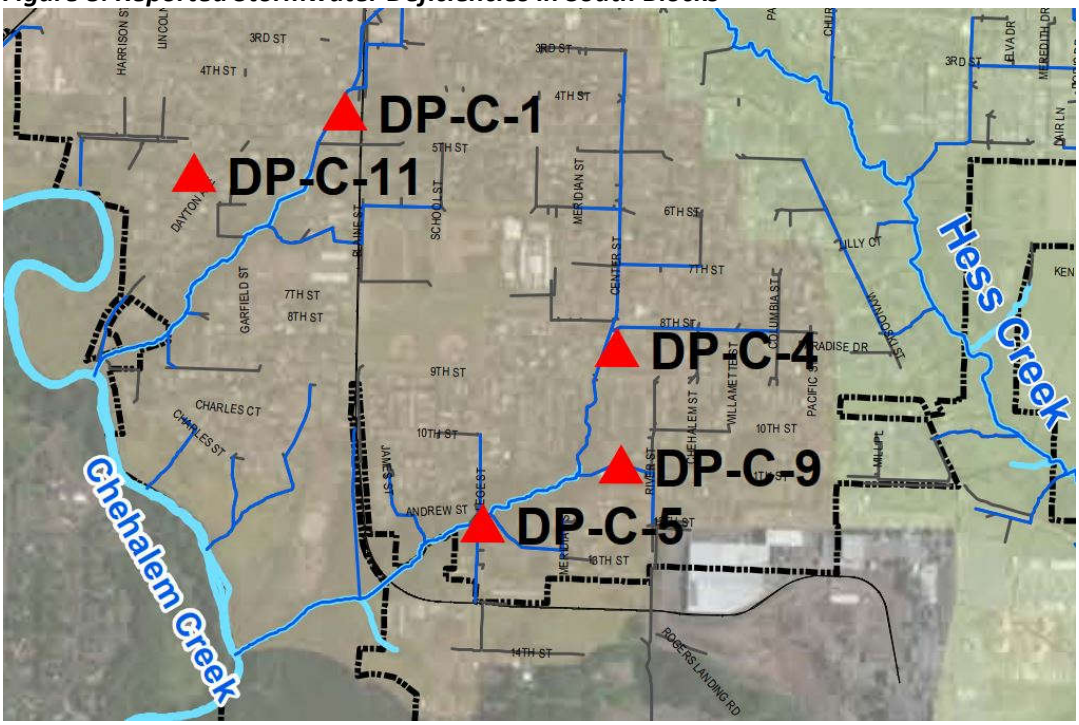


Table 2: 2014 SWMP Problem Area Descriptions in North and South Blocks

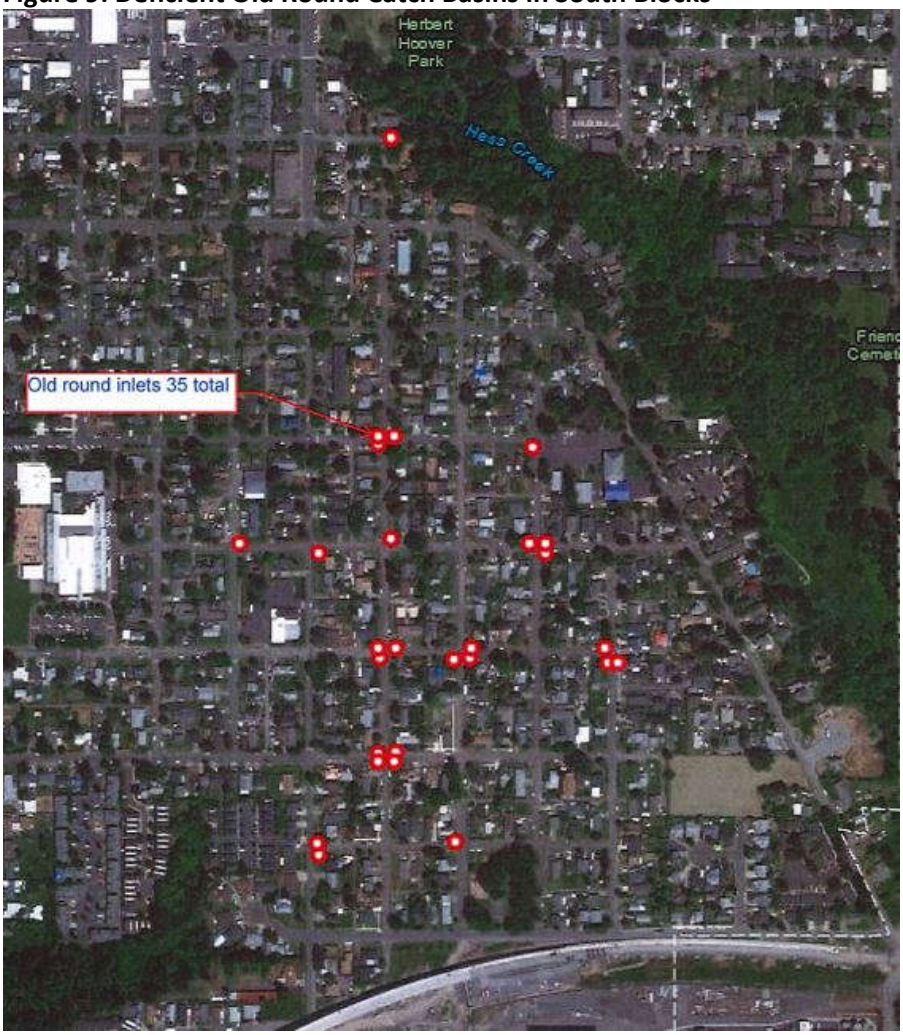
Identifier	Location	Problem description
DP-C-1	Near 5th and Blaine Streets	Hollingsworth drain is CMP/concrete; has roots; is 30' deep, under houses, and failing. When it fails/plugs, all of downtown storm system fails.
DP-C-1	Hollingsworth Storm Line	12" storm line under 5th Street needs realignment.
DP-C-1	Blaine/Hollingsworth	Failed pipe - 18" tin whistle.
DP-C-4	Between 8th and 9th Streets near Center Street	Flat sloped pipe runs under house on private property; needs to be rerouted.
DP-C-5	Natural system crossing College Street, south of Andrew Street	Steep ravine; multiple pipe materials; potential to collapse and fail.
DP-C-5	College Street south of Andrew Street	Existing pipe system under College Street is composed of multiple pipe materials, causing ongoing maintenance problems and concerns over long-term stability.
DP-C-9	9th and River Streets, southeast Corner	Roadway floods 10-12' radius around catch basin.
DP-C-9	S River Street and 11th Court	Two clay sewer tile pipe segments are deteriorating and require replacement. Replacement should be sized to convey future flows.
DP-C-11	Dayton Avenue near Johanna Court	Roadway drainage flows into driveways and causes minor damage of driveways and sidewalk. Report confirmed by maintenance staff.
DP-H-2	Vermillion Street between College Street and railroad tracks	Undersized and flat pipe discharges to tracks with no fall. (Note: GIS data do not show a pipe in this area.)
DP-H-2	College and Vermillion Streets	Intersection ponding
DP-H-2	College and Vermillion Streets	Gravel street area floods.
DP-H-5	College and Franklin Streets	Intersection ponding
DP-H-5	College and Sherman Streets	Bubbler backs up

The current City of Newberg Capital 5-Year Improvement Program (2020-2025) documents other significant infrastructure deficiencies not identified in the 2014 SWMP. Those deficiencies include the following:

- Stormwater pipe and outfall has severely eroded the area east of NE Wynooski Street near the 800 block of NE Wynooski St. This project is located within the South Blocks of Newberg. This project would extend the outfall further down the slope to reduce erosion. The City has budgeted $225,000 for the 2020-2021 fiscal year to complete this project.

- Old round catch basins located within the South Blocks of Newberg frequently plug up with debris during small rainstorms and flood road intersections (see Figure 9). The City has budgeted $375,000 for improving these deficient catch basins for the 2020-2024 fiscal years.

Figure 9: Deficient Old Round Catch Basins in South Blocks



Impacted Areas

Vicinity Map

Figures 10 and 11 are vicinity maps showing the boundary of the impacted areas for which the stormwater IBTER is requested.

Figure 10: Boundary of Stormwater Impacted Areas in North Blocks

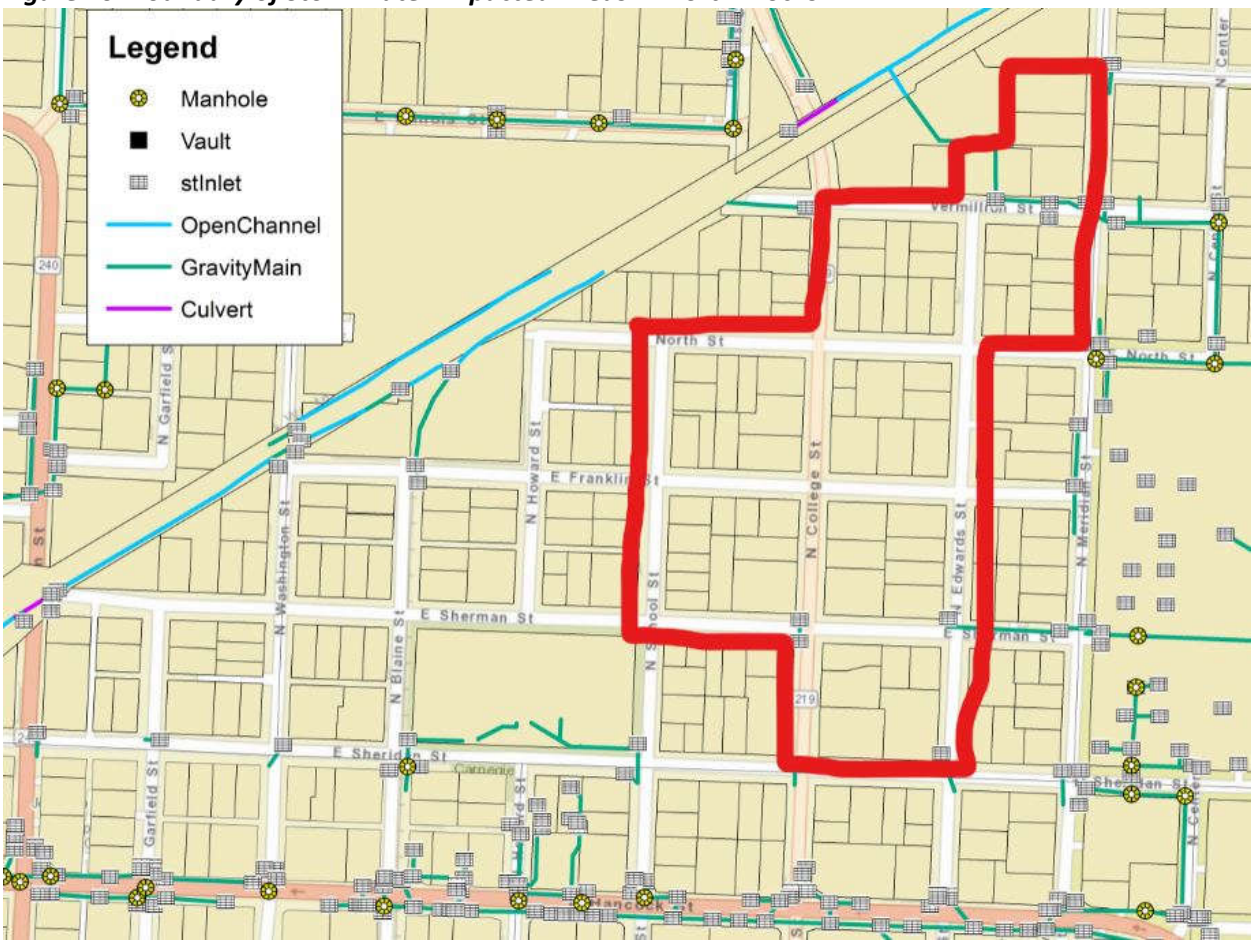
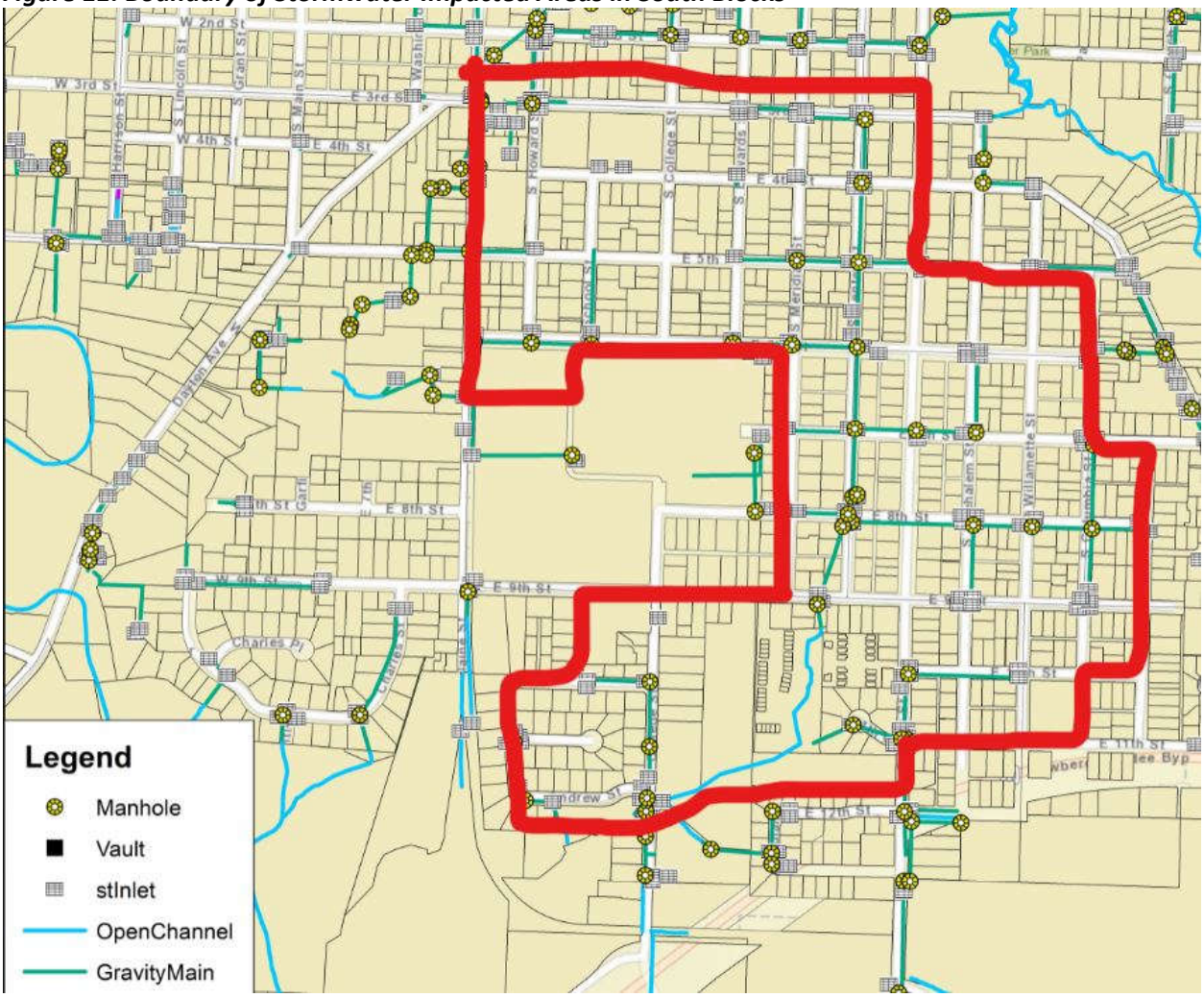


Figure 11: Boundary of Stormwater Impacted Areas in South Blocks



Remediation/Capital Improvement Plan

The remediation/capital improvement plan describes proposed infrastructure improvements intended to remedy the significant infrastructure deficiencies to allow the City to implement middle housing provisions.

Timeline

According to the adopted 2014 SWMP the proposed period of time needed to address the significant infrastructure deficiencies vary from 6 to 20 years, including phasing and contingencies.

Alternatives to Address Deficiencies

The 2014 SWMP considered several alternatives/options to address the modeled and documented significant stormwater infrastructure deficiencies. The proposed capital improvements are the most expeditiously feasible approach available to address the deficiencies. Various constraints such as topography, minimum pipe slope, minimum pipe cover, and ability to obtain public easements the alternatives/options to address the deficencies are limited. The most cost effective and expeditious alternatives were selected to address the deficencies.

Benefits of Improvement Projects for Middle Housing

The proposed stormwater capital improvements in 2014 SWMP will provide acceptable service levels to anticipated middle housing by eliminating flooding at the 25-year storm event. The proposed capital improvements will allow development of anticipated middle housing without causing flooding.

Potential Funding Sources

Two potential funding sources for the proposed remediation and capital improvement plan are the Stormwater Utility Rates and System Development Charges (SDCs) on new development.

Map of Areas Improved by Projects

Figure 12 shows the North Block areas that will be remedied by the proposed 2014 SWMP Capital Improvement Plan. The adopted CIP improvements in the North Blocks area include H-2: N Edwards St Improvements.

Figure 12: 2014 SWMP Capital Improvement Plan in North Blocks

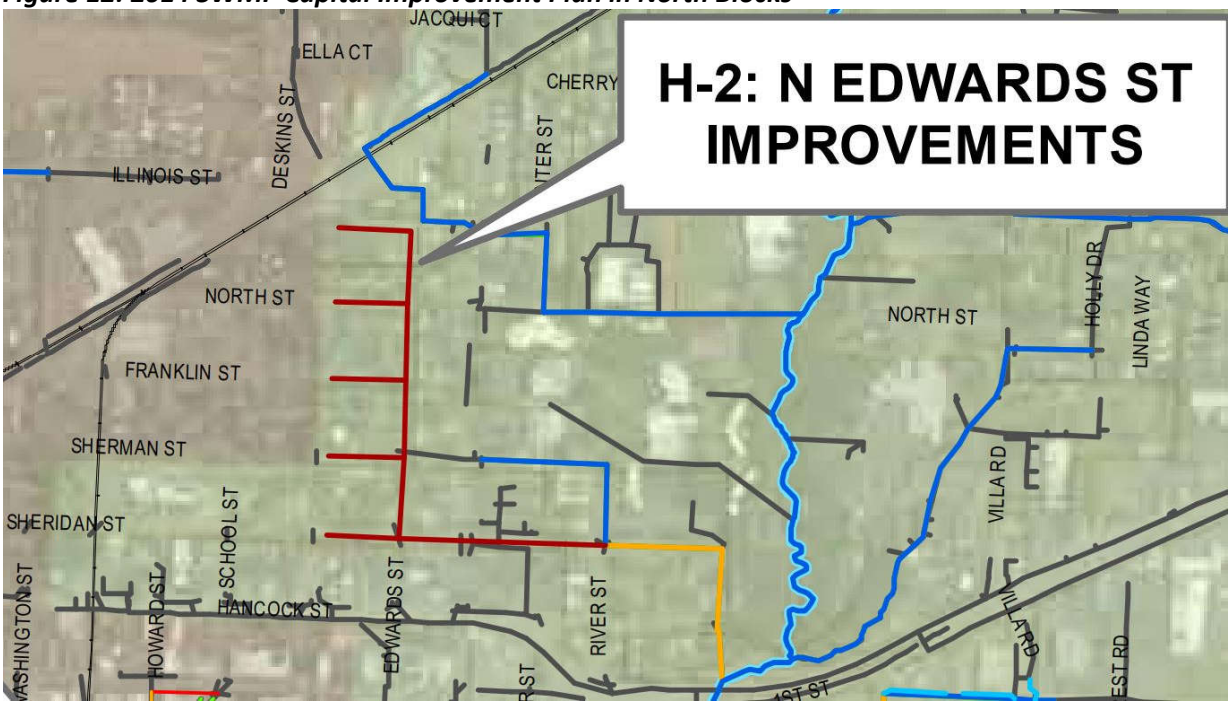
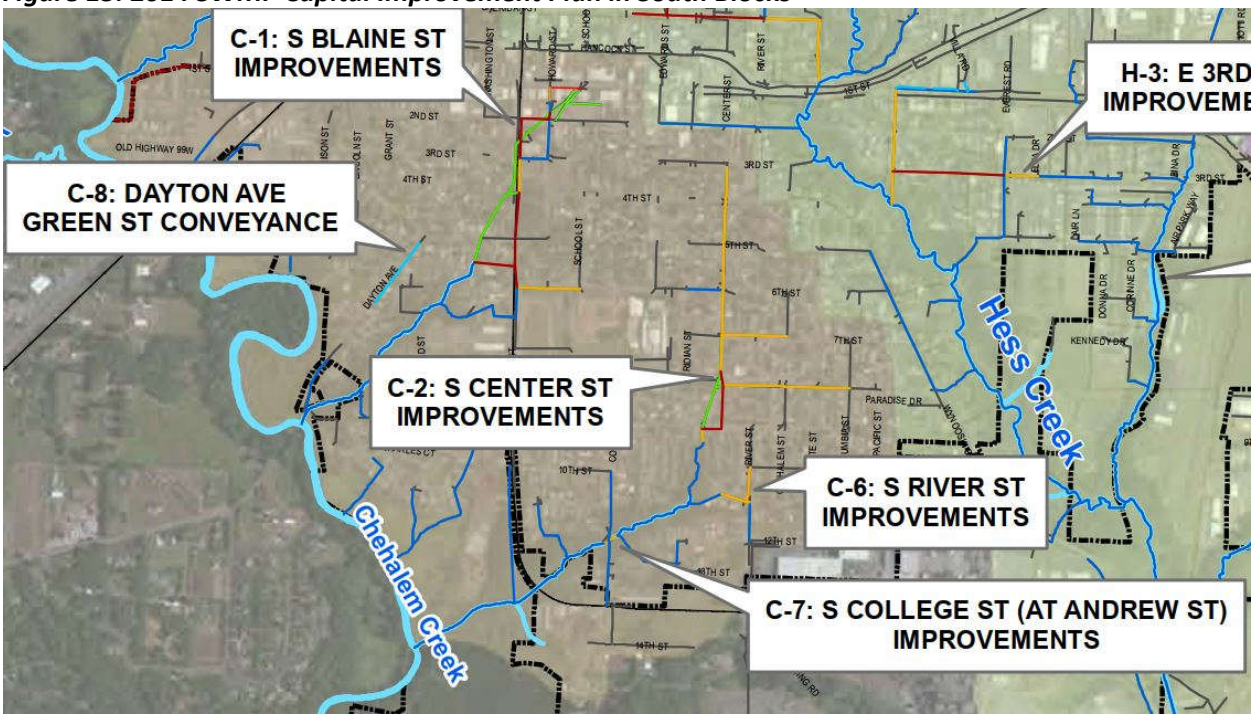


Figure 13 shows the South Block areas that will be remedied by the proposed 2014 SWMP Capital Improvement Plan. The adopted CIP improvements in the South Blocks area include C-1: S Blaine St Improvements, C-2: Center St Improvements, C-6: S River St Improvements, C-7: S College St (At Andrews St) Improvements, and C-8: Dayton Ave Green St Conveyance. It should be noted that a portion of S Blaine St Phase One Improvements have been completed in 2018 south of 401 S Blaine St.

Figure 13: 2014 SWMP Capital Improvement Plan in South Blocks



Timeline of Remediation Plan

According to the 2014 SWMP the proposed timeline and cost of the capital improvement projects located within the South and North Blocks of Newberg are shown in Table 3.

Table 3: 2014 SWMP Capital Improvement Project Cost and Timeline

CIP #	Capital Improvement Project Name	Cost	Estimated timeline
C-1	Blaine Street Improvements - Design	$ 180,000	Short-term (within 6 years)
C-1A	Highway 99W to 2nd Street Parking Lot Pipe Decommissioning/Replacement	$ 131,000	Short-term (within 6 years)
C-1B	S Blaine Street Pipe Replacement	$ 384,000	Short-term (within 6 years)
C-1C	E 2nd Street to E 5th Street Pipe Decommissioning/Replacement	$ 291,000	Short-term (within 6 years)
C-1D	E 6th and S Blaine Streets Pipe Replacement	$ 176,000	Long-term (within 20 years)
C-2	S Center Street Improvements - Design	$ 180,000	Short-term (within 6 years)
C-2A	E 9th Street to S Center Street Pipe Decommissioning	$ 294,000	Short-term (within 6 years)
C-2B	S Center, E 8th, and E 7th Streets Pipe Replacement	$ 930,000	Long-term (within 20 years)
C-6	S River Street Improvements	$ 160,000	Short-term (within 6 years)
C-7	S College Street at Andrew Street Improvements	$ 196,000	Long-term (within 20 years)
C-8	Dayton Avenue Green Streets	$ 125,000	Mid-term (within 12-years)
H-2	N Edwards Street Improvements	$1,217,000	Long-term (within 20 years)

Middle Housing in Other Areas

Middle housing is expected to be implemented in all other areas outside of the IBTER areas during the extension period.

Bond Measure

If the City proposes a bond measure or similar financial mechanism that requires voter approval as a means to fund an infrastructure improvement project, the City may prepare a contingency plan for funding the infrastructure improvement.

Technical Memorandum

Date: September 28, 2020

Project: Newberg Water Master Plan (WMP) Technical Update

To: Brett Musick, P.E.
City of Newberg Engineering

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Re: Water system analysis results to inform Infrastructure Based Time Extension Request (IBTER) for Oregon House Bill 2001 (HB 2001) Missing Middle Housing

This project is funded by Oregon general fund dollars through the Department of Land Conservation and Development. The contents of this document do not necessarily reflect the views or policies of the State of Oregon.

Introduction and Purpose

This memo documents an analysis of the estimated impact of increased residential housing density on water system infrastructure in two areas of the City of Newberg (City). Increased housing density is anticipated as result of 2019 Oregon legislation, House Bill (HB) 2001 Missing Middle Housing, which requires updates to local laws throughout Oregon that currently limit the types of housing approved for construction in residentially zoned areas. The City will adopt regulations that will allow for the development of duplexes and other types of middle housing in areas zoned for residential development to comply with this legislation and address needed housing types for residents at all income levels.

This analysis was conducted to inform an Infrastructure-Based Time Extension Request (IBTER) as described in Oregon Administrative Rules (OARs) 660-046-0300 to 0370 which became effective August 7, 2020. An approved IBTER would grant the City additional time to comply with the requirements of HB 2001 Missing Middle Housing.

IBTER Study Areas

City staff identified two areas for infrastructure analysis to inform an IBTER:

- North of Downtown Newberg - up to the rail line that runs through Newberg to Hess Creek (Figure 1)
- South of Downtown Newberg - from the Chehalem Creek and railroad line intersection to the WestRock line and Hess Creek (Figure 2)

Water System Background

The existing Newberg water system is served almost entirely as a single pressure zone, Zone 1. Both IBTER study areas are in Zone 1. Zone 1 customers receive pressure from three finished water storage reservoirs, North Valley Reservoirs 1 and 2 north of downtown and Corral Creek Reservoir east of downtown. These reservoirs are filled through the distribution system pipe network by pumps at the City's Water Treatment Plant on the Willamette River near the former WestRock mill site. The WTP is supplied by the City's wellfield on the south side of the Willamette River across from the WTP.

In general, the City's distribution system runs at relatively high pressures with most customers receiving near 80 pounds per square inch (psi), which is the Oregon Plumbing Code service pressure maximum.

The City adopted the current Water Master Plan (WMP) in 2017. The current WMP identifies a single distribution main capital improvement program (CIP) project within the IBTER south study area, replacement of a 4-inch diameter main on Dayton Avenue to meet fire flow criteria (WMP CIP M-2).

Water System Hydraulic Analysis

Consistent with IBTER state guidelines, the following analysis considers fire flow availability and service pressure impacts, if any, resulting from increased density within the IBTER study areas. Required fire flow by land use type and acceptable service pressure ranges in the distribution system are as established in the 2017 WMP and summarized in the following paragraphs.

IBTER guidelines specify that only localized utility impacts, not system-wide impacts, should be evaluated in support of an IBTER, thus a Zone 1 storage and system-wide supply analysis are not examined in detail. In general, the City's existing Zone 1 storage and supply facilities have adequate surplus capacity, therefore a short-term storage or supply impact is not expected from increased density in these limited areas. Impacts to the distribution system piping to meet fire

flow and pressure criteria are understood to be only those improvements needed beyond what was recommended in the 2017 WMP, WMP CIP M-2.

A distribution system analysis was conducted using a steady-state hydraulic network analysis model developed and calibrated with field flow testing data for the 2017 WMP.

Water Demand

Water demands can be estimated using either water consumption billed to customers or finished water production recorded at the WTP. For planning purposes, water consumption from billing records is used to assign water use geographically throughout the water system model based on service address. However, water consumption data does not capture non-revenue water, such as minor leaks and maintenance uses like hydrant flushing for water quality. To account for non-revenue water uses, distributed demands by customer service address are scaled up in the model to match water produced by the WTP. This approach effectively distributes non-revenue water evenly throughout the distribution system.

Water Demand Metrics

Water demand is described using two metrics:

- Average Daily Demand (ADD) – the total water production for a given year divided by 365 days
- Maximum Day Demand (MDD) – the largest calendar day (24 hours) water production for a given year; in Newberg and western Oregon, maximum day demand occurs between July 1 and September 30th each year (this is referred to as the peak season)

Demand per Dwelling Unit

In systems with primarily residential demands like Newberg, it can be useful to estimate a demand per person per day measured in gallons per capita day (gpcd). This is estimated as system-wide ADD divided by the water service area population. This per capita demand implicitly includes all non-residential water system demands and can be used to forecast future water demands based on population growth or new residential unit construction. Table 1 summarizes estimated demand per dwelling unit based on historical WTP production records, Newberg population estimates from the Portland State University Population Research Center (PSU PRC), and a 2.66 average number of persons per dwelling unit from US Census data. MDD is approximately two times ADD, consistent with the 2017 WMP.

Table 1
Average Water Demand per Dwelling Unit

Year	ADD (mgd)	Population	ADD/person (gpcd)	ADD/unit (gpd)	MDD/unit (gpd)
2016	2.35	23,465	100	266	532
2017	2.35	23,480	100	266	532
2018	2.39	23,795	101	269	538
2019	2.27	24,045	94	250	500
Average ADD and MDD per Unit in gallons per day (gpd)				**263**	**526**

Estimated Growth from Increased Density due to Middle Housing

Per state IBTER guidelines in OAR 660-046-0320 and 330, the City may consider a one percent growth rate for infill development in the IBTER study areas. The City may consider a three percent growth rate for any properties considered un- or underdeveloped. Underdeveloped is defined in the OARs as a larger than one-half acre parcel zoned for detached single-family housing which has an existing density of less than or equal to two units per acre.

City Planning staff provided detailed parcel information for each area and identified parcels which may be considered underdeveloped. Estimated growth in dwelling units for the IBTER study areas based on this parcel data and the OAR guidelines is summarized in Table 2.

Table 2
Estimated Dwelling Unit Growth

	Existing Units		Infill Growth	Redevelopment Growth
IBTER Area	Developed Parcels	Underdeveloped Parcels	1% for existing (not underdeveloped)	3% for existing (underdeveloped)
South of Newberg	1,485	36	18	3
Single-Family	879	35	9	2
Multi-Family	428	-	5	-
Duplex	125	1	2	1
Triplex	21	-	1	-
Fourplex	32		1	-
North of Newberg	176	-	3	-
Single-Family	170	-	2	-
Multi-Family	-	-	-	-
Duplex	6	-	1	-
TOTAL Existing Units	**1,697**		**TOTAL Growth Units**	**24**

Estimated Study Area Demand

Current demand and estimated demand with middle housing growth for the IBTER study areas is summarized in Table 3. Current ADD was estimated based on geographic assignment of 2015 billing records in the hydraulic model for the 2017 WMP and 2019 City WTP production. As shown in Table 1, ADD has remained relatively constant since 2016.

Table 3
IBTER Study Area Demand Summary

Area	Current Demand (gpd)		Estimated Demand with middle housing growth (gpd)	
	ADD	MDD	ADD	MDD
South of Downtown	336,240	672,480	341,763	683,526
North of Downtown	52,070	104,141	52,859	105,719

Distribution System Performance Criteria

System performance was evaluated using pressure, pipe velocity, and required fire flow criteria established in the 2017 WMP and summarized in Table 4.

Table 4
Distribution Performance Criteria

Water System Component	Evaluation Criterion	2017 WMP Value	Design Standard/Guideline
Service Pressure	Normal Range, during ADD	40-80 psi	City's 2015 Public Works *Design and Construction Standards*
	Maximum, without PRV	80 psi	Oregon Plumbing Specialty Code 608.2
	Minimum, during emergency or fire flow	20 psi	OAR 333-061
Distribution Mains	Velocity during fire flow	Not to exceed 8 fps	City's 2015 Public Works *Design and Construction Standards*
	Velocity during ADD	Not to exceed 5 fps	
Required Fire Flow and Duration	Low Density – Single-Family and Duplex Residential <= 3,600 sq ft	1,000 gpm for 2 hours	Oregon Fire Code
	Single-Family and Duplex Residential >3,600 sq ft	1,500 gpm for 2 hours	
	Medium Density Residential	1,500 gpm for 2 hours	
	High Density Residential	2,000 gpm for 3 hours	
	Commercial	3,000 gpm for 3 hours	
	Industrial, Institutional, and Hospitality	4,500 gpm for 3 hours	

Assumptions and Modeling Conditions

For the purposes of this analysis, it is assumed that all Zone 1 reservoirs are operating approximately three-quarters full and the WTP is not actively pumping to fill storage reservoirs.

Analysis Findings and Distribution System Constraints

Service Pressure

Modeled main line pressures under MDD conditions in the IBTER south area are between approximately 90 and 100 psi. Pressures in the north study area range between approximately 80 and 90 psi. These mainline pressure ranges remain the same with the approximately two percent increase in water demand generated by potential middle housing increased density.

Fire Flow Availability

Fire flow availability was tested at 2,000 gallons per minute (gpm) consistent with high density residential required fire flow from Table 4. This 2,000 gpm fire flow may be conservative in some parts of the IBTER study areas where smaller structures with fewer units, like duplexes, are more likely to be developed. However, providing water infrastructure capable of supplying a 2,000 gpm fire flow allows the City to consider a broader range of middle housing options as HB 2001 zoning changes are evaluated.

Fire flow availability in the south IBTER study area is constrained by high pipe flow velocity. Adequate pressure is available to supply fire flow and maintain service pressures above 20 psi for public health. However, small diameter 4- and 6-inch diameter pipe grids in the south study area create flow velocities over 20 feet per second (fps) during a fire flow event. Fire flow in the north study area is less constrained with 8-inch diameter well looped existing mains interconnected with the 18-inch diameter North Valley Reservoirs transmission main.

The primary concern with high pipe velocity is abrasion of the interior pipe coating, which can expose the pipe material to corrosion and lead to potential pipe failure. This is generally a greater concern when high flow velocity extends over a long period of time as part of normal system operation. In the case of a fire flow event, these high flow velocities are both infrequent and for a short time when they do occur. Thus, a pipe velocity higher than the 8 fps specified in Table 4 may be acceptable, provided there is adequate available pressure to supply fire flow as is the case in Newberg's IBTER south study area. According to information from the Ductile Iron Pipe Research Association (DIPRA), 14 fps is a conservative maximum pipe velocity based on satisfactory historical performance of cement mortar lined ductile iron pipe. For the purposes of this analysis available fire flow is evaluated at a flow velocity of 14 fps.

Figure 3 at the end of this memo illustrates available fire flow in the north and south IBTER study areas with existing water mains under max day demand conditions and with a maximum flow velocity of 14 fps.

Recommended Improvements

Eight significant pipe improvement projects are recommended for the south study area and one minor project is recommended for the north study area to provide adequate fire flows to potential higher density development. In the south, existing development is primarily served from a 4- and 6-inch diameter pipe grid. While a 6-inch diameter main can provide a 1,000 gpm single-family residential fire flow, a 6-inch diameter grid is inadequate to provide a 2,000 gpm multi-family residential fire flow.

Existing 6-inch diameter mains along key corridors in the south study area, including S College Street, S River Street, and E 9th Street, are recommended to be upsized to 12-inch diameter mains to provide a large diameter backbone for the area to meet 2,000 gpm fire flow requirements for potential higher density development. Additional looping is also recommended to connect larger diameter mains with the 18-inch diameter transmission main in Wynooski Street and for the W 4th Street neighborhood between Dayton Avenue and Hwy 99W.

Two areas in the southwest corner of the south study area cannot be supplied a 2,000 gpm fire flow without significant or total pipe replacement and upsizing. The first area is the S Charles Street loop, which is bordered by Chehalem Creek to the west making it difficult to connect to the water system outside of the south study area. The second area is between S College Street and S River Street just north of the Newberg Dundee Bypass, which does not have an existing east-west right-of-way to provide additional looping. Rather than replacing these pipes in their current alignments, it is instead recommended that the City assess fire flow to these areas and potential distribution system looping along with future transportation projects associated with the Riverfront area, such as the extension of S Blaine Street south of Ewing Young Park and the extension of a future road across the former WestRock mill property connecting the area around the City's WTP and NE Rogers Landing Road.

Figure 4 at the end of this memo illustrates recommended pipe improvement projects.

Cost Estimates

An estimated cost has been developed for each recommended piping improvement project. New piping is assumed to be ductile iron pipe installed by private contractors.

Cost estimates represent opinions of cost only, acknowledging that final costs of individual projects will vary depending on actual labor and material costs, market conditions for construction, regulatory factors, final project scope, project schedule and other factors. The Association for the Advancement of Cost Engineering International (AACE) classifies cost estimates depending on project definition, end usage, and other factors. The cost estimates presented here are considered Class 4 with an end use being a study or feasibility evaluation and an expected accuracy range of -30 percent to +50 percent. As the project is better defined, the accuracy level of the estimates can be narrowed.

Since construction costs change periodically, an indexing method to adjust present estimates in the future is useful. The Engineering News-Record (ENR) Construction Cost Index (CCI) is a commonly used index for this purpose. For purposes of future cost estimate updating, the current ENR CCI for Seattle, Washington is 12,771.70 (September 2020).

Recommended improvements and estimated costs are summarized in Table 5.

Table 5
Recommended Improvements

Project No.	Project Description	Estimated Project Cost[1-6]
I-1	Install 1,733 LF of 8-inch DI Pipe in S Main Street, W 4th Street, S Lincoln Street, and W 5th Street	$486,000
I-2	Install 2,558 LF of 12-inch DI Pipe in S Blaine Street	$812,000
I-3	Install 2,962 LF of 8- and 12-inch DI Pipe in E 9th Street, Charles Street, and S College Street	$1,756,000
I-4	Install 772 LF of 8- and 12-inch DI Pipe in S Meridian Street	$440,000
I-5	Install 3,691 LF of 12-inch DI Pipe in E 7th Street, S Pacific Street, E 9th Street, and Paradise Drive	$1,167,000
I-6	Install 2,736 LF of 12-inch DI Pipe in S River Street	$868,000
I-7	Install 453 LF of 12-inch DI Pipe in E 5th Street	$148,000
I-8	Install 159 LF of 8-inch DI Pipe from E 11th Street to the Boston Square Apartments	$49,000
I-9	Install 15 LF of 8-inch DI Pipe in Vermillion Street	$11,000
	Total Cost	$5,737,000

Notes:

1. All costs are in 2020 dollars
2. Includes costs for fittings/valves and connections to existing services and hydrants
3. Includes local street trench patch resurfacing; whole or half street overlays are not included
4. Includes an allowance of 30% for construction contingency, 25% for engineering, permitting and inspection, and 1% for Oregon Corporate Activity Tax (applied to construction costs only)
5. Easement and right-of-way costs are not included
6. City project management and administrative costs are not included

Figure 1: North of Downtown Newberg

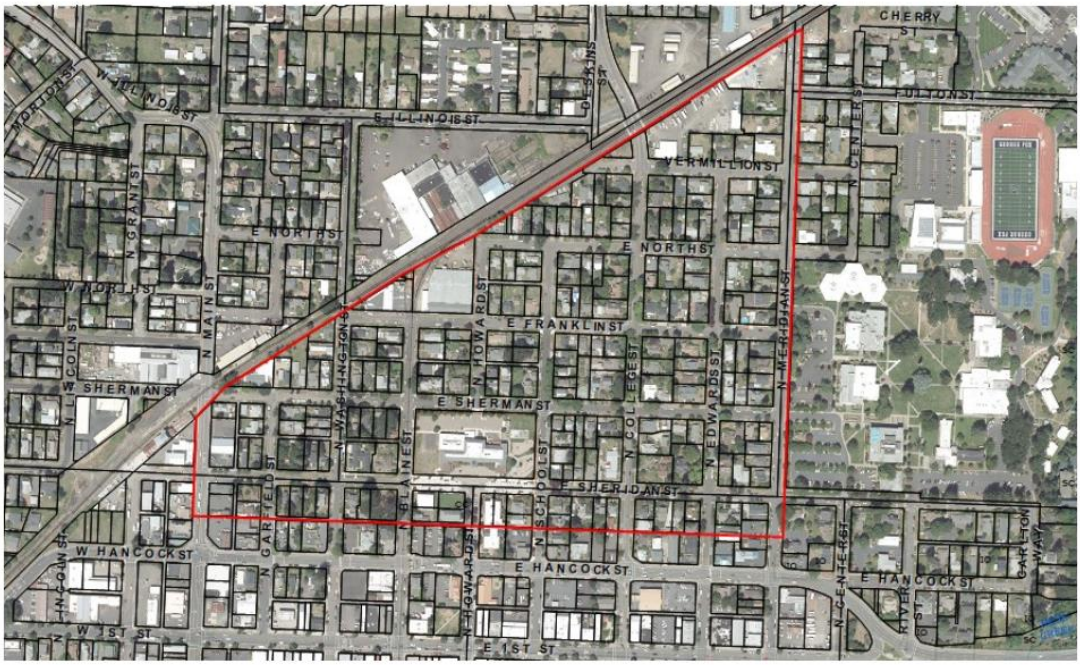
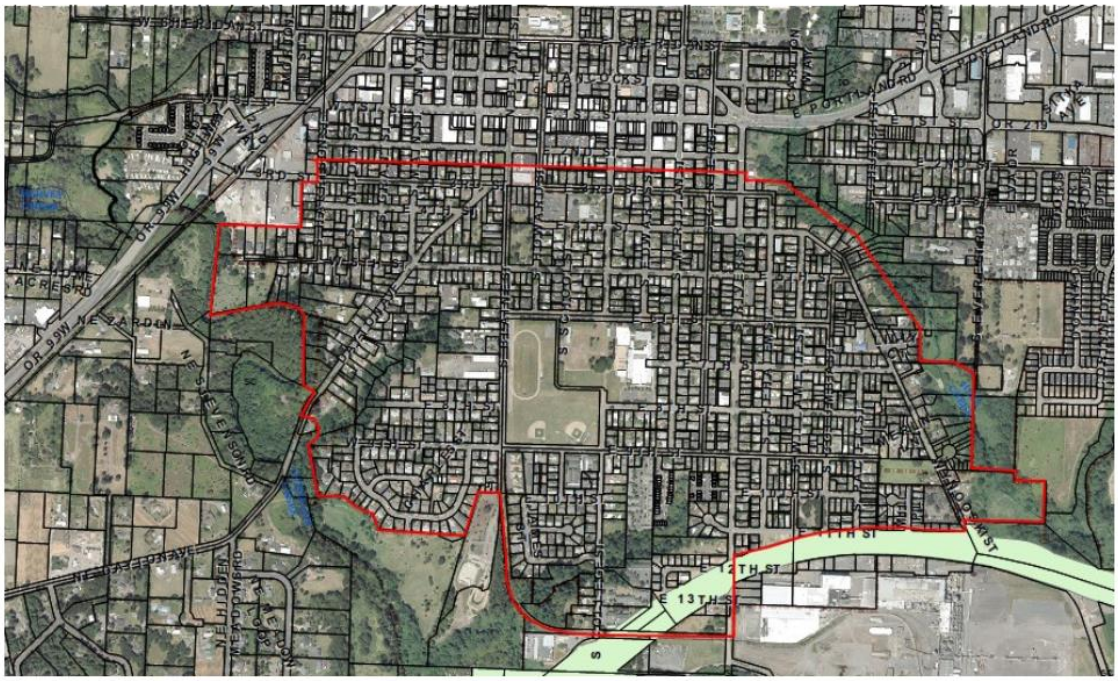
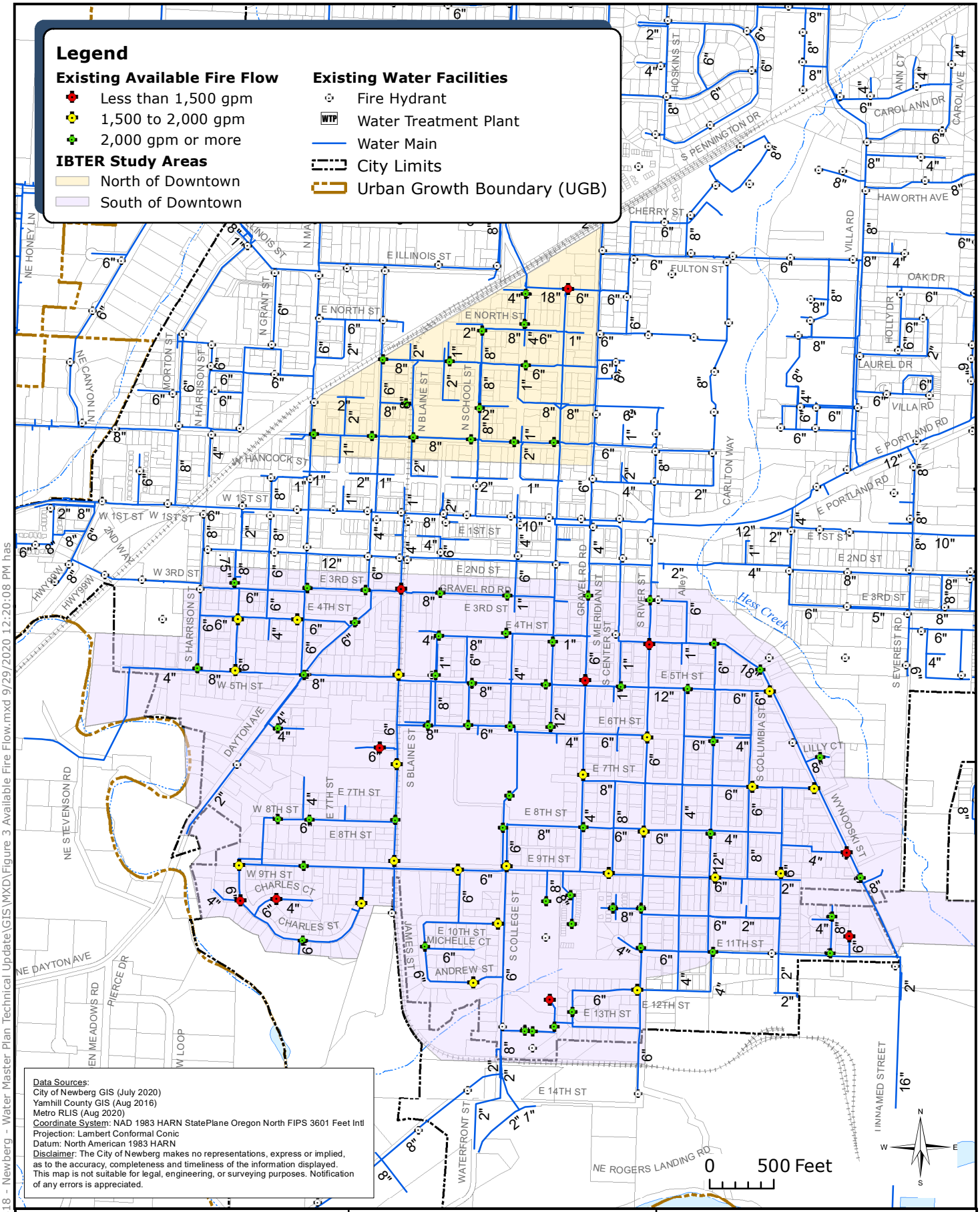


Figure 2: South of Downtown Newberg





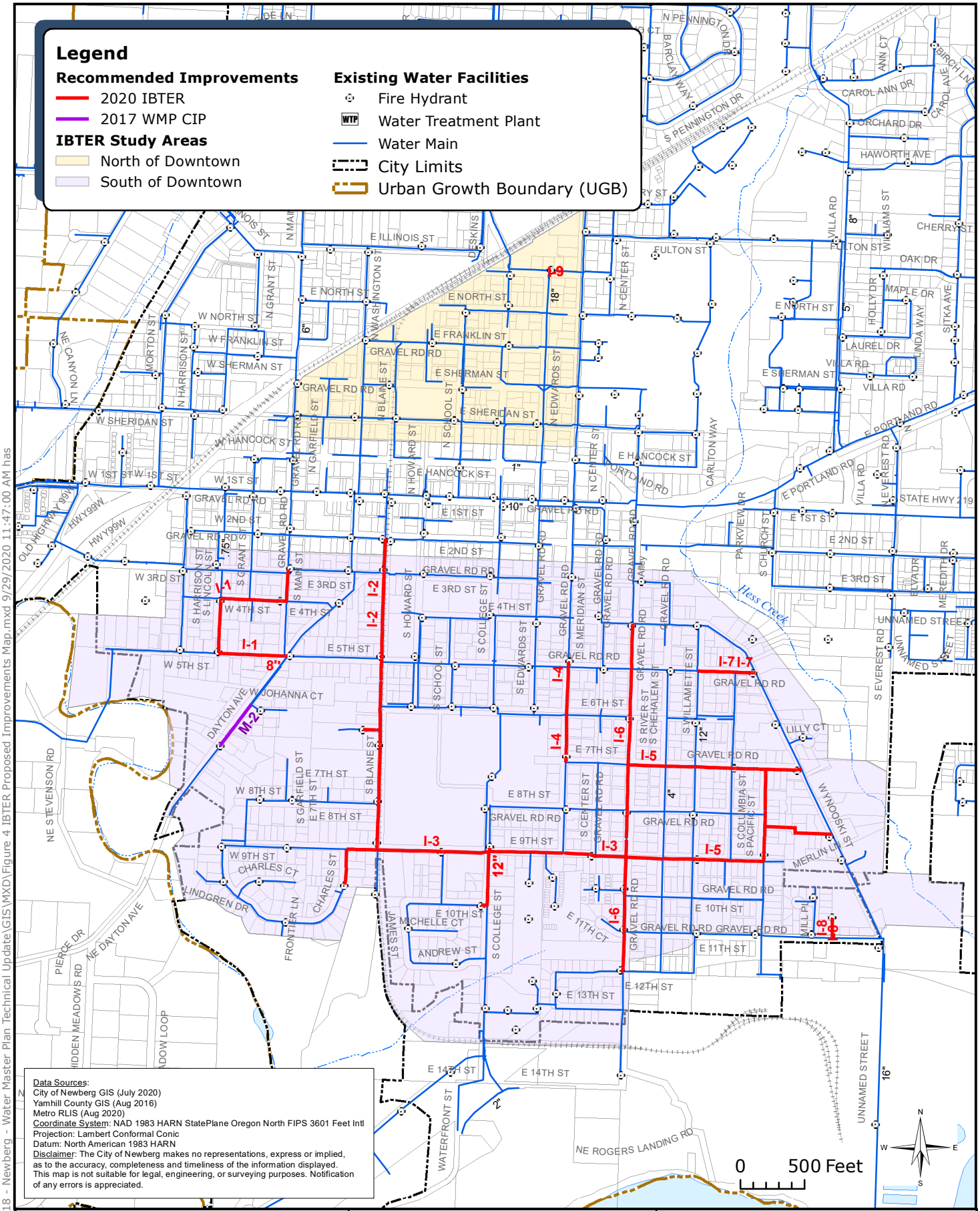
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Water Master Plan Technical Update

Figure 3 Available Fire Flow

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Water Master Plan Technical Update

Figure 4
IBTER Proposed Improvements