



PROJECT MEMORANDUM

DATE: June 11, 2014
FROM: Steven Harrison, PE – David Evans and Associates, Inc.
TO: South Cooper Mountain Technical Advisory Committee
CC: South Cooper Mountain Project Management Team
SUBJECT: **Water System Concept Plan – Summary Findings and Planning Level Cost Estimates**
PROJECT: **South Cooper Mountain Concept and Community Plans
City of Beaverton #2752-13B**
DEA PROJECT NO: APGI0000-0002

This memo provides a summary to support the evaluation of the final concept for the South Cooper Mountain Concept Plan including estimated water system demands and estimated waterline capacity and associated costs. This memo is related to the future water system infrastructure needs within the South Cooper Mountain planning area. Information was gathered from the City of Beaverton (City), Tualatin Valley Water District (TVWD), and the City of Hillsboro to identify their near term plans to provide adequate water system capacity to serve the planning area.

Evaluation Assumptions

The water system expansion into the South Cooper Mountain planning area will be based on the largest single point demand in the area. The largest single point water demand is fire service flow. Although providing domestic and irrigation services to the area is essential, the water system expansion will be developed to provide sufficient fire flow while maintaining a minimum water pressure. Therefore, the water system design will not vary based on the density of development. The City has indicated the design fire flow at any given point within the water system is 3,000 gallons per minute (gpm) while maintaining a minimum pressure of 20 pounds per square inch (psi).

Our evaluation did not include smaller diameter service lines (8-inches and smaller) to private land development projects, however, we did include the larger main lines (12-inches and larger) that are necessary to serve the larger area.

The unit cost for the water system is on a per linear foot basis and, in addition to raw pipe material, includes a 20% increase for miscellaneous items such as utility relocation, abandoning of existing facilities, etc.; 15% increase for general contractor profit and overhead; 25% increase for engineering and administration; and a 30% increase for general contingency. The City of Beaverton provided recommended unit costs as shown:

Table 1. Water System Unit Costs

Ductile Iron Pipe Diameter (inches)	Unit Cost (\$/LF)	Ductile Iron Pipe Diameter (inches)	Unit Cost (\$/LF)
12	239	20	374
16	267	24	460

Water System Overview by Subarea

As stated in previous memorandums, there are three (3) subareas defined in this study. They are, as shown on the attached map, "North Cooper Mountain", "Urban Reserve Area", and "South Cooper Mountain Annexation Area". Existing water service and the anticipated types of improvements needed within each subarea are summarized briefly below.

North Cooper Mountain (NCM)

This area is largely developed with existing single family homes on large lots. TVWD currently provides water service through their existing network of waterlines and water storage tanks in this area. Further development and added water demand in this area can be served by extending the existing water system network to areas that currently do not have service. To provide a network of waterlines that will deliver consistent flow and pressures to all points within the network area, and to create a water system looped system, we anticipate a major water main extension through this area will be required. Potential connection points are shown in the attached "South Cooper Mountain Water System" map.

Urban Reserve Area (URA)

This area includes the Cooper Mountain Nature Park and several dozen single family homes on large lots in the vicinity of SW 175th Avenue. TVWD currently provides water service to these properties through their existing network of waterlines. Future development and added water demand in this area can be served by extending the existing water system network to areas that currently do not have service. We anticipate the expanded network will include water main pipes between 12- and 24-inches in diameter located within existing and future roadways. Points of connection can be made at SW Kemmer Road, SW Weir Road, SW Snowy Owl Lane, and/or from a main line extension through the South Cooper Mountain Annexation Area in SW 175th Avenue as shown in the attached "South Cooper Mountain Water System" map.

South Cooper Mountain Annexation Area (SCMAA)

This subarea is also mostly undeveloped. The Beaverton School District has near-term plans to build a new high school in the area just north of SW Scholls Ferry Road and east of SW 175th Avenue starting as early as 2015. The City has indicated the school site can be adequately served from the 24-inch waterline soon to be under construction in SW Scholls Ferry Road. However, additional development to the north and west will require expanded network connections. Based on preliminary information from the City, the expansion will likely include water main pipes between 12- and 24-inches in diameter located within roadways and connections to the water storage facilities in the Hilltop area. Potential connections can be made at any point in SW Scholls Ferry Road, and/or from SW 175th Avenue. Potential connection points are shown in the attached "South Cooper Mountain Water System" map.

The City is also planning a future five-million-gallon tank to be located near the intersection of SW 175th Avenue/SW Weir Road and has indicated that by supplementing the existing system with this new five-million-gallon storage tank, there will be adequate water storage to serve the entire planning area. The new tank is not included in the cost estimate. Per the City, it is scheduled to be constructed by 2020.

Water System Improvements

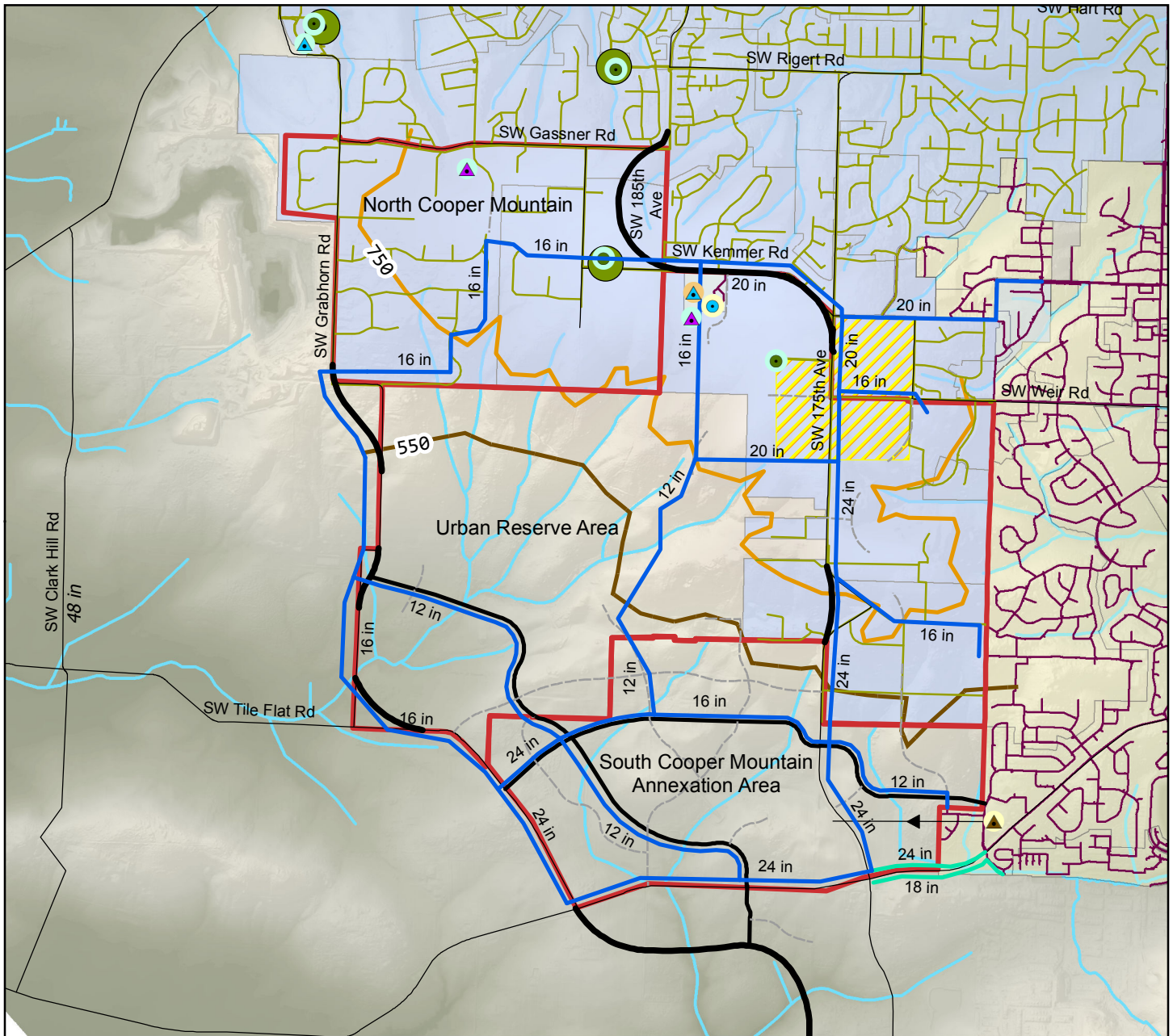
The concept plan includes a 16-inch water line within North Cooper Mountain area. This new water line will serve the new growth within NCM area. However, the main purpose of this water main is to create a water system loop that will serve Grabhorn Meadow to the south. The looped system will provide a network of waterlines that will deliver consistent flow and pressures to all points within the network.

175th Avenue remains in the same location to the north boundary of the SCMAA. A new 24-inch water line will extend along this new alignment to the future SW Weir Road intersection where the water line becomes a 20-inch line. The east-west roadway extending from SW Tile Flat Road through the 175th Avenue intersection and continuing on to SW Loon Drive will include a water line that starts as a 24-inch line on the west side and decreases to 16-inch, then 12-inch water line. A new 24-inch water line will be extended west from the 175th/Scholls Ferry intersection to Tile Flat Road and will continue north along Tile Flat Road connecting up with the new 24-inch water line within the new east-west roadway. A new 12-inch water line will be extended along the new collector from SW Scholls Ferry Road and extend northwest to SW Grabhorn Road. Development occurring within the interior of SCMAA area will connect to one of these mainlines. Service to the initial phases of development in the SCMAA (in the vicinity of 175th), could be provided from the new 24-inch water line located within 175th Avenue or SW Scholls Ferry Road.

Table 2. Water System Infrastructure Costs

North Cooper Mountain			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	SubTotal
16	*7,841	267	\$2,093,547
Subarea Total:			\$2,093,547
Urban Reserve Area			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	SubTotal
12	7,500	239	\$1,792,500
16	11,375	267	\$3,037,125
20	10,000	374	\$3,740,000
24	4,000	460	\$1,840,000
Subarea Total:			\$10,409,625
South Cooper Mountain Annexation Area			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	SubTotal
12	7,021	239	\$1,678,019
16	4,715	267	\$1,258,905
24	13,500	460	\$6,210,000
Subarea Total:			\$9,146,924
Total:			21,650,096

* - This pipe is necessary to provide a sufficient network of waterlines to serve the Urban Reserve Area.



South Cooper Mountain Future Water System

Legend

Reservoirs

- Beaverton, In service
- TVWD Pump Station
- Potential Reservoir Site Zone*

ASR Wells

- Beaverton, Drilled not producing
- JWC, In service
- TVWD, In service
- TVWD, Planned

Existing Waterlines

- CoB Water Main
- TVWD Waterline
- Potential non-potable*

New Waterlines

- Under construction (Local)
- Planned (Local)*

Future Pressure Zones

- 550 ft elevation
- 750 ft elevation
- CoB Supply Zone
- TVWD Supply Zone
- South Cooper Mountain Study Area

* Locations of planned facilities are conceptual only.

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Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

DISCLAIMER

This map is intended for informational purposes only. It is not intended for legal, engineering, or surveying purposes. While this map represents the best data available at the time of publication, the City of Beaverton makes no claims, representations, or warranties as to its accuracy or completeness. Metadata available upon request.

