

# Memorandum



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**To:** Mike Peebles, PE  
**From:** Kristen Ballou, PE  
Brad Swearingen, PE  
**Copies:** File  
**Date:** September 8, 2015  
**Subject:** South Cooper Mountain Heights – Sanitary Sewer Phasing  
**Project No.:** 16985

The purpose of this memorandum is to summarize the phasing of the proposed sanitary sewer improvements for phases 1 thru 5 of the South Cooper Mountain Heights PUD, located in Beaverton, Oregon.

## South Cooper Mountain Sanitary Sewer Master Plan

The South Cooper Mountain Phase 1 Sanitary Sewer Master Plan, completed by David Evans and Associates, dated April 24, 2015, describes preliminary sanitary sewer improvements needed to serve the South Cooper Mountain Heights subdivision, as well as future development to the north of this area. The South Cooper Mountain Heights PUD has been divided into five phases. Table 1 below summarizes where each Master Plan sanitary sewer basin lies in relation to the South Cooper Mountain Heights PUD phases.

Table 1: Proposed Project Phase vs. Sanitary Sewer Basin		
S. Cooper Mtn. Heights Phase	SS Master Plan Basin	Connection Location to SS Trunk in Scholls Ferry Rd per Master Plan
Phase 1	Basin A	Via SW 175 <sup>th</sup> Ave (MH No. 824951)
Phase 2	Basin C and D	Bittern Terrace (MH No. 824901) and at Scholls Ferry Rd (MH No. 824941)
Phase 3	Basin C	Scholls Ferry Rd (MH No. 824941)
Phase 4	Basin E	Scholls Ferry Rd (MH No. 824946)
Phase 5	Basin E	Scholls Ferry Rd (MH No. 824946)

## South Cooper Mountain Heights Proposed Sanitary Sewer Phasing

### Phase I

Phase 1 consists of 85 single family detached lots and 41 single family attached lots. According to the Sanitary Sewer Master Plan, Phase 1 is primarily served by Sanitary Sewer Basin A with a

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connection to existing SS MH No. 824951, located at the intersection of SW 175<sup>th</sup> and Scholls Ferry Road, via a proposed sanitary sewer line in SW 175<sup>th</sup> Avenue. The proposed Phase 1 development and sanitary sewer plan is shown on the attached plan sheet, UT-PH1.

The proposed sewer layout for South Cooper Mountain Heights Phase 1 will initially route sanitary sewer to SW 175<sup>th</sup> Avenue at Street F. Two connection points will be provided at the north project boundary (at the intersections of Street A/C and Street A/D). These connection points will allow future development within Basins A and E to be served.

In the initial phases of the project, the sanitary sewer system will be configured such that all of the flow from Basins A and E will be routed to SW 175<sup>th</sup> Ave. However, the City has expressed a desire not to have both Basins A and E conveyed to the existing Scholls Ferry Road trunk via SW 175<sup>th</sup> due to capacity issues connecting to the existing 12" stub line. Therefore, when future development occurs north of South Cooper Mountain Heights, there will be an option to re-route future flows from Basins A and E, as well as the Phase 1 area north of Road 6C, to Scholls Ferry Road SS MH 824946, east of SW 175<sup>th</sup> Ave. The sanitary sewer route for these flows will be via Street C, Road 6C and south through South Cooper Mountain Heights Phases 4 and 5 (in a public sanitary sewer easement). For more detail on the routing, see sections below for Phases 4 and 5. After future flows are re-routed, flows from Phase 1 lots south and west of Road 6C will continue to be conveyed to SW 175<sup>th</sup> Ave.

In order to accommodate future upstream flows from Basins A and E, the proposed line in Street C and Road 6C will be sized to accommodate flows from both basins. The attached spreadsheet was used to determine the line size for the Street C/Road 6C line. Flow data was obtained from the South Cooper Mountain Phase 1 Sanitary Sewer Master Plan. According to the calculations, a total of 3.57 cfs will be conveyed in this route. A 15-inch pipe with a minimum slope of 0.30%,  $n = 0.013$ , will provide a capacity of 3.81 cfs.

The proposed 15-inch line will connect to an existing stub from the site to SSMH No. 824946 in SW Scholls Ferry Road. This existing stub is 12-inch pipe at  $S=0.80\%$  with a capacity of 3.44 cfs. Full development of upstream Basins A and E may exceed the capacity of this stub line and require the pipe to be upsized at some point in the future.

## **Phase 2**

Phase 2 of the South Cooper Mountain Heights subdivision lies within SS Master Plan Basins C and D. Based on the current proposed development, 112 single family lots are within Basin C and 43 single family lots are within Basin D. Connections to the existing sewer will be made according to the Sanitary Sewer Master Plan.

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Basin C will connect to an existing stub from the site to SSMH No. 824941 in SW Scholls Ferry Road. This existing stub is 12-inch pipe at S=0.5%. Assuming that Phase 2 is constructed prior to Phase 3, a sanitary sewer line will be constructed within an easement south of Road 6C in order to connect to SSMH No. 824941. The easement is in the same location as the proposed street layout for Phase 3.

Basin D will connect to an existing sanitary sewer line at the end of existing Bittern Terrace (SSMH No. 824901).

The proposed Phase 2 development and sanitary sewer plan is shown on the attached plan sheet, UT-PH2.

### **Phase 3**

Phase 3 of the South Cooper Mountain Heights subdivision consists of 33 single family detached lots. Phase 3 is part of Basin C and will be routed to existing SSMH 824941 in Sholls Ferry Road. If Phase 2 precedes Phase 3, the connection to this manhole will have already been constructed, and lateral connections will be made to the existing line. If Phase 3 construction precedes Phase 2, the connection to the Scholls Ferry Road trunk will be constructed as part of Phase 3, with a stub provided at the northernmost manhole to accept future Phase 2 flows.

The proposed Phase 3 development and sanitary sewer plan is shown on the attached plan sheet, UT-PH3.

### **Phase 4**

Phase 4 consists of 61 single family attached lots. Phase 4 is part of Basin E and will connect to the Scholls Ferry Road trunk at SSMH No. 824946. The sanitary sewer route from the intersection of Streets H/K to the existing manhole will pass through proposed Phase 5. Assuming that Phase 4 precedes Phase 5 construction, the line will be constructed through Phase 5 within a public sanitary sewer easement. The proposed sanitary sewer in Phase 4 within Street L and Street H, as well as the line through Phase 5, will be a 15-inch pipe with a minimum slope of 0.30%. This line is sized to accommodate future flows from Basins A and E, as described in the Phase 1 section above.

The proposed Phase 4 development and sanitary sewer plan is shown on the attached plan sheet, UT-PH4.

### **Phase 5**

Phase 5 is a 320 unit multi-family development. Phase 5 is within Sanitary Sewer Basin E and will connect to the existing MH No. 824946 in Scholls Ferry Road. If Phase 4 precedes Phase 5, the

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public sanitary sewer line will already have been constructed through the site. If Phase 5 precedes Phase 4, a new 15-inch sewer will be constructed from Scholls Ferry Road through the site to the intersection of Street K/H. A stub for future connection of Phase 4 would be provided at this intersection. This line will be within a public sewer easement so that it can serve future development north of the site.

The proposed Phase 5 development and sanitary sewer plan is shown on the attached plan sheet, UT-PH5.

## **Conclusion**

The South Cooper Mountain Sanitary Sewer Master Plan had delineated the area within the proposed South Cooper Mountain Heights project into four Basins (A, C, D and E), each with their own connection to the existing sanitary sewer system.

Based on the proposed layout of the project site and sanitary sewer, Basins C and D will connect to the existing system in the same location assumed in the Master Plan.

As described within this memorandum, the South Cooper Mountain Heights PUD proposes that with future development to the north within Basins A and E, the sanitary flows from Basin A will be combined with Basin E and conveyed to the existing manhole in Scholls Ferry Road east of SW 175<sup>th</sup> Ave. A 15-inch sewer line routed through Phases 1, 4, and 5 will accommodate these flows. Initially, flows from all of Phase 1 will be directed to the proposed sewer extension in SW 175<sup>th</sup> Ave until future upstream development in Basins A and E warrant re-routing the flows through Phases 4 and 5. Future re-routing of flows will be accomplished by re-directing a short section of pipe between manholes at the intersection of Street F/L. Combining Basins A and E will eliminate the need to extend the sewer in SW 175<sup>th</sup> Ave north of Street F with this project.

Alternatively, the sanitary sewer extension in SW 175<sup>th</sup> Ave north of SW Scholls Ferry Road could be upsized to 15" pipe at minimum  $S=0.3\%$  to accommodate future flows from Basins A and E to the north. Flows from Phase 1 and upstream Basins A and E would connect to this upsized extension at Street F utilizing 15" pipe. Future re-routing through Phases 4 and 5 would not be necessary.

# Memorandum



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**To:** Mike Peebles, PE  
**From:** Tammi Connolly, PE  
Brad Swearingen, PE  
**Copies:** File  
**Date:** September 9, 2015  
**Subject:** South Cooper Mountain Heights  
Storm Sewer Phasing  
**Project No.:** 16985

The purpose of this memorandum is to summarize the phasing of the proposed stormwater management system for the South Cooper Mountain Heights development, located in Beaverton, Oregon. The South Cooper Mountain Heights subdivision project will be constructed in five phases, as shown in Figures UT-PH1 thru UT-PH5. This memo will document how each phase can be constructed and served by an independent stormwater management system.

## South Cooper Mountain Heights Proposed Storm System Phasing

### Phase I

Phase 1 consists of 85 single family detached lots and 41 single family attached lots. The proposed Phase 1 development and storm sewer plan are shown on the attached plan sheet, UT-PH1. Stormwater runoff from buildings, sidewalks, roadways, and landscaped areas will sheet flow to catch basins located along the public streets within Phase 1. The proposed public storm sewer system will drain to three ponds located throughout the site.

The largest pond in the southwest corner of the site is comprised of two ponds which are hydraulically connected with culverts beneath Street F to function as one water quality and detention pond. A flow control manhole downstream of the northern pond will control the release rates to meet the City's detention standards. The discharge point for this basin is into an existing roadside ditch which runs north along the east side of SW 175<sup>th</sup> Avenue. Flows in this ditch are collected by existing area drains and conveyed beneath SW 175<sup>th</sup> Avenue in a storm sewer which outfalls to a nearby open drainage-way. The property west of SW 175<sup>th</sup> Avenue is being developed into a High School for the Beaverton School District. The existing storm sewer system on the west side of SW 175<sup>th</sup> Avenue will be modified as part of this High School development, so the stormwater management for the South Cooper Mountain Heights development is being coordinated with the High School storm design to ensure adequate downstream discharge capacity.

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A small stormwater quality and quantity pond is to be located on the southeast corner of Road 6C and SW 175<sup>th</sup> Avenue. This stormwater facility will treat and detain runoff flows before discharging into the existing ditch along the east side of SW 175<sup>th</sup> Avenue. The ditch drains south at this location, conveying flows to the existing area drains described above for conveyance beneath SW 175<sup>th</sup> Avenue.

The third pond in Phase 1 is located on the east side of the development. This pond will treat and detain runoff flows before discharging into the existing natural drainage-way running south along the eastern edge of Phase 1. Release rates from the pond will be controlled by a standard CWS flow control structure, matching the peak runoff rates from the development to the existing peak runoff rates currently being experienced by the drainage-way during the 2-year, 10-year, and 25-year storm events. By detaining runoff in this pond, it can be assumed the downstream drainage system has adequate conveyance capacity.

## **Phase 2**

Phase 2 of the South Cooper Mountain Heights development will consist of 155 single family lots. The proposed Phase 2 development and storm sewer plan are shown on the attached plan sheet, UT-PH2. The proposed public storm sewer system in Phase 2 will drain south, with a majority of the site draining to a large pond in the southeast corner of Phase 2. This water quality and quantity pond will be controlled by a standard CWS flow control manhole, with an outfall pipe discharging the detained flows to a natural drainage-way running south along the eastern edge of Phase 2. A smaller pond is located in the southwest corner to serve a few lots and the portion of Road 6C which cannot drain to the larger pond. This water quality and quantity pond will discharge detained flows to the natural drainage-way which runs south along the western edge of Phase 2.

## **Phase 3**

Phase 3 of the South Cooper Mountain Heights subdivision, located directly south of Phase 2, consists of 33 single family detached lots. The proposed Phase 3 development and storm sewer plan are shown on the attached plan sheet, UT-PH3. Streets in Phase 3 will connect to existing local streets in the existing Churchill Forest residential development to the east, however the storm sewer system is independent of the existing development. Runoff from Phase 3 will be conveyed south in the proposed public storm sewer system to a pond for treatment and detention. The pond in Phase 3 will discharge detained flows into the natural drainage south of the site.

## **Phase 4**

Phase 4 is located south of Street F and consists of 61 single family attached lots. The proposed Phase 4 development and storm sewer plan are shown on the attached plan sheet, UT-PH4. The Phase 4 development will drain southeast to a water quality and quantity pond. This pond will release detained stormwater flows to the natural drainage running south along the east edge of Phase

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4. If Phase 4 precedes Phase 1, then development of Phase 4 will require the construction of Street F for access off of SW 175<sup>th</sup> Avenue. Street F drains to the Phase 1 ponds previously described, located at the intersection of Street F and SW 175<sup>th</sup> Avenue. Therefore, construction of Phase 4 must include the construction of Street F and the Phase 1 ponds serving Street F.

## **Phase 5**

Phase 5 is a 320 unit multi-family development located in the southwest corner of the South Cooper Mountain Heights development along SW 175<sup>th</sup> Avenue and SW Scholls Ferry Road. The proposed Phase 5 development and storm sewer plan are shown on the attached plan sheet, UT-PH5. This multi-family development, like Phase 4, will require construction of access roads which drain to ponds other than those serving Phase 5.

The Phase 5 multi-family development will be served by a water quality and quantity pond located in the southeast corner of the site, along SW Scholls Ferry Road. This pond will discharge detained flows to an existing natural drainage located to the east of the site. A second pond located within the Phase 5 footprint will serve as a detention pond for future improvements to the SW 175<sup>th</sup> Avenue public right-of-way. Access to the Phase 5 site requires constructing portions of Street F and Street K. Street F is served by a Phase 1 stormwater pond and Street K is served by the Phase 4 pond. Therefore, should construction of Phase 5 occur prior to Phases 1 and 4, portions of the Phase 1 and 4 storm sewer systems and associated ponds must be constructed in order to serve the Phase 5 development.

## **Conclusion**

As described within this memorandum, the South Cooper Mountain Heights residential development may be constructed in 5 independent phases, each being served by a stormwater management system and adequate outfall location.



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**To:** Mike Peebles, PE  
**From:** Brad Swearingen, PE  
**Copies:** File  
**Date:** September 8, 2015  
**Subject:** South Cooper Mountain Heights – Water Phasing  
**Project No.:** 16985

The purpose of this memorandum is to summarize the phasing of the proposed water system improvements for Phases 1 thru 5 of the South Cooper Mountain Heights PUD, located in Beaverton, Oregon. The project footprint lies within two planned water pressure zones. The majority of the project site lies within the 550 pressure zone, while a small portion at the north end of the site lies within the 675 pressure zone. The relative elevation dividing the two pressure zones is assumed to be roughly 390'. This Phasing Memo assumes the proposed water line extension in Alvord Lane to the north of the site and that project's ancillary water connection stubs in SW 175<sup>th</sup> Avenue and SW Champlin Street are available at the time of construction.

## South Cooper Mountain Heights Proposed Water Phasing

### Phase I

Phase 1 consists of 85 single family detached lots and 41 single family attached lots. Proposed points of connection for the looped water system in Phase 1 are at three locations along the frontage with SW 175<sup>th</sup> Avenue. The proposed Phase 1 development and water plan is shown on the attached plan sheet, UT-PH1.

The proposed water layout for South Cooper Mountain Heights Phase 1 will include construction of a Pressure Reducing Vault (PRV) in the far northwest corner of the site to provide a reduction in water pressure from the available 675 pressure zone in SW 175<sup>th</sup> Avenue to the 550 pressure zone to the south. Additional looped connections are proposed at the intersection of SW 175<sup>th</sup> Ave/ Road 6C, and SW 175<sup>th</sup> Ave/Street F. Phase 1 includes extending a 24" water line in SW 175<sup>th</sup> Avenue from the existing blow-off near SW Scholls Ferry Road along the site frontage to the northerly property line. Two phase end and valve connection points will be provided at the north project boundary (at the intersections of Street A/C and Street A/I). These connection points will allow looping the water system with future development to the north. Additional phase end and valve connection points will be provided along the southern edges of Phase 1 at Street F/K and Street

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F/L as well as at the eastern end of Road 6C (Collector Road) to accommodate future water system looping in Phases 2, 4 and 5.

## **Phase 2**

Phase 2 consists of 155 single family detached lots. Proposed points of connection for the looped water system in Phase 2 are to the north at the proposed water extension in SW Champlin Street (with connection to the proposed 16" water line in Alvord Lane), and to the south at SW Bittern Terrace. The proposed Phase 2 development and water plan is shown on the attached plan sheet, UT-PH2.

The proposed water layout for Phase 2 will include construction of a PRV near the intersection of Street N/T to provide a reduction in water pressure from the 675 pressure zone via the proposed water line extension in SW Champlin Street to the 550 pressure zone to the south. Lots fronting on Streets M, N and T above the PRV will be within the 675 pressure zone. An additional looped connection is proposed to the south at the existing blow-off at the extension of SW Bittern Terrace (Street O). A phase end and valve connection point will be provided at the north project boundary (at the intersection of Street T/M) to allow looping the water system with future development to the north. An additional phase end and valve connection will be provided at the western end of Street 6C (Collector Road) to accommodate future water system looping in Phases 1, 4 and 5.

## **Phase 3**

Phase 3 consists of 33 single family detached lots. Points of connection for the looped water system in Phase 3 are to the east at SW Oystercatcher Lane and SW Moorhen Way. The proposed Phase 3 development and water plan is shown on the attached plan sheet, UT-PH3.

The entirety of Phase 3 lies within the 550 pressure zone.

## **Phase 4**

Phase 4 consists of 61 single family attached lots. Assuming Phase 4 as a stand-alone project, points of connection for the looped water system are at SW 175<sup>th</sup> Avenue. If Phase 1 precedes Phase 4, points of connection are at phase end and valves at Street F/K and Street F/L. The proposed Phase 4 development and water plan is shown on the attached plan sheet, UT-PH4.

The entirety of Phase 4 lies within the 550 pressure zone. Phase 4 as a stand-alone project includes extending a 24" water line in SW 175<sup>th</sup> Avenue from the existing blow-off near SW Scholls Ferry Road along the site frontage to Street F. A phase end and valve connection point will be provided at the eastern end of Street F to accommodate future water system looping in Phases 1 and 2.

*September 8, 2015*

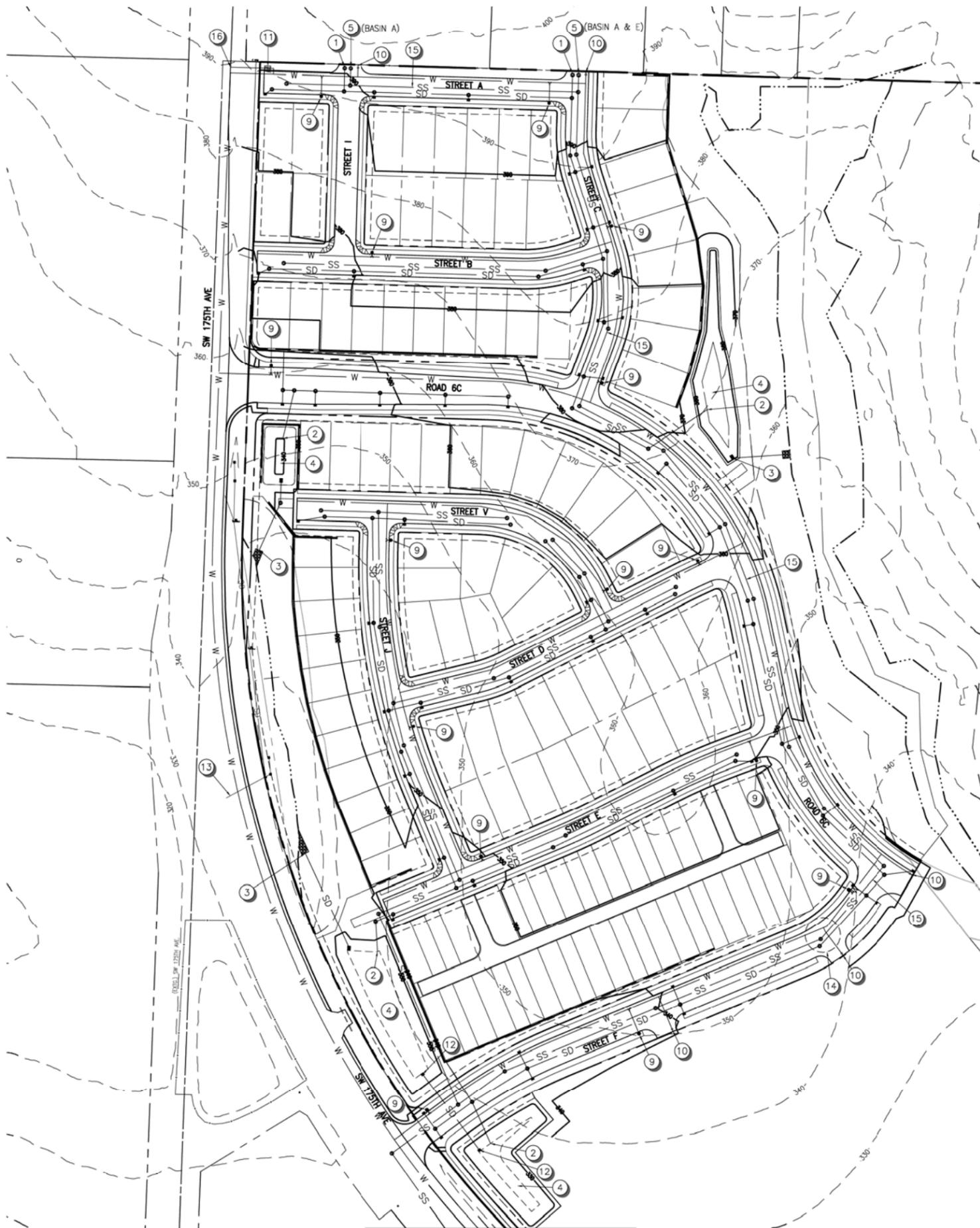
## **Phase 5**

Phase 5 is a 320 unit multi-family development. Assuming Phase 5 as a stand-alone project, points of connection for the looped water system are at SW 175<sup>th</sup> Avenue. If Phase 1 precedes Phase 5, the point of connection is at the phase end and valve at Street F/K. If Phase 4 precedes Phase 5, points of connection into the multi-family development are along Street K. The proposed Phase 5 development and water plan is shown on the attached plan sheet, UT-PH5.

The entirety of Phase 5 lies within the 550 pressure zone. Phase 5 as a stand-alone project includes extending a 24" water line in SW 175<sup>th</sup> Avenue from the existing blow-off near SW Scholls Ferry Road along the site frontage to Street F. Phase end and valve connection points will be provided at the eastern stubs of Streets F, G and H to accommodate future water system looping in Phases 1, 2 and 4.

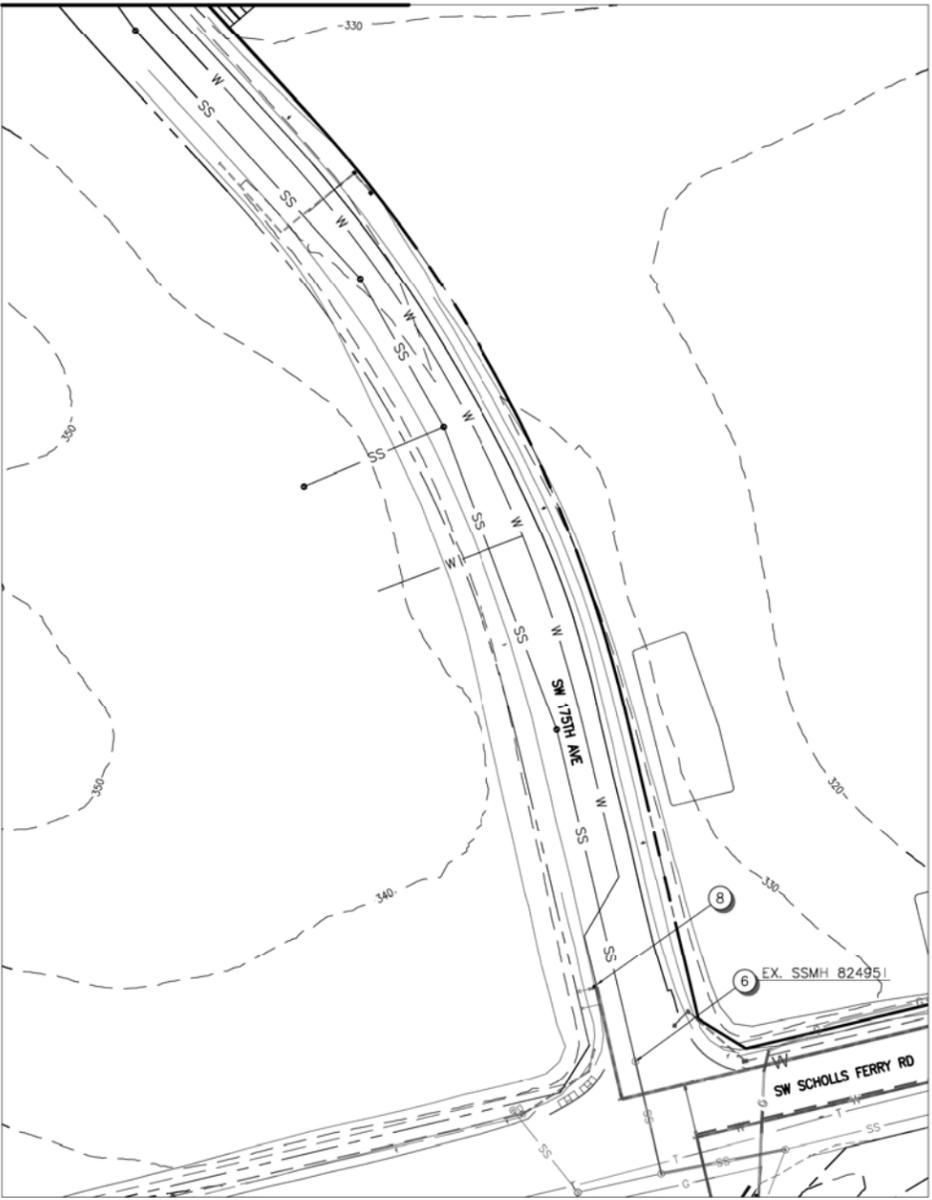


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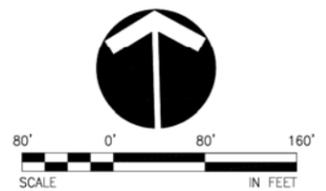


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MATCH LINE-SEE BELOW



- KEYNOTES:**
- 1 STORM DRAIN STUB FOR FUTURE DEVELOPMENT.
  - 2 STORM DRAIN OUTFALL TO STORM FACILITY.
  - 3 STORM FACILITY DISCHARGE LOCATION TO EXISTING NATURAL DRAINAGE.
  - 4 STORMWATER TREATMENT AND DETENTION FACILITY.
  - 5 SANITARY SEWER STUB FOR FUTURE DEVELOPMENT.
  - 6 SANITARY SEWER CONNECTION TO EXISTING SANITARY SYSTEM.
  - 7 PUBLIC SANITARY SEWER EASEMENT.
  - 8 WATER CONNECTION TO EXISTING WATER SYSTEM.
  - 9 PROPOSED FIRE HYDRANT.
  - 10 PHASE END BREAK AND VALVE FOR FUTURE DEVELOPMENT.
  - 11 PRESSURE REDUCING VALVE (PRV). 675 PRESSURE ZONE ABOVE, 550 PRESSURE ZONE BELOW.
  - 12 INTERCONNECT STORM FACILITIES TO FUNCTION AS ONE FACILITY.
  - 13 EXISTING DRAINAGE TO WEST UNDER SW 175TH AVE TO REMAIN. CONNECT TO REDESIGNED STORM SYSTEM WITH HIGH SCHOOL PROJECT.
  - 14 FUTURE REROUTE (BY OTHERS) OF SANITARY SEWER WITH SUBSEQUENT DEVELOPMENT WITHIN UPSTREAM SANITARY BASINS A AND E.
  - 15 SANITARY SEWER TO BE SIZED TO CONVEY FUTURE FLOWS FROM UPSTREAM SANITARY BASINS A AND E.
  - 16 WATER CONNECTION TO PROPOSED ALVORD LANE WATER LINE EXTENSION (675 PRESSURE ZONE).



**LEGEND**

STORM LINE	SD
STORM MANHOLE	○
STORM CURB INLET/CATCH BASIN	■
SANITARY LINE	SS
SANITARY MANHOLE	○
WATER LINE	W
FIRE HYDRANT	▲
WATER PHASE END VALVE	○
PUBLIC UTILITY EASEMENT	- - -

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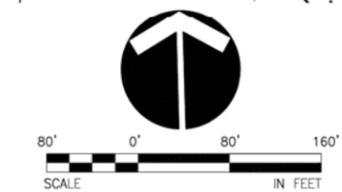
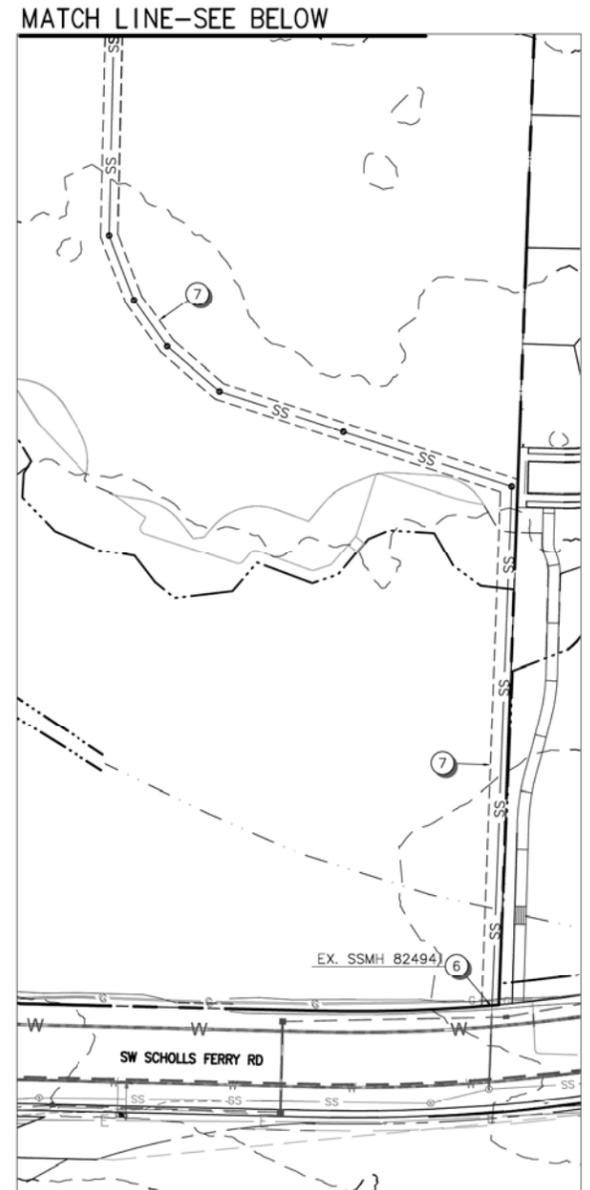
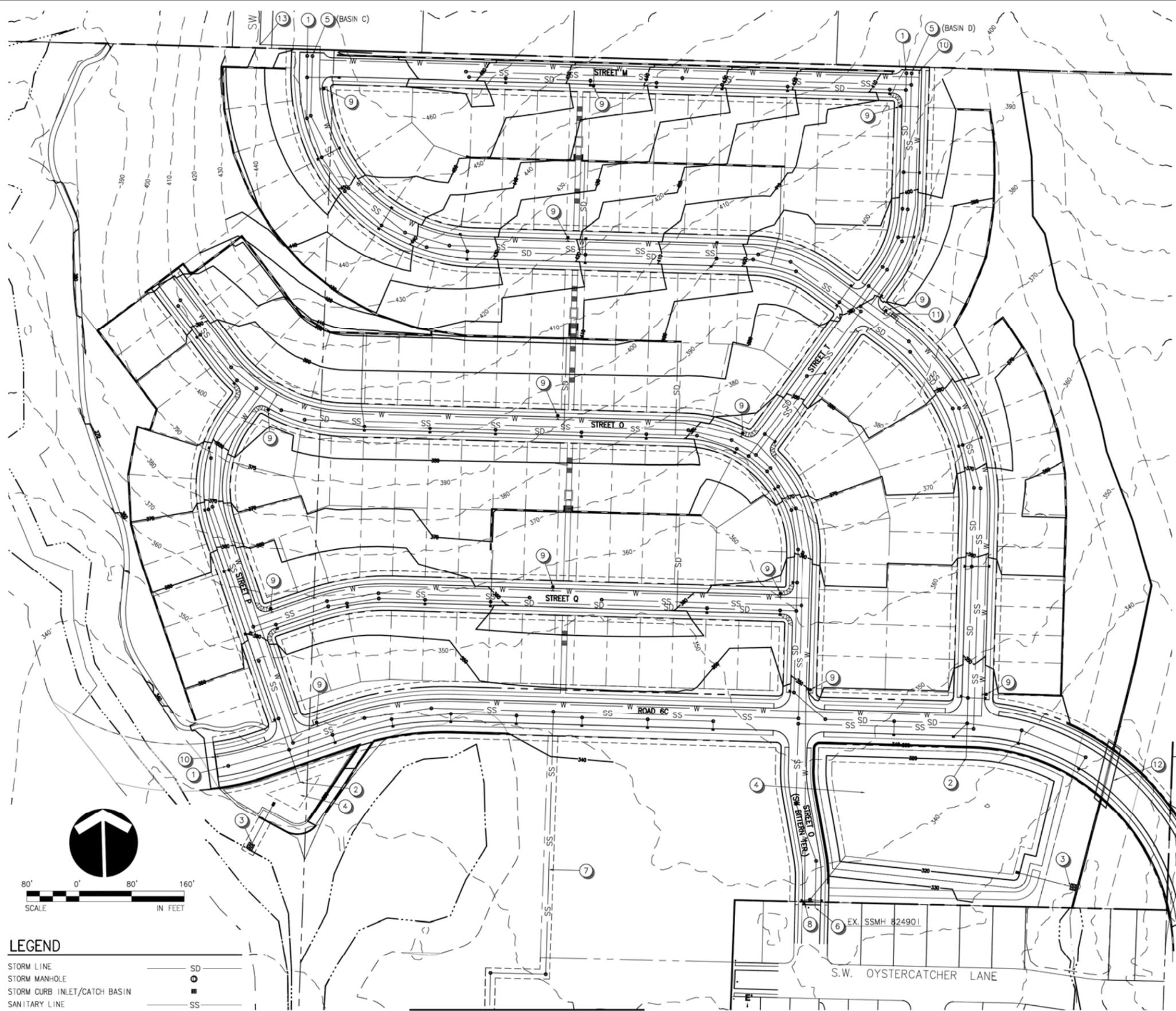
**SOUTH COOPER MOUNTAIN HEIGHTS**  
 BEAVERTON, OREGON  
 UTILITY PHASING  
 PHASE 1

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 16985\_P16985UT-Ph1  
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**UT-PH1**  
 Sheet No.  
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NO.	DATE	BY	REVISION COMMENTS

Design	Drawn	Checked	Date	Initial Issue Date:
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 O16985X101  
 P16985X001  
 P16985X230-PH 2  
 P16985X430-PH 2  
 P16985X600-PH 2



**LEGEND**

STORM LINE	SD
STORM MANHOLE	⊙
STORM CURB INLET/CATCH BASIN	■
SANITARY LINE	SS
SANITARY MANHOLE	⊙
WATER LINE	W
FIRE HYDRANT	▲
WATER PHASE END VALVE	○
PUBLIC UTILITY EASEMENT	- - - - -

- KEYNOTES:**
- 1 STORM DRAIN STUB FOR FUTURE DEVELOPMENT.
  - 2 STORM DRAIN OUTFALL TO STORM FACILITY.
  - 3 STORM FACILITY DISCHARGE LOCATION TO EXISTING NATURAL DRAINAGE.
  - 4 STORMWATER TREATMENT AND DETENTION FACILITY.
  - 5 SANITARY SEWER STUB FOR FUTURE DEVELOPMENT.
  - 6 SANITARY SEWER CONNECTION TO EXISTING SANITARY SYSTEM.
  - 7 PUBLIC SANITARY SEWER EASEMENT.
  - 8 WATER CONNECTION TO EXISTING WATER SYSTEM.
  - 9 PROPOSED FIRE HYDRANT.
  - 10 PHASE END BREAK AND VALVE FOR FUTURE DEVELOPMENT.
  - 11 PRESSURE REDUCING VALVE (PRV), 675 PRESSURE ZONE ABOVE, 550 PRESSURE ZONE BELOW.
  - 12 "BOTTOMLESS" BOX CULVERT OR ARCH SPAN ACROSS NATURAL DRAINAGE.
  - 13 WATER CONNECTION TO PROPOSED ALVORD LANE WATER LINE EXTENSION (675 PRESSURE ZONE).

MATCH LINE-SEE RIGHT

NO.	DATE	BY	REVISION COMMENTS

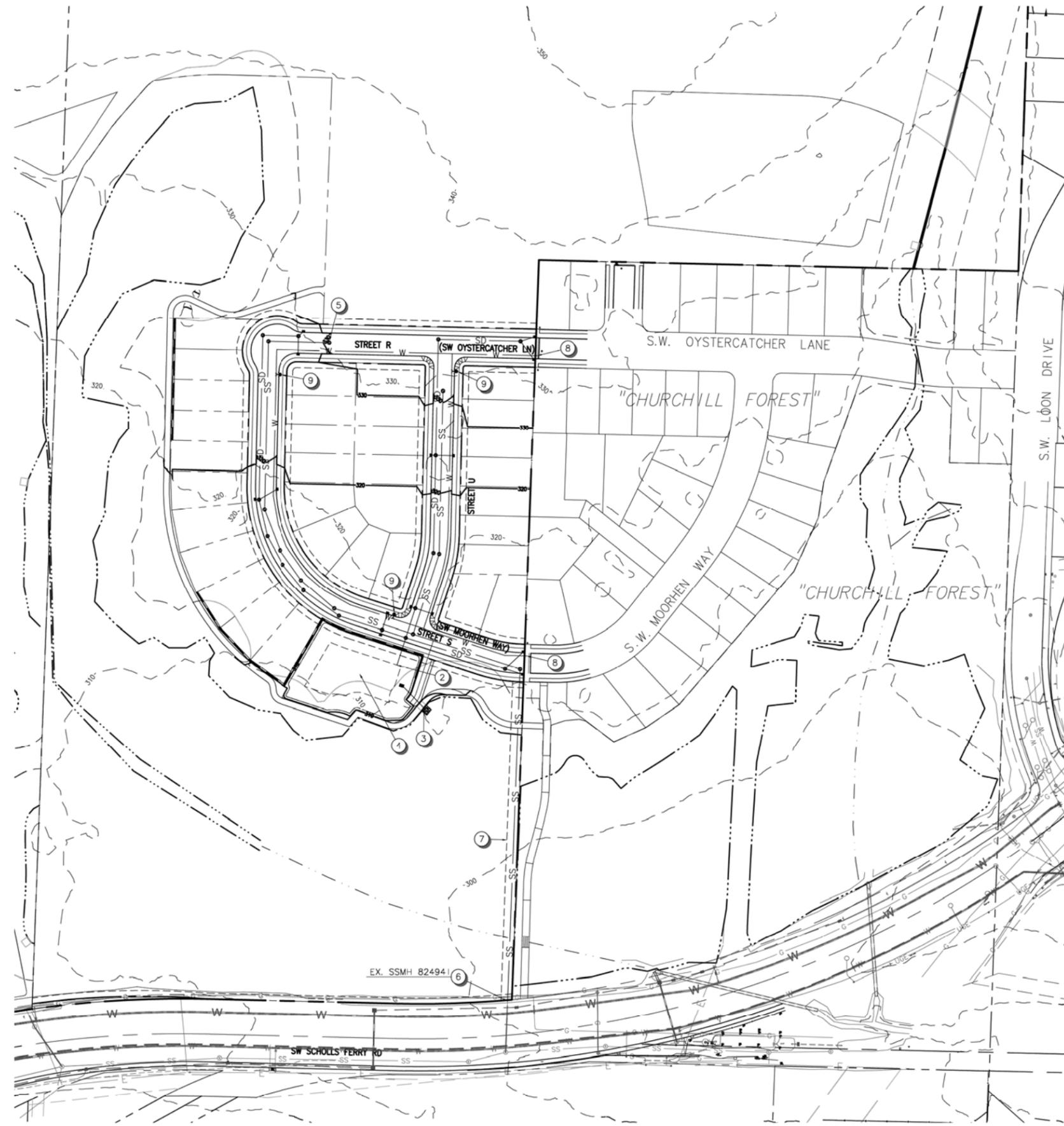
**SOUTH COOPER MOUNTAIN HEIGHTS**  
 BEAVERTON, OREGON  
 UTILITY PHASING  
 PHASE 2

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 16985\_P16985UT-PH2  
 Project No. Drawing No.  
**UT-PH2**  
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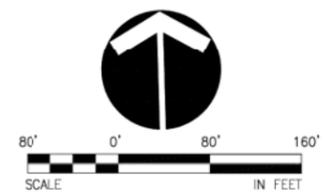
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**KEYNOTES:**

- ① STORM DRAIN STUB FOR FUTURE DEVELOPMENT.
- ② STORM DRAIN OUTFALL TO STORM FACILITY.
- ③ STORM FACILITY DISCHARGE LOCATION TO EXISTING NATURAL DRAINAGE.
- ④ STORMWATER TREATMENT AND DETENTION FACILITY.
- ⑤ SANITARY SEWER STUB FOR FUTURE DEVELOPMENT.
- ⑥ SANITARY SEWER CONNECTION TO EXISTING SANITARY SYSTEM.
- ⑦ PUBLIC SANITARY SEWER EASEMENT.
- ⑧ WATER CONNECTION TO EXISTING WATER SYSTEM.
- ⑨ PROPOSED FIRE HYDRANT.
- ⑩ PHASE END BREAK AND VALVE FOR FUTURE DEVELOPMENT.



**LEGEND**

STORM LINE	SD
STORM MANHOLE	○
STORM CURB INLET/CATCH BASIN	■
SANITARY LINE	SS
SANITARY MANHOLE	⊙
WATER LINE	W
FIRE HYDRANT	▲
PHASE END	⊕
PUBLIC UTILITY EASEMENT	- - - - -

**SOUTH COOPER MOUNTAIN HEIGHTS**  
 BEAVERTON, OREGON

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16985\_P16985UT-Ph3  
 Project No. Drawing No.  
**UT-PH3**  
 Sheet No.  
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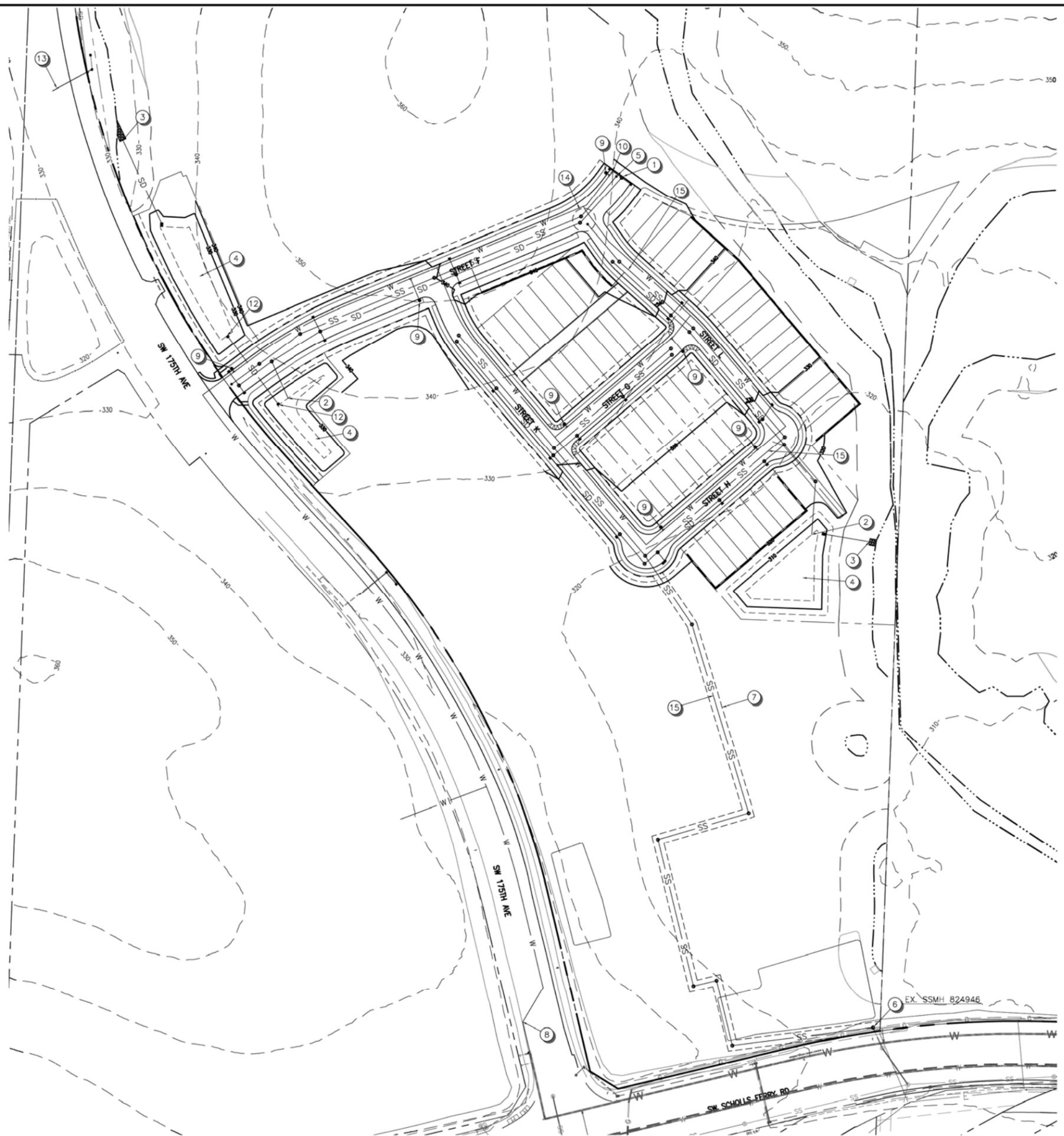
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Design	Drawn	Checked	Date	Initial Issue Date:
BDS	MDH	MAP		

UTILITY PHASING  
 PHASE 3

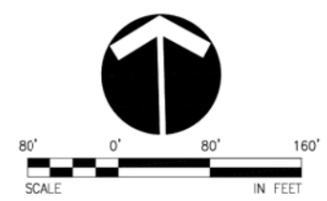
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 P16985X430-Ph 3  
 P16985X600-Ph 3

Plotted: Sep 09, 2015 - 11:35am milaeno L:\Project\16985\16985\Utility Phasing\16985UT-PH4.dwg Layout Name: UT-PH4



**KEYNOTES:**

- ① STORM DRAIN STUB FOR FUTURE DEVELOPMENT.
- ② STORM DRAIN OUTFALL TO STORM FACILITY.
- ③ STORM FACILITY DISCHARGE LOCATION TO EXISTING NATURAL DRAINAGE.
- ④ STORMWATER TREATMENT AND DETENTION FACILITY.
- ⑤ SANITARY SEWER STUB FOR FUTURE DEVELOPMENT.
- ⑥ SANITARY SEWER CONNECTION TO EXISTING SANITARY SYSTEM.
- ⑦ PUBLIC SANITARY SEWER EASEMENT.
- ⑧ WATER CONNECTION TO EXISTING WATER SYSTEM.
- ⑨ PROPOSED FIRE HYDRANT.
- ⑩ PHASE END BREAK AND VALVE FOR FUTURE DEVELOPMENT.
- ⑪ PRESSURE REDUCING VALVE (PRV). 675 PRESSURE ZONE ABOVE, 550 PRESSURE ZONE BELOW.
- ⑫ INTERCONNECT STORM FACILITIES TO FUNCTION AS ONE FACILITY.
- ⑬ EXISTING DRAINAGE TO WEST UNDER SW 175TH AVE TO REMAIN. CONNECT TO REDESIGNED STORM SYSTEM WITH HIGH SCHOOL PROJECT.
- ⑭ FUTURE REROUTE (BY OTHERS) OF SANITARY SEWER WITH SUBSEQUENT DEVELOPMENT WITHIN UPSTREAM SANITARY BASINS A AND E.
- ⑮ SANITARY SEWER TO BE SIZED TO CONVEY FUTURE FLOWS FROM UPSTREAM SANITARY BASINS A AND E.



**LEGEND**

STORM LINE	SD
STORM MANHOLE	⊙
STORM CURB INLET/CATCH BASIN	■
SANITARY LINE	SS
SANITARY MANHOLE	⊙
WATER LINE	W
FIRE HYDRANT	⊙
WATER PHASE END VALVE	⊙
PUBLIC UTILITY EASEMENT	- - - -

NO.	DATE	BY	REVISION COMMENTS

Design	Drawn	Checked	Date	Initial Issue Date:
BDS	MDH	MAP		

**SOUTH COOPER MOUNTAIN HEIGHTS**  
 BEAVERTON, OREGON

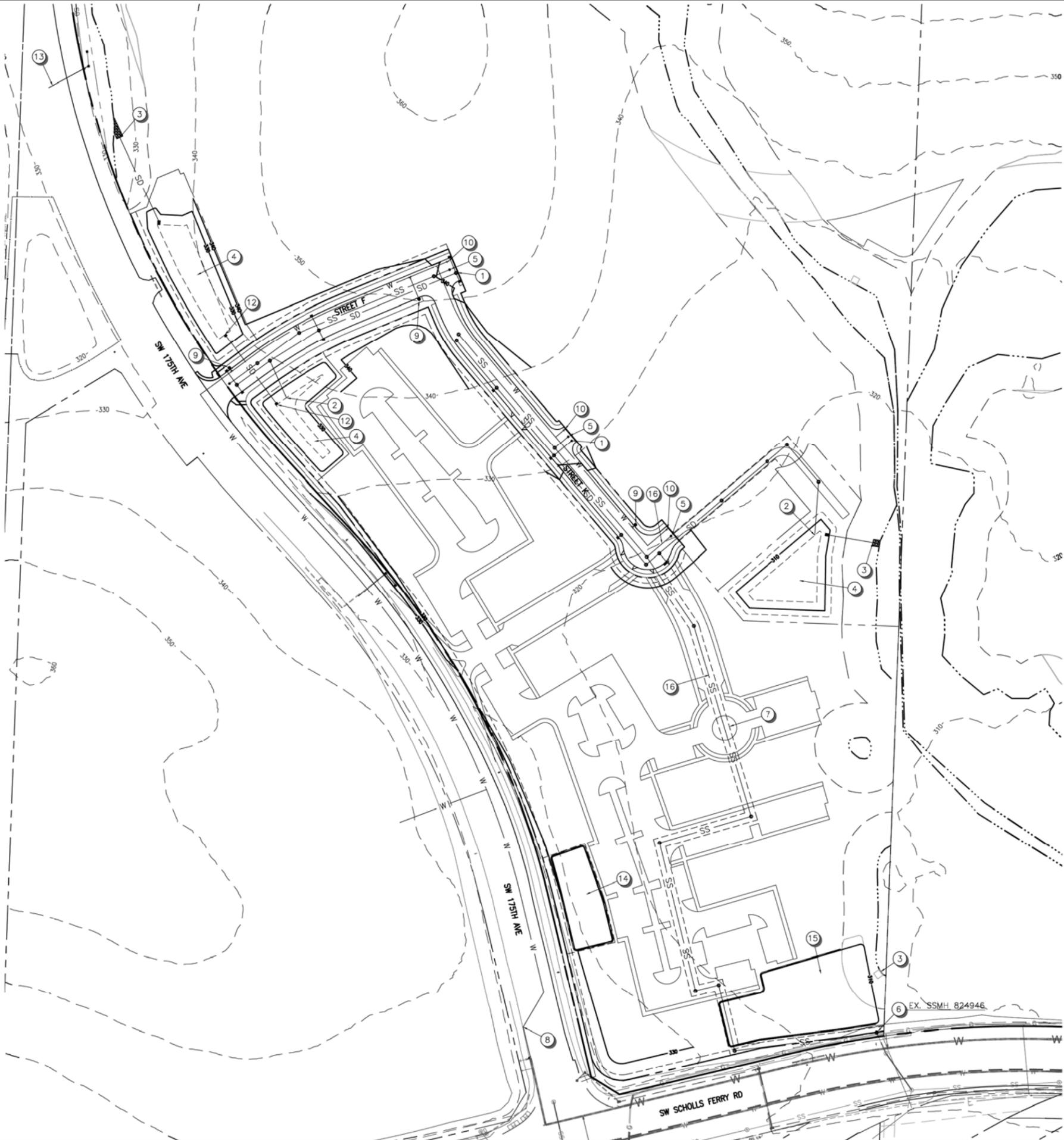
**UTILITY PHASING**  
 PHASE 4



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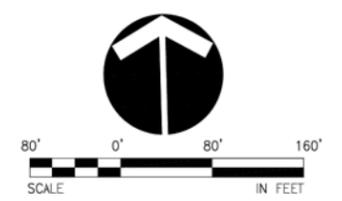
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 Sheet No.  
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 O16985X104  
 O16985X101  
 P16985X001  
 O16985X106  
 P16985X230-PH5  
 P16985X430-PH5  
 P16985X600-PH5



**KEYNOTES:**

- 1 STORM DRAIN STUB FOR FUTURE DEVELOPMENT.
- 2 STORM DRAIN OUTFALL TO STORM FACILITY.
- 3 STORM FACILITY DISCHARGE LOCATION TO EXISTING NATURAL DRAINAGE.
- 4 STORMWATER TREATMENT AND DETENTION FACILITY.
- 5 SANITARY SEWER STUB FOR FUTURE DEVELOPMENT.
- 6 SANITARY SEWER CONNECTION TO EXISTING SANITARY SYSTEM.
- 7 PUBLIC SANITARY SEWER EASEMENT.
- 8 WATER CONNECTION TO EXISTING WATER SYSTEM.
- 9 PROPOSED FIRE HYDRANT.
- 10 PHASE END BREAK AND VALVE FOR FUTURE DEVELOPMENT.
- 11 PRESSURE REDUCING VALVE (PRV). 675 PRESSURE ZONE ABOVE, 550 PRESSURE ZONE BELOW.
- 12 INTERCONNECT STORM FACILITIES TO FUNCTION AS ONE FACILITY.
- 13 EXISTING DRAINAGE TO WEST UNDER SW 175TH AVE TO REMAIN. CONNECT TO REDESIGNED STORM SYSTEM WITH HIGH SCHOOL PROJECT.
- 14 STORM FACILITY IN EASEMENT FOR FUTURE SW 175TH IMPROVEMENTS.
- 15 STORMWATER TREATMENT AND DETENTION FACILITY TO BE DEVELOPED IN CONJUNCTION WITH MULTI-FAMILY DEVELOPMENT UNDER SEPARATE LAND USE APPLICATION.
- 16 SANITARY SEWER TO BE SIZED TO CONVEY FUTURE FLOWS FROM UPSTREAM SANITARY BASINS A AND E.



**LEGEND**

STORM LINE	SD
STORM MANHOLE	⊙
STORM CURB INLET/CATCH BASIN	■
SANITARY LINE	SS
SANITARY MANHOLE	⊙
WATER LINE	W
FIRE HYDRANT	⊙
WATER PHASE END VALVE	⊙
PUBLIC UTILITY EASEMENT	- - - -

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**SOUTH COOPER MOUNTAIN HEIGHTS**  
 BEAVERTON, OREGON  
 UTILITY PHASING  
 PHASE 5 (MULTI-FAMILY DEVELOPMENT LOT)

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