Alaskan Way Viaduct & Seawall Replacement Program

U.S. Department of Transportation Federal Highway Administration | WSDOT | King County | City of Seattle

SR 99 Bored Tunnel Alternative - Utility Impact Report

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June 2009

The Alaskan Way Viaduct & Seawall Replacement Program

SR 99 Bored Tunnel Alternative - Utility Impact Report

Agreement No. Y-9715

Task CE.07

The Alaskan Way Viaduct & Seawall Replacement Program is a joint effort between the Federal Highway Administration (FHWA), the Washington State Department of Transportation (WSDOT), and the City of Seattle. To conduct this project, WSDOT contracted with:

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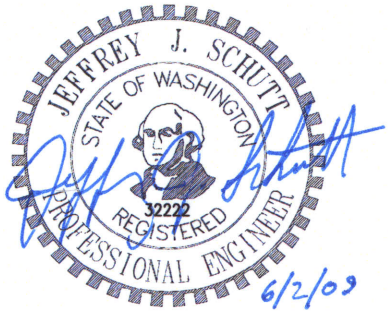

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List of Acronyms

ASCE	American Society of Civil Engineers
AWV	Alaskan Way Viaduct
AWVSRP	Alaskan Way Viaduct & Seawall Replacement Program
BNSF	Burlington Northern Santa Fe Railroad
BO	Blow off
BST	Battery Street Tunnel
CADD	Computer Aided Drafting and Design
CD	Compact Disc
CDF	Controlled density fill
CI	cast iron
CILJ	cast iron leaded joint
CIP	Cast Iron Pipe
Communication	telecommunications and cable television
Cont.	Continued
County	King County
CSO	combined sewer overflow
DI	ductile iron
DIP	Ductile Iron Pipe
DoIT	City of Seattle Department of Information Technology
E	East
EBI	Elliott Bay Interceptor
EIS	Environmental Impact Statement
ELI	Electric Lightwave, LLC.
ELRP	Electrical Line Relocation Project [or] Early Electrical
FHWA	Federal Highway Administration
FUM	City of Seattle Franchise Utility Map
GIP	Galvanized Iron Pipe
GIS	City of Seattle Geographic Information System
HP	High Pressure
HPFF	high-pressure fluid-filled
IP	Intermediate Pressure
ITS	intelligent transit systems
KC	King County
LP	Low pressure

List of Acronyms (Cont.)

MA-US-1	TRANSMISSION LINE 1
MA-US-2	TRANSMISSION LINE 2
MA-US-3	TRANSMISSION LINE 3
MA-US-BR	TRANSMISSION LINE 4
N	NORTH
PSE	PUGET SOUND ENERGY
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
S	SOUTH
SCL	SEATTLE CITY LIGHT
SDOT	SEATTLE DEPARTMENT OF TRANSPORTATION
SOUTH PROJECT	SR 99/ALASKAN WAY VIADUCT – REPLACEMENT/ S HOLGATE ST TO S KING ST – STAGE 1 [OR] STAGE 2
SPU	SEATTLE PUBLIC UTILITIES
SR	STATE ROUTE
SR 99	ALASKAN WAY VIADUCT [OR] AURORA AVENUE N.
STW	STEEL WELDED
SUE	SUBSURFACE UTILITY ENGINEERING
T-46	TERMINAL 46
TBM	TUNNEL BORING MACHINE
TWT	TW TELECOM OF WASHINGTON, LLC.
US	UNITED STATES
USCG	UNITED STATES COAST GUARD
VCP	VITRIFIED CLAY PIPE
VIADUCT	ALASKAN WAY VIADUCT
W	WEST
WESTL	WELDED STEEL
WOSCA	WASHINGTON OREGON SHIPPERS COOPERATIVE ASSOCIATION
WSDOT	WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
XLPE	CROSS-LINKED POLYETHYLENE

SR 99 Bored Tunnel Alternative - Utility Impact Report

1.0 Purpose

This Report was prepared pursuant to Task No. CE, "Central Waterfront Conceptual Engineering Support for the Environmental Impact Statement (EIS)," Subtask CE.07 "Utilities." It serves as documentation to inform the environmental process.

This Report reviews existing utility systems by type and ownership through the use of existing mapping and utility records within the project areas for the Bored Tunnel Project, No Build Alternative, Mercer Street corridor improvements (Elliott Avenue to Dexter Street N.), and the closure of Broad Street (Thomas Street to Ninth Avenue N).

This Report evaluates and summarizes impacts to existing utility systems caused by the Bored Tunnel Project, Elliott & Western Connector, and the No Build alternative.

This evaluation is based on preliminary conceptual design and is subject to refinement as project designs progress. See Appendix A for a graphic representation of the preliminary conceptual design.

1.1 Project Description

1.1.1 Background

The Alaskan Way Viaduct and Seawall Replacement Program (AWVSRP) is a joint effort by the Washington State Department of Transportation (WSDOT), the Federal Highway Administration (FHWA) and the City of Seattle to replace a critical element of Seattle's infrastructure: the Alaskan Way Viaduct (SR 99). The adjacent seawall supports the existing viaduct and streets and must also be restored.

Constructed in the 1950s, the double-tiered viaduct is nearly two miles long and parallels Alaskan Way. The viaduct, which is partially supported by the seawall, is a vital local and regional transportation link and carries about 110,000 vehicles each

day. The seawall, built from concrete and timber in the 1930s, extends along Seattle's waterfront and supports the soil behind it.

Studies in the 1990s showed that the viaduct was nearing the end of its useful life, apparent by its exposed rebar and weakened columns. The 2001 Nisqually earthquake further damaged the viaduct, forcing WSDOT to temporarily close it for inspection and limited repairs. The viaduct and nearby seawall are vulnerable in another earthquake and continue to show signs of age and deterioration.

On May 12, 2009, Governor Christine Gregoire, King County Executive Ron Sims and Seattle Mayor Greg Nickels endorsed a plan replacing the central waterfront portion of the Alaskan Way Viaduct with a roughly two-mile-long bored tunnel beneath downtown, a new waterfront surface street, transit investments, and improvements to the downtown waterfront as well as other roadway and non-roadway projects (Figure 1). The central waterfront seawall between Colman Dock and Pine Street would also be replaced. The recommendation was based on the results of an in-depth technical analysis; collaboration with a 29-member Stakeholder Advisory Committee representing communities, economic interests and cause-driven organizations; eight public meetings and hundreds of public comments during the past year.

The State, County and City, along with the Port of Seattle, have all agreed to make the SR 99 Bored Tunnel Alternative (Tunnel Project) a reality by working with their legislative bodies to fund portions of the Project. Construction of the Tunnel Project is expected to begin in 2011, and it would be open to drivers by the close of 2015.

1.1.2 Tunnel Project Description

The Tunnel Project, to be located generally under First Avenue, would provide access at a south portal near Qwest and Safeco Fields. The south portal area would include a portal building (or buildings) providing tunnel ventilation as well as tunnel maintenance and/or operations capability. Ramps providing northbound on, northbound off, southbound on and southbound off movements to and from SR 99 would also be constructed in the south portal area. In addition, new surface streets connecting First Avenue S. and Alaskan Way would be constructed between S. Royal Brougham Way and S. King Street.

The Tunnel Project would be in a stacked configuration with southbound lanes on the upper level and northbound lanes on the lower level (Figure 2). Starting as a cut-and-cover section south of Railroad Way S., the bored portion of the tunnel would begin just south of Railroad Way S., pass under First Avenue, and continue diagonally under Belltown at depths ranging up to 200 feet from the crown of the tunnel to the surface. The tunnel would pass under Seattle's central business district on a northwesterly heading under First Avenue. Crossing at or near Stewart Street,

Figure 1. Bored Tunnel Alternative

the alignment would change, with the tunnel gently turning and heading north, extending beyond and diagonal to the street grid of Seattle's Belltown neighborhood. Upon reaching a crossing under Denny Way, the bored tunnel would gently turn again to align with Aurora Avenue N. and transition to a cut-and-cover section near John Street. The cut-and-cover section would transition (unbraid) the tunnel's stacked northbound and southbound roadways at or near the Thomas Street crossing and would match the existing grade of Aurora Avenue N. south of Mercer Street.

At the north portal area on Aurora Avenue a two-way Mercer Street would be constructed between Dexter Avenue N. and Fifth Avenue N. Sixth Avenue N. would be extended from Harrison Street to Mercer Street. Broad Street would be removed between Ninth Avenue N. and Taylor Avenue N. The north portal area would include a portal building (or buildings) providing tunnel ventilation as well as tunnel maintenance and/or operations capability. Ramps providing northbound off and south bound on movements to and from SR 99 at Republican Street would be provided, as are northbound on and southbound off turning movements in the portal area.

The bored tunnel section would be approximately two miles long and 55 feet in diameter. Two lanes of traffic in each direction are expected to carry approximately 85,000 vehicles per day when the tunnel opens. Continuous eight-foot shoulders on the roadway's right side would allow disabled vehicles to safely stop and would improve access for emergency vehicles. Following completion of the new SR 99 bored tunnel, the existing viaduct would be removed. Utilities located on the viaduct and, where necessary those under the viaduct, would be relocated and the Battery Street Tunnel would be decommissioned.

1.1.3 Description of Other Program Elements

Completing the program strategy and providing cumulative effects in the downtown area are several elements, both roadway and non-roadway. They include an Alaskan Way surface street and promenade between King and Pike Streets, a connection from Pike Street to Battery Street, improvements to the Mercer Street corridor between Fifth Avenue N. and Elliott Avenue, seawall improvements, a streetcar on First Avenue and enhanced transit service. These other program elements will improve access and mobility to and through downtown while enhancing Seattle's waterfront and adjacent neighborhoods.

For more information, visit: www.alaskanwayviaduct.org.

Figure 2. Bored Tunnel Cross-Section

1.2 Bored Tunnel Project Description

See Section 1.1.2 for a description of the bored tunnel.

1.2.1 South Portal

The South Portal and interchange would extend from approximately S. Royal Brougham Way to Railroad Way S. and would be bounded on the west by the Port of Seattle's Terminal 46 (T-46) and on the east by First Avenue S. See Figure 3 for a graphic depiction of this portal.

Existing utility infrastructure was documented for areas in First Avenue S. between S. Atlantic Street and S. King Street and in Occidental Avenue S. between S. Royal Brougham Way and S. King Street. In some locations, utilities or utility-related structures fell outside of these areas but were noted because of their size or significance. See Section 1.7 for information pertaining to the methods used for this documentation.

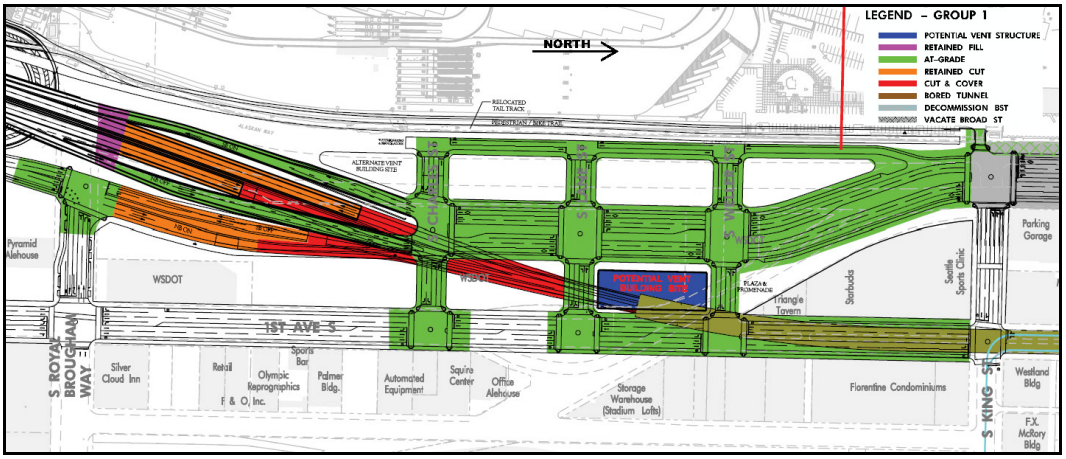

Figure 3. South Portal and Interchange, May 7, 2009

1.2.2 North Portal

The North Portal and interchange would be in the vicinity of Aurora Avenue and Harrison Street and would extend from Denny Way to Mercer Street See Figure 4 for a graphic depiction of this portal.

Existing utility infrastructure was documented for areas in SR 99 and the alleys immediately to the west and east between Denny Way and Mercer Street. In some locations, utilities or utility-related structures fell outside of these areas but were noted because of their size or significance. See Section 1.7 for information pertaining to the methods used for this documentation.

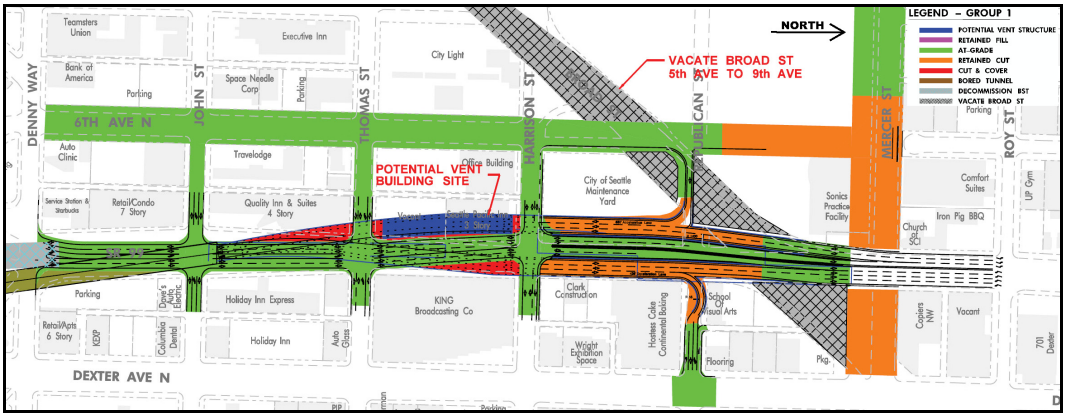

Figure 4. North Portal and Interchange, May 7, 2009

1.2.3 Bored Tunnel

The bored tunnel will be aligned as described in Section 1.1.2. Existing utility information was obtained along the alignment of the bored tunnel, while taking into account the bored tunnel settlement trough. See Appendix A for information pertaining to the bored tunnel alignment and settlement trough.

1.3 Broad Street Closure

The Broad Street Closure will close Broad Street between Fifth Avenue N. and Ninth Avenue N.

Existing utility infrastructure was documented for areas along Broad Street between Fifth Avenue N. and Ninth Avenue N. See Section 1.7 for information pertaining to the methods used for this documentation.

1.4 Mercer Street Corridor Improvements

The Mercer Street Corridor Improvements will improve Mercer Street between Elliott Avenue W. and Dexter Avenue N.

Existing utility infrastructure was documented for areas along Mercer Street between Elliott Avenue W. and Dexter Avenue N. See Section 1.7 for information pertaining to the methods used for this documentation.

1.5 Elliott & Western Connector

The Elliott & Western Connector is a surface connection between Alaskan Way and Elliott and Western Avenues. It generally follows the route of existing SR 99 but also includes at-grade improvements that connect the route to adjacent streets. See Figure 5 for more detail.

Existing utility infrastructure was documented for areas along SR 99 between Bell and Union Streets and along Alaskan Way between Union and Pike Streets. In some locations, utilities or utility-related structures fell outside of these areas but were noted because of their size or significance. See Section 1.7 for information pertaining to the methods used for this documentation.

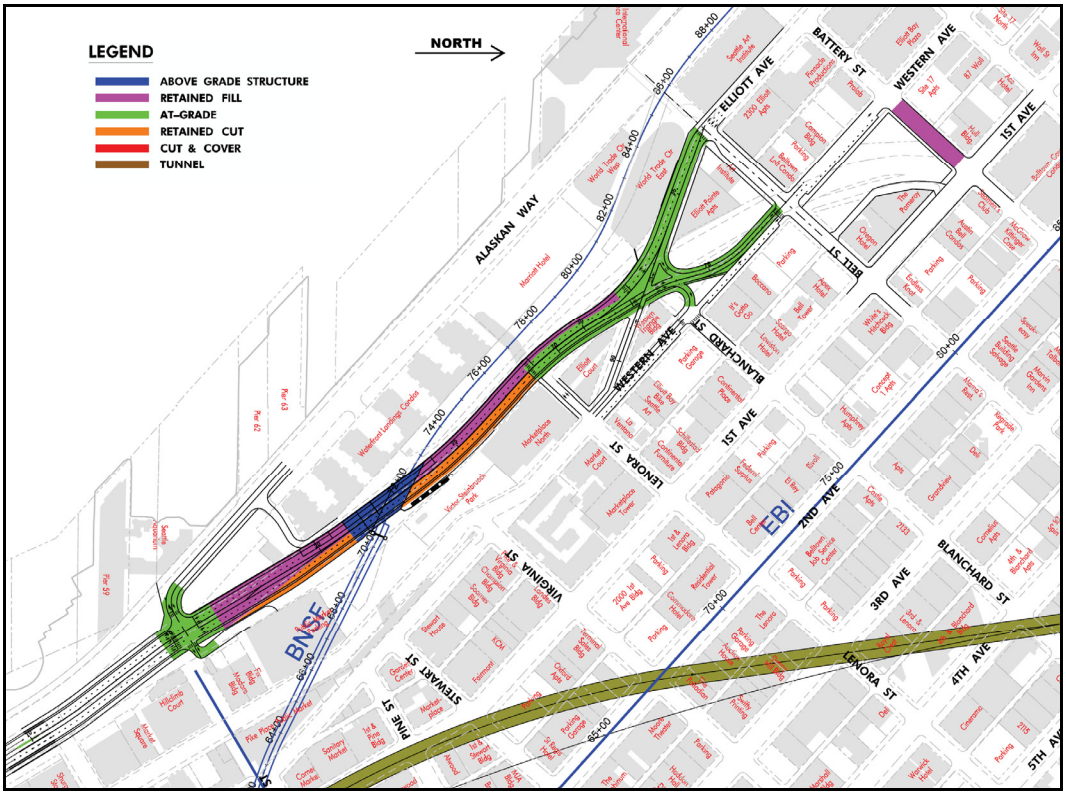

Figure 5. Elliott & Western Connector, April 22, 2009

1.6 No Build Alternative Description

The No Build Alternative includes removal of the viaduct from S. Royal Brougham Way to the South Portal of the Battery Street Tunnel (BST) with minimal restoration of the surface streets beneath the viaduct to include removal of columns to one foot below grade, filling voids left from column removal, and restriping of the roadway and parking formerly under the viaduct. No street reconfiguration or urban design would be considered as part of this project.

1.7 Methods

Existing AWVSRP utility mapping, City of Seattle Geographic Information System (GIS) mapping of gravity and water utilities, City Franchise Utility Maps (FUM), Puget Sound Energy (PSE) natural gas records, Seattle Steam records, multiple telecommunications and cable television (communications) provider records, Seattle City Light (SCL) records were reviewed and supplemented with site visits to develop this Report.

The *SR 99 Bored Tunnel Alternative – Summary Level Stormwater Report* (RoseWater GHD, June 2009) should be cross-referenced with this report when evaluating bored tunnel utility impacts.

It is possible that additional utilities (active or abandoned) not mentioned in this report may exist and even conflict with the Project. In addition, some of the records and data used to develop this report may be incomplete or inaccurate. Coordination with utility owners will be necessary to verify the accuracy and completeness of the utility descriptions.

The following items were not considered or reviewed in depth, or otherwise clarify limitations of this Report:

- Utility relocations, even at a conceptual level.
- Utility elements such as hydrants, valves, blow-offs, regulators, thrust blocks, storm drainage catch basins, and service connections.
- Private utility systems (i.e., utilities owned by property owners) and utility systems on private property.
- Irrigation systems.
- Fuel tanks or other underground storage tanks.
- Infrastructure serving traffic signals, illumination, or intelligent transit systems (ITS).
- Code implications discussed in this Report are limited to those previously identified in reports listed in Section 10.0, References.

1.7.1 Bored Tunnel Project – Existing Utility Roll Plots

The Existing Utility Roll Plots represent utility survey data that has been collected by WSDOT as part of the AWVSRP to date. The gravity and non-gravity utilities are depicted per project Computer Aided Drafting and Design (CADD) standards, enhanced by the American Society of Civil Engineers (ASCE) standard 38-02 for labeling of subsurface utility engineering (SUE) data. Testhole locations are shown and numbered "TH #" for quality level 'A' data. If no Label is shown, quality level is 'B'. Quality levels 'C' & 'D' are labeled.

Utilities to be installed as part of the *Electrical Line Relocation Project* (ELRP or Early Electrical), *SR 99/Alaskan Way Viaduct – Replacement/S Holgate St to S King St – Stage 1* [or] *Stage 2* (South Project Stage 1 and South Project Stage 2) projects are also

included on these Roll Plots. The alignments of these utilities are current as of May 19, 2009 and are subject to change.

The conceptual alignments of the bored tunnel and the Western & Elliott Connector are included and are current as of May 7, 2009 and are subject to change.

The Existing Utility Roll Plots are current as of June 1, 2009 and are subject to change. They were created to start the development of a living design tool and to identify where WSDOT needs to gather additional information. Subsequent Task No. CJ will map areas as directed by WSDOT. The Existing Utility Roll Plots are included on the attached CD.

1.8 Third Party Utility Coordination

Numerous public utility agencies and private utility companies own, operate, and maintain utilities within the limits of the project area considered by this report. As design progresses, additional research, SUE, surveying, mapping, and utility protection, and relocation planning and design will be necessary. Based on early discussions about the number of projects that will make up the AWVSRP, many project and utility interfaces should be expected.

For these reasons, significant third party utility coordination should be anticipated. This coordination will probably include correspondence, meetings, field reviews, design coordination, design and design review, and utility agreements or similar instruments. Refer to Sections 2.2, 3.2 and 4.2 for those third party utilities who will be part of this coordination.

1.8.1.1 Private Utility Corporate Organizations

Be advised that private utility corporate organizations change as a result of frequent acquisitions and mergers within the industry. The names of companies included in this report may change prior to, or during, bored tunnel construction.

2.0 Bored Tunnel – South Portal

2.1 Existing Utilities

2.1.1 Inventory of Existing Utilities

See Section 1.2.1 for the limits of documentation for existing utilities in the South Portal area.

See Section 1.7 for the methods used to inventory the existing infrastructure within the South Portal area.

2.1.2 Public Utilities

2.1.2.1 Electrical Power

2.1.2.1.1 Transmission Lines MA-US-1 and MA-US-2 and the Five Massachusetts Network Feeders

As part of the Early Electrical project, WSDOT constructed an 115kV electrical transmission ductbank and a 13.8kV electrical distribution ductbank to relocate SCL's transmission lines MA-US-1 and MA-US-2 (also referred to as transmission lines 1 and 2, respectively) and the five Massachusetts network feeders, respectively, off of the viaduct. These ductbanks were installed through the Washington Oregon Shippers Cooperative Association (WOSCA), Trager, and U-Park properties and are expected to be in direct conflict with the South Portal construction. To mediate conflicts, WSDOT is electing to realign these systems. The following two paragraphs provide a general description of the transmission lines 1 and 2 and the five Massachusetts network feeders as well as the latest design approaches to relocate these ductbanks out of the South Portal area.

Transmission Lines 1 and 2: SCL's existing transmission lines 1 and 2 are suspended from the viaduct in the South Portal area. As part of the Early Electrical contract, these lines are being relocated off of the existing viaduct south of Railroad Way S. and replaced with a cross-linked polyethylene (XLPE) cable system. Near Railroad Way S., the relocated lines will intercept the existing transmission lines suspended from the viaduct, which continue north out of the South Portal area, suspended from the viaduct. Based on the current redesign approach (valid as of June 1, 2009) the relocated transmission lines will be directionally bored at depths upwards of 60-feet. The alignment of this directional bore is still being evaluated, but is expected to begin south of S. Royal Brougham Way and end near S. Dearborn Street. These lines would be aligned beneath the large diameter gravity pipes (see Section 2.1.2.3.3 for a description of these pipes) and the South Portal.

Five Massachusetts Network Feeders: SCL's existing five Massachusetts network feeders are attached to the viaduct. As part of the Early Electrical contract, they are

being relocated south of Railroad Way S. Near Railroad Way S., the relocated lines will intercept the existing five feeders. These five feeders continue north, out of the South Portal area. Based on the current redesign approach (valid as of June 1, 2009) the relocated distribution ductbank will be aligned west of the existing viaduct. The alignment of this distribution ductbank is still being evaluated, but is expected to begin from the existing distribution vault located slightly north of S. Royal Brougham Way, turn immediately west, continue north along the west side of the viaduct, and turn east near S. Dearborn Street to intercept the existing distribution vault located in the WOSCA property. The lines would be aligned to avoid conflicts with the South Portal construction.

2.1.2.1.2 Transmission Lines MA-US-3 and MA-US-BR and Communications Conduit

SCL's transmission lines MA-US-3 and MA-US-BR (also referred to as transmission lines 3 and 4, respectively) are buried along the west side of First Avenue S. from S. Atlantic Street to Railroad Way S. At Railroad Way S., these lines turn west and are located beneath the existing Railroad Way S. viaduct ramps. Transmission line 3 is a 5-inch diameter high-pressure fluid-filled (HPFF) cable and transmission line 4 is an 8-inch diameter HPFF cable. These lines are located between 4 and 8 feet below existing grade. There is also a 3-inch polyvinyl chloride (PVC) conduit that runs parallel to and is located 1-foot above the 8-inch transmission line that is used for SCL communications.

Refer to Section 8.1.2.1.2 for further information pertaining to the alignment of these transmission lines as they vacate the Railroad Way S. corridor.

2.1.2.1.3 Overhead Distribution

An existing SCL 26kV system is located along the west side of First Avenue S. from south of S. Atlantic Street to south of S. Dearborn Street with various service connections crossing over First Avenue S. Slightly south of S. Dearborn Street, the overhead system crosses to the east side of First Avenue S. and continues north to S. King Street.

2.1.2.1.4 Buried Infrastructure

SCL has multiple buried distribution systems within First Avenue S. from S. Atlantic Street to S. King Street. Each of these systems has numerous access points and service locations. These systems range in size from one conduit to 12 concrete-encased conduits. The 12-conduit ductbank contains a single 26kV circuit.

Near the center of First Ave. S., SCL recently installed a buried network distribution ductbank that extends from south of S. King St. to Railroad Way S. At the time this report was prepared, it contained no active circuits.

In S. King Street, an 8- and 12-conduit ductbank runs east-west. One of these systems is interconnected with the system that runs north-south in First Avenue S.

2.1.2.1.5 South Project – Stage 2

An overhead 26kV system will be installed along the west side of the Stage 2 temporary transition structure. The alignment of this 26kV overhead line should not be impacted by South Portal construction.

2.1.2.2 Domestic Water

2.1.2.2.1 S. Atlantic Street to S. King Street

Seattle Public Utilities (SPU) has a 24-inch ductile iron (DI) water main along the east side of First Avenue S. from S. Atlantic Street to the north side of Railroad Way S. Between Railroad Way S. and S. King Street, the water pipe transitions from a 24-inch DIP to a 16-inch cast iron (CI) leaded joint (CILJ) pipe.

A 12-inch DIP SPU water main is located along the east side of Occidental Avenue S. between S. Royal Brougham Way and S. King Street.

2.1.2.2.2 S. Royal Brougham Way

A 12-inch DIP SPU water main is located in S. Royal Brougham Way.

2.1.2.2.3 South Project – Stage 1

As part of the South Project – Stage 1 contract, a 12-inch water main in a 24-inch casing will be installed slightly north of S. Royal Brougham Way. The alignment of this water main should not be impacted by South Portal construction.

2.1.2.2.4 South Project – Stage 2

As part of the South Project – Stage 2 contract, a portion of the water main and select services will be realigned south of S. King Street. The alignment of these realigned water mains and services should not be impacted by South Portal construction; however, as South Project – Stage 2 design advances, changes to the water design should be tracked to account for potential impacts.

2.1.2.3 Sanitary and Combined Sewer

2.1.2.3.1 King County Elliott Bay Interceptor

The King County Elliott Bay Interceptor (EBI) passes east of the AWVSRP area and conveys the combined sewer flows from Central, South, and West Seattle, including the project-affected areas, to the West Point Wastewater Treatment Plant. The EBI is a 96-inch-diameter pipeline south of the central business district and a 102-inch-diameter pipeline through the central business district, along Occidental Avenue S. and Second Avenue (HDR, September 2008).

The portion of the EBI in the South Portal area is aligned in Colorado Avenue S. to S. Massachusetts Street. At S. Massachusetts Street, the EBI turns east and continues to Occidental Avenue S. At Occidental Avenue S., the EBI turns north to S. King Street. where it turns east and aligns in Second Avenue S. The EBI is constructed of reinforced concrete pipe.

Other portions of the EBI lie outside the South Portal area. However, the combined sewer flows from the vicinity of the South Portal area are conveyed by the EBI. Controlled gates regulate flows to the EBI and their respective outfalls. King County is responsible for National Pollutant Discharge Elimination System permits for occurrences of combined sewer overflows (CSO) at existing outfalls at S. Royal Brougham Way (previously S. Connecticut Street) and S. King Street.

2.1.2.3.2 S. Atlantic Street to S. Royal Brougham Way

An existing 21-inch to 24-inch combined sewer pipe is located in Utah Avenue S. and connects into the existing 96-inch combined sewer pipe in S. Royal Brougham Way. This pipe collects surface runoff from numerous catch basins and laterals.

An existing 12-inch combined sewer pipe is located along the west side of First Avenue S. This pipe collects surface runoff from catch basins, laterals, and side sewers. This pipe connects to the existing 96-inch combined sewer pipe in S. Royal Brougham Way.

An existing 12-inch combined sewer pipe is located along the east side of First Avenue S. and connects with the 96-inch combined sewer pipe located in S. Royal Brougham Way.

2.1.2.3.3 S. Royal Brougham Way

Three large-diameter pipes are located in S. Royal Brougham Way. A 36-inch to 42-inch King County combined sewer pipe is located on the south side; a 72-inch SPU storm drainage pipe is located in the center; and an 84-inch to 96-inch King County combined sewer pipe is located on the north side of S. Royal Brougham Way. The 36-inch combined sewer pipe connects to the EBI in Second Avenue S. The 72-inch storm drainage pipe has multiple storm drainage connections and is supported on piles. The 96-inch combined sewer pipe has multiple combined and sanitary sewer connections and is supported on a concrete cradle.

Connecticut Street Regulator Station: The Connecticut Street Regulator Station, located west of Alaskan Way S. at S. Royal Brougham Way, regulates flow from the S. Royal Brougham Way 72-inch-diameter pipe, which receives stormwater runoff from an area that is separated from the combined system. The regulator allows stormwater to discharge to the EBI through a 36-inch-diameter pipe (HDR, September 2008). The Connecticut Street Regulator Station is a combination of

above and below grade structures; it controls flows that allow discharge into Elliott Bay under certain events.

West Overflow Structure and Kingdome Regulator Structure: The Kingdome Regulator Station, located in Occidental Avenue S., regulates the combined flow from the S. Royal Brougham Way Combined Sewer, a 96-inch-diameter gravity sewer, into the EBI. The Kingdome Regulator Station works in conjunction with the West Overflow Structure, which was constructed in 1998 as part of the S. Royal Brougham Way sewer separation project. The West Overflow Structure is on the west side of Alaskan Way S. at S. Royal Brougham Way. When the water surface level of the S. Royal Brougham Way Combined Sewer reaches the weir elevation in the overflow structure, a CSO occurs. The overflow is routed to the Connecticut Outfall (HDR, September 2008).

2.1.2.3.4 S. Royal Brougham Way to S. King Street

An existing 12- to 15-inch combined sewer pipe is located along the west side of First Avenue S. This pipe collects surface runoff from numerous catch basins, laterals, and side sewers. This pipe drains to the existing 96-inch combined sewer pipe located in S. Royal Brougham Way. This pipe transitions in material from vitrified clay pipe (VCP) to cast iron pipe (CIP) midway between S. Royal Brougham Way and S. Dearborn Street, reinforced concrete pipe (RCP) at Dearborn Street, VCP at Railroad Way S., and CIP between the last two manholes.

An existing 12- to 15-inch combined sewer pipe is located along the east side of First Avenue S. This pipe collects surface runoff and is connected to numerous catch basins, laterals, and side sewers. This pipe drains to the existing 96-inch sewer pipe located in S. Royal Brougham Way. This pipe transitions in material from VCP to CIP at Railroad Way S., RCP across Railroad Way S., and DIP pipe (DIP) to the north end of this system.

2.1.2.3.5 S. King Street

One 42-inch and one 48-inch combined sewer pipe are located in S. King Street Each of the pipes extend from west of Alaskan Way S.; the 48-inch pipe turns north on First Avenue S., while the 42-inch pipe continues east in S. King Street and intercepts the EBI.

As the 48-inch combined sewer pipe turns north into First Avenue S., it transitions from a pile supported RCP pipe and connects into the original sewer that was built in 1908 and is a pile supported brick pipe. The depth of this pipe as it is aligned in First Avenue S. varies but generally is located between 3-feet and 7-feet below existing grade.

King Street Regulator Station: King County has an outfall (see Section 9.0 for further information pertaining to existing outfalls) at S. King Street serving the King

basin (see Appendix B for a graphic representation of the King basin limits). Flows from the basin enter the King Street regulator, which consists of an above and below grade structure that regulates flow and is located west of Alaskan Way S. at S. King Street, through the 48-inch-diameter King Street Sewer. A 30-inch-diameter pipeline leads from the King Street Regulator Station to a manhole in Alaskan Way S., where a 24-inch-diameter pipe connects from the Washington Diversion Structure (flow control structure), located beneath SR 99 at S. Washington Street. From this manhole, a 42-inch-diameter pipe connects to the EBI at S. King Street and Occidental Avenue S. (HDR, September 2008).

2.1.2.3.6 South Project – Stage 2

As part of the South Project – Stage 2 contract, a combined sewer trunk line, with service laterals will be installed. The alignment of this line should not be impacted by South Portal construction. However, as South Project – Stage 2 design advances, changes to the combined sewer alignment should be tracked to account for potential impacts.

2.1.2.4 Storm Drainage

2.1.2.4.1 S. Atlantic Street to S. Royal Brougham Way

A 36-inch-diameter storm drainage pipe is located along the east side of First Avenue S. There are multiple manholes and side connections to this pipe. This 36-inch pipe connects to the 72-inch storm drainage pipe in S. Royal Brougham Way.

2.1.2.4.2 S. Royal Brougham Way

In the SR 99 and Alaskan Way S. corridors, all surface runoff drains to a 72-inch pipe located in S. Royal Brougham Way.

Refer to Section 2.1.2.3.3 for further discussion pertaining to the 72-inch pipe.

2.1.2.4.3 S. Royal Brougham Way to S. King Street

Multiple catch basins and laterals drain into the combined sewer system in this vicinity; however, there are no storm drainage trunk lines in First Avenue S. or the AWV corridors.

Refer to Section 2.1.2.3 for further discussion pertaining to the combined sewer trunk lines.

2.1.2.4.4 South Project – Stage 2

As part of the South Project – Stage 2 contract, multiple storm trunk lines, laterals, and catch basins will be installed to collect surface runoff from the new structures, railroad, roadways, and urban paths. The alignment of these lines, with the exception of the drainage for the temporary surface roadway and temporary transition bridge,

should not be impacted by South Portal construction. However, as South Project – Stage 2 design advances, changes to the storm drainage alignment should be tracked to account for potential impacts.

2.1.2.5 Telecommunications

This section describes infrastructure owned or maintained by the City's Department of Information Technology (DoIT).

2.1.2.5.1 S. Atlantic Street to S. Royal Brougham Way

An aerial DoIT cable is attached to SCL utility poles in S. Atlantic Street from First Avenue S. to the United States (US) Coast Guard (USCG) building at 1519 Alaskan Way S.

An aerial DoIT cable is attached to SCL utility poles in First Avenue S. from S. Atlantic Street to the south side of S. Royal Brougham Way.

2.1.2.5.2 S. Royal Brougham Way to S. King Street

DoIT maintains an existing Seattle Department of Transportation (SDOT) cable that is attached to the viaduct from S. Washington Street to S. Royal Brougham Way. At S. Royal Brougham Way, this cable transitions from an aerial to a buried configuration, and continues east to First Avenue S. along the south side of S. Royal Brougham Way. This cable will be relocated as part of the South Project – Stage 1 contract (see Section 2.1.2.5.3).

DoIT does not have any existing infrastructure in First Avenue S. or Occidental Avenue S. in the project area.

2.1.2.5.3 South Project – Stage 1

As part of the South Project – Stage 1 contract, a joint communications ductbank is designed to be installed through the WOSCA, Trager, and U-Park properties. This ductbank would consist of one DoIT conduit and two ELI (see Section 2.1.3.1.3) conduits. To avoid conflict with South Portal construction, this alignment may be redesigned to as far east as First Avenue S. where it would cross over the tunnel portal near Railroad Way S. However, this redesign has not been developed, and the alignment of the communications ductbank between S. Royal Brougham Way and Railroad Way S. is subject to change.

2.1.3 Private Utilities

2.1.3.1 Telecommunications and Cable Television

Multiple private communications providers are in the South Portal area. The key communications providers are discussed below.

2.1.3.1.1 Broadstripe

Broadstripe (formerly known as Millennium Digital Media, MDM) has an existing cable attached to the viaduct from S. King Street to S. Atlantic Street. This cable serves the USCG office building located at 1519 Alaskan Way S. This cable will be relocated as part of the South Project – Stage 1 contract. Broadstripe's cable will be in ELI's conduit system (see Section 2.1.3.1.3).

2.1.3.1.2 Comcast Corp.

Comcast has a buried ductbank along the east side of First Avenue S. between S. Atlantic Street and S. King Street. In Railroad Way S. Comcast has three buried conduits that head southeast from a vault in First Avenue S. In S. King Street, Comcast has a buried system that extends west to the viaduct.

2.1.3.1.3 Electric Lightwave, LLC.

Electric Lightwave, LLC. (ELI, owned by Integra Telecom Holdings, Inc.) has a combination of overhead and buried infrastructure in the South Portal area. They are attached to the existing SCL utility poles that are aligned along First Avenue S. between S. King Street and south of S. Dearborn Street (see Section 2.1.2.1.3). In S. King Street, ELI has buried infrastructure that extends east from viaduct bent No. 115E to an existing SCL utility pole in S. King Street and First Avenue S.

See section 2.1.2.5.3 for further discussion regarding ELI's infrastructure that will be installed as part of the South Project – Stage 1 contract.

2.1.3.1.4 Qwest Communications International, Inc.

Qwest Communications International, Inc. (Qwest) has multiple underground systems in the South Portal area.

S. Atlantic Street to S. Royal Brougham Way: Qwest has multiple ductbanks within First Avenue S. They have a 20-conduit buried ductbank that is aligned along the east side of First Avenue S.; a three-conduit buried ductbank is located near the center of First Avenue S.; and two parallel ductbanks, with between four and eight conduits each, are aligned along the west side of First Avenue S.

S. Royal Brougham Way: At S. Royal Brougham Way, Qwest's 20-conduit ductbank turns east to Occidental Avenue S.

S. Royal Brougham Way to S. King Street: A three-conduit buried ductbank is located near the center of First Avenue S. Two parallel ductbanks are aligned along the west side of First Avenue S.; each of these ductbanks has between four and six conduits and share common vaults. In multiple locations, these three systems are interconnected through a series of vaults.

According to Qwest's as-built drawings, Qwest has a 24-conduit ductbank within Occidental Avenue S. This ductbank connects to an existing vault in S. King Street.

At Railroad Way S., Qwest has four conduits that extend west to service customers. Some of these services may no longer be active as a result of surrounding construction (e.g., Trager property, Starbucks construction, etc.).

Qwest provides multiple services to buildings along the east side of First Avenue S.

S. King Street: At S. King Street, Qwest has two parallel four-conduit ductbanks that head east from First Avenue S. One of these four conduits also heads west in S. King Street to Port of Seattle property. This system provides service to the Port's T-46.

2.1.3.1.5 Sprint Nextel Corp.

Sprint is aligned in Occidental Avenue S. from S. Royal Brougham Way to Railroad Way S. with a three-conduit buried ductbank. This ductbank continues in Railroad Way S., across First Avenue S., to the existing viaduct.

2.1.3.1.6 TW Telecom of Washington, LLC.

TW Telecom of Washington, LLC. (TWT, owned by Tw telecom, inc., which acquired GST Telecommunications Inc., GST) is aligned in First Avenue S. between S. Royal Brougham Way and Railroad Way S. with a two-conduit ductbank. This ductbank did not contain any active systems at the time this report was prepared.

2.1.3.1.7 Verizon Communications Inc.

Verizon Communications Inc. (Verizon, also known as Verizon Business, MCI, WorldCom, MCImetro Access Transmission, and Verizon Services Operations) has existing underground infrastructure within Occidental Avenue S. and First Avenue S. in areas between S. Atlantic Street and S. King Street. From S. Atlantic Street to S. Royal Brougham Way, Verizon is aligned in First Avenue S. with a six-conduit ductbank. At S. Royal Brougham Way, this ductbank turns east to Occidental Avenue S. and continues north to S. King Street.

At S. King Street, Verizon has an existing system that enters First Avenue S. from Occidental Avenue S. This duct run is located near the center of First Avenue S. and extends south to the north side of Railroad Way S.

2.1.3.1.8 XO Communications

XO has an existing cable that is attached to the Railroad Way S. ramps. Slightly west of First Avenue S., this cable transitions to a buried conduit and crosses to the east side of First Avenue S. to provide service to a customer.

2.1.3.2 Natural Gas

All natural gas in the South Portal area is owned by Puget Sound Energy (PSE). If any deactivated gas mains need to be removed, coordination with PSE would be required. PSE does lease abandoned gas mains to communications providers. It would be advisable to verify that abandoned gas mains contain no other utility systems prior to removal.

2.1.3.2.1 First Avenue S.

A 6-inch intermediate pressure (IP) gas main in a 12-inch CI casing is located along the west side of First Avenue S. between S. Atlantic Street and S. Dearborn Street. Near S. Dearborn Street, this gas main transitions in size from 6 inches to 4 inches and continues north in First Avenue S. to S. King Street in a 12-inch casing. This gas main has numerous laterals that provide service to customers along First Avenue S.

A 6-inch CIP deactivated gas main is located near the center of First Avenue S.

2.1.3.2.2 Occidental Avenue S.

A 6-inch IP gas in an 8- to 10-inch CI casing is located in Occidental Avenue S. between S. Royal Brougham Way and S. King Street. This gas main has numerous laterals that serve customers along Occidental Avenue S.

2.1.3.2.3 S. Royal Brougham Way

A 2-inch IP gas main in a 4-inch casing is located in S. Royal Brougham Way between First Avenue S. and the west side of the Pyramid Ale House building. This gas main has laterals that serve the Pyramid Ale House and the Gerry Sportswear building.

A deactivated 4-inch gas main runs east from First Avenue S. in S. Royal Brougham Way.

2.1.3.2.4 S. King Street

In S. King Street, a 2-inch IP gas main in a casing varying in size from 6 inches to 12 inches travels west from First Avenue S., and a 4-inch IP gas main in a 12-inch casing runs east from First Avenue S. This gas main has numerous laterals that serve customers along S. King Street.

2.1.3.3 Steam

No known steam infrastructure exists in the South Portal vicinity.

2.1.3.4 Petroleum

No known petroleum infrastructure exists in the South Portal vicinity.

2.2 Impacts to Existing Utilities

It is anticipated that the South Portal of the bored tunnel would be constructed with a combination of multiple techniques, some of which include cut-and-cover and open trench. For both of these techniques, a type of shoring or bracing system would be required to allow for excavation; this could include a secant pile wall system, a soldier pile wall system, a slurry wall system, or some other yet to be determined method. Regardless of the technique selected, significant impacts to public and private utilities are expected.

A combination of techniques will be used to prepare the soil for the tunnel boring machine (TBM). From south of the Railroad Way S. and First Avenue S. intersection to 150 feet south of S. King Street, a series of secant pile walls be installed along the east and west sides of the First Avenue S. This series of secant piles will be closed on each end to form a box. The soil within this box will be excavated down to various depths, with depths reaching upwards of 65-feet in front of the new Starbucks building. Refer to the *SR 99 Bored Tunnel Alternative – Draft Design Approval Package MP 30.40 to MP 32.83* (PB and Jacobs, May 2009) for more detail relating to the South Portal construction methods.

2.2.1 Public Utilities

2.2.1.1 Electrical Power

The South Portal would impact SCL's transmission lines 3 and 4. Relocation work to the 115-kV system would need to consider lead times required to obtain line and equipment clearances during construction. SCL would need to be consulted to ascertain the latest clearance lead times. Once a preferred plan is selected, load flow, soil thermal conductivity, and cable-rating studies may be required to ensure that capacity requirements are met by any temporary or permanent modifications to the existing 115-kV system (POWER, May 2008).

The existing SCL 26kV system located along the west side of First Avenue S. to S. Dearborn Street and the overhead system that crosses to the east side of First Avenue S. and continues north to S. King Street near S. Dearborn Street would be affected by the South Portal. It may be possible to mitigate this impact by temporarily relocating the 26kV system to the east side of First Avenue S. to S. Royal Brougham Way.

The existing buried 26kV ductbank and the recently installed buried network distribution ductbank in First Avenue S. would be affected by South Portal construction. Relocation and mitigation options must be explored further, and coordination with SCL is required.

All electrical services must be maintained before, during, and after construction.

2.2.1.1.1 Early Electrical and South Project – Stage 2 Contracts

Once final alignments are determined as part of the Early Electrical and South Project – Stage 2 Contracts, impacts to the electrical utilities designed under these contracts should be reevaluated. See Sections 2.1.2.1.1 and 2.1.2.1.5 for information pertaining to these alignments.

2.2.1.2 Domestic Water

The 16-inch CILJ and portions of the 24-inch water main would be affected by the South Portal. It may be possible to temporarily relocate these waterlines to the far east side of First Avenue S. as a temporary above ground utility. This option needs to be reviewed with SPU and may not be feasible. The function and service level of the First Avenue S. water main would need to be replaced and meet the regulatory codes. Coordination with SPU will be required to ensure that the water main relocation meets existing service levels and will comply with current regulatory codes.

Coordination with SPU will be required to determine the appropriate fire flow rating to the South Portal corridor that must be maintained during and after South Portal construction.

Consideration must be given to excavation, ground loading, or other construction in the vicinity of existing water mains. Normal construction protection of existing utilities is all that is needed for DIP pipe. However, serious consideration needs to be given to supporting in-place or replacement of any CIP within the project corridor. Some of the CIP was constructed as early as 1891 and is more subject to failure from construction impacts due to its less forgiving lead joints and the brittle properties of CI (RoseWater, 2006). Cathodic protection may be required depending upon soil conditions.

It is anticipated that existing fire hydrants, water valves, and water services will need to be relocated to accommodate the new road layout and other south portal construction activities.

2.2.1.2.1 South Project – Stage 1 and Stage 2 Contracts

Once final alignments are determined as part of the South Project – Stage 1 and Stage 2 Contracts, impacts to the water system designed under these contracts should be reevaluated. See Sections 2.1.2.2.3 and 2.1.2.2.4 for information pertaining to these alignments.

2.2.1.3 Sanitary and Combined Sewer and Storm Drainage

It may be possible to protect the existing sewer pipe that is aligned on the east side of First Avenue S. in place. This is dependent on the width of the secant pile walls in First Avenue S. This pipe is located beneath the existing east sidewalk.

The existing sewer pipe that is aligned on the west side of First Avenue S. would likely be affected by the South Portal. Coordination with SPU would be required to determine the best way to maintain service connections in the South Portal area.

The large diameter pipes in S. Royal Brougham Way are not expected to be affected by South Portal construction, and efforts should be made to ensure that these pipes would not be affected, as mitigation may be costly and difficult.

The large diameter pipes in S. King Street may be affected by tunnel induced settlement. Monitoring of these lines may be required to measure potential settlement. See Section 4.1.2.3 for more information.

It is anticipated that the outfalls at S. Royal Brougham Way and S. King Street, the West Overflow Structure, and the Kingdome Regulator Structure would not be affected by the bored tunnel project. The Project will be designed to not affect the EBI.

2.2.1.3.1 South Project – Stage 2 Contracts

Once final alignments are determined as part of the South Project – Stage 2 Contracts, impacts to the gravity systems designed under these contracts should be reevaluated. See Sections 2.1.2.3.6 and 2.1.2.4.4 for information pertaining to these alignments.

2.2.1.4 Telecommunications

2.2.1.4.1 South Project – Stage 1 Contract

Once final alignments are determined as part of the South Project – Stage 1 Contract, impacts to the communications ductbank designed under this contract should be reevaluated. See Section 2.1.2.5.3 for additional potential impacts to this alignment.

2.2.2 Private Utilities

Private utility owners are required to relocate their utilities once directed by the City of Seattle. Efforts should be made to provide advanced notice to utility owners since impacts to their systems may be significant and, given time, some may be able to relocate prior to portal construction.

2.2.2.1 Telecommunications and Cable Television

Broadstripe, Comcast, ELI, Qwest, Sprint, TWT, Verizon, and XO may be impacted by South Portal construction.

It may be possible to relocate communications-related utilities to an above-ground pole line along the east side of First Avenue S. If the above-ground solution is

feasible and selected, utility owners would need to relocate their systems to a permanent location eventually.

2.2.2.2 Natural Gas

PSE would be affected by South Portal construction. Depending on the time of year, it may be possible for PSE to temporarily deactivate this gas main and reroute it in this area. However, assuming shut down is not possible, PSE may be able to temporarily relocate its gas main to the far east side of First Avenue S. as an above-ground pipe.

3.0 Bored Tunnel – North Portal

3.1 Inventory of Existing Utilities

See Section 1.2.2 for the limits of documentation for existing utilities in the North Portal area.

See Section 1.7 for the methods used to inventory the existing infrastructure within the North Portal area.

3.1.1 Public Utilities

3.1.1.1 Electrical Power

3.1.1.1.1 Transmission

An 115kV electrical transmission line crosses SR 99 at Thomas Street. This transmission line is approximately 10-feet deep as it crosses SR 99.

An overhead 115kV transmission line is located adjacent to the south side of Broad Street. This transmission line crosses over SR 99 at Broad Street.

3.1.1.1.2 Distribution

Denny Way: From Dexter Avenue N. to Aurora Avenue N. an eight-conduit and a nine-conduit ductbank are aligned in Denny Way. As these ductbank cross the BST, they combine to form a 16-conduit ductbank. On the west side of the BST the conduits separate into an eight-conduit and nine-conduit ductbank and continue to Sixth Avenue N.

Denny Way to John Street: SCL has an existing vault on the east side of SR 99 at Denny Way. Eight 4-inch conduits extend north from this vault and intercept a vault on the west side of SR 99 at Thomas Street. At the time this report was prepared, these conduits contained no active circuits.

John Street to Thomas Street: SCL has an existing vault on the east side of SR 99 at John Street. Eight 4-inch conduits extend north from this vault and intercept a vault on the east side of SR 99 at Thomas Street. At the time this report was prepared, these conduits contained no active circuits.

In the alley between Sixth Avenue N. and SR 99 (Sixth Avenue N. alley), SCL has nine 3-inch conduits that extend between a vault in John Street and a vault in Thomas Street. An additional vault is located in the alley midway between these streets. Select conduits contain 13.8kV network circuits.

Thomas Street: From the vault in SR 99, ten 4-inch conduits extend east to a vault in the north sidewalk of Thomas Street near the alley east of SR 99. These conduits contain three 13.8kV network circuits. From this same vault in SR 99, six 4-inch conduits extend west to a vault in Sixth Avenue N. and contain two 13.8kV network circuits.

On the south side of Thomas Street, four 4-inch conduits cross SR 99. These conduits pass through a vault in the sidewalk on the south side of Thomas Street, slightly west of SR 99. These conduits contain two 26kV circuits.

Thomas Street to Harrison Street: Six 4-inch conduits extend from the vault in SR 99 at Thomas Street to Harrison Street, where these conduits turn east. These conduits contain a single 13.8kV network cable.

In the Sixth Avenue N. alley, ten 4-inch conduits extend from a vault in Thomas Street to a vault south of Harrison Street. These conduits contain three 13.8kV network circuits. The vault near Harrison Street connects to two supply rooms, one connects five conduits to the Vagabond Inn, and one connects eight conduits to the AAA building. Each of these connections contains one 13.8kV network cable. Ten additional conduits continue north to a vault in Harrison Street. These conduits contain one 13.8kV network cable.

In the alley east of SR 99, four 4-inch conduits extend from the vault in Thomas Street to a vault serving the King TV property. These conduits contain three 13.8kV network circuits.

Harrison Street: Two parallel ductbanks with eight 5-inch conduits extend from Sixth Avenue N. to a vault just east of SR 99 in the sidewalk. These conduits contain six 13.8kV paralleled network circuits (12 circuit's total). These parallel ductbanks continue west from this vault to a vault just west of Dexter Avenue N. From the vault east of SR 99, six 4-inch conduits extend west to SR 99 where six conduits turn south in SR 99 and six conduits turn north and intercept an existing vault in SR 99. The six conduits that turn south contain on 13.8kV network cable.

Six 4-inch conduits extend west from the vault in SR 99 to a vault in Sixth Avenue N. These conduits contain two 26kV circuits. Ten 4-inch conduits extend east from the vault in SR 99 to a vault near the alley east of SR 99. These conduits contain two 26kV circuits.

A SCL vault containing a street lighting feed point is on the north side of the Sixth Avenue N. alley. This vault has conduits extending west to a vault in Sixth Avenue N. and conduits extending south to a vault in the Sixth Avenue N. alley.

Harrison Street to Republican Street: From the vault on the east side of SR 99 at Harrison Street, six conduits continue north in SR 99 to Republican Street.

3.1.1.1.3 Overhead Infrastructure

SCL has overhead infrastructure in the North Portal vicinity. The majority of this infrastructure is in alleys adjacent to SR 99 or is perpendicular to, but does not cross, SR 99.

At Harrison Street, two 26kV overhead systems cross SR 99.

3.1.1.2 Domestic Water

3.1.1.2.1 Denny Way to John Street

A 12-inch CILJ SPU water main is located in Denny Way and approaches SR 99 from the west and the east. One 12-inch CILJ water main turns north at the SR 99 on-ramp and one 12-inch CILJ water main turns north at the SR 99 off-ramp. Multiple water services extend east and west from these lines to serve multiple customers along SR 99 on- and off-ramps. These service lines range in size from 2-inch to 12-inch and are CILJ and welded steel (WESTL) materials.

3.1.1.2.2 John Street to Thomas Street

A 12-inch CILJ SPU water main continues in the on-ramp and another 12-inch CILJ continues in the off-ramp to mid-way between John and Thomas Streets where these two water mains join together and one 12-inch CILJ pipe continues north in SR 99, aligned in the northbound lanes. Multiple water services extend east and west from this line to serve multiple customers along SR 99. These service lines range from 2 to 12 inches and are CILJ and WESTL materials.

3.1.1.2.3 Thomas Street to Mercer Street

One 12-inch CILJ SPU pipe continues north in SR 99 aligned in the northbound lanes. Multiple water services extend east and west from this line to serve multiple customers along SR 99. These service lines range from 2 to 12 inches and are CILJ and WESTL materials.

3.1.1.2.4 Sixth Avenue N.

A 12-inch CILJ SPU water main is aligned in Sixth Avenue N. between Denny Way and Mercer Street. Multiple water services extend east and west from this line to serve multiple customers along Sixth Avenue N. These service lines range from 2 to 12 inches and are CILJ and WESTL materials.

3.1.1.2.5 Dexter Avenue N.

A 20-inch CILJ SPU water main is aligned in Sixth Avenue N. between Denny Way and Mercer Street. Multiple water services extend east and west from this line to serve multiple customers along Dexter Avenue N. These service lines range from 2 to 20 inches and are CILJ and WESTL materials.

3.1.1.3 Sanitary and Combined Sewer

3.1.1.3.1 Denny Way to Mercer Street

A 10-inch concrete SPU combined sewer originates at Denny Way and the SR 99 southbound off-ramp intersection. This 10-inch pipe transitions to a 12-inch RCP, which transitions to a 15-inch RCP as it turns north within SR 99. This 15-inch RCP is aligned near the centerline of SR 99 as it continues north to Mercer Street. Near Thomas Street, the 15-inch RCP transitions to a 12-inch VCP, and at Harrison Street the 12-inch VCP transitions to an 18-inch RCP. At Republican Street, the 18-inch VCP transitions to a 15-inch RCP and terminates at the Broad Street overpass.

Along this combined sewer trunk line, there are multiple catch basins and side sewer connections.

3.1.1.3.2 Sixth Avenue N. Alley

An 8-inch concrete combined sewer is located in the Sixth Avenue N. alley from south of Thomas Street to Harrison Street. This line has multiple catch basins and side sewer connections.

3.1.1.3.3 Sixth Avenue N.

A 15-inch RCP combined sewer is aligned in the center of Sixth Avenue N. from Denny Way to Harrison Street. At Harrison Street, this pipe transitions to a 12-inch VCP and continues north to Mercer Street.

3.1.1.3.4 Dexter Avenue N.

A 60-inch RCP combined sewer is located in Dexter Avenue N. from Denny Way to Republican Street (from midway between John and Thomas Streets to Thomas Street, this sewer pipe is brick). At Republican Street, this sewer increases to 66 inches and continues to Mercer Street. Between Denny Way and Thomas Street, there is also a 15-inch VCP sewer aligned above the 60-inch sewer. These trunk lines have multiple catch basins and side sewer connections.

3.1.1.3.5 Denny Way

A 24-inch RCP combined sewer is aligned in Denny Way between SR 99 and Dexter Avenue N. This pipe connects into the 60-inch pipe located in Dexter Avenue N. and to a 21-inch RCP that is in SR 99.

3.1.1.3.6 Harrison Street

In Harrison Street, an 8-inch concrete combined sewer from Sixth Avenue N. transitions to a 12-inch RCP near the Sixth Avenue N. alley, which transitions to an 18-inch RCP in SR 99 and transition back to a 12-inch VCP to Dexter Avenue N.

3.1.1.3.7 Republican Street

A 72-inch RCP combined sewer crosses SR 99 at Republican Street. There is also a 33-inch brick combined sewer near this pipe from Broad Street to SR 99.

3.1.1.4 Storm Drainage

Multiple catch basins and laterals drain into the combined sewer system in this vicinity; however, there are no storm drainage trunk lines in the North Portal area.

Refer to Section 3.1.2.3 for further discussion pertaining to the combined sewer trunk lines.

3.1.1.5 Telecommunications

DoIT has existing infrastructure that is aligned in Dexter Avenue N. to Thomas Street. At Thomas Street, this infrastructure turns west and crosses SR 99. See Section 3.1.3.1.7 for additional information pertaining to this crossing.

DoIT also has an existing system aligned along SR 99 to service various ITS infrastructure.

3.1.2 Private Utilities

3.1.2.1 Telecommunications and Cable Television

Multiple private communications providers are in the North Portal area. The key communications providers are discussed below.

3.1.2.1.1 Broadstripe

Broadstripe has aerial infrastructure in Dexter Avenue N. from Denny Way to Thomas Street. At John Street, Broadstripe has a service that extends west to the Holiday Inn Express. At Thomas Street, Broadstripe turns west and crosses over SR 99 to Sixth Avenue N. At the Sixth Avenue N. alley, Broadstripe turns north to Harrison Street. At Harrison Street, Broadstripe turns west before continuing north along Broad Street.

3.1.2.1.2 Comcast

Comcast has an aerial system in the alley east of SR 99 between John and Thomas Streets. At Thomas Street, this system turns east to Dexter Avenue N. This system also turns west at Thomas Street and crosses over SR 99 to the Sixth Avenue N. alley. At the Sixth Avenue N. alley, this system turns south and travels midway down the alley to provide service. This system also travels north in Sixth Avenue N. to Harrison Street. At Harrison Street, this system tees, turning west to Sixth Avenue N. and turning east to cross over SR 99 to Dexter Avenue N.

3.1.2.1.3 ELI

ELI has a buried system aligned in Dexter Avenue N. from Denny Way to Republican Street. At Republican Street, ELI's infrastructure tees and a portion continues east as a buried system in Republican Street and a portion continues north as an aerial in Dexter Avenue N.

3.1.2.1.4 Global Crossing Ltd.

Global Crossing Ltd. (also known as US Crossing, Inc.) has a buried system of eight conduits (ranging between 1.25 inch and 1.5 inch in diameter) aligned in Dexter Avenue N. from Denny Way to Thomas Street. At Thomas Street, this system turns west to three vaults in SR 99. Once on the west side of SR 99, this system turns north and is directionally bored to depths between 4 and 26 feet within SR 99 between Thomas and Harrison Streets. At Mercer Street, Global Crossing is directionally bored to a depth of 51 feet to go beneath Broad Street.

3.1.2.1.5 Level3 Communications, Inc.

Level3 Communications, Inc. (Level3, acquired Looking Glass Networks, Inc., LGN) has a buried system aligned in Dexter Avenue N. from Denny Way to Republican Street.

3.1.2.1.6 Qwest

An existing ductbank is aligned in the Sixth Avenue N. alley from Denny Way to midway between John and Thomas Streets.

An existing ductbank is in the alley between Dexter Avenue N. and Seventh Avenue N. At John Street, a ductbank turns west and extends to the east side of SR 99.

3.1.2.1.7 TWT

TWT has a buried system of seven conduits that cross SR 99 at Thomas Street. These conduits extend from Dexter Avenue N. to Sixth Avenue N. One of these conduits is reserved for DoIT.

3.1.2.1.8 Verizon

Verizon has four 2-inch conduits directionally bored beneath SR 99 at John Street.

3.1.2.2 Natural Gas

All natural gas in the North Portal area is owned by PSE. If any deactivated gas mains need to be removed, coordination with PSE would be required. PSE does lease abandoned gas mains to communications providers. It would be advisable to verify that abandoned gas mains contain no other utility systems prior to removal.

3.1.2.2.1 Denny Way

In Denny Way, one 2-inch IP gas main in a 6-inch casing extends west from the west side of the Denny Way and SR 99 southbound off-ramp intersection. One 4-inch IP gas in a 6-inch CI casing extends east from the east side of the Denny Way and SR 99 northbound onramp intersection to Dexter Way N.

3.1.2.2.2 Dexter Avenue N.

One 4-inch IP gas main in a 6-inch CI casing is aligned along the west side of Dexter Avenue N. to Mercer Street.

3.1.2.2.3 John Street to Thomas Street

From midway between John and Thomas Streets, an existing 2-inch IP gas main is located in the sidewalk to Thomas Street. One 6-inch deactivated CIP gas main is located in and near the center of SR 99.

3.1.2.2.4 Thomas Street

In Thomas Street, one 2-inch IP gas in a 4-inch casing extends from Sixth Avenue N. to the west side of SR 99. One 4-inch deactivated gas crosses SR 99 at Thomas Street. One 2-inch IP gas continues east from midway between SR 99 and Dexter Avenue N. past Dexter Avenue N.

3.1.2.2.5 Thomas Street to Mercer Street

One deactivated 6-inch CIP gas main is located in and near the center of SR 99.

3.1.2.2.6 Harrison Street

One 4-inch IP gas in a 12-inch CI casing crosses SR 99 at Harrison Street. Near the Sixth Avenue N. alley, a 4-inch steel pipe extends south from Harrison Street for approximately 100 feet. One 4-inch IP gas in a 12-inch casing continues west in Harrison Street to Sixth Avenue N.

3.1.2.3 Steam

No known steam infrastructure exists in the North Portal vicinity.

3.1.2.4 Petroleum

No known petroleum infrastructure exists in the North Portal vicinity.

3.2 Impacts to Existing Utilities

It is anticipated that the North Portal of the bored tunnel would be constructed with a combination of multiple techniques, some of which include cut-and-cover and open trench. For both of these techniques, a type of shoring or bracing system

would be required to allow for excavation of the North Portal; this could include a secant pile wall system, a soldier pile wall system, or some other yet to be determined method. Regardless of the technique selected, significant impacts to public and private utilities are expected. Refer to the *SR 99 Bored Tunnel Alternative – Draft Design Approval Package MP 30.40 to MP 32.83* (PB and Jacobs, May 2009) for more detail relating to the North Portal construction methods.

The utility impacts are expected because the North Portal will require excavation that is approximately the width of SR 99 for an area that extends from approximately John to Broad Streets. All utilities in SR 99 in this vicinity would be affected and would require relocation or some form of mitigation during construction.

3.2.1 Public Utilities

3.2.1.1 Electrical Power

The existing circuits in the ductbank on the east side of SR 99, the circuits in the ductbanks crossing SR 99 at Thomas and Harrison Streets, and the 115kV transmission line in Thomas Street would be affected by North Portal construction. These systems would need to remain in service during and after construction. Coordination with SCL would be required to ensure that systems can be relocated to facilitate North Portal construction.

The North Portal would impact SCL's buried transmission line. Relocation work to the 115-kV system would need to consider lead times required to obtain line and equipment clearances during construction. SCL would need to be consulted to ascertain the latest clearance lead times. Once a preferred plan is selected, load flow, soil thermal conductivity, and cable-rating studies may be required to ensure that capacity requirements are met by any temporary or permanent modifications to the existing 115-kV system (POWER, May 2008).

The overhead 115kV transmission line adjacent to the south side of Broad Street is not expected to be affected by North Portal construction.

All electrical services must be maintained before, during, and after construction.

3.2.1.2 Domestic Water

The 12-inch CILJ SPU water main aligned in the SR 99 northbound lanes and the multiple services that stem from this pipe would be affected by North Portal construction. It may be possible to reroute the water system to adjacent lines or to a temporary location adjacent to the North Portal, but this must be reviewed with SPU. The function and service level of the First Avenue water main would need to be replaced and meet the regulatory codes. Coordination with SPU will be required to ensure that the water main relocation meets existing service levels and will comply with current regulatory codes

Coordination with SPU will be required to determine the appropriate fire flow rating to the North Portal corridor that must be maintained during and after the North Portal construction.

Consideration must be given to excavation, ground loading, or other construction near existing water mains. Normal construction protection of existing utilities is all that is needed for DIP pipe. However, serious consideration needs to be given to supporting in-place or replacing any CIP within the project corridor. Some CIP was constructed as early as 1891 and is more subject to failure from construction impacts because of its less forgiving lead joints and the brittle properties of CI (RoseWater, 2006). Cathodic protection may be required depending upon soil conditions.

It is anticipated that existing fire hydrants, water valves, and water services will need to be relocated to accommodate the new road layout and other north portal construction activities.

3.2.1.3 Sanitary and Combined Sewer and Storm Drainage

The existing combined sewer near the centerline of SR 99 and the sewer line that crosses SR 99 at Harrison Street would be affected by North Portal construction. These pipes collect surface storm drainage and have multiple side sewer connections. Coordination with SPU would be required to determine how to best relocate these systems and maintain their services.

The existing 72-inch pipe that crosses SR 99 should be protected-in-place, if possible. This pipe is expected to be fairly deep and not conflict with the minimal amounts of cut that are proposed in this area (based on the May 7, 2009 profile of the SR 99 Bored Tunnel).

3.2.1.4 Telecommunications

DoIT's existing system aligned along SR 99 would be affected by North Portal construction. Coordination with DoIT would be required to determine how to best relocate this system.

DoIT's system that crosses SR 99 at Thomas Street may also be affected.

3.2.2 Private Utilities

Private utility owners are required to relocate their utilities once directed by City of Seattle. Efforts should be made to provide advance notice to utility owners since impacts to their systems may be significant and, given time, some may be able to relocate prior to portal construction.

3.2.2.1 Telecommunications and Cable Television

Broadstripe, Comcast, ELI, Global Crossing, Level3, Qwest, TWT, and Verizon may be affected by North Portal construction. It may be possible to temporarily relocate systems to an above-ground system, thereby vacating the SR 99 corridor. Some providers may need to cross the SR 99 corridor in some locations during construction.

3.2.2.2 Natural Gas

PSE would be affected by North Portal construction. Depending on the time of year, it may be possible for PSE to temporarily deactivate gas mains and reroute them in this area. However, if this is not possible, PSE may be able to temporarily relocate its gas mains or temporarily serve its customers from another system.

Deactivated mains can be removed as needed during construction. Coordination should occur with PSE to verify that lines are deactivated and to provide them with the opportunity to replace mains, if required.

4.0 Bored Tunnel

4.1 Existing Utilities

4.1.1 Inventory of Existing Utilities

See Section 1.2.3 for the limits of documentation for existing utilities in the Bored Tunnel area.

See Section 1.7 for the methods used to inventory the existing infrastructure within the Bored Tunnel area.

4.1.2 Public Utilities

4.1.2.1 Electrical Power

4.1.2.1.1 S. King Street to S. Jackson Street

An eight-conduit ductbanks crosses First Avenue S. near the south side of S. King Street. On the north side of the S. King Street and First Avenue S. intersection, a four-conduit ductbank extends west and a 12-conduit ductbank extends east in S. King Street.

A four-conduit ductbank, 22-conduit ductbank, and four-conduit ductbank are aligned in First Avenue S. between S. King Street and S. Jackson Street from the west side of First Avenue S. to the east, respectively.

4.1.2.1.2 S. Jackson Street to S. Main Street

On the south side of the S. Jackson Street and First Avenue S. intersection, a four-conduit ductbank extends west and an 8-conduit ductbank extends east in S. Jackson Street.

A four-conduit ductbank, 26-conduit ductbank, and four-conduit ductbank are aligned in First Avenue S. between S. Jackson Street and S. Main Street from the west side of First Avenue S. to the east, respectively.

4.1.2.1.3 S. Main Street to S. Washington Street

On the south side of the S. Main Street and First Avenue S. intersection, a nine-conduit ductbank extends west and an 8-conduit ductbank extends east in S. Main Street. On the north side of the same intersection, four conduits extend east out of a vault and connect to the four-conduit ductbank on the east side of First Avenue S.

A four-conduit ductbank, 28-conduit ductbank, and four-conduit ductbank are aligned in First Avenue S. between S. Main Street and S. Washington Street from the west side of First Avenue S. to the east, respectively.

4.1.2.1.4 S. Washington Street to Yesler Way

Near the center of the S. Washington Street and First Avenue S. intersection, an eight-conduit ductbank extends west and east in S. Washington Street.

A four-conduit ductbank and 32-conduit ductbank are aligned in First Avenue S. between S. Washington Street and Yesler Way from the west side of First Avenue S. to the east, respectively. Midway between S. Washington Street and Yesler Way, a four-conduit ductbank is aligned along the east side of First Avenue S. and turns west south of S. Washington Street to intercept a vault.

4.1.2.1.5 Yesler Way to Cherry Street

On the south side of the Yesler Way and First Avenue intersection, two parallel ductbanks (the southern one containing 12 conduits and the northern one containing 40 conduits) extends west and a 12-conduit ductbank extends east in Yesler Way.

A five-conduit ductbank, 20-conduit ductbank, and an eight-conduit ductbank are aligned in First Avenue between Yesler Way and Cherry Street from the west side of First Avenue to the east, respectively.

A 40-conduit ductbank and an 8-conduit ductbank are aligned in Post Avenue Alley between Yesler Way and Cherry Street from the west side of Post Avenue Alley to the east, respectively.

4.1.2.1.6 Cherry Street to Columbia Street

A four-conduit (abandoned), four-conduit ductbank, 20-conduit ductbank, an eight-conduit, and a four conduit ductbank are aligned in First Avenue between Cherry Street and Columbia Street from the west side of First Avenue to the east, respectively.

A 64-conduit ductbank and an 8-conduit ductbank are aligned in Post Avenue Alley extending south from Columbia Street to midway between Cherry Street and Columbia Street from the west side of Post Avenue Alley to the east, respectively.

4.1.2.1.7 Columbia Street to Marion Street

Near the center of the Columbia Street and First Avenue intersection, a 16-conduit ductbank extends east in Columbia Street. On the west side of this intersection, a 64-conduit ductbank extends west in Columbia Street and is empty according to the Program survey records.

A four-conduit, 15-conduit, eight conduit, and four-conduit ductbank are aligned in First Avenue between Columbia Street and Marion Street from the west side of First Avenue to the east, respectively.

4.1.2.1.8 Marion Street to Madison Street

Near the center of the Marion Street and First Avenue intersection, three eight-conduit ductbanks extend west and a 14- and 12-conduit ductbank extends east in Marion Street.

A four-conduit ductbank, ten-conduit ductbank, 24-conduit ductbank, eight conduit ductbank, four-conduit ductbank (abandoned), and four-conduit ductbank are aligned in First Avenue between Marion Street and Madison Street from the west side of First Avenue to the east, respectively.

4.1.2.1.9 Madison Street to Spring Street

At the Marion Street and First Avenue intersection, an eight-conduit, seven conduit, six conduit, and 14 conduit ductbank extends east in Madison Street.

A four-conduit ductbank, ten-conduit ductbank, 16-conduit ductbank, and four-conduit ductbank are aligned in First Avenue between Madison Street and Spring Street from the west side of First Avenue to the east, respectively.

4.1.2.1.10 Spring Street to Seneca Street

At the Spring Street and First Avenue intersection, two eight-conduit and one 12-conduit ductbank extends west and two eight-conduit, one 14-conduit, and two 4-conduit ductbanks extends east in Spring Street.

A five-conduit ductbank, eight-conduit ductbank, 32-conduit ductbank, and four-conduit ductbank are aligned in First Avenue between Spring Street and Seneca from the west side of First Avenue to the east, respectively.

4.1.2.1.11 Seneca Street to Unversity Street

At the Spring Street and First Avenue intersection, a ten-conduit and an abandoned 8-conduit ductbank extend east in Seneca Street.

A four-conduit ductbank, 44-conduit ductbank, and four-conduit ductbank are aligned in First Avenue between Seneca Street and University from the west side of First Avenue to the east, respectively. Midway between Seneca Street and University Street, the 44-conduit ductbank transitions to three separate ductbanks; the western most of the three ductbanks contains 8 conduits, the center ductbank contains 10 conduits, and the east conduit contains 4 conduits.

4.1.2.1.12 University Street to Union Street

At the University Street and First Avenue intersection, a 14-conduit and two 8-conduit ductbanks extend east in University Street.

A four-conduit ductbank, six-conduit ductbank, 10-conduit ductbank, six-conduit ductbank, and five-conduit ductbank are aligned in First Avenue between University Street and Union Street from the west side of First Avenue to the east, respectively.

4.1.2.1.13 Union Street to Pike Street

At the Union Street and First Avenue intersection, a 48-conduit ductbank extends west and two 10-conduit ductbank, an eight-conduit ductbank, an 18-condui ductbank t, and a six-conduit ductbank extend east in Union Street. A cable tunnel extends east in Union Street from the east side of the Union Street and First Avenue intersection. This tunnel connects to the Union Sub Cable Loft (located on north side of Union Street between the alley between First Avenue and Second Avenue and Second Avenue).

A 24-conduit ductbank and an eight-conduit ductbank are aligned in First Avenue between Union Street and Pike Street from the west side of First Avenue to the east, respectively.

4.1.2.1.14 Pike Street to Pine Street

At the Pike Street and First Avenue intersection, a 20-conduit, four-conduit, and 12-conduit ductbank extends west and a 32-conduit and a 12-conduit ductbank extends east in Pike Street.

A 16-conduit ductbank and a five-conduit ductbank are aligned in First Avenue between Pike Street and Pine Street from the west side of First Avenue to the east, respectively.

4.1.2.1.15 Pine Street to Stewart Street

At the Pine Street and First Avenue intersection, a 16-conduit ductbank extends west and east in Pine Street.

A 16-conduit ductbank and a six-conduit ductbank are aligned in First Avenue between Pine Street and Stewart Street from the west side of First Avenue to the east, respectively.

4.1.2.1.16 Stewart Street to Virgina Street

At the Stewart Street and First Avenue intersection, an 8-conduit and 14-conduit ductbank extends west and east in Stewart Street.

First Avenue: A four-conduit ductbank and a five-conduit ductbank are aligned in First Avenue between Stewart Street and Virginia Street from the west side of First Avenue to the east, respectively.

Alley between First Avenue and Second Avenue: An eight-conduit ductbank transitioning to 12-conduit ductbank and a six-conduit ductbank are aligned in the alley between First Avenue and Second Avenue between Stewart Street and Virginia Street from the west side of the alley to the east, respectively.

Second Avenue: A five-conduit ductbank and an eight-conduit ductbank are aligned in Second Avenue between Stewart Street and Virginia Street from the west side of Second Avenue to the east, respectively.

4.1.2.1.17 Virginia Street to Lenora Street

At the Stewart Street and Second Avenue intersection, an eight-conduit ductbank extends west and 12-conduit ductbank extends east in Lenora Street.

Second Avenue: A two-conduit ductbank and an eight-conduit ductbank are aligned in Second Avenue between Virginia Street and Lenora Street from the west side of Second Avenue to the east, respectively.

Alley between Second Avenue and Third Avenue: A 12-conduit ductbank is aligned in the alley between Second Avenue and Third Avenue between Virginia Street and Lenora Street from the west side of the alley to the east, respectively.

Third Avenue: A four-conduit ductbank and a five-conduit ductbank are aligned in Third Avenue between Virginia Street and Lenora Street from the west side of Third Avenue to the east, respectively.

4.1.2.1.18 Lenora Street to Blanchard Street

At the Lenora Street and Third Avenue intersection, a five-conduit ductbank and a 12-conduit extends west and a two-conduit ductbank and a 12-conduit ductbank extends east in Lenora Street.

Third Avenue: A four-conduit ductbank and a five-conduit ductbank are aligned in Third Avenue between Lenora Street and Blanchard Street from the west side of Third Avenue to the east, respectively.

Alley between Third Avenue and Fourth Avenue: A 36-conduit ductbank transitioning to eight-conduit ductbank is aligned in the alley between Third Avenue and Fourth Avenue between Lenora Street and Blanchard Street from the west side of the alley to the east, respectively.

Fourth Avenue: One conduit is aligned on the west and east side of Fourth Avenue between Lenora Street and Blanchard Street.

4.1.2.1.19 Blanchard Street to Bell Street

At the Blanchard Street and Fourth Avenue intersection, a 14-conduit ductbank and an eight-conduit ductbanks extend west and east in Blanchard Street.

Fourth Avenue: One conduit is aligned on the west and east side of Fourth Avenue between Blanchard Street and Bell Street.

Alley between Fourth Avenue and Fifth Avenue: A six-conduit ductbank transitioning to an eight-conduit ductbank is aligned in the alley between Fourth Avenue and Fifth Avenue between Blanchard Street and Bell Street from the west side of the alley to the east, respectively.

Fifth Avenue: A three-conduit ductbank and a 14-conduit ductbank are aligned in Fifth Avenue between Blanchard Street and Bell Street from the west side of Fifth Avenue to the east, respectively.

4.1.2.1.20 Bell Street to Battery Street

At the Bell Street and Fifth Avenue intersection, two six-conduit ductbanks extend west and east in Bell Street.

Fifth Avenue: A two-conduit ductbank and a ten-conduit ductbank are aligned in Fifth Avenue between Bell Street and Battery Street from the west side of Fifth Avenue to the east, respectively.

Sixth Avenue: A six-conduit ductbank is aligned in Sixth Avenue between Bell Street and Battery Street.

4.1.2.1.21 Battery Street to Wall Street

At the Battery Street and Sixth Avenue intersection, nine-conduit ductbank and a four-conduit ductbank extend east in Battery Street.

Sixth Avenue: A six-conduit ductbank crosses the BST and is aligned in Sixth Avenue between Battery Street and Wall.

Alley between Sixth Avenue and Seventh Avenue: Two nine-conduit ductbanks are aligned in the alley between Sixth Avenue and Seventh Avenue from Battery Street to the BST. An eight-conduit ductbank crosses the BST and continues in the alley to Wall Street.

Seventh Avenue: A six-conduit ductbank is aligned in Seventh Avenue between Battery Street and Denny.

4.1.2.1.22 Denny Way

For discussions pertaining to the existing electrical power system from Denny Way, north, see Section 3.1.2.1.

4.1.2.2 Domestic Water

Multiple laterals, hydrants, and service connections extend from the water mains described in the following subsections.

4.1.2.2.1 S. King Street to S. Jackson Street

A 16-inch CILJ water main is aligned in First Avenue S. between S. King Street and S. Jackson Street. At S. King Street, a 12-inch CILJ water main extends east from the 16-inch main.

4.1.2.2.2 S. Jackson Street to S. Main Street

A 16-inch CILJ water main is aligned in First Avenue S. between S. Jackson Street and S. Main Street. At S. Jackson Street, a 12-inch CILJ water main extends west and east from the 16-inch main.

4.1.2.2.3 S. Main Street to S. Washington Street

A 16-inch CILJ water main is aligned in First Avenue S. between S. Main Street and S. Washington Street. At S. Main Street, the size and material of this water main transitions to a 20-inch DIP water main with an 8-inch DIP water main extending west and a 20-inch DIP extending east from the 20-inch main. The 20-inch DIP water main transitions to back to CILJ at the east and north sides of the First Avenue S. and S. Main Street intersection.

4.1.2.2.4 S. Washington Street to Yesler Way

A 20-inch CILJ water main is aligned in First Avenue S. between S. Washington Street and Yesler Way. At S. Washington Street, an 8-inch DIP water main extends west and a 6-inch CILJ water main extends east from the 20-inch main. The 8-inch DIP water main transitions to an 8-inch CILJ water main at the west side of the First Avenue S. and S. Washington Street intersection. The 6-inch CILJ water main transitions to a 12-inch CILJ water main at the east side of the First Avenue S. and S. Washington Street intersection.

4.1.2.2.5 Yesler Way to Cherry Street

A 20-inch CILJ water main is aligned in First Avenue S. between Yesler Way and Cherry Street. At Yesler Way, a 12-inch DIP water main extends west and east from the 20-inch main. The 12-inch DIP water main extending east transitions to a 12-inch CILJ water main at the east side of the First Avenue S. and Cherry Street intersection.

An 8-inch CILJ water main is aligned in the alley between Western Avenue and First Avenue.

4.1.2.2.6 Cherry Street to Columbia Street

A 20-inch CILJ water main is aligned in First Avenue between Cherry Street and Columbia Street. At Cherry Street, an 8-inch CILJ water main extends east from the 20-inch main.

An 8-inch CILJ water main is aligned in the alley between Western Avenue and First Avenue to Columbia Street.

4.1.2.2.7 Columbia Street to Marion Street

A 20-inch CILJ water main is aligned in First Avenue between Columbia Street and Marion Street. At Columbia Street, an 8-inch CILJ water main extends west and a 6-inch CILJ water main extends east from the 20-inch main.

4.1.2.2.8 Marion Street to Madison Street

A 20-inch CILJ water main is aligned in First Avenue between Marion Street and Madison Street. At Marion Street, an 8-inch CILJ water main extends west and east from the 20-inch main. The water main extending west is capped approximately 15-feet west of the 20-inch water main, and the water main extending east transitions to an 8-inch water main approximately 15-feet east of the 20-inch water main.

4.1.2.2.9 Madison Street to Spring Street

A 20-inch CILJ water main is aligned in First Avenue between Madison Street and Spring Street. At Madison Street, a 12-inch CILJ water main extends west and east from the 20-inch main.

4.1.2.2.10 Spring Street to Seneca Street

A 20-inch CILJ water main is aligned in First Avenue between Spring Street and Seneca Street. At Spring Street, an 8-inch CILJ water main extends west and east from the 20-inch main. The water main extending west is capped approximately 15-feet west of the 20-inch water main, and the water main extending east transitions to an 8-inch water main approximately 15-feet east of the 20-inch water main.

4.1.2.2.11 Seneca Street to Unversity Street

A 20-inch CILJ water main is aligned in First Avenue between Seneca Street and University Street. At Seneca Street, an 8-inch CILJ water main extends east from the 20-inch main.

4.1.2.2.12 University Street to Pike Street

A 20-inch CILJ water main is aligned in First Avenue between University Street and Pike Street. At University Street, a 6-inch DIP water main extends east from the 20-inch main. This DIP water main immediately transitions to CILJ as it travels east in University Street.

4.1.2.2.13 Pike Street to Pine Street

A 20-inch CILJ water main is aligned in First Avenue between Pike Street and Pine Street. At Pike Street, a 20-inch CILJ water main extends west and east from the 20-inch main. The 20-inch water main extending east immediately transitions to a 24-inch CILJ water main.

4.1.2.2.14 Pine Street to Stewart Street

A 20-inch CILJ water main is aligned in First Avenue between Pine Street and Stewart Street. At Pine Street, a 16-inch CILJ water main extends east from the 20-inch main.

4.1.2.2.15 Stewart Street to Virgina Street

First Avenue: A 20-inch CILJ water main is aligned in First Avenue between Stewart Street and Virginia Street.

Second Avenue: A 10-inch CILJ water main is aligned in Second Avenue between Stewart Street and Virginia Street.

4.1.2.2.16 Virginia Street to Lenora Street

A 10-inch CILJ water main is aligned in Virginia Street between First Avenue and Third Avenue.

Second Avenue: A 10-inch CILJ water main is aligned in Second Avenue between Virginia Street and Lenora Street.

Third Avenue: A 12-inch CILJ water main is aligned in Third Avenue between Virginia Street and Lenora Street.

4.1.2.2.17 Lenora Street to Blanchard Street

Third Avenue: A 12-inch CILJ water main is aligned in Third Avenue between Lenora Street and Blanchard Street.

Fourth Avenue: A 12-inch CILJ water main is aligned in Fourth Avenue between Lenora Street and Blanchard Street.

4.1.2.2.18 Blanchard Street to Bell Street

Fourth Avenue: A 12-inch CILJ water main is aligned in Fourth Avenue between Blanchard Street and Bell Street.

Fifth Avenue: A 12-inch CILJ water main is aligned in Fifth Avenue between Blanchard Street and Bell Street.

4.1.2.2.19 Bell Street to Battery Street

A 24-inch CILJ water main is aligned in Bell Street between Fourth Avenue and Sixth Avenue. At the intersection of Bell Street and Sixth Avenue, this water main transitions to a 30-inch CILJ water main.

Fifth Avenue: A 12-inch CILJ water main is aligned in Fifth Avenue between Bell and Battery Street and Bell Street.

Sixth Avenue: A 12-inch CILJ water main is aligned in Sixth Avenue between Bell Street and Battery Street. At the intersection of Bell Street and Sixth Avenue, this 12-inch water main connects into the 30-inch water main that is aligned in Bell Street.

4.1.2.2.20 Battery Street to Wall Street

Sixth Avenue: A 12-inch CILJ water main is aligned in Sixth Avenue between Battery Street and Wall Street.

Seventh Avenue: A 12-inch CILJ water main is aligned in Seventh Avenue between Battery Street and Denny Way.

4.1.2.2.21 Denny Way

For discussions pertaining to the existing water system north of Denny Way, see Section 3.1.2.2.

4.1.2.3 Sanitary and Combined Sewer

Multiple combined sewer systems are aligned within or cross the Bored Tunnel alignment. A majority of these systems have several laterals, catch basin, and service connections that extend from the pipes located along the areas described in the subsections below.

4.1.2.3.1 S. King Street to S. Jackson Street

One 42-inch RCP and one 48-inch RCP/brick combined sewer are located in S. King Street Each of the pipes extend from west of Alaskan Way S.; the 48-inch pipe turns north on First Avenue S., while the 42-inch pipe continues east in S. King Street and intercepts the EBI.

As the 48-inch combined sewer pipe turns north into First Avenue S., it transitions from a pile supported RCP pipe and connects into the original sewer that was built in 1908 and is a pile supported brick pipe. The depth of this pipe as it is aligned in First Avenue S. varies but generally is located between 3-feet and 7-feet below existing grade. This pipe continues in First Avenue S. to S. Jackson Street.

4.1.2.3.2 S. Jackson Street to S. Main Street

At S. Jackson Street, a 24-inch VCP combined sewer extends east.

The 48-inch pile supported brick combined sewer continues in First Avenue S. to S. Main St.

4.1.2.3.3 S. Main Street to S. Washington Street

A 10-inch concrete combined sewer extends west and a 28-inch concrete combined sewer extends east in S. Main Street. The 28-inch combined sewer transitions in material to brick on the east side of the S. Main Street and First Avenue S. intersection.

The 48-inch pile supported brick combined sewer transitions in size to a 32x48-inch combined sewer at S. Main Street and continues in First Avenue S. to S. Washington St.

4.1.2.3.4 S. Washington Street to Yesler Way S.

An 18-inch RCP combined sewer extends west and a 20-inch brick combined sewer extends east in S. Washington Street. The 18-inch combined sewer transitions in material to VCP on the west side of the S. Washington Street and First Avenue S. intersection.

The 32x48-inch pile supported brick combined sewer continues in First Avenue S. to Yesler Way.

4.1.2.3.5 Yesler Way to Cherry Street

A 24-inch VCP combined sewer extends east in Yesler Way and a 20-inch concrete combined sewer extends east in James Street. The 20-inch combined sewer transitions in material to brick on the east side of the James Street and First Avenue intersection.

A 12-inch CIP combined sewer is aligned in the alley between Western Avenue and First Avenue S. between Yesler Way and Cherry Street.

The 32x48-inch pile supported brick combined sewer transitions in size to a 28x42-inch combined sewer at Yesler Way and continues in First Avenue S. to Cherry Street.

4.1.2.3.6 Cherry Street to Columbia Street

The 12-inch CIP combined sewer aligned in the alley between Western Avenue and First Avenue S. transitions to a 10-inch DIP combined sewer at Cherry Street and continues in the alley to Columbia Street. Midway between Cherry Street and Columbia Street, the 10-inch combined sewer transitions in material to VCP.

The 28x42-inch pile supported brick combined sewer transitions in size to a 22x33-inch combined sewer at Cherry Street and continues in First Avenue S. to Columbia Street.

4.1.2.3.7 Columbia Street to Marion Street

A 10-inch VCP combined sewer extends east in Columbia Street. A 10-inch combined sewer extends from Western Avenue to the west side of the Columbia Street and First Avenue intersection (this 10-inch combined sewer transitions in material from VCP to DIP to concrete from Western Avenue, respectively).

The 22x33-inch pile supported brick combined sewer transitions in material and size to a 22x36-inch RCP at Columbia Street and continues in First Avenue S. to Marion Street.

4.1.2.3.8 Marion Street to Madison Street

A 15-inch VCP combined sewer extends west and east in Marion Street. The 15-inch sewer extending east immediately transitions to a 12-inch sewer on Marion Street.

The 22x36-inch RCP combined sewer transitions in material to concrete at Marion Street and continues in First Avenue S. to Madison Street.

4.1.2.3.9 Madison Street to Spring Street

A 12-inch RCP combined sewer extends east in Madison Street. A 12-inch combined sewer extends from the alley between Western Avenue and First Avenue to the west side of the Columbia Street and First Avenue intersection (this 12-inch sewer transitions in material from VCP to RCP).

The 22x36-inch concrete combined sewer transitions to an 18-inch RCP combined sewer at Madison Street and continues in First Avenue S. to Spring Street.

4.1.2.3.10 Spring Street to Seneca Street

A 10-inch concrete combined sewer extends east in Spring Street.

The 18-inch VCP combined sewer transitions in size to a 24-inch RCP combined sewer midway between Spring Street and Seneca Street and continues in First Avenue S. to Madison Street.

4.1.2.3.11 Seneca Street to Unversity Street

A 10-inch RCP combined sewer extends east in Seneca Street.

The 24-inch RCP combined sewer continues in First Avenue S. to University Street.

4.1.2.3.12 University Street to Union Street

An 18-inch DIP combined sewer extends west and a 15-inch RCP combined sewer extends east in University Street.

A 15-inch VCP combined sewer extends west from Second Avenue to the east side of the University Street and First Avenue intersection.

The 24-inch RCP combined sewer continues in First Avenue S. to Union Street.

4.1.2.3.13 Union Street to Pike Street

A 10-inch VCP combined sewer extends west and east in Union Street. A 12-inch CIP combined sewer also extends east in Union Street.

The 24-inch RCP combined sewer transitions to a 12-inch DIP combined sewer at Union Street and continues in First Avenue S. to Pike Street.

4.1.2.3.14 Pike Street to Pine Street

An 18-inch VCP and a 15-inch RCP combined sewer crosses First Avenue at Pike Street. The 18-inch VCP combined sewer transitions in size to 15-inches on the west side of the Pike Street and First Avenue intersection, and the 15-inch combined sewer transitions in size and material to a 21-inch VCP combined sewer on the east side of the Pike Street and First Avenue intersection.

A 15-inch VCP combined sewer extends north in First Avenue from Pike Street.

A 15-inch concrete sanitary sewer extends north from Pike Street in Pike Place. Midway between Pine Street and Stewart Street, this pipe transitions from a sanitary sewer to a combined sewer.

EBI: The EBI tees at Second Avenue and Pike Street with a branch extending west in Pike Street. The 102-inch RCP combined sewer crosses First Avenue and has a depth to pipe invert from existing grade of approximately 125- to 130-feet.

4.1.2.3.15 Pine Street to Stewart Street

The 15-inch VCP combined sewer continues north in First Avenue to Stewart Street.

4.1.2.3.16 Stewart Street to Virgina Street

A 12-inch VCP combined sewer is aligned in Stewart Street between First Avenue and Second Avenue.

First Avenue: A 12-inch VCP combined sewer is aligned in First Avenue between Stewart Street and Virginia Street.

Second Avenue: A 12-inch VCP sewer is aligned in Second Avenue from Stewart Street to three-quarters of the way to Virginia Street.

- **EBI:** The 102-inch EBI is aligned in Second Avenue and has a depth to pipe invert from existing grade of approximately 155- to 160-feet.

4.1.2.3.17 Virginia Street to Lenora Street

A 10-inch VCP combined sewer extends from First Avenue to the east side of the Virginia Street and Second Avenue intersection.

A 12-inch VCP combined sewer extends from Third Avenue to the alley between Second Avenue and Third Avenue.

Second Avenue: The 102-inch RCP EBI is aligned in Second Avenue and has a depth to pipe invert from existing grade of approximately 160- to 175-feet.

Third Avenue: A 12-inch VCP combined sewer is aligned in Third Avenue from the north side of the Virginia Street and Third Avenue intersection to Lenora Street.

4.1.2.3.18 Lenora Street to Blanchard Street

Third Avenue: A 12-inch RCP combined sewer is aligned in Third Avenue from Lenora Street to Blanchard Street.

Fourth Avenue: A 12-inch VCP combined sewer is aligned in Fourth Avenue from Lenora Street to Blanchard Street.

4.1.2.3.19 Blanchard Street to Bell Street

Fourth Avenue: A 12-inch VCP combined sewer is aligned in Fourth Avenue from Blanchard Street to Bell Street.

Fifth Avenue: An 18-inch VCP combined sewer is aligned in Fourth Avenue from Blanchard Street to Bell Street.

4.1.2.3.20 Bell Street to Battery Street

A 10-inch VCP combined sewer is aligned in Bell Street from Sixth Avenue to the alley between Fifth Avenue and Sixth Avenue.

Fifth Avenue: The 18-inch VCP combined sewer aligned in Fifth Avenue transitions to a 15-inch combined sewer at the north side of the Bell Street and Fifth Avenue intersection and continues to Battery Street.

Sixth Avenue: A 15-inch VCP combined sewer is aligned in Sixth Avenue between Bell Street and Battery Street

4.1.2.3.21 Battery Street to Wall Street

A 15-inch RCP combined sewer is aligned in Battery Street from Fifth Avenue to Sixth Avenue. At Sixth Avenue, this combined sewer transitions in size to 21-inches and continues to Denny Way.

A 10-inch concrete combined sewer extends west from Seventh Avenue to the alley between Sixth Avenue and Seventh Avenue.

Sixth Avenue: A 15-inch RCP combined sewer is aligned in Sixth Avenue between Battery Street and Wall Street.

Seventh Avenue: A 15-inch VCP combined sewer is aligned in Seventh Avenue between Battery Street and Denny Way.

4.1.2.3.22 Denny Way

The 21-inch RCP combined sewer in Battery Street turns east on Denny Way and continues to Dexter Avenue N. where it connects to the 15-inch RCP combined sewer aligned in Dexter Avenue N.

For further discussions pertaining to the existing sewer system north of Denny Way, see Section 3.1.2.3.

4.1.2.4 Storm Drainage

In addition to the storm drainage trunk lines in the Bored Tunnel area, multiple catch basins and laterals drain into the combined sewer system in this area.

4.1.2.4.1 University Street

An 18-inch RCP storm drain crosses First Avenue at University Street. On the west side of the University Street and First Avenue intersection, this combined sewer transitions in material to DIP.

4.1.2.4.2 Pine Street to Stewart Street

A 15-inch concrete storm drain extends north from Pine Street in Pike Place.

4.1.2.5 Telecommunications

Detail pertaining to DoIT is based on information collected during earlier phases of the AWVSRP before the Bored Tunnel area was part of the Program. DoIT records have not been obtained in all Bored Tunnel areas. The following information is incomplete and does not provide a complete list of existing infrastructure for the Bored Tunnel area.

The following is based on DoIT's schematic drawings:

- It appears that DoIT crosses First Avenue at Columbia Street, Marion Street, Seneca Street, and Union Street.
- It appears that DoIT is aligned in First Avenue from Madison Street to Union Street.
- It appears that DoIT will cross the tunnel alignment north of Stewart Street at each intersection except for the Third Avenue and Lenora Street intersection.

4.1.3 Private Utilities

4.1.3.1 Telecommunications and Cable Television

Detail pertaining to private communications providers is based on information collected during earlier phases of the AWVSRP before the Bored Tunnel area was part of the Program. Private communications providers' records have not been obtained in all Bored Tunnel areas. Additional communications providers could exist in this area that have not been coordinated with or identified as part of past Program coordination. Additional investigations, research, and coordination would be required to develop a comprehensive understanding of existing private communications infrastructure in this area.

The following information is incomplete and does not provide a complete list of existing infrastructure for the Bored Tunnel area.

4.1.3.1.1 Allstream

Lenora Street: Allstream has one conduit aligned in Lenora Street from west of Second Avenue to east of Fourth of Avenue.

4.1.3.1.2 Broadstripe

S. King Street to S. Jackson Street: Broadstripe crosses First Avenue S. between S. King Street and S. Jackson Street.

S. Jackson Street to S. Main Street: Broadstripe crosses First Avenue S. at S. Jackson Street.

S. Washington Street to Yesler Way: Broadstripe crosses First Avenue S. between S. Washington Street and Yesler Way.

Seneca Street to University Street: Broadstripe crosses First Avenue at Seneca Street.

Union Street to Lenora Street: Broadstripe crosses First Avenue at Pine Street. They are also aligned in the alley between First Avenue and Second Avenue from midway between Union Street and Pike Street to midway between Virginia Street and Lenora Street.

At Pine Street, Broadstripe crosses First Avenue and continues east to the alley between First Avenue and Second Avenue.

At Virginia Street, Broadstripe has infrastructure that extends from the alley between Western Avenue and First Avenue to east of Third Avenue.

Lenora Street to Blanchard Street: Broadstripe is aligned in the alley between Third Avenue and Fourth Avenue between Lenora Street and Blanchard Street.

Blanchard Street to Bell Street: Broadstripe is aligned in the alley between Third Avenue and Fourth Avenue, Fourth Avenue and Fifth Avenue, and Fifth Avenue and Sixth Avenue between Blanchard Street and Bell Street.

Bell Street to Battery Street: Broadstripe is aligned in the alley Fifth Avenue and Sixth Avenue between Bell Street and Battery Street. They are also aligned in Bell Street from the alley between Third Avenue and Fourth Avenue to the west side of Eight Avenue.

Battery Street to Denny Way: Broadstripe is aligned in Seventh Avenue to Battery Street. At Battery Street, they turn north and are aligned in Dexter Avenue N. past Denny Way. For further discussions pertaining to ELI from Denny Way, north, see Section 3.1.3.1.3.

4.1.3.1.3 Comcast

S. King Street: In S. King Street, Comcast has a buried system that extends west from the viaduct to First Avenue S., where it turns south. See Section 2.1.3.1.2 for further discussion.

Columbia Street: In Columbia Street, a four-conduit ductbank crosses First Avenue S. Once on the east side of First Avenue S., this ductbank transition to two conduits.

Pike Street to Lenora Street: Comcast has existing infrastructure aligned in the alley between First Avenue and Second Avenue between Pike Street and Lenora Street.

Blanchard Street: Comcast has existing infrastructure aligned in Blanchard Street between Third Avenue and Fifth Avenue.

4.1.3.1.4 ELI

S. King Street: In S. King Street, ELI has buried infrastructure that extends east from viaduct bent No. 115E to an existing SCL utility pole in S. King Street and First Avenue S. See Section 2.1.3.1.3 for further discussion.

Columbia Street to Madison Street: At Columbia Street, ELI has two ductbanks that cross First Avenue. One of the ductbanks contains three conduits and the other is one conduit. The one-conduit ductbank is aligned in First Avenue S. from Cherry Street to Madison Street. At Madison Street, this conduit turns east, out of First Avenue. It is assumed that this one-conduit ductbank is the abandoned 6-inch gas main. See Section 4.1.3.2 for further discussion.

Stewart Street to Virginia Street: ELI has infrastructure in Second Avenue between Stewart Street and Virginia Street.

Virginia Street to Lenora Street: At Virginia Street, ELI turns west to First Avenue. At the intersection of Virginia Street and First Avenue, ELI turns north onto First Avenue.

Lenora Street to Blanchard Street: At Lenora Street, ELI turns east onto Lenora Street and extends east to the alley between First Avenue and Second Avenue where it turns south into the alley.

Blanchard Street to Bell Street: ELI is aligned in the alley between Third Avenue and Fourth Avenue between Blanchard Street and Bell Street.

Bell Street to Battery Street: ELI is aligned in Bell Street from the alley between Third Avenue and Fourth Avenue to Seventh Avenue.

Battery Street to Wall Street: ELI has no infrastructure between Battery Street and Denny Way east of Fifth Avenue.

Denny Way: ELI has infrastructure aligned in Seventh Avenue that crosses Denny Way and continues north, aligned in Dexter Avenue N. For further discussions pertaining to ELI north of Denny Way, see Section 3.1.3.1.3.

4.1.3.1.5 Global Crossing

Based on the record drawings available, Global Crossing is aligned in Fifth Avenue from the Westin Building (located at 2001 Sixth Avenue) to Bell Street. At Bell Street, Global Crossing turns east and remains in Bell Street to Seventh Avenue. At Seventh Avenue, Global crossing turns onto Seventh Avenue to Dexter Avenue N.

4.1.3.1.6 Level3

Stewart Street to Blanchard Street: Level3 is aligned in Second Avenue between Stewart Street and Virginia Street.

Blanchard Street to Bell Street: Level3 is aligned in Blanchard Street between Second Avenue and Fourth Avenue. At Fourth Avenue, Level3 turns north and is aligned in Fourth Avenue past Bell Street.

Bell Street to Denny Way: Level3 is aligned in Sixth Avenue from Bell Street to Denny Way. They are also aligned in Bell Street from Sixth Avenue to Seventh Avenue. At the intersection of Bell Street and Seventh Avenue, Level3 turns north to Dexter Avenue N.

4.1.3.1.7 OnFiber Communications

OnFiber Communications (acquired by Qwest) has existing infrastructure between Blanchard Street and Denny Way in Fourth Avenue and on Sixth Avenue between Lenora Street and Denny Way.

4.1.3.1.8 Qwest

S. King Street to S. Washington Street: At S. King Street, Qwest has two parallel four-conduit ductbanks that extend east from First Avenue S. in S. King Street.

Qwest has two parallel ductbanks in First Avenue S. between S. King Street and S. Washington Street.

S. Washington Street to Yesler Way: At S. Washington Street, Qwest has one ductbank that extends west and two parallel ductbanks that extend east from First Avenue S. in S. Washington Street.

Qwest has one abandoned ductbank in First Avenue S. between S. Washington Street and Yesler Way.

Yesler Way to Cherry Street: Qwest has two parallel ductbanks in Post Avenue Alley between Yesler Way and Cherry Street.

At Yesler Way, Qwest has three ductbanks that head east from Post Avenue Alley in Yesler Way and cross First Avenue.

Columbia Street: Qwest has one ductbank that crosses First Avenue at Columbia Street.

Marion Street: Qwest has two ductbanks that cross First Avenue at Marion Street.

Spring Street: Qwest has two ductbanks that cross First Avenue at Spring Street.

Seneca Street: Qwest has one ductbank that crosses First Avenue at Seneca Street.

University Street: Qwest has one ductbank that crosses First Avenue at University Street.

Pike Street to Pine Street: Qwest has two parallel ductbanks in the alley between First Avenue and Second Avenue between Pike Street and Pine Street.

Qwest has two ductbanks that cross First Avenue at Pike Street.

Stewart Street to Virginia Street: Qwest has one ductbank aligned in Stewart Street between First Avenue and Second Avenue.

Qwest has one ductbank aligned in the alley between First Avenue and Second Avenue and one ductbank aligned in Second Avenue between Stewart Street and Virginia Street.

Virginia Street to Lenora Street: Qwest has one ductbank aligned in Virginia Street between First Avenue and Second Avenue.

Qwest has one ductbank aligned in the alley between First Avenue and Second Avenue, one ductbank aligned in Second Avenue, and one ductbank aligned in the alley between Second Avenue and Third Avenue between Stewart Street and Virginia Street.

Lenora Street to Blanchard Street: Qwest has one ductbank aligned in Lenora Street from west of Second Avenue to east of Third Avenue.

Qwest has one ductbank aligned in Second Avenue and one ductbank aligned in the alley between Second Avenue and Third Avenue between Stewart Street and Virginia Street.

Blanchard Street to Battery Street: Qwest has one ductbank aligned in Blanchard Street from the alley between Sixth Avenue and Seventh Avenue to west of the alley between Fifth Avenue and Sixth Avenue.

Qwest has one ductbank aligned in the alley between Fifth Avenue and Sixth Avenue and in the alley between Sixth Avenue and Seventh Avenue between Blanchard Street and Battery Street.

Battery Street to Denny Way: Qwest has one ductbank aligned in Seventh Avenue between Battery Street and Denny Way. For further discussions pertaining to Qwest north of Denny Way, see Section 3.1.3.1.6.

4.1.3.1.9 Sprint

Sprint has existing infrastructure in Lenora Street from west of Second Avenue to east of Fourth Avenue.

4.1.3.1.10 Verizon

Verizon has existing infrastructure running parallel in and perpendicular to First Avenue S. from Railroad Way S. to Yesler Way. Verizon may have leased some of their existing conduit runs in First Avenue S. to other companies.

S. King Street to S. Jackson Street: At S. King Street, Verizon has an existing system that enters First Avenue S. from Occidental Avenue S. At First Avenue S., the system tees and turns south to intercepts an existing vault and north, past Jackson Street. The conduits that turn north, parallel a second Verizon ductbank. One 4-inch conduit turns west in S. King Street and extends towards Alaskan Way.

S. Jackson Street to Yesler Way: Both of the existing Verizon ductbanks continue north to Yesler Way in First Avenue.

Yesler Way to Cherry Street: At Yesler Way, three conduits extend west out of First Avenue. The two parallel ductbanks continue north in First Avenue to Cherry Street.

Cherry Street to Columbia Street: At Cherry Way, ten conduits extend east out of First Avenue. The two parallel ductbanks continue north in First Avenue to Columbia Street.

Columbia Street to Marion Street: At Columbia Street, six conduits extend east out of First Avenue. The two parallel ductbanks continue north in First Avenue to Marion Street.

Marion Street to Madison Street: At Marion Street, one conduit extends west and east out of First Avenue. The two parallel ductbanks continue north in First Avenue to the north side of Marion Street where they tie together at a vault. One eight-conduit ductbank continues north in First Avenue to Madison Street.

Madison Street to Spring Street: At Madison Street, five conduits extend east into First Avenue from the west. One six -conduit ductbank continues north in First Avenue to Spring Street.

Spring Street to Seneca Street: One six -conduit ductbank continues north in First Avenue to Seneca Street.

Seneca Street to University Street: One six -conduit ductbank continues north in First Avenue to University Street.

University Street to Union Street: At University Street, one conduit extends east and two conduits extend west out of First Avenue. One six -conduit ductbank continues north in First Avenue to Union Street.

Union Street to Pike Street: At Union Street, eight conduits extend east out of First Avenue. One four -conduit ductbank continues north in First Avenue to Union Street.

Pike Street to Stewart Street: One four -conduit ductbank continues north in First Avenue to Stewart Street.

Stewart Street to Virginia Street: One four -conduit ductbank continues north in First Avenue to past Virginia Street. In Stewart Street, a ductbank extends east from the alley between First Avenue and Second Avenue.

Virginia Street to Lenora Street: Based on Verizon's record drawings, it appears that there is an existing system aligned in the alley between First Avenue and Second Avenue and between Second Avenue and Third Avenue between Virginia Street and Lenora Street.

Lenora Street to Blanchard Street: Based on Verizon's record drawings, it appears that there is an existing system aligned in the alley between Second Avenue and Third Avenue between Lenora Street and Blanchard Street. It is also assumed, based on previous coordination, that Verizon has a conduit in Lenora Street from west of Second Avenue to east of Fourth Avenue.

Blanchard Street to Bell Street: Based on Verizon's record drawings, it appears that there is an existing system aligned in the alley between Fifth Avenue and Sixth Avenue between Blanchard Street and Bell Street.

4.1.3.1.11 XO

XO crosses First Avenue at Marion Street with two buried conduits.

4.1.3.2 Natural Gas

Detail pertaining to PSE is based on information collected during earlier phases of the AWVSRP before the Bored Tunnel area was part of the Program. PSE records have not been obtained in all Bored Tunnel areas. The following information is

incomplete and does not provide a complete list of existing infrastructure for the Bored Tunnel area.

All natural gas in the Bored Tunnel area is owned by PSE. If any deactivated gas mains need to be removed, coordination with PSE would be required. PSE does lease abandoned gas mains to communications providers. It would be advisable to verify that abandoned gas mains contain no other utility systems prior to removal.

4.1.3.2.1 S. King Street to S. Jackson Street

In S. King Street, a 2-inch IP gas in a casing varying in size from 6 inches to 12 inches travels west from First Avenue S., and a 4-inch IP gas in a 12-inch casing runs east from First Avenue S. This gas main has numerous laterals that serve customers along S. King Street.

Between S. King Street and S. Jackson Street, a 4-inch IP steel welded (STW) gas main, a 12-inch deactivated CI gas casing, and a 4-inch deactivated gas main are aligned in First Avenue S.

4.1.3.2.2 S. Jackson Street to S. Main Street

In S. Jackson Street, a 2-inch IP STW gas main and two deactivated 12-inch CIP gas mains cross First Ave S.

Between S. Jackson Street and S. Main Street, a 4-inch IP STW gas main, a 12-inch deactivated CIP gas main, and a 4-inch deactivated gas main are aligned in First Avenue S.

4.1.3.2.3 S. Main Street to S. Washington Street

In S. Main Street, a 12-inch HP STW gas main, a deactivated 12-inch CIP gas main, and deactivated 4-inch gas main cross First Ave S.

Between S. Main Street and S. Washington Street, a 4-inch IP STW gas main, a 12-inch deactivated CIP gas main, and a 6-inch deactivated gas main are aligned in First Avenue S. From the 4-inch IP STW gas main aligned in First Avenue S., a 2-inch IP STW casing main extends east in S. Main Street.

Midway between S. Main Street and S. Washington Street, a small section of 2-inch STW low pressure (LP) gas is parallel to the 4-inch IP STW gas main.

4.1.3.2.4 S. Washington Street to Yesler Way

In S. Washington Street, a deactivated 4-inch CIP gas main crosses First Ave S. In addition, a deactivated 4-inch CIP extends to the west side of the S. Washington Street and First Avenue S. intersection and a deactivated 4-inch CIP extends to the east side of the S. Washington Street and First Avenue S. intersection.

Between S. Washington Street and Yesler Way, a 4-inch IP STW gas main, a 12-inch deactivated CIP gas main, and a 6-inch CIP deactivated gas main are aligned in First Avenue S. From the 4-inch IP STW gas main aligned in First Avenue S., a 6-inch IP STW casing main extends east in S. Washington Street.

4.1.3.2.5 Yesler Way to Cherry Street

In Yesler Way, a deactivated 6-inch CIP gas main crosses First Ave. In addition, a deactivated 6-inch CIP and a deactivated 2.5-inch pipe extend to the west side of the Yesler Way.

Between Yesler Way and Cherry Street, a 4-inch IP STW gas main, a 12-inch deactivated CIP gas main, and a 6-inch CIP deactivated gas main are aligned in First Avenue. From the 4-inch IP STW gas main aligned in First Avenue., a 2-inch IP STW casing main extends east in Yesler Way.

In Yesler Way, a 2-inch IP STW gas main extends east from Alaskan Way to midway between Post Avenue Alley and First Avenue. From this 2-inch gas main, a 2-inch IP STW gas main extends north in Post Avenue Alley. At the south side of the Yesler Way and Post Avenue Alley intersection, this gas main transitions to a 6-inch LP STW gas main and continues north in Post Avenue Alley to Cherry Street.

4.1.3.2.6 Cherry Street to Columbia Street

A 4-inch IP STW gas main and a deactivated 12-inch CIP gas main are aligned in First Ave between Cherry Street and Columbia Street. In addition, an abandoned 6-inch CIP gas main aligned in First Avenue between Cherry Street and Columbia Street was leased or sold to a fiber optics provider (assumed to be ELI). This is based on PSE's record drawings.

From the 4-inch gas main aligned in First Avenue, a 6-inch IP STW gas main extends east in Cherry Street. A deactivated 4-inch CI casing is aligned in Cherry Street from the east side of the Cherry Street and First Avenue intersection, east.

A deactivated 12-inch LP CIP gas main is aligned in Post Avenue Alley between Cherry Street and Columbia Street.

4.1.3.2.7 Columbia Street to Marion Street

A 4-inch IP STW gas main and a deactivated 12-inch CIP gas main are aligned in First Ave between Columbia Street and Marion Street. In addition, an abandoned 6-inch CIP gas main aligned in First Avenue between Columbia Street and Marion Street was leased or sold to a fiber optics provider (assumed to be ELI). This is based on PSE's record drawings. This abandoned gas main also turns west and east in Columbia Street from First Avenue.

A deactivated 4-inch CIP and 12-inch CIP gas main is aligned in Post Avenue Alley between Columbia Street and Marion Street.

4.1.3.2.8 Marion Street to Madison Street

In Marion Street, a deactivated 6-inch CIP gas main extends from the west into First Avenue and a deactivated 4-inch CIP gas main extends from the east into First Avenue.

A 4-inch IP STW gas main and a deactivated 12-inch CIP gas main are aligned in First Ave between Marion Street and Madison Street. In addition, an abandoned 6-inch CIP gas main aligned in First Avenue between Marion Street and Madison Street was leased or sold to a fiber optics provider (assumed to be ELI). This is based on PSE's record drawings.

4.1.3.2.9 Madison Street to Spring Street

In Madison Street, two deactivated 6-inch CIP gas mains extend from the west into First Avenue and one deactivated 4-inch CIP gas main extends from the east into First Avenue.

A 4-inch IP STW gas main in a 12-inch CI casing and a deactivated 6-inch CIP gas main are aligned in First Ave between Madison Street and Spring Street. In addition, an abandoned 6-inch CIP gas main aligned in First Avenue between Madison Street and Spring Street was leased or sold to a fiber optics provider (assumed to be ELI). This is based on PSE's record drawings. This abandoned gas main also turns east in Madison Street from First Avenue.

From the 4-inch IP STW gas main aligned in First Avenue, a 2-inch IP gas main in a 6-inch CI casing extends west in Madison Street.

4.1.3.2.10 Spring Street to Seneca Street

In Spring Street, a deactivated 6-inch CIP gas main extends from the west into First Avenue and a deactivated 4-inch CIP gas main and deactivated 12-inch LP STW gas main extends from the east into First Avenue.

A 4-inch IP STW gas main in a 12-inch CI casing and a deactivated 6-inch CIP gas main are aligned in First Avenue between Spring Street and Seneca Street. From the 4-inch IP STW gas main aligned in First Avenue, a 6-inch IP STW gas main extends west and a 2-inch IP STW gas main and a 12-inch LP STW gas main extend east in Spring Street.

4.1.3.2.11 Seneca Street to University Street

In Seneca Street, a 4-inch gas main crosses First Avenue and a 2-inch gas main extends from the west to the west side of the Spring Street and First Avenue intersection.

A 4-inch IP STW gas main in a 12-inch CI casing and a deactivated 6-inch CIP gas main are aligned in First Avenue between Seneca Street and University Street.

4.1.3.2.12 University Street to Union Street

In University Street, a deactivated 8-inch gas main extends west from First Avenue; a deactivated 12-inch gas main extends to the west side of the University Street and First Avenue intersection; a deactivated 4-inch gas main extends east from First Avenue; and a 6-inch gas main extends east from First Avenue.

A 4-inch IP STW gas main in a 12-inch CI casing and a deactivated 6-inch CIP gas main are aligned in First Avenue between University Street and Union Street.

4.1.3.2.13 Union Street to Pike Street

In Union Street, a deactivated 12-inch gas main crosses First Avenue.

A 4-inch IP STW gas main, a deactivated 12-inch CIP gas main, and a deactivated 6-inch CIP gas main is aligned in First Avenue and crosses Union Street. Once on the north side of Union Street in First Avenue, a 4-inch IP gas main in a 12-inch CI casing and a deactivated 6-inch CIP gas main continue in First Avenue to Pike Street.

4.1.3.2.14 Pike Street to Pine Street

A 4-inch IP gas main in a 12-inch casing is aligned in First Avenue. From this gas main, a 2-inch gas main in a 12-inch CI casing extends east in Pike Street and a 4-inch IP gas main extends west in Pike Street. The 4-inch gas main extending west tees at the west side of the Pike Street and First Avenue intersection and parallel gas mains (4-inch and 2-inch) continue west in Pike Street.

4.1.3.2.15 Pine Street to Stewart Street

A deactivated 6-inch gas main extends into First Avenue from the west in Pine Street and a deactivated 4-inch and a deactivated 12-inch gas main extends into First Avenue from the east in Pine Street.

A 4-inch IP gas main in a 12-inch casing is aligned in First Avenue. From this gas main, a 2-inch IP STW gas main extends west and east in Pine Street.

4.1.3.2.16 Stewart Street to Virgina Street

A 2-inch IP gas main in a 6-inch CI casing and a deactivated 6-inch CIP gas main are aligned in Stewart Street between First Avenue and Second Avenue.

First Avenue: A 4-inch IP gas main in a 12-inch CI casing and a deactivated 12-inch CIP gas main are aligned in First Avenue between Stewart Street and Virginia Street.

Second Avenue: A 2-inch IP gas main in a 6-inch CI casing is aligned in Second Avenue between Stewart Street and Virginia Street.

4.1.3.2.17 Virginia Street to Lenora Street

A 2-inch IP STW gas main and a deactivated 6-inch CIP gas main are aligned in Virginia Street between Second Avenue and Third Avenue.

Second Avenue: A 2-inch IP gas main in a 6-inch CI casing is aligned in Second Avenue between Virginia Street and Lenora Street.

Third Avenue: A 2-inch IP gas main in a 6-inch CI casing is aligned in Third Avenue between Virginia Street and Lenora Street.

4.1.3.2.18 Lenora Street to Blanchard Street

A 2-inch IP gas main in a 6-inch CI casing is aligned in Lenora Street between Third Avenue and Fourth Avenue.

Third Avenue: A 2-inch IP gas main is aligned in Third Avenue between Lenora Street and Blanchard Street.

Fourth Avenue: A 2-inch IP gas main in a 6-inch CI casing is aligned in Fourth Avenue to midway between Lenora Street and Blanchard Street. Midway between Lenora Street and Blanchard Street this gas main ends and a deactivated 6-inch CI casing continues to Blanchard Street.

4.1.3.2.19 Blanchard Street to Bell Street

A 6-inch deactivated CIP gas main is aligned in Blanchard Street from the west side of the Blanchard Street and Fourth Avenue intersection to approximately a quarter of the way to Fifth Avenue. Approximately a quarter of the way between Fourth Avenue and Fifth Avenue, a 2-inch IP gas main in a 6-inch CI casing continues in Blanchard Street. A 2-inch IP gas main in a 4-inch STW casing extends north to midway between Blanchard Street and Bell Street in the alley between Fourth Avenue and Fifth Avenue.

Fourth Avenue: A deactivated 6-inch CI casing crosses Blanchard Street at Fourth Avenue. Approximately a quarter of the way between Blanchard Street and Bell Street, a 2-inch IP gas main in a 6-inch CI casing continues in Fourth Avenue to Bell Street.

Fifth Avenue: A 2-inch IP gas main in a 6-inch CI casing extends north in Fifth Avenue from Blanchard Street.

4.1.3.2.20 Bell Street to Battery Street

A 12-inch STW HP gas main is aligned in Bell Street from west of Fifth Avenue to east of Sixth Avenue.

A 2-inch IP gas main in a 4-inch CI casing is aligned in Bell Street from Fifth Avenue to Sixth Avenue.

Fifth Avenue: A 2-inch IP gas main in a 6-inch CI casing extends north in Fifth Avenue from Bell Street. Midway between Bell Street and Battery Street, this gas main ends a deactivated 6-inch CIP gas main extends north to Battery Street.

Sixth Avenue: A 2-inch IP gas main in a 6-inch CI casing extends north in Sixth Avenue from Bell Street to Battery Street.

4.1.3.2.21 Battery Street to Wall Street

Sixth Avenue: Midway between Battery Street and Wall Street, a 2-inch IP gas main in a 6-inch casing extends north to Wall Street.

Seventh Avenue: A 4-inch IP gas main in a 6-inch CI casing extends north in Seventh Avenue from Battery Street to Denny Way.

4.1.3.2.22 Denny Way

For further discussions pertaining to the existing natural gas north of from Denny Way, see Section 3.1.3.2.

4.1.3.3 Steam

All steam lines in the Bored Tunnel area are owned by Seattle Steam. Many of the steam lines described in the below subsections are insulated; an unknown number of which may be insulated with materials containing asbestos.

4.1.3.3.1 S. King Street to S. Jackson Street

A 6-inch LP steam line in an 18-inch log is aligned in First Avenue S. from midway between S. King Street to S. Jackson Street.

4.1.3.3.2 S. Jackson Street to S. Main Street

At S. Jackson Street, a 6-inch LP steam line extends east from First Avenue S.

An 8-inch LP steam line is aligned in First Avenue S. from S. Jackson Street to S. Main Street.

4.1.3.3.3 S. Main Street to S. Washington Street

At S. Main Street, a 6-inch LP steam line and an abandoned 6-inch LP steam line extends east from First Avenue S.

An 8-inch LP steam line is aligned in First Avenue S. from S. Main Street to S. Washington Street.

4.1.3.3.4 S. Washington Street to Yesler Way

At S. Washington Street, a 6-inch LP steam line in a 15-inch log crosses First Avenue S.

An 8-inch LP steam line is aligned in First Avenue S. from S. Washington Street to Yesler Way.

4.1.3.3.5 Yesler Way to Cherry Street

An 8-inch LP steam line is aligned in First Avenue S. from Yesler Way to midway between Yesler Way and Cherry Street. From midway between Yesler Way and Cherry Street, an abandoned 12-inch steam line continues in First Avenue to Cherry Street.

From Cherry Street, a 12-inch HP steam line enters First Avenue from the east and turns south. This 12-inch HP steam line extends south in First Avenue to midway between Yesler Way and Cherry Street where it turns west to the Post Avenue Alley.

In the Post Avenue Alley, an 18-inch LP steam line is aligned between Yesler Way and Cherry Street.

4.1.3.3.6 Cherry Street to Columbia Street

A 14-inch HP steam line is aligned in Cherry Street and extends east from First Avenue.

A 12-inch LP steam line is aligned in First Avenue between Cherry Street and Columbia Street.

An 18-inch LP steam line in a 34-inch log is aligned in Post Avenue Alley from midway between Cherry Street and Columbia Street to Columbia Street.

4.1.3.3.7 Columbia Street to Marion Street

An 18-inch LP steam line in a 34-inch log is aligned in Columbia Street from Post Avenue Alley, east, across First Avenue.

A 10-inch LP steam line is aligned in First Avenue between Columbia Street and Marion Street.

4.1.3.3.8 Marion Street to Madison Street

A 6-inch HP steam line in a 17-inch log is aligned in Marion Street from west of the Marion Street and First Avenue intersection. This 6-inch HP steam line turns north in First Avenue and appears to provide service to the Federal Building, located at 915 Second Avenue.

A 10-inch LP steam line is aligned in First Avenue between Madison Street and Spring Street.

4.1.3.3.9 Madison Street to Spring Street

At Madison Street, the 10-inch LP steam line aligned in First Avenue turns east out of First Avenue.

On the north side of Madison Street, a 6-inch steam is shown on the Existing Utility Roll Plots. However, the existence of this line could not be verified with Seattle Steam's record drawings.

4.1.3.3.10 Spring Street to Seneca Street

No known existing steam is aligned in First Avenue between Spring Street and Seneca Street.

4.1.3.3.11 Seneca Street to University Street

A 14-in HP steam line in a 34-inch log crosses First Avenue at Seneca Street.

A 5-inch steam line is aligned in First Avenue from Seneca Street to midway between Seneca Street and University Street.

4.1.3.3.12 University Street to Union Street

An 8-in HP steam line in a 20-inch log crosses First Avenue at University Street.

A 12-inch LP steam line crosses First Avenue at University Street. The size of this steam line transitions from 12 inches to 10 inches on the east side of First Avenue.

No known steam is aligned in First Avenue between University Street and Union Street.

4.1.3.3.13 Union Street to Pike Street

A 12-inch LP steam line in a 27-inch log crosses First Avenue at Union Street.

An abandoned 7-inch steam line crosses First Avenue at Union Street.

No known steam is aligned in First Avenue between Union Street and Pike Street.

4.1.3.3.14 Pike Street to Pine Street

An 8-inch LP steam line is aligned in the alley between First Avenue and Second Avenue between Pike Street and Pine Street.

4.1.3.3.15 Pine Street to Stewart Street

An 8-inch LP steam line is aligned in the alley between First Avenue and Second Avenue between Pine Street and Stewart Street. Midway between Pine Street and Stewart Street, this pipe transitions in size to 7 inches.

4.1.3.3.16 Stewart Street to Virgina Street

A 7-inch LP steam line is aligned in the alley between First Avenue and Second Avenue between Stewart Street and Virginia Street.

4.1.3.3.17 Virginia Street to Lenora Street

An 8-inch LP steam line is aligned in Virginia Street from the alley located between First Avenue and Second Avenue to west of Third Avenue.

4.1.3.3.18 Lenora Street to Denny Way

No known steam infrastructure exists in the bored tunnel area between Lenora Street and Denny Way.

4.1.3.4 Petroleum

No known petroleum infrastructure exists in the Bored Tunnel area.

4.2 Impacts to Existing Utilities

Impacts to utilities along the bored tunnel alignment could be caused by tunnel boring induced settlement. The amount of settlement varies depending on the location along the tunnel alignment, and is expected to range from approximately 3-inches at the ends of the tunnel to approximately .75-inches near where the tunnel turns near Pine Street (see Appendix D for more information related to the bored tunnel induced settlement).

The following are the utilities that are expected to be most affected by tunnel boring induced settlement: clay tile SCL ductbanks, CILJ water mains, water main thrust

blocks, gravity utilities, steam lines, and natural gas mains. Coordination with SPU, KC, SCL, DoIT, private communications providers, PSE, and Seattle Steam should occur to verify that they are aware of potential settlement and vibration caused by tunnel boring and to seek their guidance for mitigation.

SCL clay tile ductbanks exist along the bored tunnel alignment. These ductbanks are susceptible to settlement and in some cases, they are already broken. However, active cables still exist and coordination with SCL will be required to determine how to monitor these ductbanks to avoid cable failure.

CILJ water mains and water main thrust blocks are susceptible to settlement. Per City of Seattle Standard Specification 1-07.16(1) "Cast iron pipe joints have been known to develop leakage when disturbed by shifting earth, or excessive vibrations, or adverse impacts of any other construction excavation Work. Thrust blocks, typically placed against Water Main tees, bends, and dead ends, provide resistance to forces within the Water Main to prevent separation or other conditions that may lead to leakage of the Water Main. Thrust blocks typically extend beyond the Water Main and depend both on soil friction and on passive soil resistance" (City of Seattle, 2008).

For gravity utilities, if the ground settles significantly, the flow, capacity, and joints of pipelines could be affected. Coordination with SPU and KC is needed to determine the amount of settlement that is acceptable to their gravity systems. Special consideration should be given to the 48-inch pile supported brick sewer aligned in First Avenue S. (see Section 2.1.2.3.5 and 4.1.2.3.1 through 4.1.2.3.3 for additional information pertaining to this sewer).

Steam lines are installed with a slope to allow for drainage of condensate. Again, if the ground settles significantly, the drainage of the steam lines could be affected. If steam lines are impacted, asbestos abatement may be required. Coordination with Seattle Steam is needed to determine the amount of settlement that is acceptable to their systems.

5.0 Broad Street Closure

The City of Seattle will close Broad Street between Thomas Avenue and Ninth Avenue N. The following subsections provide a summary of utilities that exist in this corridor but do not evaluate impacts. Information pertaining to certain utility systems is known to be incomplete and is noted as such.

5.1 Existing Utilities

5.1.1 Inventory of Existing Utilities

See Section 1.3 for the limits of documentation for existing utilities in the Broad Street Closure area.

See Section 1.7 for the methods used to inventory the existing infrastructure within the Broad Street Closure area.

5.1.2 Public Utilities

5.1.2.1 Electrical Power

5.1.2.1.1 Transmission

Two 115kV overhead pole lines extend from the Broad Street Substation. One overhead line crosses Broad Street at Taylor Avenue N. and is aligned along the north side of Broad Street to Sixth Avenue N. where it turns off Broad and onto Sixth Avenue N. The other overhead line is aligned along the south side of Broad Street from Taylor Avenue N. to Dexter Avenue N. Between Dexter Avenue N. and Eighth Avenue N.; this overhead line crosses to the north side of Broad Street. This overhead line remains on the north side of Broad Street to Ninth Avenue N. where it transitions back to the south side of Broad Street.

5.1.2.1.2 Distribution

Thomas Street: Two ductbanks cross Broad Street at Thomas Street. On the south side of Thomas Street, two five-inch conduits extend from a vault located in Broad Street at the intersection of Thomas Street and Fifth Avenue N. On the north side of Thomas Street, (16) 4-inch conduits extend from a vault located in Broad Street at the intersection of Thomas Street and Fifth Avenue N. to a vault located in Thomas Street, just east of Broad Street. In addition, two 2-inch steel conduits are aligned on top of the 16-conduit ductbank to provide service to a street light handhole.

Thomas Street to Harrison Street: Multiple ductbanks are aligned in Broad Street from Thomas Street to Harrison Street. On the northwest side of Broad Street, a four-conduit ductbank extends from the vault located in Broad Street at the intersection of Thomas Street and Fifth Avenue N. to a vault located in Broad Street

at the intersection of Harrison Street and Taylor Avenue N. On the southeast side of Broad Street, two parallel ductbanks extend from south of Thomas Street to the Broad Sub Annex (bounded on by Broad Street, Thomas Street, and Taylor Avenue N.). Each of these ductbanks has ten 5-inch conduits. Two ductbank exist out of the Broad Sub Annex and continue along the southeast side of Broad Street; each ductbank has eight 5-inch conduits.

Taylor Avenue N.: Two ductbanks cross Broad Street at Taylor Avenue N. The eastern ductbank has two 4-inch conduits and the other has three 4-inch conduits. Each of these ductbanks intercepts a vault located in Broad Street at the intersection of Taylor Avenue N. and Harrison Street. From these two vaults, a total of two ductbanks continue north in Taylor Avenue N. At the north side of Broad Street, these ductbanks combine to form a consolidated three-conduit ductbank.

Harrison Street: Multiple ductbanks cross Broad Street at Harrison Street. On the south side of Harrison Street, four 4-inch conduits and two 4-inch conduits extend west and intercept the eastern vault located in Broad Street at the intersection of Taylor Avenue N. and Harrison Street (the two vaults located in this intersection are interconnected by various conduits). From this vault, one 4-inch conduit continues west in Harrison Street (a second conduit joins this conduit in Broad Street and both of these conduits continue west in Harrison Street). Near the center of Harrison Street, four 5-inch conduits and on the north side of Harrison Street, six 4-inch conduits cross Broad Street.

Sixth Avenue N.: At Sixth Avenue N., six conduits cross Broad Street. These conduits extend from a vault located on either side of Broad Street.

5.1.2.2 Domestic Water

There are no water mains aligned within Broad Street between Thomas Street and Ninth Avenue N.; however, a water main crosses Broad Street at each cross street. There are also multiple fire hydrants and laterals that are located near Broad Street.

5.1.2.2.1 Fifth Avenue N.

A 6-inch CILJ water main crosses Broad Street at Fifth Avenue N.

5.1.2.2.2 Taylor Avenue N.

A 12-inch CILJ water main crosses Broad Street at Taylor Avenue N.

5.1.2.2.3 Sixth Avenue N.

A 12-inch CILJ water main crosses Broad Street at Sixth Avenue N.

5.1.2.2.4 Aurora Avenue N.

A 12-inch CILJ water main crosses Broad Street at Aurora Avenue N.

5.1.2.2.5 Dexter Avenue N.

A 20-inch CILJ water main crosses Broad Street at Dexter Avenue N. This 20-inch main tees at the intersection of Dexter Avenue N. and Broad Street with a 20-inch CILJ water main extending west and a 12-inch CILJ water main extend east in Mercer St.

5.1.2.2.6 Eigth Avenue N.

A 2-inch WESTL water main crosses Broad Street at Eighth Avenue N. This water main appears to be a service line to a building.

5.1.2.2.7 Ninth Avenue N.

A 12-inch CILJ water main crosses Broad Street at Ninth Avenue N.

5.1.2.3 Sanitary and Combined Sewer

Multiple combined sewer systems are aligned within or cross Broad Street between Thomas Street and Ninth Avenue N. A majority of these systems have several laterals, catch basin, and service connections that extend from the pipes located within Broad Street.

5.1.2.3.1 Fifth Avenue N.

A 10-inch VCP combined sewer crosses Broad Street at Fifth Avenue N.

5.1.2.3.2 Taylor Avenue N. to Sixth Avenue N.

A 12- to 15-inch combined sewer crosses Broad Street at Taylor Avenue N. This pipe transitions from a 15-inch RCP to a 12-inch VCP at the south side of the Broad Street and Taylor Avenue N. intersection.

Harrison Street: An 8-inch concrete combined sewer pipe aligned in Harrison Street extends part way into Broad Street between Taylor Avenue N. and Sixth Avenue N.

5.1.2.3.3 Sixth Avenue N. to Aurora Avenue N.

A 12-inch RCP combined sewer crosses Broad Street at Sixth Avenue N.

The 10-inch concrete combined sewer that is aligned in Broad Street continues northeast to Aurora Avenue N. Slightly west of Aurora Avenue N. this pipe transitions to a 12-inch RCP combined sewer.

Republican Street: A 12-inch RCP and 33-inch brick combined sewer is aligned in Republican Street and crosses Broad Street. There is also a 42-inch RCP combined sewer that extends into Broad Street. This 42-inch RCP turns northeast in Broad Street and immediately transitions in size to a 48-inch RCP.

5.1.2.3.4 Aurora Avenue N. to Dexter Avenue N.

A 15-inch RCP combined sewer is aligned in Aurora Avenue N. and extends to the south side of the Aurora Avenue N. and Broad Street intersection.

The 48-inch RCP combined sewer continues in Broad Street to Dexter Avenue N. At Dexter Avenue N., this pipe turns north and connects to the 84-inch RCP combined sewer.

5.1.2.3.5 Dexter Avenue N. to Eigth Avenue N.

A 66-inch RCP combined sewer extends to the south side of Broad Street at Dexter Avenue N. This 66-inch pipe transitions in size to two parallel 24-inch combined sewers and cross beneath Broad Street. Once on the north side of Broad Street, these 24-inch pipes merge into an 84-inch combined sewer that continues north in Dexter Avenue N.

Mercer Street: A 21-inch VCP combined sewer extends into Broad Street from the west in Mercer Street and continues in Mercer Street to Dexter Avenue N. At Dexter Avenue N., this 21-inch VCP connects to the 48-inch RCP combined sewer that is aligned in Broad Street.

The 176-inch RCP combined sewer (the Mercer Street Tunnel, see Section 6.1.2.3.1) turns onto Broad Street from Mercer Street and continues in Broad Street to Eighth Avenue N.

5.1.2.3.6 Eigth Avenue N. to Ninth Avenue N

An 8-inch RCP and a 33-inch VCP combined sewer crosses Broad Street at Eighth Avenue N. On the north side Broad Street, the 33-inch VCP combined sewer tees and a 33-inch RCP combined sewer continues west in Roy Street and a 33-inch RCP combined sewer continues west in Broad Street to Ninth Avenue N.

5.1.2.3.7 Ninth Avenue N.

An 18-inch RCP combined sewer crosses Broad Street at Ninth Avenue N.

The 33-inch RCP combined sewer continues east in Broad Street past Ninth Avenue N.

An 8-inch concrete combined sewer originates in Broad Street at Ninth Avenue N. and continues east in Broad Street past Ninth Avenue N.

5.1.2.4 Storm Drainage

In addition to the storm drainage trunk lines in the Broad Street Closure area, multiple catch basins and laterals drain into the combined sewer system in this area.

5.1.2.4.1 Taylor Avenue N. to Sixth Avenue N.

A 10-inch concrete storm drain is aligned in Broad Street from midway between Taylor Avenue N. past Sixth Avenue N.

5.1.2.4.2 Sixth Avenue N. to Aurora Avenue N.

The 10-inch concrete storm drain that is aligned in Broad Street continues northeast to Aurora Avenue N. Slightly west of Aurora Avenue N. this pipe transitions to a 12-inch RCP storm drain.

5.1.2.4.3 Aurora Avenue N. to Dexter Avenue N.

At Mercer Street, the 12-inch RCP storm drains transition to a 24-inch RCP.

A 12-inch RCP storm drain extends from Aurora Avenue N. to midway between Aurora Avenue N. and Dexter Avenue N. and connects into the 24-inch RCP aligned in Broad Street.

5.1.2.4.4 Dexter Avenue N. to Eigth Avenue N.

The 24-inch combined sewer continues in Broad Street to Eighth Avenue N.

5.1.2.4.5 Eigth Avenue N. to Ninth Avenue N.

The 24-inch combined sewer continues in Broad Street to Ninth Avenue N.

5.1.2.4.6 Ninth Avenue N.

The 24-inch RCP combined sewer continues east in Broad Street past Ninth Avenue N.

5.1.2.5 Telecommunications

DoIT has an existing system aligned along SR 99 to service various ITS infrastructure that crosses Broad Street at Aurora Avenue N.

Further information pertaining to DoIT's existing system was not available at the time this report was prepared; coordination with DoIT will be required.

5.1.3 Private Utilities

5.1.3.1 Telecommunications and Cable Television

Detail pertaining to private communications providers is based on information collected during earlier phases of the AWVSRP before the Broad Street Closure area was part of the Program. Private communications providers' records have not been obtained in all Broad Street Closure areas. Additional communications providers could exist in this area that have not been coordinated with or identified as part of past Program coordination. Additional investigations, research, and coordination

would be required to develop a comprehensive understanding of existing private communications infrastructure in this area.

The following information is incomplete and does not provide a complete list of existing infrastructure for the Broad Street Closure area.

5.1.3.1.1 Comcast

Comcast has aerial infrastructure in Harrison Street that crosses over Broad Street.

They also are aligned along the north side of Bell Street between Eighth Avenue N. and Ninth Avenue N.

5.1.3.1.2 ELI

ELI has aerial infrastructure in Dexter Avenue N. that crosses over Broad Street.

5.1.3.1.3 Global Crossing

Global Crossing is directionally bored in Aurora Avenue N. and crosses beneath Broad St.

5.1.3.1.4 MDM

MDM has aerial infrastructure in Sixth Avenue N. and Dexter Avenue N. that crosses over Broad Street.

5.1.3.1.5 Qwest

Qwest has infrastructure in the Broad Street Closure area; however, the specific locations as to where Qwest' has infrastructure within the area of interest is, is not known.

5.1.3.2 Natural Gas

All natural gas in the Broad Street Closure area is owned by PSE. If any deactivated gas mains need to be removed, coordination with PSE would be required. PSE does lease abandoned gas mains to communications providers. It would be advisable to verify that abandoned gas mains contain no other utility systems prior to removal.

5.1.3.2.1 Fifth Avenue N. to Taylor Avenue N.

A 4-inch IP natural gas main in a 12-inch CI casing is aligned in Broad Street from southeast of Thomas Street to the intersection of Thomas Street and Broad Street. where this lines forms a cross. A 2-inch IP gas main in a 12-inch CI casing continues in Broad Street to the Alley between Fifth Avenue N. and Taylor Avenue N., where it turns north into the alley; from this line, a 2-inch IP gas main in a 4-inch casing extends east in Thomas Street. A 2-inch IP gas main in a 6-inch CI casing extends

and a 4-inch IP gas main in a 6-inch CI casing extends north south in Fifth Avenue N.

From midway between Fifth Avenue N. and Taylor Avenue N., a deactivated 12-inch CIP gas main is aligned in Broad Street.

5.1.3.2.2 Taylor Avenue N. to Sixth Avenue N.

A deactivated 6-inch CIP crosses Broad Street at Taylor Avenue N. The deactivated 12-inch CIP gas main continues to in Broad Street.

Harrison Street: A 4-inch IP STW gas main and a deactivated 12-inch CIP gas main cross Broad Street at Harrison Street.

5.1.3.2.3 Sixth Avenue N. to Aurora Avenue N.

The deactivated 12-inch CIP gas main continues to in Broad Street.

A 2-inch IP gas main in a 6-inch CI casing is aligned in Sixth Avenue N. and extends to the north side of Broad Street.

5.1.3.2.4 Aurora Avenue N. to Dexter Avenue N.

The deactivated 12-inch CIP gas main continues to in Broad Street.

A deactivated 6-inch CIP gas main crosses Broad Street at Aurora Avenue N.

5.1.3.2.5 Mercer Street

A 12-inch STW HP gas main is aligned in Mercer Street and crosses Broad Street. At the intersection of Mercer Street and Broad Street this HP gas main tees and a 12-inch STW HP gas main continues north in Dexter Avenue N. and a 12-inch STW HP gas main continues east in Mercer Street.

5.1.3.2.6 Dexter Avenue N. to Eigth Avenue N.

A 4-inch IP gas main in a 6- to 12-inch casing crosses Mercer Street at Dexter Avenue N.

5.1.3.2.7 Eigth Avenue N. to Ninth Avenue N.

A deactivated 6-inch CIP crosses Broad Street at Eighth Avenue N.

Roy Street: A 2-inch IP gas main in a 6-inch CI casing crosses Broad Street and remains in Broad Street to the alley between Eighth Avenue N. to Ninth Avenue N., where this line ends. A deactivated 6-inch CIP gas main continues in Broad Street to Ninth Avenue.

5.1.3.2.8 Ninth Avenue N.

A 2-inch IP gas main in a 12-inch CI casing and a deactivated 6-inch CIP crosses Broad Street at Ninth Avenue.

5.1.3.3 Steam

No known steam infrastructure exists in the Broad Street Closure area.

5.1.3.4 Petroleum

No known petroleum infrastructure exists in the Broad Street Closure area.

6.0 Mercer Street Corridor Improvements

The City of Seattle will be improving the Mercer Street corridor between Elliott Avenue W. and Dexter Avenue N. The following subsections provide a summary of utilities that exist in this corridor but do not evaluate impacts. Information pertaining to certain utility systems is known to be incomplete and is noted as such.

6.1 Existing Utilities

6.1.1 Inventory of Existing Utilities

See Section 1.4 for the limits of documentation for existing utilities in the Mercer Street Corridor Improvements area.

See Section 1.7 for the methods used to inventory the existing infrastructure within the Mercer Street Corridor Improvements area.

6.1.2 Public Utilities

6.1.2.1 Electrical Power

Information pertaining to SCL's existing system west of Third Avenue N. in Mercer Street was not available at the time this report was prepared. In addition, detailed information pertaining to existing ductbanks was not available. Coordination with SCL will be required to determine what existing infrastructure is present in this area.

6.1.2.1.1 Transmission

Taylor Avenue N. to Sixth Avenue N.: An 115kV overhead transmission line is aligned along the south side of Mercer Street between Taylor Avenue N. and Sixth Avenue N. At Taylor Avenue N., this transmission line turns north, out of Mercer Street.

Sixth Avenue N. to Aurora Avenue N.: At Sixth Avenue N., an 115kV overhead transmission line extends from the south to Mercer Street. At Mercer Street, this 115kV overhead system turns west and is aligned along the south side of Mercer Street.

Aurora Avenue N. to Dexter Avenue N.: An 115kV overhead transmission line is aligned along the south side of Broad Street and crosses over Mercer Street near the intersection of Mercer Street and Dexter Avenue N.

6.1.2.1.2 Distribution

Third Avenue N. to Nob Hill Avenue N.: A buried ductbank with four 26kV circuits is aligned in Mercer Street between Third Avenue N. and Nob Hill Avenue N. This system extends from a vault in Third Avenue N. to a vault in Nob Hill Avenue N. At Third Avenue N., an additional vault is located on the south side of Mercer Street. At Nob Hill Avenue N., three additional vaults are located in or adjacent to Mercer Street.

Nob Hill Avenue N. to Fourth Avenue N.: A buried ductbank with five 26kV circuits is aligned in Mercer Street between Nob Hill Avenue N. and Fourth Avenue N.

Fourth Avenue N. to Fifth Avenue N.: A buried ductbank with five 26kV circuits is aligned in Mercer Street between Fourth Avenue N. and Fifth Avenue N.

Fifth Avenue N. to Taylor Avenue N.: At Fifth Avenue N., the buried ductbank with five 26kV circuits turns south, out of Mercer Street. Two 26kV circuits extend north in Fifth Avenue N. to Mercer Street. These conduits turn east onto Mercer Street.

At Taylor Avenue N., the buried ductbank with two 26kV circuits turns north, out of Mercer Street. This ductbank is aligned in Mercer Street between Fifth Avenue N. and Taylor Avenue N.

Taylor Avenue N. to Sixth Avenue N.: An overhead 26kV system is aligned along the south side of Mercer Street from Sixth Avenue N., south, to midway between Taylor Avenue N. and Sixth Avenue N.

Sixth Avenue N. to Aurora Avenue N.: At Sixth Avenue N., three 26kV overhead systems cross Mercer Street.

Aurora Avenue N. to Dexter Avenue N.: At Dexter Avenue N., a 26kV overhead system crosses Mercer Street.

6.1.2.2 Domestic Water

A 20-inch CILJ water main is aligned in Mercer Street between Elliott Avenue W. and Dexter Avenue N.; this water main is along the east side of the centerline of Mercer St.

Multiple laterals, hydrants, and service connections extend north and south from this 20-inch CILJ water main.

6.1.2.2.1 W. Mercer Place

An 8-inch PL water main extends north from the 20-inch main in Mercer St.

6.1.2.2.2 Fifth Avenue W.

An 8-inch CILJ water main extends both north and south from the 20-inch main in Mercer St.

6.1.2.2.3 Fourth Avenue W.

An 8-inch CILJ water main extends both north and south from the 20-inch main in Mercer St.

6.1.2.2.4 Third Avenue W.

An 8-inch CILJ water main extends both north and south from the 20-inch main in Mercer St.

6.1.2.2.5 Second Avenue W.

An 8-inch CILJ water main extends both north and south from the 20-inch main in Mercer St. These 8-inch CILJ lines immediately transition in size to 6-inch CILJ lines.

6.1.2.2.6 First Avenue W.

An 8-inch CILJ water main extends north from the 20-inch main in Mercer St.

A 20-inch CILJ water main extends south from the 20-inch main in Mercer St.

6.1.2.2.7 Queen Anne Avenue N.

A 10-inch CILJ water main extends both north and south from the 20-inch main in Mercer St.

6.1.2.2.8 First Avenue N.

An 8-inch CILJ water main extends both north and south from the 20-inch main in Mercer St.

6.1.2.2.9 Warren Avenue N.

An 8-inch CILJ water main extends both north and south from the 20-inch main in Mercer St.

6.1.2.2.10 Second Avenue N.

An 8-inch CILJ water main extends north from the 20-inch main in Mercer St.

Two 12-inch CILJ water mains extend south from the 20-inch main in Mercer St.

6.1.2.2.11 Third Avenue N.

An 8-inch CILJ water main extends both north and south from the 20-inch main in Mercer St.

6.1.2.2.12 Fourth Avenue N.

A 12-inch CILJ water main extends both north and south from the 20-inch main in Mercer St.

6.1.2.2.13 Taylor Avenue N.

An 8-inch CILJ water main extends north from the 20-inch main in Mercer St.

6.1.2.2.14 Sixth Avenue N.

An 8-inch CILJ water main extends north and a 12-inch CILJ water main extends south from the 20-inch main in Mercer St.

6.1.2.2.15 Aurora Avenue N.

An 8-inch CILJ water main extends north and a 12-inch CILJ water main extends south from the 20-inch main in Mercer St.

6.1.2.2.16 Dexter Avenue N.

At Dexter Avenue N., the 20-inch CILJ water main aligned in Mercer Street tees. A 12-inch CILJ water main extends from the 20-inch CILJ water main aligned in Dexter Avenue N. and continues east in Mercer Street.

6.1.2.3 Sanitary and Combined Sewer

Multiple combined sewer systems exist within Mercer Street between Elliott Avenue W. and Dexter Avenue N. A majority of these systems have several laterals, catch basin, and service connections that extend from the pipes located within Mercer Street.

6.1.2.3.1 Mercer Street Tunnel

A 176-inch RCP bored sewer is aligned along the south side of Mercer Street between Elliott Avenue W. and Dexter Avenue N. This pipe ranges in depth from 40 feet to more than 140 feet and is approximately 45 feet deep as it crosses beneath Aurora Avenue N. Construction of this pipe was completed in 2005.

6.1.2.3.2 Elliott Avenue W. to Fifth Avenue W.

An 8-inch DIP and a 12-inch concrete sewer turn onto Mercer Street from Elliott Avenue N. and extend east in Mercer Street to Sixth Avenue W.

At W. Elliott Place, an 8-inch concrete combined sewer extends into Mercer Street.

6.1.2.3.3 Fifth Avenue W. to Fourth Avenue W.

An 8-inch VCP combined sewer is aligned in the center of Mercer Street between Fifth Avenue W. and Fourth Avenue W. At Fourth Avenue W., this pipe turns south, out of Mercer Street.

6.1.2.3.4 Fourth Avenue W. to Third Avenue W.

A 12-inch VCP combined sewer turns onto Mercer Street from Fourth Avenue W. This pipe is aligned in the center of Mercer Street between Fourth Avenue W. and Third Avenue W. At Third Avenue W., this pipe turns south, out of Mercer Street.

6.1.2.3.5 Third Avenue W. to Second Avenue W.

A 10-inch VCP and an 18-inch VCP combined sewer crosses Mercer Street at Third Avenue W. No trunk lines are aligned in Mercer Street between Third Avenue W. to Second Avenue W.

6.1.2.3.6 Second Avenue W. to First Ave. W.

An 18-inch VCP combined sewer crosses Mercer Street at Second Avenue W. No trunk lines are aligned in Mercer Street between Second Avenue W. to First Ave. W.

6.1.2.3.7 First Avenue W. to Queen Anne Avenue N.

A 12-inch combined sewer crosses Mercer Street at First Avenue W. As this pipe continues north, it transitions in material near the center of Mercer Street from RCP to VCP.

6.1.2.3.8 Queen Anne Avenue N. to First Avenue N.

A 12-inch VCP and a 15-inch VCP combined sewer crosses Mercer Street at Third Avenue W. No trunk lines are aligned in Mercer Street between Queen Anne Avenue N. to First Avenue N.

6.1.2.3.9 First Avenue N. to Warren Avenue N.

An 8-inch VCP combined sewer crosses Mercer Street at First Avenue N. No trunk lines are aligned in Mercer Street between First Avenue N. to Warren Avenue N.

6.1.2.3.10 Warren Avenue N. to Second Avenue N.

An 8-inch VCP combined sewer crosses Mercer Street at Warren Avenue N. No trunk lines are aligned in Mercer Street between Warren Avenue N. to Second Avenue N.

6.1.2.3.11 Second Avenue N. to Third Avenue N.

An 18-inch to 21-inch RCP combined sewer crosses Mercer Street at Second Avenue N.; this pipe transitions in size near the centerline of Mercer Street.

6.1.2.3.12 Third Avenue N. to Fourth Avenue N.

A 15-inch RCP combined sewer turns onto Mercer Street from Third Avenue N. This pipe is aligned on the south side of Mercer Street between Third Avenue N. and Fourth Avenue N. At Nob Hill Avenue N., this pipe forms a cross and a 15-inch VCP connects from the south and a 15-inch VCP connects from the north. This 15-inch VCP transitions to a 12-inch CIP on the north side of Mercer Street.

6.1.2.3.13 Fourth Avenue N. to Fifth Avenue N.

The 15-inch RCP combined sewer from Third Avenue N. transitions to an 18-inch RCP at Fourth Avenue N. This 18-inch RCP combined sewer continues east in Mercer Street to Fifth Avenue N.

A 15-inch RCP combined sewer enters Mercer Street from the south and forms a tee near the center of Mercer Street and Fourth Avenue N. From this tee, an 8-inch VCP combined sewer continues north in Fourth Avenue N. and a 12-inch VCP combined sewer extends east in Mercer Street from Fourth Avenue N.

6.1.2.3.14 Fifth Avenue N. to Taylor Avenue N.

The 18-inch combined sewer from Fourth Avenue N. tees in Mercer Street and Fifth Avenue N. An 18-inch combined sewer extends south and a 10-inch combined sewer extends north in Fifth Avenue N.

The 12-inch VCP combined sewer from Fourth Avenue N. transitions to an 18-inch VCP at Fifth Avenue N. This 18-inch VCP combined sewer continues east in Mercer Street to Taylor Avenue N.

A 48-inch RCP combined sewer crosses Mercer Street at Fifth Avenue N.

6.1.2.3.15 Taylor Avenue N. to Sixth Avenue N.

The 18-inch VCP combined sewer from Fifth Avenue N. continues in Mercer Street to Sixth Avenue N. and transitions in material to VCP.

A 12-inch RCP combined sewer crosses Mercer Street at Fifth Avenue N. On the north side of Mercer Street, this 12-inch RCP transitions to an 8-inch VCP combined sewer.

6.1.2.3.16 Sixth Avenue N. to Aurora Avenue N.

The 18-inch RCP combined sewer from Taylor Avenue N. continues in Mercer Street to Aurora Avenue N. At Aurora Avenue N., this pipe transition to a VCP.

A 15-inch VCP combined sewer is aligned in Sixth Avenue N., but stops at the south side of Mercer Street. A 12-inch VCP combined sewer is aligned in Sixth Avenue N., but stops at the north side of Mercer Street.

An 8-inch concrete combined sewer pipe extends west from Aurora Avenue N. to midway between Sixth Avenue N. to Aurora Avenue N.

6.1.2.3.17 Aurora Avenue N. to Dexter Avenue N.

The 18-inch VCP combined sewer from Aurora Avenue N. transitions to a 21-inch VCP combined sewer and continues in Mercer Street to Dexter Avenue N. At Dexter Avenue N., this 21-inch VCP connects to a 48-inch RCP combined sewer that is aligned in Broad Street. At Dexter Avenue N., this 48-inch RCP turns north onto Dexter Avenue N. and crosses Mercer Street.

Two parallel 24-inch RCP combined sewers cross Mercer Street at Dexter Avenue N.

6.1.2.4 Storm Drainage

Multiple catch basins and laterals drain into the combined sewer system in this vicinity; however, there are no storm drainage trunk lines in Mercer Street between Elliott Avenue W. and Aurora Avenue N.

6.1.2.4.1 Aurora Avenue N. to Dexter Avenue N.

A 12-inch RCP storm drain extends from Aurora Avenue N. to midway between Aurora Avenue N. and Dexter Avenue N. and connects into a 24-inch RCP aligned in Broad Street. In addition, multiple catch basins and laterals drain into the combined sewer system in this vicinity.

6.1.2.5 Telecommunications

DoIT has an existing system aligned along SR 99 to service various ITS infrastructure that crosses Mercer Street.

Further information pertaining to DoIT's existing system was not available at the time this report was prepared.

6.1.3 Private Utilities

6.1.3.1 Telecommunications and Cable Television

Detail pertaining to private communications providers is based on information collected during earlier phases of the AWVSRP before the Mercer Street Corridor Improvements area was part of the Program. Private communications providers' records have not been obtained in all Mercer Street Corridor Improvements areas. Additional communications providers could exist in this area that have not been coordinated with or identified as part of past Program coordination. Additional investigations, research, and coordination would be required to develop a comprehensive understanding of existing private communications infrastructure in this area.

The following information is incomplete and does not provide a complete list of existing infrastructure for the Mercer Street Corridor Improvements area.

6.1.3.1.1 Broadstripe

Broadstripe has aerial infrastructure in Sixth Avenue N. that crosses over Mercer Street.

6.1.3.1.2 Comcast

Comcast has aerial infrastructure in Sixth Avenue N. that crosses over Mercer Street.

6.1.3.1.3 ELI

ELI is aligned in Mercer Street from west of Second Avenue W. to Fifth Ave. N. ELI utilizes a combination of deactivated gas mains (see specific subsections of 6.1.3.2 that describe alignments in more detail) and ELI owned buried infrastructure. It is not known whether there is active cable in all of the fiber optic related natural gas mains or whether these gas mains are reserved for future expansion. Further coordination with ELI would be required to make this determination.

6.1.3.1.4 Global Crossing

Global Crossing is directionally bored in Aurora Avenue N. and crosses beneath Mercer St.

6.1.3.1.5 Qwest

Qwest has infrastructure in the Mercer Street Corridor Improvements area; however, the specific locations as to where Qwest's has infrastructure within the area of interest is, is not known.

6.1.3.2 Natural Gas

Information pertaining to PSE's natural gas infrastructure was only available for select locations within the Mercer Street Improvements area; no information pertaining to natural gas infrastructure west of Third Avenue W. is included.

All natural gas in the Mercer Street Corridor Improvements area is owned by PSE. If any deactivated gas mains need to be removed, coordination with PSE would be required. PSE does lease abandoned gas mains to communications providers. It would be advisable to verify that abandoned gas mains contain no other utility systems prior to removal.

6.1.3.2.1 Third Avenue W. to Second Avenue W.

A 2-inch IP gas main in a 4-inch CI casing and a deactivated 12-inch CIP is aligned in Mercer Street from west of Third Avenue W. to Second Avenue W. At Third

Avenue W., a 2-inch IP gas main in a 6-inch CI casing extends north a deactivated 6-inch CIP extends south.

Multiple services extend from the 2-inch IP gas main in Mercer Street.

6.1.3.2.2 Second Avenue W. to First Ave. W.

A 2-inch IP gas main in a 4-inch CI casing and a deactivated 16-inch CIP is aligned in Mercer Street from Second Avenue W. to First Avenue W. At Second Avenue W., a 4-inch IP gas main in a 6-inch casing extends both north and south. A 4-inch deactivated gas main also extend north in Second Avenue W. from the north side of Mercer Street.

Multiple services extend from the 2-inch IP gas main in Mercer Street.

6.1.3.2.3 First Avenue W. to Queen Anne Avenue N.

A 2-inch IP gas main in a 4-inch CI casing is aligned in Mercer Street from First Avenue W. to the alley between First Avenue W. and Queen Anne Avenue N. From the end of this gas main, it appears that the abandoned gas main was leased or sold to a fiber optics provider (assumed to be ELI). This is based on PSE's record drawings.

A deactivated 16-inch CIP is aligned in Mercer Street from First Avenue W. to Queen Anne Avenue N.

At First Avenue W., a 2-inch IP gas main in a 6-inch CI casing extends both north and south.

Multiple services extend from the 2-inch IP gas main in Mercer Street.

6.1.3.2.4 Queen Anne Avenue N. to First Avenue N.

From Queen Anne Avenue N. to part way between Queen Anne Avenue N. to First Avenue N., it appears that an abandoned gas main was leased or sold to a fiber optics provider (assumed to be ELI). This is based on PSE's record drawings.

A 2-inch IP gas main in a 4-inch CI casing is aligned in Mercer Street from part way between Queen Anne Avenue N. to First Avenue N. There is also a deactivated 12-inch CIP aligned in Mercer Street from First Avenue W. to Queen Anne Avenue N.

At Queen Anne Avenue N., it appears that an abandoned gas main was leased or sold to a fiber optics provider (assumed to be ELI). This is based on PSE's record drawings.

Multiple services extend from the 2-inch IP gas main in Mercer Street.

6.1.3.2.5 First Avenue N. to Warren Avenue N.

In Mercer Street from First Avenue N. to Warren Avenue N., it appears that an abandoned gas main was leased or sold to a fiber optics provider (assumed to be ELI). This is based on PSE's record drawings. There is also a deactivated 4-inch CIP is aligned in Mercer Street from First Avenue N. to Warren Avenue N.

A 6-inch IP STW gas main and a deactivated 4-inch CIP cross Mercer Street at First Avenue N.

6.1.3.2.6 Warren Avenue N. to Second Avenue N.

In Mercer Street from Warren Avenue N. to Second Avenue N., it appears that an abandoned gas main was leased or sold to a fiber optics provider (assumed to be ELI). This is based on PSE's record drawings. There is also a deactivated 6-inch CIP aligned in Mercer Street from Warren Avenue N. to Second Avenue N.

A deactivated 4-inch CIP crosses Mercer Street at Warren Avenue N.

6.1.3.2.7 Second Avenue N. to Third Avenue N.

In Mercer Street from Second Avenue N. to Third Avenue N., it appears that an abandoned gas main was leased or sold to a fiber optics provider (assumed to be ELI). This is based on PSE's record drawings. There is also a deactivated 6-inch CIP aligned in Mercer Street from Second Avenue N. to Third Avenue N.

A 2-inch IP gas main in a 4-inch casing crosses Mercer Street at Second Avenue N.

6.1.3.2.8 Third Avenue N. to Fourth Avenue N.

In Mercer Street from Third Avenue N. to Fourth Avenue N., it appears that an abandoned gas main was leased or sold to a fiber optics provider (assumed to be ELI). This is based on PSE's record drawings. There is also a deactivated 6-inch CIP aligned in Mercer Street from Third Avenue N. to Fourth Avenue N.

A deactivated 6-inch CIP extends north from Mercer Street in Third Avenue N.

A deactivated 4-inch CIP extends south and a deactivated 6-inch CIP extends north from Mercer Street in Nob Hill Avenue N.

6.1.3.2.9 Fourth Avenue N. to Fifth Avenue N.

In Mercer Street from Fourth Avenue N. to Fifth Avenue N., it appears that an abandoned gas main was leased or sold to a fiber optics provider (assumed to be ELI). This is based on PSE's record drawings. There is also a deactivated 6-inch CIP aligned in Mercer Street from Fourth Avenue N. to Fifth Avenue N.

A 2-inch IP gas main in a 6-inch CI casing crosses Mercer Street at Fifth Avenue N.

6.1.3.2.10 Fifth Avenue N. to Taylor Avenue N.

At Fifth Avenue S., the labeling of fiber optics in the abandoned gas main in Mercer Street ends. It is possible that PSE stopped maintaining this information or that this is the end of the fiber optic run.

In Mercer Street from Fifth Avenue N. to Taylor Avenue N., both a deactivated 6-inch and 12-inch CIP is aligned in Mercer Street from Fifth Avenue N. to Taylor Avenue N.

6.1.3.2.11 Taylor Avenue N. to Sixth Avenue N.

A 12-inch STW HP gas main turns east onto Mercer Street from Taylor Avenue N. There is also a deactivated 6-inch CIP is aligned in Mercer Street from Sixth Avenue N. to Aurora Avenue N.

6.1.3.2.12 Sixth Avenue N. to Aurora Avenue N.

A 12-inch STW HP gas main is aligned in Mercer Street from Sixth Avenue N. to Aurora Avenue N. There is also a deactivated 6-inch CIP is aligned in Mercer Street from Sixth Avenue N. to Aurora Avenue N.

6.1.3.2.13 Aurora Avenue N. to Dexter Avenue N.

A 12-inch STW HP gas main is aligned in Mercer Street from Aurora Avenue N. to Dexter Avenue N. A deactivated 12-inch gas main crosses Mercer Street at Broad Street.

6.1.3.2.14 Dexter Avenue N.

A 12-inch STW HP gas main is aligned in Mercer Street and continues east past Dexter Avenue N. A 4-inch STW HP gas main also continues north in Dexter Avenue N.

A 4-inch IP gas main in a 12-inch casing crosses Mercer Street at Dexter Avenue N.

6.1.3.3 Steam

No known steam infrastructure exists in the Mercer Street Corridor Improvements area.

6.1.3.4 Petroleum

No known petroleum infrastructure exists in the Mercer Street Corridor Improvements area.

7.0 Elliott & Western Connector

7.1 Existing Utilities

7.1.1 Inventory of Existing Utilities

See Section 1.5 for the limits of documentation for existing utilities in the Elliott & Western Connector area.

See Section 1.7 for the methods used to inventory the existing infrastructure within the Elliott & Western Connector area.

7.1.2 Public Utilities

7.1.2.1 Electrical Power

7.1.2.1.1 Transmission Line MA-US-BR and Communications Conduit

SCL's transmission line 4 is an 8-inch diameter HPFF cable and is located between 2.5 and 11 feet below existing grade. There is also a 3-inch PVC conduit that runs parallel to and is located approximately 1-foot above this transmission line that is used for SCL communications. This transmission line continues beneath the existing viaduct from Union Street to Bell Street and is located between the column footings. At Bell Street, this transmission line continues north in Western Avenue to Vine Street. At Vine Street, this transmission line turns east to Taylor Avenue N. This transmission line continues in Taylor Avenue N. to the Broad Street Substation at 319 Sixth Avenue N. (between Thomas and Harrison Streets on the west side of Sixth Avenue N.).

7.1.2.1.2 Alaskan Way Surface Street – Pike Street to Stewart Street

A four-conduit ductbank is aligned in Pike Street from the east side of the viaduct to the Alaskan Way surface street. Once in Alaskan Way, this system intercepts a vault, and 10 conduits continue north in Alaskan Way.

An empty 12-conduit ductbank is aligned in Alaskan Way and is reserved for future use.

At Stewart Street, four conduits turn east to the southwest side of the Waterfront Landings Condominiums to provide service.

7.1.2.1.3 Electrical Service and Distribution

Near Blanchard Street, a nine-conduit ductbank crosses beneath the viaduct between viaduct bents No. 13 and No. 14 on the west side of the viaduct. These conduits continue north and provide service to the Elliott Pointe Apartments.

Multiple lines attached to or buried beneath the viaduct provide services to customers and viaduct illumination systems.

In Battery Street, between Western Avenue and First Avenue, an electrical service conduit is located along the south side of the road and a large vault with multiple conduits is located along the north side of the road.

7.1.2.2 Domestic Water

A 21-inch steel water main is located in Alaskan Way from north of Union Street past Stewart Street. Multiple laterals and service connections extend from the water main, which is located beneath the viaduct.

At Elliott Avenue and Blanchard Street, an 8-inch water main crosses diagonally beneath the viaduct.

At Bell Street and SR 99, a 20-inch water main, aligned in Western Avenue, crosses diagonally beneath the viaduct. A 12-inch water main aligned in Bell Street crosses beneath the viaduct and over the pile cap at viaduct bent No. 5W.

7.1.2.3 Sanitary and Combined Sewer

At University Street, a 36-inch RCP combined sewer is aligned along the east side of the viaduct to viaduct bent No. 59E where the combined sewer turns west and is aligned beneath the viaduct to Pike Street. At Pike Street, this combined sewer tees between viaduct bent No. 55 and No. 56, and a 36-inch combined sewer extends east to intercept a large vault on the east side of the viaduct and a 12-inch combined sewer extends west and connects to a 12-inch combined sewer in Alaskan Way.

An 18-inch RCP combined sewer is aligned beneath the viaduct from University to Pike Streets. At Pike Street, this combined sewer turns west to the Alaskan Way surface street and continues in Alaskan Way to Pine Street.

A 12-inch sanitary sewer is located along the west side of Alaskan Way.

A 12-inch RCP combined sewer is aligned immediately east of the viaduct from Lenora Street to viaduct bent No. 22E. This combined sewer then turns west and then north beneath the viaduct and continues along Elliott Avenue.

A 24-inch combined sewer is located along the east side of Western Avenue and diagonally crosses the existing viaduct at Bell Street.

An 8-inch and a 30-inch combined sewer are aligned in Battery Street between First Ave S. and Western Avenue.

7.1.2.4 Storm Drainage

A 15-inch storm drainage pipe is aligned along the east side of Alaskan Way from Pike to Virginia Streets. At Pine Street, an adjacent 12-inch storm drainage pipe is located parallel to the east side of this pipe and continues north to Lenora Street.

At Pine Street, a 15-inch storm drainage pipe extends adjacent to the south side of the Waterfront Landings Condominiums and continues north adjacent to the west side of the viaduct to Virginia Street.

Drainage from the viaduct is collected through a series of drainage pipes beneath the viaduct and connects to the combined sewer system.

7.1.2.5 Telecommunications

DoIT has an existing conduit located in Alaskan Way that serves the Seattle Aquarium. Part of this conduit use SCL buried infrastructure.

Three buried DoIT conduits cross SR 99 at Bell Street. Two of these conduits were installed by, and are maintained by, Comcast. It is assumed that these conduits are in a joint ductbank with four buried AT&T conduits; however, this needs to be confirmed. The third conduit is in a joint trench with two 360networks conduits and one XO conduit and crosses SR 99 on the north side of Bell Street.

7.1.3 Private Utilities

7.1.3.1 Telecommunications and Cable Television

Multiple private communications providers are in the Elliott & Western Connector area. The key communications providers are discussed below.

7.1.3.1.1 360networks

360networks has two buried 4-inch conduits in a joint trench with DoIT and XO that cross SR 99 on the north side of Bell Street.

7.1.3.1.2 Allstream

Allstream (the enterprise solutions division of Manitoba Telecom Services Inc. Also known as Starcom, AT&T Canada, and MetroNet Fiber) has one buried 4-inch galvanized iron pipe (GIP) that extends from the North Portal of the Burlington Northern Santa Fe (BNSF) Railroad Tunnel, south of existing viaduct bent No. 34 to Lenora Street. This GIP has approximately 3 feet of cover and is approximately 2 feet east of the easternmost viaduct columns. At Lenora Street, the GIP enters a vault, and one buried 4-inch high-density polyethylene conduit with innerducts exits the vault and travels east along Lenora Street toward the Westin Hotel.

7.1.3.1.3 Broadstripe

Broadstripe has a system suspended from the viaduct from south of existing viaduct bent No. 34 to Bell Street. Between existing viaduct bent No. 34 and the South Portal of the BST, Broadstripe has five risers and multiple service conduits. The services at viaduct bents No. 5W and 17E transition to buried systems. North of Bell Street, Broadstripe's system transitions from an aerial system to a buried system and continues within Western Avenue.

Broadstripe has an additional existing cable that travels north in the alley between Western and First Avenues. This cable penetrates and attaches to the inside of the east BST retaining wall.

Broadstripe has a buried conduit that extends east from Western Avenue in Battery Street. This conduit turns north at the alley located between Western Avenue and First Avenue.

7.1.3.1.4 Comcast

Four buried AT&T conduits cross Bell Street; Comcast maintains all AT&T conduits in the North Project area. These conduits cross along the south side of Bell Street and turn north at the alley between Western and Elliott Avenues on the west side of SR 99. Comcast also has a buried conduit that extends north in the alley between Western and First Avenues and feeds the Pomeroy Condominiums.

7.1.3.1.5 Qwest

In Alaskan Way, Qwest has an existing ductbank that ranges from two to six conduits. At Pike Street, two conduits extend east to serve customers on the east side of the viaduct between Union and Pike Streets.

At Pine Street, two Qwest conduits turn east from the Alaskan Way surface street and are aligned along the south side of the Waterfront Landing Condominiums. At the southeast side of the condominiums, these conduits turn north and are aligned along the west side of the viaduct to midway between Virginia and Lenora Streets.

Qwest has multiple systems within the SR 99 corridor from Lenora to Bell Streets. At Lenora Street, Qwest has a service leading to the Lenora Street Pedestrian Bridge. It also has four buried conduits that head west in Lenora Street and turn north beneath the viaduct. These four conduits intercept an existing vault near viaduct bent No. 21E2. From this vault, two buried conduits continue north to Blanchard Street, and one conduit travels up a riser at viaduct bent No. 21E2 and attaches to the viaduct. This aerial cable travels down a riser at viaduct bent No. 17E and serves the Western Triangle Building.

At Bell Street, two buried Qwest conduits cross the SR 99 corridor near the centerline of the street.

7.1.3.1.6 Verizon

Two empty conduits are aligned along the west side of Alaskan Way. This ductbank did not contain any active systems at the time this report was prepared.

One buried Verizon conduit extends from the North Portal of the BNSF Railroad Tunnel, south of existing viaduct bent No. 34, to Lenora Street. This conduit is between the northbound viaduct footings. At Lenora Street, this buried conduit extends east toward the Westin Hotel.

Verizon also has four buried conduits at Bell Street and Western Avenue. These four conduits extend east from Elliott Avenue to the existing vault between viaduct bents No. 6W and 5W. Based on previous coordination meetings with Verizon Business and Yipes, there is a discrepancy regarding ownership of these conduits and the vault that is unresolved (note that current Program existing utility mapping identifies Yipes as the owner).

7.1.3.1.7 XO

XO has one buried 4-inch conduit in a joint trench with 360networks and DoIT that crosses SR 99 on the north side of Bell Street.

7.1.3.1.8 Yipes Enterprise Services, Inc.

Yipes Enterprise Services, Inc. (Yipes, acquired by Flag Telecom Group Services Ltd., which is a subsidiary of Reliance Communications) has infrastructure in the Elliott & Western Connector area. At the intersection of Bell Street and Western Avenue, Yipes' existing infrastructure is in a "T" formation. Its existing buried circuits travel west from First Avenue and Bell Street in an abandoned 6-inch steel gas main (note that utility mapping also shows four buried Yipes conduits traveling west on Bell Street adjacent to the abandoned gas main). At the southwest side of the intersection of Bell Street and Western Avenue, the pipe makes a 90-degree turn and heads north on Western Avenue. At the southwest side of Western Avenue and Bell Street, Yipes infrastructure continues west on Bell Street to Elliott Avenue from an existing vault. Based on previous coordination meetings with Verizon Business and Yipes, there is a discrepancy regarding ownership of these conduits and the vault that is unresolved (note that current Program existing utility mapping identifies Yipes as the owner).

7.1.3.2 Natural Gas

All natural gas in the Elliott & Western Connector area is owned by PSE. If any deactivated gas mains need to be removed, coordination with PSE would be required. PSE does lease abandoned gas mains to communications providers. It would be advisable to verify that abandoned gas mains contain no other utility systems prior to removal.

A 12-in HP gas main is located along the east side of Alaskan Way from near Pike Street past Stewart Street. Multiple IP gas laterals stem from the 12-inch HP main. A 2-inch IP gas main is also located along the east side of Alaskan Way, east of the 12-inch HP main.

In Blanchard Street, a 4-inch deactivated IP gas main crosses beneath the viaduct near viaduct bent No. 16. A 4-inch deactivated IP gas main is also in this vicinity as it approaches the viaduct from Elliott Avenue.

A 2-inch IP gas main in a 6-inch casing diagonally crosses beneath the viaduct at Bell Street. A 4-inch IP gas main also is located immediately adjacent to the west side of the viaduct at Bell Street and extends approximately 100 feet south.

At Bell Street, a 12-inch HP gas main crosses beneath SR 99 between viaduct bents No. 5 and No. 6. This gas main continues west to Elliott Avenue, then turns south in Elliott Avenue. Near Blanchard Street the gas main turns west, down the hillside and beneath the BNSF railroad tracks.

At Battery Street, a deactivated 4-inch gas and an active 2-inch IP gas main are aligned between Western Avenue and First Avenue. The active 2-inch IP gas main turns north in the alley between Western Avenue and First Avenue.

7.1.3.3 Steam

The 6-inch HP Bell Street main penetrates the seawall near the steam plant; it is attached to the west face of the seawall and extends to the north. This line transitions from being surface mounted on the seawall to being buried in soil between Lenora and Blanchard Streets, where it continues north to its terminus at the Port of Seattle Building. The function of this line must be continuously maintained throughout the project as it provides service to customers.

7.1.3.4 Petroleum

No known petroleum infrastructure exists in the Elliott & Western Connector vicinity.

7.2 Impacts to Existing Utilities

All utilities attached to the viaduct and expected to remain in service would need to be relocated prior to viaduct demolition. It is anticipated that utilities buried and located beneath the viaduct would not be affected by viaduct demolition or by removal of viaduct columns to a depth of 1-foot below existing grade (a design deviation will need to be obtained to leave viaduct columns and footings in place above a 5-foot depth). This may require the use of a means and method specification to ensure that utilities buried and located beneath the viaduct are not damaged during demolition. The validity of this assumption has not been vetted and further

design would be required to evaluate the actual impact to utilities buried beneath or immediately adjacent to the viaduct. Existing utility surface features located beneath the viaduct would need to be adjusted to be flush with the new surfaces. Grade changes in this area should be kept to a minimum to limit unanticipated impacts to utilities.

Since roadway structural support locations over the BNSF railroad tunnel have not been determined, a full evaluation of impacts was not possible at the time this report was prepared.

It is assumed that a mechanically stabilized earth wall would support the new roadway south of the BNSF railroad tunnel.

According to Figure 5, the limits of areas of retained fill and cut are Pike Street and Lenora Street.

7.2.1 Public Utilities

7.2.1.1 Electrical Power

Depending on the amount of retained fill required for the mechanically stabilized earth wall and on the amount of cut required north of Stewart Street, SCL transmission line 4 may be affected. If the retained fill height is more than a few feet, it may affect the ampacity of this transmission line, which could potentially necessitate its relocation. Based on test hole information, this line is between 2.5 and 11 feet deep. Coordination with SCL would be required to evaluate this further.

The Elliott & Western Connector would impact SCL's transmission line 4. Relocation work to the 115-kV system would need to consider lead times required to obtain line and equipment clearances during construction. SCL would need to be consulted to ascertain the latest clearance lead times. Once a preferred plan is selected, load flow, soil thermal conductivity, and cable-rating studies may be required to ensure that capacity requirements are met by any temporary or permanent modifications to the existing 115-kV system (POWER, May 2008).

Depending on the amount of fill needed in Battery Street, the existing vault and distribution ductbanks may be impacted. Coordination with SCL would be required to evaluate this further.

Any electrical lines attached to the underside of the viaduct would require relocation prior to removal of the viaduct.

All electrical services must be maintained before, during, and after construction.

7.2.1.2 Domestic Water

It is anticipated that existing fire hydrants, water valves, and water services will need to be relocated to accommodate the new road layout and other Elliott & Western Connector construction activities.

7.2.1.3 Sanitary and Combined Sewer and Storm Drainage

No significant impacts to gravity systems are anticipated since the majority of the systems that would be in areas of retained fill and/or cut relate to viaduct drainage.

Coordination with SPU would be required to determine the best way to tie a new drainage system into the existing systems in the Elliott & Western Connector area.

7.2.1.4 Telecommunications

No impacts to DoIT facilities are anticipated.

7.2.2 Private Utilities

Private utility owners are required to relocate their utilities once directed by City of Seattle. Efforts should be made to provide advance notice to utility owners since impacts to their systems may be significant and, given time, some may be able to relocate prior to the Elliott & Western Connector construction.

7.2.2.1 Telecommunications and Cable Television

Broadstripe and Qwest have infrastructure attached to the viaduct that would need to be relocated prior to viaduct demolition.

Allstream and Verizon facilities are buried beneath the existing viaduct north of the BNSF railroad tunnel and would likely be affected by the area of retained cut.

7.2.2.2 Natural Gas

No direct impacts to natural gas facilities are anticipated. However, coordination with PSE would be advisable to ensure that the 12-inch HP gas main would not be impacted by construction activities.

7.2.2.3 Steam

No impacts to steam facilities are anticipated.

8.0 No Build Alternative

All utilities attached to the viaduct and expected to remain in service would need to be relocated prior to viaduct demolition. It is anticipated that utilities buried and located beneath the viaduct would not be affected by viaduct demolition or by removal of viaduct columns to a depth of 1-foot below existing grade (a design deviation will need to be obtained to leave viaduct columns and footings in place above a 5-foot depth). This may require the use of a means and method specification to ensure that utilities buried and located beneath the viaduct are not damaged during demolition. The validity of this assumption has not been vetted and further design would be required to evaluate the actual impact to utilities buried beneath or immediately adjacent to the viaduct. Since minimal surface restoration would occur, existing utility surface features located beneath the viaduct would need to be adjusted to be flush with the new surfaces. Grade changes in this area should be kept to a minimum to limit unanticipated impacts to utilities.

8.1 Existing Utilities

The following items were not considered or reviewed in depth as part of the No Build Alternative:

- Utilities that are not attached to or located beneath the existing viaduct (this includes utilities that cross perpendicular to the viaduct).
- Utilities south of the Railroad Way S. on- and off-ramps since that utility relocation work would be part of the Early Electrical and South Project contracts. Utility relocation work occurring as part of these contracts is described in Section 2.0.

8.1.1 Inventory of Existing Utilities

See Section 1.7 for the methods used to inventory the existing infrastructure within the No Build area.

Since the Elliott & Western Connector would necessitate the demolition of the viaduct, see Section 7.1 for related existing utilities north of Union Street.

8.1.2 Public Utilities

8.1.2.1 Electrical Power

8.1.2.1.1 Transmission Lines MA-US-1 and MA-US-2

SCL's transmission lines 1 and 2 are suspended from the existing viaduct. As part of the Early Electrical contract, these lines are being relocated off of the viaduct south

of Railroad Way S. and replaced with an XLPE cable system. Near Railroad Way S., the relocated lines would intercept the existing transmission lines suspended from the viaduct. The existing transmission lines continue north, attached to the viaduct, to viaduct bent No. 71W near University Street. At University Street, these lines turn east to Western Avenue and then north to the Union Substation.

8.1.2.1.2 Transmission Lines MA-US-3 and MA-US-BR and Communications Conduit

SCL's transmission lines MA-US-3 and MA-US-BR (also referred to as transmission lines 3 and 4, respectively) are buried beneath the existing Railroad Way on- and off-ramps. One of these lines is a 5-inch diameter HPFF cable. The other is an 8-inch diameter HPFF cable. These lines are located between 2.5 and 11 feet below existing grade, respectively. There is also a 3-inch PVC conduit that runs parallel to and is located 1-foot above the 8-inch transmission line that is used for SCL communications. These lines continue beneath the existing viaduct and are between the column footings to Union Street. At Union Street, these lines turn east and connect to the Union Street Substation.

Transmission line 4 continues beneath the existing viaduct from Union Street to Bell Street and is located between the column footings. At Bell Street, this transmission line continues north in Western Avenue to Vine Street. At Vine Street, this transmission line turns east to Taylor Avenue N. This transmission line continues in Taylor Avenue N. to the Broad Street Substation at 319 Sixth Avenue N. (between Thomas and Harrison Streets on the west side of Sixth Avenue N.).

8.1.2.1.3 Five Massachusetts Network Feeders

The five Massachusetts 13.8 kV network feeders are attached to the existing viaduct. As part of the Early Electrical contract, they are being relocated south of Railroad Way S. Near Railroad Way S.; the relocated lines would intercept the existing five feeders. Three of the five feeders run from the Massachusetts Substation to S. Washington Street. At S. Washington Street, these three feeders turn east to First Avenue S. Two of the five feeders are attached to the viaduct from the Massachusetts Substation to Yesler Way. At Yesler Way, these two feeders turn east to First Avenue S.

8.1.2.1.4 Electrical Service and Distribution

Multiple lines attached to the viaduct provide services to customers and viaduct illumination systems.

8.1.2.2 Domestic Water

South of Columbia Street, near viaduct bent No. 93W, a 12-inch water main extends east from Alaskan Way S. to a location beneath the viaduct. This 12-inch water main transitions to a 20-inch water main, which transitions to a 21-inch water main near

Marion Street. The 21-inch water main continues north beneath the viaduct to Union Street where, between viaduct bent No. 61W and 62W, this water main turns west and is aligned in the Alaskan Way surface street. Multiple laterals, hydrants, and service connections extend from the water main as it is located beneath the viaduct.

See Section 7.1.2.2 for further information pertaining to the existing water system.

8.1.2.3 Sanitary and Combined Sewer

From S. King to S. Main Streets, one 12-inch combined sewer is located beneath the viaduct. This pipe varies in material between RCP and VCP. At S. Main Street, this 12-inch combined sewer transitions to an 8-inch concrete combined sewer.

At S. Washington Street, one 21-inch RCP sanitary sewer crosses diagonally beneath the viaduct before turning north, located immediately adjacent to the east side of the viaduct. This sanitary sewer transitions to a 15-inch pipe before turning west near viaduct bent No. 99E. This sanitary sewer continues north beneath the viaduct to Dearborn Street.

One 18-inch RCP and one 36-inch RCP combined sewer cross beneath the viaduct at Madison Street between viaduct bent No. 81 and No. 82. The 36-inch combined sewer continues east in Madison Street. while the 18-inch combined sewer continues north beneath the viaduct to University Street. At University Street, this combined sewer transitions to a 36-inch RCP combined sewer and is aligned along the east side of the viaduct to viaduct bent No. 59E. At viaduct bent No. 59E, the 36-inch combined sewer turns west and is aligned beneath the viaduct to Pike Street. At Pike Street, this pipe tees and a 36-inch RCP combined sewer intercepts a large vault on the east side of the viaduct, and a 12-inch DIP sanitary sewer extends west and connects to a 12-inch RCP sanitary sewer in Alaskan Way.

An 18-inch RCP combined sewer is aligned beneath the viaduct from University Street to Pike Street. At Pike Street, this combined sewer turns west to the Alaskan Way surface street.

See Section 7.1.2.3 for further information pertaining to the existing sewer system.

8.1.2.4 Storm Drainage

Multiple storm drainage pipes are located beneath the viaduct, or immediately adjacent to the viaduct, that collect drainage from the viaduct. These pipes generally drain to a nearby combined system. See Section 8.1.2.3 for further information pertaining to the combined systems.

A 48-inch drainage RCP crosses beneath the viaduct at S. Washington Street. A 12-inch drainage RCP extends north from this pipe and is aligned beneath the viaduct to Yesler Way.

A 48-inch drainage RCP crosses beneath the viaduct at Marion Street between viaduct bent No. 86 and No. 87.

A 24-inch drainage RCP crosses beneath the viaduct at Madison Street between viaduct bent No. 82 and No. 83.

At University Street, a 30-inch RCP crosses beneath the viaduct between viaduct bent No. 70 and No. 71. This pipe turns north at University Street and a 36-inch RCP continues north to Union Street and is located immediately west of the viaduct.

8.1.2.5 Telecommunications

A DoIT cable is attached to the viaduct from S. Royal Brougham Way to S. Washington Street. This cable serves a Seattle Department of Transportation system. The portion of the system south of the Railroad Way S. on- and off-ramps would be relocated during Stage 1 of the South Project.

A DoIT cable is attached to the Marion Street Pedestrian Walkway to serve Colman Dock and Seattle Fire Department Station #5.

See Section 7.1.2.5 for further information pertaining to the existing DoIT system.

8.1.3 Private Utilities

8.1.3.1 Telecommunications and Cable Television

Multiple private communications providers are in the No Build area. The key communications providers are discussed below.

8.1.3.1.1 360networks

See Section 7.1.3.1.1 for further information pertaining to the existing 360networks system.

8.1.3.1.2 Allstream

See Section 7.1.3.1.2 for further information pertaining to the existing Allstream system.

8.1.3.1.3 Broadstripe

Broadstripe infrastructure is attached to the viaduct from S. Atlantic Street to Bell Street. As part of the South Project Stage 1 relocations, Broadstripe intends to lease space from ELI south of S. King Street (i.e., Broadstripe will not own facilities south of S. King Street). At Victor Steinbrueck Park, Broadstripe exits the viaduct, enters the parking garage beneath the park, and then reattaches to the viaduct. Broadstripe's aerial infrastructure is considered main network in this area.

Broadstripe also has a conduit that penetrates the east retaining wall of the BST northbound portal just west of First Avenue.

See Section 7.1.3.1.3 for further information pertaining to Broadstripe's existing infrastructure north of the BNSF railroad tunnel.

8.1.3.1.4 Comcast

Comcast has existing infrastructure attached to the viaduct from S. King Street to Columbia Street. Comcast has buried infrastructure in S. King Street and in Columbia Street. Comcast's infrastructure is considered main transport and service related in this area.

See Section 7.1.3.1.4 for further information pertaining to the existing Comcast system.

8.1.3.1.5 ELI

ELI infrastructure is attached to the viaduct from S. Massachusetts Street to Spring Street. ELI's aerial infrastructure is considered a main "backbone" in this area.

8.1.3.1.6 Qwest

Qwest infrastructure is attached to the viaduct from S. Washington to S. Atlantic Streets. Midway between S. Jackson and S. Main Streets, Qwest has a cable that extends west to the west side of Alaskan Way S.

Along the SR 99 corridor, Qwest infrastructure crosses beneath the viaduct at multiple cross streets, including S. King, S. Washington, Marion, Spring, and Seneca Streets.

See Section 7.1.3.1.5 for further information pertaining to the existing Qwest system.

8.1.3.1.7 Sprint

Sprint has three buried conduits along the east side of the Railroad Way on- and off-ramps and aligned beneath the viaduct from S. King to University Streets where the conduits turn east toward Western Avenue. As these conduits turn east, they cross over the pile cap at viaduct bent No. 70E. At this crossing, the conduits are at a depth of approximately 1-foot.

8.1.3.1.8 Verizon

Verizon infrastructure crosses beneath the viaduct at Yesler Way, Marion Street, and University Street.

See Section 7.1.3.1.6 for further information pertaining to the existing Verizon system.

8.1.3.1.9 XO

XO infrastructure is attached to the viaduct from the Railroad Way on- and off-ramps to Marion Street. XO's infrastructure is considered distribution related.

See Section 7.1.3.1.7 for further information pertaining to the existing XO system.

8.1.3.1.10 Yipes

See Section 7.1.3.1.8 for further information pertaining to the existing Yipes system.

8.1.3.2 Natural Gas

All natural gas in the No Build area is owned by PSE. If any deactivated gas mains need to be removed, coordination with PSE would be required. PSE does lease abandoned gas mains to communications providers. It would be advisable to verify that abandoned gas mains contain no other utility systems prior to removal.

At S. Main Street, a 12-inch HP gas main extends from the east and turns north near viaduct bent No. 106E. This 12-inch gas main is immediately adjacent to the viaduct, and in some locations, crosses over the top of pile caps. A section of the 12-inch HP gas main was relocated as part of the *SR 99/Alaskan Way Viaduct/Bent 93/94 Emergency Repair Project* near Columbia Street. The section that was relocated is beneath the viaduct. The 12-inch HP gas main continues north along the east side of the viaduct to an area slightly south of Pike Street. Between viaduct bent No. 58 and 59, the 12-inch gas main turns west to the Alaskan Way surface street.

Multiple IP gas laterals stem from the 12-inch HP main beneath the viaduct between S. Main and Pike Streets. These laterals serve customers or distribute gas to other IP systems.

See Section 7.1.3.2 for further information pertaining to the existing gas system.

8.1.3.3 Steam

A 6-inch LP main runs east to west about 10 feet south of the centerline of S. Washington Street. It is permanently deactivated from a point in First Avenue S. and can be demolished in the Alaskan Way right-of-way to accommodate the Program.

A 6-inch LP main runs east to west about 3 feet south of the centerline of Marion Street and through the seawall. The function of this main must be continuously maintained throughout the Program, as there is a service, trap, and free blow at the west end. Seattle Steam maps indicate that this pipe penetrates both the seawall and west wall of Alaskan Way. It is assumed that this main has a 12-inch outside diameter.

8.1.3.3.1 **Steam Plant at 1319 Western Avenue**

Seattle Steam has five lines that connect to the west side of the plant. Since Seattle Steam's plant fuel conversion project is complete, three lines associated with fuel barge operations can be demolished, removed, or ignored. These five lines are described below beginning at the southern edge of the plant as follows:

- Inactive 2-inch LP main between viaduct bent No. 66 and No. 67; this line can be demolished, removed, or abandoned.
- Inactive 6-inch black oil line between viaduct bent No. 66 and No. 67; this line can be demolished, removed, or abandoned.
- Active 4-inch BO (blow off) line between viaduct bent No. 66 and No. 67. The function of the 4-inch BO line must be maintained. This line serves as a drain from the plant through the seawall to Puget Sound, and it is used periodically. Outages on this line are possible. Coordination with Seattle Steam should occur.
- Inactive 4-inch HP main between viaduct bent No. 65 and No. 66; this line can be demolished, removed, or abandoned.
- Active 6-inch HP Bell Street line. This line exits the plant with a z-bend before penetrating the seawall. The function of this main must be continuously maintained throughout the Program as it continues north to serve customers. It is assumed that this main has a 14-inch outside diameter.

8.1.3.4 Petroleum

No known petroleum infrastructure exists in this vicinity, except as described in Section 7.1.3.3.1.

8.2 Impacts to Existing Utilities

All utilities attached to the viaduct and expected to remain in service would need to be relocated prior to viaduct demolition. It is anticipated that utilities buried and located beneath the viaduct would not be affected by viaduct demolition or by removal of viaduct columns to a depth of 1-foot below existing grade (a design deviation will need to be obtained to leave viaduct columns and footings in place above a 5-foot depth). Existing utility surface features located beneath the viaduct would need to be adjusted to be flush with the new surfaces. Since some surface restoration would occur, existing utilities beneath the viaduct would need to be adjusted to match the new surfaces. Grade changes in this area are expected to be minimal, which will limit impacts to utilities.

Since the Elliott & Western Connector would necessitate the demolition of the viaduct, see Section 7.2 for related utility impacts north of Union Street.

8.2.1 Public Utilities

8.2.1.1 Electrical Power

SCL's transmission lines 1 and 2 are attached to the viaduct and would need to be relocated prior to viaduct demolition. Coordination with SCL would be required. Relocation work to the 115-kV system would need to consider lead times required to obtain line and equipment clearances during construction. SCL would need to be consulted to ascertain the latest clearance lead times. Once a preferred plan is selected, load flow, soil thermal conductivity, and cable-rating studies may be required to ensure that capacity requirements are met by any temporary or permanent modifications to the existing 115-kV system (POWER, May 2008).

Any electrical lines attached to the underside of the viaduct would require relocation prior to removal of the viaduct.

All electrical services must be maintained before, during, and after construction.

8.2.1.2 Domestic Water

It is anticipated that existing fire hydrants, water valves, and water services will need to be relocated to accommodate the viaduct demolition and surface restoration construction activities.

8.2.1.3 Sanitary and Combined Sewer and Storm Drainage

Coordination with SPU would be required to determine the best way to tie a new drainage system into the existing systems in this area.

8.2.1.4 Telecommunications

DoIT infrastructure is attached to the viaduct from S. Washington Street south and would need to relocate off the viaduct prior to demolition. Coordination with DoIT would be required.

8.2.2 Private Utilities

Private utility owners are required to relocate their utilities once directed by City of Seattle. Efforts should be made to provide advance notice to utility owners since impacts to their systems may be significant and, given time, some may be able to relocate prior to viaduct demolition.

8.2.2.1 Telecommunications and Cable Television

360networks, Broadstripe, Comcast, ELI, and XO have infrastructure attached to the viaduct that would need to be relocated prior to demolition.

8.2.2.2 Natural Gas

No direct impacts to gas are anticipated. However, coordination with PSE would be required since the 12-inch HP gas main crosses over multiple viaduct pile caps.

8.2.2.3 Steam

No direct impacts to steam facilities are anticipated. However, coordination with Seattle Steam would be advisable to ensure that steam lines would not be impacted by construction activities.

9.0 CSO and Stormwater Outfalls

The following information pertaining to CSO and stormwater outfalls within the AWVSRP area is taken from the *The Alaskan Way Viaduct & Seawall Replacement Program, CSO and Stormwater Outfall Basis of Design* report that was prepared in April 2007 by Cosmopolitan Engineering, HDR, and RoseWater Engineering.

Existing Outfalls

There are six outfalls that serve as outlet points for the combined sanitary sewer and stormwater drainage system (combined sewer) serving the central business district and adjacent areas. Two of these outfalls in the central business district and one of the outfalls south of the tunnel area also serve as separated stormwater outfalls where the stormwater system is connected to the outfall downstream of the combined sewer overflow point. Five outfalls serve as outlets to separated stormwater basins. In addition to these, there are approximately 50 individual outfalls from catch basins within the AWVSRP area.

Also within the AWVSRP boundaries is a stormwater outfall owned, operated, and permitted by the Seattle Steam Company. [See Section 7.1.3.3 and 8.1.3.3 for additional information pertaining to steam infrastructure.]

Outfall Descriptions

The ownership, type of flows, and physical configuration are summarized in Table 1. A vicinity map indicating locations of the outfalls in the project area is included as Figure 6. The data are based on record drawings; condition assessments completed in 2005 by Seattle Public Utilities (SPU); and visual observations at low tide on September 16, 2005.

Combined sewer outfalls are connected to regulator or diversion structures, hereafter referred to as regulator structures, within the Alaskan Way right-of-way. These structures generally serve as overflow points for the sewerage collection system to release combined sewerage into Elliott Bay that cannot be conveyed to King County's large diameter conveyance pipe. Design criteria for the reconstruction of these structures is described in the *Basis of Design Report for the Combined Sewer System* (HDR, 2006).

Several combined sewer outfalls also have separated stormwater connections to the outfalls downstream of the combined sewer system overflow point. Flows from these outfalls may be considered separated stormwater flows if there is not a combined sewer overflow occurring simultaneous to the combined sewer system release.

Table 1 Existing Outfall Record Data

Location – Subbasin / Outfall	Owner	Service[1]	Outfall Pipe Material[2]	Outfall Diameter	Slope to Wall	Seawall[3] Penetration IE	Slope of Outfall	Outfall[3] IE	Notes
Massachusetts	City	SW	CIP	12"	0.39%	5.8	10%	NA	South of tunnel and seawall
Connecticut	City[4]	CSO/SW	Conc	84" (box culvert)	0.30%	-1.3	2.05%	-11.1	Ends under Terminal 37
King	City[4]	CSO	Conc	48"	0.46%	6.6?	11.70%	-7.4	Ends under Terminal 46
Washington 72"	City	SW	Conc	72"	2.60%	-2.3	NA	-2.3	Ends at seawall
Washington 24"	City	CSO	CIP	24"	0.90%	3	10.50%	-18.8	Ends 157' beyond seawall
Madison	City	CSO/SW	Conc	60"	3.50%	-2.3	NA	Not found	Ends at seawall
Seneca	City	SW	DIP	10"		5.6	NA	5.6	Ends at seawall
University	City	CSO/SW	CIP	24"	0.15%	4.2	NA	-16.8	Seawall penetration is 49" before drop structure
Seattle Steam Company	Seattle Steam Company	SW/Water Softening Regenerate	Carbon Steel	6"					Located beneath Pier 57
Pine	City	SW	DIP	16"	3.60%	7.7	NA	NA	Ends at seawall. Not along tunnel construction alignment
Bell Harbor	City	SW	DIP						
Vine	City	CSO	CIP	24"	0.20%	4.4	0	-6.8	Seawall penetration is 48" before drop structure

(1) CSO = Combined Sewer Overflow; SW = Stormwater

(2) CIP = Cast Iron Pipe, Conc = Concrete, DIP = Ductile Iron Pipe

(3) Project Datum = NAVD88; 0.00 NAVD88 = +2.5 feet MLLW

(4) The Connecticut Street Outfall and the King Street Outfall is owned by the City of Seattle according to the Comprehensive Outfall Agreement dated July 27, 1982. CSO flows through these outfalls are permitted by the King County NPDES permit.

Table 1. Existing Outfall Record Data (Cosmopolitan Engineering, HDR, and RoseWater Engineering, April 2007)

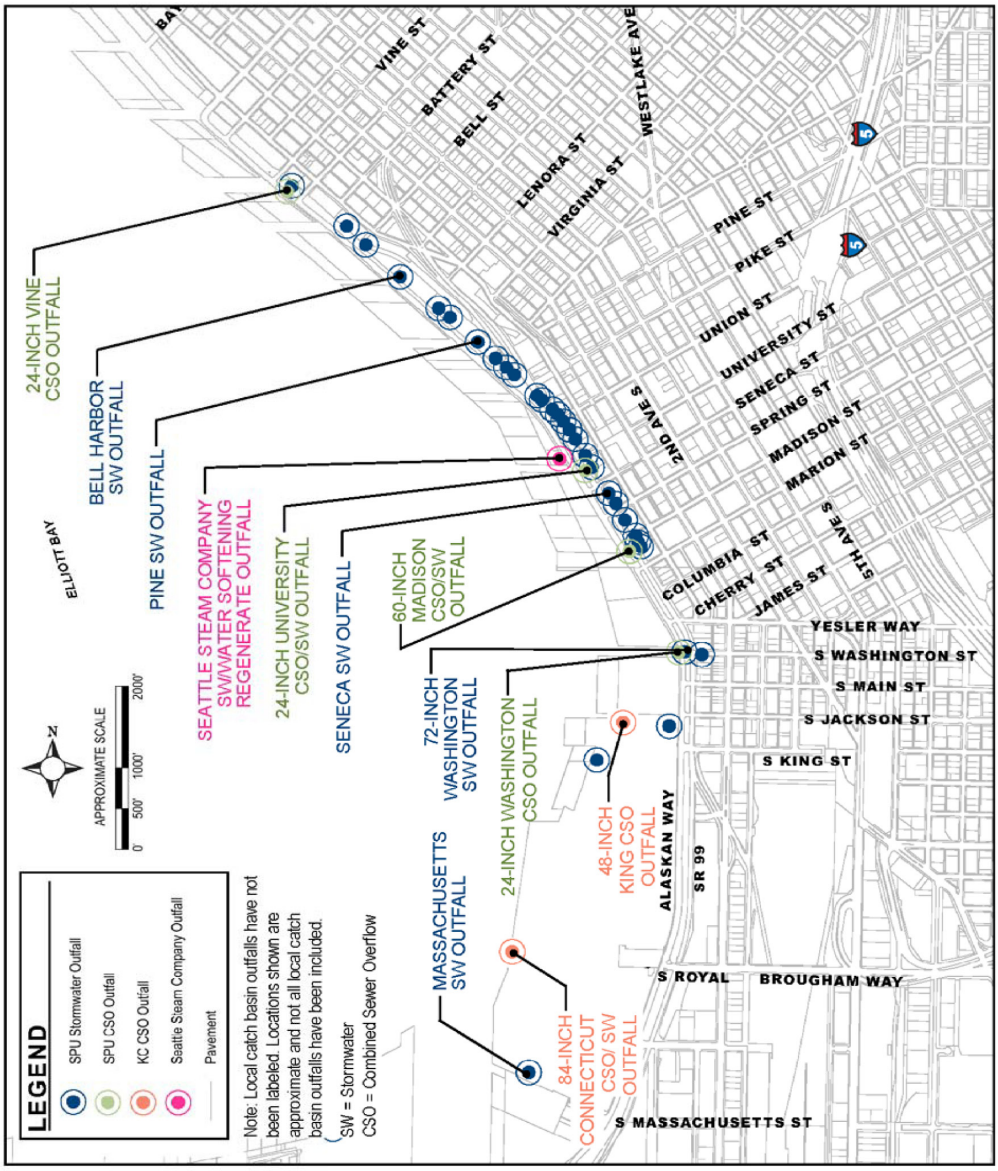

Figure 6. Existing Outfall Locations (Cosmopolitan Engineering, HDR, and RoseWater Engineering, April 2007)

For additional information pertaining to the existing outfalls, please refer to the *The Alaskan Way Viaduct & Seawall Replacement Program, CSO and Stormwater Outfall Basis of Design* report that was prepared in April 2007 by Cosmopolitan Engineering, HDR, and RoseWater Engineering.

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Appendix A

Bored Tunnel Conceptual Alignment

Washington State Department of Transportation

SR99 SDEIS–2 Configuration

May 2009

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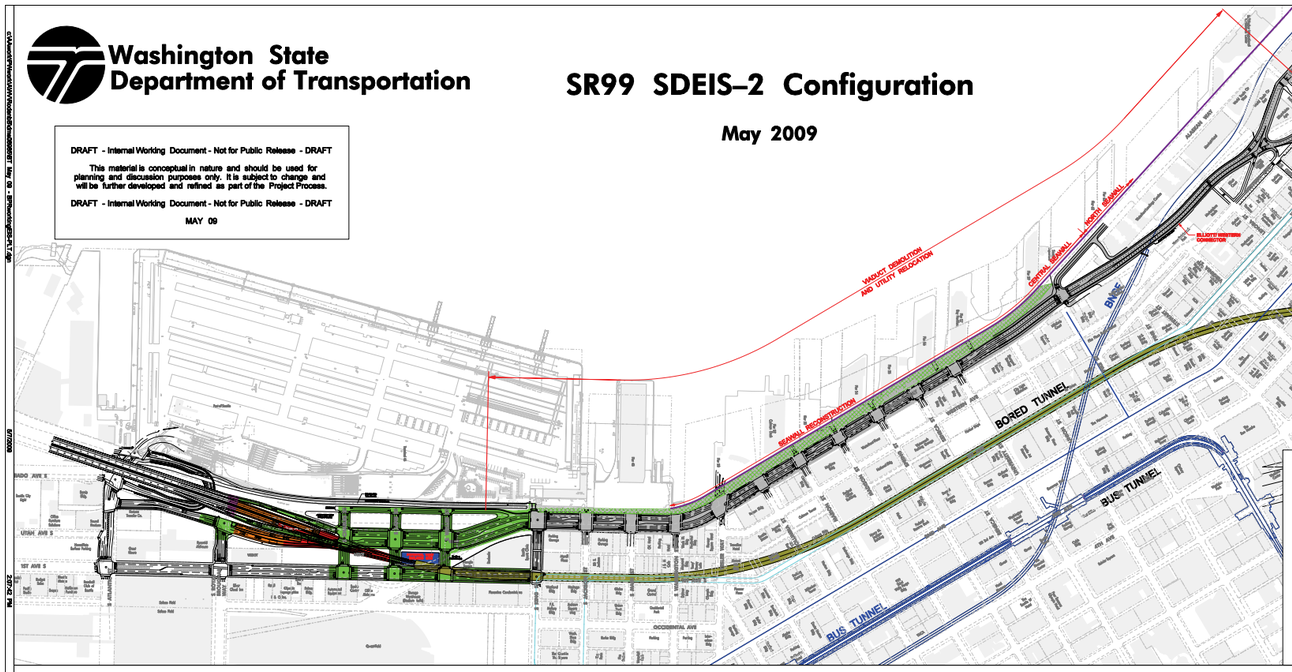
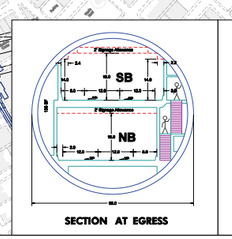
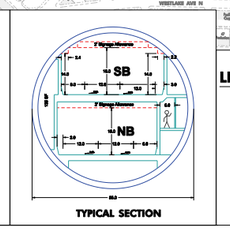
MAY 09





SECTION AT EGRESS



TYPICAL SECTION

LEGEND – GROUP 1

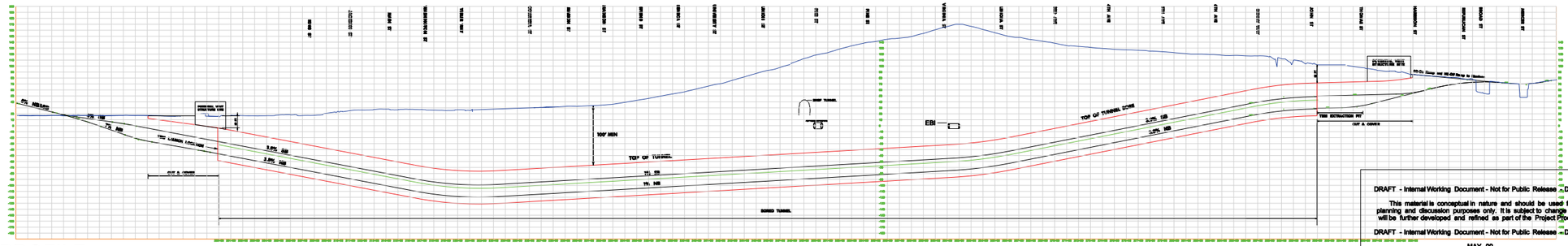
- POTENTIAL VENT STRUCTURE
- RETAINED FILL
- AT-GRADE
- RETAINED CUT
- CUT & COVER
- BORED TUNNEL
- DECOMMISSION BST
- VACATE BROAD ST

LEGEND – GROUP 2

- ALASKAN WAY SURFACE ST
- MERCER ST W/O 5TH AVE
- ELLIOTT/WESTERN CONNECTOR

LEGEND – GROUP 3

- STREETCAR
- SEAWALL RECONSTRUCTION
- ALASKAN WAY PROMENADE



TUNNEL PROFILE

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Appendix B

Bored Tunnel – South Portal

Support Documentation

Appendix B

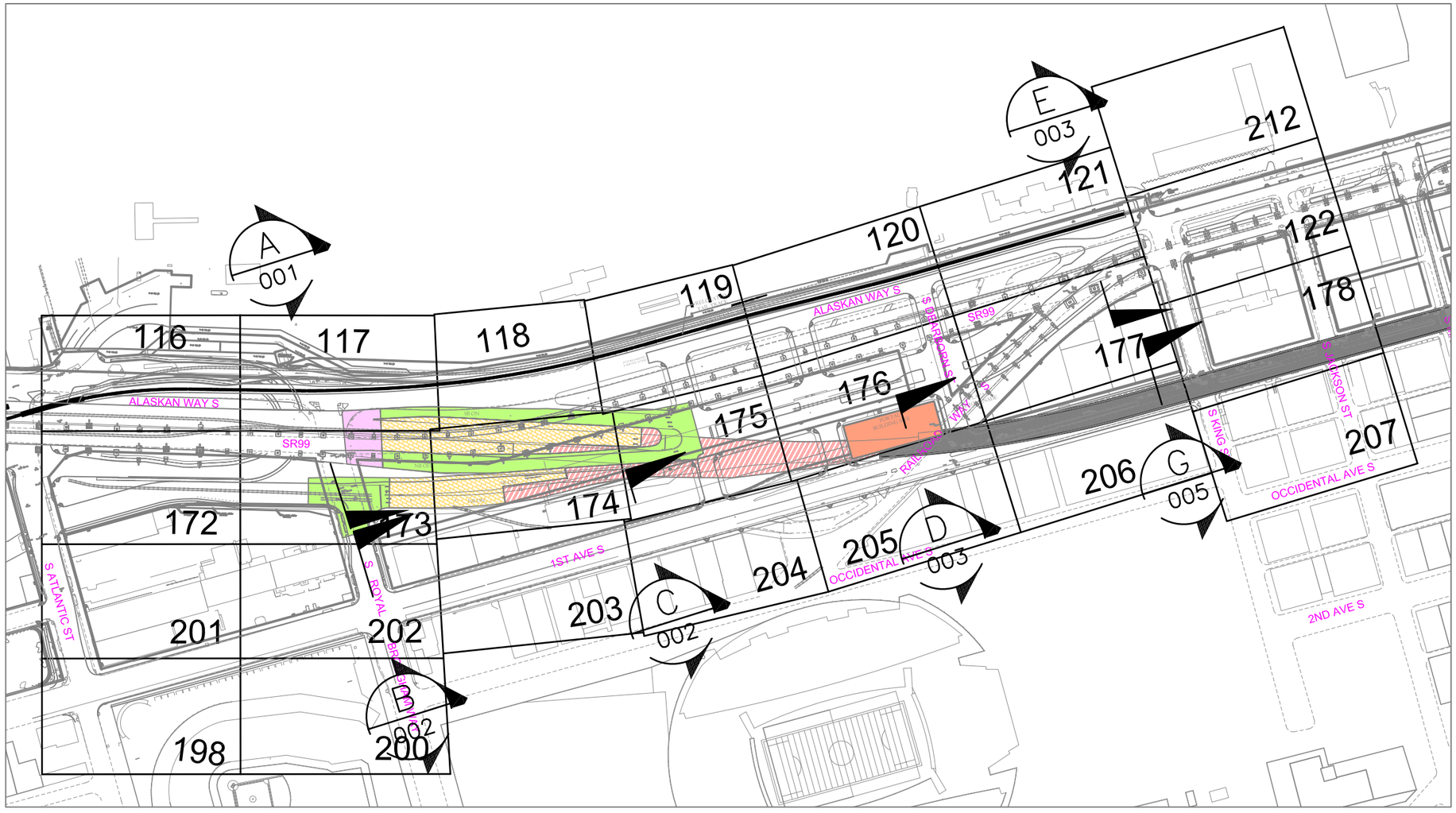
List of Figures

Refer to attached CD for the following information:

- The Alaskan Way Viaduct & Seawall Replacement Program, S Holgate St to S King St Viaduct Replacement Project – Composite Utility Roll Plots, May 19, 2009.

- City of Seattle Franchise Utility Maps.

- SR 99 Bored Tunnel Alternative, South Portal City GIS for Sewer/Drainage/Water Pipes.



SR 99
BORED TUNNEL ALTERNATIVE

EXISTING UTILITY PLANS AND SECTIONS KEY MAP SOUTH PORTAL

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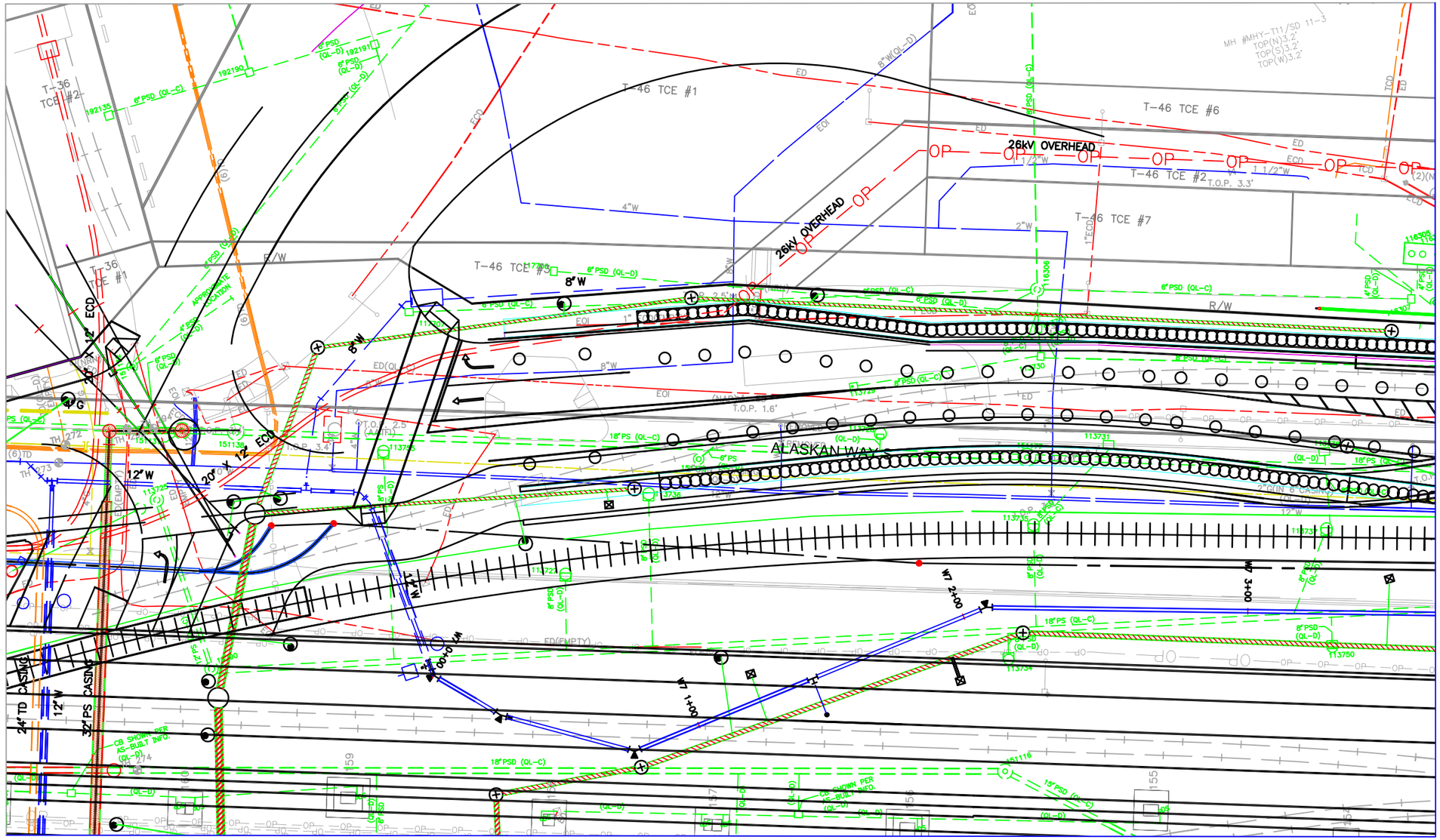
- RETAINED FILL
- AT GRADE
- RETAINED CUT
- CUT AND COVER
- TUNNEL
- ABOVE GRADE STRUCTURE

SHEET 001S

300 150 0 300

SCALE IN FEET

JUNE 1, 2009



SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY PLANS

DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

THIS MATERIAL IS CONCEPTUAL IN NATURE AND SHOULD BE USED FOR PLANNING AND DISCUSSION PURPOSES ONLY. IT IS SUBJECT TO CHANGE AND WILL BE FURTHER DEVELOPED AND REFINED AS PART OF THE PROJECT PROCESS

DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

- ELECTRICAL
- SEWER/STORM
- WATER
- COMMUNICATIONS
- GAS/PETROLEUM
- STEAM
- RAILROAD TRACKS
- OVERHEAD UTILITY
- STAGE 2 STORM
- STAGE 2 SEWER
- RETAINED FILL
- AT GRADE
- RETAINED CUT
- CUT AND COVER
- TUNNEL
- ABOVE GRADE STRUCTURE

SHEET 116

40 20 0 40

SCALE IN FEET

JUNE 1, 2009

SR 99
BORED TUNNEL ALTERNATIVE

EXISTING UTILITY PLANS

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- STAGE 2 SEWER
- RETAINED FILL
- AT GRADE
- RETAINED CUT
- CUT AND COVER
- TUNNEL
- ABOVE GRADE STRUCTURE

SHEET 117

40 20 0 40

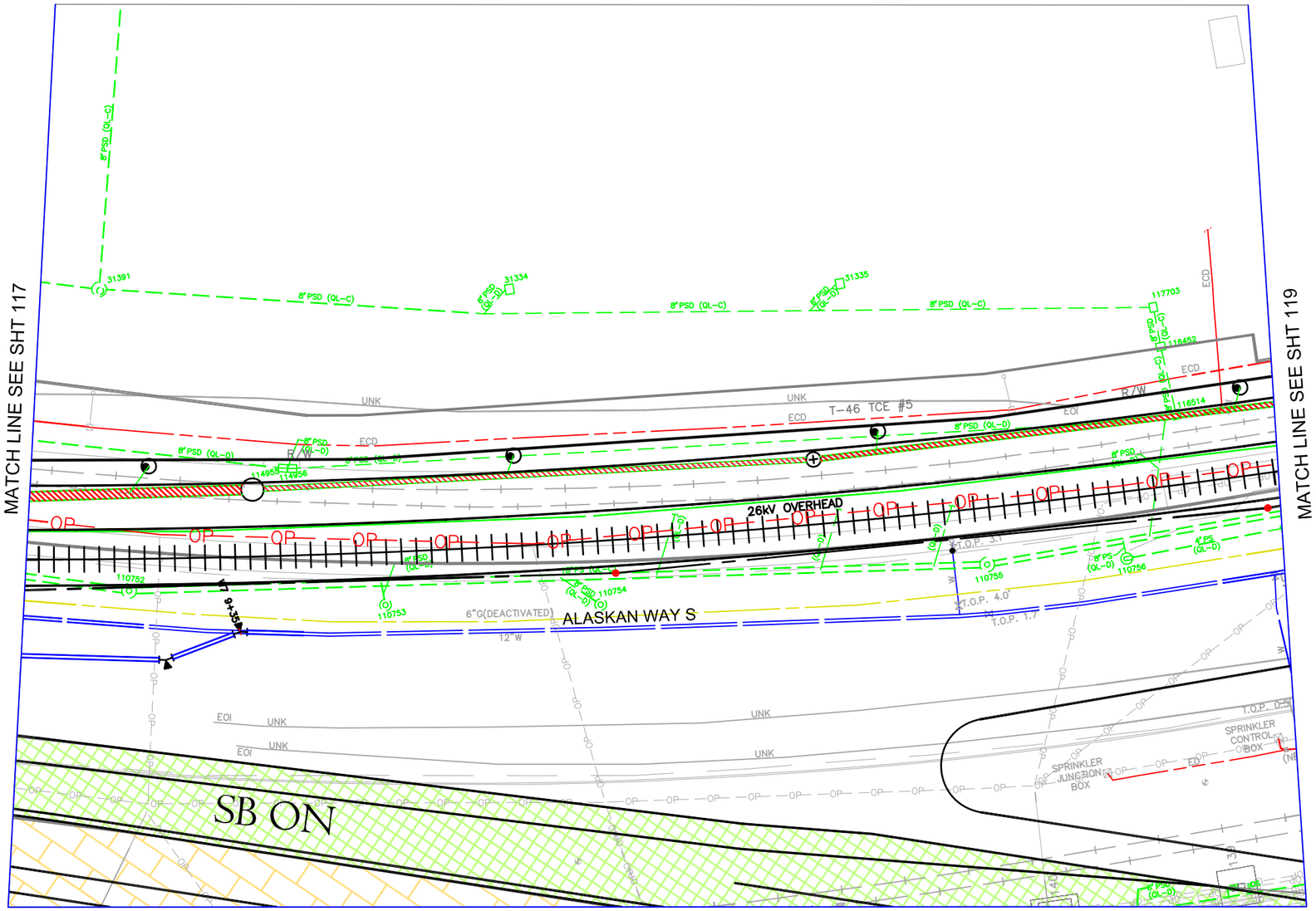
SCALE IN FEET

JUNE 1, 2009

MATCH LINE SEE SHT 116

MATCH LINE SEE SHT 118

MATCH LINE SEE SHT 173



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- CUT AND COVER
- TUNNEL
- ABOVE GRADE STRUCTURE

SHEET 118

40 20 0 40

SCALE IN FEET

JUNE 1, 2009

SR 99
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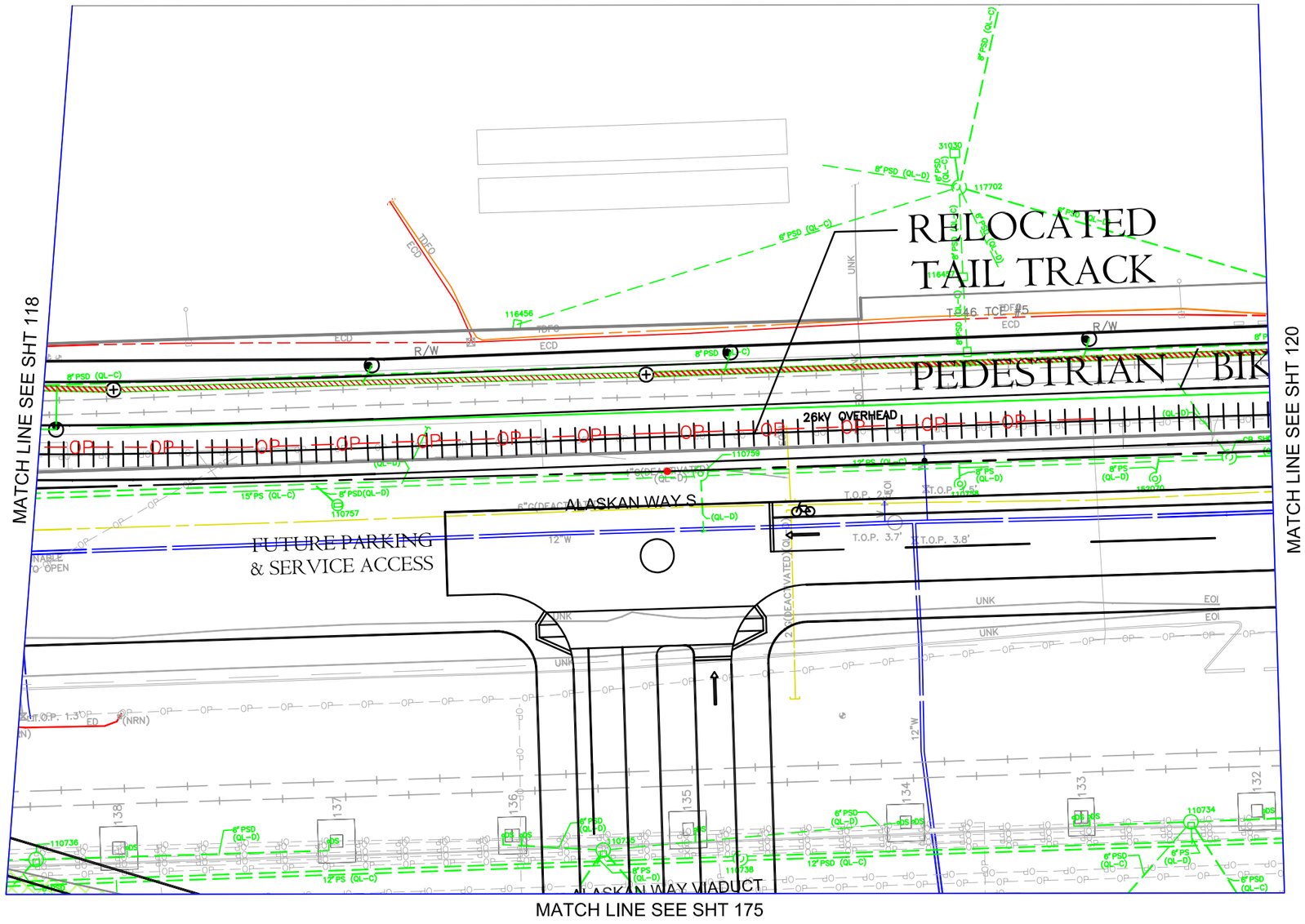

SHEET 119

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SCALE IN FEET

JUNE 1, 2009

SR 99
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EXISTING UTILITY PLANS

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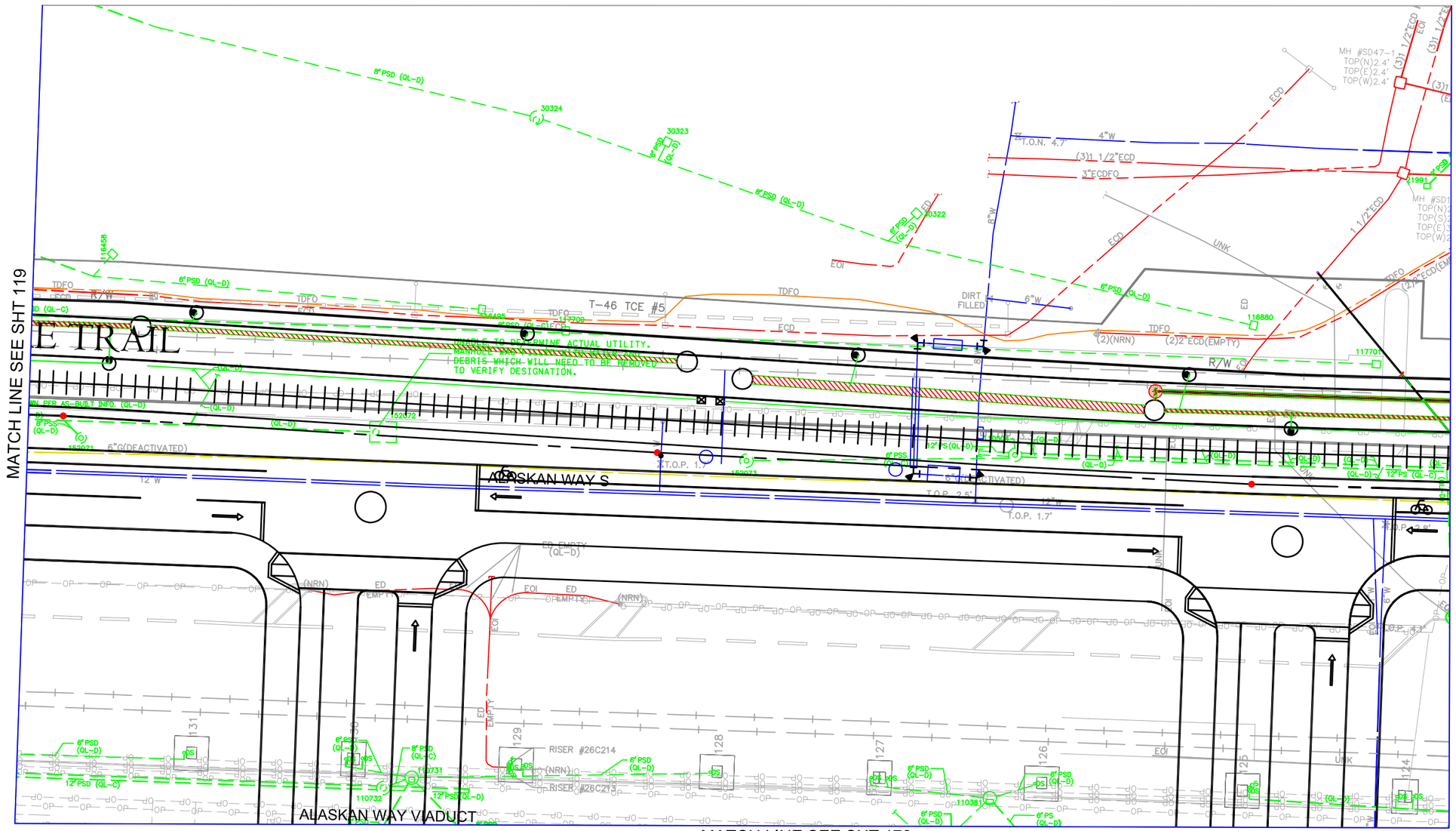
- RETAINED FILL
- AT GRADE
- RETAINED CUT
- CUT AND COVER
- TUNNEL
- ABOVE GRADE STRUCTURE

SHEET 120



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SCALE IN FEET

JUNE 1, 2009

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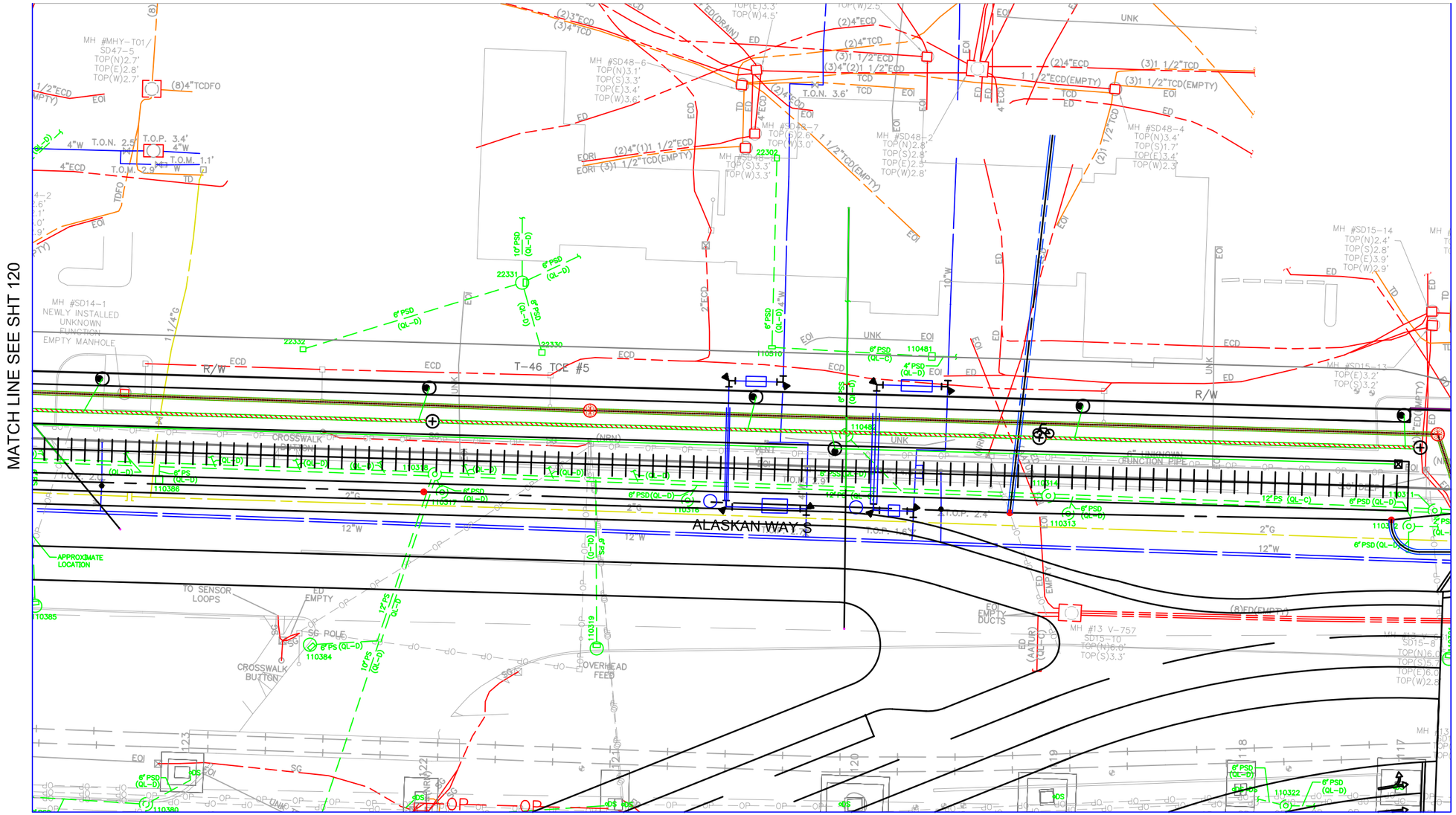

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SHEET 121

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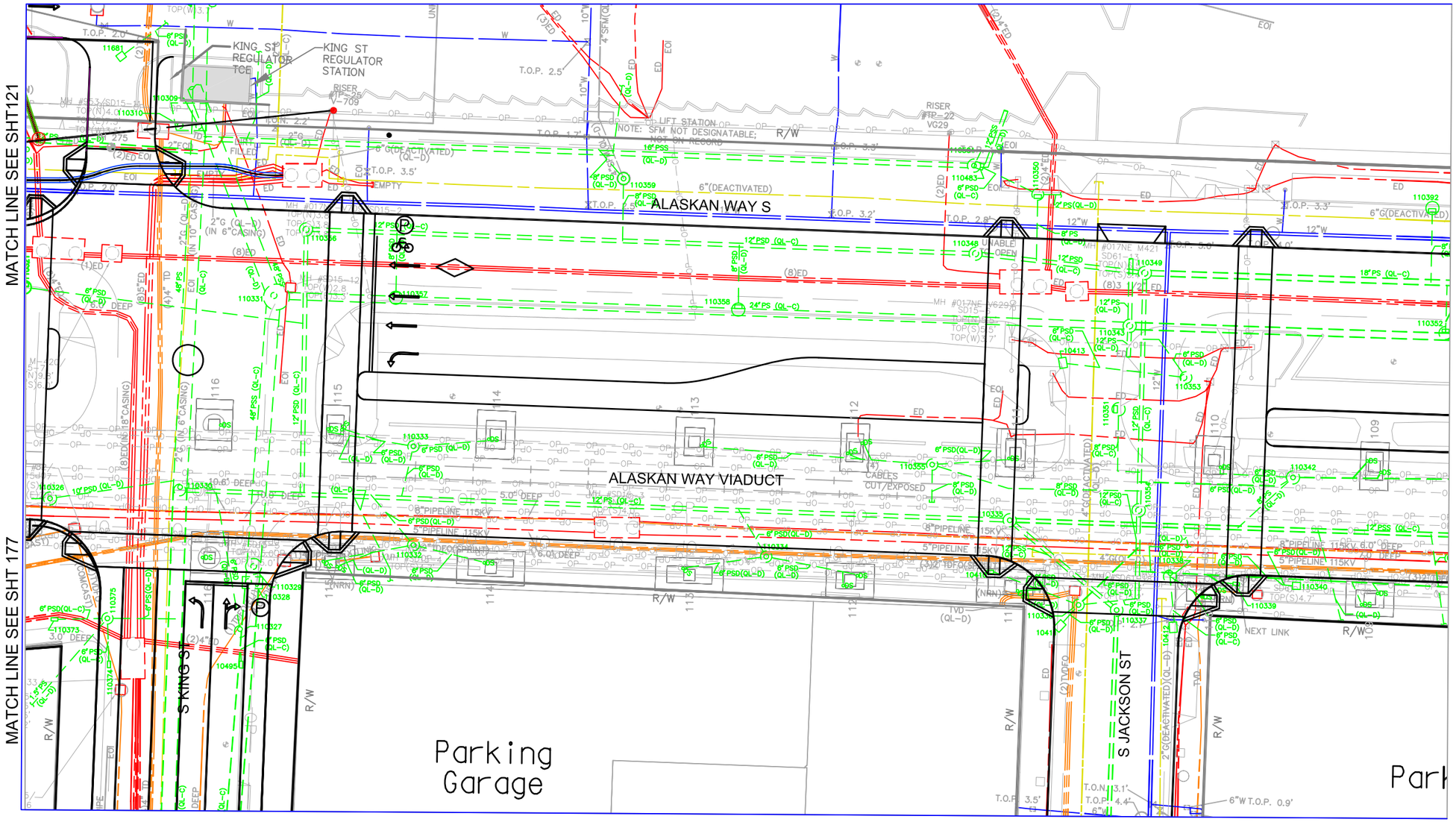
SCALE IN FEET

JUNE 1, 2009

MATCH LINE SEE SHT 212



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- STAGE 2 SEWER
- RETAINED FILL
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- CUT AND COVER
- TUNNEL
- ABOVE GRADE STRUCTURE

SHEET 122

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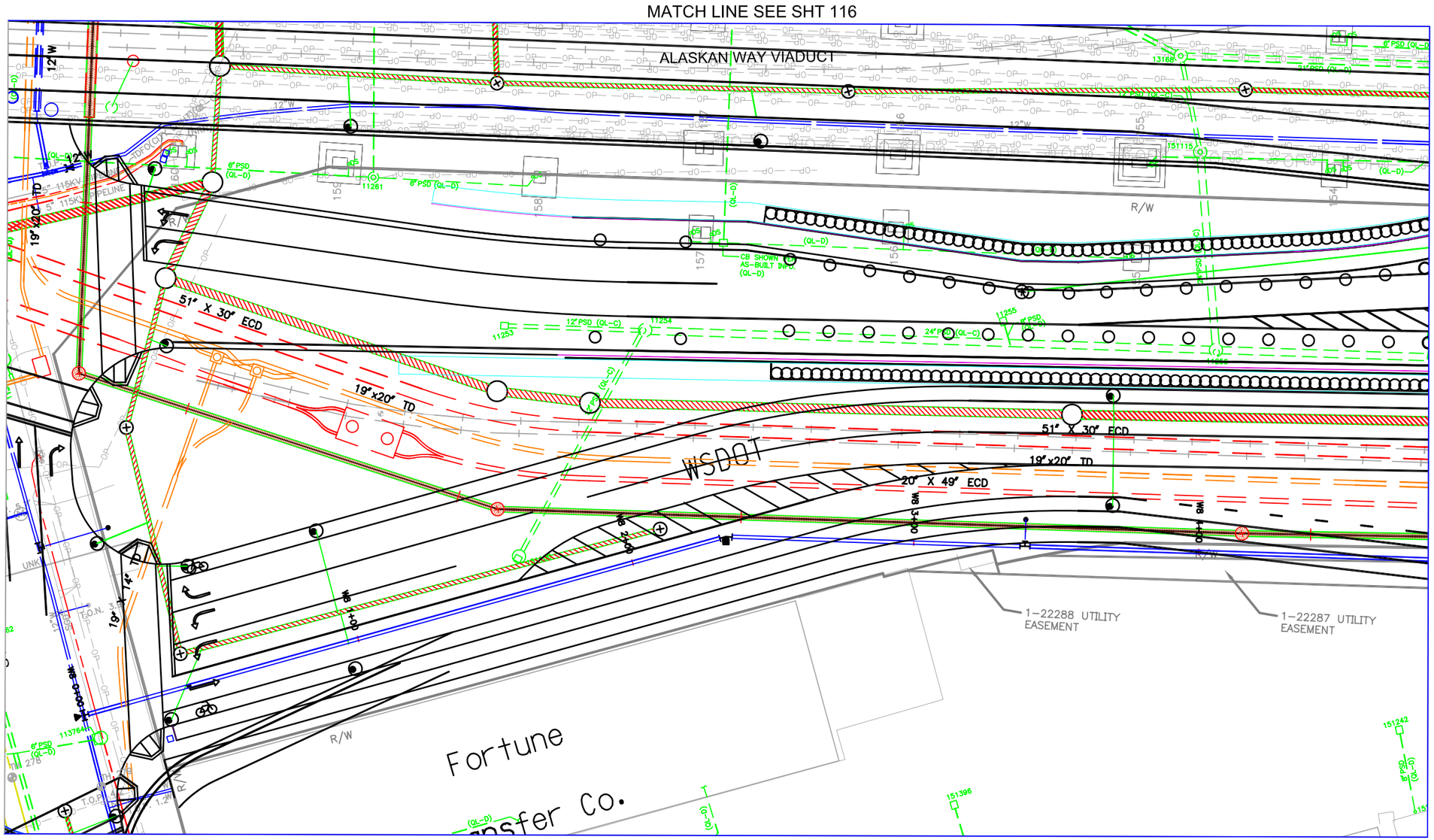
SCALE IN FEET

JUNE 1, 2009



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- ABOVE GRADE STRUCTURE

SHEET 172

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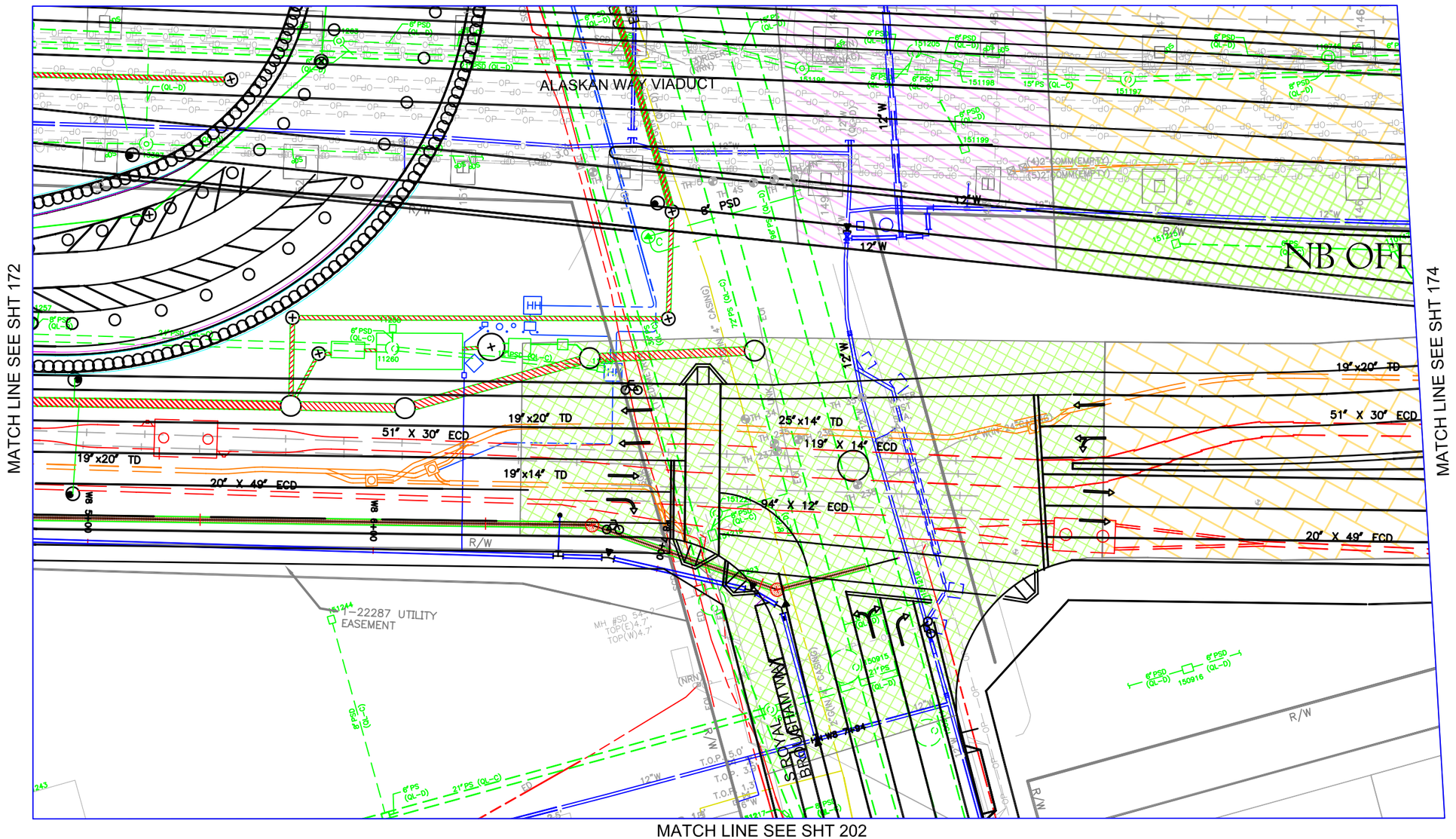
SCALE IN FEET

JUNE 1, 2009

MATCH LINE SEE SHT 117



MATCH LINE SEE SHT 202

SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY PLANS

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- ABOVE GRADE STRUCTURE

SHEET 173

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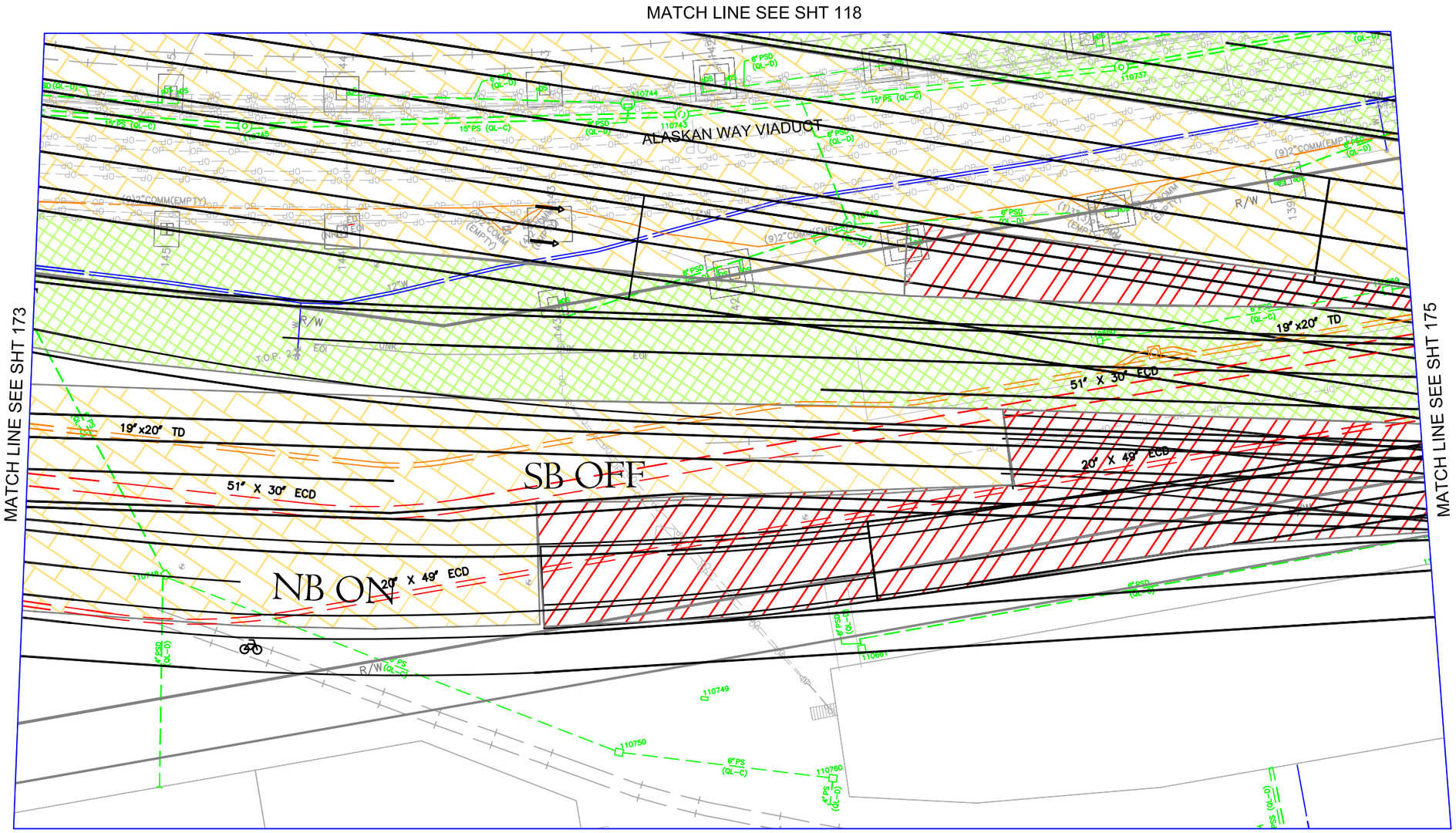
SCALE IN FEET

JUNE 1, 2009



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- ABOVE GRADE STRUCTURE

SHEET 174

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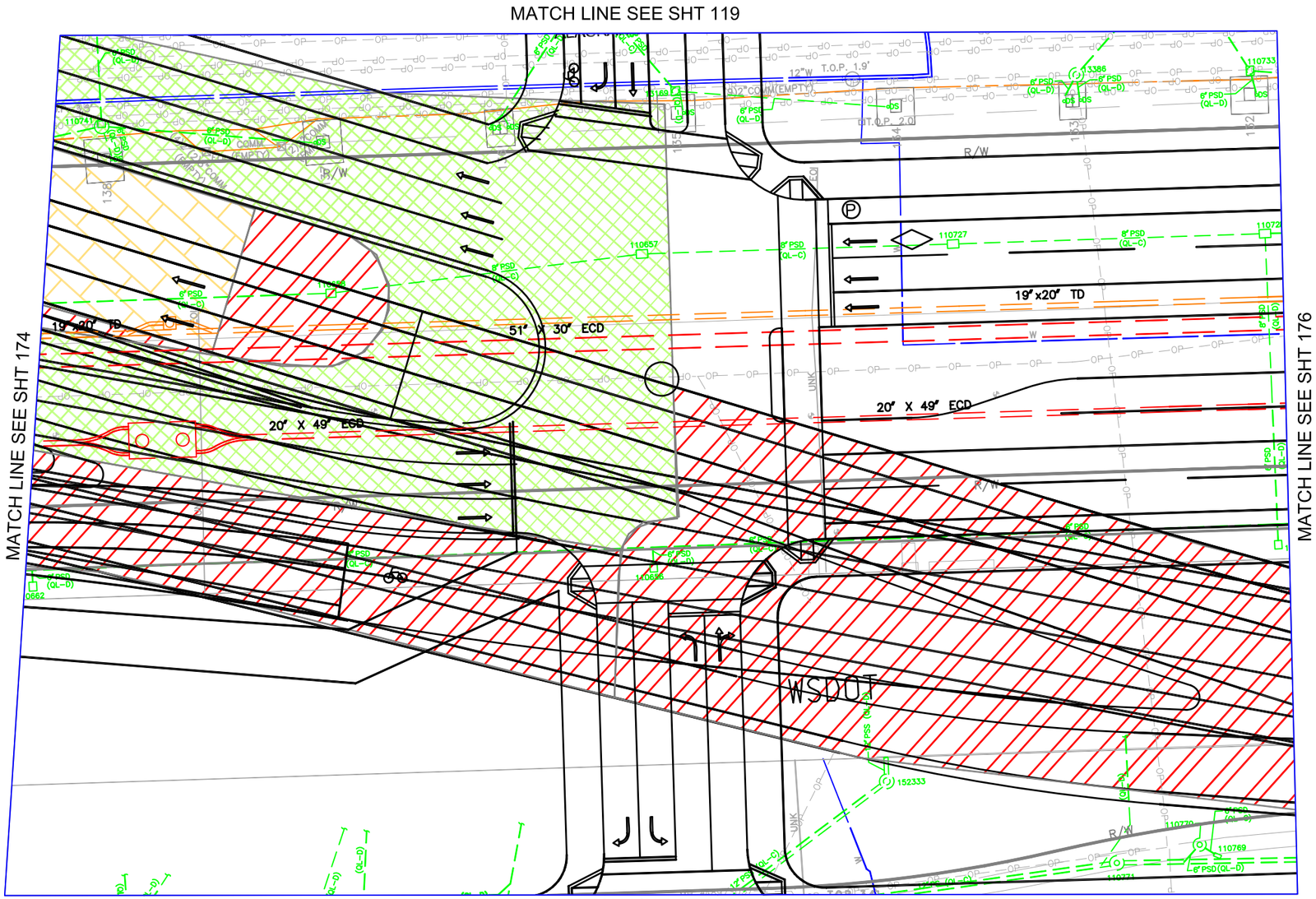
SCALE IN FEET

JUNE 1, 2009



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- ABOVE GRADE STRUCTURE

SHEET 175

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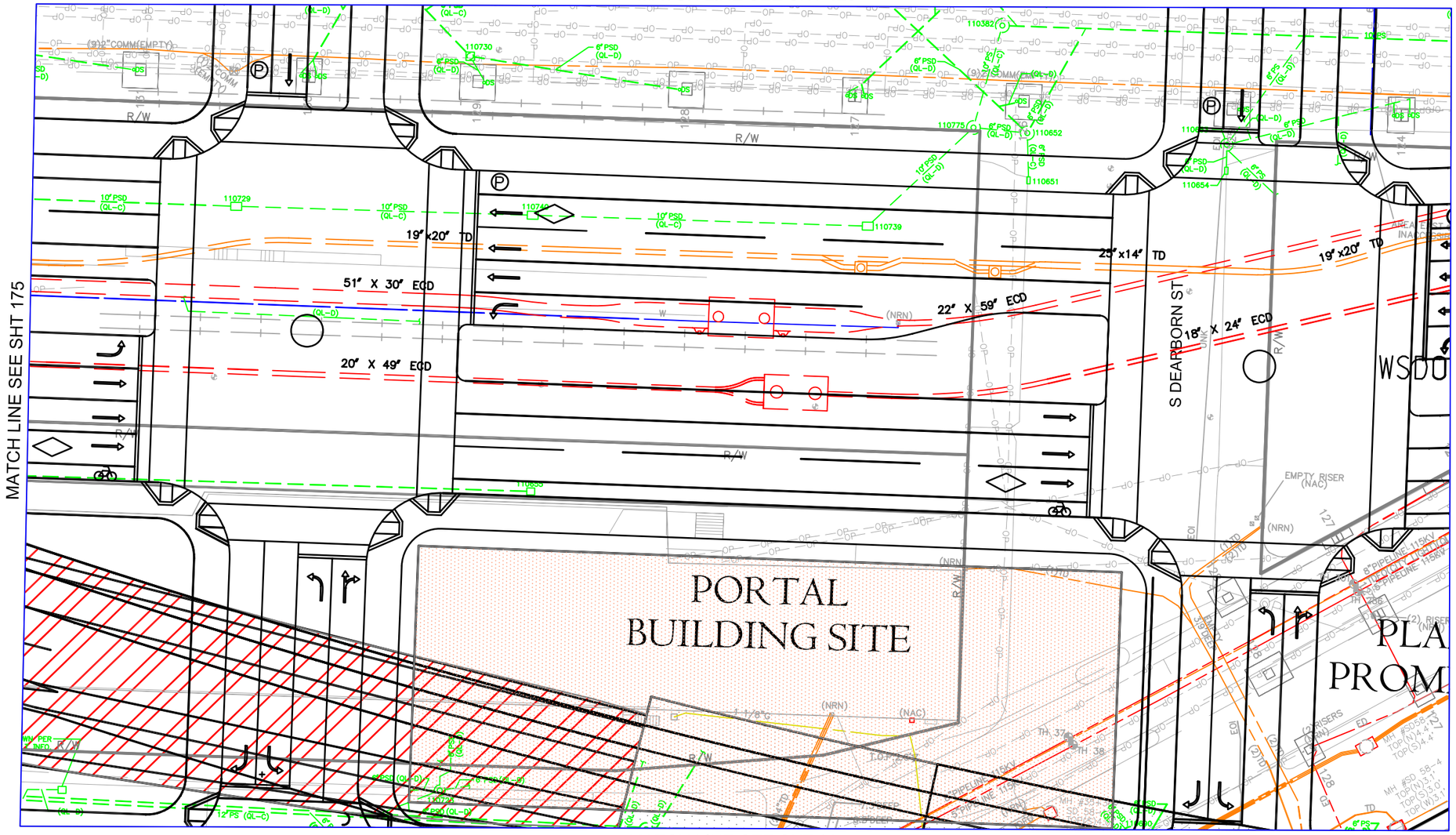
SCALE IN FEET

JUNE 1, 2009

MATCH LINE SEE SHT 120



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SR 99
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- STAGE 2 SEWER
- RETAINED FILL
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- RETAINED CUT
- CUT AND COVER
- TUNNEL
- ABOVE GRADE STRUCTURE

SHEET 176

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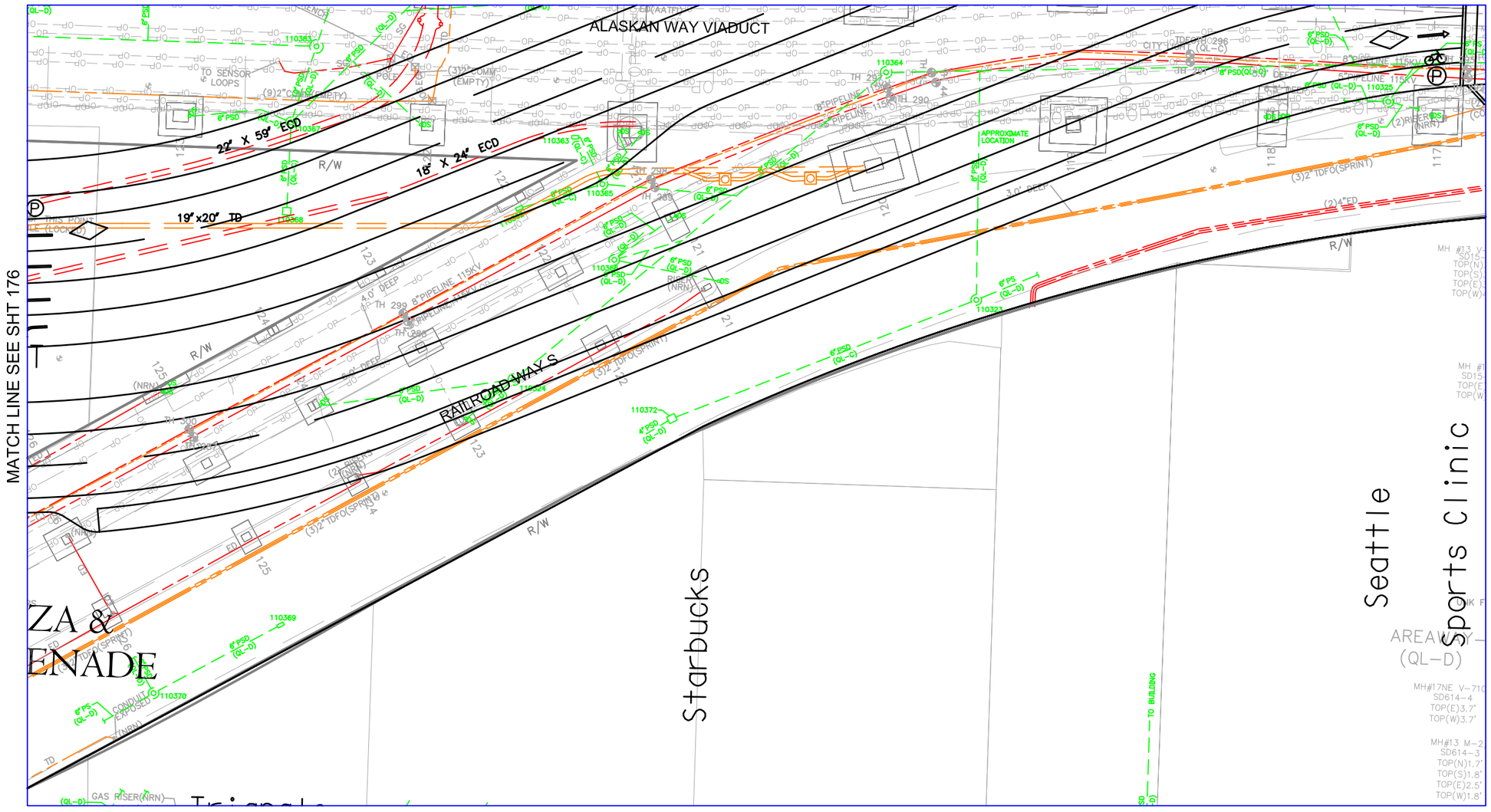
SCALE IN FEET

JUNE 1, 2009

MATCH LINE SEE SHT 121



MATCH LINE SEE SHT 176

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MATCH LINE SEE SHT 178

MATCH LINE SEE SHT 206

SR 99
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- STAGE 2 SEWER
- RETAINED FILL
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- ABOVE GRADE STRUCTURE

SHEET 177

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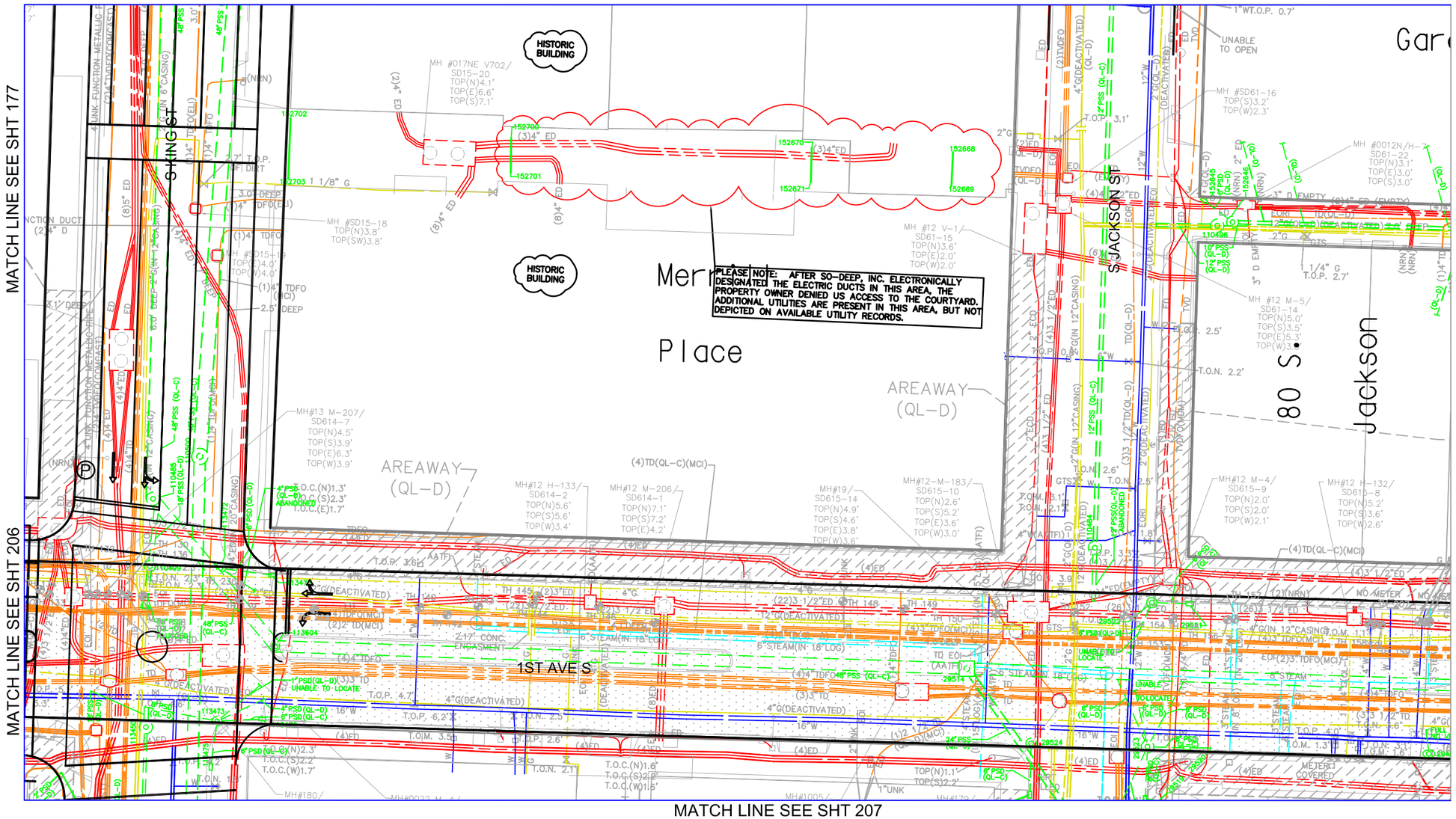
SCALE IN FEET

JUNE 1, 2009

MATCH LINE SEE SHT 122



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SHEET 178

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SCALE IN FEET

JUNE 1, 2009

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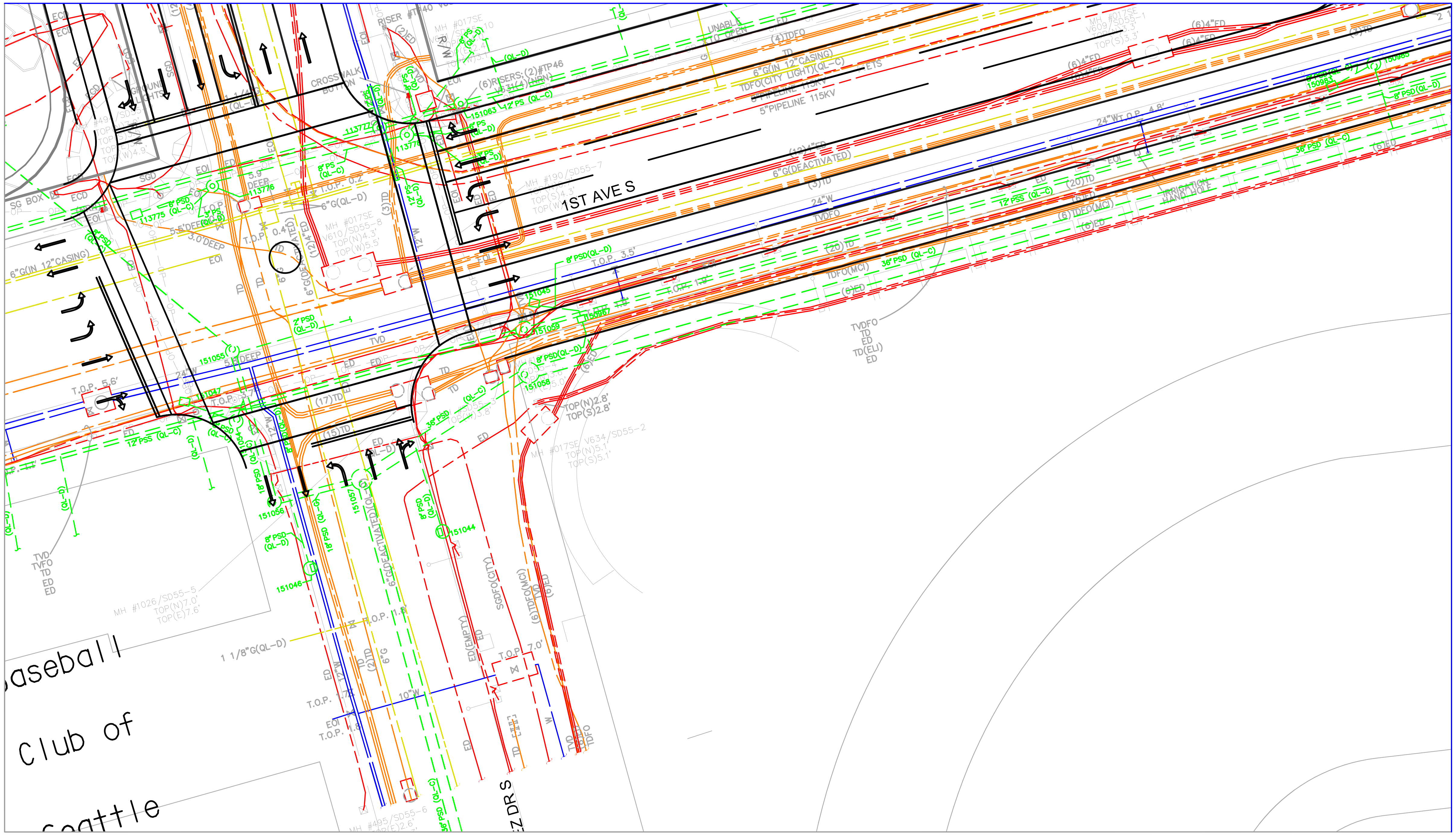

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COMMUNICATIONS
GAS/PETROLEUM
STEAM
RAILROAD TRACKS
OVERHEAD UTILITY
STAGE 2 STORM
STAGE 2 SEWER

RETAINED FILL
AT GRADE
RETAINED CUT
CUT AND COVER
TUNNEL
ABOVE GRADE STRUCTURE

SHEET 198

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SCALE IN FEET

JUNE 1, 2009

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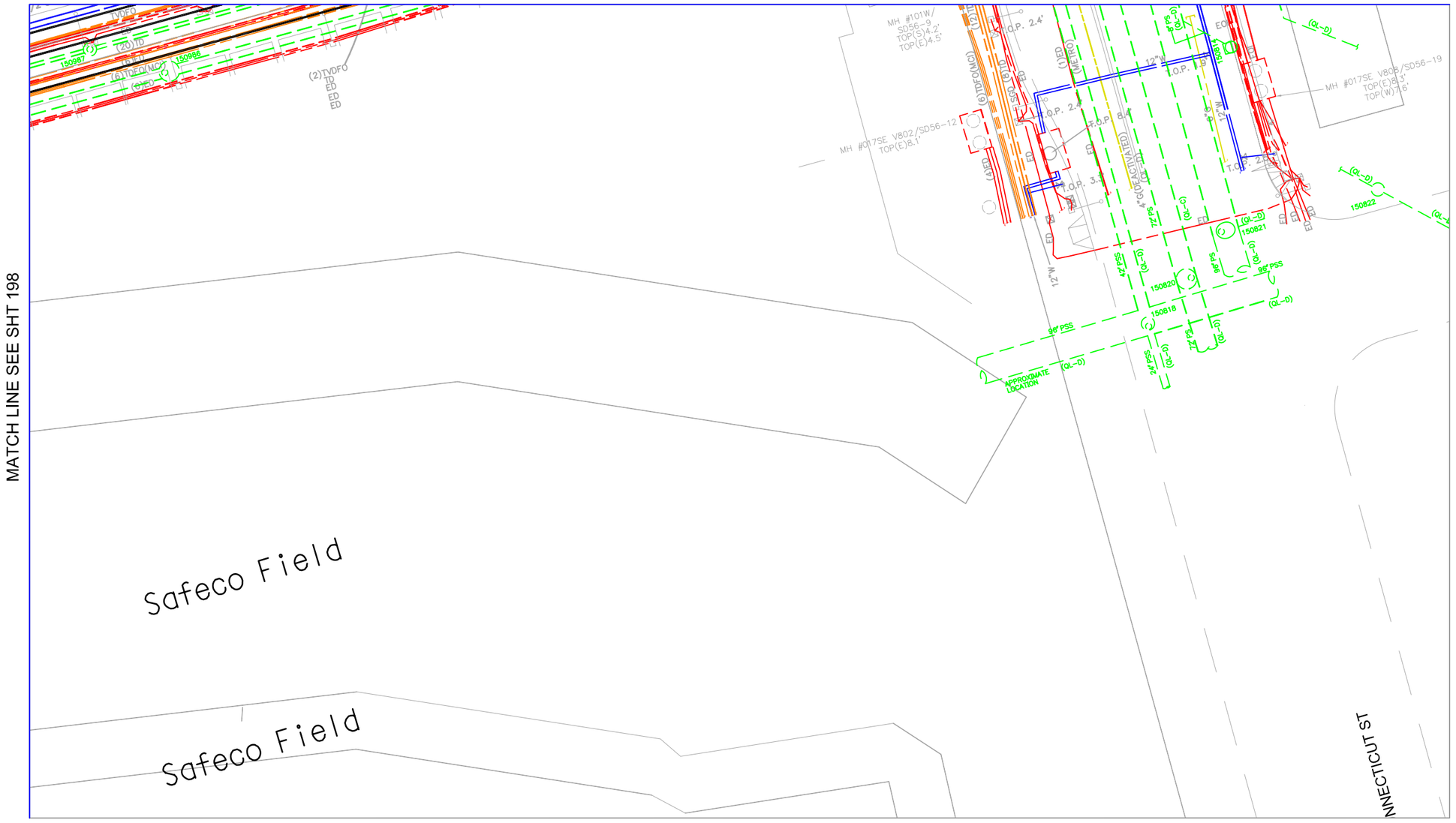

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SHEET 200

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SCALE IN FEET

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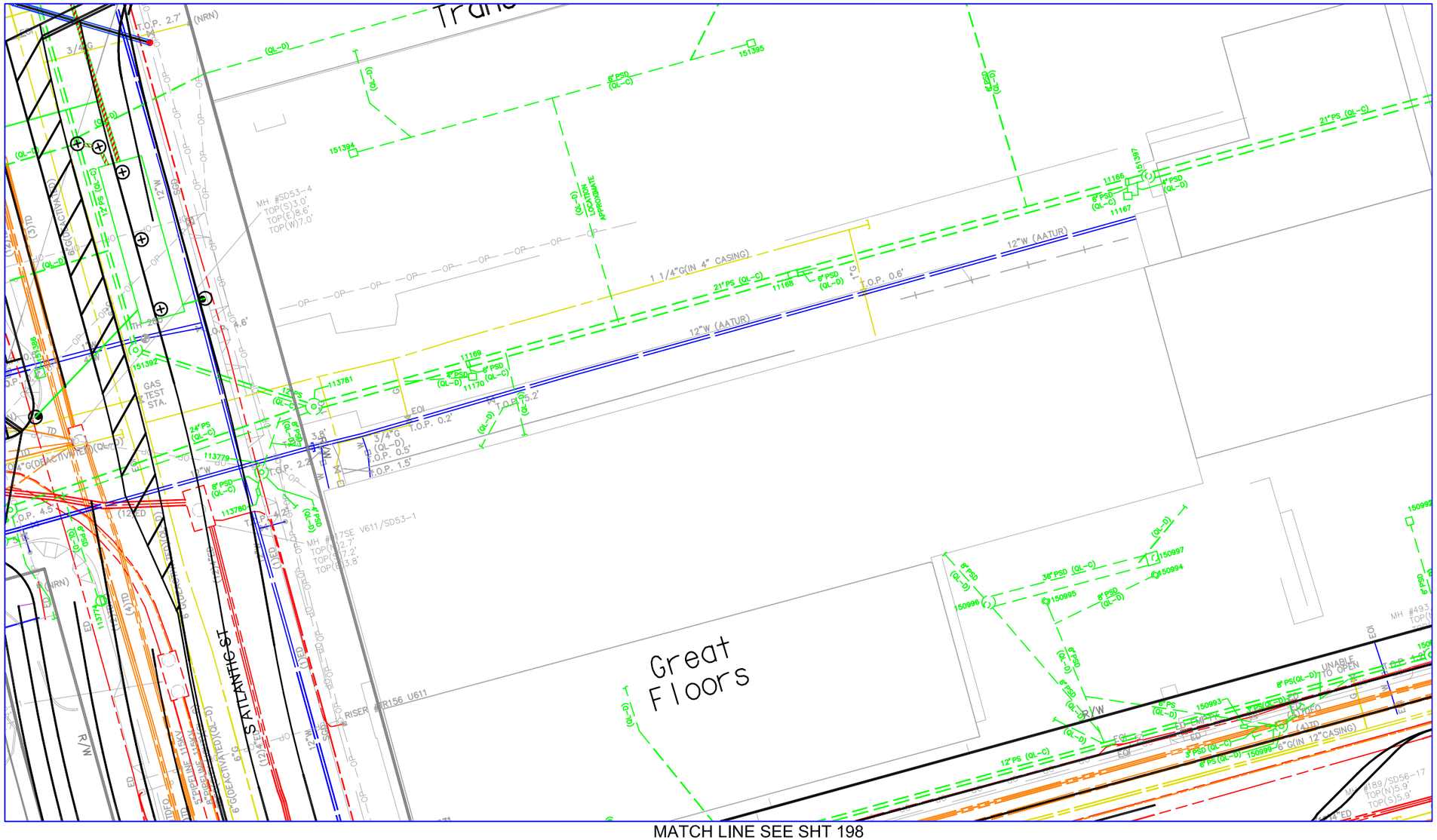
MATCH LINE SEE SHT 172



MATCH LINE SEE SHT 198

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SHEET 201

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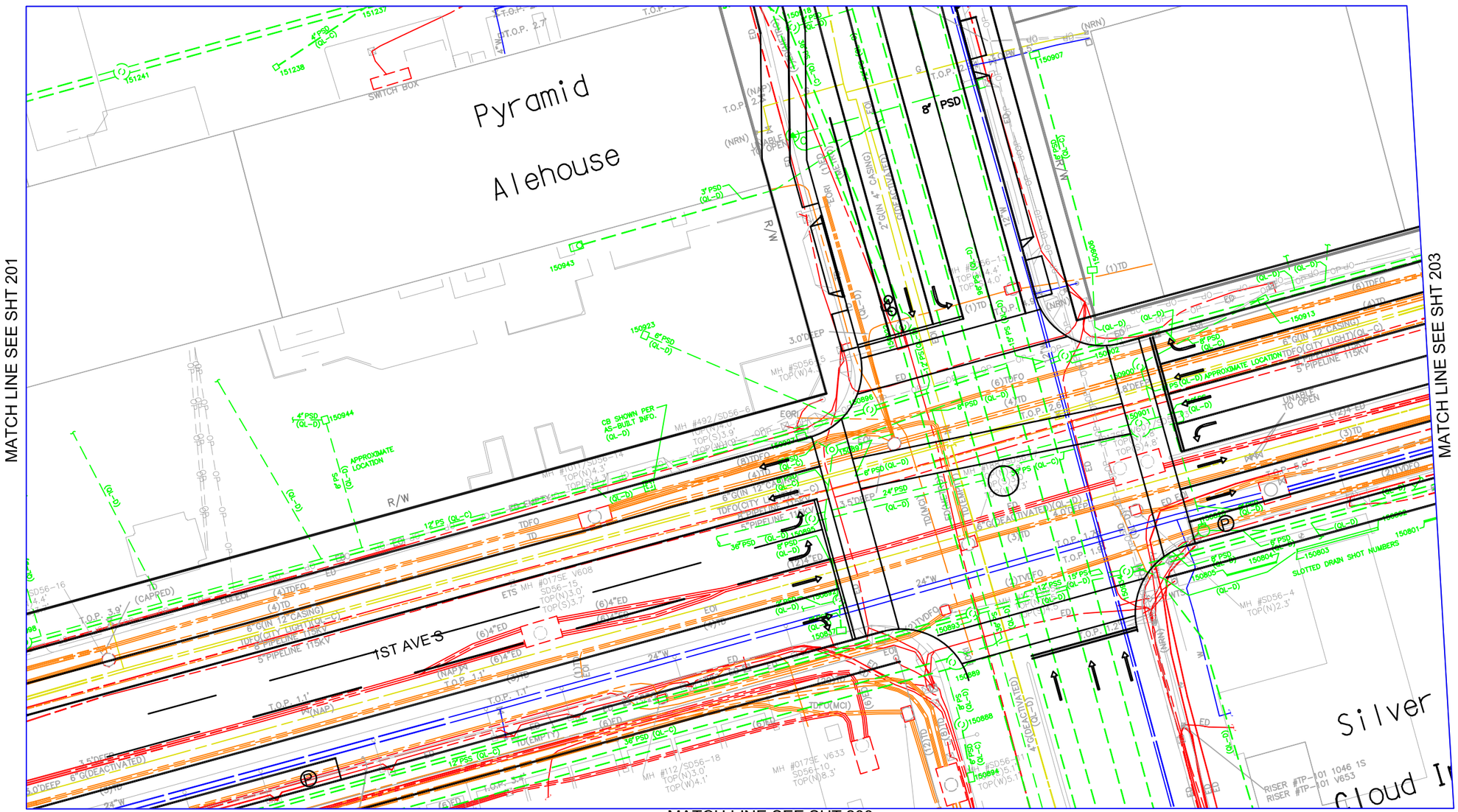
MATCH LINE SEE SHT 173



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SHEET 202

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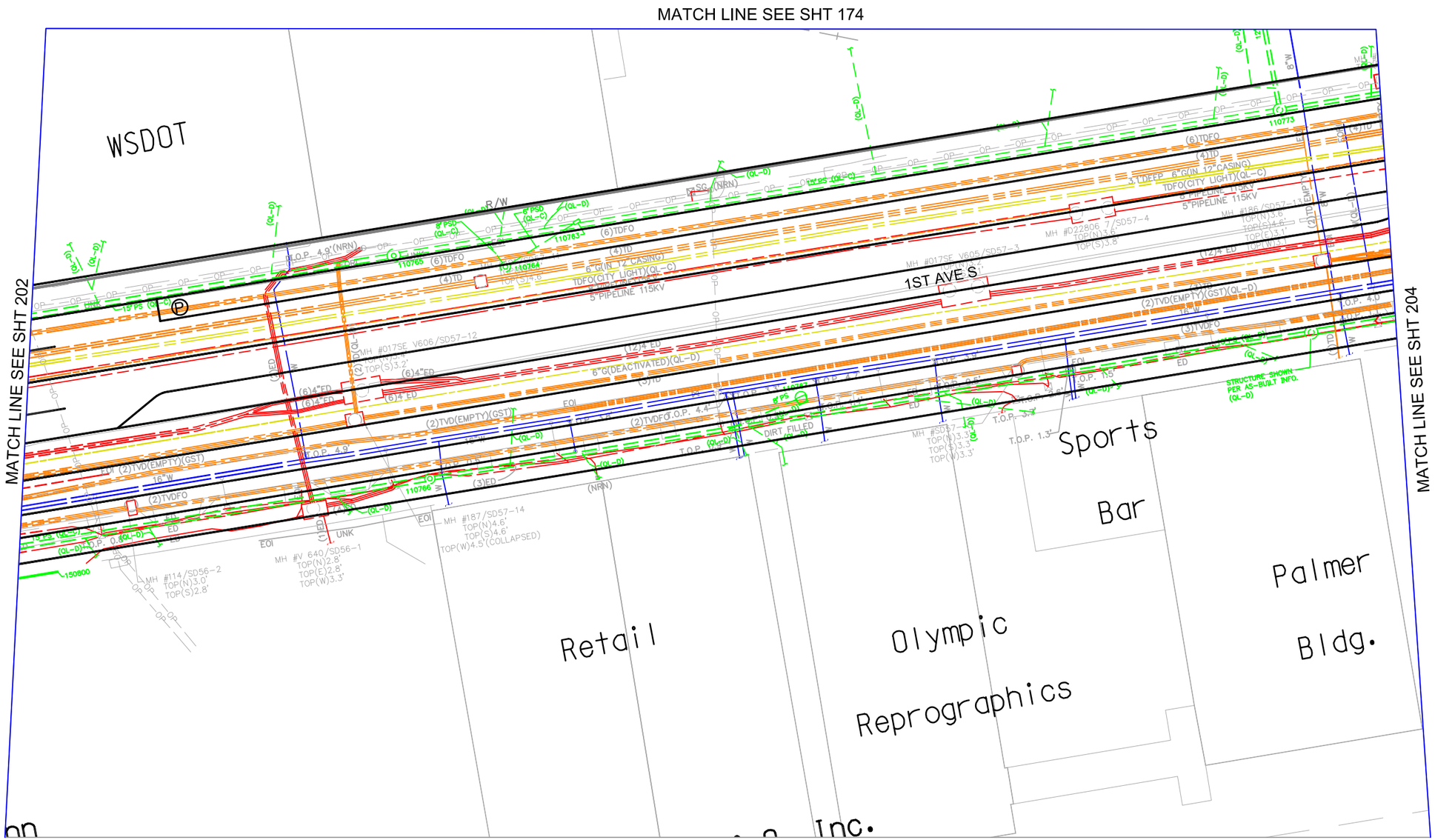

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SHEET 203

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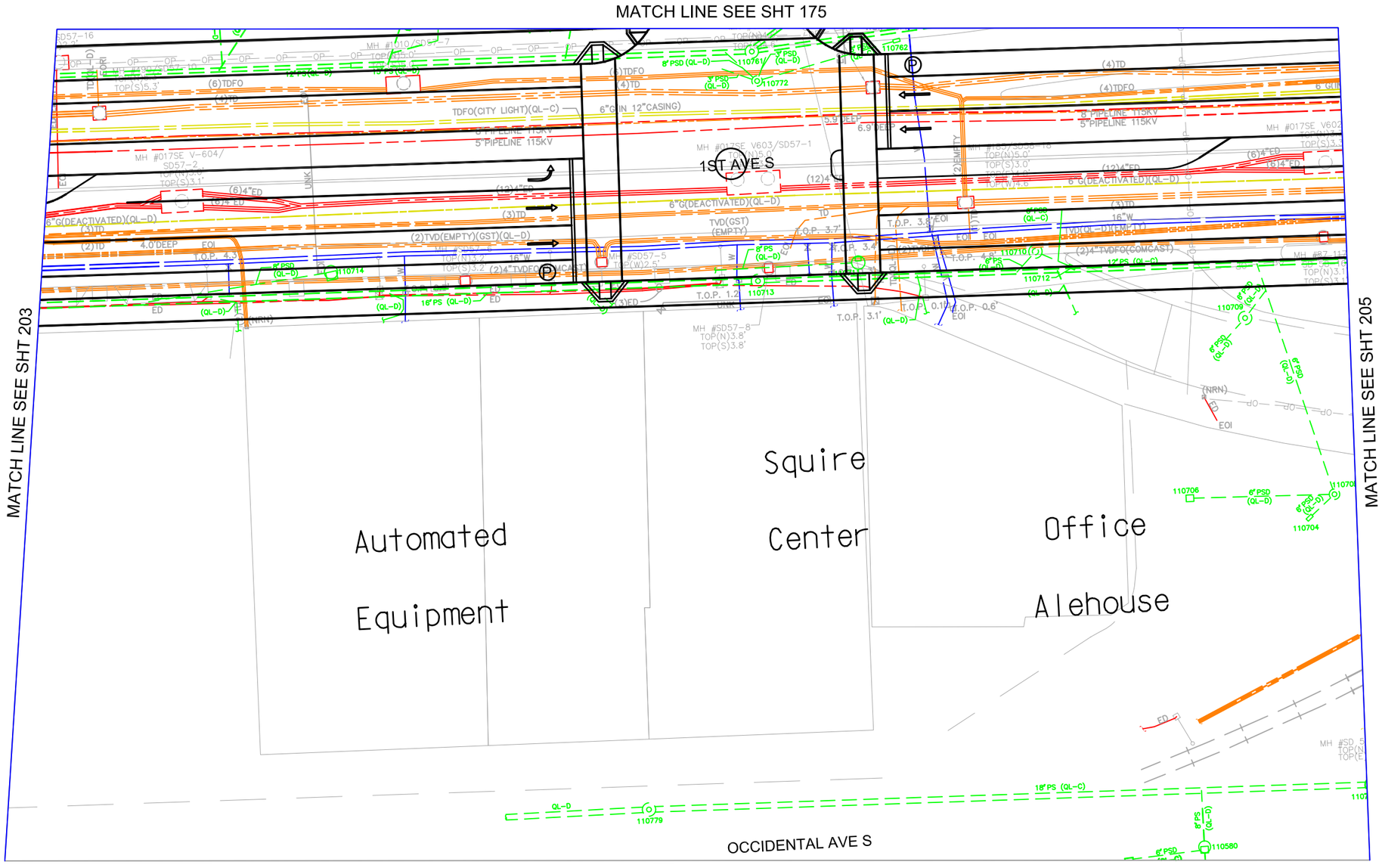

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SHEET 204

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SCALE IN FEET

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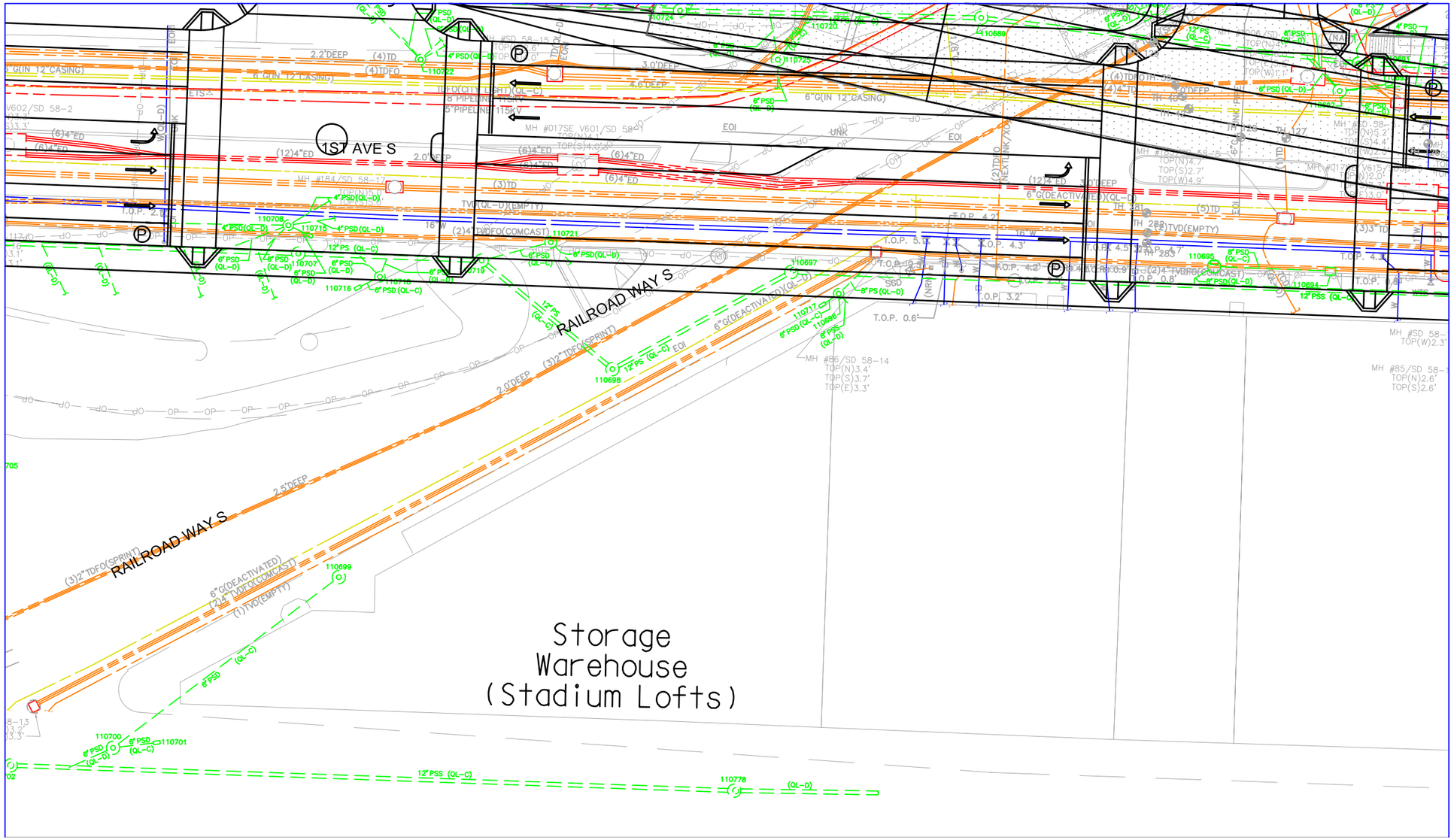
MATCH LINE SEE SHT 176

MATCH LINE SEE SHT 204

MATCH LINE SEE SHT 206



SR 99
BORED TUNNEL ALTERNATIVE

EXISTING UTILITY PLANS

DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

THIS MATERIAL IS CONCEPTUAL IN NATURE AND SHOULD BE USED FOR PLANNING AND DISCUSSION PURPOSES ONLY. IT IS SUBJECT TO CHANGE AND WILL BE FURTHER DEVELOPED AND REFINED AS PART OF THE PROJECT PROCESS

DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

- ELECTRICAL
- SEWER/STORM
- WATER
- COMMUNICATIONS
- GAS/PETROLEUM
- STEAM
- RAILROAD TRACKS
- OVERHEAD UTILITY
- STAGE 2 STORM
- STAGE 2 SEWER
- RETAINED FILL
- AT GRADE
- RETAINED CUT
- CUT AND COVER
- TUNNEL
- ABOVE GRADE STRUCTURE

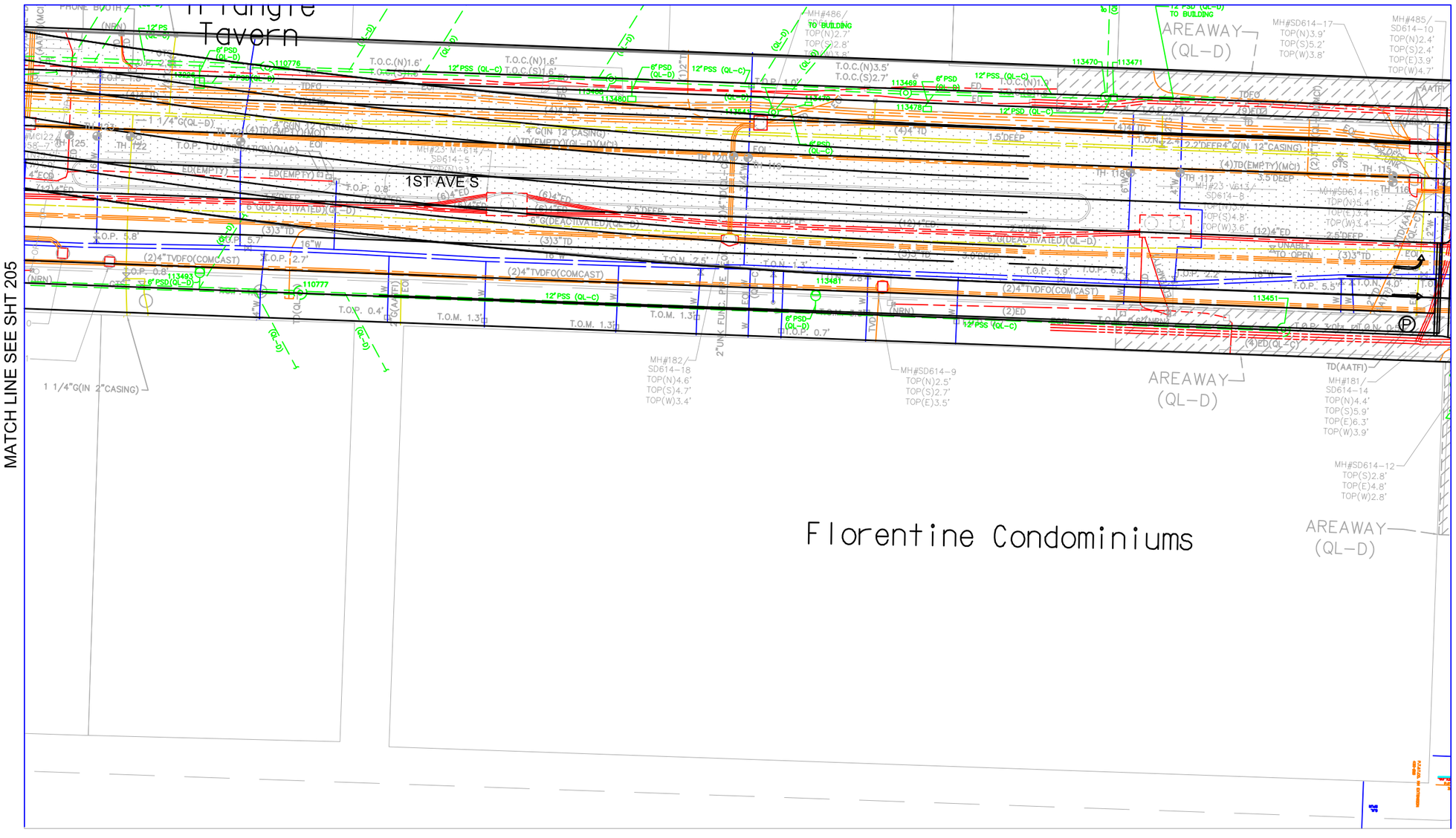
SHEET 205

40 20 0 40

SCALE IN FEET

JUNE 1, 2009

MATCH LINE SEE SHT 177



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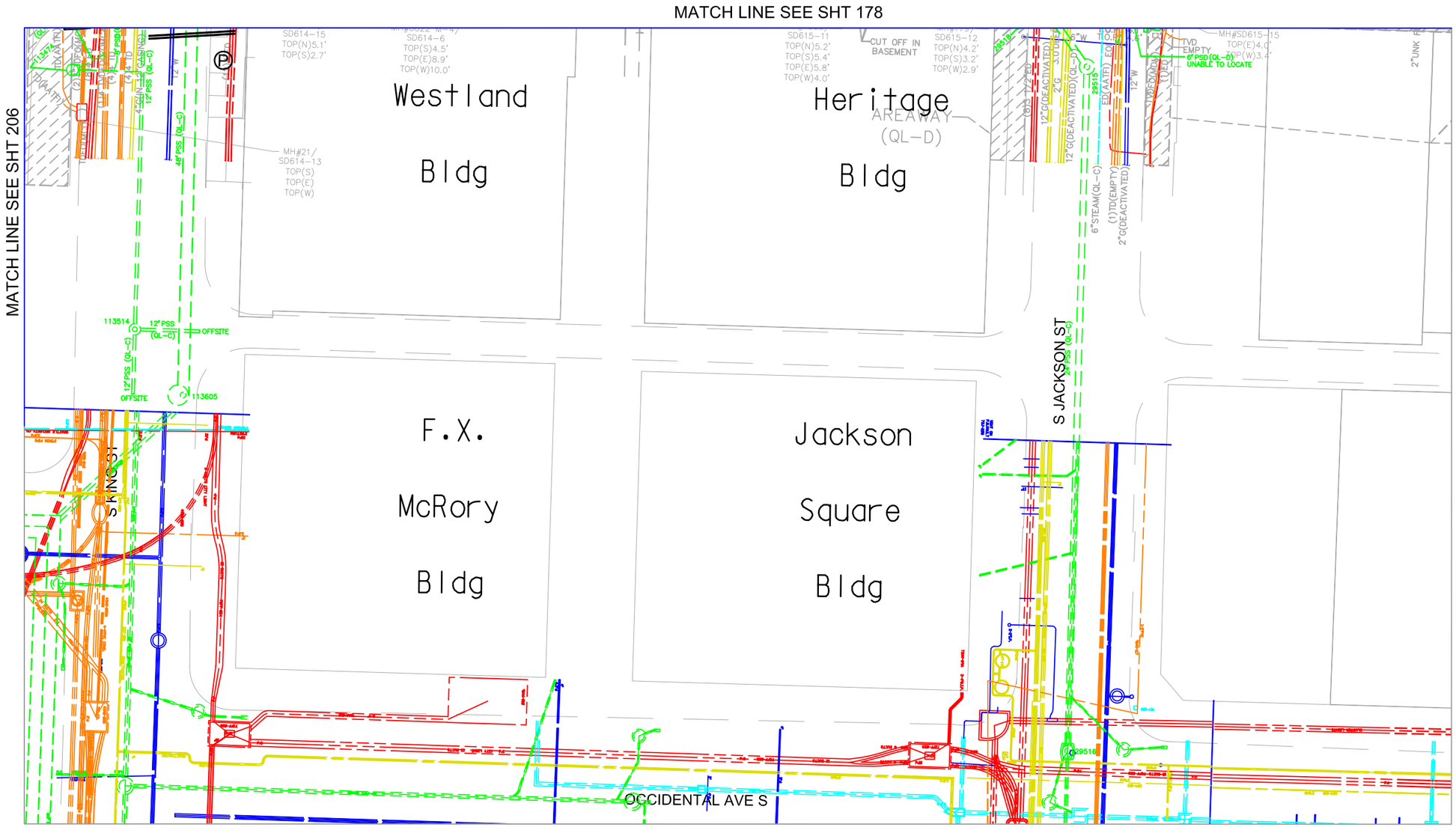
- ABOVE GRADE STRUCTURE

SHEET 206

40 20 0 40

SCALE IN FEET

JUNE 1, 2009



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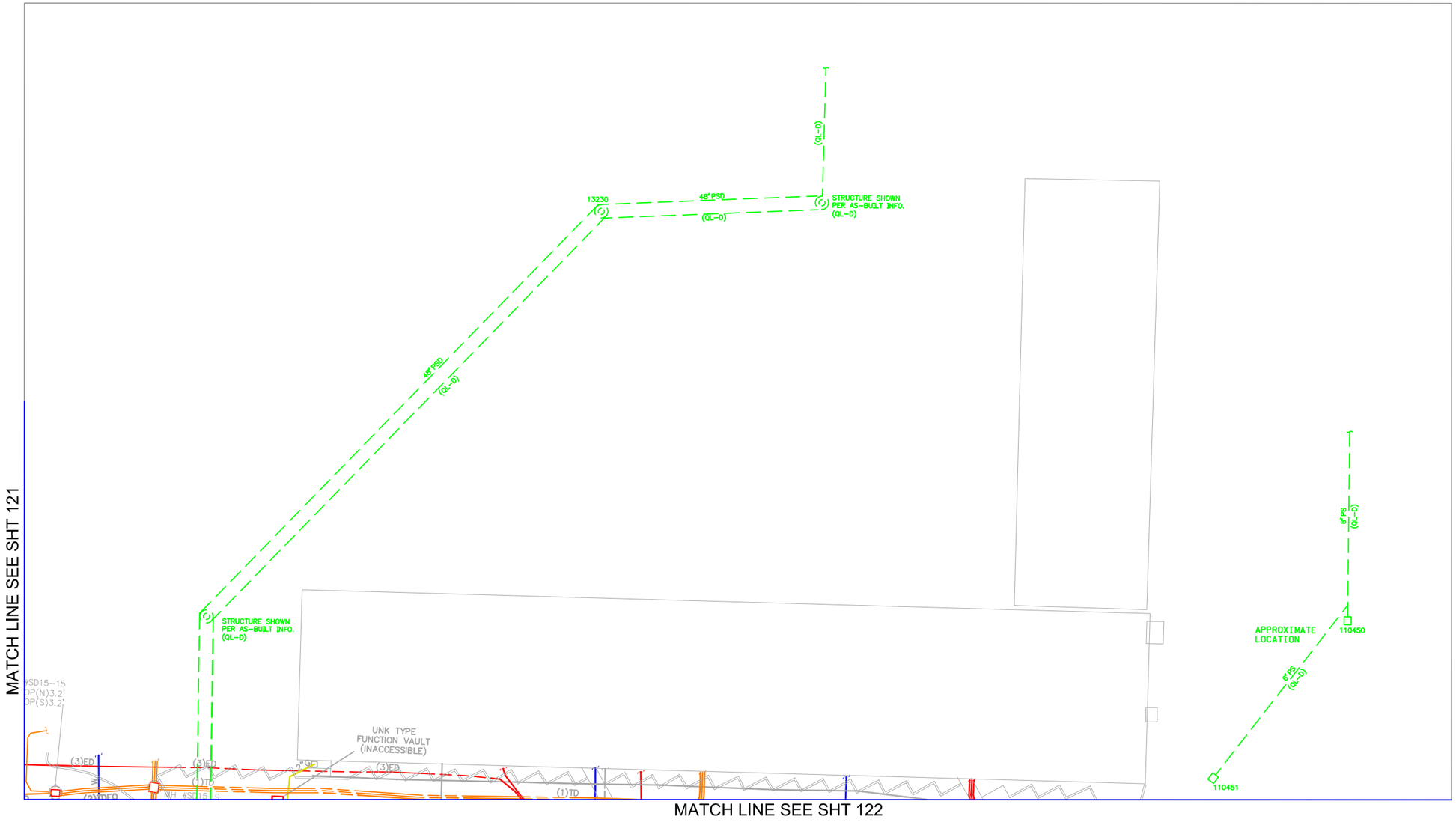
- CUT AND COVER
- TUNNEL
- ABOVE GRADE STRUCTURE

SHEET 207

40 20 0 40

SCALE IN FEET

JUNE 1, 2009



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EXISTING UTILITY PLANS

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- STAGE 2 STORM
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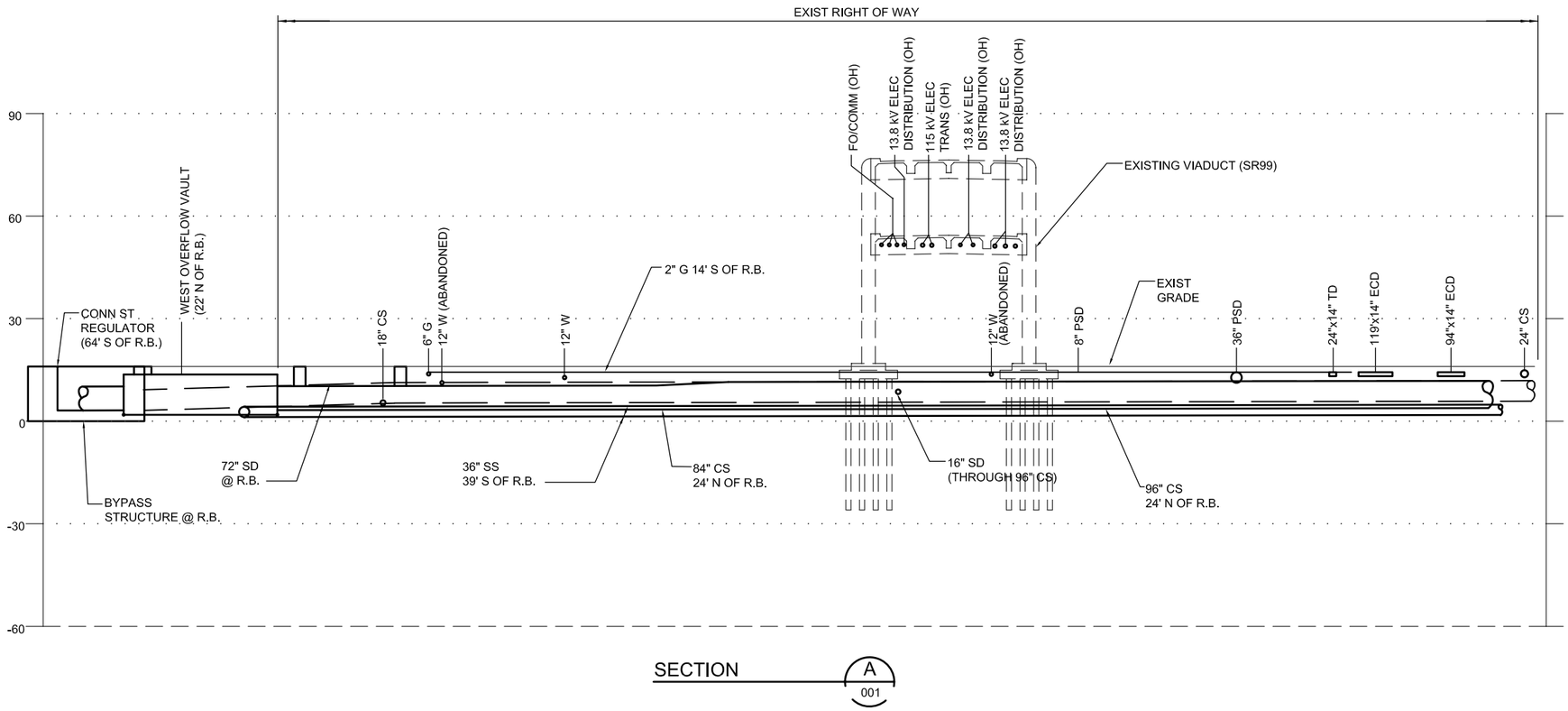
- AT GRADE
- RETAINED CUT
- CUT AND COVER
- TUNNEL
- ABOVE GRADE STRUCTURE

SHEET 212

40 20 0 40

SCALE IN FEET

JUNE 1, 2009



SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS

DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

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SHEET 001

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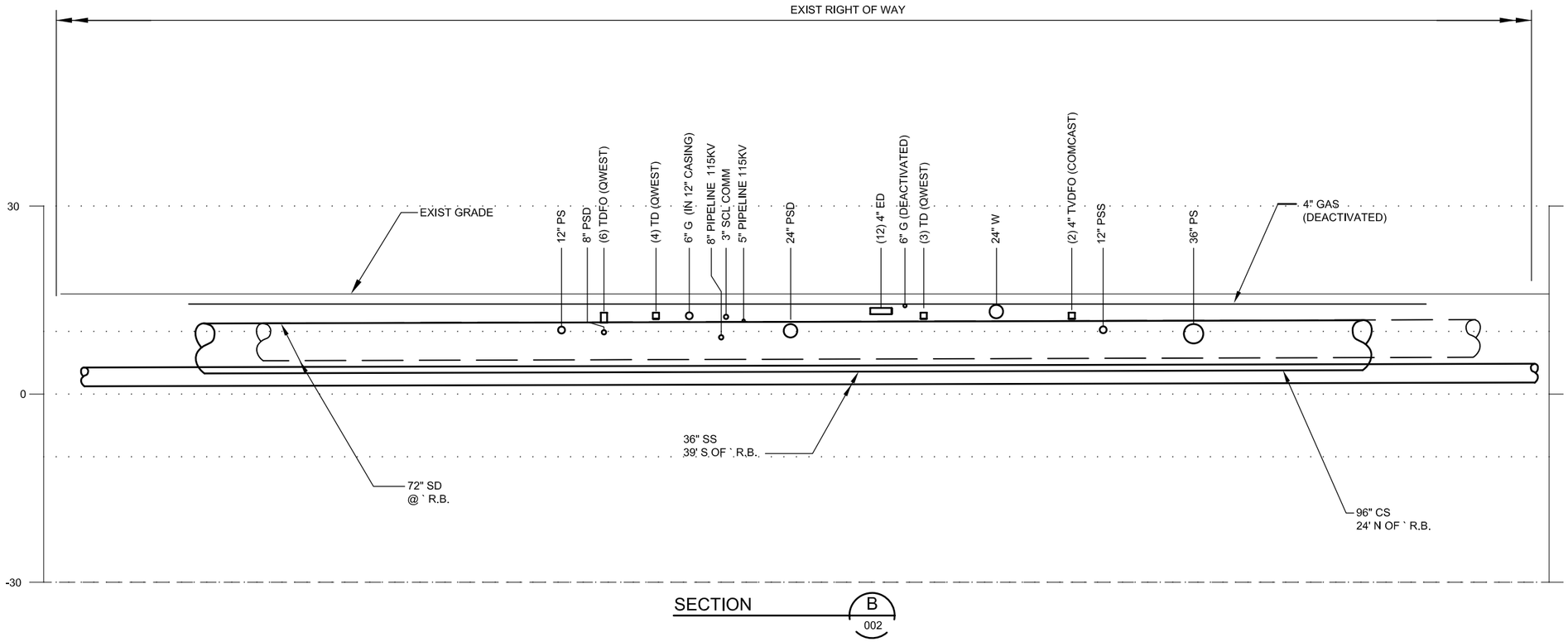
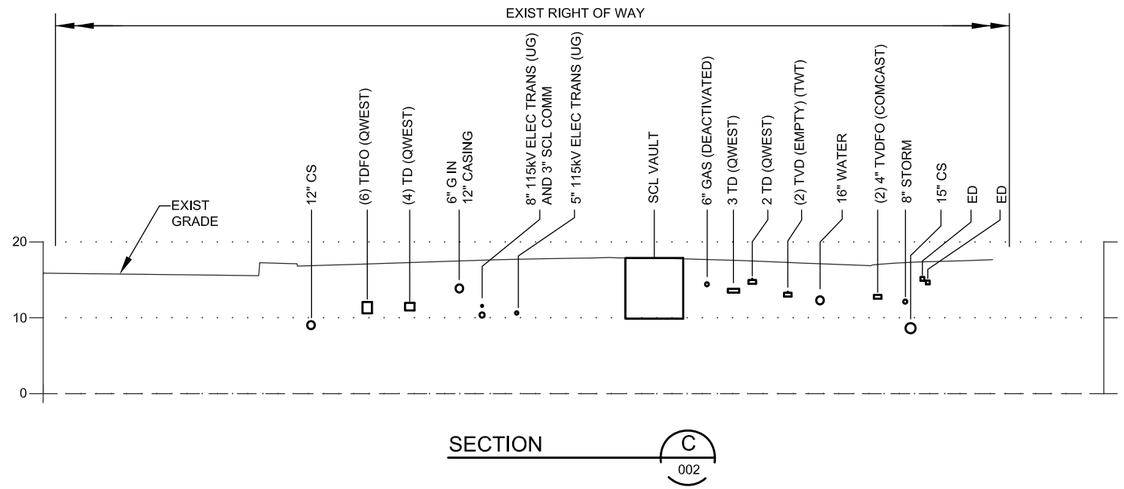
SCALE IN FEET

JUNE 1, 2009



SECTION B 002



SECTION C 002

SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS

DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

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DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

SHEET 002

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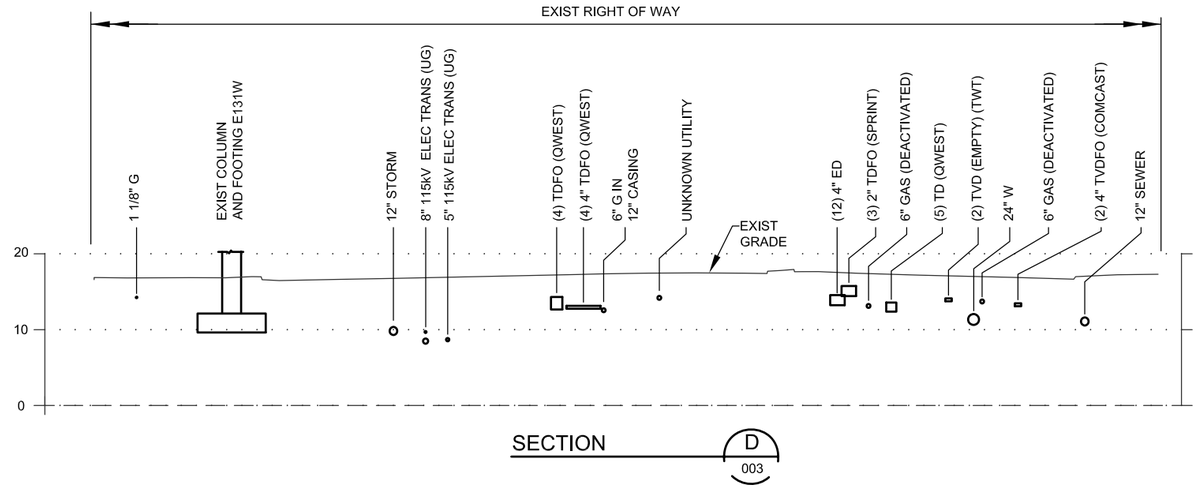
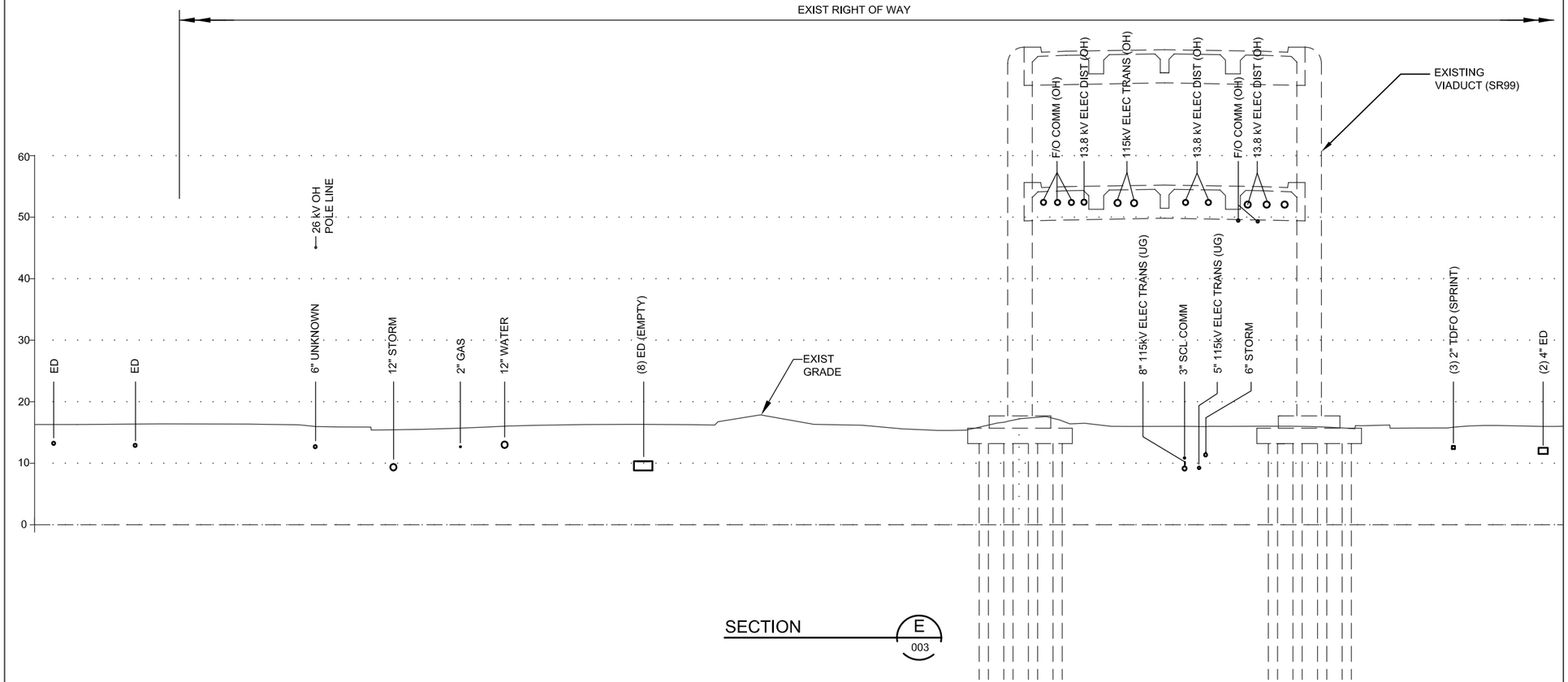
SCALE IN FEET

JUNE 1, 2009



SECTION D 003



SECTION E 003

SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS

DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

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DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

SHEET 003

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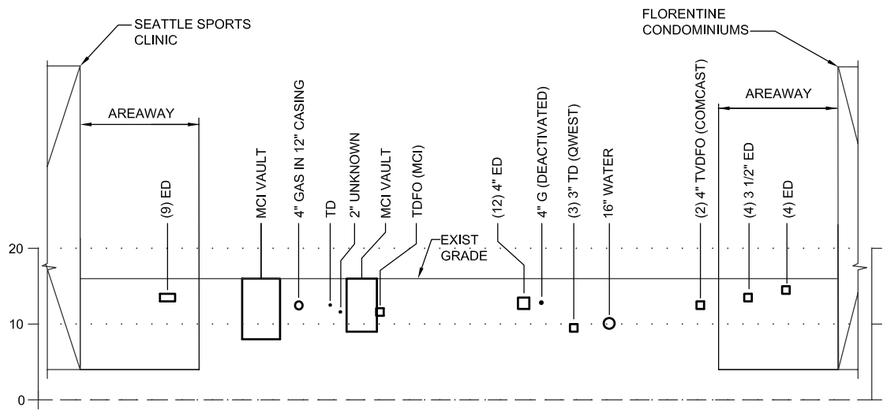
SCALE IN FEET

JUNE 1, 2009



SECTION G 005

SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS

DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

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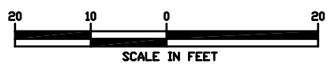
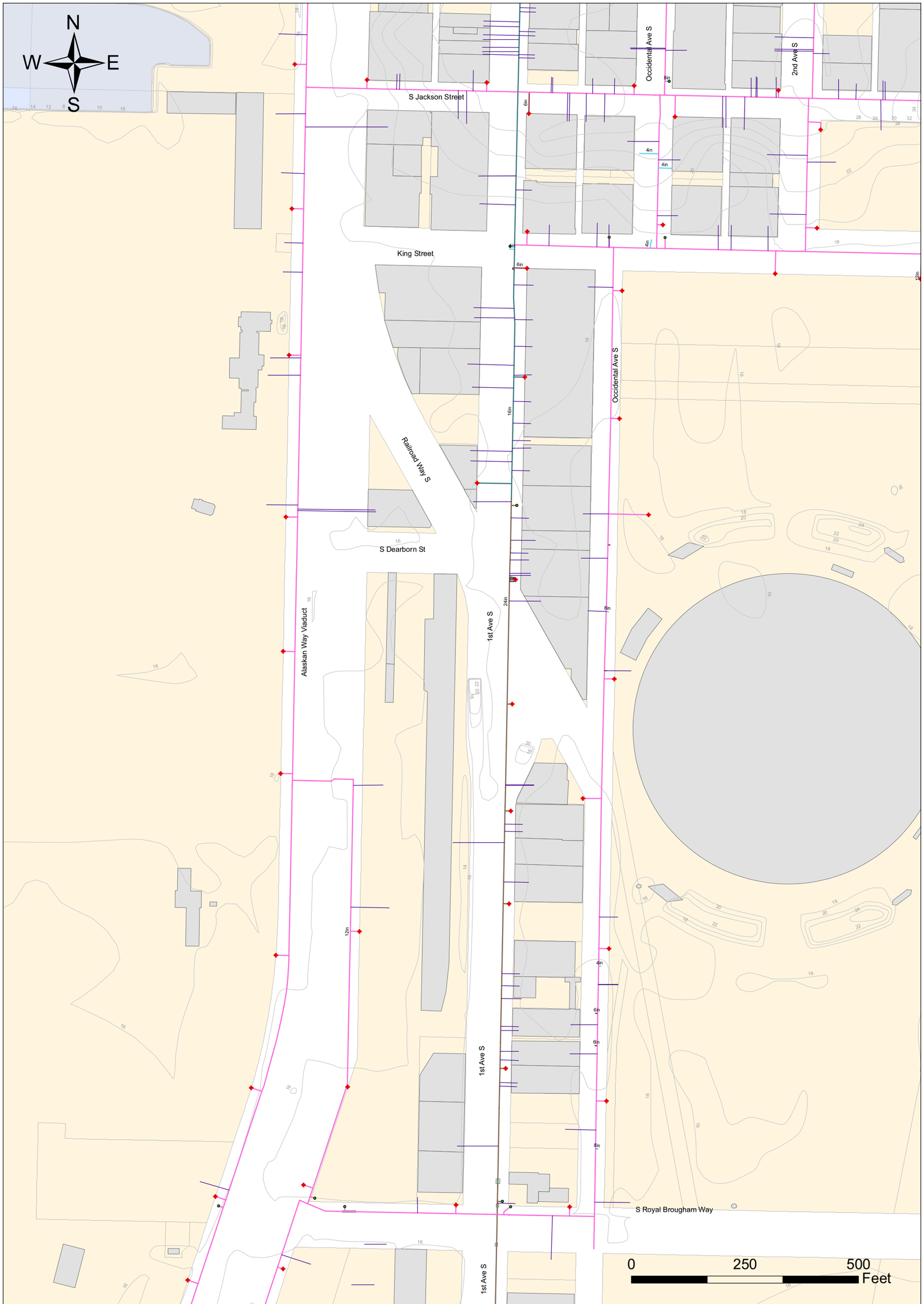
DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

SHEET 005



JUNE 1, 2009



AWV South Portal Waterlines by Diameter

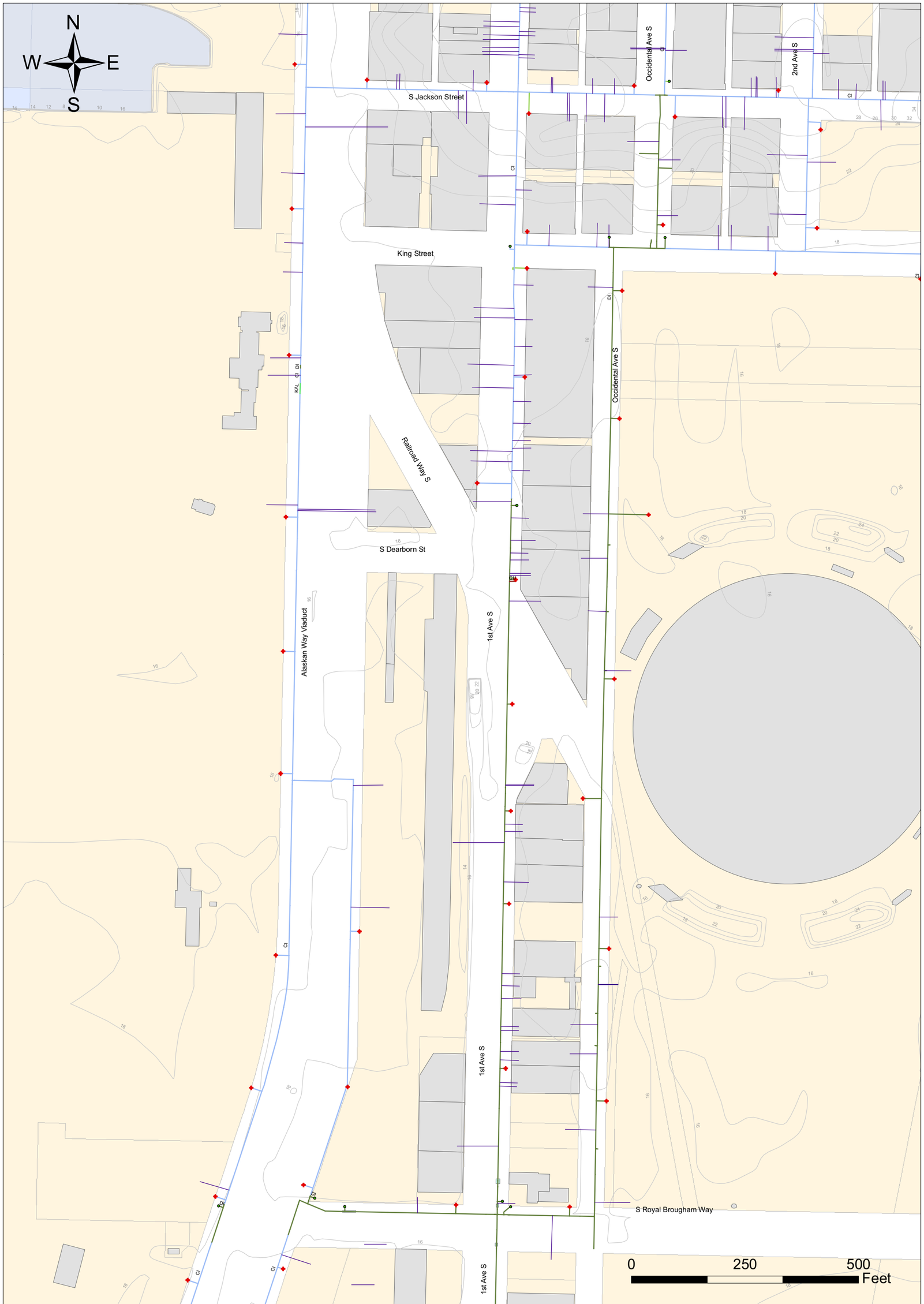
April, 2nd, 2009

Legend

- Buildings
- Water Bodies
- Parcels
- Hydrant
- Appurtenances
- Services

Waterline Diameter (in)

0.8, 1, 1.5, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 21, 22, 24, 30, 36, 40, 42, 48, 66



AWV South Portal Waterlines by Material

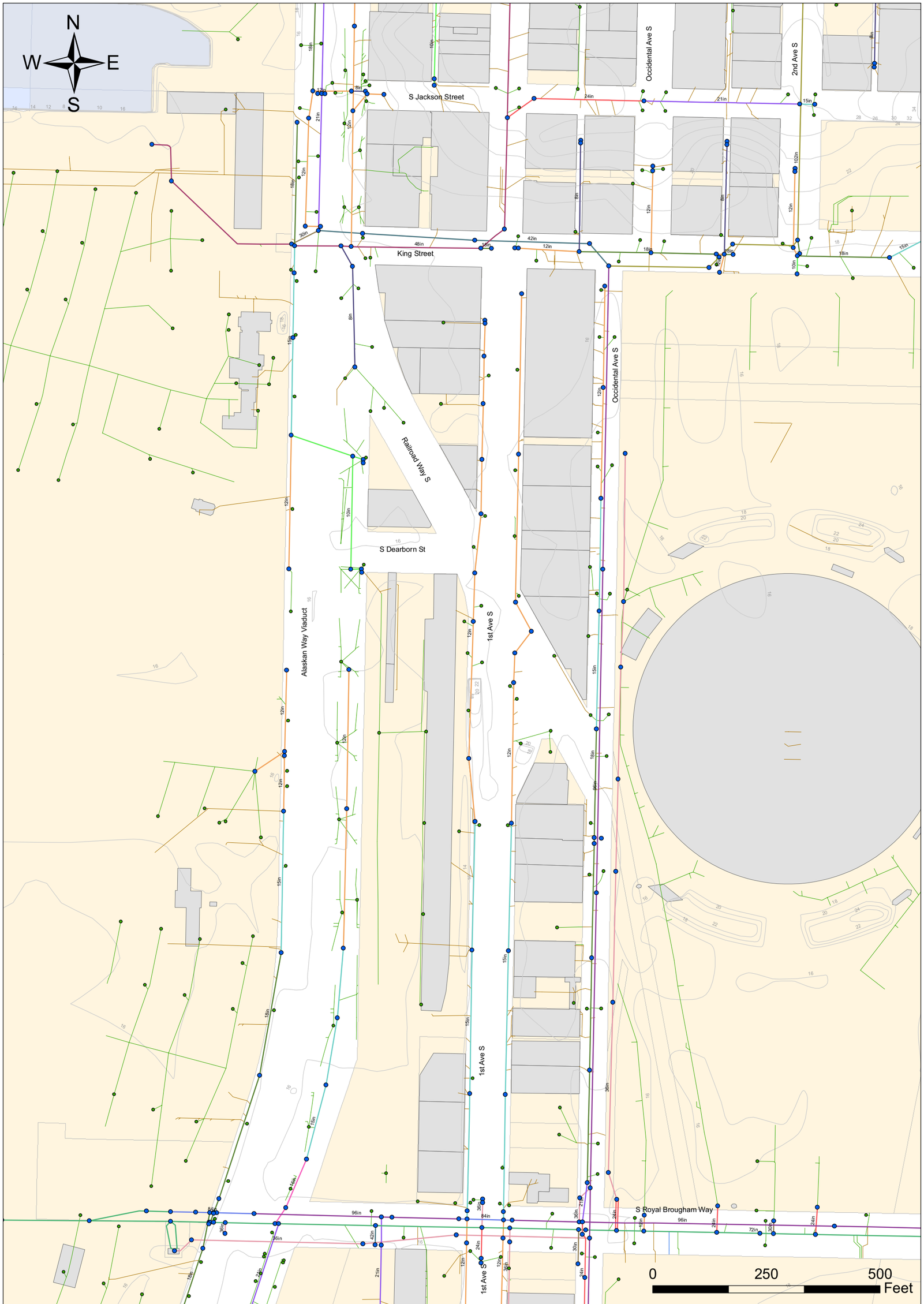
April, 2nd, 2009

Legend

- Buildings
- Water Bodies
- Parcels
- Hydrant
- Appurtenances
- Services

Waterline
MSG_MATERI

- CC
- CI
- CONC
- CU
- DI
- GI
- GS
- I
- KAL
- LBSTL
- PL
- PVC
- RVSTL
- STL
- WESTL



AWV South Portal Sewer/Drainage Pipes by Probable Flow

April, 2nd, 2009

Legend

- Manholes
- Catch Basin
- Water Bodies
- Parcels
- Buildings

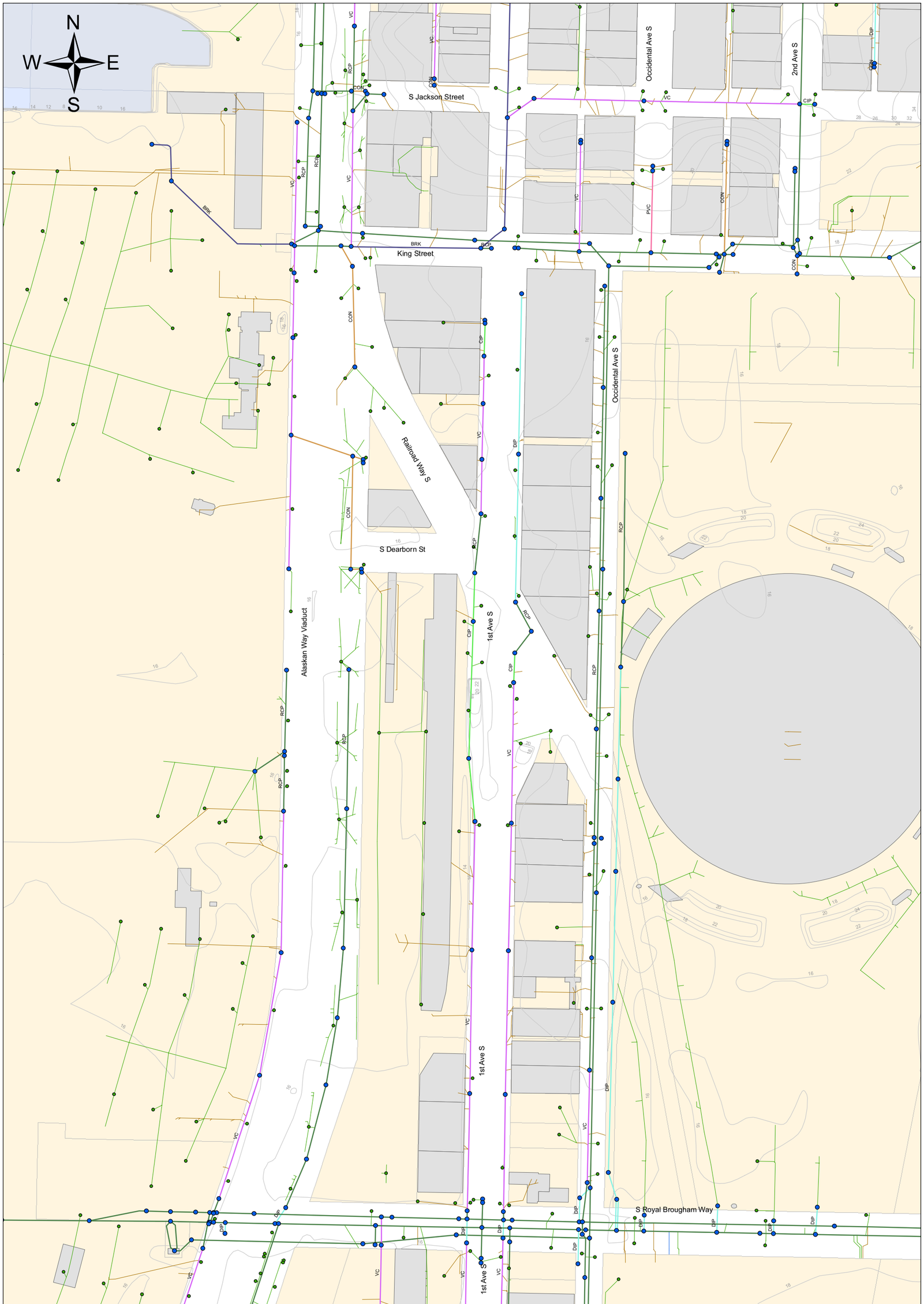
Laterals

Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines Diameter

8, 10, 12, 15, 16, 18, 20, 21, 22, 23.6, 24, 28, 30, 32, 36, 42, 48, 60, 72, 84, 96, 102



AWV South Portal Sewer/Drainage Pipes by Material

April, 2nd, 2009

0 250 500 Feet

Legend

- Manholes
- Catch Basin
- Water Bodies
- Parcels
- Buildings

Laterals

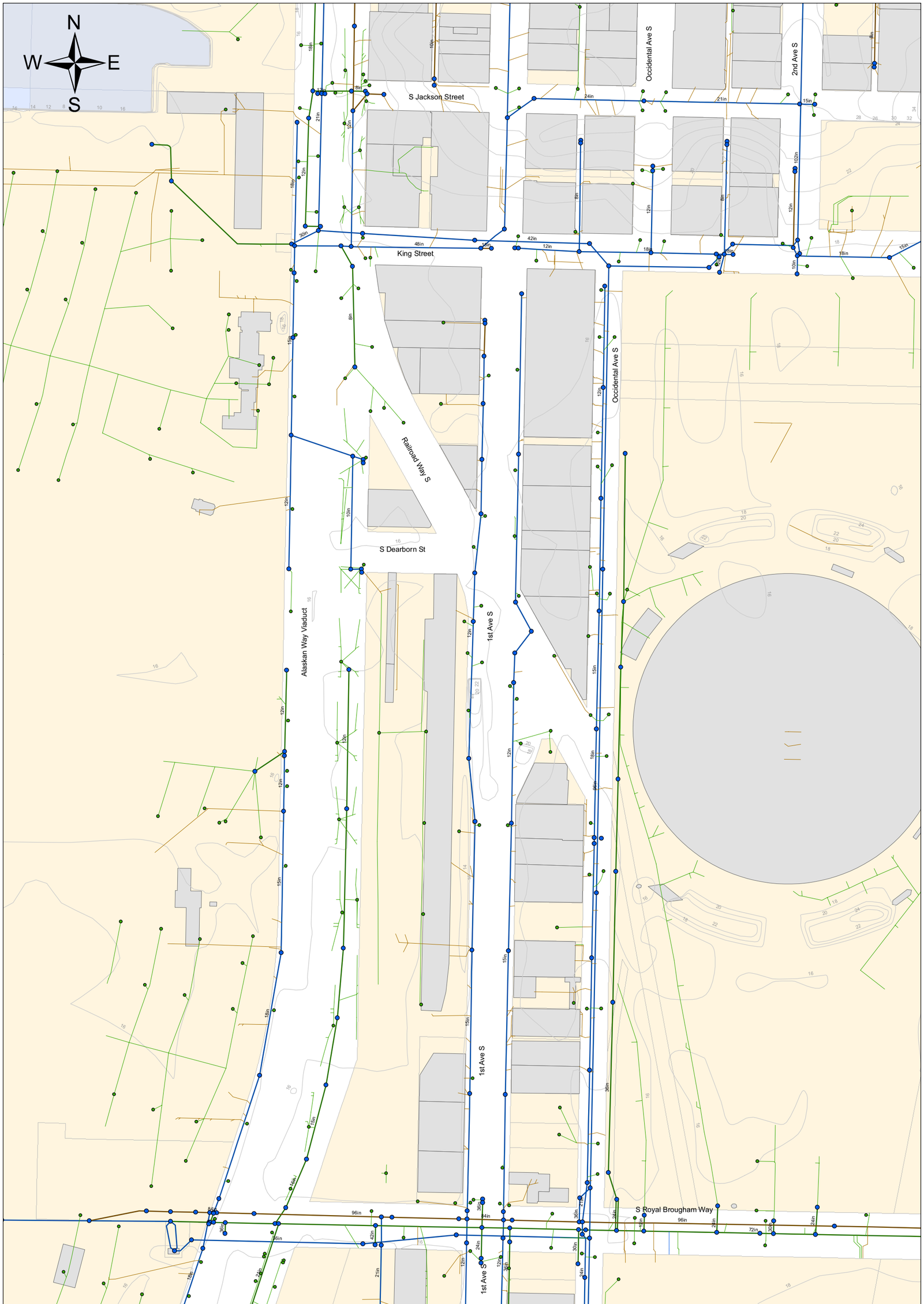
Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines

MATERIAL

- BRK
- CIP
- CON
- DIP
- PVC
- RCP
- VC



AWV South Portal Sewer/Drainage Pipes by Probable Flow

April, 2nd, 2009

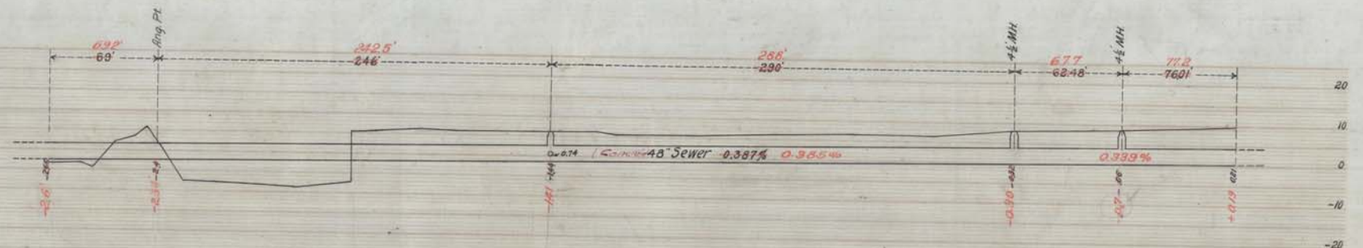
0 250 500 Feet

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals
Probable Flow
- Combined
- Drainage
- Sewer

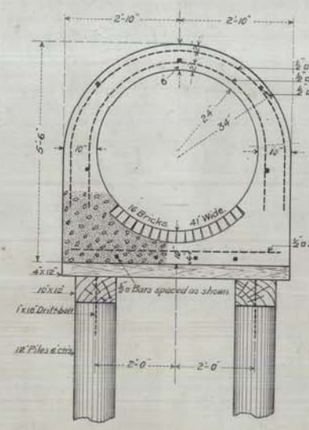
Sewer Lines
Probable Flow
- Combined
- Drainage
- Sewer



Approximate Bill of Material.

~~Brick~~ or Concrete Sewer	744 lin. ft.
3½ ft. Manholes	1.
4½ ft. Manholes	2.
Piles	234.
Lumber	34150 ft. B.M.
Extra Concrete	40 cu. yds.
Catch Basins Reconnected	1
Sand Boxes	1
12" Pipe Sewer	26 lin. ft.

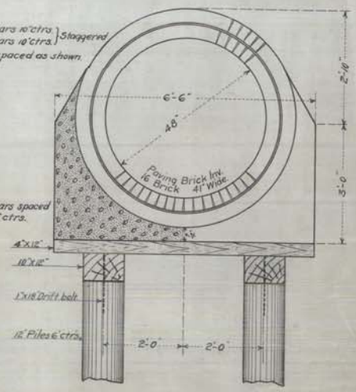
48" Circular Reinforced Concrete.



Approx. Quantities per lineal ft.

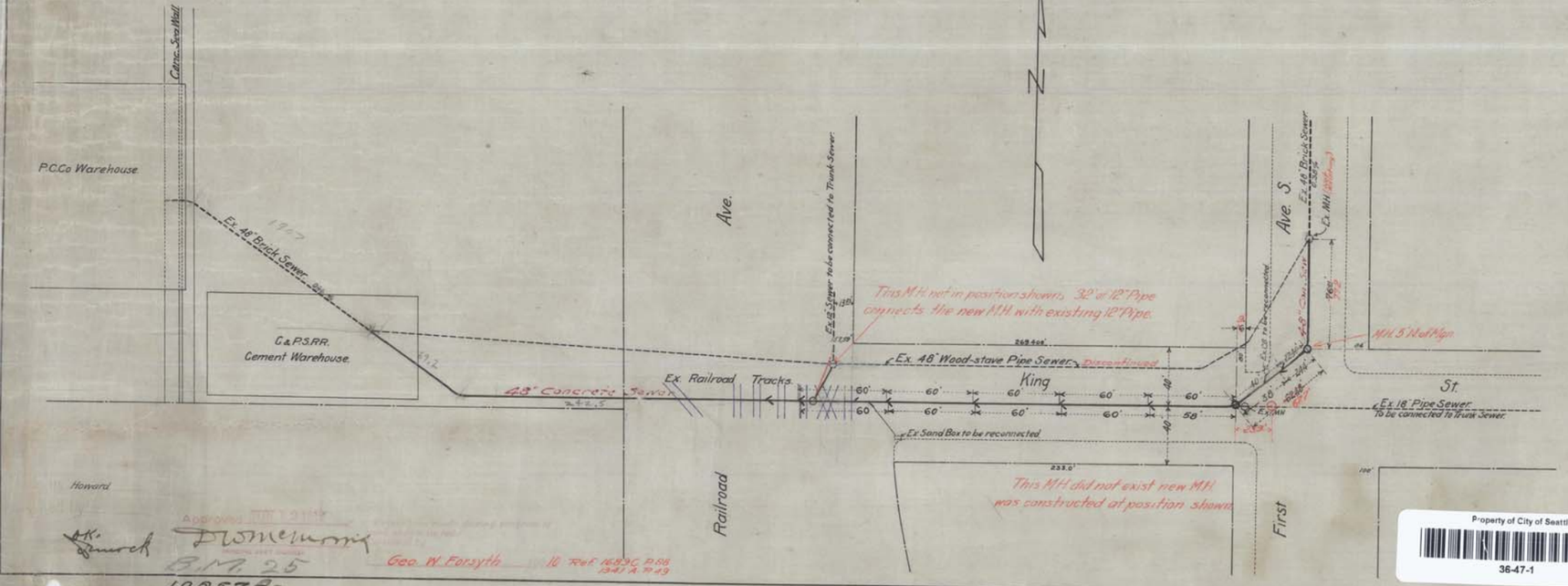
Paving Bricks	21
Concrete	14.9 cu. ft.
Steel	32.6 #
Lumber	43 ft. BM.

48" Circular Brick.



Approx. Quantities per lineal ft.

Paving Bricks	21
Sewer	14.7
Concrete	8.1 cu. ft.
Lumber	16 ft. B.M.



Seattle Sewerage

Plan and Profile

KING STREET

Trunk Sewer

Ordinance No. 21471.

Approved .1909.

Local Improvement District No. 2134.

June - 1909.

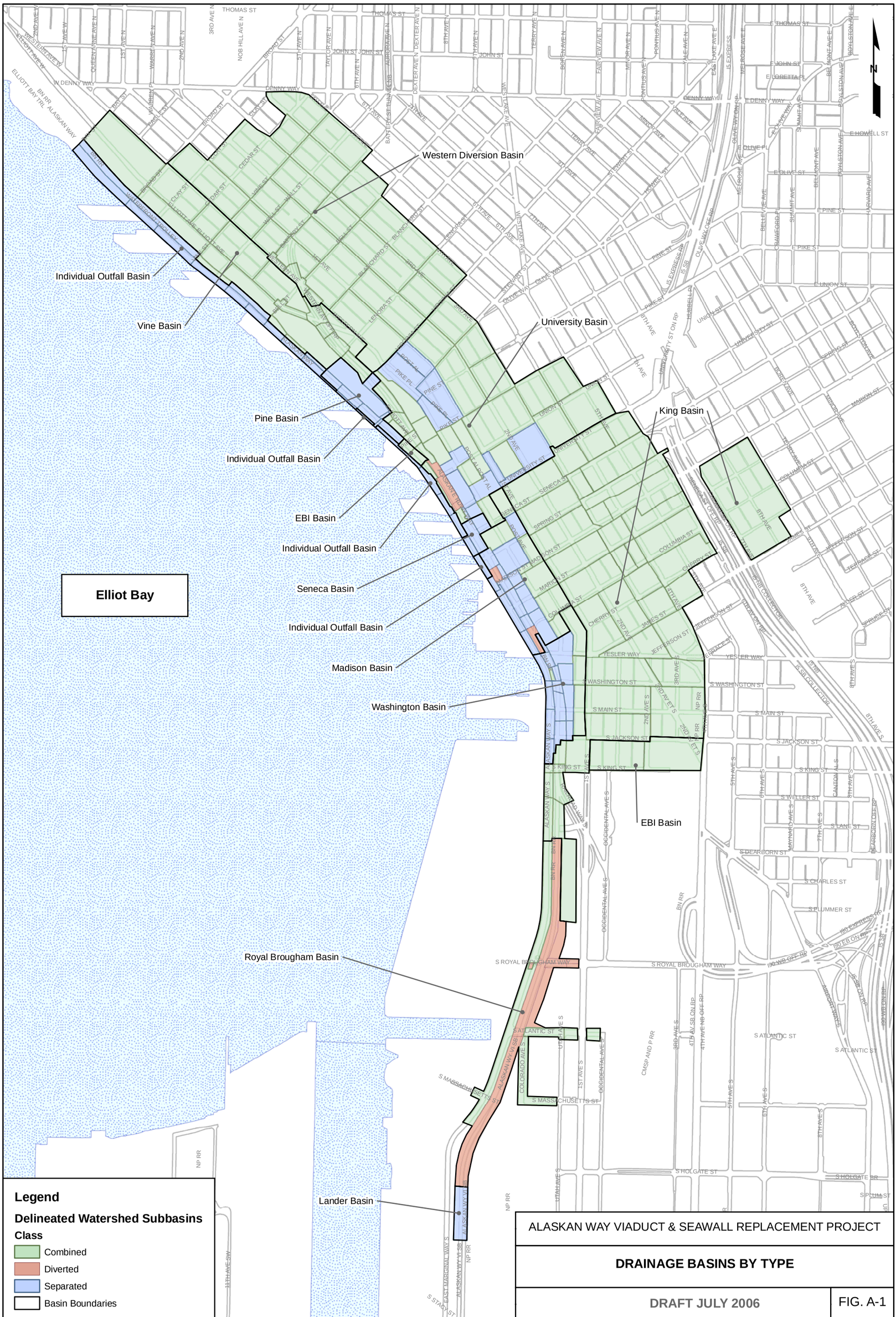
Horizontal Scale 1 inch - 50 feet. Vertical Scale 1 inch - 20 feet.

A.H. DIMOCK Asst. Eng. R.H. THOMSON City Engineer.

Approved by the Board of Public Works,

Seattle, Wash., June 22nd 1909

Attest: C.B. Bagley Secretary. R.H. Thomson Chairman


Western Diversion Basin
Individual Outfall Basin
Vine Basin
University Basin
Pine Basin
King Basin
Individual Outfall Basin
EBI Basin
Individual Outfall Basin
Seneca Basin
Elliot Bay
Individual Outfall Basin
Madison Basin
Washington Basin
EBI Basin
Royal Brougham Basin
Lander Basin
N
Legend
Delineated Watershed Subbasins
Class
Combined
Diverted
Separated
Basin Boundaries
ALASKAN WAY VIADUCT & SEAWALL REPLACEMENT PROJECT
DRAINAGE BASINS BY TYPE
DRAFT JULY 2006
FIG. A-1

Task CE
SR 99 Bored Tunnel Alternative
South Portal

City of Seattle Franchise Utility Maps

The below information is included on the attached CD.

Map No.	Location
2S-12	S. Jackson St. to S. King St. - Second Ave. S.
2S-13	S. Jackson St. to S. King St. - Occidental Ave. S.
2S-14	S. Jackson St. to S. King St. - First Ave. S.
2S-15	S. Jackson St. to S. King St. - Between First Ave. S. and Alaskan Way S.
2S-16	S. Jackson St. to S. King St. - Alaskan Way S.
2S-17	S. King St. to Railroad Way S. - Alaskan Way S.
2S-18	S. King St. to Railroad Way S. - First Ave. S.
2S-20	S. King St. to Railroad Way S. - Occidental Ave. S.
2S-21	S. King St. to Railroad Way S. - AWV
2S-24	Between S. King St. and Railroad Way S. - First Ave. S.
2S-25	Occidental Ave. S. and Railroad Way S.
2S-27	Between Railroad Way S. and S. Royal Brougham Way - First Ave. S.
2S-30	Between Railroad Way S. and S. Royal Brougham Way - First Ave. S.
6S-7	S. Royal Brougham Way and First Ave. S.
6S-14	S. Atlantic St. and First Ave. S.

Appendix C

Bored Tunnel – North Portal

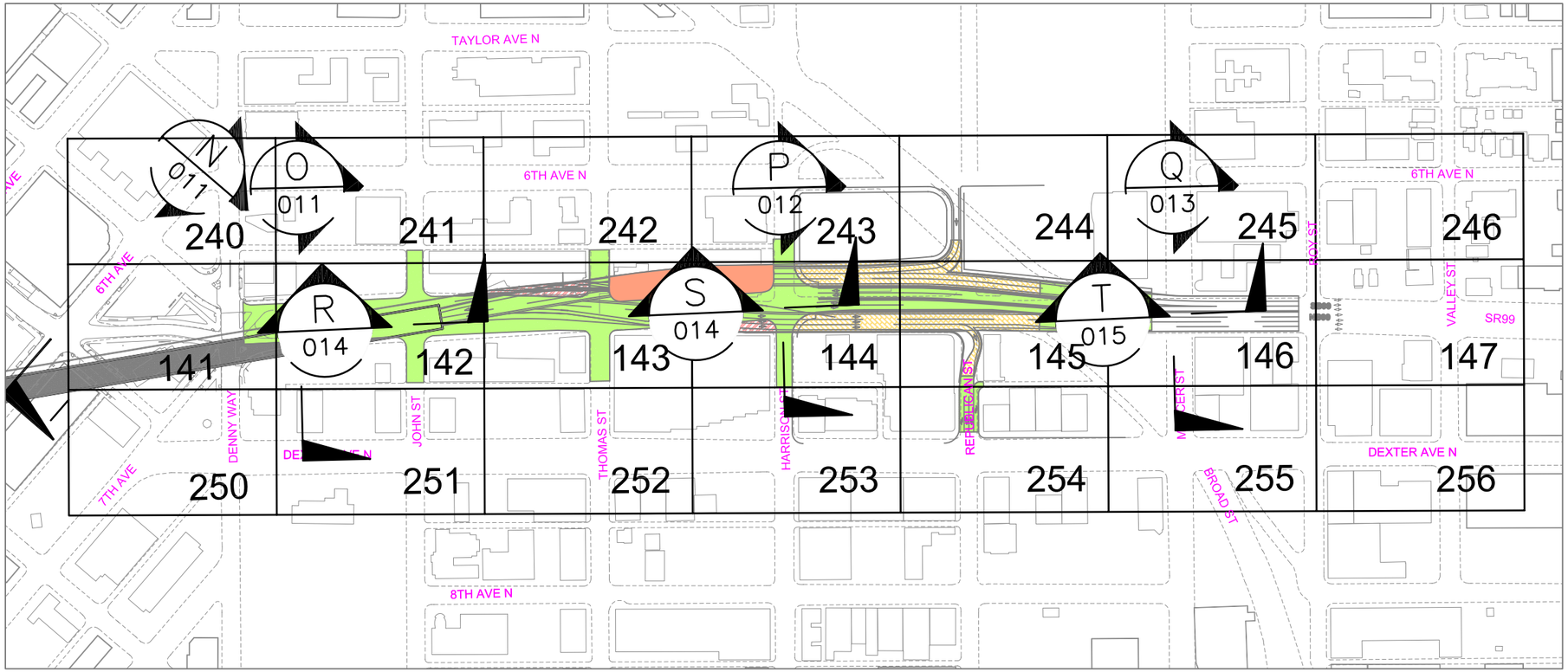
Support Documentation

Appendix C

List of Figures

Refer to attached CD for the following information:

- City of Seattle Franchise Utility Maps.
- SR 99 Bored Tunnel Alternative, North Portal City GIS for Sewer/Drainage/Water Pipes.



SR 99
BORED TUNNEL ALTERNATIVE

EXISTING UTILITY PLANS AND SECTIONS KEY MAP NORTH PORTAL

DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

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- RETAINED FILL
- AT GRADE
- RETAINED CUT
- CUT AND COVER
- TUNNEL
- ABOVE GRADE STRUCTURE

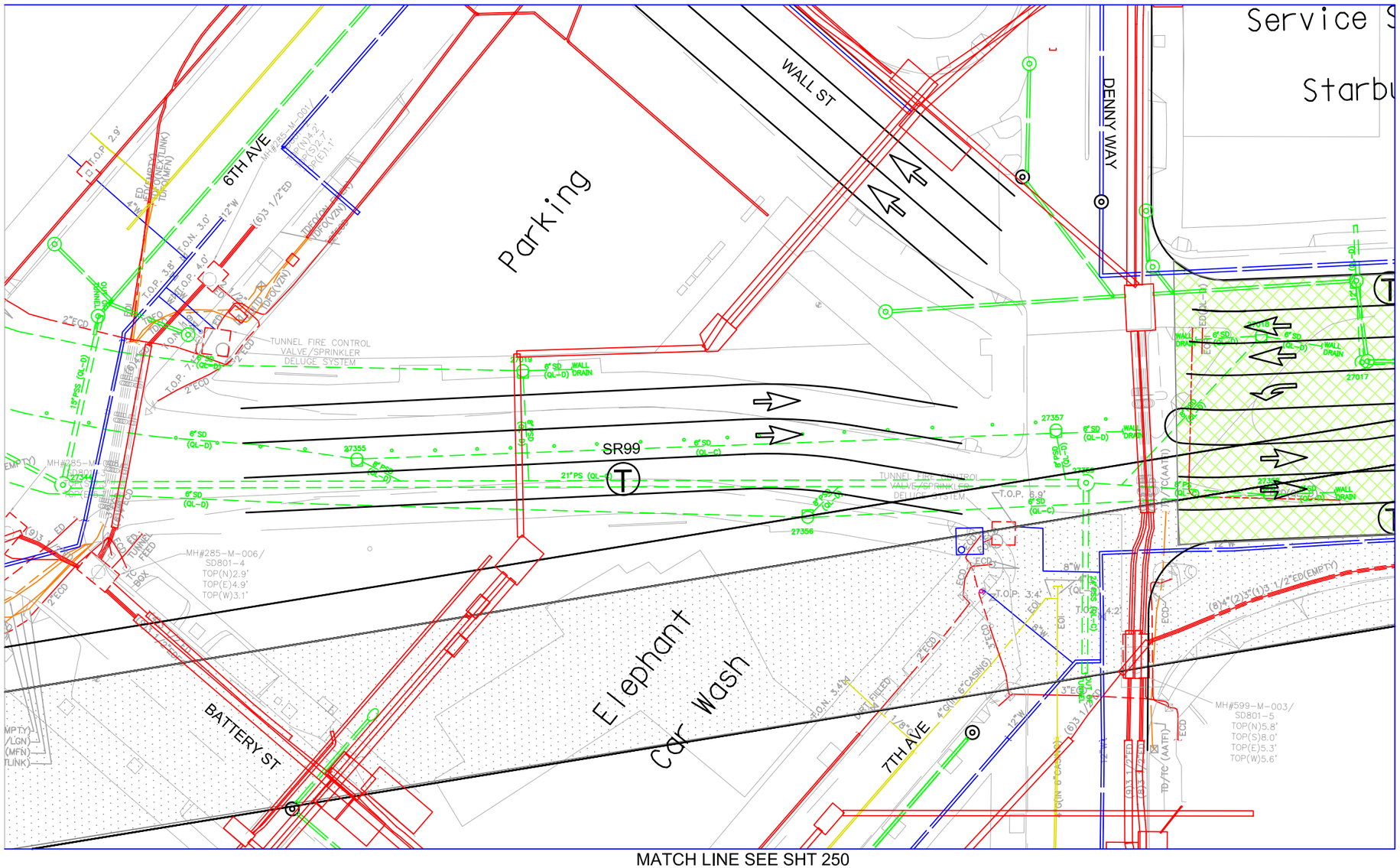
SHEET 001N

300 150 0 300

SCALE IN FEET

JUNE 1, 2009

MATCH LINE SEE SHT 240



SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY PLANS

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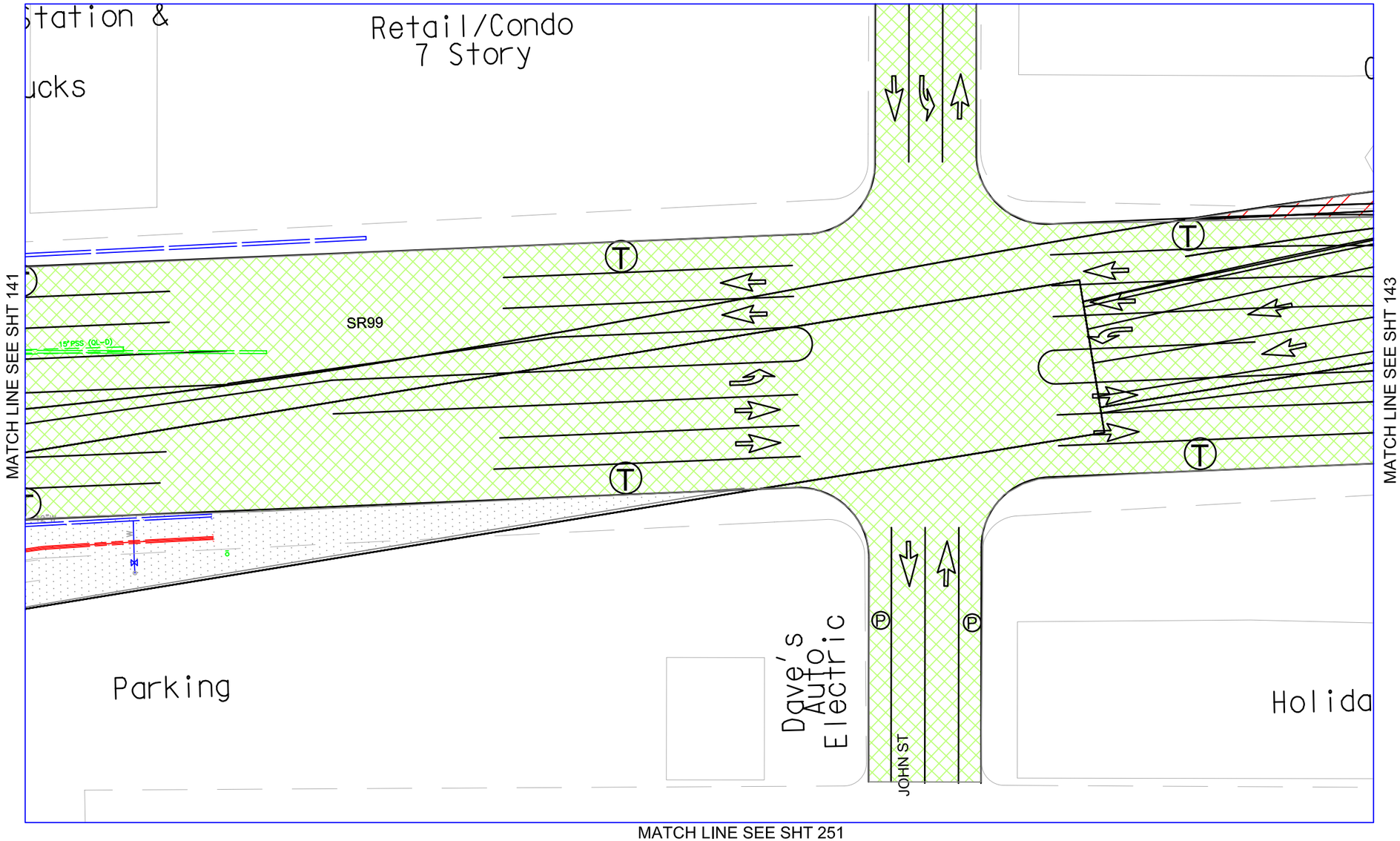
- STAGE 2 STORM
- STAGE 2 SEWER
- RETAINED FILL
- AT GRADE
- RETAINED CUT
- CUT AND COVER
- TUNNEL
- ABOVE GRADE STRUCTURE

SHEET 141

40 20 0 40
SCALE IN FEET

JUNE 1, 2009

MATCH LINE SEE SHT 241



MATCH LINE SEE SHT 251

SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY PLANS

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- STAGE 2 STORM
- STAGE 2 SEWER
- RETAINED FILL
- AT GRADE
- RETAINED CUT
- CUT AND COVER
- TUNNEL
- ABOVE GRADE STRUCTURE

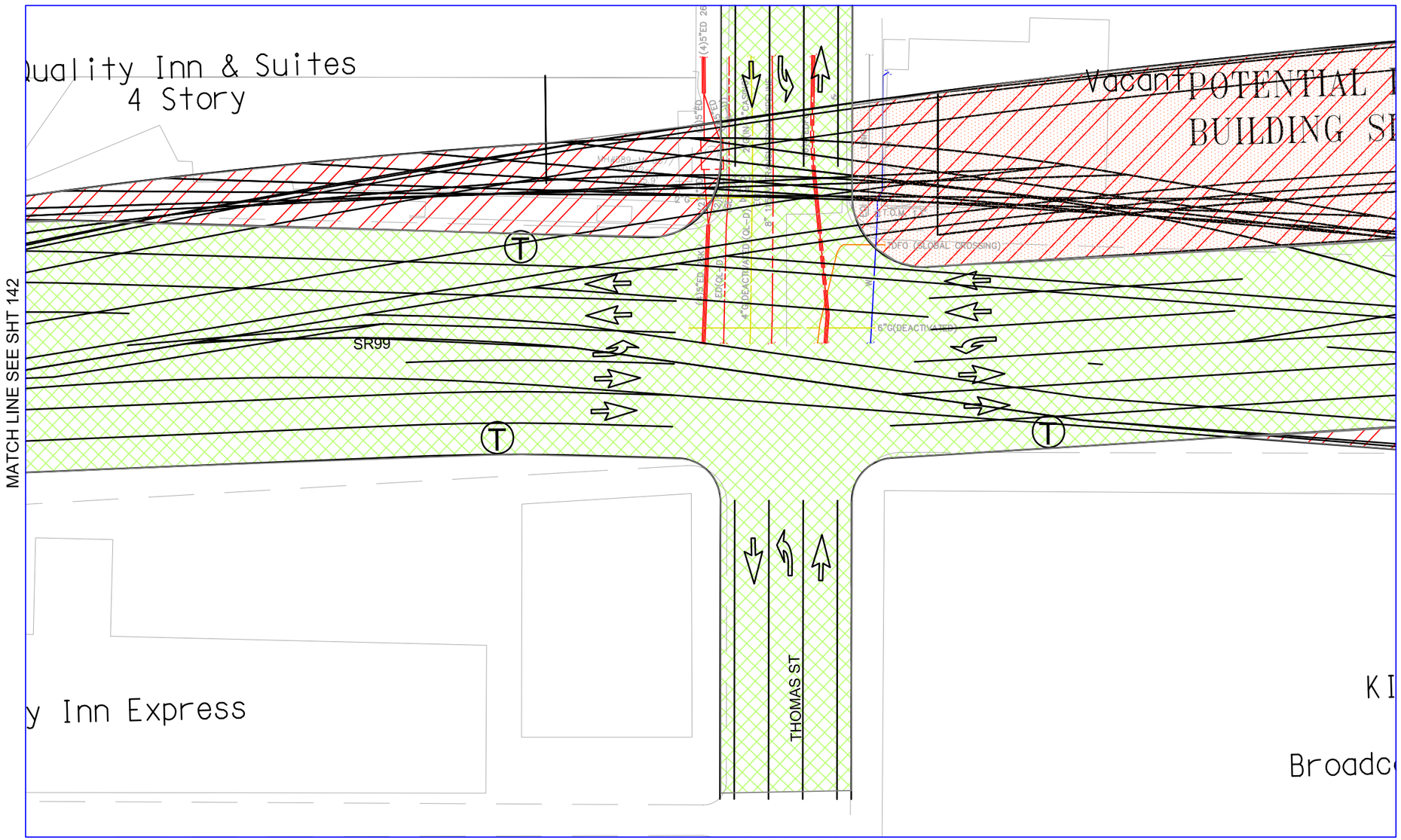
SHEET 142

40 20 0 40

SCALE IN FEET

JUNE 1, 2009

MATCH LINE SEE SHT 242



MATCH LINE SEE SHT 252

SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY PLANS

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- RETAINED FILL
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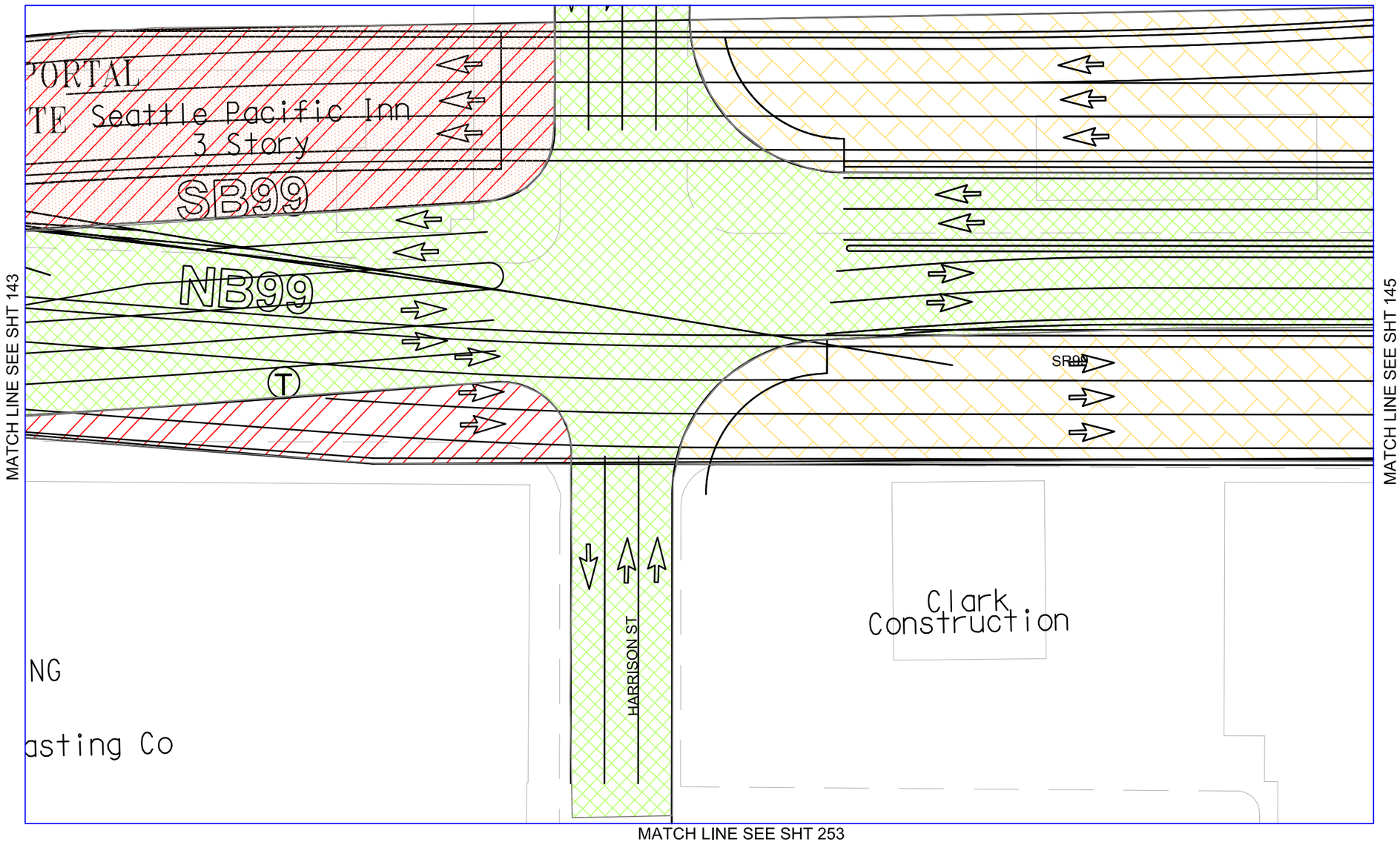
- RETAINED CUT
- CUT AND COVER
- TUNNEL
- ABOVE GRADE STRUCTURE

SHEET 143

40 20 0 40
SCALE IN FEET

JUNE 1, 2009

MATCH LINE SEE SHT 243



MATCH LINE SEE SHT 143

MATCH LINE SEE SHT 145

MATCH LINE SEE SHT 253

SR 99
BORED TUNNEL ALTERNATIVE

EXISTING UTILITY PLANS

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- STAGE 2 STORM
- STAGE 2 SEWER
- RETAINED FILL
- AT GRADE
- RETAINED CUT
- CUT AND COVER
- TUNNEL
- ABOVE GRADE STRUCTURE

SHEET 144

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SCALE IN FEET

JUNE 1, 2009

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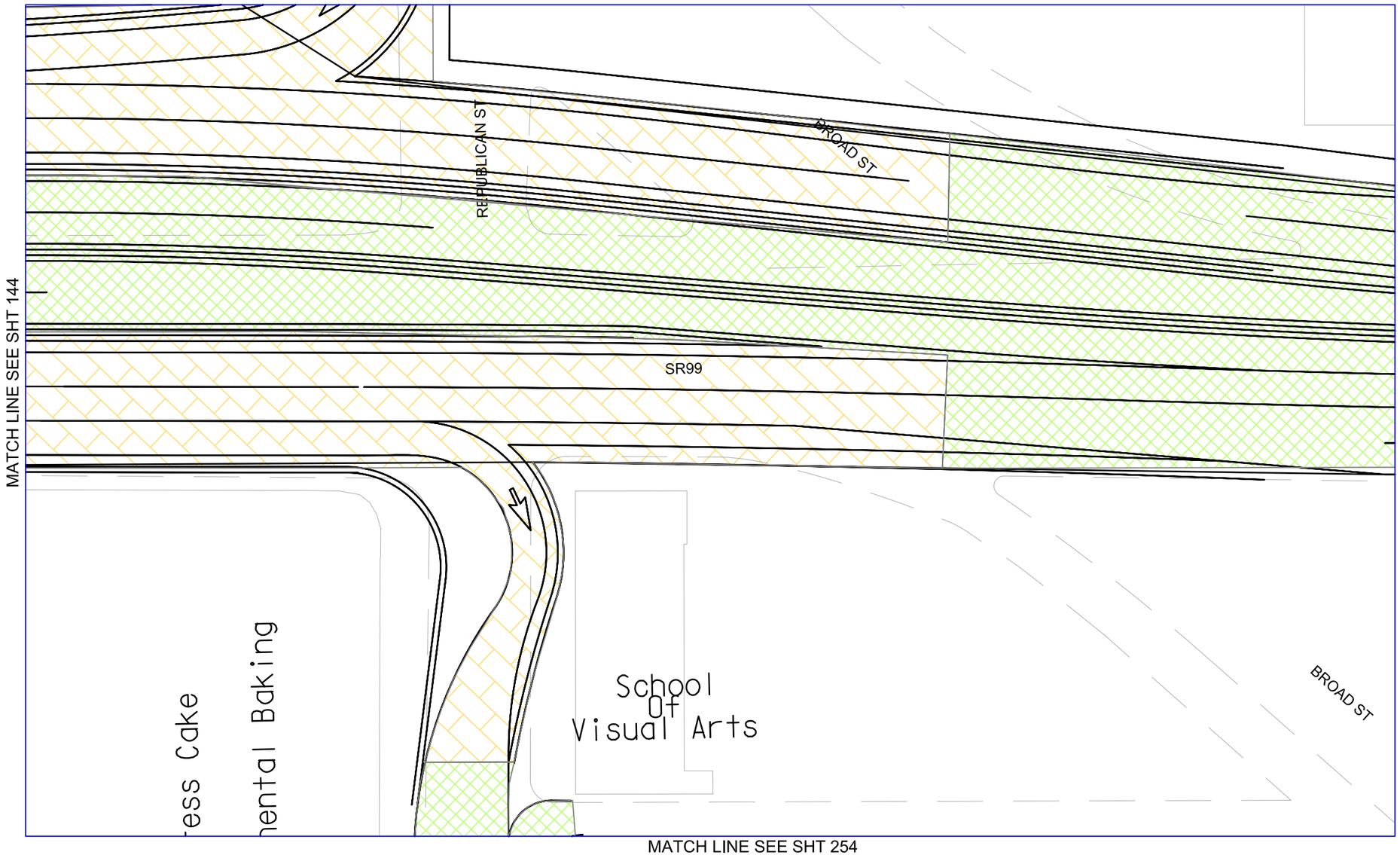

MATCH LINE SEE SHT 254

SR 99
BORED TUNNEL ALTERNATIVE

EXISTING UTILITY PLANS

DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

THIS MATERIAL IS CONCEPTUAL IN NATURE AND SHOULD BE USED FOR PLANNING AND DISCUSSION PURPOSES ONLY. IT IS SUBJECT TO CHANGE AND WILL BE FURTHER DEVELOPED AND REFINED AS PART OF THE PROJECT PROCESS

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SHEET 145

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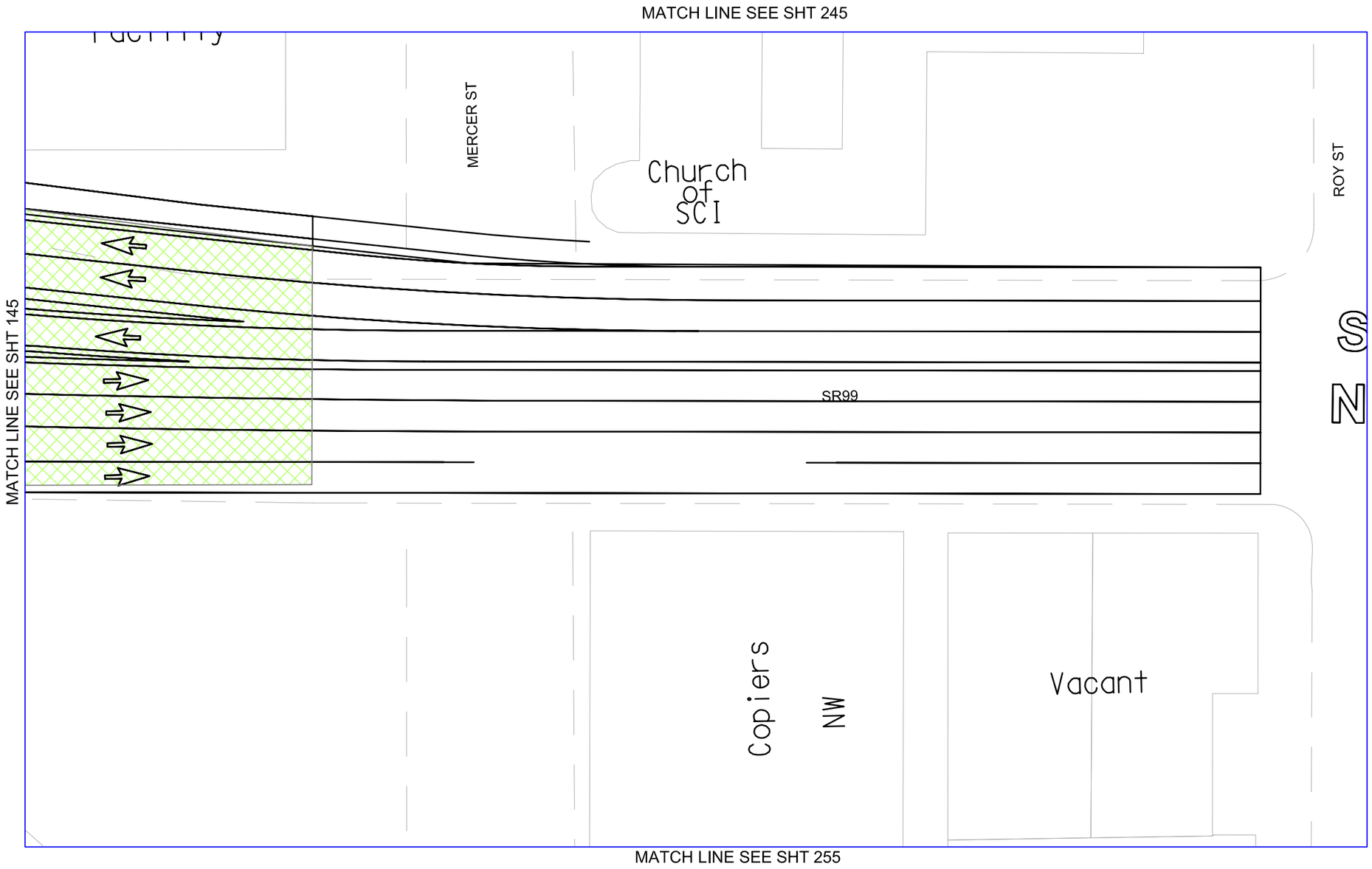
SCALE IN FEET

JUNE 1, 2009



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SHEET 146

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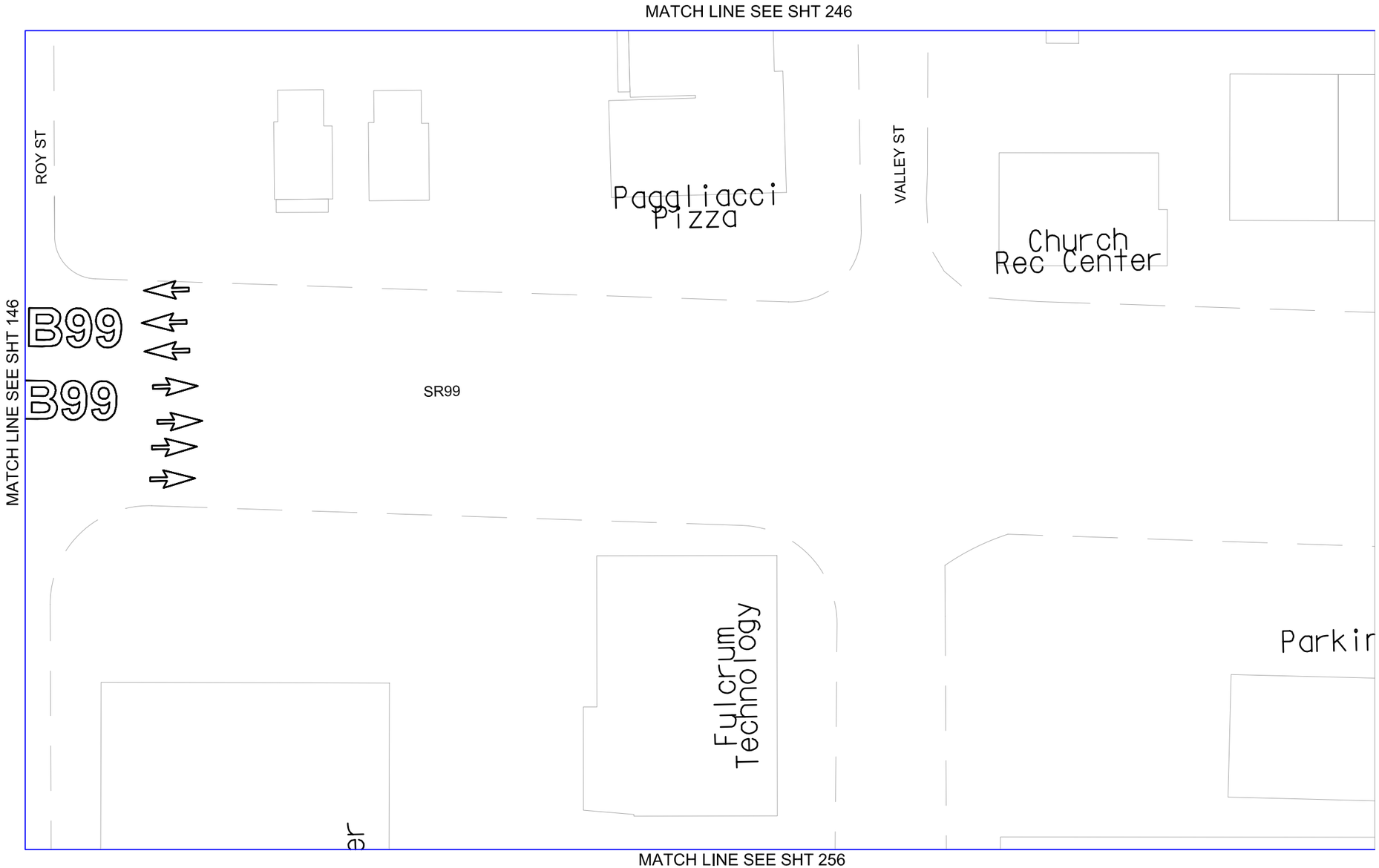
SCALE IN FEET

JUNE 1, 2009



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SHEET 147

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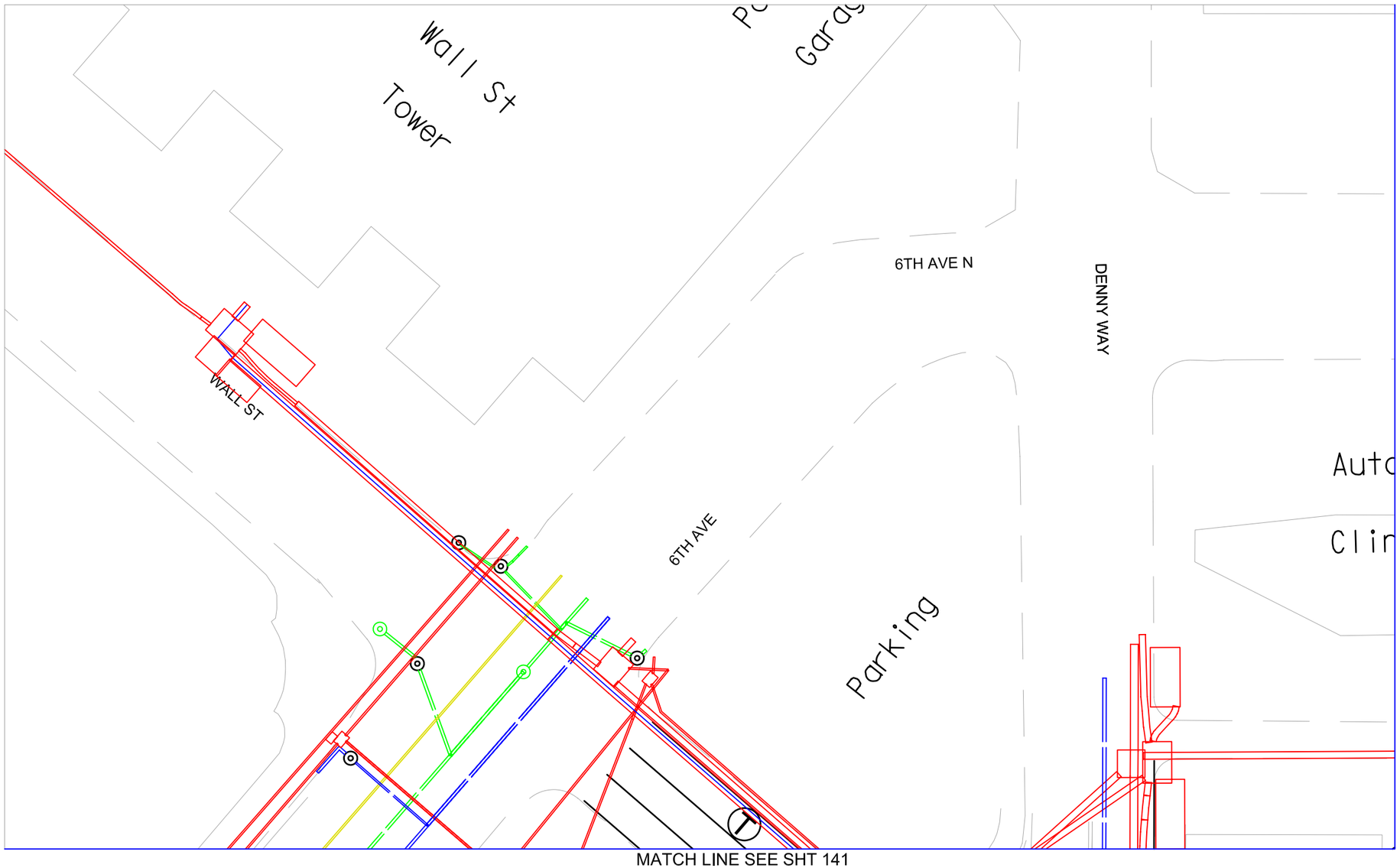
SCALE IN FEET

JUNE 1, 2009



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SHEET 240

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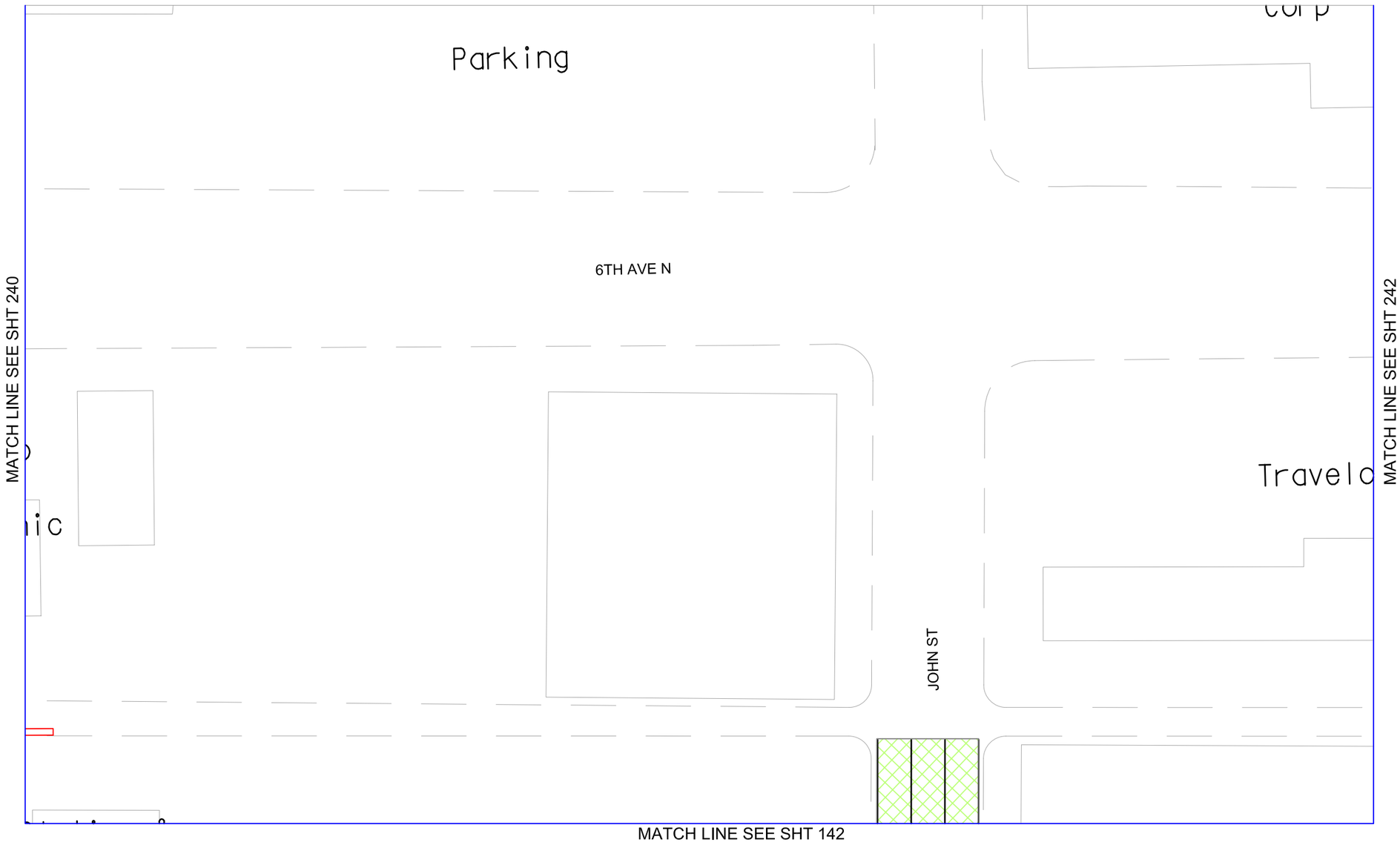
SCALE IN FEET

JUNE 1, 2009



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SHEET 241

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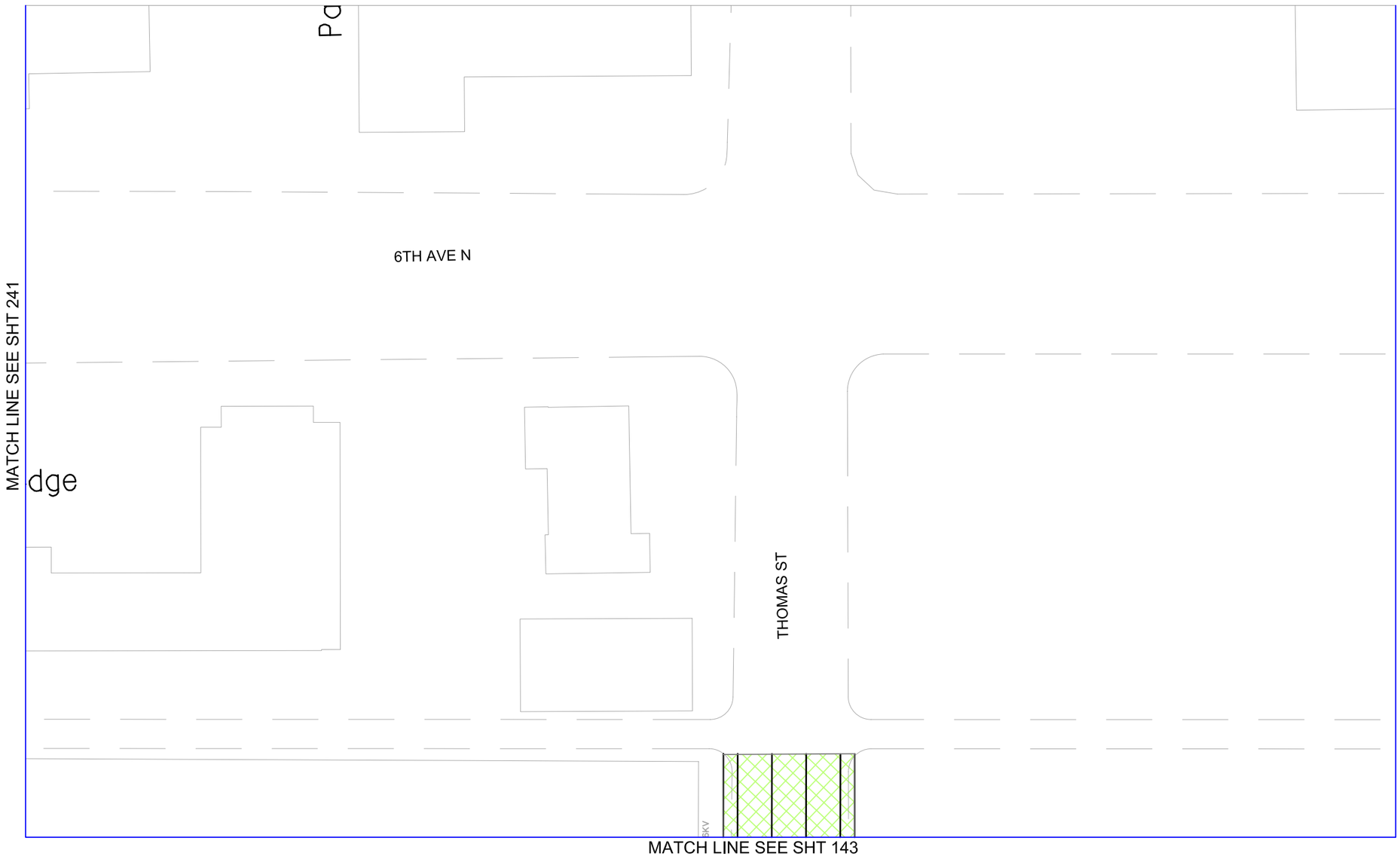
SCALE IN FEET

JUNE 1, 2009



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SHEET 242

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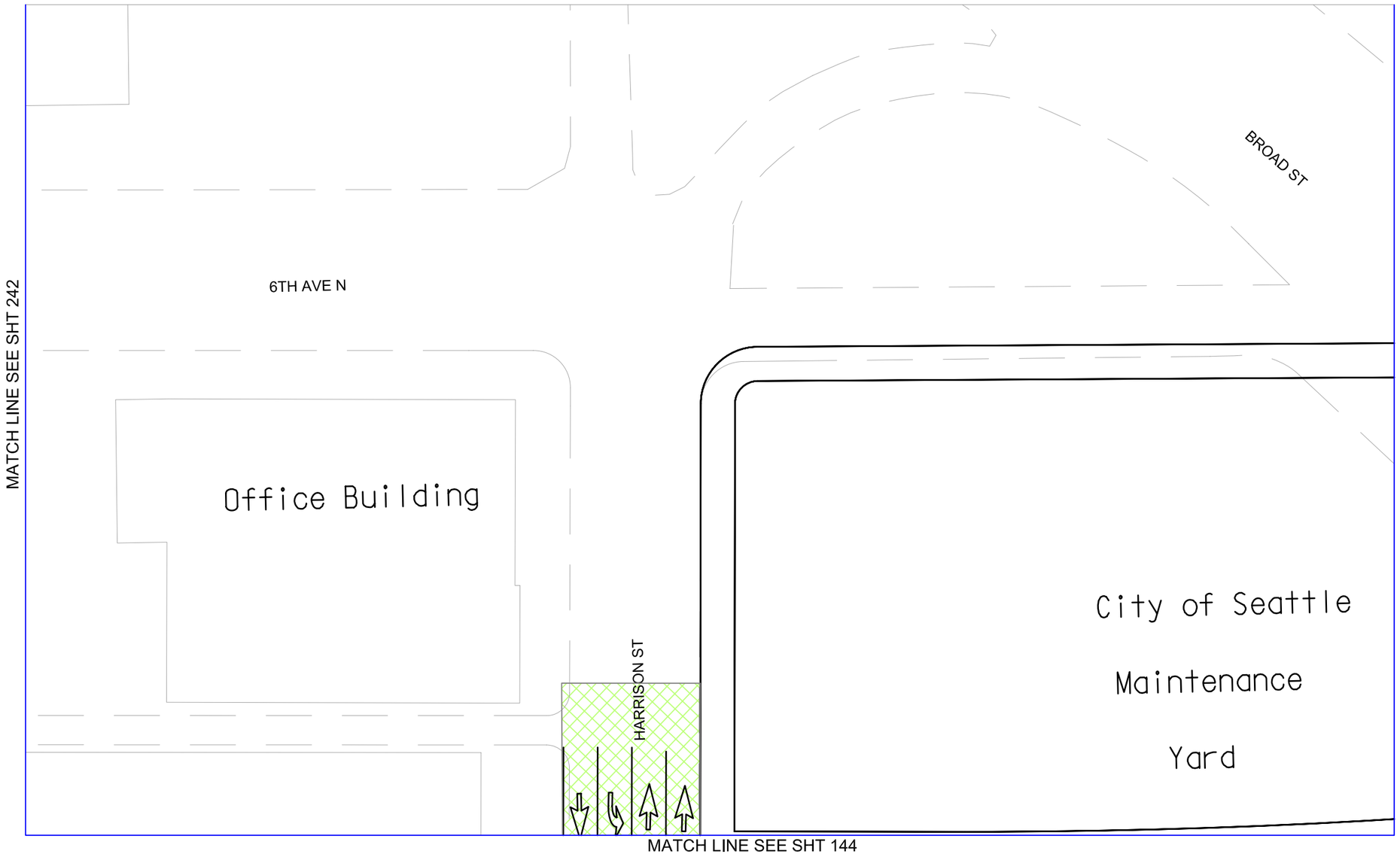
SCALE IN FEET

JUNE 1, 2009



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SHEET 243

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SCALE IN FEET

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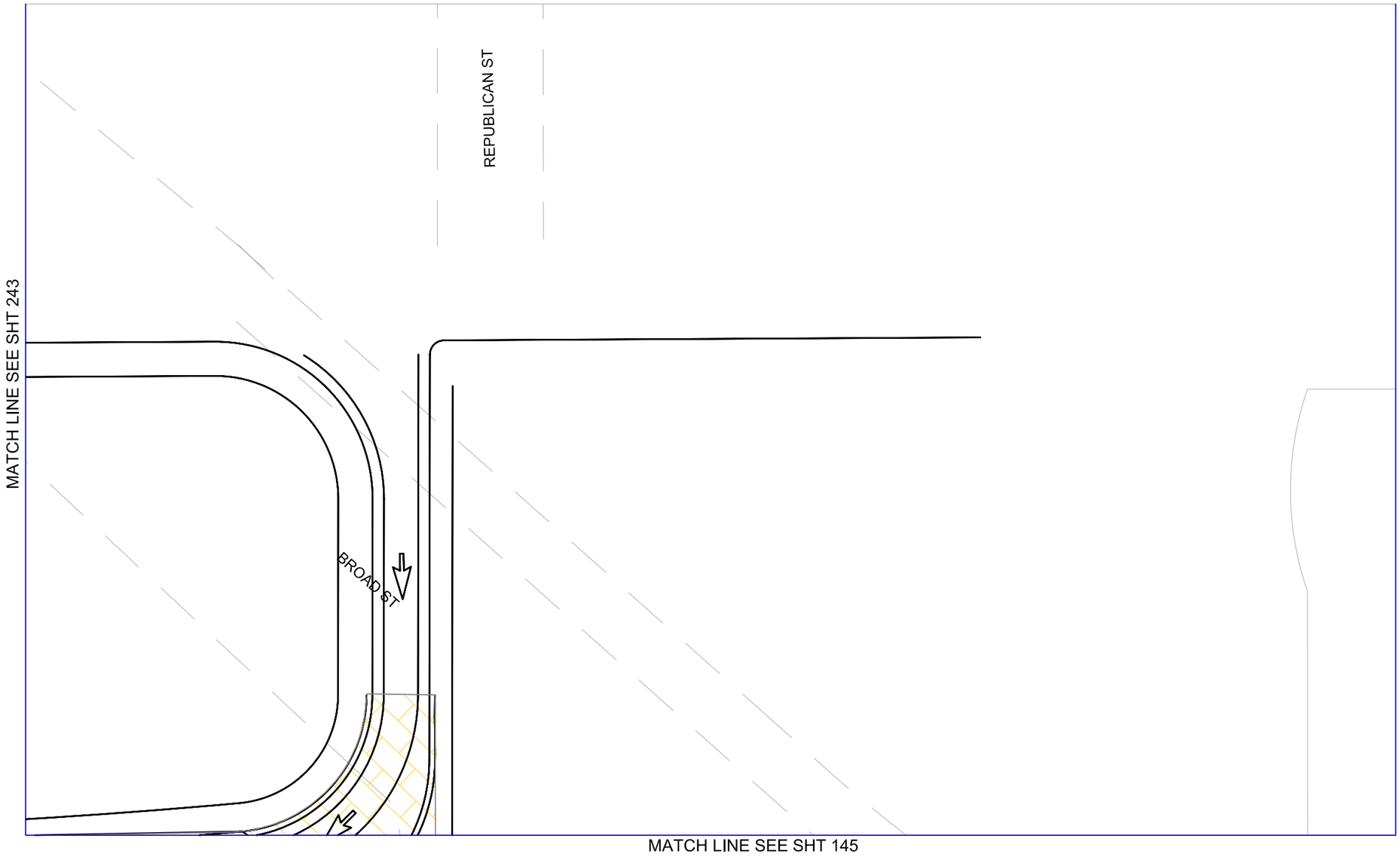

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SHEET 244

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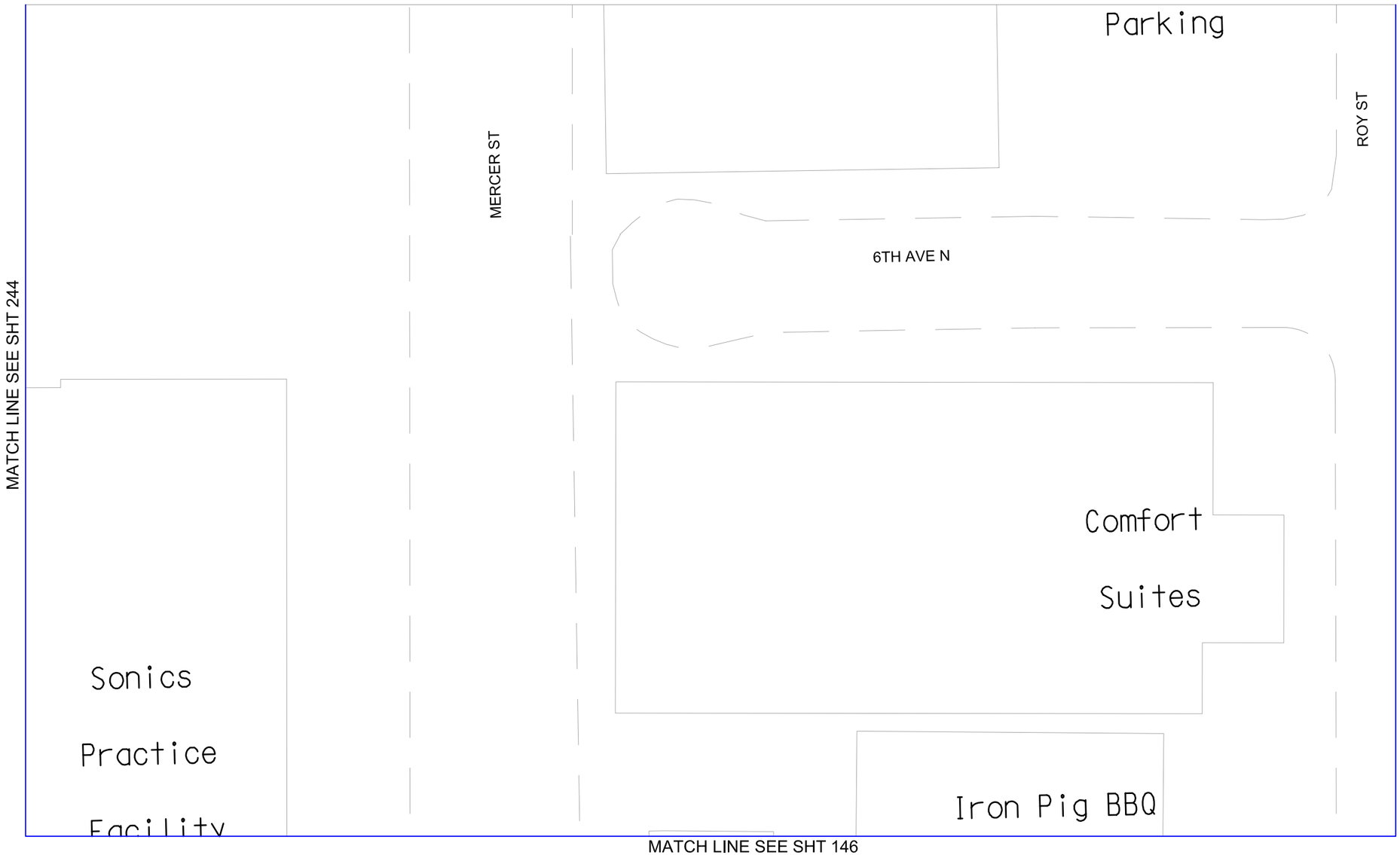
SCALE IN FEET

JUNE 1, 2009



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SHEET 245

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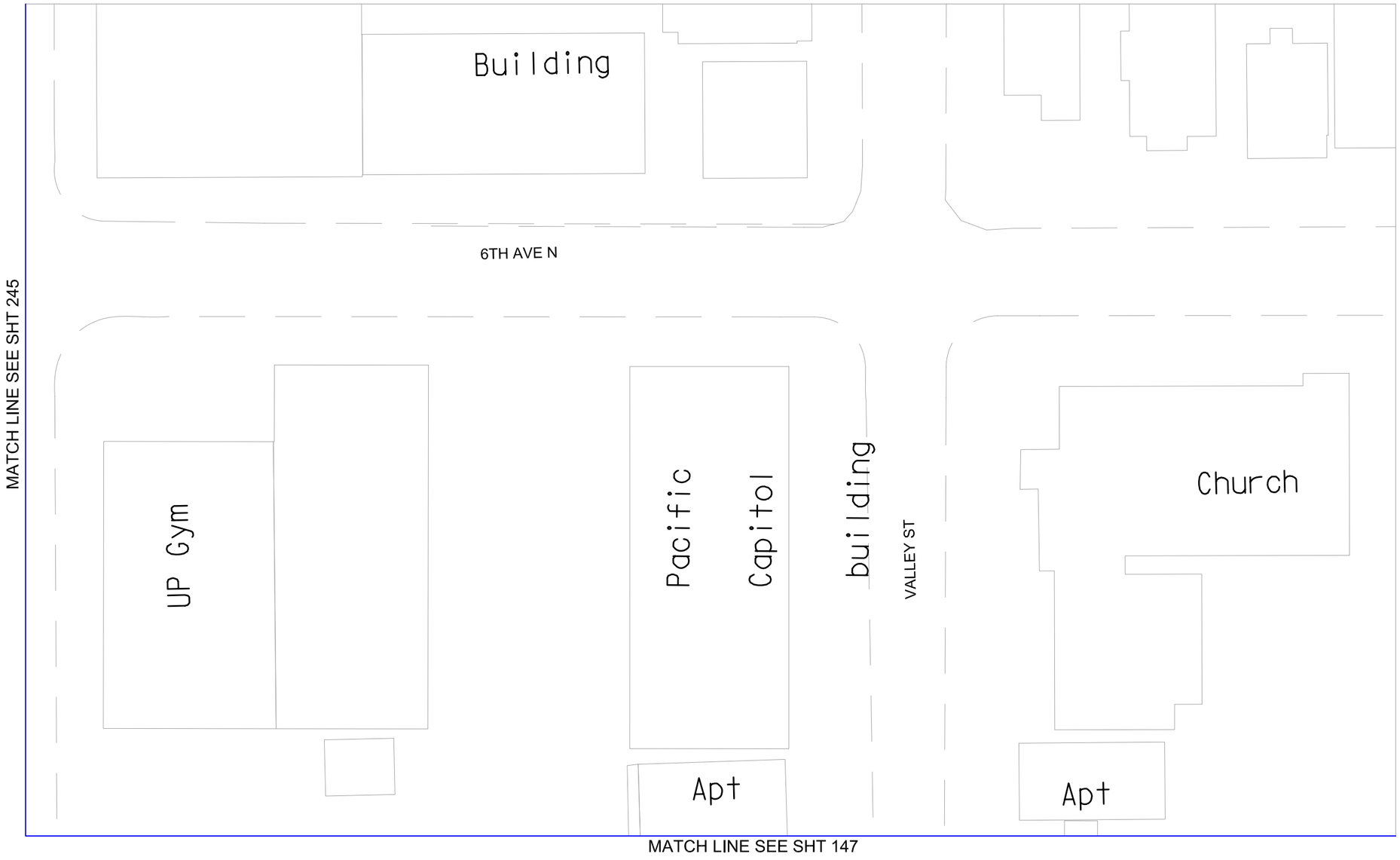
SCALE IN FEET

JUNE 1, 2009



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SHEET 246

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SCALE IN FEET

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SHEET 250

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SCALE IN FEET

JUNE 1, 2009

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SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY PLANS

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SHEET 251

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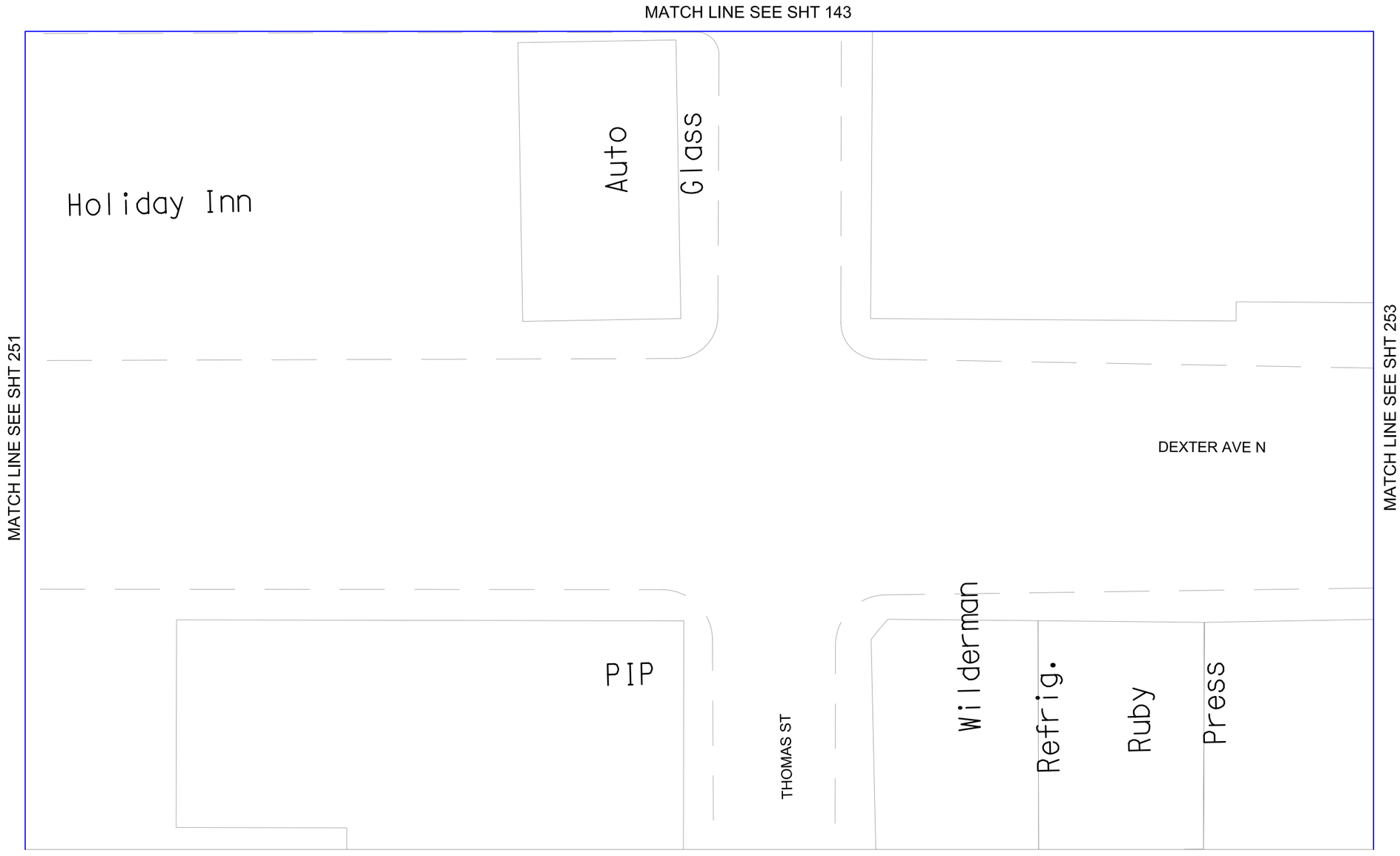
SCALE IN FEET

JUNE 1, 2009



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SHEET 252

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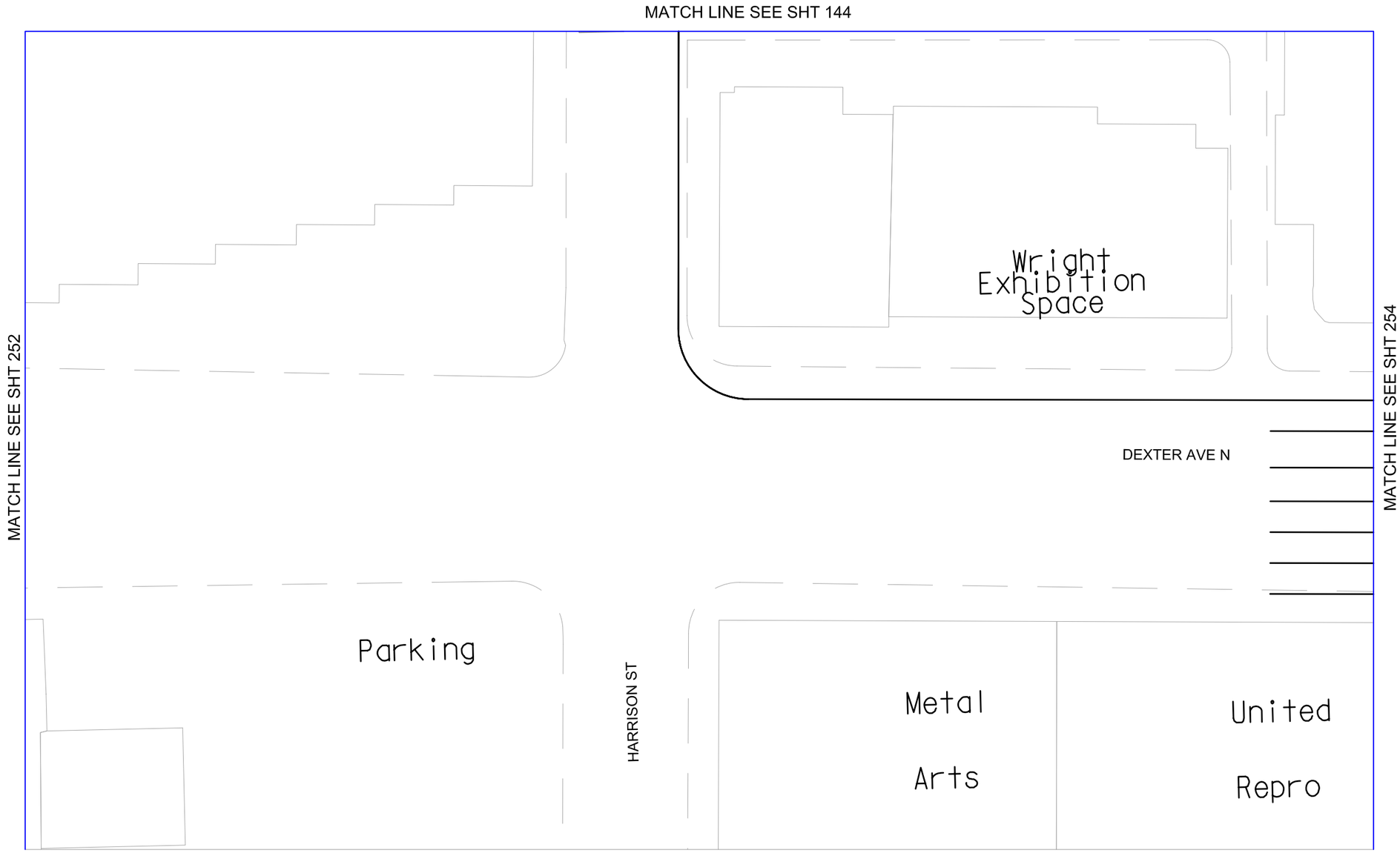

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SHEET 253

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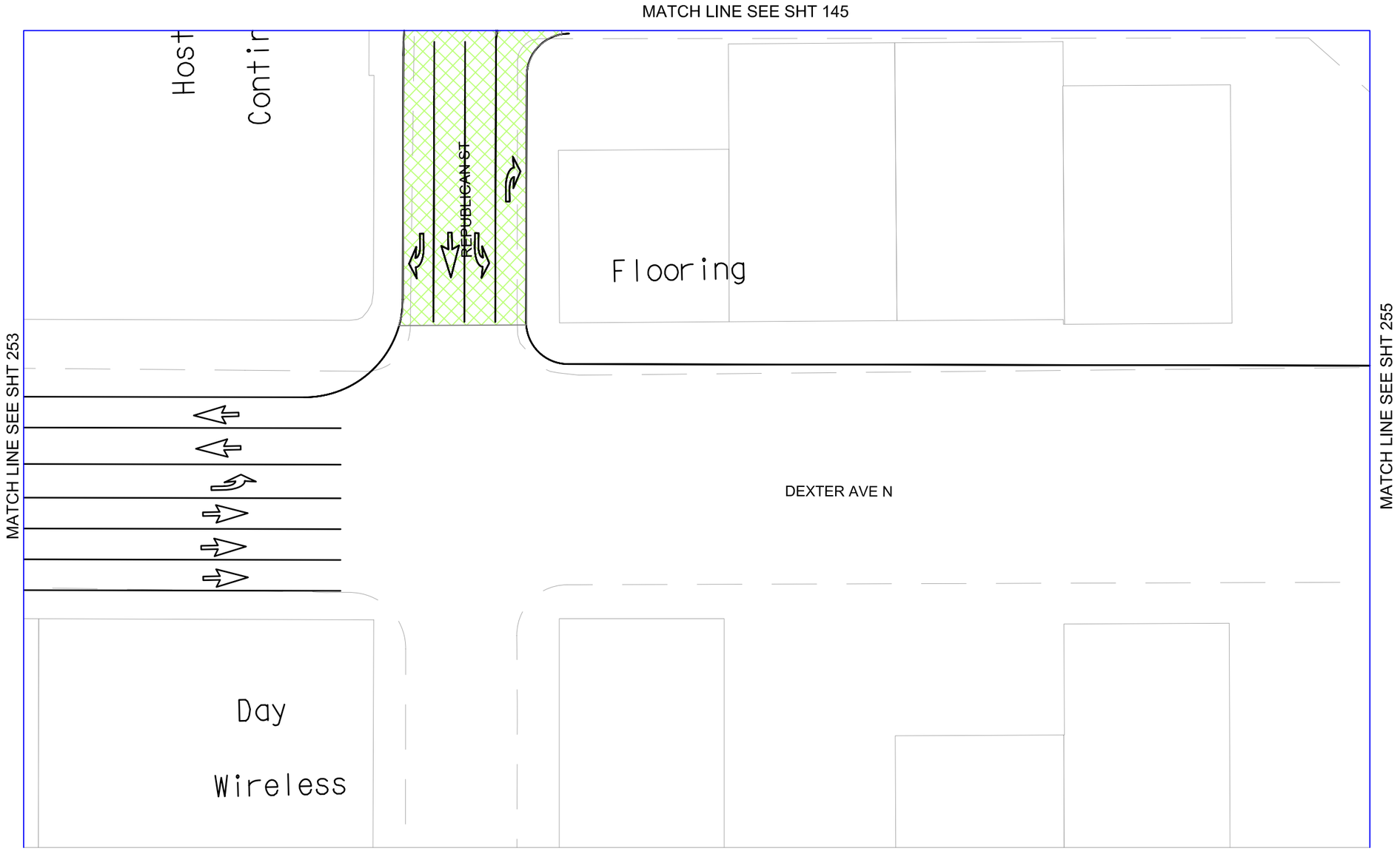

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SHEET 254

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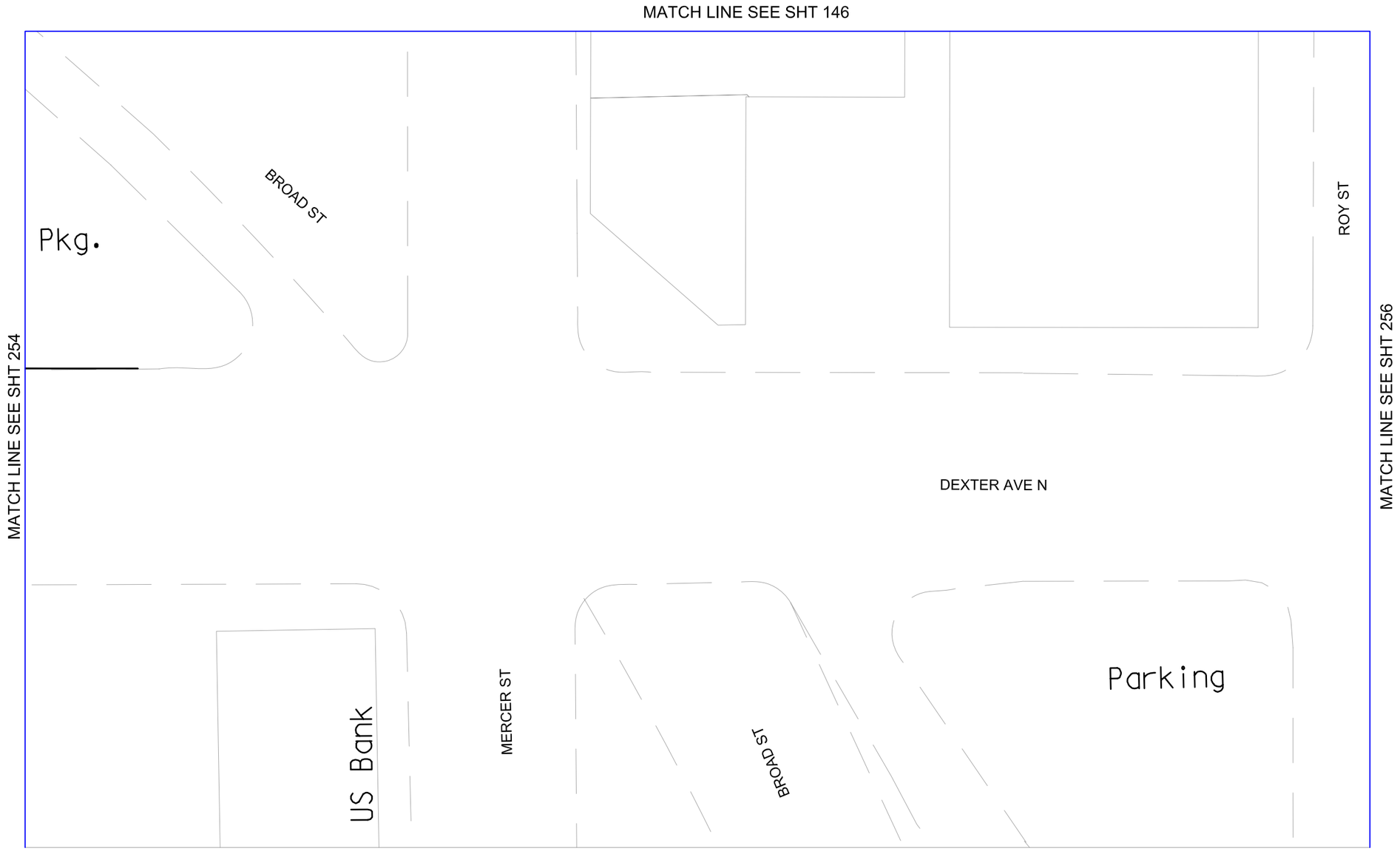
SCALE IN FEET

JUNE 1, 2009



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SHEET 255

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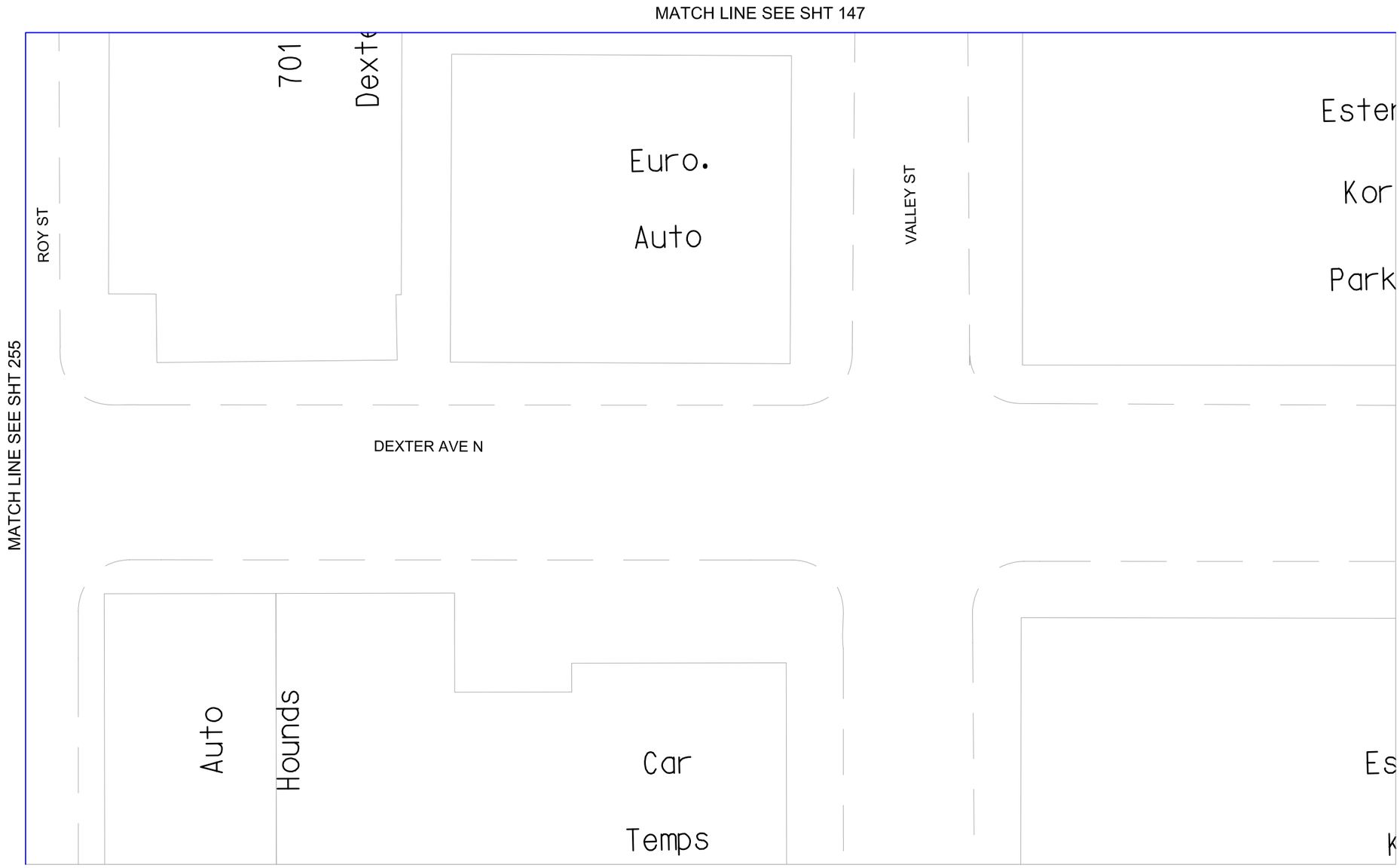

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SHEET 256

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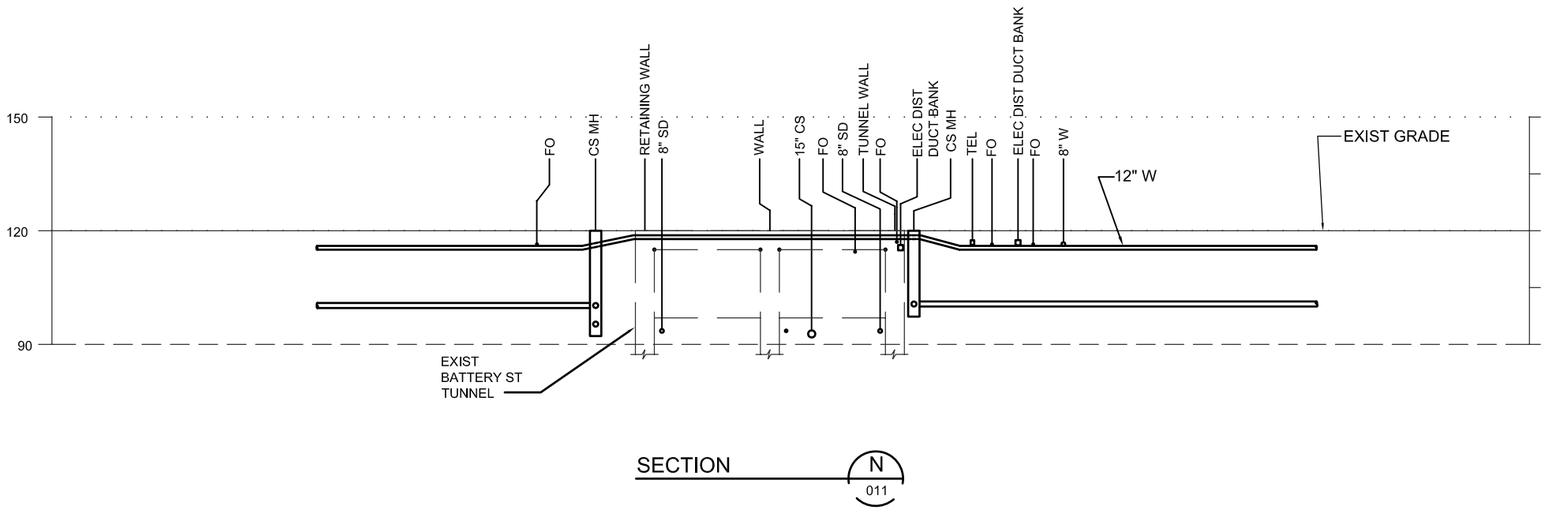

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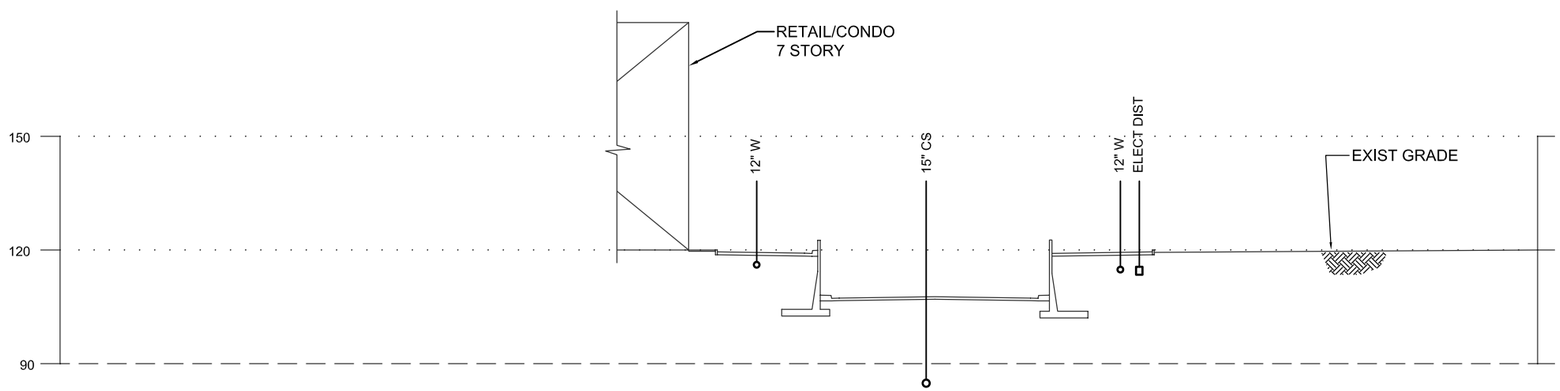

SECTION O 011

SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS

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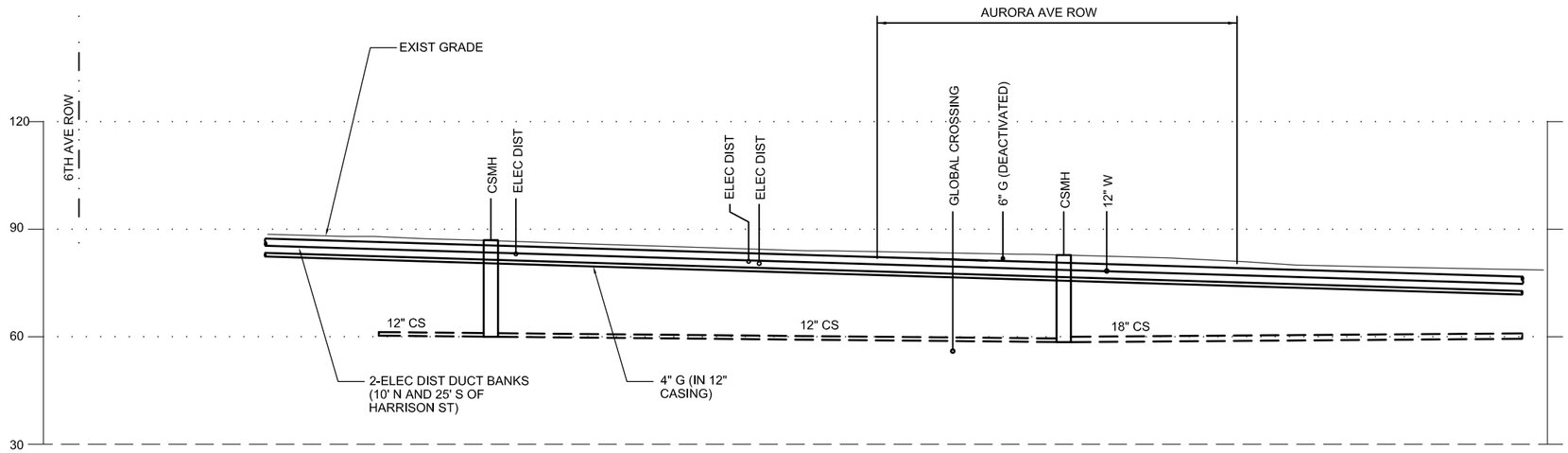

SECTION P 012

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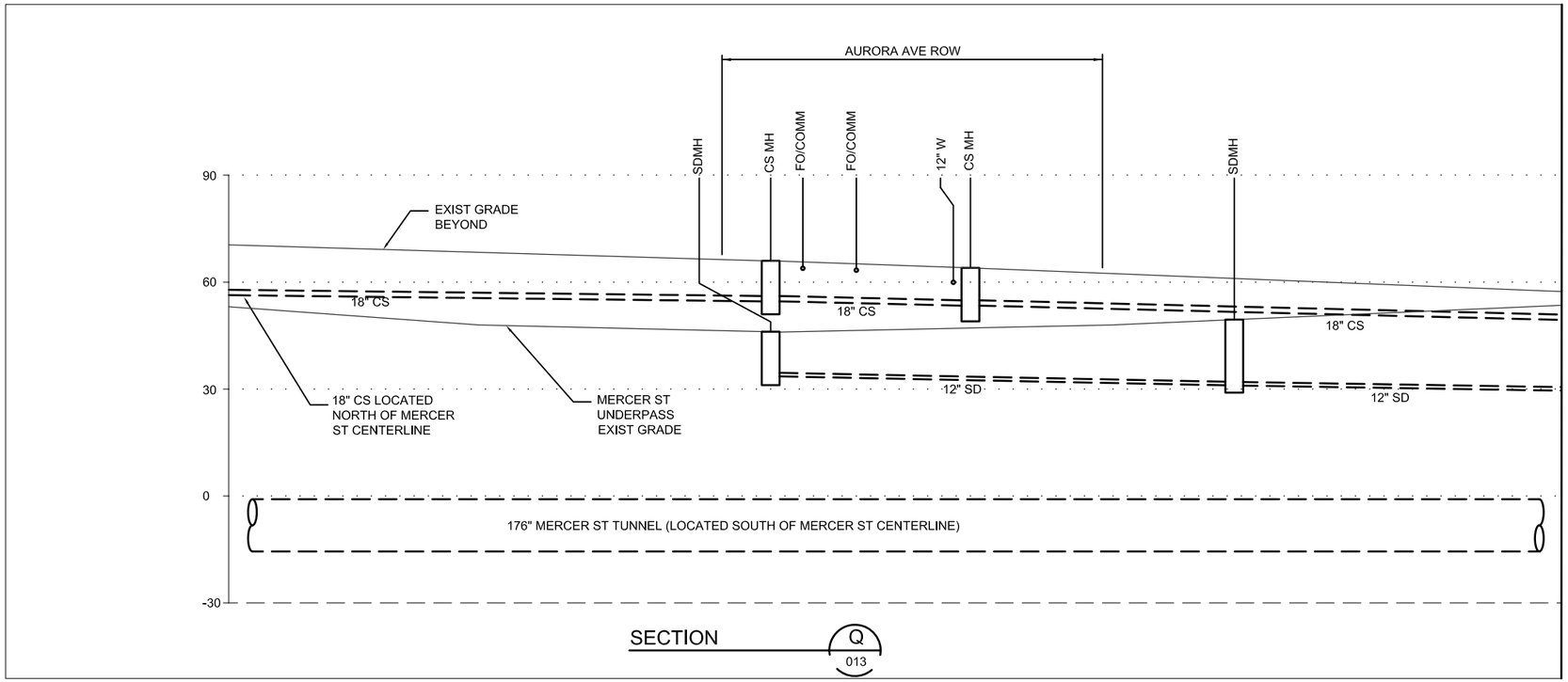

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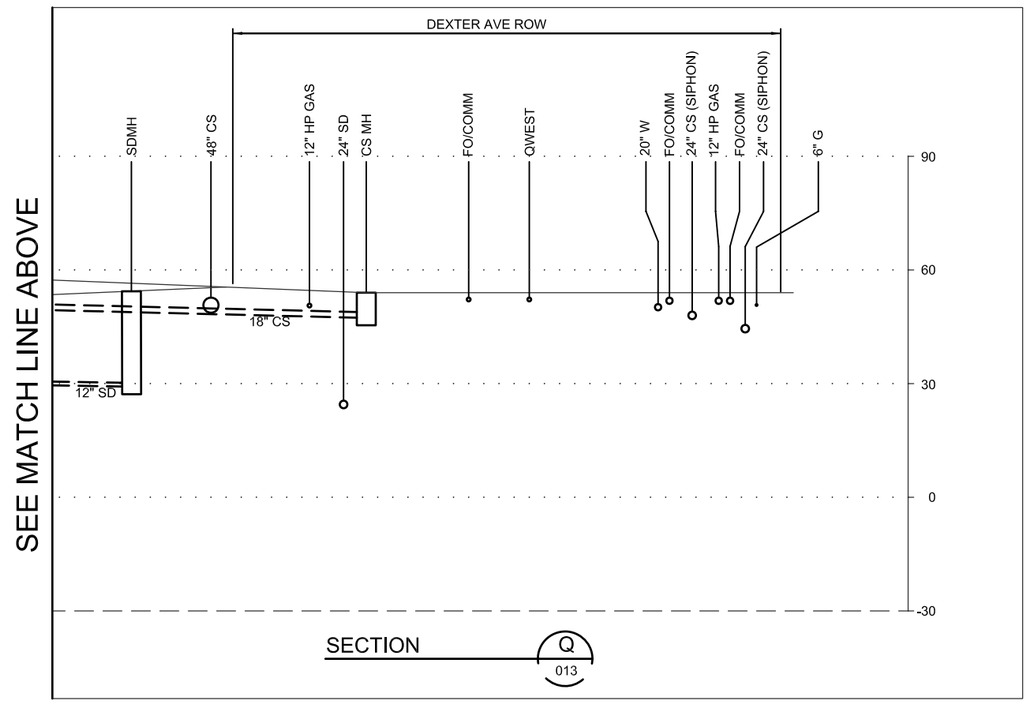

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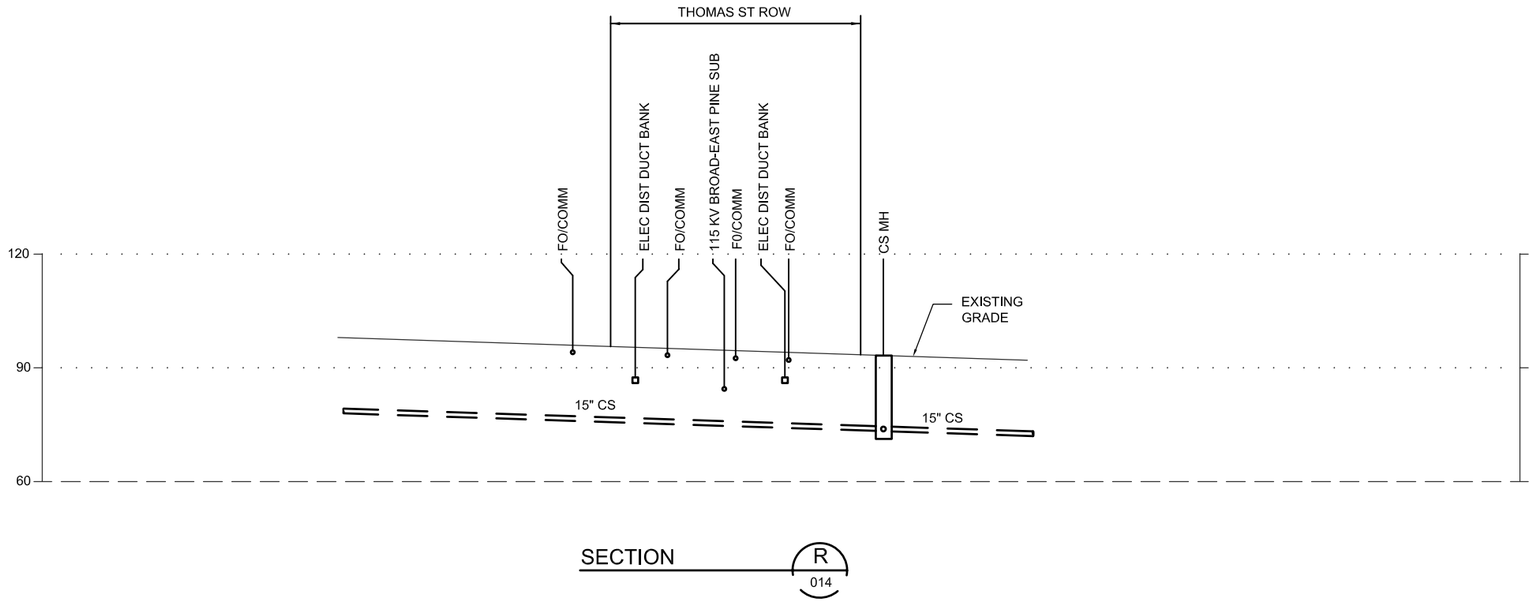
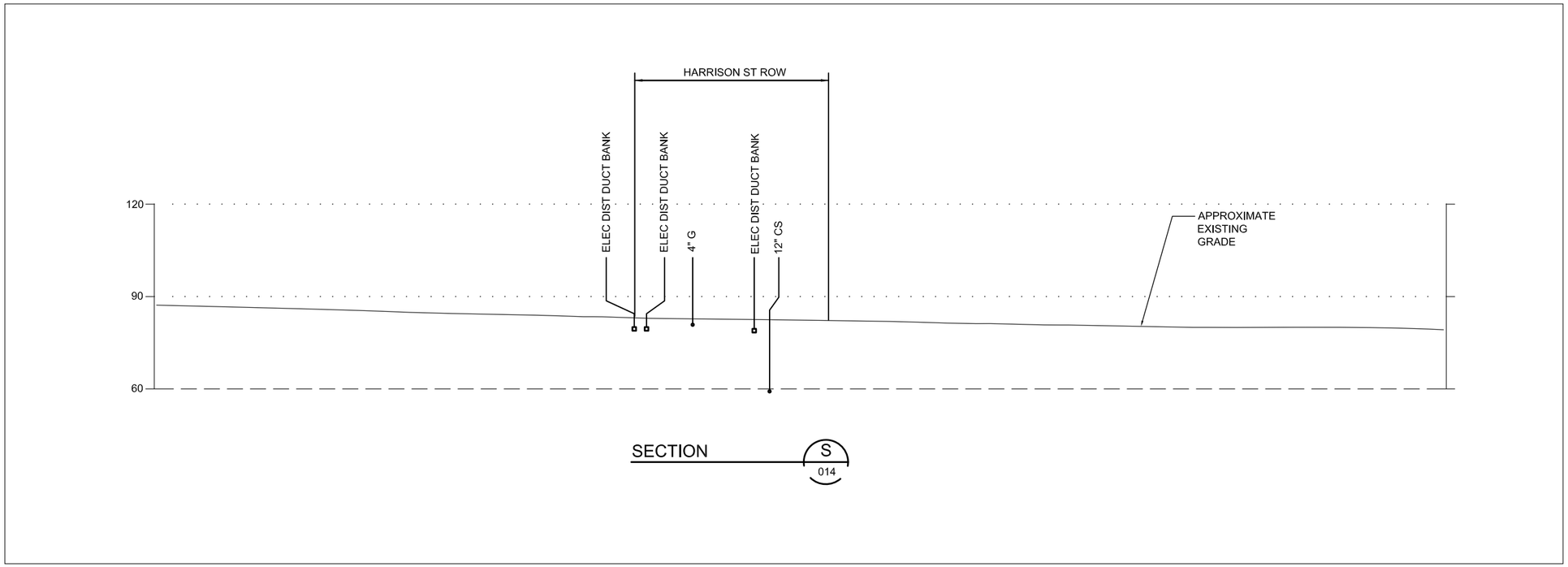
SCALE IN FEET

JUNE 1, 2009





SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS

DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

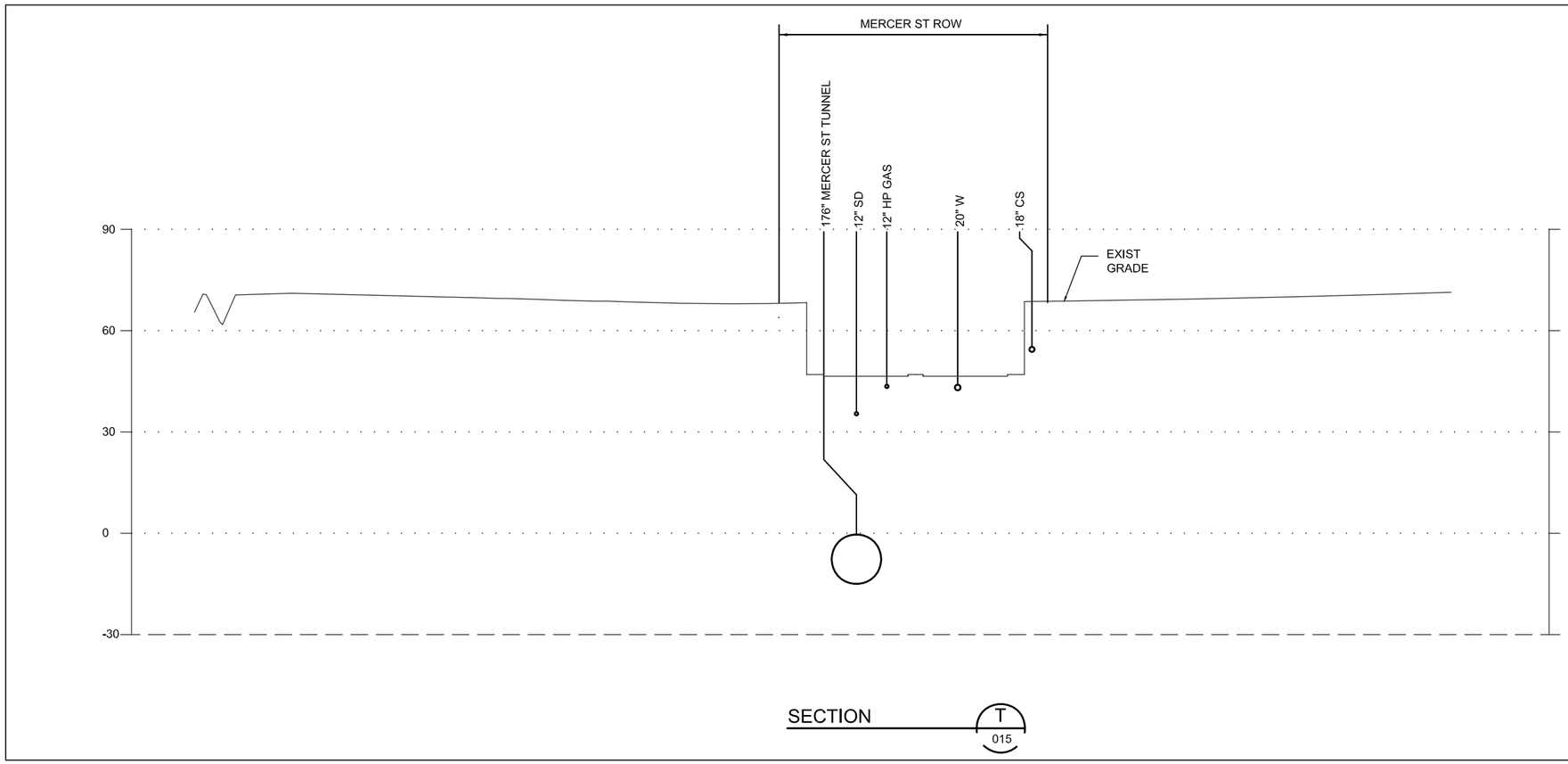
THIS MATERIAL IS CONCEPTUAL IN NATURE AND SHOULD BE USED FOR PLANNING AND DISCUSSION PURPOSES ONLY. IT IS SUBJECT TO CHANGE AND WILL BE FURTHER DEVELOPED AND REFINED AS PART OF THE PROJECT PROCESS

DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

SHEET 014

40 20 0 40
SCALE IN FEET

JUNE 1, 2009



SECTION T 015

SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS

DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

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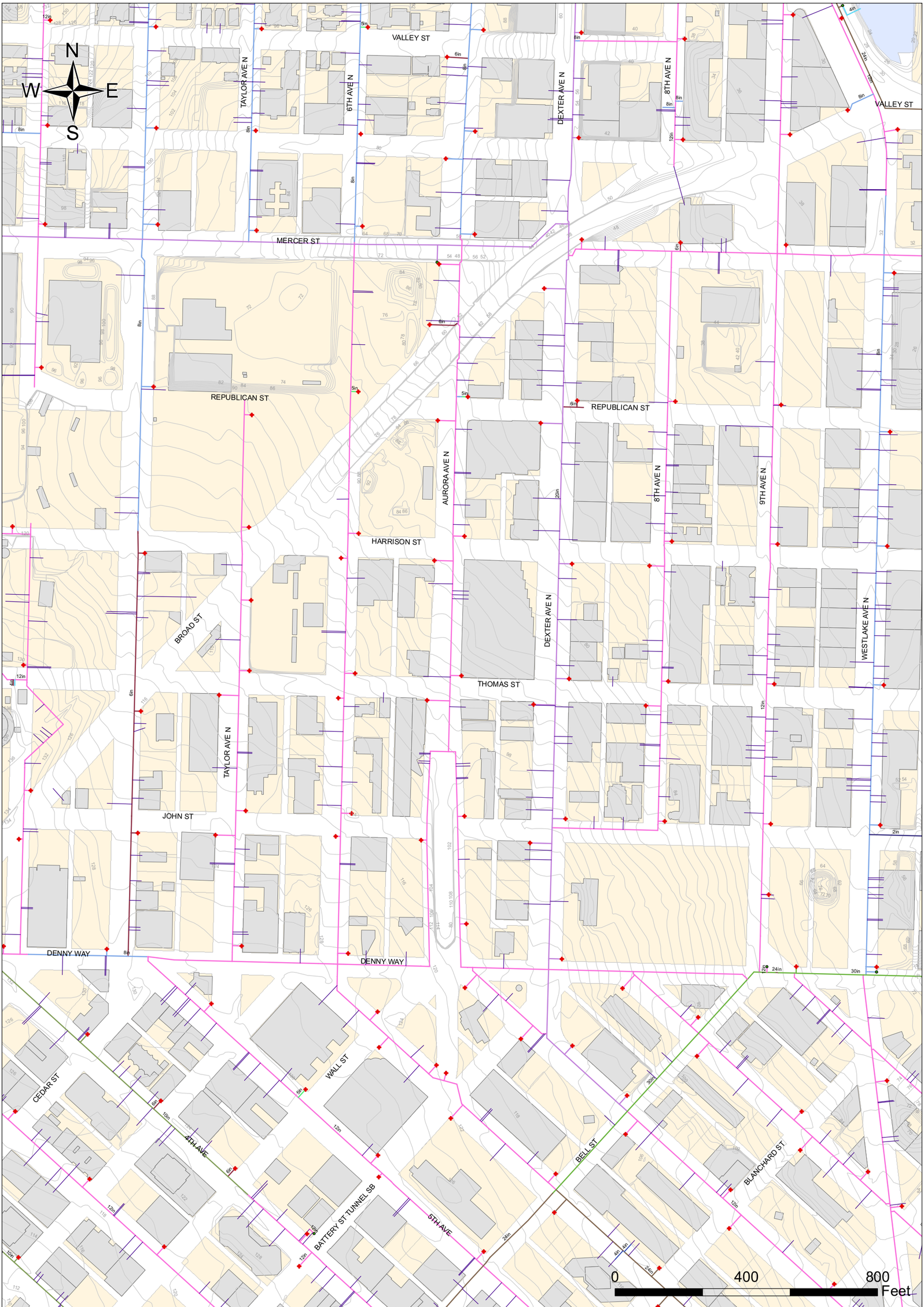
DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

SHEET 015

40 20 0 40
SCALE IN FEET

JUNE 1, 2009



AWV North Portal Waterlines by Diameter

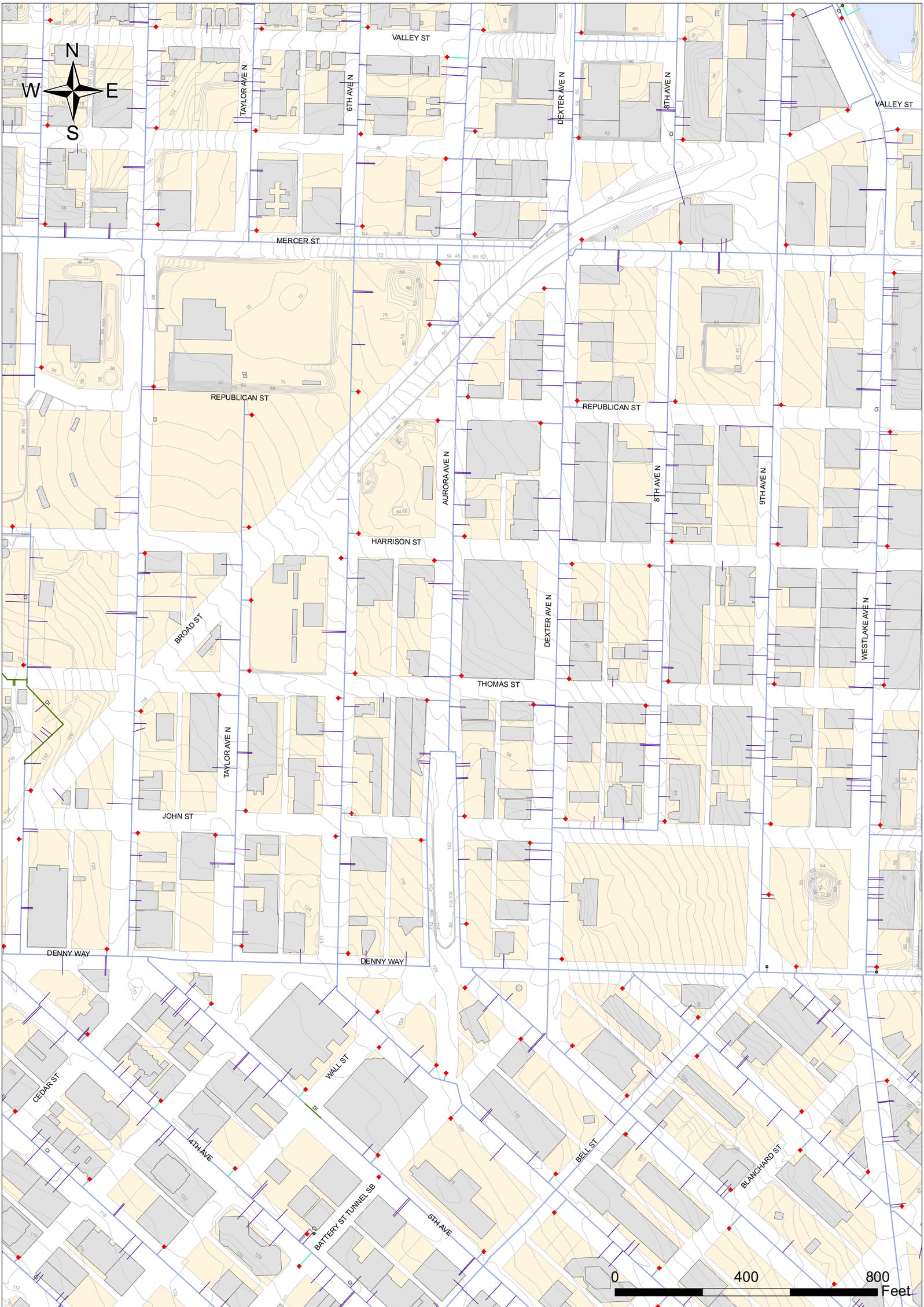
April 6th, 2009

Legend

- Hydrant
- Appurtenances
- Services
- Buildings
- Water Bodies
- Parcels

Waterline Diameter (in)

0.8, 1, 1.5, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 21, 22, 24, 30, 36, 40, 42, 48, 66



AWV North Portal Waterlines by Material

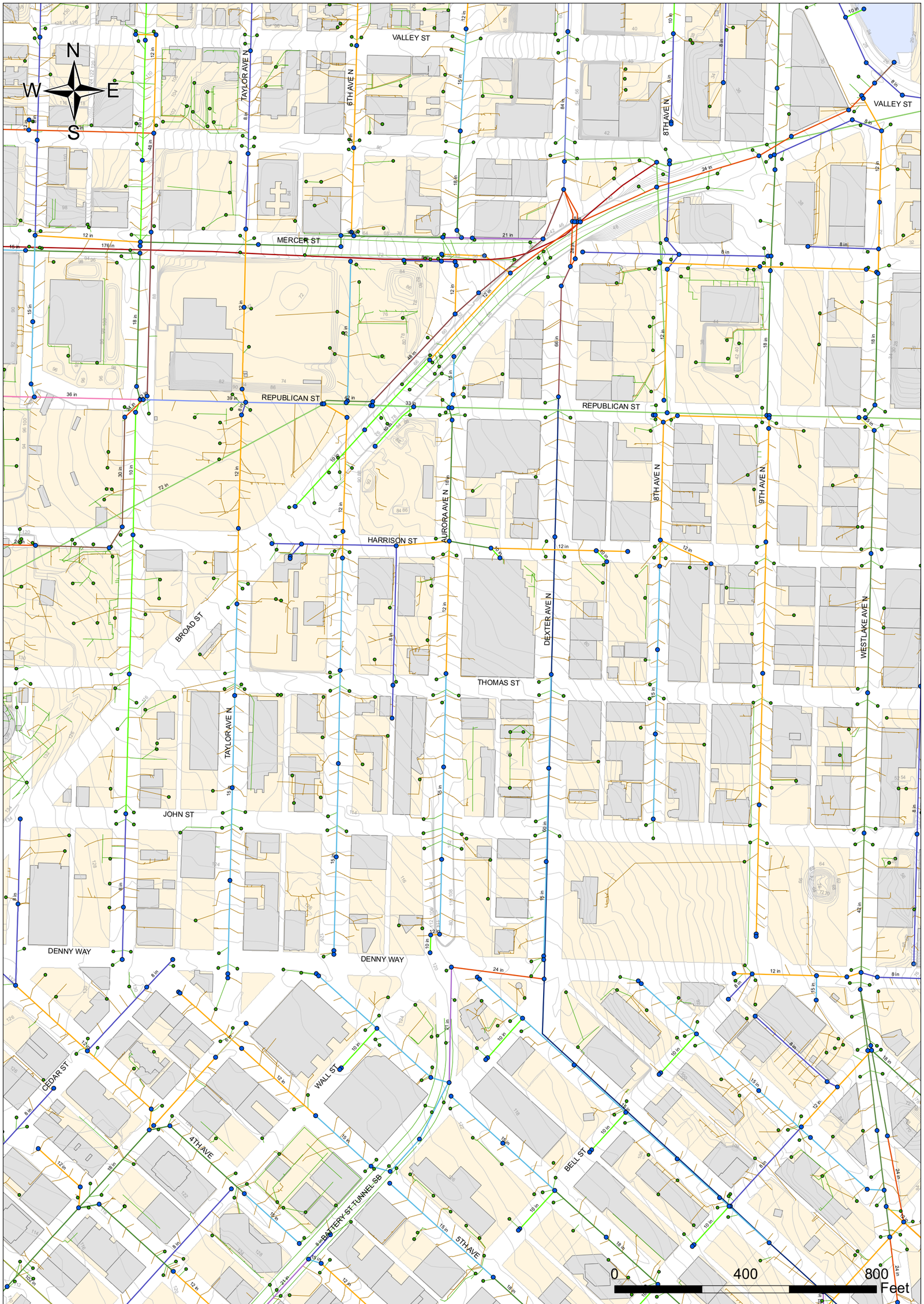
April 6th, 2009

Legend

- Hydrant
- Appurtenances
- Services
- Buildings
- Water Bodies
- Parcels

Waterline
MSG_MATERI

- CC
- CI
- CONC
- CU
- DI
- GI
- GS
- I
- KAL
- LBSTL
- PL
- PVC
- RVSTL
- STL
- WESTL



AWV North Portal Sewer/Drainage Pipes by Diameter

April 6th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

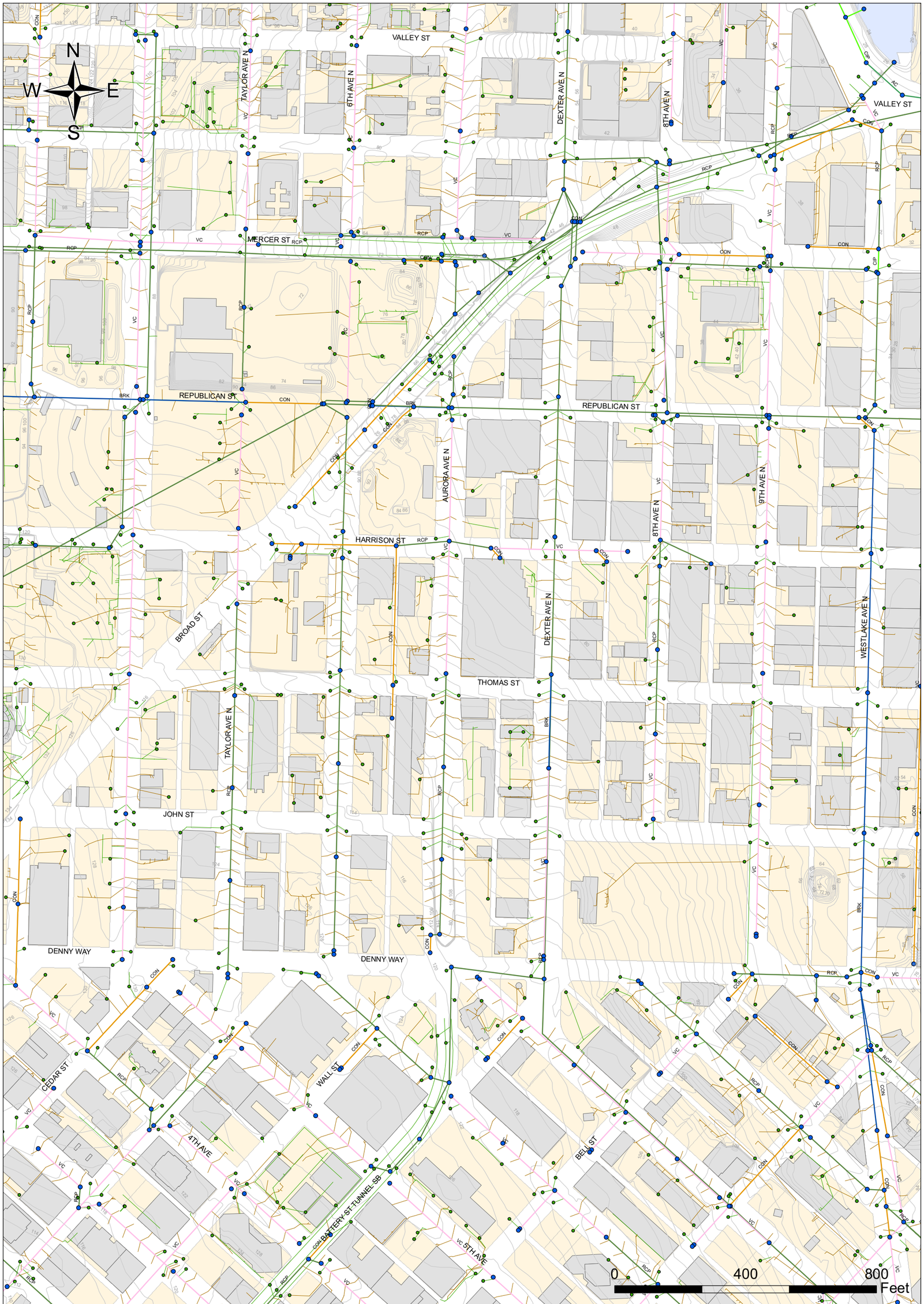
Laterals

Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines Diameter

6 8 10 12 15 18 20 21 24 30 33 36 39 42 45 48 60 66 72 84 102 176



AWV North Portal Sewer/Drainage Pipes by Material

April 6th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals

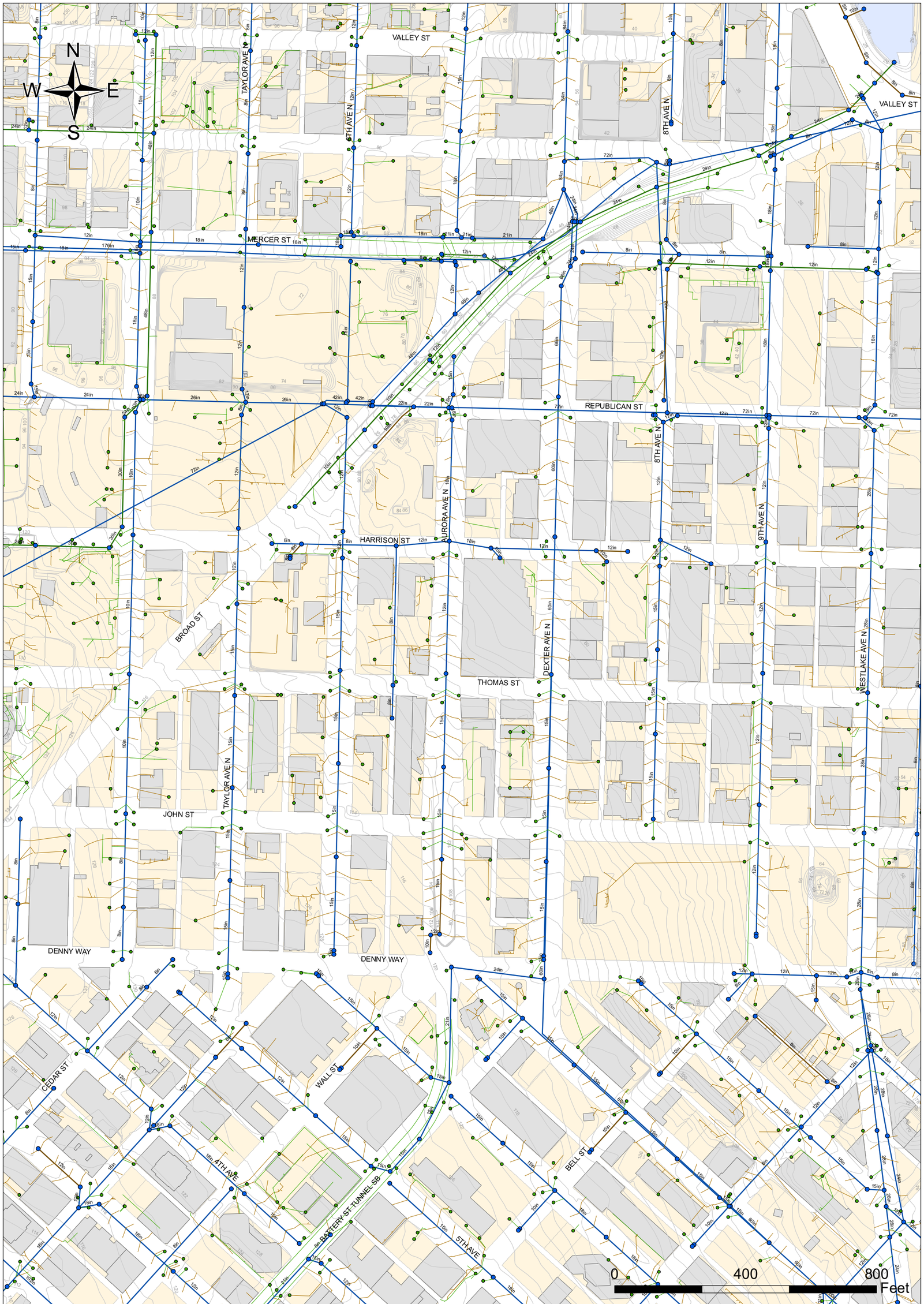
Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines

MATERIAL

- AC
- BRK
- CIP
- CON
- DIP
- PVC
- RCP
- VC



AWV North Portal Sewer/Drainage Pipes by Probable Flow

April 6th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals
Probable Flow
- Combined
- Drainage
- Sewer

Sewer Lines
Probable Flow
- Combined
- Drainage
- Sewer

Task CE
SR 99 Bored Tunnel Alternative
North Portal

City of Seattle Franchise Utility Maps

The below information is included on the attached CD.

Map No.	Location
31N-30	Bell St. to Battery St. - 5th Ave.
31N-19	Bell St. to Battery St. - 6th Ave.
31N-18	Bell St. to Battery St. - 7th Ave.
36N-1	Denny Way and SR99 Intersection
36N-2	Battery St. to Wall St. - BST
36N-5	Denny Way and Sixth Ave. N. Intersection
2D-1	Denny Way to John St. - Dexter Ave. N.
2D-2	John St. to Thomas St. - Dexter Ave. N.
2D-3	Thomas St. to Harrison St. - Dexter Ave. N.
2D-4	Harrison St. to Republican St. - Dexter Ave. N.
2D-17	Broad St. and 6th Ave. N. Intersection
2D-18	Thomas St. to Harrison St. - 6th Ave. N.
2D-19	John St. to Thomas St. - 6th Ave. N.
2D-13	Thomas St. to Harrison St. - 6th Ave. N. Alley
2D-9	John St. to Thomas St. - SR99
2D-8	Thomas St. to Harrison St. - SR99
2D-12	John St. to Thomas St. - 6th Ave. N. Alley
2D-20	Denny Way to John St. - 6th Ave. N.
2D-11	Denny Way to John St. - 6th Ave. N. Alley
2D-10	Denny Way to John St. - SR99

Appendix D

Bored Tunnel –

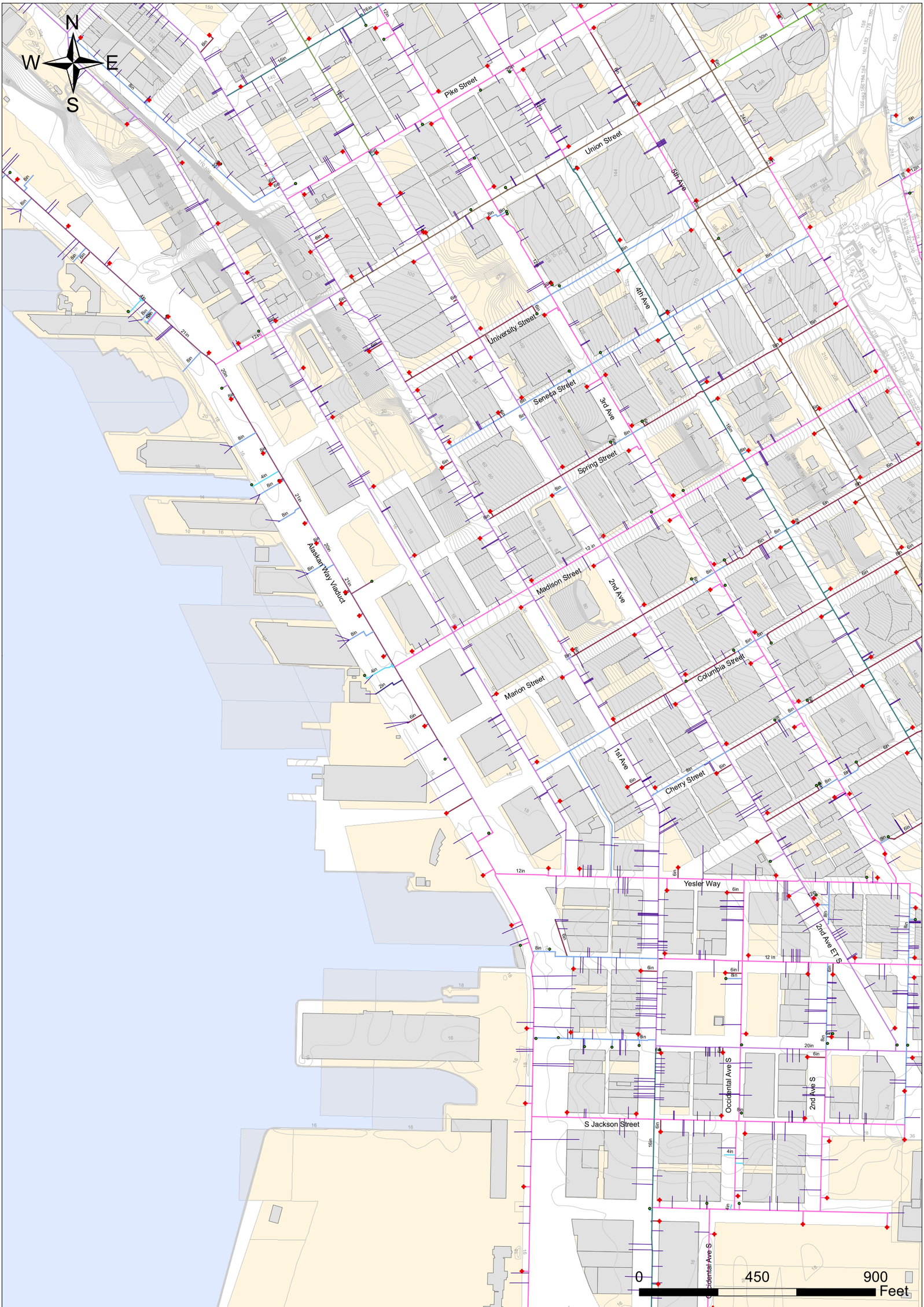
Support Documentation

Appendix D

List of Figures

Refer to attached CD for the following information:

- City of Seattle Franchise Utility Maps.
- SR 99 Bored Tunnel Alternative, Bored Tunnel City GIS for Sewer/Drainage/Water Pipes.



AWV Qwest Field to Pike St Waterlines by Diameter

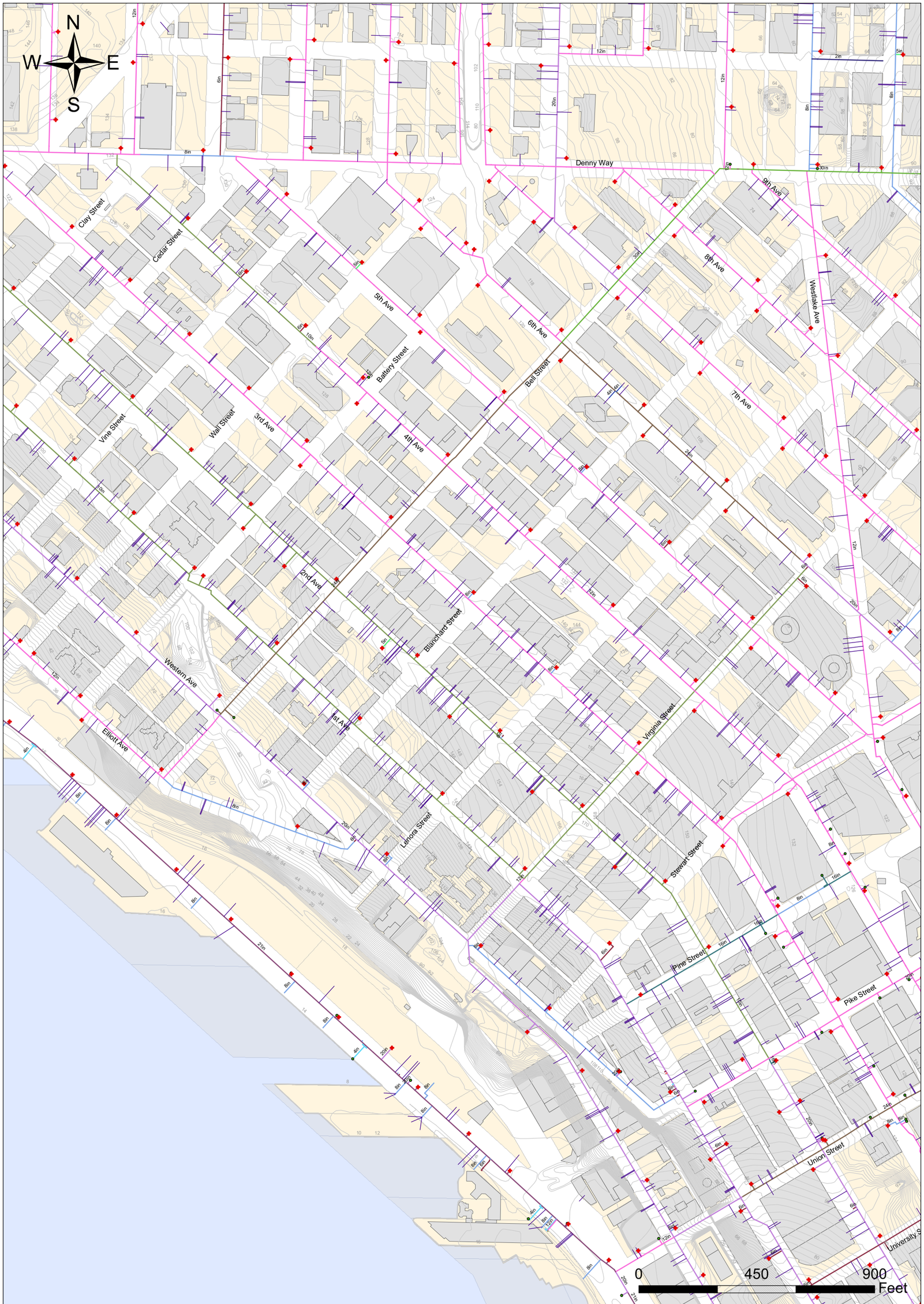
May 12th, 2009

Legend

- Hydrant
- Appurtenances
- Services
- Buildings
- Water Bodies
- Parcels

Waterline Diameter (in)

0.8, 1, 1.5, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 21, 22, 24, 30, 36, 40, 42, 48, 66



AWV Pike St to John St Waterlines by Diameter

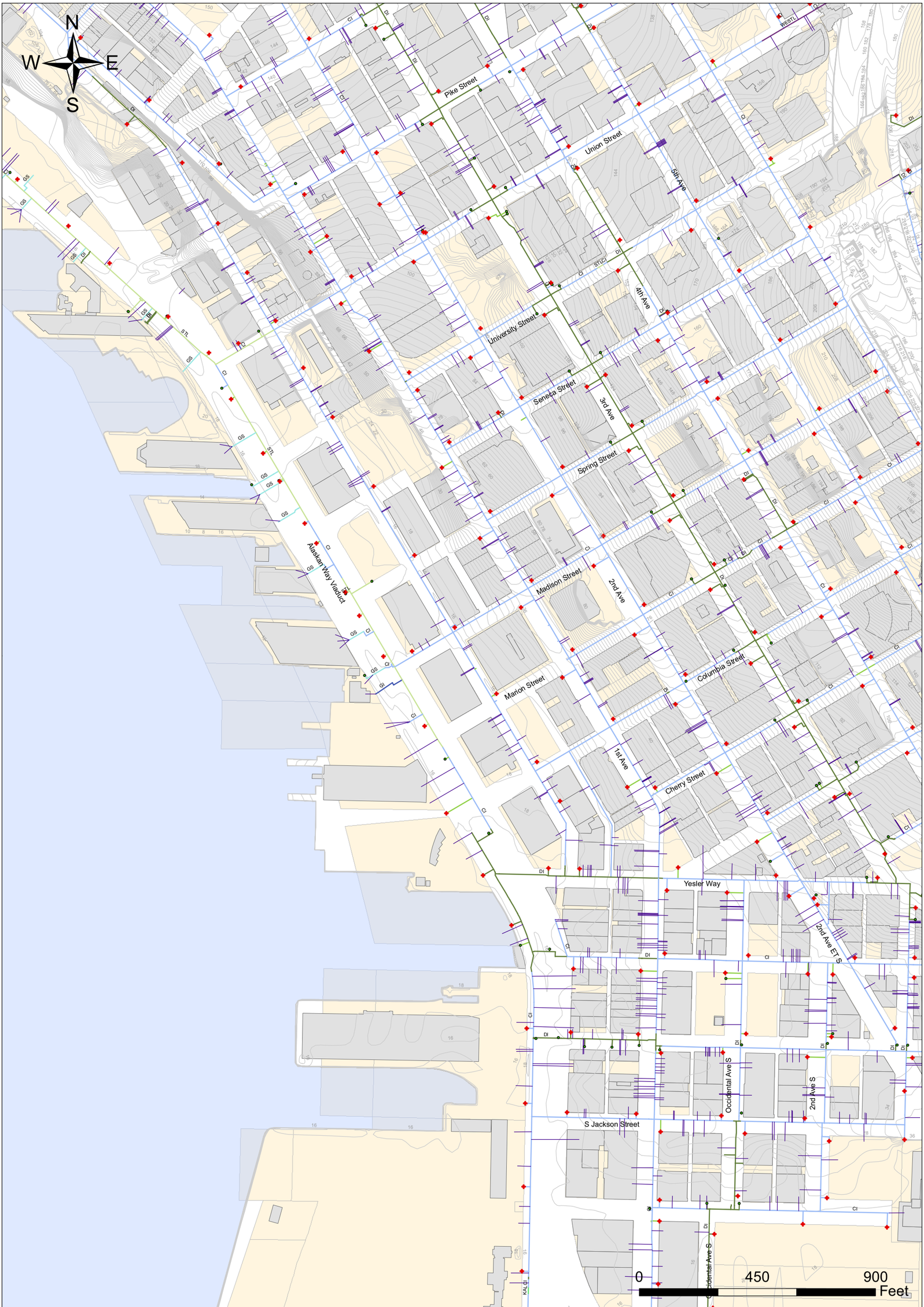
May 13th, 2009

Legend

- Hydrant
- Appurtenances
- Services
- Buildings
- Water Bodies
- Parcels

Waterline Diameter (in)

0.8, 1, 1.5, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 21, 22, 24, 30, 36, 40, 42, 48, 66



AWV Qwest Field to Pike St Waterlines by Material

May 12th, 2009

Legend

- Hydrant
- Appurtenances
- Services
- Buildings
- Water Bodies
- Parcels
- **Waterline**
- **MSG_MATERI**
- CC
- CI
- CONC
- CU
- DI
- GI
- GS
- I
- KAL
- LBSTL
- PL
- PVC
- RVSTL
- STL
- WESTL

AWV Pike St to John St Waterlines by Material

May 13th, 2009

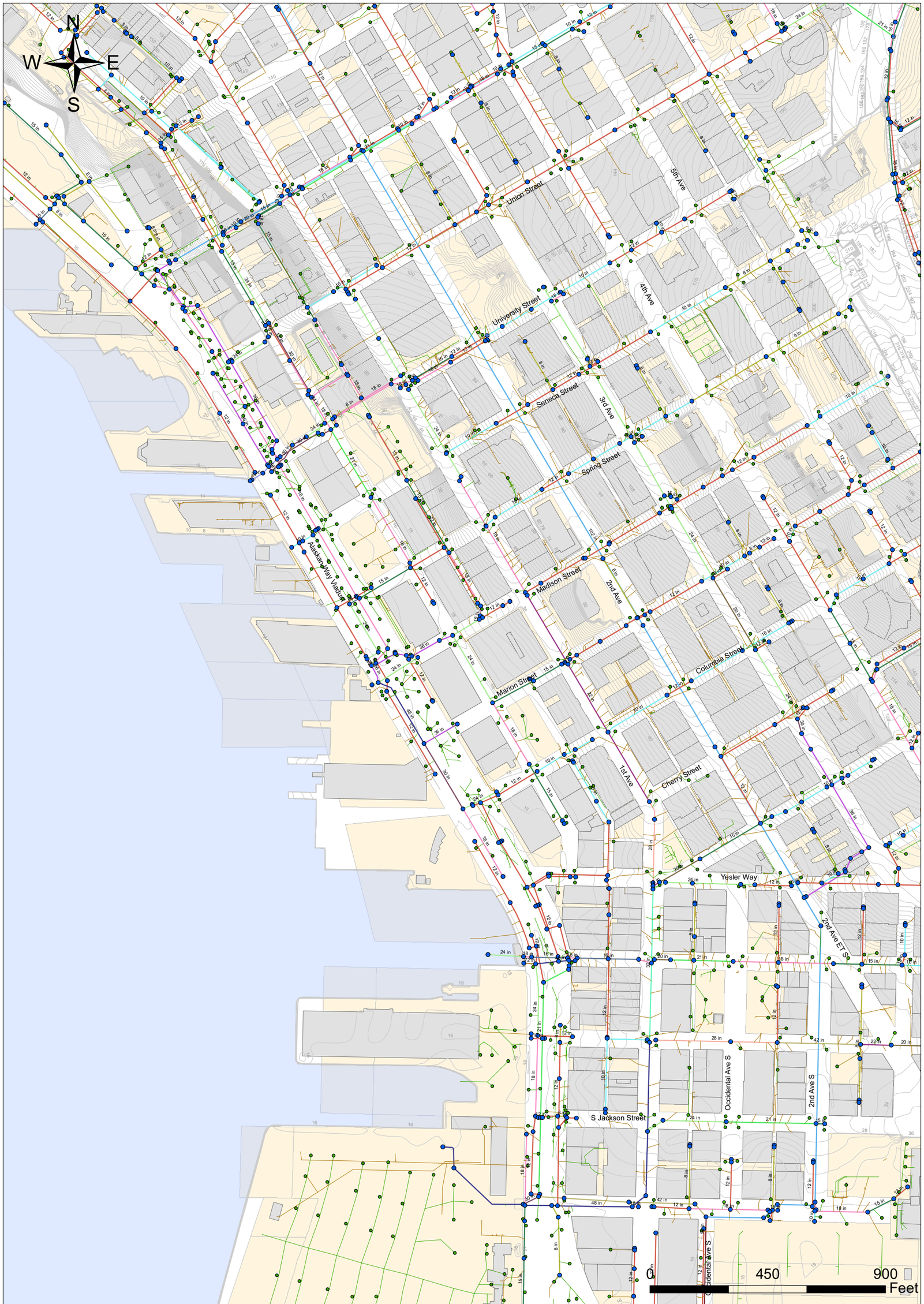
Legend

- Hydrant
- Appurtenances
- Services
- Buildings
- Water Bodies
- Parcels

Waterline

MSG_MATERI

- CC
- CI
- CONC
- CU
- DI
- GI
- GS
- I
- KAL
- LBSTL
- PL
- PVC
- RVSTL
- STL
- WESTL



AWV Qwest Field to Pike St Sewer/Drainage Pipes by Diameter

May 12th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals

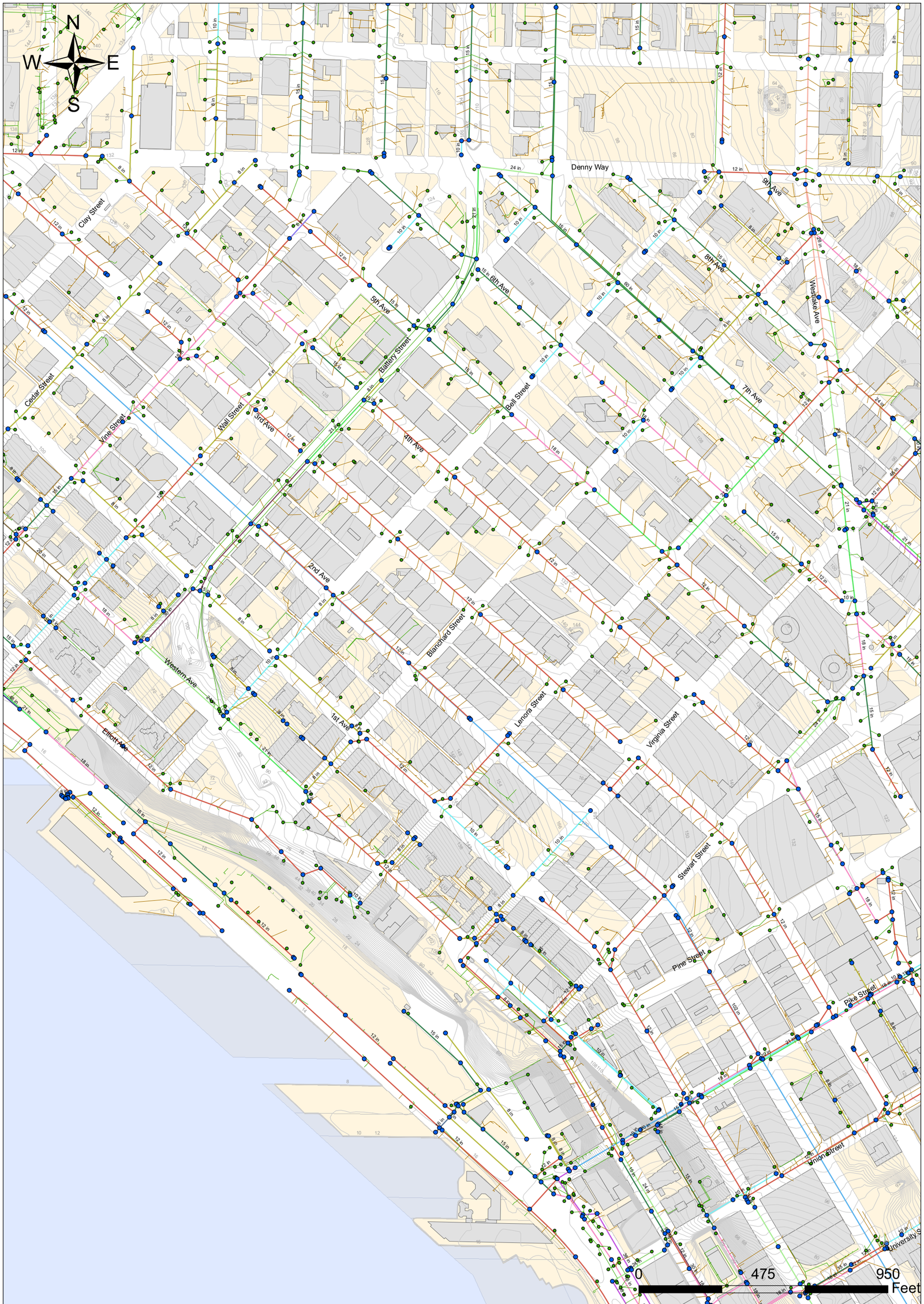
Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines

Diameter

6, 8, 10, 12, 15, 16, 18, 20, 21, 22, 24, 28, 30, 32, 36, 42, 48, 49, 60, 72, 96, 102



AWV Pike St to John St Sewer/Drainage Pipes by Diameter

May 13th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals

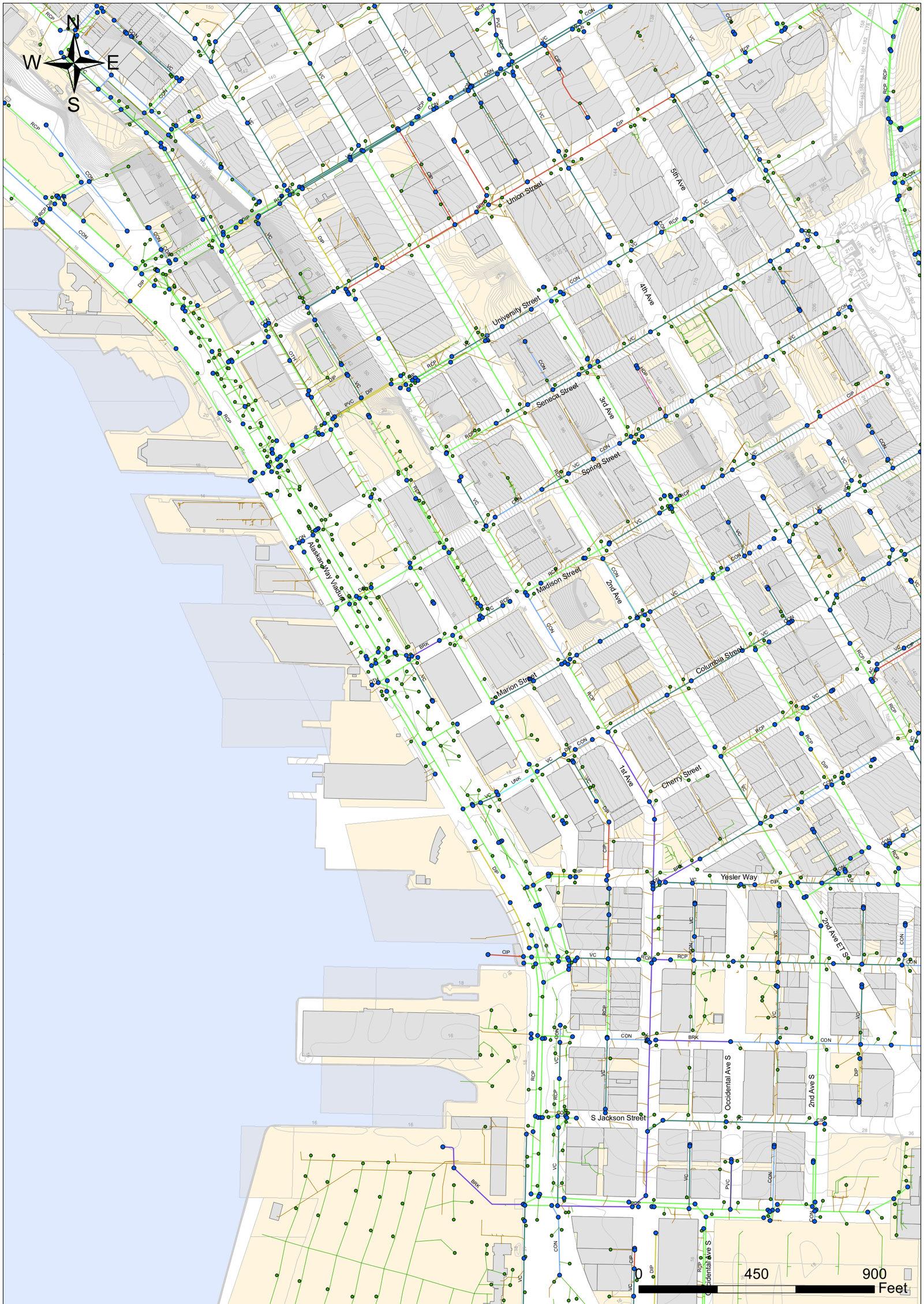
Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines

Diameter

- 6
- 8
- 10
- 12
- 15
- 16
- 18
- 20
- 21
- 22
- 24
- 28
- 30
- 32
- 36
- 42
- 48
- 49
- 60
- 72
- 96
- 102



AWV Qwest Field to Pike St Sewer/Drainage Pipes by Material

May 12th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals

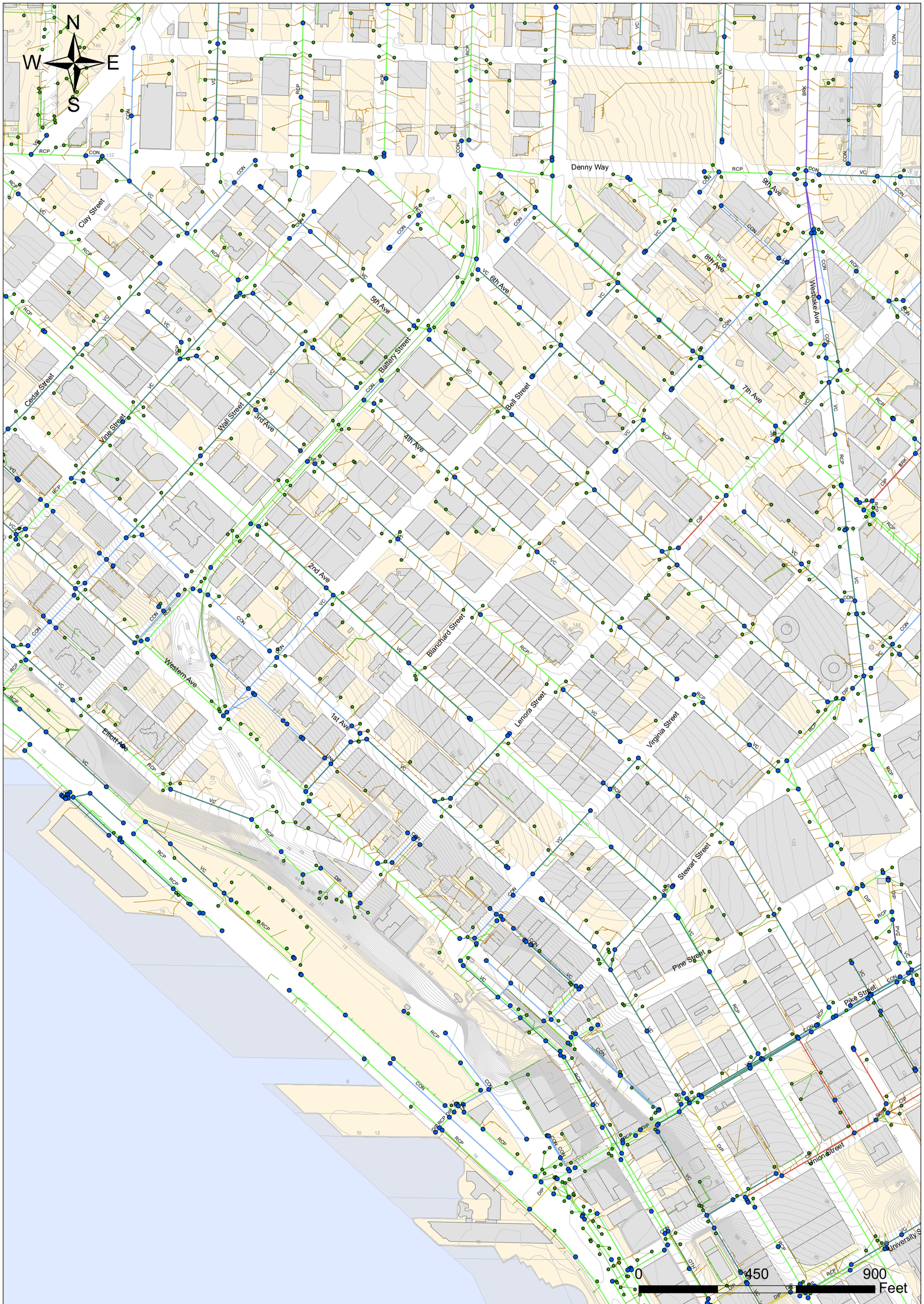
Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines

MATERIAL

- AC
- BRK
- CIP
- CON
- DIP
- HDP
- OTH
- PVC
- RCP
- UNK
- VC



AWV Pike St to John St Sewer/Drainage Pipes by Material

May 13th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals

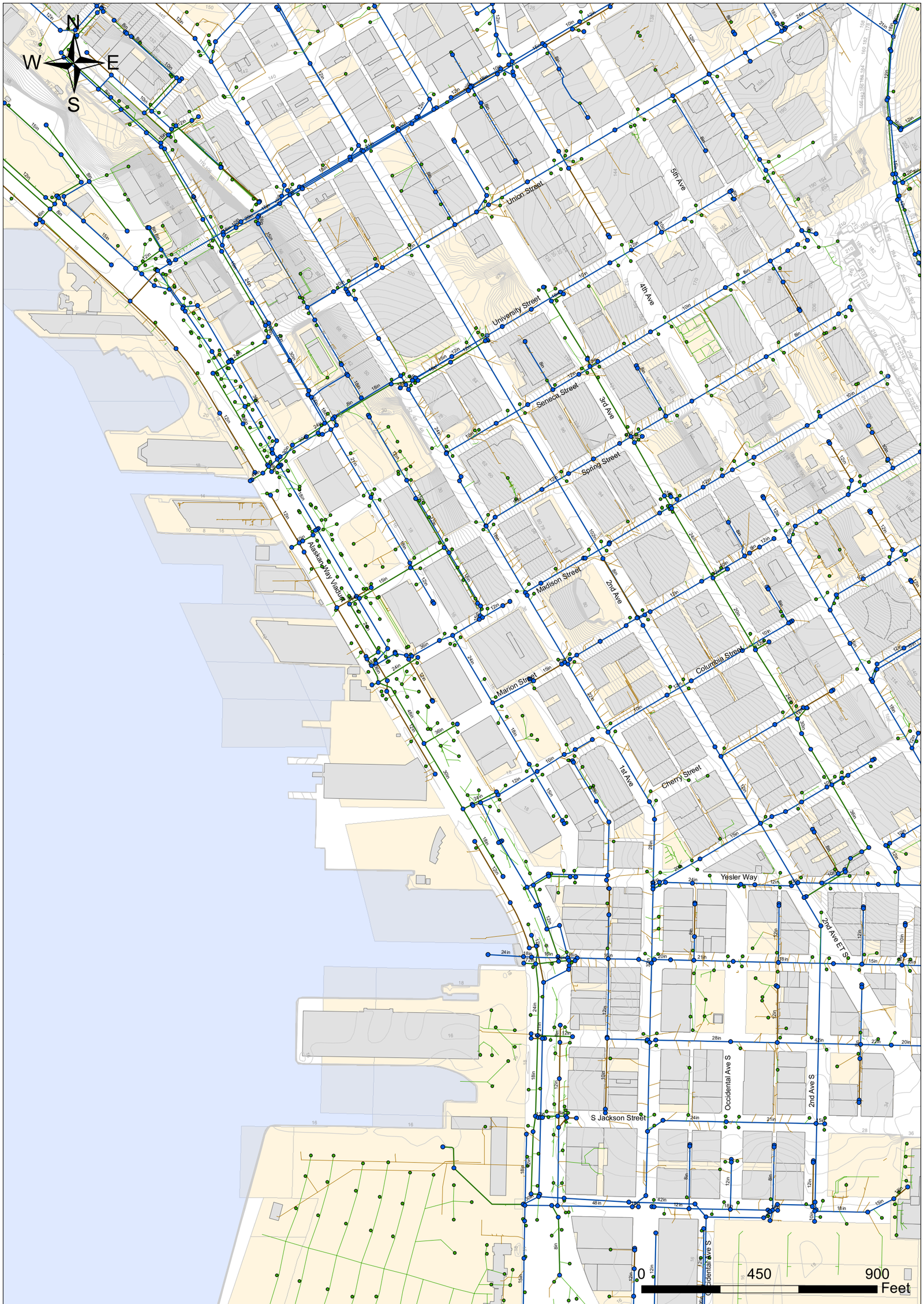
Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines

MATERIAL

- AC
- BRK
- CIP
- CON
- DIP
- HDP
- OTH
- PVC
- RCP
- UNK
- VC



AWV Qwest Field to Pike St Sewer/Drainage Pipes by Probable Flow

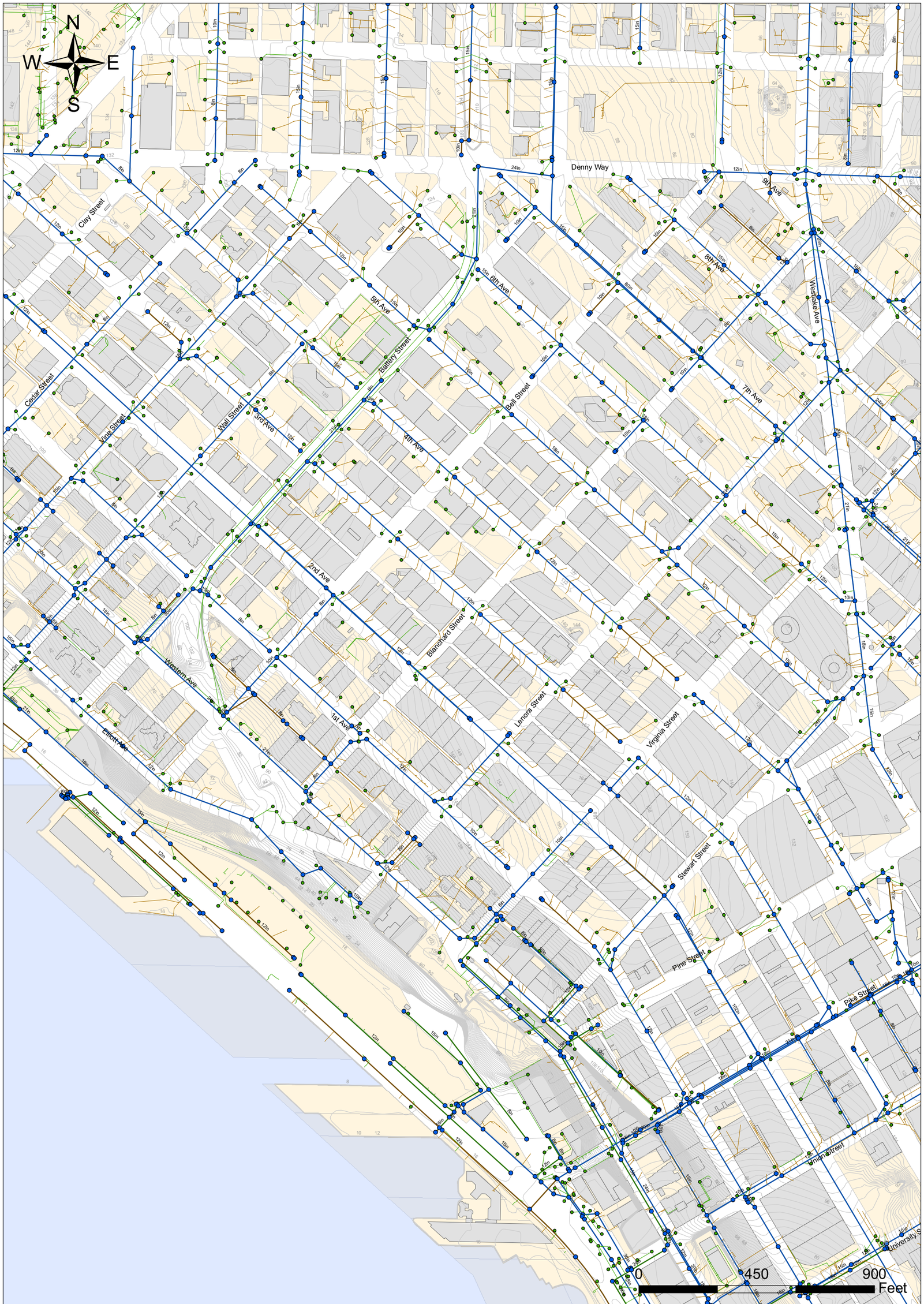
May 12th, 2009

Legend

- Manholes
- Catch Basin
- Water Bodies
- Parcels
- Buildings

Laterals
Probable Flow
- Combined
- Drainage
- Sewer

Sewer Lines
Probable Flow
- Combined
- Drainage
- Sewer



AWV Pike St to John St Sewer/Drainage Pipes by Probable Flow

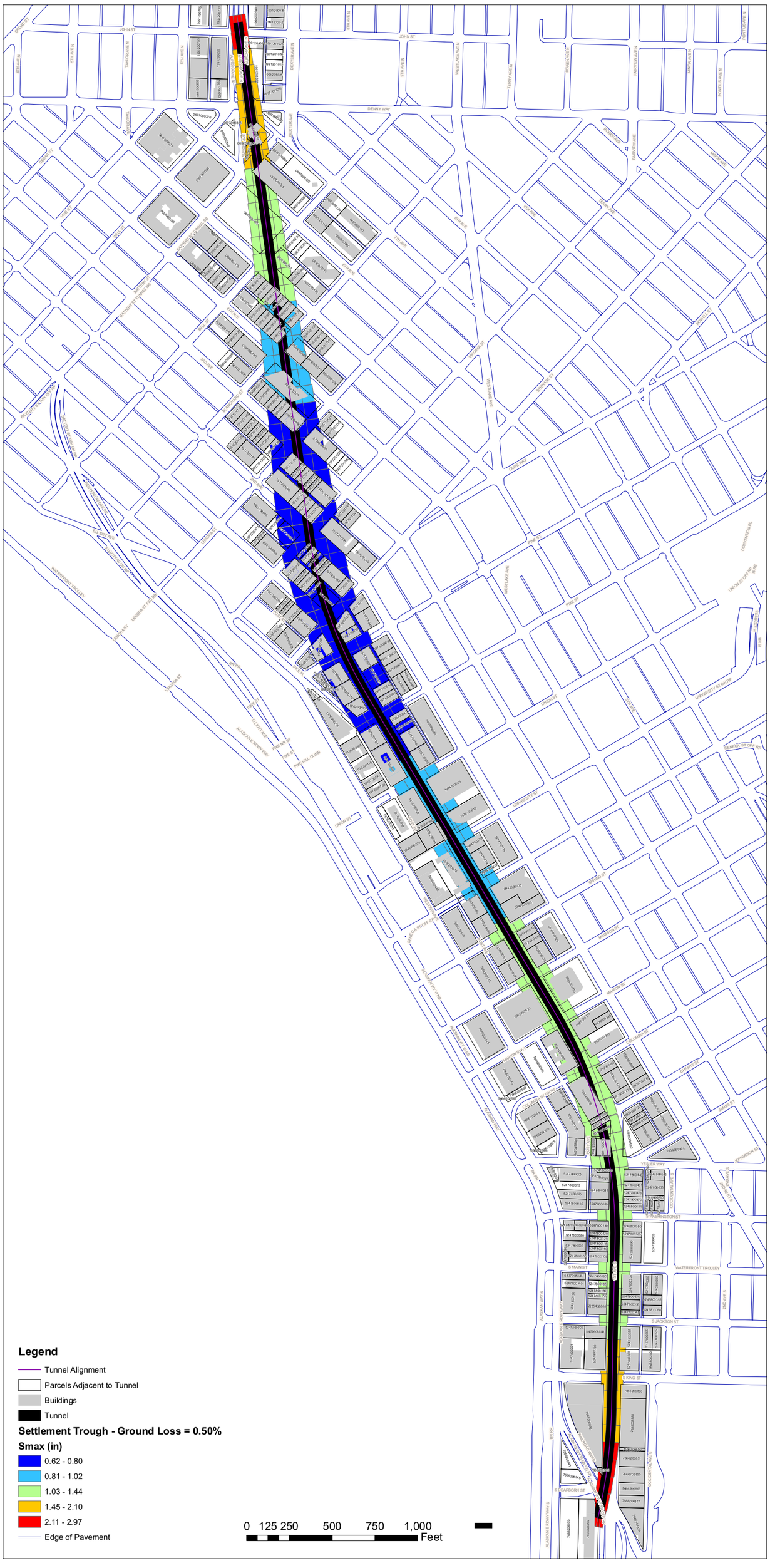
May 13th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals
Probable Flow
- Combined
- Drainage
- Sewer

Sewer Lines
Probable Flow
- Combined
- Drainage
- Sewer


Legend
Tunnel Alignment
Parcels Adjacent to Tunnel
Buildings
Tunnel
Settlement Trough - Ground Loss = 0.50%
Smax (in)
0.62 - 0.80
0.81 - 1.02
1.03 - 1.44
1.45 - 2.10
2.11 - 2.97
Edge of Pavement
0 125 250 500 750 1,000
Feet

Task CE
SR 99 Bored Tunnel Alternative
Bored Tunnel

City of Seattle Franchise Utility Maps

The below information is included on the attached CD.

Map No.	Location
1N-1	Yesler Way to Columbia St. - 1st Ave.
1N-2	Columbia St. to Marion St. - 1st Ave.
1N-3	Marion St. to Madison St. - 1st Ave.
1N-4	Madison St. to Seneca St. - 1st Ave.
1N-5	Spring St. to Seneca St. - Western Ave.
1N-6	Marion St. to Spring St. - Western Ave.
1N-7	Columbia St. to Marion St. - Western Ave.
1N-8	Yesler Way to Columbia St. - Western Ave.
2D-1	Denny Way to John St. - Dexter Ave. N.
2D-10	Denny Way to John St. - SR99
2D-11	Denny Way to John St. - 6th Ave. N. Alley
2N-9	Yesler Way to Cherry St. - 1st Ave. to 2nd Ave.
2S-2	S. Washington Ave. to Yesler Way - Occidental Ave. S.
2S-3	S. Washington Ave. to Yesler Way - 1st Ave. S.
2S-4	S. Washington Ave. to Yesler Way - Alaskan Way S. to 1st Ave. S.
2S-8	S. Jackson St. to S. Washington St - Alaskan Way S. to 1st Ave. S.
2S-9	S. Jackson St. to S. Washington St - 1st Ave S.
2S-10	S. Jackson St. to S. Washington St - Occidental Ave. S.
2S-13	S. Jackson St. to S. King St. - Occidental Ave. S.
2S-14	S. Jackson St. to S. King St. - First Ave. S.
2S-15	S. Jackson St. to S. King St. - Between First Ave. S. and Alaskan Way S.
26N-13	Seneca St. to University St. - 2nd Ave
26N-14	Spring St. to Seneca St. - 2nd Ave.
26N-15	Madison St. to Seneca St. - 2nd Ave.
26N-16	Marion St. to Madison St. - 2nd Ave.

Task CE
SR 99 Bored Tunnel Alternative
Bored Tunnel

26N-17	Marion St. - 1st Ave. to 2nd Ave.
26N-18	Columbia St. to Marion St. - 2nd Ave.
26N-19	Cherry St. to Columbia St. - 2nd Ave.
27N-1	Seneca St. to University St. - 1st Ave
27N-2	University St. to Union St. - 1st Ave.
27N-3	Union St. to Pike St. - 1st Ave.
27N-4	Pike St. to Pine St. - 1st Ave.
28N-14	Pine St. to Stewart St. - 2nd Ave.
28N-15	Pike St. to Pine St. - 2nd Ave.
28N-16	Union St. to Pike St. - 2nd Ave.
28N-17	University St. to Union St. - 2nd Ave.
28N-18	University St. to Union St. - 1st Ave.
28N-19	Union St. to Pike St. - 1st Ave.
28N-20	Pike St. to Pine St. - 1st Ave.
28N-21	Pine St. to Stewart St. - 1st Ave.
31N-18	Bell St. to Battery St. - 7th Ave.
31N-19	Bell St. to Battery St. - 6th Ave.
31N-20	Blanchard St. to Bell St. - 6th Ave
31N-29	Blanchard St. to Bell St. - 5th Ave
31N-30	Bell St. to Battery St. - 5th Ave.
32N-4	Blanchard St. to Bell St. - 4th Ave. to 5th Ave.
32N-5	Bell St. to Battery St. - 4th Ave. to 5th Ave.
32N-6	Bell St. to Battery St. - 4th Ave.
32N-7	Blanchard St. to Bell St. - 4th Ave.
32N-8	Lenora St. to Blanchard St. - 4th Ave.
32N-13	Lenora St. to Blanchard St. - 3rd Ave.
32N-14	Blanchard St. to Bell St. - 3rd Ave.
32N-18	Lenora St. to Blanchard St. - 2nd Ave.
32N-19	Virginia St. to Lenora St. - 2nd Ave.
32N-20	Stewart St. to Virginia St. - 2nd Ave
32N-21	Stewart St. to Virginia St. - 1st Ave. to 2nd Ave

Task CE
SR 99 Bored Tunnel Alternative
Bored Tunnel

32N-22	Virginia St. to Lenora St. - 1st Ave. to 2nd Ave.
33N-1	Stewart St. to Virginia St. - 1st Ave.
33N-2	Virginia St. to Lenora St. - 1st Ave.
33N-10	Stewart St. to Virginia St. - Western Ave.
36N-1	Denny Way and SR99 Intersection
36N-2	Battery St. to Wall St. - BST
36N-5	Denny Way and Sixth Ave. N. Intersection

Appendix E

Broad Street Closure –

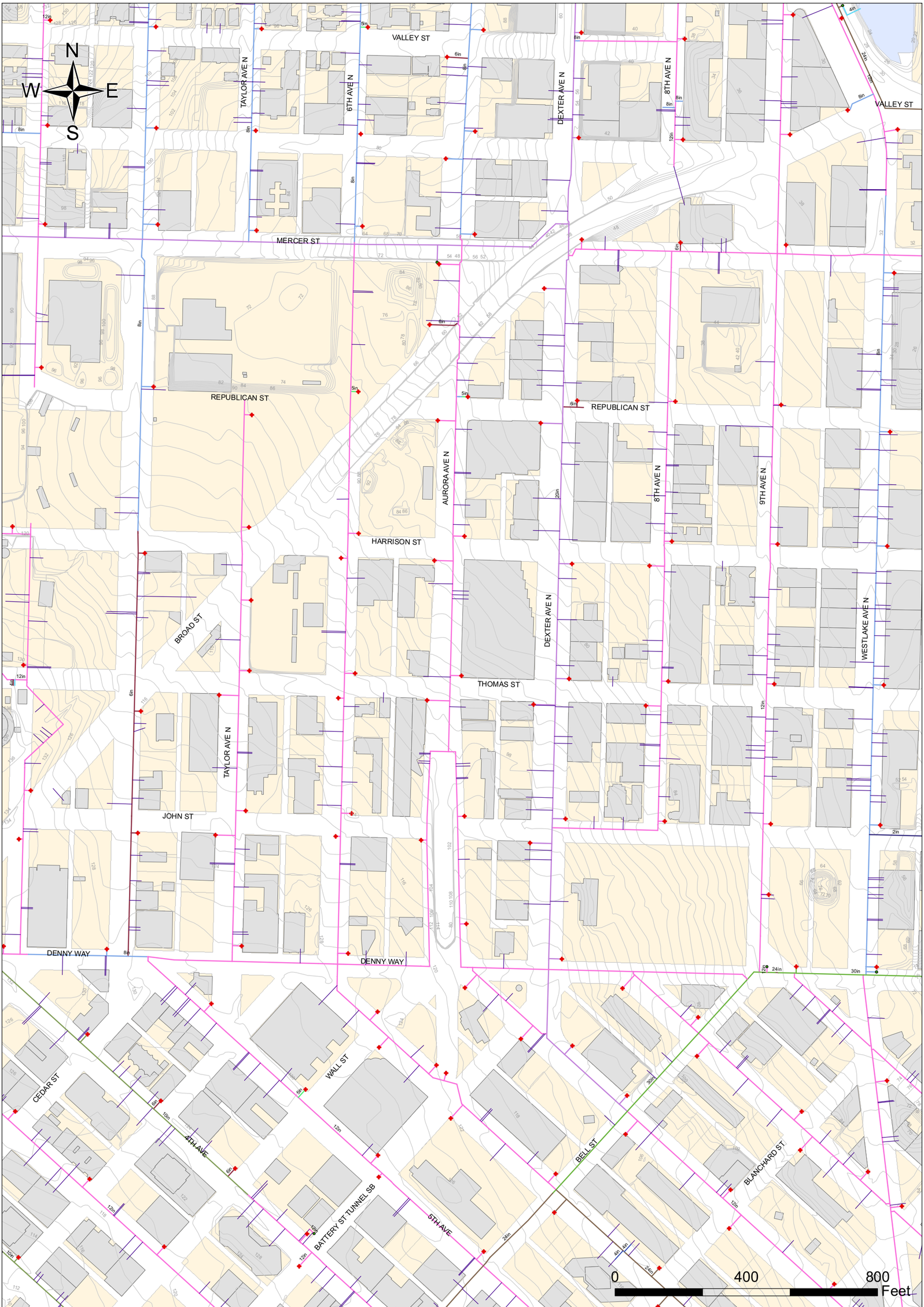
Support Documentation

Appendix E

List of Figures

Refer to attached CD for the following information:

- City of Seattle Franchise Utility Maps.
- SR 99 Bored Tunnel Alternative, Broad Street Closure City GIS for Sewer/Drainage/Water Pipes.



AWV North Portal Waterlines by Diameter

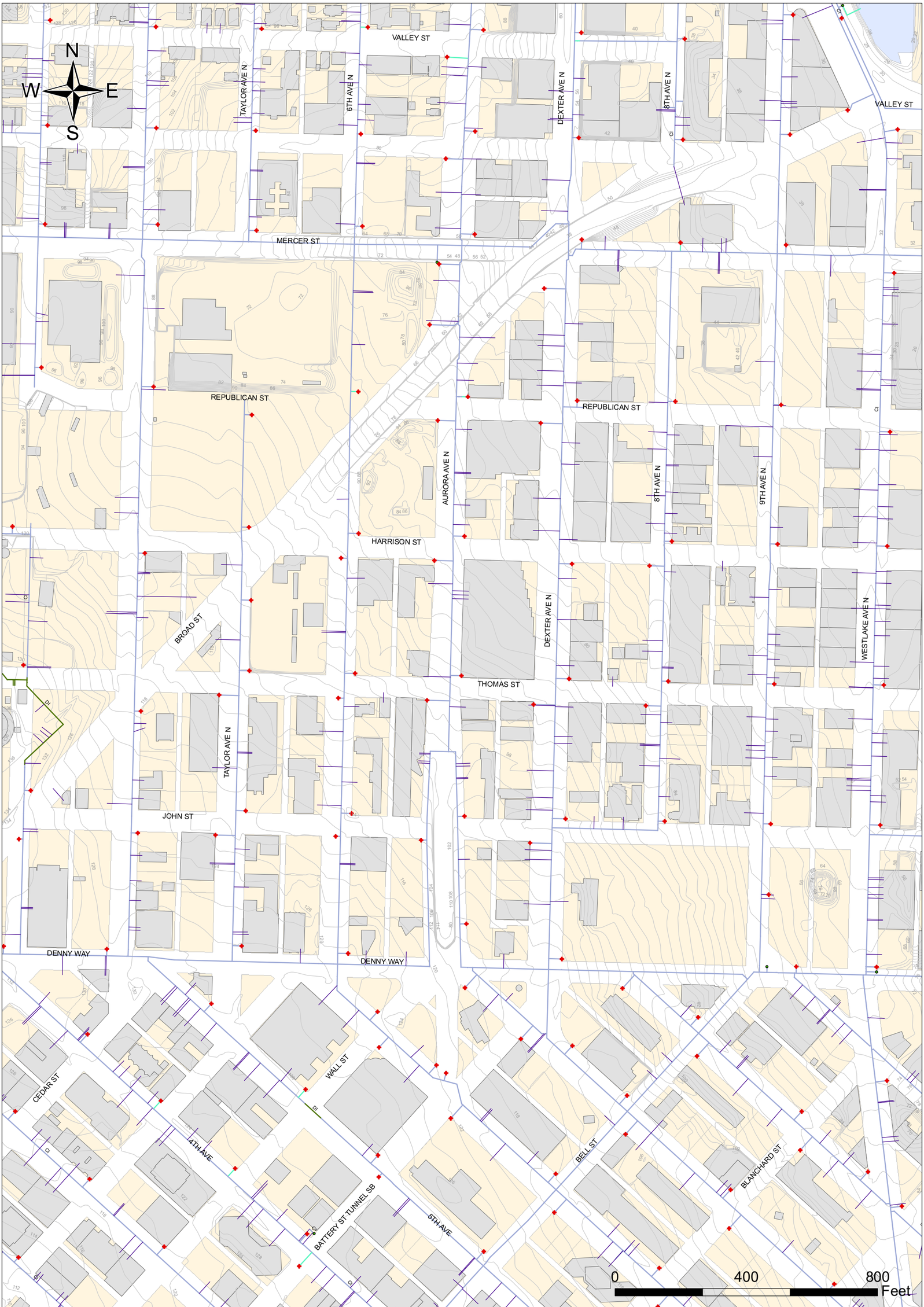
April 6th, 2009

Legend

- Hydrant
- Appurtenances
- Services
- Buildings
- Water Bodies
- Parcels

Waterline Diameter (in)

0.8, 1, 1.5, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 21, 22, 24, 30, 36, 40, 42, 48, 66



AWV North Portal Waterlines by Material

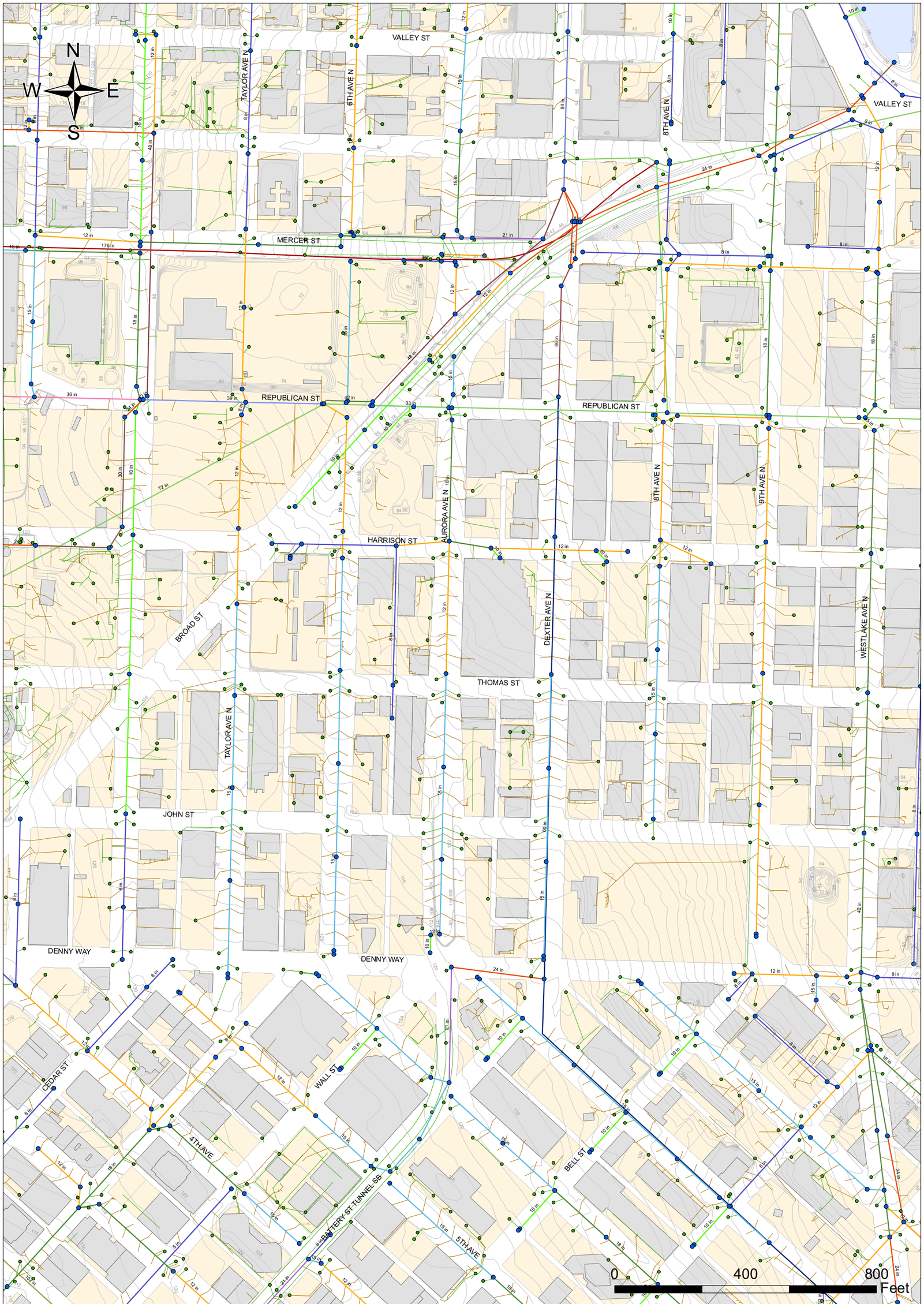
April 6th, 2009

Legend

- Hydrant
- Appurtenances
- Services
- Buildings
- Water Bodies
- Parcels

Waterline
MSG_MATERI

- CC
- CI
- CONC
- CU
- DI
- GI
- GS
- I
- KAL
- LBSTL
- PL
- PVC
- RVSTL
- STL
- WESTL



AWV North Portal Sewer/Drainage Pipes by Diameter

April 6th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals

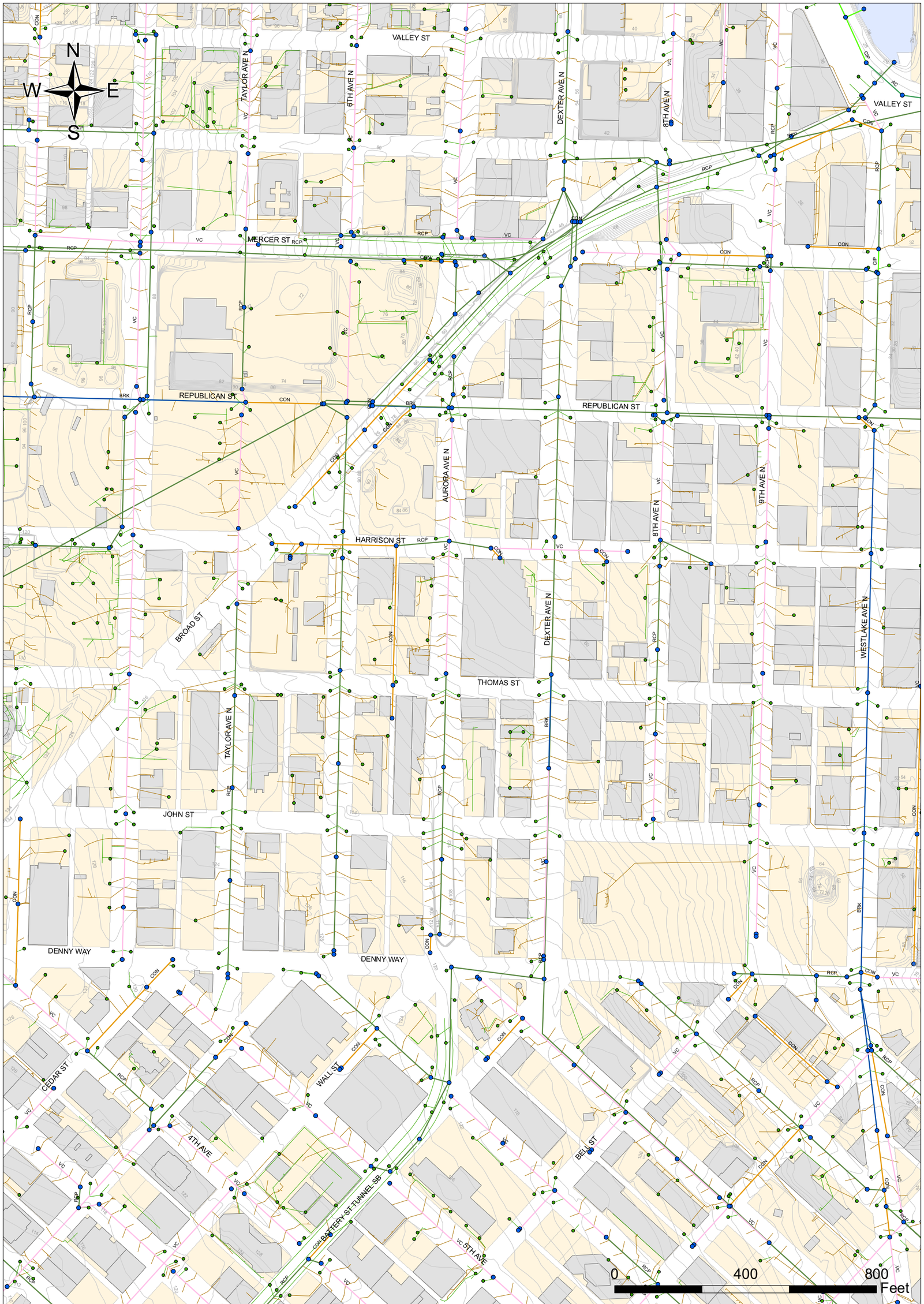
Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines Diameter

6 8 10 12 15 18 20 21 24 30 33 36 39 42 45 48 60 66 72 84 102 176

E-5



AWV North Portal Sewer/Drainage Pipes by Material

April 6th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals

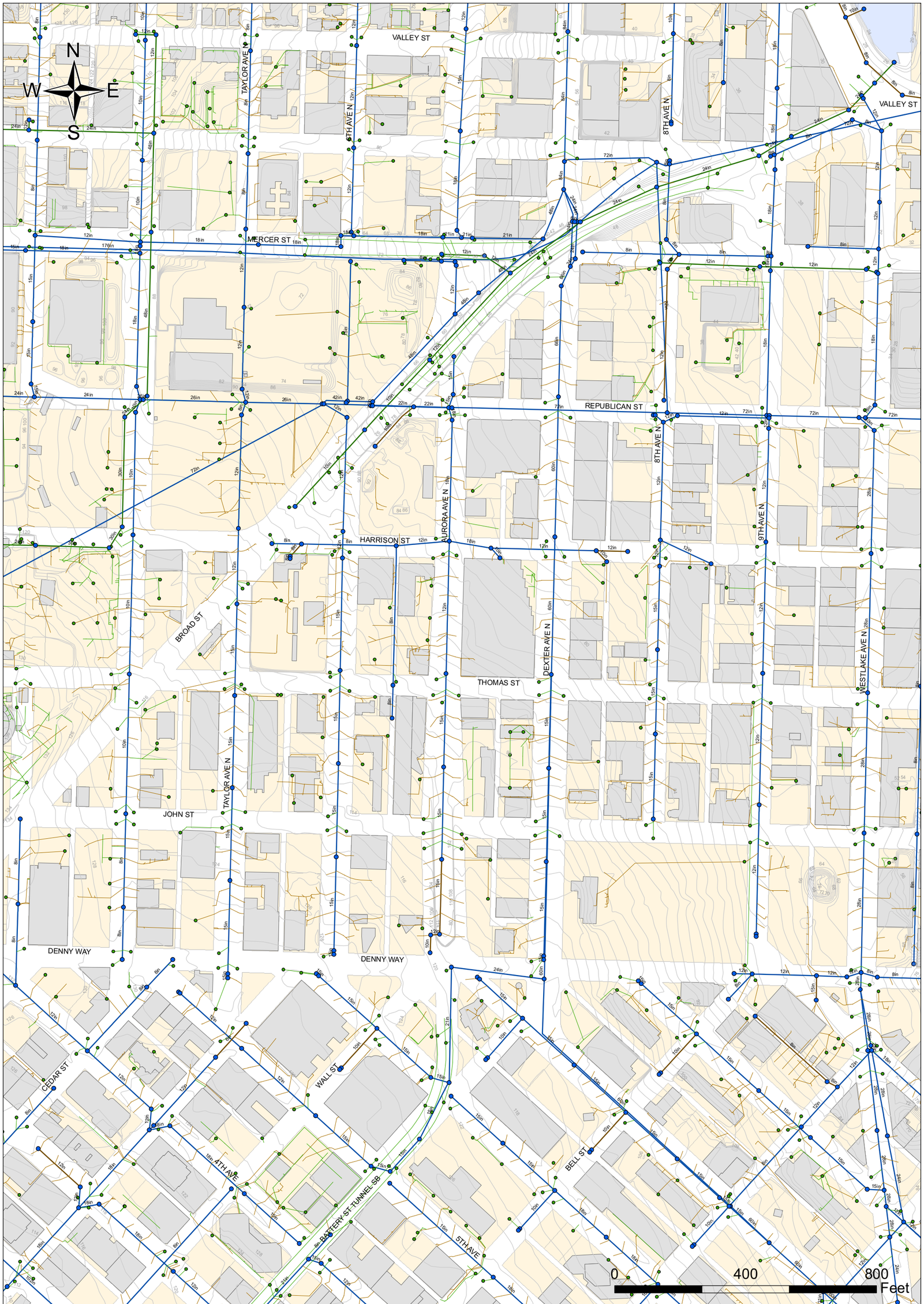
Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines

MATERIAL

- AC
- BRK
- CIP
- CON
- DIP
- PVC
- RCP
- VC



AWV North Portal Sewer/Drainage Pipes by Probable Flow

April 6th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals
Probable Flow
- Combined
- Drainage
- Sewer

Sewer Lines
Probable Flow
- Combined
- Drainage
- Sewer

Task CE
SR 99 Bored Tunnel Alternative
Broad Street Closure

City of Seattle Franchise Utility Maps

The below information is included on the attached CD.

Map No.	Location
2D-17	Broad St. and 6th Ave. N. Intersection
2D-18	Thomas St. to Harrison St. - 6th Ave. N.
2D-22	John St. to Thomas St. - Taylor Ave. N.
2D-23	Thomas St. to Harrison St. - Taylor Ave. N.
2D-28	Thomas St. to Harrison St. - 5th Ave. N.
2D-29	John St. to Thomas St. - 5th Ave. N.

Appendix F

Mercer Street Corridor Improvements –

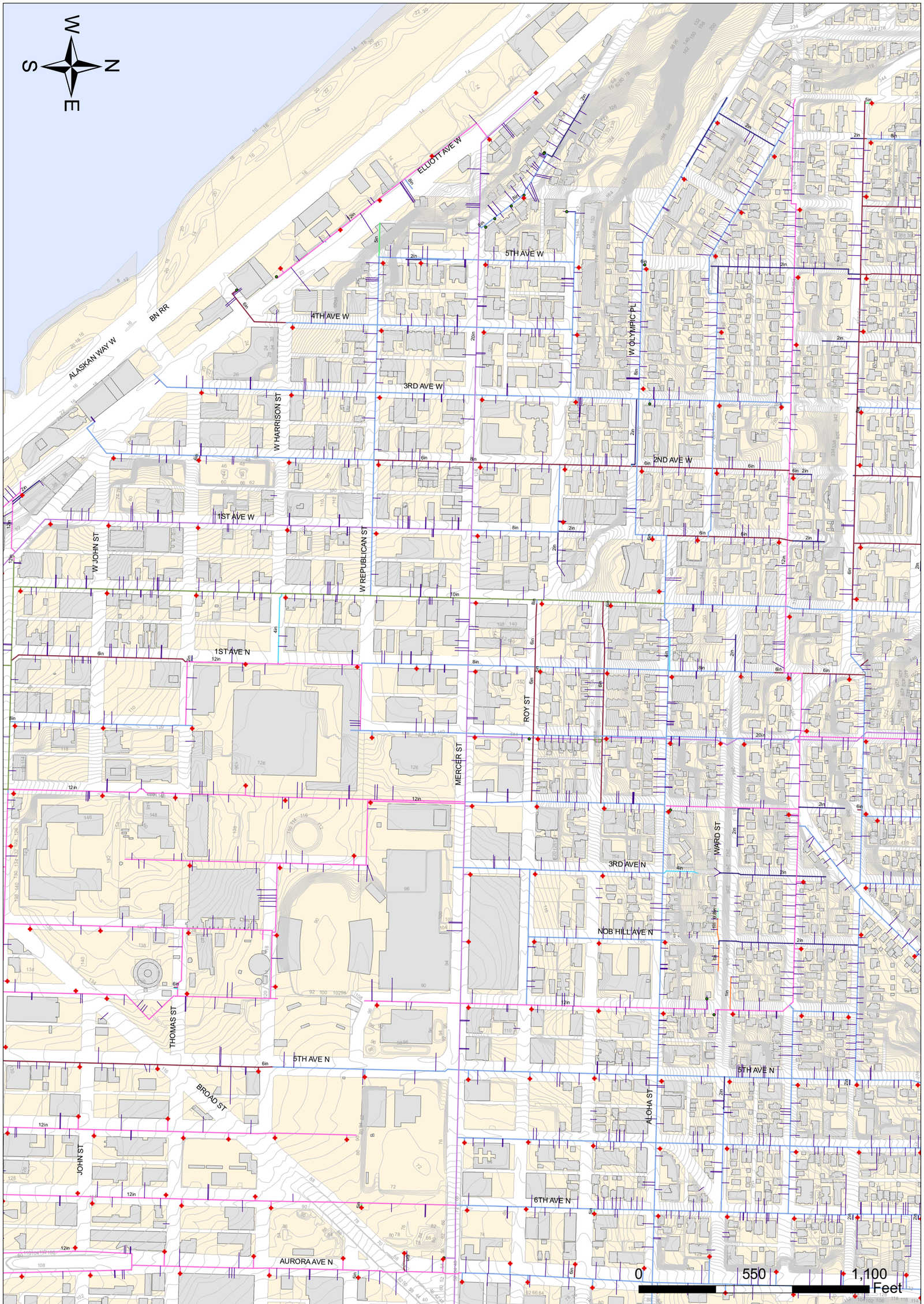
Support Documentation

Appendix F

List of Figures

Refer to attached CD for the following information:

- SR 99 Bored Tunnel Alternative, Mercer Street Corridor Improvements City GIS for Sewer/Drainage/Water Pipes.



AWV Mercer - 99 to waterfront Waterlines by Diameter

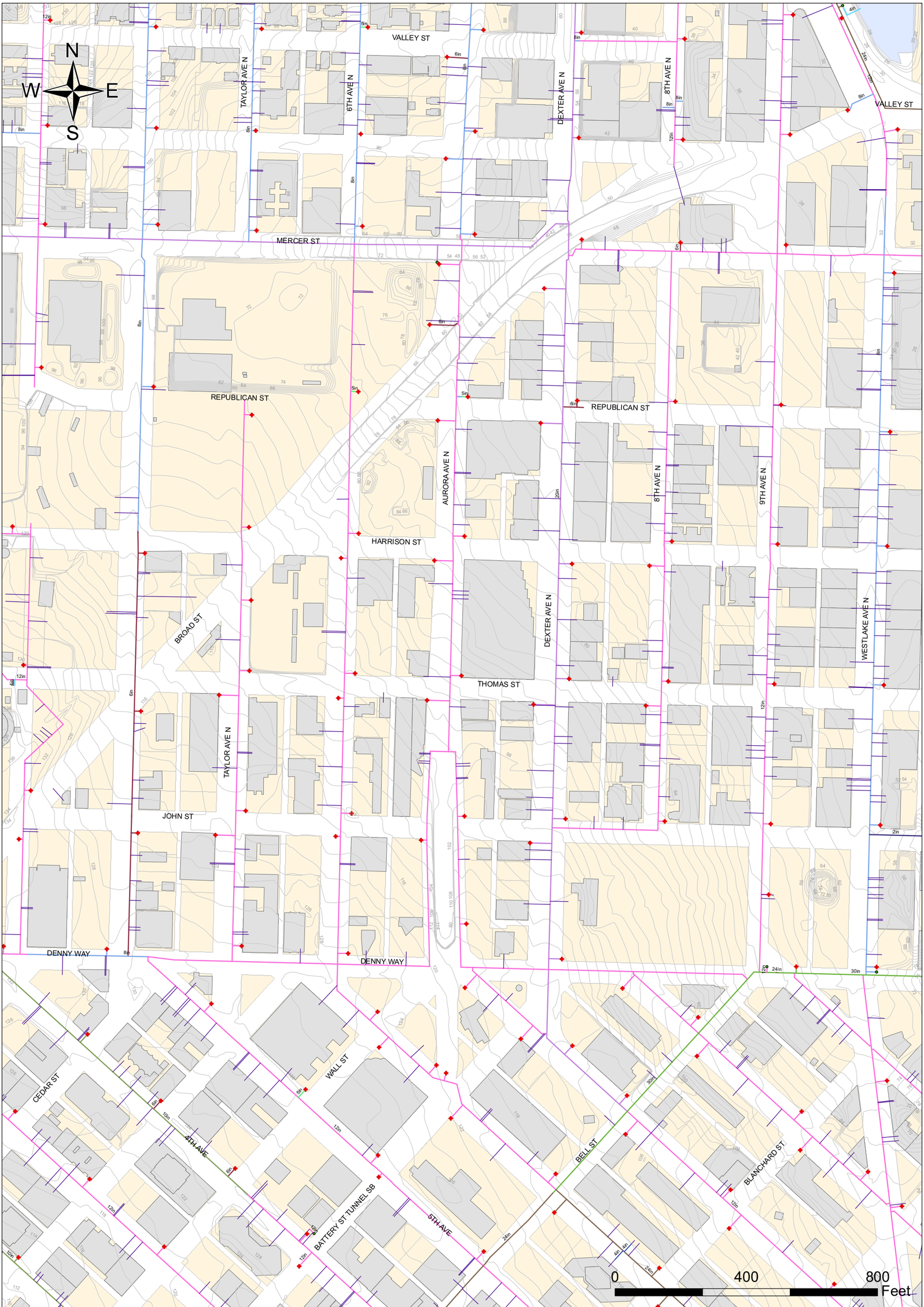
May 13th, 2009

Legend

- Hydrant
- Appurtenances
- Services
- Buildings
- Water Bodies
- Parcels

Waterline Diameter (in)

0.8, 1, 1.5, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 21, 22, 24, 30, 36, 40, 42, 48, 66



AWV North Portal Waterlines by Diameter

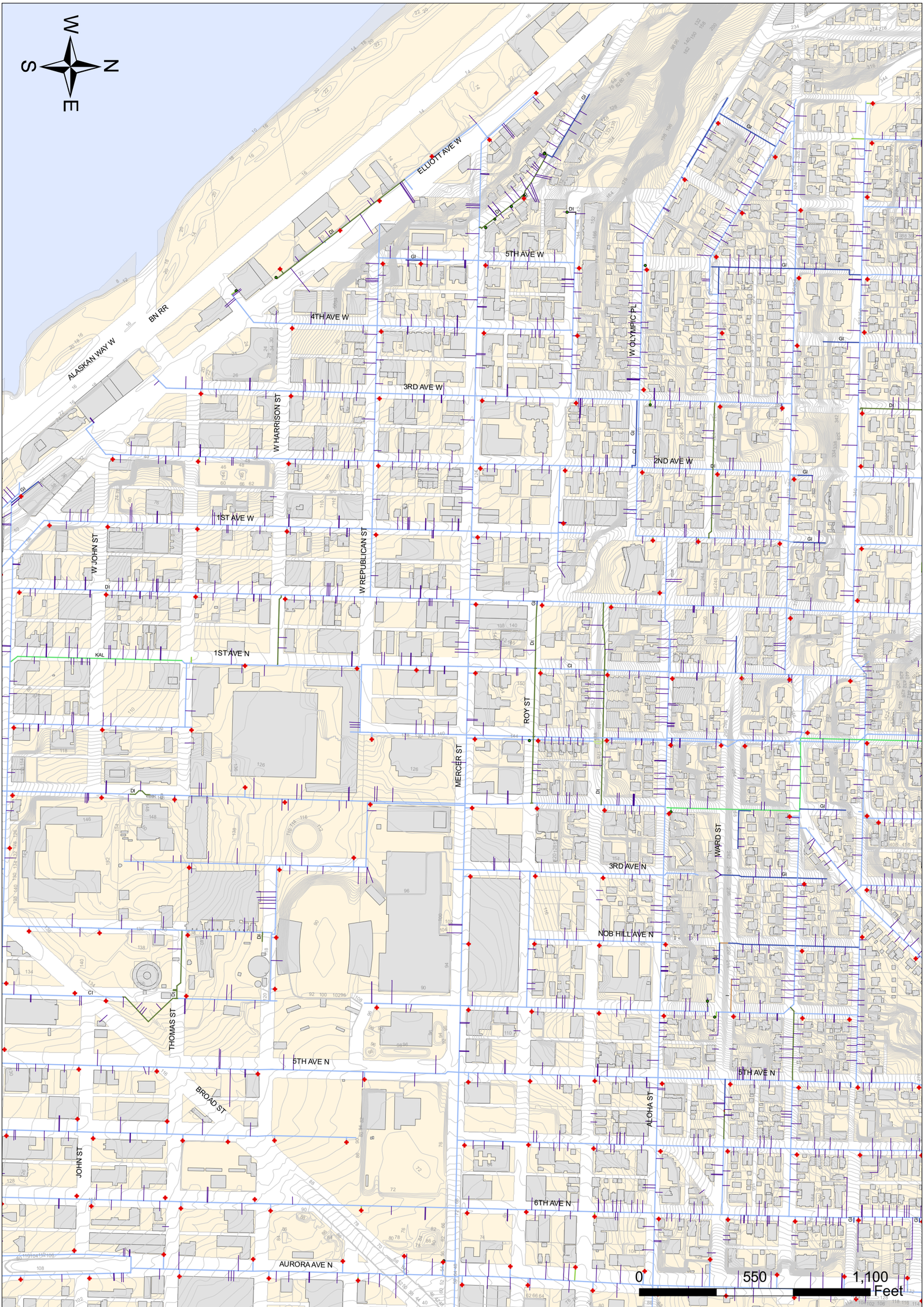
April 6th, 2009

Legend

- Hydrant
- Appurtenances
- Services
- Buildings
- Water Bodies
- Parcels

Waterline Diameter (in)

0.8, 1, 1.5, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 21, 22, 24, 30, 36, 40, 42, 48, 66



AWV Mercer - 99 to waterfront Waterlines by Material

May 13th, 2009

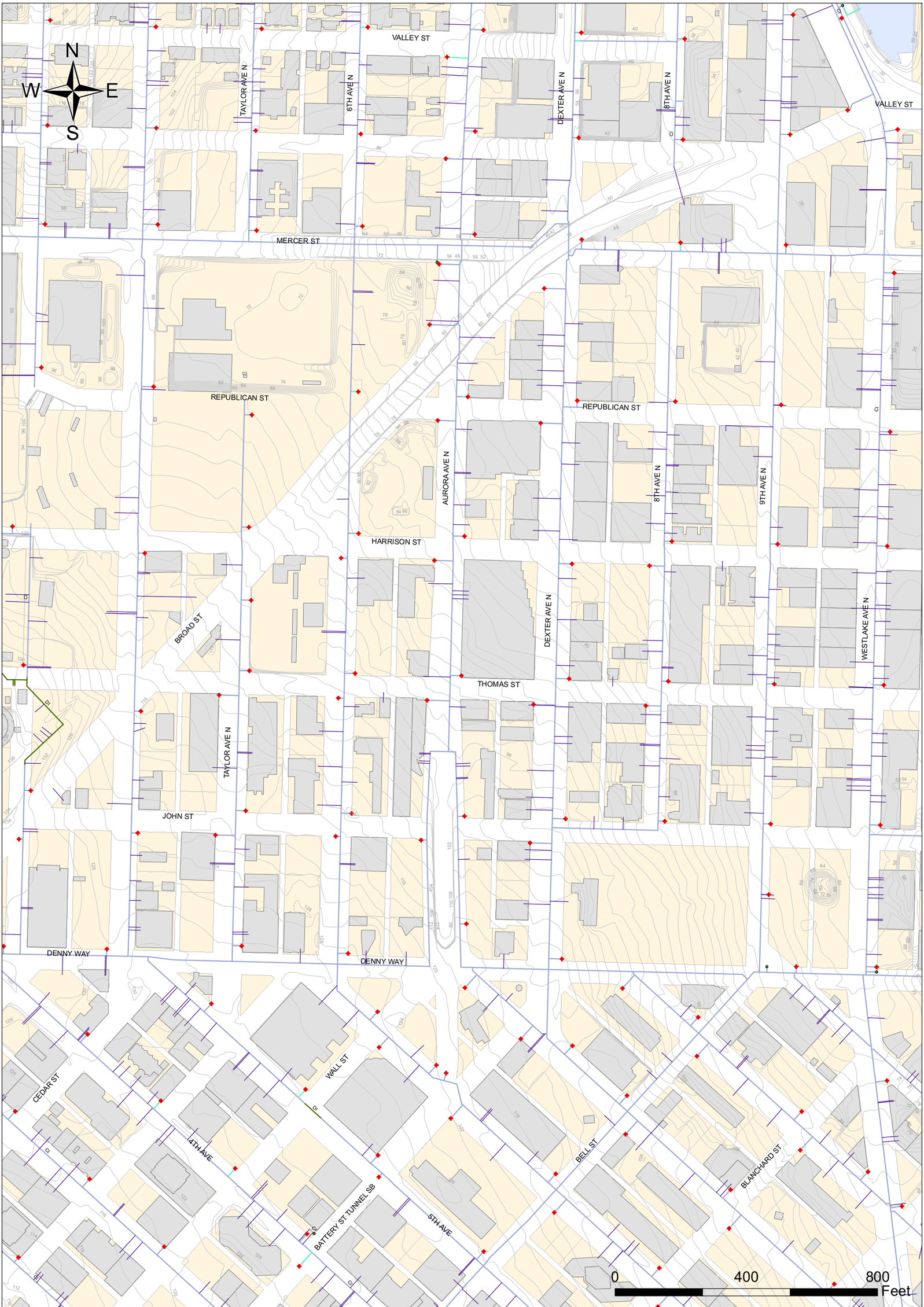
Legend

- Hydrant
- Buildings
- Services
- Appurtenances
- Parcels
- Water Bodies

Waterline

MSG_MATERI

- CC
- CI
- CONC
- CU
- DI
- GI
- GS
- I
- KAL
- LBSTL
- PL
- PVC
- RVSTL
- STL
- WESTL



AWV North Portal Waterlines by Material

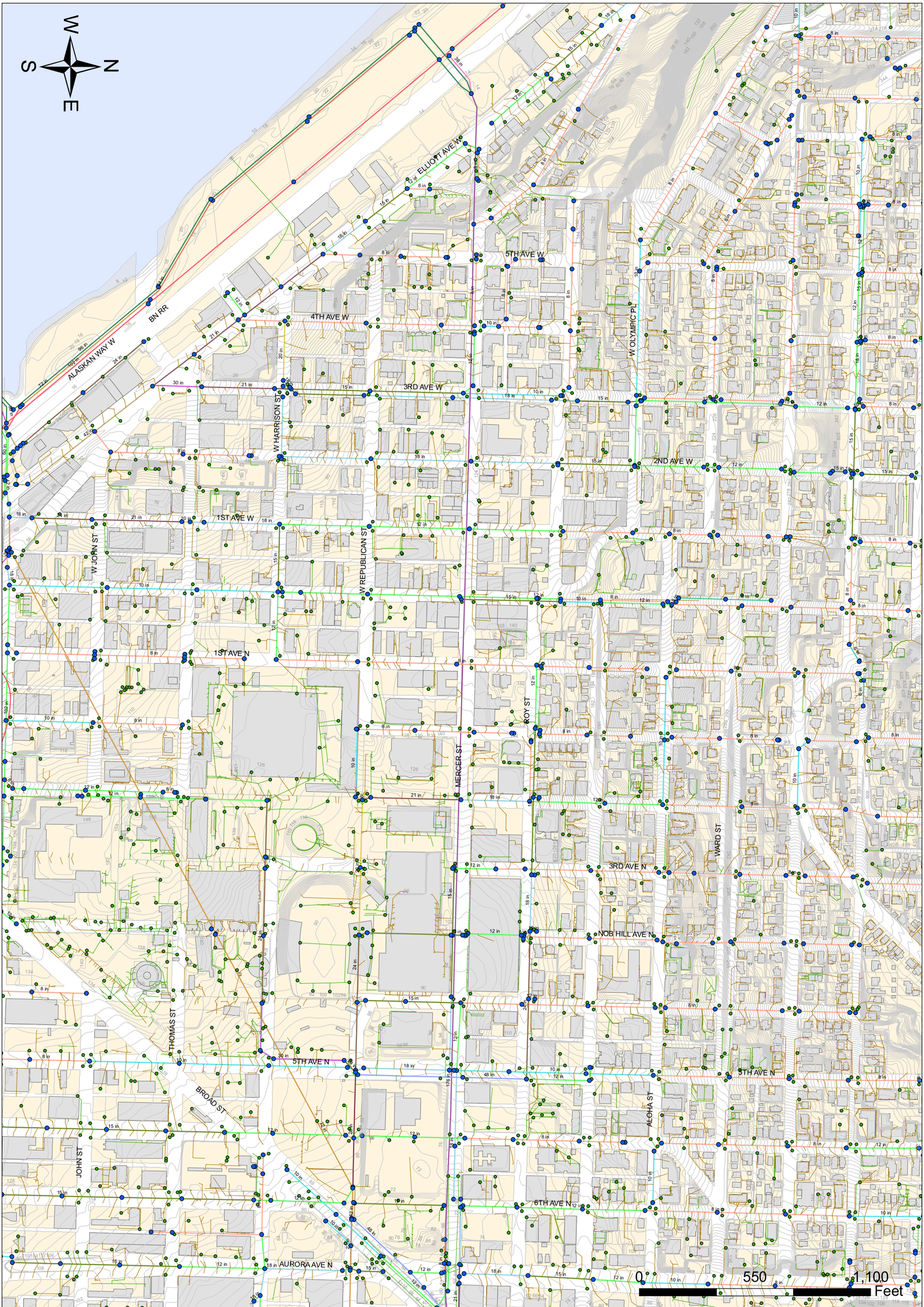
April 6th, 2009

Legend

- Hydrant
- Appurtenances
- Services
- Buildings
- Water Bodies
- Parcels

Waterline
MSG_MATERI

- CC
- CI
- CONC
- CU
- DI
- GI
- GS
- I
- KAL
- LBSTL
- PL
- PVC
- RVSTL
- STL
- WESTL



AWV Mercer - 99 to waterfront Sewer/Drainage Pipes by Diameter

May 13th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals

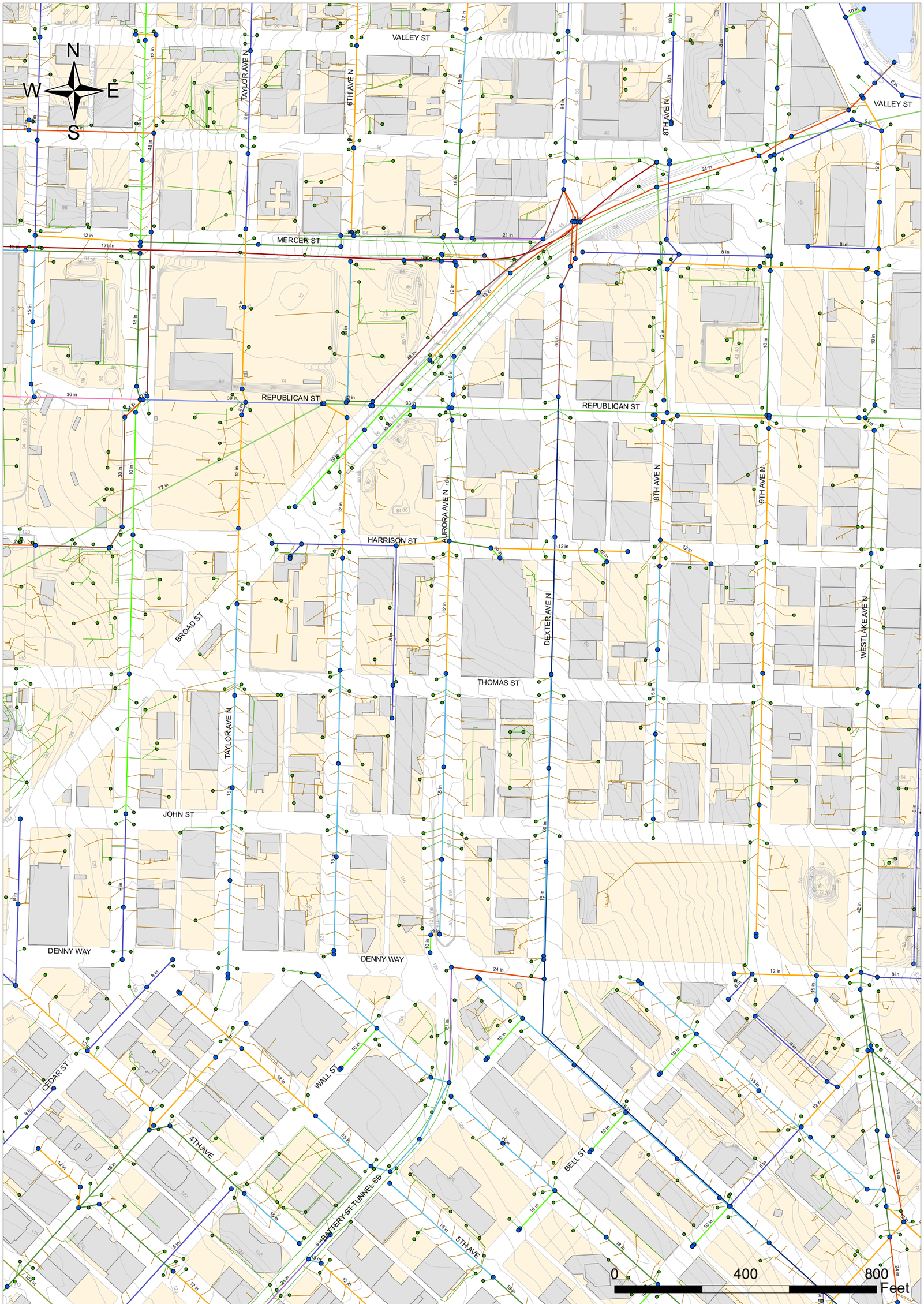
Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines

XWIDTH

4, 6, 8, 10, 12, 15, 18, 20, 21, 22, 24, 26, 28, 30, 32, 36, 42, 48, 60, 66, 72, 84, 96, 102, 120, 176



AWV North Portal Sewer/Drainage Pipes by Diameter

April 6th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

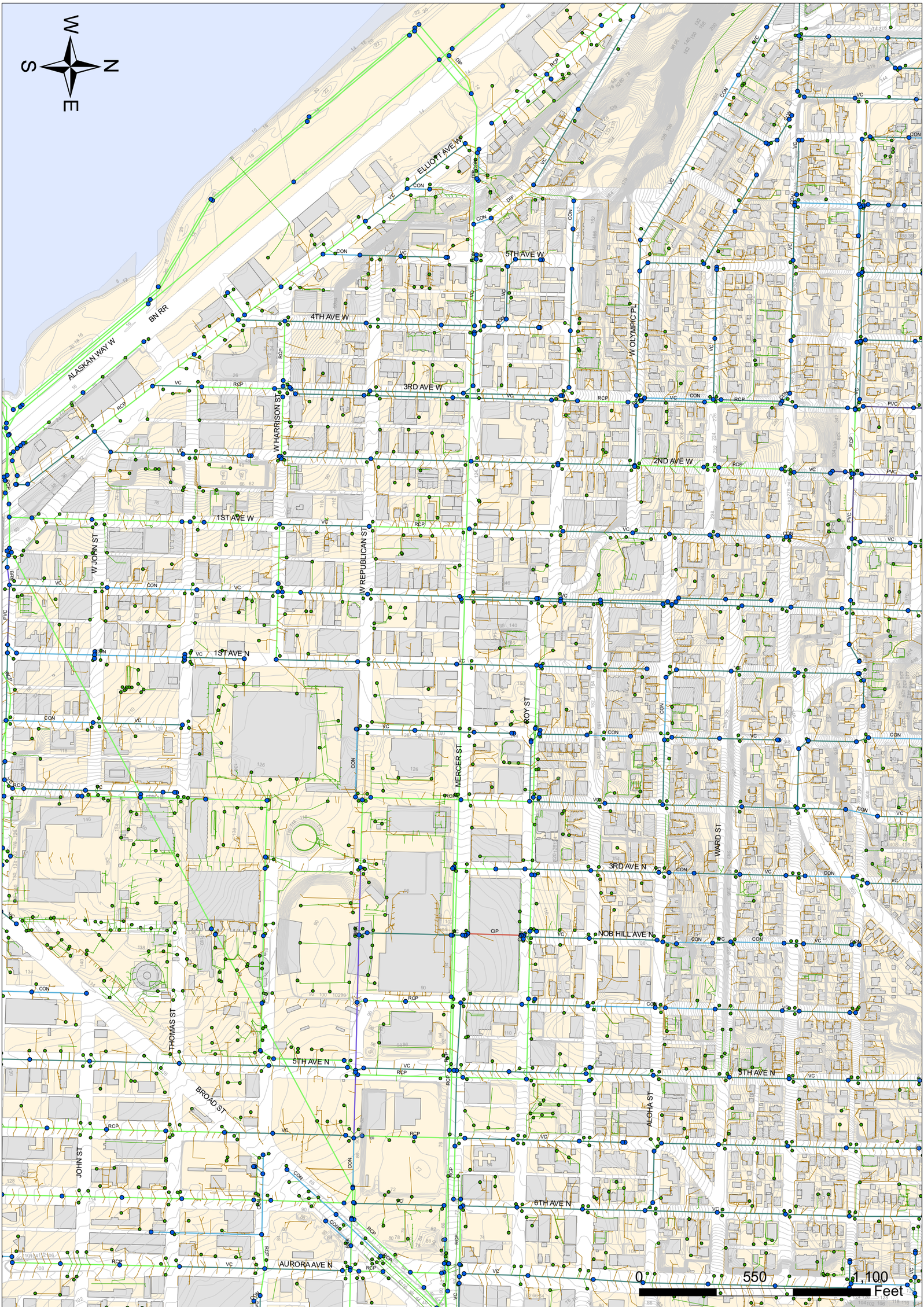
Laterals

Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines Diameter

6 8 10 12 15 18 20 21 24 30 33 36 39 42 45 48 60 66 72 84 102 176



AWV Mercer - 99 to waterfront Sewer/Drainage Pipes by Material

May 13th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- snd selection
- Parcels

Laterals

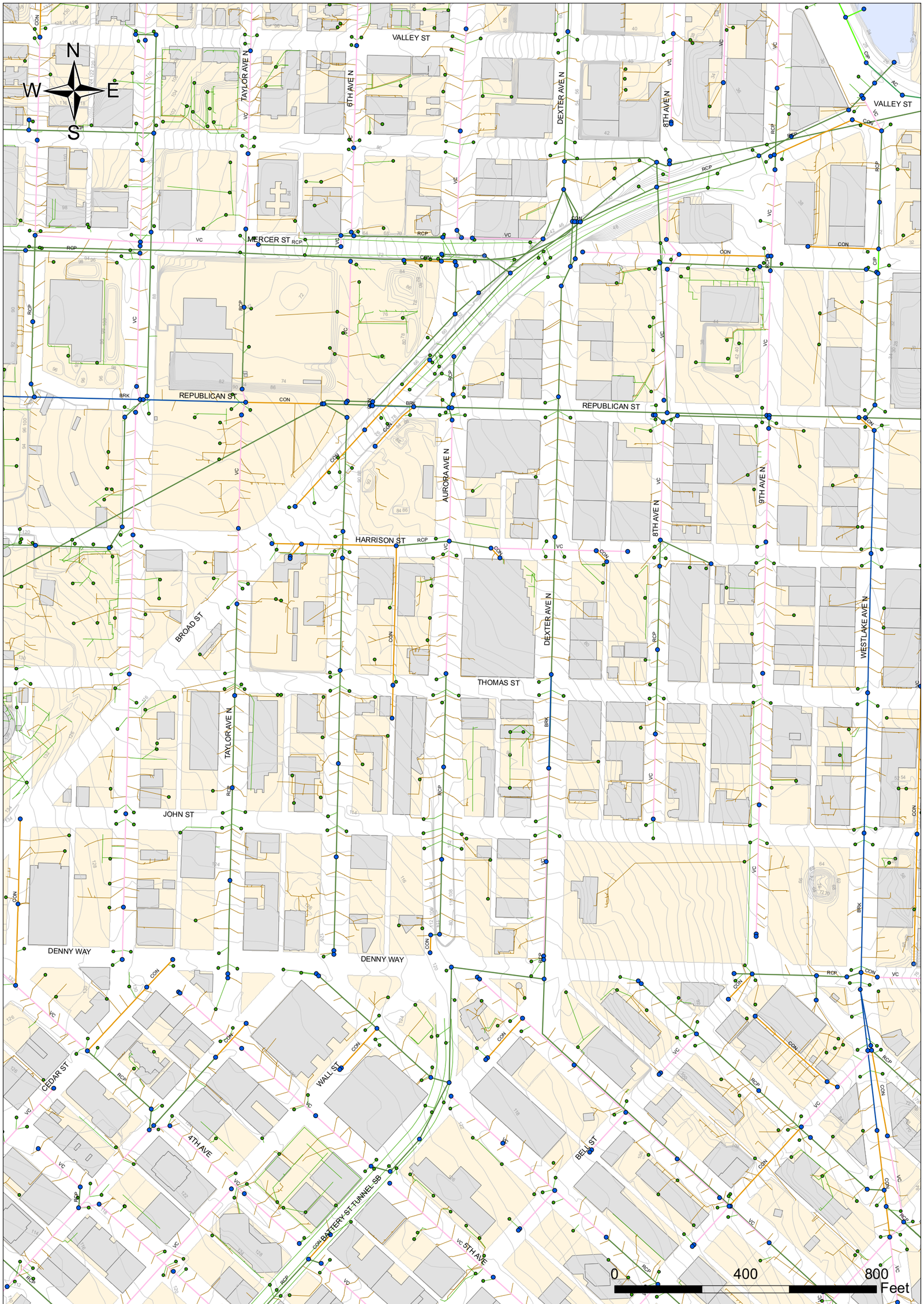
Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines

MATERIAL

- AC
- BRK
- CIP
- CON
- DIP
- HDP
- PVC
- RCP
- STL
- UNK
- VC



AWV North Portal Sewer/Drainage Pipes by Material

April 6th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals

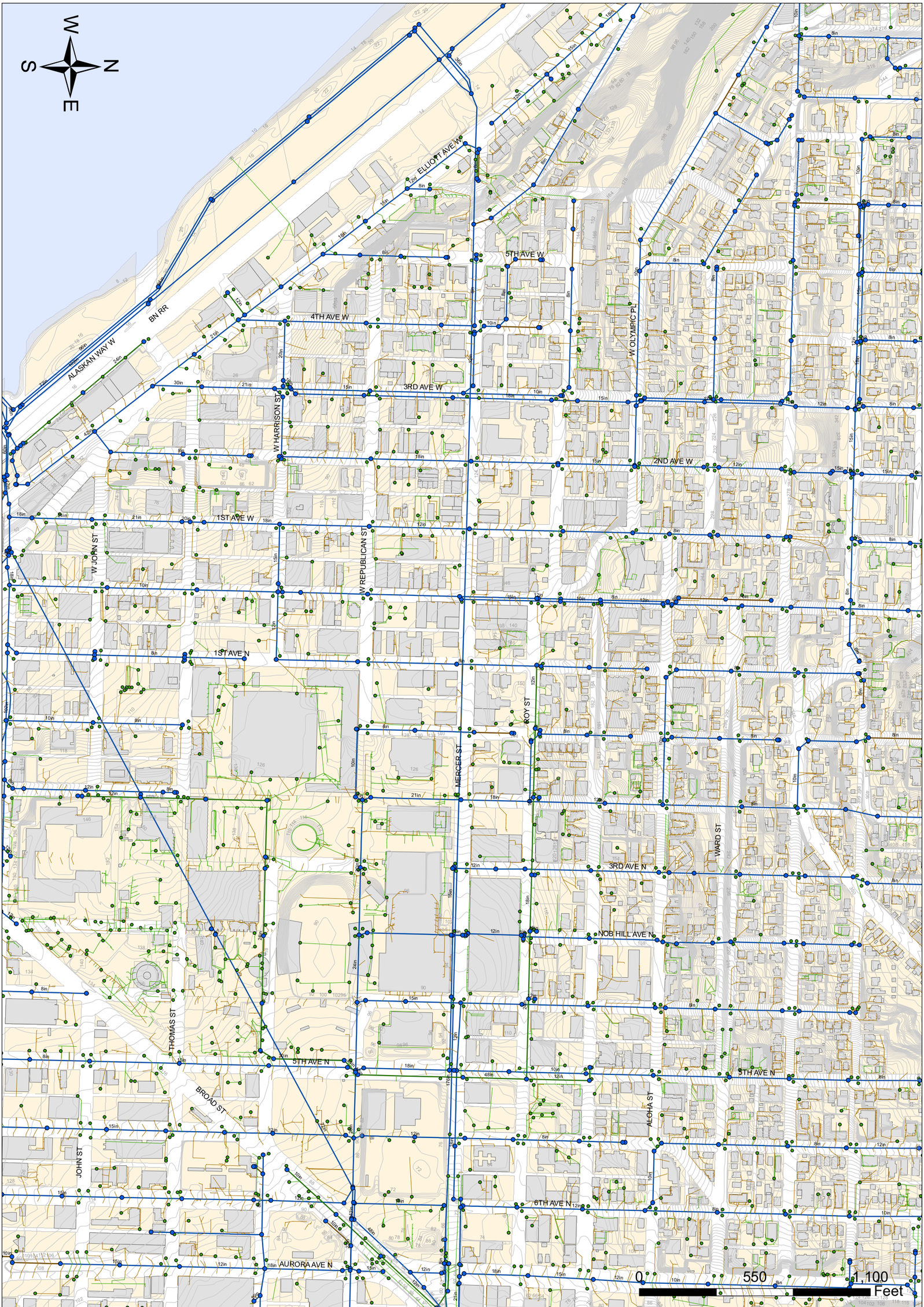
Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines

MATERIAL

- AC
- BRK
- CIP
- CON
- DIP
- PVC
- RCP
- VC



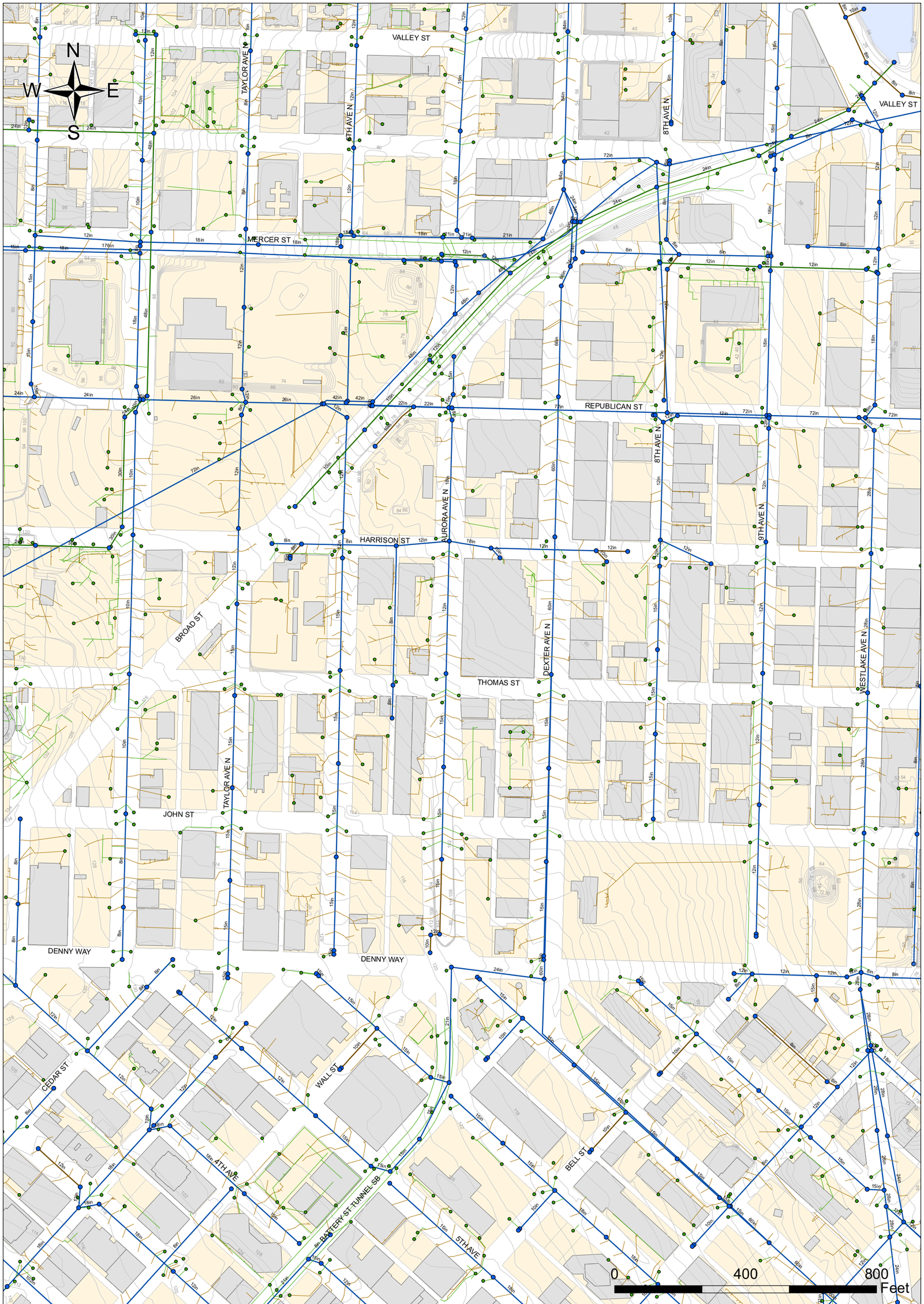
AWV Mercer - 99 to waterfront Sewer/Drainage Pipes by Probable Flow

May 13th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals Probable Flow	Sewer Lines Probable Flow
Combined	Combined
Drainage	Drainage
Sewer	Sewer



AWV North Portal Sewer/Drainage Pipes by Probable Flow

April 6th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals
Probable Flow
- Combined
- Drainage
- Sewer

Sewer Lines
Probable Flow
- Combined
- Drainage
- Sewer

Appendix G

Elliott & Western Connector

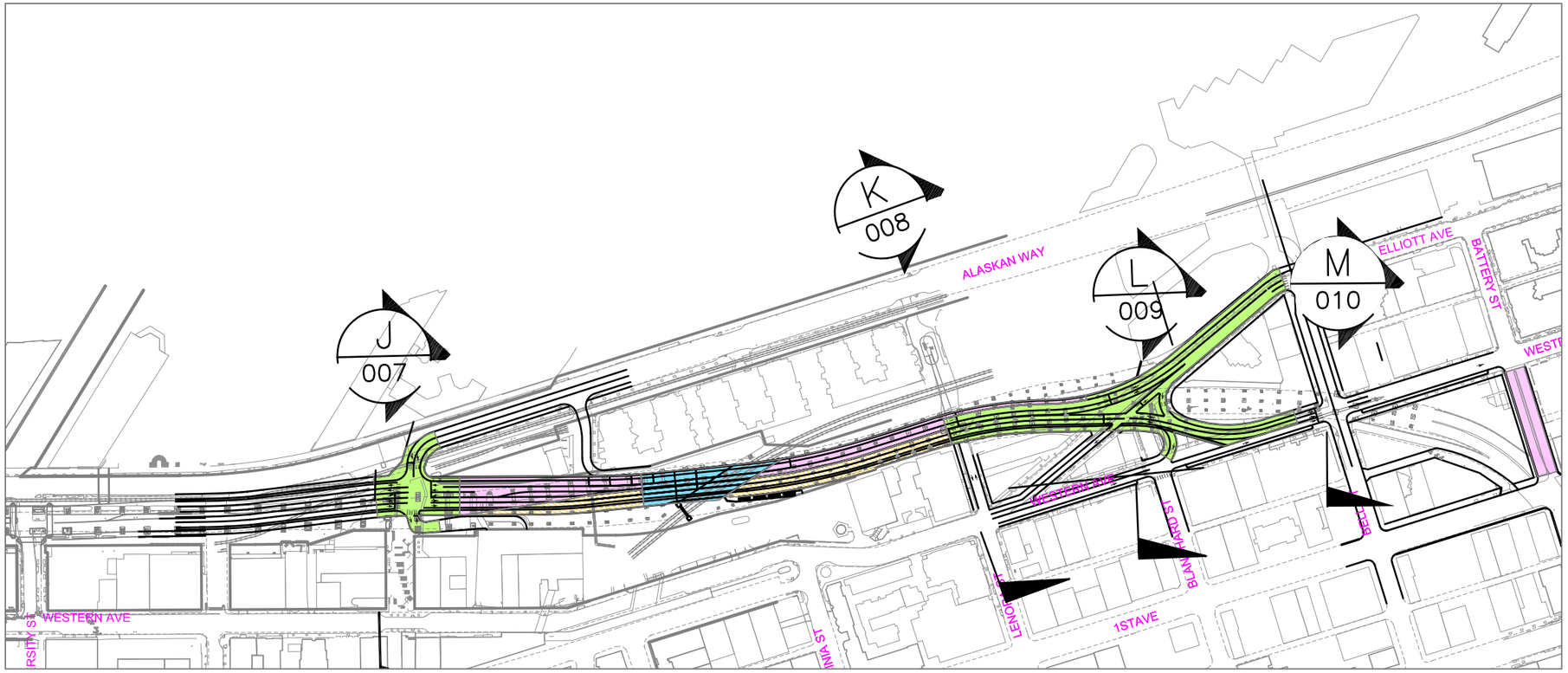
Support Documentation

Appendix G

List of Figures

Refer to attached CD for the following information:

- City of Seattle Franchise Utility Maps.
- SR 99 Bored Tunnel Alternative, Elliott & Western Connector City GIS for Sewer/Drainage/Water Pipes.



SR 99
BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS KEY MAP ELLIOTT & WESTERN CONNECTOR

DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

THIS MATERIAL IS CONCEPTUAL IN NATURE AND SHOULD BE USED FOR PLANNING AND DISCUSSION PURPOSES ONLY. IT IS SUBJECT TO CHANGE AND WILL BE FURTHER DEVELOPED AND REFINED AS PART OF THE PROJECT PROCESS

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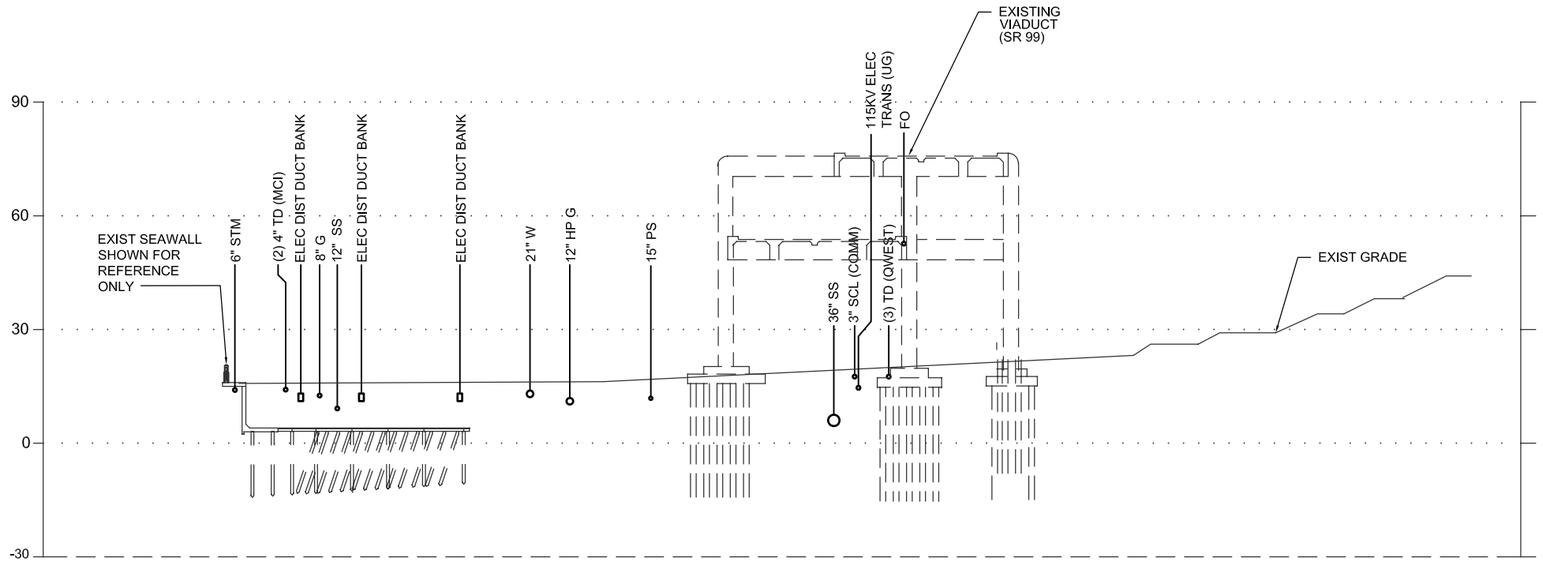
- RETAINED FILL
- AT GRADE
- RETAINED CUT
- CUT AND COVER
- TUNNEL
- ABOVE GRADE STRUCTURE

SHEET 001EWC

300 150 0 300

SCALE IN FEET

JUNE 1, 2009



SECTION J 007

SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS

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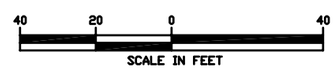
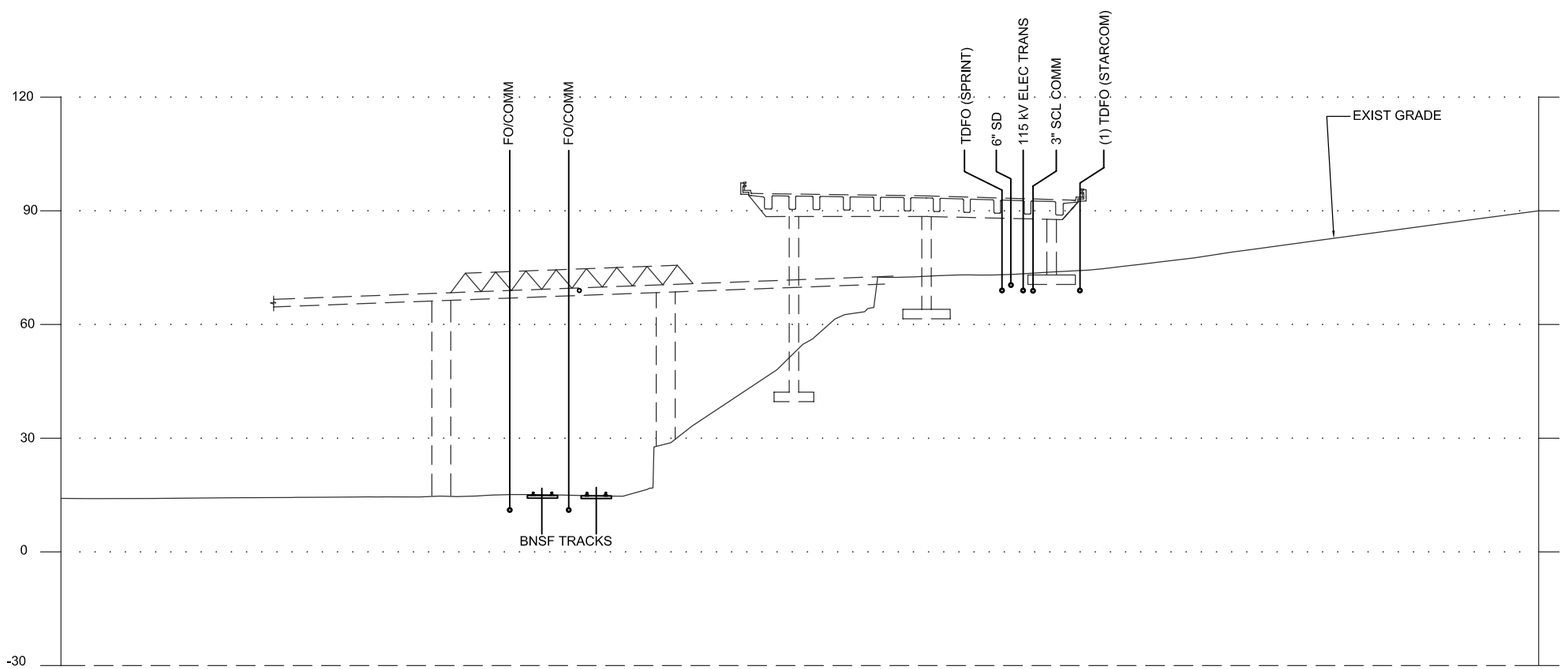


JUNE 1, 2009



SECTION K 008

SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS

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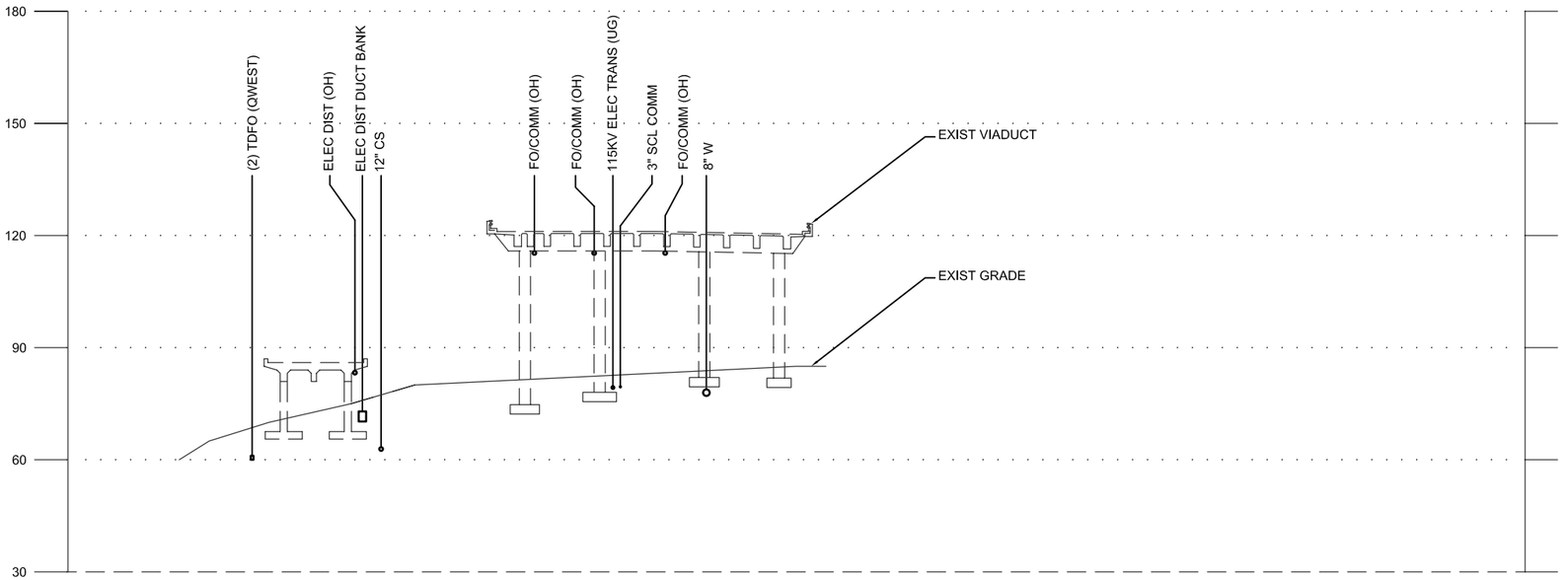

SECTION L 009

SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS

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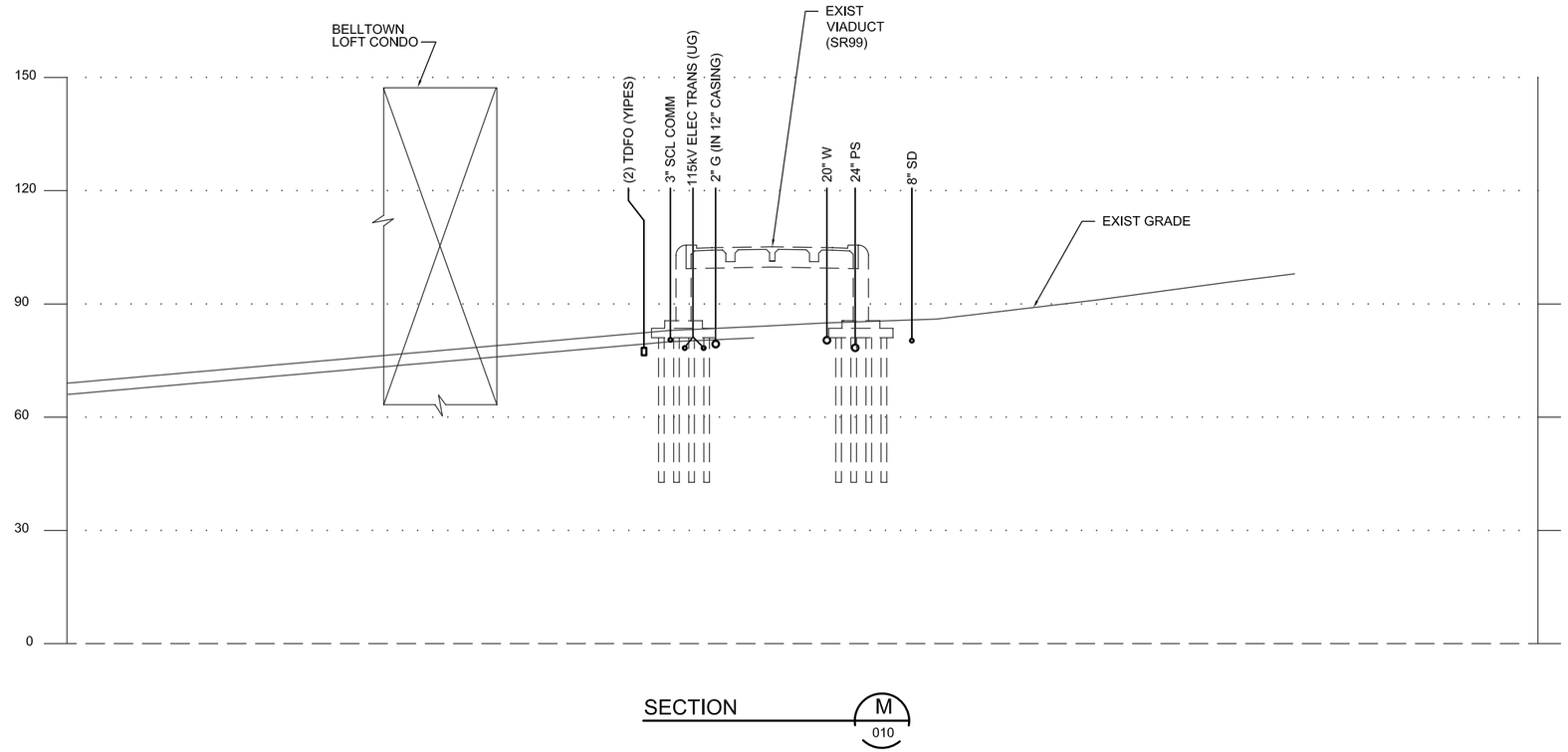
JUNE 1, 2009



SECTION M 010

SR 99
BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS

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DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

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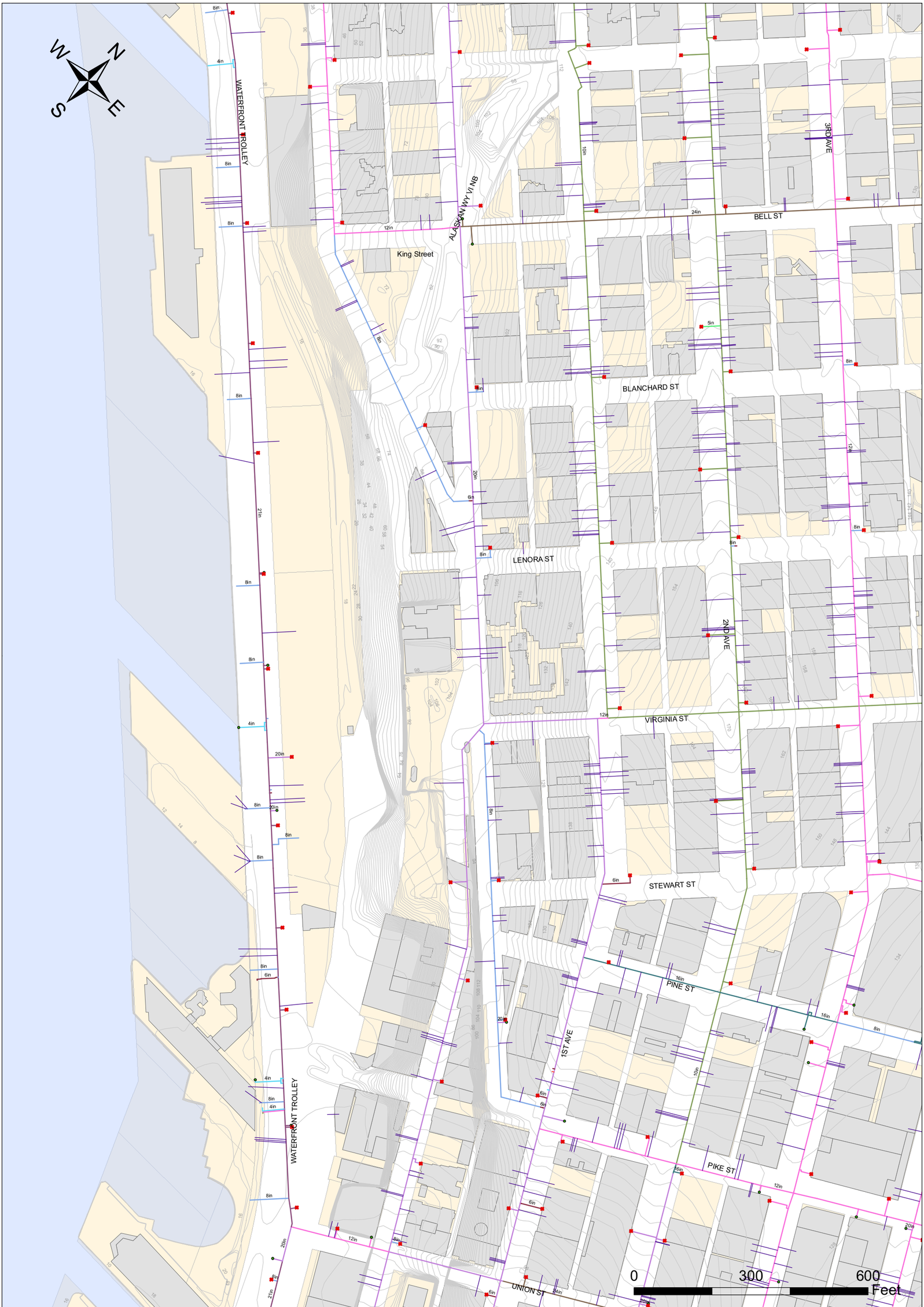
SCALE IN FEET

JUNE 1, 2009



AWV Elliott & Western Connector Waterlines by Diameter

April 6th, 2009

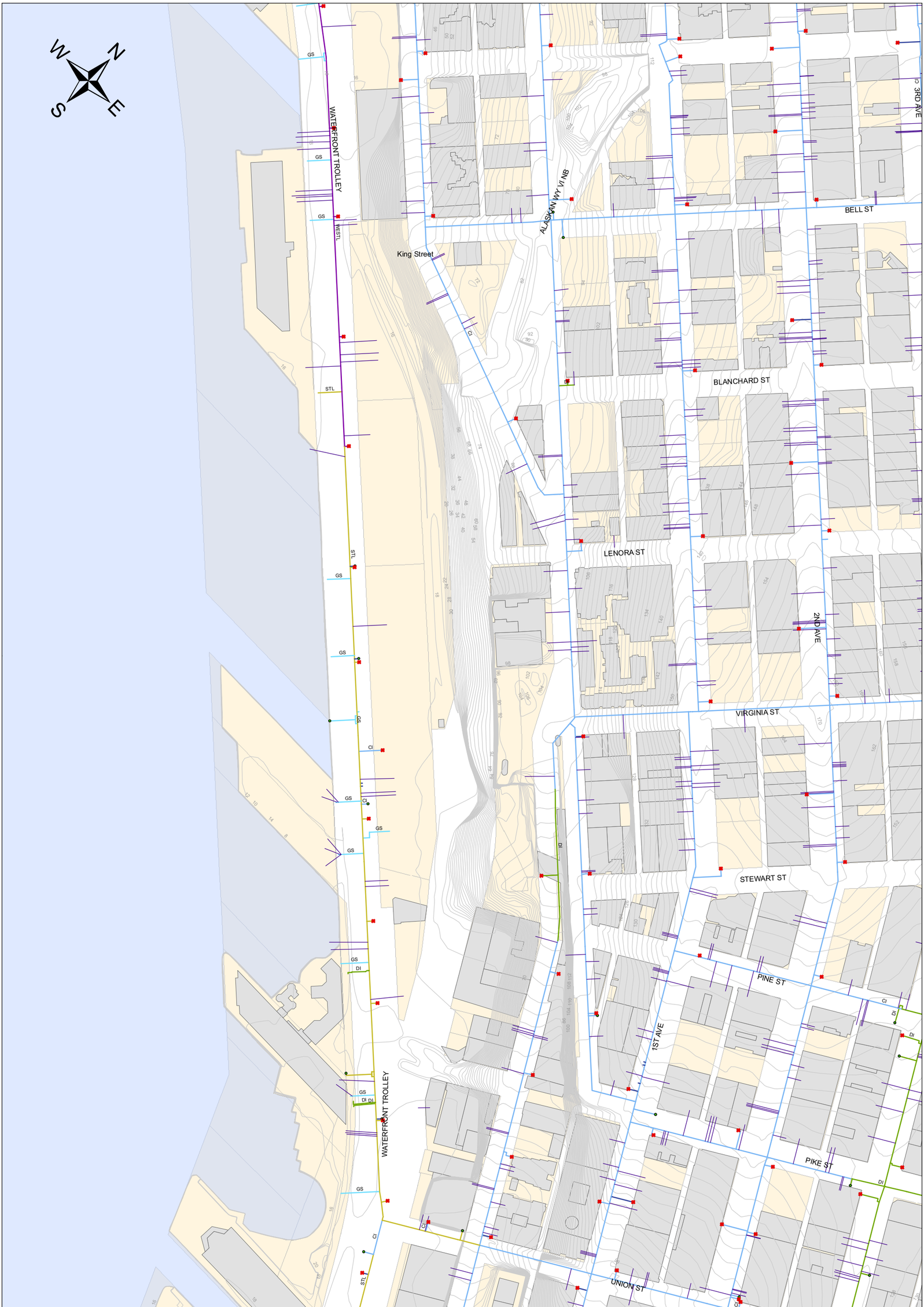
Legend

- Hydrant
- Appurtenances
- Services
- Buildings
- Water Bodies
- Parcels

Waterline Diameter (in)

0.8, 1, 1.5, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 21, 22, 24, 30, 36, 40, 42, 48, 66

G-8



AWV Elliott & Western Connector Waterlines by Material

April 6th, 2009

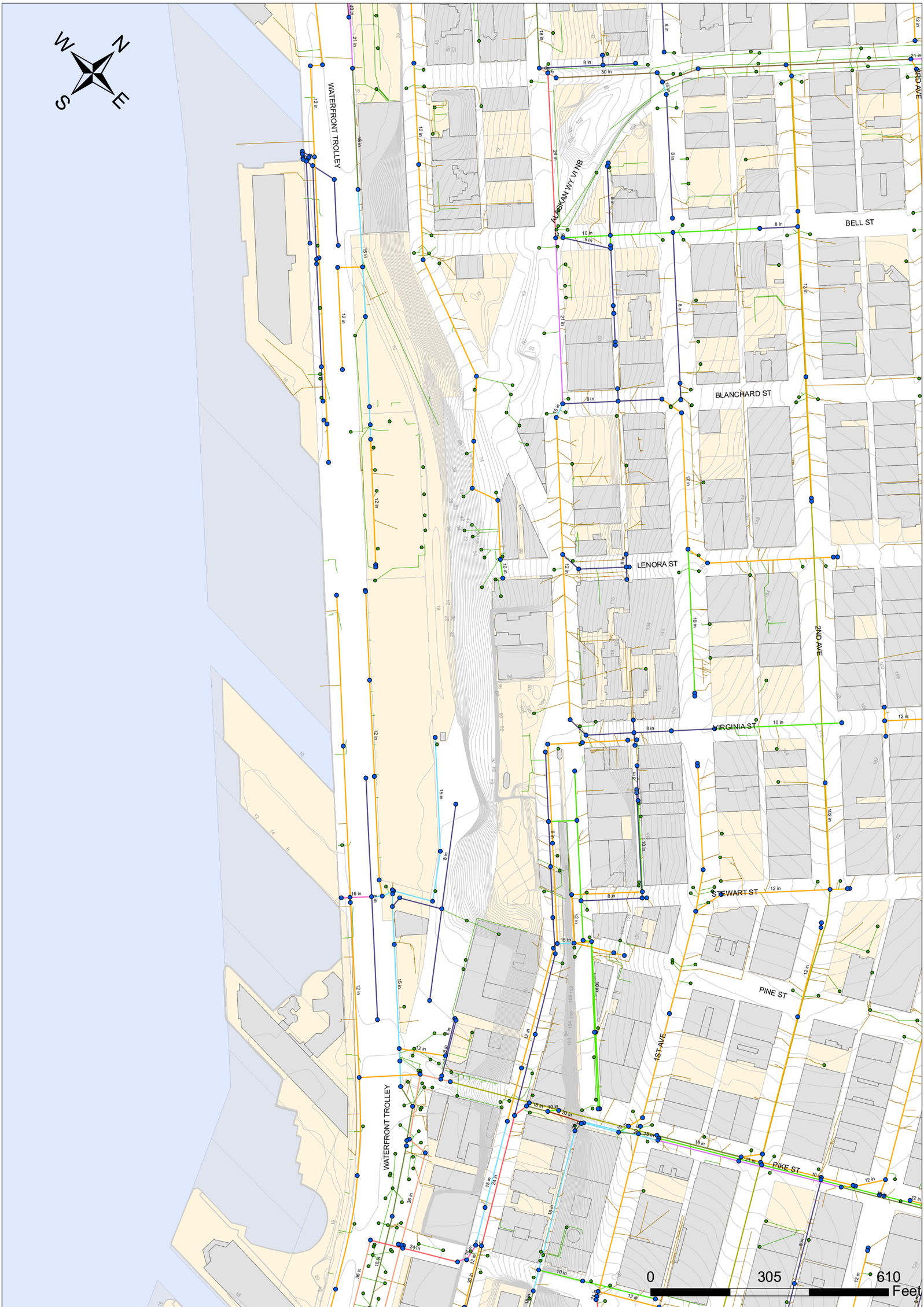
0 300 600 Feet

Legend

- Hydrant
- Appurtenances
- Services
- Buildings
- Water Bodies
- Parcels

Waterline
MSG_MATERI

- CI
- DI
- GS
- STL
- WESTL



AWV Elliott & Western Connector Sewer/Drainage Pipes by Diameter

April 6th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Parcels
- Water Bodies

Laterals

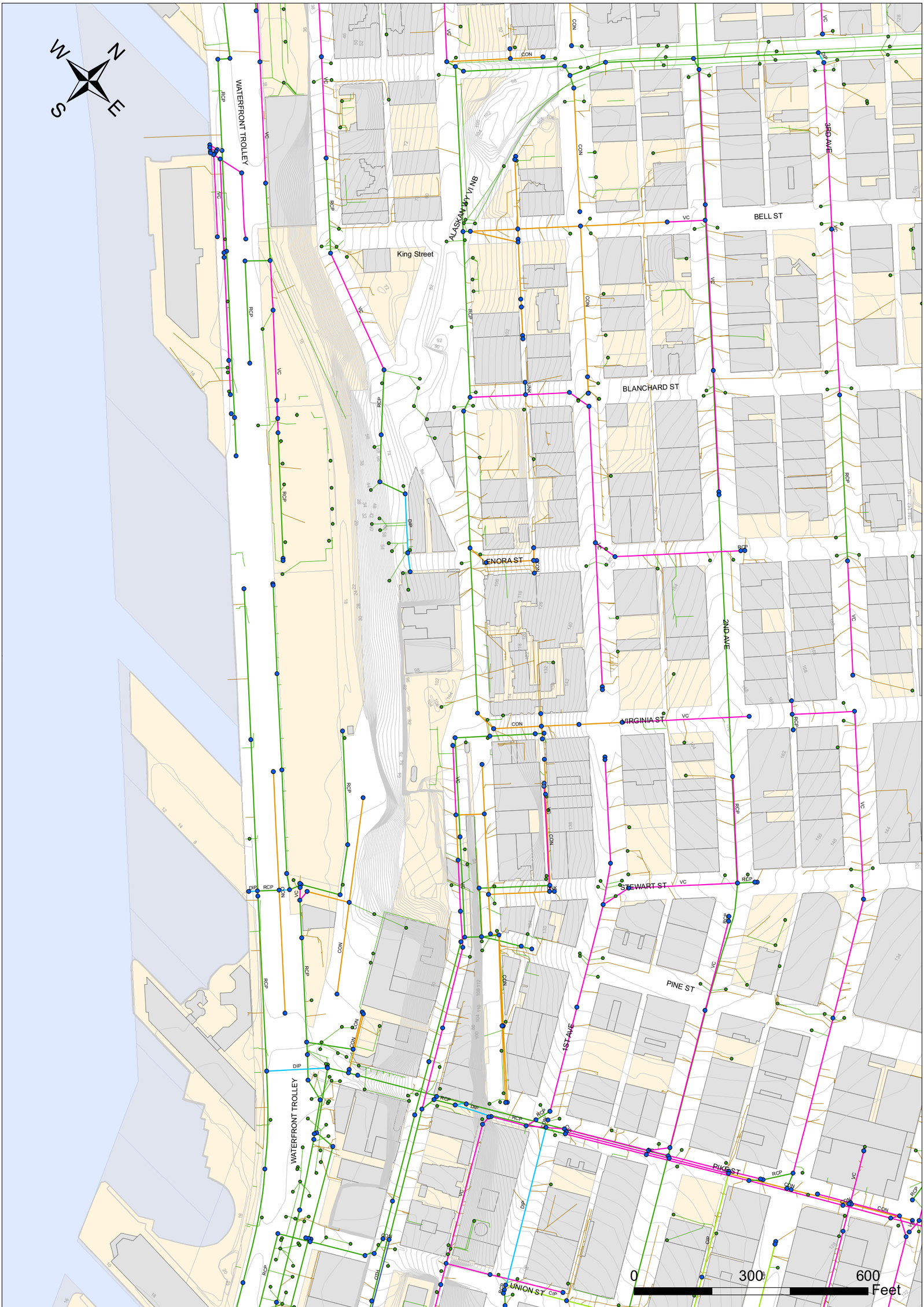
Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines

Diameter

- 8
- 10
- 12
- 15
- 16
- 18
- 20
- 21
- 24
- 30
- 36
- 48
- 49
- 102



AWV Elliott & Western Connector Sewer/Drainage Pipes by Material

April 6th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals

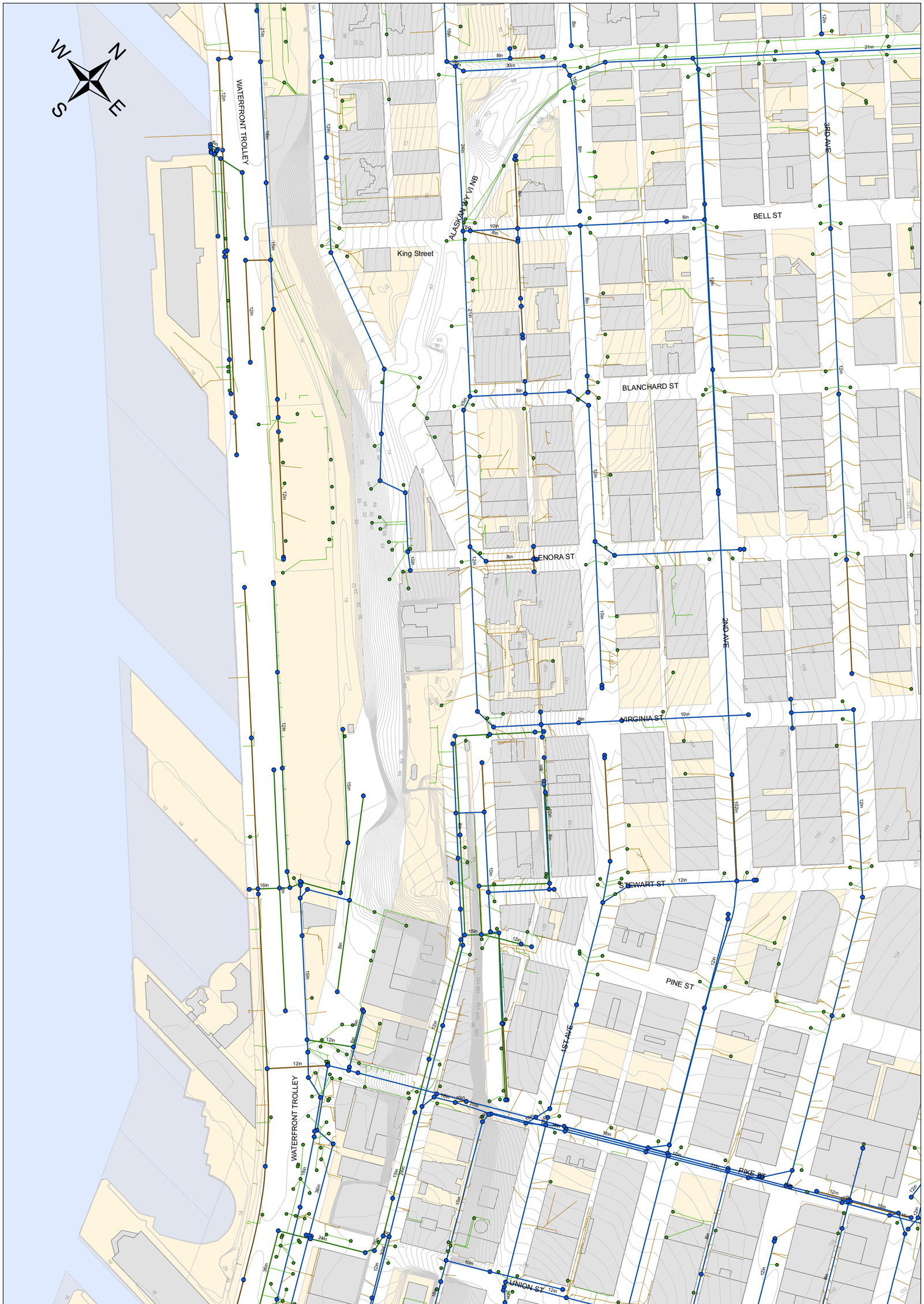
Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines

MATERIAL

- CIP
- CON
- DIP
- OTH
- PVC
- RCP
- UNK
- VC



AWV Elliott & Western Connector
Sewer/Drainage Pipes
by Probable Flow

April 6th, 2009

0 300 600 Feet

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals
Probable Flow
- Combined
- Drainage
- Sewer

Sewer Lines
Probable Flow
- Combined
- Drainage
- Sewer

Task CE
SR 99 Bored Tunnel Alternative
Elliott & Western Connector

City of Seattle Franchise Utility Maps

The below information is included on the attached CD.

Map No.	Location
27N-10	University St. to Union St. - SR99
27N-11	Union St. to Pike St. - SR99 and Alaskan Way
27N-12	Pike St. to Pine St. - SR99 and Alaskan Way
27N-13	Pine St. - SR99 and Alaskan Way
32N-25	Bell St. to Battery St. - First Ave. Alley
33N-5	Bell St. to Battery St. - First Ave.
33N-6	Bell St. to Battery St. - SR99 and Western Ave.
33N-7	Blanchard St. to Bell St. - SR99 and Western Ave.
33N-8	Lenora St. to Blanchard St. - Western Ave.
33N-11	Stewart St. to Virginia St. - SR99
33N-12	Virginia St. to Lenora St. - SR99
33N-13	Lenora St. to Blanchard St. - SR99
33N-14	Blanchard St. to Bell St. - Elliott Ave.
33N-15	Bell St. to Battery St. - Elliott Ave.
34N-1	Battery St. to Wall St. - First Ave.
34N-8	Battery St. to Wall St. - Western Ave.
34N-9	Battery St. to Wall St. - Elliott Ave.
36N-26	Battery St. to Wall St. - First Ave./Second Ave. Alley

Appendix H

No Build Alternative

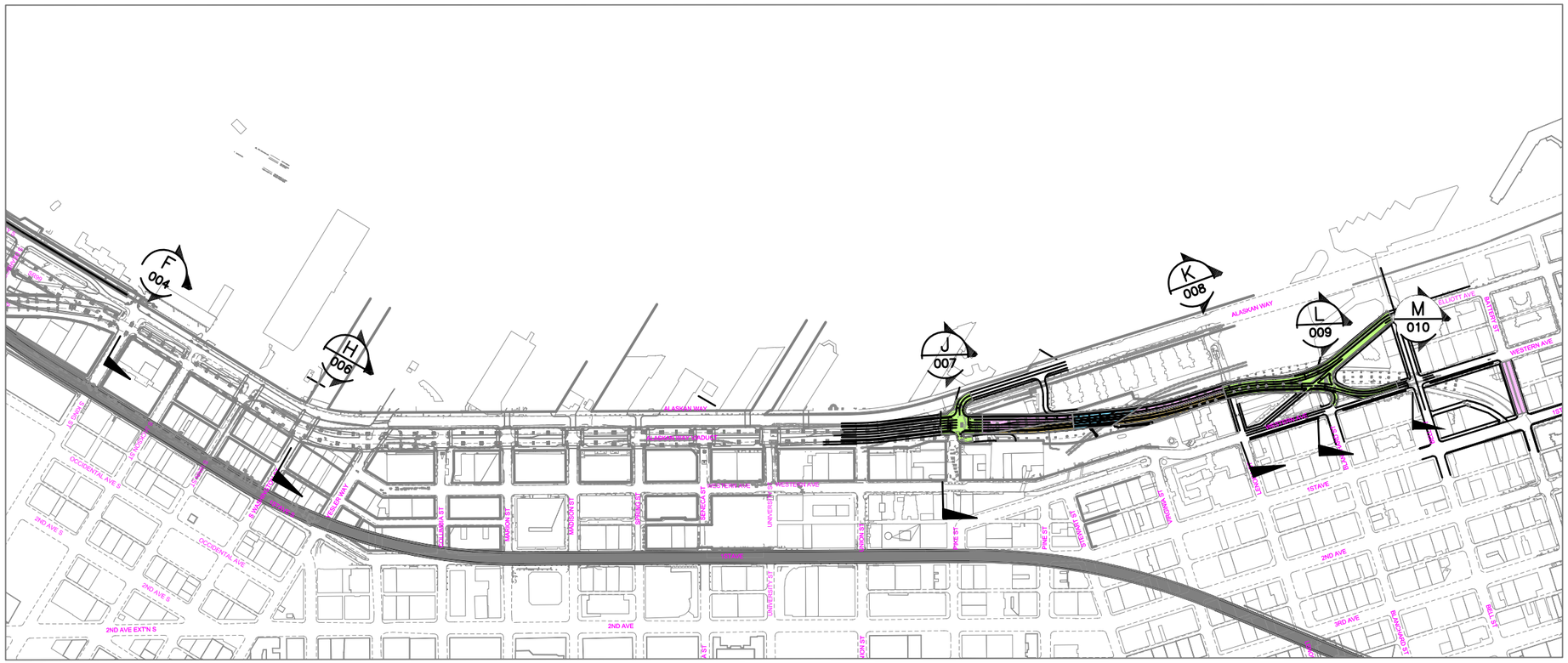
Support Documentation

Appendix H

List of Figures

Refer to attached CD for the following information:

- City of Seattle Franchise Utility Maps.
- SR 99 Bored Tunnel Alternative, No Build Alternative City GIS for Sewer/Drainage/Water Pipes.



SR 99
BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS KEY MAP NO BUILD ALTERNATIVE

DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

THIS MATERIAL IS CONCEPTUAL IN NATURE AND SHOULD BE USED FOR PLANNING AND DISCUSSION PURPOSES ONLY. IT IS SUBJECT TO CHANGE AND WILL BE FURTHER DEVELOPED AND REFINED AS PART OF THE PROJECT PROCESS

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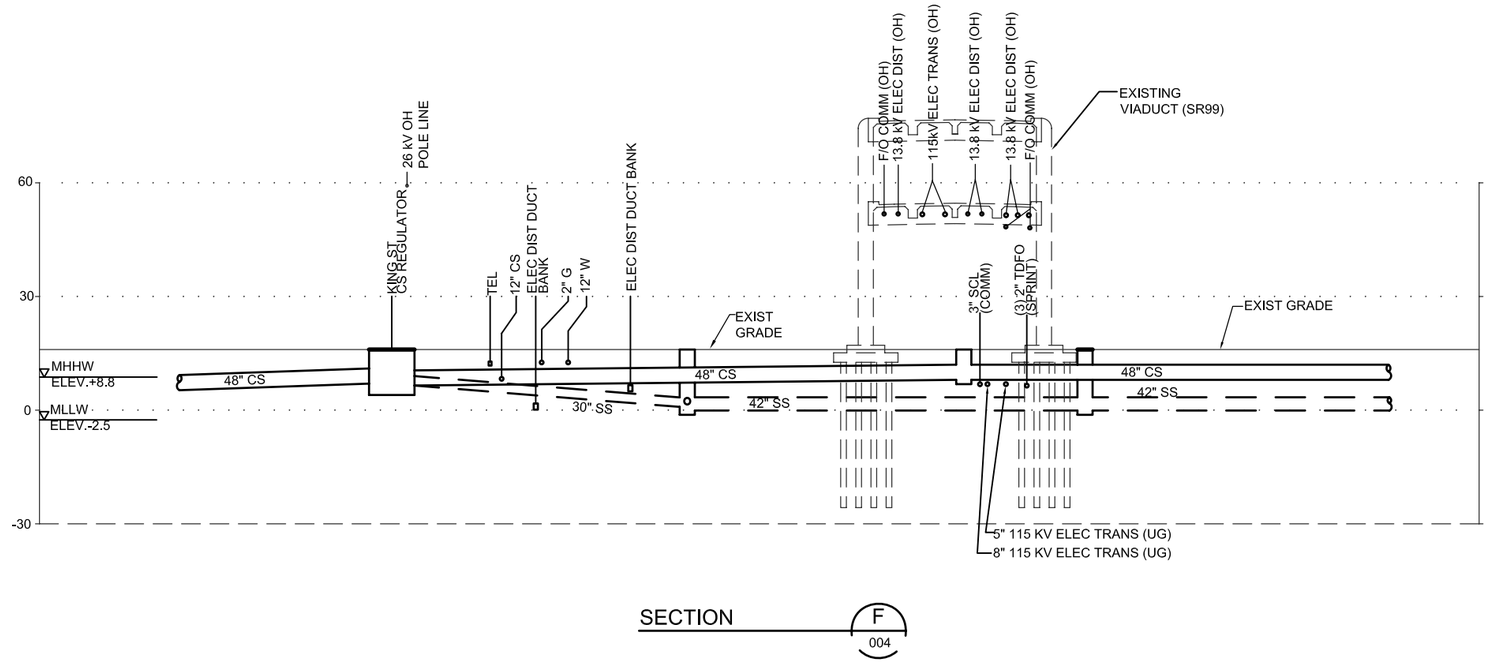
- RETAINED FILL
- AT GRADE
- RETAINED CUT
- CUT AND COVER
- TUNNEL
- ABOVE GRADE STRUCTURE

SHEET 001NBA

600 300 0 600

SCALE IN FEET

JUNE 1, 2009



SECTION F
004

SR 99
BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS

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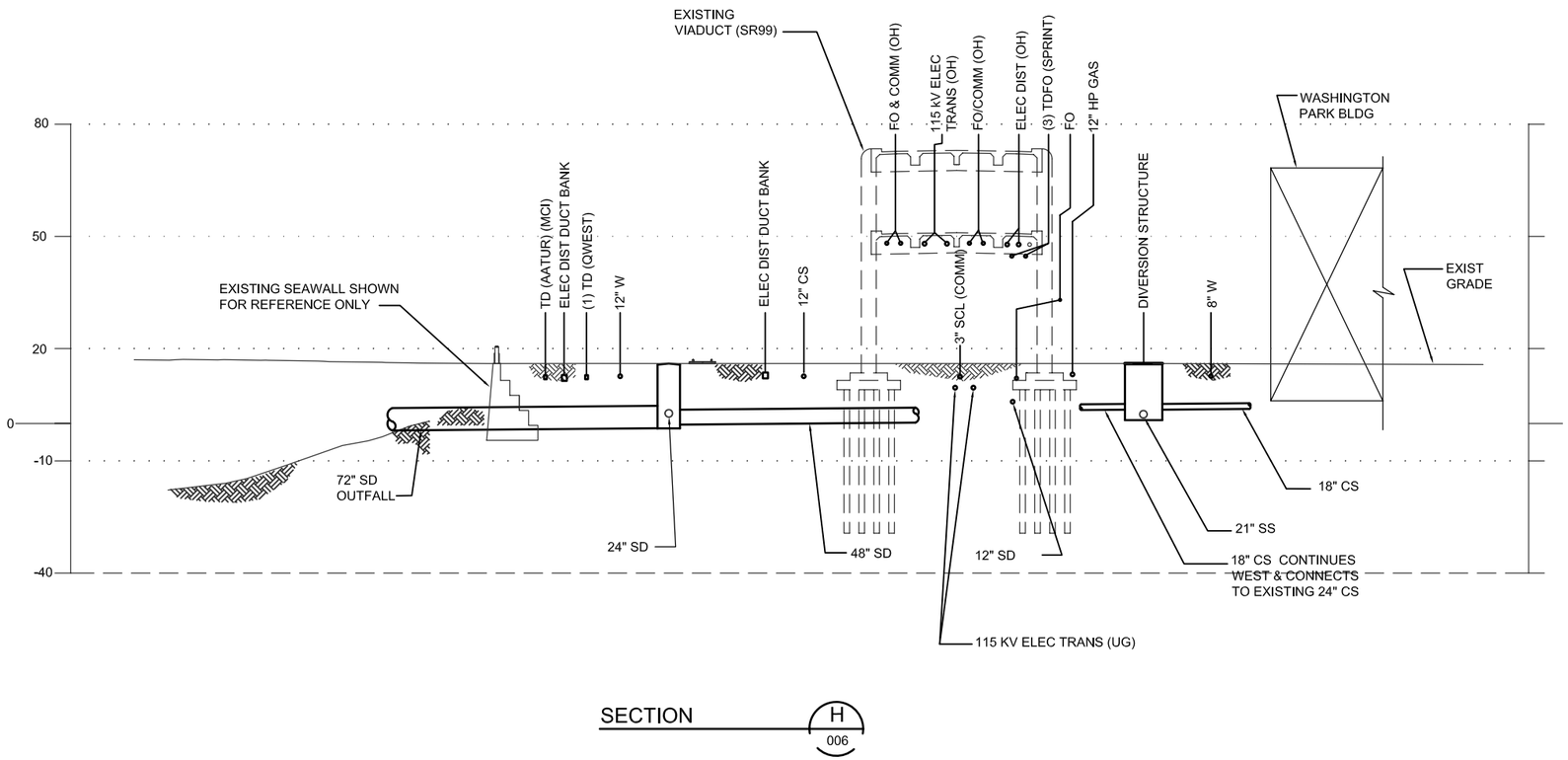

SECTION H
006

SR 99
BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS

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SHEET 006

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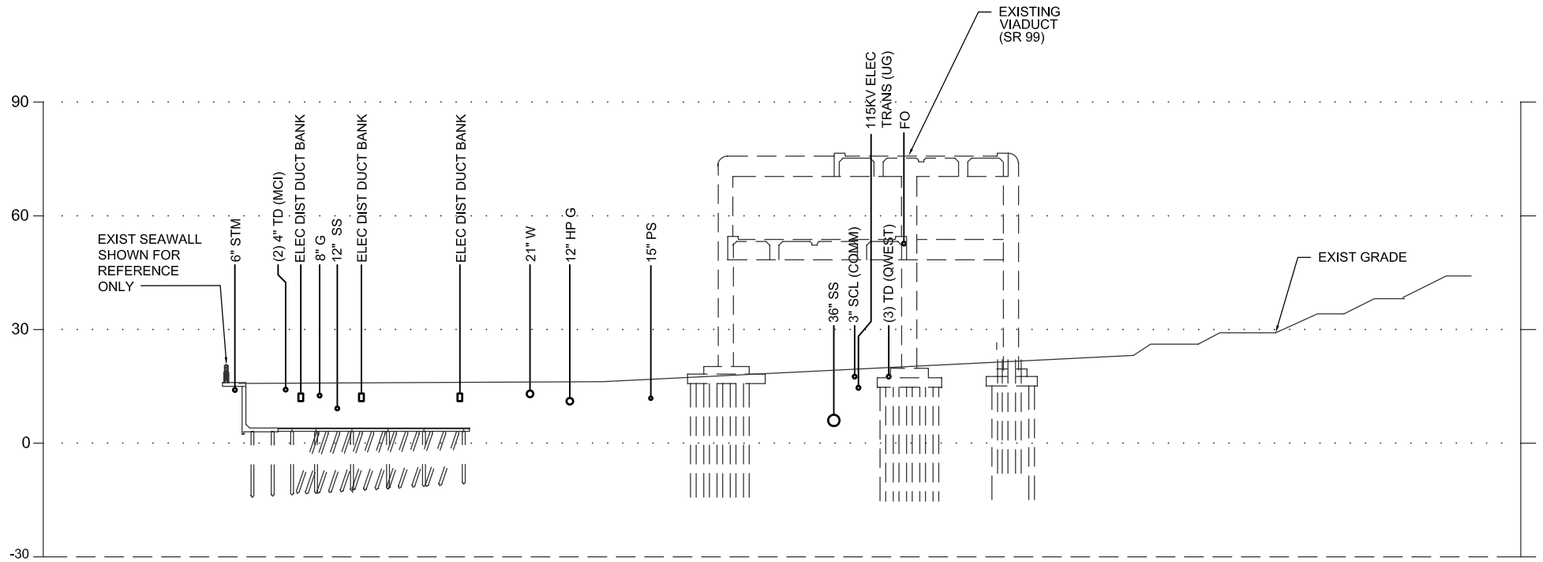
JUNE 1, 2009



SECTION J 007

SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS

DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

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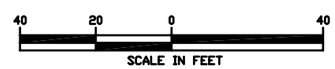
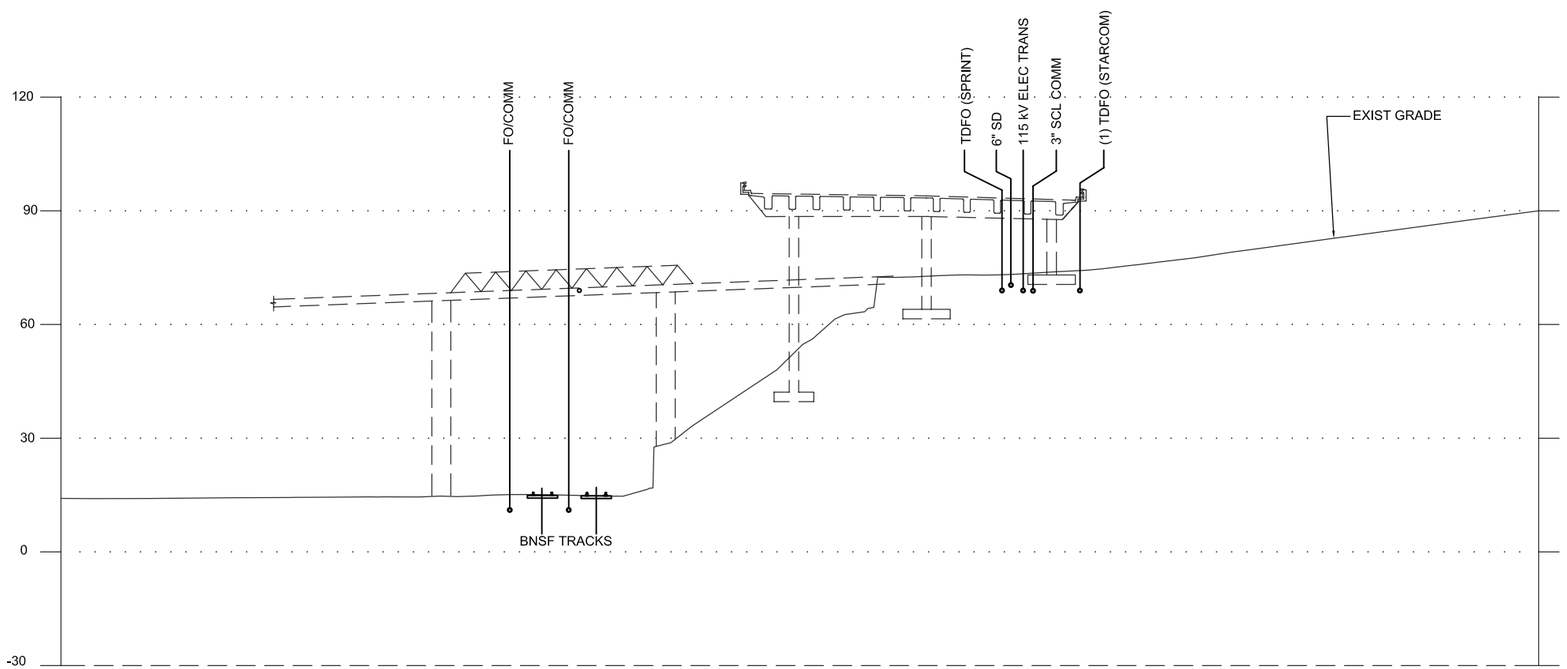
DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

SHEET 007



JUNE 1, 2009



SECTION K 008

SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS

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DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

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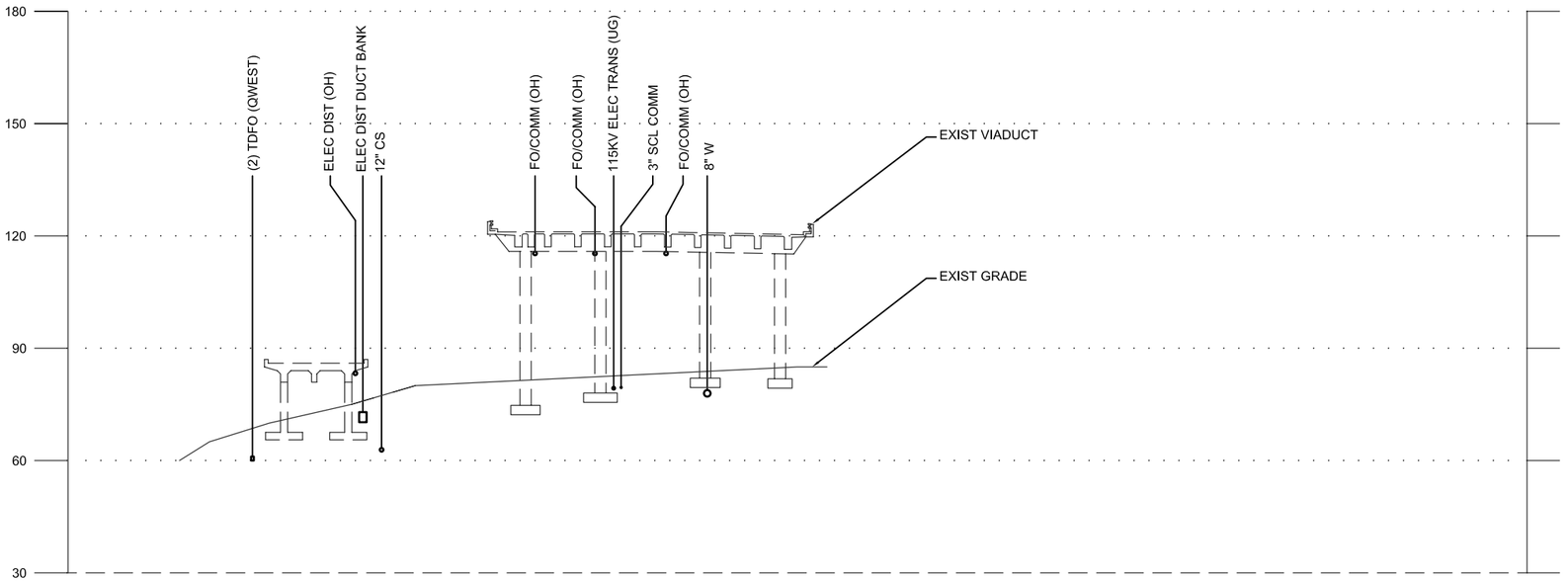
SCALE IN FEET

JUNE 1, 2009



SECTION L 009

SR 99 BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS

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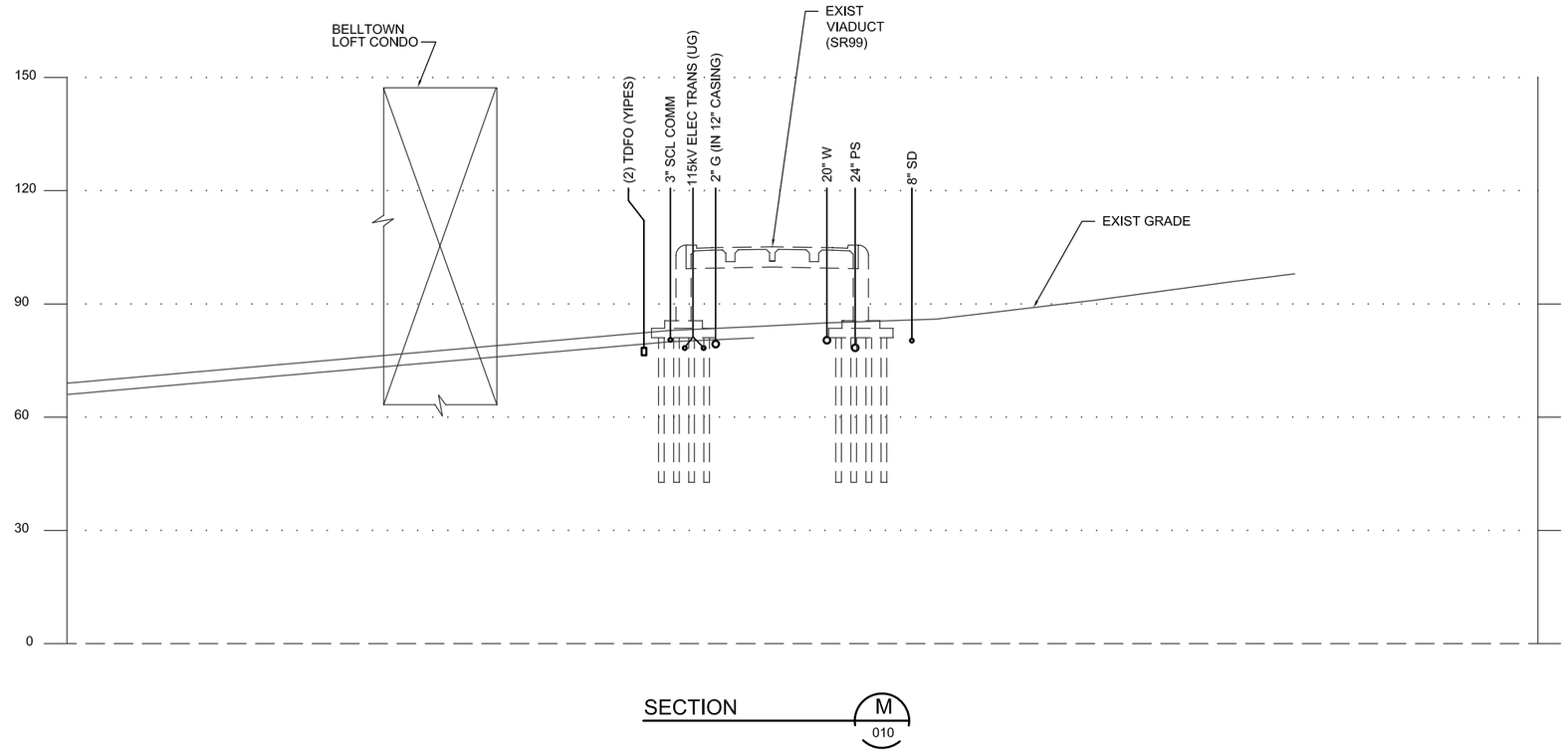
DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

SHEET 009

40 20 0 40
SCALE IN FEET

JUNE 1, 2009



SECTION M 010

SR 99
BORED TUNNEL ALTERNATIVE

EXISTING UTILITY SECTIONS

DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

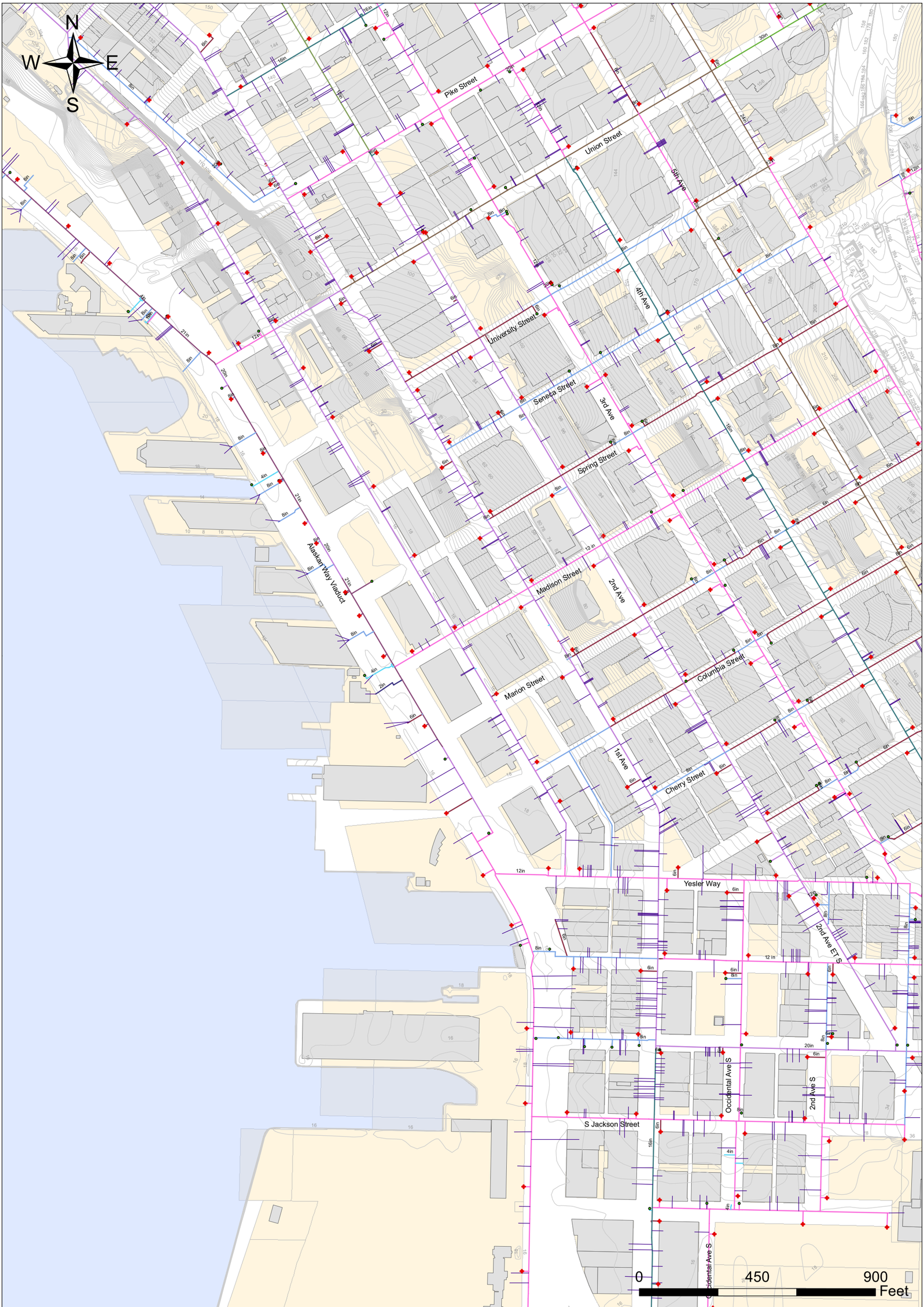
THIS MATERIAL IS CONCEPTUAL IN NATURE AND SHOULD BE USED FOR PLANNING AND DISCUSSION PURPOSES ONLY. IT IS SUBJECT TO CHANGE AND WILL BE FURTHER DEVELOPED AND REFINED AS PART OF THE PROJECT PROCESS

DRAFT - INTERNAL WORKING DOCUMENT - NOT FOR PUBLIC RELEASE - DRAFT

SHEET 010

40 20 0 40
SCALE IN FEET

JUNE 1, 2009



AWV Qwest Field to Pike St Waterlines by Diameter

May 12th, 2009

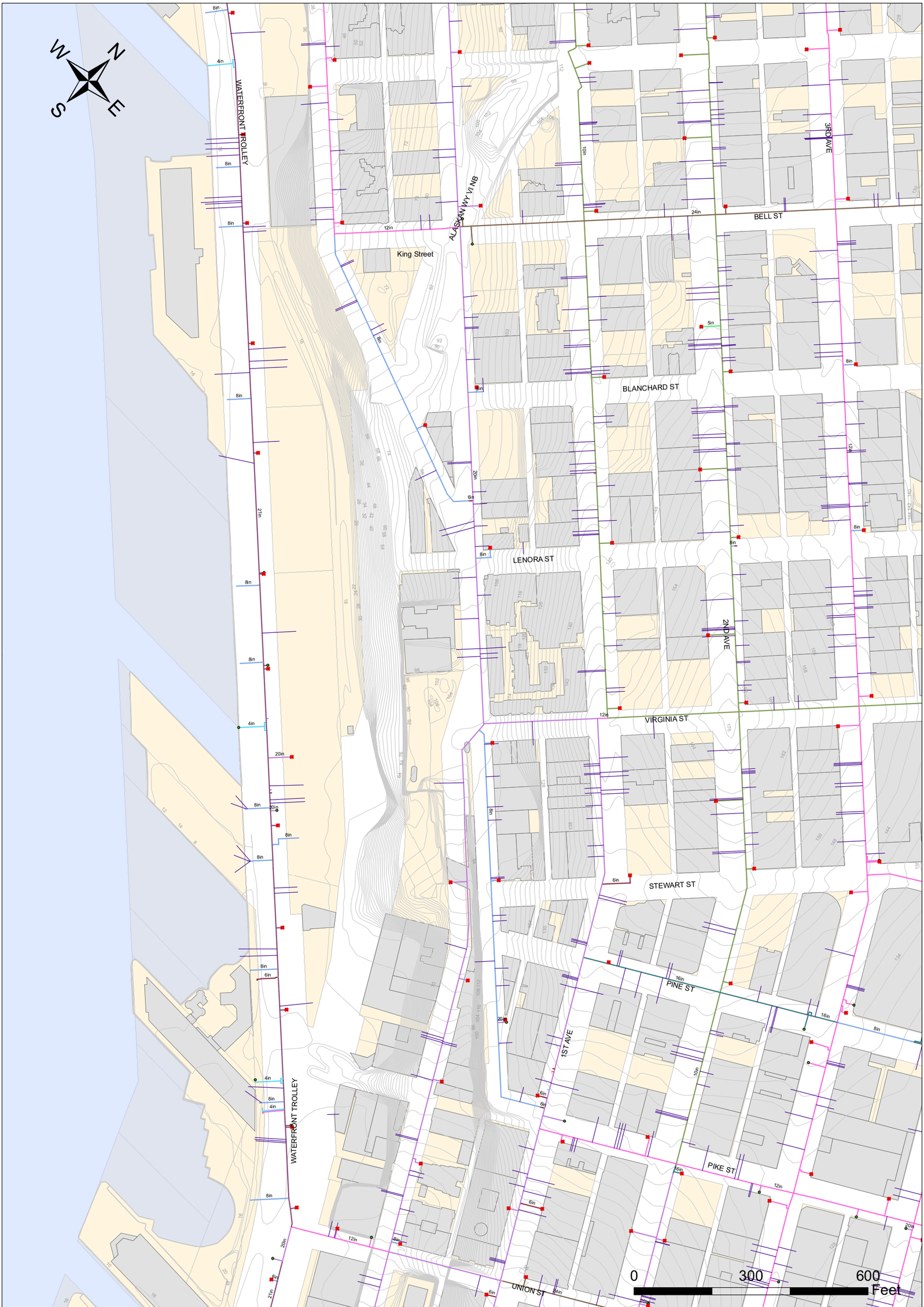
Legend

- Hydrant
- Appurtenances
- Services
- Buildings
- Water Bodies
- Parcels

Waterline Diameter (in)

0.8, 1, 1.5, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 21, 22, 24, 30, 36, 40, 42, 48, 66

H-10



AWV Elliott & Western Connector Waterlines by Diameter

April 6th, 2009

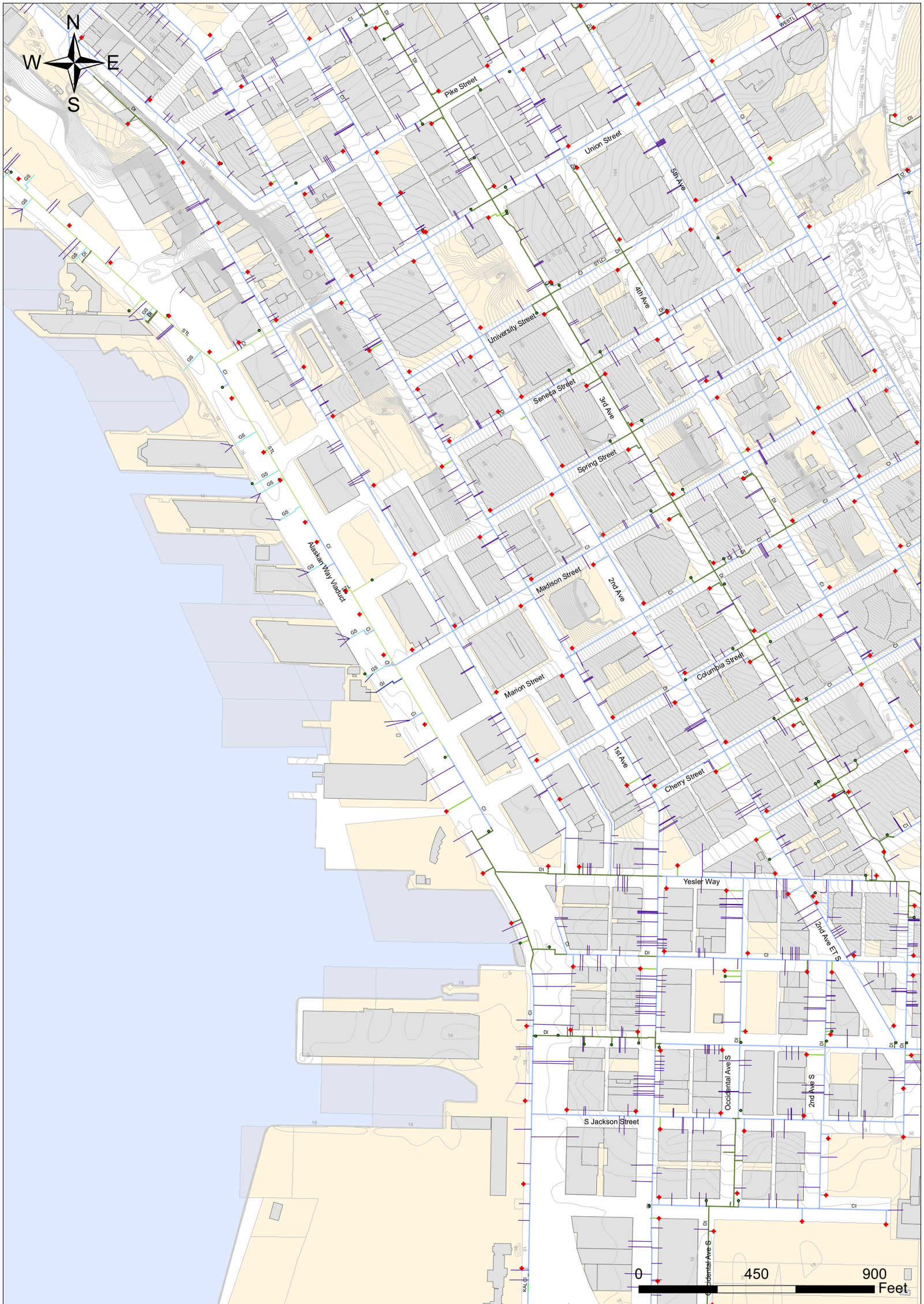
Legend

- Hydrant
- Appurtenances
- Services
- Buildings
- Water Bodies
- Parcels

Waterline Diameter (in)

0.8, 1, 1.5, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 21, 22, 24, 30, 36, 40, 42, 48, 66

H-11



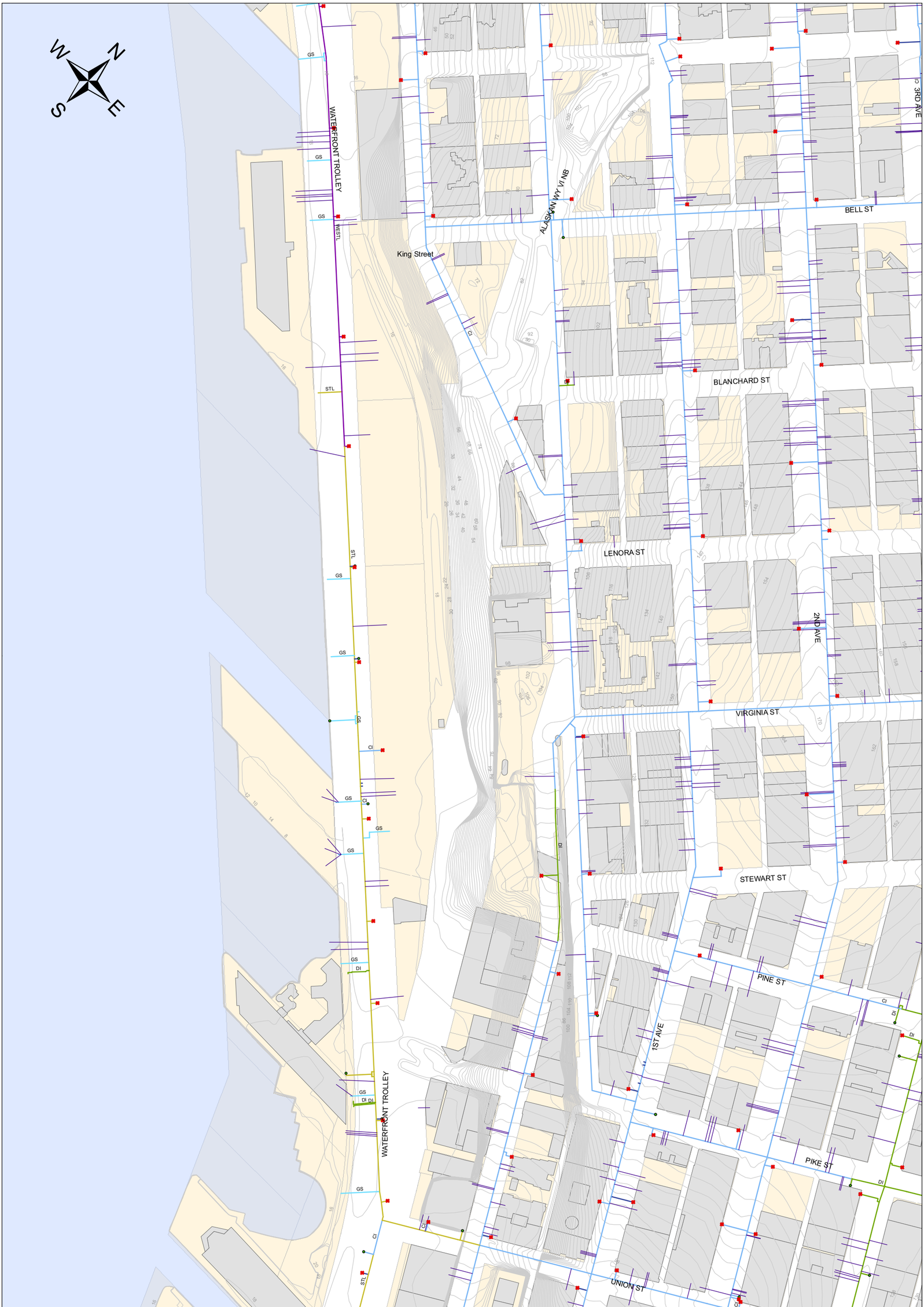
AWV Qwest Field to Pike St Waterlines by Material

May 12th, 2009

Legend

- Hydrant
- Appurtenances
- Services
- Buildings
- Water Bodies
- Parcels
- **Waterline**
- **MSG_MATERI**
- CC
- CI
- CONC
- CU
- DI
- GI
- GS
- I
- KAL
- LBSTL
- PL
- PVC
- RVSTL
- STL
- WESTL

H-12



AWV Elliott & Western Connector Waterlines by Material

April 6th, 2009

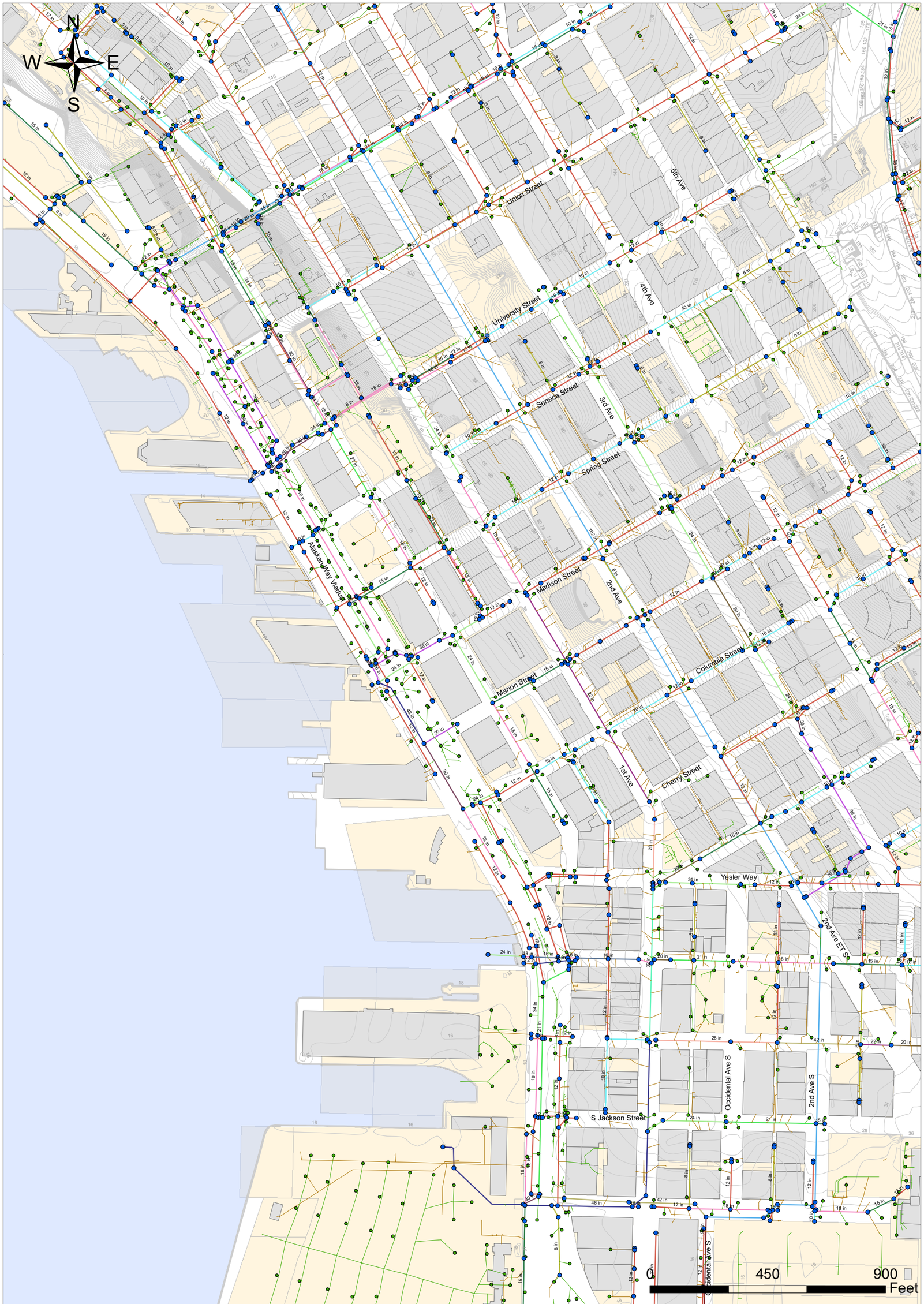
0 300 600 Feet

Legend

- Hydrant
- Appurtenances
- Services
- Buildings
- Water Bodies
- Parcels

Waterline
MSG_MATERI

- CI
- DI
- GS
- STL
- WESTL



AWV Qwest Field to Pike St Sewer/Drainage Pipes by Diameter

May 12th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals

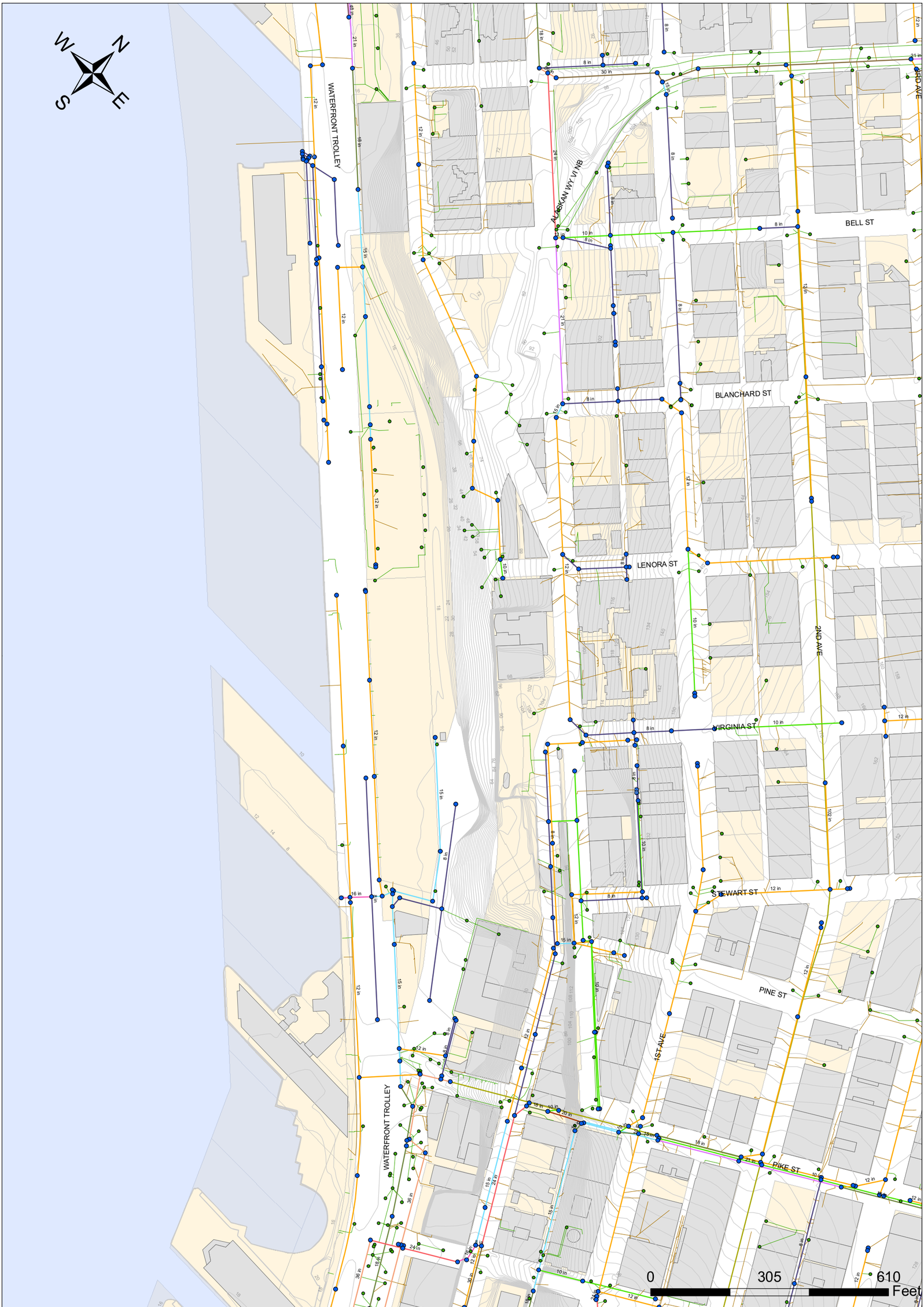
Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines

Diameter

6, 8, 10, 12, 15, 16, 18, 20, 21, 22, 24, 28, 30, 32, 36, 42, 48, 49, 60, 72, 96, 102



AWV Elliott & Western Connector Sewer/Drainage Pipes by Diameter

April 6th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Parcels
- Water Bodies

Laterals

Probable Flow

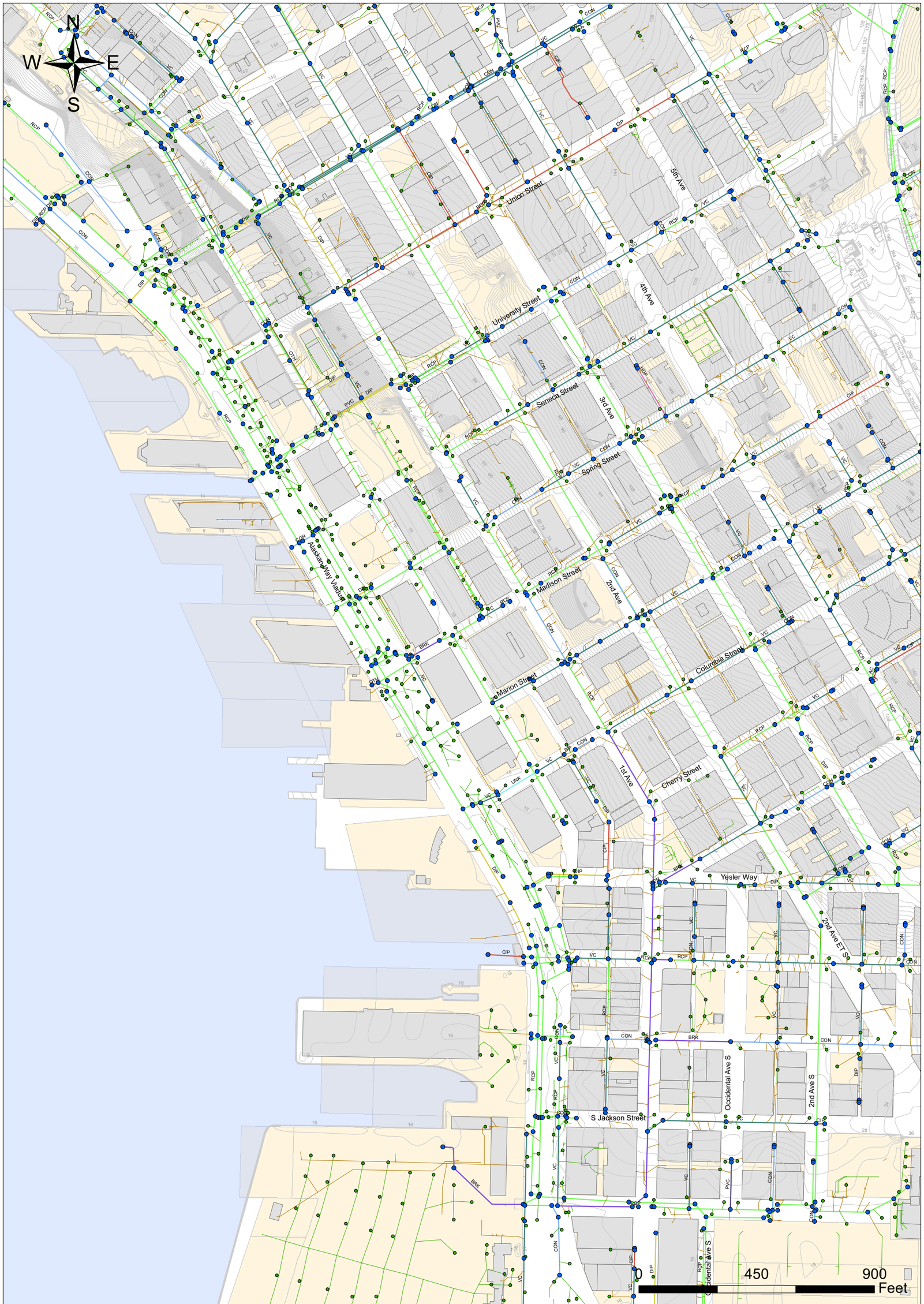
- Combined
- Drainage
- Sewer

Sewer Lines

Diameter

- 8
- 10
- 12
- 15
- 16
- 18
- 20
- 21
- 24
- 30
- 36
- 48
- 49
- 102

H-15



AWV Qwest Field to Pike St Sewer/Drainage Pipes by Material

May 12th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals

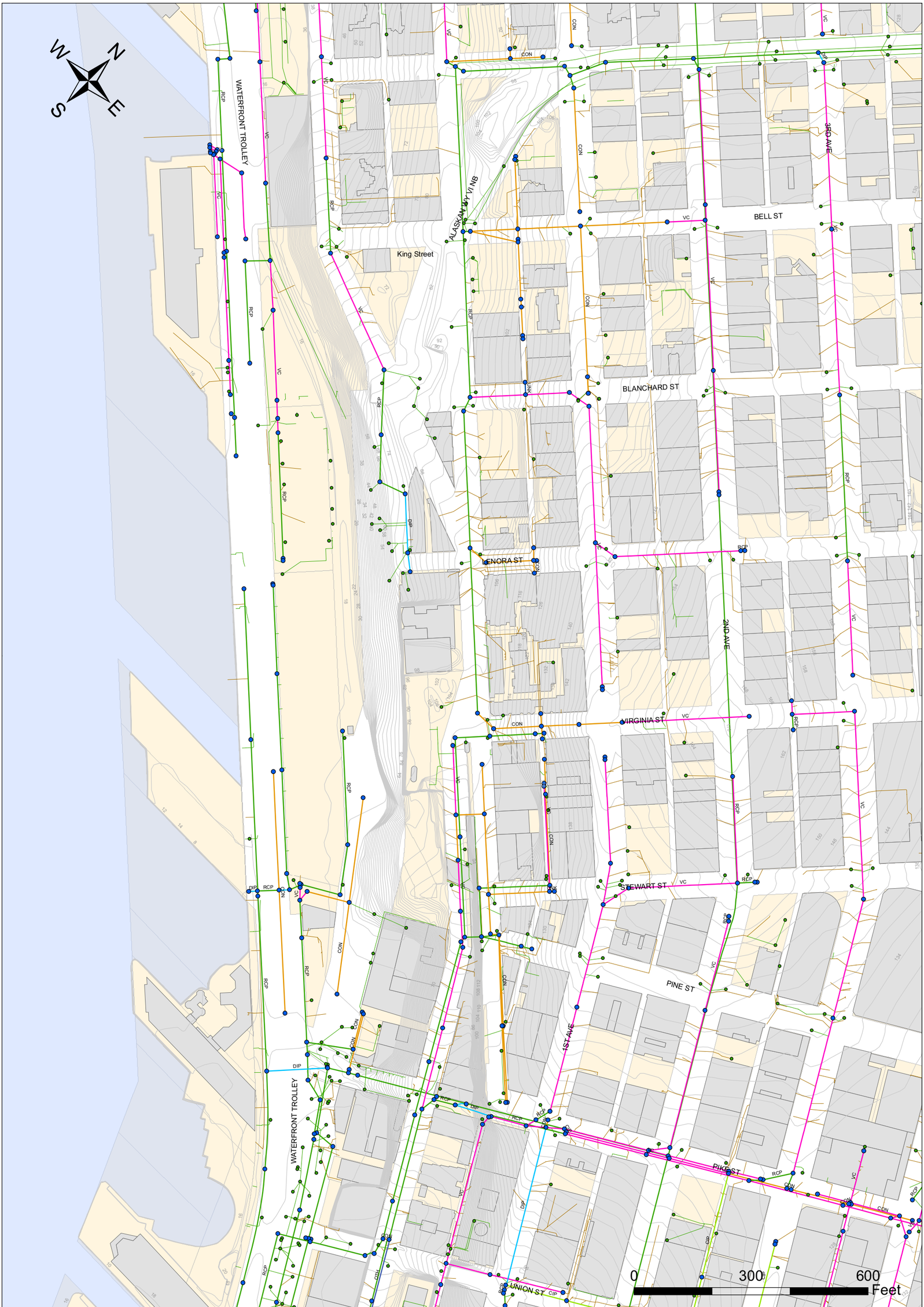
Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines

MATERIAL

- AC
- BRK
- CIP
- CON
- DIP
- HDP
- OTH
- PVC
- RCP
- UNK
- VC



AWV Elliott & Western Connector Sewer/Drainage Pipes by Material

April 6th, 2009

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals

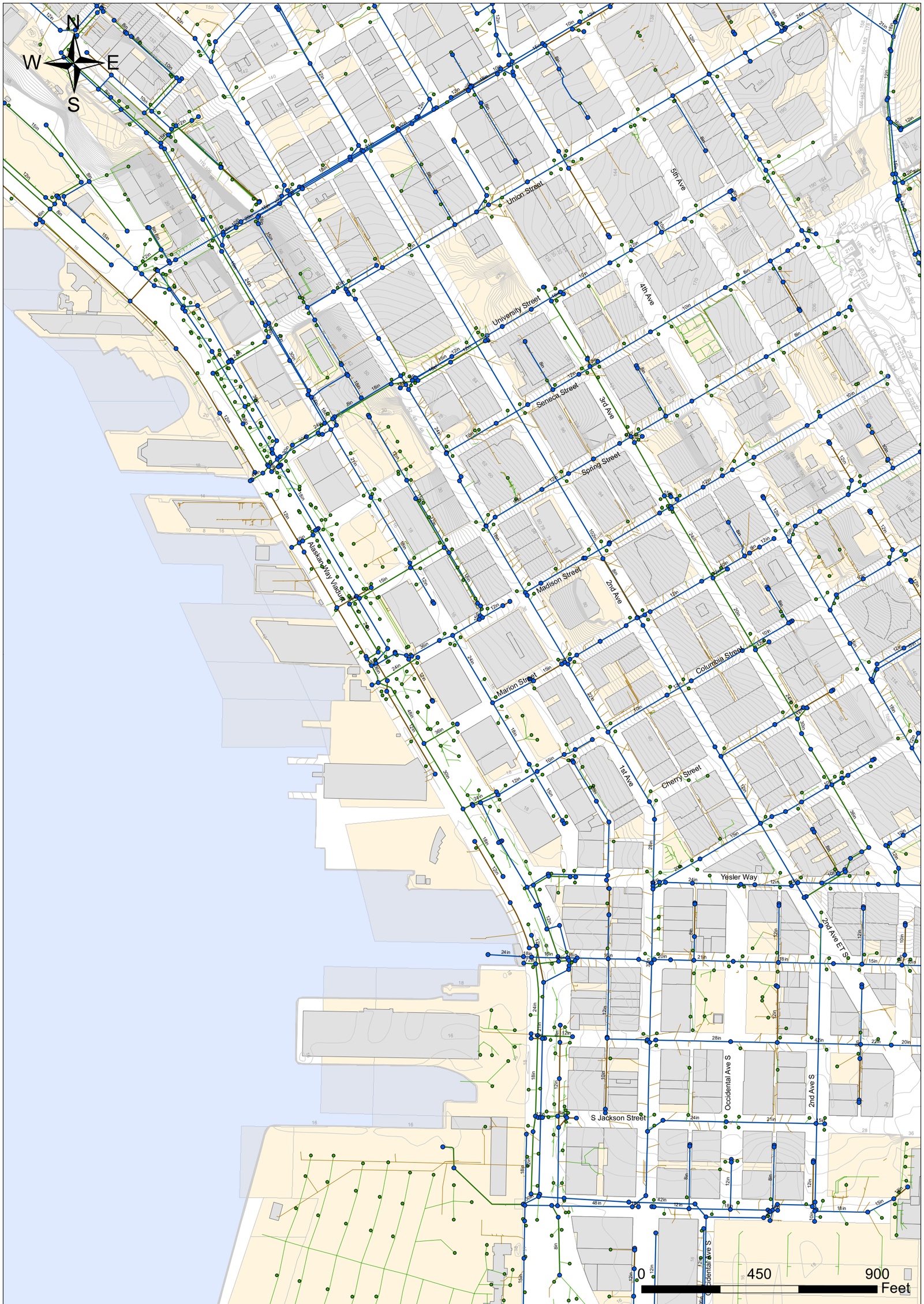
Probable Flow

- Combined
- Drainage
- Sewer

Sewer Lines

MATERIAL

- CIP
- CON
- DIP
- OTH
- PVC
- RCP
- UNK
- VC



AWV Qwest Field to Pike St Sewer/Drainage Pipes by Probable Flow

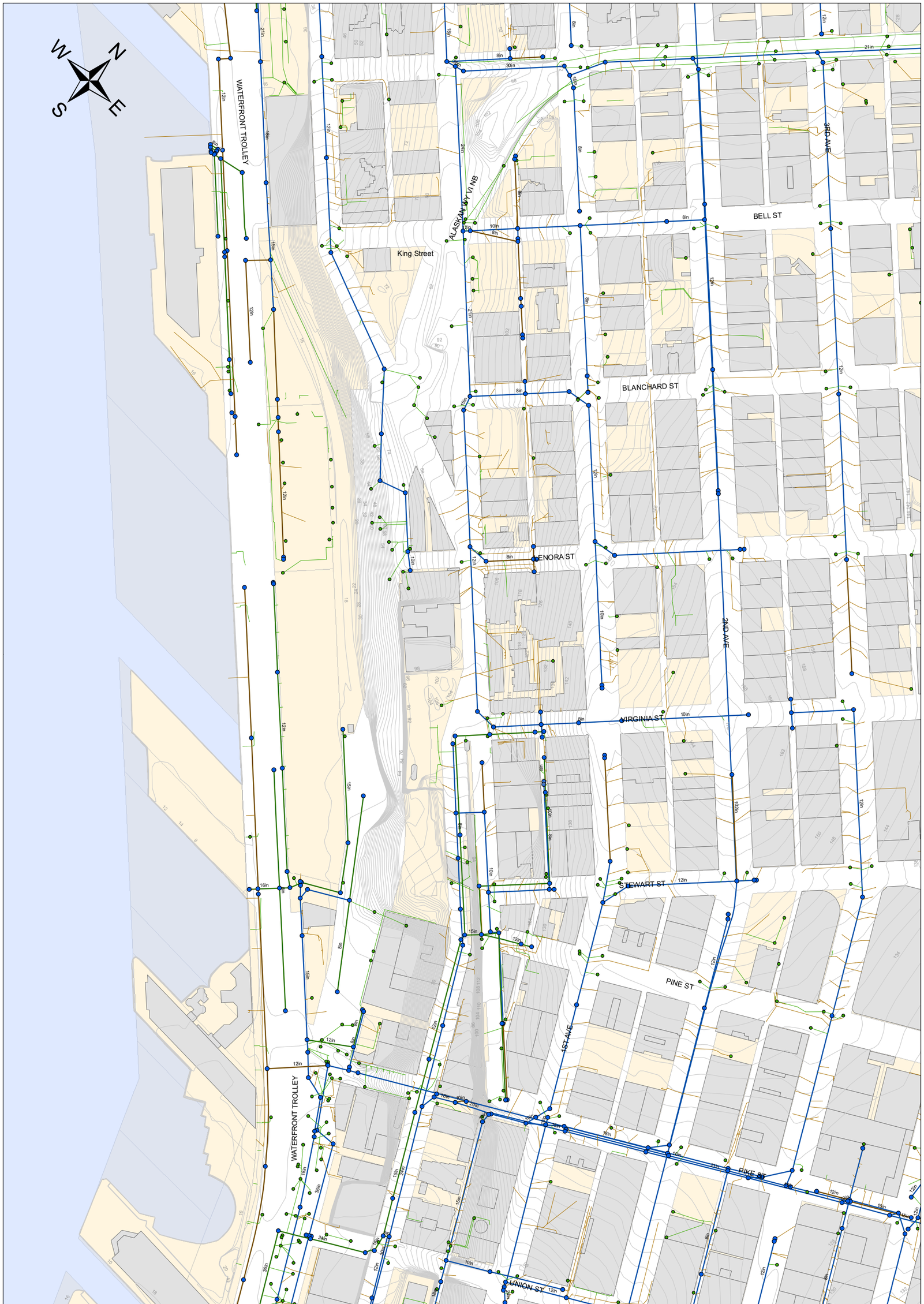
May 12th, 2009

Legend

- Manholes
- Catch Basin
- Water Bodies
- Parcels
- Buildings

Laterals
Probable Flow
- Combined
- Drainage
- Sewer

Sewer Lines
Probable Flow
- Combined
- Drainage
- Sewer



AWV Elliott & Western Connector
Sewer/Drainage Pipes
by Probable Flow

April 6th, 2009

0 300 600 Feet

Legend

- Manholes
- Catch Basin
- Buildings
- Water Bodies
- Parcels

Laterals
Probable Flow
- Combined
- Drainage
- Sewer

Sewer Lines
Probable Flow
- Combined
- Drainage
- Sewer

Task CE
SR 99 Bored Tunnel Alternative
No Build Alternative

City of Seattle Franchise Utility Maps

The below information is included on the attached CD.

Map No.	Location
1N-9	Yesler Way to Columbia St. - Alaskan Way
1N-10	Columbia St. to Marion St. - Alaskan Way
1N-11	Marion St. to Spring St. - Alaskan Way
1N-12	Spring St. to Seneca St. - Alaskan Way
2S-5	S. Washington St. to Yesler Way - Alaskan Way
2S-6	S. Washington St. - Alaskan Way S.
2S-7	S. Jackson St. to S. Washington St. - Alaskan Way S.
2S-16	S. King St. to S. Jackson St. - Alaskan Way S.
2S-17	Railroad Way S. to S. King St. - Alaskan Way S.
27N-9	Seneca St. to University St. - Alaskan Way
27N-10	University St. to Union St. - SR99
27N-11	Union St. to Pike St. - SR99 and Alaskan Way
27N-12	Pike St. to Pine St. - SR99 and Alaskan Way
27N-13	Pine St. - SR99 and Alaskan Way
33N-5	Bell St. to Battery St. - First Ave.
33N-6	Bell St. to Battery St. - SR99 and Western Ave.
33N-7	Blanchard St. to Bell St. - SR99 and Western Ave.
33N-8	Lenora St. to Blanchard St. - Western Ave.
33N-11	Stewart St. to Virginia St. - SR99
33N-12	Virginia St. to Lenora St. - SR99
33N-13	Lenora St. to Blanchard St. - SR99
33N-14	Blanchard St. to Bell St. - Elliott Ave.
33N-15	Bell St. to Battery St. - Elliott Ave.
34N-1	Battery St. to Wall St. - First Ave.