City of Bellevue

Post Office Box 90012 • Bellevue, Washington • 98009 9012

September 1, 2017

Newport Yacht Club HOA Board
81 Skagit Key
Bellevue, WA 98006
Subject: Newport Yacht Club outfall summary memo and preliminary plans

Dear Sir/Madam:

Thank you for allowing the City of Bellevue to provide information regarding the outfall that we'd like to construct on the Community's property. As you may be aware there have been long standing flooding concerns in the community from the creek and also along the roadways. The City has received funding from the King County Flood Control District to review and analyze the flooding concerns and to design and construct facilities that will alleviate the flooding concerns.

The project has identified that the culverts within Coal Creek should be replaced to reduce flooding from the creek. Through the alternatives analysis it was further identified that the roadway flooding is due to high water in Coal Creek. The alternatives analysis found that disconnecting the storm drainage from the creek and connecting it directly to Lake Washington would resolve the roadway flooding in larger storm events.

At this time the project has been broken into three pieces with design, permitting and easement acquisition generally starting one year before construction.

1. Group 1 – Upper Skagit Key Culvert Replacement – Construction summer/ fall 2017
2. Group 2 – Cascade Key and Newport Key Culvert Replacements and the Grand Canal Outfall – Construction summer/ fall/ winter 2018
3. Group 3 – Glacier Key and lower Skagit Key Culvert Replacements and Newport Yacht Club Outfall – Construction summer/ fall/ winter 2019.

The above construction work to alleviate flooding concerns is dependent on obtaining both easements and permits for the construction work.

Per your request one month ago, please find attached 1) a memorandum summarizing the work on the outfall analysis that has been completed to date for the roadway flooding problems in Newport Shores. I have also included 2) the preliminary plan, profile and details that we have currently for the Newport Yacht Club outfall and 3) the plan and profile used for the Grand Canal outfall land use permit submittal this week. The design of the Newport Yacht Club outfall is not slated to begin in earnest until the spring of 2018. Finally, I have also included 4) a figure that shows the existing drainage within the Newport Shores and the nine (9) existing storm drainage outfalls to the Grand Canal.

I am looking forward to presenting to the Board and residents information on the proposed Newport Yacht Club outfall on September 12th.

Sincerely,
City of Bellevue

Debbie Harris

Debbie Harris, P.E.
Project Manager
dharris@bellevuewa.gov
425-452-4367

TETRA TECH

MEMO

To:	Debbie Harris/City of Bellevue
Cc:	
From:	Jerry Scheller
Date:	August 30, 2017
Subject:	Lower Coal Creek Flood Hazard Reduction Project, 100-SET-T34271.03 Synthesis of the Newport Yacht Club Outfall Alternatives Analysis and Design for the Newport Yacht Club HOA Board

INTRODUCTION

Stormwater runoff in the Newport Shores neighborhood is collected in a curb and gutter system and conveyed through a pipe storm drain system to outfalls to Coal Creek located at all creek road crossings except Cascade Key . The storm drain network within the project area serves properties along Tulalip Key, Lummi Key, Newport Key, Glacier Key, Skagit Key and Lopez Key and includes an overflow from Tulalip Key to the SE 40th Street system and its outfall at Lake Washington in addition to the four outfall points along Coal Creek.

Street flooding is a frequent problem in the Newport Shores neighborhood due to high tailwater conditions at roadway storm drain outfalls to Coal Creek. To mitigate this flooding, the *Lower coal Creek Flood Hazard Reduction Alternatives Analysis Report* (NHC, 2015) recommended disconnecting the storm drain system from Coal Creek and diverting stormwater flows through two or three new outfalls through private property to Lake Washington. Supplemental analysis to support the *Coal Creek Bridges Preliminary Design Report* (Tetra Tech, 2016) documented flooding from Coal Creek at road crossings during the 100-year event.

To support the recommendation from the 2015 alternatives analysis report, an outfall evaluation study was performed (documented in *Lake Washington Outfall Concept Evaluation*, Tetra Tech, 2017) to develop a technical recommendation for the alignment of the new outfalls to Lake Washington. The study included an update to the hydraulic analysis and identification of suitable alignments near the Newport Yacht Club (NYC). This memo documents the options considered for the new outfall at the Newport Yacht Club (NYC) marina.

The following sections are a compilation of excerpts from the above studies and reports. Several of these reports and studies can be found on the project website at https://utilities.bellevuewa.gov/utilities-projects-plans-standards/projects-in-your-neighborhood/lower-coal-creek-flood-hazard-reduction

FLOODING PROBLEM EVALUATION

Street flooding in the Newport Shore neighborhood may be due to insufficient storm drain capacity and/ or also backflow from Coal Creek during high flow events (NHC 2015).

Tetra Tech
1420 5th Avenue, Suite 550, Seattle, WA 98101
Tel 206.728.9655 Fax 206.883.9301 tetratech.com

Flooding History

Frequent flooding in the Newport Shores neighborhood has generated in excess of 50 to the City of Bellevue (COB) over the years. Of those complaints, 14 were associated with street flooding. Many of the flooding problems are directly related to overbank flooding in Coal Creek; however, a subset of reported problems cover road and property flooding away from the creek in areas served by the storm drainage system. Flooding problems in the storm drainage system were identified from a review of the flood records recorded in the maintenance database and by COB maintenance staff. Figure 1 shows the location of reported street flooding in the Newport Shores neighborhood.

The timing of the drainage complaints in the Newport Shores area was compared to flow rates estimated by the hydrologic model and most were found to correspond to elevated flows, at or near bankfull conditions in Coal Creek (see Figure 1). Based on this review, it is qualitatively assumed that flooding in the storm drain system during the 100-year storm is primarily due to high flow depths in Coal Creek rather than capacity restrictions in the storm drain pipe network. Under normal flow conditions in Coal Creek, the storm drain system has adequate capacity to convey storm runoff to the creek without street flooding.

Storm Drain Capacity

The capacity of the existing storm drain system was analyzed during the alternatives analysis phase (NHC 2015) using the EPA-SWMM model. The model was updated to support the options evaluation and also future design efforts. Catch basin rim elevations and pipe inverts were updated using field survey data collected for the tributary storm drain system. Flow inputs were also updated to reflect minor changes to the hydrologic model. Conveyance capacity for existing conditions was evaluated for the 2-, 10-, 25-, and 100-year storm events. For all events, tailwater at the outfalls to Coal Creek was assumed to be at the 2-year stage representative of bankfull conditions in the creek. Tailwater was limited to the 2-year stage because at higher stages, street flooding is due to backflow from Coal Creek and is described in the next section.

The updated EPA-SWMM model of the existing storm drain system predicted street flooding due to high levels in Coal Creek insufficient conveyance capacity at only two locations for the 2-, 10-, and 25-year events; the east end of Tulalip Key and at Skagit Key near Glacier Key. For the 100-year event, flooding was predicted to occur over a larger area along Skagit Key, and additional flooding was predicted to occur at Glacier Key and Lummi Key. Figure 2 shows the areas where street flooding was predicted to occur during the 100-year peak storm event due to capacity restriction in the storm drain system.

Backflow from Coal Creek

High tailwater in Coal Creek also causes street flooding. During flood events, high flow depth in Coal Creek at the existing storm drain outfalls causes backflow from the creek to the storm drain system and street flooding occurs where the storm drain inlet elevations are lower than the flood stage in Coal Creek. The potential for street flooding due to flood conditions in Coal Creek was evaluated by comparing flood stage in Coal Creek (Tetra Tech, 2016) to the street elevation of the inlets. Flooding due to high tailwater was not predicted for the 2-year event. For the 10-year event, flooding was predicted on Skagit Key near Newport Key and Glacier Key, Newport Key at Orcas Key, and Tulalip Key. More extensive flooding occurs at these locations for the 25- and 100-year event with additional flooding at Lummi Key near Skagit Key. Figure 3 shows where street flooding occurs due to high tailwater in Coal Creek.

FIELD EVALUATION

A team of engineers and scientists with expertise in civil engineering, hydraulics, geotechnical issues, landscape architecture, environmental permitting, stormwater quality management, lake ecology, utility construction and marine construction toured the project site to evaluate potential alignments for new outfalls to Lake Washington

(Tetra Tech 2017). The investigation focused on two primary outfall locations, Grand Canal from Skagit Key and in the vicinity of the Newport Yacht Club from Skagit Key and Lummi Key.

The evaluation of potential properties for routing the new outfall focused on balancing impacts to property and the ability to construct in the corridor between houses. Specifically, the property evaluation considered impacts to:

- Landscaping features such as ornamental plantings, bushes, trees and hedgerows.
- Hard features such as patios and decks, retaining walls, and dock features.

The evaluation of constructability issues focused on:

- Width of corridor available for construction between the structures and property boundary.
- Depth of excavation.
- Material cost of construction.

Right-of-entry was granted at the Newport Yacht Club. This property was visited by the project team on January 12 and 22, 2016.

LAKE WASHINGTON OUTFALL ALTERNATIVES

Three alignment options were evaluated in detail to determine the most feasible routing option for an outfall to Lake Washington at Newport Yacht Club (Tetra Tech 2017, NHC 2015)). These options include improvements to the conveyance system and retaining the outfalls to Coal Creek, installing a new outfall at the Newport Yacht Club, and installation of a new outfall at SE 40th Street. The updated hydraulic model was used to size the new and replacement pipeline for all the options. The Lake Washington outfall alternatives options are summarized in Table 1. Peak flow at the outfall ranges from about 4 cubic feet per second for the 2-year event to 8 cubic feet per second during the 100-year event. No flow is expected during non-rainfall periods.

Conveyance Improvements

The conveyance improvement alternative would reduce flooding by replacing the existing storm drain system with larger diameter pipes where conveyance is restricted. Approximately 630 feet of pipe is proposed for replacement. High-level overflow pipes will be installed at the Lower Skagit Key outfall to Coal Creek to allow for flood relief during periods when sediment is blocking the existing outfall.

Flooding is predicted to still occur at one location in the vicinity of 61 Skagit Key southwest of the lower Skagit Key creek crossing. Incipient flooding conditions persist at multiple locations on Skagit Key, Tulalip Key, Lummi Key and Sucia Key. If flows in Coal Creek are at a 10-yr level during the 100-yr runoff event in Newport Shores, then extensive storm drain back-ups and associated street flooding are expected to occur throughout the neighborhood. The construction cost for the Conveyance Improvements alternative was estimated to be $426,000. No easements are required for this alternative.

Newport Yacht Club Outfall

This alternative connects the Lummi and Skagit Key storm drain systems to a new outfall pipe located on the south side of the Newport Yacht Club parking lot under a planting strip. The outfall will terminate in an outfall structure located in the near shore area under the existing dock and would need to be designed to so that fish are not attracted to the flow. Similar to the Grand Canal options, new storm drain pipes would be installed and existing pipes would be replaced to reverse the flow direction to the outfall. The Newport Shores Homeowners Association board expressed concerns regarding negative impacts to water quality in the marina and maintaining dock access during construction. Because the proposed outfall is a potential new source of sediment to the marina, the storm drain system will be retrofit to provide sediment removal with one or more facilities located on Skagit Key, Tulalip Key or Lummi Key. The ability to access the dock would also need to be considered in the design process.

This alternative eliminates flooding on Tulalip Key and Lummi Key during storm events and also due to high tailwater in Coal Creek. The construction cost for the NYC Outfall was estimated to be $595,000. Temporary and permanent easements would be required for routing the pipe through the Newport Yacht Club property.

SE 40th Street Outfall

The SE 40th Street Outfall alternative lowers the profile of the existing overflow between Tulalip Key and SE 40th Street and connects to a new pipeline on the north side of SE 40th Street which outfalls to outfall on the north side of the public boat launch. Approximately 1,370 feet of pipe is proposed for replacement. However, the replacement pipe will have a flat slope which would increase long-term cost to maintain the pipeline. A significant unresolved utility conflict exists in this corridor due to the presence of two 6" diameter high-pressure gas lines owned by Puget Sound Energy that appear to feed Mercer Island.

This alternative eliminates flooding on Tulalip Key and Lummi Key during storm events and also due to high tailwater in Coal Creek. The construction cost for the SE 40th Street Outfall alternative was estimated to be $926,000. An existing easement through the NYC boat storage yard would need to be maintained.

Other Options Considered

An outfall route was considered through the NYC property on the north side of the clubhouse (NYC/SE40TH Outfall). This option was eliminated from consideration due to the expected difficulty in constructing a system adjacent to the clubhouse and tennis courts.

An outfall was considered in the narrow drainage corridor in the strip of land in the public right-of-way between the public boat launch and north side of the NYC property. This option was eliminated because of the expected difficulty working in a confined corridor. Also, impacts to the marina would be identical to impacts of the NYC Outfall alternative but transferred to the "A" Dock.

Summary

After evaluating property impacts, existing utility conflicts, construction costs, and ability to obtain easements, the NYC Outfall was selected as the technical recommendation for preliminary design for the Lake Washington outfall. Preliminary discussion with property owners indicate a willingness to consider granting an easement for the outfall if concerns regarding dock access and water quality can be addressed.

Information on flow characteristics at the outfalls for different flow events was requested by the property owners and can be found in Table 1 in Attachment C.

Table 1. Outfall Options

Option	Description	Location	New/Replaced Pipe (lf)	Planning Level Cost Estimate	Comments
Conveyance Improvement	Single Outfall to Creek	Skagit Key Creek Crossings	20 / 600	$402,000	Street flooding still occurs during high water in Coal Creek.
NYC	Single Outfall	NYC parking Lot to marina	370' / 615'	$570,000	Requires easement from one property owner.
SE40TH	Single Outfall	SE 40th Street Overflow	380' / 1,020'	$926,000	Extended length of flat sloped pipeline. Utility conflicts. High cost. Not considered for further evaluation.
NYC/SE40th	Single Outfall	North side of NYC property	500' / 615'	Not computed	Constructability issues with building adjacent to the NYC clubhouse. Not considered for further evaluation.

NEWPORT YACHT CLUB OUTFALL OPTIONS

As described in the previous section, the NYC Outfall option was selected as the technical recommendation. There are four elements that make up the outfall system proposed for the marina. They are:

1. Storm drain catch basins and pipes that are in the roadways. These facilities capture the stormwater and send it to the outfall pipe. Some of these pipes will need to be replaced with new pipes to reverse the slope to direct water to the new location and away from the creek.
2. Sediment trap that will be installed in the right of way at the start of the outfall pipe that goes along the Newport Yacht Club property. At this time we are considering locating a catch basin or vault on a public right-of-way that will trap sediment before it can enter the pipe on private property.
3. Outfall pipe to connect the catch basin or vault (water quality facility) to the outfall pipe outlet.
4. Pipe outfall structure.

Four options were developed for the outfall pipeline at the NYC marina (July/August 2017). All four options would include a sediment trap in the right-of-way and a check valve (or other backflow prevention measure) to prevent lake water from going into the pipe. The team is checking to see whether the check valve is sufficient to meet permitting agency requirements for preventing fish attraction. If not, additional features may have to be added to meet this requirement. Below are summaries of four options.

Option 1: Nearshore Outfall

This option would be a typical outfall design, which would be and open pipe exit to the lake. The pipe would be installed with the pipe outlet at the lake bed elevation to match the existing bulkhead under the “D” dock. Flow velocity in the lake 10 feet from the outfall would range from 1 inches per second during the 2-year event to 2 inches per second for the 100-year event. At 20 feet from the outfall, flow velocity is almost completely dissipated to be less than 1 inch per second up to the 100-year event.

Advantages:

- Does not affect aesthetics of the dock area.
- Would not create a navigation hazard if placed under the dock.
- Least cost option.

Disadvantages:

- May require a hatch in the dock for access to clean the pipe.
- Would not address concerns regarding potential damage to the dock pilings from the water flow in larger storms.
- Access to the dock may not be possible during construction of this option
- Limited access to the dock during maintenance activity.

Option 2: Deep Water Outfall

This option is similar to Option 1 but would extend the pipe further into the lake beyond the breakwater at the west end of the “D” dock. The piles that supported the dock skirt are still in place and are offset from the dock piles so the new pipeline may need to be “woven” through the piles supporting the dock and the piles that used to support the skirt. Alternatively, the dock planks may need to be removed to allow the pipe segments to be dropped in place.

Advantages:

- Hatch not required in the dock for access to clean the pipe.
- Eliminates potential damage to the dock pilings from the water flow in larger storms.

Disadvantages:

- Difficult construction to install the pipe
- Dock may have to be replaced in order to “weave” the pipe between offset pilings.
- May require maintenance to access a larger section of the “D” dock in order to inspect the pipe opening.
- Reduced capacity compared to Option 1.
- May require an easement or rights from a second party, the Department of Natural Resources, for maintenance access at the end of the pipe
- Incremental construction cost $50,000 to $100,000 higher than Option 1 assuming the technical issues can be resolved and the pipe will fit with existing pile configuration. Cost would be higher if the dock needed to be rebuilt to accommodate pipeline.
- Significantly higher design, permitting, and property acquisition costs.

Option 3: Nearshore Outfall with Diffuser

This option would be similar to Option 1 but would include an energy diffuser under the dock, located a few feet off the existing bulkhead. The outfall pipe would outlet to a large catch basin under the “D” dock near the shore and would sit partially above the lake bed and below the water level. This structure would have narrow, screened openings in the wall of the structure. Water from the pipe outlet would enter structure and any flow energy would be diffused by having the water pass through the openings around the outside of the structure. This option was discussed at the meeting with the HOA board members in June 2016. Flow velocity in the lake 10 feet from the outfall would range from 2 inches per second during the 2-year event to 3 inches per second for the 100-year event. At 20 feet from the outfall, flow velocity is almost completely dissipated to be less than 1 inch per second up to the 100-year event.

Advantages:

- Addresses the concerns regarding pipe aesthetics.
- Would not create a navigation hazard if placed under the dock.
- Diffuse flow would not attract fish.
- Eliminates potential damage to the dock pilings from the water flow in larger storms.

Disadvantages:

- Will require a hatch in the dock for access to clean the pipe.
- Access to the dock may not be possible during construction of this option
- Limited access to the dock during annual maintenance activity.
- Incremental construction cost $15,000 higher than Option 1.

Option 4: Nearshore Outfall at Bulkhead

This option would replace the wooden bulkhead north of the “D” Dock with a concrete bulkhead. The outfall pipe would terminate in a box structure located below-grade on the land side of the bulkhead. The pipe would be installed at an elevation slightly below the lake bed and stormwater would flow over a sill opening higher up in the structure above the lake bottom. Flow energy from the pipe outlet would hit a side of the concrete structure and be dissipated before being released into the lake. The outlet would be pointed between the two docks providing more length for any flow to be dispersed by the standing lake water before encountering a piling or boat. There would be a rock pad in the lake bottom in front of the structure opening. Flow velocity in the lake 10 feet from the outfall would range from 1 inches per second during the 2-year event to 3 inches per second for the 100-year event. At 20 feet from the outfall, flow velocity is almost completely dissipated to be less than 1 inch per second up to the 100-year event.

Advantages:

- Hatch not needed in the “D” dock
- Outfall structure would be located under the asphalt pavement away from the “D” dock and behind the bulkhead.
- The wooden bulkhead would be replaced with a concrete bulkhead,
- No pipe in the lake to detract from aesthetics or cause a navigational concern.
- Eliminates potential damage to the dock pilings from the water flow in larger storms.
- This option has the least potential to limit access to the dock.

Disadvantages:

- Portions of the bulkhead would have to be replaced and some excavation of the lake bottom may be required.
- There is some concern within the Utility that waves and sediment kicked up from boat propellers in shallower water could push sediment into the opening in the top of the structure and cause additional maintenance for the structure.
- Incremental construction cost $15,000 higher than Option 1.

Summary of Outfall Options

Option 2, Deepwater Outfall is not considered to be a viable option because of the risk of having to replace the entire dock, it provides less protection from flooding compared to the other options, the complication of having to get an easement or rights from an additional party, and the additional costs without having to replace the dock.

Option 4, Nearshore Outfall at Bulkhead is the preferred option for the NYC outfall. This option minimizes fish attraction, dissipates the flow energy at the outfall, reduced construction impacts to dock access, allows continuous access during future maintenance activity, and provides for a new bulkhead to replace the ageing wooden structure currently place.

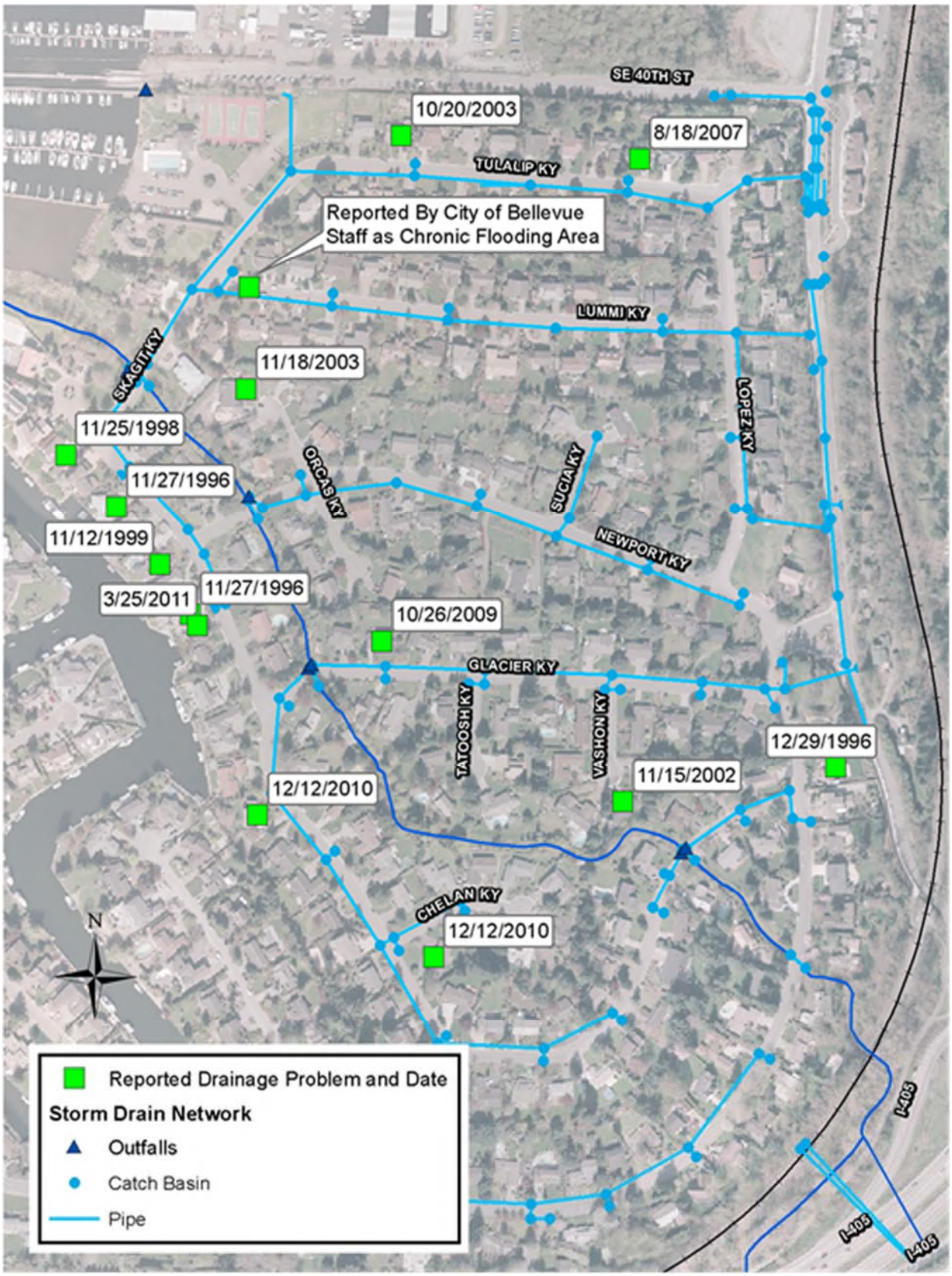


Figure 1 Street Flooding Reported by Newport Shores Residents and City of Bellevue Staff.

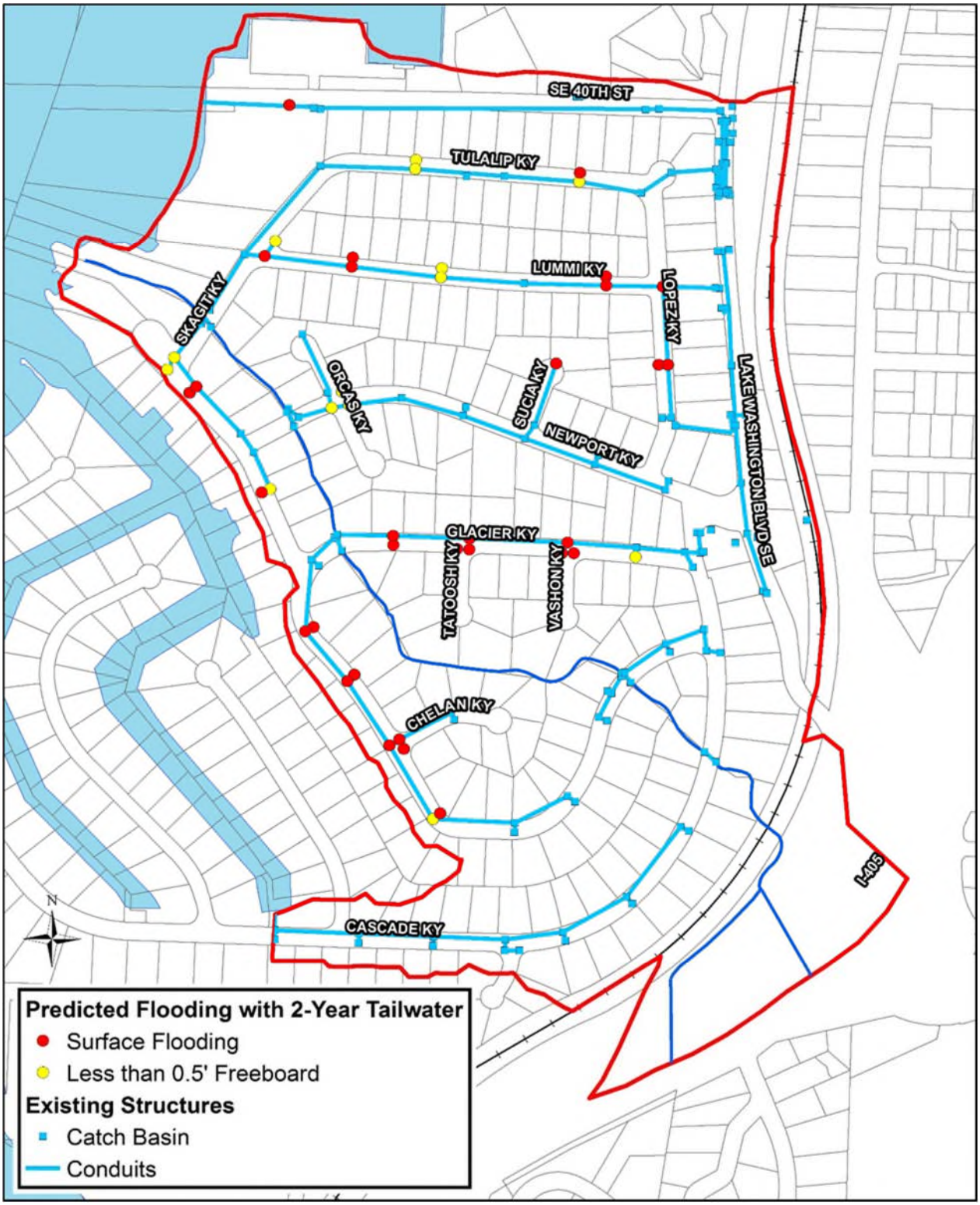


Figure 2.Predicted Street Flooding during the 100-year Peak Storm Event due to Insufficient Conveyance Capacity in the Newport Shores Storm Drain System

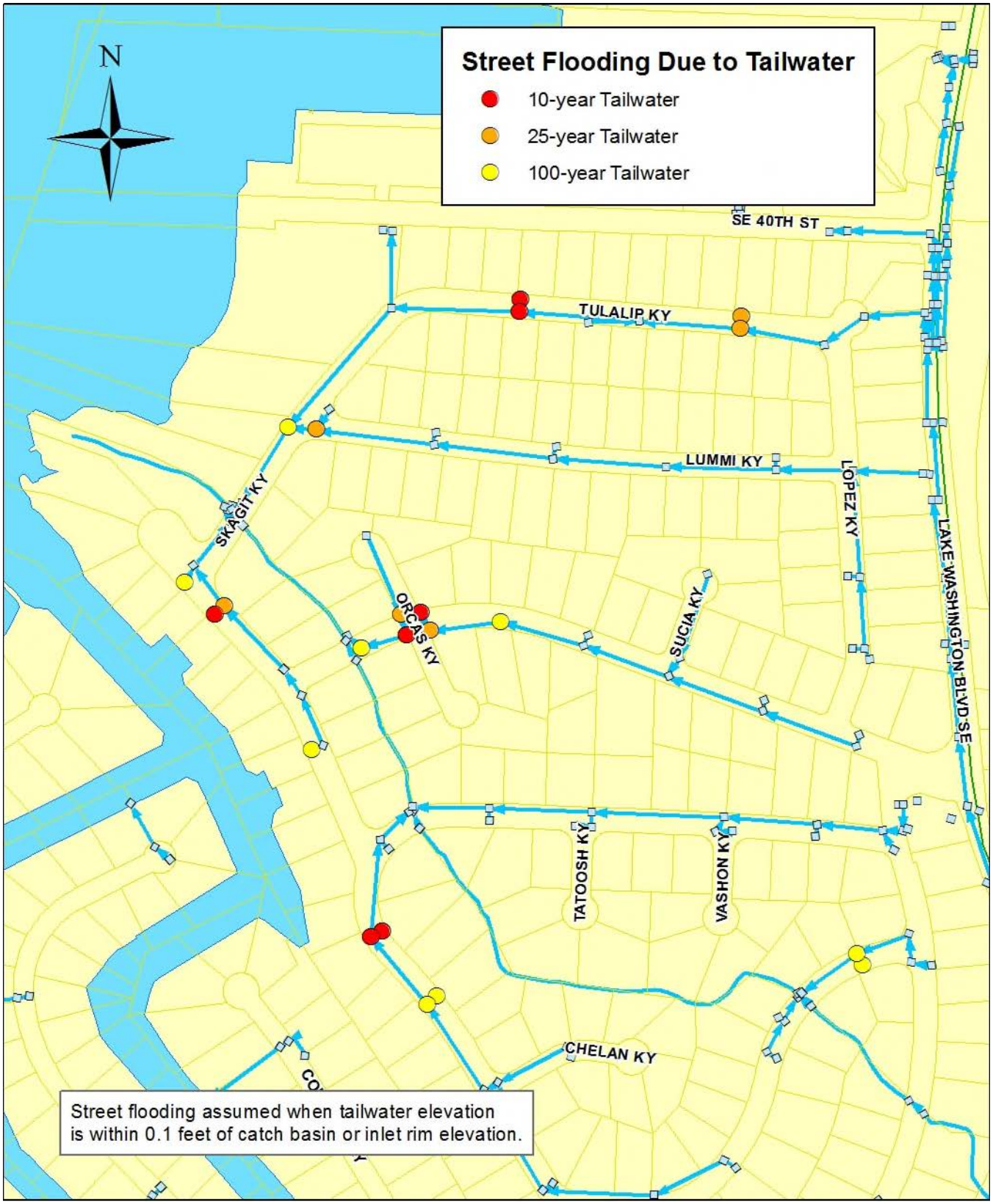
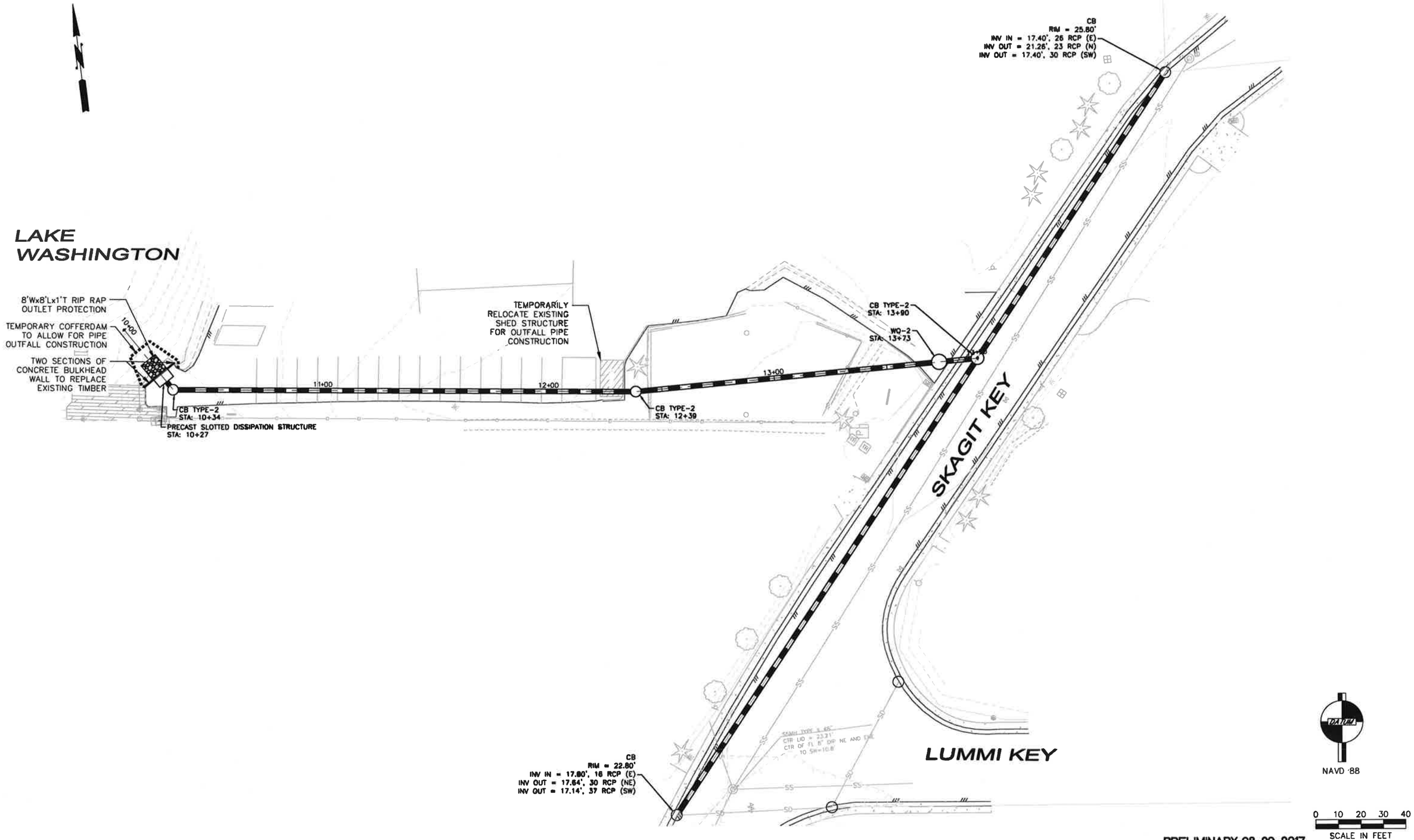


Figure 3. Street Flooding in Newport Shores due to High Tailwater in Coal Creek



PRELIMINARY 08-29-2017

NO	DATE	BY	APPR	REVISIONS

811 Know what's below. Call before you dig.

TETRA TECH
www.tetratech.com
1420 Fifth Avenue, Suite 550
Seattle, Washington 98101
Phone: 206-728-9655 Fax: 206-883-9301

Approved By

DESIGN MANAGER DATE

PROJECT MANAGER DATE

DESIGNED BY DATE

DRAWN BY DATE

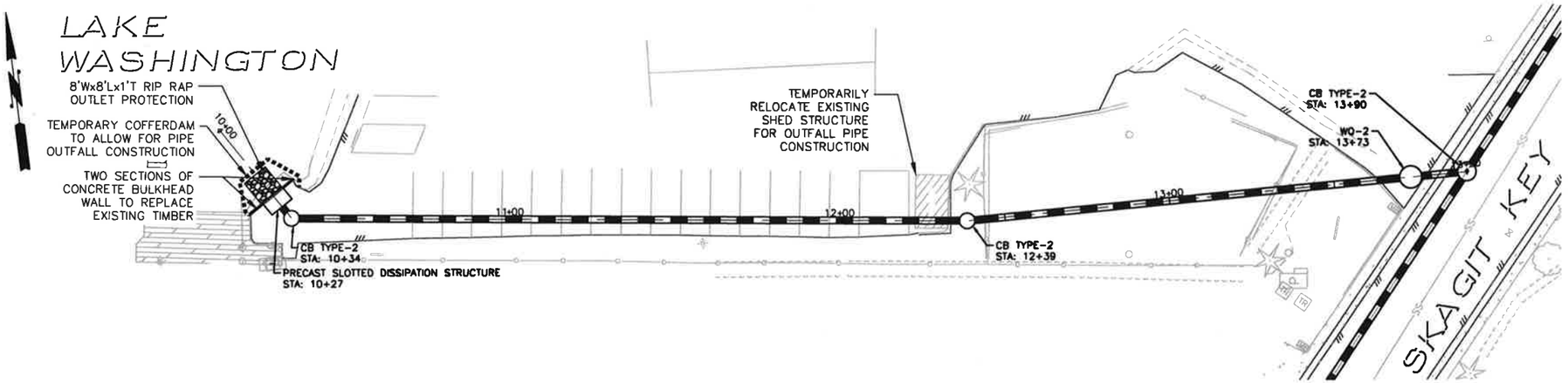
CHECKED BY DATE

City of Bellevue
UTILITIES

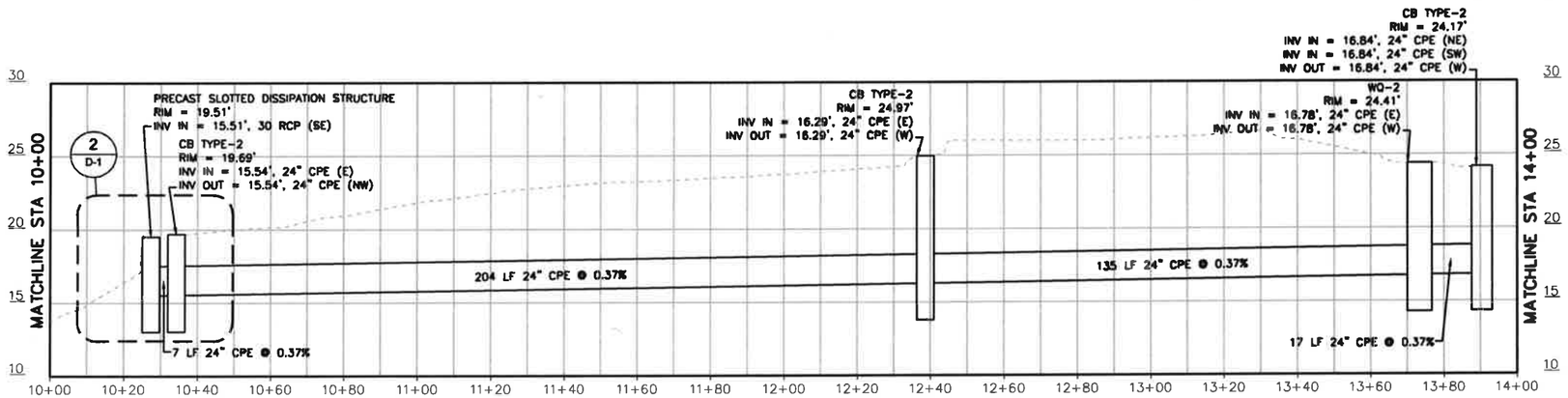
FLOOD HAZARD REDUCTION PROJECT
NEWPORT YACHT CLUB OUTFALL PLAN

SHT 1 OF 3

Path: P:\134271 Lower Coal Creek Ph 2 Early Action\DR (2 Design\CAD\Sheet Files\V63 GRAND CANAL PLN PROF.dwg Plot date: Aug 31, 2017-04:27:21pm CAD User: Adam.Forster.
Xref Filename: | Group2-border | Y-XE-SITE-02-OUTFALLS |



NEWPORT YACHT CLUB OUTFALL PLAN
SCALE: 1" = 20'



NEWPORT YACHT CLUB OUTFALL PROFILE
SCALE: 1" = 20' HORZ. 1" = 5' VERT.

NAVD 88

0 5 10 15 20
SCALE IN FEET

NO	DATE	BY	APPR	REVISIONS

811 Know what's below. Call before you dig.

TETRA TECH
www.tetratech.com
1420 Fifth Avenue, Suite 550
Seattle, Washington 98101
Phone: 206-728-9655 Fax: 206-883-9301

Approved By

DESIGN MANAGER DATE

PROJECT MANAGER DATE

DESIGNED BY DATE

DRAWN BY DATE

CHECKED BY DATE

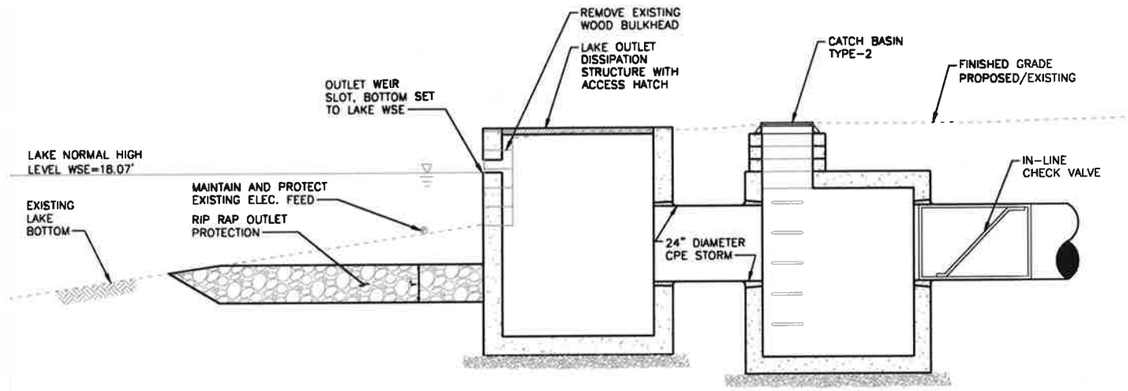
City of Bellevue
UTILITIES

FLOOD HAZARD REDUCTION PROJECT
NYC- OUTFALL PLAN AND PROFILE

NYC-C1

SHT 2 OF 3

Path: P:\134271 Lower Coal Creek Ph 2 Early Action\04 02 Design\CAD\SheetFiles\03 GRAND CANAL PLN PROF.dwg Plot date: Aug 03, 2017-01:11:28pm CAD User: lhee.prince
Xref Filename: | Group2-border | Y-XE-SITE-02-OUTFALLS | C-XP-SITE-SKAGIT KEY-LOWER | C-XP-SITE-GLACIER KEY | C-XP-SITE-NEWPORT KEY |



SECTION VIEW
NYC OUTFALL
SCALE: 1"=2'

2

0 1 2 3 4
SCALE IN FEET

NO	DATE	BY	APPR	REVISIONS

811 Know what's below. Call before you dig.

TETRA TECH
www.tetratech.com
1420 Fifth Avenue, Suite 550
Seattle, Washington 98101
Phone: 206-728-9655 Fax: 206-883-9301

Approved By

DESIGN MANAGER DATE

PROJECT MANAGER DATE

DESIGNED BY DATE

DRAWN BY DATE

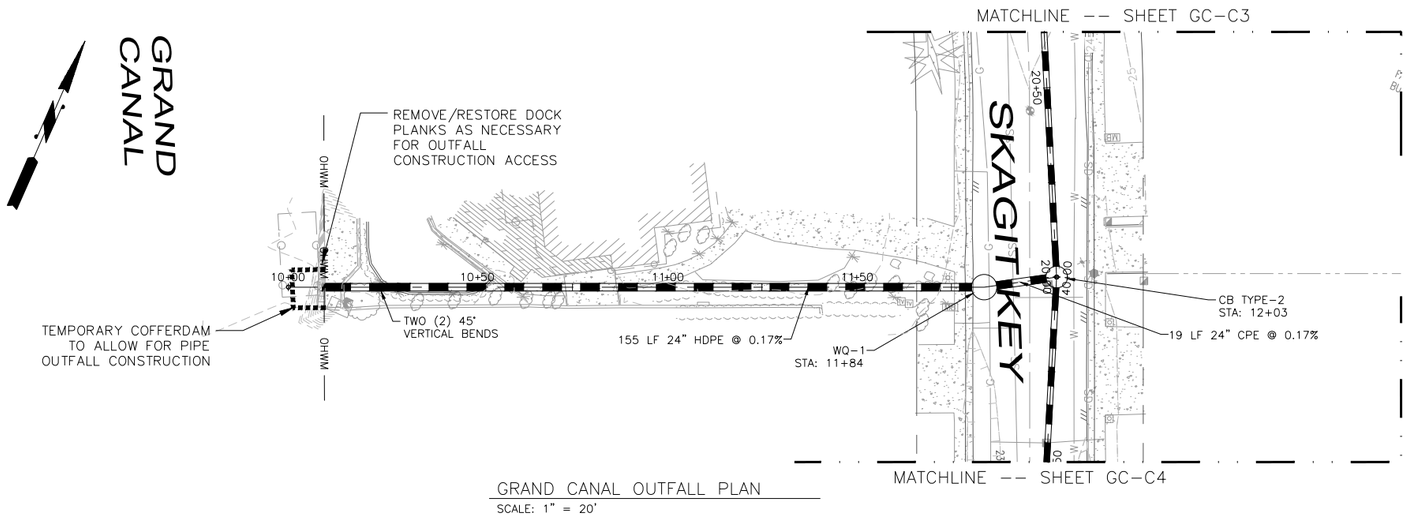
CHECKED BY DATE

City of Bellevue
UTILITIES

FLOOD HAZARD REDUCTION PROJECT
DETAILS 1

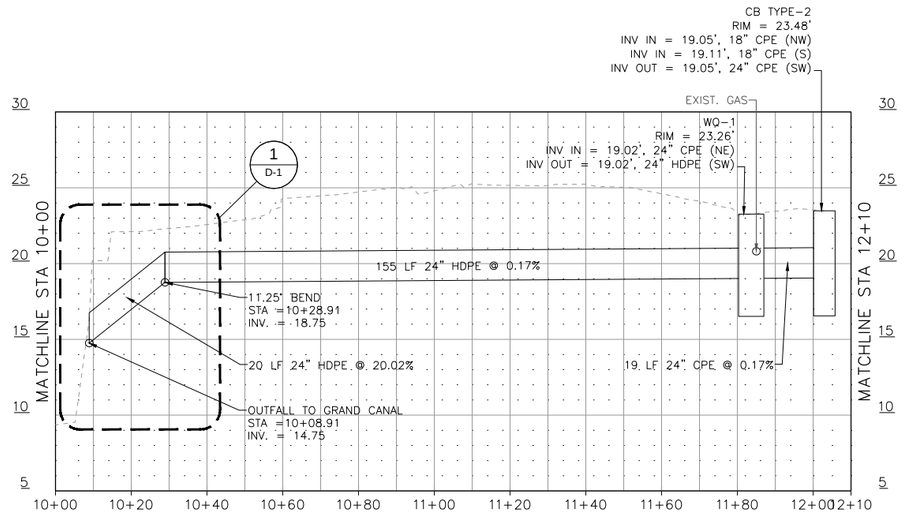
D-1

SHT 3 OF 3



GRAND CANAL OUTFALL PLAN

SCALE: 1" = 20'



GRAND CANAL OUTFALL PROFILE

SCALE: 1" = 20' HORZ. 1" = 5' VERT.

DATUM

NAVD 88

0 10 20 30 40

SCALE IN FEET

LAND USE AND SHORELINE
SUBSTANTIAL DEVELOPMENT PERMIT SUBMITTAL

NO	DATE	BY	APPR	REVISIONS

811 Know what's below. Call before you dig.

TETRA TECH
www.tetratech.com
1420 Fifth Avenue, Suite 550
Seattle, Washington 98101
Phone: 206-728-9655 Fax: 206-883-9301

Approved By

DESIGN MANAGER DATE

PROJECT MANAGER DATE

DESIGNED BY ---- DATE

DRAWN BY ---- DATE

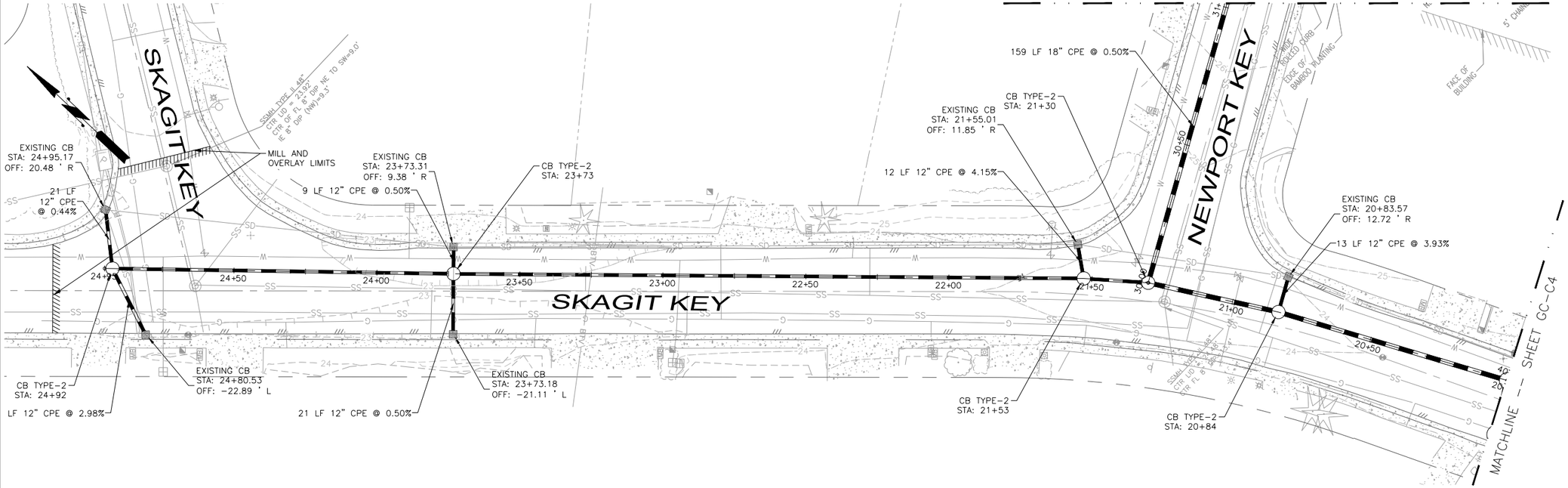
CHECKED BY ---- DATE

City of Bellevue
UTILITIES

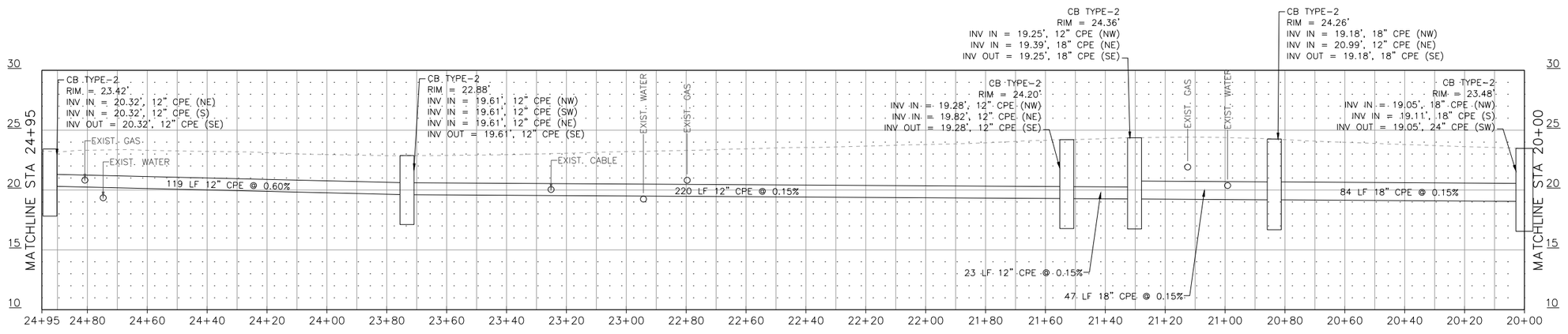
FLOOD HAZARD REDUCTION PROJECT
GRAND CANAL OUTFALL
PLAN-PROFILE 1

GC-C2

Path: P:\134271 Lower Coal Creek Ph 2 Early Action\04 02 Design\CAD\SheetFiles\V63 GRAND CANAL PLN PROF.dwg Plot date: Aug 28, 2017-04:38:10pm CAD User: Adam.Forcier.
Xref Filename: (Group2-border (V-XE-SITE-G2-OUTFALLS)



SKAGIT KEY NORTH PLAN
SCALE: 1" = 20'



SKAGIT KEY NORTH PROFILE
SCALE: 1" = 20' HORIZ. 1" = 5' VERT.

NAVD 88

0 10 20 30 40
SCALE IN FEET

LAND USE AND SHORELINE
SUBSTANTIAL DEVELOPMENT PERMIT SUBMITTAL

NO	DATE	BY	APPR	REVISIONS

811 Know what's below. Call before you dig.

TETRA TECH
www.tetratech.com
1420 Fifth Avenue, Suite 550
Seattle, Washington 98101
Phone: 206-728-9655 Fax: 206-883-9301

Approved By

DESIGN MANAGER DATE

PROJECT MANAGER DATE

DESIGNED BY ---- DATE

DRAWN BY ---- DATE

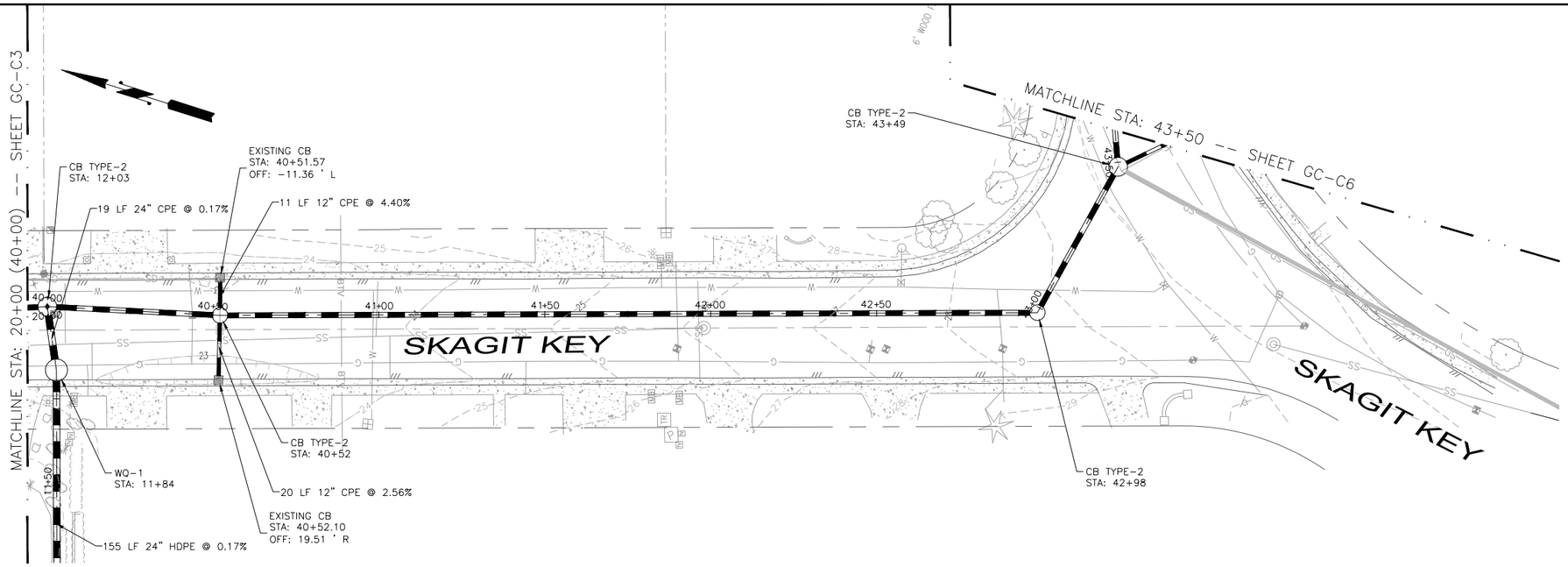
CHECKED BY ---- DATE

City of Bellevue
UTILITIES

FLOOD HAZARD REDUCTION PROJECT
GRAND CANAL OUTFALL
PLAN-PROFILE 2

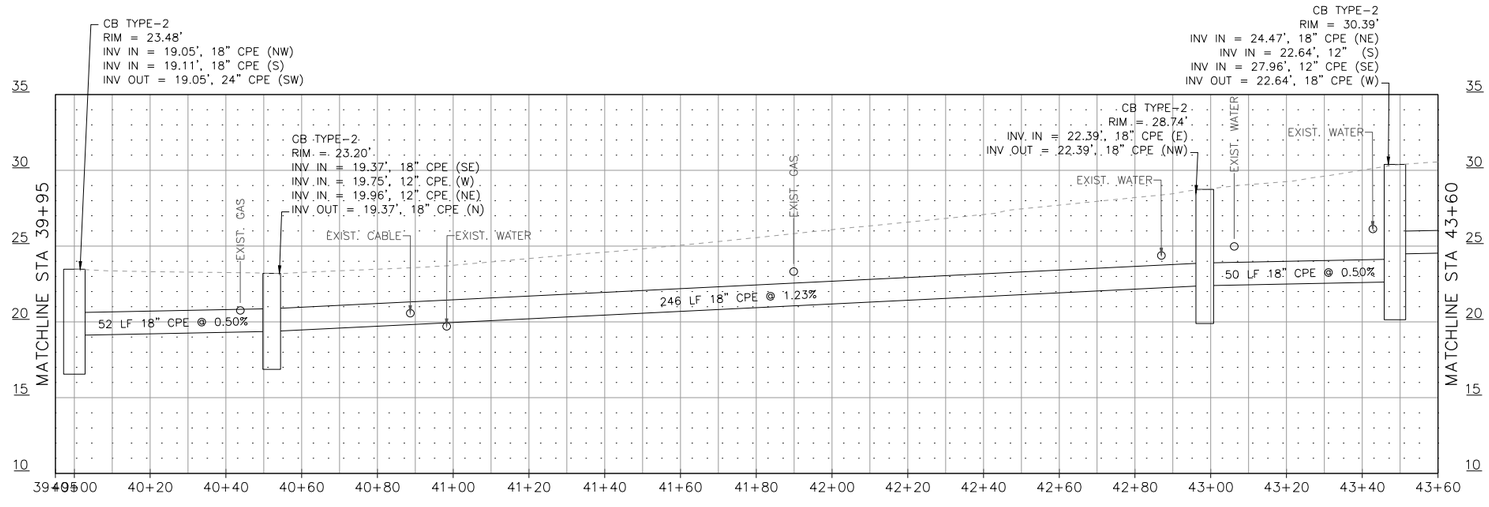
GC-C3

Path: P:\134271 Lower Coal Creek Ph 2 Early Action\04 G2 Design\CAD\SheetFiles\G3 GRAND CANAL PLN PROF.dwg Plot date: Aug 28, 2017-04:38:19pm CAD User: Adam.Forcier.
Xref Filename: | Group2-border | V:\XE-SITE-G2-OUTFALLS |



SKAGIT KEY SOUTH PLAN

SCALE: 1" = 20'



SKAGIT KEY SOUTH PROFILE

SCALE: 1" = 20' HORIZ. 1" = 5' VERT.

DATUM

NAVD 88

0 10 20 30 40

SCALE IN FEET

LAND USE AND SHORELINE
SUBSTANTIAL DEVELOPMENT PERMIT SUBMITTAL

NO	DATE	BY	APPR	REVISIONS

Know what's below. Call before you dig.

TETRA TECH
www.tetratech.com
1420 Fifth Avenue, Suite 550
Seattle, Washington 98101
Phone: 206-728-9655 Fax: 206-883-9301

Approved By

DESIGN MANAGER DATE

PROJECT MANAGER DATE

DESIGNED BY DATE

DRAWN BY DATE

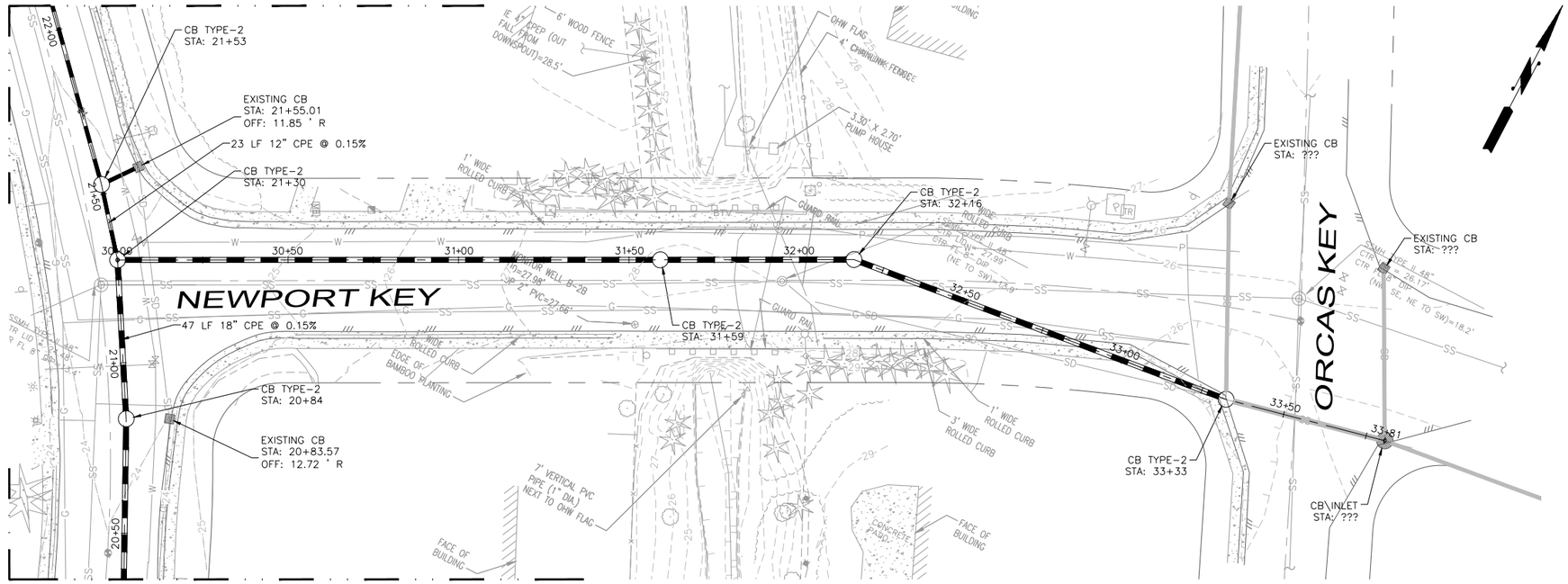
CHECKED BY DATE

City of Bellevue
UTILITIES

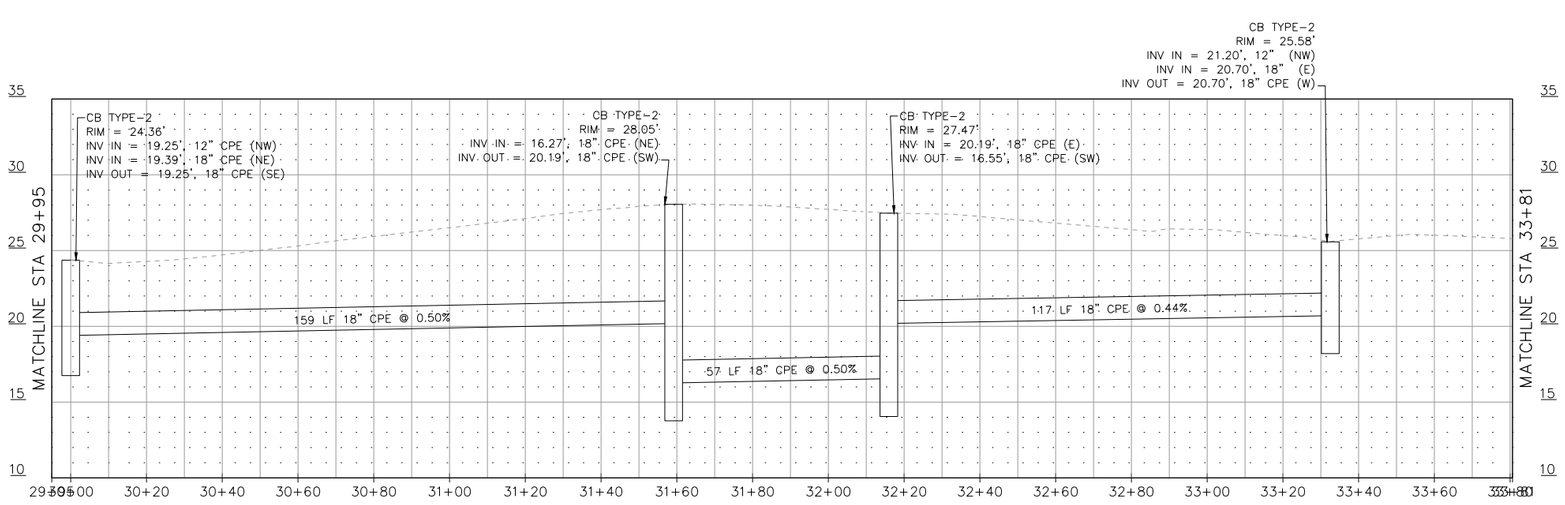
FLOOD HAZARD REDUCTION PROJECT
GRAND CANAL OUTFALL
PLAN-PROFILE 3

GC-C4

Path: P:\134271 Lower Coal Creek Ph 2 Early Action\04 02 Design\CAD\SheetFiles\63 GRAND CANAL PLN PROF.dwg Plot date: Aug 28, 2017-04:38:24pm CAD User: Adam.Forcier.
Xref Filename: | Group2-border | V-XE-SITE-02-OUTFALLS |



NEWPORT KEY PLAN
SCALE: 1" = 20'



NEWPORT KEY PROFILE
SCALE: 1" = 20' HORZ. 1" = 5' VERT.

NAVD 88

0 10 20 30 40
SCALE IN FEET

LAND USE AND SHORELINE
SUBSTANTIAL DEVELOPMENT PERMIT SUBMITTAL

NO	DATE	BY	APPR	REVISIONS

811 Know what's below. Call before you dig.

TETRA TECH
www.tetratech.com
1420 Fifth Avenue, Suite 550
Seattle, Washington 98101
Phone: 206-728-9655 Fax: 206-883-9301

Approved By

DESIGN MANAGER DATE

PROJECT MANAGER DATE

DESIGNED BY DATE

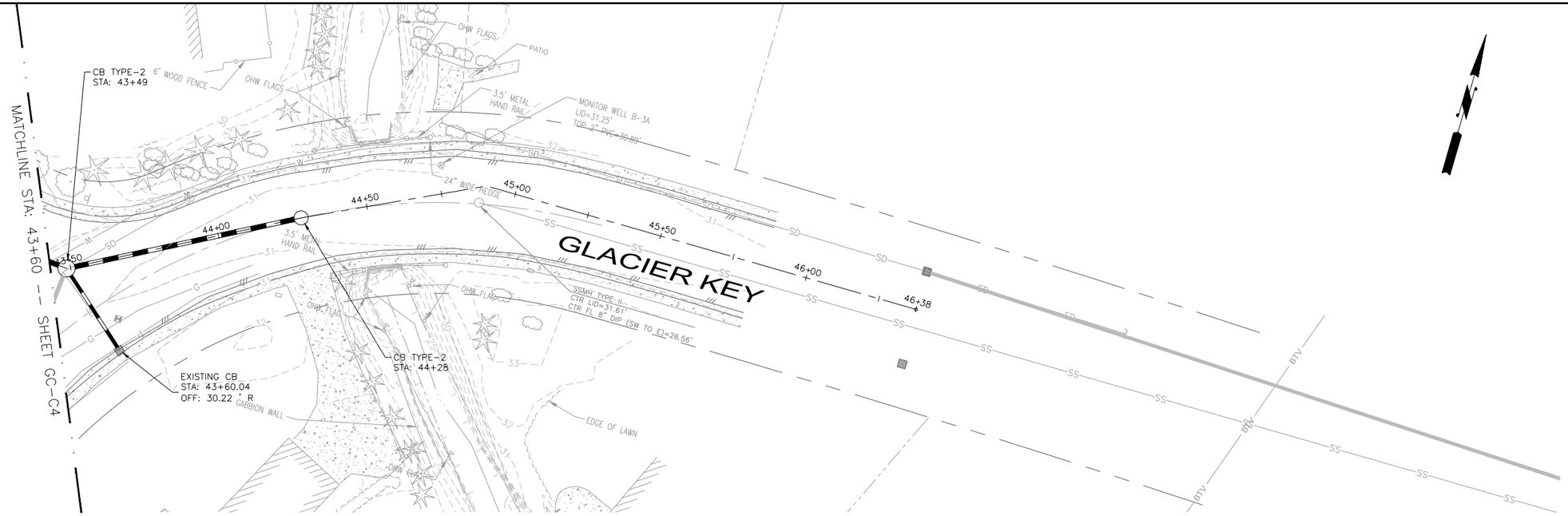
DRAWN BY DATE

CHECKED BY DATE

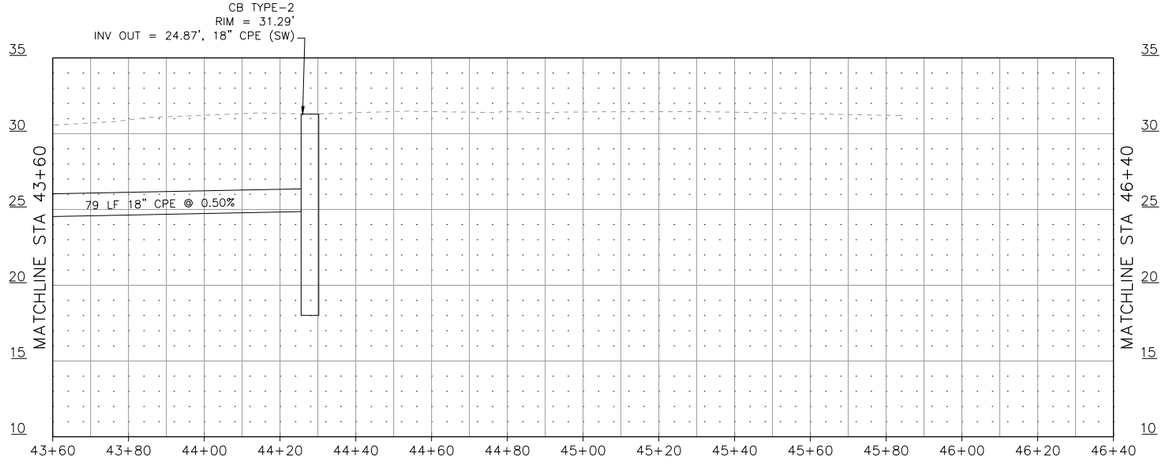
City of Bellevue
UTILITIES

FLOOD HAZARD REDUCTION PROJECT
GRAND CANAL OUTFALL
PLAN-PROFILE 4

GC-C5



GLACIER KEY SOUTH PLAN
SCALE: 1" = 20'



GLACIER KEY SOUTH PROFILE
SCALE: 1" = 20' HORIZ. 1" = 5' VERT.

NAVD 88

0 10 20 30 40
SCALE IN FEET

LAND USE AND SHORELINE
SUBSTANTIAL DEVELOPMENT PERMIT SUBMITTAL

NO	DATE	BY	APPR	REVISIONS

Know what's below. Call before you dig.

TETRA TECH
www.tetratech.com
1420 Fifth Avenue, Suite 550
Seattle, Washington 98101
Phone: 206-728-9655 Fax: 206-883-9301

Approved By

DESIGN MANAGER DATE

PROJECT MANAGER DATE

DESIGNED BY ---- DATE

DRAWN BY ---- DATE

CHECKED BY ---- DATE

City of Bellevue
UTILITIES

FLOOD HAZARD REDUCTION PROJECT
GRAND CANAL OUTFALL
PLAN-PROFILE 5

GC-C6

Path: P:\134271 Lower Coal Creek Ph 2 Early Action\04 02 Design\CAD\SheetFiles\63 GRAND CANAL PLN PROF.dwg Plot date: Aug 28, 2017-04:38:34pm CAD User: Adam.Forcier.
Xref Filename: | Group2-border | V-XE-SITE-02-OUTFALLS |

Newport Shores Drainage Lines

- Storm Gravity Mains
- Ditch Outfall to Lake
- Stream

Storm Drainage Outfalls

- Outfall to Creek
- Outfall to Ditch
- Outfall to Lake
- Outfall to be Relocated

0 250 Feet

Source: City of Bellevue

The City of Bellevue does not guarantee that the information on this map is accurate or complete. This data is provided on an "as is" basis and disclaims all warranties.

Coordinate System: State Plane, Washington North Zone, NAD83 NSRS2007 (Bellevue)

0 250 500 1,000 Feet

SE 38 PL
SE 39 ST
SE 39 PL
SE 40 CI
SE 40 ST
TULALIP KY
LUMMI KY
LOPEZ KY
LAKE WASHINGTON BL SE
122 AV SE
SE 40 LN
SE 41 ST
SE 42 ST
SE 42 CT
SE 41 LN
NEWPORT KY
ORCAS KY
SUCIA KY
GLACIER KY
TATOOSH KY
VASHON KY
COAL CREEK
CHELAN KY
SKAGIT KY
120 AV SE
121 AV SE
SE 43 ST
SE 44 PL
CASCADE KY
CRESCENT KY
COLUMBIA KY
DECATUR KY
0268Z
119 AV SE
COAL CREEK PY SE
0268Y
NEWPORT CREEK
116 AV SE
SE 45 PL
LAKE HEIGHTS ST

Date: 7/25/2017 File Name: C:\Users\MMozer\Desktop\Projects\Debbie\Coal_Creek_Debbie\Newport Shores Draignage Lines.mxd