AGENDA
GIG HARBOR CITY COUNCIL STUDY SESSION
Thursday, May 30, 2024 - 3:00 PM
Community Rooms

This meeting may also be accessed through Zoom at https://zoom.us/j/93216056382 or by calling (253) 215-8782 and entering Meeting ID 932 1605 6382.

CALL TO ORDER/ROLL CALL

DISCUSSION ITEMS

1. **2025-2030 Six-Year Transportation Improvement Program (TIP)**
   City Engineer Aaron Hulst
2. **Lift Station #5 Feasibility Study**
   Public Works Director Jeff Langhelm
3. **Budget & Revenue Discussion**
   City Administrator Katrina Knutson

ADJOURN

PUBLIC COMMENT & DECORUM

Public comment will be not be accepted at this study session.

AMERICANS WITH DISABILITIES (ADA) ACCOMMODATIONS

ADA accommodations can be provided upon request. Those requiring special accommodations should contact the city clerk at cityclerk@gjgharborwa.gov or (253) 853-7613 at least 24 hours prior to the meeting.

City of Gig Harbor
City Council Agenda Bill

Meeting Date: May 30, 2024

SUBJECT: 2025-2030 Six-Year Transportation Improvement Program (TIP)

SUBMITTED BY: City Engineer Aaron Hulst
DEPARTMENT: Public Works **PHONE:** (253) 853-7620

SUGGESTED MOTION: None.

BACKGROUND INFORMATION: In accordance with RCW 35.77.010, cities must annually prepare and adopt a comprehensive transportation program for the ensuing six calendar years that is consistent with the agency's transportation comprehensive plan. This is commonly referred to as the Six-Year Transportation Improvement Program (TIP) and is required to be submitted annually to the state Secretary of Transportation. Included as part of the TIP adoption process is a public hearing. While a TIP represents the jurisdiction's anticipated transportation projects over a six-year period, each individual project may be undertaken in any given year, subject to the budget deliberation process.

As part of the Comprehensive Plan update that concluded in 2018, the city completed a rigorous capacity analysis of the city's roadway system which evaluated the future levels of service at intersections. From this analysis, the short and long-range project lists were updated in the Transportation Element of the Comprehensive Plan to address future LOS deficiencies. The conclusions from the Comprehensive Plan update analysis, the 2024 Six-Year TIP, and the 2023-2024 Budget serve as the basis for the attached 2025-2030 Six-Year TIP. The 2025-2030 TIP was arranged with budgeted projects listed first. The Borgen Boulevard/SR-16 WB off-ramp metering STUDY was removed, as recent traffic counts demonstrated that there was no longer a vehicular capacity issue at the intersection. Cushman Trail Phase 5A project was lowered to project #20 due to a low score outcome from the Council priority matrix. The Wagner/Wollochet signal was moved to project #2 because a construction contract has been awarded.

The TIP will be presented for adoption by resolution at the June 24 city council meeting.

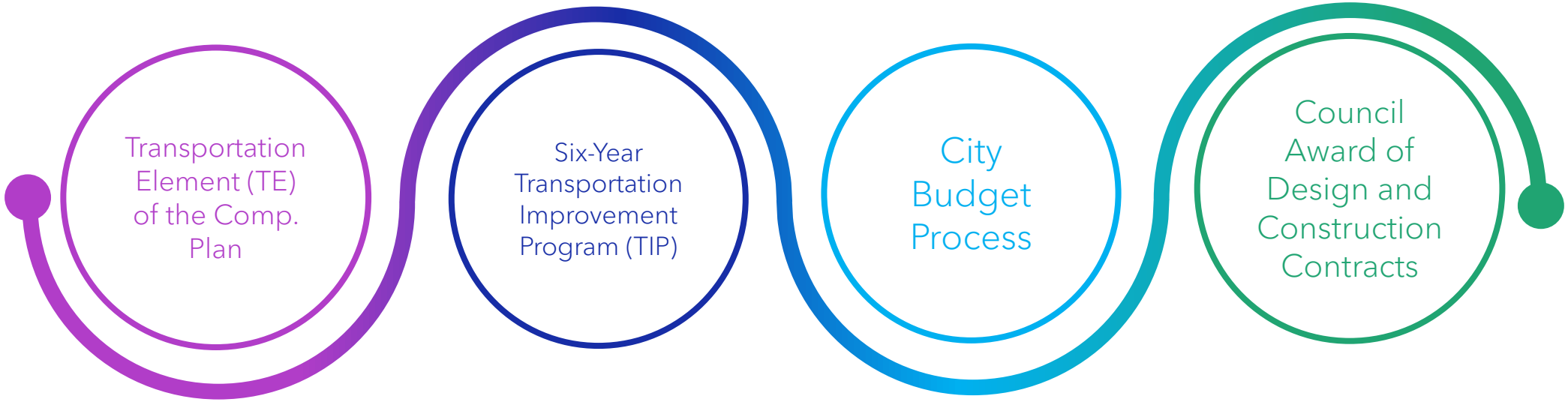
FISCAL CONSIDERATION: None.

ATTACHMENTS:
1. The progression of a Transportation project
2. TIP Comparison List_Council
3. What is the TIP
4. Transportation Improvement Program 2025 - 2030

STRATEGIC PLAN PRIORITY: Strategic Plan Priority 2- Ensure sustainable future for public services and facilities

THE PROGRESSION OF A TRANSPORTATION PROJECT

(POINTS WHERE COUNCIL HAS OPPORTUNITY FOR INPUT)



Transportation Element (TE)

Every ten years we are required to update the Transportation Element of the Comprehensive Plan. The TE takes a comprehensive look at the state of the City's transportation network.

6-Year TIP

A near-term planning document that identifies a list of planned transportation projects over the next six years. TIP projects are required to be consistent with the projects identified in the comprehensive plan.

City Budget Process

During the budget process Council determines which projects to fund in the upcoming budget cycle.

Contract Award

Council's opportunity to review and approve a design or construction contract to move a project forward.

2024 vs 2025 TIP

2024 TIP #	2025 TIP #	Project Name	City Project #	Budgeted?
1	1	Burnham Drive Improvements Phase 1A (Eagle's Club to Harbor Hill Dr./Burnham Dr. roundabout)	CSP-2003	Yes
6	2	Wagner Way/Wollochet Signal	CSP-1406	Yes
10	3	Prentice Avenue/Fennimore Street Half-Width Roadway Improvements	CSP-2107	Yes
3	4	38th Ave. Phase 2 (56th St. to Hunt St.), also includes intersection	CSP-2206	Yes
4	5	Wollochet Drive/SR-16 WB on-ramp right turn lane	CSP-2315	Yes
5	6	Wollochet Drive/SR-16 EB off-ramp right turn lane	CSP-2311	Yes
7	7	Olympic Drive/Pt. Fosdick right turn lane extension	CSP-2318	Yes
8	8	Peacock Hill Ave. Half Street Imp. (~300' north of Ringold to ~150' north of 150th St. Ct)	CSP-2325	Yes
11	9	38th Avenue Phase 1B (Briarwood Lane to 50th Street)		No
12	10	38th Avenue Phase 1C (50th Street to 56th Street)		No
13	11	Harborview Drive/Pioneer Way Intersection Improvements		No
14	12	Hunt St./Skansie Ave. Intersection Improvements		No
15	13	Hunt St./38th Ave. Intersection Improvements		No
16	14	50th St. Ct. Improvements		No
17	15	Soundview Drive/Hunt Street Intersection Improvement		No
18	16	Burnham Drive Improvements Phase 1B (N. Harborview Dr. to Eagle's Club)		No
19	17	Burnham Drive Bridge - Restripe to 4 lanes		No
20	18	Burnham Drive Improvements Phase 2 (Harbor Hill Drive to Borgen Blvd.)		No
21	19	Pedestrian Crossing at SR-16 near Borgen Blvd.		No
9	20	Cushman Trail Phase 5A	CSP-2327	Yes
22	21	Olympic Drive/SR-16 Intersection Improvements		No
23	22	Rosedale Street/Skansie Avenue Intersection Improvements		No
24	23	Grandview Street Improvements (Soundview Drive to McDonald Avenue		No
25	24	Skansie Avenue Improvements (Rosedale Street to Hunt Street)		No
26	25	Wollochet Drive Interchange Improvements (Kimball Drive to Hunt Street)		No
27	26	Vernhardson Street (Peacock Hill Avenue to City Limits)		No
28	27	Olympic Drive and Spur to Hollycroft		No
2	REMOVED	Borgen Boulevard/SR-16 WB off-ramp metering STUDY		

NEW
RANK CHANGE
REMOVED

WHAT IS THE SIX YEAR TRANSPORTATION IMPROVEMENT PROGRAM (TIP)?

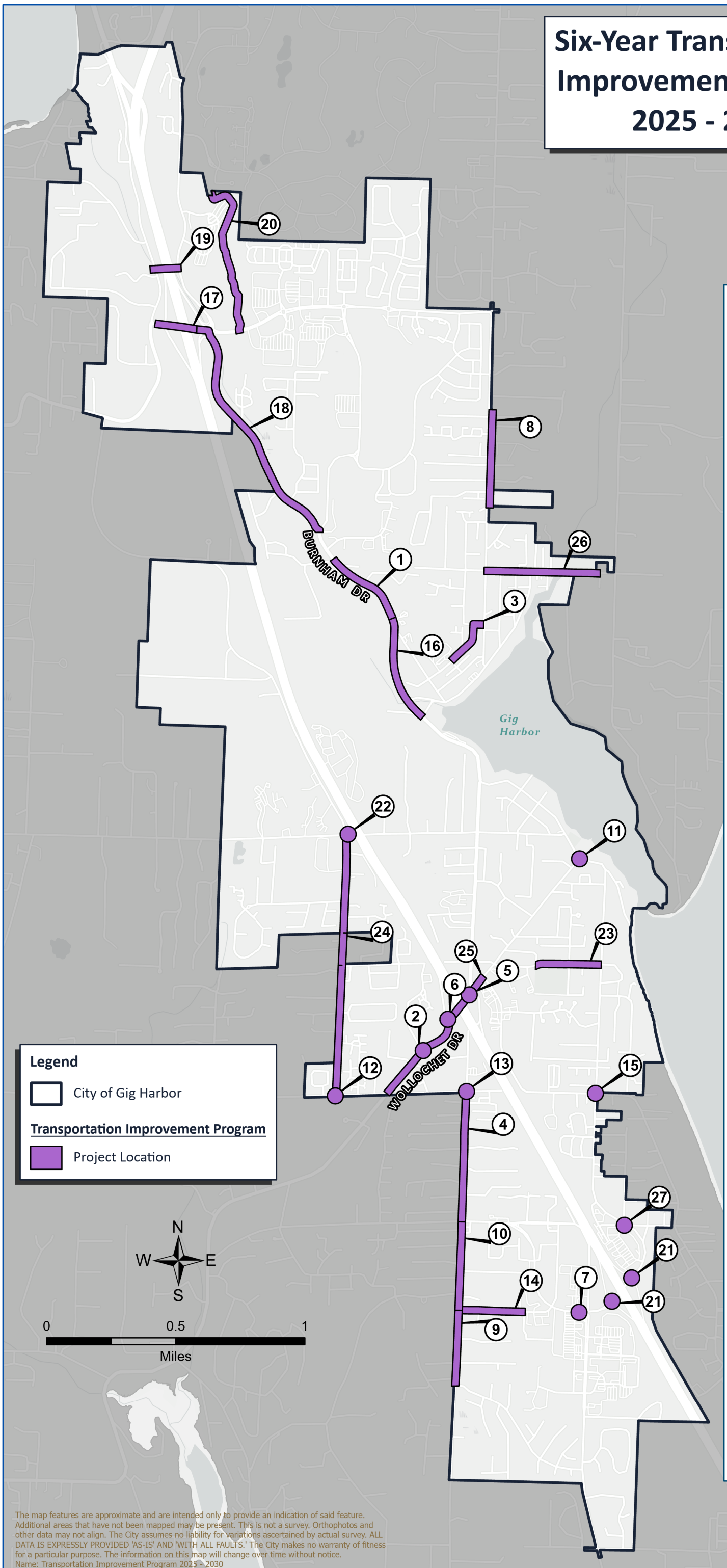
- It is the City's near-term list of transportation projects that are projected to happen over the next six years.
- It is a planning document that Engineering/Public Works updates yearly (in June) and is adopted via resolution by the City Council.
- It is a requirement of the Revised Code of Washington (RCW).
- It is a useful tool for the Public Works Department when applying for Federal or State grant applications.
- A document in the form of a map and a report (which you will see in the June Council Packet) that follows WSDOT's format for entering projects into the State TIP (STIP).
- Per RCW 35.77.010, a new project can only be added to the TIP if that project is identified in the Transportation Comprehensive Plan.
- It is typical for a project high on the TIP list (eg: #1-3) to have the following characteristics:
    - The project is budgeted by City Council.
    - The project has received Federal or State grants that have timelines/deadlines
    - The project is anticipated to begin before other projects in the TIP list
    - The project has shown in the traffic model to have the largest benefit to vehicular or pedestrian level of service (LOS).
- It is typical for a project low on the TIP list (eg: #25-28) to have the following characteristics:
    - The project is not yet budgeted by City Council.
    - The project has not applied or received Federal or State grants.
    - The project is anticipated to happen late in the six-year TIP timeframe

WHAT THE SIX YEAR TRANSPORTATION IMPROVEMENT PROGRAM IS NOT.

- A complete list of projects that are set in stone.
- A commitment by the City to spend money on any particular transportation project. Commitment to fund transportation projects is typically decided during the budget process.

Six-Year Transportation Improvement Program 2025 - 2030

GIG HARBOR
"THE MARITIME CITY"



Map ID	Project Name
1	Burnham Drive Improvements Phase 1A (Eagle's Club to Harbor Hill Dr./Burnham Dr. roundabout)
2	Wagner Way/Wollochet Signal
3	Prentice Avenue/Fennimore Street Half-Width Roadway Improvements
4	38th Ave. Phase 2 (56th St. to Hunt St.), includes 38th/56th intersection
5	Wollochet Drive/SR-16 WB on-ramp right turn lane
6	Wollochet Drive/SR-16 EB off-ramp right turn lane
7	Olympic Drive/Pt. Fosdick right turn lane extension
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9	38th Avenue Phase 1B (Briarwood Lane to 50th Street)
10	38th Avenue Phase 1C (50th Street to 56th Street)
11	Harborview Drive/Pioneer Way Intersection Improvements
12	Hunt St./Skansie Ave. Intersection Improvements
13	Hunt St./38th Ave. Intersection Improvements
14	50th St. Ct. Improvements
15	Soundview Drive/Hunt Street Intersection Improvement
16	Burnham Drive Improvements Phase 1B (N. Harborview Dr. to Eagle's Club)
17	Burnham Drive Bridge - Restripe to 4 lanes
18	Burnham Drive Improvements Phase 2 (Harbor Hill Drive to Borgen Blvd.)
19	Pedestrian Crossing at SR-16 near Borgen Blvd.
20	Cushman Trail Phase 5A
21	Olympic Drive/SR-16 Intersection Improvements
22	Rosedale Street/Skansie Avenue Intersection Improvements
23	Grandview Street Improvements (Soundview Drive to McDonald Avenue)
24	Skansie Avenue Improvements (Rosedale Street to Hunt Street)
25	Wollochet Drive Interchange Improvements (Kimball Drive to Hunt Street)
26	Vernhardson Street (Peacock Hill Avenue to City Limits)
27	Olympic Drive and Spur to Hollycroft

City of Gig Harbor
City Council Agenda Bill

Meeting Date: May 30, 2024

SUBJECT: Lift Station #5 Feasibility Study

SUBMITTED BY: Senior Engineer Dean Zavack, PE
DEPARTMENT: Public Works **PHONE:** (253) 853-7637

SUGGESTED MOTION: None.

BACKGROUND INFORMATION: Lift Station #5 is located within Wastewater Basin #5 and along the shoreline of Gig Harbor Bay adjacent to residential houses in the 2800 block of Harborview Drive. LS#5 is almost 50 years old and consists mostly of original equipment that is beyond its service life; replacement parts for the pumps and monitoring equipment are no longer available.

During seasonal high tides, in particular, king tides, LS#5 is at risk of being inundated by seawater. The city wishes to decommission the existing lift station and either rebuild/refurbish it, relocate it, or construct a new pressurized collection system consisting of individual grinder pump stations. This would improve reliability and reduce or eliminate the risk of high tides flooding the station.

To accomplish this goal, the Parametrix team performed a feasibility analysis and prepared an associated technical memo to evaluate options to either replace LS#5 with a new similarly sized lift station, or by finding an alternate method of providing wastewater collection services to the residents within Basin #5. The five alternatives were ranked based on (in order of importance):

- Low overall risk,
- Lowest O&M,
- Safety,
- Minimize impacts to residence during daily operations,
- Minimize impacts to residence during construction,
- Maximize use of existing facilities,
- Capital costs,
- Meets city current Public Works Standards.

There were 6 alternatives analyzed by Parametrix as noted in the attached technical memo. Alternative 5 was ranked highest, alternative 3A was ranked second highest.

On May 24, 2024, the city met with the homeowners of 2823 Harborview Drive and 2825 Harborview Drive, who would be most impacted by the project. A third owner, 2819 Harborview Drive, was out of town but received the technical memo for their review and for future comment. The two homeowners the city met with were generally receptive of the two highest ranked alternatives but had some concerns on how these

options would look once constructed. They also had concerns about their ingress and egress during construction.

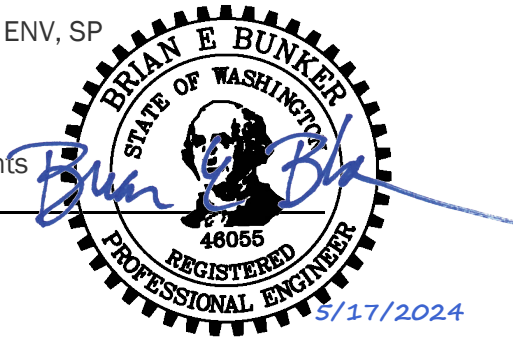
FISCAL CONSIDERATION: None.

ATTACHMENTS:

1. TM_FeasibilityAnalysis_FINAL_v2_05-2024

STRATEGIC PLAN PRIORITY: Strategic Plan Priority 2- Ensure sustainable future for public services and facilities

DATE: May 17, 2024
TO: City of Gig Harbor
FROM: Brian E. Bunker, PE; Joel Linke, PE; and John Phillips, ENV, SP
SUBJECT: Tech Memo - Lift Station #5 Basin Improvements
PROJECT NUMBER: 216-2750-046
PROJECT NAME: Feasibility Study for Lift Station #5 Basin Improvements



Introduction

Wastewater Basin (WWB) 5 is served by Lift Station #5 (LS#5). It is a relatively small basin adjacent to the waterfront of Harborview Drive and is east and downgradient of WWB-4. Flows from LS#5 are discharged to WWB-4. Existing sewer piping generally covers the existing basin area to provide gravity collection to the existing lift station, and it appears that the basin boundaries cannot be expanded to provide additional areas by gravity.

LS#5 is located within WWB-5 and along the shoreline of Gig Harbor Bay adjacent to residential houses in the 2800 block of Harborview Drive. LS#5 is almost 50 years old and consists mostly of original equipment that is beyond its service life; replacement parts are no longer available. During seasonal high tides, in particular, the kind tide, LS#5 is at risk of being inundated by seawater. The City wishes to decommission the existing lift station and either rebuild/refurbish it or construct a new pressurized collection system consisting of individual grinder pump stations. This would improve reliability and reduce or eliminate the risk of high tides flooding the station.

To accomplish this goal, the Parametrix team prepared this feasibility analysis to evaluate options to either replace LS#5 with a new similarly sized lift station, or by finding an alternate method of providing wastewater collection services to the residents within WWB-5.

Background

Sea Level Rise

Current projections of sea level rise are from the Washington Coastal Resiliency Project and are the current best available science for the Puget Sound Region. Further information on the science and methodology behind the projections are available through the Washington Coastal Resiliency website and the associated reports.[1]

The Washington Coastal Resilience Project improved risk projections to provide better guidance to strengthen capital investment programs for coastal infrastructure. This project provides an updated set of sea level rise projections that incorporate the latest science, provide community-scale projections, and are designed for direct application to risk management and planning. The new projections reflect the latest science on sea level rise. State Agencies, such as the Washington State Department of Ecology, recommend using these projections for coastal impact assessments within the state of Washington.

[1] Washington Coastal Hazard Resiliency Project https://wacoastalnetwork.com/

Rising sea levels are a consequence of climate change, which put coastal communities and shorelines at risk. Oceans absorb heat from greenhouse gases, resulting in thermal expansion, melting glaciers, and loss of polar ice sheets. Sea level rise can lead to coastal flooding and saltwater intrusion into pipes through unprotected outfalls.

The projections from the Washington Coastal Resilience Project for sea level rise are provided below. To prevent saltwater inundation of any proposed pump station, two projections are provided: a most likely (50% probability) and the least likely but highest risk (1% probability). The 50% probability is the sea level that is currently assessed as being most likely to occur based on current available science. This probability is appropriate for users who want the most likely future values and are not particularly risk-averse but rather are more risk-tolerant.

Using low-probability projections (least likely/highest risk) is a conservative approach most appropriate for risk-averse situations, such as those that involve the design of critical infrastructure that would be seriously compromised by flooding.

Using the two projections allows the team to evaluate critical components and noncritical components side by side. For example, the location of a manhole versus a parking area. A flooded sanitary sewer manhole would allow saltwater into the conveyance system causing increased pumping needs, potential for a sewage overflow, and damage to critical components. In contrast, a flooded parking lot would merely be an inconvenience during a high tide.

Projections are provided for 2080, approximately 50 years in the future. Mechanical components of pump stations have at most a 50-year life. Therefore, the assumption is that the pump station would need replacement or upgrades around 2080 and sea level rise can be reevaluated with the current science and observations at that time.

However, sea level rise will meet the projections at some time in the future. Depending on global mitigation of greenhouse gas emissions, these projections could be sooner or later than 2080. The timing is uncertain based on socioeconomic scenarios for global action to reduce greenhouse gases. The projections provided are based on the scenario that little to no global action will occur in the next 10 years to prevent increasing levels of greenhouse gas emissions.

Table 1. Relative Sea Level Rise for 2080

Likelihood	Sea Level Rise Projections (Feet)
Likely Range	1.2–2.2
Most Likely (50%)	1.6
Least Likely/Highest Risk (1%)	3.4

Vulnerability of Lift Station #5 and Associated Facilities

The City of Gig Harbor provided elevations for LS#5, and three sanitary sewer manholes provided below. Elevations were provided, surveyed in orthometric heights. The Tacoma tide gauge was used as a reference point as it matched datum provided by the City.

Based on the U.S. Army Corps Historical Tidal Benchmark at Gig Harbor and current benchmark datum from the Tacoma Tide Gauge the Orthometric Height[2] was converted to North American Vertical Datum 1988 (NAVD88) and elevations based on mean sea level (MSL) in the current Tidal Epoch (1983–2001). NAVD 88 is the datum standard for surveys and used in engineering drawings.

Table 2. Lift Station and Manhole (MH) Elevations (feet)

Facility	Orthometric Height	Mean Sea Level	NAVD 88
Lift Station #5	22.5	10.8	**15.2**
MH 5-2	21.6	9.9	**14.3**
MH 5-3	21.2	9.5	**13.9**
MH 5-4	20.8	9.0	**13.5**

Mean Higher High Water (MHHW) and King Tide

To assess vulnerability from sea level rise, the projected sea level rise from Table 1 was added to the mean higher high water (MHHW) and potential king tide. Elevations are based on NAVD88 for the Tacoma Tide Gauge. King tide elevations are verified king tide elevations from December 27, 2022.

Table 3. Sea Level Rise and Tidal Elevations NAVD 88 (feet)

Scenario	Mean Higher High Water (MHHW)	King Tide
Present Day	9.4	13.3
2080 Most Likely (ML)	11.0	14.8
2080 Least Likely (LL)/Highest Risk	12.8	16.7

Table 4 provides a visual reference to the facilities at risk under different tidal scenarios with future sea level rise and king tides. The numbers in the table represent the difference between water elevation and the existing facility. A negative number indicates the amount of water above the facility during the tidal event. The table identifies low, moderate, and high risk relative to the freeboard at the structure as indicated by color; green, yellow, and red respectively.

King Tide is a colloquial term used to describe extremely high tides caused by astronomical conditions. Weather also impacts king tides by atmospheric pressure lows and wind. In Washington State, the most extreme tides occur in the winter, but can also occur in the spring. King tides will continue, and the relative height of king tides will not change due to climate change.

[2] The orthometric height is the vertical distance along the plumb line from a point of interest to a reference surface known as the geoid. The geoid is the shape that the ocean surface would take under the influence of the gravity of Earth, including gravitational attraction and Earth's rotation, if other influences such as winds and tides were absent.

Table 4. Facility Vulnerability.

	Lift Station #5	Manhole (MH) 5-2	MH 5-3	MH 5-4
Present Day (Mean Higher High Water) MHHW	5.8’	4.9’	4.5’	4.1’
Present Day King Tide	2.0’	0.9’	0.6’	0.2’
2080 MHHW Most Likely	4.2’	3.3’	2.9’	2.5’
2080 King Tide Most Likely	0.4’	-0.6’	-1.0’	-1.4’
2080 MHHW Least Likely	2.4’	1.5’	1.1’	0.7’
2080 King Tide Least Likely	-1.4	-2.4’	-2.8’	-3.2’

Red = Vulnerable (freeboard <1 foot), Yellow = moderately vulnerable (freeboard of 1–2 feet), Green = not vulnerable (freeboard >2 feet)

Information presented in this memo is the best available science for the Puget Sound as of the date of writing. For planning purposes, these data represent projections based on current understanding of sea level rise. In the future, more detailed modeling of future projections of sea level rise, coastal erosion, and wave inundation will be available through the U.S. Geological Survey Coastal Storm Modeling System (CoSMoS). This information should be reviewed and updated when the model is available, expected in late 2024.

Basin Overview and Deficiencies

Wastewater service to WWB-5 was originally constructed through the implementation of a Utility Local Improvement District (ULID No. 1) approved 51 years ago in April of 1973. The basin consists of 13 single family homes along the east side of Harborview Drive and the four units that comprise the Ferry Landing Condominium Association on the west side of the street. The collection system is comprised primarily of 8-inch gravity main PVC sanitary sewer lines. Of the 13 single family homes, 11 are connected to a “beach” sewer main that is at risk of being inundated by seawater during seasonal high tides. The beach sewer is constructed behind the seawall and under the well-maintained rear yards, patios, and decks of the residents that it serves and is shown in Figure 1. For the purpose of this memo, the beach sewer is considered to run from Manhole (MH) 5-6 behind 2809 Harborview Drive to Cleanout (CO) 5-1 which serves 2901 Harborview Drive.

LS#5 is located within WWB-5 and along the shoreline of Gig Harbor Bay adjacent to residential houses in the 2800 block of Harborview Drive. The lift station is a duplex dry pit Allis Chalmers vacuum-primed station constructed over a 4-foot-diameter wet well and suction pipe. The station is over 50 years old and consists mostly of original equipment that is beyond its service life; replacement parts are no longer available. The facility is located on two small parcels of land centered on the common lot line separating 2823 Harborview Drive and 2825 Harborview Drive and encompassing approximately 875 square feet.

Known challenges and deficiencies of this station include:

- The risk of being inundated by seawater during seasonal high tides.
- Pumps within the station are beyond the end of their useful service life and replacement parts are no longer available.
- Concrete within the wet well has undergone moderate deterioration from being exposed to hydrogen sulfide gas.
- Accessing the station with parts and heavy equipment is challenging due to steep, slippery landscaping and the lack of a paved egress.
- Manholes and access cleanouts within the collection system that feed the lift station are also at risk of being inundated by seawater during seasonal high tides.

Photograph 1. Lift Station #5 Looking West

Photograph 2. Lift Station #5 Looking East

Basis of Design

As a basis for the recommendations contained within this technical memorandum, we have selected the 2080 most likely (ML) king tide event with a peak elevation of 14.8 feet (NAVD88) for the basis of design event.

Standardized City of Gig Harbor General Arrangement

The City has spent years developing a model for lift stations that makes the best use of available tools, resources, manpower, and technical training. An example is the selection of a ScrewSucker as a diesel-engine-driven standby pump. If sized at the station's firm capacity, the standby pump avoids the need for a standby generator. It also provides the desired ability for emergency pump-around ability, and it meets the requirements to maintain the pumping of sewage throughout construction and future maintenance activities. Other preferred lift station features include rag-passing screw centrifugal or chopper pumps, a horizontal carbon-bed odor control unit, a specialized discharge piping arrangement with wet-well flush and permanent bypass pump and temporary bypass pump connections, as well as a valve vault equipped with a flow meter.

Alternative Analysis

Define Potential Alternatives. Propose, evaluate, and prepare an engineer's estimate of probably construction cost (EOPCC) for the following alternatives:

- Alternative 1: Do nothing but current maintenance.
- Alternative 2: Eliminate LS#5 and replace the existing pump station with individual grinder pump stations and low-pressure force main.

- Alternative 3A: Rehabilitate in-place with a single quadplex grinder pump station.
- Alternative 3B: Rehabilitate in-place and with similar equipment (vacuum-prime pumps).
- Alternative 4: Relocate up-gradient with duplex submersible pumps and as close to the City's Public Works Standardized General Arrangement as possible.
- Alternative 5: Relocate up-gradient with duplex vacuum-prime pumps.

Alternatives Overview

A detailed description of each alternative is described in the following section.

Alternative 1: Do Nothing but Current Maintenance

The Do Nothing but Current Maintenance alternative was evaluated to define a basic understanding of the project need. The relevant impact of doing nothing means that the following conditions would remain in place:

- Potential for catastrophic failure of the system during any of the MHHW or king tide events that overtop any of the access manholes in the collection system or the station itself.
- Potential for risk of injury to operation and maintenance (O&M) staff due to the steep, slippery landscaping and lack of a paved safe access to the station while hauling heavy parts and equipment to and from the station.
- Potential for failure or overflow at some point in the foreseeable future because the equipment is beyond its service life and replacement parts of some equipment are no longer available.
- Potential for a sewage overflow event and contamination of the local bay.

See Figure 1 for a depiction of the existing condition.

Alternative 2: Grinder Pump Stations on Individual Properties

Alternative 2 evaluated the decommissioning of LS#5 and subsequent impact of installing individual grinder pump stations for the 11 properties that connect to the system downstream of MH 5-8 as well as the construction of upland gravity collection system improvements in Harborview Drive. The intent of this alternative is to eliminate the direct sewage lateral connections to the beach sewer and to reduce the load from upland connections that flow to LS#5 through the beach sewer upgradient of MH 5-8.

In general, each of the 11 single-family residences would receive a simplex E/One grinder station at a location extremely near to the location of their existing house lead. Table 5 summarizes common elements for connecting to upland sewer.

Table 5. Common Elements (Alternative 2)

Decommission Lift Station #5 (LS#5):	Remove/Salvage and replace with smaller access manhole
Simplex Grinder Station:	E/One WH231 with Protect Plus Simplex Panel
Manufacturer's Station Control Panel for Simplex Stations:	Located on outside face of residence or post-mounted adjacent to new station
Grinder Station Discharge Force Main:	1.5-inch high-density polyethylene (HDPE) installed within the existing 8-inch beach sewer

Combined Force Main:	2-inch HDPE installed within the exiting 4-inch force main from LS#5 to Manhole (MH) 4-31
Gravity Service Connection (from Building) to Grinder Station:	4-inch or 6-inch (match existing) polyvinyl chloride (PVC)
Existing Beach Main Sewer Lateral Connection:	Expose the sewer lateral connection at the beach main and cut/cap at that connection
Electrical Service Upgrades:	As necessary, if required by code
Upgradient Sewer Improvements:	New 8-inch sewer in Harborview Drive from MH 5-8 to approximately 100 feet downstream of MH 4-31

See Figures 2A and 2B for a depiction of the individual grinders option.

Alternative 3A: Rehabilitate Existing Lift Station – Single Quadplex Grinder Pump Station

Alternative 3A evaluated the decommissioning of LS#5 and in-place replacement with one E/One quadplex package grinder pump station. In addition, as with Alternative 2, the construction of upland gravity collection system improvements in Harborview Drive is necessary to reduce the load from upland connections that flow to LS#5 through the beach sewer upgradient of MH 5-8. Also necessary with this option, as with Alternatives 3B, 4, and 5, is the need to protect the beach sewer (pipes and structures) from inflow and infiltration. This is accomplished by lining the existing pipes and either armoring or abandoning the manholes and cleanouts.

Table 6 summarizes common elements for Alternative 3A.

Table 6. Common Elements (Alternative 3A)

Modify Lift Station #5 (LS#5):	Remove/salvage and replace with E/One quadplex package pump station
Rehabilitate LS#5 Concrete Structure:	Inspection of the wet well has revealed moderate hydrogen sulfide deterioration
Beach Sewer Improvements:	Cured-in-place pipe and structure armoring
Discharge Force Main:	1.5-inch HDPE installed within the exiting 4-inch force main from LS#5 to Manhole (MH) 4-31
Standby Generator:	Emergency power generation
Odor Control:	Odorous air piping for future activated carbon stand-alone unit
Electrical Service Upgrades:	Necessary for new pumps
Upgradient Sewer Improvements:	New 8-inch sewer in Harborview Drive from MH 5-8 to approximately 100 feet downstream of MH 4-31

See Figure 3A for a depiction of the single grinder pump station option.

Alternative 3B: Rehabilitate Existing Lift Station – Similar Equipment

Alternative 3B evaluated the decommissioning of LS#5 and in-place replacement with an above-grade vacuum-prime pump package pump station similar to the below-grade station that is there currently. Also necessary with this option, as with alternatives 3A, 4, and 5, is the need to protect the beach sewer (pipes and structures) from inflow and infiltration. This is accomplished by lining the existing pipes and either armoring or abandoning the manholes and cleanouts.

Table 7 summarizes common elements for Alternative 3B.

Table 7. Common Elements (Alternative 3B)

Modify Lift Station #5 (LS#5):	Remove/salvage and replace with above-grade vacuum-prime pump station
Rehabilitate LS#5 Concrete Structure:	Inspection of the wet well has revealed moderate hydrogen sulfide deterioration
Beach Sewer Improvements:	Cured-in-place pipe and structure armoring
Discharge Force Main:	Line the exiting 4-inch force main from LS#5 to MH 4-31
Standby Generator:	Emergency power generation
Odor Control:	Odorous air piping for future activated carbon stand-alone unit
Electrical Service Upgrades:	Necessary for new pumps

See Figure 3B for a depiction of the similar equipment replacement option.

Alternative 4: Relocate Lift Station– Duplex City-Preferred Submersible Pumps

Alternative 4 evaluated the decommissioning of LS#5 and replacement with an upgradient submersible duplex pump station located within the shared driveway in front of 2825 Harborview Drive. The station would be sited upgradient from the existing pump station and easily accessible for maintenance. In order to connect the pump station to the beach sewer, a new 8-inch HDPE gravity sewer would be placed within a 12-inch ductile iron casing and installed via jack and bore trenchless technology. Because the new station would be upgradient of the existing station, a relatively deep wet well must be constructed to house the pumps. The piping would be installed with an invert elevation of approximately 5.1 feet NAVD88, making the pump well approximately 30 feet deep in the driveway. Also necessary with this option, as with Alternatives 3A, 3B, and 5, is the need to protect the beach sewer (pipes and structures) from inflow and infiltration.

Table 8 summarizes common elements for Alternative 4.

Table 8. Common Elements (Alternative 4)

Modify Lift Station #5 (LS#5):	Remove/salvage and replace with standard manhole frame and cover
Rehabilitate LS#5 concrete Structure:	Inspection of the wet well has revealed moderate hydrogen sulfide deterioration
Beach Sewer Improvements:	Cured-in-place pipe and structure armoring
Discharge Force Main:	Abandon 4-inch ductile iron force main
New Influent Gravity Sewer:	Due to depth and proximity to adjacent homes, install sewer casing via trenchless technology and insert 8-inch carrier pipe
Standby Generator:	Emergency power generation
Odor Control:	Activated carbon stand-alone unit
Valve Vault:	Downstream and consistent with standard city equipment
Electrical Service Upgrades:	Necessary for new pumps

See Figures 4A and 4B for a depiction of the relocated pump station with submersible pumps option.

Alternative 5: Relocate Lift Station – Duplex Vacuum-Prime Pumps

Alternative 5 evaluated the decommissioning of LS#5 and replacement with an upgradient below-grade vacuum-prime duplex pump station located within the shared driveway in front of 2825 Harborview Drive. The station would be sited upgradient from the existing pump station and easily

accessible for maintenance. In order to connect the pump station to the beach sewer, dual 4-inch suction piping would be installed within a common trench, as shallow as possible. However, in order to not exceed the suction capacity of the pumps, the static head cannot exceed 17 feet. Therefore, the piping cannot be installed above an elevation of 21.6 feet NAVD88, making the pump well approximately 13.5 feet in the driveway. Also necessary with this option, as with Alternatives 3A, 3B, and 4, is the need to protect the beach sewer (pipes and structures) from inflow and infiltration.

Table 9 summarizes common elements for Alternative 5.

Table 9. Common Elements (Alternative 5)

Modify Lift Station 5 (LS#5):	Remove/salvage and replace with standard manhole frame and cover
Rehabilitate LS#5 concrete structure:	Inspection of the wet well has revealed moderate hydrogen sulfide deterioration
Beach Sewer Improvements:	Cured-in-place pipe and structure armoring
Discharge Force Main:	Abandon 4-inch ductile iron force main
New 4-Inch Dual Suction Piping:	New suction piping for about 50 feet with minimal cover then increasing to 11.6 feet
Standby Generator:	Emergency power generation
Odor Control:	Activated carbon stand-alone unit
Electrical Service Upgrades:	Necessary for new pumps

See Figures 5A and 5B for a depiction of the relocated pump station with vacuum-prime pumps option.

Alternatives Screening and Development

Evaluation Criteria

The six alternatives identified were evaluated using an analysis which includes engineering, economic, social, and environmental aspects for each site. The criteria, scoring, and refinement occurred over several months with key workshops between the consultant team and City staff occurring during:

- Kickoff Meeting, 6/8/23: Review and discuss potential site alternatives from high-level screening.
- Workshop 1, 8/16/23: Discuss and refine the impact of sea level rise, establish the most-likely-to-occur king tide event (2080) as a key basis of design; and discuss most feasible alternatives for detailed analysis.
- Workshop 2, 12/21/23: Present analysis of short-listed alternatives, including conceptual site plan and planning-level cost estimates. Discuss and select evaluation criteria and weight factors; refine scoring.

The evaluation criteria in each category, determined in Workshop 2, was provided a weight factor value ranging from 1 to 10, based on least to most significance. The eight criteria, weight factors, and descriptions are presented in Table 10. A score of 1 is the least significant (least weighted), and a score of 10 is most significant (heavily weighted).

Table 10. Evaluation Criterion Summary

	Criteria	Weight Factor	Description
1.	Minimize Public Works Capital Financial Impact ($)	2	Including equipment, labor, startup, and/or decommissioning of existing pump station, if needed.
2.	Maximize Safety	8	Feasibility of providing a solution that is safe to operate, safe to maintain and safe to construct, minimize sewer overflows and discharges to surface waters.
3.	Meets City of Gig Harbor's Public Works Standards for General Arrangement and Equipment	1	Potential for inclusion of the following equipment: generator, centrifugal or chopper pumps, odor control, temporary bypass pump connections, valve vault and flow meter. However; given the unique circumstances and site location of this station, the weight factor of this measure was reduced.
4.	Minimizes Impact to Residents during Construction	6	Including accessibility during construction, overall property disruption, and risk of property damage.
5.	Minimizes Impact to Residents during Daily Operations	7	Including reliability, impact during outage, cost.
6.	Maximizes Use of Existing Facilities	3	Potential for reuse of pipes, vaults, and sewer easements.
7.	Simplifies Operations to Reduce Operations and Maintenance (O&M) and Improve Reliability	9	Effort required to provide service and maintain infrastructure, including, operation risks, response time, and outage impact.
8.	Low Overall Risk	10	Risk of loss to property, personnel, and equipment.

Each of the six alternatives was provided a score for each of the eight criterion based on how the team ranked each of the six; the score ranged from 1 to 6, where higher scores designated better options at that site. The score provided for each site was assigned relative to the other sites within the same criterion. While some criteria were scored via quantitative methods (e.g., the capital cost of each alternative), the majority of the criteria were qualitative and, thus, implemented a consensus scoring method. The consensus scoring was achieved through communication between the consultant team and City staff, as well as through discussion in the workshops.

Scoring of Alternatives

The results of the evaluation provided a total score for each alternative, as summarized in Table 11. The matrix with criterion scores and descriptions for each score are found in Attachment A.

Table 11. Scoring Summary

Site/Alternative		Weighted Score	Final Rank
Alternative 1:	Do Nothing but Current Maintenance	89	6th
Alternative 2:	Grinder Pump Stations on Individual Properties	91	5th
Alternative 3A:	Rehabilitate Existing Lift Station – Single Quadplex Grinder Pump Station	186	2nd
Alternative 3B:	Rehabilitate Existing Lift Station – Similar Equipment	170	4th
Alternative 4:	Relocate Lift Station – Duplex City-Preferred Submersible Pumps	181	3rd
Alternative 5:	Relocate Lift Station – Duplex Vacuum-Prime Pumps	213	1st

The highest weighted score equates to the highest ranked alternative. A summary of the evaluation and scoring discussion for each alternative is presented below.

Alternative 1: Do Nothing but Current Maintenance

The Do Nothing but Current Maintenance alternative scored as the least desirable alternative of the six. The team felt strongly that this alternative was not feasible for the following reasons:

- Potential for catastrophic failure.
- Potential for risk of injury to O&M staff while maintaining the station.
- Rising sea level analysis did not necessitate moving the existing lift station.

Alternative 2: Grinder Pump Stations on Individual Properties

Individual grinder pumps installed at each of the 11 impacted single-family homes scored nearly as low as the Do Nothing but Current Maintenance alternative. This option scored as one of the three lowest ranked alternatives in every category considered. Reasoning that was discussed included:

- Would have significant impact to residents during construction. Disruption of landscaping, decks, sidewalks and rear entrances would be costly and difficult to restore.
- Does not meet any of the City's Public Works Standards for General Arrangement and Equipment. None of the items that the city typically requires for a pump station would be provided.
- Modifications to Gig Harbor Municipal Code (Chapter 13.28) may be required before an improvement similar to this could be implemented. There is not currently any language addressing authority to direct conversion to a private system or the addition of improvements that would require maintenance by owner or by City for an additional fee. Legal review and/or ordinance amendment may be needed before the City could require an existing rate payer to accommodate this improvement.
- Individual system failure will have a direct impact on that resident, resulting in a reduced level of service.
- Despite being constructed below an elevation that could become inundated by seawater, these systems are constructed to be watertight and intrinsically safe.
- Cost of this alternative is high due to complexity, potential unknown factors, and a broader scope of work.

Alternative 3A: Rehabilitate Existing Lift Station – Single Quadplex Grinder Pump Station

Utilizing the existing site and constructing a new in-place replacement with an E/One quadplex package grinder pump station scored the second highest amongst the six alternatives. The assets and liabilities of this alternative included:

- The cost of this alternative was determined to be the least of the proposed capital improvements alternatives.
- This option was deemed the best option at utilizing the assets of the existing infrastructure.
- Despite being constructed below an elevation that could become inundated by seawater, these systems are constructed to be watertight and intrinsically safe.
- Because this alternative makes use of the existing infrastructure, it scored higher in the category of Minimizes Impact to Residents – During Construction.

- Similar to Alternative 2, this option doesn't meet the City's Public Works Standards for General Arrangement and Equipment. None of the items that the City typically requires for a pump station would be provided and this equipment would be unique to this station.
- The option does not eliminate the potential for risk of injury to O&M staff while maintaining the station or getting equipment and materials to and from the existing station; however, the equipment that is used in this alternative tends to be lighter and easier to transport.

Alternative 3B: Rehabilitate Existing Lift Station – Similar Equipment

Utilizing the existing site and constructing a new above-grade vacuum pump package pump station scored as the second least favorable of the capital projects that were considered. Despite the fact that the cost of this alternative was determined to be the second least of the proposed capital improvements, it did not fare well in the other following areas:

- The typical benefit of a vacuum-primed station similar to LS#5 is the ability to hide the lift station controls and electrical equipment below grade. Since this feature is no longer possible, the in-kind option to replace is within a structure, sited above grade. Although the above grade option could function without risk of seawater inundation, the unsightly, above-grade option was deemed undesirable and unable to conform to the landscape of the rear yard setting.
- Similar to Alternative 2, this option doesn't meet the City's Public Works Standards for General Arrangement and Equipment. None of the items that the City typically requires for a pump station would be provided and this equipment would be unique to this station.
- The option does not eliminate the potential for risk of injury to O&M staff while maintaining the station.

Alternative 4: Relocate Lift Station – Duplex City-Preferred Submersible Pumps

Moving the lift station to higher ground, installing submersible duplex pumps, and adding an emergency power source or permanent bypass pump are all positive attributes of this alternative. Alternative 2 scored as the third best option for the following reasons:

- The cost of this alternative was determined to the most of the proposed capital improvements.
- This option finished highest in several categories including: Most nearly meets City's Public Works Standards for General Arrangement and Equipment, Minimizes Impact to Residents during Daily Operations; and Simplifies Operations to Reduce O&M and Improve Reliability.
- Alternative 4 finished last in the category of Maximizes Use of Existing Facilities.
- Most significantly, because of its proximity to the homes at 2825 and 2823 Harborview Drive; and the constructability of open cutting or using a trenchless method to construct the gravity sewer so close to the foundations of these homes; this option scored low in the category of overall Risk. In addition, the relatively deep wet well would be expensive to construct and includes significant risk.

Alternative 5: Relocate Lift Station – Duplex Vacuum-Prime Pumps

Like Alternative 4, Alternative 5 moves the lift station to higher ground by utilizing a vacuum duplex pump station sited in the same location as 4. The station would be constructed like the existing pump station with one major difference. Instead of installing vertical suction lines, it utilizes a transverse pipe to draw liquid from the existing wet well. This option scored highest for the following reasons:

- Finished second to Alternative 4 in several categories including: Most nearly meets City's Public Works Standards for General Arrangement and Equipment; Minimizes Impact to Residents during Daily Operations; and Simplifies Operations to Reduce O&M and Improve Reliability
- Also similar to Alternative 4, the drawbacks of this option are its capital cost (second highest); requirement of new facilities; and the impact on residents during construction.
- Unlike Alternative 4, Alternative 5 finished with the best scores in Safety and Lowest overall risk.

Engineers Opinion of Probable Cost (Planning Level)

City of Gig Harbor Feasibility Study for Lift Station #5 Basin Improvements Engineer's Opinion of Probable Construction Cost (EOPCC) Alternative Analysis		
No.	Summary of Alternatives	Construction Cost[1]
1	Do Nothing but Current Maintenance	$ -
2	Grinder Pump Stations on Individual Properties	$ 1,634,000
3A	Rehabilitate Existing Lift Station– Single Quadplex Grinder Pump Station	$ 1,388,000
3B	Rehabilitate Existing Lift Station – Similar Equipment	$ 1,554,000
4	Relocate Lift Station – Duplex City-Preferred Submersible Pumps	$ 2,208,000
5	Relocate Lift Station– Duplex Vacuum-Prime Pumps	$ 2,084,000

1 Cost includes Owner's Contingency/Market Uncertainty @30% and sales tax @ 8.9%.

Preferred Alternative Selection

Alternative 5: Relocate – Duplex Vacuum-Prime Pumps

Alternative 5 moves the lift station to higher ground by utilizing a vacuum duplex pump station sited in the common ingress/egress of 2901, 2829, 2827, 2825 and 2823 Harborview Drive and within the existing sewer easement. Alternative 5 is safer to construct than Alternative 4 and will be easier to access and maintain than Alternative 3A. It is close to the existing electrical disconnect and water source for the existing lift station. It makes use of the existing stations concrete structure by utilizing a transverse pipe to draw liquid from the existing wet well, and is estimated to include a backup generator and odor control if these can be sited adjacent to the carport for 2825 Harborview Drive. Modification to the permanent easement and temporary construction easements would be needed. We recommend Alternative 5 as the preferred alternative.

Figures

Parametrix DATE: April 25, 2024 FILE: PS02750046–FIG 1

N

0 50

1 INCH = 50 FT.

LEGEND

- EXISTING GRAVITY SANITARY SEWER (SS)
- EXISTING FORCE MAIN SEWER (SSFM)
- EXISTING HOUSE LEAD

Figure 1 - Lift Station 5
Existing Conditions
City of Gig Harbor, Washington

Parametrix DATE: April 25, 2024 FILE: PS02750046–FIG 2A

N

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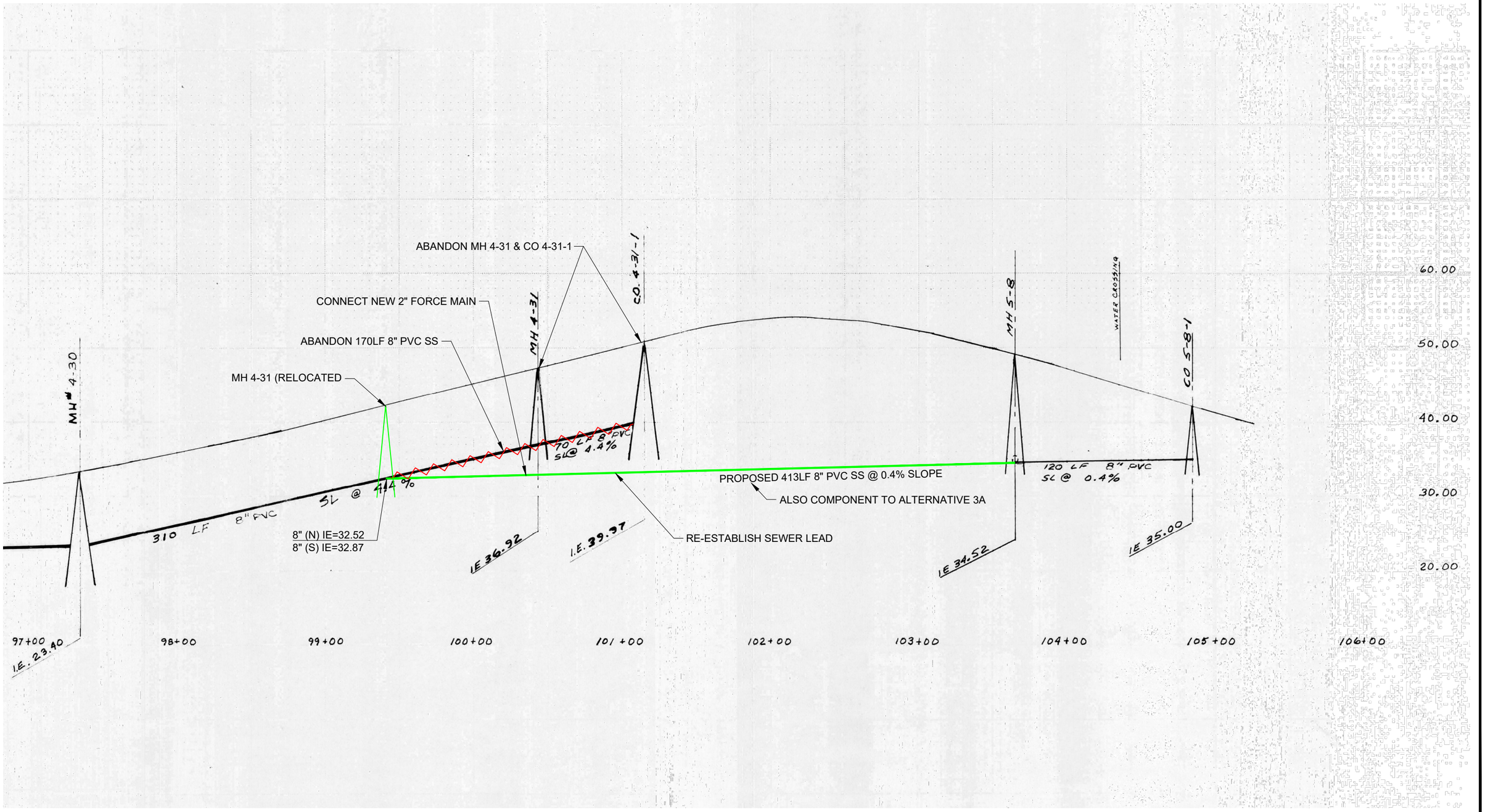
1 INCH = 50 FT.

LEGEND

- EXISTING GRAVITY SANITARY SEWER (SS)
- EXISTING FORCE MAIN SEWER (SSFM)
- EXISTING HOUSE LEAD
- PROPOSED GRAVITY SANITARY SEWER (SS)
- PROPOSED GRINDER PUMP STATION

Figure 2A - Lift Station 5 Alternative 2: Grinder Pump Stations

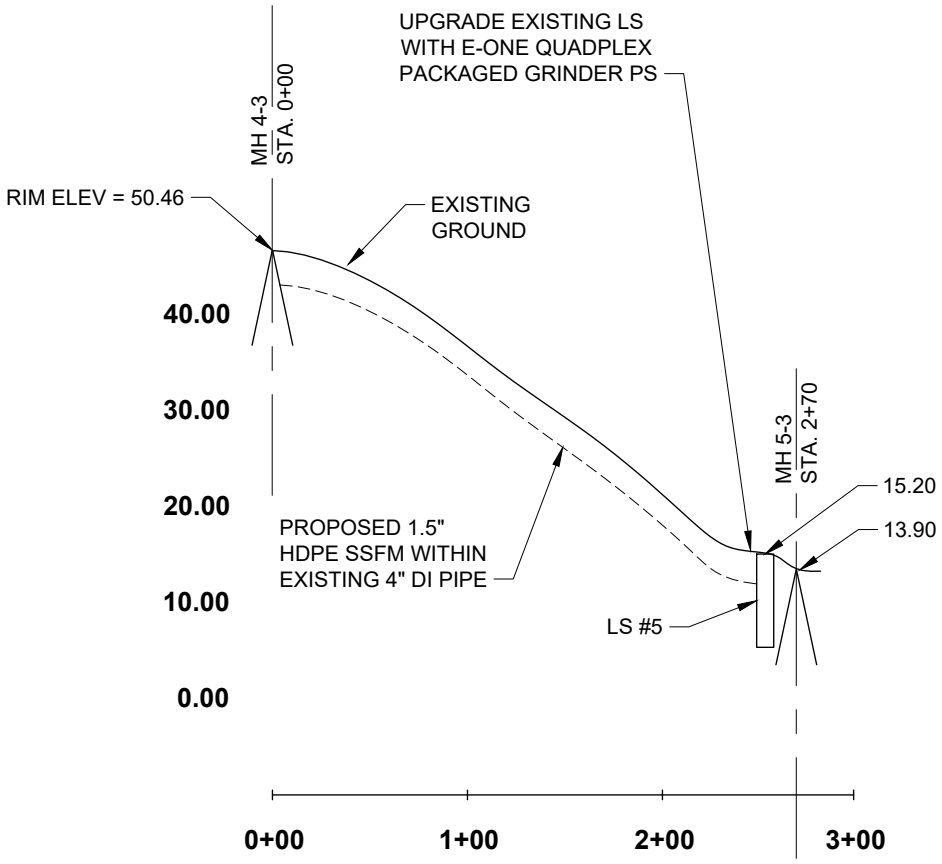
City of Gig Harbor, Washington



Parametrix DATE: April 25, 2024 FILE: PS02750046–FIG 2B

Figure 2B - Alternative 2: Up-Gradient Sewer Improvements W/ Individual Pump Stations
City of Gig Harbor, Washington

NOTE:
ALSO INCLUDES ELECTRICAL UPGRADES
AND GRAVITY SEWER IMPROVEMENTS
AS SHOWN ON FIGURE

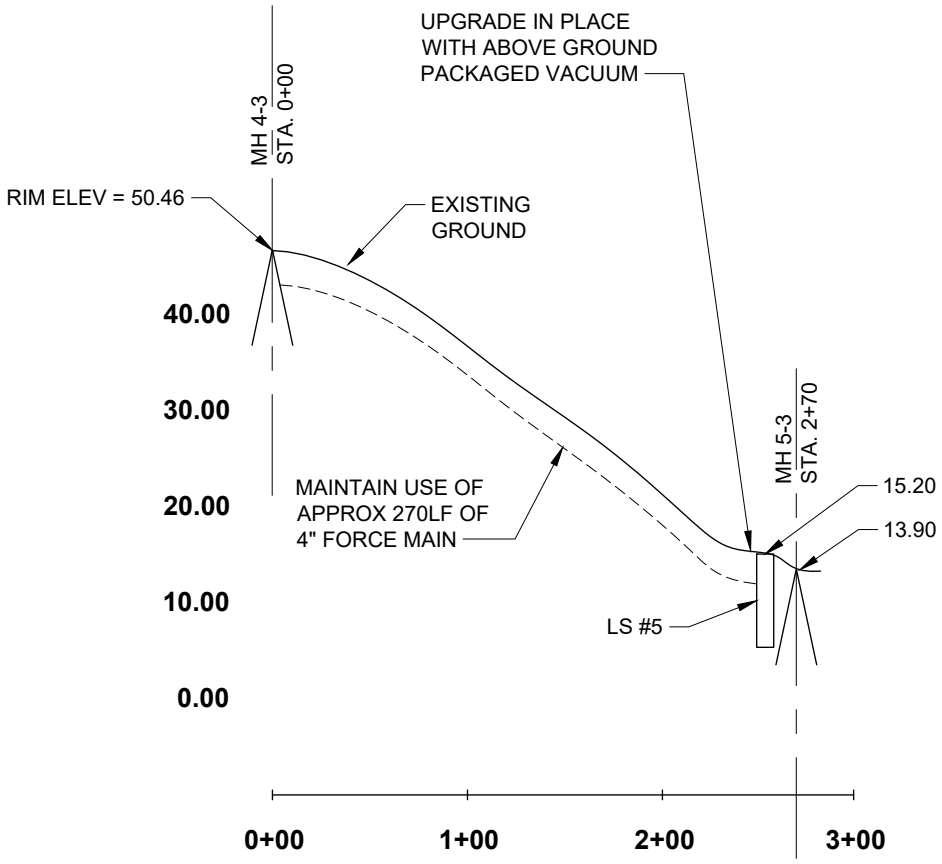


FORCE MAIN PROFILE

Parametrix DATE: April 25, 2024 FILE: PS02750046–FIG 3AB

Figure 3A - Lift Station 5
Alternative 3A: Rehabilitate - Single Quadplex Grinder Pump Station
City of Gig Harbor, Washington

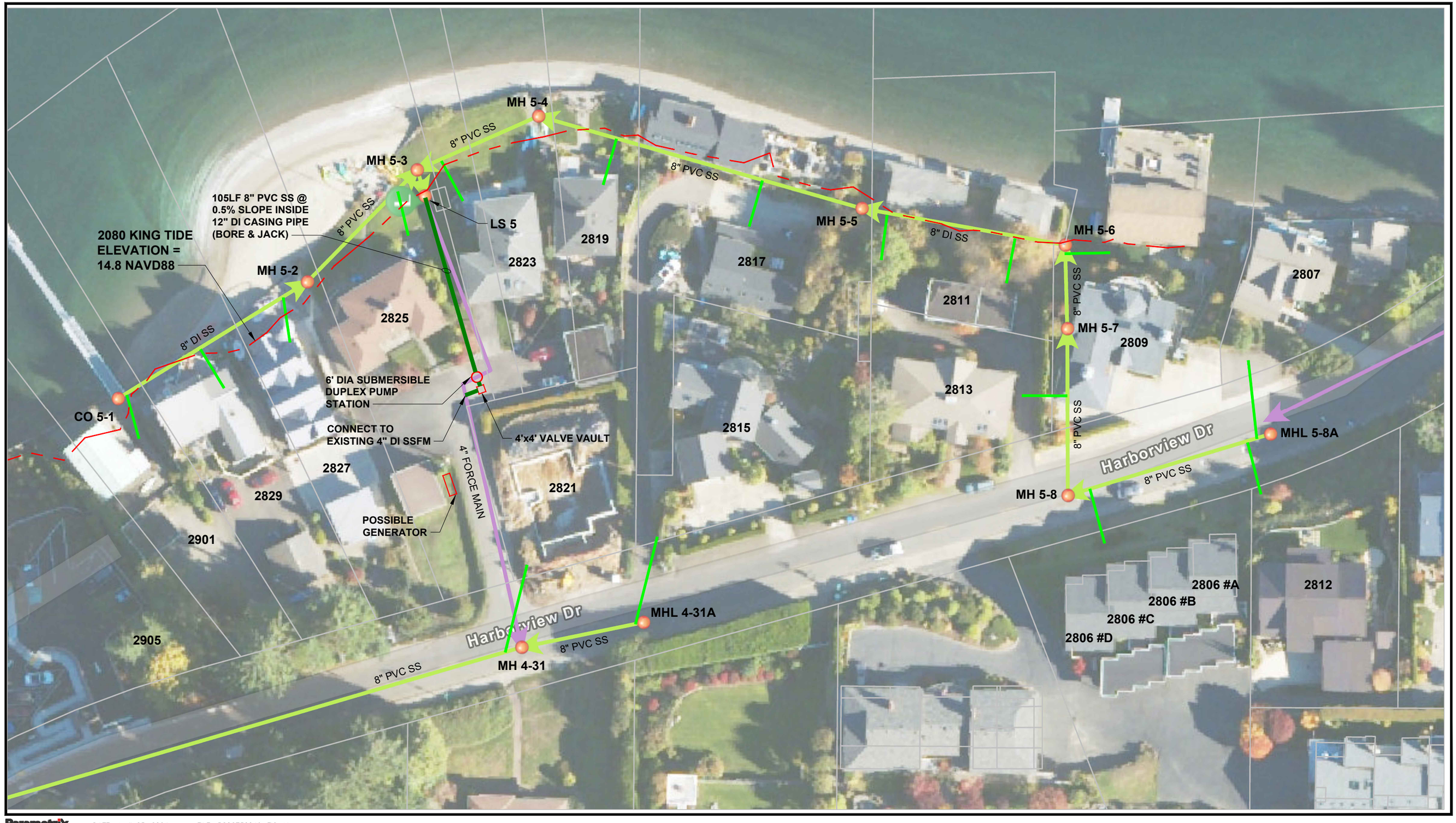
NOTE:
ALSO INCLUDES ELECTRICAL UPGRADES
AND GRAVITY SEWER IMPROVEMENTS
AS SHOWN ON FIGURE



FORCE MAIN PROFILE

Parametrix DATE: April 25, 2024 FILE: PS02750046–FIG 3AB

Figure 3B - Lift Station 5
Alternative 3B: Rehabilitate - Above Grade Vacuum Prime Pump Station
City of Gig Harbor, Washington



Parametrix DATE: April 25, 2024 FILE: PS02750046–FIG 4A

N

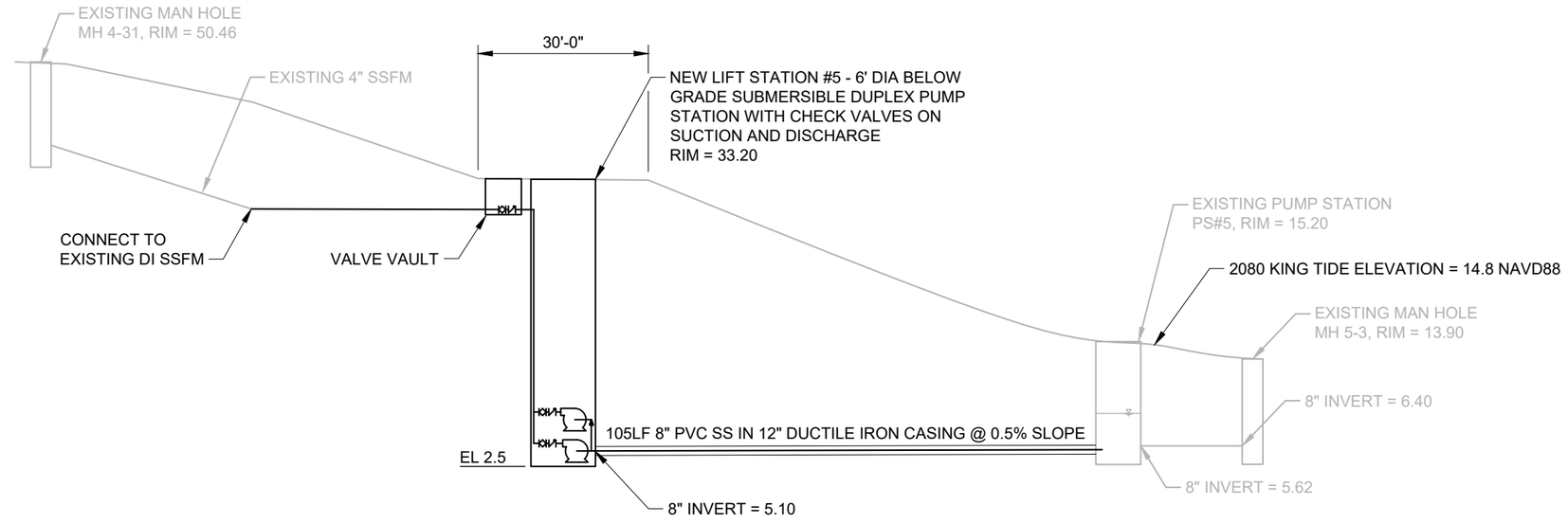
0 50

1 INCH = 50 FT.

LEGEND

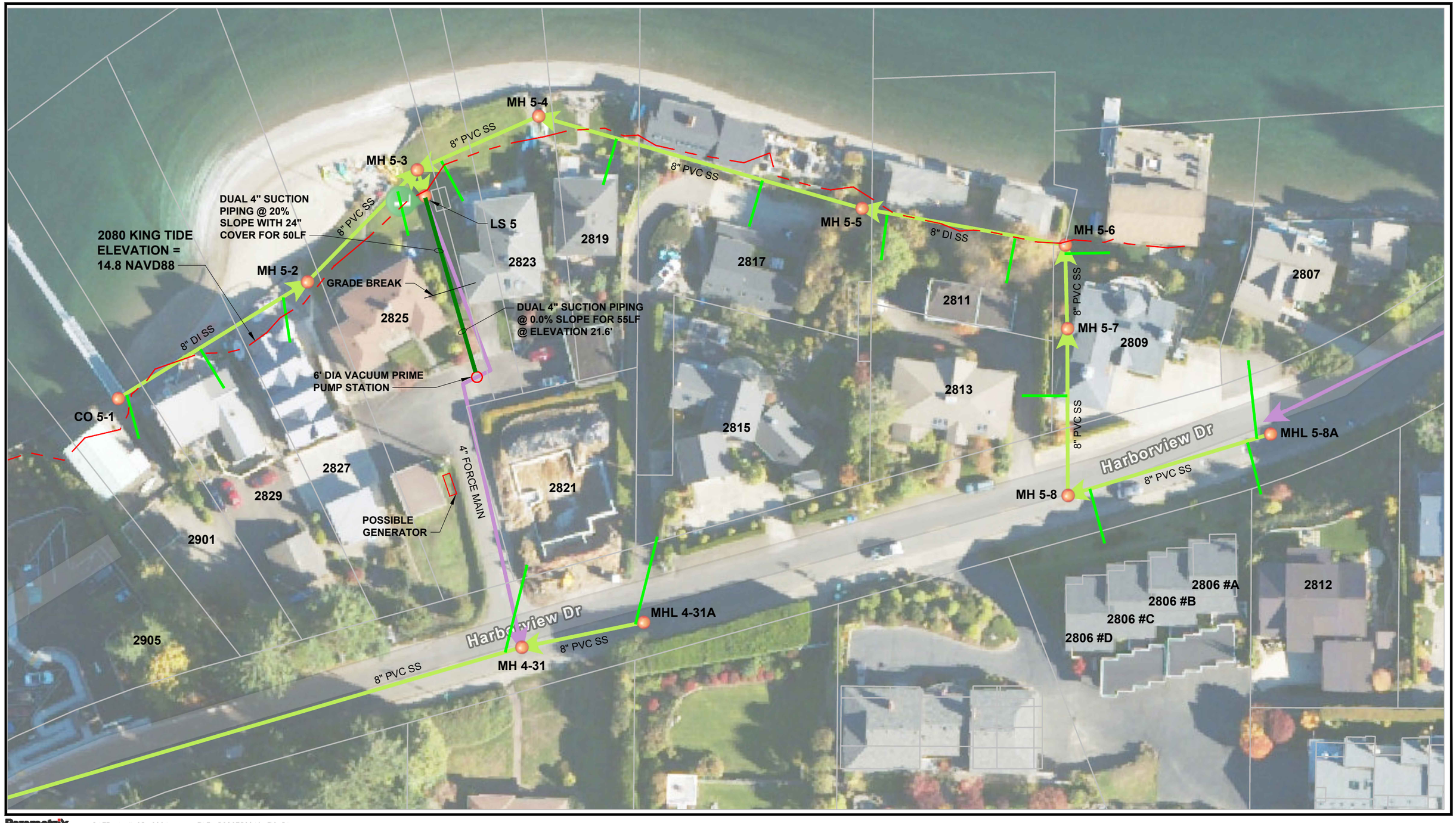
- EXISTING GRAVITY SANITARY SEWER (SS)
- EXISTING FORCE MAIN SEWER (SSFM)
- EXISTING HOUSE LEAD
- PROPOSED GRAVITY SANITARY SEWER (SS)

Figure 4A - Lift Station 5
Alternative 4: Relocate Duplex Submersible Pump Station
City of Gig Harbor, Washington



Parametrix DATE: April 25, 2024 FILE: PS02750046–FIG 4B–5B

Figure 4B - Lift Station 5
Alternative 4: Relocate Duplex Submersible Pump Station
City of Gig Harbor, Washington



Parametrix DATE: April 25, 2024 FILE: PS02750046-FIG 5A

N

0 50

1 INCH = 50 FT.

LEGEND

- EXISTING GRAVITY SANITARY SEWER (SS)
- EXISTING FORCE MAIN SEWER (SSFM)
- EXISTING HOUSE LEAD
- PROPOSED SANITARY SEWER (SS)

Figure 5A - Lift Station 5
Alternative 5: Relocate Duplex Vacuum Prime Pump Station
City of Gig Harbor, Washington

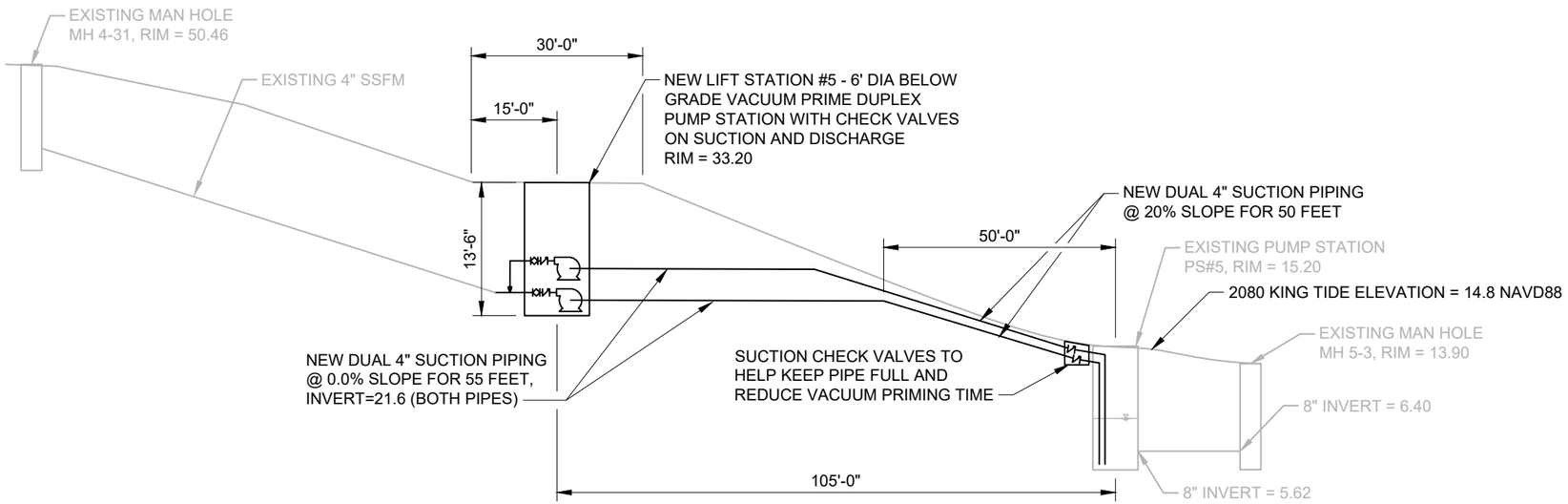
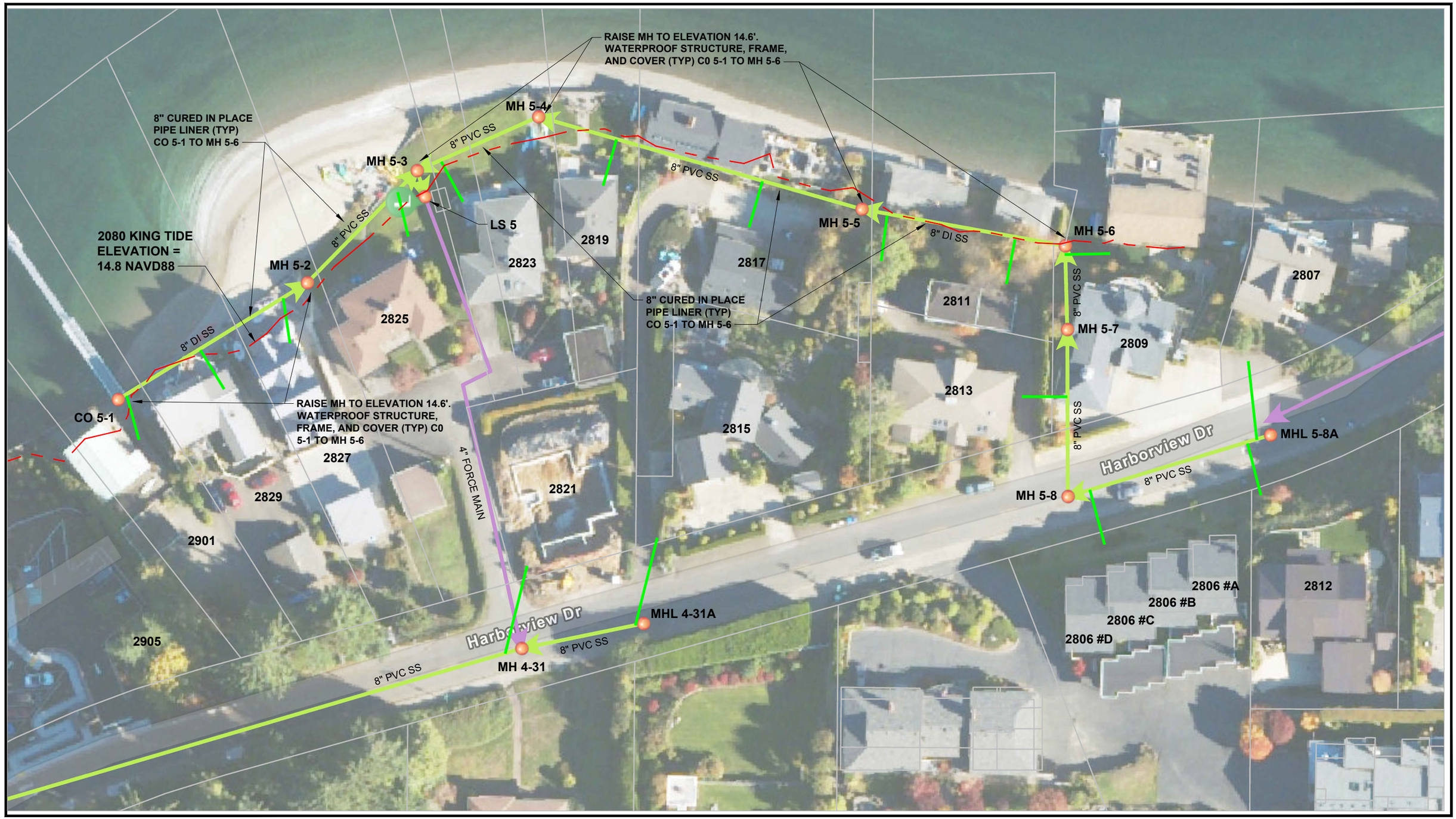


Figure 5B - Lift Station 5
Alternative 5: Relocate Duplex Vacuum Prime Pump Station
City of Gig Harbor, Washington



Parametrix DATE: April 25, 2024 FILE: PS02750046–FIG 6

N

0 50

1 INCH = 50 FT.

LEGEND

- EXISTING GRAVITY SANITARY SEWER (SS)
- EXISTING FORCE MAIN SEWER (SSFM)
- EXISTING HOUSE LEAD

Component to Alternatives 3A, 3B, 4, and 5

Figure 6 - Lift Station 5
Beach Sewer Improvements
City of Gig Harbor, Washington

Attachment A

Scoring Detail

Feasibility Study for Lift Station #5 Basin Improvements

Alternative Number and Description	Initial Project Cost	Minimize PW Capital Financial Impact ($)	Maximize Safety	Meets City's Standard for General Arrangement & Equipment	Minimizes Impact to Residents during Construction	Minimizes Impact to Residents during Daily Operations	Maximizes Use of Existing Facilities	Simplifies Operations to Reduce O&M & Improve Reliability	Low Overall Risk	Total Ranking Score	Final Rank
	(M)	Values of Importance (1-10)									
		2	**8**	**1**	**6**	**7**	**3**	**9**	**10**		
Option 1. Do Nothing	$ -	6	1	1	5	1	4	1	1	**89**	**6th**
Option 2. Upgrade with Individual Eone Packaged Grinder Pump Stations	$ 1,634,000	3	2	2	1	2	3	2	2	**91**	**5th**
Option 3A - Upgrade In-Place with Eone Packaged Grinder PS	$ 1,388,000	5	3	3	4	3	6	4	5	**186**	**2nd**
Option 3B – Upgrade In-Place with S&L Above-ground Packaged PS	$ 1,554,000	4	3	4	4	4	5	3	4	**170**	**4th**
Option 4 - Upgrade with Submersible Hidrostals in Driveway Area	$ 2,208,000	1	4	6	2	6	1	6	3	**181**	**3rd**
Option 5 - Vacuum Pumps in Driveway	$ 2,084,000	2	5	5	3	5	2	5	6	**213**	**1st**