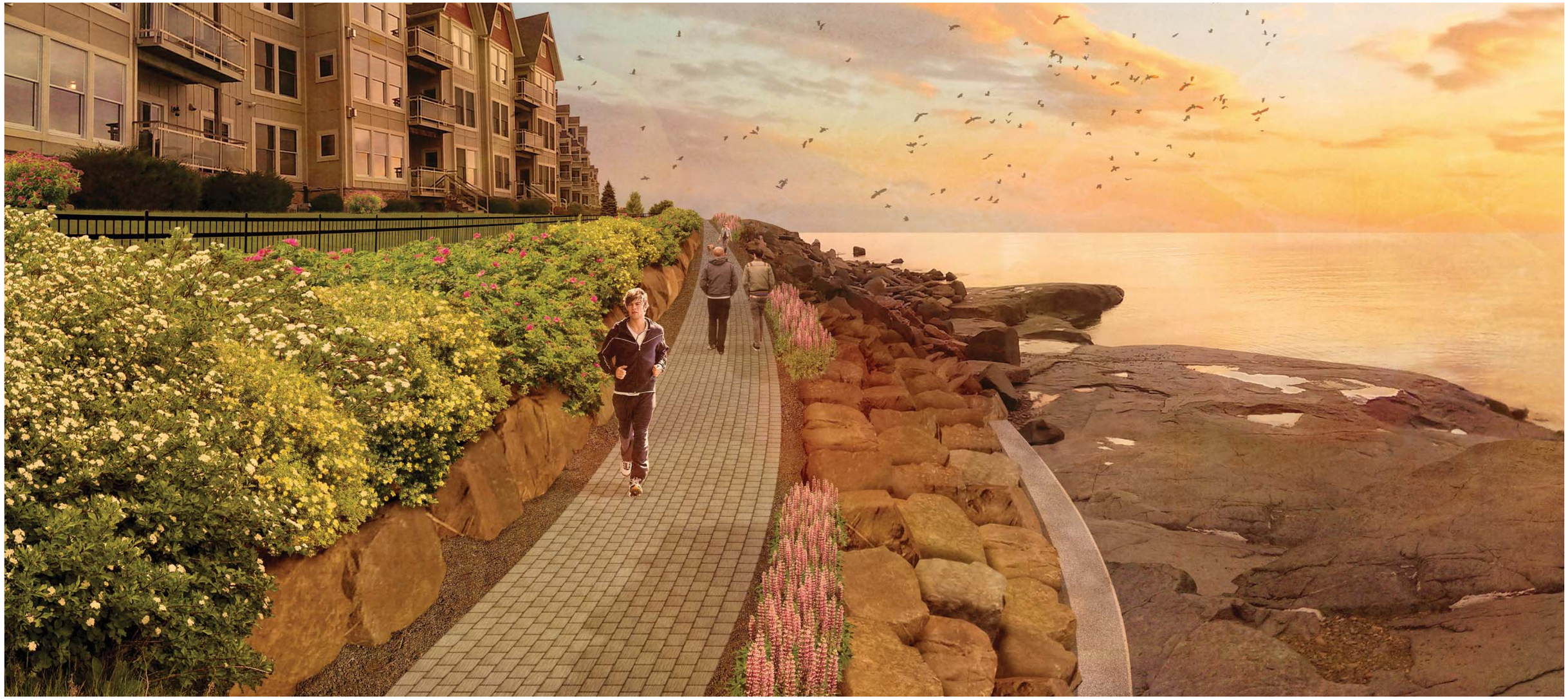
# Lakewalk Extension Feasibility Study
# Final Report

THE CITY OF DULUTH MINNESOTA

LHB PERFORMANCE DRIVEN DESIGN.



February 2016

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## Project Stakeholders

The City of Duluth
Property & Facilities Management

The City of Duluth
Parks & Recreation

LHB, Inc.
Duluth, Superior,
& Minneapolis

Lakewalk Extension
Advisory Group

## Project Background

The Duluth Lakewalk is one of the most beloved and heavily used multi-use trail systems in the City of Duluth, beginning in Canal Park and running nearly six miles along the shores of Lake Superior to 60th Ave East. The Lakewalk however, has a missing link. From 20th Ave East to 26th Ave East there is no designated alignment; instead trail users outlet onto Water Street and use the public sidewalk for approximately 1,300 feet before linking up with a designated trail again. It has been the City's long-term goal to connect the last remaining segment of the Lakewalk, however the trail's feasibility along the shoreline has been questioned by the public over the years. To the right is a timeline that summarizes events that have occurred over the past two decades resulting in this feasibility study.

## Timeline

**1992** – The completion of Interstate Highway 35 to 26th Ave East creates an opportunity for waterfront revitalization and potential for public access to the Lake Superior shoreline within the Endion neighborhood.

**1995** – The Endion Neighborhood Waterfront Plan & Development Strategy calls for preservation and enhancement of the waterfront including providing unobstructed views and public access to the lakeshore through an extension of the Lakewalk between 19th Ave East and 25th Ave East.

**2004** – Land transfers and City zoning changes occur which lose sight of the Endion Plan's vision for waterfront revitalization and public access.

**2005 & 2006** – City Easements are established with current Landowners in front of lakefront developments for future trail extension.

**2006 -2014** – The original vision of a multi-use trail along the lakeshore is questioned as properties get developed in such close proximity to the shoreline.

**2007** – SEH Inc. is hired to conduct a Construction Feasibility Report which shows three alternatives for a 10' wide multi-use trail from 20th Ave East to 25th Ave East.

**2009** - A crushed bluestone footpath in front of the Ledges is constructed on City property.

**2011** – A Citywide Trail & Bikeway Plan is developed by the Parks & Recreation Department which include the following statements:

- *The City has a vision to make Duluth the premier trail City in North America.*
- *The Lakewalk Trail is considered a regionally important trail, bringing economic and tourism opportunities to town.*
- *The Lakewalk Trail is a fundamental element of Duluth's quality of life. Many residents of Duluth live here to "be close to nature and the Lake".*

**2014** – In keeping with the longstanding City initiative to provide trail access along the Lake, a Lakewalk Task Force is formed to take a closer look at the issues, resolve past conflict and provide recommendations.

**2015** (February)– City Council approves Task Force's recommendations that an ADA accessible pedestrian-only trail segment should be constructed from 20th Ave East – 26th Ave East if proven to be technically and financially feasible. In developing such a trail, the privacy concerns of neighbors will also need to be addressed through appropriate landscaping.

**2015** (May) – Feasibility Study begins. The 2015 Task Force's Final Report & Recommendations are the foundation of this current Lakewalk Extension Feasibility Study.

## Project Purpose

The purpose of this study is to determine if, in fact, it is feasible to construct a pedestrian path along the lakefront, addressing legal ownership, engineering, environmental, landscaping and financial issues.

This document will serve as the final report summarizing the assessment and feasibility of constructing the Lakewalk Extension from 20th Ave East to 26th Ave East. The information will be used for decision-making regarding future City trail planning and will guide City staff on whether or not to move forward with the Lakewalk Extension project and if so, what steps to take next.

## Public Involvement

An Advisory Group made up of nine selected stakeholders was formed to provide valuable insight and guidance to the LHB team during the feasibility study. The Advisory Group participants met twice during the process (including once on-site) to review the project's goals, review findings of facts, and to discuss site constraints. The Advisory Group participants also attended the two public meetings held in September and December 2015.

# Goals, Objectives & Constraints

## Goals

According to the 2011 Trail and Bikeway Plan, Duluth has a vision to "Connect the System" by providing a series of cross city trail routes to link the City from west to east and enhance the quality of life for both residents and tourists of Duluth. The Cross City Trail to The Lakewalk is one of four trail systems that is designated to achieve this vision. Besides trail connectivity, additional project goals are listed below:

- Promote healthy active living
- Increase recreation opportunities
- Connect people to nature
- Provide transportation alternatives
- Build a sense of community
- Encourage economic development

Also carried forth are the 2015 Lakewalk Task Force Report principles and values:

- Provide public access to enhance the water's edge experience for all users of the Lakewalk
- Maximum accessibility for all people, including those with limited mobility and disabilities through universal design
- Minimal disruption to the natural terrain and utilization of the native vegetation and hardscape as much as possible
- Recognition of the unique geological formation known locally as "The Endion Ledges"
- Respect for the immediate neighbors
- All construction should be built professionally

## Constraints

### *Legal Boundaries: Does the City own all of the land?*

One of the primary concerns regarding extending the Lakewalk has revolved around land ownership, in particular, does the City have the legal right to construct a trail along the shoreline from 20th Ave East to 26th Ave East?

### *Existing Topography: Can a 5% slope work?*

In order to meet ADA accessibility requirements, the trail cannot exceed a 5% gradient slope in any direction. The attached Existing Conditions photo display (Exhibit 2) illustrates a rocky and steep shoreline condition which may pose grading challenges in certain areas. The photos however, also illustrate a relatively flat terrace/green space within the study area that may lend itself nicely to a pedestrian footpath.

### *Subgrade Conditions: What's going on below ground?*

The existing shoreline is mostly made up of rubble and debris, remnants from previous commercial and industrial land uses. The concrete debris and rebar is unsightly and unsafe, making the native bedrock and lakeshore inaccessible. If significant grading modifications are required for trail construction, working on the slope, debris clean-up and minimizing adjacent subgrade disturbances will need to be further addressed.

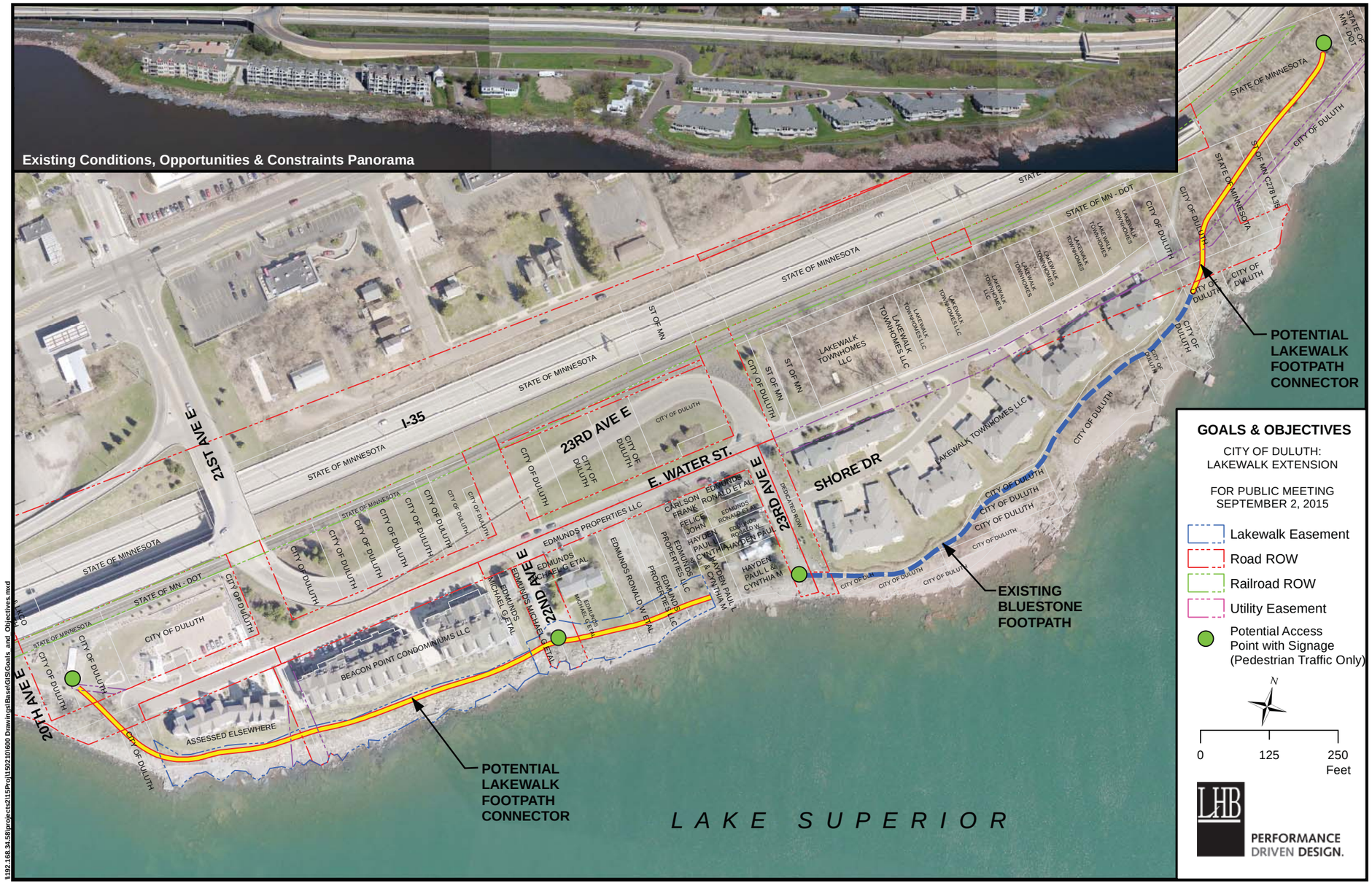
## Objectives

With the above project goals and constraints in mind, this study strives to address two primary issues (please refer to Exhibit 1: Goals & Objectives Map):

1. Can an economical, ADA accessible connection be made between the existing lakewalk grades and the lower shoreline grades, especially in front of the Point Condominiums while also providing adequate screening to adjacent neighbors?

2. What are the property ownership and easement issues underlying the proposed trail alignment in the six block area?

# GOALS + OBJECTIVES



# EXISTING CONDITIONS

SOUTH OF BEACON POINT CONDOMINIUMS

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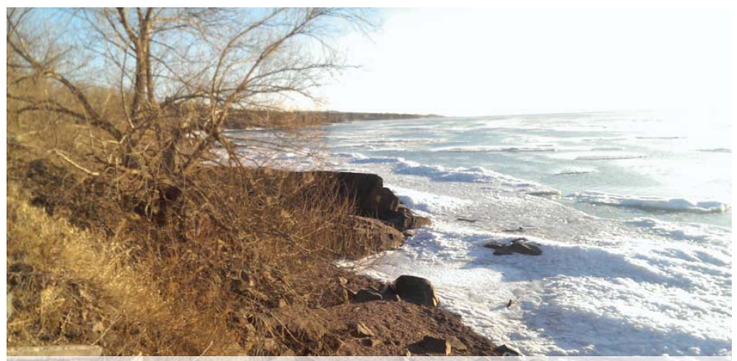
LAKESHORE CONDITION SOUTH OF BEACON POINT CONDOS



ENDION LEDGES: LOCAL LANDSCAPE FEATURE

EXISTING BLUESTONE PATH

THE LEDGES TOWNHOMES, EXISTING BLUESTONE PATH

STEEP SLOPE AND ROCKY SHORELINE

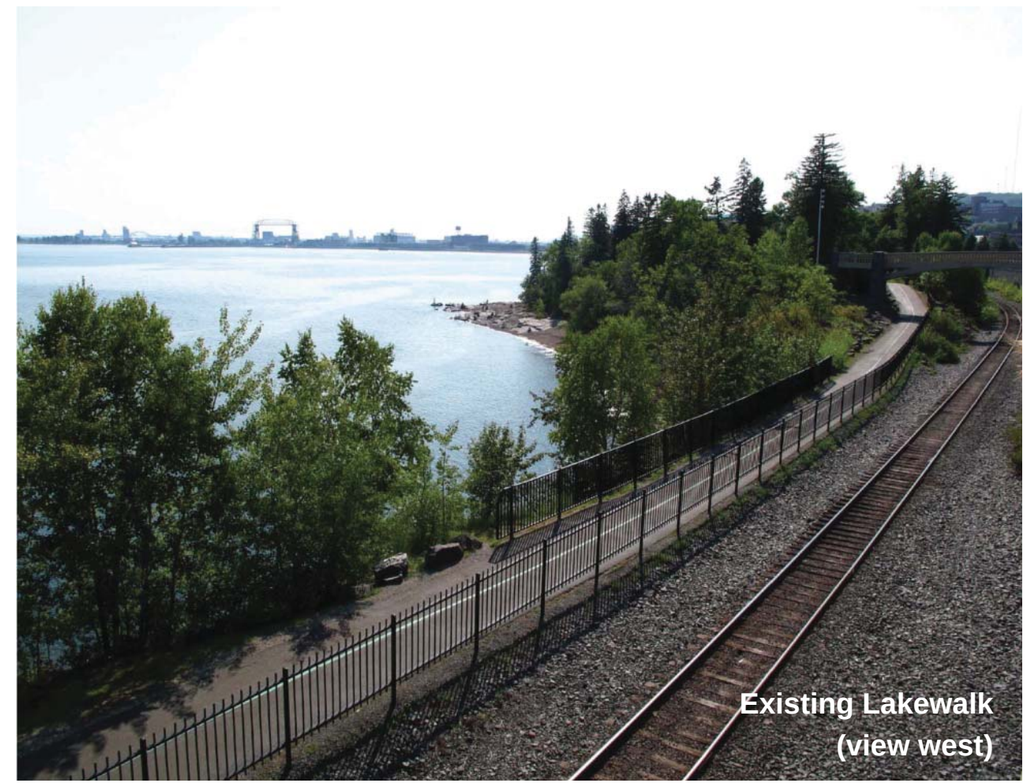
CONCRETE REMNANTS

CONCRETE REMNANTS

# Trail Design Considerations

Based on the Task Force's Report along with input from City Staff and Advisory Group participants, the trail shall be designed with the following considerations:

- The trail must meet ADA/Universal accessibility requirements, which include not exceeding a 5% maximum longitudinal slope and be at least 5' minimum width with a surface material adequate to accommodate wheeled traffic.
- In order to minimize impact and deter bike traffic, the trail shall not exceed 5' maximum width
- Trail shall be for daytime use only
- Trail shall be for pedestrian foot traffic only (bike traffic prohibited and shall remain on Water Street only)
- There shall be no public access allowed to Lake Superior (Trail-use only)
- The trail shall be screened from adjacent private residents for privacy and safety
- The trail surfacing material shall consist of a permeable paver or other natural rock material only (no blacktop)
- The trail shall use landscaping materials that fit into the natural landscape and that do not block lakeviews from adjacent neighbors



# PATH MATERIAL CONSIDERATIONS

INTENT: 5' WIDE LEISURELY PEDESTRIAN PATH ALONG LAKE SUPERIOR SHORELINE TO CONNECT LAKEWALK FROM 20TH AVE EAST TO 26TH AVE EAST.

## CRUSHED BLUE STONE AS PATH MATERIAL

+ EXISTING ON SITE AS PATH MATERIAL
+ SOFTER LOOK IN THE LANDSCAPE
+ SIMPLE YET EXPERIENTIAL

NATURAL LOOK AND FEEL + FORGIVING SURFACE + SOFTENS THE LANDSCAPE + BECOMES NATURAL ELEMENT

## PERMEABLE PAVERS AS PATH MATERIAL

+ STRUCTURED AND CHARACTERISTIC LOOK
+ EASIER FOR STROLLERS AND THOSE WITH DISABILITIES
+ ALLOWS FOR DIRECT STORMWATER INFILTRATION

UNIQUE GEOMETRIES AND LAYOUTS + HARD AND SOFT + PAVER & SAND CONTRAST + VARIETY OF COLOR OPTIONS

CITY OF DULUTH - LAKEWALK EXTENSION

PATH MATERIAL CONSIDERATIONS

DECEMBER 17, 2015

LHB PERFORMANCE DRIVEN DESIGN.

## Path Materials:

In 2009, a crushed bluestone path varying in width from 4' to 5' wide, was installed on City property between The Ledges and the lakeshore (approximately 23rd Ave East to 25th Ave East). This crushed bluestone path has proven to be a successful surface material as it has a soft, natural look and feel, is low maintenance, yet is considered an ADA accessible material.

There is desire by the Lakewalk Task Force members and Advisory Group participants to use a similar crushed rock surface material along the entire 2,934 linear foot alignment, especially if proven to be more cost effective. Alternately, a permeable paver material could be used, which provides for more durability, easier mobility for strollers and wheelchairs, allows for stormwater infiltration, yet would be an increase in cost and potentially more maintenance for the City. The desire from adjacent neighbors and the general public is that the pedestrian trail should not be paved with bituminous as a way to deter bike traffic and because a hard impervious surface would not meet the project's intent of keeping things as natural as possible.

It is the intent of the City to install the same surface material to provide consistency and continuity along the entire Lakewalk extension alignment.

Please refer to Exhibit 3 for examples of Path Materials.

# PLANT MATERIAL CONSIDERATIONS

INTENT: SCREEN 5' WIDE LEISURELY PEDESTRIAN PATH ALONG LAKE SUPERIOR SHORELINE FROM ADJACENT LAND USES

## VEGETATED HEDGE

CONIFEROUS PLANTING

GREEN YEAR-ROUND + TALL BARRIER + SCREENS VIEWS + BLOCKS WIND

## SHRUB AND STONE BORDER

MIXED BORDER OF BOULDERS + SHRUBS

DIVERSE TEXTURES + VARYING HEIGHTS + ESTABLISHES EDGE + PRESERVES VIEWS + SEMI-PERMEABLE

## FENCE OR WALL

FENCE + PLANTINGS

WOOD, STONE, OR METAL + ESTABLISHES EDGE + MAY PRESERVE VIEWS + PHYSICAL BARRIER

CITY OF DULUTH - LAKEWALK EXTENSION

PLANT MATERIAL CONSIDERATIONS

DECEMBER 17, 2015

LHB PERFORMANCE DRIVEN DESIGN.

## Landscape Materials:

One of the biggest concerns about extending the Lakewalk is how will the trail visually affect the neighbors that reside in The Point Condominiums and The Lighthouse? The neighbors, along with Task Force members and Advisory Group participants expressed a strong interest in using natural materials that would provide screening from path users, create a physical barrier for privacy and safety concerns, yet preserve their views to the lake. Similar landscaping elements are already in place along the existing crushed bluestone path, however conditions in front in The Point and The Lighthouse will vary slightly from The Ledges.

Selection of landscaping and plant materials that meet this criteria include utilizing evergreen hedges (for year round greenery and wind protection) a mix of shrub and stone boulders to make up grade differences between the private lawn area and path below, and installing an ornamental fence near the easement line to delineate private versus public space.

Please refer to Exhibit 4 for examples on Landscape Materials.

# LEGAL BOUNDARIES

## Study Findings

### Property & Easement Analysis:

A thorough property research and investigation was conducted to confirm legal parcel ownership and to clarify easement conditions. LHB worked with the City's Property Services office to collect and review available plat and property data and to determine the status of easements relevant to the study area.

The result of the property review showed that, with the exception of the Bill & Cynthia Hayden property located at the end of 23rd Ave East and one small State of Minnesota owned parcel near vacated 25th Ave East, the City either owns or has the legal right via easements to utilize the land for recreational/trail use from 20th Ave East to 26th Ave East along the lakeshore.

Please refer to the Current Legal Parcel Exhibit for a detailed overview of land ownership and Lakewalk easement boundaries.

# Study Findings

## Topographic Analysis:

LHB created a project base map of the study area based on City GIS data including an aerial background with contours and developed a horizontal and vertical trail geometry of the preferred alignment. An assessment of the existing topographic condition along with a proposed conceptual grading scheme was developed which confirms that an overall longitudinal slope of 5% for ADA accessibility can be obtained along the entire alignment route.

As illustrated in Exhibits 6- 7 (Conceptual Grading Plans & Cross Sections) the majority of the earthwork activities would need to occur in front of the Point Condominiums where the distance from the trail easement line to the water's edge is narrowest. In order to accommodate the proposed trail at this pinch point, the design utilizes an existing concrete retaining wall to be used as an anchor for a large rock slope. Beyond the existing retaining wall limits, either a small concrete or boulder wall would need to be constructed and anchored to the existing bedrock surface to reinforce the slope against potential wave, wind or ice damage. The concrete/boulder wall would continue along the shoreline for approximately 150' until the trail alignment meets up with existing grade. The size and height of the concrete/boulder wall is conceptually illustrated at an approximate height in the following exhibits; any structures and slope modifications will need to be designed to withstand the harsh elements therefore the exact sizes of boulders, concrete wall and anchoring methods will need to be determined after a wave analysis has occured and verified with a coastal engineering team.

On the upland side of the trail, the conceptual design illustrates large 2'-3' diameter boulders benched into the hillslope, allowing the trail to be at a lower elevation and creating a natural retaining wall with a defined edge. Installation of this boulder wall will also minimize earthwork modifications and keep the grading limits entirely within the lakewalk easement boundary. Using the readily available contour information, the trail's low spot is set at approximately 610.5 elevation while the assumed finished floor elevation of the building is 618.0, resulting in a difference of 7.5' vertical height. From the low spot, the trail will then gradually climb up the slope at approximately 3% until it meets existing grade at elevation 614.0 in front of 21st Ave East. From this point traveling eastward, the trail alignment will require minimal grading modifications and can be constructed within the lower terrace lawn area until it meets up with the existing crushed bluestone path.

From 23rd Ave East to 25th Ave East, the alignment is already in place and would only need minor grading adjustments to maintain a 5% slope. In order for the final segment to meet a 5% slope, the proposed alignment will veer off into a wooded area for a more gradual climb before connecting back up with the 10' wide existing bituminous trail. Please refer to Exhibits 9-10 (Plan & Profiles) for further slope and alignment information.

## Environmental Analysis:

LHB confirmed that the subgrade and slope along the shoreline consists of old concrete that will need to be removed to make room for the new trail. Although there has been some concern that contaminated soils may be present in the area and that significant clean-up of the soil/debris may disturb adjacent subgrade on private property, preliminary discussions with environmental engineers have supported that any potential clean-up work would not be detrimental to the project. We recommend however, conducting a Phase I Environmental Study to verify subgrade conditions and find out what, if anything, will be required for environmental clean-up.

Because site access is tricky, rubble removal methods may include trimming concrete at the construction limits line to keep the existing subgrade intact as well as crushing the debris right on-site. With this method, the crushed material could then be immediately re-used for the trail base rather than hauled off site. As a local government unit, the City may be able to go after state or federal grants that are geared towards clean-up efforts of waste construction materials which would be a great benefit to the project.

## Landscape & Viewshed Analysis:

For this study, a typical trail cross section and viewshed analysis were created to illustrate what a 5' wide path spatially feels like, and to address concerns about the trail's proximity to adjacent neighbors. Exhibit 8 shows a slice through the earth from Water Street to the water's edge intersecting the three-story Point Condominium building and provides approximate distances from building to trail easement boundary, along with conceptual view corridors from inside the residential units. Based on a recommendation to have the path be set as low as possible in relation to the adjacent 1st floor window, this scheme shows the trail benched into the slope and slightly lower than the building's finished floor elevation. The trail is also setback 5' from the trail easement line to accommodate a boulder/shrub planted buffer zone for screening. With approximately 30'-35' distance between private and public space, this scheme illustrates that a pedestrian on the path could be successfully out of view from a 1st floor resident.

As part of the deliverables for the project, LHB worked with adjacent neighbors to develop conceptual trail landscape plans from 20th Ave East to 23rd Ave East. As illustrated in Exhibits 12-14, the proposed planting scheme includes native deciduous and coniferous trees strategically planted in areas that do not block residential views yet enhance the trail user's overall experience. A low ornamental fence, landscape boulders and shrubs ranging in height from 2'-4' to 10'-15' are also placed along the trail's upland edge to provide a hedge and physical barrier between private lawn and public space. Species included in the planting plans are native to the North Shore, and were selected because of their hardiness and low maintenance characteristics. A series of perspective renderings are included in the following pages that demonstrate the design's intent with possible landscaping features.

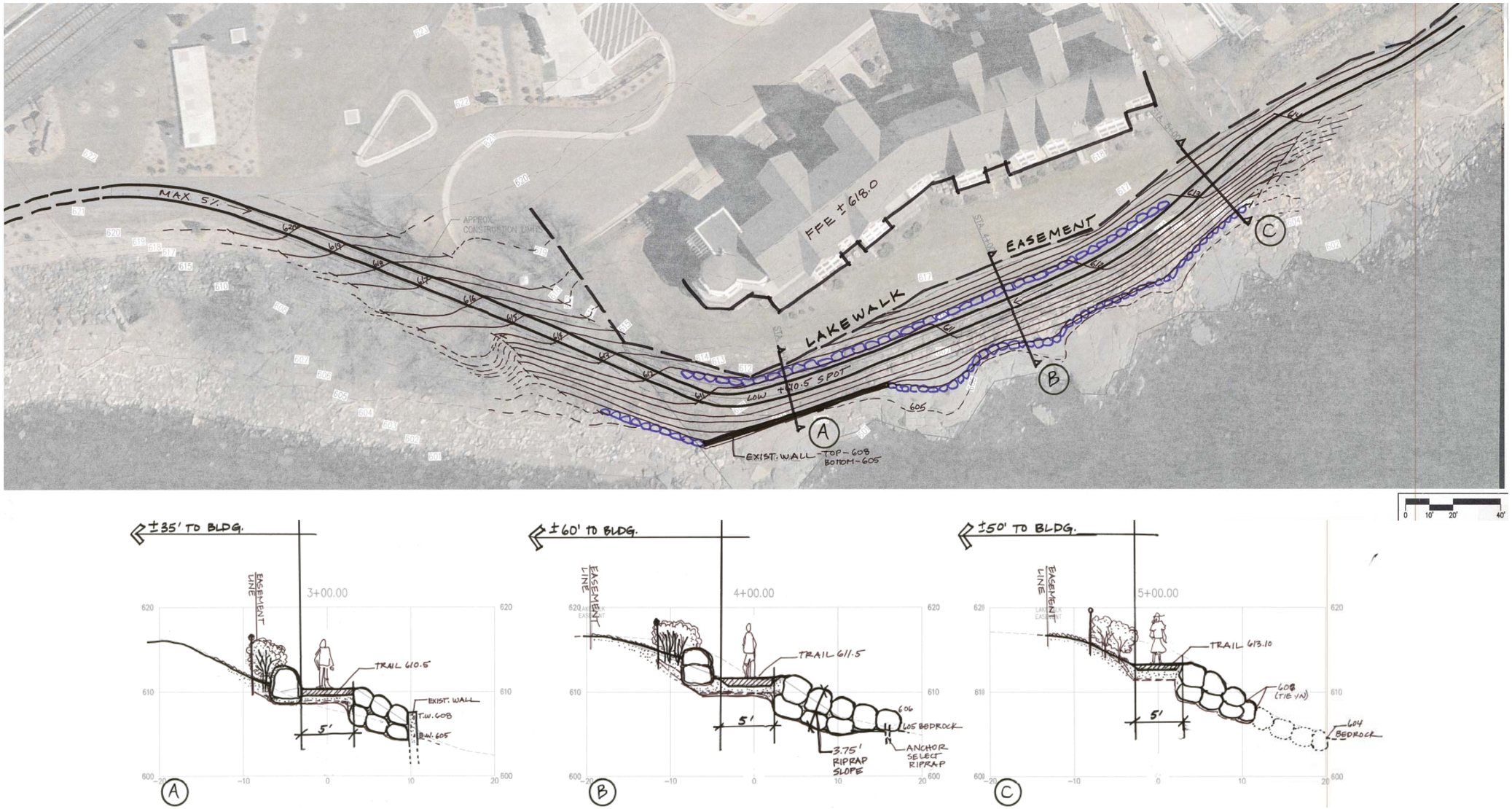
## Preferred Alignment Feasibility:

Based on the above analyses and findings, the preferred alignment called out in The Task Report appears to be feasible from a legal, engineering, and environmental standpoint.

Alignment recommendations includes constructing the trail a minimum distance of 5' setback from the easement boundary to allow for grading and construction access while minimizing the disturbances to the existing shoreline slope and preventing work within the ordinary high water level.

The proposed alignment and grading schemes illustrated in the following exhibits are either hand drawn or CAD generated images overlaid onto an aerial image with 1' contour information. These maps are approximate and should be used for feasibility analysis only.

# CONCEPTUAL GRADING



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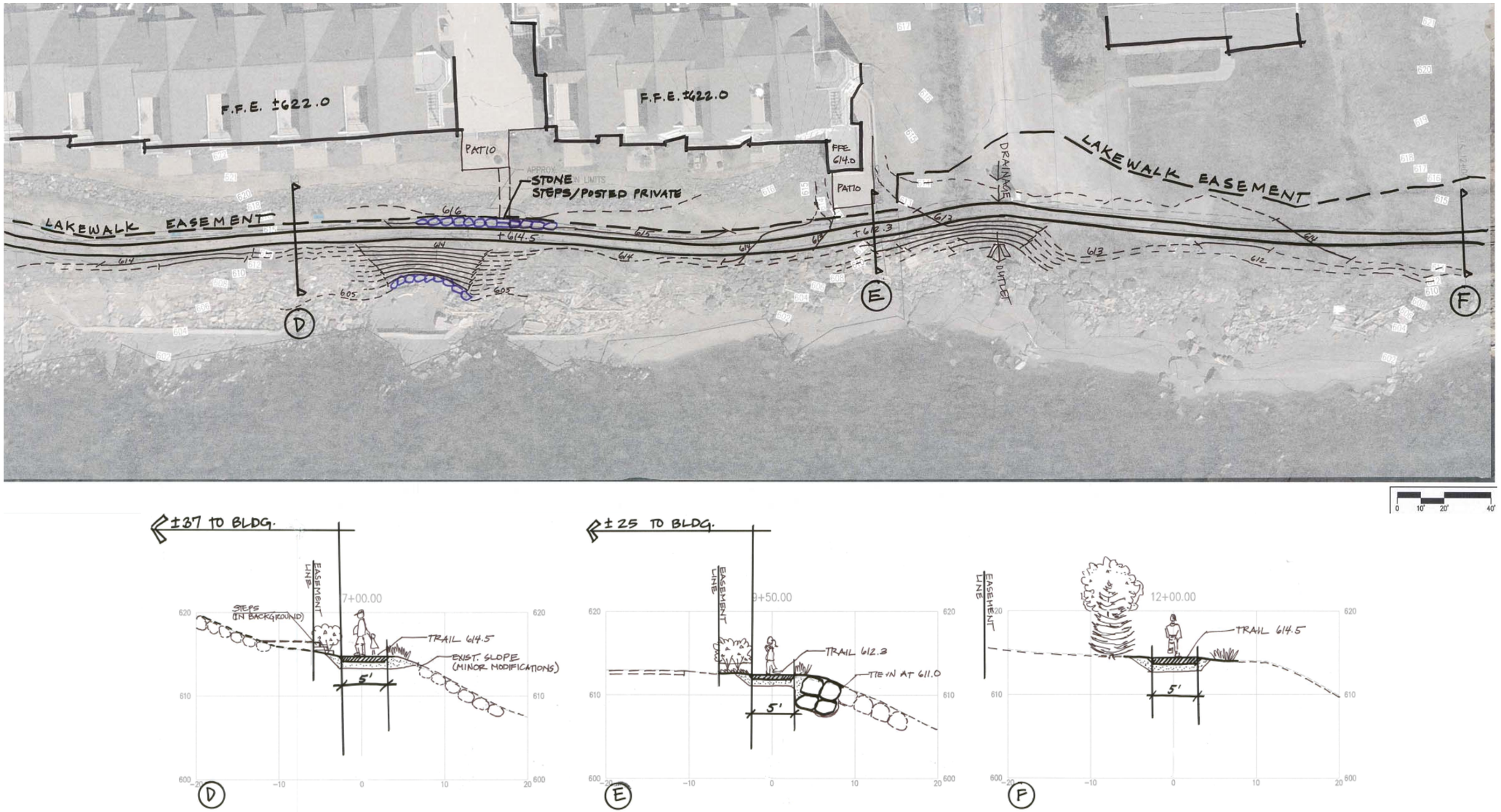
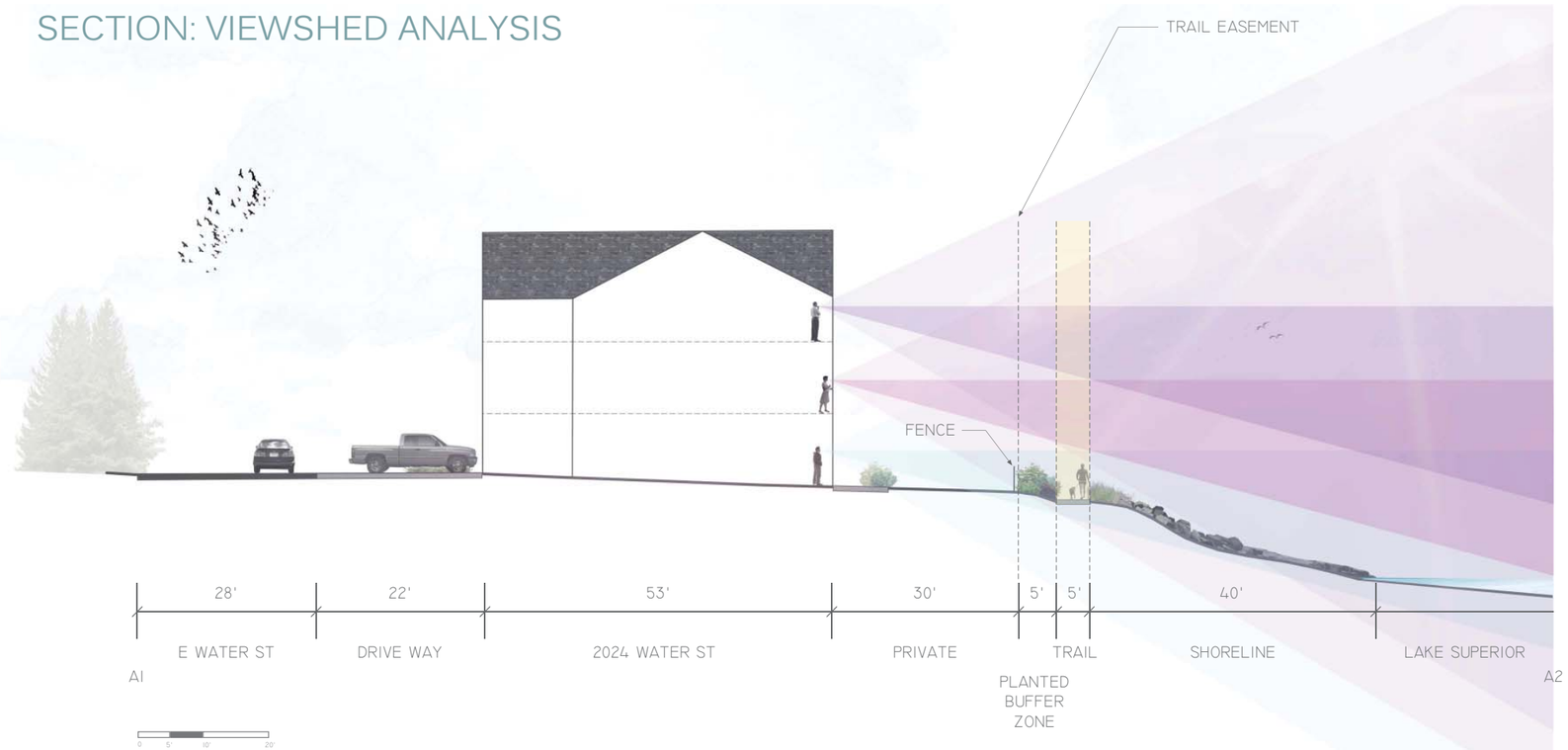


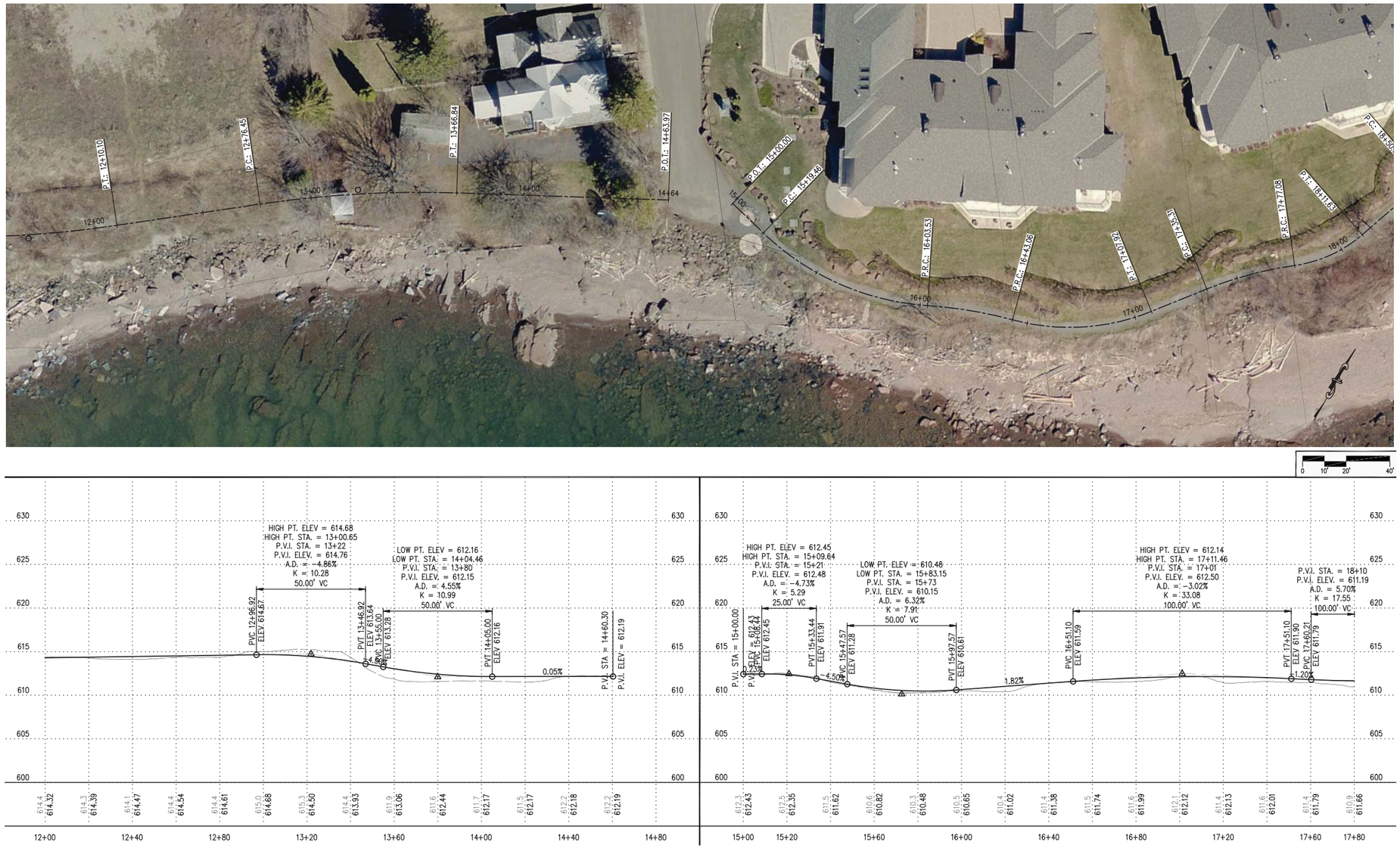
# SECTIONS

## TRAIL SECTIONS: SPATIAL ANALYSIS

## SECTION: VIEWSHED ANALYSIS



# PLAN AND PROFILE



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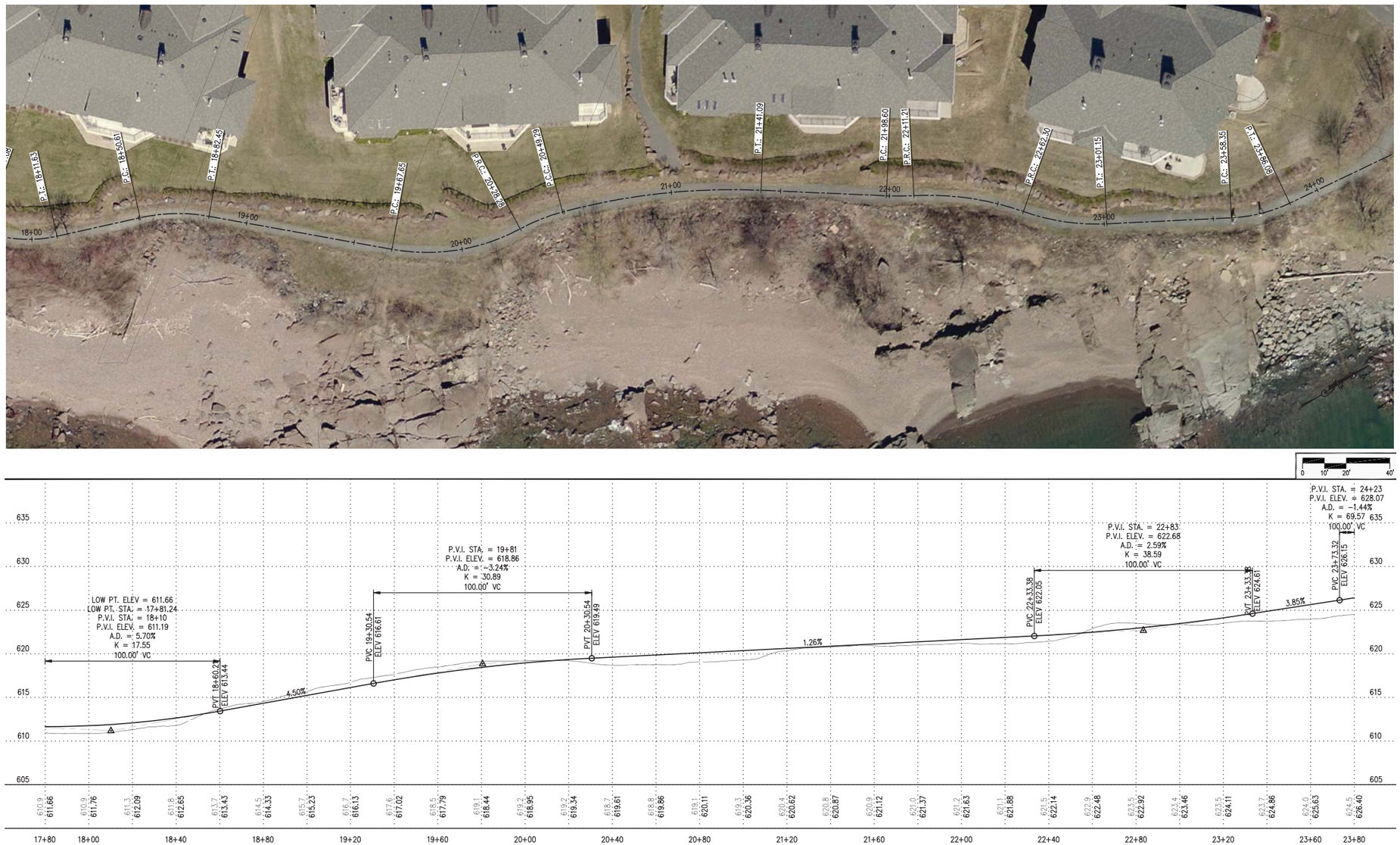

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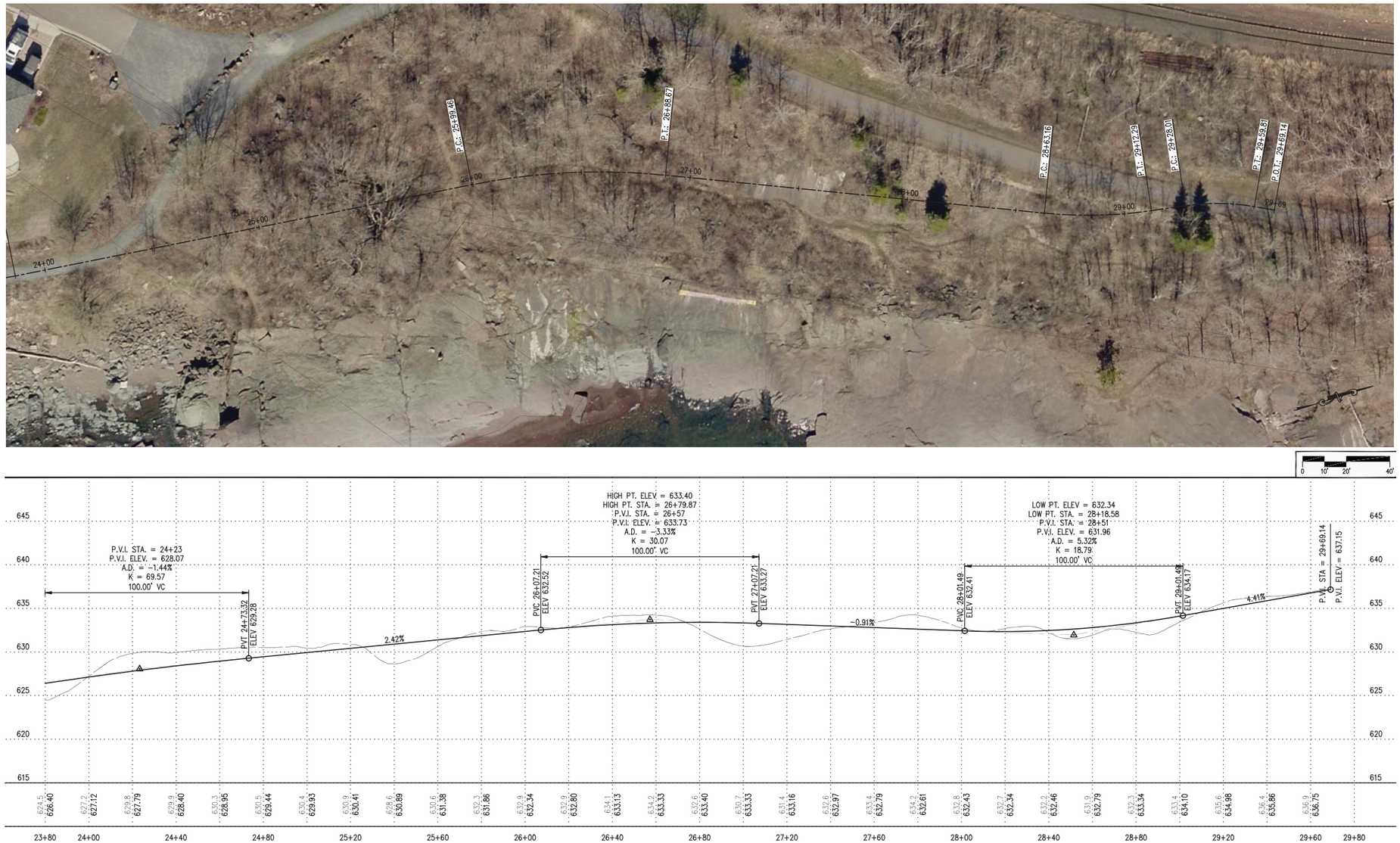

# CONCEPT PLANTING PLAN

## Trees – All trees to be underplanted with shade-loving perennials

| | |
|---|---|
| Balsam Fir | abies balsamea |
| Serviceberry | amelanchier canadensis |
| White Spruce | picea glauca |
| Mugho Pine | pinus mugo |
| Quaking Aspen | Populus tremuloides |
| Pin Cherry | prunus pennsylvanica |
| Mountain Ash | sorbus americana |

## Shrub Areas*

A - 2-4' high

| | |
|---|---|
| Bush Honeysuckle | diervilla lonicera |
| Cinquefoil | potentilla fruticosa |
| Nearly Wild Rose | rosa 'nearly wild' |

B - 3-6' high

| | |
|---|---|
| Alpine Currant | ribes alpinum |
| Gooseberry | ribes uva-crispa |
| Snowberry | symphoricarpos albus |

C - 5-8' high

| | |
|---|---|
| Red Osier Dogwood | cornus stolonifera 'farrow' |
| Ninebark | physocarpus opulifolius |

D - 10-15' high

| | |
|---|---|
| Nannyberry | viburnum lentago |
| Choke Cherry | prunus virginiana |

## Perennial Area*

Sunny Mix

| | |
|---|---|
| Wild Lupine | lupinus spp. |
| Ornamental Grasses | |

Shady Mix

to be planted under trees
(not shown on plan)

*area color represents dominant bloom, berry, or ornamental bark color

## Boulder Area

Reclaimed Boulders from On-Site
To be placed 2-3' above grade along the path, interspersed with shrubs

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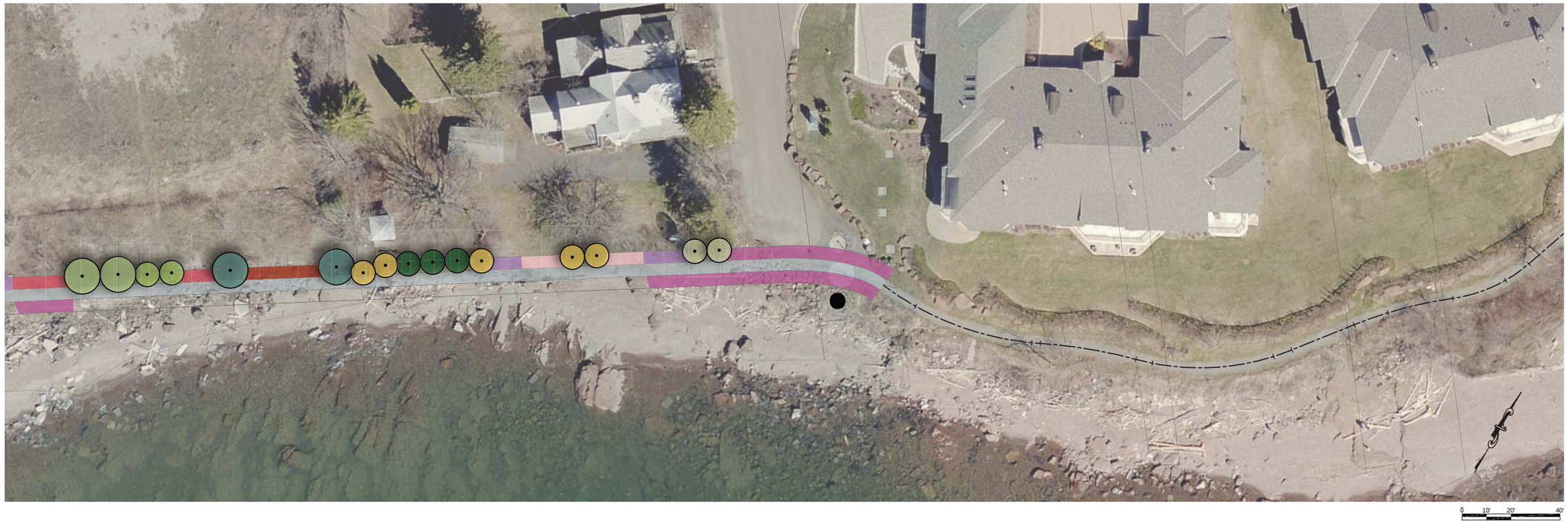


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To be placed 2-3' above grade along the path, interspersed with shrubs

## Construction

Accessing and conducting construction activities along the shoreline is a major consideration and will add considerable costs to the project.

Because the Lakewalk easement is adjacent to private property, a temporary access road will need to be constructed along the southwest shoreline to provide a way into and out of the site for equipment access, removals and materials transport. With such limited space to work, the project will have to be strategically staged and materials brought into the construction area in small quantities. Equipment and tools will likely be limited to small mobile machinery that can manuver easily on a slope and much of the work may need to be done by hand. Once the grading modifications and trail sub-base are in place, placement of surface materials would occur in a linear fashion.

The existing bedrock at the water's edge may lend itself nicely as a relatively flat surface to be used for temporary staging however materials and equipment would have to be removed daily due to unforeseen lake and weather conditions.

An alternative option for materials transport would be to access the site from the water, however evaluation of the water's depth would have to be confirmed to ensure a barge and/or crane could get close enough to the shoreline.

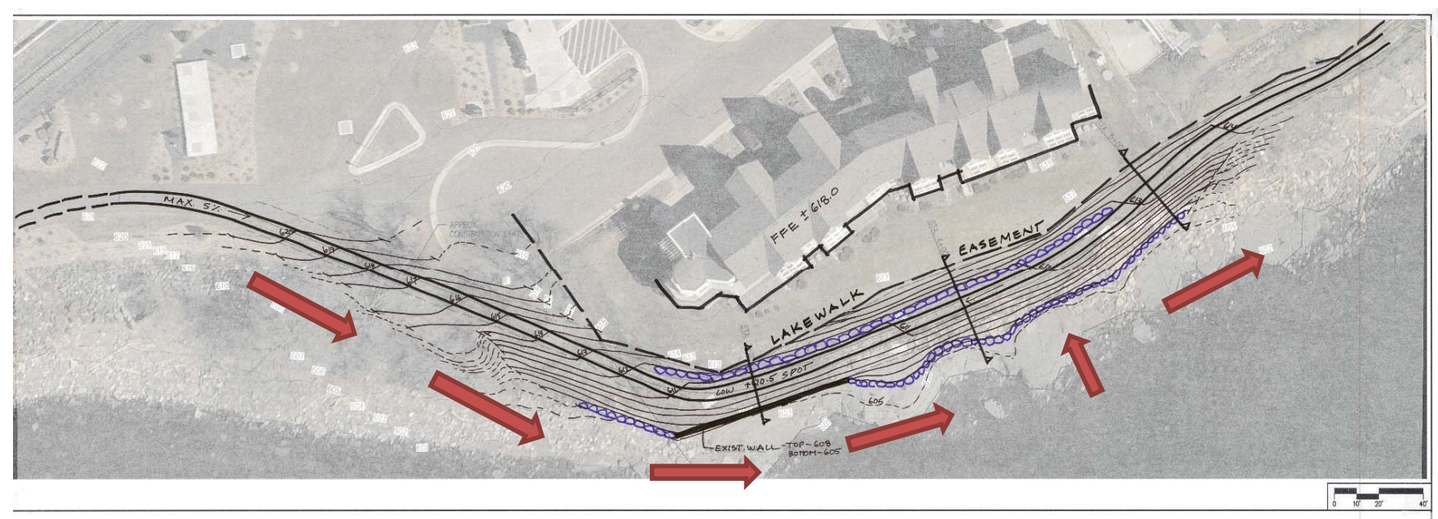
Because of these constructability challenges, costs for materials and labor will be significantly increased.

# *Constructability Challenges*

- *Temporary Access Road*

- *Limited Staging Area*

- *Linear Approach*



# LAKE WALK

# LAKE WALK

# LAKE WALK

# Professional Opinion of Costs

The estimated costs provided in the adjacent table are based on conceptual designs prepared for this feasibilty study and could vary extensively depending on results from additional analysis including but not limited to geotechnical investigation, shoreline stability and coastal wave analysis, as well as design details that will be developed as part of the final design. This opinion of probable costs has been prepared on the basis of LHB's experience, qualifications, knowledge of the site and understanding of the project, and takes into account the constructability and site access challenges previously discussed.

The estimated construction costs include material and labor for the entire 2,934 linear foot path alignment. In addition to the materials and labor costs, we have accounted for other associated project costs including a 20% contingency to cover unforeseen circumstances that would affect the overall design &/or construction costs.

Before proceeding into the design phase, we recommend further on-site analysis work to occur, including but not limited to a Phase I Environmental Assessment, geotechnical investigations, and a professional wave analysis.

**LAKEWALK EXTENSION**

| DESCRIPTION | UNIT | ESTIMATED TOTAL QUANTITY | UNIT PRICE | TOTAL PRICE |
|---|---|---|---|---|
| MOBILIZATION | LUMP SUM | 1 | $100,000.00 | $100,000.00 |
| TEMPORARY ACCESS ROAD | LUMP SUM | 1 | $20,000.00 | $20,000.00 |
| CLEARING & GRUBBING | LUMP SUM | 1 | $20,000.00 | $20,000.00 |
| SILT FENCE, TYPE MACHINE SLICED | LIN FT | 2934 | $6.00 | $17,604.00 |
| STORM DRAIN INLET PROTECTION | EACH | 2 | $150.00 | $300.00 |
| SEDIMENT CONTROL LOG TYPE STRAW | LIN FT | 300 | $3.00 | $900.00 |
| STABILIZED CONSTRUCTION EXIT | LUMP SUM | 2 | $1,800.00 | $3,600.00 |
| EROSION CONTROL BLANKETS CATEGORY 3 | SQ YD | 850 | $5.00 | $4,250.00 |
| COMMON EXCAVATION | CU YD | 1650 | $50.00 | $82,500.00 |
| GRANULAR BORROW (CV) | CU YD | 200 | $60.00 | $12,000.00 |
| AGGREGATE BASE CLASS 5 | TON | 720 | $60.00 | $43,200.00 |
| 15" APRON | EACH | 3 | $300.00 | $900.00 |
| 15" PIPE CULVERT | LIN FT | 60 | $50.00 | $3,000.00 |
| GEOTEXTILE/LANDSCAPE FABRIC | SQ YD | 3930 | $5.00 | $19,650.00 |
| RANDOM RIP RAP CLASS V | CU YD | 270 | $300.00 | $81,000.00 |
| LANDSCAPE BOULDER (2'-3' DIA) | EACH | 100 | $250.00 | $25,000.00 |
| CONCRETE ANCHOR / BOULDER WALL | LIN FT | 150 | $666.67 | $100,000.00 |
| STONE STEPPERS | EACH | 3 | $150.00 | $450.00 |
| GEOTEXTILE FABRIC TYPE IV | SQ YD | 800 | $5.00 | $4,000.00 |
| 4" PERVIOUS PAVERS & EDGE TREATMENT | SQ FT | 14670 | $20.00 | $293,400.00 |
| SETTING BED | SQ YD | 1611 | $15.00 | $24,166.67 |
| ORNAMENTAL FENCE | LIN FT | 300 | $100.00 | $30,000.00 |
| SITE FURNISHINGS (SIGNS) | LUMP SUM | 1 | $5,000.00 | $5,000.00 |
| TOPSOIL BORROW (4" THICK) | CU YD | 254 | $30.00 | $7,620.00 |
| TURF REESTABLISHMENT | SQ YD | 23025 | $5.00 | $115,125.00 |
| TREES - 1.5" CALIPER DECIDUOUS | EACH | 28 | $400.00 | $11,200.00 |
| TREES - 6' EVERGREEN | EACH | 19 | $500.00 | $9,500.00 |
| SHRUBS - #2 CONT. | SQ FT | 8730 | $5.00 | $43,650.00 |
| PERENNIALS - PLUGS | SQ FT | 3500 | $8.00 | $28,000.00 |
| TRAIL LANDSCAPING (23rd Ave E to 25th Ave E) | LUMP SUM | 1 | $1.00 | $10,000.00 |
| | | | **SUBTOTAL** | **$1,116,015.67** |

| ASSOCIATED COSTS | |
|---|---|
| CONTINGENCY 20% | $223,203.13 |
| ENVIRONMENTAL SOIL MITIGATION | $10,000.00 |
| SPECIALTY/TECHNICAL DESIGN SERVICES (WAVE ANALYSIS) | $20,000.00 |
| PROFESSIONAL A/E DESIGN SERVICES 10% | $111,601.57 |
| CONSTRUCTION ADMIN. / SITE OBSERVATION 6% | $66,960.94 |
| **SUBTOTAL** | **$431,765.64** |

**GRAND TOTAL $1,547,781.31**

| OPTION B - CRUSHED LIMESTONE PATH | | | | |
|---|---|---|---|---|
| 4" CRUSHED LIMESTONE SURFACING | SQ FT | 14670 | $8.00 | $117,360.00 |
| | | REDUCES PROJECT COST BY | | $176,040.00 |
| | | **OPTION B TOTAL PROJECT COST** | | **$1,371,741.31** |

1. Survey unit price includes data for parcel boundaries, verification of LiDAR contours, & other topographic features.
2. A construction survey to layout the work will be conducted by the Contractor.
3. Contingencies are included as provisions to cover unforeseen circumstances that would affect the overall design &/or construction costs.
4. Construction Administration/Site Observation assumes a 4 month construction period with full-time observation.

## Summary

### LEGAL
With the exception of one private parcel and one state owned parcel, the City has appropriate legal ownership to put in a continuous path along the lakeshore from 20th Ave East to 26th Ave East.

### TECHNICAL
Preliminary engineering plans show that a 5' wide, 5% sloped path is feasible, however geotechnical investigations, slope stabilization and constructability issues need to be further examined.

### FINANCIAL
A professional opinion of cost estimates the total project cost to be $1,547,781.31. Please note that this estimate does not include land aquisition costs for the two parcels in the study area that are currently not owned by the City of Duluth.

## Next Steps

After review of the final report, the City will decide whether or not to move forward with the project. Next steps, may include but are not limited to:

- Land Aquisitions
- Phase 1 Environmental Assessment
- Further Geotechnical Studies
- Further Wave/Coastal Studies
- Apply for Funding Sources
- Design Development of Trail

*Trail users are relatively affluent, mobile, and interested in spending quality time with families, trails provide a perfect "getaway" adventure. Having access to trails has changed how families recreate, with people taking shorter but more frequent "vacations" closer to home and with a more family-oriented focus.*

*Source: Economic and Social Benefit of Trails in Minnesota, August 2008.*