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Gibsons Foreshore and Seawalk Improvements

Conceptual Design Report (Revised Final)
September 2017
KWL Project No. 2132.024-300

Prepared for:

TOWN OF GIBSONS

Prepared by:

KERR WOOD LEIDAL consulting engineers

LANARC CONSULTANTS LTD

PELAGIC TECHNOLOGIES INC.

MOONSTONE ENTERPRISES

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1. Introduction

In 2016, the Town of Gibsons (Gibsons) retained Kerr Wood Leidal Associates Ltd.(KWL) with assistance from Lanarc Consultants (Public Process), Pelagic Technologies (Marine Construction) and Moonstone Enterprises (Eelgrass Biology) to develop a conceptual design for the redevelopment of a portion of the Gibsons foreshore.

This report documents the development of a conceptual design for the future improvements of the Gibsons foreshore from Gibsons Wharf to Armours Beach (refer to Figure 1-1). The report outlines design criteria and constraints and summarizes the public process that was used to get input to the concept design from the Gibsons community.

1.1 History and Background

The Town of Gibsons is the gateway to British Columbia's Sunshine Coast, located 25 kilometres west of Vancouver and 23 kilometres southeast of Sechelt. Gibsons' foreshore provides critical environmental, economic and recreational amenities to the community. Recreational amenities include a public walkway, the Gibsons Marina, public parks and beaches, and panoramic views for waterfront properties. The foreshore is an essential part of the marine ecosystem, providing habitat for eelgrass and fish and supporting local fisheries. A sanitary sewer trunk main is located along the foreshore beneath the foreshore walkway, transporting wastewater to the Gibsons Wastewater Treatment Plant.

In 2014, the Town completed an assessment of the value and condition of infrastructure in the foreshore area. The *Foreshore Condition Assessment* (KWL 2014) identified several areas along the foreshore in need of repair. A key recommendation identified in this assessment was the need to update the rock riprap that protects the foreshore and sewer from erosion. Erosion protection for the sanitary sewer infrastructure and the walkway is particularly important in light of a predicted sea level rise (SLR) increase of about 1.0 m by 2100.

1.2 Project Goals

The Gibsons Foreshore and Seawalk Improvements project involves creating a conceptual design for the foreshore area between Gibsons Wharf and Armours Beach. The objectives of the project are to:

- Propose a concept that will protect or enhance the environmental quality of the foreshore area;
- Ensure the reliable long-term provision/protection of the sanitary sewer; and
- Accommodate recreational use along the walkway.

The conceptual design presented in this report has taken into account the findings from the Foreshore Condition Assessment and principles laid out under the Town of Gibsons *Eco-Asset Strategy*, which was added to the *Official Community Plan* (OCP) in 2015. The Eco-Asset Strategy highlights the importance of incorporating key features of the natural environment to improve the sustainability of municipal services. The public process used has also provided further input into key amenities and important functions of a future design.

Phased Development

Since the ultimate design of the foreshore for the year 2100 is predicted to require raising the existing pathway grade by about 2 to 3 m to accommodate future sea level rise, then a phased approach is proposed so that a "base upgrade" could be made in the near future which could then accommodate future raising for sea level rise at a later date with minimal reconstruction.

1.3 Study Team

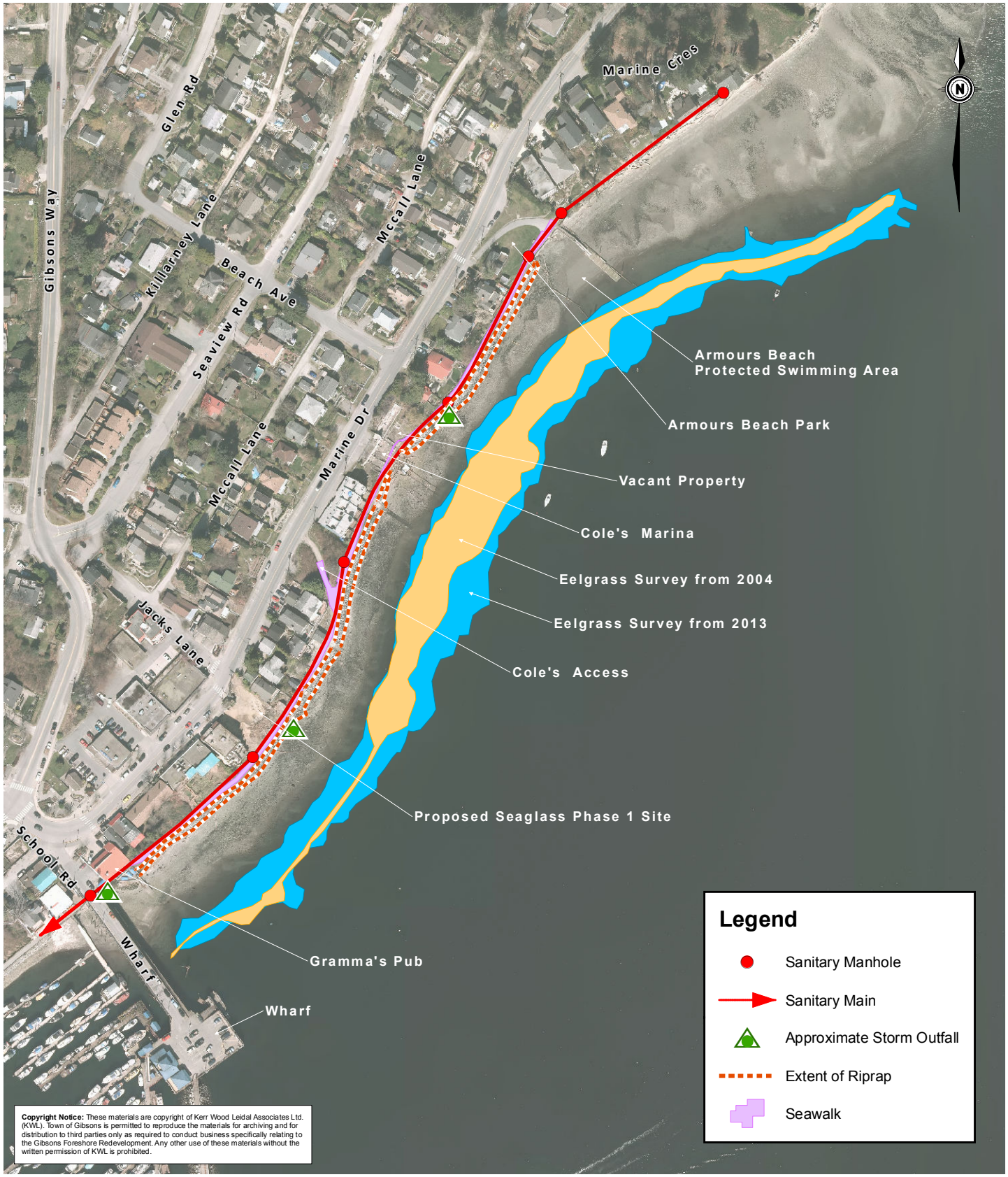
The Gibsons Foreshore project was led by Kerr Wood Leidal Associates Ltd. (KWL), with support from a group of experienced and specialized subconsultants.

Members of the KWL Project Team included:

- Dave Murray, P.Eng., Principal, Water Resources Engineer;
- Catherine Simpson, RPP, MCIP, Senior Planner;
- Robin Hawker, M.Sc.Pl, Planning Analyst; and
- Eric Morris, M.Sc., P.Eng., Coastal Engineer.

Subconsultant subject matter experts included:

- David Reid, Landscape Architect, Public Consultation and Landscape Design, Lanarc;
- Kate Evans, Landscape Architect, Lanarc;
- Glen Haffey**,** Marine Structures, Pelagic Technologies Inc.; and
- Dianne Sanford**,** Eelgrass Specialist, Moonstone Enterprises.



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Project No.	Date
2132-024	January 2017

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Study Area

Figure 1-1

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Author: TSoh

2. Design Constraints

The successful redevelopment of the Gibsons foreshore area will require balancing of the following key design constraints:

- Existing land use;
- Environmental values and regulations;
- Coastal engineering/flood protection and public safety;
- Recreational uses; and
- Future development/strategic planning.

2.1 Existing Land Use

The foreshore area between Armours Beach and Gibsons Wharf provide a range of important environmental, economic, infrastructure, and recreational amenities to the community. The foreshore includes:

- An existing walkway along the length of the foreshore;
- A sanitary sewer trunk main along the foreshore beneath the walkway and service road;
- Private residential land;
- A currently inactive private boat repair business with water leases; and
- The public Armours Beach and Armours Park facilities.

Private residences back onto the walkway, with an abundance of recreational and commercial boat activity in the harbour area offshore.

Existing land uses along the foreshore area between Armours Beach and Gibsons Wharf include multi-unit residential along the mid and northeast portion of the site, and commercial/institutional uses along the southwest portion of the site. Single family residential is adjacent to both sides of Marine Drive along the full extent of the foreshore, including single-detached and duplex dwellings.

Official Community Plan

The entire site is designated as marine shore under the **Environmental Sensitive Development Permit Area** and includes a fringing and continuous patch of Eelgrass in the nearshore area that extends the full length of the site. Environmental protection along the foreshore area is outlined as an important objective under the OCP, which sets a “Smart Plan Goal” to “preserve and protect the environmental integrity and natural beauty of the foreshore and harbour and the pristine quality of our waters.”

In 2015, the Town updated its OCP to include an **Eco-Asset Strategy** that sets the Town's approach for the efficient and sustainable operation of municipal services by working within the dynamics of the natural environment. The Eco-Asset Strategy sets four objectives for managing community assets:

- ***Managing risk*** by ensuring that Gibsons has a clear understanding of what services they receive from natural assets, such as flood prevention, provision of drinking water and rainwater management, and what it would cost to replace the natural asset with an engineered alternative if the assets were degraded or destroyed;
- ***Saving costs*** by managing natural assets in a way that they will provide services at lower cost and in perpetuity;
- ***Maintaining healthy ecosystems*** through sound asset management strategies; and
- ***Managing the asset*** to provide services for future development without degrading the condition.

2.2 Existing Land Use Constraints

Several factors place constraints on a conceptual design as follows:

Physical

- Beach slope and size of material (sand, gravel, cobble) are critical design constraints.
- Survey respondents indicated that large trees and overhanging ivy are at risk of falling at some points along the seawalk.

Sanitary Sewer

- Current alignment of sanitary sewer and road access is a constraint if it remains on this alignment.
- Sewer will require eventual replacement or relocating.
- In addition to risk of leakage to the ocean from the sanitary sewer, survey respondents raised concerns about effluent released from boat traffic in the waters off the foreshore area.
- The sewer provides justification for Gibsons to have access along the foreshore.

Access (Maintenance and Seawalk)

- Riprap protecting the walkway and sewer pipe below is currently intact, but is degrading quickly and needs slope flattening and upgrading to ensure future access and continued protection of the sewer.
- A small section in front of Cole's Marine needs to be upgraded if service road access is to be continuous.
- The majority of survey respondents indicated that they would like the foreshore to be kept as natural as possible by limiting paving and using vegetation and landscaping to soften the seawalk.
- Current land tenure is for sewer maintenance access and not for other uses such as public walkways. Figure 2-1 shows complexity of current land ownership and tenure.

Armours Beach

- The lock-block retaining wall requires replacement.
- Beach area access should be integrated into the new foreshore improvement concept.
- Limited accessibility for wheelchairs, strollers, and multi-modal transportation is currently available due to uneven paving and steep topography.
- Gibsons plans to upgrade the park in the future.

2.3 Environmental Values and Regulatory Constraints

Biological Assessment

- The upper intertidal area is largely devoid of observable aquatic life; however, the lower tidal area has rockweed and sea lettuce, mussels, barnacles, sea stars and trace oyster.
- The backshore area along the public walkway is largely devoid of any natural riparian vegetation.
- A fringing/continuous patch of eelgrass appears to be expanding toward the nearshore area.
- The long-term net benefit of a habitat bench/beach along the foreshore could be included.
- Gibsons Creek, located along the northern edge of the study area is a fish-bearing stream with historical records of Coho, Pink, Chum and Cutthroat salmon. While the Marine Drive culvert partially obstructs fish access to the creek, residents have observed Pink and Cutthroat salmon in recent years.

Eelgrass

- Eelgrass is naturally occurring along the northwest Gibsons shoreline and has expanded since 2005. Gibsons harbour received Eelgrass transplants in the mid-1980s. Transplants occurred in the bay area outside the breakwater.
- Eelgrass stabilizes shoreline substrates and moderates' shoreline wave action.
- Eelgrass serves as a refuge area for marine life, nurseries, feeding areas, and marine corridors.
- Eelgrass needs a buffer between foreshore improvements and eelgrass beds and there is a need to determine a safe offset distance from proposed improvements.
- Eelgrass can be sensitive to sedimentation, especially being covered with silts.
- Eelgrass is a valuable natural filter often capturing sediments transported by offshore drift cells or pollutants originating on land (Joleah Lamb, 2017).
- Eelgrass is a valuable Gibsons eco-asset and should be protected.

Coastal Shore Jurisdiction

- Coastal areas are often provincial crown land. Any activity on the foreshore, backshore, nearshore or seabed requires permission or a lease from the provincial government under the *Land Act (British Columbia)*.
- The land tenure along the foreshore is complex. There is a need during the next design phase to conduct more legal survey work to identify any new land tenure requirements for future concepts.
- Fish habitat in coastal waterways is under federal jurisdiction and will require an approval from the Federal Department of Fisheries and Oceans (DFO).

2.4 Coastal Conditions, Flood Protection and Public Safety

Climate Change

- Possible storm surge increases, estimated sea level rise of 0.5 m by 2050 and 1.0 m by 2100 are likely to bring higher water levels, larger waves and more energy landward on the Gibsons foreshore.
- Sea Level rise may increase flood and erosion risk in future and should be considered (see section 3).

The BC Flood Guidelines establish a recommended approach to coastal flood protection and how to determine flood construction levels.

2.5 Public/Recreation Use

- There is a desire by the community at large (with some opposition by local owners) that the foreshore area be a public access amenity.
- Possible uses of the area are:
  - walking;
  - sight-seeing;
  - dog walking;
  - swimming; and
  - beach walking etc.

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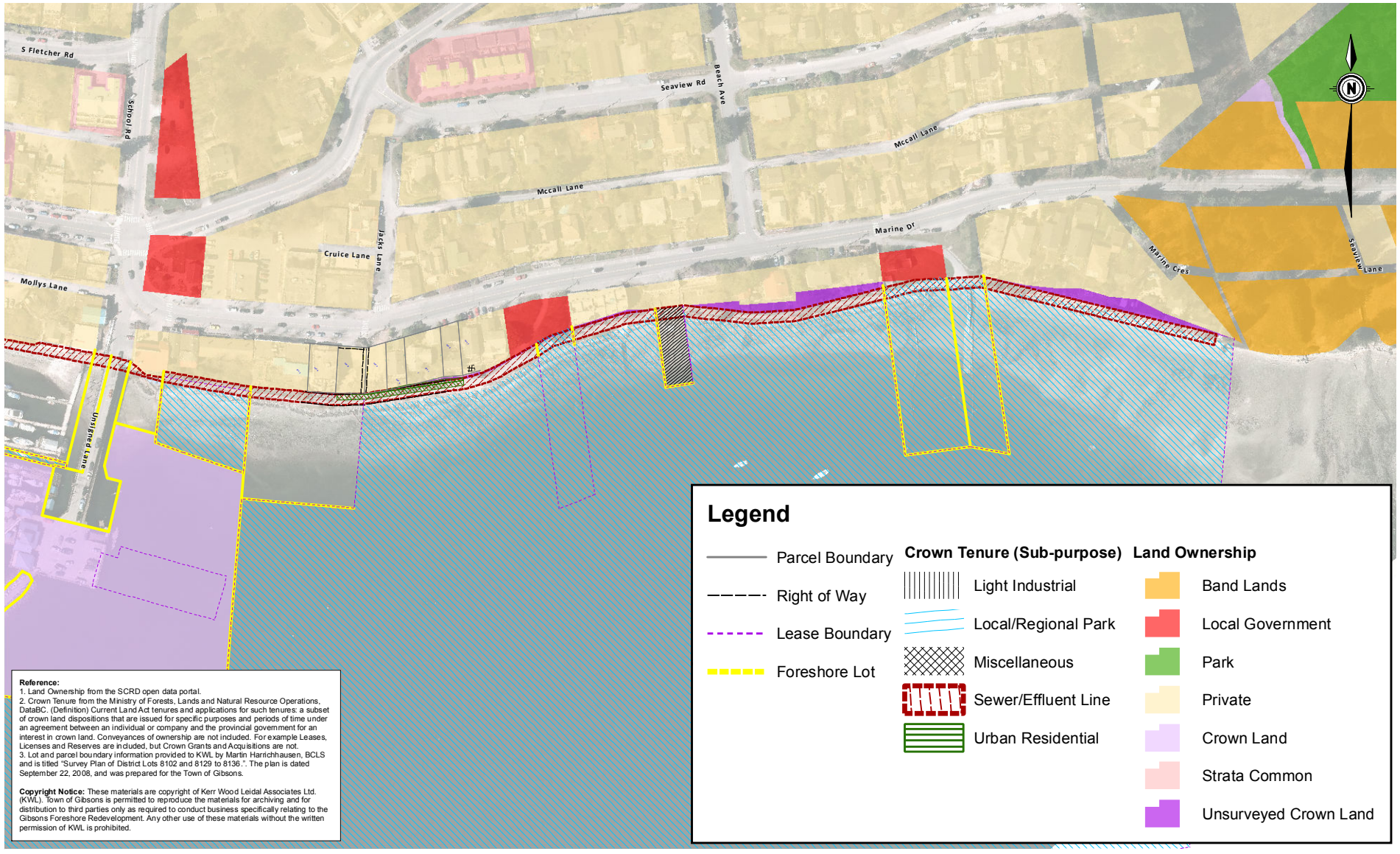

Reference:
1. Land Ownership from the SCRD open data portal.
2. Crown Tenure from the Ministry of Forests, Lands and Natural Resource Operations, DataBC. (Definition) Current Land Act tenures and applications for such tenures: a subset of crown land dispositions that are issued for specific purposes and periods of time under an agreement between an individual or company and the provincial government for an interest in crown land. Conveyances of ownership are not included. For example Leases, Licenses and Reserves are included, but Crown Grants and Acquisitions are not.
3. Lot and parcel boundary information provided to KWL by Martin Harrichhausen, BCLS and is titled "Survey Plan of District Lots 8102 and 8129 to 8136.". The plan is dated September 22, 2008, and was prepared for the Town of Gibsons.

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Project No.	Date
2132-024	January 2017

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Gibsons Foreshore Legal Tenure

Figure 2-1

3. Coastal Flood Hazard

3.1 Coastal Processes and Flood Construction Levels

The Gibsons foreshore area is subject to coastal processes that can result in a flood and erosion hazard. The combination of wind, high tide and storm surge can result in high water levels and waves overtopping the exiting top of bank along the waterfront walkway.

Long-shore sediment drift is a process that carries sediment along the foreshore during strong currents often during large storms. This is a more minor effect in the Gibsons area but can be observed along the foreshore.

For new developments, standard coastal engineering procedure is to calculate a flood construction level (FCL) which is a combination of high tide and storm surge predictions, wave effects (how high the waves are expected to run up on the shore) and freeboard (a factor added for risk uncertainty). The BC Flood Guidelines outline procedures in computing an FCL.

Climate Change Implications

Climate change related sea level rise is a **major concern** on the B.C. Coast. The province of B.C. has established guidelines so that B.C. communities can plan for future flood protection and development. Figure 3-1 below depicts current B.C. policy for sea level rise (FLNRO Flood Guidelines, 2011).

The Gibsons area is projected to see an approximate increase of 0.5 m in sea level by 2050 and up to 1 m by 2100. This elevation change should be incorporated into redevelopment plans for Gibsons. The continuing sea level rise will likely bring larger waves and more energy onto the beach. This, coupled with increased storm surge, often results in significant overtopping of coastal structures.

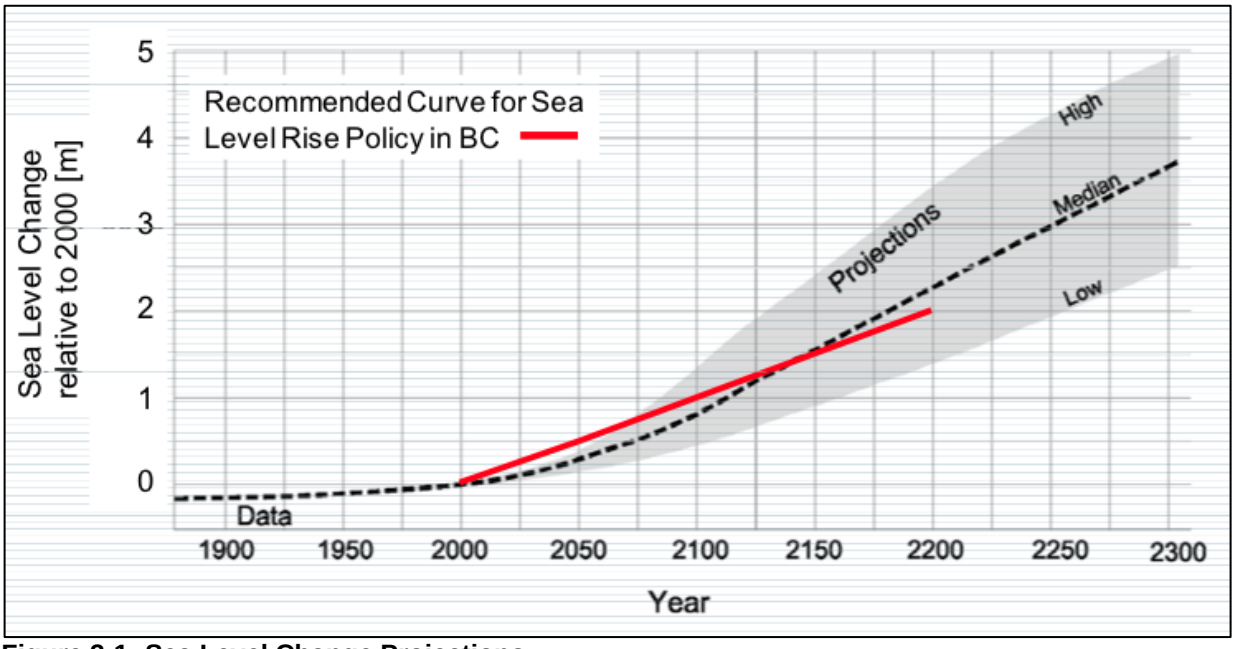


Figure 3-1: Sea Level Change Projections

3.2 Predicted Flood Levels

Figure 3-2 below shows preliminary flood construction levels (FCLs) for the project area based on previous work and an assumed foreshore slopes of 3:1 (horizontal to vertical slope). This is based on a statistical combination of high tide and surge and wave effects for a 200-year storm. An appropriate freeboard allowance has been applied to account for uncertainty (600 mm). Note that these are preliminary and final levels should be determined by a qualified professional at the detailed design stage.

The existing average elevation for the walkway ("top of bank elevation") through the project area is about 2.8 m Geodetic elevation. **The current calculated preliminary FCL elevation for this area is 4.9 m Geodetic elevation for a 200-year storm event. As shown in Figure 3-2 ,the predicted FCL for 2100 is 5.9 m (3.1 m above the current average top of bank/walkway).**

Implications for Planning Future Development

Since the existing top of bank elevation is below current flood predictions then properties along the foreshore are currently at risk to potential flooding and erosion. Gibsons will need to consider this risk and determine how best to proceed and on what schedule. Two possible approaches are:

- Elevate the foreshore to mitigate the risk (now or in the future as redevelopment occurs).
- Retreat from foreshore properties to avoid risk (now or in future) and change land use to a lower risk use such as park.

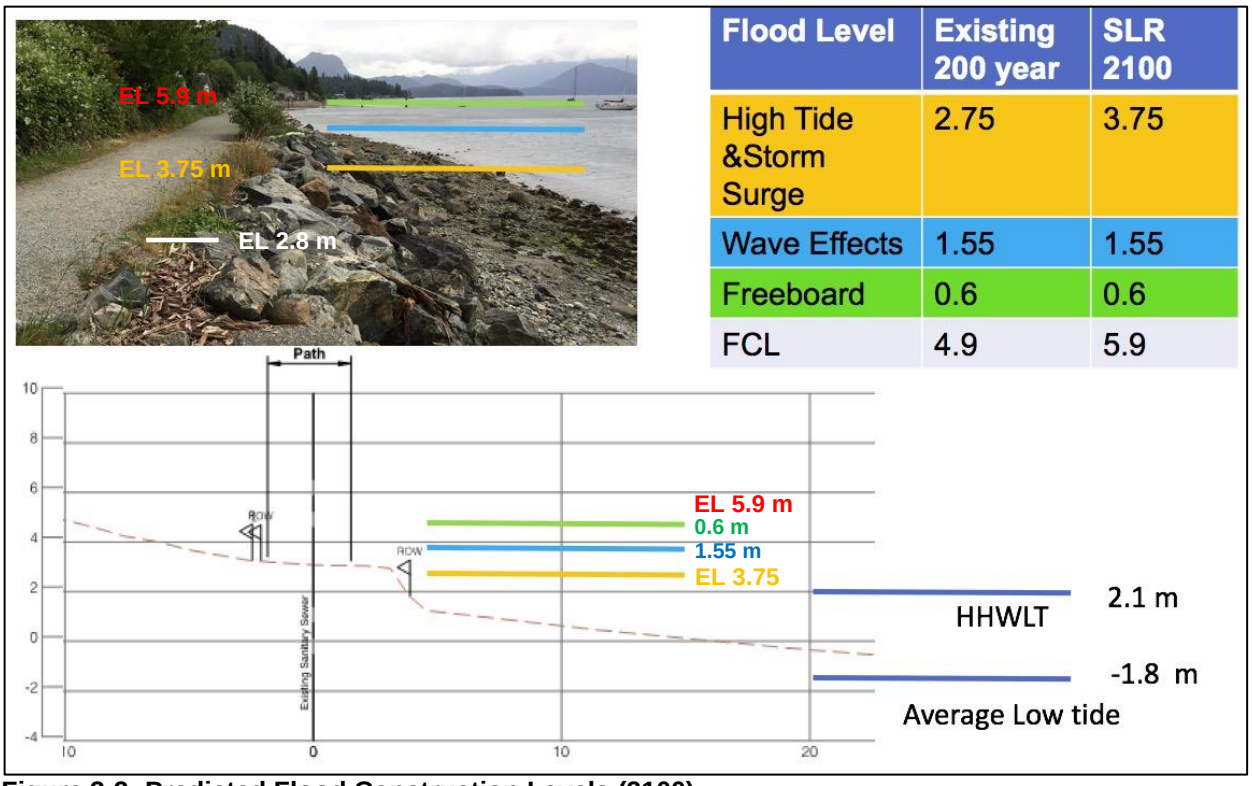


Figure 3-2: Predicted Flood Construction Levels (2100)

3.3 Phased Approach to Foreshore Protection

For the purposes of this conceptual design study we have taken the approach to consider the ultimate design for 2100 (i.e. FCL of 5.9 m elevation) then develop a short-term solution at current elevations that is compatible with the future concept. This will be described further in Section 5 of this report. Note that for individual developments a different FCL could be determined by a Qualified Professional.

4. Public Process

Stakeholder engagement has played an important role throughout the Gibsons Foreshore project. Gibsons residents had the opportunity to learn about the project at a Public Information Meeting in June, 2016 and to share their input on current and future uses along the foreshore through an online questionnaire distributed in June and July 2016.

Key stakeholders, design experts, and members of the public were also invited to provide detailed input into design features and considerations during the Mini-Charrette held in October. The feedback received through the questionnaire and mini charrette have been presented to Council, and have directly influenced the conceptual design proposed in this report.

4.1 Public Event #1: Public Information Session

On June 16, 2016, the Town of Gibsons held a Public Information Meeting for members of the public in the Town of Gibsons Council Chamber. The meeting was delivered in an open house style with an aim to provide information to the public about the planned redevelopment of the foreshore area, and to collect input from the public about current and desired uses. During the meeting, information was presented on the project objectives, the history of the foreshore, and design constraints impacting the project. Attendees were invited to submit a hardcopy questionnaire, indicating the different ways they use the foreshore and the type of features they would like to see in its development. Results from the questionnaire are summarized in the following section.

4.2 Public Questionnaire

A questionnaire was distributed to gather public feedback on existing land uses along the seawall and preferences for features to include in foreshore design. The questionnaire was distributed to members of the public who attended the Public Information Meeting on June 16th,2016 and posted on the Town of Gibsons website. Responses were collected in hardcopy and online submission by July 29th,2016

The questionnaire asked about respondent demographics, foreshore uses, and perceived opportunities and challenges for foreshore development under four categories:

- Environmental;
- Social/Recreation;
- Economic; and
- Aesthetic.

Respondents were also asked to indicate the number one thing that they would like to see changed along the foreshore.

Completed questionnaires were received from 47 respondents, including 16 hard copy 31 online surveys. Results have been summarized according to respondent demographics, reported foreshore uses, perceived development opportunities, and perceived development challenges. A summary of results from the Public Questionnaire is provided in Appendix B.

Key Feedback

According to the responses received, the most common uses of the foreshore include:

- Recreational and dog walking;
- Sitting on benches; and
- Swimming at Armours Beach.

While many respondents indicated that they would like the foreshore to keep its natural aesthetic with low density development, a few respondents indicated that they would like to see more small-scale businesses and restaurants along the foreshore. There was also differing opinions around walkway surfacing, with some respondents preferring the **natural** appearance of a gravel path, while others prefer the accessibility benefits of a **paved** walkway.

Development challenges identified by questionnaire respondents include an emphasis on the importance of Eelgrass protection and the need to address **sea level rise, flooding and erosion** from high tides. A number of respondents also indicated a desire to improve the **accessibility of the walkway** for stroller and wheelchair use.

4.3 Public Event #2: Mini-Design Charrette

Key stakeholders, design experts, and members of the public were invited to a mini-design charrette held at Cedars Inn on October 6th,2016 The objectives of the charrette were to:

- Present background information on the project;
- Develop a general design direction and strategy to inform preliminary design of the foreshore; and
- Provide an opportunity for the public and key stakeholders to build consensus around proposed design.

The charrette was divided into three sessions, each tailored to the interests of a different group of stakeholders. The morning session ran from 9am – 12noon, and was designed to engage key stakeholders to clarify design objectives and priorities. The afternoon session extended from 1pm-4pm, and was tailored to provide technical professionals (e.g. landscape architects, biologists, planners, and engineers) the opportunity to develop design options based on priorities identified during the morning session. The evening session was tailored to all stakeholders, including the general public, and provided a summary of mini-charrette outcomes and the next steps for project completion.

Key Priorities

The morning and afternoon sessions highlighted a number of priorities for foreshore redevelopment. These priorities include the following:

- Enhance foreshore using Green Shore principles, where possible;
- Protect eelgrass area & spawning areas (e.g. at Armours Beach);
- Increase natural vegetation between walkway & water;
- Soften shoreline (where possible);
- Improve Armours Beach area (e.g. more sand, swimming and amenities);
- Provide better visitor experience (e.g. with better parking, trails, wayfinding, flow and public art);
- Improve public access from businesses at southwest end of site (e.g. Grandma's Pub);
- Increase access for mobility challenges;
- Provide recreation around docks for a range of ages;
- Improve educational opportunities; and
- Connect history, including recent history such as the "The Beachcombers".

These priorities informed the development of **short and long term** draft concept designs for key points along the foreshore area during the afternoon design session. These sketches are shown in the Figures 4-1 to 4-5 below:

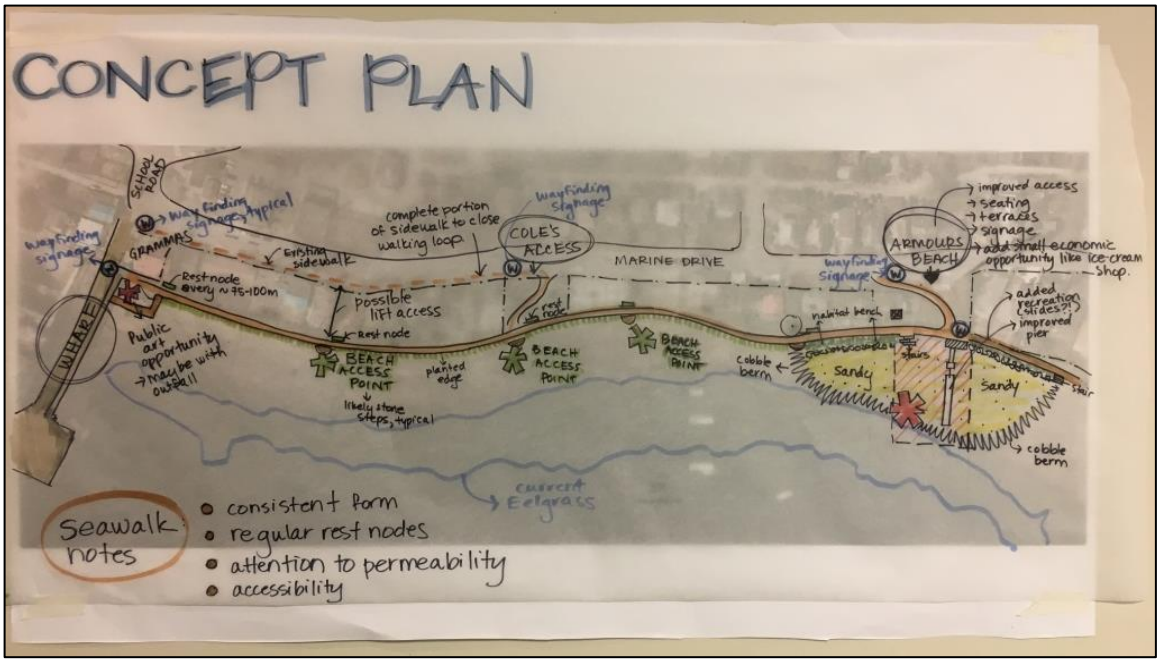


Figure 4-1: Mini-Charrette – Afternoon Session Concept Plan

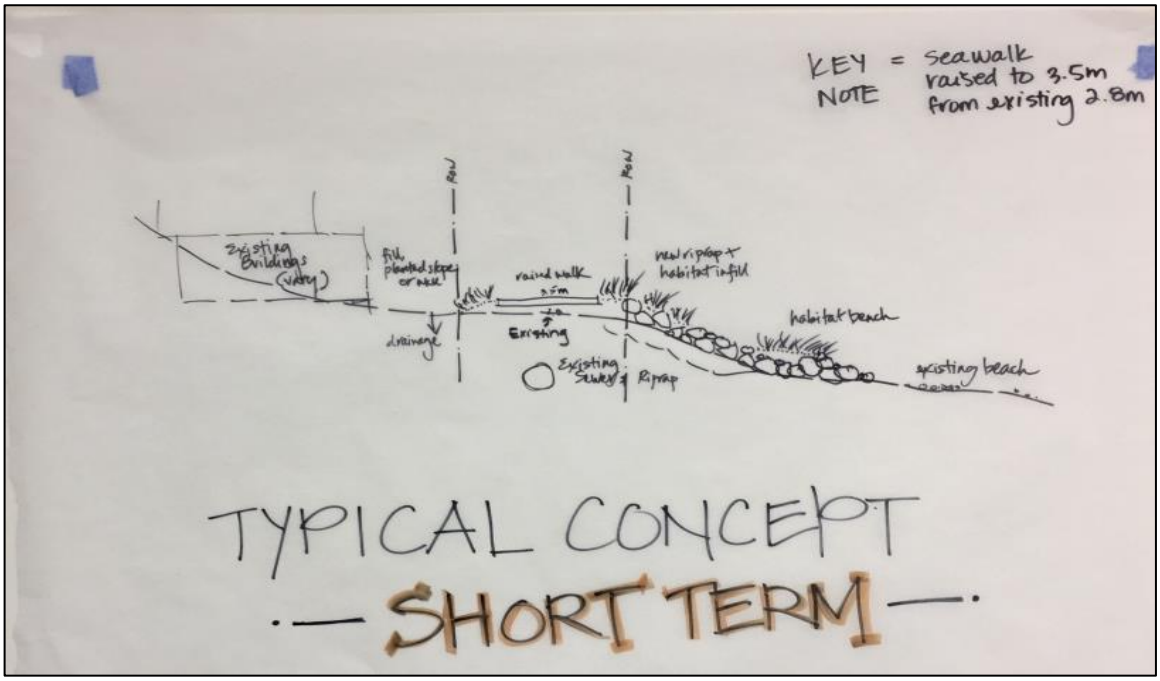


Figure 4-2: Mini-Charrette - Afternoon Session Typical Concept (Short Term)

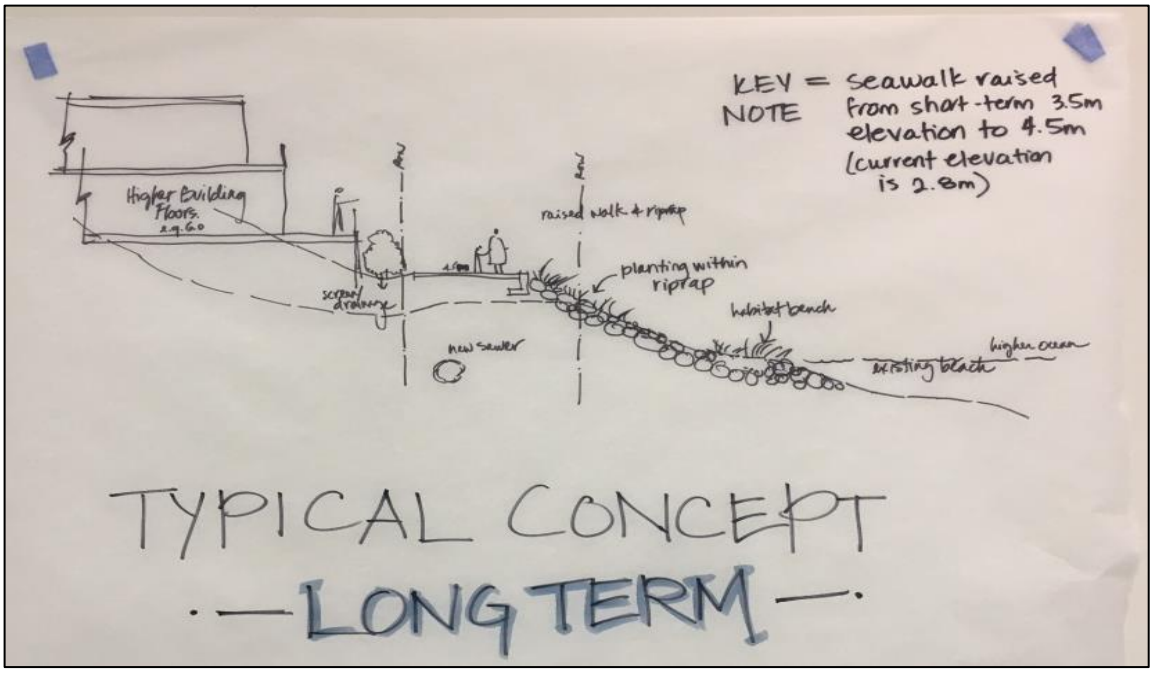


Figure 4-3: Mini-Charrette - Afternoon Session Typical Concept (Long Term)

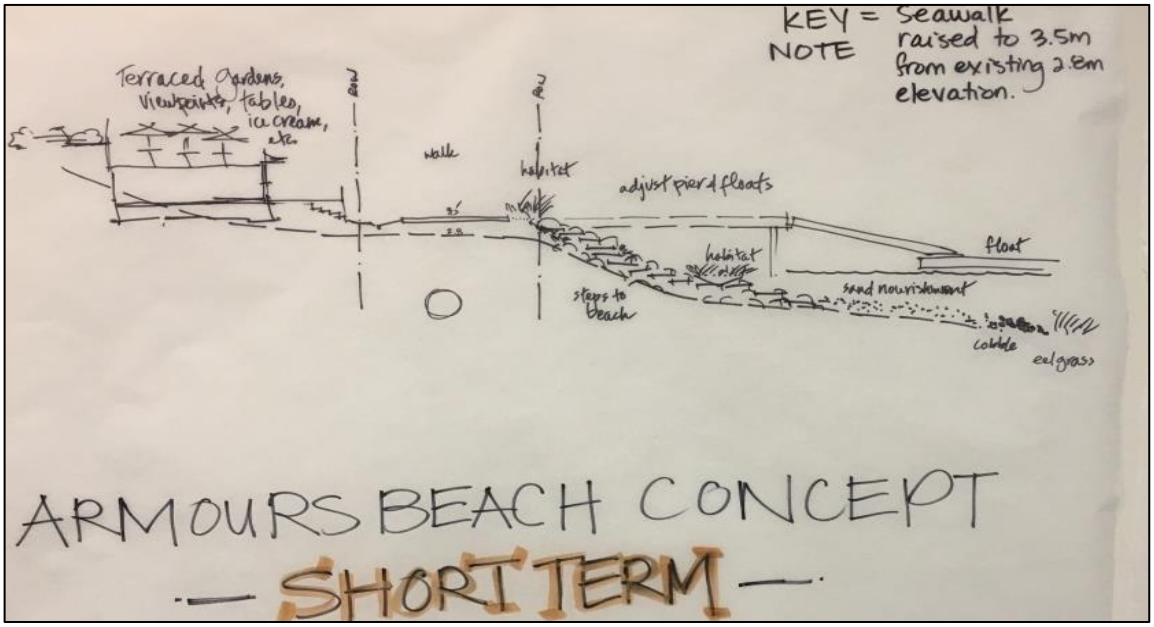


Figure 4-4: Mini-Charrette - Afternoon Session Armours Beach Concept (Short Term)

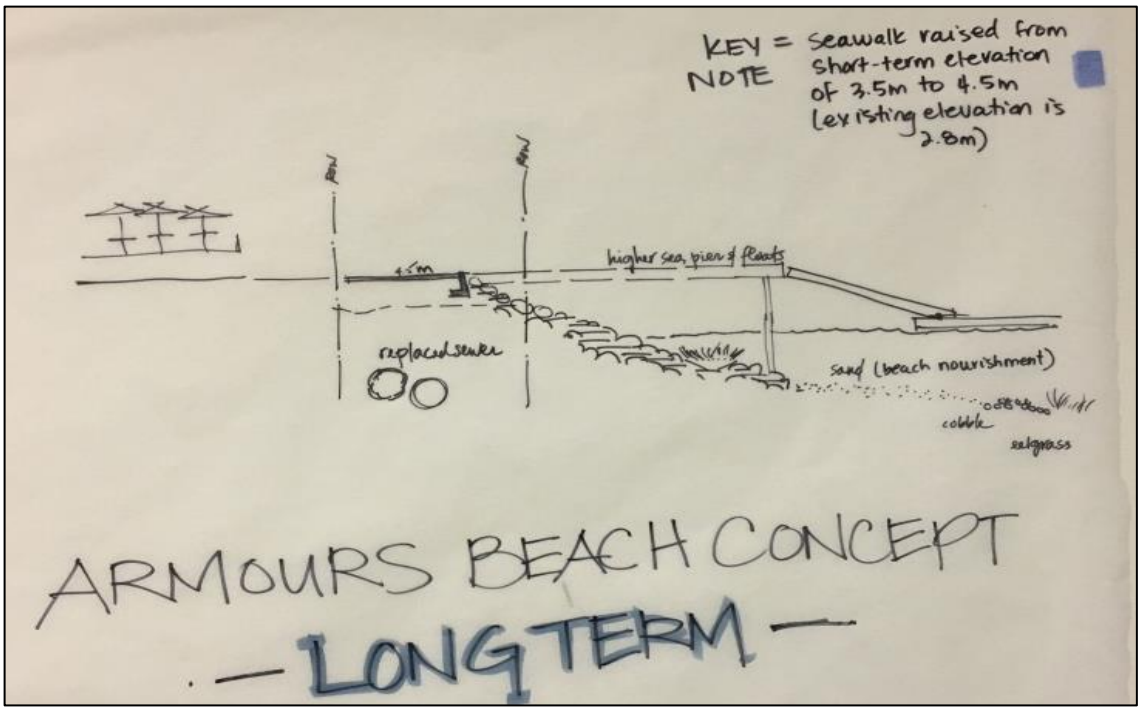


Figure 4-5: Mini-Charrette - Afternoon Session Armours Beach Concept (Long Term)

The priorities and design sketches were presented during the evening session, and have directly informed the conceptual designs presented in this report.

5. Conceptual Design

5.1 Design Criteria

Following the design charrette and open house we discussed the results with Gibson's staff to obtain direction for concept design. Since raising the existing walkway/service road now could result in the foreshore walkway acting as a flood protection structure (dike) because portions of the land behind the walkway is at similar elevations, Direction was given to KWL to develop a design for the current condition which could then be raised at a future date as soon as practically possible. The walkway was never designed as a sea dike but was intended to protect the trunk sewer. The current 200-year standard (outlined in the BC Flood Guidelines for inhabited structures) results in a higher elevation than is required for protection of the sewer or for a seasonal walkway.

Currently, the projected 200-year storm water level is well above the existing level (4.9 m geodetic elevation vs the existing 2.8 m walkway crest). There is therefore a residual risk of flooding which KWL recommends is addressed when possible working towards resolving this in phases and by starting by rebuilding and enhancing the existing foreshore. Our recommended preliminary FCL for 2100 is the 5.9 m elevation for the walkway and for future development and/or redevelopment depending on final slopes and wave effects.

The proposed concept outlined in the figures that follow include a 3H:1V rock riprap slope. The steeper the slope, the higher the wave run-up. For example, a vertical wall would result in a much higher FCL. This 3:1 slope is considered a compromise solution since flatter slopes would begin to encroach on the Eelgrass and steeper slopes would result in higher FCLs. The flattened 3:1 slope is a higher standard of protection than the existing riprap slope which is about 1.5H:1V

Design Components

The main components of the conceptual design are:

1. Enhanced Armours Beach area;
2. Rebuilding of the foreshore with a flatter slope, renewed riprap and natural plantings (including possible marsh benches on the slope); and
3. Upgraded Gibsons Wharf connection.

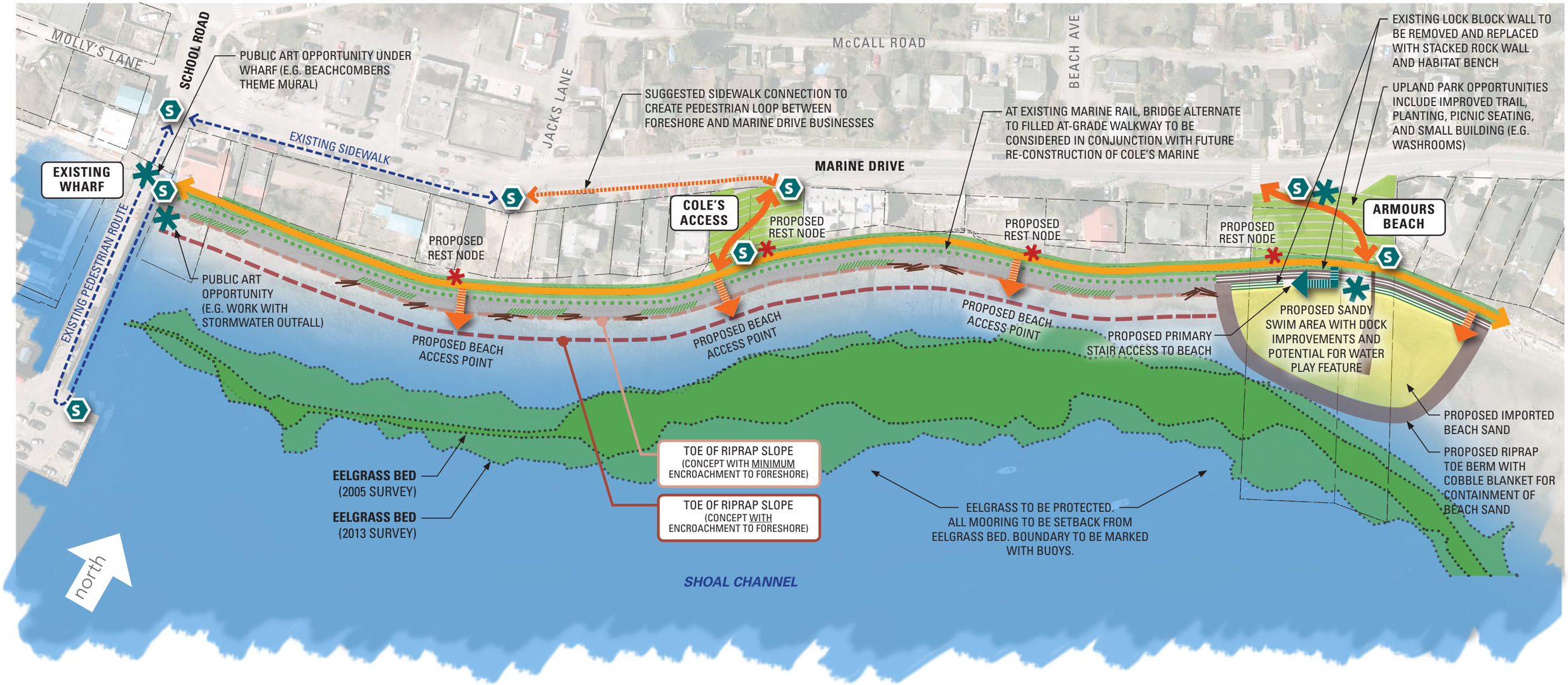
Figure 5-1 through Figure 5-7 describe the conceptual design showing the short-term (2017) and long-term 2100 scenarios. It is important to note that the proposed short-term foreshore changes are not designed to serve as a formal sea dike but are instead intended to protect the sanitary sewer infrastructure and to provide for access along the walkway the majority of the time with occasional flooding during storm events.

Figure 5-1 through Figure 5-5 depict the concepts developed at the workshop and generally minimize impacts into the foreshore intertidal area. Since the long-term scenarios in Figures 5-3 and 5-5 result in significant impacts on land adjacent to the foreshore including fill placement to increase the grade and encroachment into the properties with the walkway alignment, an additional option was developed which maintains the location of the existing walkway and sewer service road but instead extends a stable slope into the foreshore about 15 m. This was developed to evaluate impacts and costs of maintaining the walkway location into the future. This options is depicted by Figures 5-6 and 5-7.

FIGURE 5-1

SCHEMATIC PLAN - PHASE 1, SHORT-TERM

GIBSONS FORESHORE & SEAWALK IMPROVEMENTS



LEGEND

- Proposed seawalk with planted shoulders. Alignment for short-term is within the existing right-of-way.
- Proposed 3:1 riprap slope with upper bank joint planting
- Proposed toe of riprap slope — Concept with minimum encroachment to foreshore
- Proposed toe of riprap slope — Concept with encroachment to foreshore
- Proposed salt marsh bench planted area
- Proposed driftwood / beach logs
- Proposed rest node with bench. Locations to be spaced every 75-100m for accessibility.
- Proposed step access from walkway to beach across riprap slope. Steps to be built from mortared stone or similar.
- Proposed signage and wayfinding system to communicate location, distances, and access points for the seawalk.
- Proposed gateway feature or point of interest

SCALE

0 20 40 60 80 100m

FIGURE 5-2

TYPICAL SECTION - SHORT-TERM

PROPOSED WALKWAY AT EXISTING 2.8m ELEVATION – MINIMUM ENCROACHMENT TO FORESHORE

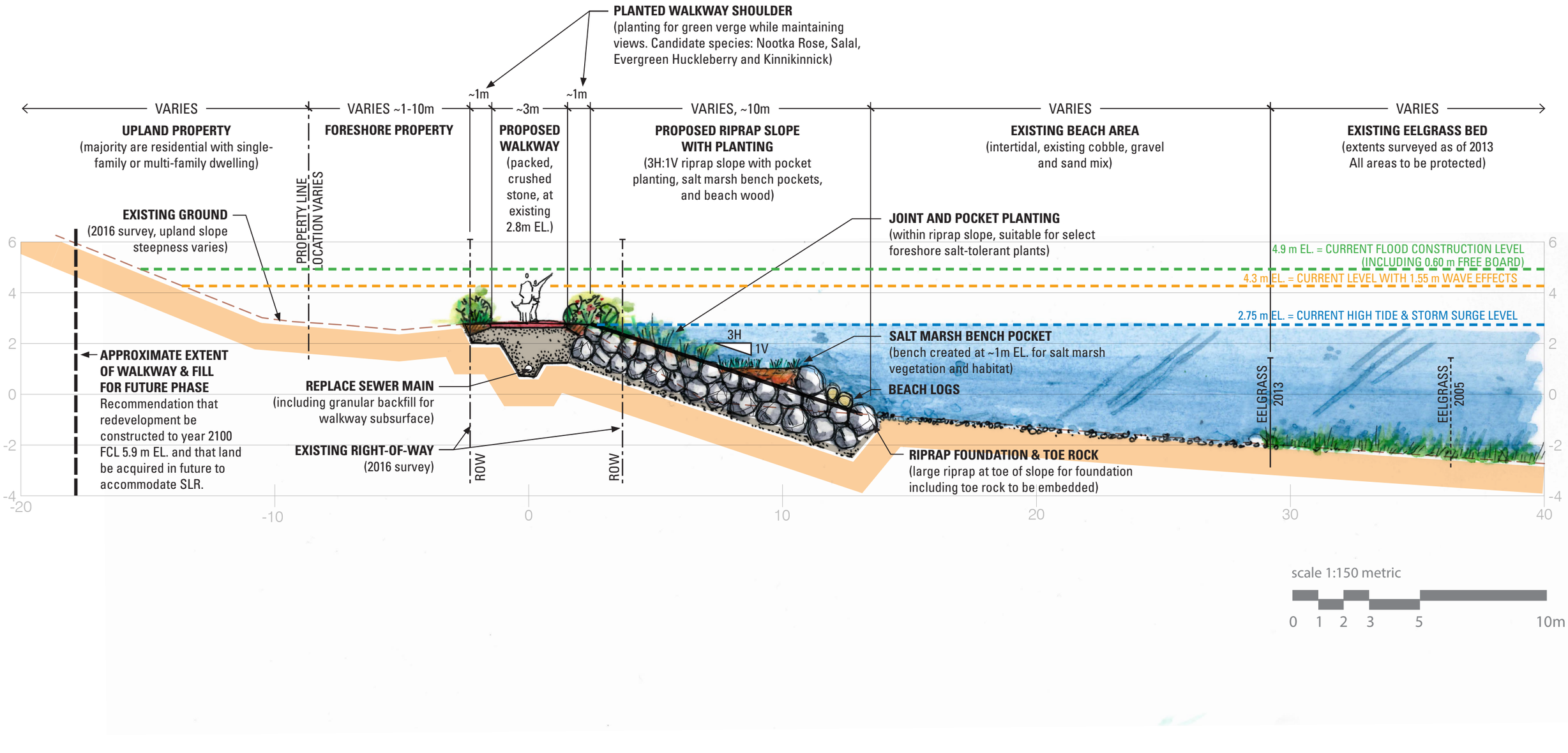
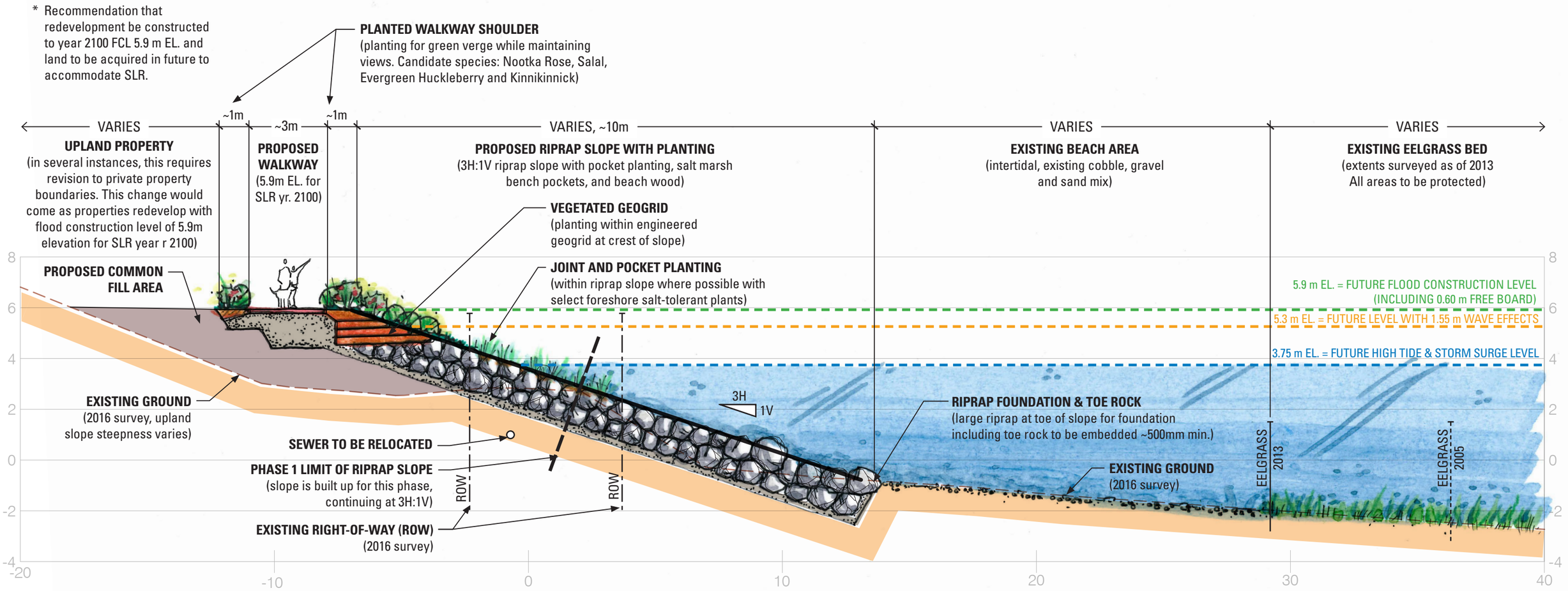


FIGURE 5-3

TYPICAL SECTION - LONG-TERM

PROPOSED WALKWAY AT 5.9m ELEVATION. SLR year 2100 – MINIMUM ENCROACHMENT TO FORESHORE



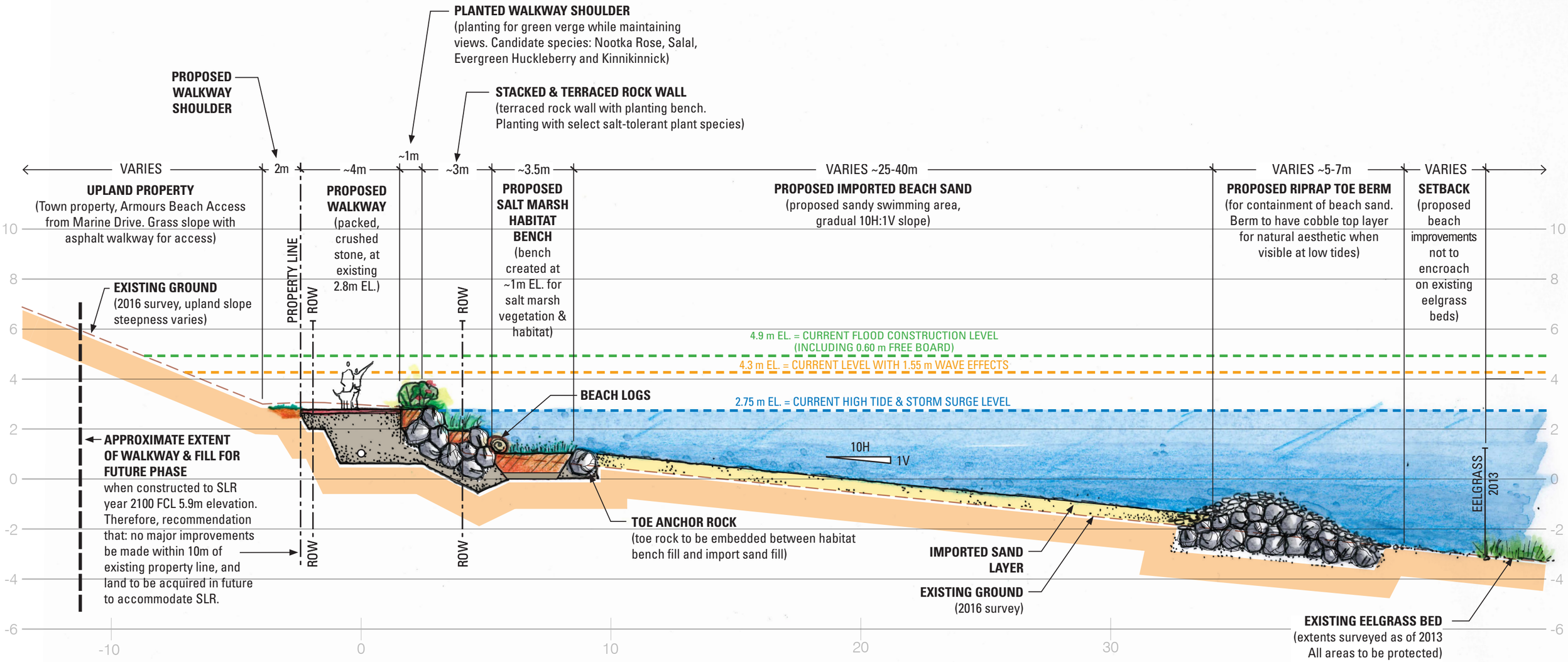
scale 1:150 metric

0 1 2 3 5 10m

FIGURE 5-4

ARMOURS BEACH SECTION - SHORT-TERM

PROPOSED WALKWAY AT EXISTING 2.8m ELEVATION – MINIMUM ENCROACHMENT TO FORESHORE



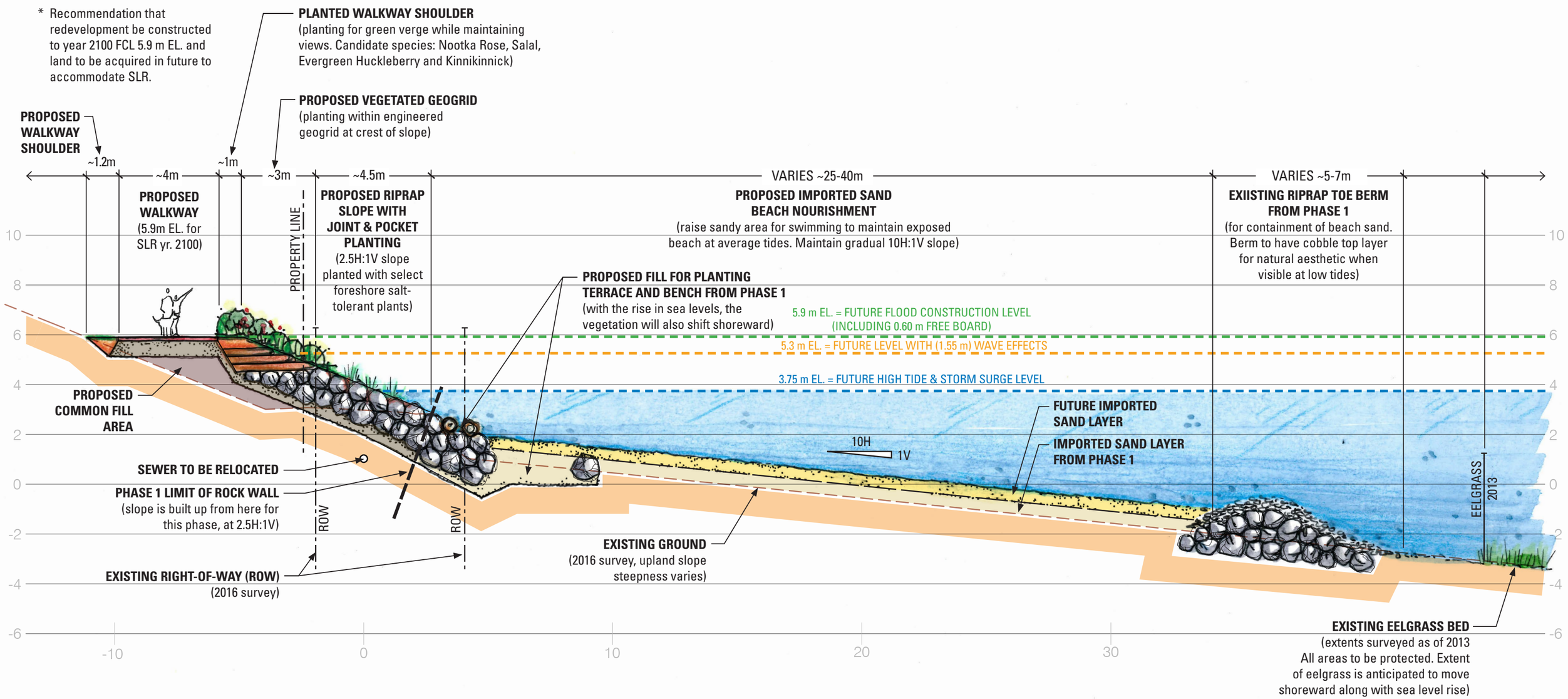
scale 1:150 metric

0 1 2 3 5 10m

FIGURE 5-5

ARMOURS BEACH SECTION - LONG-TERM

PROPOSED WALKWAY AT 5.9m ELEVATION. SLR year 2100 – MINIMUM ENCROACHMENT TO FORESHORE



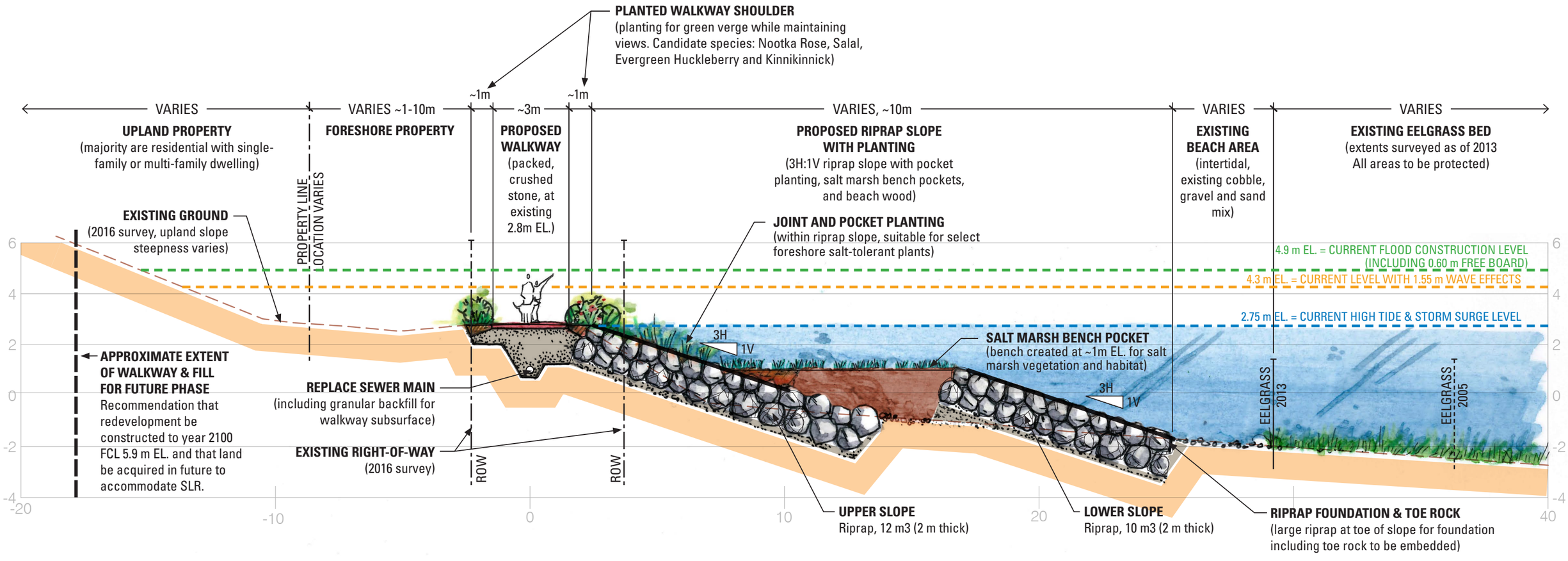
scale 1:150 metric

0 1 2 3 5 10m

FIGURE 5-6

TYPICAL SECTION - SHORT-TERM

PROPOSED WALKWAY AT EXISTING 2.8m ELEVATION – WITH ENCROACHMENT TO FORESHORE



scale 1:150 metric

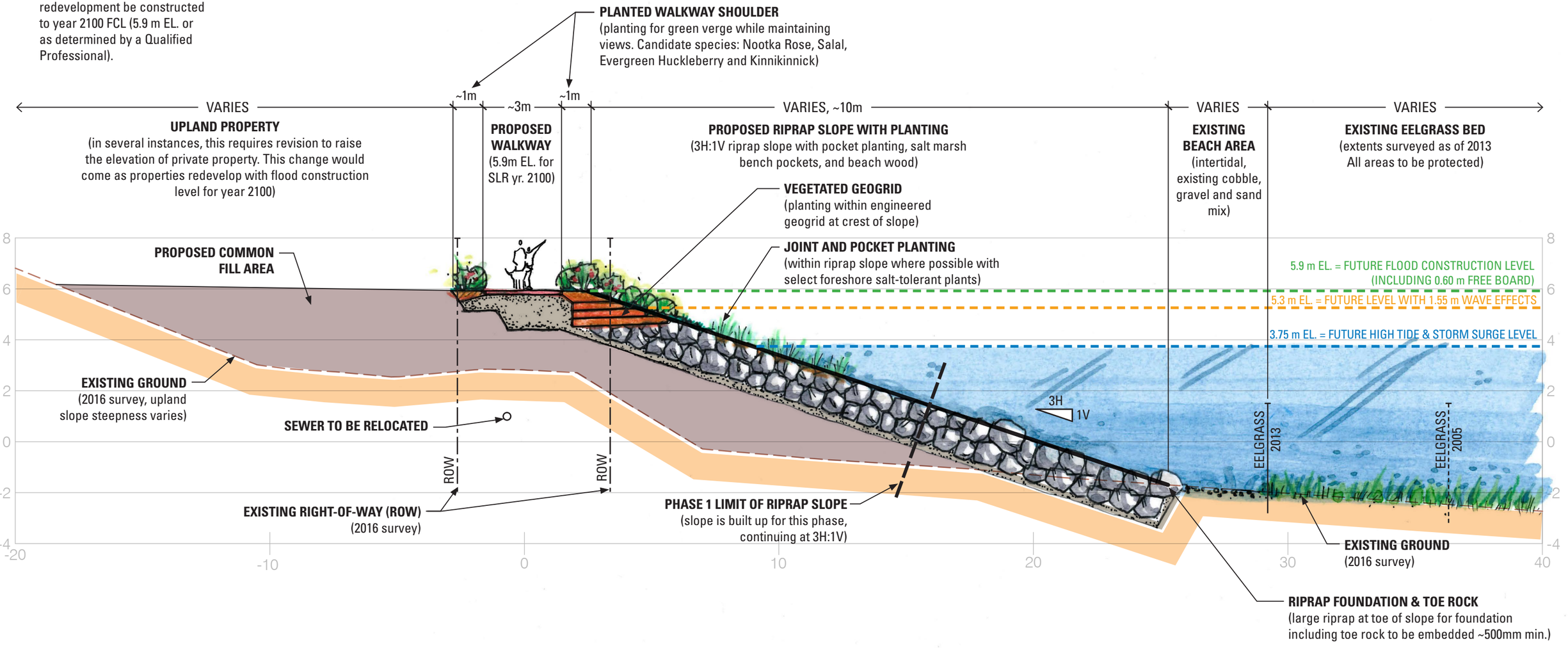
0 1 2 3 5 10m

FIGURE 5-7

TYPICAL SECTION - LONG-TERM

PROPOSED WALKWAY AT 5.9m ELEVATION. SLR year 2100 – WITH ENCROACHMENT TO FORESHORE

* Recommendation that redevelopment be constructed to year 2100 FCL (5.9 m EL. or as determined by a Qualified Professional).



scale 1:150 metric

0 1 2 3 5 10m

Armours Beach Area

Rebuilding the beach area will require:

- Construction of a rock containment berm;
- Imported beach sand to enhance the beach;
- Upgrading the wharf; and
- Upgrading access and benched seating to beach.

Upland area:

- A small building or washroom near the beach area;
- Upgraded lighting; and
- Upgraded landscaping.

Reflecting Green Shore design principles, access from the walkway to the beach would be set into the riprap. **We caution that longshore sediment drift may periodically move the newly installed beach sand from the contained area** and that from time to time or after large storms the beach may need to be "re-nourished" with new sand brought in. More coastal engineering will likely be required during preliminary design to determine the likely frequency and resulting feasibility of the enhanced beach. Figure 5-4 and Figure 5-5 describe the Armours Beach conceptual design in section.

Rebuilt Walkway

Based on the phasing direction from Gibsons, the following design criteria has been established for conceptual design of the walkway:

Short-term

- Rebuild enhanced riprap slope to approximately the 2.8 m elevation;
- 5 m wide gravel surfaced walkway with planted shoulders;
- Foreshore slopes at 3H:1V;
- Erosion protection: angular riprap with planting benches in patches;
- Planting on the planting bench and on a shoulder strip at the top of the riprap slope; and
- The sewer would be replaced at the time of the walkway upgrade.

This short-term structure could be built on for a future Phase 2 up to the 5.9 m elevation or some other intermediate level depending on timing of the second upgrade.

Long-term

Figure 5-3 and 5-7 depicts phase 2 of the walkway area for the 2100 scenario. There are considerable impacts on private land. We do not describe this in too much detail as there are many details that would need working out from sewer abandonment or relocation for access to individual rebuilds on residential/commercial buildings. We emphasize that over both the short and longer term final slopes to the beach should be as flat as possible and vertical walls are both costly and result in higher FCLs resulting in higher upland building requirements.

5.2 Slope and Land Considerations

Since sea level rise is predicted to rise by about 1 m by 2100. Therefore, current land levels directly adjacent to the walkway are too low to eliminate today's flood risks completely. The local authority responsible for flood and erosion protection (Gibsons) will determine the timing and the risk that the community is willing to accept at present.

The conceptual design for foreshore enhancement shown in Figure 5-1, Figure 5-2 , Figure 5-4 and 5-6 includes a flatter sloping riprap, rather than a vertical wall. The proposed design offers short-term improvements to protect the walkway than the current context resulting in a more stable slope. A vertical wall along the foreshore is not recommended due to the higher cost and that wave run-up increases with a steeper wall. A wall could also have a harsher impact on fish habitat.

Other future considerations for the walkway and adjacent properties could be:

- Establish future flood construction levels so that future developments are higher than predicted flood levels. This could become a covenant on title or a development permit zone.
- Consider setting aside funds for the gradual acquisition of properties upland from the sewer right-of-way for future climate change adaptation in the long-term allowing for changing land use along the foreshore into park.
- Reserving a designated zone of land between the foreshore and the slope up to the road above could be added to the Official Community Plan to ensure that flood prone land is removed from residential use in the long-term. More investigation would be required to determine the width of this designated land zone.

Foreshore Encroachment Option

- The advantages and disadvantages of an option that maintains the existing walkway location and encroaches into the foreshore was also evaluated. Figures 5-6 and 5-7 reduce the lateral impacts on adjacent land however for the future 2100 option would create a sea dike if adjacent land is not raised in conjunction with this work. In addition, the significant encroachment (15-20 m) into the intertidal foreshore would require negotiations with environmental agencies, possible habitat compensation costs and considerable increased construction costs for the municipal portion of the work due to "in water" work.

5.3 Cost Considerations

Cost Estimates have been prepared at a Class D level for planning purposes only. Preliminary designs should be done as soon as possible to ensure that construction costs are accurate enough to tender the projects. Estimates are based on aerial photography and LiDAR information that is available and survey of the walkway and typical unit costs from other projects. The estimates are based on limited site and design information and are suitable for the conceptual design level.

Appendix A provides the breakdown of costs. Each phase includes engineering and contingency suitable for this level of estimate. Table 5-1 provides a summary of the cost of each component (Phase) to the 2.8 m elevation (existing condition) with both minimal foreshore encroachment and maintaining walkway location and encroaching into the foreshore. At the request of Gibsons we have divided the project into logical phases so the upgrades could be made gradually. Capital costs for the long-term 2100 options are not evaluated at this time due to lack of cost information that far out into the future.

Table 5-1: Summary of Conceptual Capital Costs

Phase	Cost ($)		Comment
Foreshore Improvement Option	Minimal Encroachment	With Foreshore Encroachment	
Figure	5-1 to 5-5	5-6 and 5-7	
Armours Engineered Beach Upgrade	$883,000	$889,000	Rock containment berm, sand beach nourishment, and dock upgrading
Armours Beach Upland Improvements	$438,000	$438,000	Updated access and building upgrades, landscaping, and lighting
Upgraded Walkway (Armours to Coles) (120 m)	$519,000	$1,176,000	Upgrade foreshore riprap, walkway and sewer
Upgraded Walkway (Coles Marine) (40 m)	$487,000	$487,000	Upgrade foreshore riprap, walkway and sewer
Upgraded Walkway (Coles to Gibsons Wharf) Part 1 130 m	$559,000	$1,270,000	Upgrade foreshore riprap, walkway and sewer
Upgraded Walkway (Coles to Gibsons Wharf) Part 2 130 m	$559,000	$1,270,000	Upgrade foreshore riprap, walkway and sewer
Upgraded Gibsons Wharf Connection	$176,000	$176,000	Expanded wharf connection, public art and signage
Total Excluding Taxes	**$3,621,000**	**$5,706,000**	

Notes:
1. Refer to Appendix A for details.
2. Costs are Class D: This estimate has been prepared with little or no site information and as such indicates the approximate magnitude of the cost of the capital tasks, for project planning purposes only. The estimate has been derived from unit costs for similar projects.

6. Recommendations and Conclusions

6.1 Conclusions

A conceptual design for the Gibsons foreshore and Seawalk improvements project has been prepared based on a public process (public meeting and design charrette) and guidance from Gibsons staff. This design considered:

- Environmental values (Eelgrass and public access to the walkway).
- Sewer access (upgrading and access).
- Recreation and aesthetics (public access and amenities).

A flood and erosion hazard exists under current conditions; however, the concept design provides a plan for upgrading the foreshore now at the current elevation and allows for raising the foreshore at a future date as redevelopment occurs, land is acquired and/or funding is available.

The conceptual design looks at a minimal foreshore encroachment by moving the walkway in as sea levels rise and an option that maintains the walkway location and encroaches into the foreshore. This includes establishment of vegetation; however, this will be challenging given the lack of space between the properties and the water and the necessary width of a walkway to access the existing sewer.

Evaluation of foreshore encroachment option to maintain the existing walkway location now and in the future, was evaluated and found to be technically feasible but resulting in a higher cost and with potential risk of the project gaining agency approvals or in obtaining timely environmental approvals.

6.2 Recommendations

Based on our analysis we make the following recommendations:

1. Work toward raising the foreshore area to reduce existing flood risk as budgets and developments allow.
2. Based on our planning level cost estimates, identify funding for upgrading the Gibsons foreshore in phases as appropriate.
3. Undertake preliminary design for Armours Beach area to determine the extent of coastal engineering required (numerical and possible physical modelling) required to determine configuration of the future rock Armours Beach containment berm and the shape and sizing of an engineered beach at Armours Beach.
4. Prepare a preliminary design for foreshore walkway works and determine preliminary construction costs including phasing and timing of the work.
5. Establish future flood construction levels so that future developments are higher than predicted flood levels. This could become a covenant on title or a development permit zone. Note that flood levels presented here are preliminary but can be used for planning purposes unless determined otherwise by a Qualified Professional.
6. Consider setting aside funds for the gradual acquisition of properties upland from the sewer right-of-way for future adaptation in the long term and for turning portions of the foreshore into park.
7. Consider reserving a designated zone of land between the foreshore and the slope up to the road above could be added to the Official Community Plan to ensure that flood prone land is removed from residential use over the longer term.

6.3 Report Submission

Prepared by:

KERR WOOD LEIDAL ASSOCIATES LTD.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D. N. MURRAY
Sept 13/17

This document is a copy of the sealed and signed hard copy original retained on file. The content of the electronically transmitted document can be confirmed by referring to the filed original.

Dave Murray, P.Eng., AScT, CPESC
Project Manager

Reviewed by:

Eric Morris, M.Sc., P.Eng.
Technical Reviewer

Statement of Limitations

This document has been prepared by Kerr Wood Leidal Associates Ltd. (KWL) for the exclusive use and benefit of TOWN OF GIBSONS for the Gibsons Foreshore and Seawalk Improvements. No other party is entitled to rely on any of the conclusions, data, opinions, or any other information contained in this document.

This document represents KWL's best professional judgement based on the information available at the time of its completion and as appropriate for the project scope of work. Services performed in developing the content of this document have been conducted in a manner consistent with that level and skill ordinarily exercised by members of the engineering profession currently practising under similar conditions. No warranty, express or implied, is made.

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Revision History

Revision #	Date	Status	Revision	Author
1	18/01/2017	DRAFT	Submission to Gibsons	DNM/rnh
2	19/04/2017	FINAL	Submission to Gibsons	DNM/rnh
3	14/09/2017	REVISED FINAL	Submission to Gibsons	DNM/em

OQM | Organizational Quality Management Program

KERR WOOD LEIDAL
consulting engineers

Appendix A

Class D Conceptual Cost Estimate

Town of Gibsons

Apr-17

Foreshore Seawalk Improvements

Class 'D' Cost Estimate

Item	Description	Unit	Estimated Quantity	Unit Rate	TOTAL PRICE $
1.0	**Armours Engineered Beach (40 m of foreshore)**				
1.1	Riprap Containment Berm	lin.m	170	$ 1,900	$ 323,000
1.2	Beach Nourishment Fill	Sq. m	3,200	$ 50	$ 160,000
1.3	Dock upgrade	lin.m	50	$ 1,000	$ 50,000
1.4	Terraced Wall and Walkway	lin.m	40	$ 1,500	$ 60,000
1.5	Bonding and Insurance	L.S.		3%	$ 8,100
1.6	Mobilization/Demobilization	L.S.		5%	$ 29,650
1.7	Engineering & Contingency	L.S.		40%	$ 252,300
	SUBTOTAL (Rounded $1000)				**$ 883,000**
2.0	**Armours Beach - Upland Improvements**				
2.1	Updated washrooms/building	L.S.	1	$ 250,000	$ 250,000
2.2	Adjacent Landscaping	lin.m	40	$ 500	$ 20,000
2.3	Pedestrian lighting	each	4	$ 5,000	$ 20,000
2.4	Bonding and Insurance	L.S.		3%	$ 8,700
2.5	Mobilization/Demobilization	L.S.		5%	$ 14,500
2.6	Engineering & Contingency	L.S.		40%	$ 125,280
	SUBTOTAL (Rounded $1000)				**$ 438,000**
3.0	**Upgraded Walkway (Armours to Coles) (120 m)**				
3.1	Excavation and Salvage of old Riprap/Fill	lin.m	120	$ 500	$ 60,000
3.2	Sewer Excavation and Replacement	lin.m	120	$ 500	$ 60,000
3.3	Reconstruction of Bank/Riprap	lin.m	120	$ 1,400	$ 168,000
3.4	Surfacing of Walkway	lin.m	120	$ 30	$ 3,600
3.5	Native Vegetation and Landscaping	lin.m	120	$ 400	$ 48,000
3.6	Pedestrian lighting	each	6	$ 5,000	$ 30,000
3.7	Bonding and Insurance	L.S.		3%	$ 11,088
3.8	Mobilization/Demobilization	L.S.		5%	$ 18,480
3.9	Engineering & Contingency	L.S.		30%	$ 119,750
	SUBTOTAL (Rounded $1000)				**$ 519,000**
4.0	**Upgraded Walkway (Coles Marine) (40 m)**				
4.1	Excavation and Salvage of old Riprap/Fill	lin.m	15	$ 500	$ 7,500
4.2	Sewer Excavation and Replacement	lin.m	40	$ 750	$ 30,000
4.4	Surfacing of Walkway	lin.m	40	$ 30	$ 1,200
4.5	Native Vegetation and Landscaping	lin.m	40	$ 500	$ 20,000
4.6	Granular fill to bring walkway to grade	lin.m	40	$ 1,200	$ 48,000
4.7	Bonding and Insurance	L.S.		3%	$ 10,401
4.8	Mobilization/Demobilization	L.S.		5%	$ 17,335
4.9	Engineering & Contingency	L.S.		30%	$ 112,331
	SUBTOTAL (Rounded $1000)				**$ 487,000**
5.0	**Upgraded Walkway (Coles to Gibsons Wharf)**				
	Part 1 (130 m)				
5.1	Excavation and Salvage of old Riprap/Fill	lin.m	130	$ 500	$ 65,000
5.2	Sewer Excavation and Replacement	lin.m	130	$ 500	$ 65,000
5.3	Reconstruction of Bank/Riprap	lin.m	130	$ 1,400	$ 182,000
5.4	Surfacing of Walkway	lin.m	130	$ 30	$ 3,900
5.5	Native Vegetation and Landscaping	lin.m	130	$ 400	$ 52,000
5.6	Pedestrian lighting	each	6	$ 5,000	$ 30,000
5.7	Bonding and Insurance	L.S.		3%	$ 11,937
5.8	Mobilization/Demobilization	L.S.		5%	$ 19,895
5.9	Engineering & Contingency	L.S.		30%	$ 128,920
	SUBTOTAL (Rounded $1000)				**$ 559,000**
6.0	**Upgraded Walkway (Coles to Gibsons Wharf)**				
	Part 2 (130 m)				
6.1	Excavation and Salvage of old Riprap/Fill	lin.m	130	$ 500	$ 65,000
6.2	Sewer Excavation and Replacement	lin.m	130	$ 500	$ 65,000
6.3	Reconstruction of Bank/Riprap	lin.m	130	$ 1,400	$ 182,000
6.4	Surfacing of Walkway	lin.m	130	$ 30	$ 3,900
6.5	Native Vegetation and Landscaping	lin.m	130	$ 400	$ 52,000
6.6	Pedestrian lighting	each	6	$ 5,000	$ 30,000
6.7	Bonding and Insurance	L.S.		3%	$ 11,937
6.8	Mobilization/Demobilization	L.S.		5%	$ 19,895
6.9	Engineering & Contingency	L.S.		30%	$ 128,920
	SUBTOTAL (Rounded $1000)				**$ 559,000**
7.0	**Upgraded Gibsons Wharf Connection**				
7.1	Install 8 new piles to accommodate expanded wharf	each	8	$ 5,000	$ 40,000
7.2	Construct timber wharf connection (allowance)	L.S.	1	$ 50,000	$ 50,000
7.3	Interpretive signage at gathering point	L.S.	1	$ 25,000	$ 25,000
7.4	Pedestrian lighting	each	2	$ 5,000	$ 10,000
7.5	Bonding and Insurance	L.S.		3%	$ 3,750
7.6	Mobilization/Demobilization	L.S.		5%	$ 6,250
7.7	Engineering & Contingency	L.S.		30%	$ 40,500
	SUBTOTAL (Rounded $1000)				**$ 176,000**
	TOTAL (Excluding Taxes Including Contingency, bonding and Insurance)				**$ 3,621,000**

This estimate has been prepared with little or no site information and as such indicates the approximate magnitude of the cost of the capital tasks, for project planning purposes only. The estimate has been derived from unit costs for similar projects.

Town of Gibsons

Sep-17

Foreshore Seawalk Improvements- Revised for Encroachment Option

Class 'D' Cost Estimate

Item	Description	Unit	Estimated Quantity	Unit Rate	TOTAL PRICE $
1.0	**Armours Engineered Beach (40 m of foreshore)**				
1.1	Riprap Containment Berm	lin.m	170	$ 1,900	$ 323,000
1.2	Beach Nourishment Fill	Sq. m	2,000	$ 50	$ 100,000
1.3	Dock upgrade	lin.m	50	$ 1,000	$ 50,000
1.4	Riprap toe, marsh bench and upper wall plantings	lin.m	40	$ 3,100	$ 124,000
1.5	Bonding and Insurance	L.S.		3%	$ 8,220
1.6	Mobilization/Demobilization	L.S.		5%	$ 29,850
1.7	Engineering & Contingency	L.S.		40%	$ 254,028
	SUBTOTAL (Rounded $1000)				**$ 889,000**
2.0	**Armours Beach - Upland Improvements**				
2.1	Updated washrooms/building	L.S.	1	$ 250,000	$ 250,000
2.2	Adjacent Landscaping	lin.m	40	$ 500	$ 20,000
2.3	Pedestrian lighting	each	4	$ 5,000	$ 20,000
2.4	Bonding and Insurance	L.S.		3%	$ 8,700
2.5	Mobilization/Demobilization	L.S.		5%	$ 14,500
2.6	Engineering & Contingency	L.S.		40%	$ 125,280
	SUBTOTAL (Rounded $1000)				**$ 438,000**
3.0	**Upgraded Walkway (Armours to Coles) (120 m)**				
3.1	Excavation and Salvage of old Riprap/Fill	lin.m	120	$ 500	$ 60,000
3.2	Sewer Excavation and Replacement	lin.m	120	$ 500	$ 60,000
3.3	Riprap toe in ocean with marsh bench and upper bank riprap	lin.m	120	$ 5,300	$ 636,000
3.4	Surfacing of Walkway	lin.m	120	$ 30	$ 3,600
3.5	Native Vegetation and Landscaping	lin.m	120	$ 400	$ 48,000
3.6	Pedestrian lighting	each	6	$ 5,000	$ 30,000
3.7	Bonding and Insurance	L.S.		3%	$ 25,128
3.8	Mobilization/Demobilization	L.S.		5%	$ 41,880
3.9	Engineering & Contingency	L.S.		30%	$ 271,382
	SUBTOTAL (Rounded $1000)				**$ 1,176,000**
4.0	**Upgraded Walkway (Coles Marine) (40 m)**				
4.1	Excavation and Salvage of old Riprap/Fill	lin.m	15	$ 500	$ 7,500
4.2	Sewer Excavation and Replacement	lin.m	40	$ 750	$ 30,000
4.4	Surfacing of Walkway	lin.m	40	$ 30	$ 1,200
4.5	Native Vegetation and Landscaping	lin.m	40	$ 500	$ 20,000
4.6	Granular fill to bring walkway to grade	lin.m	40	$ 1,200	$ 48,000
4.7	Bonding and Insurance	L.S.		3%	$ 10,401
4.8	Mobilization/Demobilization	L.S.		5%	$ 17,335
4.9	Engineering & Contingency	L.S.		30%	$ 112,331
	SUBTOTAL (Rounded $1000)				**$ 487,000**
5.0	**Upgraded Walkway (Coles to Gibsons Wharf)**				
	Part 1 (130 m)				
5.1	Excavation and Salvage of old Riprap/Fill	lin.m	130	$ 500	$ 65,000
5.2	Sewer Excavation and Replacement	lin.m	130	$ 500	$ 65,000
5.3	Riprap toe in ocean with marsh bench and upper bank riprap	lin.m	130	$ 5,300	$ 689,000
5.4	Surfacing of Walkway	lin.m	130	$ 30	$ 3,900
5.5	Native Vegetation and Landscaping	lin.m	130	$ 400	$ 52,000
5.6	Pedestrian lighting	each	6	$ 5,000	$ 30,000
5.7	Bonding and Insurance	L.S.		3%	$ 27,147
5.8	Mobilization/Demobilization	L.S.		5%	$ 45,245
5.9	Engineering & Contingency	L.S.		30%	$ 293,188
	SUBTOTAL (Rounded $1000)				**$ 1,270,000**
6.0	**Upgraded Walkway (Coles to Gibsons Wharf)**				
	Part 2 (130 m)				
6.1	Excavation and Salvage of old Riprap/Fill	lin.m	130	$ 500	$ 65,000
6.2	Sewer Excavation and Replacement	lin.m	130	$ 500	$ 65,000
6.3	Riprap toe in ocean with marsh bench and upper bank riprap	lin.m	130	$ 5,300	$ 689,000
6.4	Surfacing of Walkway	lin.m	130	$ 30	$ 3,900
6.5	Native Vegetation and Landscaping	lin.m	130	$ 400	$ 52,000
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6.9	Engineering & Contingency	L.S.		30%	$ 293,188
	SUBTOTAL (Rounded $1000)				**$ 1,270,000**
7.0	**Upgraded Gibsons Wharf Connection**				
7.1	Install 8 new piles to accommodate expanded wharf	each	8	$ 5,000	$ 40,000
7.2	Construct timber wharf connection (allowance)	L.S.	1	$ 50,000	$ 50,000
7.3	Interpretive signage at gathering point	L.S.	1	$ 25,000	$ 25,000
7.4	Pedestrian lighting	each	2	$ 5,000	$ 10,000
7.5	Bonding and Insurance	L.S.		3%	$ 3,750
7.6	Mobilization/Demobilization	L.S.		5%	$ 6,250
7.7	Engineering & Contingency	L.S.		30%	$ 40,500
	SUBTOTAL (Rounded $1000)				**$ 176,000**
	TOTAL (Excluding Taxes Including Contingency, bonding and Insurance)				**$ 5,706,000**

This estimate has been prepared with little or no site information and as such indicates the approximate magnitude of the cost of the capital tasks, for project planning purposes only. The estimate has been derived from unit costs for similar projects.

KERR WOOD LEIDAL
consulting engineers

Appendix B

Consultation Summary

KERR WOOD LEIDAL
consulting engineers

Greater Vancouver
200 - 4185A Still Creek Drive
Burnaby, BC V5C 6G9
T 604 294 2088
F 604 294 2090

DATE: September 27, 2016

RE: **GIBSONS FORESHORE REDEVELOPMENT**
Consultation Summary – Open House Survey
Our File 1232.024

1. Background

On June 16, 2016, the Town of Gibsons held a Public Information Meeting to provide information to the public about the planned redevelopment of the Foreshore area. Meeting attendees were invited to complete a questionnaire about their use of the foreshore and their preferences for features to include in foreshore design. This memorandum summarizes the response received on this questionnaire and will be used to inform subsequent phases of foreshore development.

2. Methodology

The questionnaire was distributed to members of the public who attended the open house, and on the Town of Gibsons website. Responses were collected in hardcopy and online submission by July 29th.

The questionnaire asked questions about respondent demographics, foreshore uses, and perceived opportunities and challenges for foreshore development under four categories:

- Environmental;
- Social/Recreation;
- Economic; and
- Aesthetic.

Respondents were also asked to indicate the number one thing that they would like to see changed along the foreshore.

3. Questionnaire Results

Completed questionnaires were received from 47 respondents, including 16 hardcopy 31 online surveys. Results have been summarized according to respondent demographics, reported foreshore uses, perceived development opportunities, and perceived development challenges.

3.1 Demographics

The majority of respondents were Gibsons residents over the age of 45 years old.

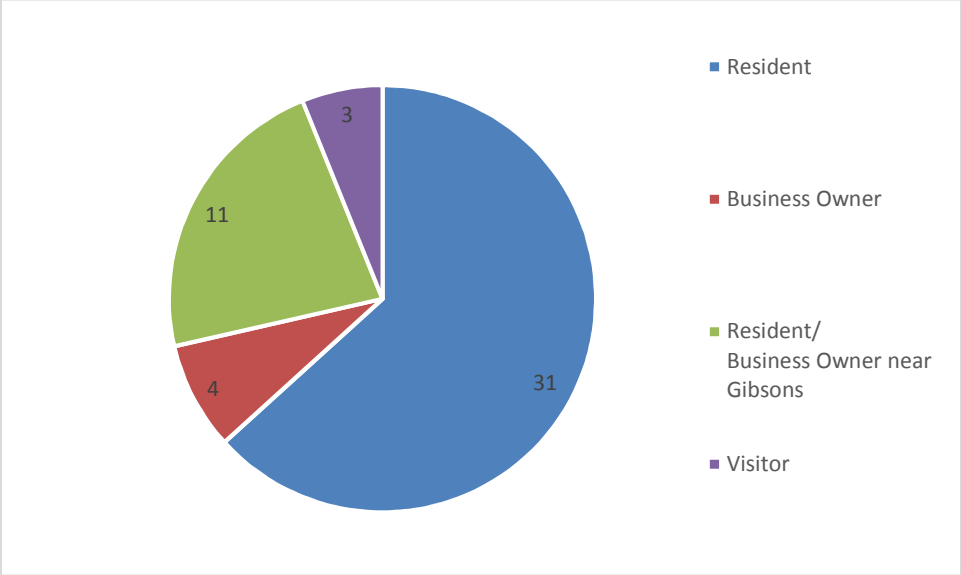

Figure 1: Respondent Identity, by number of respondents

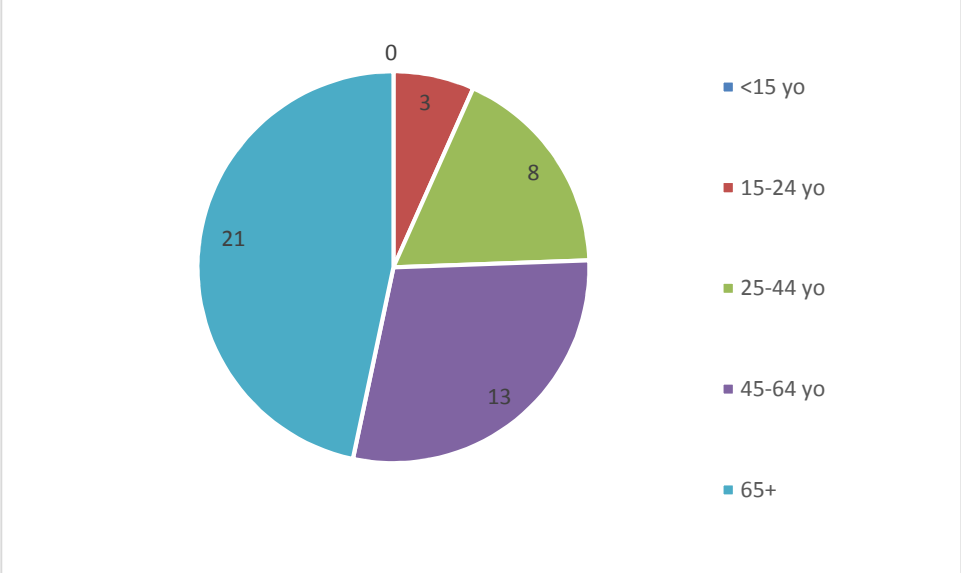

Figure 2: Respondent Age, by number of respondents

3.2 Foreshore Uses

According to respondents, the seawalk is the most frequently used feature along the foreshore, with 20 people reporting that they visit the Seawalk ten or more times per week. Armours Beach is the next most frequently used space, with 17 respondents reporting visiting Armours Beach each site ten or more times a week.

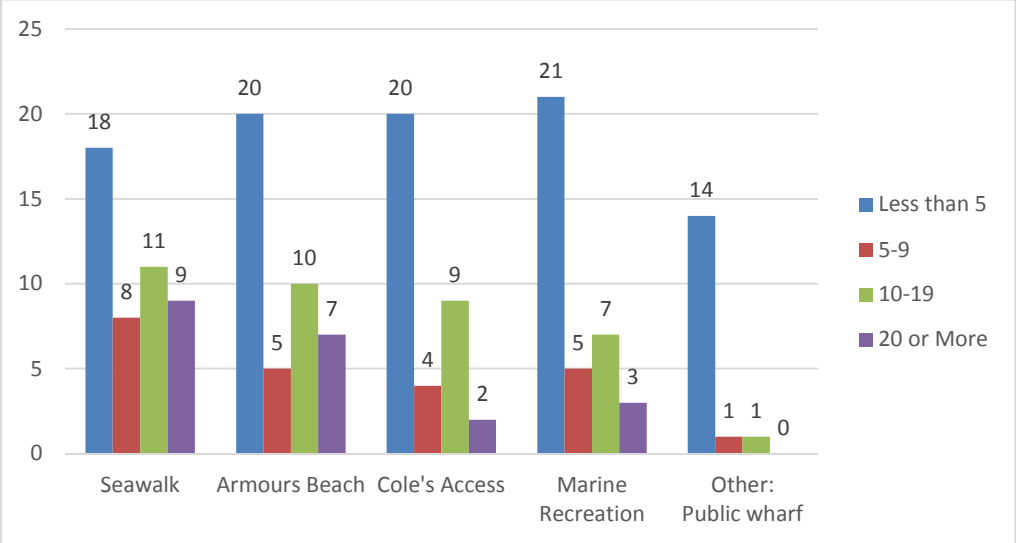

Figure 3: Foreshore Site Use Frequency, by number of respondents

The most frequently cited uses along the foreshore include:

- Recreational walking
- Dog walking
- Sitting on benches/enjoying the view
- Swimming at beach

3.3 Opportunities for Development

Respondents indicated a range of opportunities for development along the foreshore, relating to environmental, social/recreational, economic and aesthetic considerations. Overarching themes are summarized in Table 1.

Table 1: Recommended Opportunities for Development

Environmental	• Control invasive species along the seawalk • Restore and protect wildlife habitat (fish, insects, invertebrates) • Protect eelgrass from boat anchors • Enhance biodiversity and native plants (habitat & manage erosion) • Soften the foreshore using natural assets (plants rather than concrete) • Provide better waste & toilet facilities along foreshore to protect environment (i.e. bear-proof garbage bins) • Sponsor regular shoreline cleanups with citizen volunteers; promote education

Social/ Recreational	• Continuous, wide pathway along the seawalk for all modes of transportation • Improve path accessibility for wheelchairs & strollers • Remove logs, pot holes, and raise path to prevent flooding • More benches, seating areas & picnic tables in diverse formations (some in conversational groupings, others in quiet spaces to take in view). Picnic tables particularly at Armours Beach and Cole's Access. • Improve swimming facilities (washrooms/change rooms), clean up beach area, test water and provide safe beach/water access points • Set up amenities such as adult fitness equipment, historic plaques, environmental signage, or a community garden
Economic	• Encourage/permit small local businesses along the seawalk (i.e. coffee shops, small-scale retail integrated into sea glass on boardwalk). Set up a picnic area to encourage restaurant business. But not too close to pathway. • Promote Gibsons' natural beauty and image • Recognize and leverage the foreshore as a tourist destination • Limit high density development (traffic concerns & aesthetics); more low-height residential development • Charge for barge/vessel use at Gibsons Landing Harbour Authority; require installation of buoys beyond eelgrass; Save the water lease for public use
Aesthetic	• Keep as natural/rustic as possible (limit paving, lighting etc.) • Soften the foreshore with vegetation and landscaping with native plants • Restore slope (consider terracing), unkempt grass, and bushes; remove rock/debris from Armours Beach • Remove/manage derelict boats and buildings along the seawalk • More seating • Install bike racks • Keep the swing under the willow tree at Cole's marina • Add simple art pieces or encourage wall art on concrete retaining wall

There was general consensus among responses that the foreshore should remain natural and with low-density or no development. Two issues received a mixed review: while some respondents recommended the addition of small-scale local businesses and restaurants, other expressly rejected the idea of commercial uses along the foreshore. There was also disagreement among respondents about the seawalk surface, with some recommending a paved surface to improve accessibility for all modes of transport, and others requesting gravel surface.

3.4 Challenges for Development

Respondents identified challenges to development, according to Environmental, Social/Recreation, Economic and Aesthetic factors. Overarching themes and unique recommendations are summarized in Table 2.

Table 2: Identified Challenges for Development

Environmental	• Invasive plants (control via bylaw) • Impacts on marine life • Sewer infrastructure upgrades required • Sea level rise • Erosion from high tides • Boat impact on water quality (effluent, spill risk) and eelgrass (anchors)
Social/ Recreational	• Inhabited by homeless in the evenings/summer months • Sharp edges in the swim area and ladder • Limited parking • Poor wheelchair accessibility
Economic	• Limited parking for economic uses • Area is intended for recreational use, not economic
Aesthetic	• Seawalk is neglected and poorly maintained • Some derelict buildings/building backs, boathouses and boats; too much concrete

4. Open House Feedback

Questionnaire results indicate that respondents were generally satisfied with the background information provided in the survey. Respondents who attended the Public Information Meeting were more likely to state that sufficiency background information had been provided. Online respondents raised a number of areas for clarification.

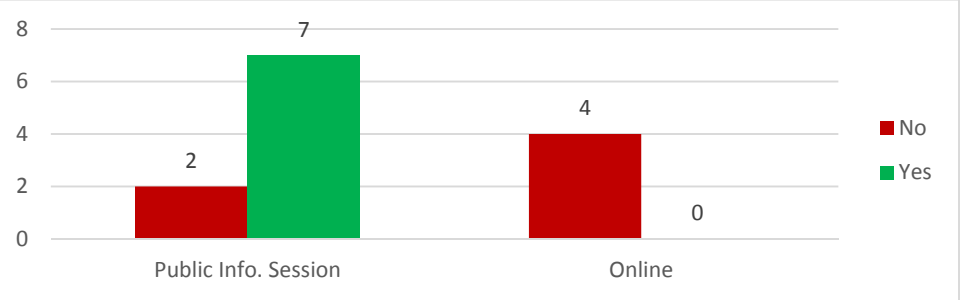

Figure 4: Was Sufficient Background Information Provided?

Some online respondents said they had trouble finding information online. Further information was requested on the following topics:

- Status of the elevated walkway by the George
- Proposed height and appearance of seawalk
- Would like slides provided in a take-away brochure
- Status of old sewage line from Armours Beach
- Consideration of climate change risks
- Legal ownership and leases along the foreshore

The majority of respondents provided an e-mail address to receive further information about the foreshore redevelopment project. A number of respondents who attended the Public Information Meeting also indicated interest in participating in the mini-charrette, though no online respondents indicated interest.

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