WAIUKU COASTAL WALKWAY
FEASIBILITY REPORT

FGL 12/022

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2 August 2013

Re: Waiuku Coastal Walkway Feasibility Report

1.0 Summary

This report summarises the evaluation of the feasibility to create a 6km walkway around the edges of the Waiuku River and Rangiwhea Creek near the Waiuku Township between King Street West and the end of Racecourse Road.

The proposed development of this walkway includes the formation of the following three sections of walkway:

- Section A (Western Walkway) between King Street West and Sandspit Reserve.
- Section B (Central Walkway) between Sandspit Reserve and Tamake Reserve.
- Section C (Eastern Walkway) between Tamake Reserve and Racecourse Road end.

This development will provide an attractive amenity for the local community, as well as an added attraction for visitors to Waiuku. The walkway will likely be used mainly by local residents for recreational purposes; however it is expected to become more popular with other users as the route is connected and expanded.

The development of some sections this walkway poses some technical challenges. Specific construction details will be necessary to provide a safe, durable walkway over sections with steep terrain and tidal areas.

The preferred route is entirely within esplanade reserve or in the Coastal Marine Area (CMA). There are several places where the proposed route traverses closely to private property and may be perceived to detract from the privacy enjoyed by these property owners. Liaison with adjacent property owners will be required in these locations.

The total estimated construction cost for Waiuku Coastal Walkway is **$ (excl GST)**.
The next step for this project following consultation and approval of this report by the stakeholders are as follows:

- Determine a programme of works.
- Arborist, Archaeological and Geotech investigations.
- Detailed site survey and final design of the different sections.
- Consultation with Iwi, local residents, etc.
- Apply for all necessary consents.
- Tendering and construction.

2.0 Objectives

The proposed walkway development has potential benefits to a wide part of the community and to visitors, ranging from Waiuku residents who wish to venture along a safe walkway in evenings and weekends, to visitors looking to explore the area. This walkway will be also available to be shared with cyclist.

The following opportunities are offered by the proposed walkway:

- Improvement of public access to the Waiuku River and Rangiwhea Creek.
- Providing the opportunity of loop walks by utilising existing footpaths on King Street and Racecourse Road.
- Facilitating observation and enjoyment of the wildlife habitat in the coastal fringe.
- Facilitating good management of the public land along the river estuary for the enjoyment of all.
- Fostering community pride and ownership of an amenity that is used and shared by the community.
- Offering the opportunity for further development by extending the proposed route in future.

This Feasibility Report has considered the proposed walkway with the following objectives in mind:

- Provision of a safe off road coastal walkway suitable for residents and visitors.
- Provision of quality, easily usable recreational access to the existing esplanade reserves.
- Protection of environmental and wildlife values of the coastal habitat.
- Provide a durable walkway with low life-cycle maintenance cost that offers high quality year-round use.
- Minimise damage or disturbance to historical and natural features in the area.

The development of the Waiuku Coastal Walkway has the potential for it to become a widely known and highly regarded recreation venue, similar in popularity to the Rotary Walkway in Pakuranga; which is receiving high numbers of local and visitor users.

3.0 Requirements

Any walkway should be designed to a standard that is appropriate for the expected use. Whilst a detailed survey of the likely users of a walkway has not been carried out, the type of users and the level of use can be estimated from similar walkways that are in close proximity to urban residential areas.

3.1. Walkway Standards

The NZ Handbook for Tracks and Outdoor Visitor Structures (SNZ HB8630:2004) classifies walkway users in User Groups based on the type of visitor, their physical capability and their level of self reliance in the outdoors. The relevant User Group Categories for this proposed walkway are as shown in Table 1.

Table 1 – User Group Categories

User Group	Description
Urban Resident (UR)	Users of urban parks, the majority of which are local residents including unsupervised children, elderly people, people with mobility difficulties and a wide range of physical abilities. People entering parks for recreation or for simply accessing other locations. Appropriate Track Classification: 'Path'
Short Stop Traveller (SST)	Users including local residents and visitors from a wider area, undertaking a short walk from a few minutes up to an hour duration. Includes parents with toddlers, school age children, elderly people and some people with mobility difficulties. Appropriate Track Classification: 'Short Walk'
Day Visitor (DV)	Users consisting of visitors undertaking an extended walk up to a full day in duration, seeking an outdoor experience in a natural setting with a sense of space. Includes families with young children, school parties and elderly people, but not generally including people who are physically challenged. Appropriate Track Classification: 'Walking Track'

3.2. Cycleway Standards

The Ministry of Tourism has prepared a Cycle Trail Design Guide which has formed the basis of cycleways that form part of Nga Haerenga, the New Zealand Cycle Trail. This document provides guidelines for the appropriate standard for various Grades of cycleway to suit the capability and experience of various user categories. The relevant grades for this proposed trail are shown in Table 2.

Table 2 – Cycleway Grades

Grade	Description
Grade 1	Flat, wide, smooth trail. Trail feels safe to ride. Ideal as a first ride experience for non-cyclists, and those wanting an easy gradient and experience. Trail allows cyclists to ride two abreast most of the time, and provides a social component to the ride. Cyclists will be able to ride the total distance without dismounting for obstacles.
Grade 2	Some gentle climbs, smooth trail. Suitable for beginner riders, the trail is predictable with no surprises. Social component with riders able to ride side by side at times, but possibly large sections of single trail.
Grade 3	Narrow trail, there will be some hills to climb, obstacles may be encountered on the trail, and there may be exposure on the edge of the trail. Suitable for riders with intermediate level skills.

It is noted that for off-road cycleways in New Zealand that this is now the preferred reference over Austroads "Guide to Traffic Engineering Practice".

3.3. Proposed Standard

Given the likely characteristics of the users of the Waiuku Coastal Walkway, we believe the appropriate classification for the track for walkers is "Path" (UR User Group) and the appropriate grade for cyclists is Grade 1. These categories are most likely to match the expectations and the experience of the users of the walkway.

Based on the walkway and cycleway classifications, the recommended parameters for design and construction of the walkway/cycleway are as shown in Table 3.

Table 3 – Recommended Design Parameters

Item	Design Range
Surface Width	All new main walkway sections to be at least 2m wide. Branch walkway sections to be at least 1.5m wide.
Maximum Grade	1 in 12 (8.3%) preferred. 1 in 8 (12.5%) acceptable in existing steep sections.
Steps	To be step free.
Surface	100mm thick black oxide tinted concrete on a 100mm thick GAP 40 basecourse. Light broom surface finish.
Alignment	Preferred minimum curve radius: 3m.
Batter Slopes	Maximum fill batter slope of 1 vertical to 1.5 horizontal and maximum cut batter slope of 4 vertical to 1 horizontal. Both reduced to 1 vertical to 3 horizontal in mown grass areas.
Vegetation Clearance	Clear vegetation around the walkway and up to 2.5m in height.
Culverts	Located under the walkway to allow the natural flow of water in depressions and small watercourses.
Structures	Timber with 2.0m wide deck width. 1 in 12 (8.3%) maximum grade.
Barriers	Type 'B' 1100mm high, installed on structures and retaining walls, where the fall height exceeds 1.5m as outlined in SNZ HB8630:2004.
Marking and Signage	Markers not necessary (route clearly defined by the surface). Directional signage at junctions.

3.4. Formation

The proposed route generally travels through mown grass, steep bush and the CMA. The following formation options will be used during construction as shown on the attached Estimated Work Schedule:

- **Form walkway on flat**
  Where the cross-slope is less than 15%, only minor formation work is required to form the walkway.

- **Form walkway where cross slope is less than 50%**
  Where the cross-slope is less than 50%, cut and fill formation shall be used where the excavated material from the inside of the formation bench is used to fill the outer edge of the walkway bench with suitable compaction equipment.

- **Form walkway where cross slope is greater than 50%**
  Where the cross slope is greater than 50%, a full cut formation (full bench) detail shall be used where the material cut from this type of formation shall be carted and compacted in place on ground having a slope of less than 50% or shall be retained for use as fill.

- **Form walkway on imported fill**
  Imported fill will be used to raise the walkway over significant tree roots or to avoid wet areas. In wet areas, culverts will typically be placed under the fill.

- **Installation of retaining walls**
  Retaining walls are to be constructed from timber poles and retaining boards. They are to be used in areas on steep cross slopes where the ground type is not suitable to be fully benched. Retaining wall posts will be concreted into the ground and where necessary tied back with reid bars or ground anchors. Retaining wall heights will vary between 0.6m and 1.5m, and barriers are to be installed where the fall height exceeds 1.5m.

- **Installation of boardwalks**
  Boardwalks are to be constructed with timber joists and decking sitting on timber poles and bearers. They are to be used over shallow watercourses or the CMA where it is not required to completely span the watercourse or the land option is not feasible. Boardwalks are to be constructed as low to the ground as possible depending on flood levels or tidal variations. Barriers are to be installed where the fall height exceeds 1.5m.

- **Deactivate existing paths**
  Where existing paths are no longer necessary; all existing metal, asphalt, edge boards, culverts, etc. will be removed. Organic material from new walkway formation will be placed over the old formation and cut out drains will be installed to control water. In some instances, as shown in the Estimated Work Schedule, this has also been specified where it is necessary to remove existing asphalt and edge boards; however the walkway will be built over the existing path. Note that planting old path locations has not been allowed for.

- **Miscellaneous**
  Other items to be used during construction include culvert installation, bollard installation, crosswalk installation, pine tree removal, old and private structure removal or modification, etc.

4.0 Proposed Route

The preferred walkway route follows the esplanade reserve along Waiuku River and Rangiwhea Creek. Where the esplanade does not exist or is too steep, it is necessary to install boardwalk in the CMA. The preferred route is summarised as follows (Note that the route and possible options are displayed in more detail in the attached Route Comments Schedule):

4.1. Section A – Western Walkway Section

Section A is 2,220m long, and traverses up the east coast of Rangiwhea Creek between King Street West (near McCall Drive) and Sandspit Reserve (at the Waiuku Yacht Club).

The section commences at King Street towards McCall Drive through steep vegetated reserve. Retaining walls are necessary to ensure that the earthworks required to form the walkway do not impact the private retaining walls above or undermine the boundary.

Beyond McCall Drive, the majority of this walkway section will be relatively easy to construct on flat grass through Bayview Esplanade Reserve and Elsie Drive Esplanade Reserve. Lengths of branch walkway are shown through the existing right of ways to allow simple access from neighbouring residential areas. The majority of this reserve boundary is fenced, so it is expected that the adjacent residents will support these segments.

Two options are shown between Rangiwhea Road and the section end at the Waiuku Yacht Club in Sandspit Reserve. These are to utilise the existing footpath along Rangiwhea Road, install a crosswalk and for a new segment of walkway in Sandspit Reserve; or form new walkway on the opposite side of Rangiwhea Road and utilise the existing concrete seawall path (Refer to Item 4.4 in this report for a more detailed breakdown of these options).

4.2. Section B – Central Walkway Section

Section B is 2,240m long, and traverses down the west coast of Waiuku River between Sandspit Reserve and Tamakae Reserve.

The walkway will continue 120m along the flat grass in Sandspit Reserve before reaching a steep bank with no esplanade reserve. A 425m long coastal boardwalk is necessary to traverse this section amongst the mangroves and in the CMA before it is possible to traverse back up the bank into the esplanade reserve.

The proposed walkway route continues through the grass esplanade and short sections of bush reserve before traversing over a proposed short 3m long bridge over a stormwater channel. Prior to designing this bridge, a flood flow analysis will need to be undertaken to ensure that the bridge has not adverse effects to flooding. Lengths of branch walkway will also be constructed to allow access from neighbouring residential areas onto the main walkway.

This section concludes by traversing over a recently constructed bridge over the estuary and upgrading a 270m long existing aggregate path to the Historic Village in Tamakae Reserve. No works has been proposed in this feasibility in Tamakae Reserve as we have been instructed to omit this section because Tonkin &Taylor Ltd has previously completed a Detailed Concept Plan for this reserve.

4.3. Section C – Eastern Walkway Section

Section C is 2,155m long, and traverses up the east coast of the Waiuku River between King Street East (near Tamakae Reserve) and the end of Racecourse Road.

There is an existing network of asphalt walkways between King Street and View Road School, which incorporates two existing viewing areas and a fenced tomo. The steeper sections of existing walkway and steps will be deactivated to allow for the new walkway to be set out and constructed at a 1:8 maximum grade.

The proposed walkway route continues through the esplanade reserve and into a gully joining to recently constructed glulam beam bridge. The walkway then continues up the slope and through a section of pine trees before joining to the north end of View Road.

Beyond View Road, the esplanade reserve is very steep below 49 View Road. A boundary survey is required to determine the location of the reserve and the walkway will require retaining wall.

After passing a small duck pond, two options are shown in the esplanade reserve towards Tui Place. These are to form the walkway on the flat grass close the property boundaries requiring the removal of some private structure; or lower in the esplanade reserve on the very steep vegetated slope. Whist building the walkway on the steep slope will provide more privacy to the adjacent private residents, this option poses some geotechnical challenges and is significantly more expensive (Refer to Item 4.4 in this report for a breakdown of the options).

Beyond Tui Place; the formation of the proposed walkway will be easy to construct on flat grass through the new Harbour Crest Drive subdivision, joining to the existing footpath on Godwit Place, and finally ending at the Racecourse Road cul-de-sac.

The final segment of branch walkway includes upgrading the existing aggregate trail down to the concrete seawall, which is currently badly scoured. This will involve re-grading the trail and installing a new flight of aggregate boxed steps with a new timber handrail. Due to uneven walking surface and fall hazard on the seawall; it is recommend not joining this branch walkway to the main walkway and possibly installing signage warning users of the walkway standard change.

4.4. Route Options

Table 4 summarises the possible options and recommendations identified along the proposed walkway.

Table 4 – Route Options

Segments	Option	Description
A2 (60m to 115m)	1 (Upper)	Form concrete walkway close to the private boundary. This option avoids possible flooding issues; however as the walkway is close to the boundary, private residents may concern.
	2 (Lower)	Form concrete walkway on the lower slope towards creek through the vegetation away from boundary. This option may have flooding issues. Flood levels should be checked.
	Recommend	*Option 1 is recommended to avoid any possible flooding issues.*
A9-A10 (1515m to 1840m)	1 (Upper)	Utilise the existing road footpath along Rangiwhea Road. Install a crosswalk and form new walkway in Sandspit Reserve.
	2 (Lower)	Form new walkway on the seaward side of Rangiwhea Road. Utilise the existing concrete seawall path in Sandspit Reserve. Excavations through Pohutukawa roots would be necessary to form approaches onto the seawall.
	Recommend	*Option 1 is recommended as currently there is no direct access onto the Option 2 seawall, which would require the excavation of Pohutukawa roots. Option 1 also avoids any possible flooding issues at high tide.*
C13-C14 (4755m to 4925m)	1 (Upper)	Form concrete walkway in esplanade reserve at the top of the slope. It is noted in this location that the boundary is very close to the houses and there appears to be enough esplanade reserve to construct a walkway on the flat at the top of the slope. A boundary survey is recommended in this location to confirm this is the case. Some private structures located within the esplanade reserve will need to be removed to make this option possible.
	2 (Lower)	Form concrete walkway with retaining wall and barrier on steep vegetated slope. A Geotechnical Engineering assessment is required to ensure this option is feasible.
	Recommend	*Option 1 is recommended as it will have less Geotechnical Engineering concerns and is estimated $ less expensive than Option 2.*

4.5. Geotechnical Issues

The following sections have been identified as requiring a Geotechnical Engineer to assess the areas and provide advice:

- A3 – The walkway will be formed below an existing private retaining wall. Geotechnical input is required to design a new retaining wall that supports the new walkway without impacting the private retaining walls above.
- B4 – After the proposed coastal boardwalk; earthworks, retaining wall and vegetation removal are required to form the walkway on ground with a cross slope up to 80%. Geotechnical input is required to design the new retaining wall and ensure that any proposed works will have no impact to slope stability.
- B5 – Minor cracking is present in the soil at the top of a steep slope. It is recommended a Geotechnical Engineer assess this section and provide advice to prevent any future ground movement.
- B6 – The walkway is to be cut above the existing service road to ensure a grade of less than 1:8 is achieved. Earthworks and vegetation removal are required to form the walkway on ground with a cross slope up to 60%. Geotechnical input is required to ensure that any proposed earthworks will have no impact to slope stability.
- C1 – The walkway climbs from King Street to the existing viewing platform. Earthworks and vegetation removal are required to form the walkway on ground with a cross slope up to 75%. Geotechnical input is required to ensure that any proposed earthworks will have no impact to slope stability.
- C2 branch – Earthworks, vegetation removal and the formation of a retained switchback is required to reform the walkway up the school on ground with a cross slope up to 80%. Geotechnical input is required to ensure any proposed earthworks will have no impact to slope stability and to assist with the design of the retained switchback.
- C10 – The walkway will be formed on a steep vegetated side slope close to an adjacent private boundary. Geotechnical input is required to design the new retaining wall and ensure that any proposed works will have no impact to slope stability.
- C13 and C14 (both options) – A Geotechnical assessment should be undertaken to investigate both options to ensure that no works will impact to the stability of the esplanade reserve or the private land above. In addition if Option 2 progresses, Geotechnical input will be required to design the new retaining wall.
- C15 – Continue the Geotechnical assessment from the previous section to ensure that the proposed works on the flat above the steep side slope will have no impact to the stability of the esplanade reserve.

5.0 Estimate

The estimated construction cost for each segment and the different options is detailed in attached Estimated Work Schedule. The estimated cost of the preferred option is summarised as follows (Note that these cost estimates were prepared in May 2012. All of the estimates exclude GST and include a 20% contingency):

- Section A – Western Walkway $
- Section B – Central Walkway $
- Section C – Eastern Walkway $
- **TOTAL ESTIMATED COST $**

These estimates are based on current contractor rates for similar construction projects. The estimated costs do not include provision for the following:

- Signage and viewing areas.
- Construction of fences and planting.
- Pine tree removal, other than those necessary to be removed for the walkway construction.
- Walkway and structures design costs.
- Sub-consultant fees.
- Consent application fees and preparation of consent application reports.
- Tender, contract management and inspections.
- Construction of items listed in Route Comments Schedule as "not part of this project".

6.0 Priorities

The various sections of the proposed Waiuku Coastal Walkway facilitate the development in logical stages. The sequence of staged development will depend on the rate of progress on access agreements and consents for various sections. There is merit in undertaking the less contentious sections of the walkway first so that visible progress is made and early benefits are achieved, thus encouraging support for the more difficult sections.

Table 5 outlines the walkway segments that are recommended to be constructed in the short, medium and long term taking into account each segments ease of construction and expected popularity with users. (Note that these cost estimates are for the preferred option and have been rounded. They all exclude GST and include a 20% contingency.)

Table 5 – Draft Programme

Time	Segments	Reason	Cost Estimate
Short term (construct immediately)	B10 branch - B13 (3200m to 3645m)	This is an important link to join Tamakae Reserve to the new bridge near Owens Road and to Edgewater Parade. Works in this section will be relatively easy upgrading an existing aggregate path and over grass.	
	B7 branch2 - B10 (3000m to 3200m)	This section will allow further access from Riverside Drive to Tamakae Reserve including better access of the stormwater channel.	
	B7 branch1 - B10 (2780m to 3000m)	This section will also allow further access from Riverside Drive to Tamakae Reserve. Upgrading beyond this section will require boardwalk.	
Medium term	B1-B7 (1845m to 2780m)	This will create an important link between Sandspit Reserve and Riverside Drive; however the coastal boardwalk is the most expensive part of this project and will required a Coastal Resource Consent.	
	(C1-C8 3920m to 4495m)	Existing asphalt walkways are already present to the school and viewing areas. An immediate upgrade to these tracks is not essential.	
Long term	A1-A3 (0m to 170m)	Issues with closeness to private boundary. This segment is not essential as there is alternative access to King Street on McCall Drive.	
	A4-A10 (170m to 1840m)	This works is not essential as there is already easy access over the grass esplanade or alternatively on road footpaths.	
	C9-C15 (4495m to 4920m)	Issues with closeness to private boundary and geotechnical issues. Close liaison will be required with private residents, which may delay this segment.	
	C15-C21 (4925m to 5830m)	This works is not essential as there is already easy access over the grass esplanade between Tui Place and Racecourse Road End.	
		Total Estimated Cost:	

7.0 Consents

A summary of the expected consent requirements to construct this walkway are as follows (note that this is a narrow summary of requirements and should act as an overview only).

7.1. Resource Consent

Auckland Council Resource Consent will be required for the proposed works as per the following:

- **Zoning**
  The proposed walkway route passes through the following zones outlined in the Franklin District Plan (Auckland Council):
  - Recreation
  - Residential

  Auckland Council Land-use Consent will be required to build the walkway where the route passes through Recreation Zones due to earthwork thresholds and setback rules from residential zones. Specific rules in regards to these zones will depend on the final alignment of the walkway.

- **Earthworks**
  Earthworks over 25 cubic metres within the "Development Setback" will require an Auckland Council Land-use Consent. Note that a Development Setback is any land area within 30m of the CMA or 10m within a river or lake.

  Any earthworks over 100 cubic metres in a Recreational Zone occurring within a single construction project will trigger consent requirements.

  Any earthworks within 6m of a Residential Zone boundary will also trigger consent requirements.

- **Buildings**
  Buildings within 6m of a Residential Zone or 3m from any other boundary will trigger consent requirements.

- **Heritage**
  The area associated with the Waiuku River (in particular the Tamakae Reserve) has been recognised on the District Plan as an area significant to local Iwi (Ngaati Te Ata). Iwi consultation may be required in association to these works.

- **Vegetation**
  Auckland Council Land-use Consent will be required for the removal or damage to any of the following trees:
  - Any scheduled tree in the District Plan.
  - Any native tree listed in the District Plan as species of trees to be protected.
  - In a Coastal Protection Setback, any native or exotic trees standing higher than 6m, and one or more limbs when measured at 1200mm above ground level is greater than 650mm in circumference.

  The cutting or removal of indigenous vegetation for recreational tracks up to 1.7m wide is permitted; however as the proposed walkway width is 2m, consent will be required to clear vegetation.

  It is recommended that an Arborist is engaged to assess the vegetation along the proposed walkway route to identify any issues.

- **Coastal**
  All works below Mean High Water Spring and in the Coastal Marine Area will require an Auckland Council Coastal Consent. Auckland Council will be interested in the adverse effects arising from the disturbance of the foreshore and seabed; adverse effects arising from deposition of material in the coastal marine area; any removal of indigenous vegetation; any discharge of contaminants; and the design and external appearance of the structure; the duration of the consent; and monitoring of the consent. Only the proposed 425m long Section B boardwalk will require an Auckland Council Coastal Consent.

7.2. Building Consents

Under the Building Act, an Auckland Council Building Consent will be necessary for any structure that is not exempt under Schedule 1 of the Act. This means that any platform, bridge or boardwalk structure from which it is possible to fall more than 1.5m, or any retaining wall supporting more than 1.5m height of soil will require a Building Consent. Building Consent will be required for the proposed 425m long Section B coastal boardwalk and some of the proposed retaining walls along the preferred walkway route.

7.3. Other Approvals

7.3.1 Adjacent Landowners

Consultation will be required with the private residents whose houses back onto the esplanade reserve. Some will be apprehensive with the closeness of the proposed walkway to their property, as well as being concerned with privacy and security to their homes.

A majority of the esplanade reserve is accessible by the public and clearly defined with the boundaries marked or fenced; however in some sections this is not the case and the residents have been using the reserve as their own property by mowing the grass and building private structures. In these areas, it is recommended that a Registered Surveyor be engaged to peg the reserve boundaries, so that the reserve is clearly defined and all private structures that encroach into the reserve can be removed.

7.3.2 Services

Both Watercare and NZ Steel services are present adjacent to the proposed walkway route. Whist any earthworks will be limited in these locations, consultation and consent may be required from the provider for working near their services.

7.3.3 Historic Places Trust and Iwi

As this proposed walkway is in very close proximity to the Coastal Marine Area, it is very likely that archaeological sites will be present along the route. Prior to completing any construction works, it is recommend that a detailed archaeological study be undertaken by an Archaeologist to assess if any archaeological sites will be impacted by the proposed construction works and apply for a Historic Places Trust (HPT) authority. At this stage, local Iwi should also be consulted.

8.0 Recommendation

To progress with the development of the Waiuku Coastal Walkway, the recommended next steps for this project are:

- Obtain stakeholders feedback for this feasibility report.
- Prioritise the different sections of walkway and determine which options to proceed with.

After the decision is made on which section of walkway to develop, the following can be completed:

- Source funding for this project.
- Engage an Archaeologist to assess this area and if necessary apply for a HPT authority.
- Engage a Geotechnical Engineer to assess the ground conditions and provide advice on retaining walls and earthworks.
- Engage an Arborist to assess any impacts to vegetation (in areas identified in the Route Comments Schedule).
- Engage a Landscape Architect to complete a Planting Plan (in areas identified in the Route Comments Schedule).
- Engage a Registered Surveyor to clearly define the reserve boundary (in areas identified in the Route Comments Schedule).
- Complete detailed surveys and prepare designs.
- Carry out consultation with residents, Iwi, Watercare, NZ Steel, Waiuku Yacht Club and other interested parties.
- Apply for any required Resource and Building Consents.
- Remove any unwanted pine trees and other vegetation along the proposed walkway route.
- Procure and manage the physical walkway construction.

9.0 Attachments

- Attachment 1 – Site and Example Photos.
- Attachment 2 – Route Comments and Estimated Work Schedule.
- Attachment 3 – Plan drawings (x5).

Drew Kenny
Senior Consultant, Frame Group Ltd.

Site Photos

A1 – Start of walkway at King Street

A3 – Form walkway below private retaining wall

A4 – Easy formation on grass

A4 Branch – McCall Drive right of way

A5 Branch 1 – Gobi blocks and services

A5 Branch 2 – Easy to Waitoa Street, avoid services

A5 – Easy formation on grass

A7 – Fill low wet area and form walkway

A9 (Op 1 &2) – Join to Rangiwhea Road

A9 (Op 1 &2) – Along Rangiwhea Road

A9 (Op 1) – Possible crosswalk location

A10 (Op 1) – Through Sandspit Reserve

A9 (Op 2) – Boat ramp and seawall, benching required

A10 (Op 2) – Existing seawall

A10 – End at existing Yacht Club Drive

B2 – Form walkway around shed and services

B3 – Start of proposed boardwalk

B3 – End of proposed boardwalk

B3 – Retaining required up steep slope

B5 – Sandspit Esplanade Reserve

B6 – Form new walkway through vegetation above access road

B8 – Proposed 3m bridge in Riverside Drive Recreation Area

B10 – Easy formation on grass

B12 – Easy formation towards existing new bridge

B13 – Existing aggregate track to be upgraded to concrete

B14 – Existing walkway in Historic Village

B15 – Join to King Street

C1 – Remove concrete and staircase

C1 – Cut new walkway up to existing viewing platform

C3 – Upgrade walkway and tomo barrier

C5 - Meander walkway down to existing new bridge

C8 – Easy formation on grass, plant steep coastal bank

C9 – Join to View Road end; retain next section

C11 – Form over existing culvert adjacent to pond

C12 – Easy formation on grass

C13 (Op 1) – Cut up to grass area after carpark

C14 (Op 1 & 2) – Remove structures or retain on bank

C15 – Form on grass above steep slope

C16 - Esplanade in front of new sub division

C17 Branch - Join to Harbour Crest Drive

C18 – Easy formation on grass

C18 – Form walkway through bollards and join Harbour Crest Drive

C20 – Install culvert in depression

C21 – End at Racecourse Road

C21 Branch – Upgrade aggregate path and steps to concrete wall

Example Photos

2m wide concrete walkway on grass

2m wide concrete walkway on coast

200mm diameter culvert under concrete walkway

Walkway with downhill retaining wall and barrier

Walkway with low uphill retaining wall

Walkway with uphill and downhill retaining wall

2m wide timber coastal boardwalk

Coastal boardwalk and bridge with barriers

2m wide timber boardwalk with kerbs

Auckland Council, Waiuku Coastal Walkway
Route Comments Schedule, Rev A - August 2013

Segment & Options	Start Distance	End Distance	Segment Length [m]	Description	Comments	Issues	Investigations	Estimated Construction Cost [excl GST]
SECTION A - KING STREET WEST TO SANDSPIT RESERVE (WESTERN WALKWAY)								
A1	0	60	**60**	Off King Street in vegetated esplanade between houses and creek.	Join to concrete footpath on King Street. Form new concrete walkway on undulating land through vegetation. Retain walkway over steep terrain.	Close to private boundary (privacy). Vegetation removal and close to large trees. Underground services present.	Setting out, Arborist, Boundary Survey.	
A2 Option 1	60	115	**55**	Below private retaining wall, close to boundary behind Logan Place.	Form concrete walkway on flat and onto slope.	Close to private boundary (privacy).	Setting out, Boundary Survey, Planting Plan.	
A2 Option 2	60	115	**55**	On lower vegetated slope between houses and creek.	Form concrete walkway on vegetated slope.	Possible flooding issue. Vegetation removal.	Setting out, Arborist, Planting Plan.	
A3	115	170	**55**	Below private retaining wall and deck close to boundary behind McCall Drive.	Form retained concrete walkway with barrier through vegetation on slope.	Close to private boundary (privacy). Works near existing private retaining wall and deck.	Setting out, Geotech Investigation, Boundary Survey, Planting Plan.	
A4	170	230	**60**	Grass esplanade reserve.	Form concrete walkway on flat grass in esplanade.	Nil		
A4 Branch	193		**50**	Existing right of way to McCall Drive.	Join to existing concrete walkway on flat grass. Flare at join. Remove chain bollard at end.	Nil		
A5	230	1300	**1070**	Grass esplanade reserve between McCall Drive and north end of Elsie Drive. Majority of boundaries fenced.	Form concrete walkway on flat grass in esplanade avoiding vegetation.	Nil		
A5 Branch 1	525		**110**	Existing gobi block path to Bayview Drive.	Form concrete walkway on flat grass joining to existing path.	Very close to services.	Liaise with Watercare.	
A5 Branch 2	775		**65**	Grass reserve opposite Waitoa Street. Easy beach access.	Form new branch walkway on flat grass between existing bollards and joining to road footpath.	Avoid services in centre of reserve.		
A5 Branch 3	1220		**50**	Grass reserve opposite Dawn Place.	Form new branch walkway on flat grass joining to road footpath. Install bollards.	Nil		
A5 Branch 4	1300		**50**	Existing right of way to north end of Elsie Drive.	Join to existing concrete walkway on flat grass. Flare at join.	Nil		
A6	1300	1380	**80**	Follow low area to avoid vegetation. Easy beach access.	Form concrete walkway on flat grass in esplanade.	Possible flooding issue at high tide.		
A7	1380	1410	**30**	Low area in explained near Shanley Crescent.	Fill low area to prevent flooding. Plant low side of path to prevent erosion.	Flooding issue at high tide.	Planting Plan.	
A8	1410	1515	**105**	Continue towards Rangiwhea Road.	Form concrete walkway on flat grass in esplanade. Boundary is fenced.	Possible flooding issue at high tide.	Planting Plan.	
A8 Branch	1415		**55**	Right of way to Shanley Crescent.	Form walkway through existing grass access way. Remove 3m fence at end and join to road footpath.	Nil		
A9 Option 1	1515	1685	**170**	Upper Option along Rangiwhea Road.	Form on flat grass and join to existing footpath. Install crosswalk at end.	Check boundary at 26 Ratangiwhea Road to see if the road footpath can continue to the cul-de-sac end (possible 15m on road section).	Boundary Survey. Liaise with roading department re crosswalk.	
A10 Option 1	1685	1840	**155**	Grass in Sandspit Reserve. End at access drive to Waiuku Yacht Club.	Form through bollards and on flat grass. Avoid trees, picnic area and toilets.	Reduced play area on grass (minimised).		
Option 1 Subtotal			***325***					
A9 Option 2	1515	1695	**180**	Lower Option along Rangiwhea Road.	Fill up to and form adjacent road. Cut down to seawall.	Trim pohutukawa. Remove two bins. On road section near boat ramp.	Arborist.	
A10 Option 2	1695	1840	**160**	Along existing seawall in Sandspit Reserve.	Along seawall. Cut up from seawall past pohutukawa trees.	Excludes seawall repairs. Flooding Issue. Tree root cutting.	Arborist, Coastal Engineer.	
Option 2 Subtotal			***340***					
TOTALS:			**2220**					
(Highlighted segments are options and are not included in totals)							**Contingency 20%:**	
Note: Estimates completed in May 2012							**GRAND TOTAL:**	

Auckland Council, Waiuku Coastal Walkway
Route Comments Schedule, Rev A - August 2013

Segment & Options	Start Distance	End Distance	Segment Length [m]	Description	Comments	Issues	Investigations	Estimated Construction Cost [excl GST]
SECTION B - SANDSPIT RESERVE TO TAMAKAE RESERVE (CENTRAL WALKWAY)								
B1	1840	1845	**5**	Access drive to Waiuku Yacht Club with bollards.	No works on concrete drive.	Close to Yacht Club.	Liaise with Yacht Club.	
B2	1845	1965	**120**	Continue in Sandspit Reserve on grass.	Form concrete walkway on flat grass. Avoid boat shed and services.	Close to services.	Liaise with Yacht Club and NZ Steel.	
B3	1965	2390	**425**	At bottom of steep bank between Sandspit Reserve and Sandspit Road Esplanade Reserve.	Install coastal boardwalk at bottom of slope through mangroves.	Coastal Consent for boardwalk. Ground too steep above for land based option.	Setting out, Boardwalk design.	
B4	2390	2465	**75**	Steep vegetated slope. Too steep to climb any earlier or join to Sandspit Road.	Start cutting in low area at top of bank and retain down to coast on steep side slope.	Steep side slope. Vegetation removal. Increase max track grade to 1:8.	Setting out, Geotech Investigation, Arborist.	
B5	2465	2620	**155**	Sandspit Esplanade Reserve.	Form concrete walkway on flat grass at top of bank.	Minor soil cracking. Close to private boundary (privacy). Any future pine removal to be complete prior to walkway installation.	Geotech Investigation.	
B6	2620	2740	**120**	Vegetated area with services.	Form concrete walkway above access way, down steep slope through thick vegetation. Avoid larger trees.	Steep side slope. Vegetation removal. Close to services. Any future pine removal to be complete prior to walkway installation. Increase max track grade to 1:8.	Setting out, Geotech Investigation, Arborist. Liaise with Watercare.	
B7	2740	3010	**270**	Grass esplanade reserve with fenced boundaries.	Form concrete walkway on grass along coastal edge below trees.	Nil		
B7 Branch 1	2780		**135**	Right of way to Riverside Drive.	Form concrete walkway up sloping ground around trees and manhole. Join to existing path at right of way. Remove old fence posts.	Underground services. Increase max track grade to 1:8.	Setting out. Liaise with Watercare.	
B7 Branch 2	3000		**105**	Grass Reserve to Riverside Drive.	Form concrete walkway on flat grass. Join to road footpath at access ramp and dog bin.	Nil		
B8	3010	3015	**5**	Riverside Drive Recreation Area.	Install 3m bridge over stormwater channel with raised approaches. Remove old bridge.	Ensure good clearance over channel. Close to services.	Bridge design. Liaise with Watercare.	
B9	3015	3135	**120**	Esplanade behind Edgewater Parade with fenced boundaries.	Cut new walkway up and down slope.	Minor vegetation clearance at top of slope. Increase max track grade to 1:8.	Setting out, Arborist.	
B10	3135	3230	**95**	Grass esplanade reserve.	Form concrete walkway on flat grass.	Any future pine removal to be complete prior to walkway installation.		
B10 Branch	3200		**120**	Grass reserve to Edgewater Parade.	Form on flat grass and bench switchback up to existing road footpath.	Increase max track grade to 1:8.	Setting out.	
B11	3230	3250	**20**	Estuary.	New bridge over estuary (no works).	Nil		
B12	3250	3375	**125**	Grass esplanade reserve near Owens Road. Boundaries are fenced.	Form concrete walkway on flat grass in esplanade.	Nil		
B13	3375	3645	**270**	Existing 2m wide aggregate path adjacent to inlet. Minor retaining present. No drainage.	Upgrade to existing concrete walkway.	Nil		
B14	3645	3805	**160**	Existing 1.2m wide concrete footpath past historic village in Tamakae Reserve.	Refer to T&T report. Not part of this project.	Nil		
B15	3805	3920	**115**	Existing King Street footpath in Waiuku.	No works.	Nil		
TOTALS:			**2440**					

(Highlighted segments are options and are not included in totals)

Contingency 20%:

Note: Estimates completed in May 2012

GRAND TOTAL:

Auckland Council, Waiuku Coastal Walkway
Route Comments Schedule, Rev A - August 2013

Segment & Options	Start Distance	End Distance	Segment Length [m]	Description	Comments	Issues	Investigations	Estimated Construction Cost [excl GST]
SECTION C - TAMAKAE RESERVE TO RACECOURCE ROAD END (EASTERN WALKWAY)								
C1	3920	4015	**95**	Off King Street adjacent to car park and up slope to existing viewing platform.	Form new on flat grass near car park and up vegetated slope. Remove lower staircase / concrete and 3 steps at viewing platform. No works on platform.	Steep side slope. Vegetation removal. Increase max track grade to 1:8.	Setting out, Geotech Investigation, Arborist.	
C2	4015	4075	**60**	Existing asphalt paths.	Upgrade higher path with new concrete. Remove old asphalt and edge board. Deactivate lower path.	Nil		
C2 Branch	4090		**100**	New side track to school. Join to existing track ending at playground.	Form up vegetated slope and form retained switchback at existing steps. Upgrade track to school. Remove existing steps to school.	Steep side slope. Vegetation removal. Increase max track grade to 1:8.	Setting out, Geotech Investigation, Arborist.	
C3	4075	4160	**85**	Existing asphalt path around tomo.	Upgrade with new concrete walkway. Remove old asphalt and edge boards. Remove old and install new barrier around tomo.	Nil		
C3 Branch 1	4105		**30**	Existing steps towards river.	No works proposed. Possible future upgrade.			
C3 Branch 2	4115		**30**	Side track to viewing area.	Upgrade to concrete walkway. Remove old asphalt and edge boards. No works on platform.	Nil		
C4	4160	4190	**30**	Existing walkway is steep up bank.	Cut new walkway through vegetated hump.	Nil	Planting Plan.	
C4 Branch	4190		**15**	Existing walkway to school field.	Form new branch walkway on grass. Remove old.	Nil		
C5	4190	4285	**95**	Towards gully in cleared area.	Meander walkway down to timber bridge. Vegetation has already been cleared. Install 200mm dia culvert in small gully.	Increase max track grade to 1:8.	Planting Plan, Setting out.	
C6	4285	4300	**15**	Gully.	New bridge with wingwalls over gully (no works).	Nil	Planting Plan.	
C7	4300	4390	**90**	Up slope and into pines to achieve grade.	Form walkway on flat grass between trees and cut up through bush. Remove 3 pines. Avoid slip. Adjacent lot belongs to council.	Bank showing some instability (does not affect walkway). Increase max track grade to 1:8.	Planting Plan, Setting out, Arborist.	
C8	4390	4495	**105**	Grass esplanade reserve.	Form concrete walkway on flat grass. Minor cutting near end.	Bank showing some instability (does not affect walkway).	Planting Plan.	
C9	4495	4520	**25**	Join to View Road end.	Join to road and continue to form walkway on flat grass.	Nil	Planting Plan.	
C10	4520	4545	**25**	Very steep esplanade below boundary of 49 View Road.	Form retained concrete walkway with barrier through vegetation on slope.	Close to private boundary (privacy). Steep side slope. Vegetation removal (some large trees).	Setting out, Geotech Investigation, Boundary Survey.	
C11	4545	4645	**100**	Flat grass adjacent to pond over existing culvert.	Easy formation along fence line. Some pruning of trees.	Nil		
C12	4645	4755	**110**	Grass esplanade reserve with fenced boundaries.	Form concrete walkway on flat grass. Cut through hump.	Nil		
C13 Option 1	4755	4800	**45**	Climb up through bush to grass area after car park.	Form concrete walkway on slope.	Increase max track grade to 1:8. Cutting required below car park. Vegetation removal.	Setting out, Geotech Investigation, Arborist, Boundary Survey.	
C14 Option 1	4800	4925	**125**	Upper Option on grass behind properties on Tui Place and Kauri Drive.	Easy to form walkway, however many private structures have been built in the reserve, which require removal (woodshed, carport, fences, swings, gardens, etc). Minor retaining wall necessary.	Close to private boundary (privacy). Remove private structures. Possible fencing.	Geotech Investigation, Boundary Survey.	
Option 1 Subtotal			***170***					
C13 Option 2	4755	4815	**60**	Cut below retained car park.	Form concrete walkway on slope.	Cutting below car park. Vegetation removal.	Setting out, Arborist, Geotech Investigation.	
C14 Option 2	4815	4925	**110**	Lower Option on slope behind properties on Tui Place and Kauri Drive.	Form retained concrete walkway with barrier through vegetation on slope.	Very steep side slope. Vegetation removal. possibly some large trees).	Setting out, Arborist, Geotech Investigation.	
Option 2 Subtotal			***170***					

Auckland Council, Waiuku Coastal Walkway
Route Comments Schedule, Rev A - August 2013

Segment & Options	Start Distance	End Distance	Segment Length [m]	Description	Comments	Issues	Investigations	Estimated Construction Cost [excl GST]
C15	4925	4985	**60**	Grass esplanade reserve with fenced boundaries.	Easy formation along fence line at top of slope.	Steep slope below walkway.	Geotech Investigation.	
C15 Branch	4955		**45**	Right of way to Tui Place.	Form on flat grass and join to existing footpath.	Residents may want fencing.		
C16	4985	5245	**260**	In esplanade in front of new sub division.	Easy formation in grass esplanade. Pines have already been removed on bank. Tidy esplanade from tree removal required.	Avoid manhole services.	Planting plan.	
C16 Branch	5130		**40**	Existing path to driveway.	Join to existing path on grass.	No right of way.		
C17	5245	5310	**65**	Enter Reserve.	Form concrete walkway on flat grass in esplanade.	Avoid manhole services.		
C17 Branch	5295		**30**	Join to Harbour Crest Drive.	Form new branch walkway on flat grass between bollards and joining to road footpath.	Nil		
C18	5310	5545	**235**	Grass esplanade reserve with fenced boundaries.	Form concrete walkway on flat grass between narrowing and bollards at end.	Any future pine removal to be complete prior to walkway installation.		
C19	5545	5625	**80**	Existing footpath on Harbour Crest Drive.	No works. Possible to widen in future.	Future pine removal.		
C20	5625	5750	**125**	Esplanade between Harbour Crest Drive and Heron Place.	Form concrete walkway on flat grass. Fill depression and install 200mm dia culvert. Follow grass into narrowing to avoid drop.	Close to private boundary (privacy).	Boundary Survey.	
C20 Branch	5725		**35**	Join to Heron Place.	Form new branch walkway on flat grass between bollards and joining to road footpath.	Nil		
C21	5750	5830	**80**	Grass esplanade to Racecourse Road end.	Form concrete walkway on flat grass. Join to road footpath at end.	Boundary not fenced (privacy). Steep drop below with warning signs.	Boundary Survey.	
C21 Branch	5820		**15**	Existing aggregate side track to concrete wall. Existing track is steep and undercutting.	Remove existing and reform aggregate track with boxed steps and handrail. Do not connect track to main walkway.	Walking on concrete block wall at bottom does not comply with walking standard.	Setting out.	
TOTALS:			**2155**					

(Highlighted segments are options and are not included in totals)

Contingency 20%:

Note: Estimates completed in May 2012

GRAND TOTAL:

Auckland Council, Waiuku Coastal Walkway
Estimated Work Schedule, Rev A - August 2013

Segment & Options	Start Distance	End Distance	Segment Length [m]	Vegetation Clearance [m]	Form walkway on flat [m]	Form walkway where crossfall <50% [m]	Form benched walkway where crossfall >50% [m]	Form walkway on imported fill [m]	Install 1.5m wide Concrete Surface [m]	Install 2m wide Concrete Surface [m]	Install retaining wall [m]	Install 2m wide timber boardwalk [m]	Install barrier or handrail [m]	Deactivate existing path [m]	Misc. [removals, culverts, bollards, etc.]	Total
				$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	LS	
SECTION A - KING STREET WEST TO SANDSPIT RESERVE (WESTERN WALKWAY)																
A1	0	60	**60**	60		20	40			60	40		30			
A2 Option 1	60	115	**55**		35	20				55						
A2 Option 2	60	115	**55**	35		20	35			55						
A3	115	170	**55**	55		25	30			55	55		35			
A4	170	230	**60**		50	10				60						
A4 Branch	193		**50**		5				5							
A5	230	1300	**1070**		1070					1070						
A5 Branch 1	525		**110**		10				10							
A5 Branch 2	775		**65**		65				65							
A5 Branch 3	1220		**50**		50				50						2500	
A5 Branch 4	1300		**50**		5				5							
A6	1300	1380	**80**		60	20				80						
A7	1380	1410	**30**					30		30						
A8	1410	1515	**105**		105					105						
A8 Branch	1415		**55**		50	5			55						500	
A9 Option 1	1515	1685	**170**		40					40					2000	
A10 Option 1	1685	1840	**155**		155					155						
Option 1 Subtotal																
A9 Option 2	1515	1695	**180**	10	145		10	20		175					2000	
A10 Option 2	1695	1840	**160**		15		10			25					2000	
Option 2 Subtotal																
TOTALS:			**2220**	**115**	**1700**	**100**	**70**	**30**	**190**	**1710**	**95**	**0**	**65**	**0**	**5000**	
(Highlighted segments are options and are not included in totals)															**Contingency 20%:**	
Note: Estimates completed in May 2012															**GRAND TOTAL:**	

Auckland Council, Waiuku Coastal Walkway
Estimated Work Schedule, Rev A - August 2013

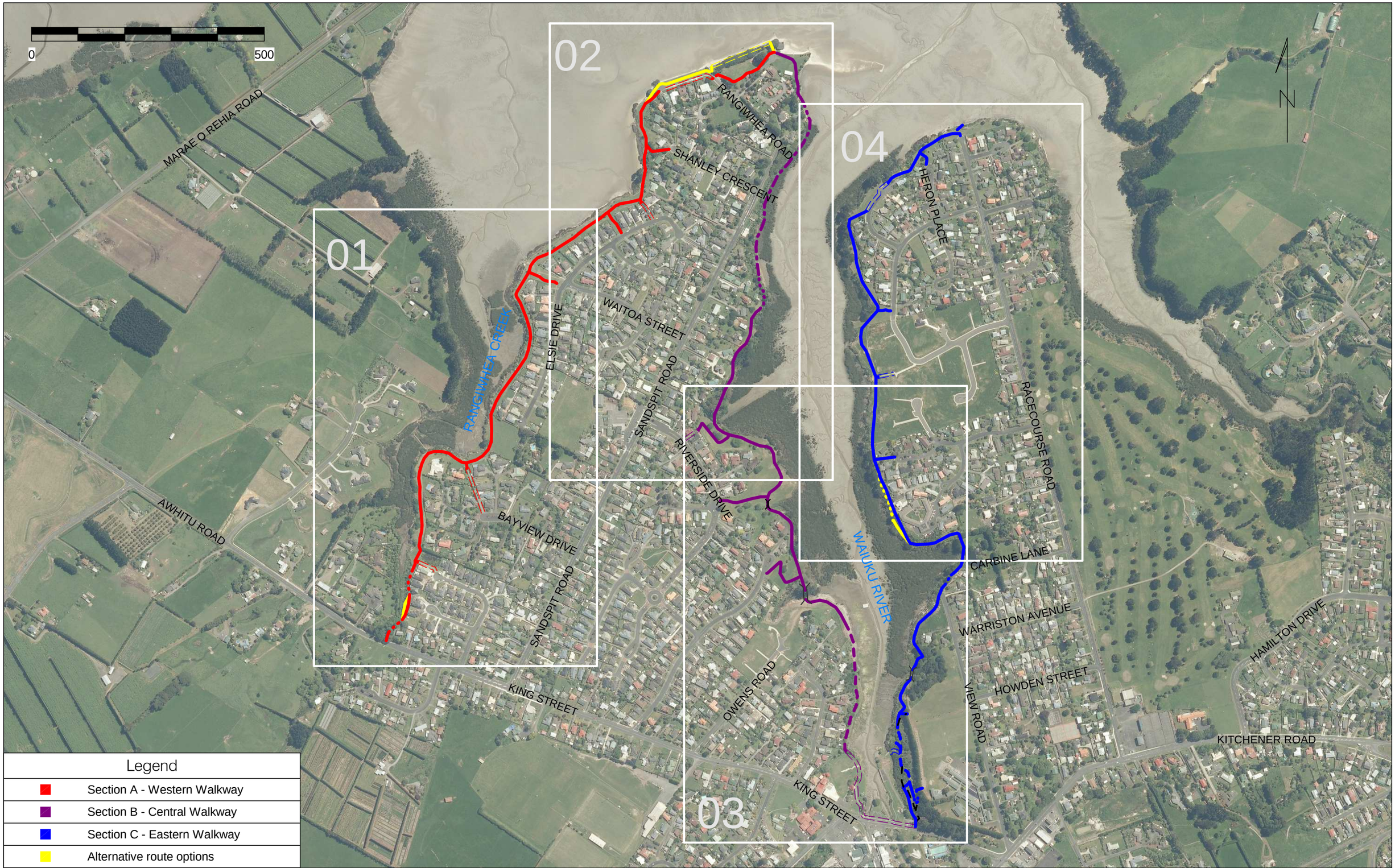
Segment & Options	Start Distance	End Distance	Segment Length [m]	Vegetation Clearance [m]	Form walkway on flat [m]	Form walkway where crossfall <50% [m]	Form benched walkway where crossfall >50% [m]	Form walkway on imported fill [m]	Install 1.5m wide Concrete Surface [m]	Install 2m wide Concrete Surface [m]	Install retaining wall [m]	Install 2m wide timber boardwalk [m]	Install barrier or handrail [m]	Deactivate existing path [m]	Misc. [removals, culverts, bollards, etc.]	Total
				$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	LS	
SECTION B - SANDSPIT RESERVE TO TAMAKAE RESERVE (CENTRAL WALKWAY)																
B1	1840	1845	**5**													
B2	1845	1965	**120**		120					120						
B3	1965	2390	**425**	425								425	280			
B4	2390	2465	**75**	75			75			75	75		70			
B5	2465	2620	**155**		155					155						
B6	2620	2740	**120**	120		60	60			120						
B7	2740	3010	**270**		160	110				270						
B7 Branch 1	2780		**135**		25	75			100						500	
B7 Branch 2	3000		**105**		105				105							
B8	3010	3015	**5**					2		2		3			500	
B9	3015	3135	**120**	20	30	90				120						
B10	3135	3230	**95**		95					95						
B10 Branch	3200		**120**		55		65		120							
B11	3230	3250	**20**													
B12	3250	3375	**125**		125					125						
B13	3375	3645	**270**							270						
B14	3645	3805	**160**													
B15	3805	3920	**115**													
TOTALS:			**2440**	**640**	**870**	**335**	**200**	**2**	**325**	**1352**	**75**	**428**	**350**	**0**	**1000**	
(Highlighted segments are options and are not included in totals)															**Contingency 20%:**	
Note: Estimates completed in May 2012															**GRAND TOTAL:**	

Auckland Council, Waiuku Coastal Walkway
Estimated Work Schedule, Rev A - August 2013

Segment & Options	Start Distance	End Distance	Segment Length [m]	Vegetation Clearance [m]	Form walkway on flat [m]	Form walkway where crossfall <50% [m]	Form benched walkway where crossfall >50% [m]	Form walkway on imported fill [m]	Install 1.5m wide Concrete Surface [m]	Install 2m wide Concrete Surface [m]	Install retaining wall [m]	Install 2m wide timber boardwalk [m]	Install barrier or handrail [m]	Deactivate existing path [m]	Misc. [removals, culverts, bollards, etc.]	Total
				$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	LS	
SECTION C - TAMAKAE RESERVE TO RACECOURCE ROAD END (EASTERN WALKWAY)																
C1	3920	4015	**95**	80	15		80			95				90	1000	
C2	4015	4075	**60**							60				105		
C2 Branch	4090		**100**	65			65		100		30		10	55		
C3	4075	4160	**85**							85			12	85	500	
C3 Branch 1	4105		**30**													
C3 Branch 2	4115		**30**						30					30		
C4	4160	4190	**30**	30			30			30						
C4 Branch	4190		**15**		15				15					30		
C5	4190	4285	**95**		45	50				95					500	
C6	4285	4300	**15**													
C7	4300	4390	**90**	30	40	50				90					3000	
C8	4390	4495	**105**	5	80	25				105						
C9	4495	4520	**25**		25					25						
C10	4520	4545	**25**	25			25			25	25		25			
C11	4545	4645	**100**		100					100						
C12	4645	4755	**110**		100	10				110						
C13 Option 1	4755	4800	**45**	45			45			45						
C14 Option 1	4800	4925	**125**		125					125	15				5000	
Option 1 Subtotal																
C13 Option 2	4755	4815	**60**	60			60			60						
C14 Option 2	4815	4925	**110**	110			110			110	110		100			
Option 2 Subtotal																

Auckland Council, Waiuku Coastal Walkway
Estimated Work Schedule, Rev A - August 2013

Segment & Options	Start Distance	End Distance	Segment Length [m]	Vegetation Clearance [m]	Form walkway on flat [m]	Form walkway where crossfall <50% [m]	Form benched walkway where crossfall >50% [m]	Form walkway on imported fill [m]	Install 1.5m wide Concrete Surface [m]	Install 2m wide Concrete Surface [m]	Install retaining wall [m]	Install 2m wide timber boardwalk [m]	Install barrier or handrail [m]	Deactivate existing path [m]	Misc. [removals, culverts, bollards, etc.]	Total
				$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	$/Lin m	LS	
C15	4925	4985	**60**		60					60						
C15 Branch	4955		**45**		45					45						
C16	4985	5245	**260**		260					260						
C16 Branch	5130		**40**		5				5							
C17	5245	5310	**65**		65					65						
C17 Branch	5295		**30**		30				30							
C18	5310	5545	**235**		235					235						
C19	5545	5625	**80**													
C20	5625	5750	**125**		120			5		125					500	
C20 Branch	5725		**35**		35				35							
C21	5750	5830	**80**		80					80						
C21 Branch	5820		**15**			10							5	15	1000	
TOTALS:			**2420**	**450**	**1480**	**145**	**415**	**5**	**215**	**2030**	**180**	**0**	**152**	**410**	**11500**	
(Highlighted segments are options and are not included in totals)														**Contingency 20%:**		
Note: Estimates completed in May 2012														**GRAND TOTAL:**		



Legend
Section A - Western Walkway
Section B - Central Walkway
Section C - Eastern Walkway
Alternative route options

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PREPARED FOR
Auckland Council
Te Kaunihera o Tāmaki Makaurau

PROJECT
WAIUKU COASTAL WALKWAY

TITLE
OVERALL PLAN

SCALE: Plan Scale 1:7500	Date: August 2013	
DRAWN: JR	FGL JOB: 12/022	
APPROVED	DRAWING: 00	REV: A

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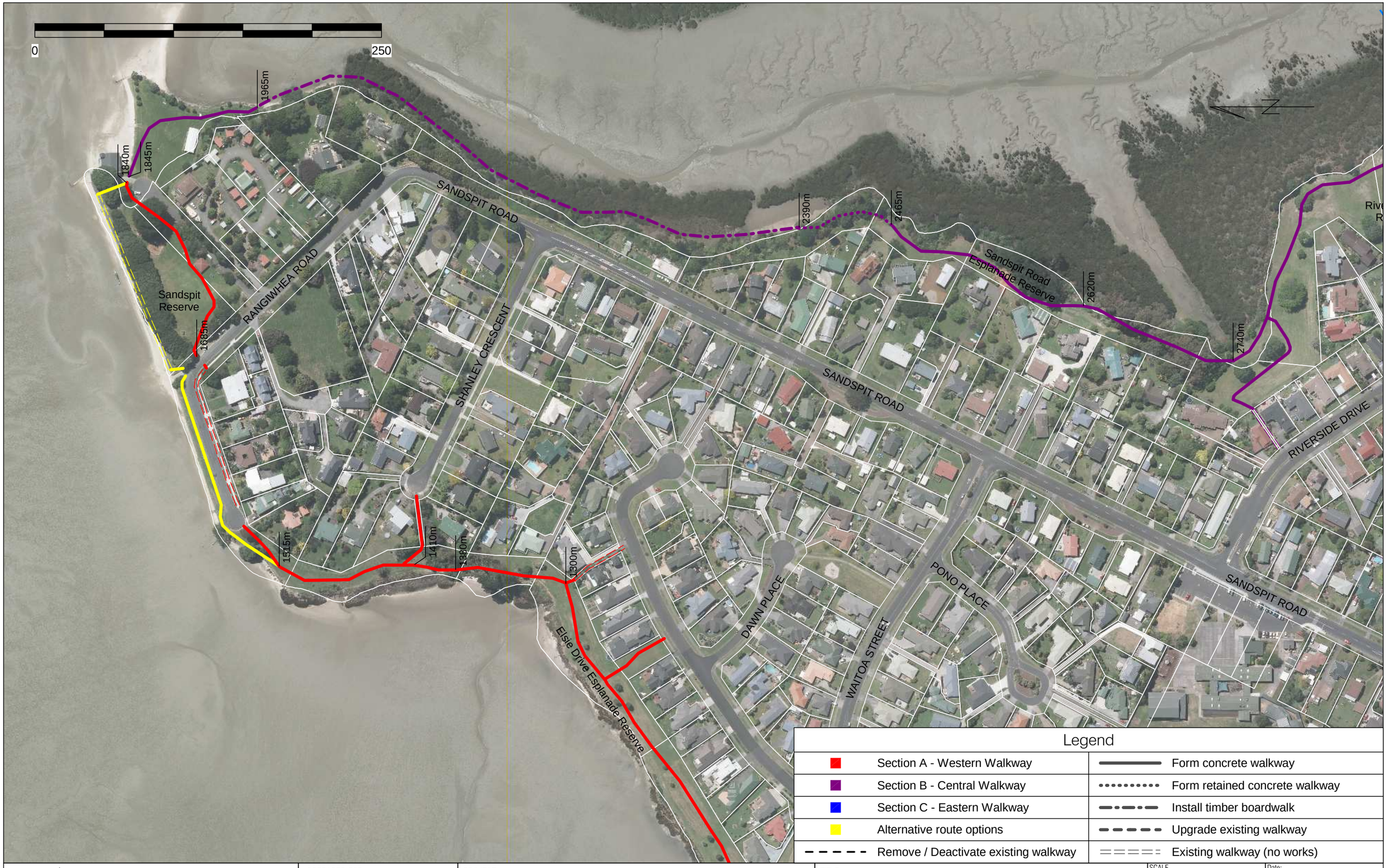
PREPARED FOR
Auckland Council
Te Kaunihera o Tāmaki Makaurau

PROJECT
WAIUKU COASTAL WALKWAY

TITLE
DETAILED PLAN

SCALE: Plan Scale 1:2500	Date: August 2013
DRAWN: JR	FGL JOB: 12/022
APPROVED:	DRAWING: 01 / REV: A



Legend

Section A - Western Walkway	Form concrete walkway
Section B - Central Walkway	Form retained concrete walkway
Section C - Eastern Walkway	Install timber boardwalk
Alternative route options	Upgrade existing walkway
Remove / Deactivate existing walkway	Existing walkway (no works)

Frame Group Limited
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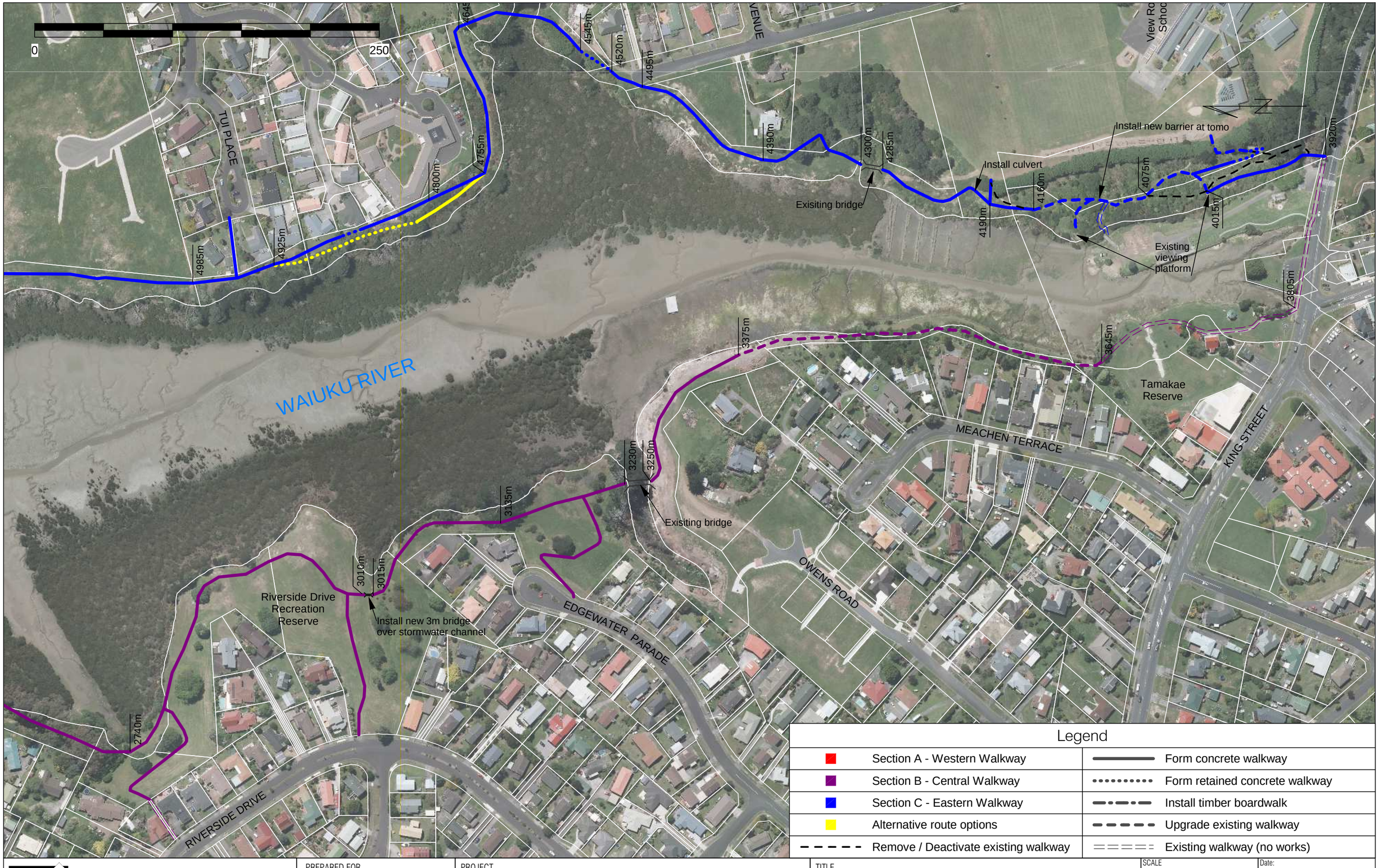
LEVEL 2, 16 COLLEGE HILL, AUCKLAND, NZ
PHONE: 64 9 638 7221 FAX: 64 9 376 0513

PREPARED FOR: Auckland Council, Te Kaunihera o Tāmaki Makaurau

PROJECT: WAIUKU COASTAL WALKWAY

TITLE: DETAILED PLAN

SCALE: Plan Scale 1:2500	Date: August 2013	
DRAWN: JR	FGL JOB: 12/022	
APPROVED	DRAWING: 02	REV: A



Legend

Section A - Western Walkway	Form concrete walkway
Section B - Central Walkway	Form retained concrete walkway
Section C - Eastern Walkway	Install timber boardwalk
Alternative route options	Upgrade existing walkway
Remove / Deactivate existing walkway	Existing walkway (no works)

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0

250

Waiuku
Golf Club

RACECOURSE ROAD

CARBINE LANE

KAURI DRIVE

KOROMIKO PLACE

CHERRY PLACE

KOWHAI PLACE

HARBOUR CREST DRIVE

GLENNRON LANE

TUI PLACE

HERON PLACE

GODWIT PLACE

5830m

5750m

5625m

5545m

5310m

5245m

4985m

4925m

4800m

4755m

4645m

Install culvert

Legend

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