5 Project Description

5.1 Project Description Overview

The Project is intended to increase the capacity and enhance the safety and efficiency of the section of SH1 between Oteha Valley Road and Constellation Drive. SH18 will be upgraded to full motorway standard from the Albany Highway interchange to SH1, with a motorway to motorway connection to SH1 (north facing SH1 – SH18 ramps only).

The proposed changes to SH1 can be generally described as the widening of the mainline carriageway to include extra general traffic lanes in each direction, the provision of a new dual direction busway adjacent to the southbound carriageway shoulder of the Motorway, and the provision of a new off-road shared-use pedestrian/cycle way adjacent to the southbound carriageway of the Northern busway extension (see General Arrangements Plans 0201-0206 in **Volume 5**).

With respect to SH18, the proposal can be generally described as a separation of the motorway from the local roads with the reconfiguration of the section between the Albany Highway interchange and SH1 to provide two lanes in either direction; dedicated ramp connections to/from SH1 to the north (i.e. from SH1 southbound to SH18 westbound, and SH18 eastbound to SH1 northbound), direct connection of Paul Matthews Road to UHH, local road intersection improvements and the provision of a new off-road shared-use pedestrian/cycle way initially tracking from Albany Highway along SH18 and up the length of SH1 to Oteha Valley Road. Connections to the shared path from local roads will be provided throughout the Project alignment (see General Arrangement Plans 0206 – 0210 in **Volume 5**).

The Design and Constructability Report providing a more detailed explanation of the Project components is attached at **Technical Assessment 15**.

The Project has been designed to a level of detail which enables assessment of its effects. However, detailed design will not take place until a contractor is appointed, and outline plans of works will be submitted prior to construction. Therefore, many aspects of the Project are described at a broad scale or 'worst case'. Feasible and realistic construction methods and programmes have been developed in order to assess effects, but these are indicative only and the appointed contractor may develop an alternative methodology (provided this complies with relevant designation and resource consent conditions).

To accommodate the Project works it is necessary to alter existing designations and also provide for new designations as described at **Section 3.4** above. The designation footprints will be altered to reflect the works shown on the General Arrangements Plans 0201-0210 in **Volume 5**. These works include:

- An increase in the overall width of the existing SH1 designations (6750 and 6751) to accommodate interchange improvements, local road connections, stormwater management, retaining structures and construction areas;
- An increase in the overall width of the SH18 designation (6756) to accommodate the Paul Matthews Road Interchange, SUP, stormwater management, retaining structures and construction areas;
- An extension to the SH18 designation (6756) to meet the western extent of the SH1 designation (6750) and accommodate the new ramps linking SH18 to SH1, associated stormwater management, retaining structures and construction areas;

- Provision of a new designation of approximately 3.5km for the Northern Busway extension from the current northern terminus at Constellation Drive (Designation 6757) north to Albany Bus Station (AT Designation 1421);
- Provision of a new designation for a shared use path along SH1 of approximately 3.9km; and
- Alteration the Constellation Bus Station designation (6758) to provide for an upgraded station design.

5.2 Improvements to existing SH1 Motorway

A large extent of the proposed improvements will be located within the existing SH1 designation, however the designation also requires alterations to accommodate the full extent of these changes (see **Section 5.10**). These improvements are described below and illustrated in the schematic diagram provided at **Figure 2** above.

5.2.1 SH1 Alignment

5.2.1.1 Northbound

A northbound climbing lane is proposed between the Greville Road interchange and the Oteha Valley Road off-ramp. This climbing lane is necessary because of the potential low merge speeds of heavy commercial vehicles (HCVs) from the Greville Road northbound on-ramp as a result of the steep uphill gradient of SH1 in this section of the Project. The extended length of the additional lane to Oteha Valley will be provided between CH12450 and CH13750.

To facilitate the functionality of the climbing lane, a further additional lane is proposed between the Greville Road interchange and the Oteha Valley Road off-ramp along with the modification of the loop on-ramp. SH1 currently drops from three lanes to two prior to the Greville Road interchange. It is proposed that the third lane be continued northbound past the interchange. This will provide for four lanes of traffic between Greville Road and Oteha Valley Road.

It is also necessary to upgrade the causeway between the two treatment ponds at the RWWTP. This upgrade is necessary to:

- Accommodate the widening of SH1 northbound between Constellation Drive and Greville Road from 3 lanes to 5 lanes;
- Extend the Busway between Constellation Bus Station and Albany Bus Station;
- Include the shared use path between Constellation Bus Station and Oteha Valley Road; and
- Provide for the motorway to motorway ramp from SH1 southbound to SH18 northbound, and the motorway to motorway ramp from SH18 eastbound to SH1 northbound.

The maximum extent of the widening on either side of the existing causeway is as follows:

- On the western side (northbound) – widening of the crest by approximately 10m; and
- On the eastern side (southbound) – widening of the crest by approximately 10m.

The proposed interchange on-ramp from SH18 is a two-lane connection that will result in a fourth and fifth northbound lanes on SH1 between SH18 and the Greville Road off-ramp. These extra lanes will address the weaving and merging flows that are likely to result within this section of the motorway as a result of the upgraded SH18 ramps. Weaving occurs where a stream of traffic on a motorway must change lanes to the right, while a second stream of traffic must change across the same lanes to the left, within a short section of motorway. Depending on the volume of traffic and the length of the weaving manoeuvres, there can be resultant conflict and safety issues. The additional lanes address this issue.

The existing lane drop (from three to two lanes) south of the Constellation Drive overbridge was identified as an existing capacity constraint and safety issue. As such it is proposed that a third lane

will be extended across the Constellation Drive overbridge and through to the Constellation Drive northbound on-ramp, where the existing three lane section begins. This on-ramp, which will be used by less traffic than at present, will merge into the third lane rather than the existing lane gain.

5.2.1.2 Southbound

North of Greville Road overbridge, the existing lane drop from three to two lanes will be removed by continuing the third lane through to the Greville Road on-ramp, in order to address capacity and safety issues.

The Greville Road on-ramp will add a fourth southbound lane, which will continue until the proposed new SH18 off-ramp. This again is as a result of safety audit recommendations and addresses forecast weaving and merging flows within this section of the motorway.

After the SH18 off-ramp, three lanes will continue to the south of the Constellation Drive off-ramp, after which a lane drop will reduce the southbound carriageway to two lanes in the vicinity of the Constellation Drive overbridge.

5.2.1.3 Motorway design

The key motorway design parameters have been developed using the NZ Transport Agency State Highway Geometric Design Manual and Austroads and are detailed in **Table 9** below.

Table 9 Motorway Design Requirements

Parameters	SH 1 and SH 18 Mainlines	Motorway to Motorway Links	On/Off Ramps
Design Speed	110km/h	90km/h (des) 80km/h (min)	Off-ramps – 90km/h at nose reducing to 60km/h. On-ramps – 80km/h at ramp meter and 90km/h at nose.
Lane Width	3.5 m	3.5 m (4m for single lane)	3.5m
Min Shoulder Width (1 lane)	N/A	3m (left) and 1m (right)	2m (left) and 1m (right)
Min Shoulder Width (2 lanes)	3m (left) and 2m(right)	3m (left) and 2m (right)	1m (left) and 1m (right)
Min Shoulder Width (3 lanes)	3m (left) and 3m (right)	N/A	N/A
Maximum Shoulder Width	4m	4m	4m
Horizontal curve radius	725m (min)	380m (des) 235m (min)	Speed dependent

5.2.2 SH1 Bridge Structures

Modifications to three existing bridge structures within the Project area are required in order to accommodate the works. These include:

- Widening the Greville Road overbridge in both directions (north/south bound);
- Widening of the Rosedale Road overbridge in both directions (north/south bound); and
- Widening of the Constellation SH1 overbridge in both directions (north/south bound).

It is proposed to replace the existing McClymonts Overbridge with a new overbridge to the south of the existing alignment to facilitate the additional busway and SUP (see **Volume 5** - Civil Structures

Drawing 1315 for details). This new bridge will also contain improved pedestrian footpaths and cycle provision. The new bridge will be contained within the proposed designation boundary. The existing overbridge will be demolished upon completion and opening of the new bridge.

5.2.3 Upgrade of the causeway at the Rosedale Wastewater Treatment Ponds

In order to accommodate the Project works, structures and earthworks will be required within both RWWTP Pond 1 and Pond 2 to widen the existing causeway (introduced at **Section 4.3.1**). The extent of these works include the widening of the SH1 northbound lane between Constellation Drive and Greville Road from three lanes to five lanes, the extension of the Northern Busway from Constellation Bus Station to Albany Bus Station, the provision of the shared use path between Constellation Drive and Oteha Valley Road, and the motorway to motorway ramps between SH1 and SH18. The upgrade works proposed are not expected to encroach beyond the extents of the existing manmade structure, with new material likely to be confined to being deposited on top of existing fill material.

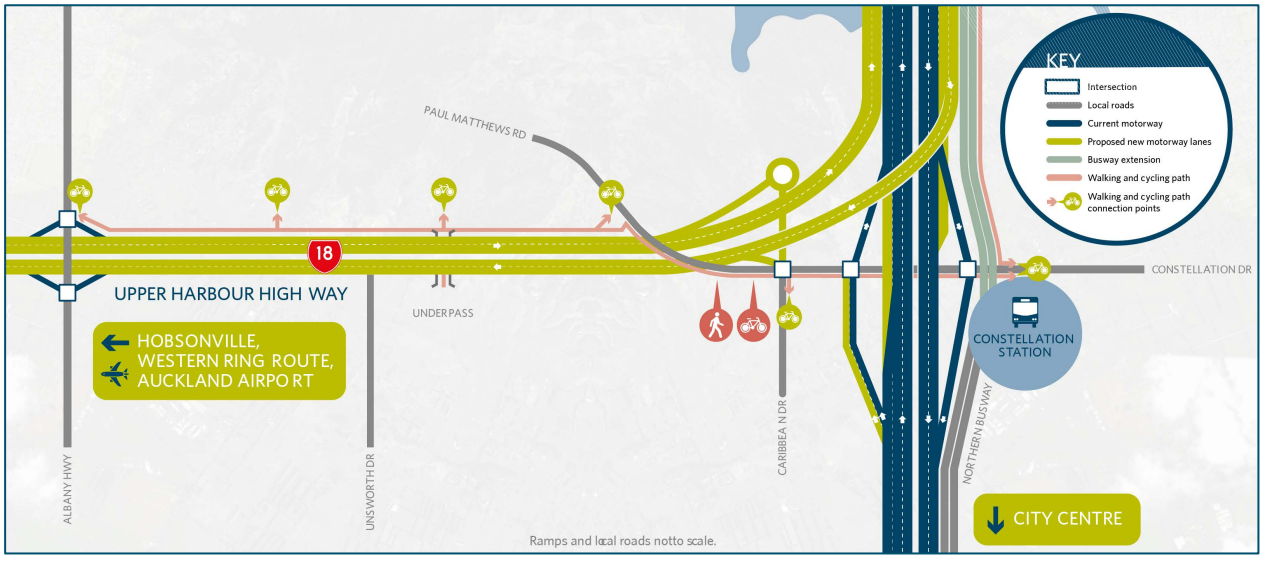
Construction works will require the temporary installation of rock revetment and/or sheet piles and groynes to be located within the bed of the ponds past the permanent structure. These works are required to temporarily allow de-watering of the construction area. It is expected that these works will not extend more than 10m beyond the existing structure in Ponds 1 and 2. A bunded area beside the existing carriageway will be required to temporarily stockpile contaminated excavated material from the wastewater pond for removal off site.

The Project will affect the existing pond link between the RWWTP treatment ponds. A new link will be constructed concurrently with the widening of the State highway between the ponds.

5.3 Improvements to existing SH18 Motorway

SH18 will be upgraded to full motorway standard from the Albany Highway Interchange to SH1, with a new SH18 eastbound to SH1 northbound ramp. The Interchange will involve a two lane ramp with ramp meter and bypass transit lane and will require the permanent closure of the Unsworth Drive exit. The works to be carried out in relation to SH18 are described below and illustrated in the schematic in **Figure 17**.

Figure 17 Schematic of the Proposed Improvements to SH18



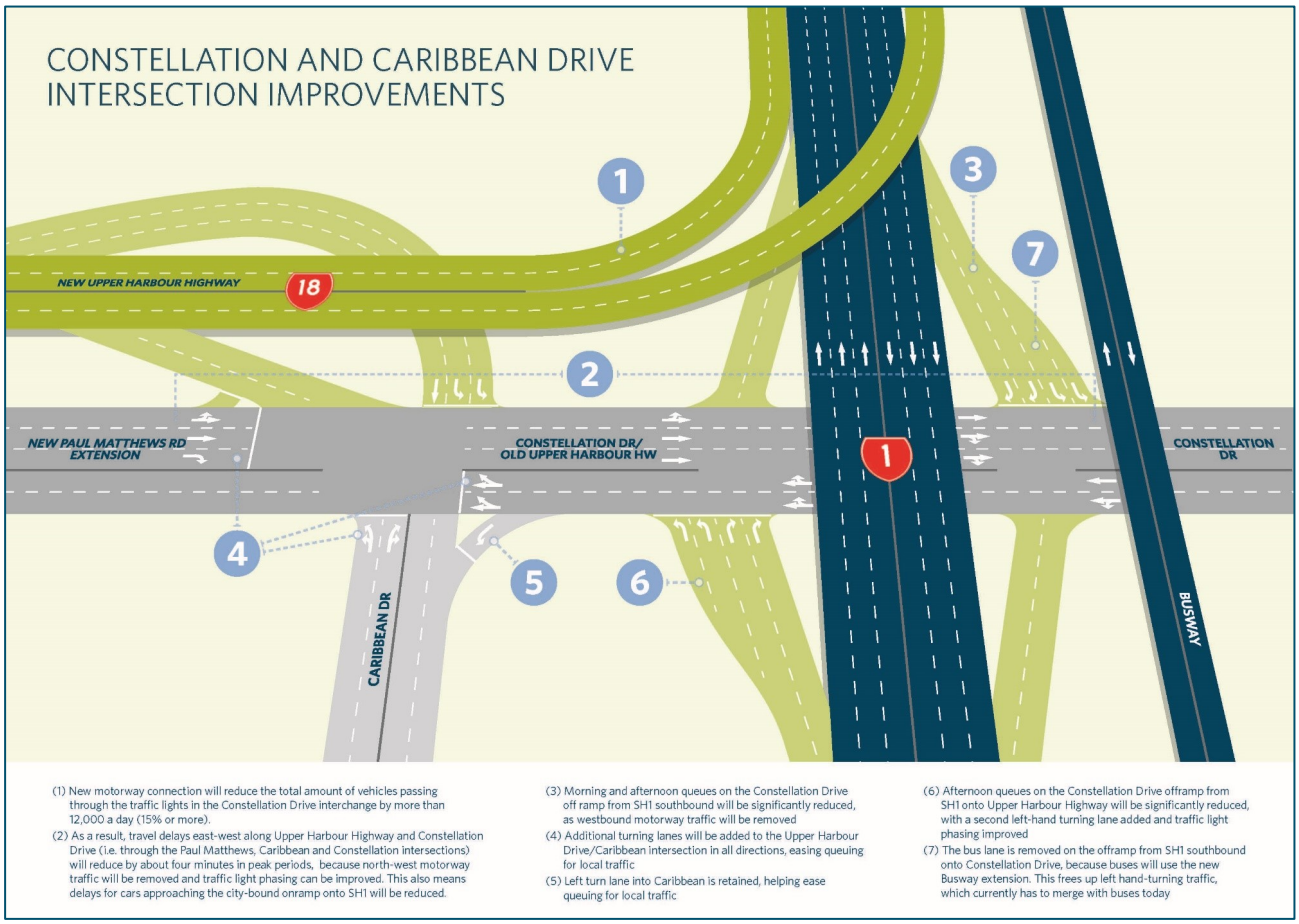
Source: NZ Transport Agency

Paul Matthews Road will be realigned to connect with Constellation Drive at Caribbean Drive Intersection and an eastbound off-ramp will be provided from SH18 to connect with the local road network in the same location.

The motorway to motorway connection will be achieved by the provision of two, two lane ramp connections between SH18 and SH1 north. The southbound traffic ramp from SH1 to SH18 will utilise an overbridge to cross SH1.

The existing off ramp to Unsworth Drive will be closed, with traffic able to gain access to Unsworth Drive via the Albany Highway off-ramp or Caribbean Drive. See **Figure 18** below.

Figure 18 Schematic of the Constellation Drive and Caribbean Drive Intersection Improvements



Source: NZ Transport Agency

5.4 Northern Busway Extension

5.4.1 Busway

It is proposed to extend the route of the Northern Busway from its current terminus at Constellation Bus Station north to Albany Bus Station.

The Busway will be separated from the main carriageway and treated as a separate road. The Busway provides for a single lane travelling in each direction, and is intended for dedicated public transportation, maintenance and emergency service vehicles. The horizontal and vertical cross section elements of the Busway extension are set out in **Table 10** below and confirmed on the Typical Cross Section Drawings provided at **Volume 5**.

Table 10 **Busway Design Requirements**

Parameters	Requirement
Number of lanes	2 lanes (1 southbound & 1 northbound)
Lane width	3.50 m
Minimum shoulder width (on or under bridges)	0.6 m
Minimum shoulder width (all other locations)	1.0 m
Drainage channel width (in addition to shoulder width)	0.6 m
Minimum vertical clearance	6.0 m
Carriageway curve widening	Required for all curved sections of the main busway where the horizontal radius is less than 330 m
Constrained areas, minimum side clearance (eg to signs, columns barriers)	600 mm
Busway corridor width	10.2 m

The busway geometry, including the horizontal and vertical alignments, is designed to allow an operating speed of 80 km/h on the main busway and 50 km/h for station areas.

The proposed alignment for the Busway (in conjunction with the proposed SUP as discussed below at **Section 5.5**) will encroach into land currently occupied by the Rosedale Closed Landfill. The vertical alignment of the Busway will require a maximum cut depth of approximately 5m in the landfill area. This may require the excavation of some existing refuse layers which is expected at that depth. The cap of the Rosedale Closed Landfill is to be reinstated with new gas and leachate collection and disposal systems required behind the proposed retaining wall alongside the SUP. The retaining wall proposed along the eastern edge will result in a maximum fill wall height of 14m.

5.4.2 Albany Bus Station Busway Bridge

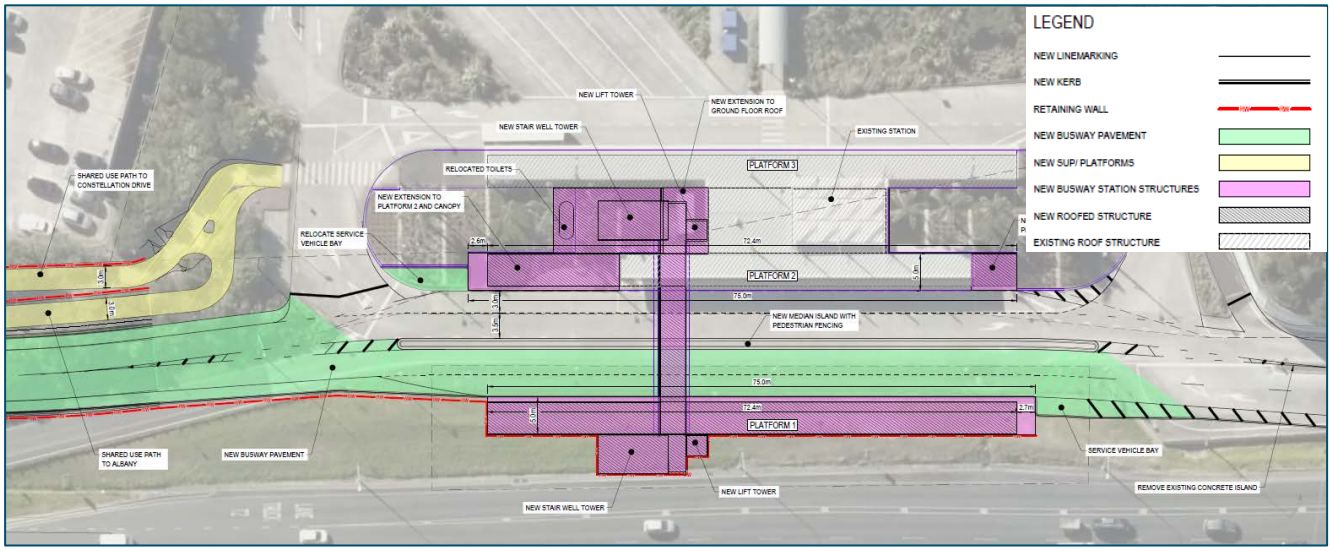
As the Busway route follows an alignment on the eastern side of SH1, a two-lane busway link across SH1 is required to provide access to Albany Bus Station.

The overbridge is proposed to be a two-lane east/west bound extension of the Busway which terminates at the existing Albany Bus Station. The bridge is to run above the bus station parking area in order to connect with the existing terminal. The minimum bridge clearance over the motorway will be 6m (see Civil Structure Drawing 1310 in **Volume 5** for details).

5.4.3 Improvements to Constellation Bus Station

The proposed extension to the Busway from Constellation Bus Station to Albany Bus Station will necessitate additional station infrastructure at Constellation Bus Station in order to convert it to a dual direction station as opposed to a terminus station. The proposed arrangement is indicated in **Figure 19** below and detailed on the Constellation Bus Station General Arrangement Drawing 3001 **Volume 5**.

Figure 19 Constellation Bus Station Upgrade



The main components of the proposed upgrade include:

- Provision of a new platform for northbound movements.
- Extension of Platform 2 for southbound movements.
- New station building adjacent to the northbound platform.
- New pedestrian overpass linking northbound and southbound platforms.

The proposed reconfiguration of the Constellation Bus Station will allow for four lanes through the station with platforms to the east and west of the Busway. The new platform is proposed to be in the order of 75m in length with shelter coverage for 12 bays. The extension of the existing Platform 2 will also see the platform increase to 75m in length with shelter provided. Changes are to be made to the existing concourse enclosure of the station to better align with the back of the platforms. Earthworks and a retaining wall up to 2m in height are required to create the new northbound platform.

The architectural approach for the new structures at Constellation Bus Station will reflect the design philosophy established in existing northern busway stations. The height of the new stairwell towers and pedestrian overpass link between Platforms 1 and Platforms 2 and 3 (being the tallest of the structures required as part of the upgrade) will be no higher than 13m above ground level.

5.5 Pedestrian / Cycleway Connectivity Improvements

5.5.1 Shared Use Pathway along SH1

A new off-road 3m wide shared use pedestrian/cycle way adjacent to the busway shoulder (on the eastern side) is proposed to extend alongside the SH1 carriageway from Oteha Valley Road (CH160) to Constellation Drive (CH4170) for approximately 4km. It is envisaged that connections from the path to the local roading network will be provided at the following locations:

- Lavender Garden Lane;
- McClymonts Road;
- Greville Road;
- Rosedale Road;
- Arrenway Drive; and

- Constellation Drive.

The design of the SUP adjacent to the closed Rosedale Closed Landfill does not prevent future connections to that area should it be developed for recreational purposes although earthworks would likely be required to achieve tie-ins or the construction of additional ramps.

All paths are to be designed in accordance with Austroads Part 6A: Pedestrian and Cyclist Paths. The current proposed design of the path is based on a 3.0m clear width with 1.0m wide shoulder where possible, reducing to 0.5m in constrained locations. In constrained locations the SUP width will reduce to 2.5m clear width. It is currently designed so that the SUP is segregated from the Busway by a TL4 concrete barrier immediately adjacent to which would be a 1.8m security fence. Where the SUP is not contained by a retaining wall on the eastern boundary, a 1.4m fence will be provided. These design details are confirmed on the Typical Cross Sections provided in **Volume 5**.

The connection between the SH1 shared use path and the SH18 shared use path will be provided beneath the Constellation Drive overbridge, as shown on General Arrangement Plan 0206 provided in **Volume 5**. This will include at-grade 4m wide pedestrian/cycle[6] crossings controlled by lights with a central refuge across both the Constellation Drive southbound on-ramp and northbound off-ramp.

5.5.2 Shared Use Pathway SH18

In addition, another 3m wide SUP will be provided adjacent to SH18 for a distance of approximately 2.3km. This path will commence on the southern side of the Constellation Drive Interchange before transferring to the northern side of the motorway via the proposed Paul Matthews Road overbridge. The path will descend from the overbridge via a ramp before continuing to run parallel to the eastbound motorway shoulder. It will terminate at the Albany Highway, which it will connect to by way of a ramp adjacent the westbound on-ramp to SH18 from the Albany Highway (see General Arrangement Plan 0210 in **Volume 5**). Access points to the path from the local road network are proposed at the following locations (see General Arrangement Plans 0208, 0209, 0210 in **Volume 5**):

- Caribbean Drive;
- Paul Matthews Road; and
- William Pickering Drive.

In addition, a link is to be provided from the shared path to the existing pedestrian/cycle way network which lies adjacent to Alexandra Stream.

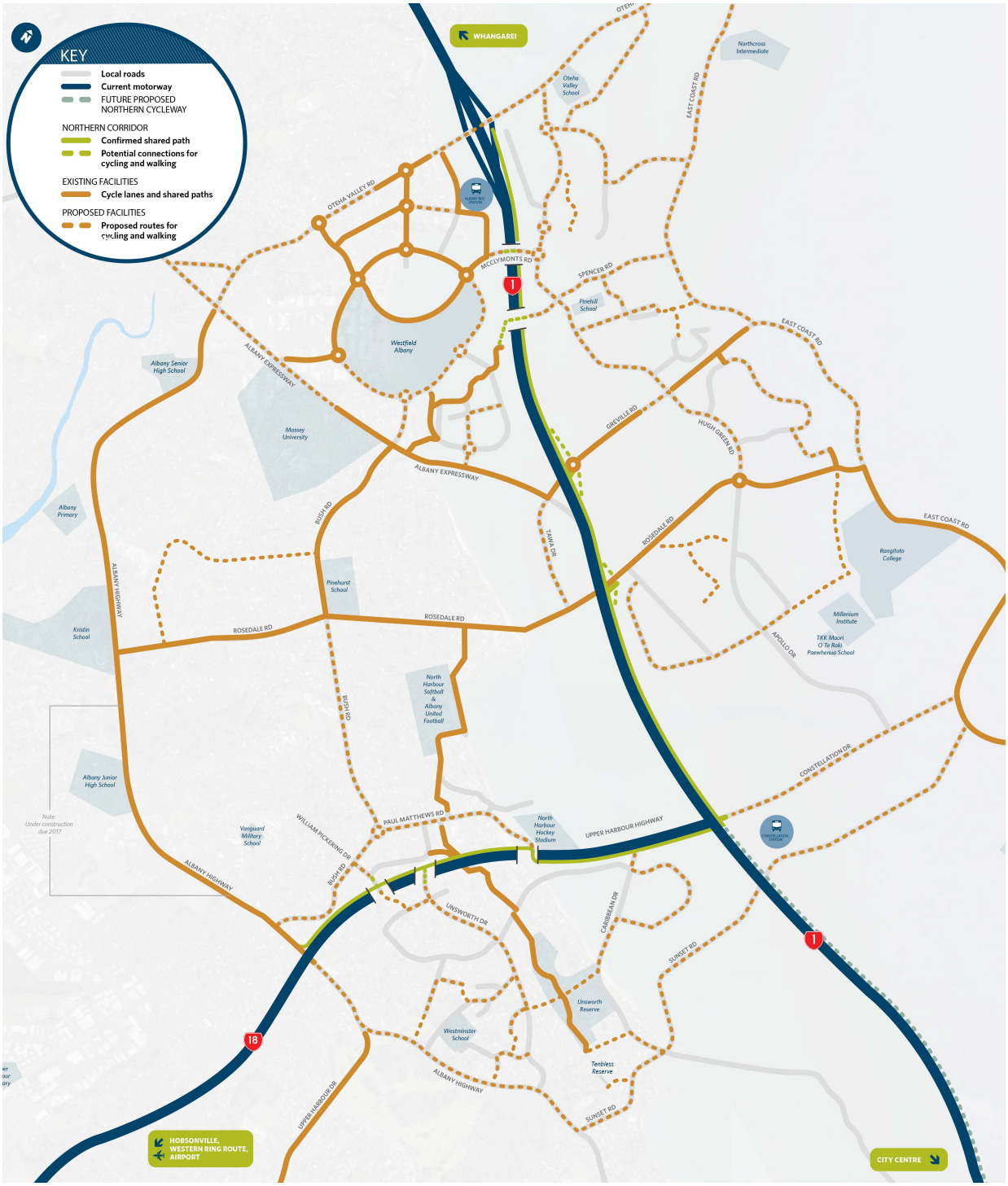
The current proposed design of the SUP is based on a 3.0m clear width with 1.0m wide shoulders where possible, reducing to 0.5m in constrained locations. In constrained locations the SUP width will reduce to 2.5m clear width. As currently designed, the SUP is segregated from the carriage way of the SH18 UHH and Paul Matthews Road Link by a TL4 concrete barrier immediately adjacent to which would be a 1.8m security fence. Where the SUP is not contained by a retaining wall on the outer boundary, a 1.4m fence will be provided. These design details are confirmed on the Typical Cross Sections provided in **Volume 5**.

5.5.3 Indicative Shared Use Pathway connectivity within Project Area

Figure 20 below, illustrates the walking and cycling improvements described above that are proposed as part of the Project. **Figure 20** shows the current existing AT North Auckland Cycle Network and the proposed improvements provide for linkages and expansion to this network that generally accord with the Regional Cycle Network Plan from the Auckland Plan (which is included in **Figure 5**). **Figure 20**, additionally shows linkage and cross-motorway connectivity at Spencer Road, the subject of a separate NZ Transport Agency project that has the potential to link to the SH1 SUP.

[6] A Toucan crossing

Figure 20 Proposed Walking and Cycling Connections



Source: NZ Transport Agency Northern Corridor Walking and Cycling Proposal Map, August 2015

5.6 Other Design Elements

5.6.1 Noise Attenuation

Noise attenuation barriers are currently proposed in the following areas as recommended in the Assessment of Operational Noise and Vibration (**Technical Assessment 12**):

a. Between SH18 and Barbados Drive (3m high and approximately 127m in length);

b. Between SH18 and the Greenwich Gardens Metlifecare facility (2m high and approximately 71m in length);

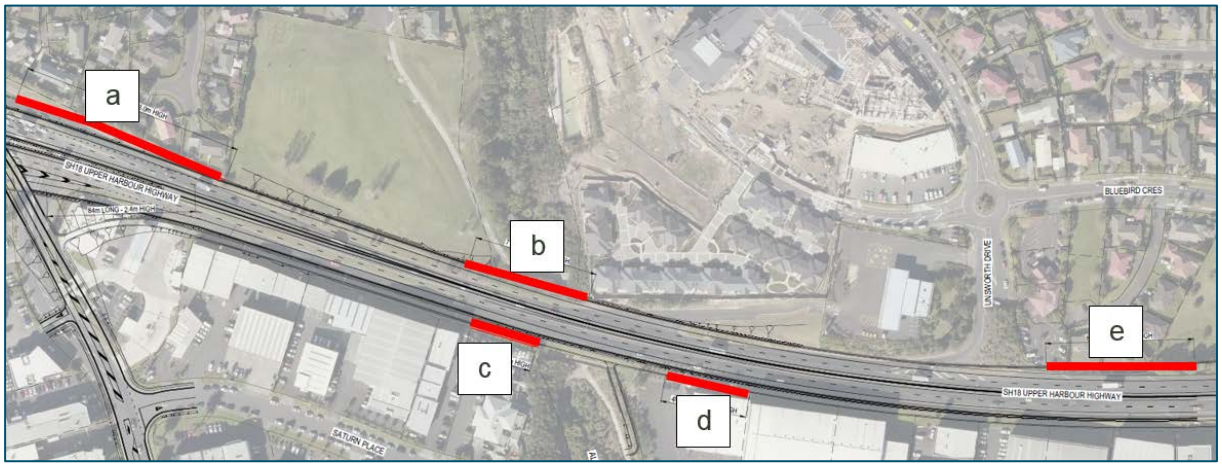
c. Between SH18 and the childcare facility at Saturn Place (2.4m high and approximately 39m in length);

d. Between SH18 and the childcare facility at Omega Street (2.4m high and approximately 49m in length); and

e. Between SH18 and Bluebird Crescent (2.4m high and approximately 84m in length).

Figure 21 below confirms the location of these noise attenuation structures, the detailed design of which will be informed by the design principles contained within the indicative Urban Design and Landscape Framework (UDLF) (see **Volume 4**) in consultation with the adjacent property owners.

Figure 21 Noise Attenuation Barrier Locations



Source: Base image from Auckland Council GIS Viewer

5.6.2 Cut and Fill Slopes

The topography of the area means that areas of cut and fill will be required along the alignment, with the form and treatment of these being an important aspect of the Project. Throughout the Project, the following general parameters will be adhered to:

- All cut/fill slopes will be stabilised to prevent any fretting or erosion after construction. Spill-through abutment slopes shall be surfaced with paving stone blocks to eliminate the potential for weed growth and erosion;
- An overall Project cut/fill balance will be maintained as far as practicable; and
- Earthworks cut slopes and fill embankments have been designed with gradients of 1V:3H (vertical: horizontal) where possible. However, in some constrained areas fill slopes have been increased in gradient to 1V:2.5H.

5.6.3 Retaining Walls

The topography of the area requires the construction of retaining walls at certain locations along the Project alignment, as indicated on the General Arrangement Plans provided in **Volume 5**. These will all be contained within the Project designations.

Approximately 7,105m of retaining walls are required for the Project. They are to be made up of the following wall types:

- MSE (mechanically stabilised earth) block walls;
- Bored pile walls;
- Anchored bored pile walls;

- L-shaped gravity walls; and
- Steel UC (universal column) walls.

The retaining walls will vary in height with a maximum height of 13.3m between CH14200 and CH14430 and a minimum height of 1.8m. The locations of all retaining walls will be within the area of designation sought under the NoRs and the individual heights, lengths and wall type are noted on the General Arrangement Plans provided in **Volume 5**. The typical appearance and bulk characteristic of these walls are illustrated on the Typical Cross Section drawings provided at **Volume 5** and within the typical cross sections within the UDLF.

5.6.4 Traffic Services

Traffic services along the carriageway will include features such as:

- Permanent road signs (including variable message signs);
- Road lighting;
- Road markings;
- Barrier protection;
- Closed-circuit Television (CCTV);
- Speed enforcement;
- Maintenance bays;
- Emergency phones; and
- Emergency laybys.

The traffic services that will be in place when the motorway opens to traffic will be confirmed during the detailed design phase and will be designed in accordance with the relevant standards at the time the Project is constructed.

Throughout the life of the motorway, it is anticipated that traffic services will be renewed and upgraded as required, to ensure the continued safe and efficient operation of the State highway.

5.6.5 Pavements and Surfacing

Final design of the pavement will be undertaken during the detailed design phase of the Project. The design will be based on the Austroads Pavement Design Manual, the NZ Transport Agency Supplement to Austroads Guide, the Austroads Guide to Pavement Technology and the AT Code of Practice Chapter 16 Road Pavements and Surfacing in respect of local roads.

In general terms, the SH1 and SH18 corridors pavement design (including shoulders) will be full depth asphalt with Open Graded Porous Asphalt (OGPA) surfacing as OGPA has benefits over chip seal in terms of drainage and noise attenuation.

For the interchanges along the main alignment, high stresses are likely to occur from braking, accelerating and turning, as such a stone mastic asphalt (SMA) is currently proposed.

5.6.6 Lighting

Project lighting has been considered at a conceptual level for the purpose of assessing the potential for any adverse effects. It is confirmed that the lighting for the Project will accord with the relevant provisions of the AUP, in particular as this relates to sensitive neighbouring activities such as residential sites.

Lighting columns will be located within the protective central median concrete barrier with infill lighting positioned on the shoulders where ramps are located for on/off ramps. Wider sections with five lane

arrangements will require infill lighting from the shoulder from a dual opposite arrangement to improve the uniformity and compressed centres to meet the design levels.

The optimum elevation of the lighting columns for the main carriageway will be a nominal height of 12-14m above finished ground level (AFGL) with an outreach arm of 1.2m - 3m with provision to extend to a maximum of 4.2m if necessary. Lighting to ramps will have the same column height but with a shorter outreach arm of a minimum of 1.2m - 2.4m pending on the offset from the kerbline or low-level protection.

The main carriageway and sealed shoulder lighting design will comply with Road Lighting Category V3 to meet Standards AS/NZS1158, or the equivalent standard applicable at the time the Project is constructed. Lighting within interchanges and the adjoining local network will be designed to and comply with Category V2. Category V3 of AS/NZS 1158 (or equivalent) which will require a luminance no less than 0.75 candela per square meter, with an overall uniformity (minimum-to-average) to be above 0.33; a longitudinal uniformity to be above 0.3. At intersections, the illuminance will meet AS/NZS1158 (being above 10 lux, with a max-to-min uniformity to be less than 8), or the appropriate equivalent at time of construction.

Lighting is intended to be located within the outer barrier with a double outreach lighting over the shared use path.

5.6.7 Landscaping

Landscaping will be undertaken as part of the Project and will serve a number of purposes, including those listed below:

- Integration of the Project into the existing landscape;
- Mitigation of the visual and landscape effects of the Project; and
- Stabilisation of batter slopes.

Detailed landscape plans will be provided as part of future OPWs for the Project, in accordance with the recommendations of the Assessment of Landscape and Visual Effects (**Technical Assessment 8**).

As shown in the indicative landscape planting plan, the landscape design will draw from the existing species mix within the existing landscape, in particular having regard to a native typology to ensure appropriate aesthetic and environmental outcomes.

5.7 Operational Drainage and Stormwater Management

A description of the drainage and stormwater management proposed for the on-going operation of the Project (as opposed to the initial construction) is set out below. More specific detail on the proposed management approach is provided in the Assessment of Stormwater Management provided in T**echnical Assessment 11.**

The operational drainage and stormwater treatment design for the Project has been driven by two key requirements:

- Ensuring that stormwater does not inhibit the safe and effective operation of the road; and
- Ensuring that the potential adverse environmental effects associated with the disposal of stormwater are appropriately managed, both in terms of effects on freshwater ecological habitats and flooding effects in relation to properties.

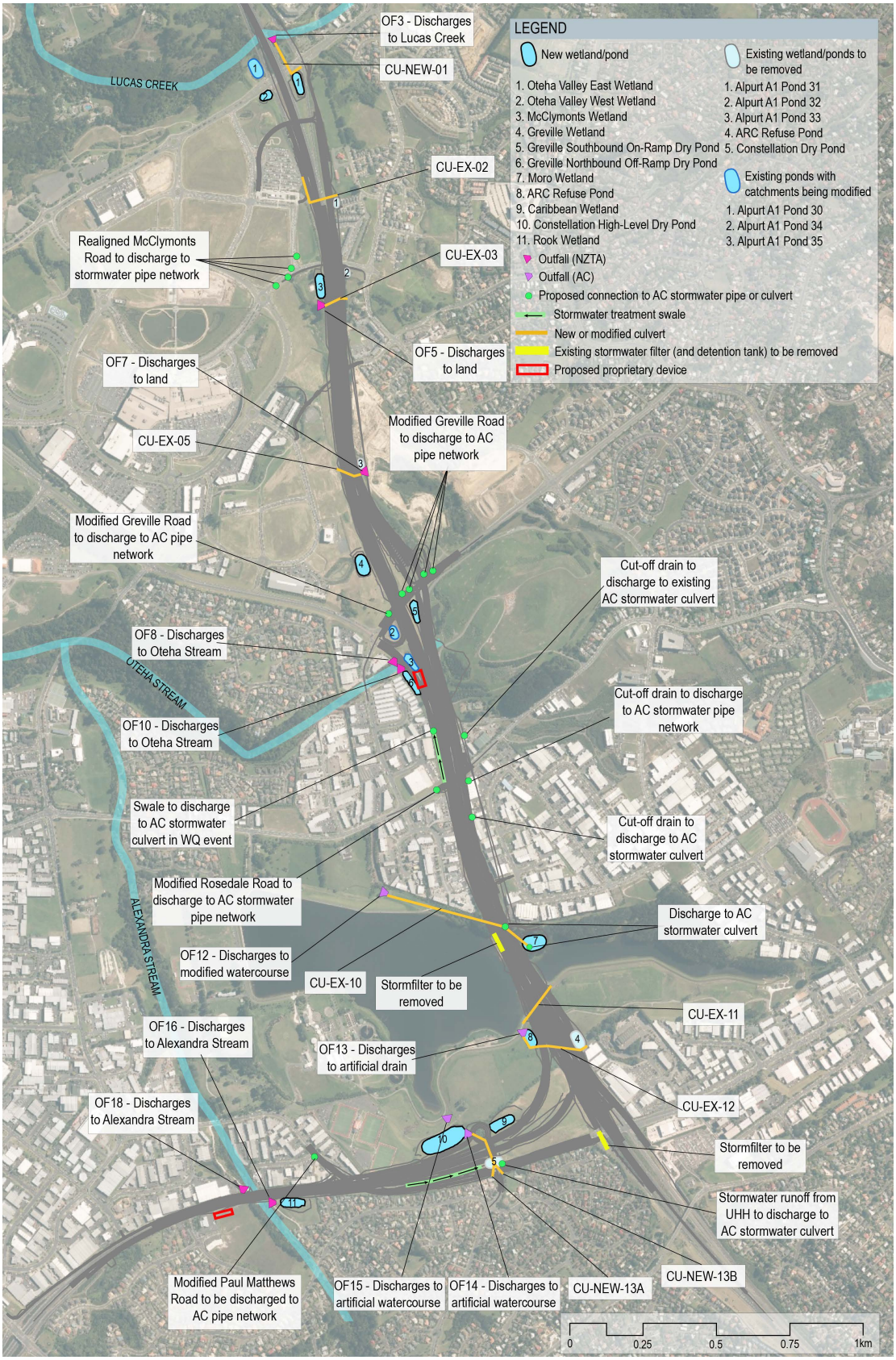
A general layout of the various drainage components as further described and detailed in this section is provided in **Figure 22** below. This figure also indicates the location of the following drainage and stormwater management components of the Project:

- Wetlands;

- Culverts;
- Outfalls; and
- Treatment swales.

These various drainage and stormwater treatment components are identified and described in **Tables 11-13**.

Figure 22 Proposed Drainage and Stormwater Treatment Design



Source: Aerial photography sourced from the LINZ Data Service and licensed by LINZ for re-use under the Creative Commons Attribution 3.0 New Zealand licence.

5.7.1 Drainage

Surface water runoff from pervious areas such as grassed or vegetated areas will generally be discharged untreated to the existing stormwater reticulation system. Where possible, this surface water is to be kept separate from the stormwater network conveying flows from the motorway surface.

Stormwater runoff from impervious surfaces will be collected via cross drainage throughout the Project Area, and discharged to stormwater treatment and management devices as discussed below.

5.7.1.1 Cross drainage

The majority of existing culverts (16 in total) within the Project area will remain in place. Only three new culverts are proposed, and these are set out in **Table 11** below. Several existing culverts are proposed to be extended, these are shown on **Figure 22** and detailed in the Assessment of Stormwater Management (**Technical Assessment 11**).

Table 11 Proposed Cross Drainage

Crossing Name	Existing / New	Location	Size	Total Length – Including Existing and Extensions (m)	Parallel to Stream flow (Y/N)	Crossing Type	Proposed works
CU-NEW-01	New	Oteha Valley Road	1500mm Ø	171	N	Grated manhole to headwall	New culvert
CU-NEW-13A	New	SH 18 – Caribbean Drive	1800mm Ø	210	Y (concrete channel)	Pipe network to headwall	New culvert
CU-NEW-13B	New	SH18 – Caribbean Drive	1350 mm Ø	47	Y (concrete channel)	Grated manhole to pipe network	New culvert

5.7.1.2 Outfalls

Existing outfalls for the Project are to be generally retained without modification. Runoff from new impervious areas is proposed to be treated and/or attenuated within wetlands prior to discharge to the receiving environment.

Overall, there are 18 outfalls included as part of the Project, of which five of are new (**Table 12**). Changes to the existing outfall structures are only proposed where there are changes to the existing peak flow rates.

Table 12 Proposed Outfalls

Outfall ID	AC Asset ID in Network Discharge Consent	Location	New / Existing	Public (AC) / Private (NZ Transport Agency)	Rip-Rap Outfall Protection Size	Comment
OF3	N/A - New Outfall	CU-NEW-01 outlet	New	NZ Transport Agency	Proposed Apron – 4.5m (L) x 5.7m (W)	New combined outfall for Oteha Valley Wetlands and cut-off drain

Outfall ID	AC Asset ID in Network Discharge Consent	Location	New / Existing	Public (AC) / Private (NZ Transport Agency)	Rip-Rap Outfall Protection Size	Comment
OF8	N/A - New Outfall	Greville Wetland outlet	New	NZ Transport Agency	Proposed Apron – 6.3m (L) x 7.4m (W)	New outfall for proposed wetland
OF10	N/A - New Outfall	Greville NB Basin outlet	New	NZ Transport Agency	Proposed Apron – 4.2m (L) x 6.0m (W)	New outfall for proposed basin
OF16	N/A - New Outfall	Alexandra Wetland outlet	New	NZ Transport Agency	Proposed Apron – 6.8m (L) x 8.6m (W)	New outfall for proposed wetland and cut-off drain
OF18	N/A - New Outfall	Near CU-EX-14 outlet	New	NZ Transport Agency	Proposed Apron – 7.5m (L) x 9.5m (W)	New combined outfall for proposed cut-off drains

5.7.2 Stormwater Treatment Devices

The proposed stormwater treatment for the Project seeks to ensure that adverse effects on waterbodies are avoided. The treatment design has been guided by:

- AC Technical Report TR2013/035 (2013); and
- AC's Stormwater Treatment Devices: Design Guidelines Manual (TP10).

Stormwater runoff from the motorways will be discharged to wetlands or treatment swales located along the alignment, treated, and, where necessary, extended detention will be provided to mitigate effects associated with erosion of the downstream environment.

5.7.2.1 Wetlands and dry basins

Constructed wetlands and basins provide effective treatment systems capable of high levels of attenuation. **Table 13** summarises the proposed wetlands and basins to be constructed as part of the Project.

Table 13 Proposed Wetlands Summary

Wetland / Device	Location	Sub-catchment	HUR Area Treated to 75% TSS Removal (ha)	WQV with 50% discount (m^3)	Live volume (m^3)	Note for replacement of existing ponds
Oteha Valley East Wetland	SH1-CH12030-SB	OV2M	0.75	480	1345	Includes WQV of 412m^3 and live volume of 548m^3 from existing Alpurt A1 Pond 31
Oteha Valley West Wetland	SH1-CH12030-NB	OV2M	1c.07	150	495	No ponds replaced by this wetland.

Wetland / Device	Location	Sub-catchment	HUR Area Treated to 75% TSS Removal (ha)	WQV with 50% discount (m^3)	Live volume (m^3)	Note for replacement of existing ponds
McClymonts Wetland	SH1-CH12720-NB	M2S	1.41	405	1225	Includes WQV of 329m^3 and live volume of 483m^3 from existing Alpurt A1 Pond 32
Greville Wetland	SH1-CH13670-NB	S2R	2.12	525	4420	Includes WQV of 116m^3 and live volume of 327m3 from existing Alpurt A1 Pond 33
Greville SB On-Ramp Dry Basin	SH1-CH13900-SB	S2R	0.00	0	320	No ponds replaced by this wetland.
Greville NB Off-Ramp Dry Basin	SH1-CH14110-NB	S2R	0.00	0	420	No ponds replaced by this wetland.
Alpurt A1 Pond 34 (existing to be modified)	SH1-CH13930-NB	S2R	2.21	785	2520	Outlet modified for additional live volume. Refer to flow management section.
Alpurt A1 Pond 35 (existing to be modified)	SH1-CH14050-NB	S2R	0.00 (2.96 ha to 60% TSS removal)	315	2800	Outlet modified for additional live volume. Refer to flow management section.
Moro Wetland	SH18-CH720-EB	R2C	6.23	1195	4095	No ponds replaced by this wetland.
Caribbean Wetland	SH18-CH1500-WB	C2PM	3.07	470	2400	No ponds replaced by this wetland.
Alexandra Wetland	SH18-CH720-EB	PM2AH	2.78	345	2005	No ponds replaced by this wetland.

Note: OV2M (Oteha Valley to McClymonts Road), M2S (McClymonts Road to Spencer Road), S2R (Spencer Road to Rosedale Road), R2C (Rosedale Road to Constellation Drive), C2PM (Constellation Drive to Paul Matthews Road), PM2AH (Paul Matthews Road to Albany Highway).

The preferred location identified for the wetland in the PM2AH catchment during the preliminary design phase was a grassed location adjacent to the UHH within Rook Reserve, to the north of Rook Place. However, following discussions with AC Parks and Reserves Division (AC Parks), two alternative sites within Bluebird Reserve were also considered. The outcome of a multi-criteria analysis process for the three sites indicated Rook Reserve as the preferred option.

However, at the time of writing, a decision had not been made by the Local Board (as manager of the reserves) as to its preferred location for the stormwater pond, largely due to the timing of the local body elections and the new meeting schedule for the Local Board. The NoRs and consent applications, therefore, include both the preferred Rook Reserve option and a Bluebird Reserve option. The alternative design drawings for Bluebird Reserve are provided in Appendix R of the

Assessment of Stormwater Management (**Technical Assessment 11)** along with an assessment of the effects of locating the stormwater pond in this location. Once the position of the Local Board is finalised, the designation line can be drawn back from the discarded option.

5.7.2.2 Swales

Swales will be used where practical to provide pre-treatment of runoff from existing and new impervious areas prior to discharge to dedicated treatment devices. They have been designed in accordance with TP10 to provide a 9-minute residence time to achieve 75% Total Suspended Solids (TSS) removal.

The current design proposes as a minimum the swale sections and lengths as identified in **Table 14** below and illustrated on **Figure 22**. The swales are detailed on Stormwater Layout Plans 1404 and 1408 in **Volume 5**. Both treatment swales have been designed with a trapezoid profile with 1m base width and 1V:3H side slopes.

Table 14 Proposed Treatment Swales Summary

Swale ID	Sub-Catchment	Impervious Area Treated (ha)	Swale Length (m)	Residence Time (min)	TSS Removal (%)
SW-S2R-1	S2R	1.02	160	11.0	75%
SW-C2PM-1	C2PM	0.28	230	14.4	75%

The hydraulic performance of swales will be designed in accordance with NZ Transport Agency and AC stormwater treatment requirements and will comply with the Auckland Motorway Alliance (AMA) and Austroads requirements for maintenance and access, and road user safety.

5.7.2.3 New proprietary devices

Stormwater treatment within the S2R catchment is provided by a stormwater proprietary device (StormFilter or similar). The proposed proprietary device has been designed to provide treatment to meet 75% TSS removal for all existing and new HUR pavement areas discharging to the existing Alpurt A1 Pond 35. This pond is currently undersized and provides sub-standard treatment (approx. 55% TSS removal), but is proposed to be retained for stormwater quantity management for the Project.

A proprietary device is also proposed for treatment of the PM2AH catchment. This device will ensure 75% TSS removal for all existing and new HUR pavement within this catchment.

5.7.2.4 Constellation Bus Station

The Constellation Bus Station stormwater reticulation system is proposed to be modified to discharge stormwater runoff from the new impervious surfaces resulting from the bus station alterations. This modification allows new impervious areas from the bus station to be treated and managed by the proposed Moro Wetland. The existing stormwater management devices within the bus station will be retained to manage stormwater runoff from the parts of the station that do not form part of the Project.

5.7.2.5 Auckland Council stormwater ponds

There are three existing AC ponds stormwater ponds within the Project area that are to be removed to accommodate the Project. These ponds are:

- Moro Pond;
- ARC Refuse Pond; and
- Constellation Pond.

The hydraulic performance of these ponds is to be replicated through two replacement stormwater devices. These are:

- An 8,500m^3 offline high-level dry pond (Location 9); and
- An 850m^3 online quality wetland for treatment (Location 6).

This pond and wetland are located as shown at **Figure 22.** The high-level dry pond is located to the north of the SH18 alignment and the wetland is located to the north of the RWWTP treatment ponds.

The existing stormwater ponds discharge to AC's stormwater network and the replacement ponds will also discharge to AC's network.

5.8 Utilities

Existing network utilities will be affected by the construction of the Project, to which the required works for their diversion, relocation or replacement are included within the Project scope. The notable utilities are detailed in the Design and Constructability Report (**Technical Assessment 15**) and in particular includes the following.

5.8.1 Watercare Services Limited.

The proposed SH18 alignment impacts on the existing Wairau Valley Branch Sewer (TS5), and East Coast Bays Branch Sewer (TS7) which are major lines leading to the RWWTP. Both trunk sewers are proposed to be diverted and a revised TS5 and TS7 alignment, as well as diversion of the local connections to the TS7 main, are proposed.

5.8.2 Vector Gas

No major relocation of Vector Gas assets has been identified as necessary, however a 50mm MP4 gasmain on Paul Matthews Drive may require a localised relocation which will be within the boundary of the Project area.

5.8.3 Vector Power

The proposed alignment conflicts with existing Vector 11KV, 33KV and 110KV overhead and underground lines in multiple locations. The relocation and replacement works have been discussed with Vector and agreed in principle which are summarised in **Table 15** below.

Table 15 Vector Relocation Works

Item	Description
McClymonts Road Bridge	Relocate existing 11kV and 33kV to proposed new McClymonts Road Bridge crossing
North of Greville Road to North of Rosedale Road	Underground existing overhead 33kV lines to accommodate busway
North of Rosedale Road	Replace existing 33kV lines under motorway due to widening. Diversion shall follow the motorway alignment south and then pass beneath the Rosedale Road overbridge.
Rosedale Road Lowering	Lower 11kV lines to allow for road lowering
Western side of SH1 north of Rosedale Road	Underground existing 33kV adjacent to SH1 to accommodate northbound widening
Eastern side of SH1 north of Constellation Drive	Underground existing 11kV adjacent to Constellation Drive Off Ramp to accommodate the busway
SH18/Upper Harbour Highway	Replace existing poles to raise height of existing 110KV and 33KV lines over proposed SH18 alignment.
SH18/Upper Harbour Highway	Relocate (underground) existing 33kV and overhead lines to accommodate Paul Matthews Road Off Ramp

Paul Matthews Road Corner	Relocate existing 33kV underground line to accommodate Paul Matthews Road realignment and bridge.

5.8.4 Transpower

There are existing Transpower 220KV power cables and an associated designation that follows the length of the Busway before traversing beneath the State highway at the UHH interchange and continuing through the RWWTP and NHHS. The proposed alignment will intersect with this cable in two locations. After discussions with Transpower, the relocation of the existing cables is to be avoided due to significant costs and procurement lead times. It is proposed that the road is bridged over the Transpower cables using culverts.

5.8.5 Fibre Backbone

The existing fibre backbone running adjacent to SH1 will be impacted by the proposed works and will require relocation. The backbone includes Vodafone and Vector communications and NZ Transport Agency Intelligent Transport System/Advanced Traffic Management System (ITS/ATMS) infrastructure. It is proposed that the full length of the backbone from Oteha Valley Road southbound on-ramp to Constellation Drive be replaced and relocated beneath the proposed shared use path.

Consultation with affected network utility owners has been undertaken throughout the development of the design and will be ongoing throughout detailed design and construction.

5.9 Construction of the Project

The Design and Constructability Report providing a more detailed explanation of the Project's construction components is attached at **Technical Assessment 15**. Its purpose is to provide a basis for the assessment of the environmental effects undertaken at **Section 9** and within the Technical Assessments contained in **Volume 3**. This section summarises the proposed construction of the Project.

The commencement of works for the Project is not scheduled until 2018, and many specific details about the construction process have yet to be determined. OPWs will be lodged with AC prior to commencement of construction.

Construction of the Project will be influenced by a number of factors, including:

- Detailed design for the Project, which is undertaken by the appointed contractors, during the implementation phase of the Project. This will occur subsequent to the outcome of the BoI;
- Construction duration, and target completion date;
- Procurement method adopted;
- Specific requirements of the appointed contractor; and
- Any technological advances.

The information provided below should be treated as indicative only, being intended to provide sufficient detail on the proposed construction activities to assess their potential environmental effects and to identify any appropriate measures to avoid, remedy or mitigate those effects.

Once the contract for the Project has been awarded and a contractor is in place, the construction methodology will be further refined and developed. This will be undertaken within the scope of the conditions which will be in place to manage the environmental effects of the construction activities.

5.9.1 Construction Programme and Staging

A preliminary construction programme has been developed to inform the assessment of the environmental effects. Construction is expected to take approximately 3.5 years and be progressed in

a staged manner (see **Table 16** below). While there are some dependencies between these proposed construction stages, the specific staging and phasing of the work will be influenced by the factors noted in the previous section with construction likely to be undertaken on a number of fronts, such that many elements in multiple zones will be undertaken at the same time.

Table 16 Potential construction staging

Stage	Period	Description
Stage 0	December 2017 – May 2018	Project establishment Detailed design
Stage 1a	June 2018 – August 2018	Commence and complete early works for Paul Matthews diversion and north/southbound ramp tie-ins Commence Busway construction Commence Rosedale Road lowering
Stage 1b	September 2018 – October 2019	Continue Busway construction Commence north-facing ramps construction Commence and complete SH1 southbound widening Complete Rosedale Road lowering Commence and complete McClymonts Bridge Extension
Stage 1c	November 2019 – June 2020	Continue Busway construction Continue north-facing ramps construction Commence SH1 northbound widening
Stage 1d	July 2020 – December 2020	Continue Busway construction Complete north-facing ramps construction Complete SH1 northbound widening Commence and complete Constellation Drive Lowering Part 1 and connection to northbound ramps
Stage 2a	January 2021 – March 2021	Complete Busway construction Commence and complete Constellation Drive Lowering Part 2 as well as connection to southbound ramp Commence and complete Paul Matthews connection
Stage 2b	April 2021 – September 2021	Complete Busway construction Commence and complete Constellation Drive Lowering Part 3 and Part 4 final arrangement Commence and complete SH1 median works

5.9.2 Construction Zones

The Project has been currently divided into eight distinct construction zones. The construction zones are locations in which the proposed works will be constructed. Construction Support Areas (CSAs) (see **Section 5.9.3**) will be required for provision of welfare, storage and other support functions for these zones. The zones are listed below and illustrated on **Figure 23** below.

- Zone 1 – SH18/SH1 Interchange;
- Zone 2 – SH18 UHH - SH1 to Albany Highway;
- Zone 3 – SH1 Northbound;

- Zone 4 – SH1 Southbound;
- Zone 5 – SH1 Median;
- Zone 6 – Albany Bus Station & Busway Bridge;
- Zone 7 – Busway - Albany to Greville Road; and
- Zone 8 – Busway - Greville Road to Constellation Bus Station.

Figure 23 Construction Zones

Source: Aerial photography sourced from Auckland Council GIS Viewer

5.9.3 Construction Support Areas

Six CSAs are required to support the construction of the Project (**Figure 24**), and may be used for the following general activities:

- Site offices and construction personnel amenities, including car parking;
- Construction vehicle and machinery parking and maintenance;
- Loading and unloading of construction materials;
- Storage of construction materials;
- Fabrication, reinforcement cutting and bending;
- Storage of plant and equipment, and building materials;
- Storage of ground improvement plant and materials;
- Storage of hazardous construction materials (if any);
- Construction vehicle wheel washing areas (where necessary);
- Stormwater and groundwater treatment facilities where required;
- Waste storage and collection;
- Spoil handling and storage;
- Storage of supplanted trees / shrubs; and
- Aggregate crushing.

All CSAs will be fully fenced and made secure. It is likely that all CSAs will be provided with utilities (water, telecommunications, power, and sewer) with connections removed after the completion of the Project. All CSAs are likely to be established on compacted hardfill and will be used for the stockpiling of earthworks, including contaminated soils. Some earthworks may be required in the CSAs prior to mobilisation to allow for the re-levelling of surfaces for construction equipment access and placement. Upon the completion of works, the construction support areas are to be disestablished and the areas reinstated. It is likely that areas which are not required for the long term operation of the State highways will be subject to a designation draw back with the land disposed of.

Figure 24 Location of Proposed CSAs

Source: Aerial photography sourced from the LINZ Data Service and licensed by LINZ for re-use under the Creative Commons Attribution 3.0 New Zealand licence.

CSA 1 combined with CSA 2 will be the primary or largest CSA. This combined CSA is located within Construction Zone 1 providing good accessibility to the SH1/SH18 tie-in works area as well as to the haul road to the RWWTP Pond 1 works area.

In addition to the main CSA, four other site locations have been identified at:

- CSA 3: Greville Road West;
- CSA 4: McClymonts Road;
- CSA 5: Rosedale Road; and
- CSA 6: Greville Road East.

5.9.4 Earthworks

Table 17 identifies the proposed locations of cut and fill along the Project corridor.

Table 17 Project Earthworks Areas

Construction Zone	Cut Area (m^2)	Fill Area (m^2)	Total	Cut Volume (m^3)	Fill Volume (m^3)	Balance
Zone 1: SH18 Ramps	58,000	54,000	112,000	149,000	212,000	63,000
Zone 2: SH18 & UHH	105,000	37,000	142,000	71,000	3,000	-67,000
Zone 3: SH1 Northbound	86,000	52,000	138,000	49,000	45,000	-4,000

Construction Zone	Cut Area (m^2)	Fill Area (m^2)	Total	Cut Volume (m^3)	Fill Volume (m^3)	Balance
Zone 4: SH1 Southbound	84,000	36,000	121,000	48,000	39,000	-9,000
Zone 5: Median Barriers	-	-	-	-	-	-
Zone 6: Busway Link Bridge to Albany Bus Station	0	1,000	1,000	0	2,000	2,000
Zone 7: Busway Greville North	22,000	21,000	44,000	48,000	56,000	7,000
Zone 8: Busway Greville South	24,000	31,000	55,000	49,000	119,000	70,000
Total	**379,000**	**232,000**	**613,000**	**414,000**	**476,000**	**62,000**

5.9.5 Erosion and Sediment Control

Traditional erosion and sediment control methods, such as temporary silt fences, dirty water diversion bunds and clean water diversion bunds, as well as progressive stabilisation of batter will be used for the Project. These methods and the general layout are shown on the Construction Water Management Plans Drawings in **Volume 5**. The overall methodology for sediment control and the associated design philosophy is set out in the Assessment of Construction Water Management (**Technical Assessment 4**).

The methodology for sediment control will be by way of a management plan based approach.

The contractor will be responsible for implementing sediment control measures in accordance with AC's Technical Publication 90: Erosion and Sediment Control Guidelines for Land Disturbing Activities (TP90) and the NZ Transport Agency's Erosion and Sediment Control Guidelines for State Highways. The contractor will also have responsibility for environmental protection during the proposed works. Such measures will be implemented prior to any land disturbance taking place.

The main erosion and control measures include those matters listed below, which will be a requirement of the construction contract:

- Clean water diversions, established between the edge of the existing motorway alignment and works area, to be directed to discharge at points beyond the works location;
- Dirty water diversion bunds to intercept stormwater from earthworked areas and divert it to designated settlement areas or decanting earth bunds before discharge;
- Use of check dams incorporating filter socks (these measures are utilised on slopes to slow flow rates and assist in sediment deposition);
- Silt fences, hay bales and detention ponds to limit erosion and collect water-borne soil in a way that manages adverse downstream effects; and
- The use of super silt fence installed around culvert headwalls/outlets.

5.9.6 Construction Works to the Causeway at the RWWTP

Construction works will require the temporary installation of rock revetment and/or sheet piles and groynes to be located within the bed of the ponds past the permanent structure. These works are required to temporarily allow de-watering of the construction area and will not extend more than 10m

beyond the existing structure in Ponds 1 and 2. A bunded area beside the existing carriageway will be required to temporarily stockpile contaminated excavated material from the wastewater pond for removal off site.

5.9.7 Construction Works at the Watercourses to the South of Pond 1 at the RWWTP

The works will require the piping of several watercourses that lie between Pond 1 at the RWWTP and the UHH. Approximately 180m of the central watercourse is to be piped and filled over to accommodate for the realignment of Paul Matthews Road and the new SH1/SH18 ramps. Several adjacent watercourses (a combination of intermittent and ephemeral streams) are also to be piped and filled over. All of which are highly modified and have very low aquatic ecological values. The length of the watercourses proposed to be piped in this location is approximately 602m.

5.10 Land Requirements

Given the nature of the proposed improvements and scale of the construction to be undertaken, additional land beyond the existing designations is required at certain locations along the SH1 and SH18 corridors. Some of the land required is already owned by the Crown for roading purposes as well as AT local roads.

The land requirements for the Project, including that required for construction purposes, are shown on the NoR Plans contained in **Volume 1** and listed on the property schedules provided with these plans. The Project has been designed to avoid the amount of third party land required where at all possible.

When existing NZ Transport Agency land holdings and local road parcels are excluded, the alterations and new designations will affect 67 property parcels as set out below. The NZ Transport Agency has acquired some of these properties already as noted below.

5.10.1.1 Properties Required in Full

The following properties are required in full:

- 123 Rosedale Road;
- 78-80 Paul Matthews Road (Units 1, 1A, 2, 2A, 3, 3A, 4, 4A, 5, 5A, 6 ,6A[7], 7, 7A, 8, 8A ,9, 9A, 10, 10A, 11, 11A, 12, 12A, 13, 13A, 14, 14A, 15 and 15A); and
- 73-77 Paul Matthews Road.

5.10.1.2 Properties Required in Part

The following properties are to be required in part:

- 98 McClymonts Road
- 60 Masons Road
- 38 Colliston Rise
- 40 Colliston Rise
- 42 Colliston Rise
- 44 Colliston Rise
- 117 Rosedale Road
- 121 Rosedale Road (Units G,H,I,J,K,L)
- 9 Arrenway Drive
- 1 Saturn Place
- 5 Greenwich Way
- 13 Omega Street
- 15 -17 Omega Street
- 19 Omega Street
- 21-23 Omega Street
- 25-27 Omega Street
- 29-31 Omega Street
- 90 Bluebird Crescent

[7] Already acquired from the owner by the NZ Transport Agency

- 11 Arrenway Drive
- 13 Arrenway Drive
- 15 Arrenway Drive
- 17 Arrenway Drive
- 19 Arrenway Drive
- 35 Arrenway Drive
- 6 Cowley Place
- 8 Cowley Place
- 10 Cowley Place
- 12 Holder Place
- 92 Bluebird Crescent
- 94 Bluebird Crescent[7]
- 96 Bluebird Crescent[7]
- 14 Wren Place;
- 2A William Pickering Drive; and
- 229 Bush Road
- 233 Bush Road
- 235 Bush Road
- 237 Bush Road
- 239 Bush Road

5.10.1.3 Auckland Council, Auckland Transport and Watercare affected land

Parts of the following AC, AT and Watercare properties will be affected by designations for the Project:

- McClymonts Road (AT)
- 62 Greville Road
- R62 Greville Road (reserve)
- R Tawa Drive (reserve)
- R15 Tawa Drive
- 171 Rosedale Road
- Rosedale Road (AT)
- R27 Arrenway Drive (reserve)
- RA2 Jack Hinton Drive (Watercare, reserve)
- R2 Centorian Drive (reserve)
- R1 Upper Harbour Highway (Constellation Park, reserve)
- Meadowood Reserve
- Omega Reserve
- Rook Reserve
- Bluebird Reserve

Not all of the above land will need to be acquired by the Crown. The NZ Transport Agency will discuss with each landowner whether land acquisition is necessary.

Where the land requirements relate to parks, discussions with AC Parks and Reserves continue to be progressed with regard to refinement of design details and the associated land requirements. It is considered probable that as a result of such refinements and discussions that there will be areas of parks from which the NZ Transport Agency will seek the removal of its designation at the completion of the Project.

The altered and new designations also include some areas of land that is required to enable the construction of the Project to be undertaken. Similar to the parks situation, upon completion of the Project it is probable that there will be areas for which the NZ Transport Agency will seek the removal of its designation(s).

The identification of any such areas will be determined as part of the completion of the Project, and if and when such areas are identified the appropriate applications for removal of the designation will be undertaken at that time.

5.11 Works excluded from Project

Works proposed for the following are excluded from this application package and are to be applied for by the NZ Transport Agency or other network utility operator separately where necessary.

5.11.1 Watercare Services Limited

The following works required to assets owned by Watercare are excluded from the Project scope.

5.11.1.1 East Coast Bays Link

A proposed network upgrade for a pumped rising main across SH1 will be affected by the Project. It is proposed that the link be constructed in conjunction with the Project to ensure integration between the road corridor and sewer network.

5.11.1.2 North Harbour 2 Watermain

The NH2 is being consented by Watercare as is proposed to be installed adjacent to the SH18 corridor between William Pickering Drive and Albany Highway. A suitable corridor for these works is allowed for as part of the Project's design.

5.11.2 North Harbour Hockey Stadium

The proposed alignment along SH18 will require some land currently occupied by North Harbour Hockey which is committed to hosting the 2016/17 Women's FIH World League final in November 2017 including the use of the stadium's facilities and four pitches. The proposed alignment of the SH18/SH1 interchange will encroach onto the existing pitch (Turf 3) and the adjacent grassed pitch located in the southwestern corner of the NHHS. As this will significantly compromise the complex, it is proposed that the hockey facilities are relocated to an alternative location within Rosedale Park North. The NZ Transport Agency has been working closely with Harbour Hockey Charitable Trust (Hockey), AC and other stakeholders to relocate the facilities, including gaining the necessary resource consents and approvals for the facilities to be constructed and operational by November 2017. Any resource consents required for the facility are being applied for separately from the Project.

5.11.3 Rosedale Closed Landfill

The Project will impact on the on-going operation of the Rosedale Closed Landfill, both during and post construction which will impact on the long term discharge consents held by AC for the Rosedale Closed Landfill site. The Project will require the relocation of monitoring apparatus which is currently located at the perimeter of the Rosedale Closed Landfill site. Consequently, variations to the following management plans are envisaged, as part of the detailed design phase of work:

- Rosedale Landfill Aftercare Management Plan, March 2010, prepared by EnviroWaste Services Limited (referred to as the Site Management Plan); and
- Rosedale Closed Landfill Air Quality Management Plan, July 2015, prepared by URS New Zealand Ltd.

A variation to the trade waste agreement may also be required. A Consenting Strategy is being developed in conjunction with the AC's Closed Landfill team in respect of these variations.