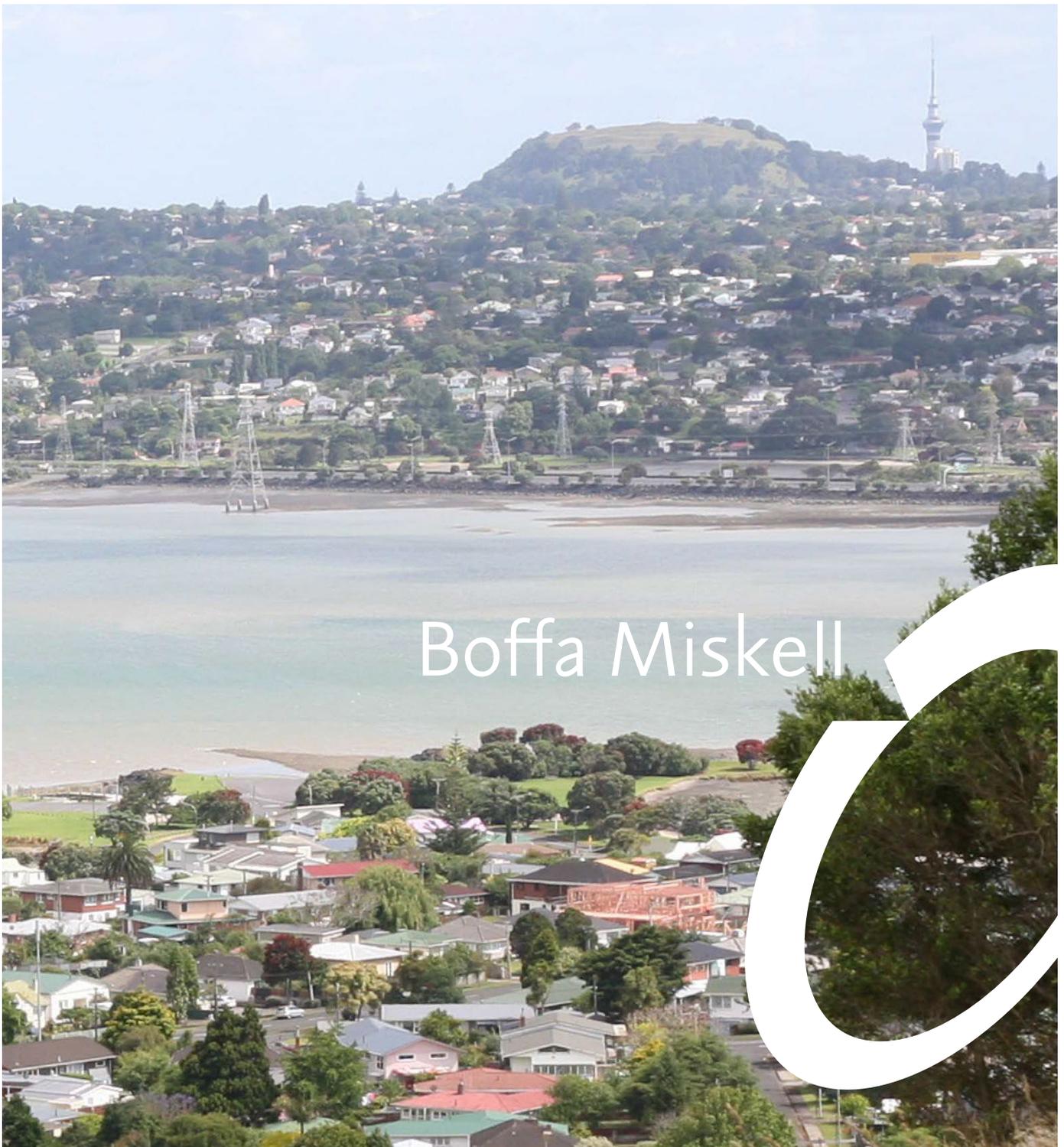


Central Interceptor and Associated Works

Assessment of Landscape and Visual Effects

Prepared for Watercare Services Limited

26 July 2012



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Table 1	Summary of Site Assessment Effects during Construction Works
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1.0 Introduction and Background

This report assesses the landscape and visual effects of the proposed Central Interceptor main works project and recommends a number of mitigation measures and design principles for consideration through subsequent phases of the design and implementation of the construction and permanent works. Much of the proposed work is located on parks and reserves owned by Auckland Council. Watercare has been working closely with Auckland Council Parks in the development of its notices of requirement and will continue to develop its designs in close consultation with Auckland Council. Opportunities for mitigating any landscape and visual effects have been identified throughout this report and these would be confirmed through the detailed design process and ongoing consultation with Auckland Council Parks.

Watercare Services (Watercare) is planning to construct a new wastewater tunnel to collect wastewater flows from the Auckland isthmus area and transfer them across the Manukau Harbour to the Mangere Wastewater Treatment Plant (Mangere WWTP). The Central Interceptor Project (the Project) arose out of the Three Waters Plan (2008) which identified the need to provide trunk sewer capacity to central Auckland to reduce wet weather wastewater overflows and provide capacity for growth.

The project extends across the Auckland isthmus from Western Springs in the north to the Mangere WWTP in the south.

This assessment of landscape and visual effects report has been based on information provided by the Central Interceptor Project Team. Details of the proposed works are included in the full Assessment of Environmental Effects documents, including reports and drawings.

The concept design provided to Boffa Miskell is preliminary in nature, and by necessity must be flexible and robust so as not to limit future design and construction opportunities. As such, the design can be expected to develop and be refined further during future stages of design development.

In addition, this report has relied on arboricultural survey information from Arborlab Consulting Services Ltd on the removal of trees and shrubs that will be required at a number of the sites. Based on this information and Boffa Miskell's site surveys and analysis, this assessment of landscape and visual effects report describes the likely effects of currently proposed works for each site.

In many instances the proposals can be considered a worst-case scenario in order to provide sufficient flexibility for construction activities to occur with the least constraint. As the design develops and more detailed investigations are undertaken, refinements may occur and their potential effects of specific activities and elements may be avoided, remedied or further mitigated.

As such, this report contains a number of potential avoidance, remedial and mitigation recommendations to be used as a basis by designers (and contractors) during

subsequent phases of the project, and for relevant consent agencies and stakeholders to consider as part of the review and consultation during the approval phases of the project.

This report provides an assessment of the landscape and visual effects for both the construction and permanent works of the project at each of 19 construction sites.

For each site a series of plans and illustrations have been prepared as follows:

- Location and Landscape Context - plan and photographs
- Construction Site and Works
- Permanent Works Concept
- Photomontages/Sketches (for certain sites only).

The plans and illustrations are contained in a separate A3 folder (Supporting Figures) which accompanies this report.

2.0 The Proposed Works

The overall concept proposed for the Central Interceptor project is a gravity tunnel from the Western Springs area to the Mangere WWTP with various link sewers and connecting pipelines connecting the existing network to the main tunnel at key locations along this route.

The key elements of the project include:

- An approximately 13 km long 4.5 metre diameter main tunnel from Western Springs to Mangere WWTP, up to 110 metres below ground.
- Four link sewers connecting the main tunnel to the existing sewerage network.
- Associated connections to existing sewers.
- Associated structures at key sites along the route and at connections. At each site, facilities include access shafts, drop shafts, and flow control structures. Grit traps, air intakes, air vent stacks, or air treatment facilities are proposed at some sites.
- A limited number of overflow structures in nearby watercourses to enable the safe discharge of occasional overflows from the tunnel.
- A Pump Station located at the Mangere WWTP.
- Other associated works at and in the vicinity of the Mangere WWTP include a rising main to connect to the WWTP and an emergency pressure relief structure to enable the safe discharge of flows in the event of Pump Station failure.

The main tunnel, link sewers, connection pipes and many of the associated structures will be underground. The tunnel and link sewers will be constructed by tunnelling methods, with access provided from around 19 construction sites. These surface construction sites include:

- Three primary construction sites (at Western Springs, May Road and Mangere WWTP);
- 16 secondary sites to provide connections to the main tunnel and link sewers.

The primary construction sites will be used for launching or retrieving the tunnel boring machine, and materials for tunnel construction would be delivered and stored, tunnel spoil removed, and permanent facilities constructed. Activities at the secondary sites on the main tunnel will include shaft sinking and the construction of surface facilities and at the link sewer sites will also include launching or retrieving the microtunnel boring machine.

Other construction activities include removal of vegetation, service relocations, establishment of construction yards, lay down areas and site access-ways, traffic management, earthworks and site reinstatement.

Within the main tunnel alignment there are three primary construction sites where the construction works are expected to take five to six years to complete. These are Western Springs (WS1), May Road (WS2) and Mangere WWTP (WS3). At most other sites the construction period is expected to be approximately 12 to 18 months, while at some of the more minor sites the duration of construction is estimated to be 6 to 8 months¹. Due to the nature of construction at the secondary sites the total period of occupation will be longer than this (ranging between 2 and 5 years) with some periods of time where no active construction works will occur at the sites. Following completion of the works, minor maintenance will be required at most sites on a regular basis as is the case with the existing network.

At each site a range of permanent structures will remain. Most of these will be at grade and consist of manhole covers and lids of shafts, control chambers and grit chambers. However, at two sites (Pump Station 23 (Frederick Street) and Kiwi Esplanade), these will be required to be 2 and 3 metres above grade respectively.

In addition, at four sites, Air Treatment Facilities are proposed and these may be between 20 and 70 (for May Road) metres long by 10 and 37 (for May Road) metres wide, and 5 to 8 metres high. These permanent structures will be housed in buildings at Western Springs (WS1), May Road (WS2), Miranda Reserve East (L3S2), and Frederick Street Pump Station 23 (AS6).

A full list of sites and the at-grade and above-grade features are generally described in Section 3.0 of this report and can be found in detail in Part A Section 5 and Part B of the Assessment of Environmental Effects (AEE).

¹ Tonkin and Taylor Limited, Central Interceptor Main Project Works Assessment of Effects on the Environment, June 2012.

3.0 Methodology

The methodology adopted by Boffa Miskell for this assessment of landscape and visual effects has comprised the following steps and tasks:

- Site familiarisation
- Review of documents, plans and other material
- Site assessment
- Analysis and Evaluation of Effects
- Design Principles and Mitigation Measures
- Recommended Process
- Internal peer review.

These steps are described below:

3.1 Site Familiarisation

This has involved a visit to each of the 19 construction sites and the surrounding area, where access has been permitted. The May Road (WS2), Keith Hay Park (AS5), Frederick Street Pump Station 23 (AS6) and Haycock Avenue (L355) sites have been assessed from adjoining publically accessible areas such as reserves and roads. Photographs of each site and its landscape context were also taken and many of these photos have been used in the report. In addition recent aerial photography (flown 2010 / 2011) and 1metre ground contours have been available for most sites and these have been used to assist to analyse the potential effects where possible.

For a number of sites subsequent visits have been made to review revisions to the design and to take additional photos.

3.2 Document Review

This assessment of landscape and visual effects report has been based on a review of a number of documents which have been prepared for the concept design of the Central Interceptor. The Assessment of Environmental Effects describes the proposed works and includes a drawing set (Part C).

In addition, this report has relied on survey arboricultural information from Arborlab Consulting Services Ltd on the removal of trees and shrubs that will be required at a number of the sites.

3.3 Site Assessments

Utilising the documents outlined above and the site survey information, including photography, the following assessment has been provided for each site:

- 3.3.1 Location and Landscape Context – a discussion which outlines where the site is, the surrounding land-uses and access.
- 3.3.2 Proposed Construction Site and Works – a discussion which describes the works during the period of construction. This is described under the following headings.
 - Landscape and Visual Effects – which describes both the effects on the landscape (i.e. landform, vegetation, watercourses), including the natural character of the coastal environment and the margins of streams (where relevant); and the effects on the visual amenity due to the construction works.
 - Extent of Visibility and Viewing Audience – which describes the area from which the proposal will be visible from and the different types of viewing audiences.
 - Level of Temporary Effects – outlines the magnitude of the temporary effects. These effects have been delineated into:
 - (I) Open Space and Landscape Character Effects (including Natural Character Effects where relevant) and Physical Landscape Effects; and
 - (II) Visual Amenity Effects i.e. effects on the visual amenity.
- 3.3.3 Permanent Works – a discussion which describes the completed works and the level of landscape and visual effects. This also includes a discussion of:
 - Mitigation Measures – which outlines proposed mitigation measures for each site.
 - Level of Long Term Effects.

For each of the effects determined in 3.3.2 (Construction Site and Works) and 3.3.3 (Permanent Works) a level of effect rating (over an 11 point scale) has been given, taking into account the property mitigation and a reasonable establishment period for each site.

This scale is:

Very High Adverse Effects	(-5)
High Adverse Effects	(-4)
Moderate Adverse Effects	(-3)
Low Adverse Effects	(-2)
Very Low Adverse Effects	(-1)
Neutral Effects	(0)
Very Small Beneficial Effects	(+1)
Small Beneficial Effects	(+2)
Moderate Beneficial Effects	(+3)
Highly Beneficial Effects	(+4)
Very High Beneficial Effects	(+5)

For assessment purposes, adverse effects that score -1 and -2 can be considered to be less than minor; whereas a score of -3 can be considered to be minor, and scores of -4 and -5 can be considered to be more than minor.

A description of how these effects are assessed is provided in Appendix 1.

3.4 Summary of Site Assessment Effects

The individual site assessment effects have been collated into two separate tables, one for the Temporary Effects and one for the Permanent Effects using the above rating scale applied across the two types of effects.

3.5 Landscape and Urban Design Principles

For the project as a whole a set of principles have been prepared which draw together the range of potential effects and proposed mitigation measures for each site. These are available to be used at the more detailed design phase of the project associated with an Outline Plan of Works. As noted in Section 1, Watercare will be working closely with Auckland Council Parks through this process.

3.6 Summary of Effects

This provides a summary of the effects and groups these in relation to the various types of sites – primary, secondary (intermediate) and secondary (small).

4.0 Site Assessments

4.1 Main Tunnel Sites

4.1.1 Western Springs (WS1)

4.1.1.1 Location and Context (refer to Figures 2 and 3)

This site is located adjacent to the playing fields at Western Springs. The playing fields are located on flat land between the Bullock Track to the east, Great North Road to the south, Stadium Road to the southwest, the Speedway Stadium to the northwest and a vegetated slope consisting primarily of native trees and shrubs to the north.

Between the playing fields and Great North Road and Stadium Road is a row of mature Cedar specimen trees. These evergreen specimen trees, although “limbed up”, provide a degree of separation to the adjoining roads and the activities beyond.

Along the base of the slope adjacent to the grassed flat area are a number of willow and poplar trees. In this area there are also a number of flood light poles and lamps to provide for night time use of the playing fields.

Beyond these edges is a range of land use activities from where views of the playing fields may be afforded. To the east is a car yard beyond the Bullock Track. Across Great North Road is a series of apartment buildings and further to the southwest is the Museum of Transport and Technology (MOTAT). Apart from the surrounding roads and these adjacent sites, the playing fields are contained by vegetation and rising landforms to the north, and the fencing and built structures associated with the Speedway and stadium to the west. The playing fields themselves contain three rugby fields located in the southern and western part of the site.

In addition to full public access to the playing fields, pedestrian access is provided around the edge of the flat open space adjacent to the adjoining road network, and a path is provided through the lower slopes of the vegetated hill connecting the Bullock Track to the stadium, and up the hill to Old Mill Road and Surrey Crescent.

North of the car yard on the eastern side of the Bullock Track and on the southern side of Old Mill Road is residential housing. Views of the site from these properties are obscured due to their physical relationship to the topography and regenerating native vegetation on the hill slope.

4.1.1.2 Proposed Construction Site and Works (refer to Figure 4)

The proposed construction site has been located in the northern corner of the playing fields site up against the base of the vegetated slope to avoid impacting on the existing layout of the rugby fields.

The site area required for construction is approximately 7,000 m² and will contain a number of activities and features located within a closed board 1.8 to 2.0 metre high fence. One-way vehicle access is to be provided from the Bullock Track through the site and out to Stadium Road. Throughout the construction period (approximately 5 years) excavation of the tunnels will be occurring and trucks will be entering and exiting the site to collect and transport spoil.

A range of other activities will also occur within the fenced compound associated with the project and a number of structures such as offices, workshops, containers and storage, and parking areas will be installed.

Construction of the 5 metre high Air Treatment Facility building and integrated vent stack and other elements would also for a period extend above the perimeter fence.

□ Extent of Visibility and Viewing Audience

The extent of visibility of the perimeter fence and any above fence protrusions (e.g. the upper part of the air treatment facility) would be confined to the eastern side of the Bullock Track in front of the car yard, along the southern side of Great North Road, and within the park, including Stadium Road and the open space/playing fields area. All views beyond the open space are partially obscured by the perimeter of trees around the outer edge of the park.

Based on this, the viewing audience would consist of the following main groups:

- Park users - be they playing sport, watching sport, playing informally on the open field or walking through the area, using the dedicated walking trails, or entering the stadium or MOTAT either on foot or by vehicle.
- Residents in flats that face Great North Road. The views from these buildings are oriented in a north westerly direction and contain foreground vegetation either within the front yards and/or along the edge of Great North Road.
- Motorists and Pedestrians using the road network outside the park, including when visiting the car yard.

□ Landscape and Visual Effects

The landscape and visual effects resulting from construction will be:

- Removal of two mature poplars and one mature willow tree from below the native shrub-land bank, as well as pruning a number of other native and exotic trees from the fringe of the construction area.
- Construction and visibility of an external fence to screen the activities beyond from public view. This fence could be “clad” with temporary artwork bespoke to the park and / or details which communicate the project to the viewing public.
- Visibility of a temporary shed and at times construction equipment over the shaft head.
- Visibility of the construction of the Air Treatment Facility building above the fence.
- Vehicle movements associated with the construction activity.

☐ **Level of Temporary Effects (5 years)**

- Open Space and Landscape Character - **High Adverse Effects (-4)**

This is due to the use of the open space for infrastructure activities and the external appearance of the fence contrasting with and having a high level of effect on the character and key attributes of the park environment and the context within which it would be seen.

Also taken into account is the limited alteration to the landform, the low number of trees being removed and their type, condition and value, and that no watercourse or wetland features will be modified.

- Visual Amenity Effects – **Moderate Adverse Effects (-3)**

The combination of the visual context within which the site is located; the limited extent of visibility of the works, particularly from residential locations; the transient nature of the majority of the viewing audience as well as the level of visibility of activities (ranging from high for the fence and elements that protrude above, to intermittent visibility of trucks, to low visibility for the majority of the internal activities) would result in a moderate visual effects on the perceived amenity of the area.

4.1.1.3 Permanent Works (refer to Figures 5, 6 and 7)

Following construction the following permanent features will remain:

- Air Treatment Facility and integrated vent stack housed in a 30 x 15 x 5 metre high building located towards the base of the vegetated hill.
- Various flush-mounted access and drop shafts and chamber manholes up to 7 metres in diameter.

☐ **Mitigation Measures**

The following techniques should be considered to remedy and mitigate effects following construction:

- Remove construction access roads apart from those providing access for maintenance. Retain with "grass cell" or similar reinforcing and re-grass to provide all-weather trafficable access for maintenance vehicles. Integrate new long term all-weather trafficable access with new pedestrian access (refer Figure 5).
- Repair and re-grass or plant (depending on final levels) disturbed ground.
- Investigate location and design options for the Air Treatment Facility. This could include provision for a viewing terrace to rugby fields, and should consider CPTED principles (refer Figure 5).
- Consider treatment of large Drop Shaft (7 metre diameter) and Access Shaft (7 metre diameter). This could include covering in soil and re-grassing or covering with other suitable material whilst still allowing for required infrequent access.
- Consider a standard design motif for above-ground surface covers as a way of interpreting the Central Interceptor project and its benefits.
- Investigate design options in the immediately affected area (including planting), with Regional Facilities Auckland that consider long-term use and amenity in line with the vision and management of Western Springs.

❑ **Level of Long Term Effects**

Following completion of the works and appropriate remedial and mitigation measures in line with those outlined above, it is considered that the adverse landscape and visual amenity effects would be:

- Open Space and Landscape Character – **Very Low Adverse (-1) to Small Beneficial Effects (+2)**

The outcome (adverse or beneficial) would depend on the final design and use of the air treatment facility building and associated veranda / bleachers and it's integration with the open space and sports park layout, along with planting and the design and treatment of the permanent surface elements. The resultant physical landscape effects would be neutral or beneficial with reinstatement of the access and lay down areas to grass and provision of appropriate planting which may include completing the "ring of trees" around the northern and eastern park boundaries, depending on final levels and park objectives.

- Visual Amenity– **Neutral (0) to Very Small Beneficial Effects (+1)**

The long term visual effects on the viewing audience would be neutral and over time as the elements weather and the planting matures these effects would be beneficial.

4.1.2 Mt Albert War Memorial Reserve (AS1/L2S3)

4.1.2.1 Location and Landscape Context (refer to Figures 8 and 9)

This site is located at the northern end of the reserve and adjoins seven residential properties to the west. To the immediate north is reserve land with a recent residential housing development beyond. To the east of the site are tennis courts, a basketball hoop, table tennis table and informal active recreation areas. To the south is a car park which connects to two access points off Wairere Avenue.

Immediately adjacent to the eastern edge of the site is a walkway which connects Asquith Avenue in the north through the reserve via various paths to New North Road in the south.

Within the site and immediately outside along the boundaries with the residential sites, there is a mix of semi-mature native trees and shrubs. These consist of Pittosporum, Ngaio, Pohutukawa, Karaka, Puriri and smaller native shrub species.

Within the site towards the northern boundary there is also a bright red sculpture in the form of a tree. Around its base are some sandstone relics from the old Auckland Town Hall.

4.1.2.2 Proposed Construction Site and Works (refer to Figure 10)

The proposed construction site has been located to avoid the maturing (3-4 metre high) native trees and shrubs along the boundary of the residential houses. This will maintain a good degree of screening for views from these properties apart from upper level views from the two houses to the north.

The site will also be located west of the existing pedestrian footpath so north-south access through the reserve will be retained.

The site area for construction is approximately 2,510 m² and the duration of the work is approximately 12 to 18 months with the site being occupied for a total of 3.5 years. Access will be off Wairere Avenue through part of the existing car park, noting that access to the balance of the car park area should remain. The construction area will require the removal of 12 mixed height (up to 6 metres) native trees and a number of other shrubs. Construction elements include a number of shafts and an office, as well as a road for heavy vehicles.

A 2.0 metre high closed board fence will provide screening from the walkway, car park and other low-level areas, although views above this may be afforded from the area around the table tennis table. The fence will also double as a noise wall to the nearby residents.

□ Extent of Visibility and Viewing Audience

- Although there are a number of houses around the western and northern perimeter of the open space where the construction site is to

be located they are generally well screened from view and residents would only have obscured views of the site and construction works. Towards the east and south the extent of visibility is restricted by existing vegetation and rising land. The majority of views would be afforded by those users of the open space for informal recreation and locals who use the formalised pedestrian path that links Asquith Avenue in the north to Warner Avenue to the south west, the Mt Albert War Memorial Hall and associated activities to the south and beyond to New North Road and a small shopping centre on the corner of Alberton Avenue and Kitenui Street.

□ **Landscape and Visual Effects**

The landscape and visual effects resulting from construction will be:

- Removal of medium sized native trees and shrubs from within the site. Should ground conditions allow, it may be possible to transplant suitable trees and shrubs to other parts of the Reserve. This would be verified at the detailed design and implementation stage.
- Construction of the perimeter fence. On the eastern side of the fence adjacent to the pedestrian path, posters or murals could include information about the project. Given the close proximity to the fence it may also be possible to cut holes in the fence to enable people to see into the working area. This would be dependent on any noise implications.
- Movement of vehicles to and from the site off Wairere Avenue.

□ **Level of Temporary Effect (3.5 years)**

- Open Space and Landscape Character - **Moderate (-3) Adverse Effects**

The resultant moderate adverse level of effect on the character and key attributes of the park environment and the context within which it would be seen is due to the use of a relatively discrete corner of the reserve for infrastructure activities, combined with the associated reduction in open space and the external appearance of the fence. Also taken into account is the limited number of small to medium sized native trees being removed and their type, condition and value, and that no watercourse or wetland features will be modified.

- Visual Amenity – **Moderate (-3) Adverse Effects**

The combination of the visual context within which the site is located; the limited extent of visibility of the works, particularly from residential locations; the transient nature of the majority of the viewing audience as well as the level of visibility of activities (ranging from high for the fence, to intermittent for trucks, to low for the majority of the internal activities) would result in a moderate visual effect on the perceived amenity of the area for the viewing audience.

4.1.2.3 Permanent Works (refer to Figures 11 and 12)

The permanent works at the site will all be located flush with the surrounding ground level. They include three shaft covers, one of which is up to 7 metres in length; and a control chamber. Provision for maintenance will be provided by all-weather trafficable access. This could be integrated with the adjoining pedestrian pathway and could include a "grass cell" type lawn finish within the park area.

□ Mitigation Measures

The following techniques should be considered to remedy and mitigate the effects following construction:

- Remove construction access roads apart from an access for maintenance vehicles. Cover with grass-cell or similar to enable full grass cover yet allow for maintenance access to manholes and lids possibly constructed on an altered alignment (to that shown on the drawings), to ensure retention of park open space amenity.
- Repair and re-grass disturbed ground.
- Undertake replacement tree and shrub planting in liaison with Auckland Council around the surface features, allowing sufficient room for future access to shafts.
- Relocate the sculpture and the existing sandstone relics of the old Auckland Town Hall near to its original location, unless a preferred alternative location is agreed with Auckland Council and any other relevant parties.

□ Level of Long Term Effects

- Open Space and Landscape Character – **Neutral (0) Effects**

The outcome (neutral or beneficial) would depend on the final design and use of the area of reserve and its integration with the open space along with planting and the design and treatment of the permanent surface elements. The resultant physical landscape effects would be neutral with reinstatement of the access and lay down areas to grass and provision of appropriate replacement planting.

- Visual Amenity– **Neutral (0) to Very Small (+1) Beneficial Effects**

The long term visual effects on the viewing audience would be neutral and over time as the planting matures these effects could become beneficial.

4.1.3 Lyon Avenue (AS2)

4.1.3.1 Location and Landscape Context (refer to Figures 13 and 14)

This site is located in an area known as the Roy Clements Treeway adjacent to Meola Creek. The site is largely located on land owned by the Ministry of Education although the northern part is within a car park adjacent to some residential apartments. To the west is the Mt Albert Grammar School grounds and to the north is a series of multi-storey apartment buildings on land zoned Business 4 accessed off Morning Star Place. To the east are large format retail shops accessed off Wagener Place; these are part of the St Lukes shopping area.

The Roy Clements Treeway connects Alberton Avenue in the north to Fergusson Avenue and Haverstock Road in the south around the northern and eastern boundaries of the Mt Albert Grammar School property and through Fergusson Reserve. Along its length the walkway provides connections to the school, residential apartments, retail shops and surrounding streets.

In 2009 the Roy Clements Treeway Boardwalk Project won an IPENZ Arthur Mead award for Environment and Sustainability. The project is one of many community projects along Meola Creek focused on enhancing this urban waterway.

4.1.3.2 Proposed Construction Site and Works (refer to Figure 15)

The proposed construction site has been located to the east of the creek to maintain the major walkway linkage around the perimeter of the school. It will, however, temporarily cut off the link through to the retail shops and Wagener Place. It will also extend north to incorporate the existing overflow channel which will be piped to where it enters the creek.

Access during construction will be provided from the end of Morning Star Place adjacent to an existing apartment building. The site area for construction is approximately 3,700 m²; the duration is approximately 12 to 18 months with a further 18 months to 2 years required for ongoing establishment. The works may require the removal of most of the trees and shrubs within this part of the Roy Clements Treeway. This includes semi-mature species of Pohutukawa, Kohuhu, Kanuka, Puka, Totara, Karaka, Puriri, Lemonwood, Kawakawa and a number of exotic trees as well as other native shrubs (refer to Arborlab report). It is however proposed to avoid existing trees if possible.

A 1.8-2.0 metres high closed board fence will be provided around the perimeter of the site to screen the activities from surrounding ground level views.

Construction elements include an office, workshop, drop and access shafts, and water treatment plant.

❑ **Extent of Visibility and Viewing Audience**

Visibility of the works from ground level locations such as along the existing walkway and around the access ways and car parks to the rear of the apartments and Noel Leemings would be restricted to the exterior of the fence. It would be seen at close quarters for those who use the north south route to school or other local areas or owners of the apartments or shoppers at Noel Leemings and other retail outlets nearby.

Elevated views would be afforded for some residents in the upper levels of some of the apartments adjoining in Morning Star Place.

❑ **Landscape and Visual Effects**

The landscape and visual effects resulting from construction will be:

- Removal of up to 130 semi-mature trees and shrubs within the site ranging between 3 and 12 metres high. Should ground conditions allow, it may be possible to transplant suitable smaller trees and shrubs to other parts of the Treeway and school grounds.
- Construction of the perimeter fence. On the western side of the fence adjacent to the pedestrian path, murals/poster boards could include information about the project and provide for viewing of the interior works if appropriate.
- Movement of vehicles to and from the site past the existing residential apartment buildings and along Morning Star Place.
- Views of the construction activities from the balconies of a number of upper level floors in the apartment buildings adjacent to the site, to the north and east.
- Removal of access through the site to the retail building car park at the rear of Noel Leemings. It is recommended that an alternative temporary pedestrian access be investigated either immediately north of the site fence, or immediately south to enable this connection to be maintained throughout the construction period.

❑ **Level of Temporary Effects (3 years)**

- Open Space and Landscape Character – **Very High (-5) Adverse Effects**

This is primarily due to the removal of approximately 2,500 m² of existing vegetation in an area of open space characterised by an enclosed woodland/ small bush adjacent to a watercourse. The temporary loss of through site access, the internal infrastructure activities and the external appearance of the fence would have a high level of effect on the character and key attributes of the treed environment and the context within which it would be seen.

- Visual Amenity– **High (-4) to Moderate (-3) Adverse Effects**

The combination of the visual context within which the site is located relative to walkway users; the limited extent of visibility of the works from ground level locations; the highly visible extent of works from a small number of upper level residential locations; would result in moderate to high visual effects on the perceived amenity of the area for the duration of the works.

4.1.3.3 Permanent Works (refer to Figure 16)

The permanent works at the site will consist of two 7 metre diameter shafts (with smaller rectangular shaft covers being apparent above ground – within planted area) and an above-ground diversion chamber at the head of the existing overflow channel. Vehicular maintenance access would be provided to these shafts from Morning Star Place and could be integrated with a new path network.

□ Mitigation Measures

The following techniques should be considered to remedy and mitigate the effects following construction:

- Restore disturbed ground to a condition suitable for planting. At this site it is envisaged that the majority of the area will be replanted with NZ native trees and shrubs to restore the area to its previous treed environment. A detailed landscape and planting plan should be prepared for this site.
- Provide new pedestrian paths, interpretative panels and seating in the area. It is envisaged that this would be done in liaison with Auckland Council, Mt Albert Grammar School and the local community who have had a significant input into the enhancement of the area to date.

□ Level of Long Term Effect

- Open Space and Landscape Character – **Neutral (0) to High (+4) Beneficial Effects**

The outcome (neutral or beneficial) would depend on the final design and use of the area of Roy Clements Treeway reserve and its integration with the open space along with planting and the design and treatment of the permanent surface elements. The effects on natural character values of the waterway would result in a highly beneficial effect due to the reduction in wastewater overflows entering the stream system in a high use area.

The resultant permanent landscape effects would be neutral with reinstatement of the access and lay down areas to grass and provision of appropriate replacement planting.

- Visual Amenity – **Moderate (-3) to Neutral (0) Adverse Effects**

The long term visual effects on the viewing audience would be moderately adverse immediately following construction and re planting. This would then reduce to low and very low over a period of 5 to 10 years as the replanting matures. Once fully established and the planting has matured the overall effects on the visual amenity of the area would be restored.

4.1.4 Haverstock Road (AS3)

4.1.4.1 Location and Landscape Context (refer to Figure 17)

This site is located within the Plant and Food Research facility grounds and is to be accessed off Haverstock Road, or if required an alternative access is provided for off the end of Camden Road. The site is bounded to the north by a consented (but not yet built) Housing New Zealand Corporation (HNZC) residential development.

HNZC has consent to redevelop the existing housing estate with up to 40 new residential units. This would involve the removal of the existing buildings and much of the vegetation within the site; the construction of new access, garaging, and houses; and installation of two small pocket parks, each adjacent to two new access roads off Haverstock Road to a rear lane at the boundary with the Plant and Food Research land.

Beyond the Plant and Food Research land to the south is residential housing located on elevated land between Hampstead Road and Mt Albert Road. A number of these properties may be located in a position from where views of the site could be afforded. This would also apply to elevated areas or buildings within Plant and Food Research land.

Along the eastern boundary of the site runs Meola Creek which currently contains an overflow discharge point near the proposed site.

4.1.4.2 Proposed Construction Site and Works (refer to Figure 18)

The proposed construction site has been located close to an existing vacant lot within the HNZC land that would provide good access to Haverstock Road. The site area required for the construction works is approximately 3,000 m²; the duration is approximately 12 to 18 months with a further 18 months to 2 years required for ongoing establishment.

The site contains a number of existing trees grown as part of Plant and Food research. This includes a group of cabbage trees which will require removal. Some of these may be able to be transplanted. Other plant species requiring removal are 2 x willows and a Privet.

Construction elements include an access road, office, workshop, shafts and other facilities for the excavation and associated works. These will be enclosed

within a 1.8 – 2.0 metre high closed board fence along the residential boundary to prevent views into the working area.

☐ **Extent of Visibility and Viewing Audience**

Much of the adjoining and nearby residential area has established gardens many on large sections which provide a high degree of tree cover which obscures views to the site and proposed fenced construction site. Where views may be afforded around existing houses or through trees they would be limited in extent and generally more distant than the view from adjacent properties.

☐ **Landscape and Visual Effects**

The landscape and visual effects resulting from the construction will be:

- Removal of cabbage trees, and other exotic trees within the site. This would be undertaken in consultation with Plant and Food Research.
- Construction of a perimeter fence.
- Movement of vehicles to and from Haverstock Road into the site.

☐ **Level of Temporary Effects (3 years)**

- Open Space and Landscape Character – **Very Low (-1) Adverse Effects**

This is primarily due to the current private use of the area for plant research and the existing fragmented landscape character derived from the adjoining residential and vegetation on site. This also is due to the limited alteration to the existing landform and the diseased nature of the cabbage trees to be removed as well as the low value of the other exotic trees to be removed.

- Visual Amenity – **Moderate (-3) to Very Low (-1) Adverse Effects**

For the duration of works it is considered the adverse visual effects would range from moderate for the viewing audience in properties immediately adjoined to the site in Haverstock Road (Nos. 96 to 102) and Hampstead Road (No.7) to low for and very low for those further away depending on their elevation and potential to view over the works.

4.1.4.3 Permanent Works (refer to Figure 19)

The permanent works at this site will consist of a 5 x 2.5 metre access shaft lid, and smaller control chamber and drop shaft manholes and a site access way.

☐ **Mitigation Measures**

The following techniques should be considered to remedy and mitigate the effects following construction.

- Replace and re-grass disturbed ground.

- Remove construction access roads, apart from an access for maintenance vehicles. This could be designed as part of the proposed new entry to the HNZN redevelopment with a gate through the permanent fence proposed along the southern boundary of this housing area.

□ **Level of Long Term Effects**

- Open Space and Landscape Character – **Neutral (0) Effects**

The outcome is considered to be neutral as the site will be returned to a similar state as existing.

The resultant permanent landscape effects would be neutral with a small access provided for and reinstatement of all grassed areas and provision of appropriate replacement planting in liaison with Plant and Food Research.

- Visual Amenity– **Neutral (0) Effects**

The long term visual effects on the viewing audience would be neutral as the land will be restored to a similar visual outcome.

4.1.5 Walmsley Park (AS4)

4.1.5.1 Location and Landscape Context (refer to Figures 20 and 21)

This site is located in the southern corner of Walmsley Park adjacent to Sandringham Road Extension. Walmsley Park is part of an open space and walkway network that surrounds Oakley Creek and extends from the Mt Roskill War Memorial Park in the southeast through Alan Wood Reserve to New North Road in the northwest. To the northeast and southwest of the proposed site are residential houses accessed off O'Donnell Avenue and Sandringham Road Extension, while south across Sandringham Road Extension is the Wesley Community Centre.

Within the proposed construction site are a number of mature trees including Pohutukawa, Puriri, Kahikatea, Magnolia, Sheoak and Willow.

The residential housing boundaries adjacent to Walmsley Park are fenced with closed board fences. Within the park is a walking track that also crosses into the proposed construction site.

4.1.5.2 Proposed Construction Site and Works (refer to Figure 22)

The proposed construction site has been located to maintain the current pedestrian access through Walmsley Park. The access across the pedestrian bridge within the site can be re-routed on to the footpath adjacent to Sandringham Road Extension.

Vehicle access will require a new bridge to be built over the creek to the construction area. The site will be fenced with a 2 metre high closed board noise barrier fence. The site area for construction works is approximately 2,400 m²; the duration is approximately 12 to 18 months with a further 3.5 to 4 years required for ongoing establishment. The area will contain an office, water treatment plant, muck bin and shafts and chambers.

□ Extent of Visibility and Viewing Audience

There are 4 properties along the south western side of the reserve from where views of the site and temporary fence could be afforded beyond existing fences on the boundary. To the north east across the stream and further east on Sandringham Road are houses and flats from where views could also be had.

The majority of views would be afforded by those users of the open space for informal recreation and locals who use the formalised pedestrian path that links Richardson Road in the west and Sandringham Road Extension and other residential streets in between.

❑ Landscape and Visual Effects

The landscape and visual effects resulting from construction will be:

- Removal of 4 mature exotic trees, 3 semi-mature trees and 2 juvenile trees from within the site. Should any of these be suitable for transplanting, they could be replanted into other areas of Walmsley Park.
- Construction of a perimeter fence. On the Sandringham Road/ Walmsley Park pedestrian access side of the fence murals/information panels could be installed to explain the project and potentially allow views into the works.

❑ Level of Temporary Effects (5 years)

- Open Space and Landscape Character – **Moderate (-3) Adverse Effects**
- The resultant moderate adverse level of effect on the character and key attributes of the park environment and the context within which it would be seen is due to the use of the southern side of the reserve as opposed to the northern where the main walkway is located, combined with the associated reduction in open space and the external appearance of the fence. This also takes into account the 9 small to medium sized native trees being removed and their type, condition and value, and the bridging of the watercourse.

- Visual Amenity– **Low (-2) Adverse Effects**

The combination of the visual context within which the site is located; the limited extent of visibility of the works, particularly from residential locations; the transient nature of the majority of the viewing audience as well as the level of visibility of activities (ranging from high for the fence), to intermittent for trucks, to very low for the majority of the internal construction works.

4.1.5.3 Permanent Works (refer to Figure 23)

The permanent works will all be flush with the ground and consist of a 5 metre in length shaft, cover and other smaller chamber covers.

❑ Mitigation Measures

The following techniques should be considered to remedy and mitigate the effects following construction:

- Remove construction access roads, apart from those providing access for maintenance. Integrate with pedestrian paths or retain with “grass cell” or similar reinforcing and re-grass to provide all-weather maintenance access.
- Repair and re-grass disturbed ground.

- Undertake tree and shrub planting around the surface features allowing sufficient room for future access to shafts.

□ **Level of Permanent Effects**

- Open Space and Landscape Character – **Neutral (0) Effects**

The outcome (neutral or beneficial) would depend on the final design and use of the area of reserve and its integration with the open space along with planting and the design and treatment of the permanent surface elements.

The resultant physical landscape effects would be neutral with reinstatement of the access and lay down areas to grass and provision of appropriate replacement planting. The existing bridge and pathways could be rationalised in keeping with the park and stream side amenity, to provide for enhanced pedestrian use.

- Visual Amenity– **Neutral (0) to Very Small (+1) Beneficial Effects**

The long term visual effects on the viewing audience would be neutral and over time as the planting matures these effects could become beneficial.

4.1.6 May Road (WS2)

4.1.6.1 Location and Landscape Context (refer to Figures 24 and 25)

This site is situated in an existing area of undeveloped business zoned land northwest of Mt Roskill and in between May Road (to the southeast), Roma Road (to the northeast) and Marion Avenue. Further to the northeast beyond Roma Road is the recently constructed South Western Motorway Extension (SH20). Roma Road provides access to some large commercial business premises including Foodstuffs and Gilmours Warehouses. These activities adjoin the area of undeveloped land to the northeast and south. To the west, accessed off Marion Avenue, lies an area of residential development of nine properties adjoining the proposed construction site boundary. Some of these houses have an unobstructed view into the site from 1 to 2 metres above the site's ground level. A row of mixed evergreen and deciduous trees are located along part of the boundary with this residential area and this currently screens views into the vacant land from other sites.

Further to the southwest the land continues to rise beyond Marion Avenue up to the Richardson Road ridge. From a number of houses within this area there would also be the opportunity for views into the site.

The undeveloped, largely flat site contains a range of shrubby vegetation and trees, and an existing watercourse which connect across SH20 and into Meola Creek.

4.1.6.2 Proposed Construction Site and Works (refer to Figure 26)

The proposed construction site has been located in the north western corner of the undeveloped land. Access to the approximately 15,000 m² (1.5ha) site will be via Roma Road. The work duration is estimated to be 5 years.

This large site will contain a range of elements as follows:

- Offices, workshops and canteen building
- Access and parking
- Storage areas
- Shafts, some housed in a temporary shed
- Substation and treatment plant
- Air treatment facility

The total site, including the access roads, would be fenced. It is proposed that the fence to the residential area be solid to screen views into the site, although this would need to be augmented with quick growing trees along the boundary, as views would be able to be afforded above this fence for many residents.

□ **Extent of Visibility and Viewing Audience**

There are approximately 4 properties on Marion Avenue adjoining the south western boundary of the property from where views of the site and temporary fence could potentially be afforded beyond existing fences and vegetation between the houses and boundary. Further to the west and southwest up to Richardson Road are additional houses on rising land which may have the opportunity to view over and between the houses in the foreground to the construction works. To the north across the stream and east towards May Road is large scale warehouse and light industrial activities accessed off Roma Road. Views of these activities can also be afforded by the same residents.

□ **Landscape and Visual Effects**

The landscape and visual effects from construction will be:

- Removal of 7x Wattle, 8x Ngaio (all semi-mature) and other shrubby vegetation. Existing trees along the residential boundary would remain and could be augmented with quick growing species for screening purposes.
- Construction of perimeter fence.
- Visibility of the temporary shed and construction of the Air Treatment Facility building and other works above the fence and vegetation for a number of residents in the area between the site and Richardson Road.

□ **Level of Temporary Effects (5 years)**

- Open Space and Landscape Character – **Very Low (-1) Adverse Effects**

This is primarily due to the current zoning and private use of the area for warehousing and industrial activities and the existing nature of the landscape character derived from the site and its vegetative state. It is also due to the limited alteration to the existing landform and the condition and low value of the trees to be removed from site.

- Visual Amenity– **Very Low (-1) to Moderate (-3) Adverse Effects**

For the duration of works it is considered the adverse visual effects would range from very low for the majority of the viewing audience in properties immediately adjoining to the site in Marion Avenue (due to existing and proposed screening) to moderate for those residents that may have a clear elevated view of the site above and between intervening buildings and vegetation up to Richardson Road. For others in this residential area the adverse visual effects would range from low to very low depending on the extent of visibility. Although views of the temporary shed and above ground elements would be afforded to some residents, their existing view contains similar industrial scale type elements.

4.1.6.3 Permanent Works (refer to Figure 27)

Following construction the following permanent features will remain:

- Air Treatment Facility housed in a 70 x 37 x 8 metre high building, and associated 8 to 10 metre high vent stack. The Air Treatment Facility is to be designed to a similar form and character to the existing industrial buildings in the area.
- One flush mounted 5 x 2.5 metre shaft cover and two smaller drop shaft covers.
- Permanent sealed vehicular access from Roma Road to the Air Treatment Facility and around to the shafts and chambers via a bridge over the existing stream channel.
- A constructed wetland for storm-water detention / treatment.

☐ Mitigation Measures

The following techniques should be considered to remedy and mitigate the effects following construction:

- Re-grass and plant disturbed ground. It is anticipated that significant drainage works would be required to prepare the area for any grassing and planting depending on future uses proposed for the site. Some of the planting could be into a wetland.
- Undertake planting to integrate the site within its surrounding residential and business land context, in line with District Plan requirements for the zone.

☐ Level of Long Term Effects

- Open Space and Landscape Character – **Very Low (-1) Adverse Effects**

The completed Air Treatment Facility with other elements and planting is considered to result in very low adverse visual effects on the residential viewing audience as it will have a close relationship and similar character to other built structures in the view. The resultant permanent landscape effects would be neutral with an area taken over for the Air Treatment Facility and associated parking.

- Visual Amenity– **Very Low (-1) Adverse Effects**

The long term adverse visual effects on the viewing audience would be very low as the land will be restored to a similar visual outcome as the adjoining properties in line with the expected District Plan outcomes.

4.1.7 Keith Hay Park (AS5)

4.1.7.1 Location and Context (refer to Figures 28 and 29)

The main site at this location contains 4 residential sites, 3 of which have recently been purchased (and the houses removed) by Auckland Council – No's 49 and 51 Arundel Street and No 20 Gregory Place and one which is to be purchased by Watercare (No 22 Gregory Place). The eastern boundaries of the 3 Council owned properties have recently been fenced with a close board timber fence. Separating the 4 sites from the Leisure Centre car park is a strip of semi-mature mixed vegetation which effectively screens the sites from the park. The works also extend into Keith Hay Park near the southern end of the shared pedestrian and cycleway up to the eastern edge of the playing fields. This will require the removal of a number of existing trees (refer Arborlab report).

Two long term concept plan options have been prepared by the Puketapapa Local Board for this area of Keith Hay Park which has recently been purchased by Auckland Council for future park development. These are attached in Appendix 1 of drawings that accompany this report. Drawing 1 is a Whole of Site Concept. Drawing 2 is titled Arundel Street Car Park – Option 1 which depicts the area as vegetated open space. This drawing has the stream annotated as (9) and the reference states "*Oakley Creek to be naturalised as part of wider storm water upgrade, section through car-park to be day-lighted (to be confirmed by further technical work)*". Drawing 3 is titled Arundel Street Car Park and depicts the area as (14) and states "*Possible community garden or orchard if expression of interest is formally received by council*". This plan also shows a "*new section of path to connect with existing shared pedestrian and cycleway*" (11). This option does not have the Oakley Creek being day-lighted.

4.1.7.2 Proposed Construction Site and Works (refer to Figure 30)

The proposed access to the construction site is from Arundel Street across No 51 and 49 to the shafts which are to be located on No's 20 and 22 Gregory Street. A 5 metre planting strip is proposed by Auckland Council between the access road and the newly constructed timber boundary fence. A 4 metre high noise wall is proposed on the boundary with No. 19 Gregory Place and this will also act to screen views into the site from this property. Additional fencing is proposed around the boundary of No's 20 and 22 Gregory Place.

In addition 2 micro-tunnel construction areas are proposed adjacent to the walkway that connects the pedestrian over-bridge on the South-Western Motorway and the Leisure Centre. These are located near the end of Rainford Street. These sites would be under construction for up to 12 to 18 months with a further 3.5 to 4 years for ongoing establishment. These sites would be accessed from Rainford Street via an existing bridge across the open concrete drain. Access would then utilise the existing concrete pedestrian/cycle pathway to the construction areas to the northeast and southwest. This may

necessitate an alternative path to be provided for cyclists and pedestrians to the west of the proposed fence at certain times during the construction period.

Construction elements include offices, 7 metre and 5 metre diameter shafts, a concrete chamber, a water treatment plant and parking/turnaround area at the larger southern site.

□ **Extent of Visibility and Viewing Audience**

To the east are a number of residential properties in both Arundel Street and Gregory Place from where residents would have immediate and close views of the site as the land rises up to the east. Some of these views would be screened by perimeter fencing but sites are elevated so some views over the fence may be afforded. These include views from No's 47 and 47a (adjoining the site), 45, 43, 41 and 37 Arundel Street; and No 16 and 18 Gregory Place.

Once the house and vegetation at No. 22 Gregory Place is removed this could open up additional views of the site from other nearby properties in the street and the road itself.

□ **Landscape and Visual Effects**

Once much of the vegetation along the western boundary with the park has been removed this will be replaced with a fence which will screen views in to the construction area from the walkway and car park area. Visibility of the two smaller micro-tunnelling sites would be restricted to the exterior fences for those using the pedestrian/cycleway and for residents in houses to the east across Oakley Creek around Rainford Street.

The landscape and visual effects resulting from construction will be:

- Removal and/or transplanting of trees from No 22 Gregory Place, from within the small site on the western side of Oakley Creek and from along the boundary with the car park to the west. The removal of the trees along the car park boundary appears likely to occur in any event as it is in line with the two concept options that have been prepared for this area of the park as outlined above and depicted in Appendix 1 of the folio of drawings which accompany this report.
- Construction of the perimeter fences for all 3 sites. On the outside of the fences adjacent to the pedestrian/cycle path information about the project could be displayed.
- Views from a number of residential sites to the east of the main construction site between Arundel Street and Gregory Place. It has not been possible to accurately determine the visual effects from these properties, however, it is our judgement that Approximately 6 houses on elevated land that overlook the site may not be screened by the proposed noise fence and views of some of the works may be afforded.

□ **Level of Temporary Effects (5 years)**

- Open Space and Landscape Character - **Low (-2) Adverse Effects**

The resultant low adverse level of effect on the character and key attributes of the park environment and the context within which it would be seen is due largely to works at the southern end of the reserve as opposed to the northern where the main pedestrian/cycleway is located, combined with the associated reduction in open space and the external appearance of the fence. It should be acknowledged that in the southern area many of these effects (apart from the fence and removal of an additional house and garden) have been anticipated through the concept design process outlined by the Puketapapa Local Board of Auckland Council.

In addition a number of trees from the southern site will require removal. Once again these have been anticipated through the concept plan development for the area.

- Visual Amenity– **High (-4) to Low (-2) Adverse Effects**

It is estimated based on existing data that views from approximately 6 adjoining and nearby properties in Arundel Street and Gregory Place may have effects that are moderate to high. For the balance of users, including passersby and residents at the northern end the visual effects are considered to be low.

4.1.7.3 **Permanent Works (refer to Figure 31)**

Permanent works consist of two flush mounted shaft covers (one 5 x 2.5 metres in area), other smaller chamber covers in the existing residential sites and a small manhole within the existing reserve and a small manhole at each of the other two sites to the north.

□ **Mitigation Measures**

The following techniques should be considered to remedy and mitigate the effects following construction:

- Repair and re-grass all disturbed ground.
- In conjunction with Auckland Council design and implement an appropriate use and landscape for the purchased residential sites, linking with the existing Keith Hay Park reserve. It is anticipated that this would be based on the concepts developed to date.

□ **Level of Permanent Effects**

- Open Space and Landscape Character – **Neutral (0) to Highly Beneficial (+4) Effects**

The outcome (neutral or beneficial) would depend on the final design and use of the area of reserve, potential integrating with Council-led stream day-lighting (if any), access and its integration with the open space along with planting and the design and treatment of the permanent surface elements.

- Visual Amenity– **Highly Beneficial (+4) Effects**

The long term visual effects on the viewing audience would be beneficial over time as the planting matures and they look out over new parkland.

4.1.8 Frederick Street Pump Station 23 (AS6)

4.1.8.1 Location and Landscape Context (refer to Figures 32 and 33)

This site is at the existing designated Watercare Pump Station 23 on the north western shores of Hillsborough Bay in the Manukau Harbour. The site access is off Frederick Street. The site is modified from its natural state and currently contains a Pump Station building on an area of reclamation, with a basalt rock wall at the coastal edge.

The coastal edge around the northern shore of this part of the Manukau Harbour is delineated as a Regionally Significant Landscape (Rating 5) in the Auckland Regional Plan: Coastal (ARP:C). Chapter 4 – Landscape of the ARP:C deals with Outstanding and Regionally Significant Landscapes of the Auckland Region's coastline (4.1.1) and has a policy which states that subdivision, use and development in the coastal marine area shall be considered inappropriate where it would result in significant adverse effects on the key elements, features and patterns which contribute positively to the landscape quality, aesthetic value and landscape sensitivity of Regionally Significant Landscapes.

The site is bounded by residential housing to the west, and to the east is a newly constructed house. The area immediately adjoining the site and along the coastal foreshore is generally well vegetated. The site itself contains a number of large Pohutukawa trees.

Near to the site within the Coastal Marine Area (CMA) are two high voltage transmission lines with towers located on the harbour bed.

4.1.8.2 Proposed Construction Site and Works (refer to Figure 34)

The proposed construction site of approximately 2,600 m² will utilise the existing access road from Frederick Street and will have an approximate 12 to 18 month construction period with a further 3.5 to 4 year ongoing establishment period. In order to undertake the works a temporary construction platform of approximately 1,000 m² will be constructed out from the existing coastal edge. This will create a working platform to enable trucks to access the two shafts and turn around. Other temporary elements at this site include a water treatment plant and wheel wash.

□ Extent of Visibility and Viewing Audience

The site is relatively discrete from most residential locations to the west as vegetation and rising landform screen views from Frederick Street and adjoining properties. Views across the top of the site would be afforded from No 5-6/41 Frederick Street where a recently built house is located on a rear site overlooking the Manukau Harbour. Immediate views from the harbours edge of Nos. 29, 33A and 37 Frederick Street would also be afforded although within these properties and from the houses the majority of the

view is obscured by large trees along the coast. Partial oblique views of the site would also be afforded from 21 and 2/25 Frederick Street as part of the wider view of the harbour from these properties. More distant views are also afforded from Taylor's Bay Road Reserve where there is a car park and small beach and a nearby walkway and seating area. Views would also be afforded from the harbour itself for boaties and kayakers.

❑ **Landscape and Visual Effects**

- Short-term landscape and visual effects within an area delineated as a Regionally Significant Landscape.
- Removal of three semi-mature/mature Pohutukawa (of between 6 and 8 metres in height) around the foreshore, as well as a number of smaller trees and shrubs, and weed species around the access way. Pruning of other trees is proposed along the access road.
- Removal of vegetation and excavation of north eastern bank to provide for the Air Treatment Facility.
- Construction of the Air Treatment Facility air vent and elevated shafts and associated retaining structures.

❑ **Level of Temporary Effects (5 years)**

- Open Space and Landscape Character – **Very High (-5) Adverse Effects**

The temporary reclamation of 1,000 m² will reduce the area of harbour for a period of time and along with the associated removal of a number of semi-mature Pohutukawa trees and the associated construction would result in high adverse effects on the existing coastal landscape character.

- Visual Amenity – **High (-4) to Low (-2) Adverse Effects**

During the construction period the adverse visual effects for residents in the new house to the north and the existing house to the south-west is considered to be high, due to the removal of semi-mature coastal Pohutukawa, reclamation activities and the character of work in relation to more natural coastal landscape. Although wider views of the harbour would still be retained for many residents in houses along Frederick Street the works would be in the immediate foreground of the view for others. From the wider area around the reserve and further out into the harbour the visual effects would be between a low and moderate level depending on the proximity of the viewer.

4.1.8.3 Permanent Works (refer to Figure 35 and 36)

The permanent works will include a 7 metre and 5 metre diameter shaft, both of which will be required to extend 3 metres out of the ground. The existing Pump Station will be removed and a new 20 x 10 x 5 metre high Air Treatment Facility building will be located adjacent or partially cut into the eastern bank. Although the new building is a larger structure than the existing Pump Station it has been located as far inland on the site as is practicable. At this location the height of the bank is approximately 4 metres which would result in 1 to 2 metres located above the existing grade at the boundary with the residential site to the north. In addition to this, an air vent stack will be integrated into the Air Treatment Facility.

The temporary construction platform would be removed and the original shoreline reinstated with the same or similar rock edging. This would ensure that the elements, features and patterns which originally determined the Regionally Significant Landscape rating would be restored. With appropriate design and treatment of the new elements (above-ground shafts, Air Treatment Facility building and vent stack) it is considered that they could be integrated into the existing landscape quality, aesthetic value and coastal character of the Manukau Harbour.

□ Mitigation Measures

The following techniques should be considered to remedy and mitigate the effects following construction:

- Remove temporary construction platform and restore coastal edge with appropriate basalt or similar rock finish.
- Use basalt or similar to sheath above-ground portion of access shafts.
- Appropriately integrate building design and use recessive materials for Air Treatment Facility and associated vent (refer to Figure No. 36 photomontage).
- Replace Pohutukawa and native shrub planting to provide scale and vegetative context to site and provide screening where required from adjoining and nearby residential properties.

□ Level of Permanent Effects

- Open Space and Landscape Character - **Moderate (-3) Adverse Effects**

Once the temporary reclamation has been removed, the existing character of the sea wall restored and planting of replacement Pohutukawa trees and other coastal shrubs it is considered that the adverse effects on the open space and landscape character, including the natural character of the coastal environment will be Moderate. With the additional structures that will be constructed on the site and their above ground profile in relation to other buildings around the coastal foreshore, and with appropriate design and planting the permanent

works would over time be integrated in to this setting, particularly with the set back of the Air Treatment Facility from the coastal edge. Once the planting is well established (10 years plus) the adverse effects are considered to reduce to a low level and would become an improvement on the current situation where the Pump Station is located within the CMA.

- Visual Amenity– **Low (-2) Adverse Effects**

Once completed the views from the adjoining property to the north will remain above the building and planting. Nearby properties to the south-west as well as more distant views from publically accessible locations around the coast would contain similar elements to that which currently exist resulting in low adverse effects. Once the replacement planting becomes well established and begins to mature, estimated to be in some 7 to 10 years, the adverse effects will become very low.

4.1.9 Kiwi Esplanade (AS7 – Option 1)

This site is one of two alternative options for a construction site on the southern side of Manukau Harbour. The other site, at Ambury Park, is assessed in Section 4.1.10. At the time of writing this report a decision had not been made as to which site will be used, therefore both sites have been assessed. However, only one of these sites will ultimately be used for construction.

4.1.9.1 Location and Landscape Context (refer to Figures 37 and 38)

This flat site is located within the Kiwi Esplanade Reserve on the southern shores of the Manukau Harbour near the settlement of Mangere. Kiwi Esplanade Reserve adjoins Ambury Farm Park to the west and is part of a reserve and walkway network that extends from Mangere Bridge in the east to the Otuataua Stonefields in the southwest (via the Watercare Walkway through the WWTP site).

The site is located near the middle of the reserve and incorporates a small toilet block surrounded by Pohutukawa trees west of the access road to the boat ramp, the Manukau Yacht and Motor Club building and associated parking area.

A walking track connects this car park area around the coastal edge to the west and then south to meet up with Kiwi Esplanade and an entrance to Ambury Regional Park.

To the south is Kiwi Esplanade; on the southern side of this road are residential houses with views out over the reserve and harbour beyond.

4.1.9.2 Proposed Construction Site and Works (refer to Figure 39)

The construction site has been located around the public toilet facility to minimise the disturbance to the open space. A number of maturing Pohutukawa in the immediate area would be retained however some (9) would require removal but are of a size that could easily be transplanted elsewhere on the reserve. The site is also located away from the coastal walkway so as not to prevent continued use of this pedestrian linkage around the coast.

The site area for construction is approximately 3,168m² and the duration of work approximately 12 to 18 months with a further 3.5 to 4 years for ongoing establishment. Access is from the internal road to the boat ramp on a separate entry and exit. A 1.8 to 2.0 metre high closed board type fence will provide screening from the walkway, the balance of the reserve and views from residential houses along Kiwi Esplanade.

Construction elements include internal roading, an office, workshop, car parking, shafts, muck bin, water treatment plant and wheel-wash.

❑ **Extent of Visibility and Viewing Audience**

The visibility of the fence and any internal works would be afforded from the western end of the reserve, including the walkway and obliquely from the residential houses towards the western end on the south side of Kiwi Esplanade. Many of the views to the south and east would be obscured by existing mature Pohutukawa although partial views through these could be afforded from nearby locations. The viewing audience would consist of regular users of the reserve, boaties and walkers and residents who access their house via Kiwi Esplanade as well as some residents in their houses.

❑ **Landscape and Visual Effects**

The landscape and visual effects resulting from construction will be:

- Removal and transplanting of 9 small Pohutukawa trees. Construction of the perimeter fence. On the northern and eastern side of the fence adjacent to the pedestrian path, information could be provided to inform passersby of the project.
- Views of construction activities from upper levels of two-storey houses opposite the site on Kiwi Esplanade would be afforded above the perimeter fence through gaps in the remaining Pohutukawa trees.
- Removal of the existing toilet block and replacement, if necessary, with temporary toilet facilities during the construction works period.

❑ **Level of Temporary Effects (5 years)**

- Open Space and Landscape Character – **Moderate (-3) Adverse Effects**

These effects are due to the construction of the external fence and change to the character of the vegetated area around the toilet which currently contains a number of mature Pohutukawa trees. This includes any effects on the natural character values of the coast in this area.

- Visual Amenity – **Low (-2) Adverse Effects**

The visual effects are considered to be low as the construction activities will take place behind the fence in an area which is generally well screened by vegetation and contains an existing structure. There will be no obstruction of the harbour view from this location for residential properties in Kiwi Esplanade as the existing toilet facility and Pohutukawa currently obscure views out.

4.1.9.3 Permanent Works (refer to Figures 40, 41 and 42)

Permanent elements on the site will be a 5 x 2.5 metre access shaft cover and smaller drop shaft covers; these elements will be required to be 1.5 metres above the surrounding ground level. A vent stack would be designed as part of a replacement toilet block / changing room facility so it would not be seen as a separate element.

☐ **Mitigation Measures**

The following techniques should be considered to remedy and mitigate the effects following construction:

- Remove construction access roads. Access for maintenance will be via the existing park access road.
- Repair and re-grass disturbed ground.
- Further develop the design for integrating the new toilet, access shaft and air treatment facility structures with associated low level planting and relocated Pohutukawa.

☐ **Level of Permanent Effects**

- Open Space and Landscape Character – **Neutral (0) to Small (+2) Beneficial Effects**

The resultant outcome with an appropriately designed new toilet and elevated shaft structure, with replacement Pohutukawa trees in place is considered to result in a neutral to small beneficial effect on the character of the reserve, and on the natural character of the coast.

- Visual Amenity – **Neutral (0) Effects**

The visual effects on the existing amenity values for residents and visitors is considered to be neutral once the works are complete and the Pohutukawa planting re-established.

4.1.10 Ambury Regional Park (AS7 – Option 2)

This site is one of two alternative options for a construction site on the southern side of Manukau Harbour. The other site, at Kiwi Esplanade, is assessed in Section 4.1.9. At the time of writing this report a decision had not been made as to which site will be used, therefore both sites have been assessed. However, only one of these sites will ultimately be used for construction.

4.1.10.1 Location and Landscape Context (refer to Figures 37 and 43)

This location is within Ambury Regional Park adjacent to a metal road which connects from the western end of Kiwi Esplanade to the western end of Ambury Road. Ambury Road is the main access road to the park facilities. The site is located on the eastern side of the access road off the main access to the park. This access road is generally used for service vehicles as there is a locked gate at the end of Kiwi Esplanade.

The site is enclosed by mixed native vegetation to the east and is also screened from residential properties to the north and the main entry / exit to the park in the south by mature vegetation. To the west rising landform also provides a sense of containment from the coastal edge of the Manukau Harbour.

4.1.10.2 Proposed Construction Site and Works (refer to Figure 44)

The site area for construction is approximately 1,640m² and the duration of the works is approximately 12 to 18 months for the initial construction with a further 3.5 to 4 years for ongoing establishment with intermittent construction during this period. Access is from Ambury Road via the existing internal metal access road. A 1.8 to 2.0 metre high closed board type fence will provide screening from any areas surrounding the site.

Construction elements include internal roading, an office, workshop, car parking, muck bin, water treatment plant and wheel-wash.

□ Extent of Visibility and Viewing Audience

Due to the landform and surrounding vegetation the site is relatively contained from the surrounding areas. Views are screened from the residential area to the north and only a narrow view through trees of the fence would be afforded for visitors entering and existing and using the main park facilities to the south. For those walking within the farmland to the west on the informal position of the Te Araroa trail, any views of the fence and works would be screened by the fence and / or back-dropped by dense native vegetation to the east. The focus of the view on this walking trail is north and west over the harbour.

❑ **Landscape and Visual Effects**

- Construction of a perimeter fence and removal of existing post and wire farm fence.
- Partial and distant views of the fence for park users and walkers.

❑ **Level of Temporary Effects (5 years)**

- Open Space and Landscape Character – **Low (-2) Adverse Effects**

A small area of existing metal road and associated farmland will be taken over and the form will contrast with the vegetated nature of the grassed areas between the road and trees. Alternative access can also be provided for walkers who may use the road to link through the park.

- Visual Amenity – **Low (-1) Adverse Effects**

The visual effects of construction activities on park users would be very low and they would be screened behind the fence which is largely screened by vegetation.

4.1.10.3 Permanent Works (refer to Figure 45)

Permanent elements on the site will be a 5 x 2.5 metre access shaft cover, 2 smaller drop shaft covers and 2 smaller air vent covers. In addition there will be a 1.6 metre diameter pressure relief air vent stack which would extend approximately 3 metres above ground level.

❑ **Mitigation Measures**

- Remove construction access roads, fences and reinstate existing metal road and farm fences.
- Restore pasture and lawn areas.
- Plant around ground level access shafts and air vent to integrate these into existing planting.

❑ **Level of Permanent Effects**

- Open Space and Landscape Character – **Very Low (-1) Adverse Effects**

The area would be returned to grass apart from surface features and 3 metre high pressure relief air vent that could be designed and located to fit recessively into the existing vegetation with additional planting to integrate it into the farm / park landscape.

- Visual Amenity – **Very Low (-1) Adverse Effects**

Once vegetation is established any adverse effects on the park user would be very low.

4.1.11 Mangere WWTP (WS3)

The Mangere Pump Station site is designated by Watercare (Designation 144A in the Manukau District Plan) for the WWTP and the prepared works are within the general cope of the existing designation. Therefore this section only addresses the works for which a coastal permit is being sought under the Auckland Council Regional Plan : Coastal.

4.1.11.1 Location and Landscape Context (refer to Figure 47)

The site of the outfall structures is located some 80 metres west of the proposed pump station, within the small bay that is contained by Island Road to the south and the promontory which houses a radio mast on the northern side of the Mangere lagoon.

4.1.11.2 Proposed Construction Site and Works (refer to Figure 48)

An Emergency Pressure Relief (EPR) point is proposed at the Mangere WWTP site (shown on Drawing No. AEE-MAIN-23 in the drawing set, Part C).

The EPR bypass is required to safely control the outflow location in the event of extreme or emergency event inflows to the tunnel allowing pressure to be safely released from the tunnel without causing damage to the pump station or tunnel structures. Situations where the pressure relief structure would operate are extremely rare, and could occur only where pump station failure coincided with a significant storm event that utilised all available storage in the tunnel.

The EPR bypass would be a piped outfall located immediately to the west of the proposed terminal pump station site.

In summary, the visible elements of the EPR structure will comprise an outfall structure including headwall and erosion protection to the mudflats e.g. Reno mattress.

Construction of this structure will involve works in the CMA, on the foreshore adjacent to the pump station. Construction will involve removal of part of the existing rock sea protective edge and installation of the outfall structure and erosion protection. Standard erosion and sediment control measures for working in the coastal environment would be employed and much of the excavation would be managed to occur while the tide is out.

□ Extent of Visibility and Viewing Audience

Visibility of the outfall structure would be afforded from the pedestrian walking to the north. This view would be approximately 300 metres away prior to the walkway turning east and linking with the Mangere Lagoon walking tracks. Although currently walkers can access the area where the structure is proposed; this area will be restricted and in time future access along this track will not be afforded and an alternative access will be provided around the lagoon and through other western land adjacent to Greenmount Road.

Other more distant views would be afforded at a low level from Island Road at a distance of over approximately 800 metres. This view would be for passing motorists travelling east and would also be viewed between existing maturing Pohutukawa. No view would be afforded from the residential area to the east (on the flanks of Mangere Mountain) as this would be screened by the plant and coastal vegetation.

❑ **Landscape and Visual Effects**

The landscape and visual effects resulting from the construction will be:

- Removal of approximately 150 square metres of 3 metre high mixed coastal native vegetation to provide for trenching.
- Removal of a small portion of the existing rock sea protection edge.
- Construction of a concrete outlet structure measuring 15 x 12 metres.

❑ **Level of Temporary Effects (3 weeks)**

- **Open Space and Landscape Character – *Low (-2) Adverse Effects***

The effects on the landscape and open space values are considered to be low as the area is dominated by the existing WWTP elements. The removal of the native vegetation which was planted as part of the Mangere WWTP upgrade will result in some short term adverse landscape effects. There is also an existing outfall structure nearby and the balance of vegetated edge would continue to provide a strong landscape context for the works.

- **Visual Amenity – *Very Low (-1) Adverse Effects***

Given the location and very temporary nature of the works and limited viewing audience the adverse visual effects are considered to be very low.

4.1.11.3 Permanent Works (refer to Figure 49)

The permanent work will consist of the 15 x 12 metre concrete outfall structure, with some additional rock revetment coastal edge protection. These will also assist to integrate the structure into the existing coastal setting.

❑ **Mitigation Measures**

Re-planting of the mixed native species using the same varieties.

❑ **Level of Permanent Effects**

- **Open Space and Landscape Character – *Low (-2) Adverse Effects***

The resultant outcome is considered to result in low adverse effects on the open space and landscape character due to the size and scale of the outfall structure relative to other elements in the area and the vegetative context surrounding the outfall structure. This includes effects on the natural character of the coastal environment.

- Visual Amenity – **Very Low (-1) Adverse Effects**

The adverse visual effects of the permanent structures are considered to be very low due to the limited number of viewers and the distance from which the structures will generally be seen.

4.2 Link Sewer Sites

4.2.1 Motions Road (L1S1)

4.2.1.1 Location and Landscape Context (refer to Figures 46 and 47)

This site is located on local purpose reserve land adjacent to Motions Creek (west) and Motions Road (east). To the north is Western Springs College and an associated car parking area, and to the southwest Pasadena Intermediate School. Across Motions Road to the east is the Auckland Zoo. The area surrounding the creek is planted in native tree and shrub species and there is a footbridge on top of the existing Orakei Main Sewer that provides pedestrian access between these destinations.

4.2.1.2 Proposed Construction Site and Works (refer to Figure 48)

The site of approximately 1,200 m² is located on flat to gently sloped grass land. Access to the site is to be provided from Motions Road. Construction activities over the approximately 12 to 18 month period include a 5.5 metre and a 6.5 metre diameter temporary shaft, a grit trap and control chamber and two overflow structures. These are to be located inside a 1.8 metre high closed board fence. There would be a further 18 months to 2 years establishment period.

☐ Extent of Visibility and Viewing Audience

- The exterior of the fence would be visible from Motions Road and the southern edge of the Western Springs College car park, as well as for those pedestrians who utilise the foot bridge across the pipeline.

☐ Landscape and Visual Effects

The landscape and visual effects resulting from construction will be:

- Construction of fence to screen views of works.
- Removal and transplanting of 2 x 4.5 metre high Pohutukawa trees.
- Removal of 16 x 3 metre high mixed native trees and shrubs (Pittosporum / Hoheria / Coprosma) on the outer edge of the planting above the creek and other native trees and shrubs, up to 6 metres high, down to the creek in two locations to provide for the construction of overflow structures.
- Removal of one existing picnic table.
- Bridge access is to remain open for pedestrian use.

☐ Level of Temporary Effects (3 years)

- Open Space and Landscape Character – **Moderate (-3) Adverse Effects**

Motions Road – The fenced construction area will reduce the area of open space adjacent to Motions Road but this is not a heavily utilised area of open space apart from the existing walkway which links to the zoo which will be re-routed. The removal of smaller trees from the site is also considered to have low adverse landscape effects.

- Visual Amenity – **Low (-2) Adverse Effects**

The exterior of the fence would be the major visual element seen by passersby either on Motions Road or across the footbridge.

4.2.1.3 Permanent Works (refer to Figure 52)

All permanent elements will be finished at grade and consist of one 4 x 4 metre diameter grit trap cover, two smaller drop shaft covers, a construction shaft cover, three smaller control chamber covers, and two overflow structures. Access will be required to those elements for maintenance.

☐ Mitigation Measures

The following techniques should be considered to remedy and mitigate the effects following construction:

- Remove construction access roads, apart from those providing access for maintenance. Integrate with formal pedestrian network and / or retain with "grass cell" or similar reinforcing and re-grass to provide all-weather maintenance access.
- Repair and re-grass disturbed ground.
- Integrate surface of Control Chamber lid into walkway/bridge
- Replant areas where vegetation has been removed to allow for construction of overflow structures.
- Reinstall picnic table in an appropriate location.

☐ Level of Permanent Effects

- Open Space and Landscape Character – **Very Low (-1) Adverse Effects**

The open character of the area would be restored following construction and the remaining elements would be integrated into the surface of the existing ground. Additional planting is proposed to integrate these elements into the surrounding landscape character.

- Visual Amenity – **Very Low (-1) Adverse Effects**

The permanent surface elements are considered to result in very low adverse visual effects for users of the bridge walkway and passersby.

4.2.2 Western Springs Depot (L1S2)

4.2.2.1 Location and Landscape Context (refer to Figure 50)

This site is located within the western extremity of the depot at Western Springs Speedway and north-east of the Western Springs Gardens, and is enclosed to the north and west by vegetation and to the east by a yard and buildings.

4.2.2.2 Proposed Construction Site and Works (refer to Figure 51)

An area of approximately 700m² is required for a 9.5 metre diameter temporary shaft. The area will be fenced and access will be provided off Stadium Road. The construction period is estimated to be 6 to 8 months with a further 16 to 18 months establishment period.

☐ Extent of Visibility

The site will not be visible to the public as it is well screened from all views, including Western Springs Garden.

☐ Landscape and Visual Effects

The landscape and visual effects resulting from construction will be:

- Construction of a perimeter fence within the yard and around the edge of existing vegetation.
- Pruning of a number of established and mature specimen trees (refer to Arborlab report).

☐ Level of Temporary Effects (2 years)

- Open Space and Landscape Character – **Neutral (0) Effects**

There will be no effect on the open space or landscape character of the area as it is well hidden from view.

- Visual Amenity – **Neutral (0) Effects**

No effects on visual amenity as the works will not be visible.

4.2.2.3 Permanent Works (refer to Figure 52)

A flush mounted 2.4 metre diameter access shaft cover will remain at the western extent of the car park and service area.

☐ Mitigation Measures

The following techniques will be considered to remedy and mitigate the effects following construction:

- Re-sealing of asphalt and concrete car park and access-way.

□ **Level of Permanent Effects**

- Open Space and Landscape Character – **Neutral (0) Effects**

There will be no effect on the open space or landscape character of the area as it is well hidden from view.

- Visual Amenity – **Neutral (0) Effects**

No effects on visual amenity as it will not be visible.

4.2.3 Rawalpindi Reserve (L2S1)

4.2.3.1 Location and Landscape Context (refer to Figures 53 and 54)

This site is located immediately west of the banks of the Meola Creek in reserve land administered by Auckland Council. Further west and south is residential land that is accessed off Rawalpindi Street, Fontenoy Street and Parkdale Road. To the east and north of the site across the creek is the Chamberlain Park Golf Course.

The site is relatively well enclosed by rising landform to the west and vegetation along the banks of the creek and within the balance of the reserve, golf course and private properties. The site also contains a number of mature and semi-mature trees and other vegetation.

Within the park to the south of the site is an existing children's playground, also accessed off an existing internal asphalt drive.

4.2.3.2 Proposed Construction Site and Works (refer to Figure 55)

Access to the site is provided from Rawalpindi Street via an existing asphalt road which leads to an existing grit chamber.

The proposed works will require the excavation of sloping land (up to a 5 metre cut) to the west and the installation of a retaining wall 3 metres off the property boundary with the adjoining residential land. This retaining wall will also extend along the northern part of the site, returning to grade near the creek bank.

The area required for construction is approximately 4,100 m² and this will require a 12 metre diameter shaft near the northern end of the site. Construction is for 12 to 18 months with a further 18 months to 2 years for establishment.

The site will be fenced with a 1.8 to 2.0 metre closed board fence to screen views in and provide noise attenuation as required.

☐ Extent of Visibility and Viewing Audience

The site is relatively well screened from view by rising landform to the west and vegetation to the east which effectively obscures views from surrounding residential properties and the golf course across the creek. Views are afforded for park users including those who utilise the playground in the southern part of the Reserve.

☐ Landscape and Visual Effects

The landscape and visual effects resulting from construction will be:

- Removal of approximately 20 trees and shrubs (refer to Arborlab report), none of which are considered to be significant. A number of the smaller specimens may be able to be transplanted within the balance of the

reserve to provide shade and screening from specific residential properties.

- Construction of perimeter fence.
- Truck and vehicle movements to and from the site, earthworks and construction of a retaining wall, visible from the playground and some adjoining properties.

□ **Level of Temporary Effects (3 years)**

- Open Space and Landscape Character – **High (-4) Adverse Effects**

The temporary activities will result in the majority of the open space to the north of the reserve being taken over for construction. Although this does not appear to be a heavily utilised area it will change the landscape character to a large extent resulting in high adverse effects during the construction period. The proposed earthworks will also alter the natural landform of the site and a large retaining wall will further alter the landscape character.

- Visual Amenity – **Moderate (-3) Adverse Effects**

The fenced area of the park will result in moderate adverse visual effects for users of the playground and for those residents who may obtain a partial view through existing trees or down from the eastern boundary of adjacent properties.

4.2.3.3 Permanent Works (refer to Figures 56 and 57)

Permanent works will all be flush with surrounding ground level and are proposed to consist of two drop shaft covers, two control chamber covers, and two diversion chamber covers (these covers range in size up to 1.5m²). The existing grit chamber will also remain.

□ **Mitigation Measures**

The following techniques should be considered to remedy and mitigate the effects following construction:

- Re-grade land to restore natural bank below retaining wall. This may require a stockpile of soil to use as backfill following construction.
- Repair and re-grass disturbed ground.
- Remove construction access roads, apart from those providing access for maintenance. Integrate with pedestrian paths and / or retain with "grass cell" or similar reinforcing and re-grass to provide all-weather maintenance access.
- Replant around surface features and on bank by stream where area of tracking will require removal of vegetation.

- Consider creating a seating area in conjunction with drop shaft lid, maintaining provision for future access when required.
- Consider possible lid treatment with graphic or imprint.

□ **Level of Permanent Effects**

- Open Space and Landscape Character – **Very Low (-1) Adverse Effects**

Once completed the long term effects would be limited to the surface cover features. The retaining wall is to be removed and the landform reinstated generally to its previous form.

- Visual Amenity – **Very Low (-1) Adverse Effects**

The additional surface elements would result in low adverse visual effects on users of the reserve and adjoining residents.

4.2.4 Norgrove Avenue (L2S2)

4.2.4.1 Location and Landscape Context (refer to Figures 58 and 59)

This site is located at the end of Norgrove Avenue within the road reserve and adjacent reserve area. To the northwest and southeast of the road are residential properties, while beyond the end of the road is Meola Creek and surrounding vegetated banks. Further northeast beyond the creek is the Chamberlain Park Golf Course.

4.2.4.2 Proposed Construction Site and Works (refer to Figure 60)

The construction area of 2900 m² will be fenced to enable an 8.5 metre temporary shaft to be constructed. The construction period is approximately 6 to 8 months with a further 16 to 18 months for establishment. Between this area the residential properties to the south west and Meola Creek, additional construction works are proposed associated with the CSO Collector. These short term works will be for the construction of pipelines from the existing sewer back to the main construction area in Norgrove Avenue, and will include a flush mounted control chamber. This will require the removal of a mix of mature and semi-mature trees (see Arborlab report for species). This will open up views to the creek bank and construction works from three properties that adjoin the site.

□ Extent of Visibility and Viewing Audience

The small fenced compound would be visible to a few residents at the north-eastern end of Norgrove Avenue as they come and go from their property, and from the very front of their properties. Views from within the houses on these properties appear to be well screened by vegetation.

□ Landscape and Visual Effects

The landscape and visual effects resulting from construction will be:

- Removal of one tree to provide continued access to No. 16 property.
- Removal or pruning of a number of trees at the end of the road to provide sufficient room for compound and construction (refer to Arborlab report).
- Removal of approximately 16 trees (refer Arborlab report) within the adjoining construction area of approximately 1,800 m²
- Construction of perimeter fence.
- Vehicle movements to and from the site.

□ Level of Temporary Effects (2 years)

- Open Space and Landscape Character – **Moderate (-3) Adverse Effects**

The effects would include removal of a tree at the end of the road and 16 others along the edge of the Meola Creek at the rear of five Verona Avenue properties. As well as the fenced area this will change the character of what is currently a vegetated terminus to the road and creek edge.

- Visual Amenity – **Moderate (-3) Adverse Effects**

This would be as a result of the fenced area immediately adjacent to three properties in Norgrove Avenue and the view from the rear of the properties at Verona Avenue. This would result in moderate adverse effects for these residents.

4.2.4.3 Permanent Works (refer to Figure 61)

The permanent works consist of a 2 metre drop shaft cover flush within the road and a flush mounted control chamber cover on the area between the residential properties and Meola Creek.

□ Mitigation Measures

The following techniques should be considered to remedy and mitigate the effects following construction:

- Restoration of road and berm (re-grassing).
- Provision of all-weather trafficable access for maintenance vehicles. This could be integrated into a new pedestrian path or retained in "grass cell" or similar surface.
- Replacement tree planting in the road reserve and within the banks of the creek at the end of the road, and along between the houses and Meola Creek to maintain vegetated enclosure and visual amenity.

□ Level of Permanent Effects

- Open Space and Landscape Character – **Low (-2) Adverse to Neutral (0) Effects**

Replanting of the trees would in time restore the area to its vegetated state. No change to Norgrove Avenue apart from a manhole cover in the road.

- Visual Amenity – **Low (-2) Adverse to Neutral (0) Effects**

No obvious change to Norgrove Avenue but tree cover in the area along Meola Creek would take some time to become re-established.

4.2.5 Miranda Reserve Pump Station 25 (L3S1)

4.2.5.1 Location and Landscape Context (refer to Figures 62 and 63)

This site is located within Miranda Reserve adjacent to a tributary to the Whau River. The site incorporates the existing St Georges Pump Station and an above-ground sewer in an aqueduct structure. Miranda Reserve provides pedestrian connection to Blockhouse Bay Road in the east and to Wolverton Street in the west, via Miranda Street. The east-west linear reserve is contained to the north and south by residential development including a number of high density townhouses and retirement village development. The reserve also contains a number of overhead high-voltage power lines.

Within the site between the above-ground sewer and the watercourse is an area of mixed native trees and shrubs contiguous with other vegetation. This contains a range of specimens such as Manuka, Ngaio, Cabbage Tree and Coprosma.

4.2.5.2 Proposed Construction Site and Works (Figure 64)

The 4,000 m² site includes the existing Pump Station and above-ground sewer, as well as part of the flat reserve area and the native vegetation between the Pump Station and the watercourse. Access will be via Miranda Street on an asphalt road already providing for access to the Pump Station. The construction period is approximately 12 to 18 months with a further 6 months to 2 years establishment period.

A closed board fence will be provided to screen views into the site for reserve users and any residents that may have the potential to view into the site from surrounding residential land to the south.

Construction elements include an 8 metre diameter shaft, control chamber, and grit chamber. In addition the existing Pump Station and associated building are to be demolished. In the same area a 40 x 15 x 5-8 metre high Air Treatment Facility will be constructed within a building, with an associated 8 metre high vent stack located approximately 15 metres to the east.

□ Extent of Visibility and Viewing Audience

Visibility is largely confined to the north to park users as vegetation along the boundary of the reserve and private properties screens views south. To the south residents with existing residential properties may have views across the gully to where the works will take place. Much of these views are currently screened by existing vegetation.

□ Landscape and Visual Effects

The landscape and visual effects resulting from construction will be:

- Removal of approximately 2,000m² of regenerating native vegetation on the banks of the watercourse.

- Removal and replanting of 4 clumps of flax around the overhead sewage structure.
- Pruning of mixed native vegetation along driveway to enable access to the site for trucks.
- Earthworks on upper bank of watercourse to provide access for chamber and shaft construction.
- Construction of perimeter fence.
- Temporary pedestrian access would be provided around the fenced area to maintain the existing east-west connection through the reserve.

□ **Level of Temporary Effects (2 to 3 years)**

- Open Space and Landscape Character – **Moderate (-3) Adverse Effects**

The fenced area and associated vegetation removal and removal of the existing above ground sewer will have moderate adverse effects on the open space and landscape character of the reserve, including down to the stream with effects also on the natural character of the margins.

- Visual Amenity – **High (-4) Adverse Effects**

During construction views from residential properties to the south will be afforded as well as those for park users with a fence and construction activity beyond and above consisting of a new Air Treatment Facility up to 5 or 8 metres. For those with a view of the site these adverse visual effects are considered to be high.

4.2.5.3 Permanent Works (refer to Figures 65 to 67)

Permanent at-grade works will consist of 5 x 4 metre grit chamber, a smaller control chamber cover, two smaller drop shaft covers; and an additional access road to the shaft cover around the Air Treatment Facility (combination of asphalt and "grass cell" pavers). Provision has been made for a CSO Collector shaft with assorted covers. Above-ground structures will consist of the 40 x 15 metre, 5 to 8 metre high Air Treatment Facility Building, with an integrated vent stack.

□ **Mitigation Measures**

The following techniques should be considered to remedy and mitigate the effects following construction:

- Repair and re-grass disturbed ground surrounding the surface features apart from those areas required for access which will be finished in asphalt similar to the existing maintenance road.
- Re-contour and replant banks above watercourse.
- Reinststate existing half court basketball area.

- Construction access roads will be removed apart from those providing access for maintenance. These will be retained in asphalt or similar to provide all-weather maintenance access to the Air Treatment Facility and other structures.

□ **Level of Permanent Effects**

- Open Space and Landscape Character – **Low (-2) Adverse Effects**

With an appropriately designed and finished Air Treatment Facility and the pavement of at grade elements, it is considered that overall the adverse effects in the long term would be low once the re-vegetation along the stream bank has become established.

- Visual Amenity – **Low (-2) Adverse Effects**

The visual effects on residents and park users with an appropriately designed Air Treatment Facility, is considered to be low once the vegetation is established.

4.2.6 Miranda Reserve East (L3S2)

4.2.6.1 Location and Landscape Context (refer to Figures 68 and 69)

This site is located at the eastern end of Miranda Reserve East adjacent to Blockhouse Bay Road. To the north and south of the reserve and across the road the land is residential, although views into the site are largely restricted by vegetation within the reserve, apart from where it is open to the road.

The site currently contains a children's playground with an access path off the main east-west reserve pedestrian path. Overhead to the north and south are high voltage transmission lines.

4.2.6.2 Proposed Construction Site and Works (refer to Figure 70)

The construction site of approximately 950 m² is located on flat to gently sloping land where the playground is currently located. Access is to be provided directly off Blockhouse Bay Road and the area will be screened by a closed board 1.8 metre high fence.

The site is to the south of the main east-west pedestrian path within the Reserve. The construction is centred on a 10 metre diameter temporary shaft and is estimated to take 6 to 8 months to complete, with a further 16 to 18 month establishment period.

□ Extent of Visibility and Viewing Audience

Views of the site are restricted to Blockhouse Bay Road and houses directly opposite where the reserve opens out on to the road and from within the reserve itself. The viewing audience includes passersby on the footpath and those reserve users be they on the walkway or visiting the play area (noting that the playground will be removed during the works).

□ Landscape and Visual Effects

The landscape and visual effects resulting from construction will be:

- Removal of the children's playground for the duration of the works.
- Pruning of several semi-mature native trees (and possible removal of some) around the edge of the fenced area.
- Perimeter fence.
- Truck and vehicle movements.

□ Level of Temporary Effects (2 years)

- Open Space and Landscape Character – **High (-4) Adverse Effects**

The adverse effects on the open space nature and character of this part of the reserve, including the inability to use the playground area during the construction period would be high.

- Visual Amenity – **Moderate (-3) Adverse Effects**

For the park users and from the houses located opposite, adverse visual effects would be moderate during the construction period.

4.2.6.3 Permanent Works (refer to Figures 71 and 72)

The remaining permanent elements will be two 1.5m² shaft covers. All-weather trafficable access ("grass cell") for maintenance vehicles will need to be provided for infrequent observation/ access to the shaft.

□ Mitigation Measures

The following techniques should be considered to remedy and mitigate the effects following construction:

- Remove construction access roads, apart from those providing access for maintenance. Retain with "grass cell" or similar reinforcing and re-grassed to provide all-weather trafficable access.
- Repair and re-grass disturbed ground.
- Reinststate the children's playground and provide seating and footpath.
- Consider materiality (metal v concrete v grass: natural or artificial) feature treatment of drop shaft lid with motif / pattern or similar and / or integrate with new park paths / seats.

□ Level of Permanent Effects

- Open Space and Landscape Character – **Very Low (-1) Adverse Effects**

Once completed and the playground has been reinstated with the surface of the shaft integrated into the park, potentially with a seating area and footpath access, the adverse effects are considered to be very low.

- Visual Amenity – **Neutral (0) Adverse Effects**

Visual effects of the present works would be neutral with the site restored to a similar state of visual amenity and existing.

4.2.7 Whitney Street (L3S3)

4.2.7.1 Location and Landscape Context (refer to Figures 73 and 74)

This site is located in the road reserve outside Nos. 118 to 124 Whitney Street. It includes the footpath and berm on the eastern side of the road as well as the carriageway.

4.2.7.2 Proposed Construction Site and Works (refer to Figure 75)

The site of approximately 450 m² would encompass the road reserve and carriageway on the eastern side of the centre line. The site would be fenced with a 1.8 metre high closed board fence. The on-site works consist of a 6.5 metre diameter temporary shaft estimated to take 6 to 8 months to construct with a further 14 to 18 months establishment period.

□ Extent of Visibility and Viewing Audience

The exterior of the fence would be visible from the front of No's 111,113A, 115,118,120,124,128 Whitney Street and No. 56 Margate Street as well as from those visiting the dairy and passersby on the road and footpath to the west. The viewing audience would include both residents and commuters.

□ Landscape and Visual Effects

The landscape and visual effects resulting from construction will be:

- Construction of a perimeter fence.
- Vehicle movements.
- Potential views of the works from adjoining residential properties.

□ Level of Temporary Effects (6 to 8 months)

- Open Space and Landscape Character – **Low (-2) Adverse Effects**

The works would cover part of the road reserve and the landscape character would be affected by the fence to a small extent. No trees would require removal and no change to the surface landform is anticipated.

- Visual Amenity – **Low (-2) Adverse Effects**

The adverse visual effects for residents and passersby would be low with the fence screening views of the works and screen views of traffic from some properties and provide a backdrop to others.

4.2.7.3 Permanent Works (refer to Figure 76)

The permanent works consist of two 1.5m² drop shaft covers, flush with the surrounding ground and a new manhole in the middle of the road.

□ **Mitigation Measures**

The following techniques will be considered to remedy and mitigate the effects following construction:

- All disturbed ground will be repaired and re-grassed surrounding the surface feature.
- Replacement street tree.

□ **Level of Permanent Effects**

- Open Space and Landscape Character – **Neutral (0) Effects**

Manholes in the road berm following construction are an expected component of roadways and this would result in a neutral effect.

- Visual Amenity – **Neutral (0) Effects**

Long term visual effects are considered to be neutral.

4.2.8 Dundale Avenue (L3S4)

4.2.8.1 Location and Landscape Context (refer to Figures 77 and 78)

This site is located within the road reserve on an open grassed area adjacent to a small watercourse (a tributary of the Whau River), fringed with native vegetation to the north. The area of open grassland is split by an access road to the Blockhouse Bay Community Church/Christian Kindergarten which, along with a number of residential properties, is located north of the watercourse. To the south across the road is residential housing on rising land, some of which has views across the site.

4.2.8.2 Proposed Construction Site and Works (refer to Figure 79)

The 1,050 m² construction site extends from the footpath adjacent to Dundale Avenue to the edge of the native vegetation adjacent to the watercourse. Within this flat area there are 5 x Puriri (1.5 to 5 metres high), 2 x Kowhai (1.5 to 2 metres high) and 3 x Titoki (5 metres high), which will require removal to provide for the site works.

Access to the site will be directly off Dundale Avenue and the access to the northern area will be unimpeded.

Construction at this site consists of a 10 metre diameter temporary shaft. The area will be screened with a 2m high closed board fence around the perimeter of the site. The construction period is approximately 6 to 8 months with a further 16 to 18 months establishment period.

☐ **Extent of Visibility and Viewing Audience**

Extent of visibility of the site is confined to the houses opposite Dundale Avenue Nos. 65 to 83 and those who access properties to the north from the road edge on either side of the site i.e. No's 62,64,66 and 68-74. Viewing audience will be those residents and locals who pass the site.

☐ **Landscape and Visual Effects**

The landscape and visual effects resulting from construction will be:

- Removal of 10 existing small (up to 4 metre high) native trees.
- Construction of the perimeter fence.
- Truck movements and activity within the site for residents opposite who have an open clear view from elevated land / houses.

☐ **Level of Temporary Effects (2 years)**

- Open Space and Landscape Character – **Low (-2) Adverse Effects**

An open area of road reserve will have restricted access during the construction period and 10 native trees will require removal resulting in a moderate adverse effect.

- Visual Amenity – **Low (-2) Adverse Effects**

The fence will screen views of the construction works and the resultant adverse visual effects are considered to be low.

4.2.8.3 Permanent Works (refer to Figure 80)

Permanent works consist of a 1 m² shaft cover and all weather trafficable vehicle access.

□ Mitigation Measures

The following techniques should be considered to remedy and mitigate the effects following construction:

- Transplant removed trees to the eastern road reserve area where possible.
- Remove construction access roads, apart from those providing access for maintenance. Retain with "grass cell" or similar reinforcing and re-grass to provide all-weather trafficable access.
- Repair and re-grass disturbed ground.
- Undertake replacement tree and shrub planting in the western road reserve area.

□ Level of Permanent Effects

- Open space and Landscape Character – **Neutral (0) Effects**

Permanent effects on open space and landscape character would be neutral.

- Visual Amenity – **Neutral (0) Effects**

Visual effects are considered to be neutral following construction.

4.2.9 Haycock Avenue (L3S5)

4.2.9.1 Location and Landscape Context (refer to Figure 81)

This site incorporates a residential lot at No. 4 Haycock Avenue just off White Swan Road in Mt Roskill. This existing private property will need to be purchased to enable the construction works and to provide for access to the permanent installations. The site is surrounded by other residential houses, apart from to the south-west where the upper tributary of the Whau Creek is located in an area of open space (zoned residential, owned by Auckland Council). This and the reserve to the north appear to provide a connection from White Swan Road to Boundary Road and a pedestrian connection to this area is located to the north of No. 6 Haycock Avenue.

Within No. 4 is a mixture of trees and shrubs and on the front boundary of the adjacent No. 6 Haycock Avenue is a large tree Pin Oak approximately 8 metres high.

4.2.9.2 Proposed Construction Site and Works (refer to Figure 82)

Construction will require removal of the existing house and associated trees from the property. The site will be fenced to provide access for construction and for noise control. Construction activities will consist of an 8.5 metre diameter shaft and a 3 x 3 metre connection chamber as well as other smaller shafts / connections. The construction period is approximately 6 to 8 months with a further 16 to 18 months establishment period.

☐ Extent of Visibility and Viewing Audience

Visibility of the construction activities would be obscured by the external (2 metre high noise barrier) fence which would appear similar to a typical residential boundary fence. The viewing audience would include residents in No. 2 and No. 6 Haycock Avenue and those opposite in No's 1 to 5 Haycock Avenue as well as some of the residents to the south across the stream. Views would largely be confined to the external fence.

☐ Landscape and Visual Effects

The landscape and visual effects resulting from construction will be:

- Removal of the house and change to the residential character of this part of the street.
- Removal of the trees from No. 4 and along the adjoining boundary will reduce the vegetative cover in the immediate area.
- Construction of the temporary 2 metre high noise barrier fence around the perimeter of the site.
- Heavy vehicle movements to and from the site visible from adjoining land and houses opposite the site in Haycock Avenue.

4.2.9.3 Level of Temporary Effects (2 years)

- Open Space and Landscape Character – **Moderate (-3) Adverse Effects**

While there would not be any effects on open space, the removal of the house and the associated trees would create moderate adverse effects on the landscape character of this part of the residential street, noting that removal of houses could occur as of right.

- Visual Amenity – **Low (-2) Adverse Effects**

As views would be of the external boundary fence and construction activities would be screened from view, adverse visual effects are considered to be low.

4.2.9.4 Permanent Works (refer to Figures 83 and 84)

Permanent works on the site include two connection chambers, one 2.5 x 2.5 metre and one smaller drop shaft covers each located at finished ground level.

□ Mitigation Measures

The following techniques should be considered to remedy and mitigate the effects following construction:

- Construction access roads will be removed apart from those providing access for maintenance.
- All disturbed ground will be repaired and re-grassed surrounding the surface features and maintenance access roads.
- Planting within the property with a mix of appropriate trees and shrubs.

□ Level of Permanent Effects

- Open Space and Landscape Character – **Very Low (-1) to Highly Beneficial (+4) Adverse Effects**

The level of permanent effects could range from very low adverse effects to highly beneficial effects. This would depend on the final use of the property which could include a local residential park which could extend through to the Whau Creek and associated open space; or alternatively the site may be returned to residential use.

- Visual Amenity - **Neutral (0) to Small (+1) Beneficial Adverse Effects**

Following the work the property will either be redeveloped for residential use and/or landscaped and used as a local park.

5.0 Summary of Site Assessment Effects

5.1 Introduction

The following tables provide a summary of the level of effects for each of the 19 sites described in Section 4.0 separated into Effects during Construction Works (Temporary Effects) and Permanent Works (Permanent Effects).

As indicted in Section 3.3 of this report, the effects have been rated as follows:

More Than Minor	Very High Adverse Effects	(-5)
	High Adverse Effects	(-4)
Minor	Moderate Adverse Effects	(-3)
Less Than Minor	Low Adverse Effects	(-2)
	Very Low Adverse Effects	(-1)
	Neutral Effects	(0)
	Very Small Beneficial Effects	(+1)
	Small Beneficial Effects	(+2)
Minor	Moderate Beneficial Effects	(+3)
More Than Minor	Highly Beneficial Effects	(+4)
	Very High Beneficial Effects	(+5)

For assessment purposes, adverse effects that score -1 and -2 can be considered to be less than minor; whereas a score of -3 can be considered to be minor, and scores of -4 and -5 can be considered to be more than minor.

5.2 Discussion of Site Assessment Effects

As would be expected, given the nature of the project, effects on open space and landscape character and effects on visual amenity are very different between the two phases (construction and completion).

The effects are also quite different depending on the location, use and character of each site relative to existing landscape elements and surrounding context, with the adverse effects ranging from neutral to very high, and the beneficial effects ranging from very small to highly beneficial.

In relation to Temporary Effects, two sites, Lyon Avenue and Frederick Street- Pump Station 23 are considered to have Very High Adverse Effects on Open Space and Landscape Character; three sites would have High Adverse Effects (Western Springs, Rawalpindi Reserve and Miranda Reserve East); while a further 7 would have Moderate Adverse Effects on these attributes.

In terms of Temporary Effects on visual amenity, the sites at Lyon Avenue, Keith Hay Park, Frederick Street Pump Station 23 and Miranda Reserve Pump Station 25 are expected to have High to Moderate Adverse Effects for the potential viewing audience identified, although for some viewers mitigation screening may reduce this effect to a Low level (e.g. Keith Hay Park and Frederick Street Pump Station 23).

In terms of Permanent Effects, Lyon Avenue and Frederick Street Pump Station 23 are expected to have Moderate Adverse Effects on visual amenity and landscape character respectively. All other sites are expected to have no more than Low Adverse Effects on Open Space and Landscape Character, with many sites having the potential for beneficial effects. Similarly, in relation to the long term Visual Amenity Effects no sites would, in time, result in any more than Low Adverse Effects, with most either being Neutral (i.e. returned to a similar state as before the works) or Beneficial.

In summary, the magnitude of the effects generated are at a level that would not be unexpected with a significant infrastructure project such as the Central Interceptor which has a range of wider natural character, landscape and visual amenity benefits for the wider Auckland city environment.

Table 1: Summary of Site Assessment Effects during Construction Works

Temporary Effects

Site ID	Name	Duration of Works	Open Space and Landscape Character	Visual Amenity
Main Tunnel Sites				
WS1	Western Springs	5 Years	-4	-3
AS1 / L2S3	Mt Albert Memorial Reserve	12 to 18 Months	-3	-3
AS2	Lyon Avenue	12 to 18 Months	-5	-5 to -4
AS3	Haverstock Road	12 to 18 Months	-1	-3 to -1
AS4	Walmsley Park	12 to 18 Months	-3	-2
WS2	May Road	5 Years	-1	-3 to -1
AS5	Keith Hay Park	6 Months	-2	-4 to -2
AS6	Frederick Street Pump Station 23	12 to 18 Months	-5	-4 to -2
AS7	Kiwi Esplanade	12 to 18 Months	-3	-2
AS7	Ambury Regional Park	12 to 18 Months	-2	-1
WS3	Mangere WWTP	3 Weeks	-2	-1
Link Sewer Sites				
L1S1	Motions Road	12 to 18 Months	-3	-2
L1S2	Western Springs Depot	6 to 8 Months	0	0
L2S1	Rawalpindi Reserve	12 to 18 Months	-4	-3
L2S2	Norgrove Avenue	6 to 8 Months	-3	-3
L3S1	Miranda Reserve Pump Station 25	12 to 18 Months	-3	-4
L3S2	Miranda Reserve East	6 to 8 Months	-4	-3
L3S3	Whitney Street	6 to 8 Months	-2	-2
L3S4	Dundale Avenue	6 to 8 Months	-2	-2
L3S5	Haycock Avenue	6 to 8 Months	-3	-2

Table 2: Summary of Site Assessment Effects from Completed Works

Permanent Effects

Site ID	Name	Open Space and Landscape Character	Visual Amenity
Main Tunnel Sites			
WS1	Western Springs	-1 to +2	0 to +1
AS1/ L2S3	Mt Albert Memorial Reserve	0	0 to +1
AS2	Lyon Avenue	0 to +4	-3 to 0
AS3	Haverstock Road	0	0
AS4	Walmsley Park	0	0 to +1
WS2	May Road	-1	-1
AS5	Keith Hay Park	0 to +4	+4
AS6	Frederick Street Pump Station 23	-3 to -2	-2
AS7 (Option 1)	Kiwi Esplanade	0 to +2	0
AS7 (Option 2)	Ambury Regional Park	-1	-1
WS3	Mangere WWTP	-2	-1
Link Sewer Sites			
L1S1	Motions Road	-1	-1
L1S2	Western Springs Depot	0	0
L2S1	Rawalpindi Reserve	-1	-1
L2S2	Norgrove Avenue	-2 to 0	-2 to 0
L3S1	Miranda Reserve Pump Station 25	-2	-2
L3S2	Miranda Reserve East	-1	0
L3S3	Whitney Street	0	0
L3S4	Dundale Avenue	0	0
L3S5	Haycock Avenue	-1 to +4	0 to +1

6.0 Landscape and Urban Design Principles and Mitigation Measures

6.1 Introduction

The New Zealand Urban Design Protocol describes urban design as being “concerned with the design of the buildings, places, spaces and networks that make up our towns and cities, and the ways people use them”.

The Protocol identifies a number of key qualities in the consideration of urban design. These are commonly referred to as the Seven C's; Context, Character, Choice, Connections, Creativity, Custodianship and Collaboration. These key qualities have been considered in relation to the surface facilities at the Central Interceptor Project sites and a number of design principles have been proposed to provide guidance through the developed design of above ground elements, structures and buildings.

The urban design principles that have been developed for the Central Interceptor project are grouped under the following categories:

- **Context and Character:** The defining characteristics of the site and its landscape context.
- **Visual Landscape:** Visibility and potential viewing audiences.
- **Planting and Surface Treatments:** Surrounding vegetation patterns and surface treatments.
- **Structures:** The location, bulk, character and qualities of built form.
- **Access:** Utility servicing, maintenance and public access to and through a site including connections to surrounding areas.
- **Crime Prevention Through Environmental Design (CPTED):** Visual surveillance, crime prevention, asset protection, health and safety considerations.
- **Public Amenity:** Maintaining or improving the utility and pleasantness and aesthetic appreciation, recreational values and cultural values of key sites.
- **Creativity and Identity:** Encouraging creative and innovative design approaches that reflect the sense of place of each site and the core values and wider environmental benefits of the project.

6.2 Context and Character

The key above-ground elements of the proposed works occur in a variety of locations. A number of these locations share similar landscape characteristics. To assist in the development of an integrated set of urban design principles these sites have been grouped into the following categories:

❑ **Public open spaces often characterised by:**

- Open areas of recreational reserve
- Formed public pathways and tracks
- Areas of public car parking
- Playgrounds and play equipment
- Community buildings
- Established and maturing patterns of amenity planting
- Surrounding patterns of residential development - the sites in this group are:

- Motions Road (L1S1)
- Western Springs (WS1)
- Rawalpindi Reserve (L2S1)
- Mount Albert War Memorial Reserve (AS1 / L2S3)
- Lyon Avenue (AS2)
- Walmsley Park (AS4)
- Keith Hay Park (AS5)
- Miranda Reserve Pump Station 25 (L3S1)
- Miranda Reserve East (L3S2)
- Dundale Avenue (L3S4)

❑ **Public utility areas characterised by:**

- Paved / formed hardstand areas
- Vehicle access and vehicle movements - the sites in this group are:

- Western Springs Depot (L1S2)
- Norgrove Avenue (L2S2)

❑ **Private landholdings characterised by:**

- Built development (residential / business)
- Private open space, and/or
- Established patterns of amenity planting - the sites in this group are:

- Haverstock Road (AS3)
- May Road (WS2)
- Whitney Street (L3S3)
- Haycock Avenue (L3S5)

□ **Coastal margins characterised by:**

- Proximity to the Manukau Harbour and associated coastal features
- Expansive water views
- Public open space and/or access
- Existing built infrastructure - the sites in this group are:
 - Frederick Street Pump Station 23 (AS6)
 - Kiwi Esplanade (AS7 – Option 1)

□ **Urban water courses. In addition to the above, a number of sites occur in areas in close proximity to existing urban water courses. These sites are also influenced by:**

- The curvilinear water course alignment.
- A variety of watercourse forms (constructed channels and open unmodified riparian areas).
- A variety of vegetation patterns from mown grass to mature established stands of indigenous vegetation.
- Formed and informal public access.

The following sites are influenced by the characteristics of urban water courses:

- Motions Road (L1S1)
- Rawalpindi Reserve (L2S1)
- Norgrove Avenue (L2S2)
- Lyon Avenue (AS2)
- Walmsley Park (AS4)
- Miranda Reserve Pump Station 25 (L3S1)
- Miranda Reserve East (L3S2)
- Haverstock Road (AS3)
- May Road (WS2)
- Haycock Avenue (L3S5)
- Dundale Avenue (L3S4)

6.2.1 General Principles in relation to context and character include:

- Appropriate reflection of site context, in particular recognizing the key open space, utility, private landholding and coastal qualities of

each site as well as the influencing qualities of adjoining urban water courses where applicable.

- Location, sighting of above ground structures where practical so as not to compromise the character of each site.
- Design implementation that appropriately reflects the essence of each site.

6.3 Visual Landscape

Visibility of key above-ground sites for the Central Interceptor project has been considered both during the construction phase and on completion. In general the construction phase of the project will be more visible and noticeable than the completed works with visible work activities and site boundary fencing / noise walls representing the more noticeable short term elements of the project. Permanent works for most sites are at grade with the exception of four Air Treatment Facility buildings, with associated air vent stacks and raised shafts at PS 23 (Frederick Street) and Kiwi Esplanade.

General principles in relation to visibility include:

- Providing appropriate types of fencing to screen activities during construction.
- Aligning architectural and landscape design principles to develop appropriate visual mitigation strategies for significant above ground structures.
- Ensuring planting treatments respond to identified viewing audiences and key views towards and from each site within the context of the surrounding landscape and land use.

6.4 Planting and Surface Treatments

Vegetation removal will be required for a number of key sites. It is intended that at each site existing patterns of vegetation will, as far as practically possible, be either restored or enhanced.

General principles in relation to planting and surface treatments include:

- Transplanting of viable specimen trees in public open space within or in close proximity to original locations where practical.
- Planting plans and designs that are consistent with existing reserve management and maintenance plans where applicable.
- Removal of invasive exotic weed species and replacement with appropriate non-invasive species.
- Use of surface treatments and other landscape enhancements (e.g. motifs) consistent with the standard of surrounding facilities.

6.5 Structures

A small number of sites include above ground buildings which include air treatment facilities and a Pump Station, as well as ancillary structures. In addition all sites include at grade structures such as shaft covers and manholes.

General principles:

- Consideration of surrounding landscape context particularly in relation to coastal and open space sites including:
 - Consideration of the natural character of the coastal environment.
 - Views to, from and across the Manukau Harbour.
 - Opportunities to acknowledge volcanic features.
 - Opportunities to acknowledge cultural associations where appropriate.
- Alignment of structures in relation to public open space features and existing patterns of use.
- Visibility and potential visual impact from residential and public use areas.
- Consideration of existing reserve management and maintenance plans where applicable.

6.6 Access

Public access to and through sites within the public realm including connections to surrounding areas is a key design consideration. Permanent site access for asset maintenance also needs to be considered.

General principles in relation to access include:

- Consideration of sites within public open space and the maintenance (and where practical) enhancement of public access.
- Consideration of permanent maintenance access routes at the construction phase including:
 - The avoidance of permanent visible formed heavy vehicle access across public open space.
 - Consideration of maintenance access routes in planting and surface treatment design – including long term form and spread of immediately adjoining vegetation.
 - Provision of suitable grassed and subsurface reinforced heavy vehicle access across public open space to protect open space qualities where applicable.

6.7 Crime Prevention through Environmental Design

Crime Prevention through Environmental Design (CPTED) is a key consideration in relation to the prevention of criminal and anti social behaviour, the protection of Watercare assets and public health and safety.

General CPTED principles include:

- Maintenance or enhancement of passive surveillance as far as practically possible for sites within public open space to discourage anti social behaviour and damage to property.
- Avoidance and/or reduction of potential entrapment areas in the design and location of access ways and around buildings and planting areas.
- Providing clear lines of sight and logical visual cues for movement through sites in proximity to buildings and planting areas.
- Provision of adequate and appropriate security lighting around buildings to discourage property damage.
- Provision of adequate and appropriately designed security fencing to eliminate entrapment areas where these cannot be avoided.
- Consideration of surface treatments and materials for building facades to discourage property damage (graffiti damage in particular).
- Earth bunding and planting of/around building facades where practical and appropriate to reduce available surface areas for potential property damage.
- Removal or avoidance of structures or access to structures that present a risk to public health and safety.

6.8 Public Amenity

Maintaining or improving the utility, pleasantness and aesthetic appreciation, and recreational and cultural values of key sites is also a principle driver in the development of final site specific designs including:

- Appropriate site fencing standards during construction phases: (Note: this has taken in to account noise and health and safety and site security considerations)
 - High quality solid fence
 - Criteria:
 - Residential and Public realm/open space
 - High visibility / exposure
 - High rates of public use / access
 - Medium quality solid fence

- Criteria:
 - Residential context
 - Medium visibility
 - Medium rates of public use/access
- Chain link fence (with scrim sheeting attached where required)
 - Criteria:
 - Commercial or industrial context
 - Low visibility from surrounding areas
 - Low rates of public use/access
- Provision of quality materials and finishes where appropriate including paving and access-way materials.
- Provision of appropriate facilities for public open space including seating and consideration of solar aspect, shelter from prevailing winds, outlook and views.
- Allowance for additional public open space facilities to be incorporated by Council if required.
- Consideration of existing reserve management and maintenance plans where applicable.

6.9 Creativity and Identity

Opportunities for creative and innovative design and detailing approaches are encouraged to reflect the sense of place of each site and the core values and wider environmental benefits of the project. Such opportunities may include:

- Creating a theme for various built elements of proposed works – for example man hole covers.
- Provision of Interpretation information within areas of public open space.
- Communication and expression of wider project aims and environmental benefits at key sites.
- Appropriate recognition of the project's cultural context particularly at key coastal and watercourse sites.
- Allowance for the incorporation of public art where appropriate.
- Provision for community collaboration in the design of public open space where appropriate and practical as part of a wider consultation with Auckland Council in line with current reserve and open space strategies.

7.0 Summary of Effects

In analysing the potential landscape and visual effects of the proposed works there are a number of factors that influence the level of effects. These can be summarised as follows:

- Are the effects temporary or permanent?
- What is the duration of the construction works?
- Do they occur on private or public land?
- To what extent is the existing landform to be modified?
- What level of vegetation removal is required?
- To what degree is existing public access prevented or disrupted?
- How many structures would be visible above ground?
- What size and to what extent would the structures be visible and/or impede views or people's outlooks?
- Is the viewing audience transient (moving through the area) or permanent (residents)?
- What ability is there to integrate the completed works and structures into the existing surrounding landscape context?
- What opportunities are there for re-vegetation and/or planting to mitigate effects?
- To what extent can the existing ground conditions be reinstated, allowing for future access to manholes and chambers?
- To what extent can structures be incorporated into other facilities/amenities?
- Are there opportunities for interpretation of the project and the site?

In summarising the effects and taking these factors into account, the proposed works have been considered in relation to the scale of the works and the duration of time they will take to be completed. This is outlined below in three sections as follows:

Primary Sites – where construction is generally 5 to 6 years.

Secondary (Intermediate) Sites – where construction is generally 12 to 18 months with an additional 18 months to 2 years establishment period, where intermittent activities would occur. This would generally result in 3 years site works duration.

Secondary (Small Sites) – where construction is generally 6 to 8 months with an additional 16-18 months establishment period, where intermittent activities would occur. This would generally result in 2 years site works duration.

7.1 Primary Sites

There are three proposed primary sites (Western Springs, May Road, and Mangere WWTP). At the two primary sites that have been assessed in this report (Western Springs and May Road) the construction will generally range from 5 to 6 years.

The proposed works at Western Springs are on public land, whereas at May Road the land is privately owned. Minimal landform modification is expected at each of these sites apart from drainage works and filling associated with low-lying wet areas.

Limited areas of vegetation removal are required at each site and these are generally exotic trees and weeds or small native shrubs.

Public access will be maintained to the sports fields at Western Springs and the surrounding path network. An area of approximately 7,000m² will be fenced off and have no public access for the duration of the works.

While most structures will be at ground level both of these sites have Air Treatment Facilities with an integrated vent structure which will be visible above the standard perimeter fence.

At Western Springs the majority of the viewing audience will be transient and views are generally back-dropped by rising landform and vegetation. At May Road there is a small residential viewing audience immediately adjacent to the south who look across the existing site and measures which include fencing and quick growing screen planting is proposed to mitigate visual effects from this residential area.

Once works are completed at the primary sites there will be further planting and re-vegetation to assist with integrating the above ground structures into their respective recreational, residential/industrial and coastal/infrastructure settings. At Western Springs opportunities also exist and have been suggested to integrate the structure as part of the recreational activity (e.g. viewing veranda), walking path and project interpretation.

In summary it is considered that with the implementation of the proposed mitigation measures during the construction period the adverse effects on the open spaces and landscape character would be more than minor at Western Springs but less than minor at May Road. Whereas the adverse effects on the visual amenity values are considered to be minor at Western Springs and May Road.

Permanent effects at these sites are considered to range from less than minor adverse effects at May Road and neutral to a very small beneficial effects at Western Springs.

7.2 Secondary (Intermediate) Sites

There are 9 sites where the duration of works is generally 12 to 18 months long and where a moderate scale of works is proposed. These are:

- Mt Albert War Memorial Reserve
- Lyon Avenue
- Haverstock Road
- Walmsley Park
- Keith Hay Park
- Frederick Street Pump Station 23
- Kiwi Esplanade or Ambury Park
- Rawalpindi Reserve
- Miranda Reserve Pump Station 25

Except for Frederick Street Pump Station 23 and Haverstock Road, all are located on land that is either publicly owned reserve land and/or accessible to the general public (e.g. Lyon Avenue).

While all sites will require some minor level of landform modification, Rawalpindi Reserve will require an extensive area of cut and retaining to create a flat area for construction works. This will be able to be largely reinstated following construction. At Frederick Street Pump Station 23 there will be a temporary construction platform constructed to provide for access to remove spoil. This will be removed upon completion of the construction works and the current coastal edge reinstated with an appropriate coastal edge treatment, e.g. basalt rock wall.

All of these sites, apart from Ambury Park, will require some level of vegetation and specimen tree removal. Mt Albert War Memorial Reserve, Haverstock Road, Walmsley Park, Keith Hay Park, and Frederick Street Pump Station 23 will require removal of specimen trees and/or groups of shrubs. Where practical, consideration will be given to transplanting trees to other parts of the reserve or open space land away from the construction area. Where this is not practical they will be removed and new planting will be provided following construction works.

At Lyon Avenue an extensive area of maturing native trees will require removal and this is considered to result in more than minor adverse effects on the open spaces, landscape and visual amenity during construction. Following construction, in the short to medium term until new trees can be established on the site minor adverse effects would still remain but in time these would progressively reduce and in some 7 to 10 years the effects would be neutral to beneficial.

At Miranda Reserve Pump Station 25 there is quite an extensive area of native shrub-land that is required to be removed (approximately 2,000 m²), and this will have minor

short term adverse landscape and visual effects. Following construction the area is to be re-vegetated, reconnecting this vegetated linkage; and in approximately 5 years these adverse effects should be mitigated.

At the sites which are accessible to the public, alternative access is to be provided to ensure connectivity can be maintained through these public open space areas.

At Frederick Street Pump Station 23 and Kiwi Esplanade the permanent structures will be finished at 2 – 3 metres above existing ground level. These will be integrated into their coastal setting through the use of basalt or a similar rock facing, although Moderate Adverse Effects are expected to continue at Frederick Street Pump Station 23 for some 7 to 10 years until the planting can become well established.

The Air Treatment Facility and associated vent stack at Frederick Street Pump Station 23 will also require careful design treatment to ensure that there is no more than minor adverse effects on the quality and aesthetic value of the Manukau Harbour edge – a Regionally Significant Landscape (ARP: Coastal).

At all other sites the permanent structures will be finished at ground level. These elements, where appropriate, may be finished with a suitable interpretive motif, and at Kiwi Esplanade they could be integrated into a new toilet and changing room facility.

Elements that require removal, such as the sculpture at Mt Albert War Memorial Reserve, interpretative panels at Lyon Avenue, and the toilets at Ambury Park will all be reinstated within these publicly accessible areas.

At Miranda Reserve Pump Station 25 opportunities exist to provide additional pedestrian access across the proposed viaduct to enhance linkages between residential areas to the south and Miranda Reserve.

All of these sites are located nearby to residential housing. Many sites such as Mt Albert War Memorial Reserve, Haverstock Road, Walmsley Park, Frederick Street Pump Station 23, Rawalpindi Avenue and Miranda Reserve Pump Station 25 are generally well screened by vegetation, either within the reserves or on the boundary. At Lyon Avenue, due to the removal of the vegetation on site and the elevated location of the adjoining apartments, the construction works will be highly visible and it is considered that adverse visual effects would occur for the residents who have a view over the construction area for the duration of the works. At Kiwi Esplanade, while low level views would be obscured, viewers from upper storeys of a few houses opposite may have the ability to see into the construction works through the existing Pohutukawa trees that surround the site. Due to the wide expansive nature of these views however, the adverse visual effects from these houses is considered to be less than minor.

Once construction is completed and the establishment period ended, the permanent works will be able to be integrated into each of these sites resulting in less than minor adverse long term landscape and visual effects. At Lyon Avenue, due to the maturity of the vegetation and the duration it would take for the planting to reach a similar height to that, minor adverse visual effects are expected to continue for up to 10 years.

At a number of sites with the implementation of appropriate design solutions, long term beneficial effects are expected.

7.3 Secondary (Small) Sites

Secondary (small) sites are those where the construction works would be completed in 6 to 8 months. These sites are:

- Motions Road
- Western Springs Depot
- Norgrove Avenue
- Miranda Reserve
- Whitney Street
- Dundale Avenue
- Haycock Avenue

Three of these sites are on public reserve land – Motions Road, Western Springs Depot and Miranda Reserve. Works at Motions Road will be adjacent to an existing footbridge which will require a temporary alternative access, while at Miranda Reserve there is an existing playground that will require removal and reinstatement following construction. These effects will be remedied through reinstatement of the access and the playground facility.

Any alteration to landform on all sites is minor in nature. Vegetation removal will be limited at most of these sites, apart from Haycock Avenue where a large tree within the residential sections will require removal and Norgrove Avenue where a group of large trees adjoining the Meola Creek will require removal. At these and all other sites replacement planting will occur and the long-term effects of vegetation removal will be mitigated.

Visibility of the construction works from residential areas will occur at Norgrove Avenue, Whitney Street, Dundale Avenue and Haycock Avenue, but these will generally be screened by the perimeter solid fence and be for a relatively short duration, resulting in no more than minor visual effects.

At all these sites the permanent structures are flush mounted and limited in scale and number. As a result any ongoing landscape and visual effects will be less than minor in nature.

At Haycock Avenue the removal of a house within an established residential area and the resultant vacant lot will change the character of this neighbourhood. Appropriate design incorporating replacement trees and shrubs in keeping with the scale and type of planting in the area should be undertaken and implemented to maintain the quality and amenity values in this area. Such a design should consider the long-term end use of the section and its relationship to the adjoining open space to the south. This could result in beneficial effects on the area.

8.0 Conclusion and Recommendations

At most sites, temporary adverse visual effects associated with the construction works will occur. At the majority of these sites, these effects can be mitigated by external fencing, although the fencing itself will in many instances result in a change to the open space nature of the area for a period of time ranging from 6 months to 5 years. Where fencing cannot effectively screen the construction activities and specific moderate, high or very high adverse visual effects may be afforded, (refer to Table 1, Page 65), quick growing or strategically placed trees will be used to screen direct views into the construction works from adjoining residential sites.

Adjacent to high public use areas (e.g. adjacent to walkways), fences can be designed to include interpretive panels or other external features appropriate to the location and activity. At all sites, construction traffic, including trucks will result in some adverse visual amenity effects for users in the immediate vicinity, until the trucks enter the roading network.

Permanent landscape effects will result from the removal of native and exotic trees and shrubs as outlined in the Arborlab report. At many sites smaller grade trees could be transplanted to other parts of a reserve or open space. In all cases replacement planting will be incorporated in reserve areas following the construction and occupation phase of the project to maintain the vegetated character of these sites.

The Air Treatment Facilities are the only permanent large built structures that will require integration into their specific setting. The key to integrating these buildings will be their design and location in relation to the use of the surrounding activities and open space. This and other appropriate design techniques (materials, colour and planting) should be investigated during the detailed design stage to enable the potential adverse visual effects of these above ground structures to be mitigated to a minor level at all sites.

Surface features (e.g. manholes) will generally result in a group of built elements located in grassed open space. A co-ordinated design approach to finishing the surface of these elements in a manner which softens their appearance (e.g. coloured concrete) and/or provides a motif or design that relates to the Central Interceptor project should be explored through the detailed design phase of the project. For reserve sites this approach should be considered in consultation with Auckland Council. Reinstatement of grass/lawn and the planting of trees and shrubs, including the potential for wetland planting in areas of poorly drained land could also be designed to enhance the general amenity of public open space areas.

As the engineering design develops for the project, including specific designs for each of the construction sites outlined in this report, urban and landscape design options should be considered and resolved and where appropriate (i.e. for those sites located in public open space areas) through consultation with relevant agencies and stakeholders. Watercare has been working closely with Auckland Council Parks in the development of its notices of requirement and will continue to develop its designs in close consultation with Auckland Council.

Through this process it is considered that the majority of the temporary and all the permanent adverse landscape and visual effects of the project can be remedied and mitigated to result in no more than minor, effects and in some cases, result in beneficial landscape and visual effects.

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Appendix 1: Effects Ratings and Definitions

Landscape and Visual Amenity Effects – Rating System	
Effects Rating and Definitions Note: Ratings may be positive (e.g. high level of enhancement) or negative (e.g. high adverse effect).	
Adverse Effects Rating	Use and Definition
No Effect (Neutral)	The development/activity would have no effect on the receiving environment.
Very Low	<p><u>Use</u> The development/activity would: Have a very low effect on the character or key attributes of the receiving environment and/or the visual context within which it is seen; and/or Have a very low effect on the perceived amenity derived from it.</p> <p><u>Oxford English Dictionary Definition</u> Very: adverb- 1. In a high degree. 2. With superlative or own without qualification: the very best quality. Low: adjective- 1. Below average in amount, extent, or intensity. 2. Lacking importance, prestige, or quality; inferior.</p>
Low	<p><u>Use</u> The development/activity would: Have low level of effect on the character or key attributes of the receiving environment and/or the visual context within which it is seen; and/or Have low level of effect on the perceived amenity derived from it.</p> <p><u>Oxford English Dictionary Definition</u> Low: adjective- 1. Below average in amount, extent, or intensity. 2. Lacking importance, prestige, or quality; inferior.</p>
Moderate	<p><u>Use</u> The development/activity would: Have a moderate level of effect on the character or key attributes of the receiving environment and/or the visual context within which it is seen; and/or Have a moderate level of effect on the perceived amenity derived from it.</p> <p><u>Oxford English Dictionary Definition</u> Moderate: adjective- average in amount, intensity, or degree</p>
High	<p><u>Use</u> The development/activity would: Have a high level of effect on the character or key attributes of the receiving environment and/or the visual context within which it is seen; and/or Have a high level of effect on the perceived amenity derived from it.</p> <p><u>Oxford English Dictionary Definition</u> High: adjective- 1. Extending above the normal level. 2. Great in amount, value, size, or intensity. 3. Great in rank or status.</p>
Very High	<p><u>Use</u> The development/activity would: Significantly change the characteristics or key attributes of the receiving environment and /or the visual context within which it is seen; and/or Have a significant effect on the perceived amenity derived from it.</p> <p><u>Oxford English Dictionary Definition</u> Very: adverb- 1. In a high degree. 2. With superlative or own without qualification: the very best quality. High: adjective- 1. Extending above the normal level. 2. Great in amount, value, size, or intensity. 3. Great in rank or status.</p>