Part VII: Adverse Effects

The project will not generate significant adverse environmental effects, as any adverse effects on the environment will be appropriately avoided, remedied or mitigated to be minor or less than minor in nature. The key potential adverse effects are addressed in general below and should be reviewed in conjunction with the supporting technical expert memorandums accompanying this application, included as **Attachments 12 to 21.**

1.1 Construction

1.1.1 Earthworks & Land Disturbance

Bulk earthworks for the project will be carried out in accordance with best practice appropriate erosion and sediment control measures to ensure potential adverse effects are avoided or minimised. Earthworks are proposed to be carried out during the summer earthworks season to reduce the potential discharge of sediment into receiving waters. Earthworks will require approximately 440,251m^3 of cut and 3,096m^3 of fill, as shown in **Attachment 3**.

The zoning of the site provides a clear signal that the planning framework for this project location anticipates change and transition from its current rural character to an urban environment. There are no natural heritage overlays that apply over the site which further supports our conclusion that modifications to the existing landform and character from earthworks and development will not be an adverse effect.

hdGEO prepared a memorandum, included as **Attachment 13**, that details the potential geotechnical effects that will be addressed in the Geotechnical Assessment.

The key geotechnical effects in relation to this proposal include:

- Groundwater settlement due to groundwater drawdown; the dewatering of the land adjacent to the Rotokauri Greenway has the potential to cause settlement to surrounding land and structures.
- Site instability due to lateral spread/liquefaction hazard; the construction of the Rotokauri Greenway will create a free face that could increase the risk of instability, especially in a liquefaction event.
- The construction of the Rotokauri Greenway will have potential effects such as sediment runoff and water control that will require management.

This memorandum outlines that the proposal does not present any effects that cannot be mitigated through engineering design, stabilisation measures, suitable conditions of consent and monitoring of effects.

1.1.2 Dust

During construction, it is anticipated that there will be dust generated by the earthworks and land disturbance, which is able to be mitigated and managed via an Erosion and Sediment Control Plan. There is an opportunity to source water from a local bore to help with dust suppression, which there is an existing water take consent for this purpose from Waikato Regional Council (part of the approved earthworks).

1.1.3 Construction Noise & Vibration

During construction, noise and vibration is anticipated to occur as a result of the works proposed to be carried out on the site. Construction will be managed in accordance with the NZS 6803:1999 Acoustics –

Construction Noise and German Standard DIN 4150-3:1999 Structural vibration – Effects of vibration on structures.

Construction noise and vibration, particularly during any rock breaking, will be managed in accordance with a Construction Noise and Vibration Management Plan ('CNVMP'). The CNVMP will outline measures, such as restrictions on days and hours on noisy works, consultation with neighbours and use of quieter machinery (among others) to ensure that potential construction noise effects of the project are appropriately managed.

See **Attachment 14**.

1.1.4 Traffic

It is anticipated that there will be potential adverse traffic effects as a result of the construction of the Rotokauri Greenway and Minor Arterial. A series of upgrades will be required on adjoining transport corridors, such as Te Wetini Drive and State Highway 1C, which will result in potential delays and traffic on these corridors while construction occurs. This will be managed through phasing and delivery during off peak periods.

Construction traffic effects will be temporary and will be managed in accordance with a Construction Traffic Management Plan ('CTMP'). The CTMP will outline measures such as anticipated number of truck movements per day and truck routes (among other measures) to ensure that the potential construction traffic effects of the project are appropriately managed. The bulk of construction and related earthwork traffic movements will be kept within the site constraints and have little impact wider afield.

Overall, the potential adverse effects from earthworks and construction can be appropriately managed.

1.2 Three Waters

1.2.1 Stormwater, Wastewater

Maven prepared a memorandum, included as **Attachment 20**, that details an overview of the proposed approach for the management of stormwater.

The proposed Minor Arterial will be required to manage potential stormwater and flooding adverse effects, with several measures proposed to minimise the impact of the Minor Arterial on the environment. This includes the provision of rain gardens, swales and the selection of plant species. Stormwater will be managed to ensure it is treated before discharging to the environment.

The proposed Greenway will future proof the greater Rotokauri area, now and in the future as the area is urbanised, from stormwater attenuation and treatment matters. The purpose of this infrastructure is to effectively manage stormwater to remedy and avoid any adverse stormwater effects.

1.2.2 Hydrogeology

Wallbridge Gilbert Aztec ('WGA') prepared a memorandum, included as **Attachment 15**, that details the potential groundwater effects that will be addressed in the Hydrogeological Assessment.

The Rotokauri development area has been under investigation in terms of the hydrogeological conditions since 2010. There are well established records of the shallow groundwater level response to seasonal changes and recent developments in the area. An existing groundwater model of the area has been updated in 2022 to incorporate recent developments within the Rotokauri area (e.g., Te Wetini Crossing) and longer-

term groundwater level records. This existing knowledge and information will be used as foundation for more refined focused assessment of the effects of the final Greenway and Minor Arterial designs.

The key groundwater effects in relation to the Rotokauri Greenway to be considered include:

- Groundwater seepage inflows to the Rotokauri Greenway;
- Groundwater seepage inflows into any temporary work excavations and any associated dewatering activities;
- Groundwater drawdown effects from the proposed works, including potential effects on existing road infrastructure and wetlands (i.e., lowering the water table in the vicinity of a wetland can impact the wetland hydrology);
- Effects from disposal of the pumped groundwater; and
- Potential groundwater mounding effects of any soakage system or constructed wetland.

The key groundwater effects in relation to the Rotokauri Minor Arterial to be considered include:

- Groundwater seepage inflows into any temporary work excavations and dewatering activities;
- Effects from construction of the arterial road on underlying groundwater flows; and
- Effects from disposal of the pumped groundwater, including potential groundwater mounding effects of any soakage system or constructed wetland.

Further explanation associated with hydrogeology can be found in Attachment 15. This memorandum outlines that the proposal does not present any effects that cannot be mitigated through engineering design, suitable conditions of consent and monitoring of effects.

1.2.3 Wastewater & Water

Maven prepared a memorandum, included as Attachment 20, that details an overview of the proposed approach for the management of wastewater and water supply.

A high-level wastewater servicing plan has been developed by Hamilton City Council. An existing wastewater reticulation is available from Te Wetini Drive including a pump station, raising main and gravity pipe network, as these surrounding areas have already been developed. The existing gravity wastewater network will be extended into the proposed development area along the arterial road to service the southern portion of the masterplan area.

The northern portion of the area will be serviced by a new pump station and raising main from Te Kowhai East Road extension which will discharge wastewater into the existing Far Western Interceptor. A new gravity wastewater network is proposed along the arterial road to convey wastewater into the proposed pump station.

Like wastewater, an existing water supply network is available to the south and east of site from Te Wetini Drive. The Watermains within the vicinity of the site will be extended into the area along the proposed arterial road. The ICMP provides general guidelines on the recommendations for water supply reticulation. 250mm trunk watermains and 450mm bulk watermains will be constructed as part of this development.

Overall, the potential adverse effects from three waters and its infrastructure can be appropriately managed. The purpose of the Greenway is to effectively manage current and future stormwater effects.

1.3 Character & Amenity

1.3.1 Visual Amenity

Reset Urban Design prepared a memorandum, included as **Attachment 16**, that details the potential visual amenity effects to be considered in relation to this project.

The key visual amenity effects in relation to the project to be considered include:

- Given the two elements of this proposal, the Greenway and the Minor Arterial, there is potential for there to be a disconnect between the design of the two. This would result in poor connectivity and a lack of continuity, with varying focus areas for ecology, revegetation, stormwater, active travel, and legible activity areas.
- The effect of the proposal on the local context; the proposal needs to fit with the local landscape (currently greenfield site) to enable the optimum development for future residents. Consideration of the wider development will need to be considered to ensure strong connections and coherent urban form.
- Integration with local and cultural heritage needs to be considered to enhance the experience of users. The proposal will need to ensure it weaves Mana Whenua input into the development for the protection of Mana Whenua values, connection and association to the landscape.
- The Greenway has not yet allocated adjacent 'interface areas', which are fundamental to good urban design outcomes (e.g., strong connection/public amenity or interface between the Rotokauri Greenway, the future road network and public reserves).
- The surrounding environment includes a range of adjacent land uses, such as industrial, residential and commercial, that need to be considered to ensure the Rotokauri Greenway interface does not detract from its amenity, safety, and inactive edges.

Reset Urban Design outline their approach to addressing visual amenity effects in **Attachment 16,** including strategically locating the activity areas and active travel connections, integrating the Greenway and the Minor Arterial to optimise interface and engage with Mana Whenua to incorporate their values into the design.

1.3.2 Landscape

Reset Urban Design prepared a memorandum, included as **Attachment 17**, that details the potential landscape effects to be considered in relation to this project.

The key landscape effects in relation to the Rotokauri Greenway to be considered include:

- The impact on local context with regard to the scale and function of feature to local landscape.
- The impact on circulation/connections of transport users with land uses (residential, commercial, industrial, etc) and locations of recreational amenities to the core functionality of the Rotokauri Greenway for water quality and conveyance.

The key landscape effects in relation to the existing natural and the proposed artificial wetlands to be considered include:

- The impact on landform and land take, as a result of spatial design resilience, cut and fill balances, and slopes.

- The visual impact of the design of the proposed artificial wetlands.

The key landscape effects in relation to the Rotokauri Minor Arterial to be considered include:

- The impact on landform and land take.
- The alignment of the Minor Arterial with the surrounding landscape.

Reset Urban Design outline their approach to addressing visual amenity effects in **Attachment 17** including enabling connectivity, integrating the Greenway and the Minor Arterial to optimise interface and designing the artificial wetlands to fit within the existing landscape and appear 'natural'.

Overall, the potential adverse visual amenity and landscape effects from can be appropriately managed.

1.4 Transportation

CKL have prepared a memorandum, included as **Attachment 18**, that details the transportation approach and potential effects to be considered in relation to this project.

The design ethos with regard to the Rotokauri Minor Arterial prioritises reducing emissions from the transport system, minimising death and serious injury crashes and having a system that is affordable and efficient to construct and maintain. This is outlined to be achieved by giving effect to the following hierarchy:

- Pedestrians located at the top of the hierarchy, with generally the lowest emissions of all transport modes.
- Followed by cyclists, who have low emissions but travel at greater speeds than pedestrians and are able to share the road in appropriate circumstances.
- Public transport follows with buses proposed to service Rotokauri.
- Then freight which Minor Arterial routes need to provide for.
- Finally, cars, as private vehicles generally produce the greatest amount of emissions.

It is noted that the Rotokauri Minor Arterial will align with relevant transportation planning documents, including the Emissions Reduction Plan, Government Policy Statement on Land Transport, Access Hamilton, and Regional and District Plans.

Overall, the potential adverse transportation effects can be appropriately managed.

1.5 Climate Change

1.5.1 Greenhouse gas emissions

The applicant seeks to minimise greenhouse gas emissions where possible through this development. The nature of the proposal is to provide infrastructure that will enable efficiencies that will support the reduction of greenhouse gas emissions. For example, the proposal will enable the intensified residential development of Rotokauri, which will provide services and amenities within a walkable catchment to reduce the need for vehicle travel. The proposal will use land and construction resource efficiently and will facilitate higher density development. The provision of walking and cycling facilitates within the Rotokauri Greenway and Minor Arterial encourages active modes of travel which indicates how the project will support the future reduction of greenhouse gas emissions.

This project supports new connectivity options via both the Greenway and Minor Arterial, through to The Base, Wintec and State Highway 1, in an efficient matter for all transport modes. Currently, there is poor connectivity, which results in significant traffic movements and driving that can be avoided by giving effect to the Rotokauri Structure Plan.

It is anticipated that the project will generate greenhouse gas emissions, specifically through the construction of the project. This is considered to be offset by future development of the area that the Rotokauri Greenway and Minor Arterial enables.

Overall, these combined factors will alone and in combination represent strong steps towards reducing greenhouse gas emissions.

1.6 Cultural

Mana Whenua have been involved and consulted to this point of the project, which will continue to occur. There is a risk that archaeological sites may appear or be uncovered in the construction process, which can be managed through accidental discovery protocol. The project will incorporate cultural values in its design, using Mana Whenua expertise to integrate their values and cultural heritage (which is currently largely invisible). This is an opportunity to reflect the area's cultural history in the development, including through activities, facilities, forms, artwork, local flora, and materials significant to the reinstatement of their presence and aspirations.

Overall, the potential adverse cultural effects can be appropriately managed, particularly through ongoing consultation with Mana Whenua and incorporation of cultural values into the project design.

1.7 Ecology & Biodiversity

1.7.1 Wetlands

Ecological Solutions have prepared an ecology memorandum, included as **Attachment 19**, which outlines the potential adverse ecological effects of the project in relation to wetlands. This includes loss of wetland habitat, loss of species and decline in water quality. There are two kinds of potential loss of wetland, direct loss, approximately 3 ha and potential indirect loss from drawdown effects. At present the existent of potential indirect loss is uncertain. A very conservative estimate of approximately 7 ha has been identified for detailed investigation, though large areas of wetland within this category are far enough away from the project that the Wetlands Hydrogeology memorandum (**Attachment 15b**) has indicated that they are unlikely to be affected. There are also a broad range of remedial and mitigation options that can be investigated and implemented where wetlands are only indirectly affected.

The anticipated effects of the project on ecology appear to be manageable through suitable conditions during consenting. With respect to wetlands and black mudfish this would require biodiversity offsetting and there is ample opportunity for this to occur in the Waikato Region. A detailed ecological assessment and ecological management/ offsetting plan will be included in the resource consent application, should the application be accepted as a referred project under the COVID-19 Recovery (Fast-track Consenting) Act 2020.

1.7.2 Wildlife

Wildlife habitat, such as indigenous black mudfish, are located within the Rotokauri catchment. The Greenway is expected to result in lowering of groundwater levels over a large area of surrounding land and this has been identified as a potential risk to At Risk black mudfish (Neochanna diversus) due to their sensitivity to water level change. It is considered that the project could potentially result in a loss of habitat and population reduction.

A Rotokauri Mudfish Management Plan has been prepared which recommends that existing wetland habitat at Lake Waiwhakareke is enhanced as suitable mudfish habitat, retaining any mudfish found within the Rotokauri Catchment. Lake Waiwhakareke is within HCC jurisdiction and managed by Council making the administrative arrangement of securing, establishing, and monitoring mudfish habitat practical. The establishment of black mudfish within the lake has already been planned for in the Waiwhakareke Natural Heritage Park Operative Management Plan.

In addition, through previous development the project team have experience and have been successful in relocating black mudfish to new local habitat. The team has a proven track record and are equipped to manage any potential transfer, trapping and relocation of this particular indigenous biodiversity.

Overall, the potential adverse effects of the project in relation to ecology and biodiversity can be appropriately managed.

1.8 Heritage & Archaeology

No natural heritage overlays that apply over the site, however, there is a risk that archaeological sites may appear or be uncovered in the construction process. This can be managed through accidental discovery protocol which will form part of conditions of consent.

1.9 Contaminated Land

From the information reviewed, two activities listed on the Ministry for the Environment (MfE) Hazardous Industries and Activities List (HAIL) were identified, only one of which is applicable under the NESCS due to the other being outside the subject area. The HAIL activities relevant are:

- G5 – Waste disposal to land
- E1 – Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition

This desktop based study is unable to fully quantify the potential contamination present within the piece of land and subsequently cannot conclude it is highly unlikely that there will be a risk to human health if the activity is completed. As Permitted Activity criteria is unable to be met for both the change of use of the land and soil disturbance, consent under the NESCS will be required. In order to support the NESCS consent, it is recommended a Detailed Site Investigation (DSI), supported by a Contaminated Soils Management Plan (CSMP). This would allow the consent to be processed as either a Controlled or Restricted Discretionary Activity under Regulation 9 or 10 of the NESCS respectively.

hdGEO will prepare a Detailed Site Investigation (DSI) with the resource consent application.