# **5.** LANDSCAPE OUTCOMES



Pūhoi hills and native forest, representative of Pūhoi sector environment

# 5. LANDSCAPE OUTCOMES

#### **DESIGN STATEMENT**

The Pūhoi sector is characterised by the most diverse landscape, history and ecology of the three sectors that make up the motorway. The alignment traverses the high natural beauty and numerous features that create interest and visual appeal around Ōkahu and Pūhoi before the progressing alongside the existing state highway 1, which skirts steeper terrain used for plantation forestry. Finally the road rises up through hilly country used for pastoral farming to meet the Moir Hill and Hikauae Creek Sector.

In the south, the landscape largely speaks for itself and the overall design intent is to appear minimal and comply with the ULDF outcomes [D33]. There are opportunities to enhance the landscape and environment, and the design has sought to maximise these particularly at Pūhoi and Ōkahu.

This is an area of history with a variety of settlements. Hōkai Nuku, as a representative of the Mana Whenua of the area, have expressed their strong interest in the local area outcomes, as have the residents and local businesses of Pūhoi and Hungry Creek. Whilst the new motorway has an impact on the landscapes, the design that is presented includes provision for a return of the environment to a state similar to what it might have been historically. In addition this should also enhance the visual amenity for road users (both of the motorway and the existing SH1) and localised recreational visitors.

Within the boundary of the designation there is a large amount of native mitigation planting. The landscaping has been purposefully designed to complement existing native bush remnant's and join up individual trees where they have been preserved. In addition to the east-west connectivity, this will help to create a longitudinal chain of ecological islands.

The environment surrounding the Pūhoi River, as it heads to the Ōkahu inlet and out to the Hauraki Gulf is one of transition. The Pūhoi River provides a physiological and visual link across the landscape, in part because of its tidal nature. Mangroves line the river sides as it gives way to estuarine and salt marsh environments. The meander of the river can never be mimicked by the motorway, but the sweeping curves of the road provide a visual structure and continuity to the landscape in contrast, but complimentary to, the organic course of the river. The viaducts in these environments provide the opportunity for motorway users, residents and visitors to engage with the unique beauty of the transitional landscape.

The two viaducts in the Pūhoi sector will be significant new landmarks, and have been designed by a bridge architect to provide visual appeal. Given the road geometry and safety constraints, they are similar in size and appearance to appear as a matched pair. The two viaducts will become features of the human interaction with the landscape in terms of both the urban and structural design elements when viewed in the landscape and the elevated views of the surrounding landscape they provide for users of the highway. Te Arawhiti ki Pūhoi, in contrast to the existing SH1 Bridge, will appear high and open when viewed from the river by users.



#### 5.1 HUMAN LANDMARKS

The Pūhoi interchange is an important landmark to Mana Whenua and residents of Pūhoi. This is because of its role as a gateway to the historic Pūhoi township. The interchange is also in close proximity to two defensive pā sites near the Ōkahu Inlet. The Pūhoi interchange extends to the south, providing for southbound on-ramps to the highway and northbound off-ramps to Pūhoi as demonstrated below.

#### Viaducts

Two viaducts feature in the Pūhoi sector as significant new landmark elements they will overlook the Ōkahu inlet and the entrance to Pūhoi. The ULDF has specific requirements for these viaducts, seeking an understated, refined, minimalist aesthetic and an elegant appearance. These considerations have been key drivers of the design of the viaducts. Each has 5 piers, with 3 on Te Arawhiti ki Ōkahu located in the coastal zone, and none in the current alignment of the Pūhoi River. This is further discussed in chapter 4.

#### Views

The southern part of this sector has a number of natural features that will make the journey through it distinguishable. Similarly, the views and scenery are a key draw for recreational activities in the area, particularly from the Pūhoi River which passes below Te Arawhiti ki Pūhoi. The design of the viaducts has sought to make these views part of the user experience. The structures complement the view when observed from a distance through elegant, simple design and consideration of the overall aesthetic, individually, and as a pair.

#### Interchanges

The Pūhoi interchange is an important landmark, particularly to Pūhoi residents and lwi. This is because of its role as a gateway to Pūhoi township and as a result of the proximity of the motorway to the two Pā sites near the Ōkahu inlet. The interchange at Pūhoi extends to the south, providing for southbound on-ramps to the highway and northbound off-ramps to Pūhoi as demonstrated below.

Hibiscus Coast Highway will be a two way road, accessible from the existing State Highway for both southbound and northbound travellers.

The ULDF outcomes include a design context sensitive feature to mark the gateway to Pūhoi that complements the low-key, intimate rural landscape setting. The landscape design includes a coastal plant mix specific to the Pūhoi interchange as well as rows of pohutukawa specimen trees, with planting along the ramp sides and around the river. This will signal a change in driving conditions to road users and demarcate the ramps, intersections, Pūhoi Road and, at a small distance away, the Pūhoi township. The physical design feature will be located on the southern abutment or be free standing nearby.

The design for the gateway feature is to draw upon the landscape of Pūhoi, in particular with the river as a defining feature of the community and morphology in the context of the ULDF. It will be developed in collaboration with community stakeholders, Hōkai Nuku and in consultation with Auckland Council and Auckland Transport [D36(b)]. The design for the Pūhoi interchange (including the gateway feature) is intended to protect the sheltered nature of Pūhoi, the sense of travelling to somewhere special and achieve the ULDF outcomes. The juxtaposition of the elegant viaduct and the gateway feature in this situation is anticipated to heighten awareness of the surrounding environment and landscape.



Diagram of Pūhoi interchange

#### Cultural and historical

The area around Pūhoi has historic and cultural significance to a number of communities (also refer to section 3.3). Puhoi historic village is an area with a strong history of European settlement, which characterises much of the landscape. In addition, Pūhoi is a popular destination for day trips from Auckland with a suite of recreational activities and features.

Ōkahu Inlet in particular has significance to Mana Whenua, with two pā and a network of occupation areas on both sides of the inlet that includes nohonga (seasonal camp sites), harvesting sites, and kainga on either side of the Puhoi River as it turns west towards Pūhoi Village.

The Māori cultural landscape of Pūhoi reflects the day-to-day activities of the Hōkai Nuku tūpuna (ancestors) who lived there in a cycle of seasonal use, as well as the significant events that helped shape their identity. Traditional routes such Te Awa Pūhoi remain markers on the landscape that remind of how the land was historically traversed, while some of the tupuna who previously walked there are remembered in prominent features, including Kahumatamomoe of Te Arawa, for whom Ōkahu is named. Hōkai Nuku, as the kaitiaki (guardians) for the Project, seek the active protection and management of Te Pā o Te Hēmara Tauhia, Te Kāinga Tawhito o Ngā Tupuna and the wider settlement area by achieving the following outcomes:

- Enduring active protection with ongoing monitoring and maintenance
- Appropriate landscape design and artworks which honour the tūpuna and the indigenous biodiversity which sustained them
- Engaged kaitiaki overseeing the restoration and protection of their homeland

#### Te Pā o Te Hēmara Tauhia and Te Kāinga o Ngā Tūpuna

The Ngā Pā o Te Hēmara Tauhia Management Plan was prepared by the Project Archaeologist and Hōkai Nuku. The plan seeks to both remedy some of the historic damage done to, and limit further destruction of the two cultural heritage sites by implementing vegetation and erosion control measures, tree management and access controls appropriate to the wider context of the pā kāinga, and a comprehensive pest management strategy. Te Pā o Te Hēmara Tauhia and Te Kāinga o Ngā Tūpuna are also protected by identified 'no soil disturbance' areas. Restoration of Ōkahu Inlet, as a vital resource and buffer for the pā kāinga, is also integral to the Pā Management Plan.

The Project will enhance degraded areas with new forest and wetland planting, which span both sides of the motorway. Planting of low-growing or ground cover shrubs and small ferns will occur where buildings and macrocarpa trees have been removed. The removal of invasive weed species will be replaced by native planting over the rocky slope.

#### 5.2 NATURAL FEATURES

The aim of the highway is to create a road that fits the existing contours while maximising views over local natural features. This sector is characterised by rural pastoral activities with vegetated slopes, and areas of plantation forestry.

After emerging from the Johnstone's Hill Tunnels the alignment traverses the significant water-bodies of the Ōkahu inlet and Pūhoi gateway before rising up to meet the steep hill country of the Moir Hill and Hikauae Creek Sector.

#### Pūhoi River

The focus of mitigation planting in this area is wetland planting, returning the site to its historical natural form and tying together previously fragmented terrestrial habitats. In a similar manner, the area east of Pūhoi River, will take advantage of the 'no build' zone at the tip of the curve to establish a lowland wetland forest that connects to existing remnant native forest (subject to auhorisation), and will be seen from the river, the land and the Te Arawhiti ki Pūhoi.

River.

#### Ōkahu Inlet

The landscape treatment in the Ōkahu inlet will link currently disconnected areas of native forest. This will 'stitch' new embankment planting with the existing covenanted kauri bush block. The Ōkahu inlet planting will provide a more diverse landscape which can better support native flora and fauna into the future.

Ecologists and landscape architects with Hōkai Nuku representatives have designed the planting to have a seamless as possible connection between ecological mitigation and general landscape planting areas, given the constraints.



Indicative cross section demonstrating the fit of the motorway with landscaping through the gateway to Puhoi (refer to page 11 for the location of the section)

Planting on adjacent embankments and on land locked areas within the interchange will reduce the visual impact of the ramps when seen from Pūhoi Road and Pūhoi



Looking south from SH1 over the pastural landscape

#### LOCAL CONNECTIVITY 5.3

#### Pūhoi Road and township

A gateway to Pūhoi Village is envisaged in the ULDF to reflect the special character of the area. The design accommodates such a gateway in the local road environment by:

- Keeping Pūhoi Road unchanged; the interchange connects to Pūhoi Road and retains the existing tree lined, rural character, the relatively narrow, winding alignment and the enclosed intimate scale of Pūhoi Road. There will be a sense of separation between the motorway and Pūhoi Village
- Open (spill-through) abutments have been used on the northern end of the viaduct to maximise openness and views beneath the viaduct. The southern abutment of the Pūhoi Viaduct is a vertical abutment to provide a legible and managed edge to the Pūhoi Road underpass
- Merging the visual mitigation planting (to soften the appearance of the new motorway) with the ecological mitigation planting to provide a wetland area that further buffers Pūhoi village from the new motorway
- Planting both sides of the Pūhoi off-ramp to visually narrow the road, marking the start of a slower speed environment that transitions to the intimate scale of Pūhoi Road, with both safety and 'character' in mind
- Mitigation planting that will tie previously fragmented terrestrial habitats and wetland planting together to return it to its natural form.
- Planting on adjacent embankments and on land locked areas within the interchange to reduce the visual impact of the ramps when seen from Pūhoi Road and Pūhoi River
- Providing space for the installation of a context sensitive design feature to engage with and highlights the natural landmark of the Pūhoi River



#### Te Araroa Trail

The Te Araroa Trail is a 3000 kilometre trail that travels the length of New Zealand. The trail passes through the Project area, tracking along the Pūhoi River, under SH1, and past Pūhoi Village.

The Pūhoi bridge over the Te Araroa Trail is designed to be an elegant structure which optimises views through the landscape, and has a 'clean' underside - this is achieved by having large bridge spans and few piers. The new Te Arawhiti ki Pūhoi and surrounding Project works have been designed to retain the amenity of the trail for both walkers and kayakers.

The Project proposes to create an enriched wetland area and provide terrestrial ecological planting within the Pūhoi River loop. Whilst the planting will not conceal the bridge, it will increase the biodiversity and amenity of the river's edge at a human scale, moderating the visual impact of the structure and enhancing the experience for trail users on the river.

#### Local roads

The local roads to be modified include; Pūhoi Road, Watson Road and Billing Road. Pūhoi Road passes under Te Arawhiti ki Pūhoi with an approximate carriageway width of 9m and a height of 6.1m, through a 48m span. Watson Road passes under the motorway though an underpass which a total width of 20m and vertical clearance of 7m. Billing Road, with a 5m carriageway, passes under the 55m span of Te Arawhiti ki Ōkahu. The Project does not preclude future pedestrian or cycle facilities on these roads, specifically on the southern side of Pūhoi Road.



#### Titford House and Cottage

Titford House and Cottage are associated with original Bohemian settler families and are located within the boundaries of Te Pā o Te Hēmara Tauhia, which has high significance and values to Mana Whenua.

The buildings have been demolished, which will better allow the re-vegetation of the pā. Titford House and Cottage has been photographed and documented following the Heritage NZ- Guidelines for the Investigation and Recording of Buildings and Standing Structures (2006).

#### Schollum House

Schollum House, located at 517 State Highway 1, Pūhoi is listed on the national heritage register. The house was constructed circa 1906 and built for a pioneering family in Pūhoi, it is a timber cornerbay villa with a corrugated iron roof. Schollum House has been relocated to a site, in consultation with Heritage NZ, to an appropriate rural setting for a use that is complementary to the built character and/or respects its historic value.

## Pūhoi Vision

The Pūhoi Community Forum has identified existing and proposed pedestrian and cycling tracks. These areas are generally avoided by the motorway alignment, and will maintain connectivity to the village.



Existing stream vegetation

#### 5.4 STREAMS

The ULDF and Project outcomes for streams include [D36(c)] [ULDF 5.5]:

- Re-vegetating stream margins to enhance habitat and ecological connectivity
- Visually accentuating the streams as landscape features through re-vegetation •
- Re-vegetating to soften the appearance of culverts •
- Using riparian (relating to banks of rivers and wetlands) and margin species indigenous to the area
- Preferring the use of bridges to culverts, for wildlife connection •
- Merging the riparian planting required by specific conditions into the overall • landscape concept [D36(c)(iv)]
- Maximising connectivity of streams, wetland, coastal, terrestrial
- Restoring past biodiversity and mahinga kai

#### Stream Mitigation (Diversion Type 2)



<sup>40</sup>m Stream Riparian Zone

The watercourses in the Pūhoi sector are all related to tributaries of Pūhoi River, which is the most significant watercourse in this sector at over 10 km long. It is a major receiving environment of tributaries within the wider Pūhoi catchment (including Te Awa Hīkauae and Ōkahu). A high diversity of native fauna has been recorded within this river, and the lower reaches are supplemented by the ecologically important Te Awa Hīkauae. The coastal, wetland, estuarine and terrestrial habitats found within the Pūhoi sector include small high gradient tributaries and larger lowland watercourses providing favourable aquatic habitat for fish and macroinvertebrates.

A diversity of freshwater fauna is evidence of healthy streams, and they play key roles within the trophic foodwebs of aquatic systems. The diversity of freshwater species in Pūhoi sector watercourses is very high. Presently, these tributaries provide important habitat for a number of species that are declining and classified as nationally 'At Risk'. Many of the freshwater species in the tributaries migrate to sea as a key part of their lifecycle. This biological process is facilitated by the connectivity between the marine and freshwater environment. Pūhoi River, Ōkahu Inlet and Te Awa Hīkauae allow the movement of freshwater fauna between these two environments.

Connections between the streams, wetland, coastal and terrestrial environments have been maximised as these catchments play an important part in preserving New Zealand's biodiversity.

The native fish species expected to be present in the Te Awa Hīkauae and Pūhoi River tributaries, includes; banded kōkopu, short-fin eel, long-fin eel, inanga and common bullies. The tributaries are variable in nature and there is considerable variation in the groups of fish found at each tributary. Due to waterfalls or existing instream barriers, some water-bodies are currently inaccessible to some fish species. Stream diversions have been designed to allow fish to migrate upstream providing a connection between lower and upper catchments while also enhancing instream habitat for native fish and invertebrates. Where necessary, stream diversions provide low flow channels to allow fish passage when water depth is very low and a pool/riffle sequence (a rocky/shallow area, where the water movement is uneven) to provide resting pools for migrating fish. Pools, riffles and rootwads (a group of tree roots adjacent to or in a stream) will provide a range of habitat types for native fish and invertebrates.

Not to scale



Kākahi (fresh water mussels) found in a Pūhoi sector stream

The ULDF principles direct the mitigation of stream and culvert enhancements, riparian planting, wetland mitigation and terrestrial planting areas. Ecological and riparian mitigation planting sites located around the watercourses within the Pūhoi sector will improve ecological connectivity in the landscape through the provision of "stepping stones". This reduces the distance between suitable habitat patches, joins smaller habitat patches into larger contiguous habitat patches and improves linkages between streams. Mitigation planting will reflect the current and historic forest and wetland habitats within the Rodney Ecological District [ULDF 5.5].

The alignment of the motorway through the Pūhoi sector has been carefully considered and balanced against the ULDF outcomes. The use of a fill embankment at this location has enabled the motorway to achieve a much lower alignment across all sectors. An embankment does not detract from the key outcome of a clean uncluttered highway, and supports a range of other outcomes, in particular an aesthetically clean margin (un-interrupted by concrete bridge barriers), and green margins where the landscape has been stitched to the edge of the motorway. Combined with a lowering of the proposed alignment at these culverted locations this lowers the statement of the highway on the landscape, making it less prominent and noticeable (refer to section 5.5 with reference to culverts).

The culvert, designed by a stormwater engineer with input from the ecologist, maintains stream integrity by allowing connectivity between the open upstream and downstream sections. In terms of ecological function the culvert is a less preferable option to an open stream, however, aspects in the design have been incorporated to mitigate these impacts.



Culverts to be installed

#### 5.5 CULVERTS

The following ULDF outcomes apply where culverts are used [D36(c)] [ULDF 5.6]:

- Minimising culvert length [RC49]
- Construct culverts to incorporate fish passage [RC50-51] across the highway in accordance with Auckland Council and NZ Transport Agency 'Fish passage guidance for state highways' August 2013' including:
  - Appropriate culvert gradient
  - Culvert invert below natural stream bed to enable natural material to build up on culvert base.
  - Baffles fixed inside culvert base to promote natural material on culvert base
  - Armoured ramps on downstream side to prevent scour
- Using indigenous shrub vegetation to soften the appearance of culverts and access tracks
- Merging the riparian planting required by specific conditions into the overall landscape concept and extending riparian planting onto the fill embankments at culvert crossings. Low species are used near the top of fill embankments to maintain views from the highway, grading to taller species at the base of the embankment
- Replant stream margins upstream and downstream of culverts for biophysical and visual reasons

Culverts are the primary method of conveying existing stream and watercourse flows beneath the motorway alignment. The number of culverts through the Pūhoi sector is determined by the number of Te Awa Hīkauae or Pūhoi River tributaries that travel under the motorway alignment. The ULDF outcome to minimise culvert lengths and stream encroachments is achieved through a low vertical alignment, reducing the scale of fill needed, and creating steep fill embankments where in proximity to streams. This creates embankments with narrower bases, therefore requiring shorter culverts to traverse the area, compared to flatter embankments with larger bases. Where tributaries upstream of the highway, are filled by soil disposal sites, this is offset by reinstating the watercourses on top of soil disposal sites (where possible) or by providing mitigation elsewhere on the Project [RC52] [RC58]. The design of the motorway replaces some indicative design bridges with culverts and the total number and length of culverts has therefore increased. An example is the tributary near Watson Road Bridge, where the topography does not allow for a swale alongside the road. Culverting in situations like this result in a lower and more flexible motorway alignment that better fits with the landscape and reduces earthworks volumes overall.

The stormwater management system for the motorway integrates stormwater conveyance and treatment infrastructure with the surrounding landscape to maintain linkages and connectivity with the natural watercourses and environments either side of the motorway.

Perched (elevated outlets) and steep culverts can inhibit fish movement along waterways. The diversity of freshwater species in the Pūhoi sector is very high. Design provisions, such as the installation of spat rope or spoiler baffles, will allow the fish species (banded kōkopu, short-fin eel, long-fin eel, inanga, common bullies, kōura) to move between the downstream and upstream habitats. To lessen adverse effects on Pūhoi sector stream communities, fish relocations and restoration will be undertaken where the watercourse tributaries are affected by the construction works [ULDF 5.6].

Past native riparian margin species and mahinga kai indigenous to the area will be restored along the edges of streams by the ecological mitigation stream planting mixes (refer section 8) which will merge into the wider landscape restoration planting mixes. The vegetation will be planted along the stream margins of culverts with harakeke (Phormium Tenax) and small shrubs to provide shade over the channel, and with larger tree species to provide shade over pools or at bends. This riparian planting helps reduce erosion, accentuate the naturalised appearance and regulate the water temperature for fish health. The Project will increase the habitat quality for native freshwater animals [D36(c)].

Fill batters have been steepened as much as possible at culverts, to minimise culvert length. Where there are no culverts, batters have been flattened as much as possible. The length of culverted stream is offset through the enhancement of other, unaffected areas so that the overall stream ecological values (SEV) remain the same as the unculverted streams. Culvert appearance has been softened by planting and design. Some embankments adjacent to culverts are hydroseeded, such as at chainage 50300, 51100 and 51600, where this vegetation will match the adjacent landscape. In general, landscaping efforts are being focussed in intentionally selected locations to boost various ecology and amenity outcomes. Robust and resilient inlet and outlet culvert structures dissipate energy and control erosion to reduce bed scour occurrence and stream bank erosion [D36(a)].

The ULDF principles direct the mitigation of stream and culvert enhancements, riparian planting, wetland mitigation and terrestrial planting areas. Ecological and riparian mitigation planting sites located around the Pūhoi sector watercourses will improve ecological connectivity much like 'stepping stones' and will rehabilitate stream margins.

#### 5.6 STORMWATER WETLANDS

The four Pūhoi Sector stormwater wetlands perform the important function of treating road runoff to remove small soil particles, and larger floatable material (e.g. litter) from the water before it returns to the land or streams. The Pūhoi sector stormwater wetlands are situated north and south of Watson Road Bridge, alongside the western side of Te Arawhiti ki Pūhoi and at the Pūhoi ramp to the east of the alignment.

While primarily functional, the stormwater wetlands have been landscaped to have a natural appearance, and respond to geotechnical conditions, topography, vegetation and proximity to the receiving stream. The outside geometry of each stormwater wetland is curved to fit the existing terrain. Stormwater wetlands will be installed lower than the motorway level to optimise gravity run off and reduce the visibility of the areas.

The landscape and ecological mitigation planting will integrate the engineered wetlands into the overall Project to act as one continuous system, treat the water flows from the motorway road surface and contribute to the ecological environment.

Riparian and margin vegetation heights and foliage texture are varied in each wetland water zone to optimise their natural appearance. The provision of shallow vegetated wetland edges provides a natural transition from the side of the wetlands to batter slopes and wider down slope landscaping to appear similar to natural land contours. The wetlands are set against a back-drop of terrestrial mitigation planting to contribute to the wetlands naturalised appearance.

A maintenance track will be provided around one side of each wetland to access outfall infrastructure and remove the need for a wide flat bench all the way around the wetland. Gated entry to the maintenance tracks will deter unauthorised access. The maintenance access alongside the wetland and the laydown area will be grassed so as to better blend into the surrounding environment. Sediment traps minimise the wetland maintenance requirements [D36(a)] [D36(c)] [ULDF 5.7].



Wiwi (Juncus gregiflorus)

Typical Wetland Bank Cross Section (refer to section 8 for plant mixes)

#### Stormwater Wetland Lower Bank Planting (WLP)



Jointed twig rush (Baumea articulata)



Softstern bulrush (Schoenoplectus tabernaemontani



Saltmarsh bulrush (Bolboschoenus fluviatills)



Bulrush (Typha orientalis





Oioi (Apodasmia similis)

### Stormwater Wetland Mid-Bank Planting (WMB)





Spreading swamp sedge (Carex lessoniana)



Giant umbrella sedge (Cyperus ustulatus)

#### Structure of a Stormwater Wetland



Not to scale



Typical wetland section showing integration of landscape treatments Not to scale



Water runoff is received via the inlet pipe. Rock riprap disperses the energy of the water slowing it down as it enters the sedimentation forebay.

#### Sedimentation Forebay

The forebay is designed to allow the water to slow and the sediment to fall to the bottom.

#### Littoral Shelf

Wetland plant species are planted on the littoral shelf. The plants take up nutrients in the water as well as trapping sediment.

Naturalised Wetland (Refer section 7 and 8 for the planting types) Not to scale



## 4 Outlet Pipe (Scruffy Dome)

After treatment water leaves the wetland via the outlet pipe. A scruffy dome is used to trap debris.

#### Emergency Outflow

The emergency out flow allows water to exit the wetland after an extreme heavy rain flow.

#### Maintenance Access Track

This track allows for maintenance vehicles and crews to perform maintenance on the wetland.

## Track

Grass Maintenance

This track allows for maintenance vehicles and crews to perform maintenance on the wetland.

## Landscape Planting

Refer to section 8 for plant species.

#### Wetland Bank Planting

Plant species that live in swamp like conditions. Refer to section 8 for plant species.



Refer to section 8 for plant species.

#### From Sky to Waterway: The Rainwater Journey



Water falls on the road and flows into a conveyance swale. Contaminants present on the road will be picked up and conveyed by the water.

Conveyance Swale

The conveyance swale on each side of the road is designed to capture and slow the flow of water. Sediment traps are incorporated and designed to collect sediment washed off the rock cuts. The water is diverted to stormwater wetlands.

Stormwater Wetland

Engineered wetlands are shallow vegetated ponds that filter stormwater runoff, slow flows and help control regular flooding downstream. They are formed to look like natural wetlands and provide habitat for wildlife. These wetlands remove sediments, nutrients and contaminants from incoming stormwater before discharging to stormwater systems or waterways.

Planting

The stream mitigation planting is designed to provide; erosion protection, shading of water to provide for fish and invertebrate habitat, fish passage, increased biodiversity and integration with natural waterways/streams and improved landscape amenity. The majority of permanent streams within the designation will receive stream mitigation planting. In many cases, this will uplift and restore the current state of waterways.



Existing Stream

Water is released into the existing streams outside of the designation or without mitigation planting.

#### 5.7 SOIL DISPOSAL SITES

Soil disposal sites will be used for excess soil or soil unsuitable for engineered fill purposes (e.g. soil that is too wet or can't be dried quickly or efficiently) where it will be deposited and re-contoured (soil disposal sites) [D37]. There are six soil disposal sites in the Pūhoi sector; these locations were selected with the consideration of minimising the disruption of natural watercourses or areas of indigenous vegetation and to minimise the movement of earth between catchments. Soil disposal sites will not generally occupy locations where there are permanent streams. Where possible, streams that have been covered by soil disposal sites will be reinstated. The spread of 'kauri dieback disease' soil pathogens will also be managed in accordance with the Project's Kauri Dieback Biosecurity Plan [D63] [D63A].

The disposal sites will be shaped to merge with the existing adjacent grades and will have feathered edges, to provide a natural landform appearance. The final slope gradients will be no steeper than 5H:1V to merge with the natural landform [D37(d) (iii)].

The top 2m of each site will be lightly compacted and free of large obstructions (e.g. rocks) to enable landscape plant root penetration. Currently all sites in the Pūhoi sector will have 300mm of topsoil. These will be planted to soften the edges between the soil disposal sites, unmodified adjacent areas, and to help stabilise the slopes [D36(c)] [D37] [ULDF 5.8].



Landform integration of soil disposal sites

#### 5.8 PLANTING

The landscape and ecological mitigation planting will:

- Marry planting with adjacent existing plant communities
- · Seek to stitch together existing vegetation patterns on both sides of the highway with landscape restoration and ecological mitigation planting
- Seek to bring adjacent land use close to the motorway to be part of the road user experience
- Plant to accentuate and appropriately fit the existing and resulting topography ٠
- Be consistent with the P39 Specification planting standard ٠
- Configure planting to soften views of the motorway from adjacent residential properties
- Reinstate and enhance wildlife corridors
- Repair edges of vegetation with dense planting •
- Identify vegetation to be retained and protected
- Incorporate Kauri dieback management protocols [D63-D63D]
- Be planted for safe maintenance [ULDF 5.9]



#### Wildlife Corridors

Wildlife corridors have been developed and enhanced along the alignment in locations where it has been considered most beneficial by ecologists. In the Moir Hill and Hīkauae sector, these are provided on both sides of the alignment around the Perry Road area (chainage 52850 – 53500 on western side of alignment; chainage 52850 – 53550 on eastern side). The mitigation planting and landscape restoration planting in this area connects existing mature and regenerating native forest patches in this area with the new planting to provide native forested habitat and corridors for native wildlife [D36]. It is accepted that grassed areas are not contributing to the enhancement of wildlife corridors, nor so, the adjacent land cover of predominantly pine plantation. However, in general, the grass treatments have been used in areas that have been determined to have lesser ecological value such as areas where catchments which have been heavily modified, (e.g. for farming).

#### Topsoil

Topsoiling will occur on all soil-cut and fill batter slopes. Topsoil requirements for the Pūhoi sector are as listed below:

Scarification breaks up cut and fill batter ground surfaces to a depth of 100-200mm. This enables topsoil to key-in to the slope, reducing the risk of topsoil slumping while allowing plant root penetration. This results in better growth and survival [D36(c)].

All planting in this sector is native and chosen to be suitable to the environment that it will be planted in to ensure the best chance of success. Planting will be undertaken as early as possible, subject to plant and topsoil sourcing in areas which will not be impacted by construction activities. In areas where construction will occur (such as cut and fill areas) planting will occur later, when plant damage risk is minimised.

A wetland mitigation planting mix will be planted in the Ōkahu area. Sites will be planted to represent the planting that would have historically occurred naturally. These sites have been identified by Hōkai Nuku for potential cultural harvesting.

Seven wire post and batten fences will be used to provide stock proofing for terrestrial mitigation areas. Fencing that reflects final property boundaries will be confirmed between NZTA and private land owners at a later date. Fencing may be used to demarcate adjacent land uses, such as where adjacent bush areas exist and for maintenance and access requirement.

#### Existing vegetation

The design of the motorway minimises or avoids impacts on existing vegetation. The trees along Pūhoi Road, south of the motorway and within the designation line, will be retained, as will the large macrocarpa that are located on the banks of the Pūhoi River will be retained. These trees, shown in the section 7 plans, will be maintained and will help in screening the temporary construction yard (refer section 5.12) and some Pūhoi residents views of sections of the motorway [D42A].

Fences will be put around areas of native vegetation at 83 and 87 Perry Road, and along the western boundary of Ōkahu Creek Scenic Reserve to prevent access during construction [D53].

Forest gecko release

• 300mm topsoil depth for all planting to cut and fill batter slopes, planted soil disposal sites, wetlands, planted swales and stream diversion planting

• 100mm topsoil depth to all hydroseeded grass cut and fill slopes, returned to pasture and on land handed back to adjacent property owners

No topsoil is proposed for rock cuts

• No topsoil is proposed for mitigation planting (this will go into existing ground)

• Stormwater wetland access ways will have a top soiled and grassed surface to provide vehicle access for when clean-out occurs [D36(c)]



Example of a hydroseeded cut slope



#### Hydroseeding (GCU) and (GFL)

Hydroseeding is a planting process that uses a mix of grass seed and a growing emulsion sprayed onto a bed of topsoil, from which grass grows. Hydroseeded grass through this sector, is mainly used on the top of earth cut batters and in areas between the motorway and existing pine forests which have low ecological values to create links or 'stitches' across the motorway.

The design approach has been to focus valuable landscape restoration and ecological mitigation planting in locations with high ecological values to provide a more comprehensive landscape stitch using native plant communities in these areas. Landscape stitching between areas of lower ecological value has simpler landscape solutions, such as grass (refer to the stitch diagram on page 11). Much of the grass will not be visible to road users as it will be elevated above rock cuts or below the motorway level on fill slopes. This will allow views from the road out to the landscape, which contributes to the road user experience along the alignment.

The ULDF adopts a strategy of leaving large cuts as either bare rock or with ground cover vegetation where such planting is likely to sustainably grow. Many south sector areas use hydroseeding to provide vegetation coverage on challenging terrain and soil conditions while also seeking a low maintenance outcome. The maintenance of hydro-seeded grassed areas will include the application of pre-emergent herbicide at the establishment phase to prevent weeds developing from an existing seed source in the soil and spot spraying thereafter, to keep weed species under control. Use of a pre-emergent herbicide and establishment of thick grass cover will reduce weed competition and ongoing spot spraying maintenance [D36(c)]. Maintenance also includes trimming as required to reduce any potential fire hazard.

#### Mulch

Site-won or imported mulch to be used will be clean and free of sawdust, dirt. phytoxins, pathogens and weed species (including chip from willow, poplar or any other introduced weed species). Mulch will not be used in areas of Mitigation Planting - Wetland, Mitigation Planting - Terrestrial, Mitigation Planting - Stream Edge (see Section 7) or in swales and areas below the stormwater wetland permanent water level. In areas that are steeper than 2:1, mulch is expected to slip down the slope, and biodegradable geotextile fabric will be used instead.

#### Succession planting strategy

A two stage planting method has been developed by the NX2 landscape and ecology teams. This enables the integration of the existing plant communities with both the proposed landscape restoration planting and the proposed ecological mitigation planting. It mimics the natural process of plant succession, increasing plant survivability. The two stage method supports whole of life landscape considerations such as the selection of plants, and planting methodologies that allow for effective growth, and plant longevity [D36(c)] [D36A] [D59].

Stage 1 (initial planting) - introduce plants including core pioneer species such as kānuka (Kunzea ericoides), toetoe (Cortaderia splendens) and mānuka (Leptospermum scoparium) which establish quickly and provide shelter and shade for the Stage 2 planting:

- These robust species from the Rodney Ecological District survive well in a range of moisture levels (from streams to exposed ridge areas) and will cope well on cut and fill batters
- Existing vegetation in the surrounding farms, streams and the adjacent road side plantings include a high proportion of mānuka (*Leptospermum scoparium*) because this species has a proven durability in highway conditions

robust nature

Stage 2 (enrichment planting) – will be introduced no later than 3 years after the initial planting so as not to be 'out-competed' for light and water:

#### Species selection

The species selected mimic the existing plant communities of the area and will be integrated with the existing vegetation to provide a contiguous 'stitch' across the alignment. These hardy species, known to thrive in the local climate and conditions, cater for the range of soils, aspect, elevation and exposure of the areas they will be planted in. The planting mixes are coordinated along the length of the motorway, and tie ecological outcomes to landscape design outcomes [D36(c)] [D37]. The plant mixes have been developed holistically by the ecology, landscape and urban design and planning team with Hōkai Nuku. Native species found in the Rodney Ecological District have been specified to:

• Mānuka (Leptospermum scoparium) and toetoe (Cortaderia splendens) and to a lesser degree kānuka (Kunzea ericoides), are a colonising species and have a

• These plant species include various large canopy trees that will grow through the Stage 1 planting and support the pioneer species using the sheltered growing conditions. In the long term, the Stage 2 species will become the dominant feature of the planted areas.

• The Stage 2 colonisation and establishment process will build organic matter in the soil which will support the growing vegetation

• Stage 2 planting mixes suit the various planting conditions and micro climates that they will be introduced to, for example totara dominant mixes will fill ridge areas and kahikatea (Dacrycarpus dacrydioides) will be used in wet areas

• Integrate the landscape planting with the various types of ecological mitigation planting (terrestrial mitigation large tree species are stipulated in the ecology consent requirements) to enhance the biodiversity and habitat linkages between existing and new vegetation



### Ecological Mitigation Terrestrial Planting- Stage 1 and Stage 2 (MPT)

The terrestrial planting mix has been designed to mitigate the loss of eight canopy tree species including puriri (Vitex lucens), taraire (Beilschmiedia tarairi), tōtara (Podocarpus totara), kahikatea (Dacrycarpus dacrydioides), kauri (Agathis australis), rimu (Dacrvdium cupressinum), rewarewa (Knightia excelsia) and tanekaha (Phyllocladus trichomanoides). The planting mix matches with bush species commonly found in the surrounding area (the Rodney Ecological District), and accordingly, will stitch the landscape across the new road. The number, species and separation of plants has been designed to maximise successful plant growth [D36(c)] [D37] [D59].

This planting mix uses a two stage approach where hardy, quick establishing natives including mānuka (Leptospermum scoparium) and kānuka (Kunzea ericoides) are planted initially and left to grow for 3 years. After 3 years the quick establishing planting should have created sheltered growing conditions for the second stage of planting, which contains the more sensitive, larger canopy species of trees.

### Ecological Wetland Mitigation Planting (WMP)

Ecological wetland mitigation planting is for areas of existing wetland that require habitat improvement through planting that is aligned with areas of high (existing) ecological value. Each square metre of lost wetland will be replaced with a square metre of new wetland planting. The plants selected thrive in wet conditions and include oioi (Apodasmia similis), pukio (Carex secta), mingimingi (Coprosma propinguia), cabbage tree (Cordyline australis), giant umbrella sedge (Cyperus ustulatus), kahikatea (Dacrycarpus dacrydioides), wiwi (Juncus gregiflorus), harakeke (Phormium Tenax) and mānuka (Leptospermum scoparium).

### Ecological Mitigation Stream Planting (MPS and MPSE)

Ecological stream planting will be undertaken along stream banks and has been designed to offset the ecological losses for streams compromised by the Project. These native plant mixes will be planted in riparian edges in order to offset ecological value losses for those streams. The stream edge planting (MPSE) forms a 10m wide buffer to each side of a stream, nearest the water's edge. The other mix of riparian stream planting (MPS), is a minimum of 10m wide band of planting outside of the MSPE planting, giving the riparian corridor total width of 40m. The MPS mix adds an enhanced ecological buffer to the riparian corridors and boosts the SEV scores of the mitigated stream edges. They also provide the opportunity for growing kahikatea (Dacrycarpus dacrydioides) and totara (Podocarpus totara), both species mitigated for under condition D59. [RC58] [D36(c)] [D37].

## Planted Soil Planting (PSP)

Currently all six soil disposal sites in the Pūhoi sector will be planted with this mitigation planting mix. The mix of plants includes mānuka (Leptospermum scoparium), kānuka (Kunzea ericoides), and totara (Podocarpus totara) which are all robust native plant species suitable for planting on soil disposal sites.



- Strengthen the visual landscape patterns of the natural landscape features including existing vegetation and in particular following natural vegetation patterns to stitch patterns and habitats across the highway
- The plant palette highlight the cultural footprint of local lwi at certain locations along the route
- Plant material will be eco-sourced, in accordance with P39 Specification for landscape treatments [D27]
- Robust propagated nursery plants will be used, and, depending on availability, plants propagated from eco-seed sourced within the Rodney Ecological District will be used in a planting design which reflect natural distribution
- Integrate stormwater treatment wetlands into the wider landscape through the landscaping and mitigation planting around them, as well as connecting them to the motorway planting along the route

Where there will be no planting, the landscape treatment will be hydro-seeded grass [D36(c)]. Refer to section 8 for the plants to be used in each planting mix [D27] [D36(c)] [D63-D63D] [D76].



Existing riparian vegetation along the banks of a tributary of Pūhoi River (P11)

The ULDF suggests open-ground forestry methodology. This methodology involves harvesting plants grown in the ground and relocating these to where they are needed. Unfortunately this method does not provide certainty of when plants will be available to replant or how fast they will grow. Plants grown in the ground are harder to successfully move due to root sensitivity and disturbances. The open-ground forestry methodology requires large land areas to grow the plants and due to the large volume of plants needed, this would be inefficient. The alternative, nursery plant stock, is more reliable in terms of construction and timing of landscape works, and will be used.

The intention of the project is to procure eco-sourced material for all planting. All species in the planting mixes can be eco-sourced from the Rodney Ecological District. There may be circumstances where volume of plants required or lack of suitable stock may force some material to be sourced from elsewhere. All wetland species will be eco-sourced as per consent condition D60.

#### **ECOLOGICAL MITIGATION PLANTING TYPES**



Tributary of Pūhoi River (P9)

#### 5.10 LANDSCAPE PLANTING TYPES

#### Landscape Restoration Planting Stage 1 and Stage 2 (PLR)

Landscape restoration planting will generally occur on construction disturbance areas, 2:1 fill slopes and adjacent to areas of ecological mitigation planting. This is consistent with the ULDF, and helps provide 'a stitched together landscape' – the new vegetation will visually connect to the existing vegetation on either side of the highway.

#### Amenity Road Edge Planting (ARE)

This planting will be installed in front of 'landscape restoration planting mix' areas and is dominated by low-growing, drought-hardy, exposure-tolerant plant species. These species are low growing so they preserve driver sightlines with little maintenance such as oioi and Wharariki.

#### Amenity Riparian Planting- Stage 1 and Stage 2 (ARP)

This hardy planting mix acknowledges the presence of significant streams culverted for the new motorway and signifies their cultural significance. It will be used around the streams located at Ch. 59550 and Ch. 63850 and on some large engineered fill slopes.

#### Amenity Gateway Planting (AGW)

This mix of native plants is designed to cope with the coastal conditions around the Pūhoi Interchange. The mix celebrates plant species prevalent in the local community, namely harakeke (Phormium Tenax), toetoe (Cortaderia splendens) and karo. This planting mix and pohutukawa specimen trees will signal to road users that there is a change in the upcoming road conditions, while also contributing to the Pūhoi gateway experience. Seasonal colour changes will occur through the pohutukawa, cabbage trees (Cordyline australis) and toetoe flowers.



Looking south towards Pūhoi Close

#### Amenity Wingwall Planting (AWW)

This plant mix is used to visually soften the edges of a rock cut batter located at chainage 63700, which hugs the south-western end of a stormwater wetland. The planting at the top of the slope will spill down and over the rock cut face.

#### Pūhoi Floodplain Wetland Mitigation Planting (PFP)

This planting mix will be used around the Pūhoi basin. The plants have been specifically selected to respond well to the area that frequently floods. With the exception of widely spaced ti kouka, the plants in this mix are low growing sedges and grasses which flex with the water, and do not provide significant obstruction to flood waters.

Stormwater Wetland Upper-Bank Planting (WUB), Stormwater Wetland Mid-Bank Planting (WMB) and Stormwater Wetland Lower-bank Planting (WLB)

The stormwater wetland planting will be planted in engineered wetlands to help remove sediment and contaminants before discharge to natural waterways. The planting is split into three mixes of native plants, according to tolerance of wet conditions:

- Upper-bank planting (WUB) contains riparian zone plant species such as harakeke (Phormium Tenax), ti kouka and manuka (Leptospermum scoparium)
- Mid-bank planting (WMB) contains plants more tolerant of wet conditions with occasional inundation including oioi
- Lower-bank Planting (WLB) contains plant species that prefer very wet ٠ conditions or permanent inundation such as raupo and kuta

Refer to section 5.8 for an explanation of the two stage planting strategy and section 8 for a complete species list of the planting mixes.

### 5.11 **ÖKAHU INLET SPECIFIC PLANT MIXES**

#### Planting Coastal Edge – Ōkahu Inlet (PCE)

This mix will be made up of species such as whāriki (Phorimum cookianum), and will line the coast of Ōkahu inlet beneath Te Arawhiti ki Ōkahu at both the northern and southern ends. This will accentuate the coast's edge, using species appropriate to the environment.

## Planting Ngahere No Dig (PND)

A specific plant mix has been developed for Te Pā o Hēmara Tauhia, east of Te Arawhiti ki Ōkahu to highlight the cultural significance of the site. This plant mix includes species such as rangiora (Brachyglottis repanda), kowhai (Sophora microphylla) and põhutukawa (Metrosideros excelsa).

#### Planting Wetland and Salt Marsh (WSM)

The wetland and salt marsh mix will be limited to an area of land surrounding a small portion of the river running from Okahu inlet, parallel to the motorway (to the west) and closest to the Okahu inlet. This mix includes species such as maire tawake (Syzygium maire), kuta/kāpūngāwhā (Schoenoplectus tabernaemontani) and raupō (Typha orientalis), and other species appropriate for saline environments.

## Planting Pā Harakeke (PPH)

Harakeke (*Phormium tenax*) will be planted in an area between Billing Road to the north and the Ōkahu coastal planting to the south so it can be harvested for weaving and textile production.

#### Planting Ngahere (PNH)

The Ngahere Terrestrial Mitigation mix will be used at Te Pā o Nga Tūpuna and the Ōkahu inlet to increase local biodiversity. The species are also used along the Project alignment in the mitigation planting terrestrial (MPT) mix with approximately 45 additional species.

As with the mitigation planting terrestrial (MPT), the planting is divided into two stages. The first stage will include karamuramu (Coprosma robusta), ti kouka (Cordyline australis) and totara (Podocarpus totara). The second stage of planting will include taraire (Beilschmiedia tarairi), whekī (Dicksonia squarrosa) and hīnau (Elaeocarpus dentatus).

#### Planting Awa (PAW)

This planting mix is a variation of the Stream edge planting, used to increase biodiversity with an increased number of species, including species such as swamp kiokio (Blechnum minus) and maire (Nestegis lanceolata). This is used as a buffer between the stream mitigation planting and Planting Ngahere.

#### 5.12 EAST OF THE PŪHOI RIVER

The ULDF has set out the following related outcomes:

- Screen planting between the highway and Pūhoi Close area, subject to any floodplain constraints (to be determined by stormwater engineer) [ULDF 6.1]
- Mitigation of the highway on the properties of Pūhoi Close and 60 Pūhoi Road, Pūhoi [D30-31][ULDF 6.1]

A specific permanent phase ULDSP is required for the area on the eastern side of the Pūhoi River on (CT NA37A/148), with a focus on establishing permanent visual screening of the Project for nearby residents, as soon as practicable (refer to section 1.3 for the condition). A separate ULDSP will be developed for the construction phase of the construction yard, this covers temporary works of the construction yard only [D38AA(a)].

The area to the east of the Pūhoi River, identified as 517 State Highway 1, was recognised by the BOI as an area of importance to Pūhoi residents. This ULDSP 'embeds' the requirement for this specific permanent phase with the information below focusing on this area and the visual screening of the motorway for nearby residents, subject to any floodplain constraints (refer to section 1.3 for the condition). The Project's permanent form will be most visible between the time construction is completed, but before landscaping has established. Early establishment of fast growing vegetation which is of sufficient density and depth will help to limit resident views of the Project at this time.

Permanent planting using the species mix Terrestrial Mitigation Planting is to be used to fill in the majority of non-flood plain areas. This fills in areas between existing native vegetation and the Macrocarpa stand to the east of the river that is to be retained. The avenue of trees that lie between Pūhoi Road and the Pūhoi River are to be retained and further landscape planting, including specimen trees, are located on the motorway off ramps to the south. The planted visual screening is intended to maintain and enhance the intimate character of Pūhoi, create new ecologically valuable areas and soften views of the motorway for nearby residents along Slowater Lane, Pūhoi Close and to a lesser extent, Saleyards Lane. New landscaping will visually tie into the existing vegetation along Pūhoi River, and along Pūhoi Road, to retain the local character, soften visual changes for residents and stitch natural habitats together. The large area of the foreground area between Pūhoi Close and the motorway is a floodplain. The planting across this area and the Pūhoi River 'bight', will predominantly be from the 'Pūhoi Flood Plain Wetland Mitigation' planting mix (refer section 8 for a list of plants). These plants have been specifically selected as they will not impede the 1 in 100 year stormwater flood flows. The plant mix was developed by an ecologist and landscape architect with input from a stormwater engineer, to give appropriate consideration to the floodplain [38AA(a)]. The grass type plants (e.g. oioi and wiwi) will lie-down to prevent obstruction of flood waters. Taller trees (e.g. ti kouka), will be planted at specific distances apart so water can move around them and flood debris is not caught by them. As the plants in the flood plain are predominantly low lying, they are limited in their ability to screen the motorway.

Planting around and across the wetland, floodplain, lowland area of the Pūhoi River is intended to enhance, protect and naturalise the area. The planting mixes chosen reflect the environment and adjacent existing vegetation to create a naturalised appearance and ecological habitat whilst providing height to screen some views of the motorway [D26-D42, D62]. For this planting to be authorised, the Transport Agency will seek a notice of requirement for an alteration to designation [D62]. The new planting will create a green foreground to the motorway for the residents of this area, without disturbing existing vegetation close to the riverbank. The planting mix includes large trees along an area of the Pūhoi River.

The topography of the area, the elevation of the motorway, and the planting constraints of the flood plain mean that screening of the entire permanent form of the motorway will not be achieved. The form of Te Arawhiti ki Pūhoi will be visible across the areas of wetland and flood plain, although the foreground will be softened by the lower level planting. At the northern and southern ends of the viaduct a combination of existing vegetation and new planting – which includes tall canopy species, which should provide screening of much of the project. This will be further enhanced over time as the vegetation reaches its full height. Despite the challenges in this area, the Project has sought to screen the motorway for nearby residents, in accordance with the outcomes sought by both the BOI conditions and the ULDF.

Cross-sections have been included to provide a representation of some of the different views of the Project from the Pūhoi Close area, these indicate the anticipated heights the vegetation will reach within 5-8 years. The native plant mixes to be used in this area include:

#### Terrestrial Mitigation Planting (MPT)

The bush species mix includes mānuka (Leptospermum scoparium), kānuka (Kunzea ericoides), karamuramu (Coprosma robusta), five finger (Pseudopanax arboreus), mapou (Myrsine australis), wineberry (Aristotelia serrata), kauri (Agathis australis), kahikatea (Dacrycarpus dacrydioides), puriri (Vitex lucens), rewarewa (Knightia excelsia), tanekaha (Phyllocladus trichomanoides), tōtara (Podocarpus totara), taraire (Beilschmiedia tarairi), and rimu (Dacrydium cupressinum). The number, species and spacing of these plants has been designed to maximise successful plant growth [D36(a)] [D37] [D59].

#### Puhoi Flood Plain Wetland Mitigation Planting (PFP)

Wetland lost during construction will be offset at a ratio of 1:1. This planting mix will be used on the 'Pūhoi River bight' area immediately to the west of the viaduct (subject to an alteration to designation). The plants thrive in wet-conditions and include oioi (Apodasmia similis), pukio (Carex secta), mingimingi (Coprosma propinqua), ti kouka (Cordyline australis), giant umbrella sedge (Cyperus ustulatus), kahikatea (Dacrycarpus dacrydioides), wiwi (Juncus gregiflorus), mānuka (Leptospermum scoparium) and harakeke (*Phormium tenax*). This landscaping will tie into the vegetation features along the Pūhoi off-ramp.

Along the bank of the Pūhoi River, the existing macrocarpa and native trees (on the western boundary at 517 State Highway 1) will be retained as part of the character and history of the area (identified by condition D42(a)). Other areas of specific vegetation within this area which will be retained and protected [D36] [D42A] [D53] [D58] [D62] include:

- - with further planting.
- 7 sector plans).



#### Native vegetation within Ōkahu Creek Scenic Reserve

• Colonies of short hair plume grass located within the designation in the vicinity of the Pūhoi Road/State Highway 1 intersection.

• Any kauri, tanekaha (Phyllocladus trichomanoides), puriri (Vitex lucens), totara, kahikatea (Dacrycarpus dacrydioides), rimu (Dacrydium cupressinum), rewarewa (Knightia excelsia) and/or taraire (Beilschmiedia tarairi) trees (canopy species) that will be removed within the designation will be replaced

Existing vegetation along the Puhoi River will be retained (refer to the section

Plan showing Pūhoi Close in relation to the Te Arawhiti ki Pūhoi

DRAFT URBAN AND LANDSCAPE DESIGN SECTOR PLAN 48 PUHOI SECTOR

Light poles will be installed from the Johnstone Hill tunnels to Te Arawhiti ki Pūhoi and down the Pūhoi off-ramp. Some street lights along Pūhoi Road will be replaced with LED lights which reduce light-spill (refer section 4.6 for lighting information). The area required to be lit will not be visible to many Pūhoi residents due to their distance from most properties and the surrounding topography. The remainder of the sector will remain unlit, to minimise light pollution areas and encourage a 'dark night sky' as sought by the ULDF.

The motorway meets the ULDF goal of maintaining the relatively narrow, winding alignment and enclosed intimate scale of Pūhoi Road (so that there is a sense of transition and separation between the highway and Pūhoi village) through visual screening and maintaining the curving alignment and intimate scale of Pūhoi Road.

#### Profiles of the motorway and its surroundings

The sections below show the relationships between Pūhoi River, and Te Arawhiti ki Pūhoi, in relation to Pūhoi Close (refer plan on the previous page) with the existing vegetation and new planting. The planted areas provide a visual buffer between Pūhoi Close and the motorway.

The vegetation shown in areas of private property is indicative only. The levels given are measured from sea-level.



49 DRAFT URBAN AND LANDSCAPE DESIGN SECTOR PLAN PŪHOI SECTOR Pūhoi sections (refer to previous plan)

Note: Vegetation growth shown at approximately 5-8 years. Vegetation in private property is indicative. Houses are shown indicatively.

Planting across the floodplain is subject to authorisation



Scale 1:1000

Pūhoi sections (refer to previous plan)

Note: Vegetation growth shown at approximately 5-8 years. Vegetation in private property is indicative. Houses are shown indicatively.

Planting across the floodplain is subject to authorisation





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Tōtora

Rimu Taraire

Pohutukawa (specimen trees)

51 DRAFT URBAN AND LANDSCAPE DESIGN SECTOR PLAN **PŪHOI SECTOR** 



Scale 1:1000

Pūhoi sections (refer to previous plan)

Note: Vegetation growth shown at approximately 5-8 years. Vegetation in private property is indicative. Houses are shown indicatively.

Planting across the floodplain is subject to authorisation

#### 5.13 PŪHOI CONSTRUCTION AREA

The Pūhoi construction yard will be located to the west of Te Arawhiti ki Pūhoi and north of Pūhoi River and Pūhoi Road, and will operate from this area during construction of the motorway. The site location is shown in the plans in section 7. This sector plan shows the area of the construction yard in its final rehabilitated form and addresses the final visual landscape outcomes of the area [D38(a)] [D38(c)] [D70] [ULDF 5.10].

A separate specific construction phase ULDSP for the construction yard, including the area on the eastern side of the Pūhoi River, will be developed for stakeholder consultation on the consideration of screening, landscaping, treatment of the flood plain and access during construction only [D38(a) ][D38AA(a)].

The construction phase ULDSP will detail the ULDF outcome of creating effective screening by way of early establishment, fast growth, sufficient depth and density of vegetation. The planting will create a green buffer area between the yard and local residents (specifically those located on Pūhoi Close and Slowater Lane).

The future plans of the Pūhoi Community Forum will not be impacted by the Pūhoi construction yard. Upon completion of the motorway construction, the construction yard will be removed and rehabilitated to merge with the adjacent land and be consistent with the wider rural outlook of the area, as shown in this ULDSP.



Approximate location of Pūhoi construction yard