STORMWATER MANAGEMENT PLAN

Private Plan Change
48 Esmonde Rd
Takapuna

CIVIL ENGINEERING ▾ SURVEYING ▾ LAND DEVELOPMENT

PROJECT INFORMATION

CLIENT	Kingstone Property Limited
PROJECT	175001

DOCUMENT CONTROL

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REVISION	D
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EXECUTIVE SUMMARY

The purpose of this Stormwater Management Plan ('SMP') is to outline the high-level approach for the management of stormwater for the Proposed Private Plan Change (Takapuna 2 Private Plan Change) at 48 Esmonde Road, Takapuna.

The report outlines the best practicable option for stormwater management to support the future redevelopment of the site, ensuring compliance with the regional Network Discharge Consent (NDC), Auckland Unitary Plan (AUP) and Stormwater Code of Practice (SWCoP). The assessment has been undertaken in accordance with the requirements of the AUP – OP, and the Auckland Council's Stormwater Code of Practice ('SWCoP').

The SMP focuses on the establishment of a new precinct plan that seeks to provide for the comprehensive and integrated redevelopment of the site. The precinct enables a new residential community comprising a mixture of housing types within a unique urban setting.

The key zoning of the land within the precinct is Residential - Terrace Housing and Apartment Buildings Zone. A limited range of non-residential activities is intended to support the local residential community while not undermining the role, function and viability of existing centres nearby. The Plan Change also seeks to rezone the proposed 20 metre esplanade reserve to Open Space.

The project is divided into three stages -

- Stage 1 includes 182 short-term accommodation units, 5 penthouse apartments, 1 restaurant, 1 cafe.
- Stage 2 includes 84 apartments of different types (1, 2 and 3-bedrooms), a cafe/restaurant, a healthcare (GP) facility, a fitness centre (gym), a convenience store, a community facility.
- Stage 3 makes up the remainder of the apartments (approximately 300) and furthermore non-residential activity

Resource consent has been granted for Stage 1 & 2.

The development of this site will be classified as a large Brownfield under Schedule 4 of the NDC. Even though the development is scheduled in 3 stages, the consent application at each stage will include a SMP for the whole site to ensure a unified approach to stormwater management

The proposed plan change precinct provisions proposes to provide a maximum impervious coverage of 100% within the development area (14,247m^2 - Area outside of the proposed esplanade reserve).

The SMP proposes the use of the existing and new stormwater outlets to service the stormwater discharge. The site is not located within a Stormwater Management Area (SMA) and therefore stormwater attenuation controls do not apply to the site.

The SMP proposes the use treatment of new impervious areas in accordance with the guidelines of Auckland Council's GD04 Water Sensitive Design for Stormwater, GD01 Stormwater Management Devices in the Auckland region and E.10 (Stormwater Management Area) of the AUP – OP.

All future trafficable surfaces including roading networks, accessways, manoeuvring and carparking areas proposed as part of the development entail stormwater quality treatment via the utilisation raingardens to achieve the best practical stormwater management outcome.

Auckland Council's GeoMaps does not identify any flood sensitive, flood prone or flood plain areas within or directly surrounding the site. Auckland Council's GeoMaps identifies an overland flowpath ("OLFP") which flows east to west within the Esmonde Road reserve and discharges into the harbour to the west of the subject site.

1 EXISTING SITE APPRAISAL

1.1 SUMMARY OF DATA SOURCES AND DATES

Existing site appraisal item	Source and date of data used
Topography	• H&G Topographical Survey, 2019
Existing stormwater network	• H&G Topographical Survey, 2019 • Auckland Council GeoMap, Stormwater Assets, 2020
Existing hydrological features	• H&G Topographical Survey, 2019 • Auckland Council GeoMaps, Catchments And Hydrology Layer, 2020
Stream, river, coastal erosion	• N/A
Flooding and flowpaths	• Maven Infrastructure Report, 2020 • Auckland Council GeoMaps, Overland Flow Paths Layer, 2020
Coastal Inundation	• Auckland Council GeoMaps coastal inundation layer, 2020
Ecological / environmental areas	• Auckland Council Unitary Plan Viewer, significant vegetation layer, 2020 • Auckland Council Unitary Plan Viewer, significant ecological area layer, 2020
Cultural and heritage sites	• Auckland Council GeoMaps, cultural heritage site, 2020

1.2 LOCATION AND GENERAL INFORMATION

The subject site is located at 48 Esmonde Road, Takapuna. The site is located on the southern side of Esmonde Road, approximately 250m east of the Barrys Point Road intersection. The site occupies a promontory, which is bound to the east, south and west by the Coastal Marine Area ("CMA"). The location of the subject site is shown in the site plans located within the Appendices.

The building supports the principal use of the site – a church. The western portion of the building and associated outdoor area is used as a childcare centre (Harbourside Kids Childcare Centre). The site features a high-level of existing impervious surfaces, resulting from the two car parking areas and vehicle access through the site. The site features a current impervious area of approximately **12,000m²,** which equates to 55.5% of the net site.

The site has recently been subdivided to remove the previous limitations to parcels, the total site area is 21,556m². The site is located within the THAB zone, The THAB controls allow for 50% site coverage, and 70% impervious area, with the total permitted impervious area consisting of 15,089m². The proposed plan change precinct provisions proposes to provide to 100% impervious within the development area of 14,247m^2 which less than the total permitted impervious area of 15,089m² under THAB Controls.

Existing site element	
Site address	• 48 Esmonde Rd, Takapuna
Legal description	• Lot 32 DP 536045
Current Land Use	• Church, Childcare centre, Wilson Carparking
Current building coverage	• 12,000m2
Historical Land Use	• Church

Image 1: Site Overview GeoMaps

1.3 TOPOGRAPHY

The site is elevated above Esmonde Road, featuring a high-point of 10.5m RL (AC GeoMaps) within the centre of the site. The site features a relatively gentle contour, before dropping away steeply at the coastal edges. The coastal margins are vegetated and feature some mature Pohutukawa interspersed with several weed species. Refer to Topographical plan. **(Appendix A)**

Any land contained within the current title that is seaward of MHWS has been vested as CMA during the recent subdivision. The resulting title has been reduced in size accordingly (20m setback from MHWS) with the developable area calculated at 14,247m².

1.4 GEOTECHNICAL

A geotechnical investigation report has been undertaken by Tonkin and Taylor and is submitted as part of the resource consent application. A completion certificate will be provided at the completion of the earthworks as required.

1.5 EXISTING DRAINAGE FEATURES AND STORMWATER INFRASTRUCTURE

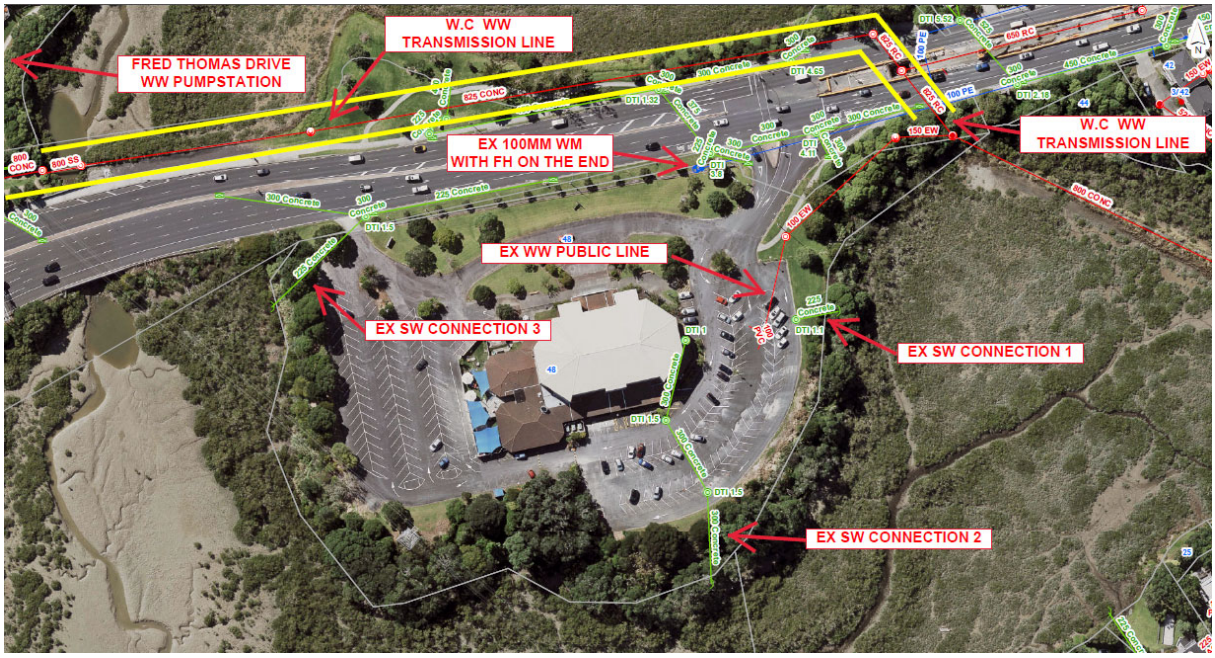


Image 2: Site Plan GeoMaps

Auckland Council's GeoMaps identifies an extensive, site-specific, publicly vested stormwater network to support the current land-use of the property. There are currently three separate existing public stormwater outlets within the site, refer to the attached plans in Appendix B for exact locations.

The existing stormwater network and outlets within the site provide suitable connection points for stormwater disposal of future development.

1.6 RECEIVING ENVIRONMENT

The site is currently serviced by three separate existing public stormwater outlets. All of the identified stormwater outlets discharge to Shoal Bay, Waitemata Harbour. (Coastal environment). A combination of existing and new stormwater network and outlet structures are proposed to service stormwater runoff from the subject development and provide erosion control.

1.7 EXISTING HYDROLOGICAL FEATURES

Stormwater discharge is to Shoal Bay, Waitemata Harbour. (Coastal environment). No other stream, wetlands, ponds or natural hydrological features are located within or immediately downstream of the subject site.

1.8 FLOODING AND FLOWPATHS

Auckland Council's GeoMaps does not identify any flood sensitive, flood prone or flood plain areas within or directly surrounding the site.

Auckland Council's GeoMaps identifies an overland flowpath ("OLFP") which flows east to west within the Esmonde Road reserve and discharges into the harbour to the west of the subject site.

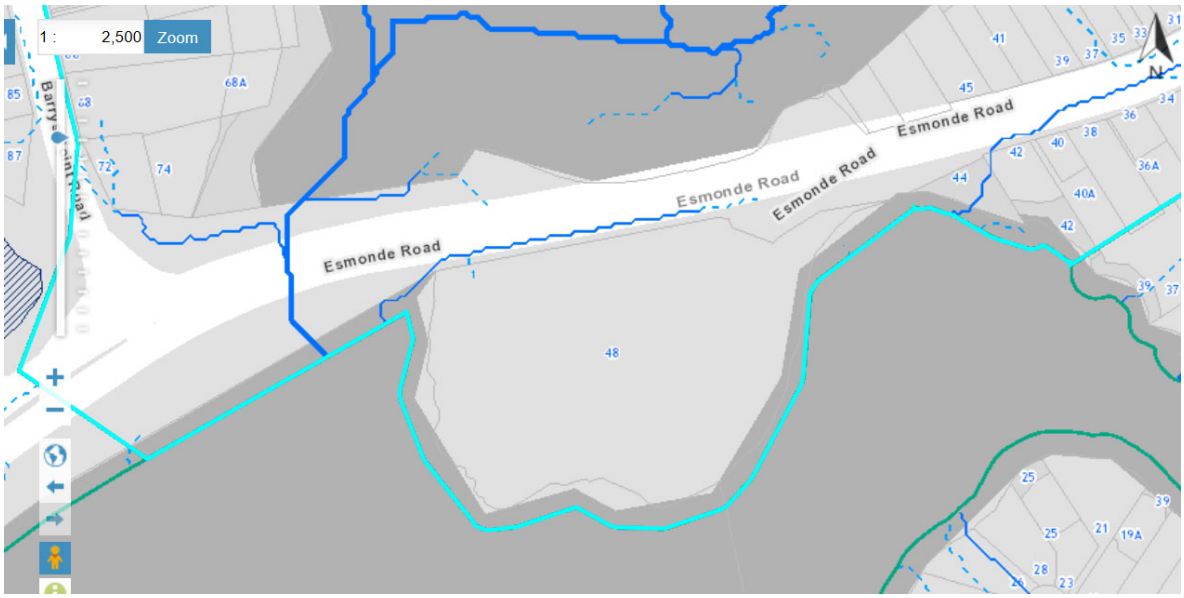


Image 3: OLFP GeoMaps

1.9 COASTAL INUNDATION

The coastal margins of the site are subject to the 1% AEP and 1m sea level rise control. Given the height of the developable areas, however, this is not considered to be a constraint.

1.10 BIODIVERSITY

A bulk earthworks consent has been granted for the development areas of the site, and these works are currently underway. The vegetation located within the proposed esplanade reserve will be retained and protected.

1.11 CULTURAL AND HERITAGE SITES

With respect to cultural and heritage matters, as noted in the archaeological report the site has been largely destroyed by landscape modification for the construction of an Assembly of God church in the 1980s. There is a small chance that there may be some surviving subsurface evidence of the house and Patuone's occupation of the property, but the majority of the site has been compromised. It is also noted that the site has been granted a resource consent for earthworks over the development area of the site.

These works are underway in accordance with that approved resource consent. Cultural Monitoring has been undertaken during the earthworks, and specific accidental discovery procedures are included to ensure that in the event that any unrecorded archaeological features or artefacts are exposed as a result of consented works on the site and appropriate protocols will be followed to ensure they are preserved. These areas that are located outside the development area (the future esplanade reserve) and will be protected by the development restrictions that would apply to this Open Space: Conservation Zone.

1.12 CONTAMINATED LAND

A site investigation has been completed as part of the previous stage 1 Resource Consent confirming that the site is not contaminated, no further reports are required as part of the plan change application. Further development of the site would be subject to the requirements of the NES Contamination which is the appropriate framework to manage Contamination effects of the Plan Change.

2 DEVELOPMENT SUMMARY AND PLANNING CONTEXT

2.1 REGULATORY AND DESIGN REQUIREMENTS

Requirement	Relevant regulatory / design to follow
Unitary Plan – SMAF hydrology mitigation	• N/A”
High Contaminant Generating Areas	• N/A
Natural Hazards	• N/A
Auckland Unitary Plan Precinct	• N/A
Existing Catchment Management Plan	Northshore” with permit number 31819
Auckland Council Regionwide Network Discharge Consent	• Site is located within the catchment of the Auckland-Wide NDC

3 MANA WHENUA MATTERS

*****Addressed under the Plan Change application*****

This waterfront development is closely working with Ngāi Tai ki Tāmaki for the conservation of the water environment, creation of waterfront public recreation and water transport opportunities, and improvement of health and safety for public users here by undergrounding a high voltage overhead electric line

4 STAKEHOLDER ENGAGEMENT AND CONSULTATION

*****Addressed under the Plan Change application*****

This waterfront development is closely working with Ngāi Tai ki Tāmaki for the conservation of the water environment, creation of waterfront public recreation and water transport opportunities, and improvement of health and safety for public users here by undergrounding a high voltage overhead electric line

5 PROPOSED DEVELOPMENT

5.1 GENERAL DEVELOPMENT INFORMATION

The key zoning of the land within the precinct is Residential - Terrace Housing and Apartment Buildings Zone. A limited range of non-residential activities is intended to support the local residential community while not undermining the role, function and viability of existing centres nearby.

The project includes in the order of 550 units and is divided into three stages-

- Stage 1 includes 182 short-term accommodation units, 5 penthouse apartments, 1 restaurant, 1 cafe.
- Stage 2 includes 84 apartments of different types (1, 2 and 3-bedrooms), a cafe/restaurant, a healthcare (GP) facility, a fitness centre (gym), a convenience store, a community facility.
- Stage 3 makes up the remainder of the apartments (approximately 300) and furthermore non-residential activity.

The development of this site will be classified as a large Brownfield under Schedule 4 of the NDC. Even though the development is scheduled in 3 stages, the consent application at each stage will include a SMP for the whole site to ensure a unified approach to stormwater management

The proposed building coverage controls areas are shown in Image 4 below. The proposed plan change precinct provisions proposes to provide a maximum impervious coverage of 100% within the development area (14,247m^2 - Area outside of the proposed esplanade reserve) and a maximum impervious coverage of 2% for the Open Space Area/Esplanade reserve.

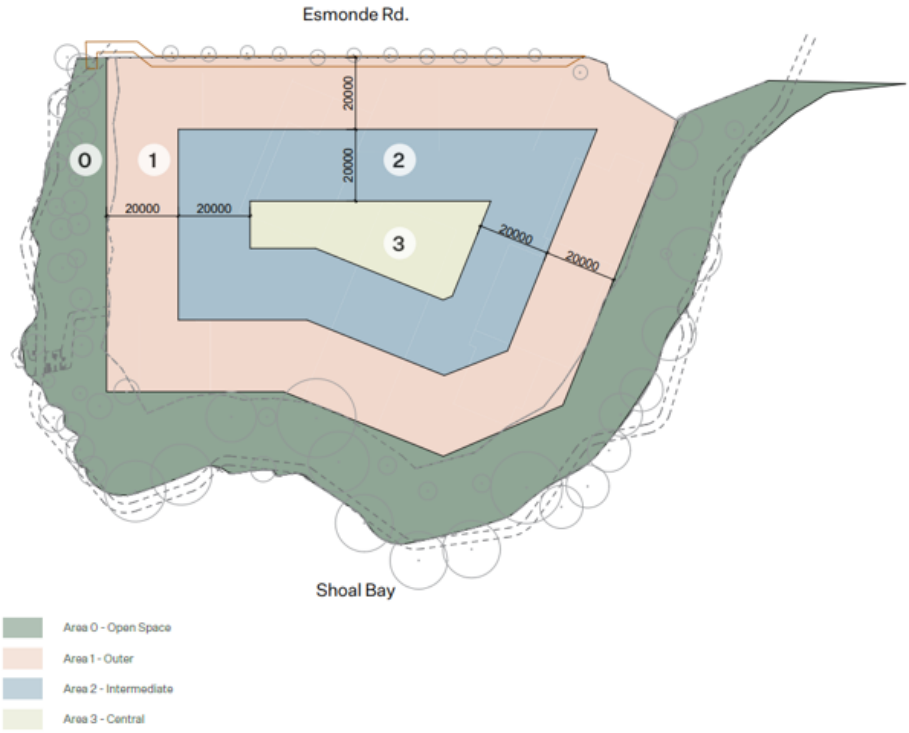


Image 4: Precinct Plan 2 – Takapuna Building coverage control areas.

5.2 LOCATION AND AREA

The subject site is located at 48 Esmonde Road, Takapuna. The site is located on the southern side of Esmonde Road, approximately 250m east of the Barrys Point Road intersection.

A locality plan below identifies the site and surrounding area.

Image 5: General Location GeoMaps

The proposed development is located within North Shore Stormwater Network Consent 31819 and the recently issued Global NDC.

The site is located within a catchment Council records identify as the “Northshore” stormwater Catchment. Healthy waters have provided a Comprehensive Catchment management plan for the Northshore area the site is contained within, completed in 2012. **(Attachment C)**

5.3 PURPOSE OF THE DEVELOPMENT

The purpose of the development is to create a sustainable urban village of the 21st century. The village will be primarily a high-density residential development with a limited number of non-residential uses in order to achieve a ‘live-work-play’ situation for its residents.

In terms of stormwater discharge, the key objective is improving the current stormwater management onsite (effectively none) by implementing controls having a positive impact on the receiving environment by managing the post development hydrology and discharge quality.

5.4 SITE LAYOUT AND URBAN FORM

The development vision is guided by a compressive masterplan covering the whole site with the masterplan implemented in stages. Both shared public and resident spaces are incorporated at both podium level and upper levels.

The extensive use of planting beds throughout the development and green roofs will ensure the visual and aesthetic qualities, amenity and liveability of the proposed development. A number of te planting beds located adjacent to trafficable areas will be in the forma of raingardens which will also provide stormwater quality treatment.

5.5 EARTHWORKS

In order to give effect to the plan change, earthworks are proposed over the majority of the site (excluding the areas of the proposed Open Space zone) and include the formation of building platforms and installation of drainage and accessways.

Earthworks are proposed over the majority of the site and include, formation of building platforms, construction of basements, and installation of drainage, and accessways.

Earthworks will involve ground disturbance of 14,247m2. Site wide excavation will be undertaken for the formation of building platforms for Stage 1,2 and future Stage 3, It is expected that the maximum cut depth will be approximately 3.2m. Temporary batter slopes not exceeding 1:2 will be created during construction. Retaining wall details will be finalised during building consent stage.

The Engineering Plans detail the extent of works and sediment control measures.

Proposed measures for erosion and sediment control have been designed under the guidelines of Auckland Council's GD05 document. Resource consent will require that erosion and sediment control measures are implemented and maintained in accordance with the Engineering Drawings.

Silt control measures will need to be installed onsite prior to the earthworks commencing. All silt control measures will be checked and confirmed acceptable by the Engineer before works commence. The site will be progressively stabilised with imported hardfill.

A geotechnical investigation has been undertaken by Tonkin and Taylor to confirm the site is geotechnically suitable for the development proposals, a completion certificate will be provided at the completion of the earthworks as required.

6 STORMWATER MANAGEMENT

6.1 PRINCIPLES OF STORMWATER MANAGEMENT

6.1.1 ORIGINAL PRINCIPLES

A stormwater strategy has been developed for the site to demonstrate the overarching principles of how stormwater is to be managed, as required by the regional Network Discharge Consent (NDC), Auckland Unitary Plan (AUP) and Stormwater Code of Practice (SWCoP).

The rules for development, with respect to stormwater runoff from the site, are working towards the objective of improving the current stormwater management onsite (effectively none) by implementing controls through redevelopment and thus, having a positive impact on the receiving environment by managing the post development hydrology and discharge quality.

6.1.2 UPDATED PRINCIPLES

The stormwater management proposed for the site can be considered as aligning with the specific requirements of the Auckland Council GD01.

The proposal is consistent with the design principles of the AUP and consequently the stormwater strategy is consistent with Conditions 3- 9 of the regional NDC.

Assessment against and AUP E8 diversion and discharge of stormwater, E9 stormwater management- High generating car park or roads, E10 stormwater management – flow, has been undertaken and stormwater controls are consistent with these outcomes, as per the below-

- the site creates more than 1,000m2 or impervious area, therefore stormwater quality management will be provided.
- the site creates high generating car park or road, therefore stormwater quality treatment will be provided for all trafficable areas.
- the site is not located within a SMAF zone, therefore retention and detention is not required or provided.

Water sensitive design is a driving component of the SMP, stormwater management requires – where possible – treatment of new trafficable impervious areas to control stormwater discharge quality.

The SMP proposes the treatment of new impervious areas in accordance with the guidelines of Auckland Council's GD04 Water Sensitive Design for Stormwater, GD01 Stormwater Management Devices in the Auckland Region and E.10 (Stormwater Management Area) of the AUP – OP.

Hydrological mitigation will be achieved through the above measures with specific devices such as onsite rain gardens and green roofs being implemented throughout the site.

6.1.3 GENERAL

The Auckland Council Stormwater Code of Practice sets out design and construction standards for stormwater and requires all development to be provided with a means of stormwater disposal.

An existing stormwater outlet and a proposed stormwater outlet will be used to discharge stormwater runoff from the site, stormwater disposal from the proposed development will be via a new private stormwater connecting to the outlets.

The proposed and existing stormwater network will convey the 10 year flows, stormwater runoff flows above the 10-year event and up to the 100 year event will be directed to the surrounding harbour.

The proposed plan change precinct provisions proposes to provide 100% impervious within the development area (14,247m2 - Area outside of the proposed esplanade reserve).).

6.1.4 WATER QUALITY

The high-risk receiving environment emphasises the importance of how stormwater runoff from development areas is managed, high stormwater quality of discharge is required to protect the downstream receiving environment.

The proposed development incorporates a Water Sensitive Design approach focusing on reducing or eliminating stormwater contaminates through source control (inert materials) and utilising natural systems and processes to manage stormwater quality effects. (biofiltration)

Trafficable surfaces require treatment as per Auckland Council requirements – GD01 Stormwater Management Devices in the Auckland Region. The primary water quality objective of the treatment is to remove 75% of total suspended sediment on a long-term average basis.

Stormwater runoff from future development of Accessways, manoeuvring and carparking areas, will include stormwater quality treatment by utilising Raingardens to achieve the best stormwater management outcome, the use of which will be subject to future consultation with Healthy Waters.

Buildings will be roofed with inert roofing materials (e.g. Green roofs) which will not generate contaminants and therefore will not require quality treatment., the design and construction of which will be subject to future building consents from Auckland Council.

The stormwater management strategy proposed in the SMP is consistent with the guidelines of Auckland Council's GD04 Water Sensitive Design for Stormwater and the AUP – OP. The proposed development will achieve the AUP – OP and Precinct objectives by utilising approved methods outlined above.

6.1.5 STREAM HYDROLOGY

The stormwater runoff from the subject site 48 Esmonde Road currently discharges into to Shoal Bay, Waitemata Harbour via the public existing outlets.

Auckland Council's GeoMaps identifies three separate public existing public stormwater outlets within the site, refer to the attached plans for locations. Two of the outlets are located on the eastern side of the site. The third outlet that is located within the North-Western side of the site is incorrectly shown on GeoMaps and instead is situated within the road and services the existing Esmond Road catchment.

A combination of existing and new stormwater network and outlets are proposed to service stormwater runoff from the proposed plan change provisions. A new stormwater outlet with rock riprap servicing a 300mm line is proposed on the North-East corner of the site. The existing stormwater network on the South-Eastern corner of the site will be upgraded while maintaining the existing wingwall outlet structure as it appears to be adequate and surrounded by protected vegetation.

A capacity check of the proposed stormwater network has been undertaken to confirm capacity, for the purpose of this analysis site coverage has been assessed in accordance with Architectural plans provided and impervious area table within this report.

The method of calculation for the network is based on the rainfall data obtained from the NIWA High Intensity Rainfall System. The rainfall intensity includes climate change.

•Proposed SW Outlet 1-0: 300mmØ at 1.0% gradient has capacity of 132l/s and is servicing a proposed catchment area of 3697m2.

•Proposed SW Line 2-1 to Existing Outlet 2-0: 355DN at 2.85% gradient has capacity of 305l/s and is servicing a catchment area of 10566m2.

Analysis confirms that the combined capacity of the proposed outlets can provide sufficient capacity to service future residential development in accordance with the underlying zoning rules.

As the proposed public network discharges directly into the Waitemata Harbour the site is not located within a SMAF zone and therefore no stormwater attenuation or retention is considered necessary as part of this development.

6.1.6 FLOODING

Auckland Council's GeoMaps does not identify any flood sensitive, flood prone or flood plain areas within or directly surrounding the site. The coastal margins of the site are, however, subject to the 1% AEP and 1m sea level rise control. Given the height of the developable areas, however, this is not considered to be a constraint.

6.1.7 OVERLAND FLOWPATH AND FLOODPLAIN MANAGEMENT

Auckland Council's GeoMaps identifies an overland flowpath ("OLFP") which flows east to west within the Esmonde Road reserve and discharges into the harbour to the west of the subject site.

Finished levels associated with the development have been designed to direct overland flow within the site away from building platform. Runoff from Stages 1 & 2 will no longer discharge onto Esmonde Road and instead track along the proposed pavement and discharge directly into the harbour. Levels within the proposed esplanade reserve will have to be reworked to allow overland flow from within the site to discharge into the harbour.

Given there are no major OLFP traversing adjacent to the proposed building are to have adequate freeboard in accordance with Auckland Council and Building Code requirements.

6.1.8 DEVELOPMENT STAGING

The project involves in the order of 553 dwellings and is divided into three stages, Stages 1 and 2 are being undertaken concurrently ASAP while stage 3 will be in the future.

- Stage 1 includes 182 short-term accommodation units, 5 penthouse apartments, 1 restaurant, 1 cafe.
- Stage 2 includes 84 apartments of different types (1, 2 and 3-bedrooms), a cafe/restaurant, a healthcare (GP) facility, a fitness centre (gym), a convenience store, a community facility.
- Stage 3 makes up the remainder of the apartments (approximately 300)

6.2 HYDRAULIC CONNECTIVITY

The existing and proposed stormwater network and outlets within the site provide suitable connection points for stormwater disposal of future residential development and will be reused as necessary.

The existing stormwater network on the South-Eastern corner of the site will be upgraded while maintaining the existing wingwall outlet structure as it appears to be adequate and surrounded by protected vegetation.

6.3 ASSET OWNERSHIP

All existing and proposed public stormwater assets noted within the appended plans servicing the site are owned by Auckland Council or the relevant CCO (Healthy Waters).

Proposed private stormwater devices and assets (including raingardens) are to be owned privately by landowners or incorporated societies as required.

6.4 ONGOING MAINTENANCE REQUIREMENTS

All public stormwater extensions into the site, pipes and manholes forming the extent there of, are to be maintained by Auckland Council.

All private devices are to be maintained by the landowners and any incorporated society formed.

Its is proposed that all stormwater devices proposed are proprietary systems that have documented operation and maintenance schedules and plans for such activities.

Operation and maintenance plans will be provided for all stormwater management devices that will be vested with Council. **(Appendix D)**

This will be required as a condition of any approved RC, similar to the RC condition below-

Operations and Maintenance Plan

12. An Operation and Maintenance Plan for the operation and maintenance of the stormwater network shall be prepared and implemented to ensure the effective operation of the stormwater network. The Operation and Maintenance Plan may be prepared as part of a region-wide Operation and Maintenance Plan for the stormwater network and shall be submitted to the Team Leader Specialist Integration, Auckland Council within 24 months of commencement of this consent.

    At a minimum, the Operation and Maintenance Plan must include the following:

    a. The operation and maintenance of the stormwater network, including stormwater management devices that are part of the network to ensure the effective functioning of the stormwater network;

    b. Pre and post stormwater inspection of critical or at risk components of the network to minimise blockages and flood risk;

    c. An inspection and maintenance programme for outfalls and other network infrastructure to prevent or minimise erosion, obstructions to flows and hazards; and

    d. Processes to ensure that the Operation and Maintenance Plan is updated following commissioning of any new major stormwater network infrastructure or management devices.

Image 7: Operation and Maintenance Plan Condition

6.5 IMPLEMENTATION OF STORMWATER NETWORK

The existing and proposed stormwater network and outlets within the site provide suitable connection points for stormwater disposal of future residential development and will be reused, as necessary.

Existing wingwall structure appears adequate. Rock rip rap sizing has been calculated for the new outlet on the site (**Appendix C**)

The methodology for implementation of the proposed networks are as follows:

- Existing site structures, pavement and minor drainage to be stripped and removed prior to bulk earthworks.

- Bulk Earthworks completed, discharging clean waters captured and treated 'dirty water' to specific existing public structures as part of a specific earthwork's management plan.
- Construction/Relocation of public stormwater infrastructure.
- Construction/installation of attenuation and treatment devices and private drainage under accessways.
- Stabilisation of the site and construction of accessways.
- Vesting of newly constructed public drainage assets.
- Construction of residential dwellings and associated private stormwater attenuation devices.

6.6 DEPENDENCIES

The downstream receiving environment is considered to benefit from the development of this site for reasons detailed within this report relating to the site currently discharging flows, unattenuated and untreated, to the receiving environment.

6.7 RISKS

Due to the brownfield nature and existing connections available to the site. Besides construction risks, there are not considered to be any further or already known that require mitigation beyond what would otherwise be implemented as part of best industry practice.

7 DEPARTURES FROM REGULATORY OR DESIGN CODES

There are no known departures from Auckland regulatory and design standards.

8 CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE WORK

Assessments and proposals outside of the development scope have not been assessed as part of this management plan due to the brownfield/redevelopment and existing connectivity of this site.

8.1 CONCLUSIONS

The site has recently been subdivided to remove the previous limitations to parcels, the total site area is 21,556m². The site is located within the THAB zone, The THAB controls allow for 50% site coverage, and 70% impervious area, with the total permitted impervious area consisting of 15,089m². The proposed plan change precinct provisions proposes to provide to 100% impervious within the development area of 14,247m^2 which less than the total permitted impervious area of 15,089m² under THAB Controls.

The SMP proposes the use of the existing and new stormwater outlets to service the stormwater discharge. The site is not located within a Stormwater Management Area (SMA) and therefore stormwater attenuation controls do not apply to the site.

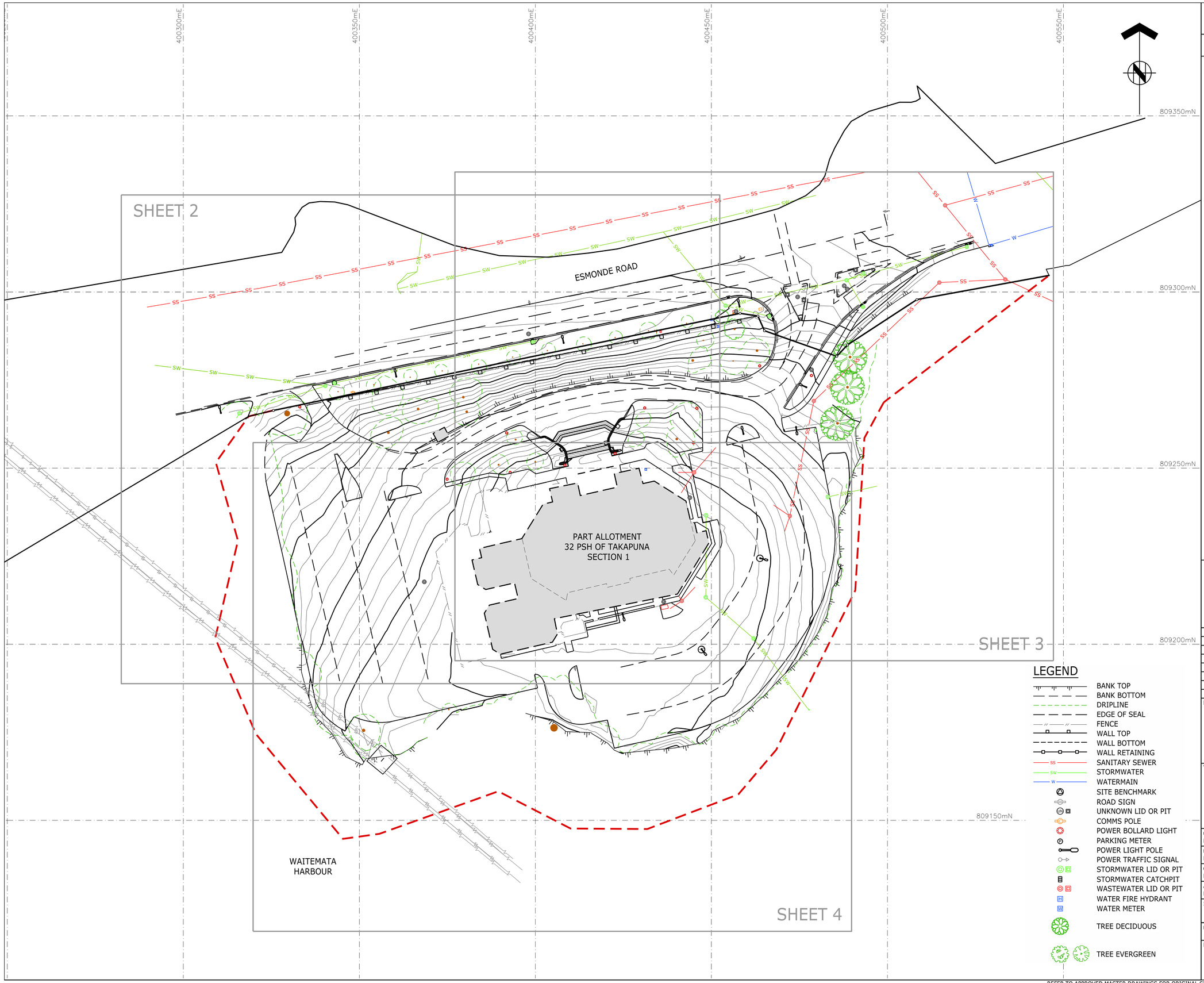
The SMP proposes the use treatment of new impervious areas in accordance with the guidelines of Auckland Council's GD04 Water Sensitive Design for Stormwater, GD01 Stormwater Management Devices in the Auckland Region and E.10 (Stormwater Management Area) of the AUP – OP.

All future trafficable surfaces including roading networks, accessways, manoeuvring and carparking areas proposed as part of the development entail stormwater quality treatment via the utilisation raingardens to achieve the best practical stormwater management outcome.

8.2 RECOMMENDATIONS

It is recommended that the design principles of this SMP be generally accepted for all site (current and future stages) .

APPENDIX A – TOPOGRAPHIGAL PLAN



LEGEND

- BANK TOP
- BANK BOTTOM
- DRIPLINE
- EDGE OF SEAL
- FENCE
- WALL TOP
- WALL BOTTOM
- WALL RETAINING
- SS SANITARY SEWER
- SW STORMWATER
- W WATERMAIN
- SITE BENCHMARK
- ROAD SIGN
- UNKNOWN LID OR PIT
- COMMS POLE
- POWER BOLLARD LIGHT
- PARKING METER
- POWER LIGHT POLE
- POWER TRAFFIC SIGNAL
- STORMWATER LID OR PIT
- STORMWATER CATCHPIT
- WASTEWATER LID OR PIT
- WATER FIRE HYDRANT
- WATER METER
- TREE DECIDUOUS
- TREE EVERGREEN

ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND

ISO 9001 QUALITY ASSURED

NOTES

1. LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (LINZ DATABASE 22/03/19)
   ORIGIN OF LEVELS
   CA 70 SO 52167
   RL 25.00
2. COORDINATES ARE IN TERMS NZ GEODETIC DATUM 2000
   MT EDEN CIRCUIT
   ORIGIN OF COORDINATES
   CA 70 SO 52167
   809485.37 mN
   401039.52 mE
3. CONTOURS ARE AT 0.25 INTERVALS. CONTOURS SHOWN ON THIS PLAN HAVE BEEN ELECTRONICALLY COMPUTED FROM SPOT HEIGHT DETERMINATIONS AND MAY NOT REPRESENT THE TRUE GROUND LEVELS. ANY CRITICAL HEIGHTS SHOULD BE CHECKED ON SITE PRIOR TO DESIGN AND CONSTRUCTION COMMENCING.
4. THIS PLAN HAS BEEN CARRIED OUT TO TOPOGRAPHICAL STANDARDS. ALL LEVELS SHOWN ARE CORRECT AT TIME OF SURVEY. CRITICAL DIMENSIONS AND LEVELS SHOULD BE VERIFIED.
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11. LEGAL DESCRIPTION
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    COMPRISED IN CT NA 777/299
    (LIMITED AS TO PARCELS)

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PARNELL AUCKLAND 1052
T +64 9 917 5000
W www.harrisongrierson.com

REF	REVISIONS	BY	DATE
A	CLIENT ISSUE	DPO	22.03.19

PROJECT:

KINGSTONE PROPERTY LTD
48 ESMONDE ROAD
TAKAPUNA

TITLE:

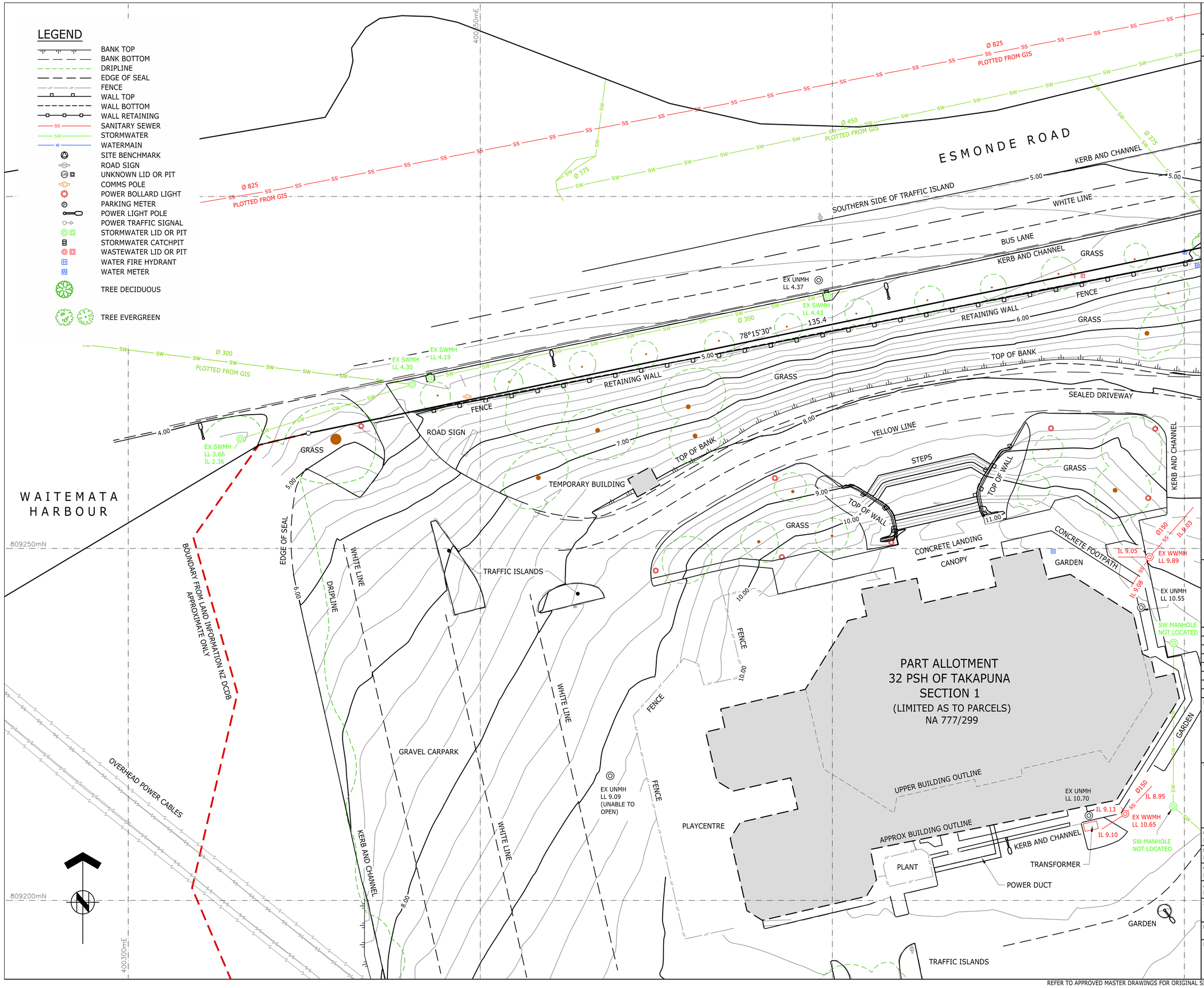
SITE SURVEY
INDEX SHEET
SHEET 1 OF 4

ORIGINATOR: MJS	DATE: 12.03.19	SIGNED:	PLOT BY: DXH
DRAWN: DXH	DATE: 12.03.19	SIGNED:	PLOT DATE: 22.03.19
CHECKED: DPO	DATE: 22.03.19	SIGNED:	SURVEY BY: MJS/KEC
APPROVED: DPO	DATE: 22.03.19	SIGNED:	SURVEY DATE: 12.03.19

ISSUE STATUS: CLIENT ISSUE

PROJECT No:	SCALES:	
1020-145448-01	1:500 - A1 1:1000 - A3	A1

DRAWING No:	REV
145448-SS01	A



ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND

ACENZ

ISO 9001 QUALITY ASSURED

NOTES

1. LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (LINZ DATABASE 22/03/19)
   ORIGIN OF LEVELS
   CA 70 SO 52167
   RL 25.00
2. COORDINATES ARE IN TERMS NZ GEODETIC DATUM 2000
   MT EDEN CIRCUIT
   ORIGIN OF COORDINATES
   CA 70 SO 52167
   809485.37 mN
   401039.52 mE
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A	CLIENT ISSUE	DPO	22.03.19

PROJECT:

KINGSTONE PROPERTY LTD
48 ESMONDE ROAD
TAKAPUNA

TITLE:

SITE SURVEY
SHEET 2 OF 4

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ISSUE STATUS: CLIENT ISSUE

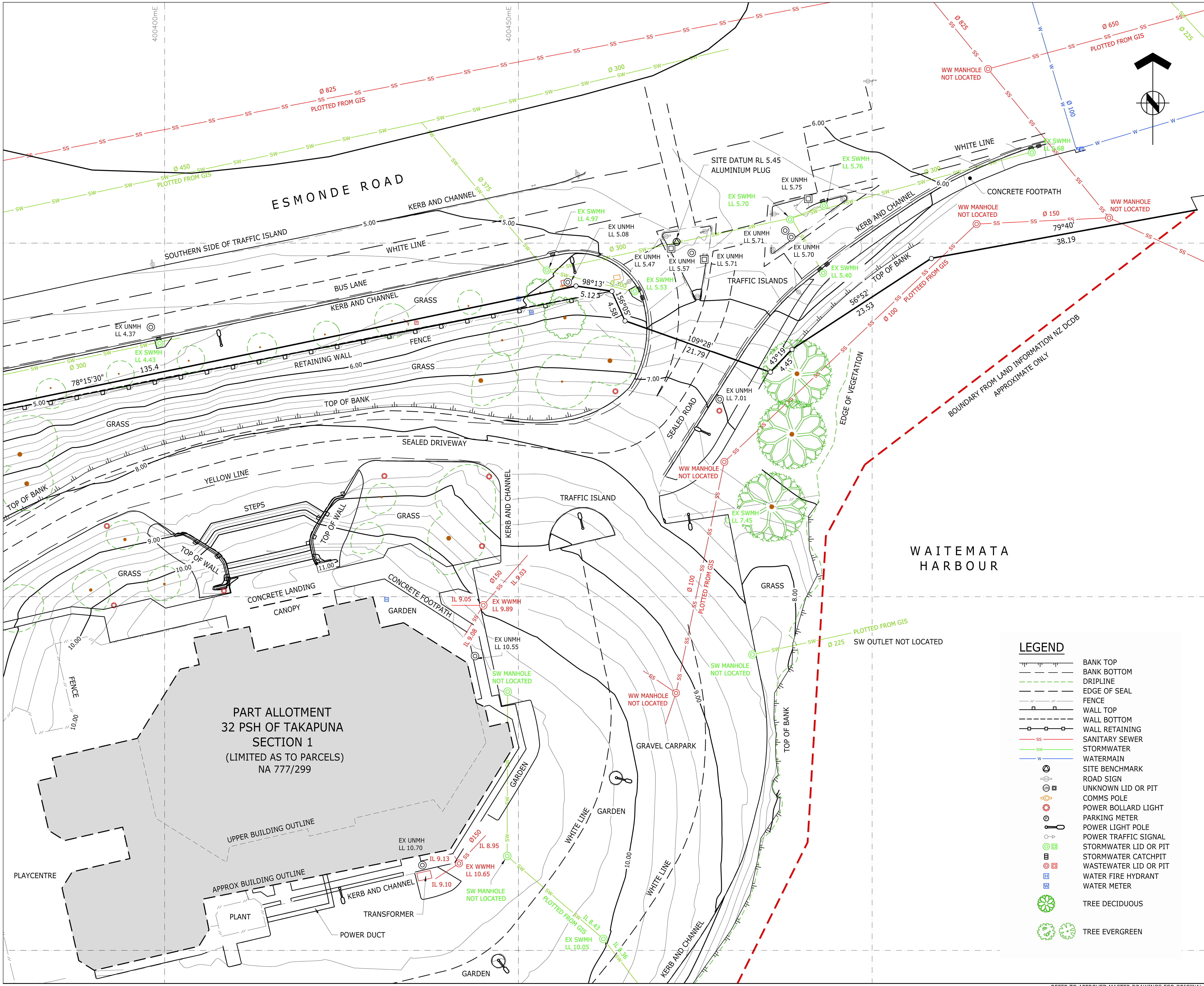
PROJECT No: 1020-145448-01

SCALES: 1:250 - A1, 1:500 - A3

A1

DRAWING No: 145448-SS02

REV A



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PROJECT:

KINGSTONE PROPERTY LTD
48 ESMONDE ROAD
TAKAPUNA

TITLE:

SITE SURVEY
SHEET 3 OF 4

ORIGINATOR: MJS	DATE: 12.03.19	SIGNED:	PLOT BY: DXH
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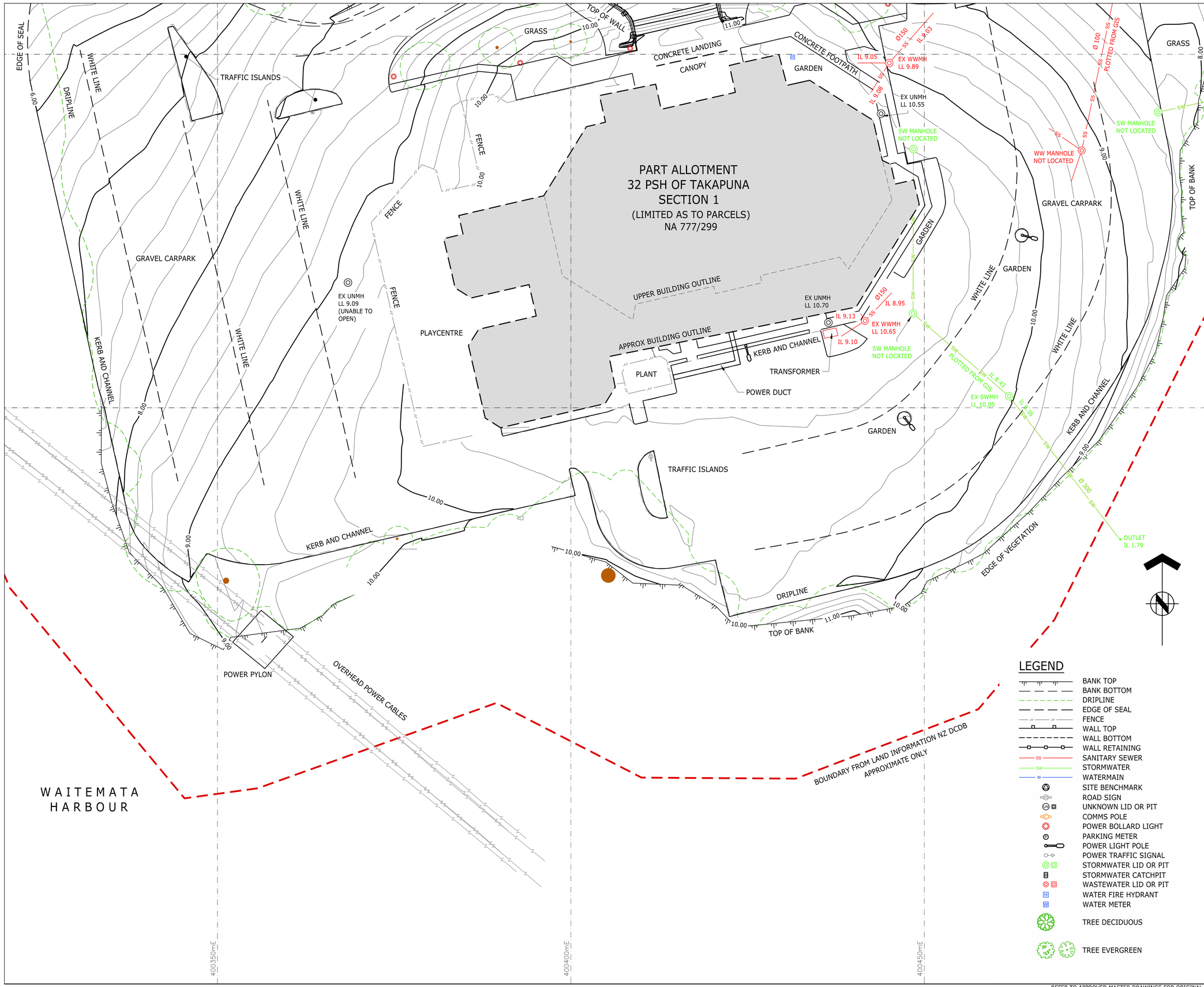
PROJECT No: 1020-145448-01
SCALES: 1:250 - A1, 1:500 - A3
A1

DRAWING No: 145448-SS03
REV: A

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: NEWMARKET Q:\1020\145448_A\CAD\145448-SS01-04.DWG



LEGEND

- BANK TOP
- BANK BOTTOM
- DRIPLINE
- EDGE OF SEAL
- FENCE
- WALL TOP
- WALL BOTTOM
- WALL RETAINING
- SANITARY SEWER
- STORMWATER
- WATERMAIN
- SITE BENCHMARK
- ROAD SIGN
- UNKNOWN LID OR PIT
- COMMS POLE
- POWER BOLLARD LIGHT
- PARKING METER
- POWER LIGHT POLE
- POWER TRAFFIC SIGNAL
- STORMWATER LID OR PIT
- STORMWATER CATCHPIT
- WASTEWATER LID OR PIT
- WATER FIRE HYDRANT
- WATER METER
- TREE DECIDUOUS
- TREE EVERGREEN

ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND

ISO 9001 QUALITY ASSURED

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REF	REVISIONS	BY	DATE
A	CLIENT ISSUE	DPO	22.03.19

PROJECT:

KINGSTONE PROPERTY LTD
48 ESMONDE ROAD
TAKAPUNA

TITLE:

SITE SURVEY
SHEET 4 OF 4

ORIGINATOR: MJS	DATE: 12.03.19	SIGNED:	PLOT BY: DXH
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ISSUE STATUS: CLIENT ISSUE

PROJECT No:	SCALES:	
1020-145448-01	1:250 - A1 1:500 - A3	A1

DRAWING No:	REV
145448-SS04	A

APPENDIX B – PROPOSED DEVELOPMENT PLANS

SITE INFORMATION:

48 Esmonde Road
Lot 32 DP 536045

Areas:

Overall Site Area:	21,566m² (5.3 acres)
Potential Esplanade Reserve Area:	7,319m² (1.8 acres)
Net Site Area (Excl. Esplanade Reserve):	14,247m² (3.5 acres)
Construction Stage 1 Site Area:	4,117m² (1.0 acres)
Constructions Stage 2 Site Area:	3,901m² (0.96 acres)
Building 1 Coverage:	2,135m² (0.52 acres)
Building 2 & 3 Coverage:	2,927m² (0.72 acres)
% Building Coverage:	35%
Total Landscaped Area (Hard and Soft Landscaping):	4,714m² (1.1 acres)
% Landscaped Area:	33%
Total Permeable Landscaped Area:	2,828m² (0.69 acres)
% Permeable Landscaped Area:	20%

BOUNDARY LINE LEGEND

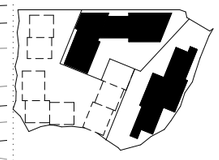
- Property Boundary Line
- Construction Site Boundary Line

DRAFT 11/05/2020

Revisions

A	50% Preliminary Design	20/03/2020
B	Pre-app Meeting	17/04/2020

Notes



If there are any discrepancies in the documents please seek clarification before proceeding with any work.

No building work shall proceed until Building Consent has been granted for the work described.

JASMAX

Client
KINGSTONE PROPERTY LIMITED

Consultant Team

Project Number: 219091
48 ESMONDE ROAD

Sheet
MASTERPLAN

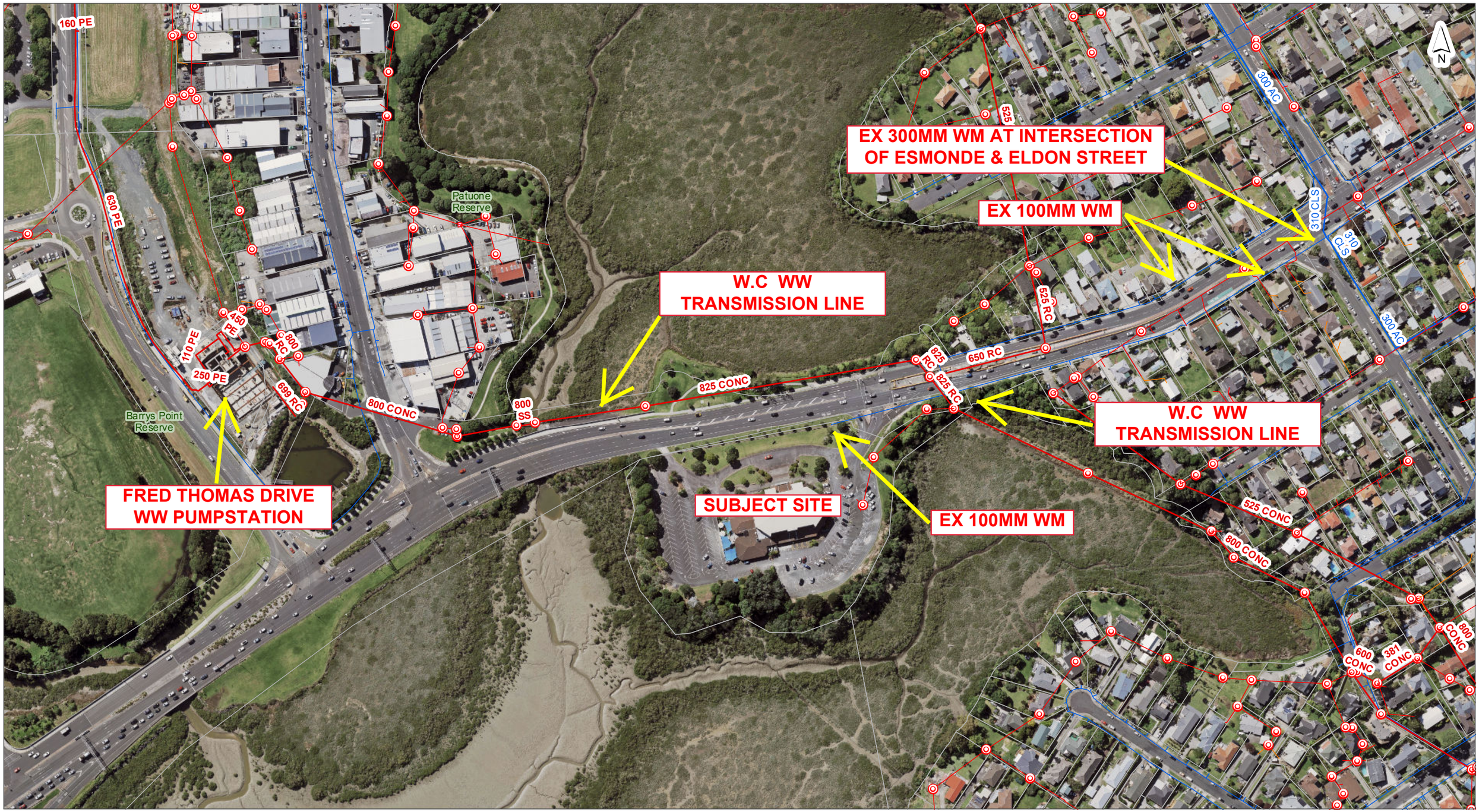
SCALE @ A1=As indicated

Milestone Issues — Revision & Date
FIRST ISSUED
RESOURCE CONSENT
BUILDING CONSENT
TENDER
FOR CONSTRUCTION

ARCHITECTURAL

Drawing Number: RC-001 Revision: B

DO NOT SCALE OFF THIS DRAWING
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING ANY WORK



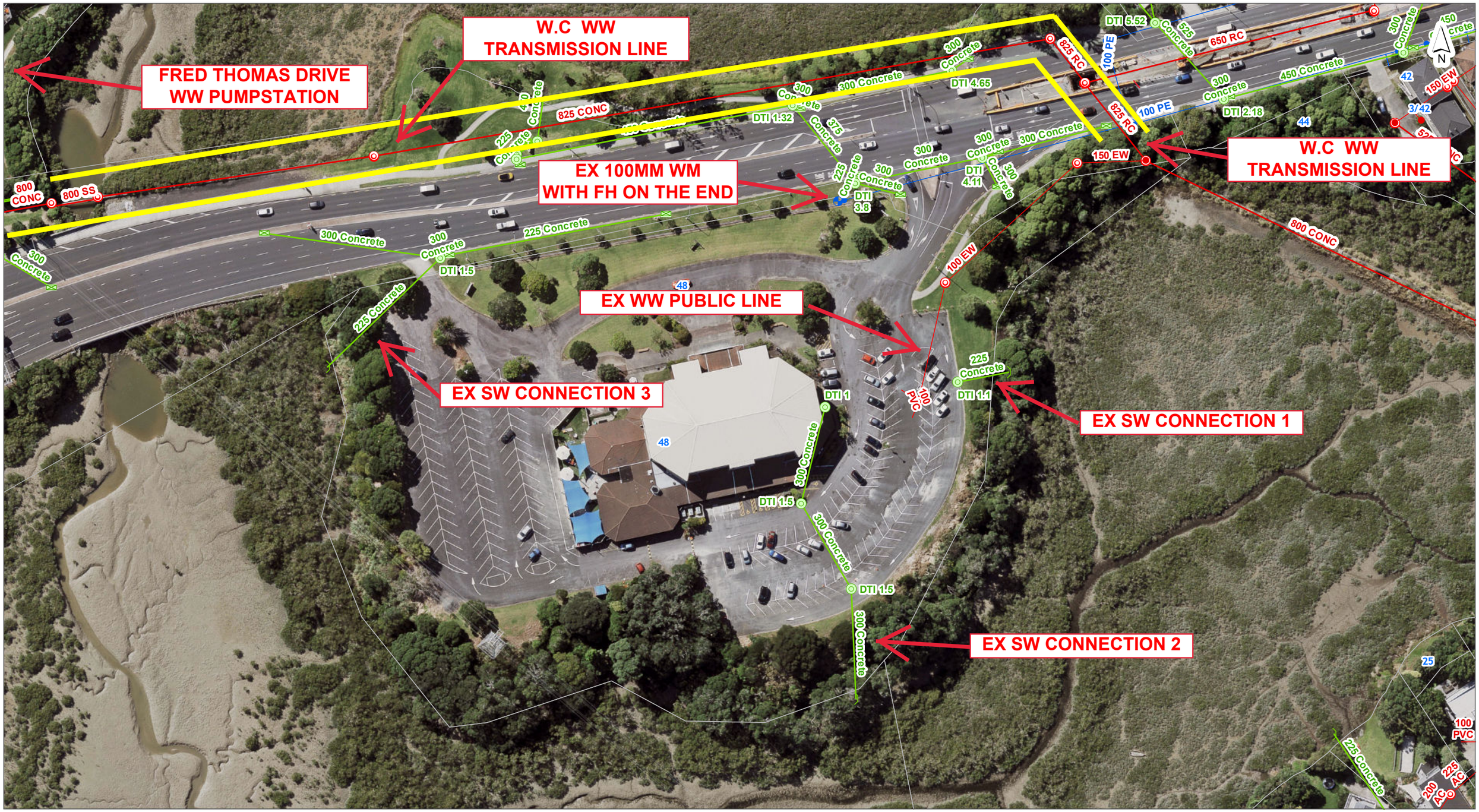
ESMONDE ROAD

0 25 50 75
Meters

Scale @ A3
= 1:2,500

Date Printed:
17/07/2018

Auckland Council
Te Kaunihera o Tāmaki Makaurau



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This map/plan is illustrative only and all information should be independently verified on site before taking any action. Copyright Auckland Council. Land Parcel Boundary information from LINZ (Crown Copyright Reserved). Whilst due care has been taken, Auckland Council gives no warranty as to the accuracy and plan completeness of any information on this map/plan and accepts no liability for any error, omission or use of the information.
Height datum: Auckland 1946.

ESMONDE ROAD

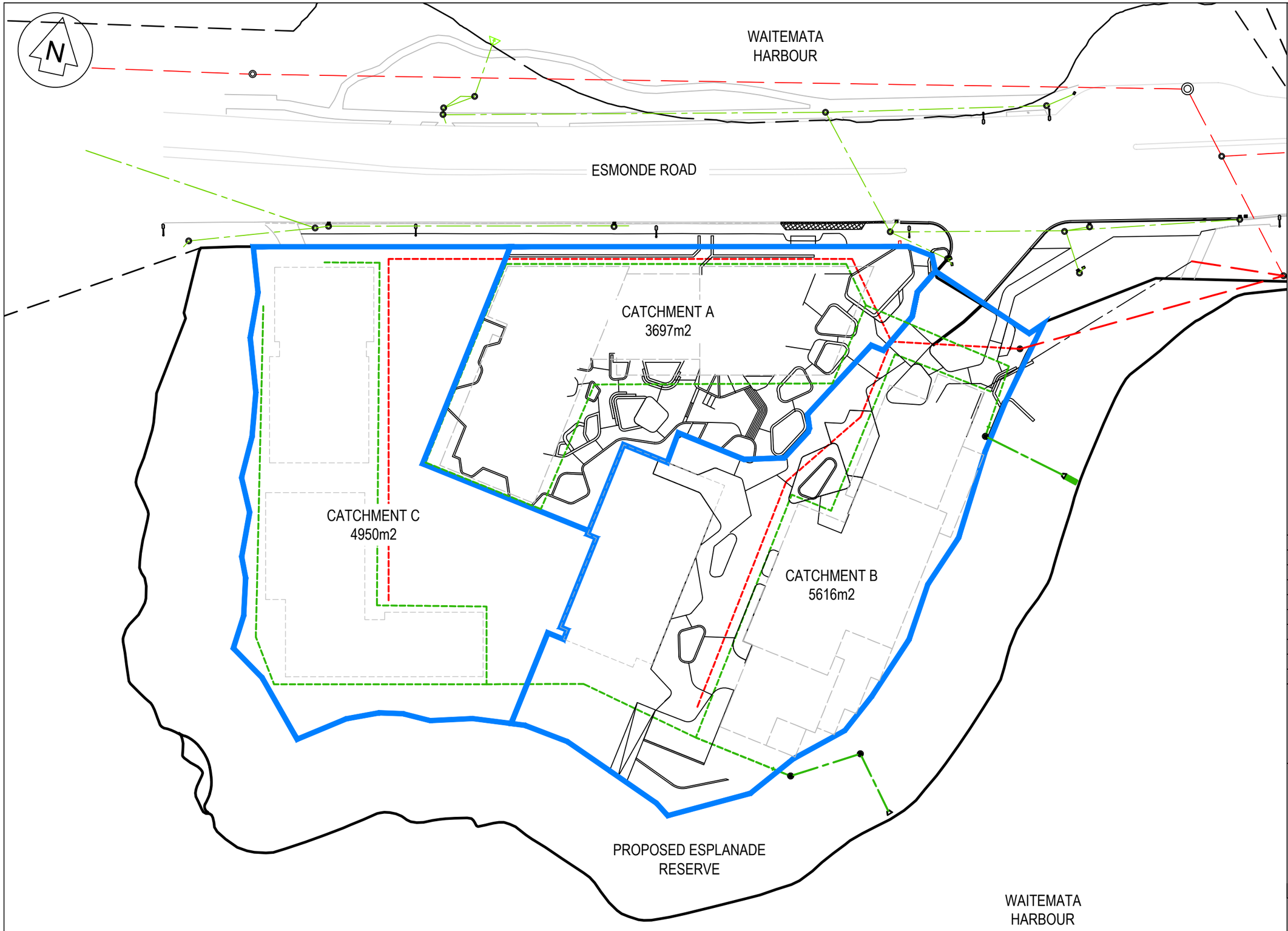
0 10 20 30
Meters

Scale @ A3
= 1:1,000

Date Printed:
16/07/2018

Auckland Council
Te Kaunihera o Tāmaki Makaurau

APPENDIX C - PROPOSED STORMWATER MANAGEMENT



Notes

1. All works to be in accordance with Auckland council standards.
2. Co-ordinates in terms of NZ Geodetic Datum Mt Eden 2000. Levels in terms of the Auckland Vertical Datum 1946.
3. It is the contractors responsibility to locate all services that may be affected by his operations.
4. Pipe bedding: 0 - 10% granular bedding,10 - 20% weak concrete bedding.greater than 20% weak concrete bedding (7mpa plus anti scour blocks at 6m crs).
5. Each connection shall be marked by a 50mmx50mm treated pine stake extending 600mm above ground level with the top painted. This marker post shall be placed alongside a timber marker installed at the time of pipelaying and extending from the connection to 150mm below finished ground level. Connections shall be accurately indicated on "as built" plans.
6. Approved hardfill is to be used in backfilling of all road crossings and vehicle crossings to council standards.
7. Heavy duty manhole lids and frames to be used in trafficked areas.
8. All cesspit leads shall have min cover 0.9m.
9. All lines are to be 150mmØ PVC Class SN16 unless shown otherwise.
10. All lines to be abandoned shall be sealed at each end. timing of all sealing to be coordinated with council staff.

Legend

- EX BDY
- PROP BDY
- EX SW
- PROP SW
- EX/PROP SWMH
- PROP SWCP SINGLE
- PROP SWCP DOUBLE

Rev	Description	By	Date
B	RC	JP	09/20
A	RC	AS	05/20

	By	Date
Survey	HG LTD	03/2019
Design	AS	05/2020
Drawn	AS	05/2020
Checked	JP	05/2020

Maven Associates
09 571 0050
info@maven.co.nz
www.maven.co.nz
12-14 Walls Road, Penrose

Project

48 ESMONDE ROAD
TAKAPUNA
FOR
KINGSTONE PROPERTY LIMITED

Title

10YR STORMWATER RUNOFF CATCHMENT PLAN

Project no.	175001		
Scale	1:750 @ A3		
Cad file	C400 - C500 DRAINAGE.DWG		
Drawing no.	C450	Rev	B

Maven Associates

Job Number	Sheet	Rev	48 Esmonde Road, Takapuna	Author	Date	Checked
175001	1	B	Calc Title: 10YR - Pipe Capacity Check	JP	4/09/2020	WM

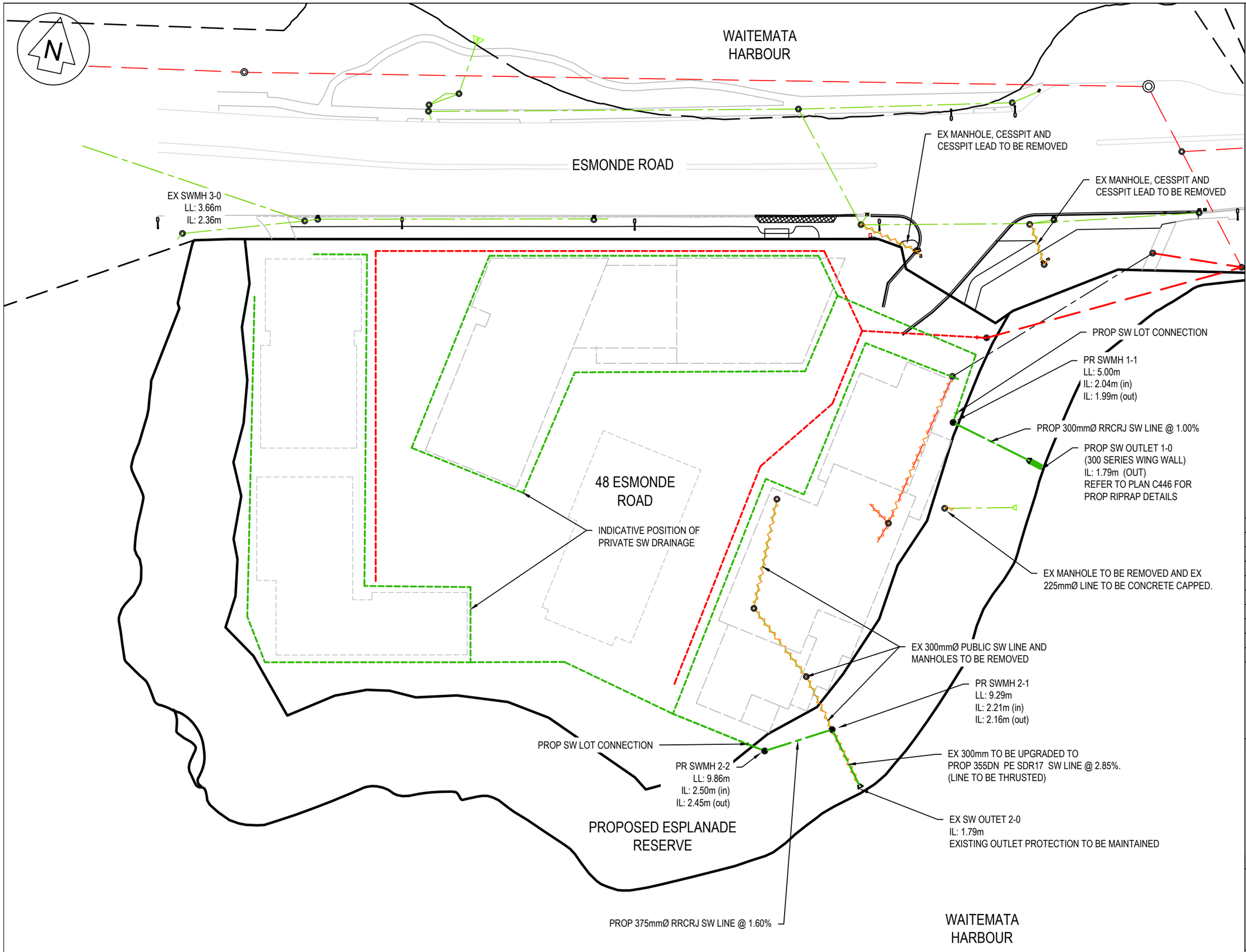
Rainfall Depth		ARI 10YR (mm)	
TP108 rainfall data		140	
Climate change Increase		159.04	(assuming 2.1C increase in temperature)

Pipe ks factor = 0.15 mm (concrete pipes up to 1.0m dia)
Pipe ks factor = 0.015 mm (PE Pipes)

	CN Number		CN Number	
Impervious area	98	Residential Lots	88.4	Equivalent CN - (60% impervious coverage, 40% pervious coverage)
Pervious	74	Proposed Roads	94.4	Equivalent CN - (85% impervious coverage, 15% pervious coverage)

Pipe Line *number*	Catchment *letter*	Catchment Area *m2*	CN	Peak Flow rate - 10YR ARI *l/s*	Cum. Flow *l/s*	Pipe dia *m*	Gradient *%*	Capacity *l/s*	Velocity *m/s*	Check OK
1-1 TO OUTLET 1-0	A	3697	98	97.41	**97.41**	0.300	1.00	132.31	1.87	OK
2-1 TO 2-1	B	5616	98	147.97						
	C	4950	98	130.42	**278.38**	0.375	1.60	299.95	2.72	OK
2-1 TO OUTLET 2-0 (PE)					**278.38**	0.311	2.85	305.59	4.02	OK

NOTE: GRADIENT OF 1-1 TO 1-0 ASSUMED BASED ON GRADIENT OF OUTLET 2-0



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Legend

- EX BDY
- PROP BDY
- EX PUBLIC SW
- PROP PUBLIC SW
- PROP PRIVATE SW
- EX PUBLIC WW
- PROP PUBLIC WW
- PROP PRIVATE WW
- EX/PROP SWMH
- PROP SWCP SINGLE
- PROP SWCP DOUBLE

Rev	Description	By	Date
B	RC	AS	09/20
A	RC	JP	05/20

	By	Date
Survey	HG LTD	03/2019
Design	JP	09/2020
Drawn	JP	09/2020
Checked	WM	09/2020

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info@maven.co.nz
www.maven.co.nz
12-14 Walls Road, Penrose

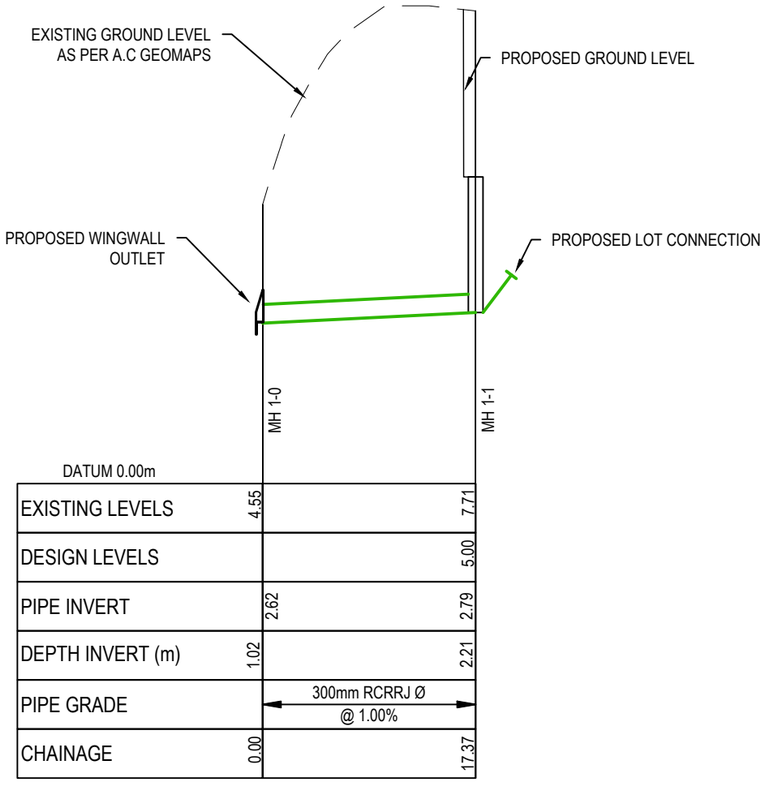
Project

48 ESMONDE ROAD TAKAPUNA FOR KINGSTONE PROPERTY LIMITED

Title

PROPOSED STORMWATER DRAINAGE PLAN

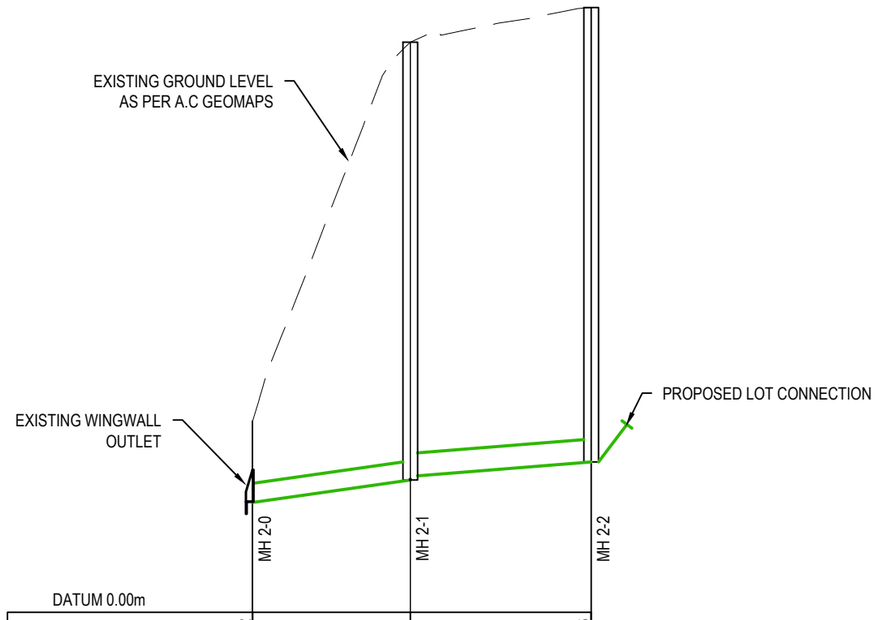
Project no.	175001		
Scale	1:750 @ A3		
Cad file	C400 - C500 DRAINAGE.DWG		
Drawing no.	C400	Rev	B



DATUM 0.00m			
EXISTING LEVELS	4.55		7.71
DESIGN LEVELS			5.00
PIPE INVERT	2.62		2.79
DEPTH INVERT (m)	1.02		2.21
PIPE GRADE		300mm RCRRJ Ø @ 1.00%	
CHAINAGE	0.00		17.37

PROPOSED STORMWATER LINE 1

SCALE: HOR 1:500, VERT: 1:100 @ A3



DATUM 0.00m			
EXISTING LEVELS	3.12	9.29	9.86
DESIGN LEVELS	3.12	9.29	9.86
PIPE INVERT	1.79	2.16 2.21	2.45
DEPTH INVERT (m)	5.10	7.14	7.41
PIPE GRADE		355 mm PE80 SDR 17 Ø @ 2.85%	375mm RCRRJ Ø @ 1.60%
CHAINAGE	0.00	12.86	27.61

PROPOSED STORMWATER LINE 2

SCALE: HOR 1:500, VERT: 1:100 @ A3

Notes

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7. Heavy duty manhole lids and frames to be used in trafficked areas.
8. All cesspit leads shall have min cover 0.9m.
9. All lines are to be 150mmØ PVC Class SN16 unless shown otherwise.
10. All lines to be abandoned shall be sealed at each end. timing of all sealing to be coordinated with council staff.

Legend

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- PROP SWCP SINGLE
- PROP SWCP DOUBLE

Rev	Description	By	Date
A	RC	JP	09/20

	By	Date
Survey	HG LTD	03/2019
Design	JP	09/2020
Drawn	JP	09/2020
Checked	WM	09/2020

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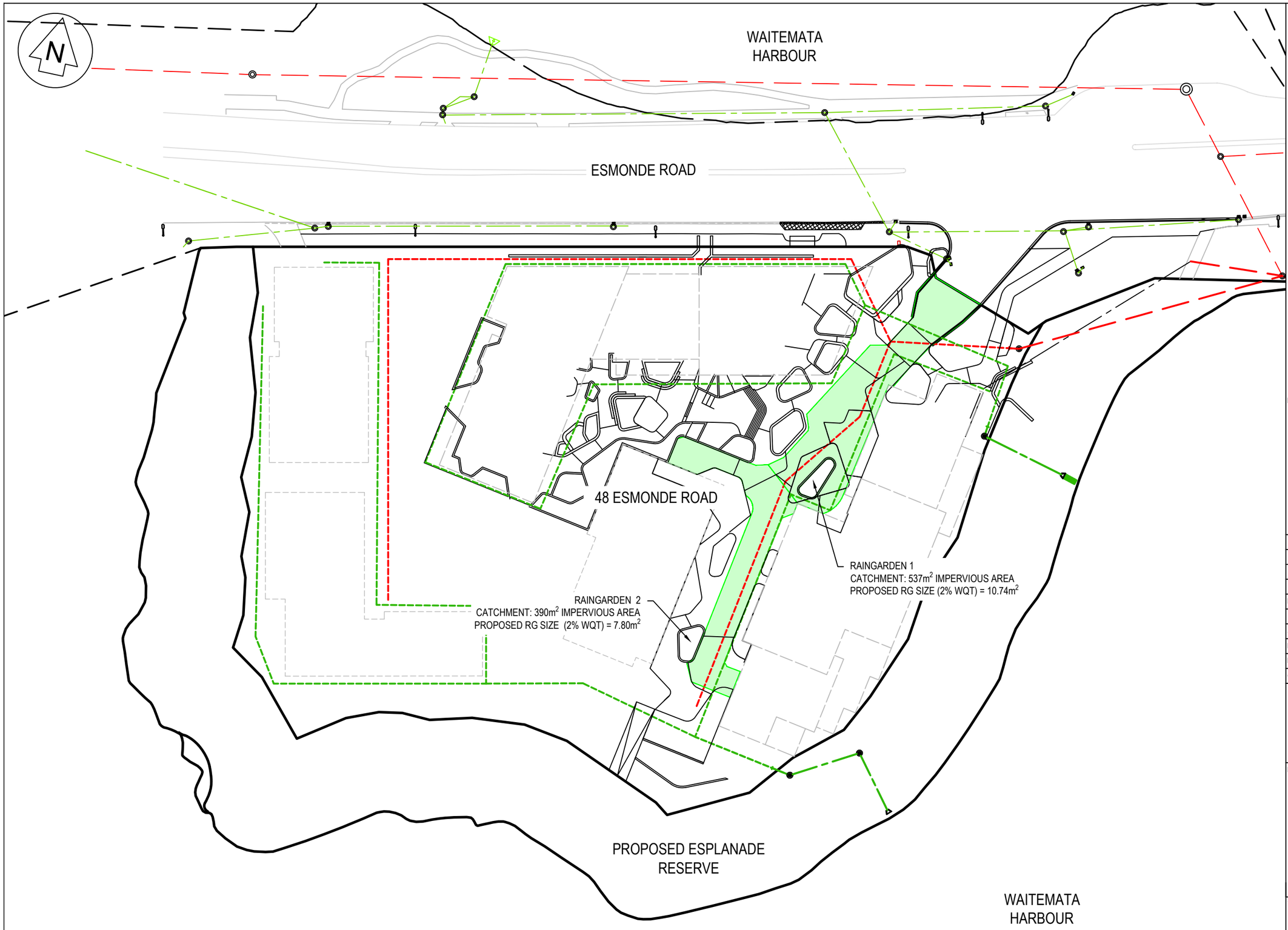
Project

48 ESMONDE ROAD
TAKAPUNA
FOR
KINGSTONE PROPERTY LIMITED

Title

PROPOSED LONGSECTION PLAN

Project no.	175001		
Scale	1:500 @ A3		
Cad file	C400 - C500 DRAINAGE.DWG		
Drawing no.	C401	Rev	A



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Rev	Description	By	Date
B	RC	AS	09/20
A	RC	JP	05/20

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Survey	HG LTD	03/2019
Design	JP	05/2020
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Checked	WM	05/2020

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Project

48 ESMONDE ROAD
TAKAPUNA
FOR
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Title

PROPOSED TREATMENT PLAN

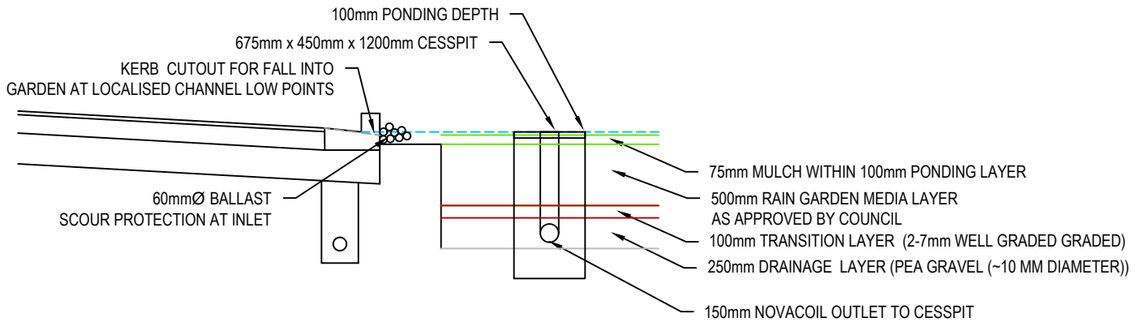
Project no.	175001		
Scale	1:750 @ A3		
Cad file	C400 - C500 DRAINAGE.DWG		
Drawing no.	C440	Rev	B

	Maven Associates	Job Number 175001	Sheet 1	Rev A
Job Title Title	48 Esmonde Road, Takapuna Raingarden Sizing	Author JP	Date 11/05/2020	Checked WM

In accordance to GD01
assuming water quality criteria only

Ponding footprint	2	**%**	**$K_{(media)}$**	1	
Rainfall Intensity	10	**mm/hr**	**Rational Coefficient**	0.95	**(impervious)**

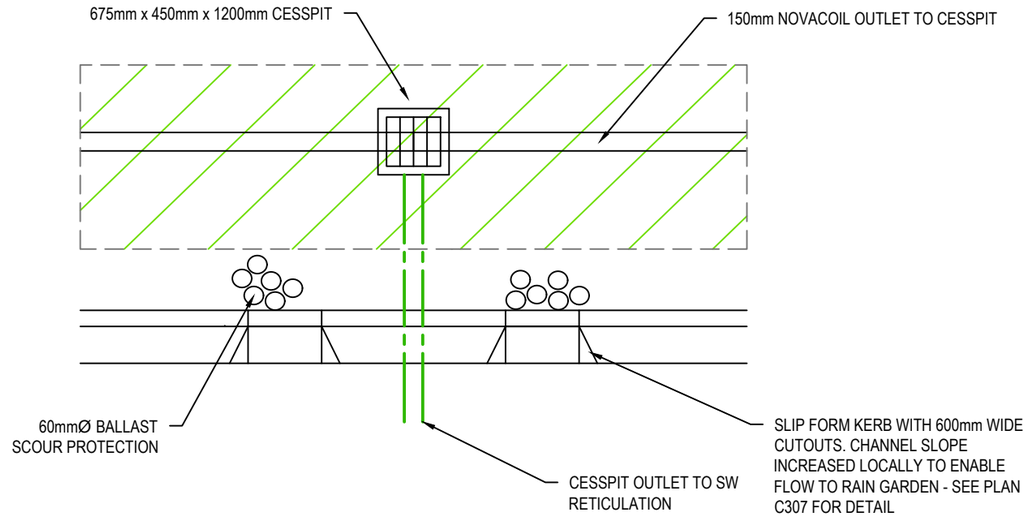
Raingarden Name	Max Catchment Area (m^2)	WQF	Minimum Area of Bioretention device			
		(m^3/hr)	A = WQF/(0.5 × K)	2% check	Use (m2)	Proposed Area
RG 1	537	5.10	10.20	10.74	10.74	10.74
RG 2	390	3.71	7.41	7.80	7.80	7.80



RG
-

TYPICAL RAIN GARDEN PLAN DETAIL

SCALE 1:50 @ A3



RG
-

TYPICAL RAIN GARDEN SECTION DETAIL

SCALE 1:50 @ A3

Notes

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A	RC	JP	05/20

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Project

48 ESMONDE ROAD
TAKAPUNA
FOR
KINGSTONE PROPERTY LIMITED

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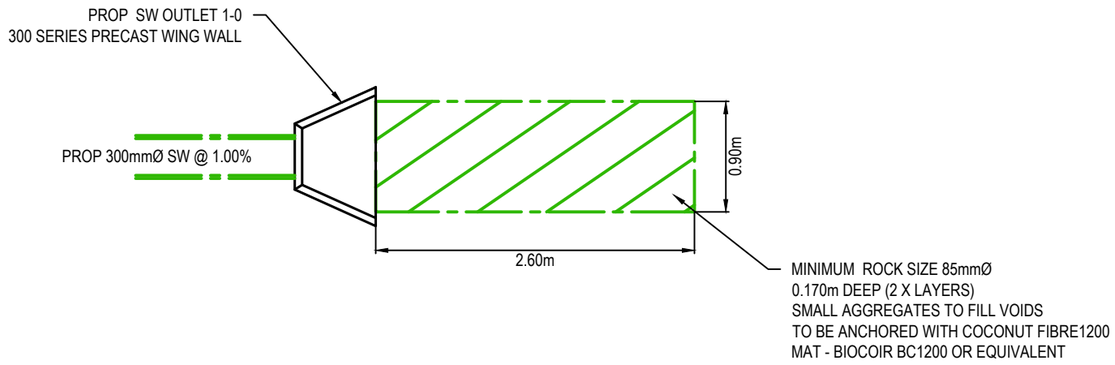
PROPOSED
RAIN GARDEN
DETAILS

Project no.	175001		
Scale	-		
Cad file	C400 - C500 DRAINAGE.DWG		
Drawing no.	C445	Rev	A



RG
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PROP RIPRAP 1-0 DETAIL

SCALE 1:50 @ A3

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Project

48 ESMONDE ROAD TAKAPUNA FOR KINGSTONE PROPERTY LIMITED

Title

PROPOSED STORMWATER OUTLET DETAILS

Project no.	175001		
Scale	-		
Cad file	C400 - C500 DRAINAGE.DWG		
Drawing no.	C446	Rev	B

Maven Associates		Job Number 175001	Sheet 1	Rev B
Job Title	48 Esmonde Road, Takapuna	Author	Date	Checked
Calc Title	Outlet Structure 1-0	JP	7/09/2020	WM

OUTLET 1-0 STRUCTURE - ROCK RIPRAP

Pipe diameter =	0.300	m	ks=	0.15	
Pipe gradient =	1.00	%			
Velocity =	1.87	m/s			
Froude Number Fo =	1.09				
Rock diameter =	82	mm	=> Use	**85**	mm (min 2 layers of aggregate)
Outfall width =	0.9	m	=> Use	**0.90**	m
Outfall length =	2.59	m	=> Use	**2.60**	m

2.60m LONG x 0.90m WIDE ROCK RIPRAP OUTLET
0.17m DEEP (MINIMUM ROCK SIZE 85mmØ)

Existing Stormwater Outfall (SW 2)

Existing Stormwater Outfall (SW 3)

APPENDIX D – DRAFT OPERATION AND MAINTENANCE

STORMWATER MAINTENANCE MANUAL

RAINGARDENS

48 ESMONDE RD

TAKAPUNA

Maven Associates	**Job Number** 175001		**Rev** A
Job Title 48 Esmonde Rd Takapuna **Title** Operation and Maintenance manual	**Author** JP	**Date** 20/05/15	**Checked** WM

OPERATIONS MANUAL FOR INSTALLED DEVICES AND COMPONENTS

The SMP proposes the use treatment of new impervious areas in accordance with the guidelines of Auckland Council's GD04 Water Sensitive Design for Stormwater, GD01 Stormwater Management Devices in the Auckland Region and E.10 (Stormwater Management Area) of the AUP – OP.

Water sensitive design is a driving component of the SMP, stormwater management requires – where possible – treatment of new trafficable impervious areas to control stormwater discharge quality

PURPOSE

The purpose of this operation and maintenance plan is to ensure the correct ongoing operation of the stormwater quality management devices.

This management plan should be read in conjunction with Auckland Council's operation and maintenance guidelines including but not limited to the information contained in the former Auckland Regional Council TP10 Technical Publication and TR2010 053 Operation and Maintenance of Stormwater Treatment Devices in the Auckland Region.

INTRODUCTION AND DESCRIPTION

As part of the development works at 48 Esmonde Rd, Takapuna stormwater quality management devices have been proposed onsite to achieve the primary water quality objective -to remove 75% of total suspended sediment on a long-term average basis.

Stormwater quality management devices collect stormwater runoff form all uncovered trafficable areas. It is proposed to use the following stormwater quality management devices at the subject site.

- Rain Gardens

All trafficable surfaces including roading networks, accessways, manoeuvring and carparking areas proposed as part of the development entail stormwater quality treatment via the utilisation raingardens to achieve the best practical stormwater management outcome.

MAINTENANCE

The operation and maintenance manual outlines the typical issues and ongoing operation and maintenance requirements for a rain garden. Refer to the supplier's specifications, installation guides and operation and maintenance manual for further information.

The key function of a rain garden is to:

- Filter stormwater run-off to remove contaminants - 75% of total suspended sediment.
- Provide retention and detention of stormwater runoff to alleviate downstream flows.

Once these functions are no longer achieved, maintenance is required.
To avoid further deterioration and costly maintenance it is advised to carry out maintenance on at least an annual frequency. More frequent monitoring may be required depending on the location, size and surface surrounding the rain garden.

Maintenance of the rain garden units are usually carried out by removing the filter media and replacing it with new media by qualified personnel. Careful planning is required to select the correct plants and do the maintenance without killing plants and/or ensuring new plants have the best chance of survival.

Figure 1.
Dead plants affect the quality of treatment and efficiency of the rain garden, a clear sign that maintenance is required. Trees should not be planted in rain gardens.

SCHEDULE

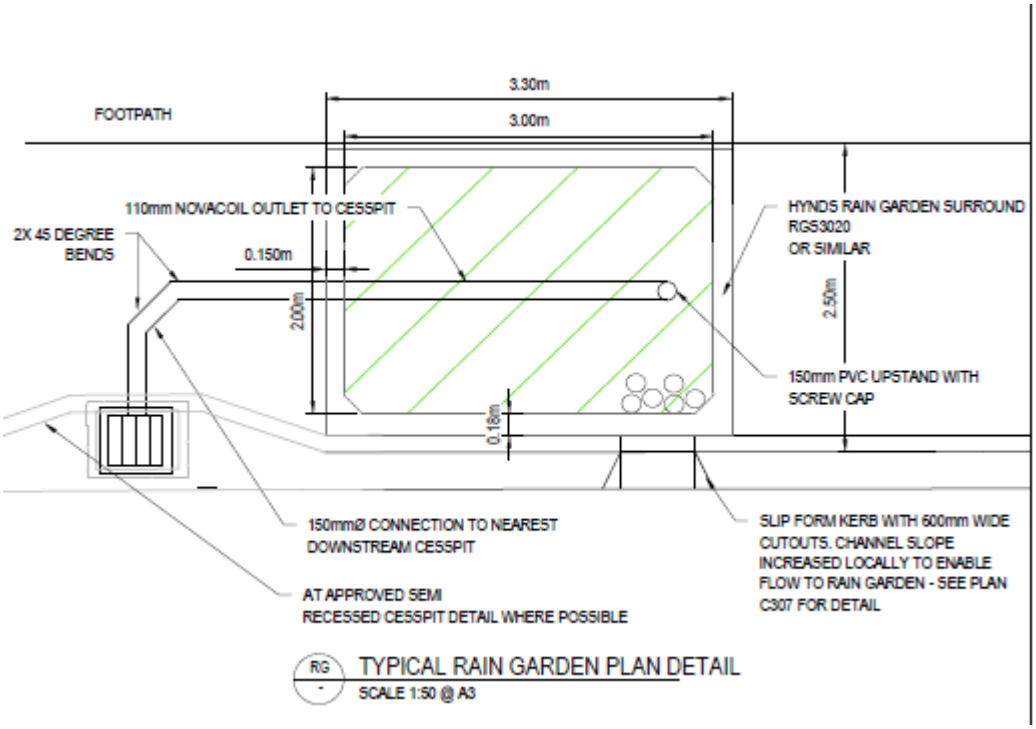
Raingardens require regular inspection and maintenance to ensure they continue to operate effectively. Removal of sediment deposition, erosion and scoured areas to be corrected, litter removal, plant maintenance as well as weed removal is to be done every 3 months.

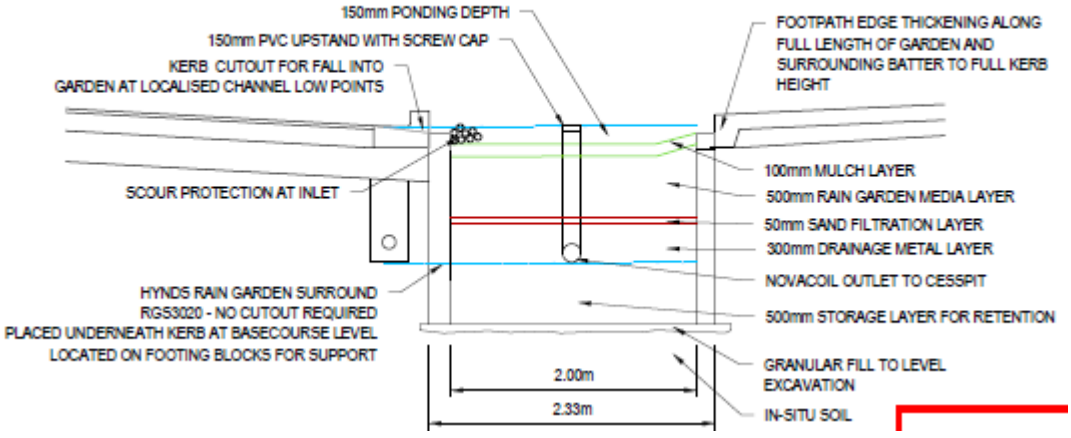
The maintenance schedule should form the basis of any maintenance contracts that are tendered. Reporting requirements, whether as a condition of consent or a contract, should be included as a procedure with details of the reporting format, contents and frequency. Any monitoring which is carried out should also be documented with details of how to undertake any sampling or testing and where results should be submitted. Public rain gardens are maintained by AT contractors. Private rain gardens also need maintenance and it is important to keep a record of the person responsible and keep the schedule up to date.

One year after construction is complete, a full inspection of the rain garden, including all the operational and visual features, should be conducted. As part of the full inspection, a flow test should be performed to test the underdrain is still working properly and that the filtration is at a sufficient rate. The underdrain and water level in the submerged zone has to be maintained annually.

Figure 2.
Rain garden media and inlet chamber may be blocked, ponding should not be visible after 1 day of dry weather. Maintenance overdue.

TYPICAL RAIN GARDEN DETAILS





Auckland Regional Council
TE RAUHITANGA TAIAO

STORMWATER COMPLIANCE INSPECTION ADVICE

(Under Section 332 of the Resource Management Act 1991)

Investigating Officer:
Date:
Time:
Weather: Rainfall over previous 2-3 days?
Person contacted during visit:

Site Name:		File No:	
Consent Holder:		Consent No:	
Engineer:		Catchment:	

DETENTION PIT MAINTENANCE INSPECTION CHECKLIST

× Needs immediate attention
– Not Applicable
✓ Okay
? Clarification Required

"As builts"	Required Y / N	Available Y / N	Adequate Y / N	Approx. check to verify vol(s). Y / N
"Operation & Maintenance Plan"	Required Y / N	Available Y / N	Adequate Y / N	
"Planting Plan"	Required Y / N	Available Y / N	Adequate Y / N	

Detention Tank Components:

Items Inspected	Checked		Maintenance Needed		Inspection Frequency		Checked		Maintenance Needed		Inspection Frequency
OBSERVATION	Y	N	Y	N		5. Backflow preventer (once in five years) (N/A)	Y	N	Y	N	
1. Extent of roof catchment conforms to design						6. Orifice	Y	N	Y	N	
2. Extent of paved (other impervious) are conforms to design	Y	N	Y	N		7. Overflow pipe	Y	N	Y	N	
						8. Maintenance access	Y	N	Y	N	
3. First flush device, screens and tank cover	Y	N	Y	N		9. Erosion protection	Y	N	Y	N	
4. Water pump and plumbing (N/A)	Y	N	Y	N							

Inspection Frequency Key **A = Annual, M = Monthly, 3M = Three monthly, 6M = Six Monthly, 3-6M = Three to Six Monthly**

OFFICERS REMARKS:

OVERALL CONDITION OF FACILITY:

In accordance with approved design plans? Y / N In accordance with As Built plans? Y / N

Maintenance required as detailed above? Y / N Compliance with other consent conditions? Y / N

Comments:

_____

Dates by which maintenance must be completed: / /

Dates by which outstanding information as per consent conditions is required by: / /

Officers signature: _____

Consent Holder/Engineer/Agent's signature: _____