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APPENDICES

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EXECUTIVE SUMMARY

The purpose of this Stormwater Management Plan ('SMP') is to outline the high-level stormwater management strategy for the development at 62,78 & 80 Papakura-Clevedon Road and to support the associated Clevedon Precinct. The SMP addresses the proposed urbanisation of the site, which as per the current proposal will consist of 242 residential lots, associated JOALs and future public roads.

The site is currently contained within the Single housing Zone of the Auckland Unitary Plan – Operative in Part ('AUP – OP').

A high-level stormwater strategy is proposed for the development that focuses on a Water Sensitive Design (WSD), providing quality treatment before ultimate discharge of the development stormwater into the receiving environment. SMAF provisions will also be adhered to by providing appropriate retention and detention.

Existing flood plains in the site vicinity have been accounted for in the SMP. The proposed overland flow path strategy details the overland flow conveyance within the development roadways and swales. Existing entry and exit points for these flows will be maintained. The proposed design shall eliminate any adverse downstream effects of the proposed development in terms of flooding (up to 1% AEP) whilst ensuring a safe/hazard free living environment.

A preliminary stormwater catchment and pipe capacity analysis has been conducted (as requested by Council) to confirm the suitability of a future public stormwater reticulation network to service the development.

The development is classified as a greenfield site under Schedule 4 of the Regional Network Discharge Consent (NDC). Final staging and detailed engineering design of the development shall be confirmed at Resource Consent and Engineering Approval stages. Subject to confirming compliance with Schedule 4 of the NDC, this SMP will be adopted into the NDC, and the resulting discharge of stormwater will be authorised as detailed within Schedule 8 of the NDC.

1 EXISTING SITE APPRAISAL

1.1 SUMMARY OF DATA SOURCES AND DATES

Existing site appraisal item	Source and date of data used
Topography	Surveyworx 2017
Geotechnical / soil conditions	Lander Geotechnical Consultants Limited, June 2020
Existing/Future stormwater network	Auckland Council GeoMaps, 2021
Existing hydrological features	Maven Associates, 2021
	 Auckland Council GeoMaps, Catchments and Hydrology Layers, 2021
Stream, river, coastal erosion	Tonkin & Taylor ICMP
Flooding and Flow paths	 Auckland Council GeoMaps, Overland Flow Paths Layer, 2021, Survey
Coastal Inundation	Council GIS
Ecological / Environmental areas	Not applicable as land is just paddocks
Cultural and heritage sites	Archaeological Assessment, June 2020
Contaminated Land	Fraser Thomas June 2021

1.2 LOCATION AND GENERAL INFORMATION

The development site is located on the southern side of Papakura-Clevedon Road. The eastern boundary of the site is bounded by Clevedon Showgrounds, and exisitng residential dwellings. The proposed development comprises of 62,78 and 80 Papakura-Clevedon Road. The sites legal description is shown in Table 1 below.



Figure 1: Overall Development Site

As shown in Figure 1, there are existing residential buildings located on the site. The proposed site is currently accessed via its individual private accessways. The balance of the site supports pasture paddocks which have been grazed. Scattered landscape planting also exist within the site with a number of these being protected trees. These have been shown on the site plans and their treatment is addressed in the arboricultural report.

The legal description of the site is as follows:

Address	62,78 & 80 Papakura-Clevedon Road
Legal Description(s)	PT LOT 1 DP 72559(NA40C/877), LOT 1 DP36345(NA939/227) & LOT 2 DP192001(NA121D/118)
Property Area	30.7850 Ha
Existing AUP OP – Zoning	Single House Zone

Table 1: Subject Site Legal Description

1.3 TOPOGRAPHY

The site is irregular in shape and comprises a total land area of 30.7850 Ha.

The site is best described as generally flat. Highest elevations (RL 14.0m) are located towards the southern portion of the site and lowest elevation (6.0m) located towards the northern portion. There is a depression towards the frontage of the site which drains north under Papakura-Clevedon Road through a exisitng 825mm diameter culvert.



Figure 2: Site Topography

1.4 GEOTECHNICAL

Addressed within the geotechnical report

1.5 EXISTING DRAINAGE FEATURES AND STORMWATER INFRASTRUCTURE

There are two exisitng drainage features located within close proximity of the site. There is an existing 825mm diameter culvert located under Papakura-Clevedon Road towards the frontage of the site which takes the centrally located overland flow path flows as shown is figure 3 below. There is also an exisitng 300mm diameter public stormwater line located within the eastern boundary of the site which discharges onto the paddocks within the site. This pipe takes the stormwater from 17-35 Monument Road. As shown in figure 2A there are two exisitng natural wetland located on the north-western and south-western boundary of the site which have been identified in the ecological report. These two wetland will remain and be protected by a drainage easement.

1.6 FLOODING AND FLOWPATHS



Figure 3: Existing 100-y r Catchment

Auckland Council's GeoMaps identifies several overland flow paths (OLFP) traversing through the subject site.

An existing OLFP generates within the site and traverses centrally before it discahrges into the exisitng culvert which discharges onto Taitaia Stream and then joins onto Wairoa River located northward. The Taita stream is likely to have some aquatic values and is highly modified by farming activities.

Another OLFP traverses through the eastern portion of the subject site which has the same discharge point as OLFP which traverses centrally.

Multiple minor overland flow paths generate within the site on the south eastern portion which genrally flows towards the neighboring property to the west.

There is an existing flood plain and flood prone area within the northern portion of the site. It is confirmed by Auckland Council that the flood level at the lower portion of the site is 7.84mRL.

1.7 COASTAL INUNDATION

The site is not within the coastal inundation zone.

1.8 **BIODIVERSITY**

As the subject site is largely grassed area with no permanent watercourses it is therefore situated within low biodiversity values.

There are exisitng trees located within the site which hold biodivesity values. These trees have been identified and will be retained as part of the development.

There are existing wetland located on the northwestern and southwestern corner of the proposed site. Majority of the catchments are outside of our site, and will remain unfaffacted, therefore, our works will not drain/remove the wetlands, as they will still be fed and maintained.

1.9 CULTURAL AND HERITAGE SITES

No archaeological evidence was identified.

1.10 CONTAMINATED LAND

Detailed site investigation carried by Fraser Thomas Ltd dated June 2021 identifies limited contamination. All actions required for this will be in accordance with any relevant consent conditions and recommendations identified in the report.

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- The subject site is not located within a SMAF Zone, However the SMAF rules are to be allowed for as part of the Clevedon Precinct
High Contaminant Generating Areas	• N/A
Natural Hazards	 AUP Chapter E36 Natural hazards and flooding
	Flood- Clevedon ICMP
	Harrison Grierson Flood Model
	 Auckland Council Stormwater Code of Practice
Auckland Unitary Plan Precinct	Clevedon Precinct
Existing Catchment Management Plan	 Tokin and Taylor ICMP for Clevedon. Council have advised this will be superseded by the Harrison Grierson model being prepared for Karaka Harbourside Estate
Auckland Council Regionwide Network Discharge Consent	NDC and Auckland Council Stormwater Bylaw

3 MANA WHENUA MATTERS

3.1 MANA WHENUA OUTCOMES

Water sensitive design principals underpin the proposed stormwater management for the development site, the design will ensure:

The holistic treatment of stormwater prior to discharge into the receiving environment (Taitaia Stream) through utilising treatment trains.

Treatment of sediments and trapping gross pollutants at localised areas via. stormwater devices.

Alignment with Taiao: Avoiding the mixing of contaminated water into marine and freshwater receiving environment.

The proposed development shall also include stormwater management devices to align with Mana whenua according to GD01:

Rainwater Tanks

The proposed re-use and detention tanks for all units align with mana whenua as stated in GD01:

Mana whenua Rainwater tanks that include reuse and/or recharge (in permeable soils) align with kaitiakitanga, Mauri Tu and Taiao and the protection of environmental health. Iwi management plans are a vital resource and should be referred to early in design.

Wetlands

The proposed wetlands within the site align with mana whenua as stated in GD01:

Mana whenua Wetlands provide excellent opportunities for alignment with mana whenua values including: opportunities for early alignment design collaboration, species selection (including species for harvest, such as flax), naming, signage, cultural monitoring, sourcing plants, maintenance contracts. Wetlands can align with the principles of kaitiakitanga, Mana, Taiao, Mauri Tu, Ahi kā, Mahi Toi and Tohu. Iwi management plans should be referred to early in design.

Permeable Pavement

There is an option of using permeable pavers for all private driveways/carpark. Use of permeable pavement aligns with mana whenua as stated in GD01:

Mana whenua Pervious paving can recharge groundwater but must be used in conjunction with water quality treatment to align with kaitiakitanga, Taiao and Mauri Tu. Also hand weeding and hand maintenance would align with the principles of Taiao. Iwi management plans are a vital resource and should be referred to early in design.

Swale

The proposed Swales within the site align with mana whenua as stated in GD01:

Mana whenua alignment	Mana whenua preference is for vegetated swales with minimum maintenance (little or no mowing). Swales may be planted with native grasses and other vegetation and can be designed to act as ecological corridors. Filtering
	sediments aligns with the principles of Taiao and kaitiakitanga. Iwi management plans are a vital resource and should be referred to early in design.

4 STAKEHOLDER ENGAGEMENT AND CONSULTATION

Stakeholders	What is the reason for interest?	What engagement has been completed?	Feedback and response
Auckland Council, Healthy Waters	Pre-App meeting	Discussion on proposed design	
144 Papakura Clevedon Road	 Stormwater discharge into their stream 100-year flow to their site 	Discussion on sw discharging into their stream	Accepted
Auckland Transport	Meeting	Discussion on proposed design	
Mana Whenua	Subdivision with associated roading, stormwater ponds, earthworks and contaminated soil remediation, removal of protected trees and works within 100m of a wetland area.	Discussion on proposed development	Formal response attached.

5 PROPOSED DEVELOPMENT

5.1 GENERAL DEVELOPMENT INFORMATION

The proposal is to provide 228 freehold Lots and 6 superlots of various sizes for residential purposes. The proposed development will also include Joint Owned Access Lots (JOALs), public roads and reserves. The site is under Clevedon sub-precinct A and B. The northern portion is under Clevedon Sub-Precinct A where residential lots are required to be 500m² and the southern portion is under Clevedon sub-precincts B where residential lots are required to be 800m² and average of 1000m².



Figure 4: Development Scheme Plan

5.2 LOCATION AND AREA

As shown in Figure 5 below, the site is situated within an evolving single housing and countryside living zone environment. Surrounding properties are a mix of residential lots and un-developed/vacant land.



Figure 5: Locality Plan

5.3 PURPOSE OF THE DEVELOPMENT

The Precinct envisions a sustainable, quality built urban development in the wider Clevedon region. The purpose of the proposed 228 Lot and 6 superlots development is to primarily provide residential opportunities in the Clevedon area, consistent with the structure plan.

5.4 EARTHWORKS

Site wide bulk earthworks will be carried out to achieve the proposed final ground levels for the development, followed by earthworks for the preparation of pavement areas (including JOALs and public roads), underground services, construction of stormwater management devices and drainage.

Sediment and erosion control measures will be designed and implemented under the guidelines of Auckland Council's GD05 document. Sediment erosion controls shall be inspected and approved by the Engineer before any commencement of earthworks and shall be regularly maintained.

Please refer to the development Infrastructure Report (via. Maven Associates) for more information.

6 STORMWATER MANAGEMENT

6.1 PRINCIPLES OF STORMWATER MANAGEMENT

6.1.1 ORIGINAL PRINCIPLES

The purpose of this SMP is to ensure that the receiving environment is protected and enhanced as it undergoes the proposed development.

A stormwater strategy has been developed for the site to demonstrate the overarching principles of how stormwater is to be managed within the development, as required by the regional NDC. The stormwater management proposed for the site generally aligns with the concept of a Water Sensitive Design.

The strategy for the stormwater management is outcome focused. The stormwater management plan provides a solution-based approach for the receiving environment. The plan sets up a clear process to mitigate the effects on the receiving environment, which is the Taitaia Stream and Wairoa River - located north of the development.

Requirements set out in the Clevedon Precinct (I408) of the AUP for stormwater management are as follows:

- Protect water quality and ensure that the rate of run-off throughout the development cycle is similar to pre-development levels
- Ensure development does not increase adverse effects from flood hazards, including increased flood, depths and velocities, experienced upstream or downstream of the site, taking into account the hydrological characteristics of the catchment and the vulnerability of activities within them.
- Require stormwater run-off to be collected, treated and disposed of in a way that avoids, remedies or mitigates adverse effects on adjacent sites or sites upstream or downstream in the catchment area.
- Not compromise or reduce the flood storage and conveyance function of the 1% AEP flood plain and overland flow paths

Other requirements as per the AUP(OP) are as follows:

<u>Frequent Rain Event Management</u> – Hydrology mitigation in accordance with the Stormwater Management for Flow Area 1 provisions as defined in Chapter E10 of the AUP(OP).

- <u>Conveyance</u> Provide a stormwater network to convey runoff generated from the 10% AEP event from the development and convey this to the receiving environment. Where this network is proposed to be vested with the Auckland Council, the network should be designed in accordance with the requirements set out in the SWCoP.
- <u>Overland Flow Management</u> Natural overland flowpaths are to be retained in the developed scenario. Flowpaths through development sites will be required to be incorporated into the final landform so as not to pose a risk to property or people. Flowpaths will also be protected and kept free from obstruction. Similar to flow attenuation, where alterations are made to the overland

flowpath as a result of earthworks, it will be necessary for the developer to demonstrate no negative impacts are caused by the proposed changes.

- <u>Floodplain Management</u> The management of the floodplain will be provided through the provisions contained within the AUP(OP). No vulnerable activities will be allowed within the floodplain (unless suitably mitigated) and general levels of development will be kept to a minimum in such areas.
- <u>Receiving Environment</u> To provide protection to and promotion of the receiving environment.

6.2 PROPOSED STORMWATER MANAGEMENT

6.2.1 GENERAL

Table 2 below summarizes the stormwater management strategy for the development.

Stormwater Management Requirements		Design Approach
Water Quality	•	Stormwater management devices that reduce/remove contaminants such as wetlands, Stormfilters and Gross Pollutant Traps (GPT'S)
	•	Potential use of permeable pavement where possible
Flooding 10% AEP Pipe Network	•	Design of new public stormwater reticulation network as per Auckland Council's Stormwater Code of Practice.
Stream Hydrology (SMAF or Stream Discharge)	•	Inclusion of SMAF controls via. retention/detention tanks for each lot and wetlands.
Flooding 1% AEP	•	Consideration of upstream and on-site flood plains for development design.
	•	Engineered design of internal OLFP flow rates and conveyance within the development. Contained within drainage swale or road reserves.
	•	Maintenance of internal OLFPs in consideration to the minimum freeboard requirements as per the SWCOP and NZBC.
Table 2: NDC Requirements and Desig	gn A	pproach for 60,78 & 80 Papakura- Clevedon Road

The overall stormwater management strategy to service the proposed development at 62,78 & 80 Papakura-

Clevedon Road is detailed in sections below.

6.2.2 WATER QUALITY

Opportunities to improve	Social & cultural values						Environmental values (in addition to water quality)				
High potential Some potential Little/no potential	Potential alignment with mana whenua values	Incorporating Te Aranga design principles	Improved amenity	Improved community connectedness	Improved public safety	Education	Habtat improvement	Connecting green comidors	Plant diversity	Bird, insect and reptile Assertion	Plant ecosourcing
Pervious pavement	•	0	0		•	•			-		
Living roof	•	•	•		0	•	0	0	•		•
Rainwater tank		0	•	0	0	•					
Infiltration device	0	0		0	0	•					
Vegetated swale	•		0	0	0	•	0	0	0	0	•
Bioretention swale			0	0	0	•	0	0	0	0	0
Raingardens	•		0		•	•	0	0	•	•	•
Stormwater tree pits	0	•	0		•	•	0		0	0	•
Planter boxes	0		0		•	•	0		0	0	0
Constructed wetland	•	•	•		0	•	•		•	•	•
Wet pond					0						
Dry pond (detention basin)	0	0					0	0	0	0	0

Figure 9: WSD Devices in The Auckland Region

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

The ultimate downstream environment Taitaia Stream and Wairoa River are sensitive to sediments and heavy mentals among other contaminants, therefore water sensitive design approach to improve the water quality runoff from the devlopment is important.

It is proposed that the site will be split into two separate catchments. Two thirds of the northern portion of the site will drain north to Pond A and the southern remaining area will drain to Pond B located towards the south-western boundary. Pond A and B is designed as a wetland pond. This will be the main treatment device for the two catchments. The pond has been designed to Auckland Council GD01-Stormwater managemen devices in the Auckland Region.

The proposed strategy will incorporate a WSUD approach focusing on reducing or eliminating stormwater contaminates through source control (inert materials), using stormwater treatment devices consistent with Auckland Council guidelines -

 Auckland Council's GD04 Water Sensitive Design for Stormwater and E.10 (Stormwater Management Area) of the AUP – OP. Trafficable surfaces require treatment as per Auckland Council requirements – GD01 Stormwater Management Devices in the Auckland Region: Design guideline document with treatment devices designed and sized to the guidelines set out in GD01.

The proposed public roads and shared accessways are considered high contaminant yielding and will hence require stormwater quality treatment as follows:

RESIDENTIAL LOTS

Permeable paving may be used for the private ways and car pads, as a way of reducing total impervious area and runoff. This will be confimed at the Resource Consent stage.

JOINT OWNED ACCESS LOTS (JOALS)

Proprietary stormwater quality treatment devices (such as StormFilter™, or similar) will be installed.

PUBLIC ROADS

Future public roads require treatment as per AUP – E10 and the guidelines set out in GD01. The primary water quality objective of the treatment is to remove 75% of total suspended sediment on a long-term average basis prior to discharging into the receiving environment.

Stormwater quality treatment for public roads will be provided via. Wetlands and Gross pollutant trap (GPT'S) where the proposed stormwater reticulation within the development will discharge to.

6.2.3 HYDROLOGY AND ATTENUATION

Due to proposed changes to the catchment coverage, the subject site will generate mulitiple runoff events a year, this will increase the probability of erosion of the soft bottom streams within the Auckland region. Under Auckland unitary Plan the subject site is outside of SMAF zones, but it is proposed to utilize SMAF 1 rules to provide a suitable approach for the protection of receiving streams.

The inclusion of SMAF-1 controls will require the following:

- Retention of the first 5mm rainfall runoff depth volume generated from impervious areas; and
- Detention of the runoff volume generated from impervious areas for the 95% percentile rainfall event released over a 24-hour period.

Hydrology mitigation is considered to promote stream health through maintaining natural baseflow regimes within the waterways through the area and minimising erosion risk through the slow release of runoff from future urban areas.

SMAF MANAGEMENT FOR RESIDENTIAL LOTS AND PUBLIC ROADS

Wetland Pond will provide the detention volumes for the corresponding catchment's impervious surfaces and will serve the purpose of stormwater mitigation for SMAF. Detention volumes will be provided within the surface storage (ponding area), sub surface storage (planting media and drainage layer).

SMAF MANAGEMENT FOR LOTS

Smaf within the lots will be provided via rainwater tanks. The rainwater tanks will provide for detention and retention.

Please refer to Plan series C400 in **Appendix A** for more information

6.2.4 PUBLIC STORMWATER NETWORKS

New public stormwater infrastructure is proposed to service the development for the 10% AEP event.

Stormwater network for the entire development will gravity discharge into the ponds located on the northern or south-western corner of the site.

The analysis confirms that the proposed development can be adequately serviced by a future public stormwater network in accordance with the AC SWCoP.

Please note the proposed stormwater design is preliminary only and the proposed ground levels are subject to change. Final engineering design is to be confirmed at the Resource Consent stage.

6.2.5 FLOODING 1% AEP

The existing 100-yr scenario has been summarized in section 1.6.

The post-development 100-yr runoff from the subject site will conveyed by the proposed roads and discharge into the proposed ponds.

100-yr runoff from the northern catchment will discharge into Pond A and then into Papakura-Clevedon Road/Culvert under to Papakura-Clevedon Road.

100-yr runoff from the southern catchment will discharge into Pond B and then into the stream located within 144 Papakura Clevedon Road Site via a 900mm stormwater line. Any overflows will discharge onto the natural existing wetland 2 situated within north-western boundary via emergency spillway.

HG's model showed that there is effectively 'backflow' into the site from downstream in the 100-year MPD flood event, attenuation of peak flows was not considered necessary.

Predevelopment flood volumes stored within the Subject site at a flood level of RL 7.84m is 20,322m3. The proposed development maintains the flood storage via pond A which achieves a flood storage volume of 21,800m3.

Wetland Pond Calculations can be found within Appendix B – Engineering Calculations

OVERLAND FLOWPATH AND FLOODPLAIN MANAGEMENT

Auckland council requires a secondary overland flow path which conveys the 100yr ARI events.

It is envisaged that post-development flows from the subject site will be conveyed via road reserve and will be discharged to the proposed pond A located adjacent to Papakura-Clevedon Road and Pond B via road reserve located within the northwestern boundary of the Site.

Overland flow for the northern catchment travels through the roads located on the eastern and western side of the site. These roads have been designed to take the overland flows while maintaining pedestrian safety.

Plans detailing the proposed OLFP are included within the engineering Drawings.

OVERLAND MITIGATION AND MINIMUM FLOOR LEVELS

In accordance with the AUP - OP and AC SWCoP, the risk of damage to people, property and the environment as a result of flooding is to be mitigated through the adherence to minimum free board heights.

There are multiple controls on the minimum finished floor level of residential dwellings within the site. Auckland Council Code of Practice (2015) Table 4.5 indicates that 500mm freeboard should be given to the 100-year rainfall event for a vulnerable activity, and 300mm for less vulnerable activities.

Freeboard	Minimum height		
Vulnerable Activities*	500mm		
Less Vulnerable Activities*	300mm		
Overland flow paths where flow is less than $2m^3/s$	 500mm where surface water has a depth of 100mm or more and extends from the building directly to a road or car park, other than a car park for a single dwelling 150mm for all other cases 		
Overland flow paths, where flow is equal to or in excess of 2m³/s	 500mm for Vulnerable Activities* 300mm for Less Vulnerable Activities* 		

Figure 9: AUP – OP Freeboard Requirements

The future detailed design of the development at the Resource Consent Stage shall confirm the minimum freeboards for the Lots. It is anticipated that all proposed buildings will have a minimum 225mm step down from the building finished floor level, ground sloping away from the building and no OLFP encroaching into the Lots.

FLOOD HAZARD

Auckland Council's SWCoP setouts the guidelines where flow paths traverse pedestrian or vehicular accessways or public carriageways, the guidelines are that the expected flow has both:

- A maximum of 200mm depth
- A maximum velocity for pedestrian safety of:
- 0.6m/s where there is no obvious danger
- 0.4m/s where there is obvious danger.

The future detailed design of the development shall confirm compliance with these guidelines.

6.2.6 DEVELOPMENT STAGING

There are 3 stages proposed for this development and they are as follows:

Stage 1 - Formation and vesting of stormwater reticulation network and stormwater wetlands to council

Stage 2 and 3 - Development of super lots created during stage 1

6.3 ASSET OWNERSHIP

All proposed public stormwater network and wetlands within the development will be owned by Auckland Council.

All stormwater management devices in the public road reserve shall be vested to Auckland Transport.

All public roadways and related assets will be vested to Auckland Transport.

Stormwater devices treating shared accessways are to be owned by Body Corporates/Resident Associations or Lot owners.

6.4 ONGOING MAINTENANCE REQUIREMENTS

All public stormwater extensions at 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 related Body Corporates/Resident Associations or lot owners.

It is proposed that all stormwater management 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. This will be required as a condition of any approved consent.

6.5 IMPLEMENTATION OF STORMWATER NETWORK

Provisions on protecting the downstream network shall be through implementing temporary sediment and erosion controls to ensure stormwater discharge is properly treated and discharged during construction.

The methodology is as follows:

- Existing site structures, pavement, and minor drainage to be stripped and removed prior to earthworks.
- Installation of erosion and sediment controls and treatment/retention devices.
- Conduct Earthworks, whilst discharging captured clean waters and treated 'dirty water' in accordance with the proposed erosion and sediment controls.
- Construction of public stormwater infrastructure.
- Construction/installation of attenuation/treatment devices and drainage under roadways
- Stabilisation of the site and construction of accessways.
- Vesting of newly constructed public drainage assets.

6.6 DEPENDENCIES

The proposed development is dependent on the construction of the future Papakura-Clevedon Road Watermain and Wastewater networks.

Please refer to the development Infrastructure Report (via. Maven Associates) for more information

6.7 RISKS

Adverse effects on the downstream environment due to the proposed development 1% AEP flows is a potential risk. The detailed design will include a high-level catchment and flooding peak flows analysis to ensure there are no adverse downstream effects.

7 DEPARTURES FROM REGULATORY OR DESIGN CODES

At this stage, there are no known departures from Auckland regulatory and design standards.

8 CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE WORK

8.1 CONCLUSIONS

The proposed SMP for the development sets out a high-level stormwater management framework which will enable the urbanisation of the site whilst mitigating any effects on the receiving environment.

The SMP includes provisions for a Water Sensitive Design (WSD). Before ultimate discharge into the receiving environment (Taitaia Stream), stormwater run-off from the site (including public trafficable areas) will be treated for quality via. Wetland ponds. The proposed treatment of stormwater is considered to align with the mana whenua values.

SMAF 1 provisions have been implemented for the development. Retention and detention storages will be provided via. above ground tanks within the lots. Detention will be provided via wetland ponds.

Proposed assets in public road reserve will be vested Auckland Council, Healthy Waters and Auckland Transport as appropriate. Assets within shared accessways will be privately owned.

Existing flood plains in the site vicinity have been accounted for in the SMP. The proposed overland flow path strategy details the overland flow conveyance within the development roadways. Existing entry and exit points for these flows will be maintained. The proposed design shall eliminate any adverse downstream effects of the proposed development in terms of flooding (up to 1% AEP) whilst ensuring a safe/hazard free living environment.

Subject to compliance with this SMP, there will be no stormwater effects and the discharge will be enabled under the regional wide NDC. Subject to the adoption of the SMP, the proposed stormwater management of the site will accord with Schedule 4 of the Regional NDC.

8.2 RECOMMENDATIONS

Maven Associates considers the Stormwater Management Plan acceptable to enable the intended development of the site, with the proposed outcomes consistent with Schedule 4 of the regional NDC and mana whenua values.

APPENDIX A: ENGINEERING PLANS



	Notes				
	1 All work	s to be in accorda	ince wi	th Auc	kland
	council	standards.			Nanu
	2. Co-ordi	nates in terms of N	VZ Ger	detic r	Datum Mt
	Eden 20	100	12 000		
	3. Boundaries are subject to final survey				
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	F EPA E S92 D S92 C S92	RFI		ML RK RK RK	03/2023 02/2023 08/2022 07/2022
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	F EPA E S92 C S92 Rev Descrip Design F Drawn F Checked N Project 62, 78 CLEV CLEV FOR C PROP	RFI RFI RFI RFI tion y K K K H E E N Aud C E C E C E C E C E C E C E C E C E C E C E C E C C E C C C C C C C C C C C C C	Date - 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ML RK RK By Asss 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.12 0.0.	03/2023 02/2023 08/2022 07/2022 Date ociates
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MEMORANDUM OF EASEMENTS IN GROSS								
PURPOSE	BENEFITED LAND							
	А	LOT 31						
	В	LOT 30						
	С	LOT 29						
DRAINAGE	D	LOT 23						
DRAINAGE	E	LOT 22	AUCKLAND COUNCIL					
	J	LOT 212						
	K	LOT 180						
	L	LOT 183						
	F	LOT 180						
DOADING	G	LOT 181						
ROADING	Н	LOT 182	AUCKLAND TRANSPORT					
	I	LOT 183						
	Μ	LOT 212						
PLANTING PROTECTION COVENANT AREA	Ν	LOT 213	AUCKLAND COUNCIL					
	0	LOT 214						

AMALGAMATION CONDITIONS

1. THAT LOT 500 HEREON (LEGAL ACCESS) BE HELD AS TO FOUR UNDIVIDED ONE-FORTH SHARES BY THE OWNERS OF LOTS 52-55 HEREON AS TENANTS IN COMMON IN THE SAID SHARES AND THAT INDIVIDUAL RECORDS OF TITLE BE ISSUED IN ACCORDANCE THEREWITH.

Note	s								
1. /	all wo	rks	to be	in acco	orda	nce wi	ith Auc	klan	d
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F E D C Rev Desig Drawv Checc Drawv Checc Checc Checc Cl Cl Cl Cl Cl Cl Cl Cl Cl Cl Cl Cl Cl	EP S9 S9 S9 Desc Py n ct ct CHI CHI CHI CHI	A RI 2 RFF By By F RK K MH	FI TI TI TI TI TI TI TI TI TI T	E N 0 P 0 P 0 N F 0 N, 1 VEC 1 ES ED PLA 1 - 4		Date - 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/22 03/2 0 0 0 0 0 0 0 0 0 0 0 0 0	ML RK RK By AASS 20.0.12 d, Epsom		3/2023 2/2023 3/2022 fr/2022 ie iates
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	Notes	s 					
d channel to have sawcuts at max. 4m centres.	1. A	all works tandards	to de in acco	rdance	With A	uckiand	Council
channels and edge beams shall have 4kg black	2. 0	Contracto	r is to avoid ι	using G	SPS for	set out	of the kerb
and pavement markings to be in accordance with]	evels whe	ere gradients	less th	nan 1%		
SAM standards and the ATCOP TCDM.	3. I	t is the co	ontractors res	ponsib	ility to I	ocate al	l services
ame signs shall follow ATCOP guidelines in terms	t	hat may l	be affected by	y his o	peratio	ns.	11
kings to be reflectorised in accordance with	4. 1	ne contr Safety rec	actor snall co juirements.	mpiy v	vith all i	relevant	Health and
tandards.	5. 1	The contr	actor shall ob	otain al	l neces	sarv api	proval from
im vertical and lateral clearances for signage shall dance with MOTSAM standards.	- L	itility ope	rators before	comm	encing	work un	der or near
ng shall be designed in accordance with all	t	heir servi	ces.				
New Zealand Standards including but not restricted	1 6. F	inal pave	ement design	subje	ct to CE	R/Bean	n tests on
ces series of standards.	5	ubgrade	material.				
odified or upgraded pram crossings must be in	1. 5	Setout sc	nedule with c	o-ordir	nates of	to the c	ge points
with RTS 14 Guidelines for Facilities for Blind and		rior to co	nstruction.	0 00 30	phied		Unitación
the details provided in AT's Standard Plan	8. F	Refer to lo	ong section fo	or finisł	ned cer	ntreline l	evels. Refer
· · · · · · · · · · · · · · · · · · ·	t	o typical	cross section	is to ob	tain lev	els for o	other
boratory testing of subgrade to be undertaken at	le	ocations					
CBR and pavement depth for construction to	9. 4	All ducts :	shall have loo	ations	marke	d on ker	b lines in
required deflections tests on top of the	6	ccordan	e with speci	lication			
ts on finished basecourse level as per ATCoP	l ine	Marking	1				
also to be provided.				— E	X BDY	,	
	_			- P	ROPF	3DY	
STAGE 1				W.	/C100	R (30m	n -
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STAGE 2		JO STO		F- Y	1100R	1x1	
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STAGE 3	1.						
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STAGE 4		K	&C	KERB	AND	CHAN	NEL
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	-	EPA RF	I			ML	10/2022
190 PAPAKURA-CLEVEDON	E					N.4I	08/2022
190 PAPAKURA-CLEVEDON ROAD, PT ALLT 2 PARO	E D	EPA					
190 PAPAKURA-CLEVEDON ROAD, PT ALLT 2 PARO WAIROA, PT ALLT 21 PARO	D	EPA				ML Du	D - 4 -
190 PAPAKURA-CLEVEDON ROAD, PT ALLT 2 PARO WAIROA, PT ALLT 21 PARO WAIROA	E D Rev	EPA Descript	on			By	Date
190 PAPAKURA-CLEVEDON ROAD, PT ALLT 2 PARO WAIROA, PT ALLT 21 PARO WAIROA	L D Rev	EPA Descript By	on		Date	By	Date
190 PAPAKURA-CLEVEDON ROAD, PT ALLT 2 PARO WAIROA, PT ALLT 21 PARO WAIROA	E D Rev Surve	EPA Descript By	on		Date	By	Date
190 PAPAKURA-CLEVEDON ROAD, PT ALLT 2 PARO WAIROA, PT ALLT 21 PARO WAIROA	E D Rev Surve	EPA Descript By y -	on		Date -	By	Date
190 PAPAKURA-CLEVEDON ROAD, PT ALLT 2 PARO WAIROA, PT ALLT 21 PARO WAIROA	E D Rev Surve	EPA Descript By y -	on		Date - 12/202	By 21	Date
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All works to be in accordance with Auckland Council

- Contractor is to avoid using GPS for set out of the ker
- The contractor shall comply with all relevant Health a
- The contractor shall obtain all necessary approval fro utility operators before commencing work under or near
- Final pavement design subject to CBR/Beam tests on
- Setout schedule with co-ordinates of chainage points along road centreline to be supplied to the contractor prior to construction.
- Refer to long section for finished centreline levels. Re to typical cross sections to obtain levels for other
- All ducts shall have locations marked on kerb lines in

03/2023

02/2023

10/2022

08/2022

Date

lev G



All works to be in accordance with Auckland Council standards.

- Contractor is to avoid using GPS for set out of the kert levels where gradients less than 1%.
- It is the contractors responsibility to locate all services that may be affected by his operations.
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- Refer to long section for finished centreline levels. R to typical cross sections to obtain levels for other locations
- All ducts shall have locations marked on kerb lines in accordance with specification.

Line Marking



	Ву	Date
Survey	-	-
Design	RK	12/2021
Drawn	RK	12/2021
Checked	WM	12/2021



Maven Associates 09 571 0050 info@maven.co.nz w.maven.co.nz E N 5 Owens Road, Epsom Auckland 1023

62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, **CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

PROPOSED ROADING PLAN

Project no.	194006		
Scale	1:2000@ A3		
Cad file	C300- ROADING.DWG		
Drawing no.	C302	Rev	G





are to be flush to the channel with no lin
channel to have sawcuts at max. 4m centres.
hannels and edge beams shall have 4kg black
• •


	No
gs are to be flush to the channel with no lip.	1.
channel to have sawcuts at max. 4m centres. hannels and edge beams shall have 4kg black	2.

oxide.
 13. All signage and pavement markings to be in accordance with NZTA MOTSAM standards and the ATCOP TCDM.

1. All works to be in accordance with Auckland Council standards.

Contractor is to avoid using GPS for set out of the kert levels where gradients less than 1%.

It is the contractors responsibility to locate all services that may be affected by his operations

The contractor shall comply with all relevant Health a Safety requirements.

The contractor shall obtain all necessary approval fro utility operators before commencing work under or nea their services.

Final pavement design subject to CBR/Beam tests on subgrade material.

Setout schedule with co-ordinates of chainage points along road centreline to be supplied to the contractor prior to construction.

Refer to long section for finished centreline levels. Re to typical cross sections to obtain levels for other locations

All ducts shall have locations marked on kerb lines in accordance with specification

Line Marking — — — — — — EX BDY PROP BDY CENTER LINE 1-WC100R (30m) CENTER LINE 2-WC100R NO STOPPING LINE- YI100R1x1 LIMIT LINE-WC300R .egend AC AC PAVING K&C KERB AND CHANNEL PR ROAD SIGN T PR TACTILE PAVERS PR SPEED HUMP / CUSHION **—** PR STREET LIGHT PR BERM POND MAINTENANCE TRACK (GAP65) PR CONCRETE FOOTPATH (BRUSHED CONC) PR ASPHALT ROAD ROAD 3 PR SWALE PR BRIDLE PATH EPA RFI ML 03/2023 EPA RFI ML 02/2023 EPA RFI ML 10/2022 EPA ML 08/2022 Rev Description Ву Date Date Survey 12/2021 Design 12/2021 Drawn RK 12/2021 Checked WM **Maven Associates** 09 571 0050 info@maven.co.nz w.maven.co.nz E N 5 Owens Road, Epsom Auckland 1023 M A 62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD** PROPOSED ROADING **ROUNDABOUT PLAN** 194006 Project no. 1:200@ A3 Scale

Cad file

Drawing no.

C300- ROADING.DWG

C302C

Rev G



ROAD 1 (1 OF 4) SCALE: HORI 1:1000 VERT 1:200

VC 10.42m, K 13.12

A.D. 0.8%

									— — <u> </u>		0.5%		
	4.6%												
DATUM 3.00m													
EXISTING LEVELS	7.24 6.68	0.00 7.19	7.56	7.77	8.16	8.59	8.89	8.99	9.08	9.16	9.26	9.27	
DESIGN LEVELS	7.24	7.71	7.81	7.91	8.01	8.11	8.21	8.31	8.41	8.51	8.62	8.72	
CUT/FILL	0.00	0.52	0.25	0.14	-0.15	-0.48	-0.68	-0.68	-0.66	-0.65	-0.65	-0.55	
HORIZONTAL GEOMETRY	17.14m 138°55'16"	42.95m 140°09'59	9"	22.39m 140°33'21"	R 136.13 A 27.47	8.22m 154°14'59"		57.73m 156°42'02"	R 178.96 A 11.32	1	46.39m 160°19'37"	1	22.37m 59°00'40"
VERTICAL GEOMETRY	6.54 4.6%							408.69 0.5%					
CHAINAGE	0.00	zu.00 40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	



Drawing no.

C310

Rev G



ROAD 1 (3 OF 4) SCALE: HORI 1:1000 VERT 1:200



ROAD 1 (4 OF 4) SCALE: HORI 1:1000 VERT 1:200



DATUM 4.00m	-2.9% -1.5%	/C 20.00m, K 10.00		0.5%		VC 13.70m, K 17	20		1.3%				0.
EXISTING LEVELS	7 88 2 88	77.7	7.65	7.87	7.96	8 08	8.34	8.64	5	9.01	a.00	9.01 9.74	
DESIGN LEVELS	7 68 2 68	7.61	7.71	7.81	7.91	8 US	8.33	5 5 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	5	8.85		9.9.9 9.46	
CUT/FILL	-0.13	-0-0-10	0.06	-0.06	-0.05	-0.0	-0.01	-0.05	5	-0.15		-0.28	
HORIZONTAL GEOMETRY	13.12m 63°40'40"	R 30.58 A 26.55	R 96.23 A 26.28	33.74 128°30	lm '38"	R 25.21 12.22 A 12.66 159°24	2m 18.61m '38" 159°24'38"			1	17.64m 9°24'38"		
VERTICAL GEOMETRY	\$22 15.03 -2.9% -1.5%	/C 20.00, A.D. 2.0% CH 28.25/RL 7:55		66.72 0.5%		VC 13.70, A.D. 0 IP CH 111.81/RL 7	3% .97		96.73 1.3%				86. <u>38</u> 0.6%
CHAINAGE	0.00	40.00	<u>60.00</u>	80.00	00.00	- 00 02	40.00	60.00		00 00		240.00	

ROAD 2 (1 OF 2) SCALE: HORI 1:1000 VERT 1:200



ENGINEERING APPROVAL



Notes

1. All works to be in accordance with Auckland Council standards.

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egend

- — — — — EX GL PROP FL

G	EPA	RFI		ML	03/2023
F	EPA	RFI		ML	02/2023
E	EPA	RFI		ML	10/2022
D	EPA			ML	08/2022
Rev	Desc	ription		Ву	Date
		Ву	Date		
Surve	у	-	-		
Desig	sign RK		12/2021		
Drawr	n –	RK	12/20	21	
Check	red	WM	12/20	21	



62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON PROPERTIES LTD

Project no.	194006		
Scale	AS SHOWN		
Cad file	C300- ROADING.DWG		
Drawing no.	C312	Rev	G



	EE LS ABOVE													
	S									0.8%				
	V	5			+									
DATUM 4.00m														
EXISTING LEVELS	9.34	9.45	9.53	9.53	9.70	9.85	9.91	9.97	9.95	10.08	10.16	10.30	10. <u>52</u>	
DESIGN LEVELS	9.44	9.56	9.67	9.83	6. 6	10.15	10.31	10.47	10.63	10.79	10.95	11.12	11.28	
CUT/FILL	0.10	0.10	0.14	0.30	0.29	0.31	0.40	0.50	0.68	0.71	0.80	0.81	0.76	
IORIZONTAL GEOMET	RY	99.32m 4.07m 161°39'47" 164°19'33"	26.89m 165°49'03"	6.34m 162°25'13"						378.56m 161°46'27"				
/ERTICAL GEOMETRY	,	240.69 0.6%							<u>264</u> 0.8	<u>.38</u> %				
CHAINAGE	280.00	300.00	320.00	340.00	360.00	380.00	400.00	420 <u>.00</u>	440 <u>.00</u>	460.00	480.00	500.00	520. <u>00</u>	
							SC	ROAD 4 ALE: HORI 1:1	(2 OF 3) 1000 VERT 1:20	0				





ENG





ROAD 4 (3 OF 3) SCALE: HORI 1:1000 VERT 1:200



ROAD 5 SCALE: HORI 1:1000 VERT 1:200

Notes

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Legend

— — — — EX GL — PROP FL

G	EPA	RFI			ML	03/2023		
F	EPA	RFI			ML	02/2023		
Е	EPA	RFI			ML	10/2022		
D	EPA				ML	08/2022		
Rev	Desc	ription			Ву	Date		
		Ву		Date				
Surve	у	-		-				
Design RK				12/20	21			
Drawr	ı	RK		12/2021				



62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON PROPERTIES LTD

Project no.	194006		
Scale	AS SHOWN		
Cad file	C300- ROADING.DWG		
Drawing no.	C315	Rev	G



ROAD 6 SCALE: HORI 1:1000 VERT 1:200

				Ā.E	01.4%							
		0.9%					-0.	5%		3.0%2.9%		-0.5%
DATUM 5.00m												
EXISTING LEVELS	9.04	9.75	<u>9.55</u>	9.51	9.32	9.06	9.37	9.53	<u>9.56</u>	9.50		9.36
DESIGN LEVELS	دی. ^{بو} ۲.۲.۵	9.70	6.80 6.80	10.07	10.01	9.91	9.81	9.71	9.61	9.55		9.44
CUT/FILL É	-0.29	-0.05	0.34	0.56	0.69	0.86	0.45	0.18	0.05	0.05		0.08
HORIZONTAL GEOMETRY		82 240°	.20m '39'04"		18.17m 240°39'05"		77.5 240°3	;3m ;9'05"		R 87.58 A 10.96	22.29m , 247°49'12"	R 65.08 2 A 8.80 25
VERTICAL GEOMETRY		74.5 0.9%	1	VC 14:42 IP CH 82	2, A.D. 1.4% .30/RL 10.10	·	<u> </u>).80 5%	6.17m_/ 240°39'05"	3.0 3 .03 3.0 2 .9%		49.82 -0.5%
CHAINAGE E	0.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00			220.00
						D						

VG 14.42m, K 10,00



Notes

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Legend

- --- -- EX GL PROP FL

				_	-
G	EPA	RFI		ML	03/2023
F	EPA	RFI		ML	02/2023
Е	EPA	RFI		ML	10/2022
D	EPA			ML	08/2022
Rev	Desc	ription		Ву	Date
		Ву	Date		
Surve	y	-	-		
Desig	۱	RK	12/202	21	
Drawr	1	RK	12/202	21	
Check	ed	WM	12/20	21	



62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON PROPERTIES LTD

Project no.	194006		
Scale	AS SHOWN		
Cad file	C300- ROADING.DWG		
Drawing no.	C316	Rev	G



ROAD 8 SCALE: HORI 1:1000 VERT 1:200

VC 14.20m, K 10.00

VC 12.81m, K 10.00

							A.D1.3%				
	-2.79	%		0.5%			,		-0.8%		3.1%
							~				
DATUM 6.00m											
EXISTING LEVELS	11.33	11.32	11.42	11.52	11.62	11.72	11.65	11.49	11.33	11.18	<u>11.02</u> 11.10
DESIGN LEVELS	11.32	11.11	11.00	10.74	10.50	10.34	10.27	10.22	10.24	10.28	10.26 10.29
CUT/FILL	-0.01	-0.21	-0.43	-0.78	-1.12	-1.39	-1.38	-1.27	-1.09	-0.90	-0.76
HORIZONTAL GEOMETRY		•				20 238)5.55m 3°27'01"		· · · · ·		
VERTICAL GEOMETRY	3.26 -2.79	0		96.52 0.5%		VC 1 IP CH	2.81, A.D. 1.3% 106.19/RL 11.75		89.87 -0.8%		3.08 3/1%
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00
			•						•	· · ·	

Notes

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Legend

— — — — EX GL — PROP FL

					_		
G	EPA	RFI	ML	03/2023			
F	EPA	RFI			ML 02/2023		
Е	EPA	RFI		ML	10/2022		
D	EPA	EPA				08/2022	
Rev	Desc	Description			Ву	Date	
		Ву		Date			
Survey			-	-			
Desig	sign RK 12			12/2021			
Drawn	Drawn RK			12/2021			



62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON PROPERTIES LTD

Project no.	194006		
Scale	AS SHOWN		
Cad file	C300- ROADING.DWG		
Drawing no.	C317	Rev	G

-3.0%



SCALE: HORI 1:1000 VERT 1:200

-0.5%

VG 14.71m, K 10,00

							Ā.D1.5%					
	-2	.8%		0.5%					-	1.0%		3
DATOM 6.00m	_			~	10							
EXISTING LEVELS	12.29	12.45	12.37	12.23	12.15	11.97	11.95	11.64	11.30	11.33	11.42	
DESIGN LEVELS	12.74	12.73	12.83	12.93	13.03	13.13	13.03	12.84	12,64	12.45	12.25	
CUT/FILL	0.45	0.28	0.47	0.70	0.89	1.17	1.08	1.20	1.26	1.12	0.83	
HORIZONTAL GEOMETRY	,						213.18m					
		1					230 57 50	_				
VERTICAL GEOMETRY	3) -2	28 8%		95.58 0.5%		VC IP C	14.71, A.D. 15% 1106.22/RL 13.16			96.50 1.0%		3
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	
						· · · · · · · · · · · · · · · · · · ·	ROAD 10	· · · · ·			C %	



Drawing no.

C318

Rev G

All works to be in accordance with Auckland Council

standards.

ROAD 12 (1 OF 2) SCALE: HORI 1:1000 VERT 1:200

	-2.8%			0.6%								F	-0.5%	
						_								
DATUM 7 00m														
	3.07	3.25	3.35	3.52	3.72	ca ca	3 03	3.95	1.09	4.33	1.39	4.36	2 CC	1
			+	÷	3 1:	÷	÷	~ ~	11	1		7		-
DESIGN LEVELS	13.42	13.40	13.54	13.66	13.78	1 3 OC	13.85	13.79	13.7(13.6(13.5	13.42	1 v v	2
CUT/FILL	0.35	0.17	0.19	0.14	0.06	0.07	-0.04	-0.17	-0.39	-0.72	-0.88	-0.94		<u>}</u>
HORIZONTAL GEOMET	RY						1	348. 236°0	07m)2'10"				•	
	, 3,30			93.37		VC	21.08, A.D1.1%				227.	32		
VERTICAL GEOWETRT	-2.8%			0.6%		IP C	H 107.21/RL 13.94				-0.5	%		
CHAINAGE	0.00	20.00	40.00	60.00	80.00		120.00	140.00	160.00	180.00	200.00	220.00		2202
	-													

VC 21.08m, K 20.00

A.D. -1.1%

ROAD 11 (2 OF 2) SCALE: HORI 1:1000 VERT 1:200

	SEE LS ON PREVIOUS PAGE			0.6%		<u>3.0</u> %
DATUM 6.00m						
EXISTING LEVELS	12.69	1 <u>2.66</u>	12.65	12.57	12.57	12.58
DESIGN LEVELS	11.59	11.69	11.82	11.94	12.07	12.18
CUT/FILL	-1.10	-0.97	-0.84	-0.63	-0.50	-0.39
HORIZONTAL GEOMET	RY		2	370.84m 236°02'10"		
VERTICAL GEOMETRY	VC 22	2.69, A.D. 1.1% 278.57/RL 11.55		77.93 0.6%		3.00 3.0%
CHAINAGE	280.00	300.00	320.00	340.00	360.00	370.00

E 3///23



Drawing no.

C319

Rev G

-2.4<u>%</u> DATUM 7.00m 13.39 12.13 11.10 13.53 12.82 11.77 12.56 89 EXISTING LEVELS 12.20 12.03 3.39 13 09 79 69 12.34 10.83 3 DESIGN LEVELS 5 -0.10 -0.48 -0.36 33 0.60 -0.74 -0.08 0.27 4 0.05 36 6 CUT/FILL 19.38m R 39.39 154.91m 33.76m 23.92m HORIZONTAL GEOMETRY 301°22'40" A 18.20 325°24'40" 325°24'40" 324°16'32" VC 12.40, A.D. 0.8% IP CH 63.34/RL 12.74 57.14 VC 23.64, A.D. -1.3% 34.43 14.59 81.00 VERTICAL GEOMETRY -1.5% -0.7% P CH 162.35/RL 12.04 -2.0% -2.4% 40.00 20.00 20.00 20.00 0.00 40.00 <u> 60.00</u> 80.00 8 00.00 00.00 00.00 8 CHAINAGE ROAD 13 SCALE: HORI 1:1000 VERT 1:200

-0.7%—

VC 12.40m, K 15.50 A.D. 0.8%

-1.5%

ROAD 12 (2 OF 2) SCALE: HORI 1:1000 VERT 1:200

	SEE LS ON PREVIOUS PAGE				<u>-3.0%</u>
DATUM 7.00m					
EXISTING LEVELS	14.03	13.92	13.77	13.50	13.40
DESIGN LEVELS	13.14	13.05	12.95	12.86	12.93
CUT/FILL	-0.89	-0.88	-0.82	-0.64	-0.47
HORIZONTAL GEOMETI	RY		348.07m 236°02'10"		
VERTICAL GEOMETRY			227.32 -0.5%		3.00 3/0%
CHAINAGE	280.00	300.00	320.00	340.00	348.07



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.egend

- EX GL _ _ _ PROP FL

G	EPA	RFI	ML	03/2023		
F	EPA	RFI		ML 02/2023		
E	EPA	RFI		ML	10/2022	
D	EPA			ML	08/2022	
Rev	Desc	ription		Ву	Date	
		Ву	Date			
Surve	ey -			-		
Desig	n	RK	12/2021			
Drawn	Drawn RK			12/2021		



62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

PROPOSED ROADING LONGSECTION

Project no.	194006		
Scale	AS SHOWN		
Cad file	C300- ROADING.DWG		
Drawing no.	C320	Rev	G



VC 38.53m, K 7.86

-2.0%



	(300m	m lime
5)	stabilised	CBR11%)
	CBR 3%	CBR 4%
	260	200
	360	200
	-	-

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- The minimum vertical and lateral clearances for signage shall be in accordance with MOTSAM standards
- Street lighting shall be designed in accordance with all applicable New Zealand Standards including but not restricted to the current version of AS/NZS 1158 Lighting for Roads and Public Spaces series of standards
- 8. All new, modified or upgraded pram crossings must be in accordance with RTS 14 Guidelines for Facilities for Blind and Vision-impaired Pedestrians and NZS/AS 1428.4 and must comply with the details provided in AT's Standard Plan No.FP006.
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G	EPA	EPA RFI			03/2023
F	EPA	EPA RFI			02/2023
Е	EPA	EPA RFI			10/2022
D	EPA	EPA			08/2022
Rev	Desc	ription		Ву	Date
By D			Date		
Survey -		-			
Ductor DV			40/00	24	

Checked	WM	12/2021
Drawn	RK	12/2021
Design	RK	12/2021



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, **CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

PROPOSED ROADING CROSS-SECTIONS

CBR 4%	Project no.	194006
200	Scale	AS SHO
300	Cad file	C300- ROAI
	Desuise as	0000

Natural Ground

CBR 3%	CBR 4%
200	200
350	300

Project no.	194006		
Scale	AS SHOWN		
Cad file	C300- ROADING.DWG		
Drawing no.	C330	Rev	G



Notes	
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- 1. All works to be in accordance with Auckland Council standards.
- Contractor is to avoid using GPS for set out of the kerb levels where gradients less than 1%.
- It is the contractors responsibility to locate all services that may be affected by his operations.
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- The contractor shall obtain all necessary approval from utility operators before commencing work under or near their services.
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E	EPA	RFI		ML	10/2022
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Desig	۱	RK	12/2021		
Drawn RK 12/2		12/202	21		
Checked WM 12/2021					



62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON PROPERTIES LTD

Project no.	194006		
Scale	AS SHOWN		
Cad file	C300- ROADING.DWG		
Drawing no.	C331	Rev	G

)	Natural Ground		
	CBR 3%	CBR 4%	
	200	200	
	350	300	





(300mm lime stabilised CBR11%)

CBR 3%	CBR 4%
260	200
360	200

- All works to be in accordance with Auckland Council standards
- Contractor is to avoid using GPS for set out of the ker levels where gradients less than 1%.
- It is the contractors responsibility to locate all services that may be affected by his operations
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Е	EPA	RFI		ML	10/2022	
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Drawr	1	RK	12/2021			
Checked WM 12/2021						

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62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	AS SHOWN		
Cad file	C300- ROADING.DWG		
Drawing no.	C332	Rev	G



TYPICAL CROSS SECTION - 18m (WIDE FOOTPATH) ROADS 10 AND 13 C302 SCALE 1:100 @ A3

DESIGN BASED ON MINIMUM CBR OF 3.0

	(400mm lime
Roads 2-5 & 7-13	stabilised CBR11%
Natural CBR	CBR 2%
Base course	200
Subbase	320



- All works to be in accordance with Auckland Council standards
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Drawr	1	RK	12/2021		
Check	ked WM 12/2021				

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62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

PROPOSED ROADING **CROSS-SECTIONS**

Project no.	194006		
Scale	AS SHOWN		
Cad file	C300- ROADING.DWG		
Drawing no.	C333	Rev	G

Natural Ground **CBR 3%** CBR 4% 200 200

200	200
350	300





All works to be in accordance with Auckland Council standards

- Contractor is to avoid using GPS for set out of the ker levels where gradients less than 1%.
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F	EPA RFI		ML	02/2023	
E	EPA RFI		ML	10/2022	
D	EPA		ML	08/2022	
Rev	Description		Ву	Date	
By D		Date			
Survey		-			
Desig	- -	DV	12/2021		

Design	RK	12/2021
Drawn	RK	12/2021
Checked	WM	12/2021



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	AS SHOWN		
Cad file	C300- ROADING.DWG		
Drawing no.	C334	Rev	G

	(300m	m lime
6)	stabilised	d CBR11%)
	CBR 3%	CBR 4%
	260	200
	360	200
	-	-

Roads 1 & 6 T- intersection	(400mm lime	(300mm lime
and Road 6 & 4 Roundabout	stabilised CBR11%)	stabilised CBR11%
Natural CBR	CBR 2%	CBR 3%
Base course (AC 20)	200	200
Subbase	350	250





(250mm lime %) stabilised CBR11%) CBR 4% 200

200

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G	EPA RFI		ML	03/2023	
F	EPA RFI		ML	02/2023	
Е	EPA RFI		ML	10/2022	
D	EPA		ML	08/2022	
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Survey -		-			

Drawn	RK	12/2021
Checked	WM	12/2021



62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON PROPERTIES LTD

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Project no.	194006		
Scale	AS SHOWN		
Cad file	C300- ROADING.DWG		
Drawing no.	C335	Rev	G



All works to be in accordance with Auckland Council standards

- Contractor is to avoid using GPS for set out of the ker levels where gradients less than 1%.
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G	EPA RFI		ML	03/2023		
F	EPA RFI		RFI ML		ML	02/2023
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D	EPA		ML	08/2022		
Rev	Description			Ву	Date	
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Design	RK	12/2021
Drawn	RK	12/2021
Checked	WM	12/2021



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	AS SHOWN		
Cad file	C300- ROADING.DWG		
Drawing no.	C336	Rev	G



Notes

1. All works to be in accordance with Auckland Council standards.

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G	EPA RFI		ML	03/2023			
F	EPA	EPA RFI		RFI M		ML	02/2023
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D	EPA	EPA		ML	08/2022		
Rev	Desc	Description		Ву	Date		
	By Date		Date				
Surve	у	-	-				

Design	RK	12/2021
Drawn	RK	12/2021
Checked	WM	12/2021



62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON PROPERTIES LTD

PROPOSED SWALE CROSS-SECTIONS

Project no.	194006		
Scale	AS SHOWN		
Cad file	C300- ROADING.DWG		
Drawing no.	C337	Rev	G



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┬~;_	-11 1	1.	All works	s to be in accor standards.	dance v	vith Auc	kland
		2.	Co-ordir	ates in terms o	f NZ Ge	odetic I	Datum Mt
	י וך		Eden 20	00. Levels in te	rms of t	he Auc	kland
	<u> </u>	3.	verucal It is the r	Contractors rese	onsihili	ty to lor	ate all
	I <u> </u>	.	services	that may be af	fected b	y his op	perations.
	1 1	4.	Each co	nnection shall b	e marke	ed by a	ding
	i I		SUMMX5 600mm	above ground le	nie stak evel with	e exten 1 the to	ong p painted.
			This ma	rker post shall b	oe place	d along	side a
			timber m	arker installed	at the ti	me of p tion to 1	ipelaying
			below fir	nished ground le	evel. Co	nnectio	ins shall
		_	be accu	ately indicated	on "as l	ouilt" pla	ans.
		5.	Approve	d hardfill is to b	e used	in back	filling of all
			standard	ls.		.งแหง แ	
		6.	All Manh	noles are to be	1050mn	nØ unle	ss shown
		7.	All lines end. tim	to be abandone ing of all sealing	ed shall g to be o	be seal	led at each ated with
		Q	COUNCILS	statt. Saro to bo class		se it is t	o ho
		0.	installed	within the road	reserve	e. In this	s case, the
			pipe is to	be upgraded t	o class	4.	
STAGE 1							
	· ·	Lege	end				
STAGE 2		- -				(
STAGE 3		_			PR STA	I AGING I	BDY
STAGE 3		—			EX STC	RMWA	TER
STAGE 4	1 :				PR STO PR WM	VRMWA VACU	ALER UM LINF
	i	_			PR WW	GRAV	ITY LINE
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					PR SW	СР	
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		E	EPA RF	1		ML	10/2022
	I	D	EPA			ML	08/2022
		Rev	Descript	ion	Dete	Ву	Date
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	·	Draw	ving no.	C400		Rev	G







All works to be in accordance with Auckland council standards. Co-ordinates in terms of NZ Geodetic Datum M 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. 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. Approved hardfill is to be used in backfilling of a road crossings and vehicle crossings to council standards. All Manholes are to be 1050mmØ unless shown otherwise. All lines to be abandoned shall be sealed at each end. timing of all sealing to be coordinated with council staff. All pipes are to be class 2 unless it is to be installed within the road reserve. In this case, the pipe is to be upgraded to class 4. egend EX BDY PR BDY PR STAGING BDY EX STORMWATER PR STORMWATER PR WW VACUUM LINE PR WW GRAVITY LINE

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Chec	ked	JP	02	/2022		
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E	EPA	RFI		ML	10/202	
F	EPA	RFI		ML	02/202	
G	EPA RFI			ML	02/202	

09 571 0050

info@maven.co.nz

w.maven.co.nz

o Owens Road, Epsom

- PR FUTURE GRAVITY

ABANDON / REMOVE PR WW VALVE PIT EX/PROP SWMH

PR SWCP



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IL=8 PROPOSED II =8 525mm RCR PLAN

Project no.	194006		
Scale	1:500 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C403	Rev	G



















- All works to be in accordance with Auckland
- Co-ordinates in terms of NZ Geodetic Datum M Eden 2000. Levels in terms of the Auckland
- It is the contractors responsibility to locate all services that may be affected by his operations.
- 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.
- Approved hardfill is to be used in backfilling of a road crossings and vehicle crossings to council
- All Manholes are to be 1050mmØ unless shown
- All lines to be abandoned shall be sealed at each end. timing of all sealing to be coordinated with
- All pipes are to be class 2 unless it is to be installed within the road reserve. In this case, the pipe is to be upgraded to class 4.



- EX BDY PR BDY PR STAGING BDY EX STORMWATER PR STORMWATER PR WW VACUUM LINE PR WW GRAVITY LINE PR FUTURE GRAVITY ABANDON / REMOVE

PR WW VALVE PIT EX/PROP SWMH PR SWCP

G	EPA	RFI		ML	02/2023
F	EPA	RFI		ML	02/2022
E	EPA	RFI		ML	10/2022
D	EPA			ML	08/2022
Rev	Desc	Description		Ву	Date
		Ву	Date		
Surve	y	SURVEYWORX	12/2021		
Design JV		01/2022			
Drawn MS		MS	02/2022		
Check	ed	JP	02/20	22	

Maven Associates 09 571 0050 fo@maven.co.n w.maven.co.nz

62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, **CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

STORMWATER DRAINAGE

Project no.	194006		
Scale	1:500 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C412	Rev	G



	Note	26				
	1.	as All wor	ks to be in acc	ordance v	vith Auc	ckland
BE INDICATIVE ONLY.	2	council	standards.		adatia	Datum Mt
ASTEWATER DETAILS.	^{2.}	Eden 2	000. Levels in	terms of t	he Auc	balum Mt kland
		Vertica	I Datum 1946.			
	3.	It is the service	contractors re s that may be	sponsibili affected b	ty to loc v his or	cate all
	4.	Each c	onnection shal	l be marke	ed by a	
		50mm>	50mm treated	pine stak	e exten	iding
		This m	above ground arker post sha	l be place	d along	p painted. gside a
		timber	marker installe	ed at the ti	me of p	ipelaying
		and ex below f	inished ground	level. Co	nnectic	ons shall
		be acc	urately indicate	ed on "as l	ouilt" pl	ans.
	5.	Approv road cr	ed hardfill is to	be used	in back	filling of all
	road crossings and vehicle crossings to council standards.			e oourioli		
450mm RCRRJ	6.	All Mar	holes are to b	e 1050mn	nØ unle	ess shown
	7.	All line	ise. s to be abando	oned shall	be sea	led at each
		end. tir	ning of all seal	ing to be o	coordina	ated with
	ß	Council	staff.	ice 2 unla	e it in t	n he
	0.	installe	d within the roa	ad reserve	e. In this	s case, the
		pipe is	to be upgrade	d to class	4.	, -
		and				
	Lege			EX BD	(
	—			PR BD	(DDV
				EX STA	NGING NRMWA	ATER
	-			PR STO	RMW	ATER
PROP				 PR WM PR WM 	/ VACU / GRAV	IUM LINE
T KOI	-			PR FU1	URE O	GRAVITY
		\sim	$\sim\sim$	ABAND	00N / R	EMOVE
		6		PR WW EX/PRO	VALVI	E PIT MH
		e		PR SW	CP	
	G	EPA F	FI		ML	02/2023
0.070%	G	EPA R	FI		ML ML	02/2023
RCRRJ @ 0.70%	G F E	EPA R EPA R EPA R	FI FI		ML ML ML	02/2023 02/2022 10/2022
2CRRJ @ 0.70%	G F E D	EPA R EPA R EPA R EPA	FI FI STI		ML ML ML By	02/2023 02/2022 10/2022 08/2022 Date
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RCRRJ @ 0.70%	G F E D Rev Desic Draw Chece Draw Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Ch	EPA F EPA F EPA F EPA EPA EPA E E E E E E E E C C C C C C C C C C C	IFI IFI IFI Stion By SURVEYWORX V AS P EDON EDON EDON EDON EDON EDON EDON EDON	Date 12/20 01/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 00 0 0 0	ML ML ML By 21 22 22 22 22 22 22 22 22 22	02/2023 10/2022 10/2022 Date Sociates A - ND
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RCRRJ @ 0.70%	G F E D Rev Desic Draw Chece Draw Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Chece Ch	EPA F EPA F EPA F EPA F EPA F EPA F EPA F E E E C C C C C C C C C C C C C C C C	IFI IFI IFI Storn By SURVEYWORX V AS P E N B & 800 P EDON F EDON F EDON, S CLEVED P OSED MWATE 194006 1:500 @ C400- DRAIN	Date 12/20 01/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 00 00 00 00 00 00 00 00 00 00 00 00 0	ML ML ML By 21 22 22 22 22 22 22 22 22 22	02/2023 10/2022 10/2022 Date
RCRRJ @ 0.70%	G F E D Rev Desig Draw Chec Chec Cl Cl Cl Cl Cl Cl Cl Cl Cl Cl Cl Cl Cl	EPA F EPA F EPA F EPA F Poscription EPA F EPA F	IFI IFI IFI Stion By URVEYWORX V AS P E N & 80 P EDON F EDON, I CLEVED P COSED MWATE 194006 1:500 @ C400- DRAIN C413	Date 12/20 01/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 02/20 00 00 00 0 0 0	ML ML ML By 21 22 22 22 22 0 ASS 0 ONR 4 (LA CAR CAR CAR CAR CAR CAR CAR CA	02/2023 02/2022 10/2022 Date sociates A - ND VAGE



- All works to be in accordance with Auckland council standards.
- 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.
- 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.
- Approved hardfill is to be used in backfilling of al road crossings and vehicle crossings to council standards.
- All Manholes are to be 1050mmØ unless shown otherwise.
- All lines to be abandoned shall be sealed at each end. timing of all sealing to be coordinated with council staff.
- All pipes are to be class 2 unless it is to be installed within the road reserve. In this case, the pipe is to be upgraded to class 4.

Legend

EX BDY PR BDY PR STAGING BDY EX STORMWATER PR STORMWATER PR WW VACUUM LINE PR WW GRAVITY LINE PR FUTURE GRAVITY ABANDON / REMOVE

PR WW VALVE PIT EX/PROP SWMH PR SWCP

G	EPA	RFI		ML	02/2023
F	EPA RFI ML 02/2022			02/2022	
E	EPA	RFI		ML	10/2022
D	EPA			ML	08/2022
Rev	Desc	Description		Ву	Date
		Ву	Date		
Survey SURVEYWORX 12		12/202	21		
Design JV		01/2022			
Drawn	1	MS	02/20	22	
Chack	ha	ID	02/20	22	



Maven Associates 09 571 0050 nfo@maven.co.nz w.maven.co.nz

62, 78 & 80 PAPAKURA -CLEVEDON ROAD, **CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

PROPOSED STORMWATER DRAINAGE PLAN

Project no.	194006		
Scale	1:500 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C414	Rev	G












All works to be in accordance with Auckland council standards.

- Co-ordinates in terms of NZ Geodetic Datum Mt Eden 2000. Levels in terms of the Auckland Vertical Datum 1946.
- It is the contractors responsibility to locate all services that may be affected by his operations.
- 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).
- 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.
- Heavy duty manhole lids and frames to be used in trafficked areas.
- All Manholes are to be 1050mmØ unless shown otherwise.
- 9. Catchpit leads with 800mm or less cover shall be protected with concrete capping.
- 10. All lines to be abandoned shall be sealed at each end. timing of all sealing to be coordinated with council staff.

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EX GROUND LEVEL PROP FINISHED LEVEL

G	EPA	EPA RFI			02/2023
F	EPA	EPA RFI			02/2022
E	EPA	RFI		ML	10/2022
D	EPA			ML	08/2022
Rev	Description			Ву	Date
		Ву	Date		
Survey		SURVEYWORX	12/2021		
Design		JV	01/2022		
Deeuun		MC	00/00	22	



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

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Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C420	Rev	G

G APPROVAL EN(

			-
DATUM 3.00m		MH 1-7 (1200mm)	
EXISTING LEVELS	10.24		9.97
DESIGN LEVELS	10.25		10.72
PIPE INVERT		8.44	8.95
DEPTH INVERT (m)	2.16		1.77
PIPE GRADE		225mm RCRRJ Ø @ 1.10%	•
CHAINAGE	0.00		46.62
		SW LINE 1-7-1 SCALE: HORI 1:1000 VERT 1::	200

			Ψ
	L	9 8- -	MH 1-8-1
DATUM 4.00m			
EXISTING LEVELS	11.16		10.01
DESIGN LEVELS	11.30		11.12
PIPE INVERT		9 6 6	CI .01
DEPTH INVERT (m)	2.19	3	16.1
PIPE GRADE		225mm RCRRJ Ø @ 0.90%	-
CHAINAGE	0.00		/0./0
		SW/1 INE 1.8.1	

SW LINE 1-8-1 SCALE: HORI 1:1000 VERT 1:200

DATUM 3.00m		(mm0021) 7-1 HM	MH 1-7-1
EXISTING LEVELS	10.24		9.97
DESIGN LEVELS	10.25		10.72
PIPE INVERT	11.0	χ. 4	8.95
DEPTH INVERT (m)	2.16		1.77
PIPE GRADE	-	225mm RCRRJ Ø @ 1.10%	-
CHAINAGE	0.00		46.62

SW LINE 1-5-1
SCALE: HORI 1:1000 VERT 1:200



SW LINE 1-6-1 SCALE: HORI 1:1000 VERT 1:200

DATUM 2.00m	MH 1-5 (1500mm)
EXISTING LEVELS	9.64
DESIGN LEVELS	9.57
PIPE INVERT	7.82
DEPTH INVERT (m)	2.27
PIPE GRADE	225mm RCRRJ Ø @ 1.20%
CHAINAGE	0.00

	ļ			
DATUM 2.00m	MH 1-4 (1500mm)			MH 1-4-1
EXISTING LEVELS	9.55		9.65	
DESIGN LEVELS	9.48		9.78	
PIPE INVERT	7.72		8.22	
DEPTH INVERT (m)	2.32		1.57	
PIPE GRADE		225mm RCRRJ Ø @ 1.50%		
CHAINAGE	0.00		33.59	

ПТ

SW LINE 1-4-1

SCALE: HORI 1:1000 VERT 1:200

DATUM 2 00m		MH 1-5-1
	9.69	
DESIGN LEVELS	9.88	
PIPE INVERT	8.37	
DEPTH INVERT (m)	1.51	
PIPE GRADE 225mm RCRRJ Ø @ 1.20%	-	
CHAINAGE	45.00	

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- 8. All Manholes are to be 1050mmØ unless shown otherwise.
- 9. Catchpit leads with 800mm or less cover shall be protected with concrete capping.
- 10. All lines to be abandoned shall be sealed at each end. timing of all sealing to be coordinated with council staff.

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EX GROUND LEVEL PROP FINISHED LEVEL

G	EPA	EPA RFI			02/2023		
F	EPA	PA RFI		EPA RFI		ML	02/2022
E	EPA	RFI		ML	10/2022		
D	EPA			ML	08/2022		
Rev	Desc	ription		Ву	Date		
		Ву	Date				
Surve	y	SURVEYWORX	12/2021				
Design		JV	01/2022				
Drawn		MS	02/20	22			
Checked		JP	02/2022				



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C421	Rev	G

ſ						Z			777							_
DATUM 0.00m	MH OUTLET 2-0	MH 2-1 (2550mm)		MH 2-2 (2300mm)	MH 2-3 (1500mm)	(MH 24 (2050mm)		MH 2-5 (1800mm)	MH 2-9 (2300mm)			MH 2-10 (1800mm)		MH 2-11 (1800mm)	μη 2-τι τι τουσιμιτι
EXISTING LEVELS	8.74	8.66	8.50		8.22	8.06		8.45	C X X X	000		9.26			9.42	
DESIGN LEVELS	7.67	8.35	8.47		8.50	8.51		8.93	20	9.04		640	1		9.58	_
PIPE INVERT	5.65	5.67 5.73	5.77	5.82	5.85 5.99	6.02	6.07	6.29	6.45 6.45	6.62		6.93	6.98		7.13 7.18	1.10
DEPTH INVERT (m)	3.49	2.76	2.79		2.65	2.49		2.72	2 4R	0 +. V		2.49			2.46	
PIPE GRADE		1200n	nm RCRR @ 0.30%	JØ	1050mi @	n RCR 0.30%	RJ Ø 1050mm RCRRJ Ø @ 0.30%		900mm RCRRJ Ø @ 0.50%	-	900mm RCRRJ Ø @ 0.45%		-	900mm RCRRJ Ø @ 0.40%	-	
CHAINAGE	8.0	9.70	22.87		35.18	44.83		118.67	08 CV	42.00		212 66	2		249.96	
1350mm RCRRJ @ 0.20	ø_] %			•	1200r @ 0.2	nm RCI 5%	RRJØ	S	SW LINE 2 (CALE: HORI 1:100	(1 OF 3) 00 VERT 1:200						

SW LINE 1-9-1 SCALE: HORI 1:1000 VERT 1:200

MH 1-9 (1200mm)		
11.35		10.51
11.35		11.74
9.60		10.25
1.99		1.49
-	225mm RCRRJ Ø @ 0.80%	-
0.00		80.69
	0.00 1.99 11.35 11.35 MH 1-9 (1200mm)	(uuu0021) 9:00 000 000 000 000 000 000 00

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DATUM 6.00m				
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	12		7	
	23		<u>.</u>	
	12		7	
	0	0	80	
		0	÷	
	<u> </u>		23	
	2.(
		225mm RCRRJ Ø		
IPE GRADE		@ 0.90%		
	8		41	
MAINAGE	0		<u>7</u> 9.	
		SW/LINE 1_10_1	_	

SCALE: HORI 1:1000 VERT 1:200

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.egend _____ _____

EX GROUND LEVEL PROP FINISHED LEVEL
PROT FINISHED LEVEL
HARDFILL BACKFILL

G	EPA	RFI		ML	02/2023		
F	EPA	RFI		ML	02/2022		
Е	EPA	PA RFI		PA RFI		ML	10/2022
D	EPA			ML	08/2022		
Rev	Desc	ription		Ву	Date		
		Ву	Date				
Surve	y	SURVEYWORX	12/2021				
Design		JV	01/2022				
Drawn		MS		02/2022			
Check	ed	JP	02/2022				



62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C422	Rev	G



SW LINE 2 (3 OF 3) SCALE: HORI 1:1000 VERT 1:200

	X	<u></u>		
	MH 2-19	MH 2-20		MH 2-21
DATUM 4.00m				
EXISTING LEVELS	10.93	10.84		11.17
DESIGN LEVELS	11.78	11.84		12.56
PIPE INVERT	06.6	10.08 10.13		10.83
DEPTH INVERT (m)	2.03	1.79		1.73
PIPE GRADE	300mm @	RCRRJØ 1.20%	300mm RCRRJ Ø @ 0.90%	•
CHAINAGE	527.47	542.15		620.11
			SW LINE 2 (3 OF 3)	

SW LINE 2-5-1 SCALE: HORI 1:1000 VERT 1:200

DATUM 1.00m		MH 2-5 (1800mm)	MH 2-5-1	
EXISTING LEVELS	8.45	8.76		9.29
DESIGN LEVELS	8.93	9.02		9.42
PIPE INVERT		7.29 7.35	7.40	7.71
DEPTH INVERT (m)	2.72	1.67		1.74
PIPE GRADE	3	00mm RCRRJ @ 0.40%	2 300mm RCRRJ Ø @ 0.50%	
CHAINAGE	0.00	15.95		78.63

SW LINE 2 (2 OF 3) SCALE: HORI 1:1000 VERT 1:200

DATUM 0.00m	MH 2-13 (1500mm)	MH 2-14 (1500mm)	MH 2-15 (1500mm)	MH 2-16 (1500mm)	MH 2-17 (1200mm)	MH 2-18
EXISTING LEVELS	9.50 9.50	0 0	0.83 0.83 0.83	88. 0	10.26 10.35	
DESIGN LEVELS	60.00 88 6	00.	10.34 10.42	10.42	11.06 1.06	
PIPE INVERT	7.54 7.66	7.71	8.11 8.16 8.23	8.23 8.37	<u>9.07</u>	8 6 6
DEPTH INVERT (m)	2.16		2.27	2.26	2.12	
PIPE GRADE 75	50mm RCRR @ 1.00%	R Ø 750mm RCRRJ Ø @ 0.70%	750mm RCR	CRRJ Ø 600mm RCRRJ Ø 0% @ 0.70%	450mm RCR @ 1.50%	J Ø 450mm RCRRJ Ø @ 0.60%
CHAINAGE	289.84	+	347.31	357.01	437.16 48.04	

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egend _____ _____

EX GROUND LEVEL PROP FINISHED LEVEL
PROT FINISHED LEVEL
HARDFILL BACKFILL

G	EPA	RFI	ML	02/2023		
F	EPA	RFI	ML 02/2022			
E	EPA	RFI	ML 10/2022			
D	EPA	ML 0				08/2022
Rev	Desc	ription			Ву	Date
		Ву		Date		
Surve	у	SURVEYWORX		12/2021		
Design JV 01/2022						
Drawr	Drawn MS			02/20	22	

02/2022 Checked JP Maven Associates 09 571 0050 fo@maven.co.nz www.maven.co.nz A E N 5 Owens Road, Epsom Auckland 1023

62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C423	Rev	G

SW LINE 2-16-1
SCALE: HORI 1:1000 VERT 1:200

DATUM 3.00m		MH 2-16 (1500mm)	MH 2-16-1	
EXISTING LEVELS	9.88	9.94		9.58
DESIGN LEVELS	10.42	10.36		10.81
PIPE INVERT		8.53 8.59 8.59	8 0	9.11
DEPTH INVERT (m)	2.26	1.78		1.70
PIPE GRADE	45	0mm RCRRJ @ 0.40%	Ø 375mm RCRRJ Ø @ 0.50%	
CHAINAGE	0.00	14.36		104.48

			-	
DATUM 4.00m		MH 2-17 (1200mm) ⁻	MH 2-17-1	
EXISTING LEVELS	10.26	10.24		
DESIGN LEVELS	11.06	11.12		
PIPE INVERT		9.16 9.20	9.27	
DEPTH INVERT (m)	2.12	1.94		
PIPE GRADE	37	25mm RCRRJ @ 0.30%	Ø	300mm RCRRJ Ø @ 1.10%
CHAINAGE	0.00	14.57		

SW LINE 2-15-1 SCALE: HORI 1:1000 VERT 1:200

		2-12 (1500mm)			MH 2-12-1
DATUM 2.00m		ΗW			
EXISTING LEVELS	9.39			9.16	
DESIGN LEVELS	9.56			9.39	
PIPE INVERT		7.74		7.81	
DEPTH INVERT (m)	2.41			1.58	
PIPE GRADE			375mm RCRRJ Ø @ 0.20%	٨	
CHAINAGE	0.00			32.68	

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SW LINE 2-12-1

SCALE: HORI 1:1000 VERT 1:200

DATUM 3.00m	MH 2-15 (1500mm)	MH 2-15-1	
EXISTING LEVELS	9.83	9.89	
DESIGN LEVELS	10.34	10.37	
PIPE INVERT	8.41	8.47 8.54	
DEPTH INVERT (m)	2.27	1.91	
PIPE GRADE	450mm @ 0	RCRRJØ	375mm RCRRJ Ø @ 0.50%
CHAINAGE	0.00	4.03	

SCALE: HORI 1:1000 VERT 1:200

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EX GROUND LEVEL PROP FINISHED LEVEL

G	EPA	RFI		ML 02/2023		
F	EPA	RFI		ML	02/2022	
E	EPA	RFI		ML	10/2022	
D	EPA			ML	08/2022	
Rev	Desc	cription		Ву	Date	
Ву		Date				
Surve	urvey SURVEYWORX 12/202		21			
Desig	۱	JV	01/20			
Drawn	1	MS	02/2022			
Check	ed	JP	02/20	22		



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

PROPOSED STORMWATER DRAINAGE LONG SECTIONS

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C424	Rev	G



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9.60

10.83

8.99

8

SW LINE 2-17-1





DATUM 1.00m

EXISTING LEVELS

DESIGN LEVELS

DEPTH INVERT (m)

PIPE INVERT

PIPE GRADE

CHAINAGE

MH 3-1 (1500)

22

2

MH 3-1-1

8.82

3.38

6.78 6.87

ଞ

9.00

3-1-1

SCALE: HORI 1:1000 VERT 1:200

300mm RCRRJ Ø @ 0.20%

Η

@ 0.70%





Η

\$74

89

7.00

89



SW LINE 3-2-1 SCALE: HORI 1:1000 VERT 1:200

MH 3-:

3.87

35

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ENGINEERING APPROVAL

All works to be in accordance with Auckland council standards.

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EX GROUND LEVEL PROP FINISHED LEVEL

G	EPA	RFI		ML	02/2023	
F	EPA	RFI		ML	02/2022	
Е	EPA	RFI		ML	10/2022	
D	EPA			ML	08/2022	
Rev	Description			Ву	Date	
		Ву	Date	Date		
Survey SURVEYWORX		12/20	12/2021			
Design JV 01/20		01/20	01/2022			
Drawn	1	MS	02/20	02/2022		

Checked JP



02/2022

62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C425	Rev	G

DATUM 1.00m	MH 4-5 (1500mm)		
EXISTING LEVELS	9.61		8.35
DESIGN LEVELS	9.43		8.47
PIPE INVERT	6.70		6.85
DEPTH INVERT (m)	2.84		1.65
PIPE GRADE	-	450mm RCRRJ Ø @ 0.20%	
CHAINAGE	233.06		311.54
•	:-	SW LINE 4 (2 OF 2)	<u>.</u>

SCALE: HORI 1:1000 VERT 1:200

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SW LINE 5
SCALE: HORI 1:1000 VERT 1:200

r		
l		
	(1800mm)	(1500mm)
DATUM 1.00m	MH 4-1 (MH 5-1.
EXISTING LEVELS	2) 20 20	
DESIGN LEVELS	8 4 0	
PIPE INVERT	5.89 50 80 80 80 80 80 80 80 80 80 80 80 80 80	6.06
DEPTH INVERT (m) සි	251	
PIPE GRADE	525mm RCRRJ Ø ■ @ 0.15%	450mm RCRRJ Ø
CHAINAGE	2 2 2 3 2 3 2 3 3 2 3 3 3 3 3 3 3 3 3 3	

SW LINE 4 (1 OF 2) SCALE: HORI 1:1000 VERT 1:200

DATUM 1.00m	MH 1-1 (2050mm)	MH 4-1 (1800mm)	MH 4-2 (2050mm)	MH 4-3 (1800mm)	MH 4-4 (1800mm)	MH 4-5 (1500mm)
EXISTING LEVELS	9.19 8.96		9.53 9.67	08. 08		9.61
DESIGN LEVELS	8.72 8.79		9.30 9.42	77.6		9.43
PIPE INVERT	5.76 5.79	5.87	6.28 6.28	6.45 6.45	6.52	6.62
DEPTH INVERT (m)	3.13		<u>3.20</u> 3.19	3 32		2.84
PIPE GRADE	825mm RCRRJ @ @ 0.25%	Ø 750mm RCRRJ Ø @ 0.25%	600mm RCRRJ @ 0.30%	Ø 600mm RCRRJ Ø @ 0.20%	525mm RCRRJ Ø @ 0.20%	-
CHAINAGE	0.00 15.36		105.64 118.93	179.37		233.06

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egend _____ _____

EX GROUND LEVEL PROP FINISHED LEVEL
PROT FINISHED LEVEL
HARDFILL BACKFILL

G	EPA	EPA RFI			02/2023
F	EPA	RFI		ML	02/2022
Е	EPA RFI			ML	10/2022
D	EPA		ML	08/2022	
Rev	Desc	escription		Ву	Date
Ву		Date			
Surve	y	SURVEYWORX	12/2021		
Desig	۱	JV	01/2022		
Drawn	1	MS	02/20	22	



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C426	Rev	G



SW LINE 7 SCALE: HORI 1:1000 VERT 1:200

					1
DATUM 0.00m	MH 2-2 (2300mm)	MH 7-1 (1500mm)	MH 7-2 (1500mm)	MH 7-3 (1200mm)	MH 7-4
EXISTING LEVELS		211 L		0.40	t ? -
DESIGN LEVELS	60 8	2 <u>85</u> 7 85		0.24 8 20	0 2 2
PIPE INVERT	5.87	6.02	6.29 	6.66 6.66	6.8.2
DEPTH INVERT (m)	6 6 6	1.67		1.65.1 1.65	22
PIPE GRADE	750mm RCRRJ Ø @ 0.15%	600mm RCRRJ Ø @ 0.25%	525mm RCRRJ Ø @ 0.20%	300mm RCRRJ @	300mm RCRRJ Ø @ 0.50%
CHAINAGE E	7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	00 00 00 00 00 00 00 00 00 00 00 00 00		108.13	

SW LINE 6 SCALE: HORI 1:1000 VERT 1:200

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DATUM 0.00m	MH 4-2 (2050mm)		MH 6-1 (1200mm)	MH 6-2 (1200mm)	AH 6-3	MH 6-4
EXISTING LEVELS	9.53	L C C	00.8 0 70	9.70		7 0F
DESIGN LEVELS	9.30	ç	9.70 0.62	9.62 9.00	3	7 03
PIPE INVERT	6.32	5	6.50 6.50	00 0.50 0.00 0.00 0.00 0.00 0.00 0.00 0	6.73 6.85 6.85	6.90 6.90
DEPTH INVERT (m)	3.20	ç	3.12	3.12	111	
PIPE GRADE		525mm RCRRJ Ø 5 @ 0.20%	25mm RCRR @ 0.20%	RJ Ø 525mm RCRRJ Ø @ 0.15%	450mm RCRRJ Ø 3 @ 0.15%	00mm RCRR. @ 0.30%
CHAINAGE	0.00		80.00	63 36 36 89	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	30.10

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egeno _____

EX GROUND LEVEL PROP FINISHED LEVEL
PROT FINISHED LEVEL
HARDFILL BACKFILL

G	EPA	RFI	ML	02/2023		
F	EPA	EPA RFI ML 02/20			02/2022	
Е	EPA	RFI		ML	10/2022	
D	EPA		ML	08/2022		
Rev	Desc	ription		Ву	Date	
Ву		Ву	Date	Date		
Survey SURV		SURVEYWORX	12/20	12/2021		
Desig	Design JV		01/20	01/2022		
Drawn		MS	02/2022			
Check	ed	JP	02/20	22		



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

PROPOSED STORMWATER DRAINAGE LONG SECTIONS

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C427	Rev	G



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SW LINE 9
SCALE: HORI 1:1000 VERT 1:200

DATUM 1.00m		MH 8-2 (1800mm)	MH 9-1 (1500mm)		MH 9-2 (1500mm)	6-9 HW	MH 0.4
EXISTING LEVELS	7.77	8.00	2	8 .43	8.31		8.22
DESIGN LEVELS	8.86	8.92	y D D	9.16	9.16		8.83
PIPE INVERT		6.52 6.54	00	6.76	6.91 6.94	7.02	7.14
DEPTH INVERT (m)	2.43	2.38		2.45	2.25		1.73
PIPE GRADE	675	0.20%	Ø 675mm RCRRJ Ø @ 0.20%		25mm RCRRJ & @ 0.20%	450mm RCRRJ Ø @ 0.20%	
CHAINAGE	0.00	12.13	2	97.57	114.63		174.91

DATUM 1.00m		MH 9-2 (1500mm	
EXISTING LEVELS	8.43		
DESIGN LEVELS	9.16		
PIPE INVERT		6.98	
DEPTH INVERT (m)	2.45		
PIPE GRADE		١	450mm R
			@ 0.3
CHAINAGE	0.00		

SVV LINE 7-3-1	
SCALE: HORI 1:1000 VERT 1:	200

SW LINE 8 SCALE: HORI 1:1000 VERT 1:200

DATUM 1.00m	MH 7-3 (1200mm) MH 7-3-1	않 보 표 DATUM 1.00m	MH 2-3 (1500mm)		MH 8-1 (1500mm)	MH 8-2 (1800mm)			8.9 2.5
EXISTING LEVELS	6.45	EXISTING LEVELS	8.22		7.23			8.28	
DESIGN LEVELS	8.35		8.50		8.80 8.86			9.28	
PIPE INVERT	6.75 6.91 6.91		6.30		6.37 6.42 6.44	6.78		7.28	05.7
DEPTH INVERT (m)	1.79	꽃 DEPTH INVERT (m)	2.65		2.43 2.43			2.05	
PIPE GRADE	225mm RCRRJ Ø 225mm RCRRJ Ø @ 0.60%	PIPE GRADE	-	750mm RCRRJ Ø @ 0.15%	750 mm RCRR @ 0.15%	JØ	375mm RCRRJ Ø @ 0.60%		30
CHAINAGE	0.00		0.00		49.39 59.59			142.44	

SW LINE 9-2-1 SCALE: HORI 1:1000 VERT 1:200

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EX GROUND LEVEL PROP FINISHED LEVEL

G	EPA	RFI		ML	02/2023	
F	EPA	RFI		ML	02/2022	
Е	EPA RFI			ML	10/2022	
D	EPA			ML 08/2022		
Rev	Description			Ву	Date	
		Ву	Date			
Surve	y	SURVEYWORX	12/2021			
Design JV		JV	01/2022			
Drawn MS		MS	02/2022			
Check	ed	JP	02/20	22		



62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

	-		
Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C428	Rev	G

	п
	8.02
	8.99
	7.54
	1.48
300mm RCRRJ Ø	_
@ 0.30%	
	201.73



SCALE: HORI 1:1000 VERT 1:200

-1 (1800mn		H 10-1-1		
MH 10		2		
14.38		13.78		
13.64		13.96		
10.64		11.00		
3.23		2.96		
	450mm RCRRJ Ø @ 0.40%		375mm RCRRJ Ø @ 0.30%	
0.00		90.70		
	0.00 3.23 13.64 14.38 MH 10-1 (1800mm)	Image: state	Image: constraint of the second se	(muoogi) 1-1-01 (muoogi)



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EX GROUND LEVEL PROP FINISHED LEVEL

G	EPA	RFI	ML	02/2023		
F	EPA	RFI		ML	02/2022	
Е	EPA	RFI		ML	10/2022	
D	EPA			ML 08/2022		
Rev	Desc	ription		Ву	Date	
Ву			Date			
Surve	y	SURVEYWORX	YWORX 12/2021			
Desig	۱	JV	01/2022			
Drawn	1	MS	02/20	22		



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C429	Rev	G

					_			
DATUM 2.00m	_	MH 2-11 (1800mm)	MH 11-1 (1500mm)	MH 11-2		MH 11-3 (1500mm)		MH 11-4
EXISTING LEVELS	9.42	9.55	0 5.4		9.12		9.24	
DESIGN LEVELS	9.58	69.69	0 7 0		9.95		10.10	
PIPE INVERT		7.43 7.47	7.61 7.63	7.68	7.78	8.01	8.22	
DEPTH INVERT (m)	2.46	2.22	2 23		2.17		1.88	
PIPE GRADE	6	00mm RCRRJ 9 @ 0.25%	Ø	450mm RCRRJ Ø @ 0.20%		225mm RCRRJ 0 @ 0.80%	ð	
CHAINAGE	0.00	15.96	22 45		70.93		96.58	
				SW LINE 11 SCALE: HORI 1:1000 VERT 1:20 450mm RCRRJ Ø @ 0.20%	00			

SW LINE 11-1-1	
SCALE: HORI 1:1000 VERT	1:200

DATUM 2.00m	MH 11-1 (1500mm)	MH 11-1-1
EXISTING LEVELS	9.57	9 ع م
DESIGN LEVELS	9.75	10 10
PIPE INVERT	7.62 7.67	7.82 8.35
DEPTH INVERT (m)	2.08	1 75
PIPE GRADE 45	0mm RCRRJ @ 0.40%	Ø 300mm RCRRJ Ø @ 0.70%
CHAINAGE	13.68	2 0 2 2 2 2 2



DATUM 5.00m	MH 10-2 (1800mm)	MH 10-2-1 MH 10-2-2
EXISTING LEVELS	14.47 14.16	13.56
DESIGN LEVELS	13.64	12.96
PIPE INVERT	10.67	10.98
DEPTH INVERT (m)	3.11 2.44	1.81
PIPE GRADE	450mm RCRRJ Ø @ 0.30%	375mm RCRRJ Ø
CHAINAGE	0.00 69.01	150.27

lotes

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- 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).
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.egend _____

----- EX GROUND LEVEL PROP FINISHED LEVEL
PROT FINISHED LEVEL
HARDFILL BACKFILL

G	EPA	RFI	ML	02/2023	
F	EPA	RFI		ML	02/2022
Е	EPA	RFI		ML	10/2022
D	EPA		ML	08/2022	
Rev	Desc	ription	Ву	Date	
	Ву				
Surve	у	SURVEYWORX	12/2021		
Desig	n	JV	01/2022		
Drawr		MC	02/20	າາ	



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C430	Rev	G

	ļ		₩			ļ	1		
		MH 12-4 (1800mm)	MH 12-5 (1800mm)	(1800mm) (1800mm)		MH 12-6 (1500mm)	MH 12-7		
	.37	_	- 20	-	4		067		.18
	1		-		,		D -		11
DESIGN LEVELS	12.34		12.29		11 91	44 OF	89.		12.51
PIPE INVERT		9.72	9.73 9.88	20 20 20	66 6	10.12 10.15	10.30		10.77
DEPTH INVERT (m)	2.86		2.63		1.97	1 7.4			1.78
PIPE GRADE	750	nm RC @ 0.15	RRJ %	JØ 600mm RCRRJØ @ 0.15%	45	0mm RCRF @ 0.20%	RJØ	300mm RCRRJ Ø @ 0.60%	
CHAINAGE	162.77		172.95		249 56	051 ED	70.107		339.57
					SW LINE SCALE: HORI 1	12 (2 OI 1:1000 VI	F 2) ERT 1:200		

MH 11-3-1

SW LINE 11-3-1 SCALE: HORI 1:1000 VERT 1:200

ML 11 3 (1600mm)		
	-	
9.12		95 Q
9.95		0 10
8 01		8 13
2.17		0.97
	300mm RCRRJ Ø	_
	@ 0.20%	
0.00		58 37
	0.00 2.17 9.95 9.12 MH 11.2.14500mm	CF C C C C C C C C C C C C C C C C C C

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		I		
Ĺ	MH OUTLET 4-0	AH 12-1 (3000mm)	/H 12-2 (2550mm)	/H 12-3 (1800mm)
DATUM 4.00m	12.266	12.70	10 14 14	2
DESIGN LEVELS	1.80	1 96	12.29	
PIPE INVERT	9.05	9.22 9.27	9.32 9.35	9.50
DEPTH INVERT (m)	2.73	2.72	2 2 5 2	
PIPE GRADE	1350mm RCRRJ Ø	1350mm RCRRJ Ø @ 0.15%	1050mm RCRRJ Ø @ 0.10%	90
CHAINAGE	49.08 80	82.91	114 21	

SW LINE 12 (1 OF 2) SCALE: HORI 1:1000 VERT 1:200

		MH 12-4 (1800mm)
	11.37	
	12.34	
	9.55	
	2.86	
)mm RCRRJ Ø		
@ 0.10%	 _	
	62.77	

lotes

All works to be in accordance with Auckland council standards.

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.egend ____ _____ _____

EX GROUND LEVEL PROP FINISHED LEVEL
PROT FINISHED LEVEL
HARDFILL BACKFILL

G	EPA	RFI		ML	02/2023	
F	EPA	RFI		ML	02/2022	
Е	EPA	RFI		ML 10/2022		
D	EPA			ML	08/2022	
Rev	Desc	ription		Ву	Date	
		Ву	Date			
Surve	/	SURVEYWORX	12/202	21		
Design		JV	01/2022			
Drawn		MS	02/2022			
Check	ed	JP	02/2022			

Checked JP



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C431	Rev	G

MH 13-2 (1500mm) MH 13-3 (1800r MH 13-1 (1500r MH 13-4 ΗM DATUM 3.00m 12.46 12.50 13.31 12.66 2.60 EXISTING LEVELS 12.94 99 5 DESIGN LEVELS 11.15 9.61 9.69 9.85 9.95 9.99 10.27 PIPE INVERT 5 8 53 .85 2.73 DEPTH INVERT (m) 600mm RCRRJ Ø @ 0.20% 675mm RCRRJ Ø 300mm RCRRJ Ø 750mm RCRRJ Ø PIPE GRADE @ 0.15% @ 0.20% @ 1.00% 0.00 29.81 30.37 CHAINAGE SW LINE 13 SCALE: HORI 1:1000 VERT 1:200

SW LINE 12-4-1 SCALE: HORI 1:1000 VERT 1:200

DATUM 4.00m		MH 12-4 (1800mm)	MH 12-4-1	
EXISTING LEVELS	11.37	11.46		11.82
DESIGN LEVELS	12.34	12.27		13 <u>.</u> 01
PIPE INVERT		10.15 10.31	10.36	11.47
DEPTH INVERT (m)	2.86	1.96		1.54
PIPE GRADE	300	mm RCRR @ 1.50%	JØ 300mm RCRRJØ @ 1.40%	
CHAINAGE	0.00	10.98		90.53

SW LINE 12-5-1

SCALE: HORI 1:1000 VERT 1:200

			4		
DATUM 4.00m		MH 12-5 (1800mm)		MH 12-5-1 (1200mm)	
EXISTING LEVELS	11.20		11.30		
DESIGN LEVELS	12.29		12.32		
PIPE INVERT		10.18	10.37	10.42	
DEPTH INVERT (m)	2.63		1.98		
PIPE GRADE	30	0mm F @ 1	RCRR.	Ø	300mm RCRRJ Ø @ 1.40%
CHAINAGE	0.00		12.97		

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EX GROUND LEVEL

G	EPA	RFI		ML	02/2023	
F	EPA	RFI		ML 02/2022		
E	EPA	RFI		ML 10/2022		
D	EPA			ML 08/2022		
Rev	Desc	ription		Ву	Date	
		Ву	Date			
Surve	у	SURVEYWORX	12/2021			
Desig	n	JV	01/2022			
Drawn	ı	MS	02/2022			



62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C432	Rev	G



DATUM 5.00m	u u	MH 14-4 (1500mm)	MH 14-5 (1500mm)			MH 14-6 (1500mm)	MH 14-7 (1200mm)			MH 14_8
EXISTING LEVELS	12.84	12 81	2		12.39	12.35			12.26	21.1
DESIGN LEVELS	12.97	13 10	2		12.75	12.75			12.40	101-17
PIPE INVERT		10.12 10.14	10.19		10.33	10.55 10.58	10.65		10.85	2212
DEPTH INVERT (m)	2.94	2.96			2.48	2.23			1.54	
PIPE GRADE	675	nm RCR @ 0.20%	RJØ	675mm RCRRJ Ø @ 0.20%	450	mm RCRR @ 0.30%	JØ	375mm RCRRJ Ø @ 0.30%		-
CHAINAGE	200.67	010 A0			282.42	294.05			361.90	22.120
					SW LINE 14	4 (2 OF 2)	0		-

SW LINE 13-3-1 SCALE: HORI 1:1000 VERT 1:200

	l				
DATUM 5.00m		MH 13-3 (1800mm)			MH 13-3-1
EXISTING LEVELS	12.46			11.81	
DESIGN LEVELS	12.27			11.87	
PIPE INVERT		10.14		10.20	
DEPTH INVERT (m)	2.31			1.66	
PIPE GRADE		-	450mm RCRRJ Ø @ 0.20%	-	
CHAINAGE	0.00			31.40	

	ſ				
DATINA 4 00-r	L	MH 12-2 (2550mm)	MH 14-1 (1500mm)	MH 14-2 (1500mm)	MH 14-3 (1500mm)
EXISTING LEVELS	12.70	12.61	12 49	ער איז	2 2 4
DESIGN LEVELS	11.96	12.02	12.27	د م	
PIPE INVERT		9.57 9.60	9.65	6.77. 6.	00
DEPTH INVERT (m)	2.72	2.49	2.55	02 0	
PIPE GRADE		825mm RCRRJ Ø @ 0.15%	825mm RCRRJ Ø @ 0.15%	825mm RCRRJ Ø @ 0.15%	750mm RCRRJ Ø @ 0.15%
CHAINAGE	0.00	19.19	60 09	0 0 2	
			*		

SW LINE 14 (1 OF 2) SCALE: HORI 1:1000 VERT 1:200

SCALE: HORI 1:1000 VERT 1:200

lotes

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egend

----- EX GROUND LEVEL PROP FINISHED LEVEL
PROP FINISHED LEVEL
HARDFILL BACKFILL

G	EPA	RFI		ML 02/2023		
F	EPA	RFI		ML	02/2022	
E	EPA	RFI		ML	10/2022	
D	EPA			ML	08/2022	
Rev	Desc	ription		Ву	Date	
		Ву	Date			
Survey		SURVEYWORX	12/2021			
Design		JV	01/2022			
Drawn		MS	02/2022			
Check	ed	JP	02/2022			



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C433	Rev	G

		uu) (mu
		MH 14-4 (1500n
	12.84	
	12.97	
	10.02	
	2.94	
i	٨	
	200.67	

SW LINE 15
SCALE: HORI 1:1000 VERT 1:200

	h			
DATUM 5.00m	MH 10-1 (1800mm)		MH 15-1	
EXISTING LEVELS	14.38	4 0 80		
DESIGN LEVELS	13.64	5 33 2		
PIPE INVERT	10.64	10 85	10.93	1 7 7
DEPTH INVERT (m)	3.23	24 7		1 7
PIPE GRADE		450mm RCRRJ Ø @ 0.30%	375r	nm RCRRJ Ø @ 0.30%
CHAINAGE	00.00	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		ŝ
		•	· · · · · · · · · · · · · · · · · · ·	



	Ψ			
DATUM 5.00m	MH 14-6 (1500mm)			MH 14-6-1
EXISTING LEVELS	12.39		12.05	
DESIGN LEVELS	12.75		13.18	
PIPE INVERT	10.78		11.62	
DEPTH INVERT (m)	2.48		1.56	
PIPE GRADE	•	225mm RCRRJ Ø @ 1.00%		
CHAINAGE	0.00		84.08	



SCALE: HORI 1:1000 VERT 1:200

SW LINE 14-7-1

Notes

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.egend 777

EX GROUND LEVEL PROP FINISHED LEVEL
HARDFILL BACKFILL

G	EPA RFI			ML	02/2023	
F	EPA	RFI		ML	02/2022	
E EPA RFI			ML	10/2022		
D	D EPA			ML 08/202		
Rev	ev Description			Ву	Date	
By Dat		Date				
Survey SURVEYWORX		12/2021				
Design JV		01/20	22			
D 140			00/00	00		



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C434	Rev	G

DATUM 4.00m		MH 12-1 (3000mm)	MH 17-1 (1500mm)	MH 17-2	MH 17-3
EXISTING LEVELS	12.66	12.84	12.76		C0.21
DESIGN LEVELS	11.80	11.76	11.66		12.00
PIPE INVERT	0	9.92 9.94	10.05	10.19	10.40
DEPTH INVERT (m)	2.73	1.88	1.64	5 5 7	00.1
PIPE GRADE	600	nm RCRR @ 0.15%	J Ø525mm RCRRJ Ø @ 0.15%	375mm RCRRJ Ø @ 0.30%	
CHAINAGE	0.00	10.71	36.61	2 2 2	105.11
			SCA	SW LINE 17 LE: HORI 1:1000 VERT 1:200	-

SW LINE 16 SCALE: HORI 1:1000 VERT 1:200

								_
DATUM 4.00m	MH 12-2 (2550mm)	MH 16-1 (2300mm)	MH 16-2	MH 16-3		MH 16-4 (1500mm)		אני א אני אפ
EXISTING LEVELS	12.70	8077	12.66	12.62		12.94		13.20
DESIGN LEVELS	11.96		12.27	12.55		13.02		13.44
PIPE INVERT	9.47	10.02	10.31	10.66		<u>11.16</u> 11.23		11.76
DEPTH INVERT (m)	2.72	n t i	1.96	-1.89		1.89		1.68
PIPE GRADE	1050mm RCR @ 0.15%	RJ Ø 525mm RCRRJ Ø @ 0.50%	450mm RCI @ 0.50	RRJØ	375mm RCRRJ Ø @ 0.50%		300mm RCRRJ Ø @ 0.80%	
CHAINAGE	0.00		71.98	127.10		213.00		278.64

lotes

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egend ____ _____ _____

EX GROUND LEVEL PROP FINISHED LEVEL
HARDFILL BACKFILL

G	EPA	EPA RFI			02/2023
F	EPA	RFI		ML	02/2022
E	EPA	RFI		ML	10/2022
D	EPA	EPA			08/2022
Rev	Desc	Description			Date
By		Date			
Surve	Survey SURVEYWORX 12/20			21	
Desig	Design JV 01/20		01/20	22	
Drawn	Drawn MS 02/20		02/20	22	
Checked JP		02/2022			



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C435	Rev	G

	ĺ		
DATUM 0.00m		MH OUTLET 7-0	MH 21-1 (GPT)
EXISTING LEVELS	6.47	л л л	20.0
DESIGN LEVELS	6.52	7 69	2021
PIPE INVERT		5.93 6.07	
DEPTH INVERT (m)	09.0	1 80	2
PIPE GRADE		225mm RCRRJ (@ 0.82%	
CHAINAGE	0.00	17 49	21.1
			-





POND OUTLET 2 SCALE: HORI 1:1000 VERT 1:200



SW LINE 20 SCALE: HORI 1:1000 VERT 1:200



SCALE: HORI 1:1000 VERT 1:200

ENGINEERING APPROVAL

Notes

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Legend

EX GROUND LEVEL
 PROP FINISHED LEVEL
 HARDFILL BACKFILL

L								
ſ	G	EPA	EPA RFI		RFI ML		ML	02/2023
I	F	EPA	PA RFI		ML	02/2022		
I	E	EPA RFI		ML	10/2022			
ſ	D	EPA	EPA		ML	08/2022		
[Rev	Description		Ву	Date			
I	By Da		Date					
I	Survey SURVEYWORX 12/2		12/20	21				
Design JV		01/2022						
Drawn MS 02		02/2022						



62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON PROPERTIES LTD

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C436	Rev	G





DATUM 2.00m		MH 19-3	
EXISTING LEVELS	7.97		
DESIGN LEVELS	8.46		
PIPE INVERT		7.00	
DEPTH INVERT (m)	1.67		
PIPE GRADE		+	22
CHAINAGE	0.00		

SW LINE 19 SCALE: HORI 1:1000 VERT 1:200

				41
]				
			U U	
DATUM -1.00m	dH POND 1 (2050mm)	MH 19-1	MH 19-2	MH 19-3
EXISTING LEVELS	2 - - - - - -	2 	7 07	1.2.1
DESIGN LEVELS	5	۲۵ ۲۵ ۲۵	2 7 7 7 7 7 7	っ ト.つ
PIPE INVERT	6.05 6.31	6 6 6 6 7 4	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	222
DEPTH INVERT (m) 5	2 t i		167	2
PIPE GRADE	225mm RCRRJ Ø @ 0.55%	225mm RCRRJ Ø @ 0.50%	225mm RCRRJ Ø @ 0.40%	-
CHAINAGE	5	04.46	60 44	17.00

- All works to be in accordance with Auckland council standards.
- Co-ordinates in terms of NZ Geodetic Datum Mt Eden 2000. Levels in terms of the Auckland Vertical Datum 1946.
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- 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).
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- Heavy duty manhole lids and frames to be used in trafficked areas.
- All Manholes are to be 1050mmØ unless shown otherwise.
- 9. Catchpit leads with 800mm or less cover shall be protected with concrete capping.
- 10. All lines to be abandoned shall be sealed at each end. timing of all sealing to be coordinated with council staff.

EX GROUND LEVEL PROP FINISHED LEVEL

G	EPA	EPA RFI		A RFI MI		ML	02/2023
F	EPA	RFI		ML	02/2022		
E	EPA RFI		ML	10/2022			
D	EPA		ML	08/2022			
Rev	Desc	scription		Ву	Date		
By Date		Date					
Surve	y	SURVEYWORX	12/2021				
Desig	Design JV 01/2022		22				
Drown		MC	02/2022				





62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C437	Rev	G



CP 19-3B SCALE: HORI 1:1000 VERT 1:200





DATUM 1.00m

EXISTING LEVELS

DESIGN LEVELS

DEPTH INVERT (m)

PIPE INVERT

PIPE GRADE

CHAINAGE

9.30 9.27

8.78 8.65

2.39 .65

7.29

7.32

225mm RCRRJ Ø

@ 1.00%



ΗM

00.

225mm RCRRJØ

@ 1.00%

CP1-4A

SCALE: HORI 1:1000 VERT 1:200

₹

DATUM 2.00m

EXISTING LEVELS

DESIGN LEVELS

DEPTH INVERT (m)

PIPE INVERT

PIPE GRADE

CHAINAGE



DATUM 2.00m

EXISTING LEVELS

DESIGN LEVELS

DEPTH INVERT (m)

PIPE INVERT

PIPE GRADE

CHAINAGE

9.55 9.57

9.48 9.30

0.00 2.62

CP1-4B

SCALE: HORI 1:1000 VERT 1:200

7.94

7.97

225mm RCRRJ Ø

@ 1.00%





SCALE: HORI 1:1000 VERT 1:200

CP1-8A

All works to be in accordance with Auckland council standards

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EX GROUND LEVEL PROP FINISHED LEVEL HARDFILL BACKFILL

G	EPA	RFI		ML	02/2023
F	EPA	RFI		ML	02/2022
E	EPA	RFI		ML	10/2022
D	EPA		ML	08/2022	
Rev	Desc	scription		Ву	Date
Ву		Date			
Surve	y	SURVEYWORX	12/2021		
Desig	۱	JV	01/2022		
Drawn	1	MS	02/2022		
Checked JP 02/2022					



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, **CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C437A	Rev	G



- All works to be in accordance with Auckland council standards
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egen

EX GROUND LEVEL PROP FINISHED LEVEL HARDFILL BACKFILL

G	EPA	RFI		ML	02/2023	
F	EPA	RFI		ML	02/2022	
E	EPA	RFI		ML	10/2022	
D	EPA			ML	08/2022	
Rev	Desc	Description		Ву	Date	
		Ву	Date			
Surve	y	SURVEYWORX	12/20	21		
Desig	Design JV 01/202		22			
Drawn MS		02/20	22			
Checked JP 02/		02/2022				



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, **CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

PROPOSED STORMWATER DRAINAGE LONG SECTIONS

	-		
Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C437B	Rev	G

6.81 6.84

225mm RCRRJ Ø @ 1.00%

225mm RCRRJ Ø



DATUM 2.00m

EXISTING LEVELS

DESIGN LEVELS

DEPTH INVERT (m)

PIPE INVERT

PIPE GRADE

CHAINAGE

<u>9.26</u> 9.28

42

65

0.00 3.37

CP2-10A

7.92

7.95

225mm RCRRJ Ø

@ 1.00%



MH 2-13A

8.22

8.26

@ 1.00%

225mm RCRRJ Ø

MH 2-'

9.53 9.52

9.68 9.59

<u>61</u>

60

CP2-13A

DATUM 1.00m

EXISTING LEVELS

DESIGN LEVELS

DEPTH INVERT (m)

PIPE INVERT

PIPE GRADE

CHAINAGE



MH 2-16 (1500m MH 2-16A

9.88 9.88

10.42 10.24

2.26 1.65

0.00 2.84

CP2-16A

8.88

8.91

225mm RCRRJ Ø

@ 1.00%

DATUM 3.00m

EXISTING LEVELS

DESIGN LEVELS

DEPTH INVERT (m)

PIPE INVERT

PIPE GRADE

CHAINAGE



SCALE: HORI 1:1000 VERT 1:200

225mm RCRRJ Ø

225mm RCRRJ Ø

All works to be in accordance with Auckland council standards

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EX GROUND LEVEL PROP FINISHED LEVEL HARDFILL BACKFILL

G	EPA	RFI		ML	02/2023
F	EPA	RFI		ML	02/2022
E	EPA	RFI		ML	10/2022
D	EPA			ML	08/2022
Rev	Desc	scription		Ву	Date
		Ву	Date		
Surve	y	SURVEYWORX	12/2021		
Design		JV	01/2022		
Drawn		MS	02/2022		
Check	ed	JP	02/20	02/2022	



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, **CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C437C	Rev	G



225mm RCRRJ Ø @ 1.00%

All works to be in accordance with Auckland council standards

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EX GROUND LEVEL PROP FINISHED LEVEL HARDFILL BACKFILL

G	EPA	RFI		ML	02/2023
F	EPA	RFI		ML	02/2022
E	EPA	RFI		ML	10/2022
D	EPA			ML	08/2022
Rev	Desc	cription		Ву	Date
		Ву	Date		
Surve	y	SURVEYWORX	12/2021		
Design		JV	01/2022		
Drawn		MS	02/2022		
Check	ed	JP	02/20	02/2022	



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, **CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C437D	Rev	G







DATUM 1.00m	MH 4-2 (2050mm)	(
EXISTING LEVELS	9.53	9.62	
DESIGN LEVELS	9.30	9.13	
PIPE INVERT	7.65	7.80	
DEPTH INVERT (m)	3.20	1.65	
PIPE GRADE	2 2 5r	nm RCRRJ @ 1.00%	Ø
CHAINAGE	0.00	14.53	
		CP4-2B	

SCALE: HORI 1:1000 VERT 1:200



CP4-5B SCALE: HORI 1:1000 VERT 1:200

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EX GROUND LEVEL PROP FINISHED LEVEL

G	EPA	RFI		ML	02/2023
F	EPA	RFI		ML	02/2022
Е	EPA	RFI		ML	10/2022
D	EPA	EPA		ML	08/2022
Rev	Desc	cription		By	Date
		Ву	Date		
Surve	y	SURVEYWORX	12/2021		
Design		JV	01/2022		
Drawn		MS	02/20	02/2022	
Check	ed	JP	02/20	02/2022	



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, **CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

PROPOSED **STORMWATER DRAINAGE** LONG SECTIONS

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C437E	Rev	G

MH 4-5B









All works to be in accordance with Auckland council standards

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EX GROUND LEVEL PROP FINISHED LEVEL HARDFILL BACKFILL

G	EPA	RFI		ML	02/2023
F	EPA	RFI		ML	02/2022
Е	EPA	RFI		ML	10/2022
D	EPA			ML	08/2022
Rev	Desc	scription		Ву	Date
		Ву	Date		
Surve	y	SURVEYWORX	12/2021		
Design		JV	01/2022		
Drawn		MS	02/2022		
Check	ed	JP	02/20	02/2022	



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, **CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C437F	Rev	G









			4	
DATUM 1.00m		MH 7-2 (1500mm)		MH 7-2B
EXISTING LEVELS	7.77		7.98	
DESIGN LEVELS	7.85		7.68	
PIPE INVERT		6.27	6.35	
DEPTH INVERT (m)	1.67		1.65	
PIPE GRADE	225m (m F ⊉1.	CR	RJ Ø
CHAINAGE	0.00		7.76	
	(P7	-2F	2

DATUM 1.00m		MH 7-3 /1200mm	MH 7-3A
EXISTING LEVELS	6.45	6.30	
DESIGN LEVELS	8.24	8.08	
PIPE INVERT		/	
DEPTH INVERT (m)	1.79	G0. I	
PIPE GRADE		/	
CHAINAGE	0.00	2.25	
	CP	7-	.3

SCALE: HORI 1:1000 VERT 1:200



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EX GROUND LEVEL PROP FINISHED LEVEL

G	EPA	RFI		ML	02/2023
F	EPA	RFI		ML	02/2022
Е	EPA	RFI		ML	10/2022
D	EPA			ML	08/2022
Rev	Desc	escription		Ву	Date
		Ву	Date		
Surve	y	SURVEYWORX	12/2021		
Design		JV	01/2022		
Drawn		MS	02/2022		
Check	ed	IP	02/2022		



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, **CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

PROPOSED **STORMWATER DRAINAGE** LONG SECTIONS

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C437G	Rev	G



225mm RCRRJ Ø @ 1.00%







225mm RCRRJ Ø @ 1.00%

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EX GROUND LEVEL PROP FINISHED LEVEL HARDFILL BACKFILL

G	EPA	EPA RFI			02/2023
F	EPA	RFI		ML	02/2022
Е	EPA	RFI		ML	10/2022
D	EPA	EPA		ML	08/2022
Rev	Desc	Description		Ву	Date
		Ву	Date		
Surve	у	SURVEYWORX	12/20	21	
Desig	Design JV 01/2		01/2022		
Drawn MS 02/2		02/20	02/2022		
Check	ed	JP	02/20	22	



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, **CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C437H	Rev	G



All works to be in accordance with Auckland council standards

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EX GROUND LEVEL PROP FINISHED LEVEL

G	EPA	EPA RFI			02/2023
F	EPA	RFI		ML	02/2022
Е	EPA	RFI		ML	10/2022
D	EPA			ML	08/2022
Rev	Desc	escription		Ву	Date
		Ву	Date		
Surve	/	SURVEYWORX	12/2021		
Design JV 01/2		01/2022			
Drawn		MS	02/2022		
Check	ed	JP	02/202	02/2022	



62, 78 & 80 PAPAKURA -CLEVEDON ROAD, **CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C437I	Rev	G



All works to be in accordance with Auckland council standards

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egen

EX GROUND LEVEL PROP FINISHED LEVEL HARDFILL BACKFILL

G	EPA	EPA RFI			02/2023
F	EPA	RFI ML 0		02/2022	
Е	EPA	RFI		ML 10/202	
D	EPA			ML	08/2022
Rev	Desc	Description		Ву	Date
By		Ву	Date		
Surve	y	SURVEYWORX	12/2021		
Design		JV	01/2022		
Drawn		MS	02/20	22	
Check	ed	JP	02/2022		



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, **CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C437J	Rev	G





All works to be in accordance with Auckland council standards

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EX GROUND LEVEL PROP FINISHED LEVEL HARDFILL BACKFILL

G	EPA	EPA RFI			02/2023	
F	EPA	RFI		ML	02/2022	
E	EPA RFI			ML	10/2022	
D	EPA			ML	08/2022	
Rev	Desc	Description		Ву	Date	
		Ву	Date	Date		
Surve	y	SURVEYWORX	12/2021			
Design J		JV	01/2022			
Drawn		MS	02/20	22		
Check	ed	JP	02/2022			



62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, **CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C437K	Rev	G



E 3/7/2

Notes

1. All works to be in accordance with Auckland council standards.

- Co-ordinates in terms of NZ Geodetic Datum Mt Eden 2000. Levels in terms of the Auckland Vertical Datum 1946.
- It is the contractors responsibility to locate all services that may be affected by his operations.
- 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.
- Approved hardfill is to be used in backfilling of all road crossings and vehicle crossings to council standards.
- Heavy duty manhole lids and frames to be used in trafficked areas.
- All Manholes are to be 1050mmØ unless shown otherwise.
- Catchpit leads with 800mm or less cover shall be protected with concrete capping.
- All lines to be abandoned shall be sealed at each end. timing of all sealing to be coordinated with council staff.

EX GROUND LEVEL PROP FINISHED LEVEL

G	EPA	RFI		ML	02/2023
F	EPA	RFI		ML	02/2022
E	EPA	RFI		ML	10/2022
D	EPA			ML	08/2022
Rev	Desc	escription		Ву	Date
		Ву	Date		
Survey SURVEYWORX		SURVEYWORX	12/2021		
Design		JV	01/2022		
Drawn		MS	02/20	22	
Check	ed	IP	02/2022		



62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON PROPERTIES LTD

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C437L	Rev	G



otes

- All works to be in accordance with Auckland council standards.
- Co-ordinates in terms of NZ Geodetic Datum Mt Eden 2000. Levels in terms of the Auckland Vertical Datum 1946.
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- 6. Approved hardfill is to be used in backfilling of all road crossings and vehicle crossings to council standards.
- Heavy duty manhole lids and frames to be used in trafficked areas.
- 3. All Manholes are to be 1050mmØ unless shown otherwise.
- 9. Catchpit leads with 800mm or less cover shall be protected with concrete capping.
- 10. All lines to be abandoned shall be sealed at each end. timing of all sealing to be coordinated with council staff.

egend

EX GROUND LEVEL PROP FINISHED LEVEL

G	EPA	EPA RFI		ML	02/2023		
F	EPA	PA RFI		EPA RFI		ML	02/2022
Е	EPA RFI		ML		A RFI ML 10/2		10/2022
D	EPA		ML	08/2022			
Rev	Description		Ву	Date			
		Ву	Date	Date			
Survey SUF		SURVEYWORX	12/20	12/2021			
Design JV 0		01/20	01/2022				
Drawn	1	MS	02/20	02/2022			

Checked JP



02/2022

62, 78 & 80 PAPAKURA -**CLEVEDON ROAD,** CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

Project no.	194006		
Scale	1:1000 @ A3		
Cad file	C400- DRAINAGE.DWG		
Drawing no.	C437M	Rev	G






PROPOSED WETLAND A CROSS SECTION B SCALE 1:1000 HORZ 1:200 VERT

00.00

<u>10.00</u>

36

60.00

00 0.

ENGINEERING APPROVAL

CUT/FILL

CHAINAGE

800

- All works to be in accordance with Auckland council standards.
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- Heavy duty manhole lids and frames to be used in trafficked areas.

standards.

- All Manholes are to be 1050mmØ unless shown otherwise.
- All cesspit leads shall have min cover 0.9m.
- 0. All lines to be abandoned shall be sealed at each end. timing of all sealing to be coordinated with council staff.

7.24	7.53	
260.00	 269.37	

EX BDY PROP BDY EX STORMWATER PR STORMWATER PR STORMWATER EX/PROP SWMH PROP SWCP SINC PROP SWCP DOU			ter Ter 1H Single Double			
I	S92	S92			JV	03/2023
н	S92	92			JV	01/2023
G	S92				JV	01/2023
F	S92				JV	12/2022
Rev	Desc	ription			Ву	Date
		Ву		Date		
Surve	у	SURVEYWORX		12/21		
Design RK 01/2		01/22				
Drawn RK			01/22			
Check	ked	JP		01/22		



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62, 78 & 80 PAPAKURA -**CLEVEDON ROAD, CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

PROPOSED WETLAND A LONGSECTION AND **CROSS SECTION**

Project no.	194006		
Scale	AS SHOWN		
Cad file	C440- WETLAND.DWG		
Drawing no.	C442	Rev	I



SCALE 1:1000 HORZ 1:200 VERT

Notes

 All works to be in accordance with Auckland council standards.

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- It is the contractors responsibility to locate all services that may be affected by his operations.
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Legend PROP BDY EX STORMWATER PR STORMWATER PR STORMWATER EX/PROP SWMH PROP SWCP SINGL PROP SWCP DOUB				Ter Ter H Ingle Ouble		
I	S92				JV	03/2023
Н	S92				JV	01/2023
G	S92				JV	01/2023
F	S92				JV	12/2022
Rev	Desc	ription			Ву	Date
		Ву		Date		
Survey SURVEYWORX			12/21			
Design RK			01/22			
Drawn RK			01/22			
Check	ed	JP		01/22		



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62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON PROPERTIES LTD

PROPOSED WETLAND B LONGSECTION AND CROSS SECTION

Project no.	194006		
Scale	AS SHOWN		
Cad file	C440- WETLAND.DWG		
Drawing no.	C443	Rev	I



ENGINEERING APPROVAL

100 YEAR PONDING LEVEL RL 7.41m 10 YEAR PONDING LEVEL RL 6.98m STREAM PROTECTION PONDING LEVEL RL 6.00m PERMANENT WATER LEVEL RL 5.60m

Notes

 All works to be in accordance with Auckland council standards.

- Co-ordinates in terms of NZ Geodetic Datum Mt Eden 2000. Levels in terms of the Auckland Vertical Datum 1946.
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- 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).
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NDING LEVEL RL 10.67m
IDING LEVEL RL 10.18m
DTECTION LEVEL RL 9.36m
WATER LEVEL RL 9.0m

Legend PROP BDY EX STORMWATER PR STORMWATER PR STORMWATER EX/PROP SWMH PROP SWCP SING PROP SWCP DOU			Ter Ter H Ingle Ouble			
I	S92				JV	03/2023
Н	S92				JV	01/2023
G	S92				JV	01/2023
F	S92				JV	12/2022
Rev	Desc	ription			Ву	Date
		Ву		Date		
Survey SURVEYWORX			12/21			
Design		RK		01/22		
Drawn RK			01/22			
Checked JP			01/22			



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62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON PROPERTIES LTD

PROPOSED WETLAND A & B OUTLET CROSS SECTION

Project no.	194006		
Scale	NTS		
Cad file	C440- WETLAND.DWG		
Drawing no.	C444	Rev	I



- All works to be in accordance with Auckland council standards.
- Co-ordinates in terms of NZ Geodetic Datum Mt Eden 2000. Levels in terms of the Auckland Vertical Datum 1946.
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SCRUFFY DOME AS PER SWCoP SW22 (100mm GAP TO RISER)

1500mm Ø MANHOLE/RISER

PROPOSED SQUARE OPENING WITH SLOT (750mm WIDE CUTOUT)

PROPOSED 825mmØ OUTLET PIPE

I	S92	S92		JV	03/2023				
Н	S92	S92			01/2023				
G	S92			JV	01/2023				
F	S92	S92				JV		JV	12/2022
Rev	Desc	scription		Ву	Date				
		Ву	Date						
Survey		SURVEYWORX	12/21						
Design RK 01/22		01/22							
Drawn	1	RK	05/22						



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62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, **CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

PROPOSED WETLAND A **OUTLET DETAIL**

Project no.	194006		
Scale	NTS		
Cad file	C440- WETLAND.DWG		
Drawing no.	C445A	Rev	I



- All works to be in accordance with Auckland council standards.
- Co-ordinates in terms of NZ Geodetic Datum Mt Eden 2000. Levels in terms of the Auckland Vertical Datum 1946.
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I	S92			JV	03/2023
Н	S92		JV	01/2023	
G	S92		JV	01/2023	
F	S92	S92		JV	12/2022
Rev	Desc	Description		Ву	Date
		Ву	Date		
Survey A 12/2		12/21			
Design RK 01/22		01/22			
Drawn		RK	05/22		



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62, 78 & 80 PAPAKURA -**CLEVEDON ROAD,** CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

PROPOSED WETLAND B **OUTLET DETAIL**

Project no.	194006		
Scale	NTS		
Cad file	C440- WETLAND.DWG		
Drawing no.	C445B	Rev	I

SCRUFFY DOME AS PER SWCoP SW22 (100mm GAP TO RISER)

1500mm Ø MANHOLE/RISER

PROPOSED 900mmØ OUTLET PIPE



- All works to be in accordance with Auckland council standards.
- Co-ordinates in terms of NZ Geodetic Datum Mt Eden 2000. Levels in terms of the Auckland Vertical Datum 1946.
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I	S92	S92		JV	03/2023
Н	S92			JV	01/2023
G	S92			JV	01/2023
F	S92			JV	12/2022
Rev	Description			Ву	Date
Ву		Ву	Date		
Survey		SURVEYWORX	12/21		
Design		RK	01/22		
-		DI	05/00		





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62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, **CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

PROPOSED WETLAND AND ANTI-SEEP COLLAR DETAIL

Project no.	194006				
Scale	NTS				
Cad file	C440- WETLAND.DWG				
Drawing no.	C445C	Rev	I		



ENGINEERING APPROVAL

- All works to be in accordance with Auckland council standards.
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1	S92	S92		JV	03/2023
Н	S92			JV	01/2023
G	S92			JV	01/2023
F	S92			JV	12/2022
Rev	Description			Ву	Date
		Ву	Date		
Survey		SURVEYWORX	12/21		
Design BK 01		01/22			

Checked	JP	05/22
)rawn	RK	05/22
)esign	RK	01/22



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62, 78 & 80 PAPAKURA -**CLEVEDON ROAD, CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

PROPOSED WETLAND A **SPILLWAY DETAIL**

Project no.	194006			
Scale	NTS			
Cad file	C440- WETLAND.DWG			
Drawing no.	C445D	Rev	Ι	

EMBANKMENT STABILISED WITH GEOFABRICS ENKAMAT TO EXTEND 2m BEYOND ANGLE



ENGINEERING APPROVAL

EMBANKMENT STABILISED WITH GEOFABRICS ENKAMAT. TO EXTEND 2m BEYOND ANGLE CHANGE

- All works to be in accordance with Auckland council standards.
- Co-ordinates in terms of NZ Geodetic Datum Mt Eden 2000. Levels in terms of the Auckland Vertical Datum 1946.
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I	S92			JV	03/2023	
Н	S92			JV	01/2023	
G	S92		S92		JV	01/2023
F	S92			JV	12/2022	
Rev	Desc	scription		Ву	Date	
		Ву	Date			
Survey		SURVEYWORX	12/21			
Design		RK	01/22			
Drawn	1	RK	05/22			



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05/22

62, 78 & 80 PAPAKURA -**CLEVEDON ROAD,** CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

PROPOSED WETLAND B **SPILLWAY DETAIL**

Project no.	194006			
Scale	NTS			
Cad file	C440- WETLAND.DWG			
Drawing no.	C445E	Rev	I	



- PLACE RIPRAP ROCK WITH MINIMUM SIZE 285mm AT END OF OUTLET STRUCTURE AND HAND PLACE ROCK

PLACE RIPRAP ROCK WITH MINIMUM SIZE 340mm AT END OF OUTLET STRUCTURE AND HAND PLACE ROCK

All works to be in accordance with Auckland

- council standards. Co-ordinates in terms of NZ Geodetic Datum Mt Eden 2000. Levels in terms of the Auckland Vertical Datum 1946.
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I	S92	S92			03/2023
Н	S92			JV	01/2023
G	S92			JV	01/2023
F	S92			JV	12/2022
Rev	Description			Ву	Date
Ву		Date			
Survey			12/21		
Design		RK	01/22		





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62, 78 & 80 PAPAKURA -**CLEVEDON ROAD, CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

PROPOSED WETLAND INLET DETAIL SECTIONS

Project no.	194006			
Scale	NTS			
Cad file	C440- WETLAND.DWG			
Drawing no.	C445F	Rev	I	



PLACE RIPRAP ROCK WITH MINIMUM SIZE 380mm AT END OF OUTLET STRUCTURE AND HAND PLACE ROCK

PLACE RIPRAP ROCK WITH MINIMUM SIZE 360mm AT END OF OUTLET STRUCTURE AND HAND PLACE ROCK

- All works to be in accordance with Auckland council standards.
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Ι	S92			JV	03/2023
Н	S92			JV	01/2023
G	S92			JV	01/2023
F	S92			JV	12/2022
Rev	Desc	Description		Ву	Date
		Ву	Date		
Surve	y	SURVEYWORX	12/21		
Design		RK	01/22		
Drawn		RK	05/22		
Check	ed	JP	05/22		



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62, 78 & 80 PAPAKURA -**CLEVEDON ROAD, CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

PROPOSED WETLAND INLET DETAIL SECTIONS

Project no.	194006			
Scale	NTS			
Cad file	C440- WETLAND.DWG			
Drawing no.	C445G	Rev	I	



ENGINEERING APPROVAL

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I	S92	S92			JV	03/2023
Н	S92	S92			JV	01/2023
G	S92	S92			JV	01/2023
F	S92	S92			JV	12/2022
Rev	Desc	cription		Ву	Date	
		Ву		Date		
Survey SURVEYWORX 12		12/21				
Design RK 01/22		01/22				
Drawn PK 05/22						



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0522

62, 78 & 80 PAPAKURA -**CLEVEDON ROAD,** CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

PROPOSED ACCESS ROAD **CROSS-SECTION**

Project no.	194006		
Scale	NTS		
Cad file	C440- WETLAND.DWG		
Drawing no.	C445I	Rev	I



TYPICAL PLAN DETAIL



LEVEL SPREADER

TABLE 1: LEVEL	. SPREADER DESIGN	CRITERIA
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DESIGN FLOW (m ³ /sec)	INLET WIDTH (m)	DEPTH (mm)	END WIDTH (m)	LENGTH
0 - 0.3	3	150	1	3
0.3 - 0.6	5	180	1	7
0.6 - 0.9	7	220	1	10

NOTES: A LEVEL SPREADER WEIR IS REQUIRED ON THE FOREBAY BUND (CAN BE A PRECAST CONCRETE BEAM). THIS IS DESIGNED TO SPREAD THE FLOWS EVENLY ACROSS THE FULL WIDTH OF THE WETLAND AND REDUCE THE RISKS OF PREFERENTIAL FLOW PATHS. DRAWINGS OF LEVEL SPREADER SHOULD INDICATE THAT IT WILL WELL KEYED INTO THE BATTERS (BY AT LEAST 500 MM) TO PREVENT ANY SHORT CIRCUITS FORMING RESULTING IN PREFERENTIAL FLOW PATHS AND PERSISTENT SCOUR OR PIPING.

ENGINEERING APPROVAL



- All works to be in accordance with Auckland council standards.
- Co-ordinates in terms of NZ Geodetic Datum Mt Eden 2000. Levels in terms of the Auckland Vertical Datum 1946.
- It is the contractors responsibility to locate all services that may be affected by his operations.
- 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).
- 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.
- Approved hardfill is to be used in backfilling of all road crossings and vehicle crossings to council standards.
- Heavy duty manhole lids and frames to be used in trafficked areas.
- All Manholes are to be 1050mmØ unless shown otherwise.
- All cesspit leads shall have min cover 0.9m.
- 0. All lines to be abandoned shall be sealed at each end. timing of all sealing to be coordinated with council staff.

I	S92			JV	03/2023
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G	S92			JV	01/2023
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Rev	Desc	ription		Ву	Date
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Surve	y	SURVEYWORX	12/21		
Desigr	ı	RK	01/22		
Drawn	1	RK	05/22		
Check	ed	JP	05/22		



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62, 78 & 80 PAPAKURA -**CLEVEDON ROAD, CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

PROPOSED WETLAND LEVEL SPREADER DETAIL

Project no.	194006		
Scale	NTS		
Cad file	C440- WETLAND.DWG		
Drawing no.	C445J	Rev	I











Notes

1. All works to be in accordance with Auckland council standards.

- Co-ordinates in terms of NZ Geodetic Datum Mt Eden 2000. Levels in terms of the Auckland Vertical Datum 1946.
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- 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.
- 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.
- All Manholes are to be 1050mmØ unless shown otherwise.
- 9. All cesspit leads shall have min cover 0.9m.
- All lines to be abandoned shall be sealed at each end. timing of all sealing to be coordinated with council staff.

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Surve	y	SURVEYWORX	12/21		
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Check	ed	JP	05/22		



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62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON PROPERTIES LTD

WETLAND STANDARD DETAILS

Project no.	194006		
Scale	NTS		
Cad file	C440- WETLAND.DWG		
Drawing no.	C445K	Rev	I



Project no.	194006		
Scale	NTS		
Cad file	C440- WETLAND.DWG		
Drawing no.	C445L	Rev	1

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600mm above ground level with the top painted. timber marker installed at the time of pipelaying Approved hardfill is to be used in backfilling of al road crossings and vehicle crossings to council Heavy duty manhole lids and frames to be used All Manholes are to be 1050mmØ unless shown All lines to be abandoned shall be sealed at each end. timing of all sealing to be coordinated with 03/2023 02/2022 09/2022 08/2022

	Project no.	194006				
	Scale	1:2000 @ A3				
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	Drawing no.	C453	Rev	G		



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- All works to be in accordance with Auckland council standards.
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EX BDY PROP BDY OLFP FLOW PROP SW SWALE

G	EPA	RFI	JV	03/2023	
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Design JV 0		01/22			
Drawn JV 01/2			01/22		
Check	ed	JP	01/22		



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62, 78 & 80 PAPAKURA -**CLEVEDON ROAD**, **CLEVEDON, AUCKLAND** FOR CLEVEDON **PROPERTIES LTD**

PROPOSED OVERALL OLFP 100 YEAR CATCHMENT PLAN POST

Project no.	194006				
Scale	1:5000 @ A3				
Cad file	C454- 100 YEAR OLFP PLANS.DWG				
Drawing no.	C455	Rev	G		



	Note	S				
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Legend

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- 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.
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Check	ed	JP	01/22			



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62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD**

PROPOSED OLFP 100 YEAR CATCHMENT PLAN

Project no.	194006				
Scale	1:2000 @ A3				
Cad file	C454- 100 YEAR OLFP PLANS.DWG				
Drawing no.	C457	Rev	G		







150mm MIN FREEBOARD IF CONTAINED WITHIN THE ROAD CARRIAGEWAY. IF ENCROACHES THE LOT BOUNDARY, THEN 500mm FREEBOARD.

ENGINEERING APPROVAL

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M Projee 62 CI CI FC PF Title PF	A 2, 7 LEV DR RO RO LFI LFI	E 8 & 80 /EDON /EDON CLEVE PERTIE POSED > SECT N (2 OF	PAF RC , AL :DO :S L 'ION 2)	inaven. vens Roa Adard 102 PAH DAD JCH N .TD	xxx, xxx, xxx, xxx, xxx, xxx, xxx, xxx	™ RA - AND	
M Projee 62 Cl Cl FC Pf Pf OI Pf OI Pl		E 8 & 80 VEDON VEDON CLEVE PERTIE POSED POSED P SECT N (2 OF	PAF RO , AU EDO ES L (10N 2) 6	vens Roza PAP DAD JCP N .TD	20.nz dd, Epsol 3 (UF), (LA	" RA - AND	
M Project 62 Cl Cl FC Pff Ol Pl Proje Scale	A ct, 7 LEV DR RO RO LFI LFI LAI	E 8 & 80 /EDON /EDON /EDON CLEVE PERTIE POSED P SECT N (2 OF 19400	PAF RC , AU EDO SS L (ION 2) 6	Veris Roce evens Roce and 102 PAH DAD JCH N .TD IS	20.nz d, Epsoid 3 (UF), (LA	AND	
M Projee 62 Cl Cl FC PF Title PF OI PL Scale		E 8 & 80 /EDON /EDON CLEVE PERTIE POSED POSED P SECT N (2 OF 19400 - C454-100	PAF RC , AL EDO SS L (10N 2) 6	American Constraints Research	20.NZ H, Epson (UF), (LANS.	AND	

Rev G

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Drawing no.







	Notes 1. A c 2. C E V 3. It s	s ouncil : co-ordir den 20 /ertical is the ervices	s to be in acc standards. nates in terms 100. Levels in Datum 1946. contractors re that may be	ordance w of NZ Gee terms of th sponsibilit affected by	ith Auc odetic I he Auc y to loc y his op	kland Datum Mt kland kate all perations.
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	62 CL CL FC	, 78 .EVI .EVI .R C	& 80 P. EDON F EDON, J ELEVED	APAK ROAD AUCK OON	(UR), (LA)	A - ND
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l l	Drawir	ng no.	C464		Rev	Н
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Point	Table	Point	Table	Point	Table		Point	Table
LOT NUMBER	MINIMUM FFL	LOT NUMBER	MINIMUM FFL	LOT NUMBER	MINIMUM FFL		LOT NUMBER	MINIMUM F
1	8.44m	42	9.65m	82	8.82m		138	11.73m
2	8.56m	43	9.57m	83	9.14m		139	11.69m
3	8.66m	44	8.79m	84	8.67m		140A	11.88m
4	8.75m	45	8.94m	85	8.83m		141 & 140B	12.02m
5	8.86m	46	8.83m	86	8.97m	1 1	142	11.91m
6	9.31m	47	8.94m	87 & 89	9.12m	1 [143	12.80m
7	9.40m	48	9.04m	90	9.11m	1 [144 & 145A	12.91m
8	9.50m	49	9.14m	91	9.22m		145B	12.73m
9	9.60m	50 & 51	10.26m	92 & 93	9.32m		146	12.51m
10	9.70m	52	9.21m	94	9.23m		147	12.29m
11	9.78m	53	9.07m	95	9.32m		148	12.31m
12	10.45m	54	8.96m	96	9.40m	1 [149	12.46m
13	10.17m	55B	9.37m	97 & 98	9.49m		150B	12.69m
14	10.01m	55A	9.80m	99	9.47m		151 & 150A	12.90m
15	9.86m	56	10.17m	100	9.38m	1 [152	12.82m
16	9.63m	57	10.08m	101	9.29m	1 [153	13.34m
17	9.39m	58	10.26m	102 & 103	9.45m		154 & 155A	13.46m
18	9.15m	59	10.07m	104	9.33m		155B	13.29m
19	8.91m	60	9.99m	105	9.23m		156	13.06m
20	8.66m	61	9.90m	106	9.47m	1 [157	12.79m
21	8.14m	62	9.81m	107, 108 & 109	9.72m		158 & 167	12.60m
22	9.02m	63	9.48m	110, 111 & 112	9.91m		159A	13.19m
23	9.26m	64	9.39m	113, 114 & 115	10.09m		159B	12.96m
24	9.50m	65	9.31m	116	9.74m		160 & 161	13.41m
25	9.74m	66	9.22m	117	10.12m		162	13.37m
26	9.96m	67	9.14m	118	10.64m		163	12.94m
27	10.08m	68	9.44m	119	10.14m		164	12.84m
28	10.19m	69	9.29m	120	10.28m	1	165	12.73m
29	10.30m	70	9.20m	121 & 122	10.32m		166B	12.48m
30	10.50m	71	9.10m	123	11.04m		166A	12.59m
31	10.50m	72	8.38m	124 & 125A	11.04m	1	167	12.36m
32	10.50m	73	8.30m	125B	10.94m	[168	14.01m
33 & 34	9.86m	74	8.30m	126	10.83m		171 & 173	14.16m
35	10.03m	75	8.30m	127	10.95m		175	13.91m
36	10.01m	76	8.30m	129	10.91m		177	13.67m
37	10.16m	77	8.30m	130 & 131	11.04m		179	13.78m
38	10.29m	78	8.30m	132	11.13m		180	13.85m
39	9.89m	79	8.32m	133	11.90m	1	181	13.03m
40	9.80m	80	8.65m	134 & 135	12.02m		182	12.57m
41	9.73m	81	8.73m	136	11.88m	1 [183	12.19m
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able	Point	Table
MINIMUM FFL	LOT NUMBER	MINIMUM FFL
1.73m	184	13.27m
1.69m	185	13.38m
1.88m	186	13.49m
2.02m	187	13.60m
1.91m	188	13.72m
2.80m	189	13.87m
2.91m	190	13.98m
2.73m	191	14.08m
2.51m	192 & 193	14.19m
2.29m	194	14.14m
2.31m	195	14.01m
2.46m	196	12.97m
2.69m	197	12.82m
2.90m	198	12.70m
2.82m	199	12.57m
3.34m	200	12.45m
3.46m	201	12.32m
3.29m	202	12.51m
3.06m	203	12.44m
2.79m	204	12.32m
2.60m	205	12.46m
3.19m	206	12.57m
2.96m	207	12.82m
3.41m	208 & 211	12.44m
3.37m	212	12.36m
2.94m	213 & 214	12.54m
2.84m	215B	12.32m
2.73m	215A	12.42m
2.48m	216	12.23m
2.59m	217	12.13m
2.36m	218	12.00m
4.01m	219C	11.49m
4.16m	219B	11.64m
3.91m	219A	11.78m
3.67m	220	11.35m
3.78m	221	11.20m
3.85m	222	11.05m

223

224

225

10.91m

11.11m

10.97m

Point	Point Table					
LOT NUMBER	MINIMUM FFL					
226	10.82m					
227	10.68m					
228	10.53m					
1001	10.85m					
1002	11.78m					
1003	12.67m					
1004	13.22m					
1005	13.38m					
1006	13.89m					
1007	11.69m					

ADDITIONAL NOTES:

IN ACCORDANCE WITH AUP: 1. WHERE OVERLAND FLOW PATH IS CONTAINED WITHIN THE ROAD CARRIAGEWAY AND FLOW IS LESS THAN 2m3/s, AS SIMPLIFIED METHOD (AND CONSERVATIVE), MINIMUM FINISHED FLOOR LEVELS HAVE BEEN ESTABLISHED BY ADDING 150MM FREEBOARD TO THE TOP OF KERB LEVEL.

2. WHERE OVERLAND FLOW PATH OVERTOPS THE KERB AND FLOW IS LESS THAN 2m3/sec, MINIMUM FINISHED FLOOR LEVELS HAVE BEEN ESTABLIHSED BY ADDING 150MM FREEBOARD TO THE TOP OF THE 100 YEAR FLOOD LEVEL.

3. MINIMUM 500MM FREEBOARD HAS BEEN PROVIDED WHERE FLOWS ARE MORE THAN 2m3/sec AND/OR ENCROACHES THE LOT BOUNDARIES.

ENGINEERING APPROVAL

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11.	All wo	orks cil st	to be in acc tandards.	orda	ance w	ith Auch	land	
2.	Co-or	dina	ates in terms	s of I	NZ Ge	odetic D	atum Mt	
	Eden Vertic	en 2000. Levels in terms of the Auckland tical Datum 1946.						
3.	It is th	he contractors responsibility to locate all						
	servio	es i	tnat may be	atte	cted b	y his op	erations.	
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C462- MINIMUM FFL.DWG

C465

Rev H

Cad file

Drawing no.



All works to be in accordance with Auckland council standards. Co-ordinates in terms of NZ Geodetic Datum Mt Eden 2000. Levels in terms of the Auckland Vertical Datum 1946. It is the contractors responsibility to locate all services that may be affected by his operations. 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). 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. Approved hardfill is to be used in backfilling of al road crossings and vehicle crossings to council standards. Heavy duty manhole lids and frames to be used in trafficked areas. All Manholes are to be 1050mmØ unless shown otherwise. All cesspit leads shall have min cover 0.9m. 10. All lines to be abandoned shall be sealed at each end. timing of all sealing to be coordinated with council staff. Legend PROP BDY EPA RFI 03/2023 EPA RFI JV 02/2023 Rev Description By Date Date Survey 01/22 Design 01/22 Drawn 01/22 Checked Maven Associates 09 571 0050 info@maven.co.nz ww.maven.co.nz E N 5 Owens Road, Epsom Auckland 1023 M A 62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD EXISTING OLFP** STREAM OVERALL PLAN 194006 Project no. 1:5000 @ A3 Scale Cad file C463A- EX STREAM OLFP.DWG Rev B C463A Drawing no.







- 2/7/23



Notes

1. All works to be in accordance with Auckland council standards.

- Co-ordinates in terms of NZ Geodetic Datum Mt Eden 2000. Levels in terms of the Auckland Vertical Datum 1946.
- It is the contractors responsibility to locate all services that may be affected by his operations
- 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.
- Approved hardfill is to be used in backfilling of all road crossings and vehicle crossings to council standards.
- Heavy duty manhole lids and frames to be used in trafficked areas.
- All Manholes are to be 1050mmØ unless shown otherwise.
- 9. All cesspit leads shall have min cover 0.9m.
- 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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62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON PROPERTIES LTD

EXISTING OLFP STREAM SECTIONS

Project no.	194006				
Scale	AS SHOWN				
Cad file	C463A- EX STREAM OLFP.DWG				
Drawing no.	C463D	Rev	В		



All works to be in accordance with Auckland council standards. Co-ordinates in terms of NZ Geodetic Datum Mt Eden 2000. Levels in terms of the Auckland Vertical Datum 1946. It is the contractors responsibility to locate all services that may be affected by his operations 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). 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. Approved hardfill is to be used in backfilling of al road crossings and vehicle crossings to council standards. Heavy duty manhole lids and frames to be used in trafficked areas. All Manholes are to be 1050mmØ unless shown otherwise. 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 PROP GPT CATCHMENT ML 03/2023 EPA RFI 02/2023 EPA RFI ML EPA RFI 09/2022 ML 08/2022 EPA ML Rev Description By Date Date Survey SURVEYWORX 12/2021 01/2022 Design Drawn 01/2022 01/2022 Checked Maven Associates 09 571 0050 info@maven.co.nz ww.maven.co.nz E N 5 Owens Road, Epsom Auckland 1023 M A 62, 78 & 80 PAPAKURA -CLEVEDON ROAD, CLEVEDON, AUCKLAND FOR CLEVEDON **PROPERTIES LTD** PROPOSED GPT CATCHMENT PLAN **OVERVIEW** 194006 Project no. 1:5000 @ A3 Scale Cad file C470- GPT PLANS.DWG C470 Rev G

Drawing no.



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200		4. Pipe bedding: 0 - 10% granular bedding,10 -					
		20% weak concrete bedding greater than 20%					
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		5. Each connection shall be marked by a					
		600mm	above ground le	vel with	the top	o painted.	
		This mai timber m	rker post shall be arker installed a	e placed t the tin	d along ne of n	side a ipelaving	
		and exte	nding from the c	onnect	ion to 1	50mm	
		below fir be accur	ately indicated c	/el. Cor n "as b	nnectio uilt" pla	ns shall ans.	
	6.	Approve	d hardfill is to be	used i	n backl	filling of all	
		standarc	ssings and venic ls.	IE CLOS	sings to	COUNCII	
	7.	Heavy d	uty manhole lids	and fra	ames to	be used	
	8.	All Manh	ioles are to be 1	050mm	Ø unle	ss shown	
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		Note	es				
.75m		1.	All worl	ks to be in ac	cordance v	ith Au	ckland
	1	2.	Co-ordi	nates in term	is of NZ Ge	odetic	Datum Mt
			Eden 2	000. Levels i	n terms of t	he Auc	ckland
		3.	It is the	contractors r	esponsibili	tv to lo	cate all
	PR FOOTPATH		service	s that may be	e affected b	y his o	perations.
		4.	Pipe be	dding: 0 - 10	% granular	beddir	ng,10 -
			weak c	oncrete bedd	ing (7mpa	plus ar	nti scour
			blocks	at 6m crs).			
		5.	Each co 50mmx	50mm treate	all be marke d pine stak	e exter	nding
			600mm	above grour	nd level with	the to	op painted.
			timber	narker post sna marker install	all be place led at the ti	d along me of p	gside a pipelaying
			and ext	ending from	the connec	tion to	150mm
			below f	inished grour iratelv indica	ted on "as l	nnectio puilt" pl	ons shall ans.
		6.	Approv	ed hardfill is	to be used	in back	filling of all
			road cro standar	ossings and v	ehicle cros	sings t	to council
DG	PTMANHOLE	7.	Heavy	duty manhole	lids and fr	ames t	o be used
/			in traffic	ked areas.	4050	~ .	
		8.	All Mar otherwi	holes are to se.	be 1050mn	10 unie	ess shown
		9.	All lines	to be aband	loned shall	be sea	led at each
			end. tin	ning of all sea staff	aling to be o	oordin	ated with
		1	Jourioll				
		Leg	end				
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		=			PROP	ormw	/ATER
			C		EX/PR	OP SW	/MH
			V.V.0				NGLE
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		G	EPA R	FI		ML	03/2023
	1	F	EPA R	FI		ML	02/2023
		D	EPA			ML	08/2022
-		Rev	Descrip	otion		Ву	Date
			B	у	Date		•
		Surve	ey S	URVEYWORX	12/20	21	
		Desig	gn J	V	01/20	22	
		Draw	n J	V	01/20	22	
		Chec	iked J		01/20		
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		P		FRTIE	SITO)	
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		Cad	file	C470- GPT	PLANS.DWG	1_	6
		Cad Draw	file ring no.	C470- GPT	PLANS.DWG	Rev	G



All works to be in accordance with Auckland council standards. 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. 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). 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. Approved hardfill is to be used in backfilling of al road crossings and vehicle crossings to council standards. Heavy duty manhole lids and frames to be used in trafficked areas. All Manholes are to be 1050mmØ unless shown otherwise. 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 PR STORMWATER \odot EX/PROP SWMH PR SWCP SINGLE EPA RFI ML 03/2023 02/2023 EPA RFI ML 09/2022 EPA RFI ML 08/2022 EPA ML Rev Description By Date Date SURVEYWORX 12/2021 Survey 01/2022 Design 01/2022 Drawn 01/2022 Checked Maven Associates 09 571 0050 info@maven.co.nz /w.maven.co.nz E N 5 Owens Road, Epsom MA 62, 78 & 80 PAPAKURA -



PROPOSED GPT B PLAN

l				
	Project no.	194006		
	Scale	1:100 @ A3		
	Cad file	C470- GPT PLANS.DWG		
	Drawing no.	C474	Rev	G



APPENDIX B: ENGINEERING CALCULATIONS

	MAVEN ASS	OCIATES	Job N 194	umber 1006	Sheet 3a	Rev B
Job Title Calc Title	PAPAKURA-CLEV Post-development Pond A 90th percenti	EDON ROAD SW Demand le storm post 1	Au R	thor RK	Date 25/01/2022	Checked
1. Runoff Curve	Number (CN) and initial	Abstraction (Ia)				
Soil name and classification	Cover description (cover type, treatme ogic condition)	nt, and	Curve Number CN*	Area (ha) 10000m2= 1ha	Product of CN x area
C	Paved (concre	te, gravel, metal, e	tc)	98	5 0000042	0.00
C	Grass (lands	scape and gardens)	/4	5.9999843	444.00
						0.00
						0.00
* from Appendix E	3			Totals =	6.0000	444.00
			WQV			
CN (weighted) =	total product = total area	<u>444.00</u> 6.000	=	74.0		
la (weighted) =	<u>5 x pervious area</u> = total area	<u> </u>	6.0	5.0	mm	
2. Time of Conce	entration					
Channelisation fac	ctor C =	0.6	(From Table	: 4.2)		
Catchment length	L =	0.7	km (along d	rainage path)	1	
Catchment Slope	Sc=	0.015	m/m (by equ	ual area meth	od)	
Runoff factor	CN =	74 0	=	0.59		
	200 - CN 200-	74.0				
$t_c = 0.14 \text{ C L}^{0.66}$ (0	CN/200-CN) ^{-0.55} Sc ^{-0.30}					
= 0.1	0.6 0.79	1.34	3.53	=	0.314	hrs
SCS Lag for HEC	-HMS t _p = 2/3 t _c			=	0.210	hrs
					OK	
					use	
					0.3135761	hrs
	Worksheet 1: Rui	noff Parameters a	nd Time of C	Concentratio	n	

	MAVEN ASSO	CIATES	Job Number 194006	Sheet 3b	Rev B
Job Title Calc Title	PAPAKURA-CLEVED Post-development SV Pond A 90th percentile	ON ROAD V Demand storm post 2	Author RK	Date 25/01/2022	Checked
1.	Data Catchment Area	A= 0.059999843	3 km2(100ha =1km2)		
	Runoff curve number C	N= 74.0) (from worksheet 1)		
	Initial abstraction	a= 5.0) mm (from worksheet 1)		
	Time of concentration	c= 0.31357611	hrs (from worksheet 1)		
2.	Calculate storage, S =(1000/CN - 10)2	5.4	= 89) mm	
3.	Average recurrence interval, ARI		90th %		
4.	24 hour rainfall depth, P24		27 (mm)		
5.	Compute c* = P24 - 2Ia/P24 - 2Ia+2S		0.087		
6.	Specific peak flow rate q*		0.068		
7.	Peak flow rate, $q_p = q^*A^*P_{24}$		0.110		
8.	Runoff depth, $Q_{24} = (P_{24}-Ia)^2/(P_{24}-Ia)^2$	+S	4.4		
9.	Runoff volume, V ₂₄ = 1000xQ ₂₄ A		261.05 (m3)		
	Post development run off volume (Per	vious)	261.05 (m3)		
	Workshe	et 2: Graphical F	eak Flow Rate		

	MAVEN AS	SOCIATES	Job N 194	umber 1006	Sheet 4a	Rev B
Job Title Calc Title	PAPAKURA-CLI Post-developme Pond A 90th perce	EVEDON ROAD ont SW Demand ntile storm post 1	Au R	thor RK	Date 25/01/2022	Checked
1. Runoff Curve I	Number (CN) and initi	al Abstraction (la)				
Soil name and classification	Cover description	n (cover type, treatme ologic condition)	nt, and	Curve Number CN*	Area (ha) 10000m2= 1ha	Product of CN x area
C	Paved (cond	crete, gravel, metal, e	tc)	98	14.495481	1420.56
C	Grass (lar	idscape and gardens)	/4	0	0.00
						0.00
						0.00
* from Appendix B				Totals =	14.4955	1420.56
			WQV		B	
CN (weighted) =	total product = total area	<u>1420.56</u> 14.495	=	98.0		
la (weighted) =	<u>5 x pervious area</u> = total area	<u> </u>	0.0 5	0.0	mm	
2. Time of Conce	ntration					
Channelisation fac	ctor C =	0.6	(From Table	e 4.2)		
Catchment length	L =	0.7	km (along d	rainage path)		
Catchment Slope	Sc=	0.015	m/m (by equ	ial area meth	od)	
Runoff factor.	CN =	98.0	=	0.96		
	200 - CN 20	00- 98.0				
$t_c = 0.14 \text{ C L}^{0.66}$ (C	CN/200-CN) ^{-0.55} Sc ^{-0.30}					
= 0.1	0.6 0.	79 1.02	3.53	=	0.239	hrs
SCS Lag for HEC	-HMS t _p = 2/3 t _c			=	0.160	hrs
					OK use 0.2392062	hrs
	Worksheet 1: F	Runoff Parameters a	nd Time of (Concentratio	n	

	MAVEN ASSOCIATES		ATES	Job Number 194006	Sheet 4b
Job Title Calc Title	PAPAKU Post-dev Pond A 90t	RA-CLEVEDON R relopment SW Der h percentile storn	ROAD mand n post 2	Author RK	Date 25/01/2022
1.	Data Catchment Area	A=	0.144954809	km2(100ha =1km2)	
	Runoff curve number	CN=	98.0	(from worksheet 1)	
	Initial abstraction	la=	0.0	mm (from worksheet 1)	
	Time of concentration	tc=	0.239206165	hrs (from worksheet 1)	
2.	Calculate storage, S =(1000	/CN - 10)25.4		=	5 mm
3.	Average recurrence interval	, ARI		90th %	
4.	24 hour rainfall depth, P24			27 (mm)	
5.	Compute c* = P24 - 2Ia/P24	- 2la+2S		0.723	
6.	Specific peak flow rate q*			0.068	
7.	Peak flow rate, $q_p = q^*A^*P_{24}$			0.266	
8.	Runoff depth, $Q_{24} = (P_{24}-Ia)$) ² /(P ₂₄ -Ia)+S		22.7	
9.	Runoff volume, V ₂₄ = 1000	xQ ₂₄ A		3283.41 (m3)	
	Post development run off vo Post development run off vo Total Post development run	lume (Pervious) lume (Impervious off volume	5)	261.05 (m3) 3283.41 (m3) 3544.45 (m3)	
	Total Post development run	off volume (50%	reduction)	1772.23 (m3)	Stored as PW
	Permanent Water area (Tota	al Post runoff Vol	ume/1.5m)	1181.48 m2	

Worksheet 2: Graphical Peak Flow Rate

	MAVEN	ASSC	CIATES	Job N 211	umber 1001	Sheet 3a	Rev B
Job Title Calc Title	PAPAKUF Post-deve Pond A 95th	RA CLEVE	DON ROAD SW Demand e storm post 1	Au R	thor RK	Date 25/01/2022	Checked
1. Runoff Curve	Number (CN) an	d initial A	Abstraction (Ia)				
Soil name and classification	Cover des	cription (c hydrolog	over type, treatme gic condition)	nt, and	Curve Number CN*	Area (ha) 10000m2= 1ha	Product of CN x area
C	Paveo	d (concret	e, gravel, metal, e	tc)	98	0	0.00
С	Gra	ss (lands)	cape and gardens)		/4	5.9999843	444.00
							0.00
							0.00
* from Appendix F	1				Totals =	6 0000	444.00
	,			WOV		0.0000	
CN (weighted) =	total product = total area		<u>444.00</u> 6.000	=	74.0		
ia (weighted) =	total area	<u>a</u> –	6.000	0.0		mm	
2. Time of Conce	ntration						
Channelisation fac	ctor C =		0.6	(From Table	e 4.2)		
Catchment length	L =		0.7	km (along d	rainage path))	
Catchment Slope	Sc		0.015	m/m (by equ	ual area meth	iod)	
Runoff factor,	CN =		74.0	=	0.59		
	200 - CN	200-	74.0			-	
$t_c = 0.14 \text{ C L}^{0.66}$ (C	CN/200-CN) ^{-0.55} S	c ^{-0.30}					
= 0.1	0.6	0.79	1.34	3.53	=	0.314	hrs
SCS Lag for HEC	-HMS t _p =	= 2/3 t _c			=	0.210	hrs
						OK	
						use	
						0.3135761	hrs
	Workshe	et 1: Run	off Parameters a	nd Time of (Concentratio	on	

F:\MAVEN\Projects\194006 Clevedon\Excel\POND CALC\210616 Detention SW Calc TP108 POND A

	MAVEN	ASSOCI	ATES	Job Numbe 211001	er	Sheet 3b	Rev B
Job Title Calc Title	PAPAKUI Post-deve Pond A 95th	RA CLEVEDON elopment SW De	ROAD emand m post 2	Author RK		Date 25/01/2022	Checked
1.	Data Catchment Area	A=	0.059999843	km2(100ha =1km	2)		
	Runoff curve number	CN=	74.0	(from worksheet 1)		
	Initial abstraction	la=	5.0	mm (from workshe	eet 1)		
	Time of concentration	tc=	0.31357611	hrs (from workshe	et 1)		
2.	Calculate storage, S =(100	0/CN - 10)25.4		=	89	mm	
3.	Average recurrence interva	al, ARI		95th	%		
4.	24 hour rainfall depth, P24			37	(mm)		
5.	Compute c* = P24 - 2Ia/P2	4 - 2la+2S		0.131			
6.	Specific peak flow rate q*			0.041			
7.	Peak flow rate, $q_p = q^*A^*P_2$	4		0.820			
8.	Runoff depth, $Q_{24} = (P_{24}-I)$	a) ² /(P ₂₄ -la)+S		8.4			
9.	Runoff volume, $V_{24} = 100$	0xQ ₂₄ A		506.75	(m3)		
	Post development run off v	olume (Perviou	s)	506.75	(m3)		
		Worksheet 2	: Graphical Pe	eak Flow Rate			

	MAVEN AS	SSOCIATES	Job N 211	umber 001	Sheet 4a	Rev B
Job Title Calc Title	PAPAKURA C Post-developn Pond A 95th perc	LEVEDON ROAD nent SW Demand centile storm post 1	Au R	thor RK	Date 25/01/2022	Checked
1. Runoff Curve I	Number (CN) and ini	itial Abstraction (la)				
Soil name and classification	Cover descripti	on (cover type, treatme drologic condition)	nt, and	Curve Number CN*	Area (ha) 10000m2= 1ha	Product of CN x area
C	Paved (co	ncrete, gravel, metal, e	tc)	98	14.495481	1420.56
C	Grass (la	andscape and gardens)	/4	0	0.00
						0.00
						0.00
* from Appendix B				Totals =	14.4955	1420.56
			WQV		B.	
CN (weighted) =	total product = total area	<u>1420.56</u> 14.495	=	98.0		
la (weighted) =	<u>5 x pervious area</u> = total area	<u> </u>	0.0 5	0.0	mm	
2. Time of Conce	ntration					
Channelisation fac	ctor C =	0.6	(From Table	e 4.2)		
Catchment length	L =	0.7	km (along d	rainage path)		
Catchment Slope	Sc=	0.015	m/m (by equ	ial area meth	od)	
Runoff factor	CN =	98.0	=	0.96		
	200 - CN	200- 98.0				
$t_c = 0.14 \text{ C L}^{0.66}$ (C	CN/200-CN) ^{-0.55} Sc ^{-0.30})				
= 0.1	0.6	0.79 1.02	3.53	=	0.239	hrs
SCS Lag for HEC	-HMS t _p = 2/3	t _c		=	0.160	hrs
					OK use 0.2392062	hrs
	Worksheet 1:	Runoff Parameters a	nd Time of (Concentratio	n	

MA	MAVEN 2	ASSOCI.	ATES	Job Number 211001	r	Sheet 4b	Rev B
Job Title Calc Title	PAPAKUR/ Post-devel Pond A 95th p	A CLEVEDON F opment SW De oercentile storr	ROAD mand m post 2	Author RK		Date 25/01/2022	Checked
1.	Data Catchment Area	A=	0.144954809	km2(100ha =1km2	2)		
	Runoff curve number	CN=	98.0	(from worksheet 1)			
	Initial abstraction	la=	0.0	mm (from workshe	et 1)		
	Time of concentration	tc=	0.239206165	hrs (from workshee	et 1)		
2.	Calculate storage, S =(1000	/CN - 10)25.4		=	5	mm	
3.	Average recurrence interval,	ARI		95th 9	%		
4.	24 hour rainfall depth, P24			37 ((mm)		
5.	Compute c* = P24 - 2Ia/P24	- 2la+2S		0.781			
6.	Specific peak flow rate q*			0.158			
7.	Peak flow rate, $q_p = q^*A^*P_{24}$			0.820			
8.	Runoff depth, Q ₂₄ = (P ₂₄ -Ia)²/(P ₂₄ -la)+S		32.5			
9.	Runoff volume, V ₂₄ = 1000	xQ ₂₄ A		4704.26 ((m3)		
	Pre development run off volu Post development run off vo Post development run off vo	ume lume (Pervious lume (Impervio	s) bus)	1731.01 (506.75 (4704.26	(m3) (m3)		
	Detention Volume Required			3480.00 ((m3)	Stream Protec	tion
		Worksheet 2:	: Graphical Pe	eak Flow Rate			

	Mave	Job Number 194006	Sheet 1	Rev A					
Job Title Calc Title	l	Papakura-Clevedon Road Orifice Size Calc Pond A	Author RK	Date 21/12/2022	Checked JP				
Detention Volume <u>3533.13</u> m ³ (See SMAF Summary)									
Flow Rate (Qi) i	Flow Rate (Qi) if released over 24 hours 0.04089 m³/sec (Average Discharge Flow-Rate)								
Tank Details									
Tank Height Orifice Height	0.400	m m (Above tank base)							
Orifice Sizing (to atmo)								
Qi=0.62*A*(2*G	*H _{2/3}) ^{1/2}								
$\begin{array}{c c} Q_{P} & 0.04089 & m^{3}/\text{sec} (\text{Peak Discharge Flow-Rate}) \\ G = & 9.810 & m^{2}/\text{sec} \\ H_{T} = & 0.399 & m (\text{Height of water above Discharge Point}) \\ H_{2/3} = & 0.266 & m (\text{Average Head of Water in pond} = \text{Two-Thirds of } H_{T}) \end{array}$									
$Qmax = 0.08 \text{ m}^3/\text{sec} 2(Qi)$ With 265mm Orifice Qi = 0.08 m ³ /sec Qi = 0.62.A.v(2.g.hi)									

Job Title Calc Title	MAVE N	EN ASSO Papakura, Clev 00yr Overland Fl	CIATES edon owpath	Job 19 A	Number 94006 uthor JV	Sheet 1 Date 7-Mar	Rev C Checked JP
		-	•				
	Design Spre	adsheet for Ma	nnings Formula				
	Calc 1: Capa	acity of Channe	l Flow (Q), Manniı	ngs formula			
		0	(AD2/301/2)/-				
		Q=	(AR 'S)/n		R=A/P		
	Where	Q=	Channel Flow		l/s		
		S =	Longitudinal SI	lope	m/m		
		A =	Cross sectiona	al area	m2		
		P=	Wetted Perime	eter	m		
	R = Hydraulic Radiu		us	m			
	n = Mannings n						
	Longitudina	l slope					
		S=		0.00	5 m/m		
	Section Location		SECTION	4			
		Depth=		0.2	4 m		
		Width=		16.0	0 m		
		S=		0.00	5 m/m		
		A=		1	9 m ²		
		P=		16.3	0 m		
		R=		0.11	7		
		n=		0.02	, 0 (Road - Aco	cessway)	
		Valacity (V)		0.94	2 m/200		
		R(2/3) S(1/2	2)/ n	0.04	5 m/sec		
		Depth x Vel	ocity (D.V)	0.2	0 Low Hazar	d*	
		Channel Flo VxA	ow (Q)	429	0 l/sec		
		100 year pe	eak discharge =	3,92	0 l/sec	OK	
	* Refer TP108 Modelling for F Based on tipping point to outfa			low rates II			

Job Title		N ASSOC	IATES	Job I 19 Au	Number 4006 Ithor	Sheet 2 Date	Rev C Checked
Calc Title	100	yr Overland Flow	/path		JV	7-Mar	JP
	Design Spread	Isheet for Mann	iings Formula			1	
	Calc 1: Capaci	ty of Channel F	low (Q), Mannir	<u>igs formula</u>			
		Q=	(AR ^{2/3} S ^{1/2})/n		R=A/P		
	Where	Q= S = A = P= R = n =	Channel Flow Longitudinal SI Cross sectiona Wetted Perime Hydraulic Radi Mannings n	ope Il area eter us	l/s m/m m2 m m		
	Longitudinal slope						
	S=			0.008	3 m/m		
	Section Location		SECTION E	3			
		Depth= Width= S= A= P= R= n= Velosity (V) R(2/3) S(1/2)/ Depth x Veloc	n ity (D.V)	0.3 4.00 0.008 0.93 4.10 0.227 0.030 1.108	3 m 3 m/m 3 m/m 3 m ²) m 7 0 (Landscape) 3 m/sec 8 Low Hazard*		
		Channel Flow VxA	(Q)	103 [,]	I l/sec		
		100 year peak	discharge =	980) l/sec	ОК	
		* Refer TP108	Modelling for FI	ow rates			

Job Title		EN ASSO Papakura, Clev	CIATES		Job Number 194006 Author	Sheet 3 Date 7 Mar	Rev C Checked
	I.		lowpath		50	1-Iviai	JF
	Design Spre	adsheet for Ma	nnings Formula				
	Calc 1: Capa	acity of Channe	el Flow (Q), Mannir	ngs form	<u>ula</u>		
	$Q = (AR^{23}S^{n2})/n$				R=A/P		
	Where	Q=	Channel Flow		l/s		
	THE STORE	S =	Longitudinal SI	ope	m/m		
		A =	Cross sectiona	al area	m2		
		P=	Wetted Perime	eter	m		
		R =	Hydraulic Radi	us	m		
		n =	Mannings n				
	Longitudina	l slope					
	-	-					
	S=				0.005 m/m		
	Section Location		SECTI	ON B1			
		Depth=			0.3 m		
		Width=			2.50 m		
		S=			0.005 m/m		
		A=			1.45 m ²		
		P=			4.56 m		
		R=			0.318		
		n=			0.030 (Landscape)		
					4 007 /		
) 2)/ n		1.097 m/sec		
		N(2/3) 3(1/	2)/11				
		Depth x Ve	locity (D.V)		0.33 Low Hazard*		
		Channel Fl VxA	ow (Q)		1591 l/sec		
		100 year pe	eak discharge =		1220 l/sec	ОК	
		* Refer TP	108 Modelling for Fl	ow rates			

Job Title	MAVE	N ASSO Papakura, Cleve	CIATES	Job 1 <i>P</i>	Number 94006 Author	Sheet 4 Date	t Rev C Checked
Calc Title	10	0yr Overland Flo	owpath		JV	7-Mar	r JP
	Design Sprea	adsheet for Ma	nnings Formula				
	Calc 1: Capa	city of Channel	Flow (Q), Mannir	<u>ngs formula</u>			
		Q=	(AR ^{2/3} S ^{1/2})/n		R=A/P		
	Where	Q= S = A = P= R = n =	Channel Flow Longitudinal SI Cross sectiona Wetted Perime Hydraulic Radi Mannings n	ope Il area eter us	l/s m/m m2 m m		
	Longitudinal	slope	indininge in				
	S=		0.00)5 m/m			
	Section Location		SECTION E	32			
		Depth= Width= S= A= P= R= n= Velosity (V) R(2/3) S(1/2 Depth x Velo	?)/ n ocity (D.V)	0 4.4 0.00 1.4 4.5 0.3 ³ 0.00 1.09	.3 m 40 m 05 m/m 45 m ² 56 m 18 30 (Landscape 98 m/sec) 1*	
		Channel Flo VxA	w (Q)	159	92 l/sec		
		100 year pe	ak discharge =	1,47	70 l/sec	ОК	
		* Refer TP1	08 Modelling for Fl	ow rates			

Job Title	MAVEN ASSOCIATES Papakura, Clevedon 100yr Overland Flowpath			Job 1 A	Number 94006 uthor	Sheet 5 Date 7-Mar	Rev C Checked
	•		owpath			7-mai	01
	Design Spre	adsheet for Ma	nnings Formula				
	Calc 1: Capa	acity of Channe	l Flow (Q), Manniı	ngs formula			
		Q=	(AR ^{2/3} S ^{1/2})/n		R=A/P		
	Where	Q=	Channel Flow		l/s		
		S =	Longitudinal S	lope	m/m		
		A =	Cross sectiona	al area	m2		
		P=	Wetted Perime	eter	m		
		R =	Hydraulic Radi	us	m		
		n =	Mannings n				
	Longitudina	l slope					
	S=			0.00	7 m/m		
	Section Location			SECTION	С		
		Denth=		0	3 m		
		Width=		22.0	0 m		
		S=		0.00	07 m/m		
		Δ-		2.00	$3 m^2$		
		P=		2.0	0 m		
		P-		0.10	ю III м		
		n=		0.10	20 (Road - Aco	cessway)	
					,		
		Velosity (V) R(2/3) S(1/2	2)/ n	0.92	25 m/sec		
		Depth x Vel	ocity (D.V)	0.2	8 Low Hazar	d*	
		Channel Flo VxA	ow (Q)	215	4 l/sec		
		100 year pe	eak discharge =	2,05	i0 l/sec	ОК	
		* Refer TP1 Based on ti	08 Modelling for Fl pping point to outfa	ow rates II			

Job Title Calc Title		N ASSOC Papakura, Cleve Dyr Overland Flo	CIATES		Job Number 194006 Author JV	Sheet 6 Date 7-Mar	Rev C Checked JP
		-					
	Design Sprea	dsheet for Mar	nings Formula				
	Calc 1: Capac	city of Channel	Flow (Q), Mannir	ngs form	ula		
		Q=	(AR ^{2/3} S ^{1/2})/n		R=A/P		
	Where	Q= S = A = P= R =	Channel Flow Longitudinal SI Cross sectiona Wetted Perime Hydraulic Radi	lope al area eter ius	l/s m/m m2 m m		
	n = Mannings n						
	S=				0.005 m/m		
	Section Location		SECTI	ON D			
		Depth= Width= S= A= P= R= n= Velosity (V) R(2/3) S(1/2 Depth x Velo Channel Flor VxA 100 year pea * Refer TP10)/ n ocity (D.V) w (Q) ak discharge =)8 Modelling for FI	low rates	0.24 m 16.00 m 0.005 m/m 1.34 m ² 16.30 m 0.082 0.020 (Road - Acc 0.668 m/sec 0.16 Low Hazar 895 l/sec 820 l/sec	cessway) d* OK	

	1	MAVEN	ASSOCIATES	Job Nun 19400	nber 16	Sheet 7	Rev C
Job Title		Papakura, (Clevedon	Autho	or	Date	Checked
Calc Title		100yr Overlan	d Flowpath	JV		14-Jan	JP
	Design Spre	adsheet for N	lannings Formula				I
	Calc 1: Capa	acity of Chann	el Flow (Q). Mannings f	ormula			
		Q=	(AR ^{2/3} S ^{1/2})/n	F	R=A/P		
	Where	Q=	Channel Flow	1/	/s		
		S =	Longitudinal Slope	n	n/m		
		A =	Cross sectional area	n	n2		
		P=	Wetted Perimeter	n	n		
		R =	Hydraulic Radius	n	n		
		n =	Mannings n				
	Longitudina	l slope					
		S=		0.005 n	n/m		
	Section Loc	ation		SECTION E			
		Donth-		0.00 -	-		
		Width-		0.20 II 26 33 n	n		
		S=		0 005 n	n/m		
		A=		3 29 n	n ²		
		P=		26.80 n	n		
		R=		0.123			
		n=		0.020 (Road - Acc	essway)	
		Velocity (V)		0 873 n	n/sec		
		R(2/3) S(1/2)/ n	0.010	1,000		
		Depth x Velo	ocity (D.V)	0.24 <mark>L</mark>	ow Hazar	d*	
		Channel Flow	w (Q)	2871 /	/sec		
		VxA					
		100 year pea	ak discharge =	2470	/sec	ОК	
		* Refer TP10 Based on tip	08 Modelling for Flow rates ping point to outfall	5			

MAE	N	MAVEN	ASSOCIATES	Job Number 194006	Sheet 8	Rev C
Job Title		Papakura. C	levedon	Author	Date	Checked
Calc Title		100yr Overlan	d Flowpath	JV	14-Jan	JP
	<u>Design Sp</u>	readsheet for M	annings Formula			
	<u>Calc 1: Ca</u>	pacity of Channe	el Flow (Q), Mannings fo	ormula		
		Q=	(AR ^{2/3} S ^{1/2})/n	R=A/P		
	Where	Q=	Channel Flow	l/s		
		S =	Longitudinal Slope	m/m		
		A =	Cross sectional area	m2		
		P=	Wetted Perimeter	m		
		R =	Hydraulic Radius	m		
		n =	Mannings n			
	Longitudi	nal slope				
		S=		0.005 m/m		
	Section Lo	ocation		SECTION F		
		Depth=		0.3 m		
		Width=		19.47 m		
		S=		0.005 m/m		
		A=		2.45 m ²		
		P=		19.75 m		
		R=		0.124		
		n=		0.020 (Road - Ac	cessway)	
		Velocity (V)		0.870 m/sec		
		R(2/3) S(1/2)	/ n	0.079 11/360		
		Depth x Velo	city (D.V)	0.26 Low Haza	rd*	
		Channel Flow	<i>μ</i> (Ω)	2153 //sec		
		VxA		100 1000		
		100 year pea	k discharge =	1960 l/sec	ОК	
		* Refer TP10 Based on tipp	8 Modelling for Flow rates bing point to outfall	5		

	N	MAVEN	ASSOCIATES	Job Nu 1940	ımber 006	Sheet 9	Rev C
Job Title		Papakura. (Clevedon	Auti	hor	Date	Checked
Calc Title		100yr Overlan	d Flowpath	J/	/	14-Jan	JP
		•	•				
	Design Spre	adsheet for N	lannings Formula				
	Calc 1: Capa	acity of Chann	iel Flow (Q), Mannings f	ormula			
		Q=	(AR ^{2/3} S ^{1/2})/n		R=A/P		
	Where	Q=	Channel Flow		l/s		
		S =	Longitudinal Slope		m/m		
		A =	Cross sectional area		m2		
		P=	Wetted Perimeter		m		
		R =	Hydraulic Radius		m		
		n =	Mannings n				
	Longitudina	l slope					
		S=		0.005	m/m		
	Section Loc	ation		SECTION G			
		Depth=		0.27	m		
		Width=		18.51	m		
		S=		0.007	m/m		
		A=		1.71	m ²		
		P=		19.45	m		
		R=		0.088			
		n=		0.020	(Road - Ac	cessway)	
		Velocity (V)		0.826	m/sec		
		R(2/3) S(1/2)/ n				
		Depth x Velo	ocity (D.V)	0.22	Low Hazai	<mark>·d</mark> *	
		Channel Flov VxA	w (Q)	1413	l/sec		
		100 year pea	ak discharge =	1360	l/sec	OK	
		* Refer TP1(Based on tip	08 Modelling for Flow rate ping point to outfall	s			

Job Title Calc Title	MAVE	N ASSOC Papakura, Cleve 0yr Overland Flo	CIATES		Job Number 194006 Author JV	Sheet 10 Date 7-Mar	Rev C Checked JP
		-					
	Design Sprea	adsheet for Mar	nings Formula				
	Calc 1: Capa	city of Channel	Flow (Q), Mannir	ngs formu	<u>la</u>		
		0=	(AR ^{2/3} S ^{1/2})/n		R=A/P		
		<u> </u>	(**************************************				
	Where	Q=	Channel Flow		l/s		
		S =	Longitudinal SI	lope	m/m		
		A =	Cross sectiona	al area	m2		
		P=	Wetted Perime	eter	m		
		R =	Hydraulic Radi	ius	m		
		n =	Mannings n				
	Longitudinal	slope					
	S=).005 m/m		
	Section Location		SECTIO	DN H			
		Depth=			0.06 m		
		Width=			2 02 m		
		S=		(005 m/m		
		A=		, () 121 m ²		
		P=			4 13 m		
		R=		(1.029		
		n=		().020 (Road - Acc	essway)	
					Υ.	.,	
		Velosity (V) R(2/3) S(1/2)/ n	().336 m/sec		
		Depth x Velo	ocity (D.V)		0.02 Low Hazard	d*	
		Channel Flo [.] VxA	w (Q)		41 l/sec		
		100 year pea	ak discharge =		30 l/sec	ОК	
		* Refer TP10	08 Modelling for FI	low rates			

Job Title		N ASSOC	CIATES		Job Number 194006 Author	Sheet 11 Date 7-Mar	Rev C Checked
			ii paul		•••		
	Design Sprea	dsheet for Man	<u>nings Formula</u>				
	Calc 1: Capad	city of Channel	Flow (Q), Mannir	ngs formu	la		
					_		
		Q=	(AR ^{2/3} S ^{1/2})/n		R=A/P		
	Where	Q=	Channel Flow		l/s		
		S =	Longitudinal SI	lope	m/m		
		A =	Cross sectiona	al area	m2		
		P=	Wetted Perime	eter	m		
		R =	Hydraulic Radi	ius	m		
		n =	Mannings n				
	Longitudinal	slope					
	S=).005 m/m		
	Section Location		SECT	ION I			
		Denth=			0 29 m		
		Width=			0.20 m 01 44 m		
		S=			0.005 m/m		
		Δ=			2.000 m/m^2		
		P=			2.27 m 21.80 m		
		R=			100		
		n=).020 (Road - Aco	cesswav)	
					,	,	
		Velosity (V)		().782 m/sec		
		R(2/3) S(1/2)	/ n				
		Depth x Velo	city (D.V)		0.23 Low Hazar	d*	
		Channel Flow	v (O)		1775 l/sec		
		VxA	. (2)				
		100 year pea	k discharge =		1,770 l/sec	ОК	
		* Refer TP10	8 Modelling for Fl	low rates			

Job Title Calc Title	MAVE	N ASSO Papakura, Cleve 0yr Overland Flo	CIATES edon	Jol	b Number 194006 Author JV	Sheet 12 Date 7-Mar	t Rev C Checked JP
	Dosign Sproa	adshoot for Ma	nings Formula	I			
	Calc 1: Capa	city of Channel	Flow (Q), Mannir	ngs formula			
		Q=	(AR ^{2/3} S ^{1/2})/n		R=A/P		
	Where	0=	Channel Flow		l/s		
	Which o	S =	Longitudinal SI	ope	m/m		
		A =	Cross sectiona	l area	m2		
		P=	Wetted Perime	eter	m		
		R =	Hydraulic Radi	us	m		
		n =	Mannings n				
	Longitudinal slope						
	S=			0.0	07 m/m		
	Section Location		SECTION	4 J			
		Depth=		() 3 m		
		Width=		6	00 m		
		S=		0.0	07 m/m		
		A=		1	57 m^2		
		P=		6	08 m		
		R=		0.2	58		
		n=		0.0	 30 (Landscape))	
		Velosity (V) R(2/3) S(1/2	?)/ n	1.1	30 m/sec		
		Depth x Vel	ocity (D.V)	0.	34 Low Hazard	I *	
		Channel Flo VxA	w (Q)	17	75 l/sec		
		100 year pe	ak discharge =	1,7	70 l/sec	OK	
		* Refer TP1	08 Modelling for FI	ow rates			

Job Title Calc Title	MAVE	N ASSOC Papakura, Cleve 0yr Overland Flo	CIATES		Job Number 194006 Author JV	Sheet 13 Date 7-Mar	Rev C Checked JP
		-					
	Design Sprea	adsheet for Mar	nings Formula				
	Calc 1: Capa	city of Channel	Flow (Q), Mannir	ngs formu	<u>la</u>		
		Q=	(AR ^{2/3} S ^{1/2})/n		R=A/P		
	Where	Q= S = A = P= R =	Channel Flow Longitudinal SI Cross sectiona Wetted Perime Hydraulic Radi	lope al area eter ius	l/s m/m m2 m m		
	n = Mannings n Longitudinal slope						
	S=).007 m/m		
	Section Location		SECTI	ON K			
		Depth= Width= S= A= P= R= n= Velosity (V) R(2/3) S(1/2 Depth x Velo Channel Flor VxA 100 year pea * Refer TP10)/ n ocity (D.V) w (Q) ak discharge = 08 Modelling for Fl	low rates	0.23 m 15.00 m 0.007 m/m 1.08 m ² 15.30 m 0.071 0.020 (Road - Acc 0.714 m/sec 0.16 Low Hazar 771 l/sec 770 l/sec	cessway) ' d *	

MA	Maven A	Job Number 194006	Sheet 1	Rev C	
Job Title Calc Title	PAPAKURA-C Inlet/ Outl	LEVEDON ROAD et Structure	Author RK	Date 3/03/2022	Checked JP
	SW OUTLET STRU Wetland A	CTURE 1-0			
	Pipe diameter =	1.050 m	ks= 0.6	1	
	Pipe gradient =	0.250 %			
	Velocity =	1.73 m/s			
	Froude Number Fo =	0.54			
	Rock diameter =	141 mm	=> Use 285	mm (min 2x D)ia)
	Outfall width =	3.15 m	=> Use 3.35	m (min)	
	Outfall length =	3.60 m	=> Use 3.60	m (min)	
	SW OUTLET STRU Wetland A	CTURE 2-0			
	Pipe diameter =	1.350 m	ks= 0.6	1	
	Pipe gradient =	0.200 %			
	Velocity =	1.80 m/s			
	Froude Number Fo =	0.50			
	Rock diameter =	167 mm	=> Use 340	mm (min 2x D)ia)
	Outfall width =	4.05 m	=> Use 4.10	m (min)	
	Outfall length =	3.80 m	=> Use 3.80	m (min)	
	SW OUTLET STRU Wetland A	CTURE 7-0			
	Pipe diameter =	0.225 m	ks= 0.6	I	
	Pipe gradient =	2.000 %			
	Velocity =	1.87 m/s			

Froude Number Fo =	1.26	
Rock diameter =	71 mm	=> Use 150 mm (min 2x Dia)
Outfall width =	0.68 m	=> Use 1.00 m (min)
Outfall length =	2.18 m	=> Use 2.20 m (min)
SW OUTLET STRUG Wetland B	CTURE 4-0	
Pipe diameter =	1.350 m	ks= 0.6
Pipe gradient =	0.250 %	
Velocity =	2.02 m/s	
Froude Number Fo =	0.55	
Rock diameter =	187 mm	=> Use 380 mm (min 2x Dia)
Outfall width =	4 05 m	=> Lise 4 10 m (min)
Outfall longth =	4.03 m	=> Use 5.00 m (min)
	4.91 m	-> 03e 3.00 m (mm)
POND OUTLET STF Wetland B	RUCTURE 2	
POND OUTLET STF Wetland B Pipe diameter =	RUCTURE 2 0.900 m	ks= 0.6
POND OUTLET STF Wetland B Pipe diameter = Pipe gradient =	RUCTURE 2 0.900 m 0.550 %	ks= 0.6
POND OUTLET STF Wetland B Pipe diameter = Pipe gradient = Velocity =	RUCTURE 2 0.900 m 0.550 % 2.33 m/s	ks= 0.6
POND OUTLET STF Wetland B Pipe diameter = Pipe gradient = Velocity = Froude Number Fo =	RUCTURE 2 0.900 m 0.550 % 2.33 m/s 0.78	ks= 0.6
POND OUTLET STF Wetland B Pipe diameter = Pipe gradient = Velocity = Froude Number Fo =	RUCTURE 2 0.900 m 0.550 % 2.33 m/s 0.78	ks= 0.6
POND OUTLET STF Wetland B Pipe diameter = Pipe gradient = Velocity = Froude Number Fo = Rock diameter =	RUCTURE 2 0.900 m 0.550 % 2.33 m/s 0.78 177 mm 2.7 m	ks= 0.6 => Use 360 mm (min 2x Dia) => Use 335 m (min)
POND OUTLET STF Wetland B Pipe diameter = Pipe gradient = Velocity = Froude Number Fo = Rock diameter = Outfall width =	RUCTURE 2 0.900 m 0.550 % 2.33 m/s 0.78 177 mm 2.7 m 5.50 m	ks= 0.6 => Use 360 mm (min 2x Dia) => Use 3.35 m (min) => Use 5.60 m (min)
POND OUTLET STF Wetland B Pipe diameter = Pipe gradient = Velocity = Froude Number Fo = Rock diameter = Outfall width = Outfall length =	RUCTURE 2 0.900 m 0.550 % 2.33 m/s 0.78 177 mm 2.7 m 5.59 m	ks= 0.6 => Use 360 mm (min 2x Dia) => Use 3.35 m (min) => Use 5.60 m (min)
POND OUTLET STF Wetland B Pipe diameter = Pipe gradient = Velocity = Froude Number Fo = Rock diameter = Outfall width = Outfall length = SW OUTLET STRUC	RUCTURE 2 0.900 m 0.550 % 2.33 m/s 0.78 177 mm 2.7 m 5.59 m CTURE 6-0	ks= 0.6 => Use 360 mm (min 2x Dia) => Use 3.35 m (min) => Use 5.60 m (min)
POND OUTLET STF Wetland B Pipe diameter = Pipe gradient = Velocity = Froude Number Fo = Rock diameter = Outfall width = Outfall length = SW OUTLET STRUC Wetland B Pipe diameter =	RUCTURE 2 0.900 m 0.550 % 2.33 m/s 0.78 177 mm 2.7 m 5.59 m CTURE 6-0 0.300 m	ks= 0.6 => Use 360 mm (min 2x Dia) => Use 3.35 m (min) => Use 5.60 m (min)

Velocity =	0.87 m/s		
Froude Number Fo =	0.51		
Rock diameter =	38 mm	=> Use	150 mm (min 2x Dia)
Outfall width =	0.9 m	=> Use	1.00 m (min)
Outfall length =	0.89 m	=> Use	1.00 m (min)

	MAVEN ASSOCIATES			Job Number 194006		Sheet 1	Rev C
Job Title Calc Title	Papakura, Clevedon Pre-development OLFP 100YR OLFP (EX CATCHMENT 1)			Aut J	thor V	Date 4/08/2022	Checked JP
1. Runoff Curve	Number (CN) and initial /	Abstraction (la)				
Soil name and classification C	Cover	description (c hydrolo (landscape ai	cover type, treatme gic condition) nd gardens) (35%	ont, and of Lots)	Curve Number CN* 74	Area (ha) 10000m2= 1ha 23.075	Product of CN x area 1707.55
							0.00
* from Appendix B	3			WQV	Totals =	23.0750	1707.55
CN (weighted) =	total produc total area	<u>t</u> =	1707.55 23.075	=	74.0		
la (weighted) =	<u>5 x pervious</u> total area	<u>s area</u> =	5 x 23.07	<u>23.1</u> 5	5.0	mm	
2. Time of Conce	entration						
Channelisation fac	ctor	C =	0.8	(From Table	4.2)		
Catchment length		L =	0.935	km (along di	rainage path)	1	
Catchment Slope		Sc=	0.008	m/m (by equ	ial area meth	od)	
Runoff factor,	CN 200 - CN	= 200-	74.0 74.0	=	0.59		
$t_c = 0.14 \text{ C L}^{0.66}$ (C	CN/200-CN) ⁻⁰	^{.55} Sc ^{-0.30}					
= 0.1	0.8	0.96	1.34	4.26	=	0.611	hrs
SCS Lag for HEC	-HMS	$t_{\rm p}$ = 2/3 $t_{\rm c}$			=	0.409	hrs
						OK	
						USE	hra
						0.0111574	1115
	Work	sheet 1: Run	off Parameters a	nd Time of C	Concentratio	n	

		IATES	Job Number 194006	Sheet 2	Rev C
Job Title Calc Title	Papakura, Clevedo Pre-development OL 100YR OLFP (EX CATCHI	n FP MENT 1	Author JV	Date 4/08/2022	Checked JP
1.	Data Catchment AreaA=Runoff curve numberCN=Initial abstractionIa=	0.23075 74.0 5.0	km2(100ha =1km2) (from worksheet 1) mm (from worksheet 1)		
2.	Time of concentration tc= Calculate storage, S =(1000/CN - 10)25.4	0.611157356	hrs (from worksheet 1) = 89) mm	
3. 4. 5. 6. 7. 8. 9.	Average recurrence interval, ARI 24 hour rainfall depth, P24 Compute c* = P24 - 2la/P24 - 2la+2S Specific peak flow rate q* Peak flow rate, $q_p=q^*A^*P_{24}$ Runoff depth, $Q_{24} = (P_{24}-la)^2/(P_{24}-la)+S$ Runoff volume, $V_{24} = 1000xQ_{24}A$	3	100 (yr) 280.32 (mm) 0.602 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.088 0.0888 0.0888 0.088 0.0888 0.088 0.088 0.088 0.088 0.08		
	Worksheet 2	2: Graphical Pe	eak Flow Rate		

	MAVEN ASSOCIATES			Job Number 194006		Sheet 1	Rev C
Job Title Calc Title	Papakura, Clevedon Pre-development OLFP 100YR OLFP (EX CATCHMENT 2)			Aut J	thor V	Date 4/08/2022	Checked JP
1. Runoff Curve I	Number (CN)	and initial A	bstraction (Ia)				
Soil name and classification C	Cover d Grass (I	escription (co hydrolog andscape an	over type, treatme jic condition) d gardens) (35%	nt, and of Lots)	Curve Number CN* 74	Area (ha) 10000m2= 1ha 5.5706	Product of CN x area 412.22 0.00
* from Appendix B	<u> </u>				Totals =	5.5706	0.00 412.22
				WQV			
CN (weighted) =	total product total area	= -	<u>412.22</u> 5.571	=	74.0		
la (weighted) =	<u>5 x pervious a</u> total area	area = _	5 x 5.571	5.6	5.0	mm	
2. Time of Conce	ntration						
Channelisation fac	ctor	C = _	0.8	(From Table	4.2)		
Catchment length	I	_ = _	0.34	km (along di	rainage path))	
Catchment Slope	:	Sc=	0.01	m/m (by equ	ial area meth	od)	
Runoff factor,	CN = 200 - CN	= 200-	74.0 74.0	_=	0.59		
t _c = 0.14 C L ^{0.66} (C	CN/200-CN) ^{-0.5}	⁵ Sc ^{-0.30}					
= 0.1	0.8	0.49	1.34	3.98	=	0.293	hrs
SCS Lag for HEC	-HMS 1	_p = 2/3 t _c			=	0.196	hrs
						ОК	
						use	hro
						0.2931706	nrs
	Works	heet 1: Rune	off Parameters a	nd Time of C	Concentratio	'n	

		CIATES	Job Number 194006	Sheet 2	Rev C
Job Title Calc Title	Papakura, Cleved Pre-development (100YR OLFP (EX CATC	lon)LFP 1MENT 2)	Author JV	Date 4/08/2022	Checked JP
1.	Data Catchment Area A Runoff curve number CN Initial abstraction Ia Time of concentration to Optimization to Data	= 0.055706 = 74.0 = 5.0 = 0.293170631	km2(100ha =1km2) (from worksheet 1) mm (from worksheet 1) hrs (from worksheet 1)		
2. 3. 4. 5. 6.	Average recurrence interval, ARI 24 hour rainfall depth, P24 Compute c* = P24 - 2la/P24 - 2la+2S Specific peak flow rate q*	.4	- 09		
7. 8. 9.	Peak flow rate, $q_p = q^*A^*P_{24}$ Runoff depth, $Q_{24} = (P_{24}-Ia)^2/(P_{24}-Ia)^2$ Runoff volume, $V_{24} = 1000xQ_{24}A$	S	1.874 m3/s		
	Workshee	2: Graphical P	eak Flow Rate		

	MAVEN ASSOCIATES			Job Number 194006		Sheet 1	Rev C
Job Title Calc Title	l Pr 100YR	Papakura, Cle e-developme OLFP (EX CA	evedon nt OLFP TCHMENT 3)	Aut J	thor V	Date 4/08/2022	Checked JP
1. Runoff Curve I	Number (CN)) and initial /	Abstraction (Ia)				
Soil name and classification C	Cover description (cover type, treatme hydrologic condition) Grass (landscape and gardens) (35%			nt, and of Lots)	Curve Number CN* 74	Area (ha) 10000m2= 1ha 0.5466	Product of CN x area 40.45 0.00
* from Appendix B					Totals =	0.5466	0.00 40.45
				WQV			
CN (weighted) =	total product total area	<u>t</u> =	40.45 0.547	=	74.0		
la (weighted) =	<u>5 x pervious</u> total area	<u>area</u> =	5 x 0.547	0.5	5.0	mm	
2. Time of Conce	ntration						
Channelisation fac	ctor	C =	0.8	(From Table	4.2)		
Catchment length		L =	0.102	km (along di	rainage path))	
Catchment Slope		Sc=	0.01	m/m (by equ	ial area meth	iod)	
Runoff factor,	CN 200 - CN	= 200-	74.0 74.0	=	0.59		
t _c = 0.14 C L ^{0.66} (C	CN/200-CN) ^{-0.}	⁵⁵ Sc ^{-0.30}					
= 0.1	0.8	0.22	1.34	3.98	=	0.132	hrs
SCS Lag for HEC	-HMS	$t_{\rm p} = 2/3 \ t_{\rm c}$			=	0.089	hrs
						NO GOOD use 0.17	hrs
	Works	sheet 1: Run	off Parameters a	nd Time of C	Concentratio	on	

	MAVEN A	ASSOCIA	TES	Job Number 194006	Sheet 2	Rev C
Job Title Calc Title	Papakı Pre-deve 100YR OLFP	ira, Clevedon Iopment OLFP EX CATCHMEN	IT 3)	Author JV	Date 4/08/2022	Checked JP
1.	Data Catchment Area Runoff curve number Initial abstraction	A= CN= la=	0.005466 74.0 5.0	km2(100ha =1km2) (from worksheet 1) mm (from worksheet 1)		
2.	Time of concentration Calculate storage, S =(1000/0	tc= CN - 10)25.4	0.17	hrs (from worksheet 1) = 8) mm	
3. 4. 5. 6. 7. 8. 9.	Average recurrence interval, A 24 hour rainfall depth, P24 Compute c* = P24 - 2la/P24 - Specific peak flow rate q* Peak flow rate, $q_p=q^*A^*P_{24}$ Runoff depth, $Q_{24} = (P_{24}-la)^2$ Runoff volume, $V_{24} = 1000x0$	ARI 2la+2S /(P ₂₄ -la)+S Q ₂₄ A		100 (yr) 280.32 (mm) 0.602 0.170 0.260 m3/s 207.9 1136.51 (m3)		
	v	Vorksheet 2: G	iraphical Pe	eak Flow Rate		

	MAVEN ASSOCIATES			Job Number 194006		Sheet 1	Rev C
Job Title Calc Title	ן Pi 100YR	Papakura, Cle re-developme OLFP (EX CA	vedon nt OLFP TCHMENT 4)	Aut J	thor V	Date 4/08/2022	Checked JP
1. Runoff Curve I	Number (CN) and initial A	Abstraction (Ia)				
Soil name and classification C	Cover Grass	description (c hydrolo (landscape ar	over type, treatme gic condition) nd gardens) (35% (nt, and of Lots)	Curve Number CN* 74	Area (ha) 10000m2= 1ha 1.5686	Product of CN x area 116.08 0.00
* from Appendix B	1				Totals =	1 5686	0.00
	, ,			WQV	Totalo	1.0000	110.00
CN (weighted) =	total produc total area	<u>t</u> =	<u>116.08</u> 1.569	=	74.0	-	
la (weighted) =	<u>5 x pervious</u> total area	area =	<u>5 x</u> 1.569	1.6	5.0	mm	
2. Time of Conce	ntration						
Channelisation fac	ctor	C =	0.8	(From Table	4.2)		
Catchment length		L =	0.102 km (along drainage path)				
Catchment Slope		Sc=	0.01	m/m (by equ	ial area meth	iod)	
Runoff factor,	CN 200 - CN	= 200-	74.0 74.0	=	0.59		
t _c = 0.14 C L ^{0.66} (C	CN/200-CN) ⁻⁰	^{.55} Sc ^{-0.30}					
= 0.1	0.8	0.22	1.34	3.98	=	0.132	hrs
SCS Lag for HEC	-HMS	$t_{p} = 2/3 t_{c}$			=	0.089	hrs
						NO GOOD use 0.17	hrs
	Work	sheet 1: Run	off Parameters a	nd Time of C	Concentratio	on	

	MAVEN A	ASSOCIA	TES	Job Number 194006	Sheet 2	Rev C
Job Title Calc Title	Papakı Pre-deve 100YR OLFP	ira, Clevedon Iopment OLFP EX CATCHMEN	IT 4)	Author JV	Date 4/08/2022	Checked JP
1.	Data Catchment Area Runoff curve number Initial abstraction	A= CN= Ia=	0.015686 74.0 5.0	km2(100ha =1km2) (from worksheet 1) mm (from worksheet 1)		
2.	Time of concentration Calculate storage, S =(1000/0	tc= CN - 10)25.4	0.17	hrs (from worksheet 1) = 89) mm	
3. 4. 5. 6. 7. 8. 9.	Average recurrence interval, <i>A</i> 24 hour rainfall depth, P24 Compute $c^* = P24 - 2Ia/P24 - 2Ia$	ARI 21a+2S /(P ₂₄ -1a)+S Q ₂₄ A		100 (yr) 280.32 (mm) 0.602 0.170 0.170 0.1748 m3/s 207.9 3261.48 (m3)		
·.		Vorksheet 2: G	iraphical Pe	eak Flow Rate		
	MAVEN ASSOCIATES	Job N 194	lumber 1006	Sheet 1	Rev C	
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Job Title Calc Title	Papakura, Clevedon Pre-development OLFP 100YR OLFP (UPSTREAM 1)	Au J	thor IV	Date 4/08/2022	Checked JP	
1. Runoff Curve	Number (CN) and initial Abstraction (Ia)					
Soil name and classification C	Cover description (cover type, treatme hydrologic condition) Paved (concrete, gravel, metal, etc),	ent, and Road	Curve Number CN* 98	Area (ha) 10000m2=1ha 1.0725	Product of CN x area 105.11	
С	Grass (landscape and gardens) (35%	74	0.5775	42.74		
					0.00	
* from Appendix B		WQV	Totals =	1.6500	147.84	
CN (weighted) =	total product =147.84total area1.650	.=	89.6			
la (weighted) =	5 x pervious area5 xtotal area1.650	0.6	1.8	mm		
2. Time of Conce	ntration					
Channelisation fac	ctor C = <u>0.8</u>	(From Table	94.2)			
Catchment length	L =0.1	km (along d	rainage path))		
Catchment Slope	Sc= 0.01	m/m (by equ	ual area meth	od)		
Runoff factor,	<u>CN = 89.6</u> 200 - CN 200- 89.6	_=	0.81			
$t_c = 0.14 \text{ C L}^{0.66}$ (C	CN/200-CN) ^{-0.55} Sc ^{-0.30}					
= 0.1	0.8 0.22 1.12	3.98	=	0.109	hrs	
SCS Lag for HEC	-HMS $t_p = 2/3 t_c$		=	0.073	hrs	
				NO GOOD use 0.17	hrs	
	Worksheet 1: Runoff Parameters	and Time o	f Concentrat	tion		

	MAVEN	ASSOCIAT	ES	Job Number 194006	Sheet 2	Rev C
Job Title Calc Title	Papak Post-dev 100YR OLI	ura, Clevedon elopment OLFP FP (UPSTREAM 1))	Author JV	Date 4/08/2022	Checked JP
2.	Data Catchment Area Runoff curve number Initial abstraction Time of concentration Calculate storage, S =(1000/0	A= CN= la= tc= CN - 10)25.4	0.0165 89.6 1.8 0.17	km2(100ha =1km2) (from worksheet 1) mm (from worksheet 1) hrs (from worksheet 1) = 29) mm	
 3. 4. 5. 6. 7. 8. 9. 	Average recurrence interval, 24 hour rainfall depth, P24 Compute c* = P24 - 2la/P24 Specific peak flow rate q* Peak flow rate, $q_p=q^*A^*P_{24}$ Runoff depth, $Q_{24} = (P_{24}-la)^*$ Runoff volume, $V_{24} = 1000x$	ARI · 2la+2S ²/(P ₂₄ -la)+S Q ₂₄ A		100 (yr) 280.32 (mm) 0.824 0.161 0.745 m3/s 251.9 4156.51 (m3)		
		Norksheet 2: Gr	aphical Pe	eak Flow Rate		

	MAVEN ASSC	OCIATES	Job N 194	umber 006	Sheet 1	Rev C
Job Title Calc Title	Papakura, Cle Pre-developmer 100YR OLFP (UPS	vedon nt OLFP TREAM 1)	Aut J	thor V	Date 4/08/2022	Checked JP
1. Runoff Curve I	Number (CN) and initial A	Abstraction (la)				
Soil name and classification C	Cover description (c hydrolog Paved (concrete, g	over type, treatme gic condition) ravel, metal, etc),	nt, and Road	Curve Number CN* 98	Area (ha) 10000m2=1ha 0.39	Product of CN x area 38.22
С	Grass (landscape ar	nd gardens) (35% o	of Lots)	74	0.21	15.54
						0.00
* from Appendix B			WQV	Totals =	0.6000	53.76
CN (weighted) =	total product = total area	53.76 0.600	=	89.6		
la (weighted) =	<u>5 x pervious area</u> = total area	5 x 0.600	0.2	1.8	mm	
2. Time of Conce	ntration					
Channelisation fac	ctor C =	0.8	(From Table	4.2)		
Catchment length	L =	0.05	km (along di	rainage path))	
Catchment Slope	Sc=	0.01	m/m (by equ	ial area meth	od)	
Runoff factor,	<u>CN</u> = 200 - CN 200-	89.6 89.6	=	0.81		
t _c = 0.14 C L ^{0.66} (C	CN/200-CN) ^{-0.55} Sc ^{-0.30}					
= 0.1	0.8 0.14	1.12	3.98	=	0.069	hrs
SCS Lag for HEC	-HMS $t_p = 2/3 t_c$			=	0.046	hrs
					NO GOOD use 0.17	hrs
	Worksheet 1: Ru	noff Parameters	and Time of	f Concentrat	tion	

	MAVEN	ASSOCIAT	ES	Job Number 194006	Sheet 2	Rev C
Job Title Calc Title	Papał Post-de 100YR OL	tura, Clevedon velopment OLFP FP (UPSTREAM 1)		Author JV	Date 4/08/2022	Checked JP
1.	Data Catchment Area Runoff curve number Initial abstraction Time of concentration Calculate storage, S =(1000,	A= CN= la= tc= 'CN - 10)25.4	0.006 89.6 1.8 0.17	km2(100ha =1km2) (from worksheet 1) mm (from worksheet 1) hrs (from worksheet 1) = 29) mm	
3. 4. 5. 6. 7. 8. 9.	Average recurrence interval, 24 hour rainfall depth, P24 Compute c* = P24 - 2Ia/P24 Specific peak flow rate q* Peak flow rate, $q_p=q^*A^*P_{24}$ Runoff depth, $Q_{24} = (P_{24}-Ia)$ Runoff volume, $V_{24} = 1000x$	ARI - 2la+2S 9 ² /(P ₂₄ -la)+S (Q ₂₄ A		100 (yr) 280.32 (mm) 0.824 0.161 0.271 m3/s 251.9 1511.46 (m3)		
		Worksheet 2: Gra	aphical Po	eak Flow Rate		

MAEN	MAV	EN ASS	OCIATES	Job N 194	lumber 1006	Sheet 1	Rev C
Job Title Calc Title	P 100	Papakura, Clo re-developme YR OLFP (UP	evedon ent OLFP STREAM 2)	Au J	thor IV	Date 4/08/2022	Checked JP
1. Runoff Curve I	Number (CN	I) and initial	Abstraction (Ia)				
Soil name and classification C C	Cover Pave Grass	Cover description (cover type, treatme hydrologic condition) Paved (concrete, gravel, metal, etc), Grass (landscape and gardens) (35%			Curve Number CN* 98 74	Area (ha) 10000m2= 1ha 0.929435 1.395465	Product of CN x area 91.08 103.26
							0.00
* from Appendix B	<u> </u>			WQV	Totals =	2.3249	0.00 194.35
CN (weighted) =	total produc total area	<u>ot</u> =	<u>194.35</u> 2.325	=	83.6		
la (weighted) =	<u>5 x perviou</u> total area	<u>s area</u> =	<u> </u>	1.4	3.0	mm	
2. Time of Conce	ntration						
Channelisation fac	ctor	C =	0.8	(From Table	94.2)		
Catchment length		L =	0.15	km (along d	rainage path)	1	
Catchment Slope		Sc=	0.01	m/m (by equ	ual area meth	od)	
Runoff factor,	CN 200 - CN	= 200-	83.6 83.6	=	0.72		
$t_c = 0.14 \text{ C L}^{0.66}$ (C	CN/200-CN) ⁻¹	^{0.55} Sc ^{-0.30}					
= 0.1	0.8	3 0.29	1.20	3.98	=	0.153	hrs
SCS Lag for HEC	-HMS	t_p = 2/3 t_c			=	0.102	hrs
						NO GOOD use 0.17	hrs
	Work	sheet 1: Rur	noff Parameters a	nd Time of (Concentratio	'n	

	MAVEN ASSOCIATES			Job Number 194006	Sheet 2	Rev C
Job Title Calc Title	Papaku Post-deve 100YR OLFI	ra, Clevedon Iopment OLFP ? (UPSTREAM	2)	Author JV	Date 4/08/2022	Checked JP
2.	Data Catchment Area Runoff curve number Initial abstraction Time of concentration Calculate storage, S =(1000/C	A= CN= la= tc= N - 10)25.4	0.023249 83.6 3.0 0.17	km2(100ha =1km2) (from worksheet 1) mm (from worksheet 1) hrs (from worksheet 1) = 50) mm	
3. 4. 5. 6. 7. 8. 9.	Average recurrence interval, A 24 hour rainfall depth, P24 Compute c* = P24 - 2la/P24 - Specific peak flow rate q* Peak flow rate, $q_p=q^*A^*P_{24}$ Runoff depth, $Q_{24} = (P_{24}-la)^2/Runoff volume, V_{24} = 1000xG$	RI 2la+2S (P ₂₄ -la)+S 9 ₂₄ A		100 (yr) 280.32 (mm) 0.733 0.150 0.978 m3/s 235.1 5465.05 (m3)		
	w	orksheet 2: G	Braphical Pe	eak Flow Rate		

	MAV	EN ASSO	OCIATES	Job N 194	umber 006	Sheet 1	Rev C
Job Title Calc Title	P 100	Papakura, Clevedon Pre-development OLFP 100YR OLFP (UPSTREAM 3)			Author JV		Checked JP
1. Runoff Curve	Number (CN	N) and initial A	Abstraction (la)				
Soil name and classification	Cover	description (c hydrolo	cover type, treatme gic condition)	nt, and	Curve Number CN*	Area (ha) 10000m2= 1ha	Product of CN x area
C	Pave	ed (concrete, g	98	0.36	35.28		
C	Grass	Grass (landscape and gardens) (35% of Lots) 74					187.96
							0.00
* from Appendix E	l				Totals =	2.9000	223.24
CN (weighted) =	total produc total area	<u>ot</u> =	<u>223.24</u> 2.900	WQV =	77.0		
la (weighted) =	<u>5 x perviou</u> total area	<u>s area</u> =	<u> </u>	2.5	4.4	mm	
2. Time of Conce	entration						
Channelisation fac	ctor	C =	0.8	(From Table	4.2)		
Catchment length		L =	0.28	km (along di	rainage path)	1	
Catchment Slope		Sc=	0.01	m/m (by equ	ial area meth	od)	
Runoff factor,	<u>CN</u> 200 - CN	= 200-	77.0 77.0	=	0.63		
$t_c = 0.14 \text{ C L}^{0.66}$ (C	CN/200-CN) ⁻	^{0.55} Sc ^{-0.30}					
= 0.1	0.8	3 0.43	1.29	3.98	=	0.249	hrs
SCS Lag for HEC	-HMS	$t_p = 2/3 t_c$			=	0.167	hrs
						OK use 0.2490718	hrs
	Worl	sheet 1: Run	off Parameters a	nd Time of C	Concentratio	n	

	MAVEN ASSOCIATES			Job Number 194006	Sheet 2	Rev C
Job Title Calc Title	Papakur Post-devel 100YR OLFP	a, Clevedon opment OLFP (UPSTREAM 3	3)	Author JV	Date 4/08/2022	Checked JP
2.	Data Catchment Area Runoff curve number Initial abstraction Time of concentration Calculate storage, S =(1000/CM	A= CN= la= tc= 0.2	0.029 77.0 4.4 249071824	km2(100ha =1km2) (from worksheet 1) mm (from worksheet 1) hrs (from worksheet 1) = 74	5 mm	
3. 4. 5. 6. 7. 8. 9.	Average recurrence interval, AF 24 hour rainfall depth, P24 Compute c* = P24 - 2la/P24 - 2 Specific peak flow rate q* Peak flow rate, $q_p=q^*A^*P_{24}$ Runoff depth, $Q_{24} = (P_{24}-la)^2/(2)$ Runoff volume, $V_{24} = 1000xQ_2$	RI Ia+2S P ₂₄ -Ia)+S ₂₄ A		100 (yr) 280.32 (mm) 0.641 0.150 1.219 m3/s 216.4 6274.96 (m3)		
	Wo	orksheet 2: G	raphical Pe	eak Flow Rate	L	1

	MAV	EN ASS	OCIATES	Job N 194	umber 1006	Sheet 1	Rev C
Job Title Calc Title	P 100	Papakura, ClevedonAuthorPre-development OLFPJV100YR OLFP (UPSTREAM 3)			thor V	Date 4/08/2022	Checked JP
1. Runoff Curve	Number (CN	I) and initial .	Abstraction (Ia)				
Soil name and classification	Cover	description (o	cover type, treatme ogic condition)	nt, and	Curve Number CN*	Area (ha) 10000m2= 1ha	Product of CN x area
С	Pave	Paved (concrete, gravel, metal, etc), Road					9.80
С	Grass	(landscape a	nd gardens) (35%	ot Lots)	74	0.5	37.00
							0.00
* from Appendix F	l				Totals =	0.6000	46.80
				WQV			
CN (weighted) =	total productotal area	<u>ct</u> =	<u>46.80</u> 0.600	=	78.0		
la (weighted) =	<u>5 x perviou</u> total area	<u>s area</u> =	<u> </u>	0.5	4.2	mm	
2. Time of Conce	entration						
Channelisation fac	ctor	C =	0.8	(From Table	4.2)		
Catchment length		L =	0.12	km (along di	rainage path))	
Catchment Slope		Sc=	0.01	m/m (by equ	ual area meth	iod)	
Runoff factor.	CN	=	78.0	=	0.64		
· · · · · · · · · · · · · · · · · · ·	200 - CN	200-	78.0	•		•	
$t_c = 0.14 \text{ C L}^{0.66}$ (C	CN/200-CN) ⁻¹	^{0.55} Sc ^{-0.30}					
= 0.1	8.0	3 0.25	1.28	3.98	=	0.141	hrs
SCS Lag for HEC	-HMS	$t_p = 2/3 t_c$			=	0.094	hrs
						NO GOOD	
						use	
						0.17	hrs
	Work	(sheet 1: Rur	noff Parameters a	nd Time of C	Concentratio	n	

	MAVEN	ASSOCIAT	ES	Job Number 194006	Sheet 2	Rev C
Job Title Calc Title	Papał Post-de 100YR OL	ura, Clevedon velopment OLFP FP (UPSTREAM 3)		Author JV	Date 4/08/2022	Checked JP
2.	Data Catchment Area Runoff curve number Initial abstraction Time of concentration Calculate storage, S =(1000/	A= CN= la= tc= CN - 10)25.4	0.006 78.0 4.2 0.17	km2(100ha =1km2) (from worksheet 1) mm (from worksheet 1) hrs (from worksheet 1) = 72	2 mm	
 3. 4. 5. 6. 7. 8. 9. 	Average recurrence interval, 24 hour rainfall depth, P24 Compute c* = P24 - 2la/P24 Specific peak flow rate q* Peak flow rate, $q_p=q^*A^*P_{24}$ Runoff depth, $Q_{24} = (P_{24}-la)$ Runoff volume, $V_{24} = 1000$	ARI - 2la+2S ² /(P ₂₄ -la)+S :Q ₂₄ A		100 (yr) 280.32 (mm) 0.655 0.146 0.246 m3/s 219.3 1315.62 (m3)		
		Worksheet 2: Gra	aphical Pe	eak Flow Rate		

	MAV	EN ASS	OCIATES	Job Number 194006		Sheet 1	Rev C		
Job Title Calc Title	P 100	Papakura, Cl re-developmo YR OLFP (UP	evedon ent OLFP STREAM 4)	evedon Author nt OLFP JV STREAM 4)			Checked JP		
1. Runoff Curve	Number (CN	I) and initial	Abstraction (la)						
Soil name and classification	Cover	description (hydrolo	cover type, treatme ogic condition)	nt, and	Curve Number CN*	Area (ha) 10000m2= 1ha	Product of CN x area		
C	Pave	Paved (concrete, gravel, metal, etc), Road					0.00		
	Grass	Grass (landscape and gardens) (35% of Lots) 7					0.00		
							0.00		
* from Appendix E	5				Totals =	1.5100	111.74		
				WQV					
CN (weighted) =	total produc	<u>st</u> =	111.74	=	74.0				
la (weighted) =	<u>5 x perviou</u> total area	<u>s area</u> =	<u> </u>	1.5	5.0	mm			
2. Time of Conce	ntration								
Channelisation fac	ctor	C =	0.8	(From Table	4.2)				
Catchment length		L =	0.28	km (along di	rainage path))			
Catchment Slope		Sc=	0.012	m/m (by equ	al area meth	iod)			
Runoff factor.	CN	=	74.0	=	0.59				
· · · · · · · · · · · · · · · · · · ·	200 - CN	200-	- 74.0	•		•			
$t_c = 0.14 \text{ C L}^{0.66}$ (C	CN/200-CN)⁻	^{0.55} Sc ^{-0.30}							
= 0.1	8.0	8 0.43	3 1.34	3.77	=	0.244	hrs		
SCS Lag for HEC	-HMS	t_p = 2/3 t_c			=	0.164	hrs		
						OK			
						use			
						0.2441824	hrs		
	Worksheet 1: Runoff Parameters and Time of Concentration								

	MAVEN ASSC	Job Number 194006	Sheet 2	Rev C	
Job Title Calc Title	Papakura, Clev Post-developme 100YR OLFP (UPS	vedon nt OLFP TREAM 4)	Author JV	Date 4/08/2022	Checked JP
1.	Data Catchment Area Runoff curve number Initial abstraction Time of concentration Calculate storage, S =(1000/CN - 10)	A= 0.0151 CN= 74.0 la= 5.0 tc= 0.244182369 25.4	km2(100ha =1km2) (from worksheet 1) mm (from worksheet 1) hrs (from worksheet 1) = 89	mm	
3. 4. 5. 6. 7. 8. 9.	Average recurrence interval, ARI 24 hour rainfall depth, P24 Compute c* = P24 - 2la/P24 - 2la+2S Specific peak flow rate q* Peak flow rate, $q_p=q^*A^*P_{24}$ Runoff depth, $Q_{24} = (P_{24}-la)^2/(P_{24}-la)^2$ Runoff volume, $V_{24} = 1000xQ_{24}A$	a)+S	100 (yr) 280.32 (mm) 0.602 0.145 0.145 0.145 0.614 m3/s 207.9 3139.64 (m3)		
	Worksh	eet 2: Graphical Pe	eak Flow Rate		

	MAVEN ASSO	DCIATES	Job N 194	umber 1006	Sheet 1	Rev C
Job Title Calc Title	Papakura, Cle Post-developme 100YR OLFP (CATO	vedon nt OLFP CHMENT 1)	Aut J	thor V	Date 4/08/2022	Checked JP
1. Runoff Curve	Number (CN) and initial A	Abstraction (Ia)				
Soil name and classification	Curve Cover description (cover type, treatment, and Number hydrologic condition) CN*			Area (ha) 10000m2= 1ha	Product of CN x area	
		e, gravel, metal, e	ic)	98	1.807	72.00
	Grass (landscape ar	iu garueris) (35%) Rood		/4	0.973	12.00
		INUdu		98	2.130	200.74
						0.00
* from Appendix F	1			Totals =	/ 0100	457.83
	,		WQV	Totais –	4.9100	437.03
CN (weighted) =	total product = total area	<u>457.83</u> 4.910	=	93.2		
la (weighted) =	<u>5 x pervious area</u> = total area	5 x 4.910	1.0	1.0	mm	
2. Time of Conce	ntration					
Channelisation fac	ctor C =	0.8	(From Table	4.2)		
Catchment length	L =	0.8	km (along di	rainage path)	1	
Catchment Slope	Sc=	0.005	m/m (by equ	ial area meth	od)	
Runoff factor,	<u>CN</u> = 200 - CN 200-	93.2 93.2	=	0.87		
$t_c = 0.14 \text{ C L}^{0.66}$ (C	CN/200-CN) ^{-0.55} Sc ^{-0.30}					
= 0.1	0.8 0.86	1.08	4.90	=	0.510	hrs
SCS Lag for HEC	-HMS $t_p = 2/3 t_c$			=	0.342	hrs
					OK	
					use	
					0.5103766	hrs
	Worksheet 1: Run	off Parameters a	nd Time of C	Concentratio	'n	

		OCI	ATES	Job Number 194006		Sheet 2	Rev C
Job Title Calc Title	Papakura, Cl Post-developm 100YR OLFP (CAT	evedon ent OLF ICHMEN	P IT 1)	Author JV		Date 4/08/2022	Checked JP
1.	Data Catchment Area Runoff curve number	A= CN=	0.0491 93.2	km2(100ha =1km2) (from worksheet 1) mm (from worksheet 1			
2.	Time of concentration Calculate storage, S =(1000/CN - 10	tc= 0)25.4	0.51037656	hrs (from worksheet 1 =) 18	mm	
3. 4. 5. 6. 7. 8. 9.	Average recurrence interval, ARI 24 hour rainfall depth, P24 Compute c* = P24 - 2la/P24 - 2la+2 Specific peak flow rate q* Peak flow rate, $q_p=q^*A^*P_{24}$ Runoff depth, $Q_{24} = (P_{24}-la)^2/(P_{24}-Runoff volume, V_{24} = 1000xQ_{24}A$	2S -la)+S		100 (yr) 280.32 (mn 0.883 0.110 1.514 m3 262.1 12867.30 (m3	n) /s		
	Works	heet 2:	Graphical Pe	eak Flow Rate			

	MAVEN ASSO	OCIATES	Job N 194	umber 1006	Sheet 1	Rev C
Job Title Calc Title	Papakura, Cle Post-developme 100YR OLFP (CATC	evedon ent OLFP CHMENT 1A)	Au J	thor Ⅳ	Date 4/08/2022	Checked JP
1. Runoff Curve	Number (CN) and initial <i>i</i>	Abstraction (Ia)				
Soil name and classification	Cover description (cover type, treatment, and hydrologic condition)			Curve Number CN*	Area (ha) 10000m2= 1ha	Product of CN x area
C	Paved (concret	te, gravel, metal, e	tc)	98	0.624	61.15
С	Grass (landscape a	nd gardens) (35% (of Lots)	74	0.336	24.86
С		Road		98	0.400	39.20
						0.00
						0.00
* from Appendix E	3			Totals =	1.3600	125.22
			WQV			
CN (weighted) =	total product = total area	<u>125.22</u> 1.360	=	92.1		
la (weighted) =	<u>5 x pervious area</u> = total area	5 x 1.360	0.3	1.2	mm	
2. Time of Conce	entration					
Channelisation fac	ctor C =	0.8	(From Table	4.2)		
Catchment length	L =	0.25	km (along d	rainage path)	1	
Catchment Slope	Sc=	0.007	m/m (by equ	ual area meth	od)	
Runoff factor,	CN =	92.1	=	0.85		
	200 - CN 200-	92.1				
$t_c = 0.14 \text{ C L}^{0.66}$ (C	CN/200-CN) ^{-0.55} Sc ^{-0.30}					
= 0.1	0.8 0.40	1.09	4.43	=	0.217	hrs
SCS Lag for HEC	-HMS t _p = 2/3 t _c			=	0.145	hrs
					OK	
					use	
					0.2169149	hrs
	Werkshoot 4. Dow	off Dovorsations	nd Time of (-	
	Worksheet 1: Run	off Parameters a	nd Time of (Concentratio	n	

	MAVEN ASSO	CIATES	Job Number 194006	Sheet 2	Rev C
Job Title Calc Title	Papakura, Cleve Post-developmen 100YR OLFP (CATCH	edon t OLFP MENT 1A)	Author JV	Date 4/08/2022	Checked JP
2.	Data Catchment Area Runoff curve number C Initial abstraction Time of concentration Calculate storage, S =(1000/CN - 10)2	A= 0.0136 N= 92.1 la= 1.2 tc= 0.216914911	km2(100ha =1km2) (from worksheet 1) mm (from worksheet 1) hrs (from worksheet 1) = 22	mm	
3. 4. 5. 6. 7. 8. 9.	Average recurrence interval, ARI 24 hour rainfall depth, P24 Compute c* = P24 - 2la/P24 - 2la+2S Specific peak flow rate q* Peak flow rate, $q_p=q^*A^*P_{24}$ Runoff depth, $Q_{24} = (P_{24}-Ia)^2/(P_{24}-Ia)^2$ Runoff volume, $V_{24} = 1000xQ_{24}A$)+S	100 (yr) 280.32 (mm) 0.864 0.152 0.152 0.579 m3/s 258.8 3519.67 (m3)		
	Workshe	et 2: Graphical Pe	eak Flow Rate	L	

	MAVEN ASSO	DCIATES	Job N 194	umber 1006	Sheet 1	Rev C				
Job Title Calc Title	Papakura, Cle Post-developme 100YR OLFP (CATCHMEI	vedon ent OLFP NT 1- SECTION F)	Aut J	thor V	Date 4/08/2022	Checked JP				
1. Runoff Curve	1. Runoff Curve Number (CN) and initial Abstraction (Ia)									
Soil name and classification	Cover description (cover type, treatment, a hydrologic condition)			Curve Number CN*	Area (ha) 10000m2= 1ha	Product of CN x area				
C	Paved (concret	e, gravel, metal, e	tc)	98	1.4365	140.78				
C	Grass (landscape ar	nd gardens) (35%	of Lots)	74	0.7735	57.24				
С		Koad		98	1.500	147.00				
						0.00				
*					0 7400	0.00				
* from Appendix E	i		WQV	l otals =	3.7100	345.02				
CN (weighted) =	total product = total area	345.02 3.710	=	93.0						
la (weighted) =	<u>5 x pervious area</u> = total area	5 x 3.710	0.8	1.0	mm					
2. Time of Conce	ntration									
Channelisation fac	ctor C =	0.8	(From Table	4.2)						
Catchment length	L =	0.46	km (along di	rainage path))					
Catchment Slope	Sc=	0.005	m/m (by equ	ual area meth	od)					
Runoff factor,	CN =	93.0	=	0.87						
	200 - CN 200-	93.0								
$t_c = 0.14 \text{ C } L^{0.66}$ (C	CN/200-CN) ^{-0.55} Sc ^{-0.30}									
= 0.1	0.8 0.60	1.08	4.90	=	0.355	hrs				
SCS Lag for HEC	-HMS $t_p = 2/3 t_c$			=	0.238	hrs				
					OK use 0.35519	hrs				
	Worksheet 1: Run	off Parameters a	nd Time of C	Concentratio	n					

	MAVEN	ASSOCIA	TES	Job Number 194006		Sheet 2	Rev C
Job Title Calc Title	Papak Post-dev 100YR OLFP (CA	ura, Clevedon velopment OLFP TCHMENT 1-SEC	CTION F)	Author JV		Date 4/08/2022	Checked JP
1.	Data Catchment Area	A=	0.0371	km2(100ha =1km2)			
	Runoff curve number	CN=	93.0	(from worksheet 1))		
	Time of concentration	tc= 0.5	355190026	hrs (from worksheet 1))		
2.	Calculate storage, S =(1000/	CN - 10)25.4		=	19	mm	
3.	Average recurrence interval,	ARI		(yr)			
4.	24 hour rainfall depth, P24			280.32 (mn	ו)		
5.	Compute c* = P24 - 2la/P24	- 2la+2S		0.879			
6.	Specific peak flow rate q*			0.130			
7.	Peak flow rate, $q_p = q^*A^*P_{24}$			1.352 m3/	/s		
8.	Runoff depth, $Q_{24} = (P_{24}-Ia)$	²/(P ₂₄ -la)+S		261.4			
9.	Runoff volume, V ₂₄ = 1000x	Q ₂₄ A		9696.99 (m3)		
	Existing Upstream Peak flow	rate, q _p =q*A*P	24	0.610 m3/	/s		
	Total Peak flow rate, q _p =q*A	*P ₂₄		1.962 m3/	/s		
		Norksheet 2: G	raphical Pe	eak Flow Rate			

	MAVEN ASSC	DCIATES	Job N 194	umber 006	Sheet 1	Rev C
Job Title Calc Title	Papakura, Cle Post-developme 100YR OLFP (CATC	vedon nt OLFP CHMENT 2)	Aut J	thor V	Date 4/08/2022	Checked JP
1. Runoff Curve	Number (CN) and initial A	bstraction (la)				
Soil name and classification	Curve Cover description (cover type, treatment, and Number hydrologic condition) CN*			Area (ha) 10000m2= 1ha	Product of CN x area	
	Paved (concrete	e, gravel, metal, e	ic)	98	0.897	87.91
	Grass (landscape an	u garueris) (35%) Pood		/4	0.483	30.74
		Nudu		98	0.570	0.00
						0.00
* from Appendix P	<u> </u>			Totals =	1 9500	179 51
	,		WQV		1.0000	110.01
CN (weighted) =	total product = total area	<u>179.51</u> 1.950	=	92.1		
la (weighted) =	<u>5 x pervious area</u> = total area	5 x 1.950	0.5	1.2	mm	
2. Time of Conce	entration					
Channelisation fac	ctor C =	0.8	(From Table	4.2)		
Catchment length	L =	0.25	km (along di	rainage path)	1	
Catchment Slope	Sc=	0.005	m/m (by equ	ial area meth	od)	
Runoff factor,	<u>CN</u> = 200 - CN 200-	<u>92.1</u> 92.1	=	0.85		
$t_c = 0.14 \text{ C L}^{0.66}$ (C	CN/200-CN) ^{-0.55} Sc ^{-0.30}					
= 0.1	0.8 0.40	1.09	4.90	=	0.240	hrs
SCS Lag for HEC	-HMS $t_p = 2/3 t_c$			=	0.161	hrs
					OK use 0.2399943	hrs
	Worksheet 1: Run	off Parameters a	nd Time of C	Concentratio	n	

	MAVEN ASSOCIATES		TES	Job Number 194006	Sheet 2	Rev C
Job Title Calc Title	Papakı Post-dev 100YR_OLF	ura, Clevedon elopment OLFP P (CATCHMENT	2)	Author JV	Date 4/08/2022	Checked JP
1.	Data Catchment Area Runoff curve number	A= CN=	0.0195 92.1	km2(100ha =1km2) (from worksheet 1)		
	Initial abstraction	la=	1.2	mm (from worksheet 1)		
	Time of concentration	tc= 0	.23999429	hrs (from worksheet 1)		
2.	Calculate storage, S =(1000/0	CN - 10)25.4		=	22 mm	
3.	Average recurrence interval, A	ARI		<u>100</u> (yr)		
4.	24 hour rainfall depth, P24			280.32 (mm)		
5.	Compute c* = P24 - 2Ia/P24 -	2la+2S		0.864		
6.	Specific peak flow rate q*			0.150		
7.	Peak flow rate, $q_p = q^*A^*P_{24}$			0.820 m3/s		
8.	Runoff depth, $Q_{24} = (P_{24}-Ia)^2$	²/(P ₂₄ -la)+S		258.8		
9.	Runoff volume, $V_{24} = 1000x^{10}$	Q ₂₄ A		5045.76 (m3)		
		Vorksheet <u>2:</u> G	raphical Pe	eak Flow Rate		

	MAVEN ASS	OCIATES	Job N 194	umber 1006	Sheet 1	Rev C
Job Title Calc Title	Papakura, Cla Post-developm 100YR OLFP (CAT	evedon ent OLFP CHMENT 3)	vedon Author nt OLFP JV CHMENT 3)			Checked JP
1. Runoff Curve	Number (CN) and initial A	Abstraction (Ia)				
Soil name and classification	Curve Cover description (cover type, treatment, and Number hydrologic condition) CN*			Area (ha) 10000m2= 1ha	Product of CN x area	
	Paved (concre	te, gravel, metal, e	ic)	98	3.302	349.08
	Grass (landscape a	Pood		/4	1.918	141.93
		NUdu		98	2.520	240.90
						0.00
* from Appendix F	<u> </u>			Totals =	8 0000	737.97
	, ,		WQV	lotais	0.0000	101.01
CN (weighted) =	total product = total area	737.97 8.000	=	92.2		
la (weighted) =	<u>5 x pervious area</u> = total area	<u> </u>	1.9	1.2	mm	
2. Time of Conce	entration					
Channelisation fac	ctor C =	0.8	(From Table	4.2)		
Catchment length	L =	0.7	km (along di	rainage path)	1	
Catchment Slope	Sc=	0.005	m/m (by equ	ual area meth	od)	
Runoff factor,	CN =	92.2	=	0.86		
	200 - CN 200-	92.2				
$t_c = 0.14 \text{ C L}^{0.66}$ (C	CN/200-CN) ^{-0.55} Sc ^{-0.30}					
= 0.1	0.8 0.79	1.09	4.90	=	0.473	hrs
SCS Lag for HEC	-HMS $t_p = 2/3 t_c$			=	0.317	hrs
					OK	
					use	
					0.4725078	hrs
	Worksheet 1: Rur	noff Parameters a	nd Time of C	Concentratio	n	

	MAVEN	ASSOCIAT	ES	Job Number 194006	Sheet 2	Rev C
Job Title Calc Title	Papak Post-dev 100YR OLF	ura, Clevedon velopment OLFP P (CATCHMENT 3)	Author JV	Date 4/08/2022	Checked JP
1.	Data Catchment Area Runoff curve number Initial abstraction Time of concentration Calculate storage, S =(1000/	A= CN= la= tc= 0.47 CN - 10)25.4	0.08 92.1 1.2 72507765	km2(100ha =1km2) (from worksheet 1) mm (from worksheet 1) hrs (from worksheet 1) = 22	? mm	
3. 4. 5. 6. 7. 8. 9.	Average recurrence interval, 24 hour rainfall depth, P24 Compute c* = P24 - 2Ia/P24 Specific peak flow rate q* Peak flow rate, $q_p=q^*A^*P_{24}$ Runoff depth, $Q_{24} = (P_{24}-Ia)$ Runoff volume, $V_{24} = 1000x$	ARI - 2la+2S ² /(P ₂₄ -la)+S Q ₂₄ A		100 (yr) 280.32 (mm) 0.864 0.110 0.110 2.467 m3/s 258.7 20699.94 (m3)		
		Worksheet 2: Gra	aphical Pe	eak Flow Rate		1

	MAVEN ASSO	OCIATES	Job N 194	lumber l006	Sheet 1	Rev C
Job Title Calc Title	Papakura, Cle Post-developme 100YR OLFP (CATCHMEI	evedon ent OLFP NT 3- SECTION G)	Au J	thor IV	Date 4/08/2022	Checked JP
1. Runoff Curve	Number (CN) and initial A	Abstraction (Ia)				
Soil name and classification	Cover description (c	nt, and	Curve Number CN*	Area (ha) 10000m2= 1ha	Product of CN x area	
C	Paved (concret	e, gravel, metal, e	tc)	98	1.599	156.70
	Grass (landscape ar	na gardens) (35%)	of Lots)	74	0.861	63./1
<u> </u>		Road		98	1.280	125.44
						0.00
* frame Area andisc F				Tatala -	2 7400	0.00
" from Appendix E	5		WQV	Totais =	3.7400	345.80
CN (weighted) =	total product = total area	<u>345.86</u> 3.740	=	92.5		
la (weighted) =	<u>5 x pervious area</u> = total area	5 x 3.740	0.9	1.2	mm	
2. Time of Conce	entration					
Channelisation fa	ctor C =	0.8	(From Table	e 4.2)		
Catchment length	L =	0.45	km (along d	rainage path))	
Catchment Slope	Sc=	0.005	m/m (by equ	ual area meth	od)	
Runoff factor,	CN =	92.5	=	0.86	_	
	200 - CN 200-	92.5				
$t_c = 0.14 \text{ C } L^{0.66}$ (0	CN/200-CN) ^{-0.55} Sc ^{-0.30}					
= 0.1	0.8 0.59	1.09	4.90	=	0.352	hrs
SCS Lag for HEC	$t_{p} = 2/3 t_{c}$			=	0.236	hrs
					OK	
					use	
					0.352099	hrs
	14/a m/s= 1	off Denser to a	nd Times of f		-	
	worksheet 1: Run	ioπ Parameters a	nd Time of C	oncentratio	n	

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	MAVEN AS	SSOCIA	TES	Job Number 194006	Sheet 2	Rev C
Job Title Calc Title	Papakura Post-develo 100YR OLFP (CATCH	, Clevedon opment OLFP IMENT 3 - SE	CTION G)	Author JV	Date 4/08/2022	Checked JP
1.	Data Catchment Area Runoff curve number Initial abstraction	A= CN= Ia=	0.0374 92.1 1.2	km2(100ha =1km2) (from worksheet 1) mm (from worksheet 1)		
2.	Time of concentration Calculate storage, S =(1000/CN	tc= 0. - 10)25.4	352098953	hrs (from worksheet 1) = 22	2 mm	
3. 4. 5. 6. 7. 8. 9.	Average recurrence interval, AR 24 hour rainfall depth, P24 Compute c* = P24 - 2Ia/P24 - 2 Specific peak flow rate q* Peak flow rate, $q_p=q^*A^*P_{24}$ Runoff depth, $Q_{24} = (P_{24}-Ia)^2/(IR)$ Runoff volume, $V_{24} = 1000xQ_2$	la+2S ⊃ ₂₄ -Ia)+S ₄A		100 (yr) 280.32 (mm) 0.864 0.130 0.130 1.363 m3/s 258.7 9677.22 (m3)		
	Wa	rksheet 2: G	iraphical Pe	eak Flow Rate		

	MAVEN ASSC	DCIATES	Job N 194	umber 006	Sheet 1	Rev C
Job Title Calc Title	Papakura, Cle Post-developme 100YR OLFP (CATC	vedon nt OLFP CHMENT 5)	Aut J	thor V	Date 4/08/2022	Checked JP
1. Runoff Curve	Number (CN) and initial A	Abstraction (Ia)				
Soil name and classification	Cover description (c	Curve A Cover description (cover type, treatment, and Number 1 hydrologic condition) CN* 1			Area (ha) 10000m2= 1ha	Product of CN x area
	Paved (concrete	e, gravel, metal, e	(C)	98	2.704	264.99
	Grass (landscape an	iu garderis) (35% (ui Lois)	/4	1.456	107.74
	· · · · · · · · · · · · · · · · · · ·	nuau		98	1.020	99.90
						0.00
* from Appendix P	<u> </u>			Totals =	5 1800	472 70
			WQV		0.1000	472.70
CN (weighted) =	total product = total area	472.70 5.180	=	91.3		
la (weighted) =	<u>5 x pervious area</u> = total area	<u> </u>	1.5	1.4	mm	
2. Time of Conce	entration					
Channelisation fac	ctor C =	0.8	(From Table	4.2)		
Catchment length	L =	0.5	km (along di	rainage path)	1	
Catchment Slope	Sc=	0.005	m/m (by equ	ial area meth	od)	
Runoff factor,	CN = 200 - CN 200-	91.3 91.3	=	0.84		
$t_c = 0.14 \text{ C L}^{0.66}$ (C	CN/200-CN) ^{-0.55} Sc ^{-0.30}					
= 0.1	0.8 0.63	1.10	4.90	=	0.383	hrs
SCS Lag for HEC	-HMS $t_p = 2/3 t_c$			=	0.256	hrs
					OK use 0.3825919	hrs
	Worksheet 1: Run	off Parameters a	nd Time of C	Concentratio	n	

		CIATES	Job Number 194006	Sheet 2	Rev C
Job Title Calc Title	Papakura, Cleve Post-development 100YR OLFP (CATCH	don OLFP MENT 5)	Author JV	Date 4/08/2022	Checked JP
1.	Data Catchment AreaARunoff curve numberCIInitial abstractionITime of concentrationt	A= 0.0518 N= 91.3 a= 1.4 c= 0.382591858	km2(100ha =1km2) (from worksheet 1) mm (from worksheet 1) hrs (from worksheet 1)		
2.	Calculate storage, S =(1000/CN - 10)2	5.4	= 24	mm	
3. 4.	Average recurrence interval, ARI 24 hour rainfall depth, P24		100 (yr) 		
5.	Compute c* = P24 - 2la/P24 - 2la+2S		0.851		
6.	Specific peak flow rate q*		0.122		
7.	Peak flow rate, $q_p = q^*A^*P_{24}$		1.772 m3/s		
8.	Runoff depth, $Q_{24} = (P_{24}-Ia)^2/(P_{24}-Ia)$	+S	256.5		
9.	Runoff volume, V ₂₄ = 1000xQ ₂₄ A		13287.99 (m3)		
	Workshee	t 2: Graphical P	eak Flow Rate		

	MAVEN ASS	OCIATES	Job N 194	umber 1006	Sheet 1	Rev C
Job Title Calc Title	Papakura, Cle Post-developm 100YR OLFP (CATC	evedon ent OLFP CHMENT 5a)	Author JV		Date 4/08/2022	Checked JP
1. Runoff Curve	Number (CN) and initial	Abstraction (Ia)				
Soil name and classification	Curve Cover description (cover type, treatment, and Number hydrologic condition) CN*			Curve Number CN*	Area (ha) 10000m2= 1ha	Product of CN x area
C	Paved (concre	te, gravel, metal, e	tc)	98	0.533	52.23
С	Grass (landscape a	nd gardens) (35% (of Lots)	74	0.287	21.24
С		Road		98	0.960	94.08
						0.00
						0.00
* from Appendix E	}			Totals =	1.7800	167.55
			WQV			
CN (weighted) =	total product = total area	<u> </u>	=	94.1		
la (weighted) =	<u>5 x pervious area</u> = total area	<u> </u>	0.3	0.8	mm	
2. Time of Conce	entration					
Channelisation fac	ctor C =	0.8	(From Table	4.2)		
Catchment length	L =	0.24	km (along di	rainage path)		
Catchment Slope	Sc=	0.005	m/m (by equ	ial area meth	od)	
Pupoff factor	CN -	0/ 1	_	0.80		
Runon lactor,	200 - CN 200-	94.1	_	0.09		
$t_c = 0.14 \text{ C L}^{0.66}$ (C	CN/200-CN) ^{-0.55} Sc ^{-0.30}					
= 0.1	0.8 0.39	1.07	4.90	=	0.228	hrs
SCS Lag for HEC	-HMS $t_p = 2/3 t_c$			=	0.153	hrs
					OK	
					use	
					0.2283177	hrs
	Worksheet 1: Rur	noff Parameters a	nd Time of C	Concentratio	n	

		IATES	Job Number 194006	Sheet 2	Rev C
Job Title Calc Title	Papakura, Clevedo Post-development OL 100YR OLFP (CATCHME	n .FP NT 5a)	Author JV	Date 4/08/2022	Checked JP
1.	Data Catchment AreaA=Runoff curve numberCN=Initial abstractionIa=	0.0178 94.1 0.8	km2(100ha =1km2) (from worksheet 1) mm (from worksheet 1)		
2.	Time of concentration tc= Calculate storage, S =(1000/CN - 10)25.4	0.228317655	hrs (from worksheet 1) = 16) mm	
3. 4. 5. 6. 7. 8. 9.	Average recurrence interval, ARI 24 hour rainfall depth, P24 Compute c* = P24 - 2la/P24 - 2la+2S Specific peak flow rate q* Peak flow rate, $q_p=q^*A^*P_{24}$ Runoff depth, $Q_{24} = (P_{24}-la)^2/(P_{24}-la)+S$ Runoff volume, $V_{24} = 1000xQ_{24}A$		100 (yr) 280.32 (mm) 0.898 0.155 0.155 0.773 m3/s 264.5 4708.54 (m3)		
	Worksheet 2	: Graphical Pe	eak Flow Rate		

	MAVEN ASSC	DCIATES	Job N 194	umber 006	Sheet 1	Rev C
Job Title Calc Title	Papakura, Cle Post-developme 100YR OLFP (CATC	vedon nt OLFP CHMENT 6)	Aut J	thor V	Date 4/08/2022	Checked JP
1. Runoff Curve	Number (CN) and initial A	Abstraction (Ia)				
Soil name and classification	Curve Cover description (cover type, treatment, and Number hydrologic condition) CN*			Curve Number CN*	Area (ha) 10000m2= 1ha	Product of CN x area
C	Paved (concrete	e, gravel, metal, e	tc)	98		0.00
	Grass (landscape an	ia gardens) (35% (of Lots)	/4	0.000	0.00
		nuau		98	0.090	ŏ.ŏ∠ 0.00
						0.00
* from Appendix E	}			Totals =	0.0900	8.82
			WQV			
CN (weighted) =	total product = total area	<u>8.82</u> 0.090	=	98.0		
la (weighted) =	<u>5 x pervious area</u> = total area	5 x 0.090	0.0	0.0	mm	
2. Time of Conce	ntration					
Channelisation fac	ctor C =	0.8	(From Table	4.2)		
Catchment length	L = -	0.04	km (along di	rainage path)		
Catchment Slope	Sc=	0.005	m/m (by equ	ial area meth	od)	
Runoff factor.	CN =	98.0	=	0.96		
,	200 - CN 200-	98.0				
$t_c = 0.14 \text{ C } L^{0.66}$ (C	CN/200-CN) ^{-0.55} Sc ^{-0.30}					
= 0.1	0.8 0.12	1.02	4.90	=	0.067	hrs
SCS Lag for HEC	-HMS $t_p = 2/3 t_c$			=	0.045	hrs
					NO GOOD use 0.17	hrs
	Worksheet 1: Run	off Parameters a	nd Time of C	Concentratio	n	

	MAVEN	ASSOCIAT	ES	Job Number 194006	Sheet 2	Rev C
Job Title Calc Title	Papak Post-dev 100YR OLF	ura, Clevedon elopment OLFP P (CATCHMENT 6	6)	Author JV	Date 4/08/2022	Checked JP
1.	Data Catchment Area Runoff curve number Initial abstraction Time of concentration	A= CN= la= tc=	0.0009 98.0 0.0 0.17	km2(100ha =1km2) (from worksheet 7) mm (from worksheet 7) hrs (from worksheet 7)		
2. 3. 4. 5. 6. 7. 8. 9.	Calculate storage, S =(1000/d Average recurrence interval, 24 hour rainfall depth, P24 Compute c* = P24 - 2la/P24 - Specific peak flow rate q* Peak flow rate, $q_p=q^*A^*P_{24}$ Runoff depth, $Q_{24} = (P_{24}-la)^2$ Runoff volume, $V_{24} = 1000x$	CN - 10)25.4 ARI • 2la+2S ² /(P ₂₄ -la)+S Q ₂₄ A		= 100 (yr) 280.32 (mm) 0.964 0.166 0.166 m3/s 275.2 247.71 (m3)	5 mm	
	Ň	Norksheet 2: Gra	aphical Pe	eak Flow Rate		

	MAVEN ASSO	DCIATES	Job N 194	umber 1006	Sheet 1	Rev C
Job Title Calc Title	Papakura, Cle Post-developme 100YR OLFP (CATO	vedon nt OLFP CHMENT 6)	Aut J	thor V	Date 4/08/2022	Checked JP
1. Runoff Curve	Number (CN) and initial A	Abstraction (Ia)				
Soil name and classification	Curve Cover description (cover type, treatment, and hydrologic condition) CN*			Area (ha) 10000m2= 1ha	Product of CN x area	
	Paved (concrete	e, gravel, metal, e	(C)	98		0.00
	Grass (landscape ar	iu garueris) (35%) Road		/4 09	0.060	0.00 5.99
		INUdu		98	0.000	0.00
						0.00
* from Appendix F	<u> </u>			Totals =	0.0600	5.88
			WQV		0.0000	0.00
CN (weighted) =	total product = total area	5.88 0.060	=	98.0		
la (weighted) =	<u>5 x pervious area</u> = total area	5 x 0.060	0.0	0.0	mm	
2. Time of Conce	entration					
Channelisation fac	ctor C =	0.8	(From Table	4.2)		
Catchment length	L =	0.04	km (along di	rainage path))	
Catchment Slope	Sc=	0.005	m/m (by equ	ual area meth	od)	
Runoff factor,	<u>CN</u> = 200 - CN 200-	98.0 98.0	=	0.96		
t _c = 0.14 C L ^{0.66} (C	CN/200-CN) ^{-0.55} Sc ^{-0.30}					
= 0.1	0.8 0.12	1.02	4.90	=	0.067	hrs
SCS Lag for HEC	-HMS $t_p = 2/3 t_c$			=	0.045	hrs
					NO GOOD use 0.17	hrs
	Worksheet 1: Run	off Parameters a	nd Time of C	Concentratio	n	

	MAVEN	ASSOCIAT	ES	Job Number 194006	Sheet 2	Rev C
Job Title Calc Title	Papak Post-dev 100YR OLF	ura, Clevedon velopment OLFP P (CATCHMENT 6	i)	Author JV	Date 4/08/2022	Checked JP
1.	Data Catchment Area Runoff curve number Initial abstraction Time of concentration	A= CN= la= tc=	0.0006 98.0 0.0 0.17	km2(100ha =1km2) (from worksheet 7) mm (from worksheet 7) hrs (from worksheet 7)	5 mm	
2. 3. 4. 5. 6. 7. 8. 9.	Calculate storage, S =(1000/ Average recurrence interval, 24 hour rainfall depth, P24 Compute c* = P24 - 2la/P24 Specific peak flow rate q* Peak flow rate, $q_p=q^*A^*P_{24}$ Runoff depth, $Q_{24} = (P_{24}-la)$ Runoff volume, $V_{24} = 1000x$	CN - 10)25.4 ARI - 2la+2S ² /(P ₂₄ -la)+S Q ₂₄ A		= 100 (yr) 280.32 (mm) 0.964 0.166 0.166 m3/s 275.2 165.14 (m3)	5 mm	
		Norksheet 2: Gra	aphical Pe	eak Flow Rate		

APPENDIX C: NEIGHBOUR'S AGREEMENT

RECIPROCAL RIGHT OF ENTRY AGREEMENT

1. The Parties

Conmara Estate Clevedon Limited (CECL) being the owner of Lot 2 DP 186158, 144 Papakura-Clevedon Road

and

Clevedon Properties limited (CPL) being the owners of Lot 2 DP 192001, 80 Papakura-Clevedon Road (subject to settlement of an unconditional sales and purchase agreement between Acorn Parish Holdings Limited and Clevedon Parish Investments Limited.

2. Description

The Parties own (or will own) adjacent parcels of land located at Papakura-Clevedon Road, Clevedon. Both parcels are the subject of resource consent applications for subdivision and associated construction activities including earthworks and land drainage.

Each Party has engaged civil engineers to design the respective developments. Specifically, CECL has engaged CivilPlan Consultants Limited and Maven Consultants Limited has been engaged by CPL.

The engineers have liaised through the design process to achieve the best engineering outcomes for the Parties. These outcomes involve certain works being undertaken by each Party on the land owned by the other Party.

3. The Work

The work to be undertaken by CECL on CPL's land consists of minor earthworks necessary to eliminate small overland flow paths currently crossing from CPL's land in three locations onto CECL's land.

The work to be undertaken by CPL's on CECL's land consists of the construction of a stormwater pipeline 825mm (more or less) in diameter and associated outfall.

The works are shown on the appended plans.

4. Agreement

The owners hereby agree to the work described above and on the following plans being undertaken by the other Party on their properties at the above address.

Signed for and on behalf of Clevedon Properties Ltd

Full name(s): Mike Sullivan

Signature(s): M.G. Date: 7/7/22.

Signed for and on behalf of Conmara Estate Clevedon Limited:

Full name(s):

Signature(s):

Date:




S:\lobs\1832 - KHEL Conmara Farm\correspondence\Right of Entry\1832-01-ROE1v1-Reciprocal-mss-20220614 Maven CivilPlan.docx

5. Further terms of agreement:

Note: this clause is added for the benefit of the parties but will not be submitted to Council as part of the right-of-entry documentation.

Prior to works commencing work on the other's land, the parties acknowledge that specific other matters shall be mutually agreed such as:

- Timing and programming
- Access
- Temporary works
- Liabilities and indemnifications
- Materials and workmanship
- Specifications
- As-builting and certifying
- Right-of-entry release requirements
- Remediation and reinstatements

Signed for and on behalf of Clevedon Properties Ltd

Darren Ellis

Full name(s):

Signature(s):

Date:

Signed for and on behalf of Conmara Estate Clevedon Limited:

Full name(s):

Signature(s):

Date: