*Ref 2124 - R01 - 0*

31 March 2020

Gull NZ Ltd
c/- Technitrades Architecture Ltd
Attn Lance Meiklejohn

Dear Sir

**Proposed Gull Pokeno Service Station – Infrastructure Report**

## 1. Introduction

Arete Civil has been engaged to investigate and report on infrastructure servicing for the proposed Gull service station development at 68 – 72 Great South Road, Pokeno.

This report forms supporting documentation for the resource consent that is to be submitted to Waikato District Council (WDC).

This report focuses on the existing infrastructure servicing the existing site, and the proposed servicing for the development. This report covers the following servicing aspects:

- Existing Services
- Wastewater Reticulation
- Water Supply
- Stormwater (primary and secondary)

## 2. Description of the Site

The property is located at 68 – 72 Great South Road, Pokeno, and is legally described as Lot 41 DP 19787. The site has a total area of 911m$^2$ and is reasonably well developed with 2 dwellings, vehicle access, trees and shrubs as well as a level mown grass surface.

The topography is generally level with a slight fall away from the western corner of the site at Great South Road towards the eastern corner at Market Street.

There is an unformed road reserve, Church Street, along the western side of the site. On the eastern side is Market Square.

45 Freyberg Street • Otumoetai • Tauranga 3110
Mobile 027 535 6369
Email ross@aretecivil.com


*Figure 1 – Proposed Gull Pokeno Site*

## 3. Proposed Development

The development involves removing the existing dwellings and vegetation, then raising the general site slightly so as to create a site suitable for vehicles to access and to ensure stormwater falls to the proposed stormwater sumps on the eastern side. The developed forecourt which forms the majority of the site will be concrete surfaced. There will be a minor landscaped buffer strip around the edges of the site.

The proposed site development is shown in Figure 2 (image provided by Technitrades)

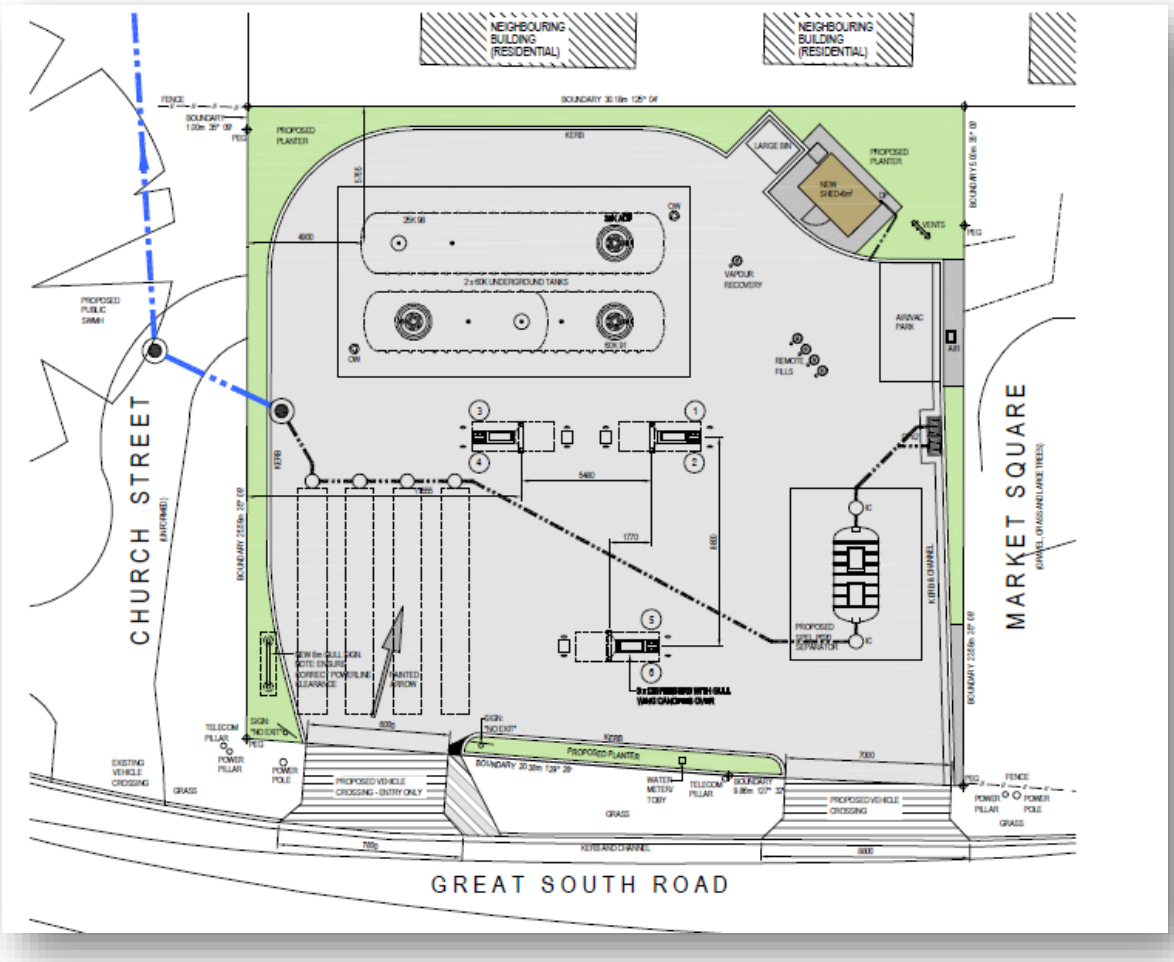



*Figure 2 – Proposed Development*

## 4. Existing Services

The site is serviced by existing water supply, wastewater, power and telecommunications connections. However, there are no reticulated stormwater connections to the site, and it is assumed that the existing dwellings, and paving discharge stormwater to soak holes.

### 4.1. Wastewater

WDC GIS does not show any wastewater connections to the site and it appears from the existing site plan that there is a septic tank with pumped effluent pipeline to a raised Wisconsin mound.

### 4.2. Water

There is a service connection to the site from the 50mm uPVC rider main within the Great South Road berm, as well as a 150mm OPVC watermain located within the Market Square to the east of the site. There is also a 355mm PE bulk watermain within the Great South Road berm next to the site.

Two fire hydrants are available reasonably close to the site. The most accessible hydrant is located on the 355mm PE watermain in the Great South Road berm outside Market Square approximately 25m east of the site, the other fire hydrant is located directly opposite the site on the 150mm OPVC watermain in the formed section of Church Street.

### 4.3. Stormwater

There does not appear to be any reticulated stormwater system in the vicinity, however a reasonably large sized open drain is located some 130m north east of the site. Access to the drain is available via the unformed part of Church road.

Stormwater from the lots in the general area around the site appears to be managed by on site disposal within each lot.

### 4.4. Other Utilities

In addition to the 3 waters services addressed above there are existing power and telecommunications utilities available at the site. Chorus advise that fibre network is not available in the area, however this is due to be installed in December 2020. Power network is available in Great South Road.

We note that the power network in Great South Road is aerial and a pole is located in the berm very close to the proposed location for the vehicle entrance. It is possible that the pole will need to be moved, or the power undergrounded across the Great South Road frontage.

## 5. Proposed Services

### 5.1. Wastewater

As the site will not be staffed and there is no retail facility or restrooms, there is no requirement for rest rooms and hence no connection to a wastewater system will be required.

Should the situation change, and a wastewater connection is required, there is a 150mm uPVC sewer located in the unformed section of Church Street, a distance of approximately 30m from the site.

### 5.2. Proposed Water Supply

The existing water supply is a standard service line connected to the 50mm uPVC rider main in Great South Road berm. Should the flow capacity of the rider main be insufficient for requirements it will be possible to provide a connection to the 150mm OPVC watermain located within Market Square. It is proposed to replace the current connection with a new commercial connection. At this stage of the project it is likely that a DN 25mm or possibly a 32mm connection will be suitable for the potable water supply to the development. The connection will be either a metered installation with above ground RPZ back flow prevention device or a metered supply with double check valve installed within a meter box.

The determination of the backflow protection device will be in accordance with section 3.3 and 3.4 of the New Zealand Building Code G12/AS1. More than likely the cross connection hazard potential would be classified as High Hazard and in accordance with Table 2 of the code an RPZ backflow prevention device will be required.

### 5.3. Fire Protection

As noted in section 4.2 there are 2 fire hydrants within close proximity to the site, 1 of these hydrants is connected to the 355mm PE watermain located in the Great South Road berm outside Market Square approximately 25m east of the site. The second hydrant is opposite the site on the southern side of Great South Road, therefore we can be confident that there is adequate water flow rate and pressure to meet the requirements of SNZ PAS 4509:2008 New Zealand Fire Service Firefighting Water Supplies Code of Practice.

## 6. Stormwater Assessment

The development of this project will require a managed stormwater disposal system that minimises the effect of stormwater runoff on nearby properties and roads. At the same time, the development will need to be in accordance with the Waikato District Council District Plan requirements as well as Waikato Regional Infrastructure Technical Specifications (RITS) for determination of rainfall intensities.

### 6.1. Waikato District Council Stormwater Requirements

In October 2019 Waikato District Council advised Technitrades that the stormwater requirements from the district plan are addressed in section *22D.6.10 Stormwater management – Volume Control,*

*Each new lot or SITE within the subdivision intended for individual ownership shall provide for a stormwater management system deemed by the Council to be effective and appropriate. Regional Council discharge consents may be required to accommodate stormwater discharges from some developments. The landowner shall be responsible for the ongoing maintenance of the private on site stormwater system upon its implementation to its continuing HYDOROLOGICAL NEUTRALITY. An effective and appropriate stormwater management system in the Village Zone shall be achieved by providing for either A, B, C, D or E following:*

*A. An independent connection to a PUBLIC STORMWATER SYSTEM, and an on-site detention structure to contain a 20% AEP 10 minute storm event before overflowing to the PUBLIC STORMWATER SYSTEM which is able to collect stormwater from the SITE equivalent to that generated by: 70% impervious surface covering for all SITES less than 425 m2 in area; and 55% impervious surface covering for all SITES between 425m2 and 1000m2 in area.*

*The detention structure must be able to completely empty via an orifice controlled outlet over a 24 hour period.*

The District Plan requirements can be summarised as: - on site attenuation is needed, this is to be designed to manage a 20% AEP (5 year ARI) 10 minute storm event, and empty within 24 hours.

### 6.2. Rainfall Data

The stormwater disposal system is based on the 20% AEP storm event (5 year ARI) for the primary level of service. As required in section 4.2.4.3 of RITS this is determined from the rainfall intensity data obtained from NIWA High Intensity Rainfall System V4 (HIRDS V4). The post development runoff is based on the HIRDS historical data that has been factored to allow for 2.1$^{0}$C climate change adjustment. The rainfall depths are presented in Table 1.

| 5 Year Rainfall (20% AEP) | | | |
|---|---|---|---|
| Duration | Historical Rainfall Data (mm/hr) | 1$^{o}$C % Change (%) | 2.1$^{o}$C Climate Change Rainfall (mm/hr) |
| 10 min | 82.9 | 13.1 | 105.7 |

*Table 1: HIRDS v4 5 Year Rainfall Depth with Climate Change for 68 -72 Great South Road, Pokeno*

### 6.3. Pre-Development Runoff

We have based our assessment of the pre-development impervious and pervious areas from the WDC GIS aerial photos, taking a conservative approach the assessment assumes an impervious area of 30% and pervious of 70%. Runoff coefficients of 0.3 for pervious and 0.95 for impervious are obtained from RITS.

The analysis of the pre-development runoff uses the HIRDS v4 rainfall that have been generated from historical data without allowance for climate change. The pre-development runoff for the site during a 10 minute 1 in 5 year rainfall event (20% AEP) is 10.4l/s. Refer to the attached calculations for details.

### 6.4. Post Development Runoff

The post development situation is based on the proposed development plans, with the exception that the entire site is considered impervious, i.e. the small areas of landscaping around the edges of the site are included in the impervious area calculations.

The runoff from the developed station area during a 10 minute 1 in 5 year rainfall event (20% AEP) is 25.4l/s.

The attenuation tank design will therefore aim to reduce the peak post development flow to less than pre-development flow of 10.4l/s.

### 6.5. Proposed Stormwater Layout

All stormwater runoff from the forecourt will flow towards the double catch pits located at the eastern side of the site, from there the flow is into the SPEL separator. After the separator treated stormwater is piped to the below ground APD attenuation tank.

Attenuated stormwater is discharged from the APD tank at a controlled rate into a new public stormwater pipeline that will be installed within the unformed Church Road from the site to the open drain located approximately 130m to the north east.

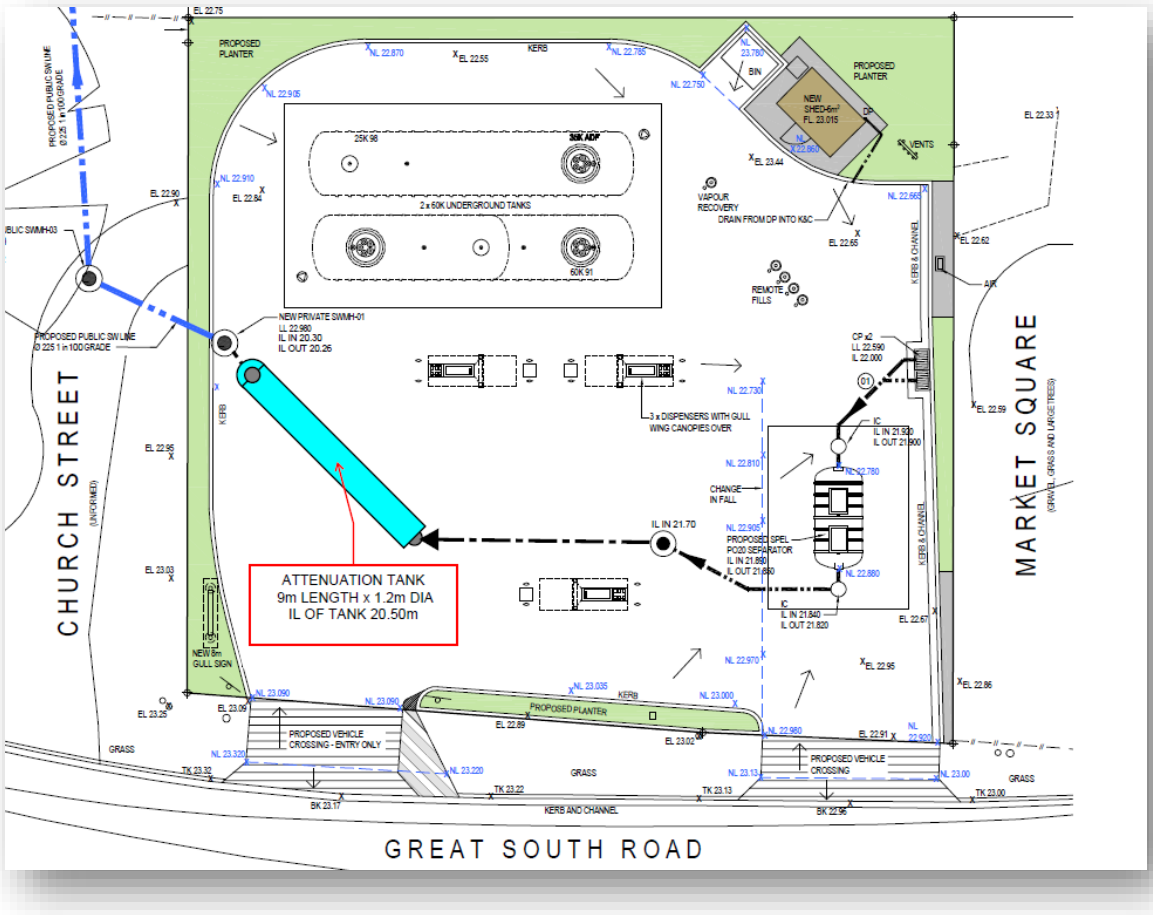



*Figure 3 – Proposed Drainage Plan*

The proposed APD attenuation tank location is shown on the previous page in Figure 3, and the proposed public stormwater drain is shown on Technitrades drawing 2998-B14 Rev SK 02.

## 7. Attenuation Tank Design

We have based the attenuation tank design on a buried cylindrical PE tank. The specific tank dimensions used in the analysis are a cylindrical shaped 10,200 litre, 1.2m diameter x 9m long StormLite tank supplied by APD. The APD StormLite tank has been referred to because it has an integrated silt trap within the outlet chamber, the APD tanks are well established, and the system has been used at other service station sites in New Zealand.

The peak attenuated discharge from the tank fitted with a 70mm diameter outlet orifice is 9.99l/s, this is acceptable as it is less than the maximum 10.4l/s allowable.

The tank will be located in the western part of the site with the outlet connected to the proposed public stormwater pipeline which will be installed in the Church Street road reserve. The tank location is clear of the fuel lines between the fuel storage tanks and the 3 dispensers on site.

The overall layout and location of the tank will be subject to final design. It is possible that the attenuation tank will be impacted by the ground water level, in which case the tank will be secured with ground anchors designed by APD.

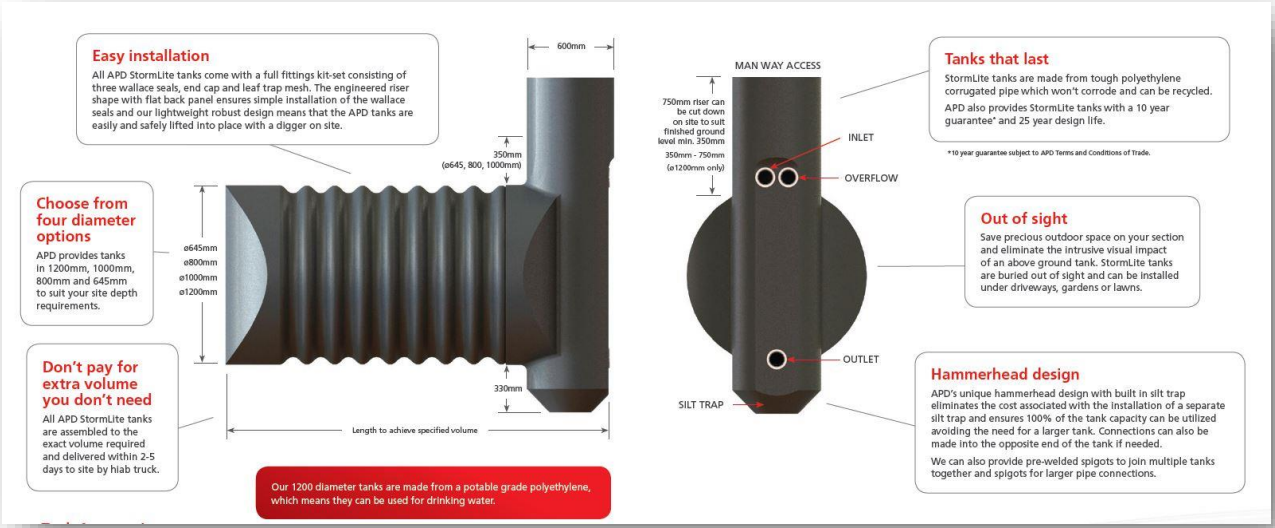



*Figure 4 – Typical APD StormLite Tank*

## 8. Limitations

This report has been prepared for use by our client, their consultants and the Waikato District Council. Liability for its use is limited to these parties and to the scope of work for which it was prepared as it may not contain sufficient information for other parties or for other purposes.

Please contact the undersigned if you have any questions about the above.

**Arete Civil**

Report Prepared By:

Ross Kernot
BE Civil, CMEngNZ, CPEng, IntPE

Enclosures: HIRDS v4 data for Gull Pokeno Site
Stormwater runoff and attenuation calculations
Technitrades Drainage Plan with attenuation tank 2998-B04 SK 01
Technitrades Proposed Public Drainage Plan 2998-B14 SK 02
APD Tank Brochure

**HIRDS V4 Intensity-Duration-Frequency Results**

Sitename: Gull Pokeno Site
Coordinate system: WGS84
Longitude: 175.0208
Latitude: -37.2448

**Rainfall intensities (mm/hr) :: Historical Data**

| ARI | AEP | 10m | 20m | 30m | 1h | 2h | 6h |
|---|---|---|---|---|---|---|---|
| 1.58 | 0.633 | 59 | 40.3 | 32 | 21.2 | 13.8 | 6.75 |
| 2 | 0.5 | 64.3 | 44 | 34.9 | 23.2 | 15.1 | 7.4 |
| 5 | 0.2 | 82.9 | 56.8 | 45.1 | 30.1 | 19.6 | 9.65 |
| 10 | 0.1 | 96.9 | 66.5 | 52.9 | 35.3 | 23.1 | 11.4 |
| 20 | 0.05 | 111 | 76.6 | 61 | 40.8 | 26.7 | 13.2 |
| 30 | 0.033 | 120 | 82.8 | 66 | 44.1 | 29 | 14.3 |
| 40 | 0.025 | 127 | 87.3 | 69.6 | 46.6 | 30.6 | 15.1 |
| 50 | 0.02 | 132 | 90.9 | 72.5 | 48.5 | 31.9 | 15.8 |
| 60 | 0.017 | 136 | 93.8 | 74.8 | 50.1 | 32.9 | 16.3 |
| 80 | 0.012 | 143 | 98.6 | 78.6 | 52.7 | 34.7 | 17.2 |
| 100 | 0.01 | 148 | 102 | 81.6 | 54.7 | 36 | 17.9 |
| 250 | 0.004 | 171 | 118 | 94.3 | 63.3 | 41.8 | 20.8 |

| ARI | AEP | 12h | 24h | 48h | 72h | 96h | 120h |
|---|---|---|---|---|---|---|---|
| 1.58 | 0.633 | 4.2 | 2.56 | 1.54 | 1.13 | 0.906 | 0.761 |
| 2 | 0.5 | 4.6 | 2.81 | 1.69 | 1.24 | 0.995 | 0.836 |
| 5 | 0.2 | 6.02 | 3.69 | 2.22 | 1.64 | 1.31 | 1.1 |
| 10 | 0.1 | 7.11 | 4.36 | 2.63 | 1.94 | 1.56 | 1.31 |
| 20 | 0.05 | 8.26 | 5.08 | 3.06 | 2.26 | 1.82 | 1.53 |
| 30 | 0.033 | 8.97 | 5.52 | 3.33 | 2.46 | 1.98 | 1.66 |
| 40 | 0.025 | 9.49 | 5.84 | 3.53 | 2.61 | 2.1 | 1.76 |
| 50 | 0.02 | 9.9 | 6.1 | 3.69 | 2.72 | 2.19 | 1.84 |
| 60 | 0.017 | 10.2 | 6.31 | 3.82 | 2.82 | 2.27 | 1.91 |
| 80 | 0.012 | 10.8 | 6.65 | 4.03 | 2.98 | 2.39 | 2.02 |
| 100 | 0.01 | 11.2 | 6.92 | 4.19 | 3.1 | 2.49 | 2.1 |
| 250 | 0.004 | 13.1 | 8.09 | 4.91 | 3.63 | 2.93 | 2.47 |

## Climate change projections

For this version of the HIRDS tool, climate change projection information is provided based on IPCC scenarios rather than for arbitrary temperature increases. This aligns with other information NIWA provides on climate change projections. In some cases the change in rainfall intensity due to a specific temperature increase may be required. This can be acheived using percentage change factors provided in the table below taken from the HIRDSv4 Technical Report. The appropriate factor should be multiplied by the required temperature increase and applied to the historical HIRDS rainfall estimate.

For example, if the historic estimate for a 1-hour, 10-year is 35mm, then the projected value given a 2.1°C temperature increase would be calculated as follows. First the percentage increase per degree of warming for this duration and event frequency is selected from the table and multiplied by 2.1, i.e. 2.1 × 13.1% = 27.5%. The projected rainfall amount assuming a 2.1°C warming is then 35mm × 1.275 = 45mm.

The percentage change factors provided for storm durations of 1 hour should also be used for durations shorter than one hour.

Percentage change factors to project rainfall depths derived from the current climate to a future climate that is 1 degree warmer.

| Duration/ARI | 2 yr | 5 yr | 10 yr | 20 yr | 30 yr | 40 yr | 50 yr | 60 yr | 80 yr | 100 yr |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 hour | 12.2 | 12.8 | 13.1 | 13.3 | 13.4 | 13.4 | 13.5 | 13.5 | 13.6 | 13.6 |
| 2 hours | 11.7 | 12.3 | 12.6 | 12.8 | 12.9 | 12.9 | 13.0 | 13.0 | 13.1 | 13.1 |
| 6 hours | 9.8 | 10.5 | 10.8 | 11.1 | 11.2 | 11.3 | 11.3 | 11.4 | 11.4 | 11.5 |
| 12 hours | 8.5 | 9.2 | 9.5 | 9.7 | 9.8 | 9.9 | 9.9 | 10.0 | 10.0 | 10.1 |
| 24 hours | 7.2 | 7.8 | 8.1 | 8.2 | 8.3 | 8.4 | 8.4 | 8.5 | 8.5 | 8.6 |
| 48 hours | 6.1 | 6.7 | 7.0 | 7.2 | 7.3 | 7.3 | 7.4 | 7.4 | 7.5 | 7.5 |
| 72 hours | 5.5 | 6.2 | 6.5 | 6.6 | 6.7 | 6.8 | 6.8 | 6.9 | 6.9 | 6.9 |
| 96 hours | 5.1 | 5.7 | 6.0 | 6.2 | 6.3 | 6.3 | 6.4 | 6.4 | 6.4 | 6.5 |
| 120 hours | 4.8 | 5.4 | 5.7 | 5.8 | 5.9 | 6.0 | 6.0 | 6.0 | 6.1 | 6.1 |

**GULL POKENO**
**68-72 GREAT SOUTH ROAD, POKENO**
**STORMWATER ATTENUATION CALCULATIONS**
**CYLINDRICAL TANK**

| Time (min) | Surface Runoff | | Tank Storage (C m³) | Tank Water Level (E m) | Tank Orifice Outflow (F l/s) | Net Tank Storage (G m³) | SITE RUNOFF CALC | |
|---|---|---|---|---|---|---|---|---|
| | Hydrograph (A l/s) | Volume (B m³) | | | | | Rest of Site (H l/s) | Total Site (I l/s) |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 2.54 | 0.076 | 0.076 | 0.032 | 1.904 | -0.038 | 0.00 | 1.904 |
| 2 | 5.08 | 0.229 | 0.191 | 0.060 | 2.590 | 0.035 | 0.00 | 2.590 |
| 3 | 7.62 | 0.381 | 0.416 | 0.102 | 3.373 | 0.214 | 0.00 | 3.373 |
| 4 | 10.16 | 0.533 | 0.747 | 0.152 | 4.118 | 0.500 | 0.00 | 4.118 |
| 5 | 12.70 | 0.686 | 1.186 | 0.209 | 4.829 | 0.896 | 0.00 | 4.829 |
| 6 | 15.24 | 0.838 | 1.734 | 0.272 | 5.514 | 1.404 | 0.00 | 5.514 |
| 7 | 17.78 | 0.991 | 2.394 | 0.342 | 6.183 | 2.023 | 0.00 | 6.183 |
| 8 | 20.32 | 1.143 | 3.166 | 0.419 | 6.842 | 2.756 | 0.00 | 6.842 |
| 9 | 22.86 | 1.295 | 4.051 | 0.503 | 7.499 | 3.601 | 0.00 | 7.499 |
| 10 | 25.40 | 1.448 | 5.049 | 0.596 | 8.161 | 4.559 | 0.00 | 8.161 |
| 11 | 22.86 | 1.448 | 6.007 | 0.685 | 8.749 | 5.482 | 0.00 | 8.749 |
| 12 | 20.32 | 1.295 | 6.777 | 0.758 | 9.203 | 6.225 | 0.00 | 9.203 |
| 13 | 17.78 | 1.143 | 7.368 | 0.816 | 9.546 | 6.796 | 0.00 | 9.546 |
| 14 | 15.24 | 0.991 | 7.786 | 0.858 | 9.789 | 7.199 | 0.00 | 9.789 |
| 15 | 12.70 | 0.838 | 8.037 | 0.884 | 9.936 | 7.441 | 0.00 | 9.936 |
| 16 | 10.16 | 0.686 | 8.127 | 0.893 | 9.990 | 7.527 | 0.00 | 9.990 |
| 17 | 7.62 | 0.533 | 8.061 | 0.886 | 9.950 | 7.464 | 0.00 | 9.950 |
| 18 | 5.08 | 0.381 | 7.845 | 0.864 | 9.823 | 7.255 | 0.00 | 9.823 |
| 19 | 2.54 | 0.229 | 7.484 | 0.827 | 9.613 | 6.907 | 0.00 | 9.613 |
| 20 | 0.00 | 0.076 | 6.983 | 0.778 | 9.322 | 6.424 | 0.00 | 9.322 |
| 21 | 0.00 | 0.000 | 6.424 | 0.724 | 8.996 | 5.884 | 0.00 | 8.996 |
| 22 | 0.00 | 0.000 | 5.884 | 0.674 | 8.675 | 5.364 | 0.00 | 8.675 |
| 23 | 0.00 | 0.000 | 5.364 | 0.625 | 8.358 | 4.862 | 0.00 | 8.358 |
| 24 | 0.00 | 0.000 | 4.862 | 0.579 | 8.042 | 4.380 | 0.00 | 8.042 |
| 25 | 0.00 | 0.000 | 4.380 | 0.534 | 7.724 | 3.916 | 0.00 | 7.724 |
| 26 | 0.00 | 0.000 | 3.916 | 0.491 | 7.404 | 3.472 | 0.00 | 7.404 |
| 27 | 0.00 | 0.000 | 3.472 | 0.449 | 7.079 | 3.047 | 0.00 | 7.079 |
| 28 | 0.00 | 0.000 | 3.047 | 0.408 | 6.747 | 2.642 | 0.00 | 6.747 |
| 29 | 0.00 | 0.000 | 2.642 | 0.367 | 6.407 | 2.258 | 0.00 | 6.407 |

| | | |
|---|---|---|
| Tank Diameter = | 1.2 | m |
| Tank Length = | 9.00 | m |
| Tank Volume = | 10.18 | $m^3$ |

$$Q = nKA(2gh)^{0.5}$$

| | | |
|---|---|---|
| No of Orifices r | 1 | |
| K = | 0.62 | |
| Nominal Diameter = | 70 | mm |

| Client: | Gull NZ | Date: 31/3/20 |
|---|---|---|
| Project/Job: | Gull Pokeno | Job No: 2124 |
| Subject: | Stormwater Disposal | Sheet No: 1 / By: RK |

- Pre-development area
  - Total site area = $910m^2$

  estimate impervious area is 30% of site

  " pervious " " 70% " "
  - impervious area $\Rightarrow 0.3 \times 910m^2 = 273m^2$
  - pervious area $\Rightarrow 0.7 \times 910m^2 = 637m^2$
  - From RITS impervious C = 0.95

    pervious C = 0.3

- 5 year ARI Rainfall
  - From HIRDS V4

  10min 5yr ARI historical rainfall = 82.9 mm/hr

  1°C Climate change = +13%

  ∴ 2.1°C Climate change = 27.5%

  10min 5yr ARI 2.1° rainfall = 105.7 mm/hr

- Pre-development runoff

  use current landuse with historic rainfall

  impervious $273m^2 \times 82.9 \times \frac{0.95}{3600} = 6.0$ l/s

  pervious $637m^2 \times 82.9 \times \frac{0.3}{3600} = 4.4$ l/s

  total pre-development = 10.4 l/s

AreteCivil

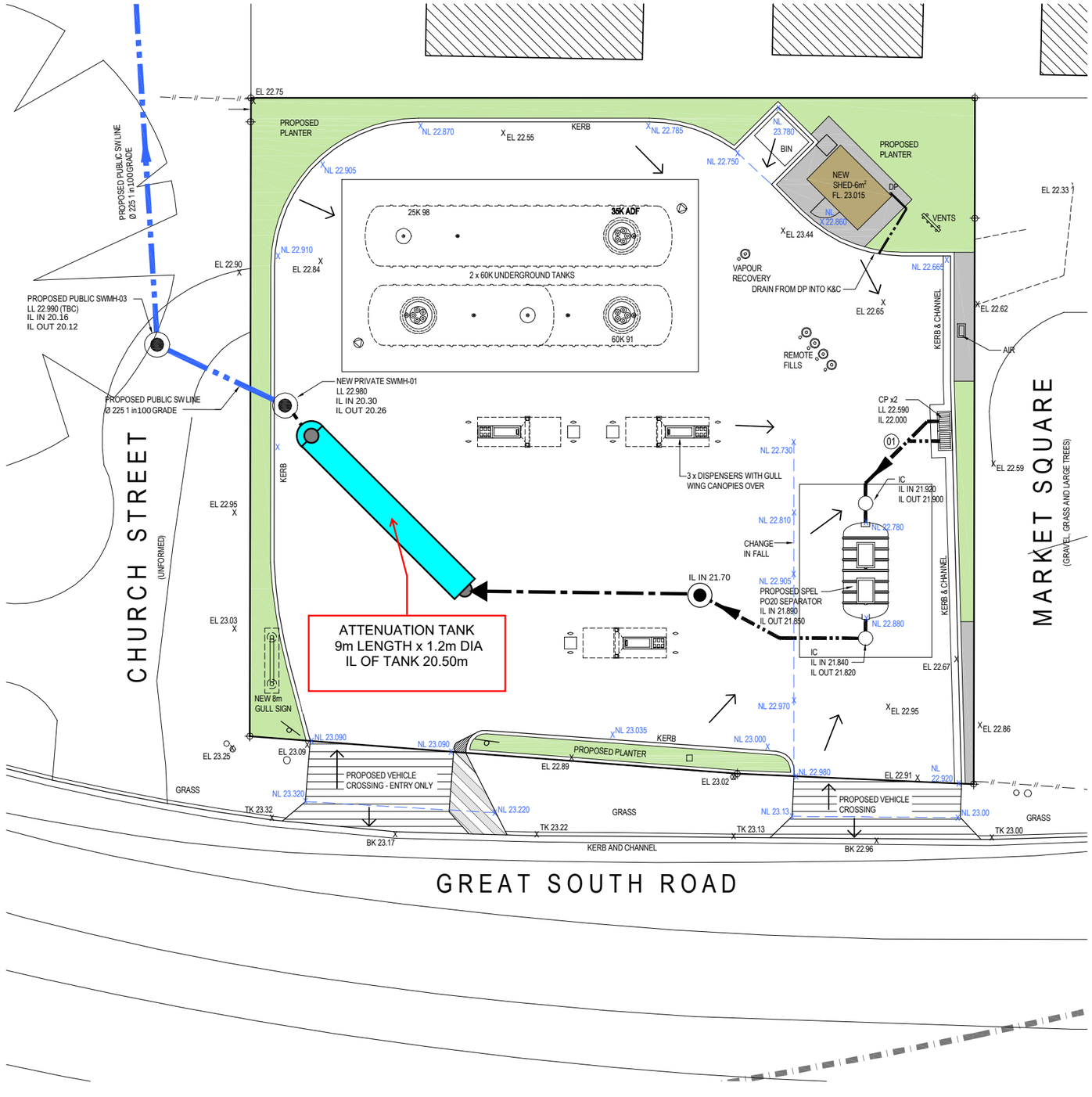
| Client: Gull NZ | | Date: 31/3/20 |
|---|---|---|
| Project/Job: Gull Pokeno | Job No: 2124 | |
| Subject: Stormwater Disposal | Sheet No: 2 | By: RK |

- Post development runoff

assume full site is impervious

impervious $910m^2 \times 105.7mm/hr \times \frac{0.95}{3600} = 25.4$ l/s

- aim to reduce peak runoff from 25.4 l/s to 10.4 l/s




## STORMWATER DESIGN :

ALL STORMWATER DESIGN BASED ON NZBC E1/AS1.
A = CATCHMENT IN M²
I = RAINFALL INTENSITY = 100mm PER HOUR
DRAIN SIZE & GRADIENT = REFER TO FIGURE 3, PAGE 14, E1/AS1.

| LABEL | CATCHMENT | 0.01 x A x I | MIN. SIZE | MIN. GRADE | DESCRIPTION |
|---|---|---|---|---|---|
| 1 | 720 | 720 | 225 Ø | 1 IN 350 | DOUBLE CP - ADJACENT AIR PARK / EAST BOUNDARY |
| | | | | | |

LEGEND:

- PROPOSED BUILDINGS
- NEIGHBOURING BUILDINGS
- LANDSCAPED AREAS
- PROPOSED VEHICLE CROSSING
- PROPOSED PRIVATE STORM WATER DRAINS Ø150 1 IN 60 GRADE
- EXISTING COUNCIL WASTE WATER SEWER
- PROPOSED COUNCIL STORM WATER SEWER
- DRAIN DIRECTION OF FLOW
- SLAB FALL DIRECTION
- MANHOLE - STORMWATER (SWMH)
- IC — 600mm INSPECTION CHAMBER
- CP1 — 2 x NEW STANDARD CESSPIT 675 x 450 CESSPIT
- LL 23.590 — LID LEVELS
- X EL 22.98 — EXISTING SURFACE LEVELS
- NEW SURFACE LEVELS
- CHANGE IN FALL LINE



| | |
|---|---|
| A1 Scale. | 1:100 |
| A3 Scale. | 1:200 |
| Designed. | L.MEIKLEJOHN |
| Drawn. | V.SAYWELL |
| A1 Plot Scale. | 1 : 1 |
| A3 Plot Scale. | 1 : 2 |

### NOTES

DO NOT SCALE.

DIMENSIONS IN MILLIMETERS UNLESS NOTED OTHERWISE.

IF IN DOUBT ON ANY ISSUE SEEK VERIFICATION PRIOR TO PROCEEDING.

READ THESE DRAWINGS IN CONJUNCTION WITH ALL OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS.

| REV. | DESCRIPTION | BY | DATE |
|---|---|---|---|
| A | RESOURCE CONSENT APPLICATION | VS/MK | 10-02-20 |

# GULL POKENO

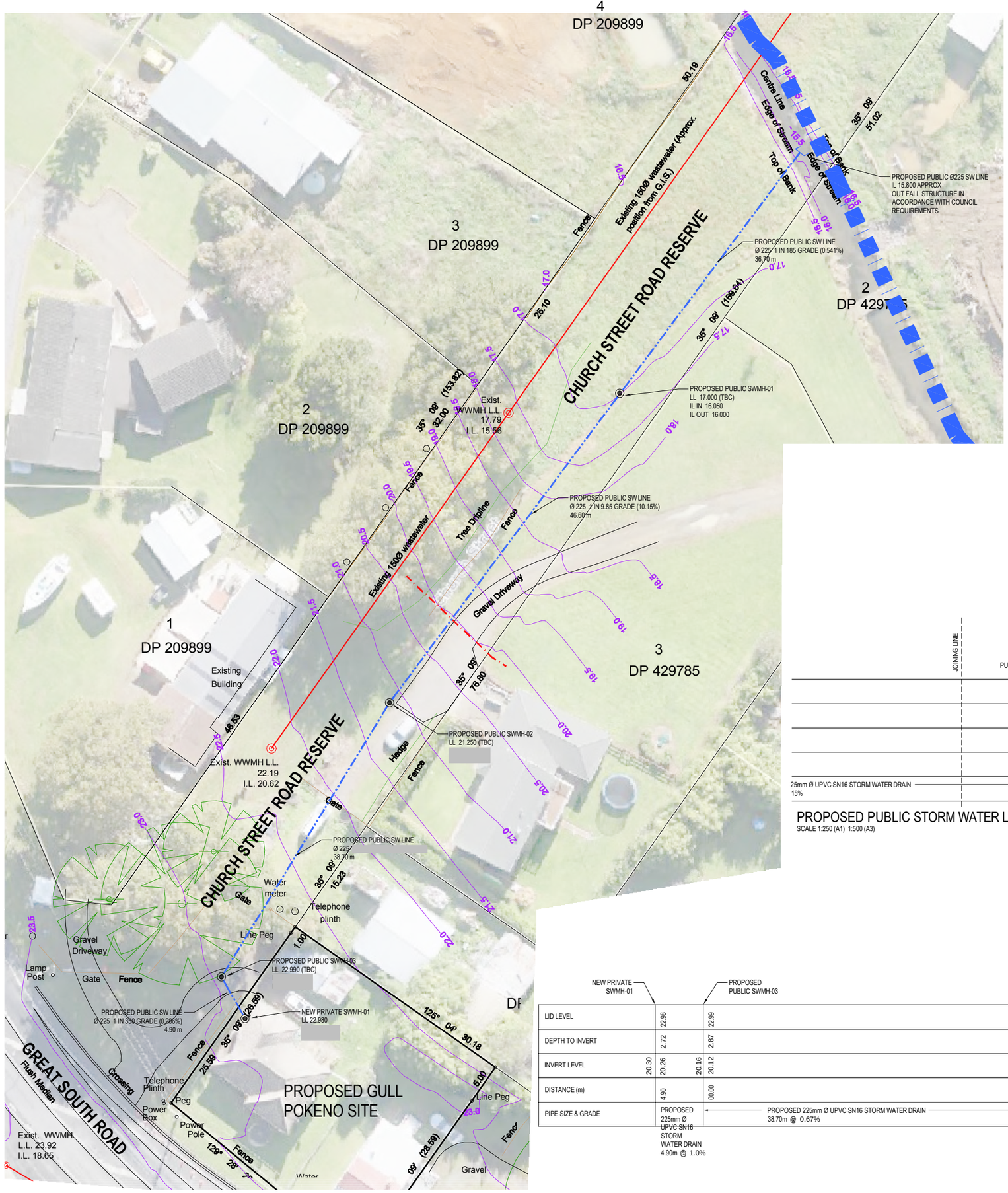
## PROPOSED FUEL FACILITY

68-72 Great South Road, Pokeno

TECHNITRADES ARCHITECTURE
12 Ben Lomond Crescent, Pakuranga, Auckland 2010
Phone (09) 5767166 | design@technitrades.co.nz

Drawing.
Drainage & Levels Plan

Drawing No. 2998-B04
Revision. SK 01




LEGEND:

- EXISTING PUBLIC STORM WATER DRAIN
- PROPOSED PUBLIC STORM WATER DRAIN
- EXISTING PUBLIC OPEN STORM WATER DRAIN
- EXISTING PUBLIC WASTE WATER DRAIN
- PROPOSED STORM WATER MANHOLE
- EXISTING WASTE WATER MANHOLE

| | JOINING LINE | PROPOSED PUBLIC SWMH-01 | | PROPOSED PUBLIC OUTFALL STRUCTURE |
|---|---|---|---|---|
| LID LEVEL | | 17.00 | | |
| DEPTH TO INVERT | | 0.47 | | |
| INVERT LEVEL | 16.05 | 16.00 | 15.80 | |
| DISTANCE (m) | | 46.60 | 36.70 | |
| PIPE SIZE & GRADE | 25mm Ø UPVC SN16 STORM WATER DRAIN 15% | | PROPOSED 225mm Ø UPVC SN16 STORM WATER DRAIN 36.70m @ 0.541% | |

PROPOSED PUBLIC STORM WATER LINE
SCALE 1:250 (A1) 1:500 (A3)

| | NEW PRIVATE SWMH-01 | | PROPOSED PUBLIC SWMH-03 | | PROPOSED PUBLIC SWMH-02 | JONING LINE | PROPOSED PUBLIC SWMH-01 | |
|---|---|---|---|---|---|---|---|---|
| LID LEVEL | | 22.98 | | 22.99 | | | | 17.00 |
| DEPTH TO INVERT | | 2.72 | | 2.87 | | | | 0.47 |
| INVERT LEVEL | 20.30 | 20.26 | 20.16 | 20.12 | 19.86 | | 19.82 | 16.05 | 16.00 |
| DISTANCE (m) | | 4.90 | | 00.00 | | | 38.70 | | 46.60 |
| PIPE SIZE & GRADE | | PROPOSED 225mm Ø UPVC SN16 STORM WATER DRAIN 4.90m @ 1.0% | | PROPOSED 225mm Ø UPVC SN16 STORM WATER DRAIN 38.70m @ 0.67% | | | PROPOSED 225mm Ø UPVC SN16 STORM WATER DRAIN 46.60m @ 8.09% | |

PROPOSED PUBLIC STORM WATER LINE
SCALE 1:250 (A1) 1:500 (A3)



| | |
|---|---|
| A1 Scale. | 1:250 |
| A3 Scale. | 1:500 |
| Designed. | L.MEIKLEJOHN |
| Drawn. | V.SAYWELL |
| A1 Plot Scale. | 1 : 1 |
| A3 Plot Scale. | 1 : 2 |

NOTES

DO NOT SCALE.

DIMENSIONS IN MILLIMETERS UNLESS NOTED OTHERWISE.

IF IN DOUBT ON ANY ISSUE SEEK VERIFICATION PRIOR TO PROCEEDING.

READ THESE DRAWINGS IN CONJUNCTION WITH ALL OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS.

| REV. | DESCRIPTION | BY | DATE |
|---|---|---|---|
| A | RESOURCE CONSENT APPLICATION | MK | 10-02-20 |

# GULL POKENO
## PROPOSED FUEL FACILITY
## 68-72 Great South Road, Pokeno

12 Ben Lomond Crescent, Pakuranga, Auckland 2010
Phone (09) 5767166 | design@technitrades.co.nz

Drawing.
Proposed Public Drainage Plan

Drawing No. 2998-B14
Revision. SK 02

# StormLite®

DETENTION & RETENTION SOLUTIONS

**Made to Order Economy.**

## The economical choice, made light and strong.

At around 250 kilograms, a 5000 litre StormLite® water tank is a mere fraction of the weight of concrete tanks. This means it can be moved around site with only a small digger. Designed strong, StormLite can go under driveways, carparks, and grass. Tell us your volume requirement, and our make-to-order service will ensure your Stormlite tank adheres to Council regulations, while making your drainlayer's job a breeze. **Make the affordable choice, with made to order economy. Call APD now on (09) 263 7741.**

## Easy installation

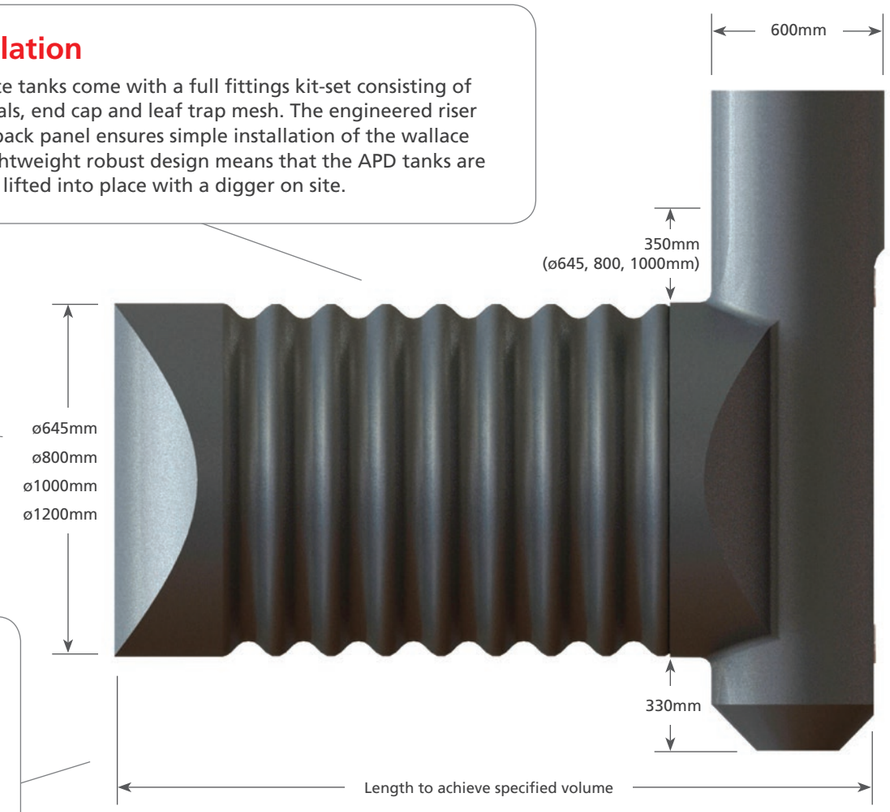
All APD StormLite tanks come with a full fittings kit-set consisting of three wallace seals, end cap and leaf trap mesh. The engineered riser shape with flat back panel ensures simple installation of the wallace seals and our lightweight robust design means that the APD tanks are easily and safely lifted into place with a digger on site.

## Choose from four diameter options

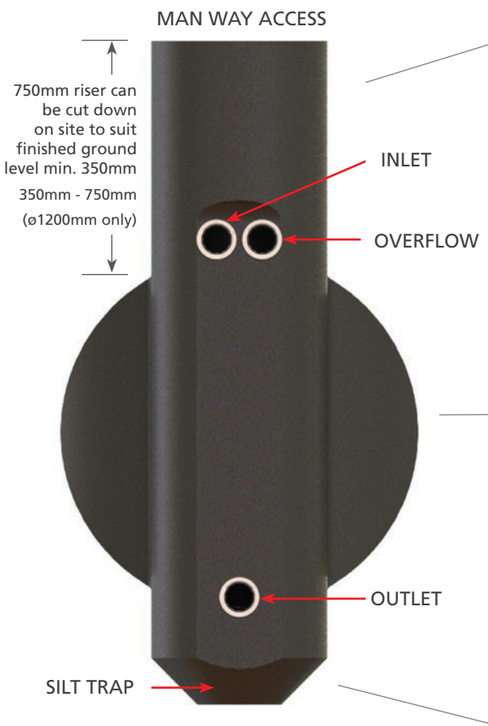
APD provides tanks in 1200mm, 1000mm, 800mm and 645mm to suit your site depth requirements.

## Don't pay for extra volume you don't need

All APD StormLite tanks are assembled to the exact volume required and delivered within 2-5 days to site by hiab truck.




Our 1200 diameter tanks are made from a potable grade polyethylene, which means they can be used for drinking water.




## Tanks that last

StormLite tanks are made from tough polyethylene corrugated pipe which won't corrode and can be recycled.

APD also provides StormLite tanks with a 10 year guarantee* and 25 year design life.

*10 year guarantee subject to APD Terms and Conditions of Trade.

## Out of sight

Save precious outdoor space on your section and eliminate the intrusive visual impact of an above ground tank. StormLite tanks are buried out of sight and can be installed under driveways, gardens or lawns.

## Hammerhead design

APD's unique hammerhead design with built in silt trap eliminates the cost associated with the installation of a separate silt trap and ensures 100% of the tank capacity can be utilized avoiding the need for a larger tank. Connections can also be made into the opposite end of the tank if needed.

We can also provide pre-welded spigots to join multiple tanks together and spigots for larger pipe connections.

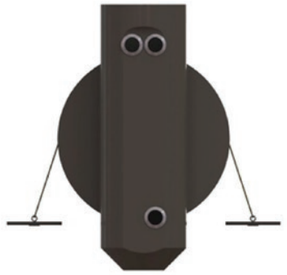
## Tank Accessories

Garden Lid

Adjustment ring for driveway or concrete install

Standard 100mm fittings kit (150mm available on request)

Optional pre-welded connecting and joining spigots



Optional Anti-Buoyancy Ground Anchors

# Installation Diagrams

StormLite®
DETENTION & RETENTION SOLUTIONS

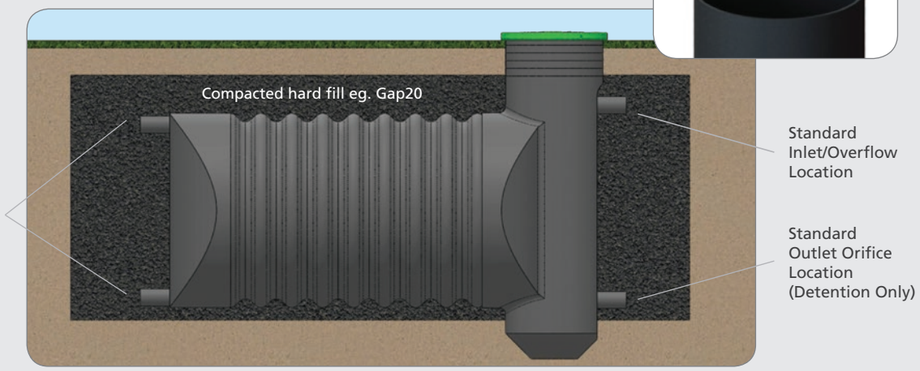
**Made to Order Economy.**

## Residential Lawn Installation

**Standard Cover:**
**150mm Compacted Hard Fill + 200mm Soil = 350mm Total**

1. For 1200 diameter tanks, the riser can be cut down to suit finished ground level.
2. Ground Anchors: If your site requires less than 350mm cover and/or has a high water table please contact APD.

• Detailed engineering drawings are available on request from APD.

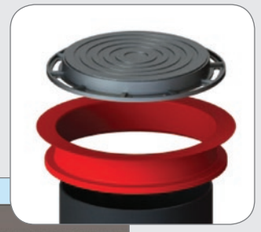


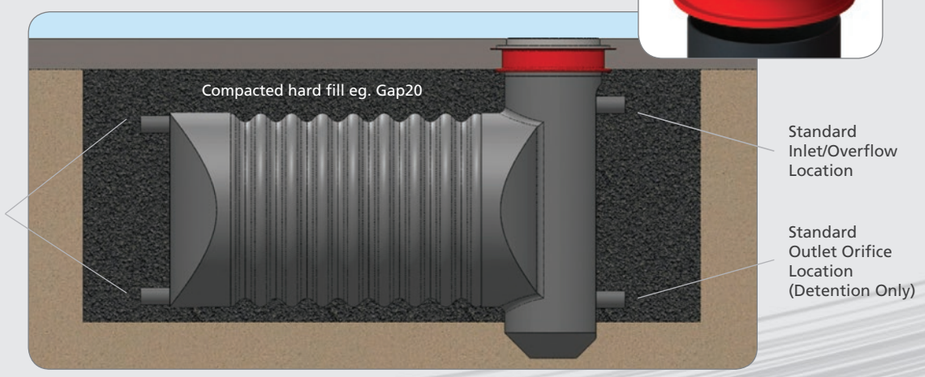

## Driveway Installation

**Cover Requirements:**
**Compacted Hard Fill + Concrete Thickness = 350mm Min Total Cover**
**200mm Thick Reinforced Concrete Over Tank - Residential Driveway**
**250mm Thick Reinforced Concrete Over Tank - Commercial Driveway**

1. For 1200 diameter tanks, the riser can be cut down to suit finished ground level.
2. Ground Anchors: If your site requires less than 350mm cover and/or has a high water table please contact APD.

• Detailed engineering drawings are available on request from APD.








# Stormlite® Rectangular

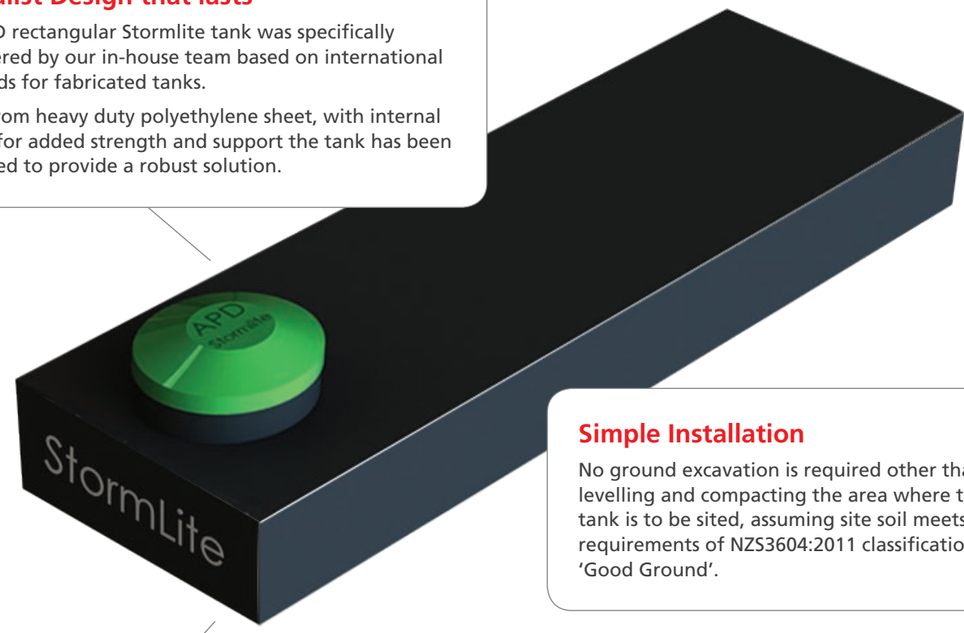
## Above Ground Detention / Retention Tanks

**Above ground Rectangular tanks are available from APD for those projects where standard detention tanks just won't work. Great for placing under houses and decks, these tanks can be custom made to fit between piles and structural supports. Tanks can be partly buried if required.**

### Specialist Design that lasts

The APD rectangular Stormlite tank was specifically engineered by our in-house team based on international standards for fabricated tanks.

Made from heavy duty polyethylene sheet, with internal baffles for added strength and support the tank has been optimised to provide a robust solution.




### Simple Installation

No ground excavation is required other than levelling and compacting the area where the tank is to be sited, assuming site soil meets the requirements of NZS3604:2011 classification of 'Good Ground'.

### Dimensions

Standard height is up to 800mm. Both the width and length of our rectangular tanks can be sized to suit the site requirements.

### Options

APD offers a choice of lid types to suit installation. There is also an optional addition of silt traps and optional re-positioning of a man way.

We can also include access and risers if required.

*See below for examples.*

## Options

**1** Standard man way position


**2** Optional man way position


**3** Silt trap and custom lid