

MEMORANDUM



Project: 21a Manuka Street, Whanganui

Project no: W25043

Client Name: IWIK Trust

c/o Property Group

Attention: Ryan O'Leary

Date: 13/8/2025

Subject: Servicing Potential for Proposed Residential Development at 21A Manuka Street, Whanganui

1. OVERVIEW

This memo provides an assessment of the property at 21A Manuka Street, Castlecliff, Whanganui in the context of supporting a proposed District Plan rezoning application from open space to general residential. Our assessment covers the following points:

- Assessment of landform and identification of overland flow paths
- Statement on the ability to service the site for stormwater, wastewater and water supply.
- Commentary on earthworks and ground conditions.

The site is currently held in multiple parcels of land under a single title and was previously used as the Castlecliff bowling green. The site is 4,774m² and is situated in a residential area with residential dwellings on three side and fronts onto Manuka Street on the fourth side.

2. EXISTING LANDFORM

As a former bowling green, the site is generally flat with two bowling greens lower than the surrounding ground levels.

In relation to the surrounding land the site is at a similar elevation to Manuka Street and 72 Cornfoot Street with the remaining properties to the north, east and west being at higher elevations.

Due to the site being at similar or lower elevations to the surrounding land, overland flow that arrives at the site from the surrounding residential land would be expected to pool in the existing bowling green before overflowing offsite. This is represented in the Whanganui District Council maps showing a significant portion of the site as being in a depression with a depth greater than 300 and the majority of the remaining area of the site as being in a depression less than 300mm.

2.1 Overland flow routes

The existing overflow points from the site are located at the driveway as shown on Orogen Drawing P25010-DG-302.

Despite being in a localised depression, the subject site does not have a flood hazard identified by WDC in either the 100-year or 200-year flood events.

Any development will need to integrate into the surrounding landform and manage the flows arriving from the upstream catchment. This can be achieved through earthworks to raise site levels, remove the depression area, provide access to new lots, establish flood free building platforms and establish flow paths through or around the site. These are standard activities for a residential development and can be supported by designs completed for resource consent.

2.2 Site Geology

Ground conditions at the site have been identified from investigations completed by LDE Ltd, and are covered within their report. The following information for the site is noted:

- The GNS active Faultline dataset indicates that there are no active fault lines on the property or within the Castlecliff township.
- The Council liquefaction maps indicate that most of the site is subject to moderate liquification with the remaining area subject to low liquefaction.
- No Hazardous Activities and Industries List 2011 (HAIL) information is recorded for the site.

Geotechnical investigations will be required to support a future Resource Consent application to address the liquification risk, inform the earthworks design for the site and foundation design for future residential dwellings. This is a common approach for addressing this matter in residential developments.

2.3 Soakage Rates

Soakage testing was undertaken by LDE Ltd on the 5 August 2025, and found rates varying from 102 mm/hr to 641 mm/hr. No groundwater was encountered in the test pits which were 950 - 1000mm in depth. The testing was undertaken within fine to medium sand, which resulted in the test pits collapsing during the test.

This indicates that although the ground does have soakage, any onsite solution would primarily utilise stored volumes during rainfall events, rather than relying on soakage to manage stormwater volumes. Solutions utilising the soakage rates could be beneficial in reducing overall discharge volumes from the site, if this is an issue across the wider network.

3. STORMWATER

Stormwater will require management for any new residential development to comply with the Whanganui District Council Land Development and Subdivision Engineering Document 2016, NZS4404 and the New Zealand Building Code.

There is an existing Council main in Manuka Street in front of the property which can provide connection to the public stormwater network. Survey of the Council main (SWP02695) has confirmed this as a 300Ø pipe at a grade of 1 in 88. The calculated capacity of this line is 120 L/s, assuming no tailwater effects on the pipeline capacity.

This catchment area to this Council manhole adjacent to the site is shown on Plan P25010-DG-0302. The 10-year design event flow to this point, based on the identified catchment area of 2.1Ha, is approximately 150 L/s. This catchment flows overland with a single sump inlet located outside 21a Manuka Street. Sump inlet capacity is generally limited to around 40 L/s so it is anticipated that this sump would not have the inlet capacity to convey the full 10-year catchment flow into the pipe network and therefore overland flow from the catchment is expected in the 10-year event.

The only known connection from the site to the public network is an existing shed connecting into the sump in Manuka Street. This information is from the Council GIS so accuracy of information is unknown. It would be preferable to have a direct connection from the subject site into the public network via new pipework that can drain most of the site area. This would decrease the load on the sump in Manuka Street and thus reduce overland flows in the 10-year event downstream of the site.

In addition to a direct connection from the site into the public network, it is proposed that stormwater runoff can be managed onsite through stormwater volume control (i.e. soakage or attenuation) to ensure that overall stormwater runoff from the site is not increased.

Through these management measures, adverse effects from any proposed residential development on the public stormwater network would be avoided. Further detail of site suitable solutions can be developed for future Resource Consent applications.

4. WASTEWATER

There is a 225Ø public gravity main in Manuka Street. Survey was undertaken for the upstream manhole and confirmed a depth of 3.03m to invert.

Based on the available asset information (available online at WDC maps and survey), the capacity of the existing Council main in front of 21A Manuka Street is expected to be approximately 41 L/s. Peak wet weather flows from the catchment draining to this pipeline are 4 L/s.

The Council main is deep, being around 2.5 – 3.0m below the road surface thus providing suitable depth for additional connections from any proposed development.

Based on the residual capacity in the Council wastewater main and available depth it is feasible to connect new residential dwellings at the site to the network without any significant downstream effects.

5. WATER

Water supplies must address both potable supply and firefighting requirements. A 200mm diameter water main exists in Manuka Street which services the existing residential dwellings into the neighbourhood. Due to the existing residential use surrounding the site, we assume that service pressures are available for potable supply.

Any residential development on the site can be serviced via a new connection to the existing Council main with the details of the water reticulation to the property to be resolved in a future Resource Consent application.

For firefighting purposes, there is a fire hydrant directly adjacent to the property boundary at eastern corner of the site in Manuka Street. A secondary hydrant is located further along Manuka Street at the intersection of Kotuku Street. This secondary hydrant is approximately 230m from the rear corners of the site and therefore complies with firefighting requirements for distances to hydrants.

6. TELECOMMUNICATIONS AND POWER

Fibre is available at the site and overhead power lines are present in Manuka Street. No issues are foreseen around servicing any residential development proposed for the site, with existing services being extended into the site to service future residential dwellings.


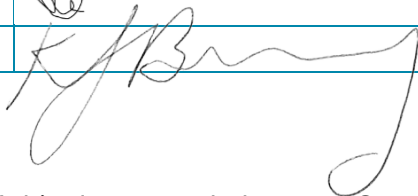
7. CONCLUSION

Based on the existing infrastructure available in the vicinity of the site we consider the site can be serviced for residential development via extension and/or connection to the stormwater, sewer, water supply, power and telecommunication networks. The arrangement of the residential dwellings, onsite services and confirmation of connection points can be resolved through a future Resource Consent application.

Earthworks will be required to provide building platforms and vehicle access whilst also considering overland flow path management around or through the site. These will need to include geotechnical considerations for the identified liquefaction risks.

Based on the above information, the site is considered suitable and appropriate for rezoning to a residential land use.

DOCUMENT ACCEPTANCE

| Action | Name | Signed | Date |
|-------------|-----------------|--|------------|
| Prepared by | Francesca Smith |  | 7/08/2025 |
| Reviewed by | Karla Beamsley |  | 13/08/2025 |

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Wastewater Calculations



Project Details

| | | | |
|---------------|---|-------------------|------------|
| Job Name: | 21A Manuka Street, Castlecliff, Whanganui | | |
| Job no.: | P25010 | Prepared by: | F Smith |
| Client: | The Property Group | Checked by: | K Beamsley |
| Date: | 10/07/2025 | District Council: | Whanganui |
| Design Stage: | Feasibility | Regional Council: | Horizons |

Element: Council Wastewater line WWP01116

| | |
|-------------------------|---|
| Relevant design plan/s: | Refer to included images on calculation sheet. |
| Asset ID: | WDC asset WWM00201 |
| Design function: | Wastewater flow calculation. |
| Calculation purpose: | Determine the exiting catchment flows in the wastewater network where the proposed development will connect to. |

Wastewater Catchment drain to WWM00201



NZS4404:2010 Population Calculation

| | |
|-------------------------------|-----------------------|
| Lot in U/S catchment | 80 (approx) dwellings |
| Number of people per dwelling | 3.5 |
| Population | 280 |

NZS 4404:2010 Residential Flow Calculation

Average dry weather flow (ADWF) = ADWF/person/day x population

| | |
|-----------------|-------------|
| ADWF per person | 250 L |
| ADWF | 70000 L/day |
| | 0.81 L/s |

Peak dry weather flow (PDWF) = ADWF x peak factor (PF)

| | |
|------------------------|--------------|
| Dry weather diurnal PF | 2.5 |
| PDWF | 175000 L/day |
| | 2.03 L/s |

Peak wet weather flow (PWWF) = PDWF x infiltration factor

| | |
|---------------------|----------|
| Infiltration factor | 2 |
| PWWF | 4.05 L/s |

Wastewater Calculations



Capacity Calculation of Existing Line

Element: Council Wastewater line WWP01116

| | |
|----------------------|---|
| Relevant plan/s: | P25010-DG-0301 |
| Asset ID: | WDC asset: WWP01116 (between WWM00201 and WWM00152) |
| Design function: | Pipe capacity calculation |
| Calculation purpose: | Determine capacity of existing Council main to compare to existing catchment flows and assess whether there is residual capacity available. |

Survey data in green cells

GIS data in blue cells

| | Upstream MH | Downstream MH |
|--------------|-------------|---------------|
| WDC Asset ID | WWM00201 | WWM00152 |
| Lid level | 15.43 | 14.1 |
| Invert level | 12.4 | 11.65 |
| Depth | 3.03 | 2.51 |

| | | Pipeline | |
|----------|------|----------|-----|
| | | WWP01116 | |
| U/S IL | | 12.4 | m |
| D/S IL | | 11.65 | m |
| Length | | 121 | m |
| Slope | | 0.00620 | m/m |
| Slope | 1 in | 161.3 | |
| Diameter | | 225 | mm |

Max flow in 225Ø 41.2 L/s partial pipe flow calc

Comment:

Based on available the Council asset information (available online at WDC maps) and survey data, the capacity of the existing Council main in front of 21A Manuka Street is 41.2 L/s. Peak wet weather flows from the catchment draining to this pipeline are estimated at 4.05 L/s. Therefore, there is ample residual capacity in the wastewater line to service additional residential dwellings.

Stormwater Calculations



Project Details

| | | | |
|---------------|---|-------------------|-----------|
| Job Name: | 21A Manuka Street, Castlecliff, Whanganui | | |
| Job no.: | P25010 | Prepared by: | F Smith |
| Client: | The Property Group | Checked by: | |
| Date: | 10/07/2025 | District Council: | Whanganui |
| Design Stage: | Feasibility | Regional Council: | Horizons |

Capacity Calculation of Existing Line

Element:

Council Stormwater line SWP02695

| | |
|----------------------|--|
| Relevant plan/s: | |
| Asset ID: | WDC SWP02695 |
| Design function: | Capacity calculation of line SWP02695 (between SWM09750 and SWM09749) |
| Calculation purpose: | Determine capacity of existing Council main to compare to existing catchment flow and assess whether there is residual capacity available. |

Survey data in green cells

GIS data in blue cells

| | Upstream MH | Downstream MH |
|--------------|-------------|---------------|
| WDC Asset ID | SWM09750 | SWM09749 |
| Lid level | 14.69 | 14.35 |
| Invert level | 13.28 | 12.86 |
| Depth | 1.41 | 1.49 |

| | Pipeline | |
|---------------|----------|----------|
| | SWP02695 | SWP02696 |
| U/S IL (m) | 13.28 | 12.88 |
| D/S IL (m) | 12.86 | 12.61 |
| Length (m) | 36.95 | 29.21 |
| Slope (m/m) | 0.01137 | 0.00924 |
| 1 in | 88.0 | 108.2 |
| Diameter (mm) | 300 | 300 |

| | | |
|----------------------|---------|------------------------|
| Max flow in SWP02695 | 120 L/s | partial pipe flow calc |
|----------------------|---------|------------------------|

Stormwater Calculations



Element:

Rational Method catchment flow calculation

| | |
|----------------------|---|
| Relevant plan/s: | P25010-DG-0302 |
| Asset ID: | WDC SWP02695 |
| Design function: | Catchment flow calculation |
| Calculation purpose: | Rational Method flow calculation for catchment draining to SWP02695 (between SWM09750 and SWM09749) to compare to pipe flow capacity. |

Longest flow path

| | | |
|------------|--------|-----|
| Upstream | 22.82 | m |
| Downstream | 14.32 | m |
| Length | 174.13 | m |
| Slope | 0.0488 | m/m |
| | 4.9 | % |

Time of concentration

Time of concentration:

$$Time\ of\ overland\ flow = \frac{107nL^{0.333}}{s^{0.2}}$$

[Equation 8]

Where overland flow is in minutes;
 n is Horton's roughness value for the surface;
 L is length in metres (m); and
 s is slope in percentage (integer i.e. 3.0 for 3%)

Table 2-3 Horton's roughness values

| Surface Type | Horton's roughness values |
|----------------|---------------------------|
| Paved | 0.015 |
| Bare Soil | 0.0275 |
| Poorly Grassed | 0.035 |
| Average Grass | 0.045 |
| Dense Grass | 0.06 |

| | | |
|------------------------|-------|-----|
| Horton's roughness - n | 0.045 | |
| Tc | 19.5 | min |

Rational Method Flow Calculation - 10-year 20 minute design flow

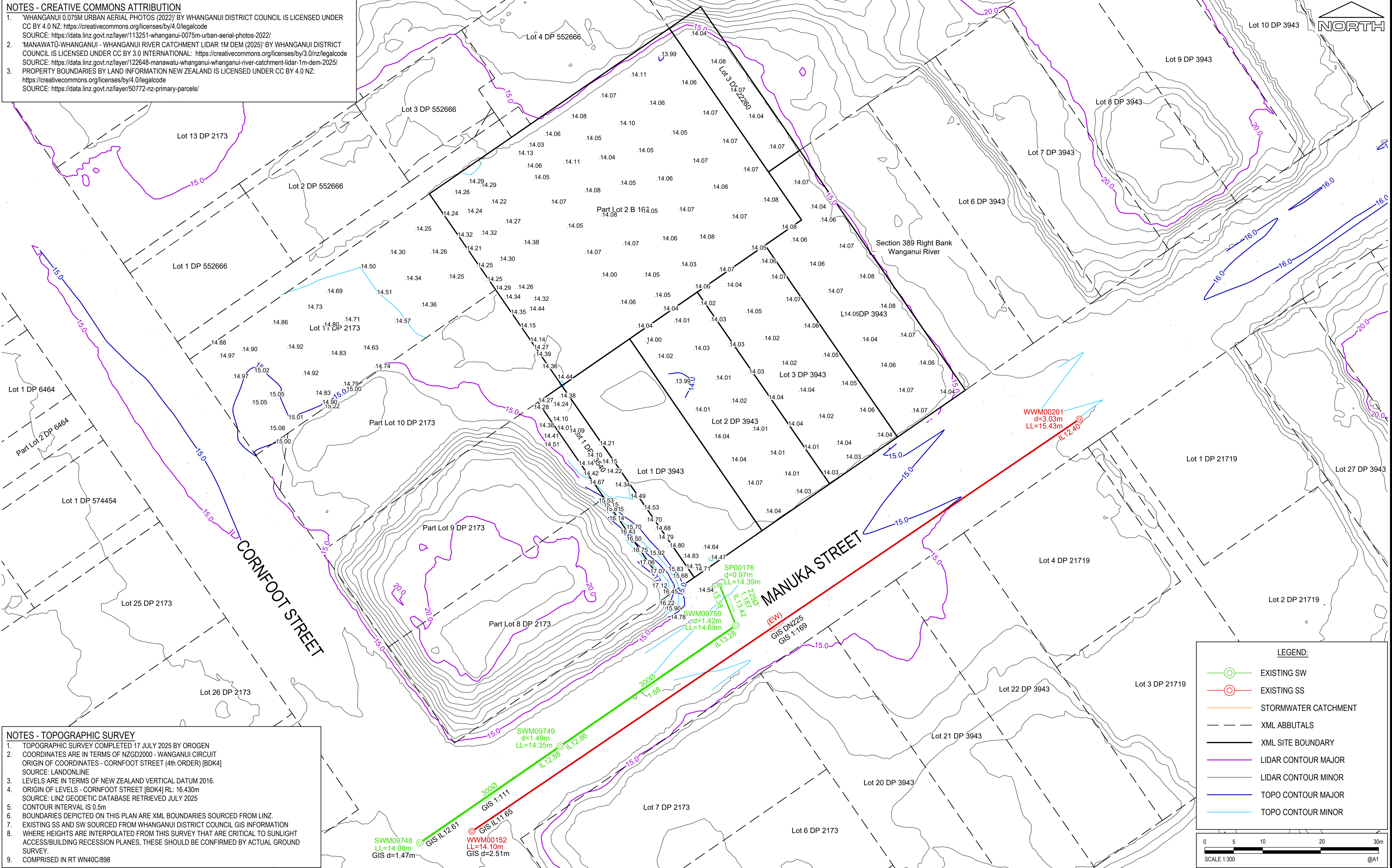
Runoff coefficient from NZBC E1 for residential areas in which the impervious area is less than 36% of gross area

Intensity value sourced from HIRDS. Historic data used with 20% climate change allowance applied.

| | | |
|------------------------|-------|-------------------|
| Runoff coefficient - C | 0.45 | |
| Intensity - I | 56.16 | mm/hr |
| Area - A | 2.08 | ha |
| Q | 0.146 | m ³ /s |
| | 146 | L/s |

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NOTES - TOPOGRAPHIC SURVEY

1. TOPOGRAPHIC SURVEY COMPLETED 17 JULY 2025 BY OROGEN
2. COORDINATES ARE IN TERMS OF NZGD2000 - WANGANUI CIRCUIT
ORIGIN OF COORDINATES - CORNFOOT STREET (4th ORDER) [BDK4]
SOURCE: LANDONLINE
3. LEVELS ARE IN TERMS OF NEW ZEALAND VERTICAL DATUM 2016.
4. ORIGIN OF LEVELS - CORNFOOT STREET [BDK4] RL: 16.430m
SOURCE: LINZ GEODETIC DATABASE RETRIEVED JULY 2025
5. CONTOUR INTERVAL IS 0.5m
6. BOUNDARIES DEPICTED ON THIS PLAN ARE XML BOUNDARIES SOURCED FROM LINZ.
7. EXISTING SS AND SW SOURCED FROM WHANGANUI DISTRICT COUNCIL GIS INFORMATION
8. WHERE HEIGHTS ARE INTERPOLATED FROM THIS SURVEY THAT ARE CRITICAL TO SUNLIGHT ACCESS/BUILDING RECESSON PLANES, THESE SHOULD BE CONFIRMED BY ACTUAL GROUND SURVEY.
9. COMPRISED IN RT WN40C/898

LEGEND:

- EXISTING SW
- EXISTING SS
- STORMWATER CATCHMENT
- XML ABUTMENTS
- XML SITE BOUNDARY
- LIDAR CONTOUR MAJOR
- LIDAR CONTOUR MINOR
- TOPO CONTOUR MAJOR
- TOPO CONTOUR MINOR

0 5 10 20 30m
SCALE 1:300

| Issue | Date | Description | PLM | CBR |
|-------|------------|-----------------|-----|-----|
| 1 | 24/07/2025 | FOR INFORMATION | | |

| Drawn | Date |
|-------|------------|
| PLM | 24/07/2025 |

| Checked | Date |
|---------|------------|
| CBR | 24/07/2025 |

| Designed | Date |
|----------|------|
| | |

| Verified | Date |
|----------|------|
| | |

| Approved | Date |
|----------|------|
| | |

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Client: IWIK TRUST
Project: 21A MANUKA STREET
CASTLECLIFF
WHANGANUI
Status: AS SURVEYED

Title: TOPOGRAPHIC SURVEY & DRAINAGE ASBUILT
Datum: WANG2000
Surveyor: P. McLeod
Scale: 1:300m
Original Size: A1
Drawing Number: P25010-DG-0301
Issue: 1

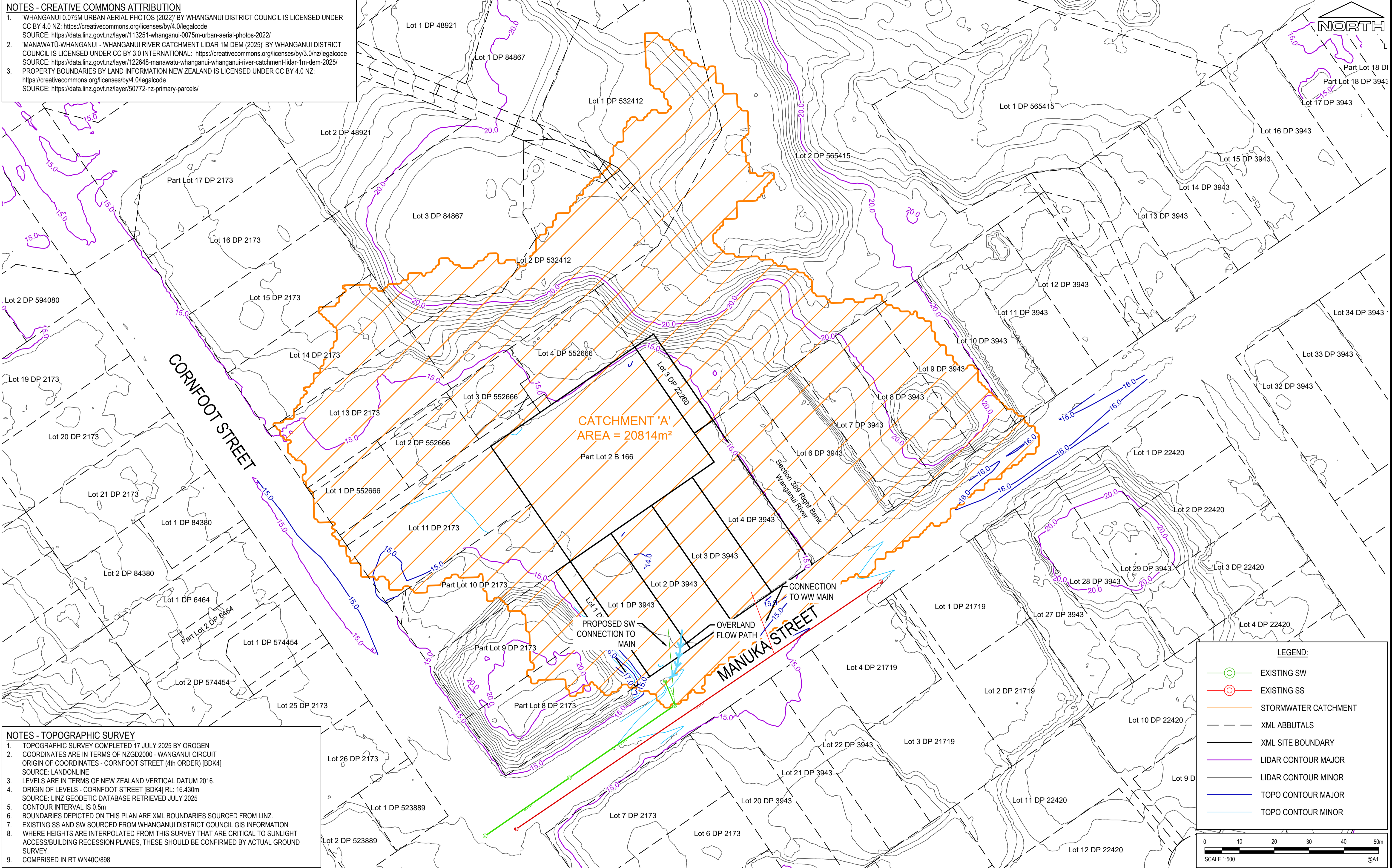
DATE: 7 August 2025 5:01 pm
Reference Files:

Drawing File: C:\12ds\data\logsgy01\P25010 - IWIK - 21a Manuka St_1366\Cad\P25010-DG-0300-SU-02.dwg

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| Issue | Date | Description | PLM | Des | Veri | App | CBR | Date |
|-------|------------|-----------------|-----|-----|------|-----|-----|------------|
| 1 | 24/07/2025 | FOR INFORMATION | PLM | | | | CBR | 24/07/2025 |

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| | |
|----------------|---|
| Client | WIK TRUST |
| Project | 21A MANUKA STREET CASTLECLIFF WHANGANUI |
| Status | AS SURVEYED |
| Datum | WANG2000 |
| Surveyor | P. McLeod |
| Scale | 1:500m |
| Original Size | A1 |
| Drawing Number | P25010-DG-0302 |
| Issue | 1 |

| | | | |
|----------------|--|----------------|--|
| Title | | CATCHMENT PLAN | |
| Scale | | 1:500m | |
| Original Size | | A1 | |
| Drawing Number | | P25010-DG-0302 | |
| Issue | | 1 | |

DATE: 7 August 2025 5:01 pm
Reference Files:

Drawing File: C:\12ds\data\ogsgy01\P25010 - IWIK - 21a Manuka St_1366\Cad\P25010-DG-0300-SU-02.dwg

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