APPENDIX F

Stormwater Management Report prepared by Westera Partners

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WESTERA
PARTNERS

Stormwater Management Report

Proposed Retirement Living Development

99 Hogarth Drive, Bohle Plains

For: Ruby Developments Pty Ltd

2 August 2024

Ref: S24-020

ISO 14001 ENVIRONMENT Management System
ISO 9001 QUALITY Management System
AS 4801 OHS Management System

A QUALITY ASSURED COMPANY

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This report has been prepared for Ruby Developments Pty Ltd for the purpose of accompanying a development application to Townsville City Council. This report must only be used by Ruby Developments Pty Ltd for this purpose and must not be used or relied upon by any other person for any other purpose.

The assessment, conclusions or recommendations in this report are based on conditions encountered and information received at the time of preparing the report and may not be relied upon as site conditions or operations vary over time.

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1 INTRODUCTION

Westera Partners Pty Ltd has been commissioned by Ruby Developments Pty Ltd to prepare a Stormwater Management Report to accompany a development application for a proposed retirement living development.

The development application involves the construction of 292 retirement living dwellings, including facilities, parking and landscaping. Access to the site is to be provided from Hogarth Drive.

This report documents how stormwater runoff will be managed on-site in accordance with Townsville City Council requirements.

2 SITE DESCRIPTION

2.1 Location and Land Use

The proposed development site is located at 99 Hogarth Drive, Bohle Plains also known as Lot Plan 1002 on SP340654. The site area is approximately 13.67Ha, and the development proposal will occur over approximately 13.01Ha. The site is primarily vacant and covered by light cover bushland and grass. The northern portion of the site currently falls towards a mapped waterway close to the northern boundary which ultimately discharges to Three Mile Creek, and the southern portion falls towards the southern boundary via multiple mapped waterways located within the site, which then ultimately discharge towards existing infrastructure on Hogarth Dr.

The proposed development site is bound by Three Mile Creek to the north, urban residential development to the east and south, and The Ring Road to the west. Refer to Figure 1 for an indicative site location.

Figure 1 – Indicative development footprint (Nearmaps, 2024)

2.2 Existing Stormwater Infrastructure

There is currently no stormwater infrastructure within the proposed development site. It is noted that located throughout the proposed development are multiple mapped waterways. These waterways convey stormwater runoff from upstream catchments to the west of the Ring Road which then ultimately discharge to existing stormwater infrastructure and Three Mile Creek.

2.3 Lawful Point of Discharge

Stormwater drainage for the proposed development shall ensure no adverse impact on upstream, downstream or adjoining properties. The proposed lawful points of discharge for the development shall be the mapped waterways. The southern catchment of the proposed development is to discharge to an existing mapped waterway located within the adjoining easement to then ultimately flow east beneath Hogarth Dr via the existing culvert structure. The northern portion of the site and RV compound area are proposed to discharge to an existing mapped waterway which then connects to Three Mile Creek. New on-site stormwater infrastructure shall be constructed to direct stormwater to the lawful point of discharge to ensure no adverse impacts on adjacent properties.

Refer to Appendix B for further information regarding the proposed stormwater works.

2.4 Upstream Drainage Connection

The site does not have any upslope properties that would require a piped stormwater drainage connection through the subject site to achieve a lawful point of discharge.

2.5 Flooding

The proposed development site is impacted by Townsville's flood overlay mapping. The Engeny flood investigation has identified varying flood levels through the development site. To ensure flood immunity throughout the site, the building floor levels are set to ensure 300mm freeboard is achieved in line with TCC flood overlay code requirements. Refer to the separate flood report completed by Engeny for further information.

3 STORMWATER MANAGEMENT

A detailed stormwater quantity analysis of the existing and developed site conditions has not been undertaken as the overland flow analysis prepared by Engeny has determined no adverse impacts off site as a result of the increase in impervious area fraction as a result of the development. Stormwater detention is therefore not considered to be required for the development. Refer to separate overland flow investigation for further information.

4 WATER QUALITY MANAGEMENT

4.1 Operational Phase

The proposed development must address the State Planning Policy (SPP 2017) as the development site area exceeds 2500m^2. The development shall ensure that environmental values of receiving waters downstream of the development are maintained or enhanced during the construction and operation of the development in accordance with State Legislation and Local Government requirements. The stormwater quality management proposed for the development are required to achieve the following pollutant load reduction objectives in accordance with SPP and TCC requirements (TCP6.4.8.10):

- ≥ 80 % reduction in total suspended solids load (TSS)
- ≥ 60 % reduction in total phosphorus load (TP)

- ≥ 40 % reduction in total nitrogen load (TN)
- ≥ 90 % reduction in gross pollutant load

Pollutants typically generated during the operational phase of the development include:

- Litter/gross pollutants;
- Sediment;
- Nutrients (N & P);
- Hydrocarbons (oils and grease); and
- Heavy metals.

Stormwater treatment measures are shown on the attached stormwater management drawings and include:

- ATLAN Stormsack 200 micron filter baskets – gross pollutant filter baskets shall be installed within field inlets on site to act as a primary treatment device for the removal of TSS, nutrients and hydrocarbons.
- ATLAN SF.30-EMC-M Filter system to be installed within the two proposed combined treatment tanks within development site for final treatment of stormwater prior to discharging to the stormwater network.

Stormwater modelling has been carried out using MUSIC modelling software to determine the required infrastructure needed to meet the Water Quality Objectives (WQO's) above.

4.2 MUSIC Model

MUSIC modelling for this development has been carried out using MUSIC Version 6.3 and rainfall data obtained from the pluviograph tool on the eWATER website for Townsville. The developed site catchment and treatment measure details included in the MUSIC model are outlined in Table 1.

As the development proposal is for a retirement living facility, final house designs are not known at this stage, and therefore, assumptions have had to be made regarding the site roof portion and impervious area fraction.

Table 1 – MUSIC model parameters

Description	Specification
Assumed northern road catchment to all treatment	2.098 Ha (70% impervious)
Assumed northern lots ground catchment to all treatment (assumed to be 30% of lot area)	1.492 Ha (20% impervious)
Assumed northern ground catchment to ATLAN Filters only	0.289 Ha (10% impervious)
Assumed northern lots roof catchment to ATLAN Filters only (assumed to be 70% of lot area standard lots)	3.482 Ha (100% impervious)
Assumed additional northern roof catchment to ATLAN Filters only	0.314 Ha (100% impervious)

Description	Specification
Assumed northern ground catchment to bypass treatment	0.175 Ha (100% pervious)
Number of modelled ATLAN Stormsacks	60
Number of modelled ATLAN Filters	90
Assumed southern road catchment to all treatment	1.352 Ha (100% impervious)
Assumed southern lots ground catchment to all treatment (assumed to be 30% of lot area)	0.826 Ha (20% impervious)
Assumed southern ground catchment to ATLAN Filters only	0.412 Ha (6% pervious)
Assumed southern lots roof catchment to ATLAN Filters only (assumed to be 70% of lot area standard lots)	1.928 Ha (100% impervious)
Assumed additional southern roof catchment to ATLAN Filters only	0.097 Ha (100% impervious)
Assumed ground catchment to bypass treatment	0.097 Ha (100% pervious)
Number of modelled ATLAN Stormsacks	40
Number of modelled ATLAN Filters	50
Assumed RV compound road catchment to all treatment	0.236Ha (100% impervious)
Assumed ground catchment to ATLAN Filters only	0.158Ha (10% impervious)
Number of modelled ATLAN Stormsacks	2
Number of modelled ATLAN Filters	8

The MUSIC model layout is shown in Figure 2.

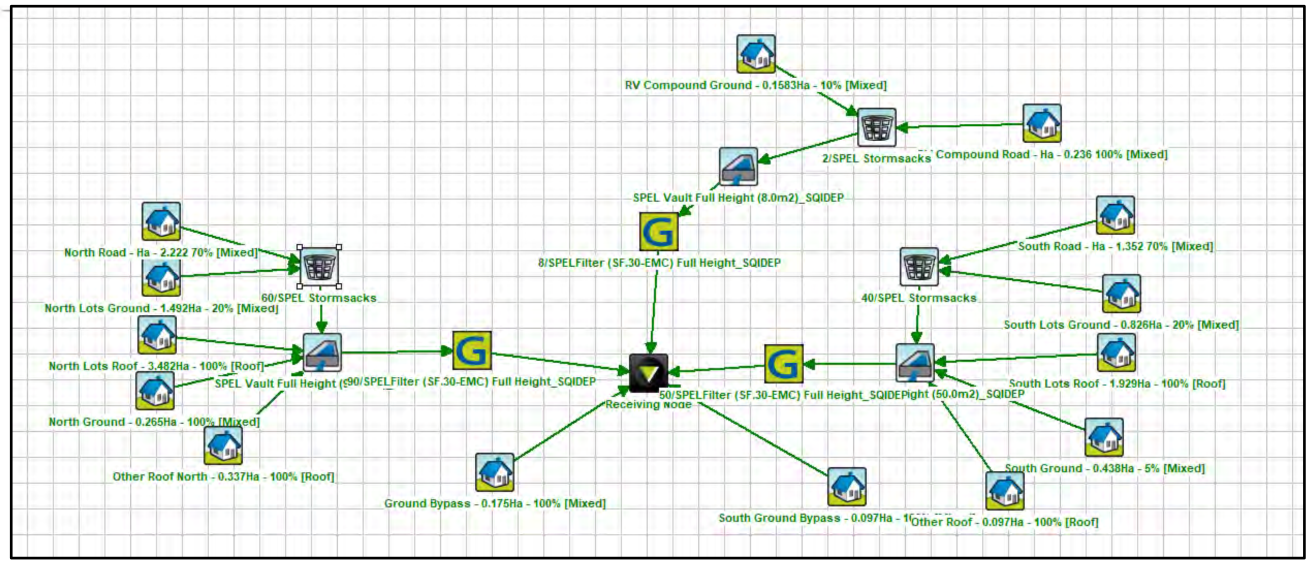

Figure 2 - MUSIC layout for development

The developed site treatment train effectiveness is outlined in Table 2.

Table 2 - Treatment train effectiveness

Modelled Parameters	Source nodes	Residual load	% Reduction
Flow (ML/yr)	95.2	95.2	0
Total Suspended Solids (kg/yr)	15500	3040	80.3
Total Phosphorus (kg/yr)	31.9	11.9	62.7
Total Nitrogen (kg/yr)	198	90.6	54.1
Gross Pollutants (kg/yr)	1480	0	100

4.3 Construction Phase

Management of stormwater runoff during construction and the implementation of an erosion & sediment control program is necessary to avoid impacts to receiving waters from pollutants typically generated during the construction phase. Typical pollutants are described in Table 3 below:

Table 3 - Pollutants Typically Generated During the Construction Phase

Pollutant	Sources
Litter (Gross Pollutants)	Paper, construction packaging, food packaging, cement bags.
Sediment	Unprotected exposed soils and stockpiles during earthworks and building.
Hydrocarbons	Fuel and oil spills, leaks from construction equipment.
Toxic materials	Cement slurry, asphalt prime, solvents, cleaning agents, wash waters.

Pollutant	Sources
pH altering substances	Acid sulphate soils, cement slurry and wash waters.

In addition to the degradation of receiving waters, impacts of inadequate erosion and sediment control downstream from the site include:

- traffic safety problems;
- blocked drains;
- local flooding problems;
- aesthetic pollution of drainage paths; and
- damage to local ecosystems.

4.3.1 Design Objectives

Management of stormwater runoff during construction should be undertaken in accordance with Appendix 2 of the SPP (July 2017). The SPP outlines the design objectives for construction phase stormwater management. These are presented in Table 4, Table 5 and Table 6.

Table 4 - SPP Appendix 2: Part 1 Construction Phase - Stormwater Management Design Objectives

Issue	Desired Outcomes
Drainage Control	1. Manage stormwater flows around or through areas of exposed soil to avoid contamination. 2. Manage sheet flows in order to avoid or minimise the generation of rill or gully erosion. 3. Provide stable concentrated flow paths to achieve the construction phase stormwater management design objectives for temporary drainage works (part 2). 4. Provide emergency spillways for sediment basins to achieve the construction phase stormwater management design objectives for emergency spillways on temporary sediment basins (part 3).
Erosion Control	1. Stage clearing and construction works to minimise the area of exposed soil at any one time. 2. Effectively cover or stabilise exposed soils prior to predicted rainfall. 3. Prior to completion of works for the development, and prior to removal of sediment controls, all site surfaces must be effectively stabilised using methods which will achieve effective short-term stabilisation.
Sediment Control	1. Direct runoff from exposed site soils to sediment controls that are appropriate to the extent of disturbance and level of erosion risk. 2. All exposed areas greater than 2500 metres must be provided with sediment controls which are designed, implemented and maintained to a standard which would achieve at least 80% of the average annual runoff volume of the contributing catchment treated (i.e. 80%

Issue	Desired Outcomes
	hydrological effectiveness) to 50mg/L Total Suspended Solids (TSS) or less, and pH in the range (6.5–8.5).
Litter, Hydrocarbons and other contaminants	1. Remove gross pollutants and litter. 2. Avoid the release of oil or visible sheen to released waters. 3. Dispose of waste containing contaminants at authorised facilities.
Waterway Stability and flood flow management	1. Where measures are required to meet post-construction waterway stability objectives, these are either installed prior to land disturbance and are integrated with erosion and sediment controls, or equivalent alternative measures are implemented during construction. 2. Earthworks and the implementation of erosion and sediment controls are undertaken in ways which ensure flooding characteristics (including stormwater quantity characteristics) external to the development site are not worsened during construction for all events up to and including the 1 in 100-year ARI (1% AEP).

Table 5 - SPP Appendix 2: Part 2 Construction Phase - Stormwater Management Design Objectives for Temporary Drainage Works

Temporary Drainage Works	Anticipated Operation Design Life and Minimum Design Storm Event		
	<12 Months	**12-24 Months**	**>24 Months**
Drainage Structure	1 in 2-year ARI/39% AEP	1 in 5-year ARI/18% AEP	1 in 10-year ARI/10% AEP
Where located immediately up-slope of an occupied property that would be adversely affected by the failure or overtopping of the structure	1 in 10-year ARI/10% AEP		
Culvert Crossing	1 in 1 year ARI/63% AEP		

Table 6 - SPP Appendix 2: Part 3 Construction Phase - Stormwater Management Design Objectives for Emergency Spillways on Temporary Sediment Basins

Drainage Structure	Anticipated Operation Design Life and Minimum Design Storm Event		
	<3 Months	3-12 Months	>12 Months
Emergency spillways on temporary sediment basins	1 in 10-year ARI/10% AEP	1 in 20-year ARI/5% AEP	1 in 50-year ARI/2% AEP

Best practice erosion and sediment controls must be installed to minimise the discharge of sediment laden runoff during construction and to achieve the objectives outlined in Tables 4-6. This is discussed in the following section.

4.3.2 Erosion and Sediment Control

Management of stormwater runoff during construction is necessary to avoid pollution of downstream waterways from sediment and gross pollutant loading. Impacts of inadequate erosion and sediment control downstream from the site include:

- traffic safety problems;
- blocked drains;
- local flooding problems;
- aesthetic pollution of drainage paths; and
- damage to local ecosystems.

Best practice erosion and sediment controls must be installed to minimise the discharge of sediment laden runoff during construction. Erosion and sediment control plans shall be developed during detailed design phase and must be continually maintained and amended as required to minimise environmental harm.

Erosion and sediment control plans are based on three sets of control measures:

- drainage control;
- erosion control; and
- sediment control.

These control measures must be maintained in an effective operational condition. Sediment disposal from site is to occur to the satisfaction of Townsville City Council. Defects in erosion and sediment control devices, such as sediment fences, are to be inspected and documented. Upon Inspection, the Contractor is to determine whether the device should be replaced or repaired. Documentation is to include how the damage was caused and what measures can be implemented to reduce the possibility of repeat occurrences. Any damage to either permanent or temporary water quality control structures or devices is to be immediately rectified at the contractor's expense.

The effectiveness of the erosion and sediment control devices can be monitored by visual audits. All ESC measures are to be inspected:

- at least daily (when work is occurring on site) or weekly (when work is not occurring on site).
- within 24 hours of expected rain; and
- within 18 hours of a rainfall event (i.e. an event of sufficient intensity and duration to mobilise sediment on site).

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Drainage paths are to be inspected to ensure the sediment fences are not being bypassed as a result of soil erosion.

Sediment laden runoff shall be prevented from entering neighbouring properties. This shall be achieved by landscaping disturbed areas immediately and prior to a rainfall event.

The proposed development has scored a '28' on the IECA erosion hazard assessment form with no trigger score values exceeded (refer Appendix A for details). Further details of proposed on site erosion and sediment control measures will be required at the detailed design phase of the development.

4.3.3 Maintenance and Monitoring Requirements

Periodic maintenance and monitoring of stormwater devices proposed in this report is crucial to ensure effective operation and design life.

Inspect field inlet grates, pits and underground pipes for blockage or damage at least 6 monthly or after significant rainfall event. The filter baskets shall be inspected and maintained preferably by the manufacturer to avoid damage to units and to ensure adequate cleaning and record keeping. For the first 12 months routine inspections of filter baskets shall be carried out monthly with routine clean out at alternate months. Results of the initial 12 months maintenance program shall be used to determine future maintenance intervals. Refer manufactures maintenance and monitoring methodology for specific details.

Maintenance of ESC measures must occur in accordance with Table 7.

Table 7 - ESC maintenance requirements

ESC Measure	Maintenance Trigger	Timeframe for Completion of Maintenance
Sediment basins	When settled sediment exceeds the volume of the sediment storage zone	Within 7 days of the inspection.
Other ESC measures	The capacity of ESC measures falls below 75%.	By the end of the day.

Sediment accumulation on ESC devices is to be removed and disposed of to the satisfaction of Townsville City Council.

5 CONCLUSION

This SWMP outlines how stormwater runoff from the site will be managed in order to not adversely impact the receiving environment.

The proposed lawful point of discharge for the development shall be the existing mapped waterways. New on-site stormwater infrastructure shall be constructed to collect stormwater runoff and direct it to the lawful point of discharge. Stormwater detention is not considered to be required for the proposed development as the overland flow analysis has determined no adverse impacts off site as a result of the development.

Stormwater treatment is proposed to be managed on-site to achieve the water quality objectives through primary treatment from filter basket inserts into the field inlets on the road and tertiary treatment from ATLAN filter cartridges in the treatment tanks. MUSIC modelling has been undertaken to demonstrate runoff from the development site achieves the water quality pollution load reduction targets of the State Planning Policy.

Further refinement of the proposed stormwater management measures is recommended at the detailed design phase.

By implementing the proposed stormwater management system, and providing adequate maintenance, the downstream environment and neighbouring properties will not experience any adverse deterioration of water quality due to the proposed development

6 APPENDICES

Appendix A – Erosion Hazard Assessment

Erosion Hazard Assessment Form

Condition	Points	Score	Trigger value
AVERAGE SLOPE OF DISTURBANCE AREA [1] • not more than 3% [3% . 33H:1V] • more than 3% but not more than 5% [5% = 20H:1V] • more than 5% but not more than 10% [10% = 10H:1V] • more than 10% but not more than 15% [15% . 6.7H:1V] • more than 15%	0 1 2 4 6	**0**	**4**
SOIL CLASSIFICATION GROUP (AS1726) [2] • GW, GP, GM, GC • SW, SP, OL, OH • SM, SC, MH, CH • ML, CL, or if *imported fill* is used, or if soils are untested	0 1 2 3	**3**	
EMERSON (DISPERSION) CLASS NUMBER [3] • Class 4, 6, 7, or 8 • Class 5 • Class 3, (default value if soils are untested) • Class 1 or 2	0 2 4 6	**4**	**6**
DURATION OF SOIL DISTURBANCE [4] • not more than 1 month • more than 1 month but not more than 4 months • more than 4 months but not more than 6 months • more than 6 months	0 2 4 6	**6**	**6**
AREA OF DISTURBANCE [5] • not more than 1000 m^2 • more than 1000 m^2 but not more than 5000 m^2 • more than 5000 m^2 but not more than 1 ha • more than 1 ha but not more than 4 ha • more than 4 ha	0 1 2 4 6	**6**	**4**
WATERWAY DISTURBANCE [6] • No disturbance to a watercourse, open drain or channel • Involves disturbance to a constructed open drain or channel • Involves disturbance to a natural watercourse	0 1 2	**1**	**2**
REHABILITATION METHOD [7] Percentage of area (relative to total disturbance) revegetated by seeding without light mulching (i.e. worst-case revegetation method). • not more than 1% • more than 1% but not more than 5% • more than 5% but not more than 10% • more than 10%	0 1 2 4	**0**	
RECEIVING WATERS [8] • Saline waters only • Freshwater body (e.g. creek or freshwater lake or river)	0 2	**2**	
SUBSOIL EXPOSURE [9] • No subsoil exposure except of service trenches • Subsoils are likely to be exposed	0 2	**2**	
EXTERNAL CATCHMENTS [10] • No external catchment • External catchment diverted around the soil disturbance • External catchment not diverted around the soil disturbance	0 1 2	**1**	
ROAD CONSTRUCTION [11] • No road construction • Involves road construction works	0 2	**2**	
pH OF SOILS TO BE REVEGETATED [12] • more than pH 5.5 but less than pH 8 • other pH values, or if soils are untested	0 1	**1**	
Total Score [13]		**28**	

Explanatory notes

Requirements: Specific issues or actions required by the proponent.

Warnings: Issues that should be considered by the proponent.

Comments: General information relating to the topic.

[1] **REQUIREMENTS:**

For sites with an average slope of proposed land disturbance greater than 10%, a preliminary ESCP must be submitted to the regulatory authority for approval during planning negotiations.

Proponents must demonstrate that adequate erosion and sediment control measures can be implemented on-site to effectively protect downstream environmental values.

If site or financial constraints suggest that it is not reasonable or practicable for the prescribed water quality objectives to be achieved for the proposal, then the proponent must demonstrate that alternative designs or construction techniques (e.g. pole homes, suspended slab) cannot reasonably be implemented on the site.

WARNINGS:

Steep sites usually require more stringent drainage and erosion controls than flatter grade sites.

COMMENTS:

The steeper the land, the greater the need for adequate drainage controls to prevent soil and mulch from being washed from the site.

[2] **REQUIREMENTS:**

If the actual soil K-factor is known from soil testing, then the Score shall be determined from Table 1.

If a preliminary ESCP is required during planning negotiations, then it must be demonstrated that adequate space is available for the construction and operation of any major sediment traps, including the provision for any sediment basins and their associated embankments and spillways. It must also be demonstrated that all reasonable and practicable measures can be taken to divert the maximum quantity of sediment-laden runoff (up to the specified design storm) to these sediment traps throughout the construction phase and until the contributing catchment is adequately stabilised against erosion.

WARNINGS:

The higher the point score, the greater the need to protect the soil from raindrop impact and thus the greater the need for effective erosion control measures. A point score of 2 or greater will require a greater emphasis to be placed on revegetation techniques that do not expose the soil to direct rainfall contact during vegetation establishment, e.g. turfing and *Hydromulching*.

COMMENTS:

Table 2 provides an *indication* of soil conditions likely to be associated with a particular Soil group based on a statistical analysis of soil testing across NSW. This table provides only an initial estimate of the likely soil conditions.

The left-hand-side of the table provides an indication of the type of sediment basin that will be required (Type C, F or D). The right-hand-side of the table provides an indication of the likely erodibility of the soil based on the Revised Universal Soil Loss Equation (RUSLE) K-factor.

Table 3 provides some general comments on the erosion potential of the various soil groups.

Table 1 – Score if soil K-factor is known

	RUSLE soil erodibility K-factor			
	K < 0.02	0.02<K<0.04	0.04<K<0.06	K > 0.06
Score	0	1	2	3

Table 2 – Statistical analysis of NSW soil data [1]

Unified Soil Class System	Likely sediment basin classification (%)			Probable soil erodibility K-factor (%) [2]			
	Dry	Wet		Low	Moderate	High	Very High
	Type C	Type F	Type D	K < 0.02	0.02<K<0.04	0.04<K<0.06	K > 0.06
GM	30	**58**	12	12	**51**	26	12
GC	**42**	33	25	13	**71**	17	0
SW	40	**48**	12	**49**	39	12	0
SP	**53**	32	15	**76**	18	5	1
SM	21	**67**	12	26	**48**	25	1
SC	26	**50**	24	16	**64**	18	2
ML	5	**63**	32	4	35	**45**	16
CL	9	**51**	39	12	**56**	19	13
OL	2	**80**	18	34	**61**	5	1
MH	12	41	**48**	15	19	**41**	25
CH	5	44	**51**	39	**43**	11	7

Notes: [1] Analysis of soil data presented in Landcom (2004).
[2] Soil erodibility based on Revised Universal Soil Loss Equation (RUSLE) K-factor.

Unified Soil Classification System (USCS)

GW Well graded gravels, gravel-sand mixtures, little or no fines
GP Poorly graded gravels, gravel-sand mixture, little or no fines
GM Silty gravels, poorly graded gravel-sand-silt mixtures
GC Clayey gravels, poorly graded gravel-sand-clay mixtures
SW Well graded sands, gravelly sands, little or no fines
SP Poorly graded sands, gravelly sands, little or no fines
SM Silty sands, poorly graded sand-silt mixtures
SC Clayey sands, poorly graded sand-clay mixtures
ML Inorganic silts & very fine sands, rock flour, silty or clayey fine sands with slight plasticity
CL Inorganic clays, low–medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
OL Organic silts and organic silt-clays of low plasticity
MH Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
CH Inorganic clays of high plasticity, fat clays
OH Organic clays of medium to high plasticity

Table 3 – Typical properties of various soil groups [1]

Soil Groups	Typical properties [2]
GW, GP	• Low erodibility potential.
GM, GC	• Low to medium erodibility potential. • May create turbid runoff if disturbed as a result of the release of silt and clay particles.
SW, SP	• Low to medium erodibility potential.
SM, SC	• Medium erodibility potential. • May create turbid runoff if disturbed as a result of the release of silt and clay particles.
MH, CH	• Highly variable (low to high) erodibility potential. • Will generally create turbid runoff if disturbed.
ML, CL	• High erodibility potential. • Tendency to be dispersive. • May create some turbidity in runoff if disturbed.

Note: [1] After Soil Services & NSW DLWC (1998).
[2] Any soil can represent a high erosion risk if the binding clays or silts are unstable.

Table 4 provides **general** guidelines on the suitability of various soil groups to various engineering applications.

Table 4 – Engineering suitability based on Unified Soil Classification [1]

Unified Soil Class	USC Group	Embankments		Fill	Slope stability	Untreated roads
		Water retaining	Non water retaining			
Well graded gravels	GW	Unsuitable	Excellent	Excellent	Excellent	Average
Poorly graded gravel	GP	Unsuitable	Average	Excellent	Average	Unsuitable
Silty gravels	GM	Unsuitable	Average	Good	Average	Average
Clayey gravels	GC	Suitable	Average	Good	Average	Excellent
Well graded sands	SW	Unsuitable	Excellent	Excellent	Excellent	Average
Poorly graded sands	SP	Unsuitable	Average	Good	Average	Unsuitable
Silty sands	SM	Suitable [2]	Average	Average	Average	Poor
Clayey sands	SC	Suitable	Average	Average	Average	Good
Inorganic silts	ML	Unsuitable	Poor	Average	Poor	Unsuitable
Inorganic clays	CL	Suitable [2]	Good	Average	Good	Poor
Organic silts	OL	Unsuitable	Unsuitable	Poor	Unsuitable	Unsuitable
Inorganic silts	MH	Unsuitable	Poor	Poor	Poor	Unsuitable
Inorganic clays	CH	Suitable [2]	Average	Unsuitable	Average	Unsuitable
Organic clays	OH	Unsuitable	Unsuitable	Unsuitable	Unsuitable	Unsuitable
Highly organic soils	Pt	Unsuitable	Unsuitable	Unsuitable	Unsuitable	Unsuitable

Notes: [1] Modified from Hazelton & Murphy (1992)
[2] Suitable only after modifications to soil such as compaction and/or erosion protection

[3] If the soils have not been tested for Emerson Class, then adopt a score of 4.

REQUIREMENTS:
Works proposed on sites containing Emerson Class 1 or 2 soils have a very high pollution potential and must submit a conceptual ESCP to the regulatory authority for review and/or approval (as required by the authority) during planning negotiations.

WARNINGS:
Class 3 and 5 soils disturbed by cut and fill operations or construction traffic are highly likely to discolour stormwater (i.e. cause turbid runoff). Chemical stabilisation will likely be required if these soils are placed immediately adjacent to a retaining wall. Any disturbed Class 1, 2, 3 and 5 soils that are to be revegetated must be covered with a non-dispersive topsoil as soon as possible (unless otherwise agreed by the regulatory authority).

Class 1 and 2 soils are highly likely to discolour (pollute) stormwater if exposed to rainfall or flowing water. Treatment of these soils with gypsum (or other suitable substance) will most likely be required. These soils should not be placed directly behind a retaining wall unless it has been adequately treated (stabilised) or covered with a non-dispersible soil.

[4] The duration of disturbance refers to the total duration of soil exposure to rainfall up until a time when there is at least 70% coverage of all areas of soil.

REQUIREMENTS:
All land developments with an expected soil disturbance period greater than 6 months must submit a conceptual ESCP to the regulatory authority for review and/or approval (as required by the authority) during planning negotiations.

COMMENTS:
Construction periods greater than 3 months will generally experience at least some significant storm events, independent of the time of year that the construction (soil disturbance) occurs.

[5] **REQUIREMENTS:**
Development proposals with an expected soil disturbance in excess of 1ha must submit a conceptual ESCP to the regulatory authority for review and/or approval (as required by the regulatory authority) during planning negotiations.

The area of disturbance refers to the total area of soil exposed to rainfall or dust-producing winds either as a result of:

(a) the removal of ground cover vegetation, mulch or sealed surfaces;
(b) past land management practices;
(c) natural conditions.

WARNINGS:
A *Sediment Basin* will usually be required if the disturbed area exceeds 0.25ha ($2500m^2$) within any sub-catchment (i.e. land flowing to one outlet point).

COMMENTS:
For soil disturbances greater than 0.25ha, the revegetation phase should be staged to minimise the duration for which soils are exposed to wind, rain and concentrated runoff.

[6] **REQUIREMENTS:**
All developments that involve earthworks or construction within a natural watercourse (whether that watercourse is in a natural or modified condition) must submit a conceptual ESCP to the regulatory authority for review and/or approval (as required by the regulatory authority) during planning negotiations.

Permits and/or licences may be required from the State Government, including possible submission of the ESCP to the relevant Government department.

[7] **REQUIREMENTS:**
No areas of soil disturbance shall be left exposed to rainfall or dust-producing winds at the end of a development without an adequate degree of protection and/or an appropriate action plan for the establishment of at least 70% cover.

COMMENTS:
Grass seeding without the application of a light mulch cover is considered the least favourable revegetation technique. A light mulch cover is required to protect the soil from raindrop impact, excessive temperature fluctuations, and the loss of essential soil moisture.

[8] **COMMENTS:**
All receiving waters can be adversely affected by unnatural quantities of sediment-laden runoff. Freshwater ecosystems are generally more susceptible to ecological harm resulting from the inflow of fine or dispersible clays than saline water bodies. The further inland a land disturbance is, the greater the potential for the released sediment to cause environmental harm as this sediment travels towards the coast.

For the purpose of this clause it is assumed that all sediment-laden runoff will eventually flow into saline waters. Thus, sediment-laden discharges that flow first into freshwater are likely to adversely affect both fresh and saline water bodies and are therefore considered potentially more damaging to the environment.

This clause does **not** imply that sediment-laden runoff will not cause harm to saline waters.

[9] **COMMENTS:**
This clause refers to subsoils exposed during the construction phase either as a result of past land practices or proposed construction activities. The exposure of subsoils resulting from the excavation of minor service trenches should not be considered.

[10] **WARNINGS:**
The greater the extent of external catchment, the greater the need to divert up-slope stormwater runoff around any soil disturbance.

COMMENTS:
The ability to separate “clean” (i.e. external catchment) stormwater runoff from “dirty” site runoff can have a significant effect on the size, efficiency and cost of the temporary drainage, erosion, and sediment control measures.

[11] **REQUIREMENTS:**
Permission must be obtained from the owner of a road reserve before placing any erosion and sediment control measures within the road reserve.

WARNINGS:
Few sediment control techniques work efficiently when placed on a road and/or around roadside stormwater inlets. Great care must be taken if sediment control measures are located on a public roadway, specifically:

- safety issues relating to road users;
- the risk of causing flooding on the road or within private property.

The construction of roads (whether temporary or permanent) will usually modify the flow path of stormwater runoff. This can affect how "dirty" site runoff is directed to the sediment control measures.

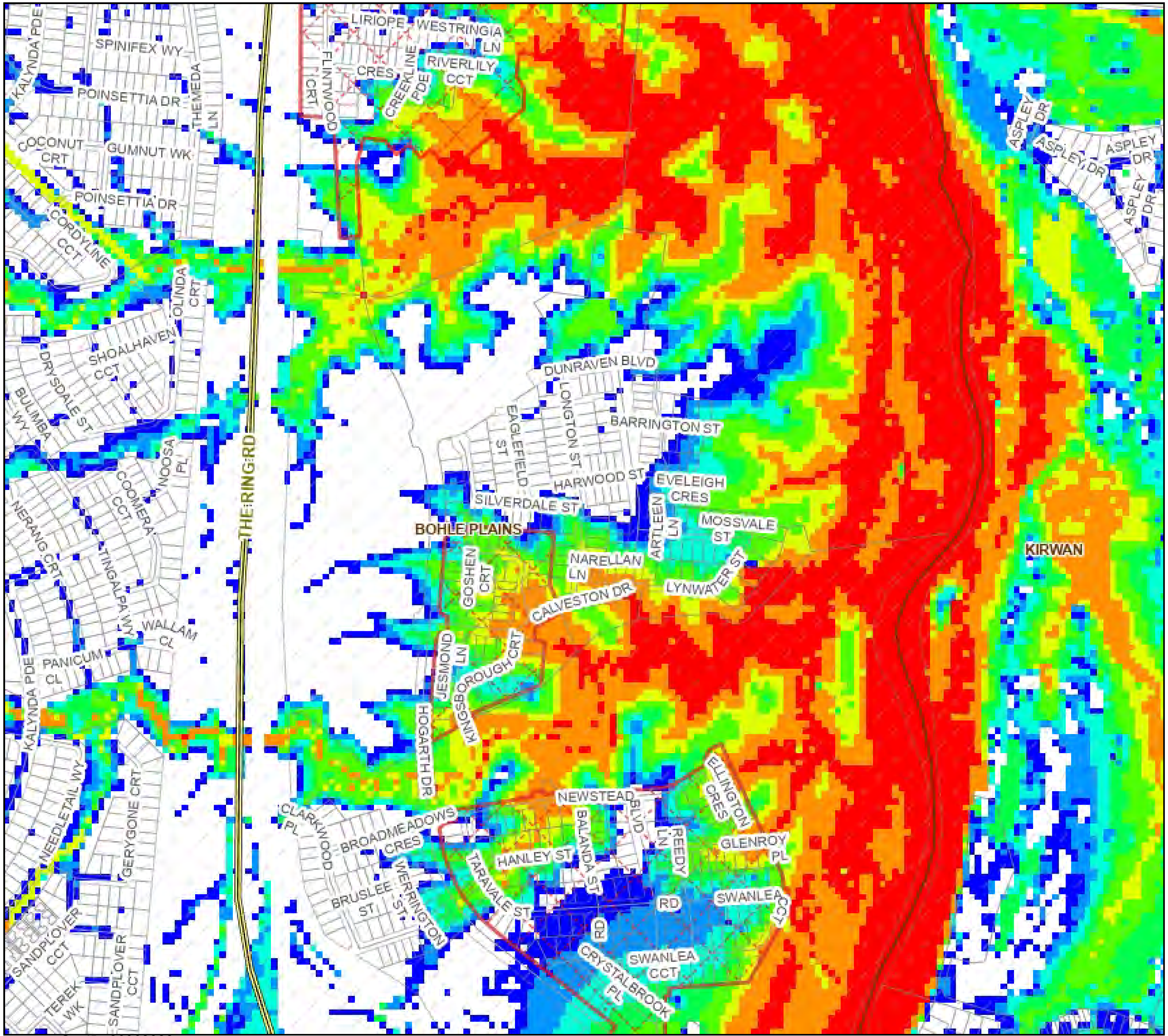
COMMENTS:
"On-road" sediment control devices are at best viewed as secondary or supplementary sediment control measures. Only in special cases and/or on very small projects (e.g. kerb and channel replacement) might these controls be considered as the "primary" sediment control measure.

[12] **WARNINGS:**
Soils with a pH less than 5.5 or greater than 8 will usually require treatment in order to achieve satisfactory revegetation. Soils with a pH of less than 5 (whether naturally acidic or in acid sulfate soil areas) may also limit the choice of chemical flocculants (e.g. Alum) for use in the flocculation of *Sediment Basins*.

[13] **REQUIREMENTS:**
A preliminary ESCP must be submitted to the local government for approval during the planning phase for any development that obtains a total point score of 17 or greater or when any trigger value is scored or exceeded.

Appendix B – Townsville City Council Flood Overlay

Flooding Layout



Legend

- Properties
- Suburbs

FLOOD STUDY AREAS

- November 2014 to Present

WATER HEIGHT (1:250 - 1:5000)

- 2% AEP Height
- 1% AEP Height

1% AEP & 2% AEP DEPTH (1:250 - 1:5,000)

- Water Depth: 0.01 - 0.3m
- Water Depth: 0.3 - 0.5m
- Water Depth: 0.5 - 0.75m
- Water Depth: 0.75 - 1.0m
- Water Depth: 1.0 - 1.5m
- Water Depth: 1.5 - 2.0m
- Water Depth: 2.0 - 3.0m
- Water Depth: 3.0 - 25.0m

0 101.6 203.20

Meters

Date: 23/7/2024 12:31 PM

Scale 1: 8,000

DISCLAIMER: The information shown on this map has been produced from the Townsville City Council's digital database. There is no warranty implied or expressed regarding the accuracy or completeness of the data. The data has been compiled for information and convenience only, and it is the responsibility of the user to verify all information before placing reliance on it. For accurate service locations please contact the Customer Service Centre on 13 48 01. This is not a legal document and is published for information and convenience only. The Townsville City Council takes no responsibility for any errors or omissions herein or for any acts that may occur due to its use.

DISCLAIMER: Visible Scale - 1: 250 - 1 :5,000. The flooding contained in this map does not in itself indicate whether any particular property has or has not been affected by floods. The flooding information depicted shows inundation resulting from rainfall of river flows resulting from rainfall and does not include inundation due to Storm Tide. The council considers that the information presented in the map is the best available at the time of preparation. However the modelling results contained in this map are based upon projections, assumptions and analys is about circumstances that may not eventuate, or may eventuate in different combinations and with different outcomes. Because of that, the information in the map is not provided with the intention that persons will rely upon its accuracy or completeness for the purpose of making decisions with financial or legal implications. Neither the council nor its officers will be liable in contract, negligence or otherwise for the consequences of any deficiency, inaccuracy or error in the map or for the consequences of any person relying upon the map. The Flood Study Areas layer indicates the date of the flood study that has generated the flood map data. Infrastructure constructed since the completion of a flood study has the potential to alter flood levels and extents to those shown.

City of Townsville

Appendix C – Preliminary Engineering Plans

PROPOSED RETIREMENT LIVING DEVELOPMENT

99 HOGARTH DRIVE, BOHLE PLAINS

RUBY DEVELOPMENTS PTY LTD

Project Number: S24-020

INDEX OF DRAWINGS

LOCALITY PLAN
NOT TO SCALE

DESIGNED S.C.M	
DRAWN J.J.D	
CHECKED J.M.H	
APPROVED J.M.H	
DATE JULY 2024	For and on behalf of WESTERA PARTNERS PTY. LTD.
DOCUMENT CONTROL	APPROVED

No.	DATE	REVISIONS	DES	DRN	CHK	APD

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SURVEYOR
BRAZIER MOTTI
PHONE 07 4772 1144
DATUM A.H.D.
PSM 95569
R.L. 17.143

PROJECT	PROPOSED RETIREMENT LIVING DEVELOPMENT
LOCATION	LOT 1002 ON SP340654 99 HOGARTH DRIVE, BOHLE PLAINS
TITLE	COVER SHEET
CLIENT	RUBY DEVELOPMENTS PTY LTD

DRAWING STATUS	PRELIMINARY N.F.C.
DRAWING NUMBER	S24-020-PG01
SHEET NUMBER	01 OF 01
REVISION	

GENERAL NOTES

G1 WESTERA PARTNERS HAS LIMITED CONTROL OR INPUT TO LOCAL GOVERNMENT OR OTHER LEGISLATED APPROVALS UNLESS SPECIFICALLY ENGAGED BY IT'S CLIENT. ANY CHANGES TO APPROVAL REQUIREMENTS (INCLUDING ORDERS FOR SUSPENSION OF WORKS ETC) SHOULD BE COMMUNICATED TO WESTERA PARTNERS AND ALL OTHER RELEVANT DESIGNERS TO ALLOW ASSESSMENT OF POTENTIAL RISKS AND ENSURE DESIGN AND SAFETY COMPLIANCE.

G2 ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LOCAL AUTHORITIES STANDARD DRAWINGS & SPECIFICATIONS AND COMPLETED TO THE SATISFACTION OF THE SUPERINTENDENT AND LOCAL AUTHORITY.

G3 UNLESS SPECIFIED OTHERWISE ALL MATERIALS AND WORK SHALL COMPLY WITH THE RELEVANT AUSTRALIAN STANDARDS.

G4 PRIOR TO THE COMMENCEMENT OF CONSTRUCTION THE CONTRACTOR MUST LOCATE ALL EXISTING SERVICES AND PROMPTLY PROVIDE THE LOCATION DATA TO THE DESIGN ENGINEER TO ASSESS IMPACTS ON THE DESIGN.

G5 ALL CONNECTIONS TO EXISTING SEWERS AND WATER MAINS ARE TO BE CONSTRUCTED BY THE LOCAL AUTHORITY OR AN APPROVED CONTRACTOR. THE CONTRACTOR IS TO ALLOW IN HIS CONTRACT SUM FOR THE COST OF ANY PROPOSED CONNECTIONS.

G6 ALL SEWERS ARE TO BE 150MM DIA. U.P.V.C. CLASS SN8 RUBBER RING JOINTED AND PROPERTY CONNECTIONS ARE TO BE 100MM DIA. U.P.V.C CLASS SN6 UNLESS NOTED OTHERWISE

G7 THE PAVEMENT DEPTHS SHOWN ARE PRELIMINARY ONLY AND ARE TO BE VERIFIED FOLLOWING SUB-SOIL TESTS OF THE SUB-GRADE MATERIAL.

G8 ALL ROOFWATER CONNECTIONS FROM KERB ADAPTERS ARE TO BE 100MM DIA CLASS SN10 AT A MIN GRADE OF 1.0% UNLESS SHOWN OTHERWISE. ROOFWATER CONNECTIONS FROM FIELD INLETS OR GULLY PITS ARE TO BE 150MM DIA CLASS SN8 AT A MIN GRADE OF 1.0% UNLESS NOTED OTHERWISE.

G9 ALL U.P.V.C. STORMWATER DRAINAGE PIPES ARE TO BE CLASS SN8 (U.N.O.)

ALL R.C. PIPES ARE TO BE CLASS 3 (U.N.O.)
< 900ø = USE SPIGOT AND SOCKET PIPES WITH RUBBER RING JOINTS
900ø < PIPES < 1050ø = USE FLUSH JOINTED PIPES WITH EXTERNAL ELASTOMERIC BAND
1050ø < PIPES = USE FLUSH JOINTED PIPES WITH EXTERNAL ELASTOMERIC BAND AND INTERNAL CEMENT MORTAR JOINT

ALL F.R.C. PIPES ARE TO BE FRCPIPE+ CLASS 4 (U.N.O.) AND SHALL BE DUAL RUBBER RING JOINT WITH COLLAR. PIPES SHALL BE FROM 225ø TO 600ø ONLY.

POLYPROPYLENE/POLYETHYLENE STORMWATER PIPE MINIMUM CLASS SN8 (U.N.O.) SUBJECT TO ACCEPTANCE BY CERTIFYING ENGINEER AND LOCAL AUTHORITY. CONSTRUCTION AND EMBEDMENT TO BE IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS.

G10 WATER PIPES SHALL BE;
- P.V.C.-M WATER PIPES ARE TO BE SERIES 2 PN16 SN10 R.R.J.
- D.I.C.L. WATER PIPES ARE TO BE PN35 WITH ALL FITTINGS TO BE FUSION BONDED POLYMERIC COATED.
- PE WATER PIPES ARE TO BE PN16 SDR11 PE100. DN25 AND DN32 WATER SERVICES SHALL BE PE80B.

G11 ALL "AS CONSTRUCTED" INFORMATION IS TO BE RECORDED AS REQUIRED BY THE LOCAL AUTHORITY AND SUBMITTED TO THE SUPERINTENDENT IMMEDIATELY AFTER COMPLETION OF THE WORKS.

G12 ALL ALLOTMENTS ARE TO BE GRADED AT A MINIMUM GRADE OF 1 IN 200.

CONCRETE NOTES

C1 ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3600 CONCRETE STRUCTURES CODE AND THE REFERENCED STANDARDS THEREIN.

C2 THE CONCRETE STRENGTH GRADE AND THE COVER TO REINFORCEMENT FOR THE VARIOUS CONCRETE ELEMENTS SHALL BE AS LISTED BELOW:
- CLIMATE ZONE: ~~TROPICAL~~ TEMPERATE ~~ARID~~
- LOCATION: ~~COASTAL~~ NEAR COASTAL ~~INLAND~~

ELEMENT	EXPOSURE CLASSIFICATION	STRENGTH GRADE	MINIMUM COVER
MANHOLES	B1	N32	40
	C2	S50	65
FIELD INLET PITS	B1	N32	40
	C2	S50	65
HEADWALLS	B1	N32	40
	C2	S50	65
INTERNAL ROADS	B1	N32	40
KERB/CHANNEL	B1	N32	–
FOOTPATHS	B1	N32	40
RETAINING WALL PANELS	B1	N32	30*
	C2	S50	60*
BORED PIERS	B1	N32	40
	C2	S50	65

*RIGID FORMWORK & INTENSE COMPACTION

C3 CONCRETE TO HAVE A MAXIMUM AGGREGATE SIZE OF 20mm WITH 80mm MAXIMUM SLUMP, A WATER/CEMENT RATIO OF NOT GREATER THAN 0.65 AND A MAXIMUM FINAL BASIC DRYING SHRINKAGE STRAIN OF 800×10^{-6}, UNLESS APPROVED OTHERWISE.

C4 NO ADDITIVES SHALL BE ADDED OF APPLIED TO THE CONCRETE MIX WITHOUT THE APPROVAL OF THE ENGINEER.

C5 THE MAXIMUM PERMISSIBLE TRANSPORT TIME FOR CONCRETE BETWEEN BATCHING AND PLACEMENT ON SITE SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE.

AMBIENT AIR TEMPERATURE	MAX. BATCHING TO PLACEMENT TIME
10° – 24°C	120 MINUTES
25° – 27°C	90 MINUTES
28° – 30°C	60 MINUTES
31° – 33°C	45 MINUTES
34° – 36°C	30 MINUTES
37°C+	NO PLACEMENT OF CONCRETE UNLESS CHILLED WATER OR ICE IN MIX

C6 ALL CONCRETE SHALL BE MECHANICALLY VIBRATED. VIBRATORS SHALL NOT BE USED TO SPREAD CONCRETE.

C7 ALL CONCRETE SHALL BE SAMPLED AND TESTED IN ACCORDANCE WITH AS1379 ADOPTING THE PROJECT ASSESSMENT METHOD FOR COMPRESSIVE STRENGTH AND SLUMP COMPLIANCE. THE RESULTS OF ALL TESTS SHALL BE PROMPTLY SUBMITTED TO THE ENGINEER FOR REVIEW.

C8 WHEN THE AIR TEMPERATURE EXCEEDS 30°C, ALIPHATIC ALCOHOL SHALL BE APPLIED TO THE CONCRETE SURFACE OF SLABS IMMEDIATELY AFTER THE INITIAL SCREED AND AGAIN AFTER BULL FLOATING.

C9 CURING OF ALL CONCRETE SURFACES SHALL COMMENCE IMMEDIATELY AFTER COMPLETING CONCRETE FINISHING AND SHALL CONTINUE FOR 7 DAYS. CONTRACTOR TO CONFIRM METHOD OF CURING WITH ENGINEER PRIOR TO USE.

C10 SIZES OF CONCRETE ELEMENTS DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.

C11 BEAM DEPTHS ARE WRITTEN FIRST AND INCLUDE SLAB THICKNESS, IF ANY.

C12 NO HOLES, CHASES OR EMBEDDED ITEMS OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT PRIOR APPROVAL OF THE ENGINEER. CONDUITS, PIPES ETC. SHALL NOT BE PLACED IN THE COVER THICKNESS OF THE CONCRETE.

C13 WHERE SERVICE PIPES PENETRATE CONCRETE ELEMENTS, PROVISION SHOULD BE MADE TO ALLOW FOR MOVEMENT OF THE ELEMENT.

C14 FORMWORK SHALL BE DESIGNED, CONSTRUCTED AND STRIPPED IN ACCORDANCE WITH AS3610 FORMWORK CODE, UNLESS NOTED OTHERWISE ON THE DRAWINGS.

C15 REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND NOT NECESSARILY SHOWN IN TRUE PROJECTION OR SCALE.

C16 ALL REINFORCEMENT SHALL BE SECURELY SUPPORTED IN ITS CORRECT POSITION ON PLASTIC BAR CHAIRS, GENERALLY AT NOT GREATER THAN 800mm CENTRES IN BOTH DIRECTIONS.

C17 WELDING AND HEATING OF REINFORCEMENT SHALL NOT BE PERMITTED WITHOUT APPROVAL OF THE ENGINEER.

C18 ALL STEEL REINFORCEMENT IN CONCRETE ELEMENTS SHALL BE INSPECTED BY THE ENGINEER AND PASSED PRIOR TO POURING OF ANY CONCRETE.

C19 LAP REINFORCEMENT ONLY AT LOCATIONS SHOWN ON THE DRAWINGS OR AS APPROVED BY THE ENGINEER.

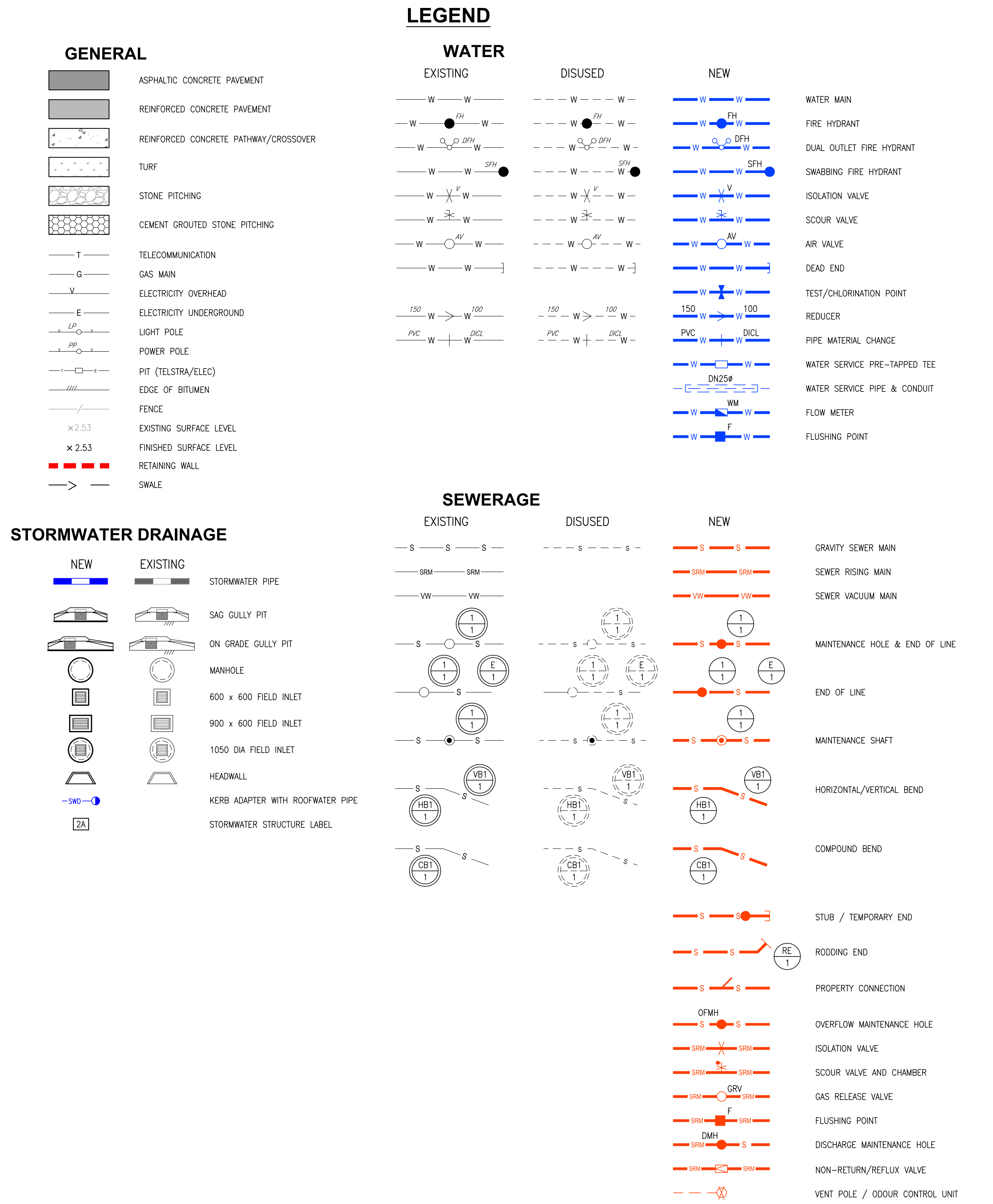
C20 SLAB FABRIC SHALL BE LAPPED ONE FULL PANEL OF FABRIC PLUS 50mm SO THAT THE TWO OUTERMOST TRANSVERSE WIRES OF ONE SHEET OVERLAP THE TWO OUTERMOST TRANSVERSE WIRES OF THE SHEET BEING LAPPED BY 50mm.

C21 BAR REINFORCEMENT SHALL BE LAPPED IN ACCORDANCE WITH THE FOLLOWING TABLE.

TYPICAL BAR REINFORCEMENT LAP LENGTHS		
BAR	LAP LENGTH UNO	HORIZONTAL BARS WITH GREATER THAN 300mm OF CONCRETE CAST BELOW THEM
N12	550	750
N16	800	1100
N20	1100	1400
N24	1250	1600
N28	1400	1800
N32	1600	2100
N36	2000	2500

WHERE LAPS ARE SHOWN ON THE DRAWINGS THE ABOVE LAP LENGTHS SHALL BE ADOPTED UNLESS NOTED OTHERWISE. WHERE BARS OF DIFFERENT DIAMETER ARE SHOWN LAPPED, ADOPT THE LAP LENGTH APPROPRIATE TO THE SMALLER DIAMETER BAR.

C22 A VAPOUR BARRIER OF 0.2mm (200um) MINIMUM THICK POLYTHENE SHEETING SHALL BE PLACED BENEATH SLABS ON GROUND UNLESS NOTED OTHERWISE.



No.	DATE	REVISIONS	DES	DRN	CHK	APD

DOCUMENT CONTROL
DESIGNED S.C.M
DRAWN J.J.D
CHECKED J.M.H
APPROVED J.M.H
DATE JULY 2024

APPROVED
For and on behalf of WESTERA PARTNERS PTY. LTD.

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BRAZIER MOTTI
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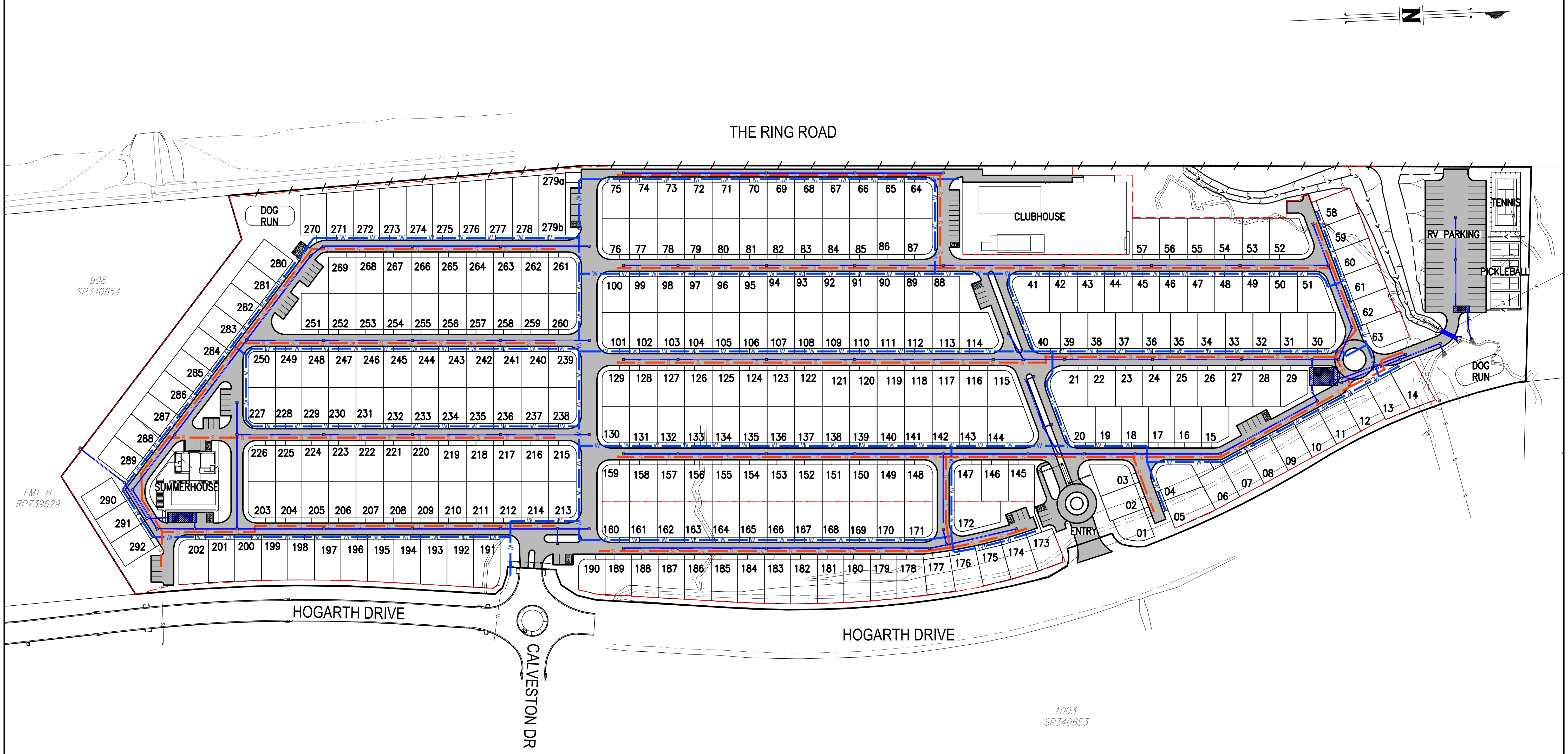
DATUM A.H.D.
PSM 95569
R.L. 17.143

PROJECT PROPOSED RETIREMENT LIVING DEVELOPMENT
LOCATION LOT 1002 ON SP340654
99 HOGARTH DRIVE, BOHLE PLAINS
TITLE CIVIL NOTES AND LEGEND
CLIENT RUBY DEVELOPMENTS PTY LTD

DRAWING STATUS PRELIMINARY N.F.C.
DRAWING NUMBER S24-020-PC01
SHEET NUMBER 01 OF 06
REVISION



SITE PLAN

SCALE 1:1000
(A1 SIZE)
0 10 20 30 40 50

No.	DATE	REVISIONS	DES	DRN	CHK	APD

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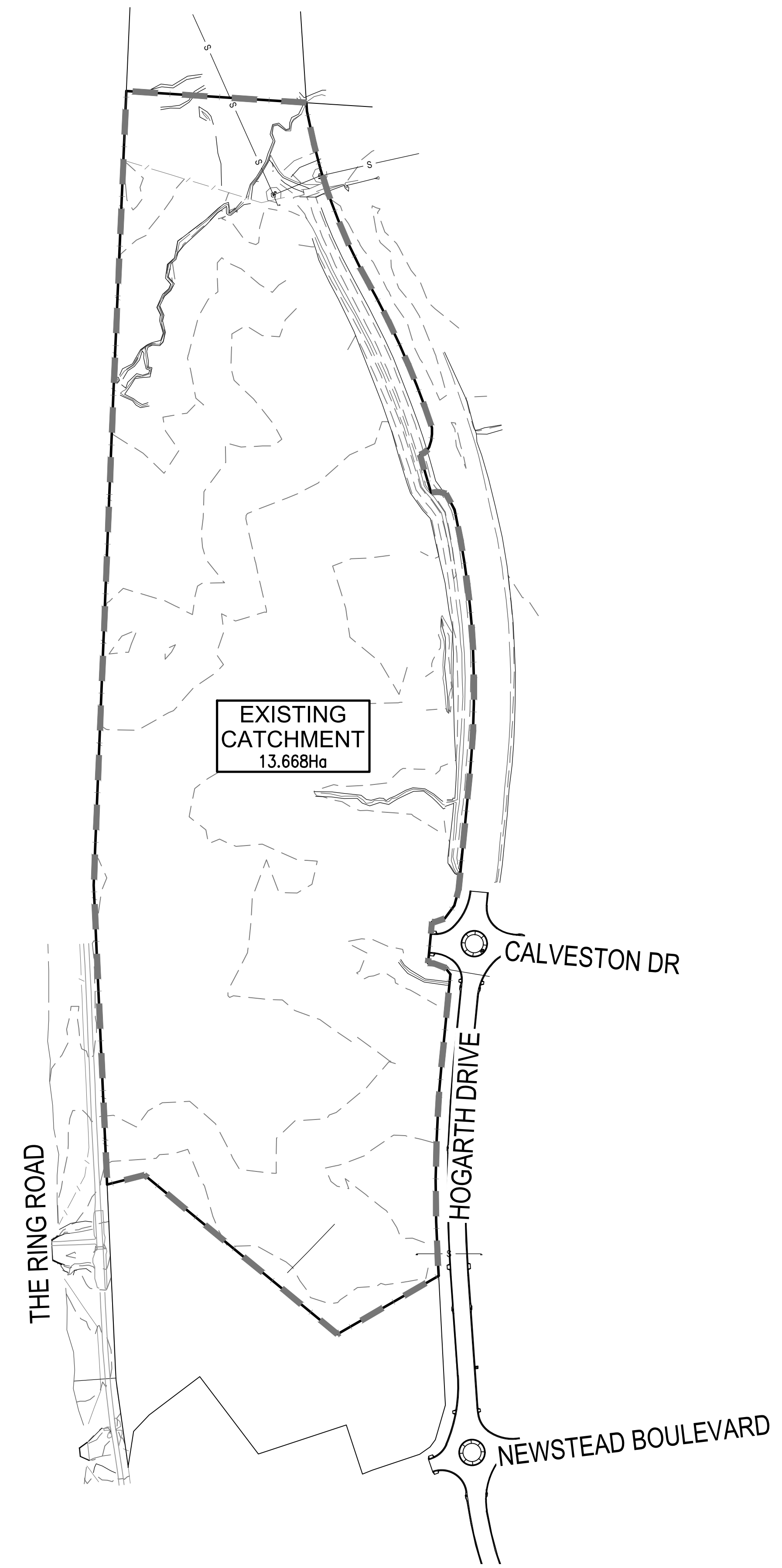
PROJECT PROPOSED RETIREMENT LIVING DEVELOPMENT
LOCATION LOT 1002 ON SP340654
99 HOGARTH DRIVE, BOHLE PLAINS
TITLE SITE PLAN
CLIENT RUBY DEVELOPMENTS PTY LTD

DRAWING STATUS PRELIMINARY N.F.C.
DRAWING NUMBER S24-020-PC02
SHEET NUMBER 02 OF 06
REVISION



EXISTING CATCHMENT PLAN

SCALE 1:2000
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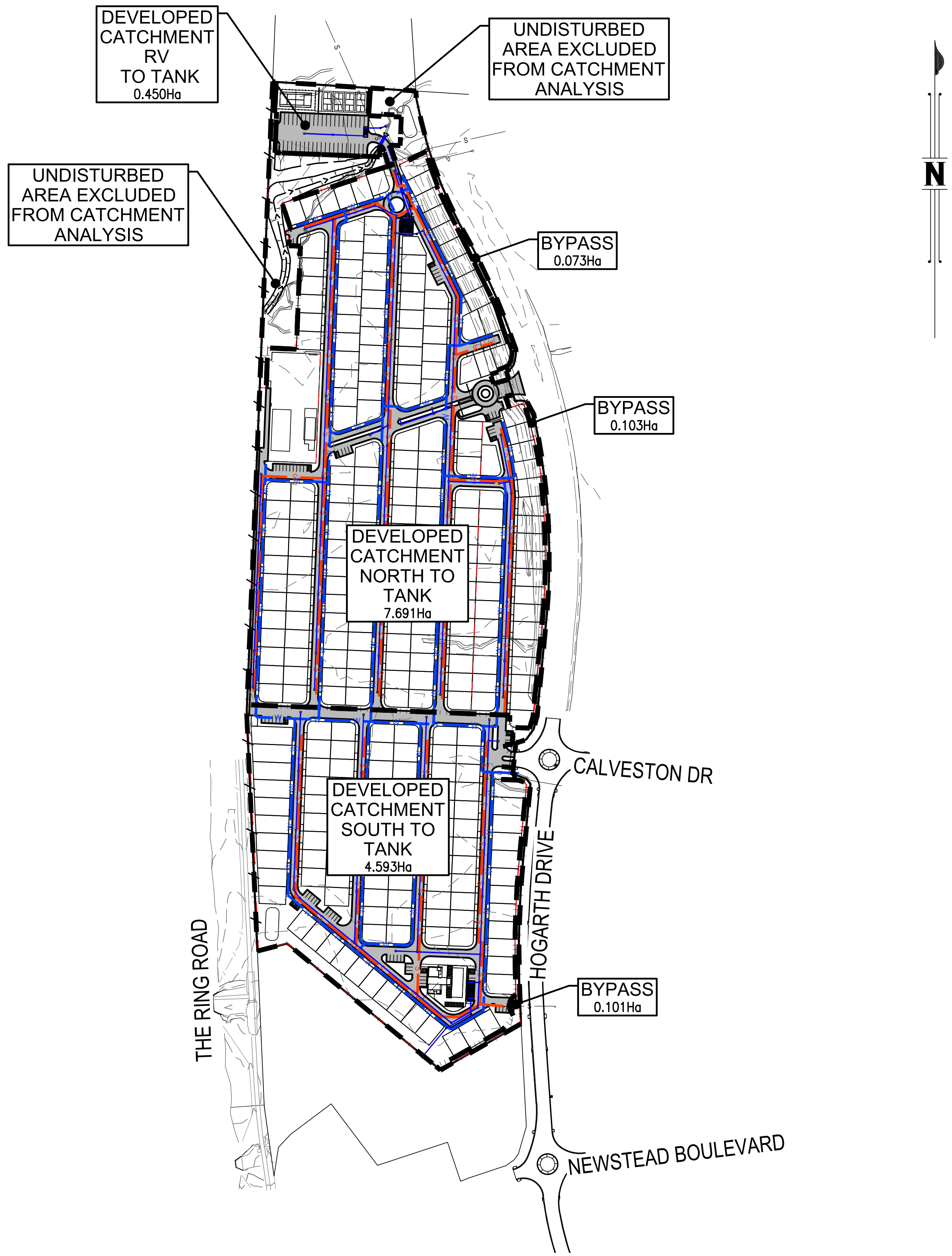

DEVELOPED CATCHMENT PLAN

SCALE 1:2000
(A1 SIZE)
0 20 40 60 80 100

No.	DATE	REVISIONS	DES	DRN	CHK	APD	DOCUMENT CONTROL	APPROVED
							DESIGNED S.C.M	
							DRAWN J.J.D	
							CHECKED J.M.H	
							APPROVED J.M.H	
							DATE JULY 2024	For and on behalf of WESTERA PARTNERS PTY. LTD.

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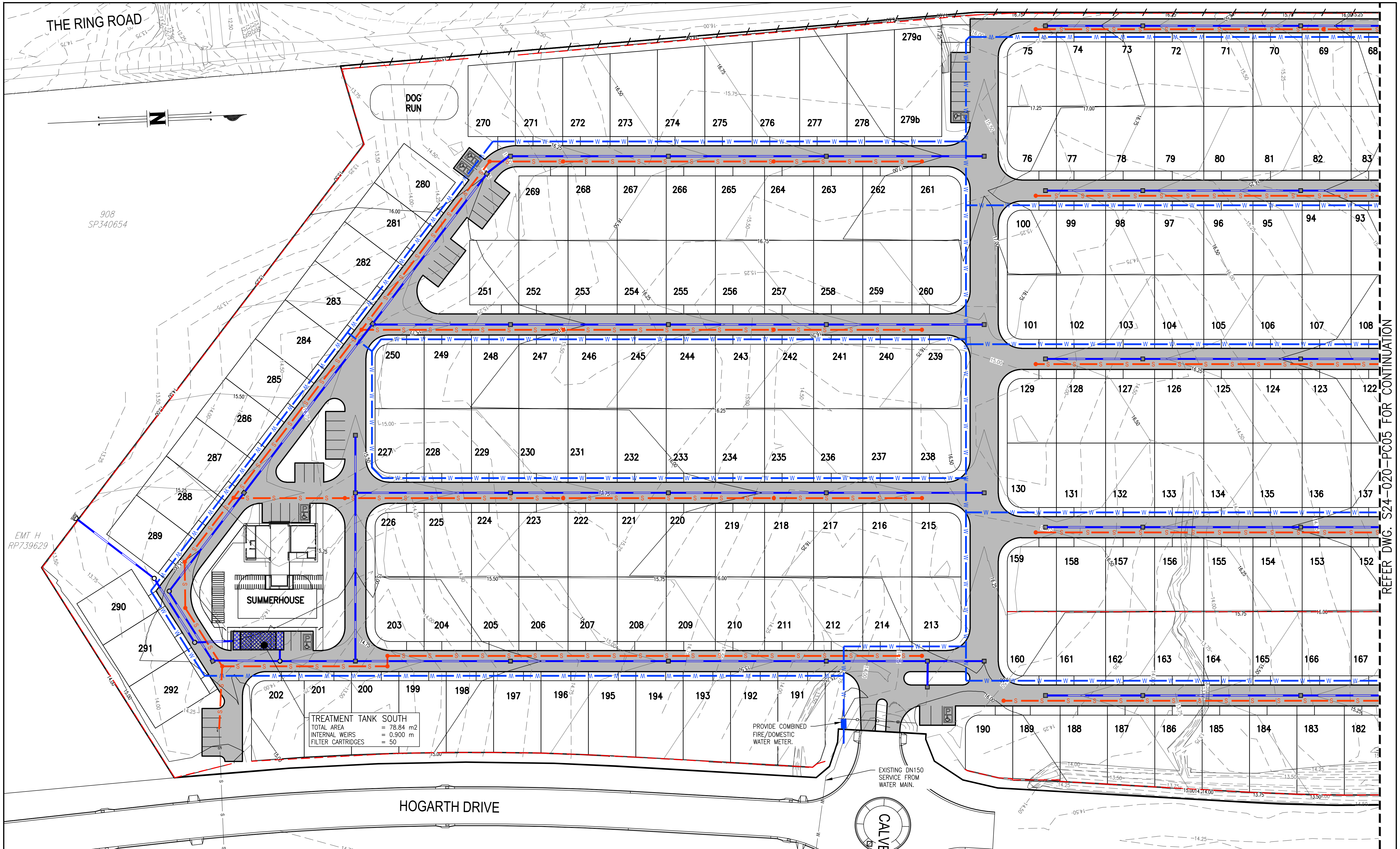
DATUM A.H.D.
PSM 95569
R.L. 17.143

PROJECT PROPOSED RETIREMENT LIVING DEVELOPMENT
LOCATION LOT 1002 ON SP340654
99 HOGARTH DRIVE, BOHLE PLAINS
TITLE CATCHMENT PLAN
CLIENT RUBY DEVELOPMENTS PTY LTD

DRAWING STATUS PRELIMINARY N.F.C.
DRAWING NUMBER S24-020-PC03
SHEET NUMBER 03 OF 06
REVISION



PRELIMINARY SERVICES PLAN

SCALE 1:500 (A1 SIZE)
0 5 10 15 20 25

No.	DATE	REVISIONS	DES	DRN	CHK	APD

DOCUMENT CONTROL	
DESIGNED	S.C.M
DRAWN	J.J.D
CHECKED	J.M.H
APPROVED	J.M.H
DATE	JULY 2024

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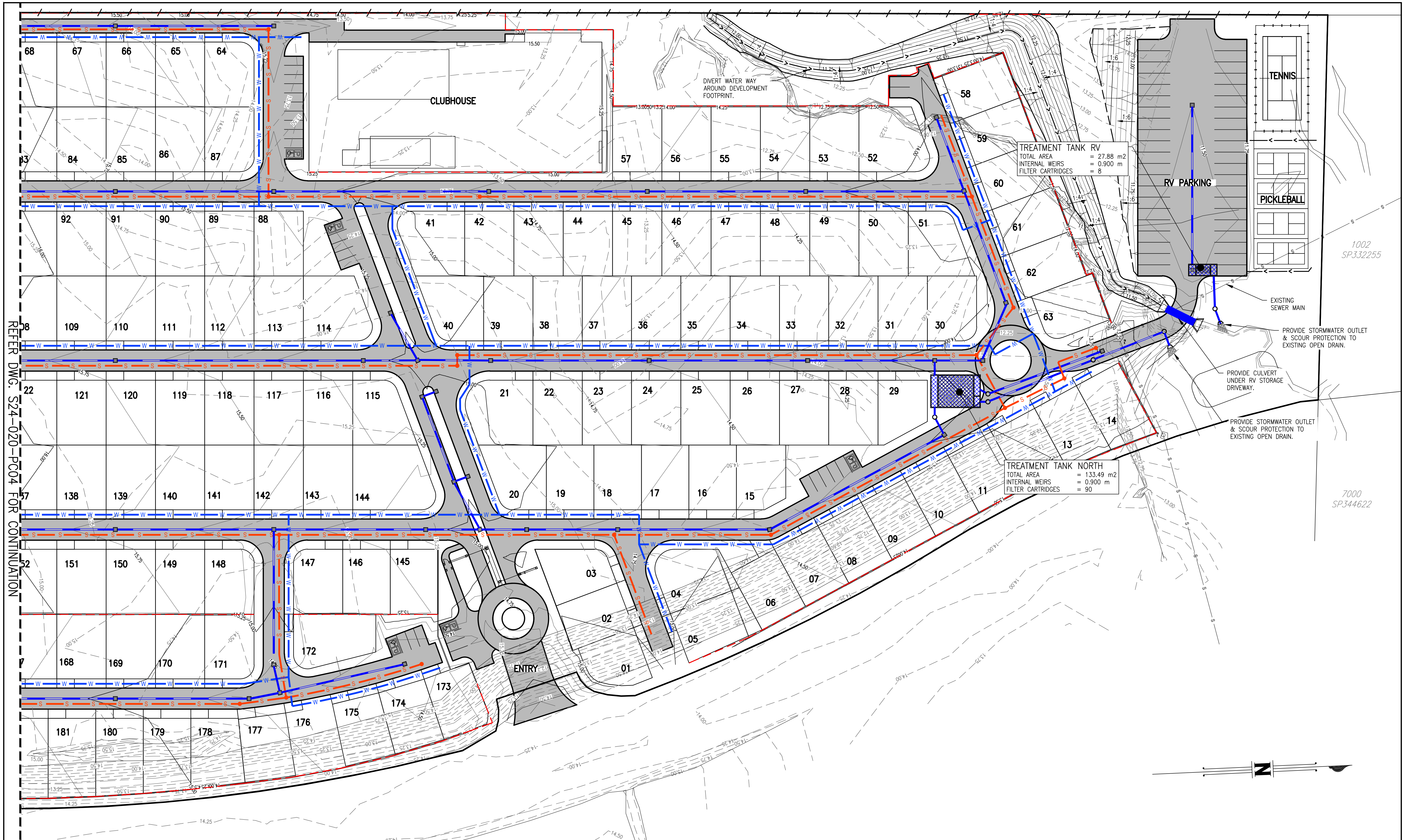
PSM 95569
R.L. 17.143

PROJECT: PROPOSED RETIREMENT LIVING DEVELOPMENT
LOCATION: LOT 1002 ON SP340654, 99 HOGARTH DRIVE, BOHLE PLAINS
TITLE: PRELIMINARY SERVICES PLAN 1 of 2
CLIENT: RUBY DEVELOPMENTS PTY LTD

DRAWING STATUS: PRELIMINARY N.F.C.
DRAWING NUMBER: S24-020-PC04
SHEET NUMBER: 04 OF 06
REVISION:

S24-020-PC-Civilwks.DWG



PRELIMINARY SERVICES PLAN

SCALE 1:500 (A1 SIZE) 0 5 10 15 20 25

No.	DATE	REVISIONS	DES	DRN	CHK	APD

DOCUMENT CONTROL

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DRAWN J.J.D
CHECKED J.M.H
APPROVED J.M.H
DATE JULY 2024

APPROVED

For and on behalf of WESTERA PARTNERS PTY. LTD.

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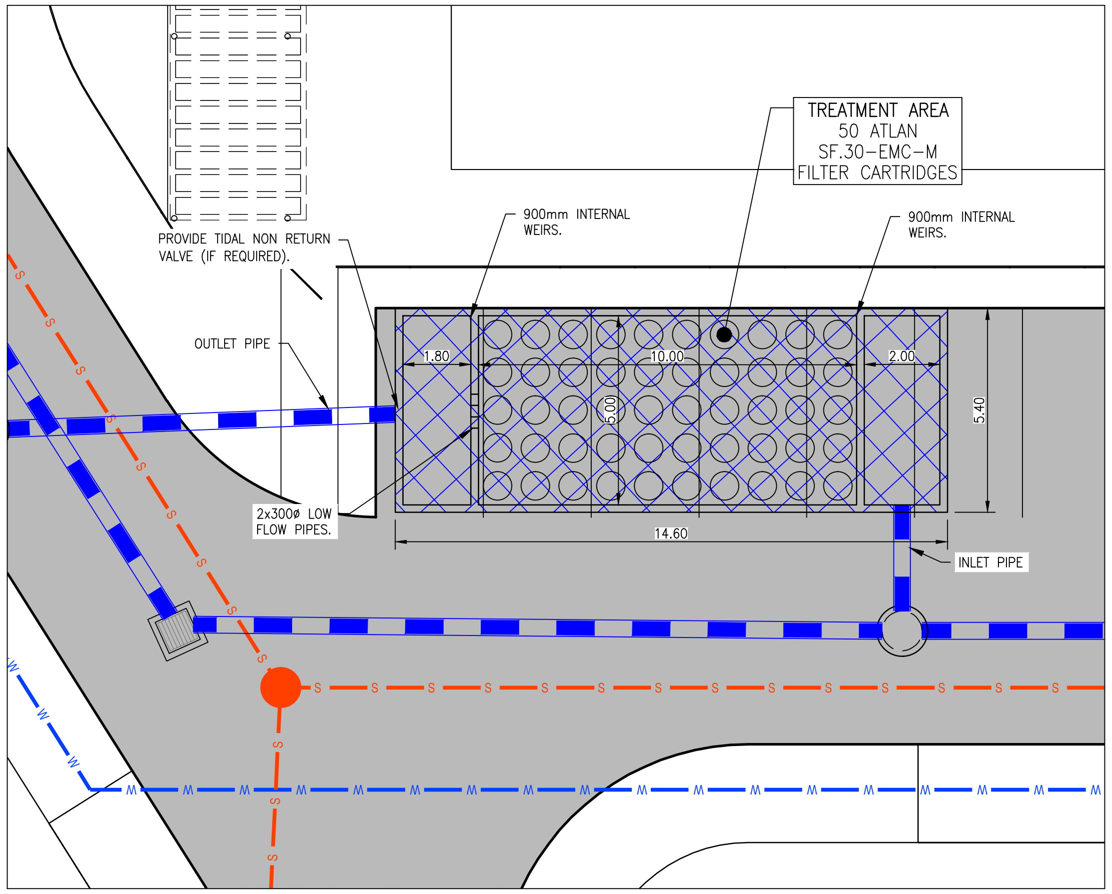
R.L. 17.143

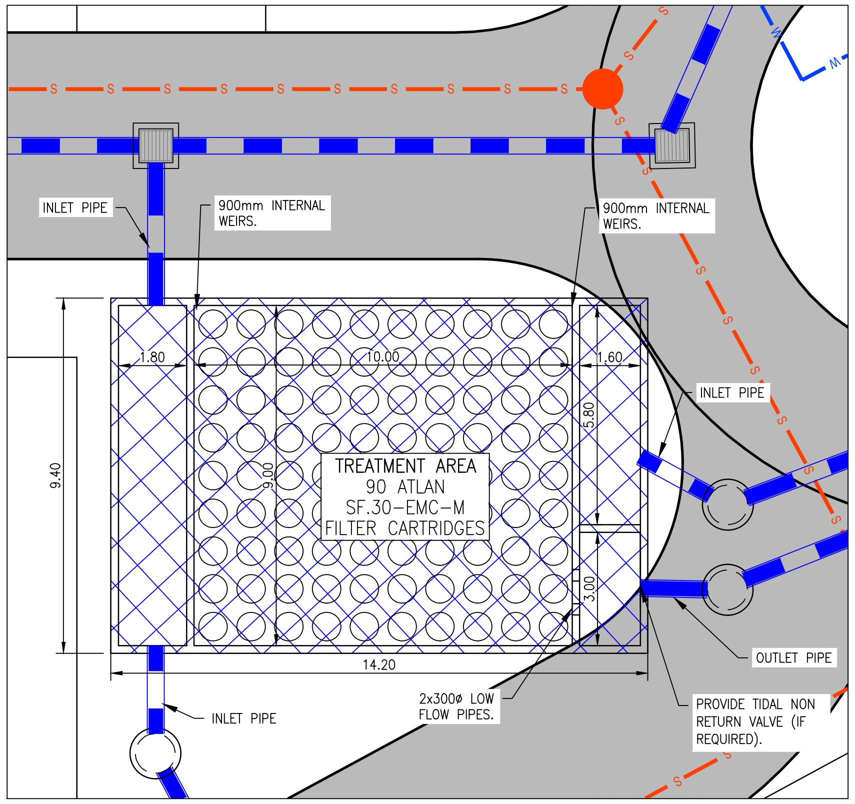
PROJECT PROPOSED RETIREMENT LIVING DEVELOPMENT
LOCATION LOT 1002 ON SP340654
99 HOGARTH DRIVE, BOHLE PLAINS
TITLE PRELIMINARY SERVICES PLAN 2 of 2
CLIENT RUBY DEVELOPMENTS PTY LTD

DRAWING STATUS PRELIMINARY N.F.C.
DRAWING NUMBER S24-020-PC05
SHEET NUMBER 05 OF 06
REVISION



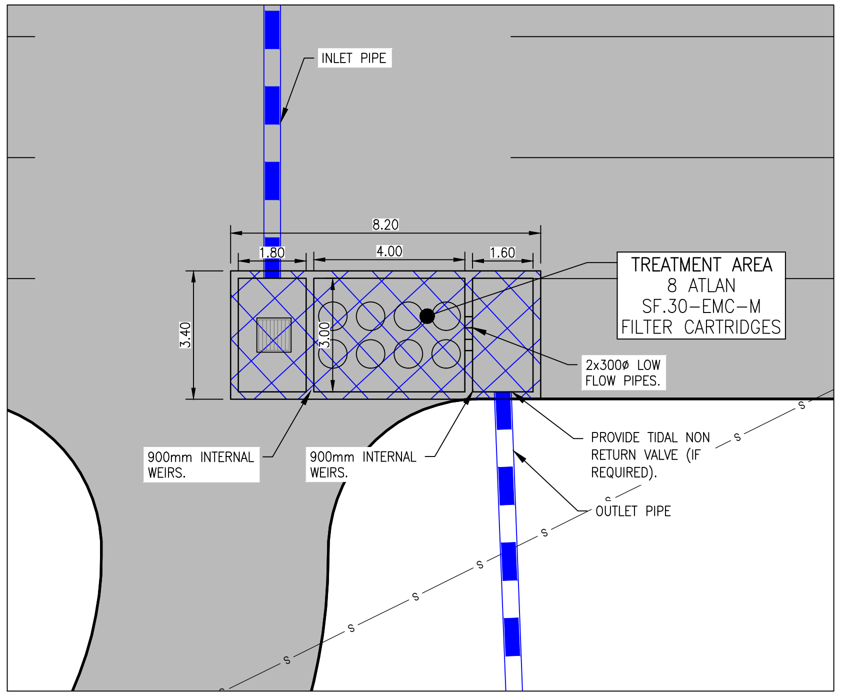
SOUTH TREATMENT TANK

SCALE 1:100
(A1 SIZE)



NORTH TREATMENT TANK

SCALE 1:100
(A1 SIZE)



RV PARKING TREATMENT TANK

SCALE 1:100
(A1 SIZE)

No.	DATE	REVISIONS	DES	DRN	CHK	APD

DESIGNED S.C.M
DRAWN J.J.D
CHECKED J.M.H
APPROVED J.M.H
DATE JULY 2024
DOCUMENT CONTROL

For and on behalf of WESTERA PARTNERS PTY. LTD.
APPROVED

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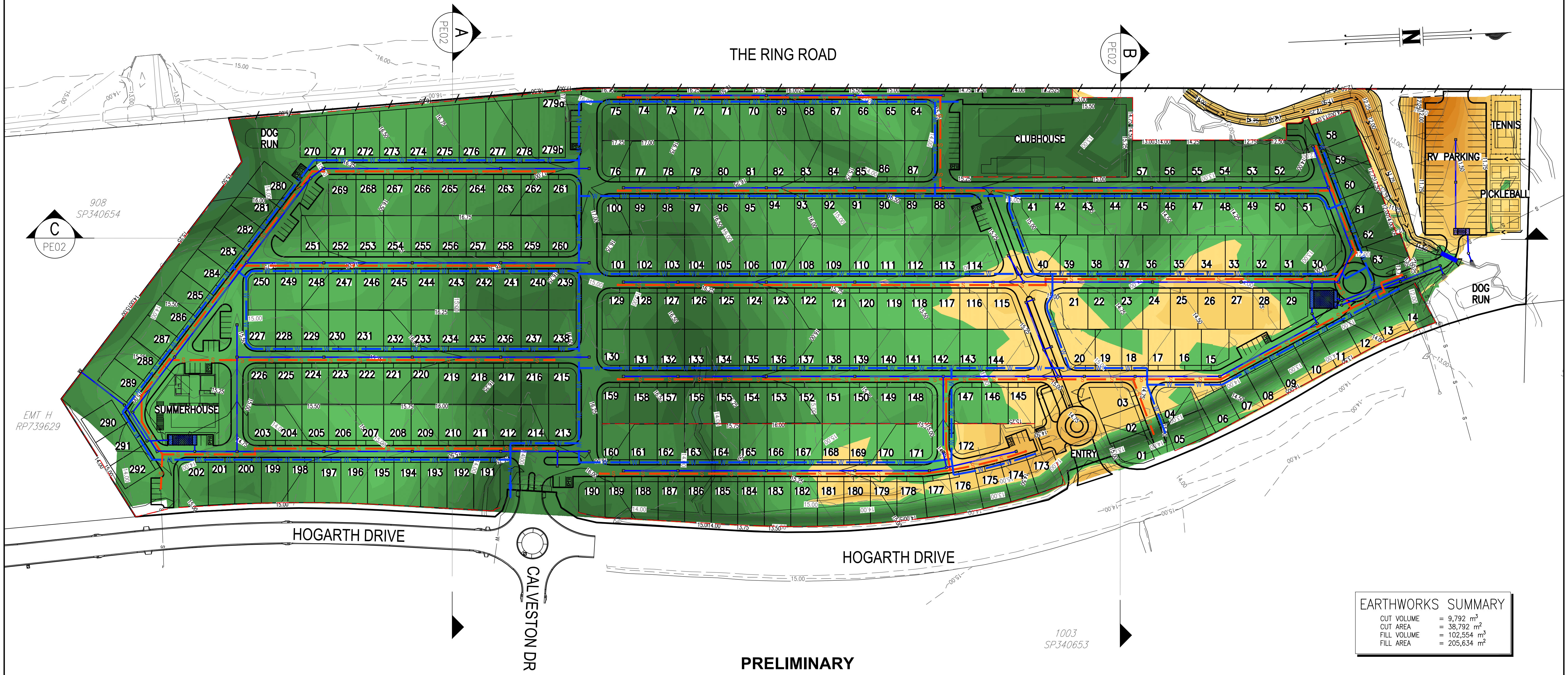
SURVEYOR
BRAZIER MOTTI
PHONE 07 4772 1144
DATUM A.H.D.
PSM 95569
R.L. 17.143

PROJECT PROPOSED RETIREMENT LIVING DEVELOPMENT
LOCATION LOT 1002 ON SP340654
99 HOGARTH DRIVE, BOHLE PLAINS
TITLE STORMWATER DETAILS
CLIENT RUBY DEVELOPMENTS PTY LTD

DRAWING STATUS PRELIMINARY N.F.C.
DRAWING NUMBER S24-020-PC06
SHEET NUMBER 06 OF 06
REVISION



EARTHWORKS SUMMARY

CUT VOLUME	=	9,792 m^3
CUT AREA	=	38,792 m^2
FILL VOLUME	=	102,554 m^3
FILL AREA	=	205,634 m^2

PRELIMINARY EARTHWORKS PLAN

SCALE 1:1000 (A1 SIZE) 0 10 20 30 40 50

EARTHWORKS LEGEND

DEPTH OF CUT TABLE	DEPTH OF FILL TABLE
0.0m - 0.25m	0.0m - 0.25m
0.25m - 0.5m	0.25m - 0.5m
0.5m - 0.75m	0.5m - 0.75m
0.75m - 1.0m	0.75m - 1.0m
1.0m - 1.25m	1.0m - 1.25m
1.25m - 1.5m	1.25m - 1.5m
1.5m - 1.75m	1.5m - 1.75m
1.75m - 2.0m	1.75m - 2.0m
2.0m - 2.25m	2.0m - 2.25m
2.25m - 2.5m	2.25m - 2.5m
> 2.5m	2.5m - 3.5m
	> 3.5m

GENERAL NOTES:

1. IN CASE OF DOUBT – ASK!
2. ALL LEVELS TO AHD, DIMENSIONS IN METERS U.N.O
3. ALL LIAISON WITH LOCAL, STATE & STATUTORY AUTHORITIES IS THE CONTRACTOR'S RESPONSIBILITY.
4. THE LOCATION OF EXISTING SERVICES IS FOR CONTRACTOR'S INFORMATION ONLY, THE LOCATION OF SERVICES WILL BE CONFIRMED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORKS.
5. ANY DAMAGE CAUSED TO THE EXISTING SERVICE WILL BE MADE GOOD AT THE CONTRACTORS EXPENSE.
6. EARTHWORKS PROCEDURES ARE TO BE CARRIED OUT IN ACCORDANCE WITH AS 3798 – 2007 "GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS".
7. EARTHWORKS OPERATIONS ARE TO BE CARRIED OUT IN GENERAL ACCORDANCE WITH THE GEOTECHNICAL REPORT.
8. WORKS NOT SPECIFICALLY REFERRED TO, ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE GENERAL DRAWINGS AND SPECIFICATIONS OF THE LOCAL AUTHORITY.
9. THE CONTRACTOR IS TO ALLOW FOR ALL FEES AND HAULAGE COSTS ASSOCIATED WITH DISPOSAL OF MATERIAL FROM THE SITE.
10. ALL COSTS ASSOCIATED WITH NOISE AND DUST SUPPRESSION FOR SITE WORKS ARE DEEMED THE CONTRACTOR'S RESPONSBILITY.
11. COMPACTION STANDARDS
    –'MODIFIED' TO AS 1289 TEST 5.2.1
    –'STANDARD TO AS 1289 TEST 5.1.1
12. PRIOR TO COMMENCEMENT OF WORKS THE CONTRACTOR WILL PROVIDE SCOUR AND EROSION PROTECTION INCLUDING PROVISION OF SILT TRAPS AND FENCES TO MINIMISE DEPOSITION OF MATERIAL DOWNSTREAM OF THE PROPERTY.
13. NO BLASTING WILL BE PERMITTED.
14. THE LOCATION OF THE SITE SHEDS, SITE OFFICE AND AMENITIES BUILDING WILL BE LOCATED TO SUIT TEMPORARY UTILITY SERVICES OR AS AGREED WITH THE MANAGER.
15. TESTING FREQUENCY AS 3798 – 2007 SECTION 8.0 OR AS APPROVED BY THE GEOTECHNICAL ENGINEER.
16. AT COMPLETION OF CONSTRUCTION THE CONTRACTOR SHALL ARRANGE FOR AN INDEPENDENT LICENSED SURVEYOR TO CARRY OUT A "WORKS AS CONSTRUCTED" SURVEY AND SUBMIT THE DETAIL PLAN TO THE MANAGER.
17. THE LOCATION OF TEMPORARY STOCKPILES DURING CONSTRUCTION IS TO BE AGREED WITH THE MANAGER.

No.	DATE	REVISIONS	DES	DRN	CHK	APD

DOCUMENT CONTROL	
DESIGNED	S.C.M
DRAWN	J.J.D
CHECKED	J.M.H
APPROVED	J.M.H
DATE	JULY 2024

APPROVED
For and on behalf of WESTERA PARTNERS PTY. LTD.

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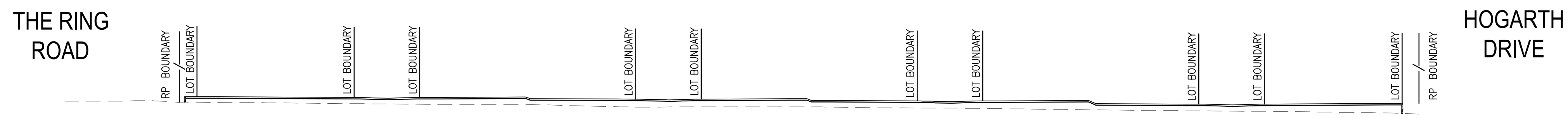
SURVEYOR
BRAZIER MOTTI
PHONE 07 4772 1144

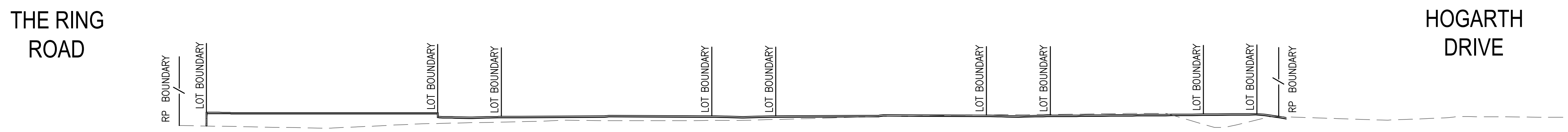
DATUM A.H.D.
PSM 95569
R.L. 17.143

PROJECT	PROPOSED RETIREMENT LIVING DEVELOPMENT
LOCATION	LOT 1002 ON SP340654 99 HOGARTH DRIVE, BOHLE PLAINS
TITLE	PRELIMINARY EARTHWORKS PLAN
CLIENT	RUBY DEVELOPMENTS PTY LTD

DRAWING STATUS
PRELIMINARY N.F.C.
DRAWING NUMBER
S24-020-PE01
SHEET NUMBER
01 OF 02
REVISION



SECTION A PE01
SCALE A1 – 1 : 500
A3 – 1 : 1000



SECTION B PE01
SCALE A1 – 1 : 500
A3 – 1 : 1000

SECTION C PE01
SCALE A1 – 1 : 1000
A3 – 1 : 2000

No.	DATE	REVISIONS	DES	DRN	CHK	APD	DOCUMENT CONTROL	APPROVED
							DESIGNED S.C.M	
							DRAWN J.J.D	
							CHECKED J.M.H	
							APPROVED J.M.H	
							DATE JULY 2024	For and on behalf of WESTERA PARTNERS PTY. LTD.

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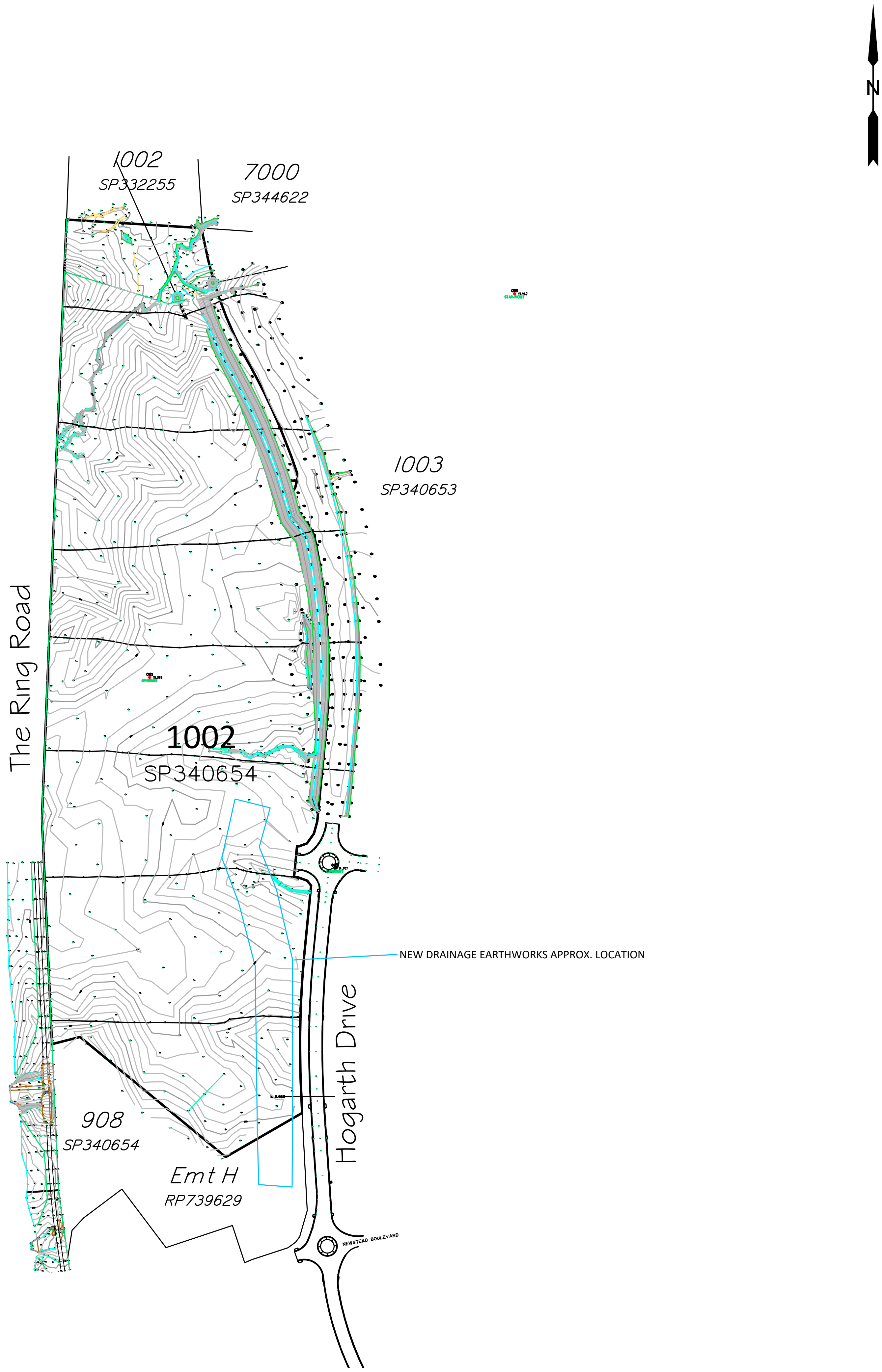
E centralvic@westerapartners.com.au

SURVEYOR
BRAZIER MOTTI
PHONE 07 4772 1144
DATUM A.H.D.
PSM 95569
R.L. 17.143

PROJECT	PROPOSED RETIREMENT LIVING DEVELOPMENT
LOCATION	LOT 1002 ON SP340654 99 HOGARTH DRIVE, BOHLE PLAINS
TITLE	PRELIMINARY EARTHWORKS SECTIONS
CLIENT	RUBY DEVELOPMENTS PTY LTD

DRAWING STATUS
PRELIMINARY N.F.C.
DRAWING NUMBER
S24-020-PE02
SHEET NUMBER 02 OF 02
REVISION

Appendix D – Site Survey & Architectural Drawings



Note:
This plan represents a combination of surveys undertaken 06/08/2020, 17/05/2021 and 18/06/2024. A combined surface model has been created from these different surveys and is subject to survey. All levels to be verified prior to commencement of any design

0m 40 80 120 160 200m 240 280 320 360 400m

1 : 4000

The title boundaries as shown hereon were not marked at the time of survey and have been determined by plan dimensions only and not by field survey. No attempt has been made to locate any services. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.

Level Datum: AHD Der.
B.M. Used: PSM95569 RL.17.143
Coordinate Projection: MGA Zone 55
Coordinate Datum: MGA94
Origin of Coordinates: PSM131662 E: 468140.991
Meridian: MGA Zone 55 N: 7865023.405
Map Reference:
Contour Interval: Surveyed by: BM
Job No: 43793/002-01 Drawn: MJM
File No: 43793_001B.dwg Approved:

Client:
RUBY DEVELOPMENTS PTY LTD

Project:
SKETCH PLAN OF COMBINED SURVEYS
LOT 1002 ON SP340654
HARRIS CROSSING

Local Authority: Townsville City Council
Locality: Bohle Plains

Date: 10th July, 2024
Sheet 1 of 2 Sheets
Scale: 1:4000 A3
Plan No: 43793/001 B

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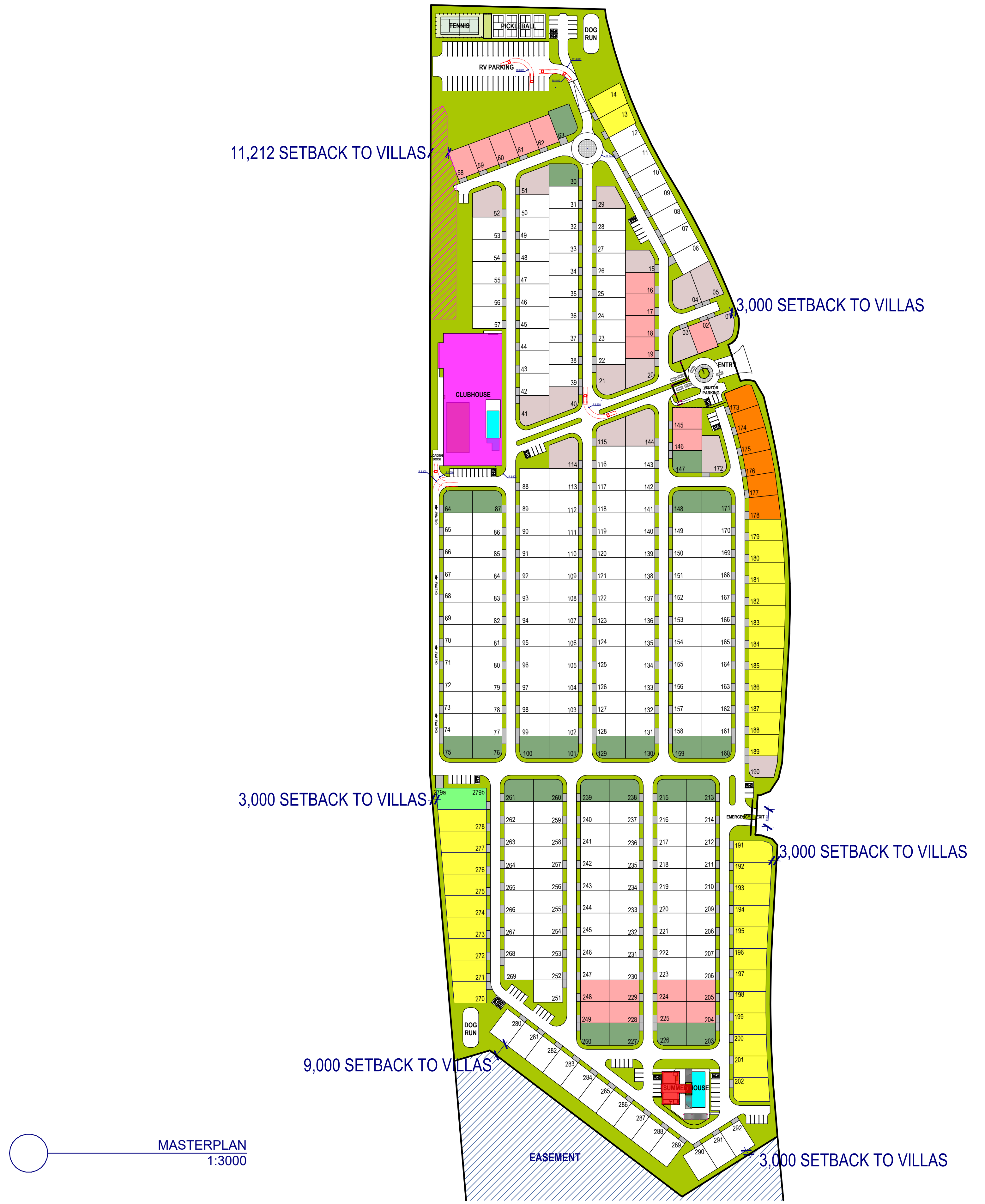
SURVEYING
TOWNPLANNING
PROJECTMANAGEMENT
MAPPING&GIS



YIELD

TOTAL NUMBER OF LOTS		**292**
LOT SIZE		
	14.0m x 21.0m STANDARD LOTS	191
	13.5m x 21.0m STANDARD LOTS	20
	13.5m x 21.0m+ VARIOUS LENGTH LOTS	34
	14m x 21.0m CORNER VILLA LOTS	25
	13.5m x 21.0m SPLAYED LOTS	6
	SPECIAL LOTS	17
	DUPLEX LOT (279a & 279b)	1

STATISTICS

VISITOR CAR PARKING	90
RV PARKING	42
SITE AREA	136,728 m2
SITE COVER	%
TOTAL SITE COVER (LOTS + ROADS + FACILITIES)	%
OPEN SPACE (MIN.DIMENSION OF 2m)	31,700 m^2
SITE PERIMETER	1.778 m^2

AREAS

CLUB HOUSE (UNDER ROOF)	3117m^2
SUMMER HOUSE (INCL. WORKSHOP)	970m^2
DOG RUN STRUCTURES	250m^2
ENTRY STATEMENT & GATE HOUSE	20m^2
TENNIS COURT	450m^2
PICKLEBALL COURT	495m^2

FOR APPROVAL

NOT FOR CONSTRUCTION

PROJECT NO.	HOA23-19	DRAWING TITLE :	GENERAL MASTERPLAN
STATUS	CONCEPT	SITE :	HARRIS CROSSING - MASTERPLAN LOT 908 & 1002 ON SP340654 TOWNSVILLE, QLD
CLIENT	GEMLIFE		

REVISION NO.	REV F.2
SHEET SIZE.	A3
DRAWING NO.	SK-005
PLOT DATE:	30/07/2024

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