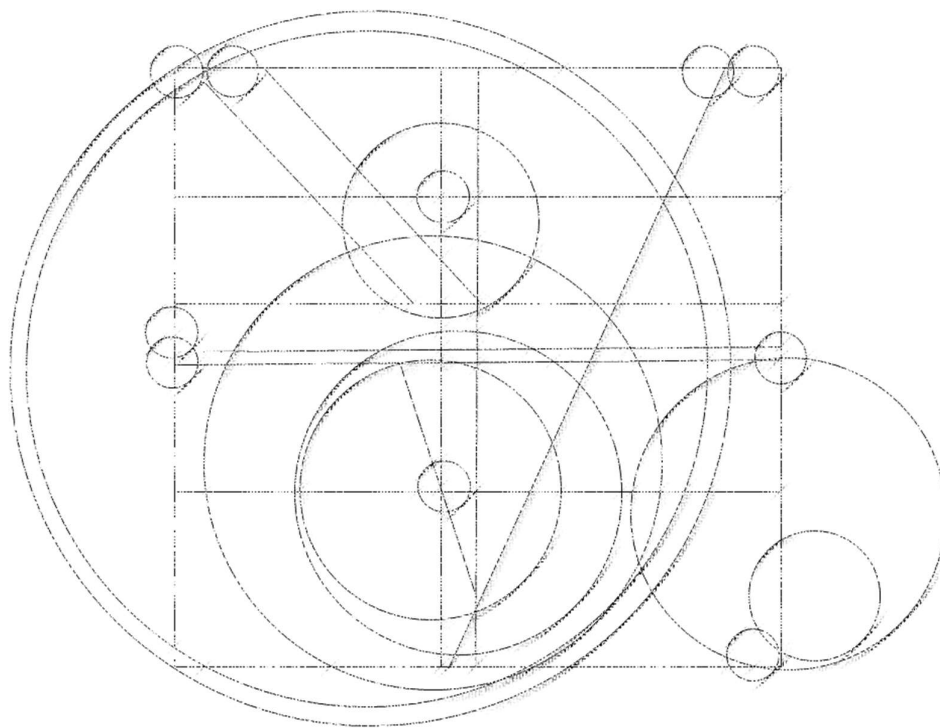


DROUGHTY PENINSULA STRUCTURE PLAN - PHYSICAL INFRASTRUCTURE ASSESSMENT REPORT

Final



Prepared for REALM Studios | 12 January 2025

Version 2.0

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PHYSICAL INFRASTRUCTURE ASSESSMENT REPORT

Final Report

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V0.2	30/10/24	Revised Draft. Inclusion of required improvements to traffic management. Addition of potential sequencing based on water and wastewater constraints. Addition of Appendix 1A and Table 2.	J Sugden	JS
V1.0	23/12/24	Final. Response to Council feedback on Draft.	N Vivian	NV
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1. GLOSSARY

Term	Meaning
EP	Equivalent Population
EPANET	Environmental Protection Agency Network Evaluation Tool
ET	Equivalent Tenements
MUSIC	Model for Urban Stormwater Improvement Conceptualisation
SIDRA	Sidra Intersection traffic modelling software
SPS	Sewage Pump Station
STP	Sewage Treatment Plant
TWL	Top Water Level
WSUD	Water Sensitive Urban Design

2. PURPOSE

REALM Studios has engaged Sugden & Gee to prepare a Physical Infrastructure Assessment for the Droughty Peninsula Structure Plan. This report seeks to provide guidance regarding the physical infrastructure requirements, with reference to relevant standards and expectations of various infrastructure providers and Council as the statutory authority. The assessment identifies potential site and infrastructure constraints and information gaps that need to be resolved to inform future design. The report also relies on work completed by others for the Droughty Peninsula area including desktop geotechnical assessment by Scherzic, a traffic assessment by SALT and preliminary development layout plans and road typologies provided by REALM Studios.

3. BACKGROUND

Clarence City Council has engaged REALM Studios to provide a Structure Plan to guide future development of the Droughty Peninsula area, located south of Tranmere and Rokeby. The area of the Structure Plan is largely dominated by the proposed Skylands development on land owned by the Carr family, but also includes large parcels owned by others including the Luckmans and Dr Howie, with their future development visions and plans. The Structure Plan is proposed to provide unified guidance for development across all properties in the Droughty Peninsula area, noting that there may be different development visions and typologies.

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The Structure Plan has been prepared assuming an ultimate total of 3000 Equivalent Tenements¹ (ETs) are developed over 20 to 30 years, via separate stages². The sequencing of the development is partially dependent on existing physical infrastructure constraints, since development of some areas may require upgrade to existing services earlier than others, requiring significant upfront investment. Engagement with service providers has sought to clarify the constraints on existing services and the nature of upgrades that may be required. It is noted that the ultimate development may vary from the proposed lot yield, subject to various factors including site constraints (e.g. slope and geotechnical issues such as landslips), road and development design (e.g. road widths, lot sizes and service lanes). For the purposes of the Structure Plan the assessment at this stage has deliberately taken a conservative approach based on the expected upper limit lot yield.

The proposed development layout prepared by REALM Studios based on the Skylands Master Plan and other developer visions and has evolved during the assessment period. The most recent layout is provided in

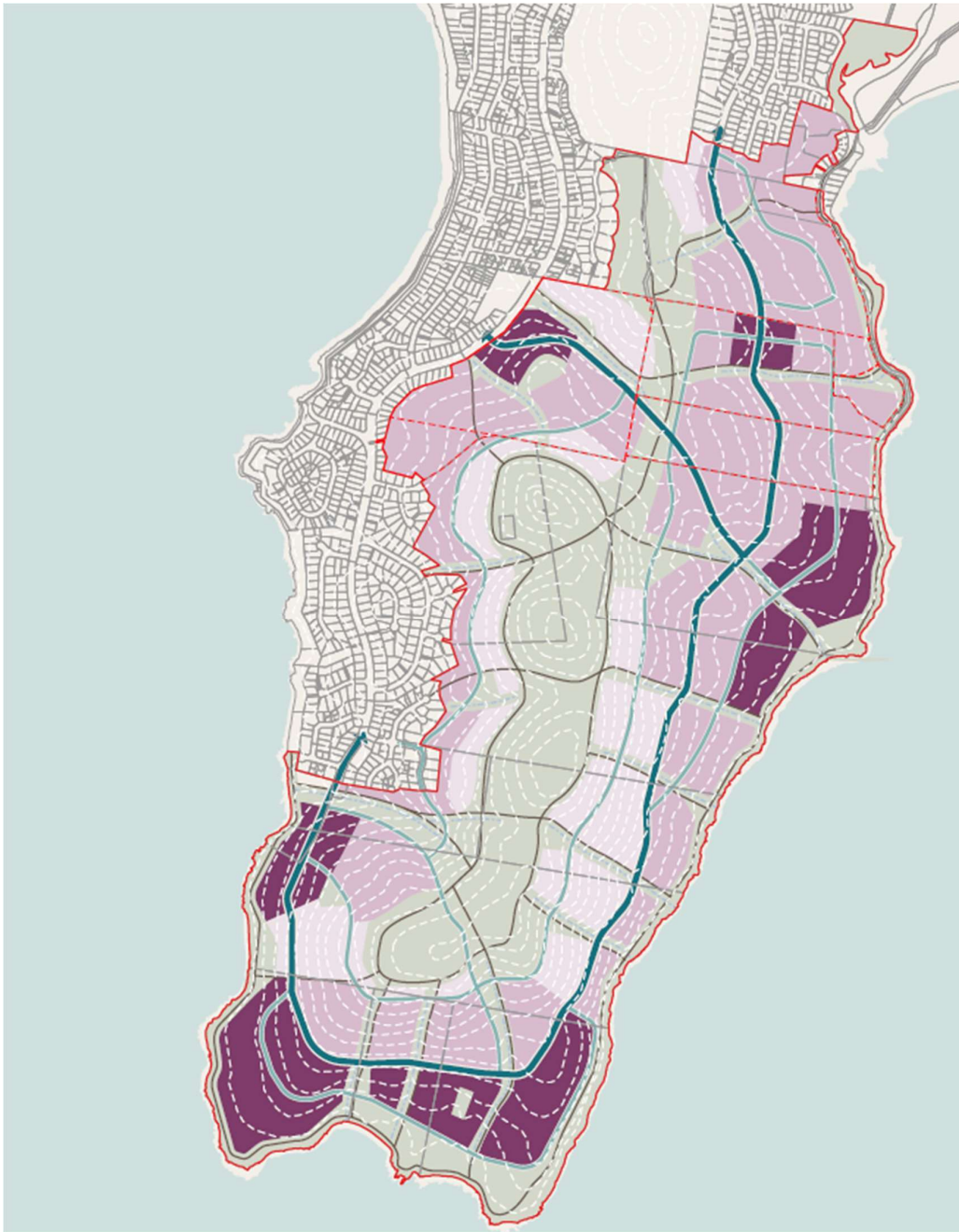
¹ An Equivalent Tenement is a typical residential building. Commercial and other non-residential developments may have demands more (or less than 1 Equivalent Tenement). Multiple residential complexes may also have more than 1 Equivalent Tenement.

² The estimated number of dwellings has been taken from the Greater Hobart Plan. Actual dwelling yields will depend on the proposed density of dwellings and allowances for roads, public open space and other uses.

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Figure 1.

Figure 1: Preliminary Development Layout (Source: REALM Studios)



The dark red line in Figure 1 represents the extent of the Structure Plan area for the purposes of the physical infrastructure assessment. It is noted that the approach to the community service infrastructure extends to include adjacent existing residential areas to the north and west. The darkest areas on the development plan indicate the potential areas of highest density (e.g. commercial development). This includes the areas at the southern end of the Droughty Peninsula.

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4. INFRASTRUCTURE ASSESSMENT

The infrastructure assessment has included the following key elements:

- Potable Water
- Wastewater
- Stormwater
- Power
- Communications
- Transportation/Traffic

Consultation with physical infrastructure service providers, REALM Studios, Scherzic (Geotechnical assessment) and SALT (Traffic management) and Clarence City Council has informed the assessment.

Each element has been considered in separate sections that follow. The desktop geotechnical assessment has also been considered in terms of potential impacts on the proposed infrastructure.

4.1 Potable Water

4.1.1 Demand Assumptions

For an ultimate demand of 3000ET, the peak water demand is estimated as:

- Mean Day Maximum Month: 3083 kL/d
- Peak Day: 4624 kL/d
- Peak Hour: 107 L/s.

This assumes the following based on TasWater requirements³:

- Average daily demand per Equivalent Tenement (ET) = 685L⁴
- Mean Day Maximum Month = 1.5 x Average daily demand
- Peak daily demand = 2.25 x Average daily demand⁵
- Peak Hourly demand = 2 x Peak day, average hour demand.

Clarence City Council has flagged the possibility of rainwater tanks being mandated within the Droughty Peninsula. If this were to occur it could reduce the total demand⁶ however is not expected to make a significant difference to peak demand, especially peak hour demand which is used for preliminary hydraulic modelling and pipe sizing.

³ TasWater supplement to Water Supply Code of Australia WSA 03 2011-3.1 MRWA Edition V2.0 (June 2023). An Equivalent Tenement is an approximation of a typical residence

⁴ Includes system losses and community use (e.g. irrigation of parklands)

⁵ Assumes low tourist loads

⁶ Council would also need to mandate connections from the rainwater tank to laundry, toilet or other fixtures to ensure that any water collected was used to substitute for potable water demand. This requirement has been applied in other municipalities but is considered more useful as a means of reducing peak stormwater runoff than peak water demand.

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4.1.2 Supply Options

Early engagement with TasWater indicates that water may be supplied to the Droughty Peninsula area from the following existing tanks⁷:

Table 1: TasWater Tanks

Tank	Supply Side	Capacity (ML)	Top Water Level (m)	Current Connections ⁸	Spare Connections
Rokeby (HOBWS091)	East	9.2	107	3036	1400
Tranmere - 2 x tanks (HOBWS104)	West	6	76	1971	1000
Malwood – Rokeby High Level (HOBWS061)	Central	1.7	140	607	225
Norla Street (HOBWS077)	West	1.3	112	185	450

The location of existing tanks and potential future connection points are shown in **Appendix 1A**.

The Rokeby and Norla Street tanks have sufficient capacity to service approximately 1850 ETs, representing over half of the proposed development on Droughty Peninsula, however their elevation limits supply to lots up to approximately 70m AHD⁹. The Malwood - Rokeby High Level tank could potentially service some higher lots but has limited capacity and would not provide sufficient pressure for the highest lots proposed around 120m AHD. Given the high cost of providing a long, dedicated service main from the Malwood-Rokeby High Level tank, and its limited spare capacity, this is not considered to be a suitable means for servicing Droughty Peninsula. The Tranmere tanks have significant spare capacity, but due to their low elevation can only supply approximately 200 ETs up to an elevation of approximately 35m AHD at the southern end.

⁷ TasWater also refer to tanks as service reservoirs.

⁸ The current number of connections includes all land titles that have been created even if not developed. While planning approval may have been granted for additional subdivision lots, these are not included in the current connections if new water supply connections have not yet been made and land titles issued for those lots.

⁹ This was the limit of the previous application of the urban growth boundary for Droughty Point.

A preliminary EPANET¹⁰ 2.0 hydraulic water model was built for the Droughty Peninsula to test the performance of alternative water supply configuration options and nominal pipe sizes for the expected demand. The areas adjacent to the structure plan area in Rokeby and Tranmere are serviced by the Rokeby (HOBWS091) and Norla Street (HOBWS077) Tanks. These Tanks have limited available capacity to service the expected growth at Droughty Peninsula and cannot supply lots located above approximately 70mAHD due to pressure constraints. To address this a new high-level tank and supply area¹¹ is included in the model.

4.1.3 Service Requirements

TasWater's service requirements, are provided in the TasWater supplement to Water Supply Code of Australia WSA 03 2011-3.1 MRWA Edition V2.0 (June 2023). These include:

- Minimum Pressure at Peak Hour¹²:
 - 250kPa (25m) for Non-Residential or Residential lots on grades >18%, or
 - 220kPa (22m) for Residential lots on grades <18%
- Maximum service pressure of 800kPa (80m)
- Maximum allowable peak day pressure variation between static pressure (tank level) and pressure at the connection point is 20%
- Firefighting demand of 20L/s at 250kPa (25m) with system residual pressure of 100kPa in entire service zone¹³

The more conservative requirement of 25m pressure at the connection point was assumed for modelling, noting that most areas of development are steep and that non-residential development is expected to be located at the furthest part of the supply network. Firefighting demands were added to the model at the furthest extent of the high and low-level zones to ensure that sufficient pressure could be achieved at those nodes.

TasWater staff have provided verbal advice that there may be opportunity to relax the maximum service pressure (e.g. to 1000kPa). It is not expected that any relaxation of the minimum service pressure is allowed, since this is critical to ensuring suitable servicing of lots. If pressure levels are not high enough to meet peak demand this would likely result in complaints from owners of high-level properties. Relaxation of the firefighting demand requirements would require approval of the Tasmanian Fire Service. This is not considered likely since it would potentially put properties at risk if they cannot be adequately protected using the public water supply system.

¹⁰ Environmental Protection Agency Network Evaluation Tool (EPANET) is a public domain water distribution system modelling software package developed by the US EPA.

¹¹ The water industry including TasWater refer to these as supply zones, however the term "supply area" has been adopted to prevent confusion with planning scheme zones.

¹² Measured at the connection point, where the supply reservoir is not more than one third full and excluding fire-fighting flows.

¹³ Assumes the more conservative requirement for residential use, rather than 50kPa for commercial/industrial.

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4.1.4 Concept Water Supply Arrangement

The conceptual arrangement for the water supply is provided in **Appendix 1B** which has been provided to TasWater for review. Initial feedback has been provided by TasWater, and the conceptual water supply arrangement revised to address concerns raised.

The conceptual water supply arrangement proposed includes a high level and low-level supply loop, with a cross connection from the East to West. It was nominally assumed that half of the demand (i.e. 1500ETs at ultimate development) would be from the high-level tank. The model was configured with multiple demand nodes, representing potential stages of development. Typically, it was assumed that each stage of development included 200 ET (High Level) and 200 ET (Low Level).

Multiple configurations and pipe sizes were trialled to identify whether the performance would comply with TasWater requirements. The preliminary illustrative network configuration resulted in the following elements:

- Connection to existing DN200¹⁴ PVC main at end of Oceana Drive, Tranmere (A3404967) supplied from the Norla Street Tank (on western side of the peninsula)
- Connection to existing DN300 reticulation main at end of Tollard Drive (A3359069) supplied from the Rokeby Tank (on eastern side of the peninsula). The model indicates there is limited capacity for initial stages of development so the remaining capacity would need to be confirmed by TasWater based on available pressure at this point during peak hour prior to development approval
- Connection to DN762 MSCL Bulk Transfer Main at Tollard Drive, near Kanooka Street (ID A261170) via new DN450 main supplied from the Rokeby Tank, to meet ultimate demand
- DN300 connection from Tollard Drive to Norla Street pump station via East-West link road to feed water from Rokeby tank to the low-level zone on the western side of the peninsula
- Low level ring main ranging from DN250 to DN150
- Pump station from Tollard Drive to the high-level tank via a DN250 rising main
- New high-level tank (approximately 3ML¹⁵) situated on Droughty Hill (above 150m AHD) to supply lots with connections up to approximately 120m AHD
- DN250 connections from the Droughty Hill tank to the high-level ring main on the east and western side of the peninsula
- High Level ring main ranging from DN250 to DN150, with DN150 northern spurs.

A high-level tank with a separate supply area is required to service proposed lots above 70m AHD. If the tank is situated above 150m AHD on Droughty Hill, it can potentially service lots with connection points up to approximately 120m AHD (as is currently proposed). If any lots are proposed with connection points higher than 120m AHD in future, then an elevated tank or booster pump system may be required. Alternatively, if Council wish to avoid the tank being located at the top of Droughty Hill to preserve the skyline it may be necessary to either limit the maximum elevation of lot

¹⁴ Nominal Diameter of 200mm

¹⁵ 4/3 x Peak Day Demand

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connections below 120m or alternatively provide a booster pump solution. Booster pumps are considered a last resort due to risk of failure and loss of service.

4.1.5 TasWater Advice

Advice provided by TasWater¹⁶ is that the existing water supply network can supply:

- 600-650 ETs on the western side
 - 400-450 ETs supplied by Norla Street tanks
 - 200 ETs supplied by Tranmere tank
- 500-550ETs on the eastern side supplied by the Rokeby tank

TasWater has undertaken hydraulic modelling of their network with extensions to service the Droughty Peninsula. To enable sufficient water pressure to all development they have proposed supply areas from existing and proposed new tanks per Figure 2.

Figure 2 Proposed Water Supply Zones (provided by TasWater 19 December 2024)



The proposed supply areas are to be fed from existing/proposed tanks as follows:

- Red – Norla Street tank
- Green – Tranmere tank

¹⁶ Email from Grant Henderson, Senior Planning Engineer, 19 December 2024

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- Purple – Rokeby tank
- Orange – New low-level tank (2.5-3.0 ML at TWL¹⁷ 105m AHD)
- Blue – New high-level tank (2.5-3.0 ML at TWL >150m AHD)
- Not shown – Malwood-Rokeby High Level tank

The Malwood-Rokeby High Level tank can supply to approximately 160 ET on land owned by the Luckmans. Additional lots south of 623 Oceana Drive would need the DN150 feed to be upgraded.

TasWater has proposed a new low-level tank, not previously considered in the early concept development. This is required due to network hydraulic constraints from the Rokeby tank and other future demands in the Oakdowns area from that storage. The TasWater supply concept does not include an East West water supply link, so the low-level supply is not a loop as previously proposed.

The extent of the orange supply area from the new low-level tank, means that development in the south-west corner of the peninsula will require a long water supply main from the DN762 bulk main via Duntroon Place (or via Tollard Drive with a connection near Kanooka Street). This would require a significant investment to unlock this area.

4.1.6 Design development and potential sequencing of development

The illustrative water supply network arrangement shown in **Appendix 1B** has been put together balancing two constraints:

1. The pipelines must be large enough to match peak water demand for a fully developed Droughty Peninsula
2. The pipelines must be small enough to ensure minimum scour water velocities are achieved with lower demands observed during early stages of development.

To determine the pipe sizes required to meet these constraints we have assumed that development will progress down the west and eastern sides of the peninsula with the supply mains extended progressively for each stage. These would ultimately form a fully connected ring for the high-level supply area once all stages of development have commenced. Further modelling is required to be undertaken as part of detailed design for each stage to confirm infrastructure requirements with consideration of ultimate demand. The intention is to avoid the need to upgrade pipes in future by sizing them for the ultimate demand where possible. Due to the high cost associated with the pump station and high-level tank, the proposed lots in the low-level zone may be more economical to pursue initially. However, a new low-level tank would be required after approximately 800 ETs in total are connected on both sides of the peninsula.

The actual configuration and sizing of infrastructure required for the water supply network will depend on the spatial distribution of future developments that are proposed. Alternative network concepts may also be possible, however, the example proposed may help inform early planning.

The potential sequencing of development of key infrastructure to defer capital expenditure may be as follows:

¹⁷ Top Water Level

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- **Stage 1:** Existing DN300 supply via Tollard Drive from Rokeby tank can potentially supply approximately 500 ETs via a Low-Level supply area
- **Stage 2:** DN450 connection to the DN762 bulk main in Duntroon Place to a new low-level tank
- **Stage 3:** New pumpstaion and High-Level Tank to supply High Level supply area

Alternative sequencing may be proposed by developers considering other drivers such as the value of land.

4.1.7 Location of Water Services

Water mains should be installed at least 1m from property boundary and preferably in the road verge (e.g. planted areas) rather than in trafficable areas for ease of maintenance and renewal. Where water mains are installed alongside roads that follow contours on steeply graded land with cut and fill, it is expected that water mains will be installed on the higher side of the road. This will ensure that the trenches are excavated in undisturbed land (i.e. in cut rather than fill) and enable any leakage from the pipes to be collected by the roadside drainage, minimising risk of damage to properties below.

4.2 Sewerage

4.2.1 Demand Assumptions

For an ultimate development of 3000ET the estimated sewage flows are:

- Average Dry Weather Flow = 16L/d (1.35ML/d)
- Peak Dry Weather Flow = 32L/s
- Design flow (peak wet weather) = 138L/s

4.2.2 Service Requirements

The estimated flows have been derived based on the methodology provided in WSA02-2014-3.1 WSAA Gravity Sewerage Code of Australia (MRWA Edition) Version 2, Appendix C. Specific factors have been taken from the TasWater supplement s5.5.5.2 (unless noted otherwise) as follows:

- Average dry weather flow per lot = 450 L/ET/d¹⁸
- Portion (wet) = 0.7
- Leakage severity (C) = 1.4
- Density = 23EP/ha (based on 3000ET x 3EP per ET and a total development area of 394ha)

¹⁸ Assumes 3 Equivalent People (EP) per ET, and 150L/d/EP for new residences

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- Rainfall intensity (1 hour, ARI¹⁹ of 5 years) = 16.5mm/hr (from Bureau of Meteorology website IFD²⁰ tables for Tranmere)

The estimated sewage flows may need to be revised in future taking into account any changes to the development extent and density, and potential geotechnical advice regarding soil aspect and leakage severity. No soil tests have been undertaken at this stage to justify deviation from the default values²¹.

4.2.3 Existing Infrastructure

Tranmere is currently serviced by the following sewage pumping stations (SPSs):

- Tranmere SPS (ROKSP11)
- Pindos Drive SPS (ROKSP07)
- Tranmere Bus Stop SPS (ROKSP10)

Initial advice from TasWater indicates that:

- Tranmere SPS (ROKSP11) has capacity for approximately 78ET before an upgrade is required to the emergency storage. An upgrade to the pumps is likely required prior to that.
- The Pindos Drive SPS (ROKSP07) pump station has an existing deficiency in emergency storage. An additional ~132ET can be added before pump upgrades are required, however its emergency storage is already deficient with its current loading so would require an early upgrade.
- The Tranmere Bus Stop SPS (ROKSP10) is already under capacity and would require a significant upgrade. The feasibility of the pumping station upgrade would need to be determined by developers in liaison with TasWater as part of the engineering approval phase.
- The rising main from Tranmere Bus Stop to Rokeby Sewage Treatment Plant (STP) would require an upgrade if the pump capacity was increased.

As the Tranmere SPS pumps to the Tranmere Bus Stop SPS there is limited opportunity to connect to this infrastructure on the western side without a series of potentially expensive upgrades. Instead, it is proposed that the majority of sewage from the Droughty Peninsula is delivered to the eastern (Rokeby) side of the peninsula. While there is an existing SPS located on Droughty Point Road (ROKSP02), TasWater advise that this has limited spare capacity, and the rising main is in poor condition. Therefore, it is assumed that no new connections can be made to the existing Droughty Point Road SPS.

¹⁹ Average Recurrence Interval. Note the 20% Annual Exceedance Probability rainfall intensity has been used as an approximation of the 1 in 5 year ARI.

²⁰ Intensity Frequency Duration based on historical rainfall statistics. It is noted that IFD tables will alter to consider future climate change, however TasWater standards do not currently provide direction regarding which future scenario (if any) should be used for rainfall intensity in the calculation of sewage flows.

²¹ It is also noted that the leakage severity (C) factor adopted is conservative and may be reduced in future (subject to soil tests) potentially offsetting any climate change impacts on wet weather flows.

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The sizing of new pump stations and pipelines will need to be determined by modelling the proposed flows from different stages of development to determine if/when upgrades may need to occur.

4.2.4 Conceptual Sewerage Network Arrangements

From preliminary assessment of the early structure plan development layout and the topography of the land, it is expected that at least four pumpstations are required, each located within the coastal reserve strip (public land):

- New Sewage Pumping Station #1 (SPS#1) – Services catchment A (Howie land and the northern section of Skylands Stage 6). Located at the North-East Corner of Skylands Stage 6. Proposed to pump direct to Rokeby STP via Droughty Point Road. The rising main should allow for injection of flows from Droughty Point Road SPS so that the existing rising main can be abandoned, per advice from TasWater²²
- New SPS#2 – Services catchment C (Skylands stages 4, 5 and the southern end of Stage 6 including the proposed Lilly/Greenpoint Developments). Located in the southern half of Stage 5. It is assumed that this pumping station delivers to Rokeby STP via the existing DN375 gravity main at the end of Enchantress Street (A3358940) – below Tollard Drive. The gravity main may be extended along Tollard Drive to intercept the rising main further south and to collect sewage from development above (Catchment F including upper section of Howie land and Skylands Stage 6).
- New SPS#3 – Services catchment D including Skylands Stages 1,2 and 3. New rising main required to deliver to a gravity trunk main draining to New SPS#2.
- New SPS#4 – Services Catchment E above existing areas of Tranmere.

The overall configuration is summarised in Table 2. This is consistent with the proposed concept accepted by TasWater.

Table 2: Summary of conceptual sewerage network

Catchment	Sewage Pumping Station	Delivers to	Comment
A	SPS#1	Rokeby STP	New sewage pumping station
C	SPS#2	Enchantress Street Gravity Main	New sewage pumping station
D	SPS#3	Catchment C	New sewage pumping station

²² The rising main from Droughty Point SPS is in poor condition and is exposed to coastal erosion. Abandoning this line in future is proposed by TasWater from an asset management perspective, rather than being triggered by development in this area.

Catchment	Sewage Pumping Station	Delivers to	Comment
E	SPS#4	Enchantress Street Gravity Main	New sewage pumping station
F	NA – Gravity drainage via main in Enchantress Street	Rokeby STP	Capacity of gravity main TBC ²³

The sizing of sewage pumping stations will need to be determined as part of the engineering approval phase for future development proposals. This should consider potential infill development in adjacent areas such as Tranmere which could be directed to new SPS#4 and to relieve the existing capacity constraints at Pindos Drive SPS, Tranmere Bus Stop SPS and the rising main to Rokeby STP. The capacity constraints of this infrastructure limits the amount of development that can occur on the Tranmere side without significant upgrades to existing infrastructure.

Additional pump stations may be required, subject to the extent of development and assessment of the topography, specifically the ability to drain by gravity from the furthest extent of the catchments to each pump station. Early assessment indicates that if a wide coastal reserve is provided so that development is situated on higher land (>20m AHD at the furthest extent of the catchment) then these could potentially be drained to pump stations that are situated in low lying areas (e.g. inlets below 5m AHD). The location of sewage pumping stations and pipelines will need to consider exposure to sea-level rise and erosion, as well as proximity to sensitive receptors (e.g. residential areas). Coastal reserves of at least 30m, should give sufficient flexibility for location of pipelines but may require widening in some areas. Sewage pumping stations may typically be located within drainage corridors or adjacent to open recreational areas to provide sufficient attenuation of odour. A setback distance of at least 30m from residential areas is expected for sewage pumping stations.

Higher level development in Catchment F (Skylands Stage 7, upper areas of Stage 6 and Luckman land) is proposed to drain directly to the DN375 gravity main at Enchantress Street.

It is expected that future development will be serviced via connection to gravity sewerage mains as a standard solution. While TasWater currently operate low pressure sewer schemes in the Clarence municipal area at Seven Mile Beach and Lauderdale, this is not typically preferred. TasWater do not operate any vacuum sewerage schemes and there are limited examples of their use in Australia.

A concept plan for the proposed upgrade is provided in **Appendix 2**.

4.2.5 Sewage Treatment and Discharge/Recycling

²³ Advice received from TasWater via email on 11/11/24 states that the DN375 main on Enchantress St has not capacity constraints or operational concerns. It is recently installed and is understood to have been sized to allow for future development on Droughty Peninsula.

Advice has been sought from TasWater regarding the spare capacity of the Rokeby STP to accommodate growth. Early advice indicates that the STP requires multiple upgrades (including inlet works, aerators, diffusers, decanters, effluent balancing and recycled water pumps) however the recycled water main to the Coal River Valley is not expected to require an upgrade. The additional flows from Droughty Peninsula would help meet demand for recycled water in the Coal River Valley, so are not expected to require discharge off Tranmere Point except in wet weather or emergencies.

Discussions with TasWater on 17 September 2024, indicated that onsite use of recycled water on private lots or on public land is not preferred since there is excess demand in the Coal River Valley Scheme, and it is difficult to feed back from the high-level storage in Richmond to Droughty Point.

4.2.6 Design Development and Potential Sequencing of Development

The nominal size of pump stations (and rising mains) can be advised following estimation of the number of ETs in each catchment.

Potential sequencing of sewerage infrastructure to defer capital investment could be as follows:

- **Stage 1:** Catchment F could potentially be developed without major works
- **Stage 2:**
 - Construct SPS#1 and rising main to Rokeby STP for Catchment A, and/or
 - Construct SPS#4 for Catchment E.
- **Stage 3:** Construct SPS#2 and rising main to service Catchment C
- **Stage 4:** Construct SPS#3 and rising main to service Catchment D. Upgrade to SPS#2 to transfer additional flows from Catchment D e.g. install larger pumps and additional emergency storage. The wet well should be sized for ultimate flows to simplify the upgrade.

Stage 1 includes areas above 70m AHD, which require significant upgrades to the water supply (new pump station, rising main and high-level tank). The lower sections of Catchment F (below 70m AHD) may be an early opportunity, with the higher lots deferred until Stage 3 of the water network is delivered²⁴. Approximately 20-30 lots below 70m AHD may potentially be serviced by gravity in Stage 1, depending on lot layout and size as well as the capacity of the DN375 gravity main.

The order of sequencing to defer capital expenditure may need to be revised following sizing of infrastructure and determination of costs for each stage. It is noted also that the value of land may dictate the sequencing of construction, e.g. land on the Tranmere side may be preferable to develop first even though it could require additional investment upfront.

4.2.7 Location of Services

New sewerage gravity and rising mains should be situated within road reserves or coastal reserves to allow access for maintenance and renewal by TasWater. Sewerage pipelines need to be installed at least 1m from property boundaries with a minimum of 3m wide corridor clear of trees, lighting, powerpoles or other obstacles. Typically trenches for new sewerage pipes should be excavated in

²⁴ It is noted that this is a different concept the proposed sequencing of the Skylands Masterplan.

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stable, undisturbed ground. Where roads are installed along contours on steeply sloping land including cut and fill areas, the sewerage pipe will typically be installed on the upper side of the slope to be in cut rather than fill for stability.

4.3 Stormwater

Early concept drawings for the Structure Plan suggest a preference for Water Sensitive Urban Design, which is generally considered as best practice for stormwater management. Initial concept typologies provided by REALM Studios indicate a preference for 4.5m wide planted swales to collect runoff from primary connector streets via slotted kerbs. 2m wide footpaths are expected to drain to adjacent planted areas. The purpose of swales and other planted areas is to promote infiltration to reduce the volume and peak flow rate from the catchments. By reducing the velocity of stormwater runoff, this can minimise the size of downstream infrastructure (e.g. culverts) and the potential for erosion at discharge locations. Furthermore, such devices can aid in the treatment of stormwater, removing particulates and nutrients in line with Council's *Stormwater Procedure for New Development*.

Infiltration into planted areas, including swales, is subject to the soil type in the area. While sandy loam (or similar) material may be imported for planting, the drainage may be limited by the underlying native soil (or rock). Geotechnical investigations for the structure plan are desktop only, so have not assessed the level of permeability. Future proposals for swales would need to demonstrate that these can fit within the road reserve, protect pavements and other infrastructure, have sufficient capacity in accordance with Council's *Stormwater Management Procedure for New Development* (including site specific Council requirements), and that future maintenance arrangements are established.

Permeable road pavements or footpaths may be proposed by developers in future. The adoption of permeable pavements in Tasmania has been limited, and the acceptability of such surfaces would need to be confirmed by Council. Considerations would include asset life, maintenance requirements, drainage arrangements etc. For the purpose of the structure plan, it is assumed that the roads and footpaths are impermeable and that swales will receive runoff from those surfaces. While the swales should allow infiltration of runoff from small rainfall events (e.g. less than 5-10 mm), capacity for conveyance of larger, less frequent rainfall events is required. Clarence City Council requires that the drainage system must have sufficient capacity for the 5% Annual Exceedance Probability rainfall event (including allowance for climate change)²⁵ for residential and commercial areas, per the *Stormwater Management Procedure for New Development*.

Depending on the catchment area and the equivalent time of concentration for peak flow, the stormwater system may need to be designed to fully convey runoff from a rainfall event of 20mm or more without flooding of roads. Without sufficient information to estimate the infiltration capacity of swales, it is assumed that they will require underdrains and entry pits at the end of swale sections to convey excess stormwater via culverts to prevent flooding issues. It is expected that the culverts

²⁵ The Stormwater Management Procedure currently specifies that an allowance for climate change be made in accordance with the Australian Rainfall and Runoff Data Hub, scenario RCP 8.5, for the year 2090. It is noted that the climate change allowances required may be updated taking into account updated advice.

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will convey stormwater to existing gullies prior to discharge to the ocean. Where possible stormwater infiltration basins may be utilised within drainage corridors to help capture excess stormwater. The scope for this may be limited by the steep topography, width of drainage channels and potential landslide risks. As such, it is assumed that stormwater culverts will need to convey excess stormwater via drainage corridors.

Drainage of stormwater from roof runoff will also need to be considered, with stormwater connections required at the property boundary for each lot. Potential options are:

- Direct connection to stormwater culverts (conventional drainage solution)
- Discharge direct to swales (subject to Council consideration and approval)

The latter option is a departure from the typical expectation of Council, so would need demonstration by developers to ensure that it does not cause flooding or other issues. It may also be difficult to drain to the swales for lots located on the lower side. This may require an alternative drainage point (e.g. stormwater easements at the back of the lots/in service roads) or pump stations at each property. Pump stations are generally considered to be a last resort, due to the ongoing maintenance requirements and risk of potential failure.

Council may require on site detention (e.g. rainwater tanks) for development in this area to minimise peak runoff flowrates (as outlined in the Stormwater Management Procedure for New Development). Further requirements such as connections from rainwater tanks to laundry/toilet fixtures, or restricted outlet orifices, may also be required by Council to enable more effective management of peak flows.

Discharge direct to the ocean (or waterways) may only be accepted by Council if it achieves either site specific water quality targets²⁶ or default targets as follows:

- 90% reduction in average annual load of litter/gross pollutants
- 80% reduction in average annual load of total suspended solids
- 45% reduction in average annual load of total phosphorus
- 45% reduction in the average annual load of total nitrogen.

Alternatively, Council may accept a cash contribution from the developers for Council to complete treatment works.

While swales and other treatment devices may intercept a large proportion of pollutants, there is currently insufficient design resolution in the development plan to confirm if they could achieve the water quality performance targets. The Water Sensitive Urban Design Engineering Procedures for Stormwater Management in Tasmania (Derwent Estuary Program, 2012) indicate that it is possible to achieve the default water quality targets with bioretention swales that have a surface area of at least 1% of the impermeable surface area of the catchment.²⁷ It is recommended that developers

²⁶ Site specific targets may be required to protect sensitive waterways or threatened species (e.g. Spotted Handfish)

²⁷ Refer Chapter 4 – Bioretention Swales. <https://www.derwentestuary.org.au/water-sensitive-urban-design/>

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undertake modelling (e.g. MUSIC²⁸) for the proposed development and stormwater network to assess the performance and determine specific infrastructure requirements. It is envisaged that end of line treatment devices may be required in the coastal reserve to protect downstream environments (including habitat for threatened species such as the spotted handfish). Given the proposed width of the coastal reserve, it may be possible to install large infiltration basins to capture stormwater from most runoff events in this location preventing the need for discharge via ocean outfalls. This will need to be resolved as part of future engineering designs by developers.

Proposed developments also need to be designed to safely convey runoff via overland flow paths for a 1% Annual Exceedance Possibility event including allowance for climate change without undue inundation of any properties. This will be an important consideration of the developers, through the preparation of hydrology assessment reports, as they prepare engineering plans for proposed development. Such design storms may dictate the geometry of road corridors and the size (width) of drainage corridors.

4.4 Power

4.4.1 Demand Assumptions

Initial correspondence from TasNetworks²⁹ indicates that the following substations have headroom capacity for the proposed number of new connections in the Droughty Peninsula area:

- Rokeby Substation – 12 MVA
- Howrah Zone Substation – 3 MVA

These nearby substations have capacity for 3,000 to 5,000 residential lots, assuming a typical allowance of 3-5kVA per lot. It is noted that estimated demands do not necessarily take into account changes in future demand e.g. electric vehicle charging or community batteries. While the impact of potential changes on demand is not known at this stage, it is best to assume that demand could be at the upper end of the available supply. As development will proceed over a period of 20-30 years, this will provide sufficient opportunity for TasNetworks to identify potential supply constraints and plan upgrades if required. However, it is not expected that power supply will be a constraint for development in the short to medium term.

4.4.2 Location of Services

Kiosk substations are expected to be 500kVA (or larger) in size, with approximately 30 to be installed throughout the Droughty Peninsula area to meet demand as development progresses. The location of kiosk substations is to be determined in consultation with TasNetworks when draft development designs are provided. For high level planning purposes, a 500kVA kiosk substation has a footprint of approximately 3m x 1.4m. Allowing for operational access to kiosk doors a clear space of at least 6m

²⁸ Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software can simulate rainfall and pollution generation and treatment performance for different system configurations.

²⁹ Anita Bourn, Land Use Planner TasNetworks, via email 29/7/24

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x 4m is required on a flat foundation. This may require retaining walls and drainage on sloped ground (refer

Figure 3). Kiosks are to be located at least 3m from driveways and 1.6m from footpaths, with sufficient setback from buildings as shown in Figure 4.

Figure 3: Standard Kiosk substation spatial requirements. Source: TasNetworks Distribution Design and Construction Standard – Kiosk Substations.

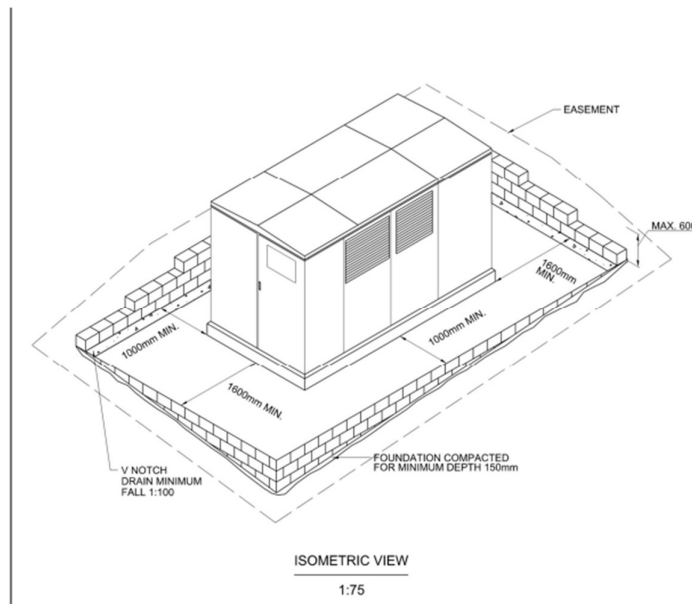
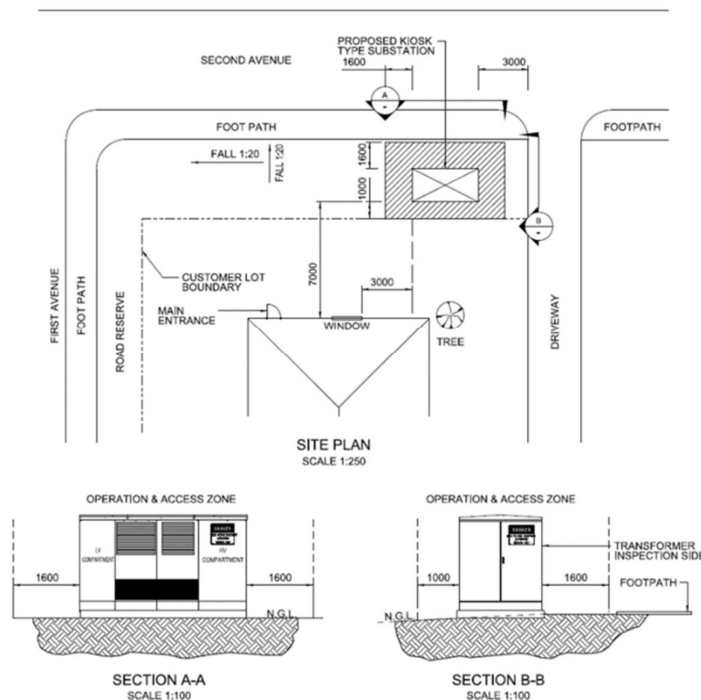


Figure 4: Site Selection for Kiosk Substations – Source: TasNetworks Distribution Design and Construction Standard – Kiosk Substations.



TasNetworks prefer substations to be located on public land e.g. within the road reserve, in parklands, or Crown/Council reserves, in locations where they are accessible (i.e. close to parking). Location of substation kiosks within a standard road corridor will be challenging without impinging on drainage, footpaths, cycleways etc and is not preferred by Council. While the street width could be locally widened to accommodate switchboards, strategic location of the kiosk substations adjacent to public open space e.g. park areas may be preferred to minimise visual or other impacts on the streetscape. Council prefers that substations are installed in locations that do not impact on the aesthetics or use of public open space.

It is assumed that power will be installed underground via conduits within road corridors. Depending on the location, multiple conduits may be required for supply to private lots as well as public infrastructure such as street lighting, traffic lights etc. Power cables typically need to be installed in non-trafficable areas to allow for safe access to pits for maintenance. Also, above ground turrets/kiosks/substations will need to be located either in the road verge or in public open space / parkland. Where service lanes are provided behind houses or commercial buildings, power cables may be run via these corridors, albeit outside trafficable areas.

4.5 Communications

4.5.1 Internet and landline

Development within the Droughty Peninsula Structure Plan area will need to provide for internet and landline communications from NBN or alternative service provider(s). Initial engagement with NBN³⁰ has confirmed they have sufficient capacity to service Droughty Peninsula from Howrah and/or Bellerive. Underground cables will need to be installed in street corridors to service residents and businesses. NBN has advised that their communication cables can be installed in shared trenches with other communications (e.g. for traffic lights) or power cables. Communication cables must be installed outside trafficable areas, with pits located in the verge (e.g. in planted areas or in footpaths/cycleways). Where service lanes are provided behind houses or commercial buildings, communication cables may be run via these corridors, albeit outside trafficable areas.

4.5.2 Mobile Service

Mobile service (5G) may be provided for by a tower on Droughty Hill (or nearby) to ensure suitable reception to all areas as required under the Australian Government's *Telecommunication in New Developments (TIND) Policy*. Blackspot surveys would need to be undertaken to confirm reception for each stage of development prior to construction. It is conceivably possible to service the entire peninsula with a macro tower on Droughty Hill or nearby for all service providers (or different towers for each provider). This is not preferred by Council since it would impact on the skyline. Alternatively, it is recommended that developers provide 5G via smart poles throughout development areas, which may host multiple carriers under the Neutral Host model. Council may also wish to provide for Wi-Fi in 'Smart Places' for management of public infrastructure (e.g. parking, bins, lighting) as part of a future trend toward increased deployment of Internet of Things networks.

³⁰ Steve Pullen, Damon Messias, Brett Howard, Video Conference 4/9/24

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4.6 Transportation/Traffic

Public and private transportation to and from Droughty Peninsula are important considerations given the scale of the proposed development, and distance from the Hobart CBD and other places of employment, training, shopping etc.

4.6.1 Public Transport

Bus Services

Metro Tasmania operate bus services to Tranmere and Rokeby including spur lines via Tranmere Road and Oceana Drive, as well as a loop via Tollard Drive including a bus stop at the intersection with Sunray Court. The Masterplan prepared by DPZ for Skylands proposes a bus loop via Oceana Drive and Tollard Drive with eight new bus stops. However, expansion of the bus service is likely to occur via stages as extensions of the separate Tranmere and Rokeby bus routes. The Department of State Growth³¹ has advised that it would be more effective to extend the current bus route from Tranmere via Oceana Drive assuming that occurs in a sequenced manner. Extension of the Rokeby bus service further down Tollard Drive would likely require a full redesign due to the current loop arrangement. Alternatively, a private operator could operate a service to extend the public transport network if required.

The street design for Droughty Peninsula needs to consider the geometry for large buses (and other large vehicles) along primary connector routes to ensure there is sufficient room for negotiating corners and turn around areas. Council may accept that large vehicles can depart from a single lane while turning (in some areas) to allow for tighter kerb radius on corners as a traffic calming measure.

Ferry Services

The Department of State Growth has advised that master planning for expansion of the ferry service has been undertaken, with consideration of potential future demands and the suitability of sites. The master plan has not considered a new ferry terminal at Droughty Peninsula at this stage, presumably due to the lack of current demand. Future master planning may consider Droughty Peninsula as a potential ferry terminal location, following sufficient development of the areas. Assessment of this option would need to consider site factors (e.g. water depth, exposure to ocean swell, environmental impacts) to determine its suitability. In the meantime, the existing Bellerive ferry terminal may capture some trips from the Droughty Peninsula area. Alternatively, nearer potential sites such as Howrah Point may be developed by the Department.

The Department of State Growth advise that future ferry terminals are intended to complement local placemaking, and that large car parks are not considered to be consistent with that vision. It is expected that public and active transport options will connect to the ferry terminal rather than it be developed as a 'park and ride' facility.

³¹ Sarah Poortenaar, Manager Strategic Networks Passenger Transport, Department of State Growth, email 17/10/24

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4.6.2 Traffic Assessment

SALT completed a traffic engineering report for the Droughty Peninsula area, considering both existing and projected future traffic loads from the proposed development. The main points of access to and from Droughty Peninsula are via:

- Oceana Drive or Howrah Road in Tranmere and
- Tollard Drive or Droughty Point Road in Rokeby.

Wait times for intersections with Rokeby Road/South Arm Highway and Shoreline Drive Howrah were assessed using SIDRA³² modelling software, to determine levels of service at peak hours. This indicated that no upgrades of the intersections are expected to be required other than optimisation of sequencing and perhaps some 'keep clear' pavement markings at the Oceana Drive/ Holland Court intersection due to the increased queue lengths. No upgrade to the South Arm Highway (other than currently proposed improvements) is expected to manage the additional traffic. It is noted however that the development of Droughty Peninsula will add considerable additional traffic loads to adjacent areas.

Key Assumptions

The traffic assessment includes some key assumptions regarding introduction of a ferry terminal and service on Droughty Peninsula with the following capacity:

- Initial service: 200 passengers during peak hour between 2030 and 2035
- Upgraded service: 400 passengers during peak hour from 2035.

It may be reasonable to assume the Department of State Growth would expand the existing ferry service to cater for growth in the Droughty Peninsula area, particularly as traffic loads increase and if the ferry service could defer or avoid potential upgrades to South Arm Highway or the Tasman Bridge. However, the introduction of the ferry service on Droughty Peninsula, or its timing are not guaranteed. A terminal on Droughty Peninsula is not included in the Department of State Growth's River Derwent Ferry Masterplan presumably due to lack of existing demand. It is recommended that future updates to the masterplan by the Department should consider growth in the Droughty Peninsula to determine the potential need for a ferry terminal in the area. Further consideration of future traffic loads and impacts on existing roads should be considered if the ferry terminal is constructed at Howrah Point in lieu of, or prior to Droughty Peninsula. However, initial assessment by SALT indicates that this is unlikely to trigger any additional upgrades for the intersections considered.

4.6.3 Road Design

REALM Studios has prepared a high-level concept for the primary and secondary connector roads to service the Droughty Peninsula area. The primary connectors extend from Oceana Drive, Tranmere and the Tollard Drive, Rokeby. Draft typologies have been provided showing nominal widths of traffic lanes, parking, footpaths, cycleways, swales and planted areas. These will require resolution by developers as part of future planning/engineering approvals to consider the necessary services to be

³² Sidra Intersection traffic modelling software.

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provided in the corridors, taking into account minimum separation distances and location constraints (e.g. distance from property boundaries). Given the steep nature of the Droughty Peninsula area, retaining walls are likely to be required in the road corridor, with potential split-level roads, and/or walls between the road and property boundary subject to Council approval. These will require further consideration including location of drainage pathways, access to properties and safe access and egress from parked vehicles. The primary and secondary roads are expected to largely follow natural contours and should ensure that the longitudinal grade is less than 10% to be suitable for buses and heavy vehicles. Side streets will be required between primary and secondary roads which may have steeper grades. Future development layouts will need to consider the grade and length of steep roads to protect public safety. All roads should be compliant with Council's *Local Highways Standard Requirements By-Law* which allows longitudinal gradients up to 17% for a maximum of 200m (or up to 20% for less than 70m with Chief Executive Officer approval).

Particular consideration should be made to ensure that buses and other large vehicles can safely navigate proposed transport routes. Proposed design vehicles for designing roads with reference to the Austroads *Guide to Road Design part 3 - Geometric Design* (2021) are as follows:

- Articulated bus (19m), Semi trailer (19m) – Level 1 roads and access to large depots/supermarkets etc.
- Single unit truck/bus (12.5m) – all Level 2 roads
- Service vehicle /garbage truck (8.8m) – all local roads.

Additional considerations, include:

- The ability for the disabled and active transport to safely cross streets
- The ability for passengers to access and egress from parked vehicles
- Location for waste and recycling collection including the ability for trucks to negotiate steep side streets
- Accessibility for fire trucks

A network of trails has been included to encourage active use along drainage corridors and ridgelines. These may potentially be utilised to manage bushfire risks if they are properly designed and maintained to the requirements of the Tasmanian Fire Service. Access to offtake points on the water supply should also be provided.

4.7 Geotechnical Considerations

Scherzic has completed a preliminary desktop geotechnical assessment of the Droughty Peninsula Structure Plan area. This has identified some high-risk areas indicated by historic landslips and erosion. The significance of these risks are not able to be confirmed without extensive on-site investigations which are beyond the scope of the Structure Plan. Such investigations are typically undertaken by developers for each development stage, taking into account the proposed alignment of roads and other infrastructure. Future developers of houses and commercial buildings will also need to undertake further investigations to obtain building approvals. Council has indicated they prefer that retaining walls are installed on private property. These will require engineering design,

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particularly for any retaining walls over 1m height in high-risk geotechnical areas noting that failure could impact on public property and safety (e.g. failure onto footpaths).

From discussions with Scherzic, at this stage the high-risk areas do not necessarily preclude the construction of public infrastructure including roads, pipelines and conduits that will need to cross these areas. However, the commercial viability of building construction may be limited in high-risk areas, especially if the depth to competent rock requires significant geotechnical improvement works (e.g. foundation piles). Given the level of uncertainty, no changes have been made to the projected number of dwellings in the Droughty Peninsula area, or the resulting infrastructure requirements (e.g. capacity of roads, water or sewage infrastructure) at this stage. However, it is reasonable to expect that some areas will require improved design of public infrastructure to mitigate the risk of unstable ground. Such examples include concrete base in pipeline trenches to reduce the risk of cracking, leaks and bursts. Roads may also require significantly improved pavement design to mitigate the risk of movement. An important consideration is the management of drainage to limit concentrated flows and potential erosion or landslips. Retention and establishment of vegetation may assist to reduce these risks but needs to be done in a way to not create unacceptable fire hazards.

5. CONCLUSIONS

Consultation with various service providers has confirmed that it is feasible to construct the physical infrastructure for the proposed development on Droughty Peninsula. The key outcomes are as follows:

- Electrical and communications (landline and mobile) may be provided by extension of existing services without major upgrades. It is expected that 5G smart poles will be installed in lieu of macro towers to preserve the skyline.
- Water and sewerage infrastructure will require significant upgrades to the existing networks (including pump stations, high level tanks and interconnecting pipework) to serve the peninsula, however initial development in some areas could feasibly occur without need to upgrade the existing water supply or sewerage network. Additional liaison with TasWater is required to confirm the number of dwellings that may be connected before upgrades are required.
- The stormwater drainage design approach and ongoing maintenance arrangements will need to be resolved as an integral part of the streetscape design and in consultation with Clarence City Council.
- Transportation modelling has been determined that no major upgrades are required for the intersections or main roads outside the peninsula. Additionally, some local area traffic management may be required for the additional traffic volumes e.g. turning lanes, pedestrian crossings etc. Extension of the existing public bus network on both sides of the peninsula, and provisions for active transportation will help to reduce traffic loads.
- Desktop geotechnical assessment of the peninsula has identified areas of high risk related to historic landslips and erosion. The level of risk and implications for construction of infrastructure cannot be quantified without site investigations however, it is expected that

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this may limit the financial viability of residential construction in some areas. The geotechnical conditions will need to be considered when designing physical infrastructure such as roads, pipelines, drainage etc especially in high-risk areas to ensure that they do not contribute to landslides or erosion in future.

5.1 Future Actions

Due to the high-level nature of the physical infrastructure assessment, there are several assumptions and uncertainties that need to be verified before development is approved in the area. The majority of these will need to be resolved by the developers as part of the planning and engineering approval phases in liaison with Council and service providers.

5.1.1 Developer Actions

Developers will need to undertake significant additional work to design infrastructure required for Droughty Peninsula as part of the planning and engineering approval phases. These include:

Water and sewerage

- Updated hydraulic modelling for extension of the water network based on density of development and proposed sequencing to confirm the size of water infrastructure (pipes, pumps, tank/s)
- Confirmation of the water network configuration with TasWater including connection points sizing and location of new pipelines, pump station, high level tank etc.
- Provision of access points to water supply for fire-fighting along trails at strategic locations in liaison with TasFire
- Consideration of the visual impact of the high-level tank and suitable mitigations (e.g. tree planting)
- Location and sizing of sewage pump stations to service existing and new catchment areas
- Undertake sewage network modelling to confirm the sizing of new gravity mains and if any upgrade of existing sewers are required
- Feasibility assessment of upgrades to existing sewage pumping stations

Geotechnical

- Site investigations to determine landslide and erosion risks, and to inform the design of physical infrastructure such as roads, retaining walls, drainage and pipelines.
- Soil tests to determine site permeability for stormwater and sewage network design
- Consideration of retention and establishment of vegetation in public open space to mitigate erosion risks without creation of unacceptable fire hazards.

Stormwater drainage

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- Confirm stormwater discharge standards with Council
- Develop concept stormwater design
- Verify if WSUD elements (e.g. swales) can be integrated into the streetscape successfully considering other infrastructure requirements and site slope
- Confirm future maintenance arrangements for WSUD elements with Council.
- Undertake stormwater modelling (eg MUSIC) to confirm treatment performance
- Confirm capacity for minor and major storm conveyance in accordance with Council's Stormwater Management Procedure (and site-specific requirements e.g. detention/retention storages such as rainwater tanks)
- Sizing of infiltration basins (if used) and confirm sufficient space within the coastal reserve to enable reliable function.

Power

- Location of substation kiosks to be determined in liaison with TasNetworks and Council so as not to physically impinge on the streetscape or public open space or to create aesthetic impacts

Communications

- Blackspot surveys to determine locations that require upgrade to mobile communications
- Liaison with Council to determine expectations for 'smart place' devices e.g. 5G connection to public infrastructure such as street lighting, parking, bins etc.
- Location and design of 5G smart poles in liaison with Council and service providers to provide reliable mobile communications

Transportation and road design

- Liaison with Metro Tasmania to confirm plans for extension of public bus stations including route and location of bus stops.
- Explore opportunities to provide a private bus service if required.
- Engage with Department of State Growth to confirm the proposed location of future ferry terminals at Droughty Point or nearby
- Additional traffic modelling if a ferry terminal at Howrah if pursued
- Confirm ability to accommodate all services within the nominated road corridors
- Confirm road geometry including longitudinal constraints with Council
- Determine location and height of retaining walls for Council approval taking into account geotechnical risks

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- Develop suitable off-street parking arrangements to ensure safe access to the road network, considering access grades and site slopes
- Develop active transport infrastructure concepts to ensure that they meet design requirements such as maximum grade

5.1.2 Council actions

Future actions for Clarence City Council required to inform infrastructure design include:

- Confirmation of discharge standards for stormwater
- Confirmation of design requirements for road geometry
- Confirmation of 5G Smart Places requirements
- Confirmation of suitable locations for substation kiosks

5.1.3 Third party actions

Additional work that is required by other parties include:

- Department of State Growth
 - Confirm location of a new ferry terminals at or near Droughty Point as part of future updates of the River Derwent Ferry Masterplan, considering future demand and the suitability of potential sites
 - Cost benefit study for a new ferry terminal at Droughty Point vs upgrade of roads
- TasWater
 - Complete hydraulic system modelling for the existing water supply network to determine available capacity for additional demand (number of equivalent tenements) prior to upgrade
 - Confirm suitability of proposed extensions for water and sewerage networks and determine upgrades required to existing networks
 - Confirm upgrade requirements to the Rokeby STP that need to be completed prior to construction of additional development

APPENDICIES

5.2 Appendix 1A: Existing water supplies and potential connection points

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5.3 Appendix 1B: Water Servicing Concept Plan

5.4 Appendix 2: Sewerage Servicing Concept Plan

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