Urangan South Land Use Strategy and Local Area Plan

Draft Structure Plan Report

June 2019

Prepared for Fraser Coast Regional Council
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Cardno®

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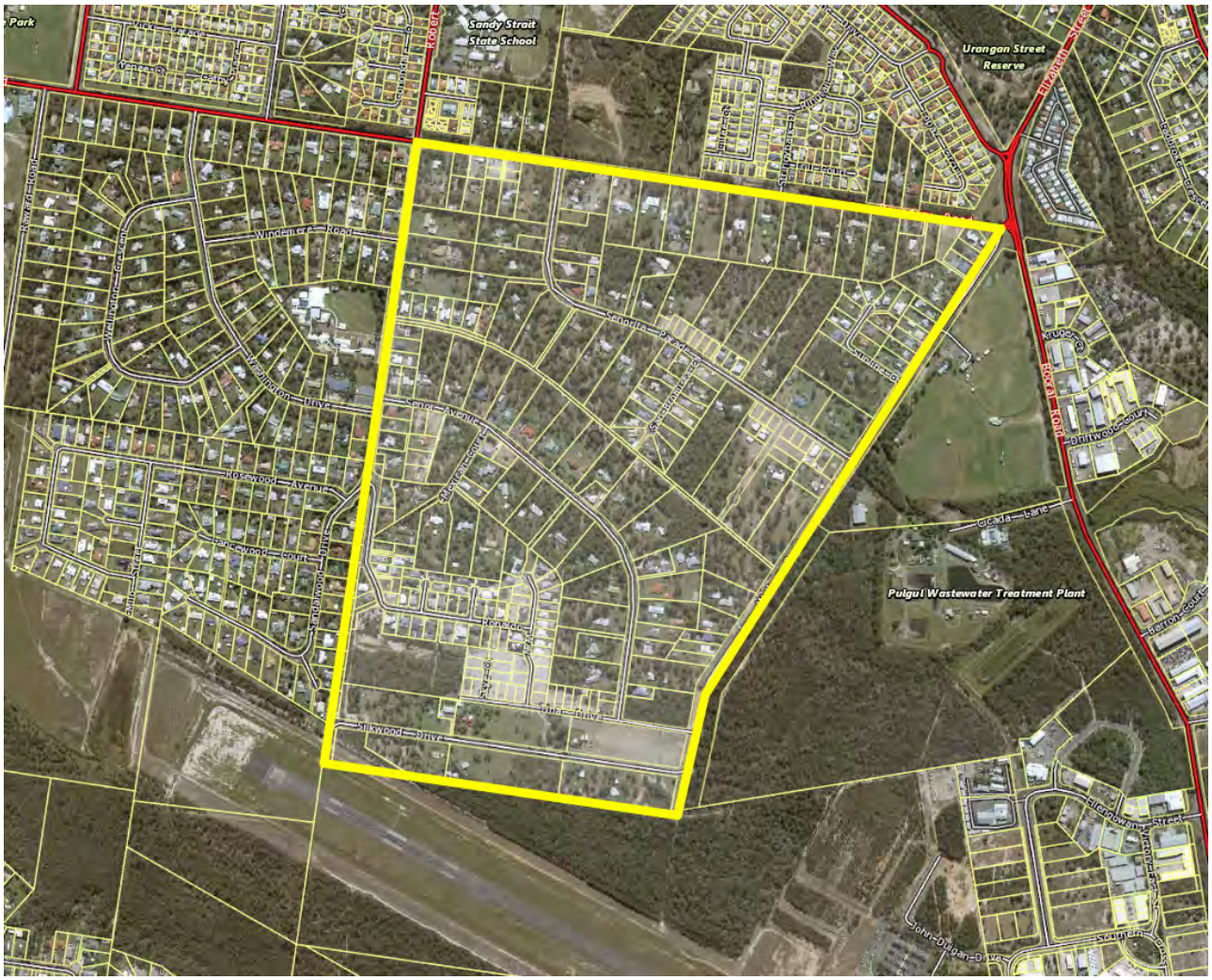
1 Introduction

1.1 Purpose

Cardno has been commissioned by the Fraser Coast Regional Council (the Council) to undertake a structure and local area planning exercise for the area known as Urangan South.

The Urangan South Project Area (the 'project area') has an area of approximately 137.3 hectares, and is located on the south-eastern periphery of the Hervey Bay urban area, approximately 4.5 kilometres from the Pialba CBD.

Figure 1-1 Urangan South Project Area



Referred to as the Land Use Strategy and Local Area Plan (the Project), it is intended to undertake a structure and local area planning exercise for the project area.

Historically, the project area has been used for very low density residential and rural residential type uses, with the area characterised by large lots (between approximately 1-5 hectares) occupied by single dwellings.

However, with the continued urban expansion of Hervey Bay towards the urban fringe, the project area is coming under increasing development pressure to accommodate general low-density residential land uses in accordance with the current low density residential zoning (the change to zoning occurring with adoption of the current Planning Scheme).

Given the large number of lots and the fragmented nature of tenure within the project area, this recent development has been opportunistic, with a number of individual small lot subdivisions establishing in an ad-hoc and uncoordinated nature across the locality.

To ensure that development within the project area contributes to the establishment of a sustainable urban settlement pattern and is supported by appropriate urban infrastructure services, Council is now seeking to prepare a land use strategy for Urangan South. The land use strategy (essentially a structure plan) will integrate environmental, land use, transport, urban design, urban infrastructure and staging considerations to identify and guide the preferred type, form, sequencing, and character of future development in the structure plan area.

Subsequently, the role of the Local Area Plan is to translate the structure plans into a format that integrates with the overall structure and operation of the current planning scheme, implements the identified outcomes of the structure plan and, most importantly, provides Council with the regulatory tools to effectively manage development in the project area with certainty. In implementing the Local Area Plan, Council will also need to be conscious of and adopt strategies for the delivery of infrastructure, either as up front capital works, or trunk and non-trunk infrastructure delivered in conjunction with the rollout of development activity.

1.2 Aims

The aim of the Project is to establish a well-founded strategic position from which to effectively manage future growth within the project area and to use this position to achieve key urban development outcomes.

More specifically, in accordance with the Council's project brief, the project aims to:

- Identify and test development scenarios for the optimal management of critical flood constraints within the project area;
- Identify the developable area and potential yields for the project area having regard to environmental values and character and amenity considerations;
- Identify key transport corridors and road linkages that will integrate the project area with surrounding development;
- Identify a stormwater solution for the project area that manages flooding and drainage constraints in a manner that is achievable, efficient and enabling (to realise development opportunity); and
- Identify the requirements for major water and sewer infrastructure to service the development.

1.3 Project methodology

The methodology for the Project comprises six (6) stages of work as summarised in **Diagram 1-1** (Project methodology). This report forms the output of Stage 3.

Diagram 1-1 Project methodology

1.4 Project deliverables

The deliverables for the project are summarised below:-

- a Project Area Context Analysis Report and Options Review incorporating a context analysis plan and summarising the key findings from Stage 2 to help inform subsequent project stages (dated October 2018);
- a Draft Structure Plan Report incorporating a vision statement, draft structure plan concept and supporting elements, comprising Stage 3 and being the content of this report;
- production of a Final Structure Plan Report following stakeholder consultation (Stage 5); and
- preparation of a Local Area Plan compliant with the *Planning Act 2016* for incorporation into the Fraser Coast Regional Council Planning Scheme (Stage 6).

The preparation of the Urangan South Structure Plan Report contained herein is the key deliverable from Stage 3 of the project. This report provides a land use structure for the project area, in conjunction with this report which contains information that has instructed the detail of the structure plan, and identifies infrastructure and delivery matters.

1.5 Information and data sources

The scope of this Project did not envisage or include the preparation of further technical assessments or studies for the respective development areas.

The analysis and structure planning undertaken within the project area has been informed by currently available information and data held by the Fraser Coast Regional Council and other government agencies.

It is noted that the flood information used in the preparation of land use scenarios is based on the 'Pulgul Creek Catchment Model Flood Outputs' and not the flood hazard information and mapping from the current Fraser Coast Planning Scheme. This data is the most up to date and locally detailed flood information available for the project area and provides for the study to develop a higher level of accuracy regarding management of flood impacts.

2 Background and context

2.1 Introduction

This Chapter provides an overview of the key characteristics of the Urangan South Structure Plan area. The discussion of key characteristics is largely reflective of the content of the Context Analysis Report produced in Stage 2 of the project, however has been refined in response to further information and insights being made available through the stakeholder engagement and community consultation process. The information summarised in this Chapter provides a basis for explanation of the outcomes pursued in the proposed draft Structure Plan.

2.2 Location and setting

The Urangan South Project Area (the project area) is a pocket of land located to the east of the Pialba principal centre and south of the coastal centre of Urangan. Refer to **Figure 1 – Location Map**.

The project area is predominantly made up of a number of large residential lots (2,000m^2 and larger), in keeping with its historical location on the periphery of the Hervey Bay urban area. Generally low lying, a number of shallow drainage channels traverse the area, with the various channels of Pulgul Creek converging to the east of the site in a large wetland. The Pulgul Creek Waste Water Treatment Plant (WWTP) is located in this area to the east. The Hervey Bay Airport is located adjacent to the south of the site.

The Urangan South Project Area has a total land area of approximately 137 hectares with the boundaries of the area generally defined by:

- Boundary Road to the north;
- Walkers Road to the east;
- Hervey Bay Airport to the south; and
- Hughes Road to the west.

Refer to **Figure 2 – Structure Plan Area** for details.

2.3 Key features and characteristics

Having been historically used for low density and large lot residential purposes, the Urangan South project area retains a predominantly residential character. Due to the large lot sizes available, mature vegetation has been retained throughout the project area, and contributes to the natural character and amenity of the locality. However, due to recent development activity, the southern part of the project area has begun to accommodate typical low-density residential subdivision, and the smaller lot sizes and removal of mature vegetation in this area exhibits a modern suburban character and built form typology.

Key natural features include the major drainage channels that traverse the central part of the project area. These channels support mature vegetation that provide the leafy and natural backdrop to the established residential dwellings.

The project area is also located adjacent to major infrastructure items including the Pulgul Creek WWTP and the Hervey Bay Airport. The proximity to these major infrastructure items and their respective potential odour and noise issues have slowed development within the project area, with the Urangan South area traditionally used as a form of separation area to limit denser forms of urban development from increasing the numbers of people potentially exposed to these nuisance emissions.

2.4 Development Activity

The Urangan South project area has not historically been subject to high levels of urban development. In general, development activity in the locality has been limited to a gradual expansion of low density, large lot residential living typologies on lots of 2,000m^2 and greater.

However, more recently, there have been a number of proposals for more significant urban development within the locality, aiming to take advantage of the recent re-zoning of the land and its adjacency to the eastern development front of the Hervey bay urban area.

A number of approvals for a significant extent of residential development have been granted over the site, predominantly in the southern sections. There are also a number of applications currently under assessment with Council that would significantly add to the scale and extent of urban development within the locality.

In particular, since 2014 and subsequent to the change to zoning, within the project area there is a total of:

- 79 lots approved (but construction not commenced);
- 15 lots discussed at pre-lodgement meetings;
- 30 lots undergoing assessment; and
- 166 lots already constructed.

This equates to a potential total of 290 additional lots within the project area. Refer to **Figure 3 – Development Activity Map** that identifies the locations of current application and development activity within the project area. This figure also identifies the constructed and approved layouts of lots, such that any future structure planning can be delivered cognisant of and responsive to (where possible) the lot outcomes that are already established and approved.

A further summary of the development applications within the project area, including their infrastructure requirements (i.e. sewer, water and stormwater conditioned on the development as non-trunk infrastructure), is provided in **Appendix A – Development Activity within the project area – approvals and applications**. It is noted that these numbers are based on a point in time, and the actual numbers of lots and dwellings within the structure plan area is constantly evolving in response to development activity, changes to approvals, and ongoing delivery of staged approvals. The development applications and approvals shown are therefore those available to the project team at the time of preparation of this report, and as such recent applications may not be shown. It is further noted that not all approved lots have been registered and sealed, and the cadastre shown in Figure 3 is the latest cadastre available at the time of preparation. The approved lot layouts of approvals within the project area have been taken into account in the preparation of the structure plan where relevant and warranted.

In terms of infrastructure delivery, the majority of applications and approvals provide all infrastructure connections as non-trunk infrastructure, with only one application appearing to necessitate trunk infrastructure delivery (comprising a sewer main along the central drainage corridor from Walkers Road to approximately Bonita Court).

2.5 Statutory planning context

2.5.1 Planning Act 2016

The *Planning Act 2016* (the Act) provides the overarching planning and development framework for Queensland. Therefore, planning exercises and future development within the Urangan South Project Area will be guided by the Act both in terms of making and amending planning instruments and assessing and deciding future development applications.

2.5.2 Wide Bay Burnett Regional Plan

All land within the Wide Bay Burnett Regional Plan (WBBRP) is identified within a regional land use category. The project area is included entirely within the 'Urban Footprint' land use category.

The Urban Footprint identifies land that can meet the region's projected urban development needs until 2031. The Urban Footprint includes established urban areas, new and residual broad hectare development lands, as well as land that could potentially be suitable for future urban development.

The intent of the Urban Footprint is to consolidate growth in locations that are well located and have access to employment generators, community facilities and services, and can make efficient use of available urban infrastructure.

The Urban Footprint does not imply that all land within the footprint can be developed for urban purposes, and land within the footprint may be unsuitable for urban development due to the presence of significant constraints such as flood, bushfire hazard, or coastal management issues.

2.5.3 Wide Bay Burnett Regional Plan State Planning Regulatory Provisions

The State Planning Regulatory Provisions for the WBBRP ceased to have effect on 16 May 2012. The practical implication of the Regulatory Provisions ceasing to have effect is that any development applications made within the project area will not trigger an assessment by the referral agency (DSDMIP). However, Council must still have regard to the relevant provisions of the regional plan when preparing planning schemes or planning scheme amendments for the locality.

2.5.4 State Planning Regulatory Provisions

State planning regulatory provisions (SPRPs) are State planning instruments that regulate development and can apply to all or part of the State. Apart from the Wide Bay Burnett State Planning Regulatory Provisions 2011 (referred to in section 2.5.3 above), no current SPRPs have particular relevance to the Urangan South project area.

2.5.5 State Planning Policies

The State Planning Policy (SPP) is a State planning instrument under the Act that is intended to provide a framework for protecting and managing particular matters of State interest. The SPP has effect when planning schemes are made or amended, and local planning instruments are required to achieve consistency (to the greatest extent possible) with any relevant aspect of the SPP. In the event that there is an inconsistency between an aspect of the SPP and a local planning instrument, the SPP prevails to the extent of the inconsistency.

Where an aspect of the SPP has not been appropriately reflected in a local planning scheme, a development application is required to be assessed against the relevant assessment benchmarks of the SPP.

The Minister has identified that the Fraser Coast Planning Scheme appropriately reflects the relevant aspects of the SPP. However, this advice reflected the version of the SPP in force at the time of preparation and commencement of the planning scheme in 2014. The current State Planning Policy commenced on 3 July 2017. In this regard the planning scheme does not technically reflect the latest SPP and as such may potentially apply to development applications within the project area.

2.5.6 Fraser Coast Planning Scheme

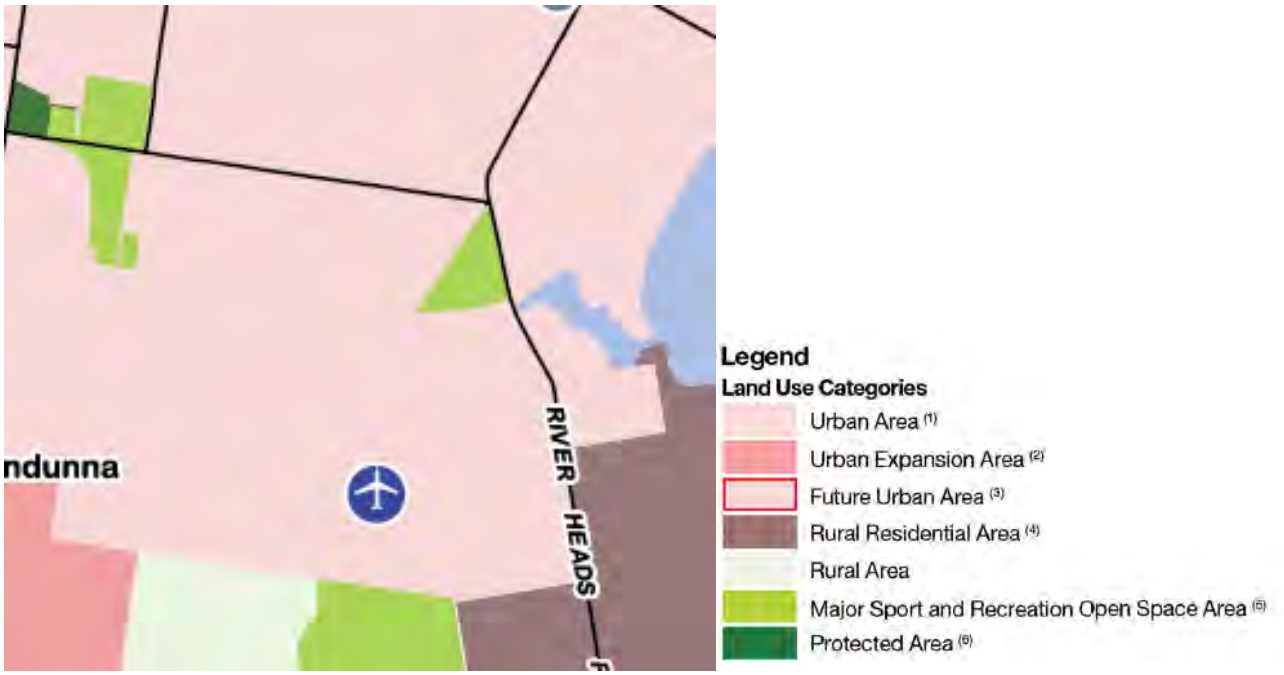
The Fraser Coast Planning Scheme 2014 is the local planning scheme that regulates planning and development within the project area.

The planning scheme was prepared under the Queensland Planning Provisions, and includes a strategic framework and zones that together identify the preferred type and location of development within the local government area. The planning scheme also includes a number of overlays that identify areas where there are specific constraints or opportunities for development. While it is acknowledged that there are a number of use codes and planning scheme policies that provide more detailed guidance as to the technical delivery of development, for the purposes of this structure planning exercise it is considered that the parts of the scheme relating more broadly to land use and settlement pattern are the most relevant.

2.5.6.1 Strategic Framework

The strategic framework identifies a number of land use categories relating to future land use and development within the local government area. The Urangan South project area is identified as being within the 'Urban Area' land use category.

Figure 2-1 Strategic Framework Map Extract



In relation to the settlement pattern for the region, the strategic framework intends that urban development occurs on land within the Urban Area, and in particular:

- Achieves a compact and consolidated urban form;
- Optimises the efficient delivery and use of infrastructure and services;
- Minimises exposure to physical and environmental constraints and natural hazards;
- Minimises the impact of lands supporting environmental, rural production and landscape values; and
- Enhances and preserves the discrete identities of individual cities, towns and villages of the Fraser Coast.

The settlement pattern theme also includes the following specific outcomes:

- Development should support the creation of complete and vibrant communities, including the provision social infrastructure and community facilities;
- New housing is designed to integrate with existing houses and community facilities;

- Residential development is characterised by a distinct identity that reflect the landscape setting and pattern of existing subdivision;
- Major infrastructure is protected from urban encroachment and other incompatible land uses to ensure its continued operation and viability; and
- The potential adverse impacts to people and property from natural hazards are minimised by ensuring that development avoids areas subject to flooding or otherwise mitigates potential impacts.

2.5.6.2 Zone

The subject site is included predominantly within the Low density residential zone (refer to **Figure 4 - Zoning Map**).

The purpose of the Low density residential zone code is to:

> *…provide for predominantly low density, low-rise residential uses on a range of lot sizes, supported by community uses and small scale services and facilities that cater for local residents.*

While being predominantly for residential purposes, small scale retail and commercial development may be appropriate where it serves the day to day convenience needs of local residents. The location of such non-residential uses must be compatible with the residential character and amenity of the area, and co-location of these services is encouraged.

A section of the Structure Plan area on the eastern boundary of the project area is included within the Limited development (constrained land) zone. This zone identifies land that is subject to a significant development constraint such as known flooding or land contamination. In this instance, the zone identifies that land that is subject to significant potential odour emissions from the adjacent Pulgul Creek Wastewater Treatment Plant. The inclusion of land within the Limited development zone recognises that the constraint it relates to cannot be managed or mitigated through any other means than by separation. Odour cannot be easily mitigated through mechanical solutions or landscape buffering, and as such the most effective land use strategy is to ensure that sensitive development does not locate within the area known to be affected. On this basis, within the Limited development (constrained land) zone, no further reconfiguration for residential purposes is permitted as a Performance Outcome of the relevant zone code (PO4).

A small part of the south-western corner of the project area is included within the Limited development (constrained land) zone and the Community facilities CF2 (Government purpose and public utilities) zone. The Community Facilities Zone relates to land associated with the Hervey Bay Airport, while the Limited development (constrained land) zone includes a small corridor of land that forms part of the OLS for the airport. No further urban development is generally intended to occur within these zones as they provide a separation distance and buffer to maintain the safe and efficient operation of the airport.

A narrow strip of land is zoned as Open Space. This zone relates to land utilised for the constructed drainage corridor that traverses the central part of the site. As currently configured no urban development is able to be accommodated within the narrow strip of land, and it is not intended that it would be changed to allow for urban development given its importance to the Structure Plan area in conveying stormwater flows.

It is noted that prior to the commencement of the Fraser Coast Regional Council Planning Scheme in 2014 the part of the site now included in the Low density residential zone was included within the Emerging community zone. The Emerging community zone was intended to conserve land that may be suitable for urban purposes, and provide a framework for the planning and sequential development of the area over time. In particular, the Acceptable Solution AS3.1 for the Emerging community zone code stated:

> *Development complies with an approved Structure Plan of Council.*

Effectively this required any development proponent to prepare a 'plan of development' that considered infrastructure provision, coordination of land uses, and sequencing of development across the broader area. However, once the project area was removed from this zone ad-hoc development has occurred which has resulted in a fragmented pattern of isolated developments that do not provide for an integrated and well connected settlement pattern.

The current structure planning exercise is intended to prepare an area wide plan of development for the Urangan South site, which will then be translated into a Local Area Plan in the planning scheme.

2.5.6.3 Overlays

Overlays identify land that is subject to a particular planning constraint or opportunity, and requires specific management or development controls to ensure development responds appropriately.

Having regard to the Overlay maps in Schedule 2 of the current planning scheme, the Urangan South project area is subject to the following overlays (refer to **Figure 5 – Overlays (Planning Scheme)**):

- ASS Overlay – Area 2 (Land above 5m AHD but below 20m AHD);
- Airport and aviation facilities overlay – 20m ANEF Contour, Horizontal Surface Limitation Boundary, 3km distance boundary;
- Biodiversity areas, waterways and wetlands overlay – Other remnant vegetation, MSES Regulated vegetation intersecting a watercourse;
- Bushfire hazard overlay – Medium bushfire hazard area and potential impact buffer;
- Coastal protection overlay – Coastal zone;
- Flood hazard overlay – Flood hazard area[1]; and
- Infrastructure overlay – Waste water treatment plant buffer.

In relation to Bushfire hazard mapping, it is noted that the overlay mapping identifies the southern part of the project area as being subject to Medium bushfire hazard. This mapping was prepared prior to the ongoing development of the locality for the Huntingdale Woods Estate, and due to vegetation clearing the level of bushfire hazard has now been reduced.

The data used to inform the Flood hazard mapping in the planning scheme (and shown in **Figure 5 – Overlays (Planning Scheme)**) was based on older studies that were available at the time of preparation. A more recent flood study has been prepared for the project area that utilises more up to date data and modelling methods, and this data has been used to inform flood hazard considerations for the current structure planning project. This flood hazard data is provided at **Figure 6 – Flood Hazard Map**, and clearly shows a greater extent of flooding than the planning scheme mapping in **Figure 5 – Overlays (Planning Scheme)**. It is noted that this new flood hazard modelling will also be used to inform subsequent amendments to the mapping in the Fraser Coast Planning Scheme.

The Biodiversity areas, waterways and wetland overlay in the planning scheme is based on data made available from the State government. This State government data appears to be misaligned with the location of the central drainage channel (between Senor Avenue and Senorita Parade), and it is assumed that this is an anomaly with the mapping (see **Figure 7 – Matters of State Environmental Significance Mapping** which shows the State data set that informs the planning scheme mapping). Despite the exact location of the mapped corridor being unclear, the mapping does indicate that the central drainage channel does have environmental significance, and these values should be considered in the final structure plan.

[1] This overlay is based on the available flood hazard mapping at the time of preparation and commencement of the planning scheme. For the purposes of the current project, data from a recent 2018 flood hazard investigation for Pulgul Creek has been used.

2.6 Other planning instruments and legislation

Apart from the planning instruments described in the preceding sub-sections of this report, no other planning instruments are considered particularly relevant to the development area.

Notwithstanding, the following State and Commonwealth legislation may potentially influence planning and development decisions within the development area:-

- *Nature Conservation Act 1992*, given that essential habitat for several species listed as vulnerable under this legislation is located adjacent to the development area;
- *Environmental Protection and Biodiversity Conservation Act 1999*, given that fauna species listed as vulnerable under this legislation (Koala) may potentially be located adjacent to the development area.

2.7 Project implications

There are a range of State, regional and local planning dimensions that will require address in considering the future development options for the Urangan South project area.

The most relevant implications that arise from a review of the planning framework are as follows:-

- the Urangan South project area is included in the Urban Footprint land use category of the Regional Plan. Through this designation, the project area is considered to be potentially suitable for urban development;
- the Urangan South project area is identified in the Strategic Framework of the Fraser Coast Regional Council Planning Scheme as being within the Urban Area which further supports the use of the land for urban development;
- the Urangan South project area is included predominantly within the Low density residential zone, which commits the land to some form of low density residential development;
- the part of the Urangan South project area included within the Limited development (constrained land) zone is not further developed so as not to increase the number of people exposed to nuisance odour emissions from the Pulgul Creek Wastewater Treatment Plant and noise from the Hervey Bay airport;
- various aspects of the SPP are applicable to development in the Urangan South project area. In particular, development in the Urangan South project area must ensure:-
  - the protection of people and property from flood hazard and bushfire;
  - the protection of values associated with Matters of State Ecological Significance (MSES) both on the site and adjacent to the site;
  - the protection of ecological values associated with wetlands and waterways;
  - the protection of the operational safety and efficiency of Hervey Bay Airport.
- any future urban development within the Urangan South project area must consider the protection of the existing Pulgul Creek Wastewater Treatment Plant from encroachment by incompatible development.

3 Key issues for structure plan area

3.1 Land use and tenure

The Urangan South project area is predominantly used for low density residential development. Historically the area was characterised by large lot residential forms of living, with detached dwellings and outbuildings on lots of between approximately 1-2 hectares. However, more recently a number of typical suburban subdivisions have begun to commence, particularly in the southern part of the project area south of Senor Avenue.

In the central part of the project area (refer to **Figure 2 – Structure Plan Area**), land use remains predominantly for large lot residential living on lots ranging between 8,000m^2 and 15,000m^2.

The major focus of recent subdivision is on the southern boundary of the area. This area is slightly elevated, and the recent pattern of subdivision provides for a mix of lot sizes between approximately 600m^2 and 1,500m^2. Further low density residential subdivisions have also commenced on the eastern boundary of the project area, with subdivisions on the corner of Senorita Drive and Walkers Road and Sunline Court and Walkers Road providing lots between approximately 1,000m^2 and 2,500m^2.

A small landscaping business is located on the corner of Senorita Parade and Boundary Road. This is the only commercial/retail land use within the project area, and has a total land area of approximately 1 hectare. This is an established use (presumed to be lawfully established), but does not provide indication of a longer term preference for this, or other, non-residential uses within the structure plan area.

Land within the Urangan South project area is predominantly in freehold tenure. A long and narrow reserve extends from Jordan Close to Senor Avenue. The reserve accommodates a drainage corridor to allow for services/drainage infrastructure to extend from the central part of the site to the emerging subdivisions on the southern part of the area.

3.2 Development Activity

As described in section 2.4 of this report, a number of approvals for a significant extent of residential development have been granted over the site, predominantly in the southern section. There are also a number of applications currently under assessment with Council that would significantly add to the scale and extent of urban development within the locality. Refer to **Figure 3 – Development Activity Map** and **Appendix A – Development Activity within the project area – approval and applications** that identifies the details of current application and development activity within the project area.

Key issues arising from the development activity that has occurred and is occurring, including the following.

- The part of the Structure Plan area to the south is largely accounted for through approvals for urban residential development (both constructed and yet to commence). These approvals provide for urban infrastructure delivery, with all lots being serviced by water, sewer and stormwater networks. There remain some areas available for further subdivision in the very south of the Structure Plan area, which it is assumed will be consistent with the scale and density of development that has already been constructed and approved.
- Subdivision approvals that have occurred in the central part of the Structure Plan area, to the south of the drainage corridor, are generally for larger lots (i.e. greater than 2,000m^2). This reinforces a character generally observed in that part of the Structure Pan area. These lots are provided with urban water connections, but typically provide for on-site sewerage facilities. Notably, there is limited development activity on the lots adjacent to the drainage corridor, which provides ability to manage stormwater on this side of the corridor.
- Subdivision approvals that have occurred in the central part of the Structure Plan area, to the north of the central drainage corridor and south of Senorita Parade, are for a range of sizes from approximately 800m^2 to 3,000m^2. These approvals and existing allotments provide for a potential disruption to drainage corridor and open space expansion and esplanade roads to the existing central drainage corridor. These lots are provided

with urban water connections. Stormwater falls to the drainage corridor. Sewer is provided either on-site or via a new trunk main to be constructed from Walkers Road to approximately Bonita Close.

- Subdivision approvals in the northern part of the Structure Plan area are mixed – with both lots of 800m^2 and larger lots (i.e. greater than 2,000m^2). One approval in particular (ROL-153072) provides for a second stage of development, including road connections, that is not cognisant of broader urban form and infrastructure issues. However, we note that Council may be resisting the progression of that second stage, until such time as this Structure Planning process is progressed. We note that some minor redesign of this stage may be required, and the structure plan process may assist in achieving a settlement pattern that can allow for a modified approval to be pursued whilst facilitating the development of the northern precinct.

3.3 Physical and environmental elements

3.3.1 Topography

The Urangan South project area is generally flat, falling gradually from approximately 20m AHD on the southern boundary down to approximately 10m AHD adjoining the Pulgul Creek wetlands on the eastern boundary of the site.

3.3.2 Flooding and drainage

The natural drainage regime for the project area is from the west to east, in keeping with the prevailing topography of the locality. Two major overland flowpaths traverse the central part of the project area from west to east, discharging into the wetlands adjacent to the eastern boundary of the site (refer to **Figure 6 – Flood Hazard Map**). It is noted that this map is based on a recent Cardno flood modelling exercise for the Pulgul Creek catchment, and is a more accurate assessment of the extent of flooding than the mapping used to inform the flood hazard overlay within the current planning scheme as shown at **Figure 5 – Overlays (Planning Scheme)**.

The major drainage channel extends across the site within a dedicated lot generally between Senor Avenue and Senorita Parade. This 'central drainage channel' has been profiled to be approximately 90cm deep and incorporates a granite boulder lining to protect the channel from scour. In rain events, including relatively minor events such as the Q2 rain event, the channel is not able to accommodate the volume of water and overtops, spreading into the near vicinity. The depth of flooding is generally shallow (given the flat topography), with flood depths in the Q100 event ranging from approximately 1.5m within the channel to approximately 0.1m further from the central channel.

Another drainage channel is located in the northern part of the site, generally located between Boundary Road and Senorita Parade. This 'northern drainage channel' is a natural overland flow path and has not been modified in any way. Due to the flat topography of the locality the flood extent is relatively wide, and varies in depth between approximately 0.5m and approximately 0.1m.

Stormwater ponds adjacent to the Walkers Road frontage of the site. At this location the two channels are directed under the road via culverts and discharge into the Pulgul Creek wetlands adjacent to the site. Depths in this area range from between approximately 0.6m to 0.8m.

While the flood depths and velocities potentially have impacts on the safety of people and property, the level of hazard is relatively low.

It is noted that a recent flood modelling exercise for the Pulgul Creek catchment was prepared by Cardno. The outputs of this investigation have been used in the preparation of this analysis to inform:

- modelling of drainage options; and
- understanding of flood hazard within the structure plan area.

3.3.3 Coastal Hazard Areas

Although in proximity to the coast, the Urangan South project area is not identified as being subject to coastal hazard such as storm tide inundation or include areas identified as erosion prone areas.

3.3.4 Waterways and wetlands

3.3.4.1 Waterways

There are no major or permanent waterways within the project area, however Pulgul Creek is located adjacent to the eastern boundary of the site. While not a natural waterway, the main drainage channel that extends through the site functions as a waterway with a defined course and known extent and is identified as a watercourse on the Vegetation Management Supporting Map.

Two (2) non-permanent drainage gullies flow through the central part of the project area, with a number of small ponds providing detention and water storage options for amenity and landscaping purposes on some larger residential lots on the eastern part of the project area.

3.3.4.2 Wetlands

There are no mapped wetlands within the Urangan South project area.

However, High Ecological Significance (HES) wetlands are located adjacent to the eastern boundary of the project area associated with the confluence of the two drainage channels with Pulgul Creek. The ongoing health and function of these wetlands will be influenced by land use and construction practices within the project area, and as such measures to protect the quality of water entering the receiving environment will be an important consideration in future development of the Urangan South project area.

3.3.5 Vegetation and ecology

Although a green and leafy environment, significant clearing associated with dwelling construction has thinned the remaining vegetation on site.

Remnant vegetation is predominantly associated with the two drainage channels that traverse the site. In particular, a long corridor is identified as being a Category R area (regrowth vegetation associated with a watercourse) on the Regulated Vegetation Management Map. It is noted that the mapped corridor does not directly align with the central drainage channel (between Senor Avenue and Senorita Parade), and it is assumed that this is an anomaly with the mapping. Despite the exact location of the mapped corridor being unclear, the mapping does support the assumption that the vegetation communities generally in the location of the central drainage corridor have some value that requires consideration.

A small pocket of Category R area vegetation (regrowth vegetation) is also located on the south-western corner of the project area. This appears to be associated with a small dam/pond that forms part of the drainage system that extends between the project area and the airport.

Ecological values are generally limited within the Urangan South project area, with the area having been highly modified to support historical residential development and not providing a varied habitat that would support a broad range of terrestrial or aquatic species. However, mapped essential habitat adjacent to the east of the site is identified as being essential habitat for Koala and the Wallum Froglet.

Figure 7 – Matters of State Environmental Significance Mapping includes current SPP mapping identifying MSES as it applies to the Urangan South project area and surrounds.

3.3.6 Land resources

Having been historically used for urban development, there are no specific land resources (such as extractive industry or Agricultural Land Classification Class A or Class B lands) within the project area.

3.4 Character and amenity elements

3.4.1 Surrounding land uses

Situated within a pocket of land on the south-eastern periphery of the Hervey Bay urban area, the project area is surrounded by a number of urban land uses.

Surrounding land use to the north and west is predominantly low density residential, with some community infrastructure including the Star of the Sea Primary School and Child Care centre located adjacent to the western boundary of the area on Hughes Road.

Surrounding land uses to the east include the Pulgul Creek WWTP, with a large field sports complex situated adjacent to the eastern boundary on Walkers Road. Due to the large wetland area adjacent to the eastern boundary, there is a large separation distance of approximately 800m to the industrial development further to the east on Booral Road.

Although not directly adjacent, the Hervey Bay Airport is located to the south of the site. The airport runways and facilities are located approximately 500m to the south of the site, with the intervening land comprising of typical melaleuca vegetation communities as found in lower lying coastal areas.

3.4.2 Character and identity

The Urangan South project area is characterised as a large lot residential area. Individual detached dwelling houses and associated large sheds and other outbuildings predominate in the project are, with stands of retained vegetation throughout that provides an attractive and natural character and amenity.

The major landscape feature of the project area is the retained vegetation and overland flow paths that traverse the central part of the site. Being relatively flat, the vegetation provides a sense of enclosure that frames the low set dwellings, and provides significant separation and privacy between lots. However, the newer development on the southern part of the project area is transforming into a denser form of suburban living, with smaller lots and less natural vegetation providing a modern and organised suburban character and amenity.

Although presenting as a pleasant and quiet residential enclave, the Urangan South project area does not exhibit any particularly distinctive or outstanding visual character elements that would warrant particular protection.

3.5 Infrastructure considerations

Within the Urangan South structure plan area, there are notable constraints with respect to the delivery of infrastructure services. An exploration of various options was undertaken as part of the scenarios analysis in Stage 2 of this project, which demonstrated that infrastructure delivery for all urban services could occur, however there is a need to balance the cost efficiency of that delivery with the potential development yield that would be generated. Any proposed development within the structure plan area will require access to suitable infrastructure, the undertaking of site specific flood and stormwater investigations, and the preparation of any required management plans to address these issues.

This structure plan area report and accompanying concept plans provide conceptual information with regard to the provision of infrastructure to service the development area. It should be noted that actual requirements for trunk infrastructure and any potential offsets that may be applicable will be in accordance with the Local Government Infrastructure Plan in place at the time of development applications being made. Recommendations about the delivery of infrastructure, via trunk or non-trunk mechanisms, are made later in this report.

Development in the Urangan South structure plan area should provide for infrastructure and services which are designed and constructed to:

- comply with, and not otherwise compromise, the identified networks and hierarchies of planned infrastructure;
- be co-located, where reasonably practicable, with other infrastructure networks;
- minimise the overall life cycle costs of the infrastructure and the network;

- achieve a high level of environmental performance;
- take into consideration the combined demand requirements of the land uses; and
- be provided ahead of, or in conjunction with, the early stages of development.

The following sections provide an analysis of the key infrastructure networks, with recommendations for augmentation and delivery contained in later sections of this report.

3.5.1 Transport network

The project area is accessible via connections off Boundary Road including:

- Walkers Road;
- Senorita Parade; and
- Hughes Road.

Figure 3-1 Site Location

Source: Photomap by nearmap.com

3.5.1.1 Existing Road Network

The project area has an area of approximately 140 hectares, with the boundaries generally defined by:

- Boundary Road to the north;
- Walkers Road to the east;
- Hervey Bay Airport to the south; and
- Hughes Road to the west.

The key roads surrounding the development are illustrated on **Figure 3-2** with the key characteristics of these roads summarised in **Table 3-1**. A street-view of major connecting roads within the development area out illustrated in **Figure 3-3**, **Figure 3-4** and **Figure 3-5**.

Figure 3-2 Local Road Network

Source: Photomap by nearmap.com

Table 3-1 Local Road Network

Road	Authority	Classification	Posted Speed Limit	Typical Form
Booral Road	TMR	State Road	60 km/h	Undivided two-way two lane
Boundary Road	FCRC	Traffic Distributor	60 km/h	Undivided two-way one lane
Hughes Road	FCRC	Major Collector	60 km/h	Undivided two-way one lane
Walkers Road	FCRC	Major Collector	60 km/h	Undivided two-way one lane
Senorita Parade	FCRC	Minor Collector	60 km/h	Undivided two-way one lane
Senor Avenue	FCRC	Minor Collector	60 km/h	Undivided two-way one lane

Figure 3-3 Existing Senorita Parade Cross Section

Source: Photomap by nearmap.com

Figure 3-4 Existing Senor Avenue Cross Section

Source: Photomap by nearmap.com

Figure 3-5 Existing Walkers Road Cross Section

Source: Photomap by nearmap.com

3.5.1.2 Planned Road/Intersection Upgrades

The Fraser Coast Regional Council's Planning Scheme identified the planned upgrades on the trunk road network in its Local Government Infrastructure Plan (LGIP). Of relevance to the structure plan area are the following items:

Table 3-2 Planned Upgrade Works

ID	Location	Description of Works	Timing
BS29	Boundary Road (Urangan)	Bus Stop	2031
BS30	Boundary Road (Urangan)	Bus Stop	2031
RC009	Boundary Road	Road Upgrade to Traffic Distributor Type 1 (2-lane undivided to 4-lane median divided)	2025
ISF26	Boundary Road / Robert Street / Hughes Road Intersection	Intersection	2020

Figure 3-6 Planned LGIP Upgrades

Source: Photomap by nearmap.com

As outlined in **Table 3-2**, planned LGIP upgrades on Boundary Road include a duplication from 2-lanes (undivided) to 4-lanes (median-divided) by 2025. Access to lots with frontages along Boundary Road are recommended to be via rear-lot accesses. Therefore, roads internal to the structure plan area are required to accommodate rear-lot access.

In addition to Council upgrades, it is understood that the Department of Transport and Main Roads has undertaken planning to upgrade the Boundary Road / Booral Road / Walkers Road intersection. At the moment, the intersection is in the form of two separate sites, Boundary Road / Booral Road and Boundary Road / Walkers Road. The upgrade will involve consolidating the two adjacent intersections to one intersection.

3.5.2 Water and Sewer Network

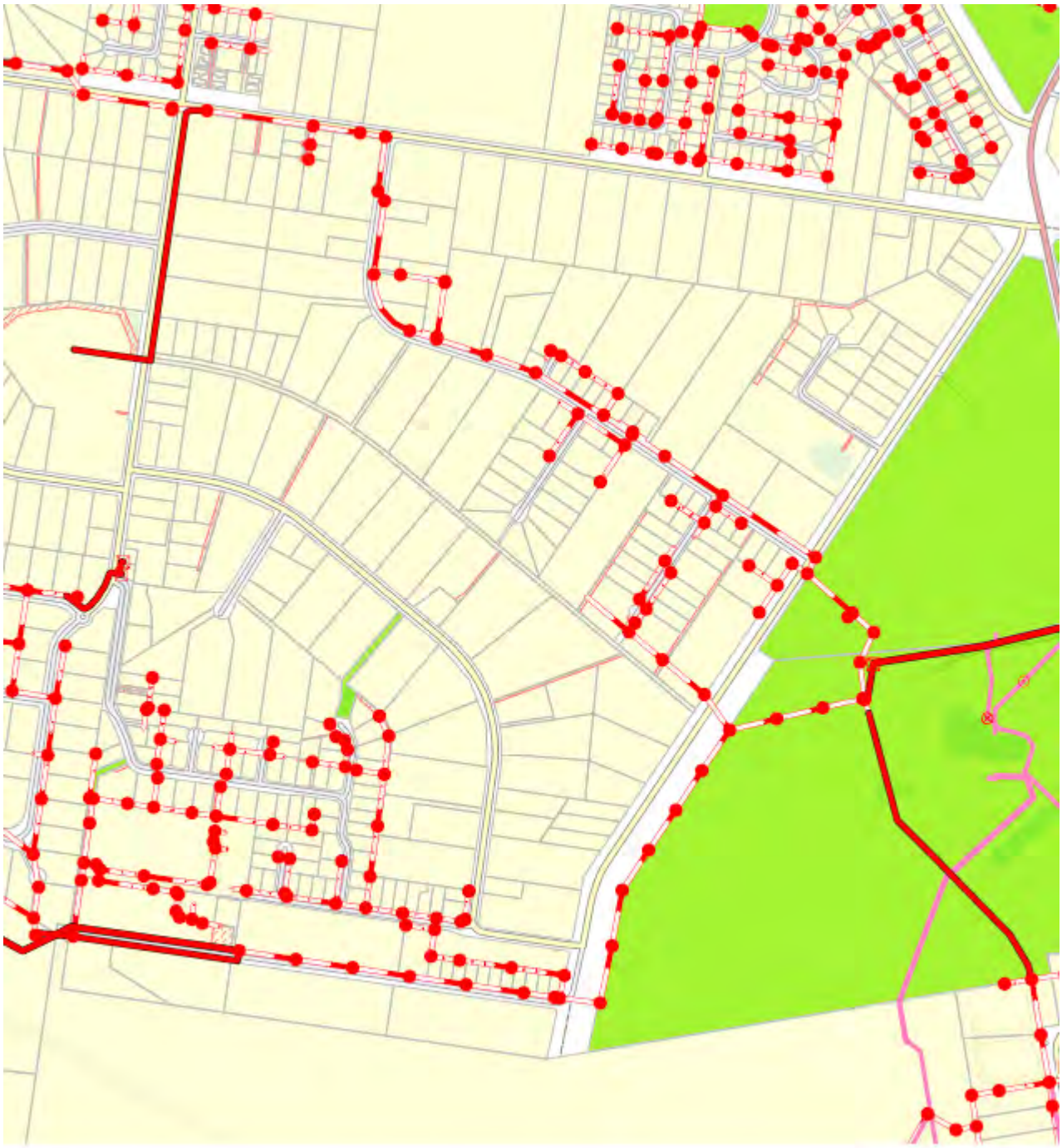
The existing water network consists of a double loop, as shown in **Appendix B – Water and Sewer Figures** (extract in **Figure 3-7** below).

Figure 3-7 **Existing water network infrastructure**

This allows for consistent pressure and flow delivery throughout the network, servicing all precincts. The pipe size is primarily smaller diameter pipes, ranging from DN100 to DN150 in size.

The sewer infrastructure is well developed in the South Precinct, consisting of DN150 mains feeding into a DN345 main. The northern and central precincts are primarily un-serviced. There is a DN600 main running from the northern precinct through the central precinct. The existing sewer infrastructure can be seen in **Appendix B – Water and Sewer Figures** (extract in **Figure 3-8** below).

Figure 3-8 Existing sewer network infrastructure



The nature of the topography will likely significantly impact on the sewer alignment. Multiple gravity sub catchments will be required within the defined structure plan area. A significant catchment will be serviced by a gravity main filling the predominant valley. Smaller catchment to the north and south will be serviced by new mains. In association with an existing development approval, a trunk main has recently been constructed from approximately Bonita Court to Walkers Road. There is opportunity to extend that sewer further along the central drainage corridor to service upstream lots, however this would be dependent on the lot sizes and development yields ultimately pursued in the central catchment.

Due to the large existing lot size, the project area can be treated similarly to a "green-field". As a result, infrastructure can be placed in the optimal position, to reduce cost and difficulty of construction.

3.5.3 Stormwater and drainage

As noted in earlier sections of this report, stormwater and drainage is a critical constraint to site development. Cardno has recently undertaken a flooding analysis of the Pulgul Creek catchment, which contains the Urangan South project area. Flooding data from this investigation found that there are two critical conveyance paths that flow through the central and northern catchments. Refer to **Figure 6 – Flood Hazard Map**.

The central flow path includes a constructed channel, which overtops for relatively small events, resulting in low depth flooding over a large area. Flood depth mapping for the area clearly shows that this drain has been constructed roughly along the same alignment as the natural watercourse. Other than the construction of the channel however, no further modification of the floodplain occurs. This would suggest that the channel was constructed primarily to cater for frequent flows. It is unlikely that the extent of inundation for larger events has been significantly affected by the construction of this drain.

The Northern Precinct currently does not have a formalised drainage channel to contain the flooding extent. Therefore, the overland flow discharged across the Northern catchment follows the natural low points in the topography, inundating several properties.

It is considered that the central flow path offers significant opportunities in terms of reducing the extent of flooding through the optimisation of the drain in conjunction with localised filling. Similarly, the northern drain is likely to result in similar benefits through a combination of drain shaping and overbank filling. The primary constraint to this approach are existing properties that have recently been developed. Any modification of the drainage channels will need to be located and designed to incorporate existing development to the greatest extent practicable while maximising conveyance capacity for the locality.

3.5.4 Energy and telecommunications infrastructure

Development in the structure plan area will need to provide for the establishment of electrical and telecommunications infrastructure networks suitable to supply the needs of the variety of intended land uses within the plan. Site specific investigations, in conjunction with discussions with the relevant providers, will need to be undertaken and assessed as part of any future development within the structure plan area. It is understood that there is currently energy and telecommunications infrastructure available throughout the structure plan area, to service urban development.

3.6 Structure Plan Area Context Analysis Plan

Based on the findings of the Context Analysis Report in Stage 2, a development area analysis plan was compiled. Refer to **Figure 8 – Development Area Analysis Plan**. The Project Area Analysis Plan synthesises the important opportunities and constraints identified as part of the development area context analysis process. This includes the identification of key features and potential developable areas within the Urangan South project area.

Importantly, the Project Area Analysis Plan provides a basis for carrying out more detailed planning within the structure plan area and the identification of a preferred structure plan concept.

The Project Area Analysis Plan highlights the following:-

- the project area is constrained by flooding along the two channels that traverse the site;
- the influence of the Pulgul Creek Odour Buffer limits potential for significant intensification of land uses on the eastern boundary of the site;
- ecological constraints on the site are limited to a narrow corridor that is generally aligned with the drainage channel that traverse the central part of the site;
- the unconstrained areas are generally contingent with the existing urban area of Hervey Bay to the north and west; and

- existing and approved development has progressed significantly in the northern and southern parts of the project area and has entrenched a particular pattern of development.

3.7 Land use requirements

3.7.1 Residential land use

The relevant planning instruments intend for urban land to be used efficiently for the delivery of residential development catering to the growing Hervey Bay population. Equally, delivery of residential development in urban areas should be responsive to local characteristics, environmental matters and infrastructure availability and efficiency. There is no identified 'need' or 'requirement' for a particular yield of residential development in the Urangan South structure plan area. However, given that the land is included within the Low Density Residential Zone, there is an assumption and expectation made within the planning scheme that some residential development will occur in this location. The approach for delivery of future residential land use is to balance those expectations with the relevant characteristics of the locality.

The Urangan South structure plan area is intended for residential development in its entirety, consistent with current planning expectations. A range of densities is appropriate for the structure plan area, and having regard to the characteristics of the area this is generally expected to comprise

- higher densities in the south (consistent with that already occurring) and in the north (adjacent to existing higher density residential); and
- lower densities in the central area (where community preference, flooding, and infrastructure considerations influence the density that may be able to be developed).

Other activities generally associated with and compatible with residential activities, such as community uses, may be able to be accommodated, in accordance with the established provisions of the Low Density Residential Zone Code.

3.7.2 Non-residential land use

There is only one known established non-residential use within the structure pan area, comprising a landscaping business at the corner of Boundary Road and Senorita Parade. However, that use is historical, and the current zoning and the structure plan intent is for that site to transition to residential activities at some point in the future.

There are no specific planning requirements for non-residential development within the structure plan area. The existing and planned centres hierarchy and employment areas within the City are adequate to cater for the likely resident population currently planned for and ultimately delivered pursuant to the existing zoning and/or structure plan.

There is no specific planning requirement for designated community uses within the structure plan area. The existing and planned community facilities provided for throughout Hervey Bay are adequate to cater for the population currently planned for pursuant to the existing zoning and/or structure plan. Small-scale community uses may be accommodated in the structure plan area as required in accordance with the provisions of the Low Density Residential Zone Code.

3.7.3 Other land uses

The structure plan area will predominantly cater for residential land uses. However, a range of other land uses will be required to manage local characteristics and infrastructure. Structure planning in the area has therefore considered provision for the following land uses:-

- The provision of drainage corridors to maintain stormwater conveyance capacity in the structure plan area. The retention of vegetated buffers to the drainage corridors, where possible would assist in maintaining water quality and quantity objectives. In some locations, the opportunity for an esplanade road and/or pedestrian connections may be delivered adjacent to the drainage corridors.

- The provision of Limited Development – Constrained Land Zone areas, to protect from residential incursion into sensitive areas, comprising the Pulgul Creek WWTP buffer (odour) and Hervey Bay airport buffer (noise).

3.8 Scenario Analysis

Prior to embarking on the structure planning exercise, through discussions with Council officers it was decided to undertake a high level options analysis of a range of development scenarios. This process was intended to provide Council, stakeholders and the community with an opportunity to understand and consider the comparative opportunities and constraints for a range of development options, as well as a preliminary identification of infrastructure requirements and their costs[2]. This provided the opportunity for information gathering to determine palatability of particular development intensities and infrastructure arrangements.

Three scenarios were developed based on a range of assumptions for future development within the project area. It is noted that the scenarios were not intended to provide a refined pattern of urban development. Rather, the scenarios provided a broad range of potential urban development densities and locations that informed the analysis of relative infrastructure and servicing requirements. The scenarios were identified in detail in the Context Analysis Report, and are summarised below.

- **Maximum Yield (Existing Zoning) Scenario** – this scenario assumed that the entire area (excluding the Limited development (constrained land) zone) is given over to low density residential subdivision typical of suburban neighbourhoods. To deliver a larger development footprint and accommodate higher residential densities in the project area the infrastructure requirements for this scenario are greater and include a more interventionist flood control approach (constructed channels, pipes and road corridor drainage infrastructure etc.) (refer to **Figure 10 – Option 1 Maximum Yield (Existing Zoning) Scenario Map**);
- **Mixed Lot Scenario** – this scenario is based on the northern and southern precincts accommodating low density residential subdivision, with the central precinct accommodating large lot (2,000m^2) development (refer to **Figure 11 – Option 2 Mixed Lot Scenario Map**). The scenario was developed on the following basis:
    1. The southern precinct is already committed to low density urban development due to the high level of development activity that has already occurred;
    2. The northern precinct can appropriately accommodate low density residential subdivision as it is adjacent to similar development, and can be relatively easily serviced by development infrastructure;
    3. The central precinct will deliver large lot living options that maintains the leafy character and amenity of the precinct while allowing sufficient room to accommodate mitigation options to manage drainage constraints.

    The scenario would require the extension of urban infrastructure into the low density residential areas particularly in the northern precinct, as well as drainage controls (minor modifications to natural channels) and management controls such as setbacks and separation distances in the central precinct to deliver a development footprint suitable for larger lot subdivision.
- **Large Lot Scenario** – this scenario was based on maintaining the existing pattern of development within the project area, with the southern precinct accommodating low density residential subdivision and the central and northern precincts providing for large lot residential living (refer to **Figure 12 – Option 3 Large Lot Scenario Map**). This scenario would require only limited infrastructure provision as larger lots could potentially provide for on-site effluent disposal, and minor modifications and planning controls (setbacks and separation distances) would potentially be appropriate to manage drainage issues.

[2] The high level cost estimates included in the Context Analysis and Options Review Report were overstated due to the costings for the drainage network including all drainage works within the structure plan area, and not just the cost of the major central and northern drainage corridors which are intended to be trunk infrastructure. A revised cost estimate of the three scenarios is provided in **Appendix H** with the costs for the drainage network only including the major trunk corridors.

The three scenarios were then analysed by the project team and Council's planning, engineering and executive teams, and were put to key stakeholders and the community for consideration and feedback.

3.9 Preliminary consultation

Stage 2 of the project involved the undertaking of consultation with stakeholders and the community in relation to the scenarios analysis. The consultation process comprised:

- A stakeholder roundtable was held on 19 September 2018 with a range of industry stakeholders to present the development scenarios and seek feedback. The stakeholder group comprised local consultants, landowners and developers who are active within the project area. The purpose of the exercise was to identify the issues that are facing those who work within the current planning framework that impact on development within the project area, and preferred development outcomes.
- A community public forum was held in Urangan on 19 September 2018 to present the development scenarios and seek feedback from the community, through interactive discussions. Approximately 48 members of the public attended the forum, with Council technical officers and Councillors also in attendance.

A summary of feedback from each session is provided below.

3.9.1 Stakeholder Round Table

The feedback from the stakeholder group identified the following issues as the key matters for consideration and address:

- Drainage and stormwater impacts constrain the ability to develop the central part of the site for low density residential development at the current allowable density (20DU/Ha);
- The influence of the odour buffer for the Pulgul Creek WWTP on the eastern boundary is a significant constraint, and it is not clear that such a large buffer area is required to mitigate the perceived odour impacts;
- Notwithstanding that the current framework allows for 500m^2 lots, larger lots of 1,000m^2 and above are the most marketable with a consensus that a mix of lot sizes from approximately 800m^2 minimum is the optimal arrangement;
- Landowners/developers are unlikely to develop smaller lots if they cannot easily sell them;
- Fragmentation of ownership makes acquisition of large lots difficult, such that it is hard for any individual developer to address drainage constraints within a single development;
- Acquisition of land for drainage corridors will be difficult given the fragmentation of ownership;
- Drainage infrastructure can be co-located with upgraded roads for a more cost effective solution;
- Given the difficulties facing individual developers, Council should undertake the major works to catalyse development throughout the project area;
- Any delivery of infrastructure should be sequenced to allow for an orderly roll-out of development across the whole project area.

3.9.2 Community Forum

The feedback from the community forum identified the following issues as the key matters for consideration and address:

- There was a clear and consistent preference for larger lot sizes across all the groups, with a general preference for a minimum lot size of approximately 2,000m^2 to maintain the existing character and amenity of the locality;
- Larger lot sizes (approximately 4,000m^2) were preferred in the central catchment;
- Drainage is generally preferred to be managed in a more natural manner, with no support expressed for highly engineered drainage channels apart from some small sections where no other options to mitigate flood would require such works;
- The community values the quiet, small scale and low intensity of development in the central and northern catchments and do not wish for this character to be diminished through smaller lot subdivision;
- Traffic impacts are already being felt due to the intensification of development in the southern catchment, and upgrades and augmentation of the existing road network is required to maintain a safe and efficient road network;
- There are nuisance issues associated with odour from the Pulgul Creek WWTP and noise from the animal shelter to the east of the project area that should be addressed in further planning for the locality.

3.10 Direction for Structure Plan

The existing context, infrastructure elements and community and stakeholder inputs (in response to the options analysis) have informed the structure plan concept for the Urangan south Area. Based on the analysis of the physical and environmental elements, character and amenity considerations, infrastructure networks and the preferred land use/settlement pattern approach as identified through community and stakeholder consultation, the key structure planning elements for the Urangan South Project Area are identified below.

3.10.1 Overarching Considerations

- There must be a change to the planning for the area, as the current ad hoc approach is not creating, and if continued is unlikely to create, good planning outcomes. This will require some difficult decisions to be made by Council, including potentially a need for infrastructure spend and management of community expectations.
- The structure plan area is intended only for residential development, at a range of densities that transition across the structure plan area. This reflects considerations arising through stakeholder, community and Council engagement, and reflects the need for provision of infrastructure to address characteristics of the locality. Areas of higher density (within the context of the Low Density Residential Zone) are also appropriate to limit the potential for land owners and applicants to seek compensation for 'downzoning'. Equally, areas for lower densities are desired given community sensitivities together with infrastructure provision issues.
- There was general consensus amongst community and stakeholders that 500m^2 lots are not preferred, despite current planning expectations for the area. There is market acceptance and preference of 800m^2 to >1,000m^2 lots, and community preference for larger lots (approximately 2,000m^2). A balance and variety of lot sizes should be pursued.
- Existing development approvals impact on potential for logical urban development layouts and on logical infrastructure delivery. The structure plan outcome primarily avoids disrupting the existing approvals and constructed allotments, given the potential for costs associated with this (e.g. land acquisition).
- The critical infrastructure issue is drainage, with interventions to the central drainage corridor and northern drainage corridor required to enable urban development to occur in a safe and well-planned way.

- A further infrastructure issue is the provision of sewer to the central portion of the structure plan area. There is currently a trunk extension planned for part of the central corridor, which could potentially be extended.
- Water, energy and telecommunications infrastructure exists and is available for urban development.
- While there is general support to provide for recreation space and active transport along and adjacent to the central drainage corridor, the imposition of existing allotments and development activity limit this from occurring. A drainage buffer shall be provided via easement to the south (into larger allotments), which has the potential to be used for public purposes in the future if desired by Council (i.e. use of the land for active transport or recreation space is not precluded).
- Road provision is based on the existing network, with augmentation to cater for a logical urban form associated with low density residential development. Intersection upgrades are required.

3.10.2 Land Use Considerations

- The structure plan area is intended only for residential development. This reflects the existing expectations of the planning scheme, and was reinforced through stakeholder, community and Council engagement.
- Residential development shall occur at the following intensities, having regard to the sensitivities of the community (a desire to limit the amount of small lots to maintain existing character), the economic drivers of land owners and developers (a market preference for lots of generally 800m^2 to >1,000m^2), and the need to provide a balance of lots including with some level of density to justify infrastructure spending:

    1. 800m^2 LDR lots in the northern portion (between Boundary Road and Senorita Parade). This density responds to the location being adjacent to existing LDR land to the north of Boundary Road, and maintains a consistency of development density in the area. The northern location is also closer to existing community and employment nodes, and as such locating higher densities in this area enhances accessibility to necessary urban facilities and services.

        Importantly, future upgrades to Boundary Road will limit future direct access from individual lots, meaning that future lots will need to gain access from within the structure plan area. The proposed density will allow for the necessary infrastructure spend in the northern precinct to facilitate alternative trunk road access and provide rear access to lots adjacent to Boundary Road;

    2. 1,500m^2 LDR lots in the central portion (between Senorita Parade Avenue and the southern portion), reflecting the clear community desire for larger lots to maintain the open and natural character and amenity of the locality.

        Larger lots in this location also provides optimal arrangements to manage stormwater in the central drainage channel as any required easements and setbacks to the corridor will not unduly interfere with or alienate the development potential of the lots. No additional primary or secondary roads are intended for the areas of 1,500m^2 LDR lots, with rear lot outcomes acceptable given the low traffic volumes;

    3. Standard LDR lots in the southern portion, in accordance with existing development activity (i.e. no change to the existing planning scheme provisions, given development progress to date). This approach recognises that the southern part of the structure plan area has been developed, has approvals in place or has active applications under assessment, and is adequately serviced with urban infrastructure. On this basis the ability to influence the pattern of development is limited;

- No non-residential development is intended, as the existing centres hierarchy and industrial areas are sufficient in catering for the expected residential population in the Urangan South structure plan area.

- Small-scale community uses remain possible where in accordance with the existing provisions of the Low Density Residential Zone. These uses can be dealt with on a case by case basis and the existing planning controls are appropriate to consider locational and amenity concerns are addressed.
- Land in the Limited Development – Constrained Land Zone areas to be retained as existing, to protect from residential incursion into sensitive areas, comprising the Pulgul Creek WWTP buffer (odour) and Hervey Bay airport buffer (noise).

3.10.3 Drainage Infrastructure Considerations

- The central drainage corridor is preferred as having a soft engineering outcome (i.e. not a heavily engineered concrete channel outcome). A semi-natural drainage solution similar to that currently occurring is required. Having regard to the local attributes and development activity, the following outcome is proposed.

    1. The existing channel is to be widened, to cater for and contain the typical stormwater flows occurring pursuant to increased development activity in the locality and to better manage upstream catchment runoff. A 12m wide channel (extended into land to the south), of a semi-natural drainage outcome similar to that currently occurring (i.e. rock lined channel), shall be pursued. A drainage buffer is provided to the southern side of the channel for overflow during large rain events, and which will be able to contain water quality devices as required. All water quality treatment devices will be located above the Q100 level.
    2. The channel widening on the southern side is preferred from a structure planning perspective (as compared to on the northern side), as it will be more easily acquired due to:
        - limited development activity (existing lots and approvals) on that side;
        - the structure plan provides for larger lots such that land acquisition may be more cost effective; and
        - it will be less disruptive to entrenched an existing development on the northern side of the channel.
    3. A drainage buffer on the southern side is also preferred from a structure planning perspective (as compared to on the northern side), for the following reasons:
        - It will be accommodated in and accommodate a larger lot development outcome;
        - It currently experiences some overflow during rain events (so there is limited change);
        - It is not substantially disrupted by existing lots and approved lots (as occurs on the northern side), as such this alignment will allow for an easement to be obtained and dwellings to be setback as land is progressively developed (as there is currently limited development activity).
    4. The widening of the channel should preferably occur as a comprehensive exercise by Council, undertaken as priority capital works to encourage development to occur. However, Council may choose to take an easement over the relevant land, with the channel constructed in conjunction with development activity. The drainage buffer on the southern side will be acquired through easements occurring in conjunction with development activity.
    5. Soil extracted from the channel widening may be suitable for any required filling to the north and should be considered during the detailed planning and design of any excavation exercise.

    Note: An alternative approach exists whereby taking of land for the 12m channel is avoided, and the existing channel width retained. This comprises making the existing channel slightly deeper (0.3m) but as a heavily constructed channel, with a drainage buffer (30m) provided to the southern side of the channel for overflow during large rain events. This is not preferred as the heavily constructed approach was resisted by community and stakeholders. It has been explored to deepen the existing width of channel and maintain as

a semi-natural design, however the deepening of the channel necessary to contain flows is not possible due to topography.

- The northern drainage corridor is to be constructed with a 14m wide drain with a 1 in 6 batter arrangement, to contain the flooding generally within the proposed extent.
- Constructed channels and other built drainage infrastructure should be low intensity and maintain the more natural character and amenity of the locality (e.g. similar to the existing rock-lined channel). Extensive concrete channels and large drainage infrastructure are not compatible with the intended character and amenity of the project area (however Council may prefer this in the central channel, to avoid channel widening).
- The wetlands adjacent to the east of the site are identified a containing Matters of State Environmental Significance including Wildlife Habitat, Regulated Vegetation (Essential Habitat), and High Ecological Significance Wetlands. Given these values, any wastewater treatment and stormwater management approach must meet relevant water quality guidelines and ensure that water discharging from the project area does not negatively impact on the high ecological values of the adjacent wetlands;
- Stormwater quality will be managed in accordance with the Water Sensitive Urban Design (WSUD) principles. The environmental buffer proposed provides a potential location for water treatment devices such as but not limited to gross pollutant traps (GPT), bio retention basins and wetlands along its length. As there will be no intensification of development within the Limited Development Area, there may be an opportunity to incorporate larger stormwater treatment devices through this area.
- Once the central and northern drainage corridors enter the Limited Development (Constrained Land) Zone, beyond stormwater quality treatments, they have the opportunity to overspill as currently occurs. It is noted that the modelled scenario for the northern drainage channel extends into the Limited Development (Constrained Land) Zone
- Development must be located above the 1 in 100 year ARI flood level, with appropriate freeboard allowance.
- Stormwater quantity and quality management must be addressed by individual applications unless precinct scale WSUD has been incorporated into the landform. Stormwater quality devices will be appropriately located above the Q100 event in appropriate and practicable locations to take advantage of any opportunities that arise in response to subsequent applications and approvals.

3.10.4 Water and Sewer Infrastructure Considerations

- Potable water supply is provided throughout the structure plan area, which is expected to allow for consistent pressure and flow delivery throughout the network, servicing all portions / precincts. All development in the structure plan area shall be connected to the potable / reticulated water supply network.
- Water mains within the structure plan area should be sized according to the projected population growth within the area. Individual development applications should determine potential upgrades and augmentation having regard to the specific nature of their proposal (i.e. non-trunk upgrades). Provision must be made for fire flow demand for the structure plan area.
- Sewer infrastructure is well developed in the southern portion and the northern portion (sewer along Senorita Drive). Remaining areas are generally un-serviced.
- Sewer mains within the structure plan area should be sized according to the projected population growth within the area. Individual development applications should determine potential upgrades and augmentation having regard to the specific nature of their proposal (i.e. non-trunk upgrades).
- In association with an existing development approval, a trunk main has been constructed from approximately Walkers Road to Bonita Court on the eastern boundary of the structure plan area. There is opportunity to extend

that trunk sewer further along the central drainage corridor to service lots in Precinct 2, taking advantage of the topography and the existing infrastructure.

- Capacity of the external system has been excluded from this assessment, based on comments from Wide Bay Water at project meetings that advised no consideration of external systems was necessary[3].

3.10.5 Transport Network Considerations

- Senorita Parade and Senor Parade are intended to remain the primary collector streets for the structure plan area. No change to the alignment of Senorita Parade and Senor Parade is required.
- Additional roads are required in the northern precinct (Precinct 1) to service higher density residential development and provide interconnectivity in the structure plan area, and are to be provided to a standard suitable for the ultimate intended uses within the area. Additional roads are also required in the northern precinct (Precinct 1) to service the residential development and to provide an alternative access to Boundary Road. No new roads are required for the central / southern precinct or southern precinct apart from those required to service individual development. Additional roads beyond those identified as forming part of the primary network will be required for specific development proposals.
- Within Precinct 2 these access roads will likely comprise of access handles or easements to allow for safe and efficient access while maintaining the large lot amenity of the precinct. Where large lots are amalgamated a common access road or cul de sac may be appropriate subject to safety, efficiency, and amenity considerations.
- Secondary road connections along the northern interface to the central drainage corridor may be considered as part of individual development proposals to provide a defined and active edge between residential development and the drainage corridor.
- No direct access is to be provided to Boundary Road as a consequence of its proposed upgrades (four lane, median-divided road). Internal roads for development sites will need to accommodate rear-lot access.
- An additional access to Boundary Road is recommended, to assist with staging of development activity in the northern precinct (Precinct 1) and to contribute to an orderly structure plan layout. Access will be left-in left-out given the median intended to be constructed along Boundary Road. The actual location of this road along the Boundary road frontage is flexible, subject to maintaining appropriate separation to nearby intersections and maintaining appropriate sightlines.
- Upgrades to intersections will be required to cater for increased road traffic demand, including:
    1. Boundary Road / Senorita Parade - signalisation
    2. Boundary Road / Robert Street / Hughes Road – planned Council upgrade to signals
- The Boundary Road / Walkers Road will be upgraded by DTMR, and is not contemplated in this project given the variables associated with that upgrade that are beyond Council's control. In any case, the ultimate intersection layout will have limited influence on the structure planning outcomes.
- Upgrades will be required to Senorita Parade to align with its emerging urban character and cater for increased traffic capacity, including widening of the sealed carriageway, and construction of an appropriate form of road shoulder/verge and stormwater conveyance.
- Upgrades will be required to Senor Avenue, to cater for increased traffic capacity, including widening of the sealed carriageway, and construction of an appropriate form of road shoulder/verge and stormwater conveyance.

[3] No assessment of the potential impact of the project on the external water/sewer network has been undertaken based on directions given during project discussions. An assessment of the external networks will be required to ensure that sufficient capacity is available, and identify any required augmentation prior to further development of the structure plan area.

- Detailed design of new roads and road upgrades should generally be in accordance with Fraser Coast Regional Council standard design drawings. Departures from the standard drawings may be appropriate where the design provides for safe and efficient traffic movement, provides for stormwater conveyance, and remains cost effective and construct-able in terms of the prevailing topography and landform. It is recommended that Council prepare and adopt a design standard for required road upgrades within the structure plan area to ensure that a consistent and appropriate standard can be applied on all future works.
- Detailed traffic network analysis will need to be undertaken in association with the proposed development of any land area within the structure plan area (i.e. a traffic impact assessment is to be undertaken with all development applications).
- Pedestrian and cycle networks within the structure plan area need to integrate into the wider surrounding road and pathway network. Limited off-road pedestrian and cycle connections will be possible due to existing development activity and other characteristics, and so constructed footpaths should be implemented along all collector, primary and secondary roads.

3.10.6 Other Considerations

- A corridor of higher value vegetation traverses the central part of the project area, generally aligned with the location of the central drainage corridor. Development in the project area should seek (where possible and practicable) to protect the integrity and value of this vegetation;
- The ultimate design outcomes are of critical importance to the success of the structure plan, including:
    1. Major central and northern drainage corridors should be activated through esplanade roads where possible, otherwise with residential development that overlooks the corridors, to ensure CPTED principles are observed.
    2. Vegetation should be retained where possible, along drainage corridors and within redevelopment sites, to maintain the green and leafy character of the locality. Vegetation that is removed should be replaced through compensatory planting within allotments and along street frontages.
    3. Design and development provisions for new dwellings should be as per existing planning scheme provisions (i.e. Low Density Residential Zone Code and Dwelling House Code).

4 Vision statement for structure plan area

4.1 Overview

The Urangan South structure plan area provides an opportunity to create a well-planned residential area that accommodates a range of residential densities that caters for the ongoing growth of Hervey Bay.

To guide and provide a framework for future development, a vision statement describing the overarching intent for the Urangan South structure plan area is included below.

4.2 Vision statement

4.2.1 Structure plan area context and setting

The Urangan South structure plan area is located on the south-eastern periphery of the Hervey Bay urban area.

Situated between Boundary Road to the north, Walkers Road to the east, Hughes Road to the west and Hervey Bay airport to the south, the Urangan South structure plan area is set in a peri-urban locality traditionally characterised by larger lot housing that is distinct from the urban residential character of localities to the north. However, with the continued expansion of Hervey Bay towards the urban fringe, the Urangan South structure plan area has been subject of continued ad hoc urban residential development that is changing the character of the locality in an unplanned manner.

Whilst some development activity has already occurred in the Urangan South structure plan area, the structure planning process is intended to provide a basis for orderly development and infrastructure delivery into the future.

The purpose of the Urangan South structure plan (and ultimate local area plan) is to provide finer grained planning at a local level, to guide coordinated and well-planned development and infrastructure outcomes.

4.2.2 Structure plan area vision

The Urangan South structure plan area is developed as an integrated and planned community, with a mix of residential densities providing for a diversity of residents and for housing choice.

Residential development integrates with the character of the existing neighbourhood, through retention of vegetation where possible and low-scale residential forms.

Development is delivered in a coherent and appropriately phased manner, to manage the transitioning of the community from a very low density environment to a mixed density urban residential environment, with limited impacts on amenity and infrastructure provision. Where development is provided out of sequence it maintains the ability for trunk and site infrastructure to be provided generally in accordance with the structure plan concept.

Urangan South will primarily comprise residential land uses, across a series of precincts as follows:

- *Precinct 1 (Northern Precinct) – This precinct comprises dwelling houses of allotments of generally 800m^2, having regard to its accessible location adjacent to Boundary Road and proximity to established urban residential areas. Residential development only occurs in conjunction with the delivery of suitable road and stormwater infrastructure, identified in the structure plan and infrastructure plan. Development in this precinct is serviced by all urban infrastructure networks.*
- *Precinct 2 (Large Lot Precinct) – This precinct comprises dwelling houses on allotments of minimum 1,500m^2. Development is provided in a natural setting through retention of vegetation and natural land forms. The extension of the existing trunk sewer along the central drainage corridor allows for these lots to be connected to the reticulated sewerage network. Lots adjacent to the southern side of the drainage corridor have a 30 metre setback (dedicated as a drainage easement in favour of Council), to provide for stormwater conveyance associated with the central drainage channel. Dwellings located adjacent the central drainage channel are designed to overlook the channel to encourage activation and passive surveillance opportunities.*

- *Precinct 3 (Southern Precinct) – This precinct comprises dwelling houses developed in accordance with the provisions of the Low Density Residential Zone.*

Land in the Limited Development (Constrained Land) Zone is not further developed for residential uses, to protect the operation of the Pulgul Creek WWTP and Hervey Bay Airport.

Drainage solutions are provided to the central drainage channel and northern drainage channel to allow appropriate urban development to occur. Drainage channels are design to be low intensity and maintain the natural character and amenity of the locality.

The internal road and movement network (including pedestrian and bicycle pathways) is designed to integrate with the existing transport network to ensure high levels of access to the higher order community facilities and activity centres located in the established areas of Hervey Bay to the north. Development provides upgrades to Senorita Parade and Senor Avenue, as well as a new road that extends into Precinct 1 to provide for safe and efficient access into this Precinct and facilitate the local road network.

The safety and efficiency of Boundary Road is protected, with no direct access provided to Boundary Road and a landscape buffer protecting the amenity of adjacent development.

5 Structure plan and supporting elements

5.1 Structure plan

Arising from the review of available information and the analysis undertaken as part of the broader structure planning process (refer conclusions in Chapter 3), a structure plan concept has been prepared for the Urangan South structure plan area (refer to **Appendix C – Urangan South Structure Plan Concept**).

In summary, the structure plan concept includes the following:-

- the preferred pattern of residential land use and residential densities, and other land designations;
- the major elements of the road network (including both existing and proposed roads) and their integration with adjacent road networks (including where upgraded or new intersections occur);
- the major elements of the drainage network, including drainage corridors and drainage buffers.

In conjunction with the structure plan concept, the following supporting material has been prepared.

- a precinct plan, identifying the various precincts for planning purposes (as identified in Vision in Chapter 4) – refer **Appendix D – Precinct Plan**;
- a preliminary area analysis, identifying the gross areas of each residential density, and associated yield analysis based on assumptions for dwellings per hectare – refer **Appendix E – Preliminary Area Analysis**;
- an infrastructure plan, identifying key items of infrastructure required for delivery of the structure plan, including identification of whether they are capital costs, trunk infrastructure or non-trunk infrastructure - refer **Appendix F – Infrastructure Plan**; and
- a phasing plan, identifying the staging that must occur for development activities pursuant to the structure plan – refer **Appendix G – Phasing Plan**.

5.2 Intent for preferred uses and densities

This section outlines the intent for the preferred land use and density areas shown on the Urangan South Structure Plan (**Appendix C – Urangan South Structure Plan Concept**). The following accords with the considerations stated in section 3.10 of this report (Directions for Structure Plan), which provide the analysis that is a basis for informing the structure planning outcomes.

- At the outset, it is noted that the entirety of the Urangan South Structure Plan is intended for low density residential uses, at a range of densities with lots between approximately 500m^2 and 1,500m^2. There is no intent to provide for non-residential uses within the Urangan South Structure Plan area, given the existing centre hierarchy is understood to adequately cater for the local resident population.
- The land use and density scenario is largely reflective of the Mixed Lot Scenario developed during the Scenarios Analysis and presented during the initial consultation and engagement activities. Our assessment following the initial consultation and engagement activities was that the Mixed Lot Scenario was generally preferred by stakeholders and community, and by the Council executive.
- Residential development shall occur at the following intensities, having regard to the sensitivities of the community (a desire to limit the amount of small lots to maintain existing character), the economic drivers of land owners and developers (a market preference for lots of generally 800m^2 to >1,000m^2), and the need to provide a balance of lots including with some intensity to justify infrastructure spending:
    1. 800m^2 LDR lots in Precinct 1, given proximity to existing LDR land, to support the necessary infrastructure spend in that location, and reflect emerging development activity in that general part of the structure plan area;

2. 1,500m^2 LDR lots in Precinct 2, to provide lot size diversity and reflecting community sentiment for larger lots in the central area of the structure plan area. Precinct 2 will benefit from access to sewerage services which will be cost-efficiently extended from the existing network in the eastern part of the precinct. No additional network roads are intended for Precinct 2, with rear lot outcomes acceptable; and
3. Standard LDR lots in Precinct 3, in accordance with existing development activity (i.e. no change to the existing planning scheme provisions, given development progress to date).

> Land in the Limited Development – Constrained Land Zone areas to be retained as existing, to protect from residential incursion into sensitive areas, comprising the Pulgul Creek WWTP buffer (odour) and Hervey Bay airport buffer (noise).

> Additional rationale for the layout and allocation of Precincts and densities include the following:

1. There are clear natural and infrastructure barriers such as roads, drainage corridors and infrastructure network thresholds that create logical boundaries to precincts;
2. Densities greater than 1,500m^2 at least in some parts are necessary to justify the proposed infrastructure spend, and a range of densities is appropriate in this location given its transitional character and location. Further, it is important to note that existing density provisions are for lots of 500m^2, and so in most instances the densities proposed are of a lower intensity than that currently allowed;
3. The proposed infrastructure spend is predominantly to address current flooding constraints, and is intended to catalyse development.
4. While greater density could potentially be achieved in the central precinct (Precinct 2), this would require more significant and costly drainage works, and would result in residential densities and that compromise the clear community preference for larger lot sizes and a more natural amenity.
5. Densities in the northern precinct (Precinct 1) are a compromise between providing sufficient density to justify the required transport infrastructure, while maintaining a neighbourhood character that generally accords with community expectations.
6. By providing for densities that generally align with market expectations, Council's potential exposure to compensation due to 'downzoning' of land is minimised.

> The boundaries and dimensions of the preferred land use areas and infrastructure items shown on the structure plan concept are indicative only based on the consideration of development constraints at the structure plan area-wide scale. The exact locations and boundaries of the respective precincts and infrastructure items are intended to be determined through more detailed ground-truthing and site-specific assessment of environmental and other physical constraints (including buffering) undertaken as part of subsequent development application and assessment processes.

> Detailed design of infrastructure networks has not been considered as part of the preparation of this structure plan. Detailed design will be undertaken at a later date to finalise locations, sizings and capacities required to implement the outcomes of the structure plan. To provide certainty regarding the design and location of the drainage corridors, Council may prepare an overall design for the corridors and channels that will provide appropriate outcomes and guide individual developments in terms of what is required at any given section of the corridor.

> A Local Area Plan (LAP) will be prepared to support the implementation of the structure plan. The LAP will include maps, figures, and codes that future development applications will be assessed against. The LAP will be consistent with the performance based operation of current planning scheme codes, and applicants may demonstrate performance based solutions that justify departures from the LAP. It is expected that any

departures would be relatively minor, and would reflect site specific design responses to on the ground conditions.

5.2.1 Indicative land budget

Based on the preferred land use areas presented on the structure plan concept, **Table 5-1** provides an indicative land budget for the structure plan area. This is also represented in **Appendix E – Preliminary Area Analysis**.

The land budget is based on a calculation of the total land area within the three (3) residential precincts, and does not take into account roads or other constrained land.

Table 5-1 Indicative land budget

Preferred land use area	Approximate area (ha)	% of total structure plan area
Precinct 1 – low density residential	30.88 ha	22.5%
Precinct 2 – low density residential	52.00 ha	37.9%
Precinct 3 – low density residential	27.64 ha	20.2%

5.2.2 Theoretical housing and population yield

Based upon the indicative land budget and the densities intended to be achieved in the respective residential precincts, a theoretical housing and population yield for the structure plan area has been calculated. It is noted that the Limited Development (Constrained Land) Zone area is excluded from this analysis, as no increase in lots is envisaged in this area under the current planning scheme.[4]

The theoretical housing and population yields have been based on the following assumptions:

- Not all land in the precinct will be available for development, and the calculation assumes that 20% of the total precinct area will be given over to roads, services, landscaping and other uses;
- Densities in Precincts 1 and 2 have been based on a simple calculation of the developable area (total area minus 20%) divided by the assumed residential densities. This approach is considered reasonable as there is uncertainty as to the actual densities likely to be achieved in these precincts;
- The level of development in Precinct 3 (with approximately 75% of the precinct developed or approved for future development) provides a more detailed basis on which to make assumptions about likely densities. A review of approved lot sizes identifies an average actual lot size of approximately 1,000m^2, which has been assumed to be the approximate overall density that will be achieved across the precinct.

The table also includes a calculation of the new or additional dwellings that are projected to establish in each precinct. This calculation provides an indication of the change in raw dwelling numbers in each precinct, and will assist in understanding the potential infrastructure charges that may be expected to be levied across the structure plan area from new development.

A breakdown of the theoretical yields is provided in **Table 5-2** below.

[4] Existing recent development in this area was subject to superseded planning scheme applications that allowed for greater density.

Table 5-2 Theoretical housing and population yield

Precinct and density assumption	Total Area	Area available (assuming 20% of total for services, landscaping, roads etc)	Projected dwellings (theoretical maximum)	Additional dwellings (to existing)	Projected total population (theoretical maximum based on 2.3 persons / household)
Precinct 1 (assumed 800m^2 density – 12DU/Ha)	30.88 ha	24.7Ha	297	247	684
Precinct 2 (assumed 1,500m^2 density – 6DU/Ha)	52.00 ha	41.6Ha	250	157	575
Precinct 3 (assumed 1,000m^2 density – 10DU/Ha)	27.64 ha	22.1Ha	221	128	508
TOTAL	**110.52 Ha**	**88.42**	**768**	**532**	**1,767**

It is noted that due to a range of factors (physical constraints, lot arrangement and size, market preferences, type of adjoining development etc.) future residential development may not result in an overall net residential density within the intended density range and, in this regard, the theoretical yields calculated above may not be achieved. It is anticipated that the estimated yield of 768 dwellings is expected to be an upper figure, so that infrastructure assumptions made pursuant to the estimated yield are likely to be conservative.

5.3 Infrastructure elements

This section provides an analysis of the preferred infrastructure elements shown on the Urangan South Structure Plan (**Appendix C – Urangan South Structure Plan Concept**) and the Infrastructure Plan (**Appendix F – Infrastructure Plan**). A detailed infrastructure analysis for each of the key networks is provided initially, followed by identification of the overarching infrastructure elements, high level estimations of indicative costs and potential infrastructure contributions, and finally an infrastructure delivery strategy and phasing strategy discussion.

5.3.1 Transport Network

Based on the potentially developable land identified above, the approximate area of land considered potentially suitable for urban development has been assigned a dwelling rate per hectare which informs the basis of the traffic generated on the road network. Approved developments which are contained in the developable area have been excluded from the yield calculation, similar to the constrained land area.

A summary of the total yields with the corresponding maximum developable dwellings is provided in **Table 5-3**.

Table 5-3 Summary of Development Options

Projected Total Dwellings	Total Trips in Peak Hour
768 dwellings	Up to 653 vehicles per hour

5.3.1.2 Proposed Access Roads

Existing access to the development area is via Walkers Road, Senorita Parade and Hughes Road. These access points connect to the project area northern boundary off Boundary Road.

As outlined in **Table 5-3**, the land use plan calculates a development yield of approximately 768 dwellings. Based on preliminary analysis, the traffic demand from the projected dwelling yield in the structure plan area is expected to exceed the capacity of the existing form of the major road network, and as such these will require upgrade.

A future LGIP upgrade of Boundary Road from a 2-lane undivided road to a 4-lane median divided road is scheduled to be completed by 2025. The hierarchy of the road will change as result of the duplication which will facilitate an increased traffic flow and a higher speed environment. As such, dwellings with their frontages on Boundary Road would be required to adopt a left in/left out access arrangement, however are recommended to find alternate access in the longer term.

Therefore, the draft structure plan proposes the following to accommodate for the increased traffic demand from the development:

- Upgrades to Senorita Parade, Senor Avenue, Walkers Road – upgrade to Major Collector rads (or agreed equivalent);
- New internal Streets 1, 2, and 3 – provide as new Access Streets.

The indicative locations of the required road upgrades and new access streets are outlined in **Figure 5-1**.

A new access street onto Boundary Road (Street 1 on **Figure 5-1**) is proposed approximately 500m west of the Boundary Road / Booral Road intersection, located opposite Stringybark Drive. The new access is proposed to alleviate pressure from the Senorita Parade / Boundary Road intersection by providing a secondary access point for lots fronting Boundary Road when direct access is no longer permitted, and for some lots along Senorita Parade. Based on the planned Boundary Road upgrade being a median divided duplication, it is assumed that the traffic carrying capacity is of higher importance than the accessibility function. As a result, it is proposed that the intersection form will be restricted to left in-left out at Boundary Road. Detailed analysis of this has not been undertaken as the restricted movements will limit the potential for conflicts. The exact location of proposed Street 1 may change if required to accommodate individual development proposals, however the actual location would be required to ensure that intersection spacings remain appropriate along Boundary Road to maintain safety and efficiency of the higher order road network.

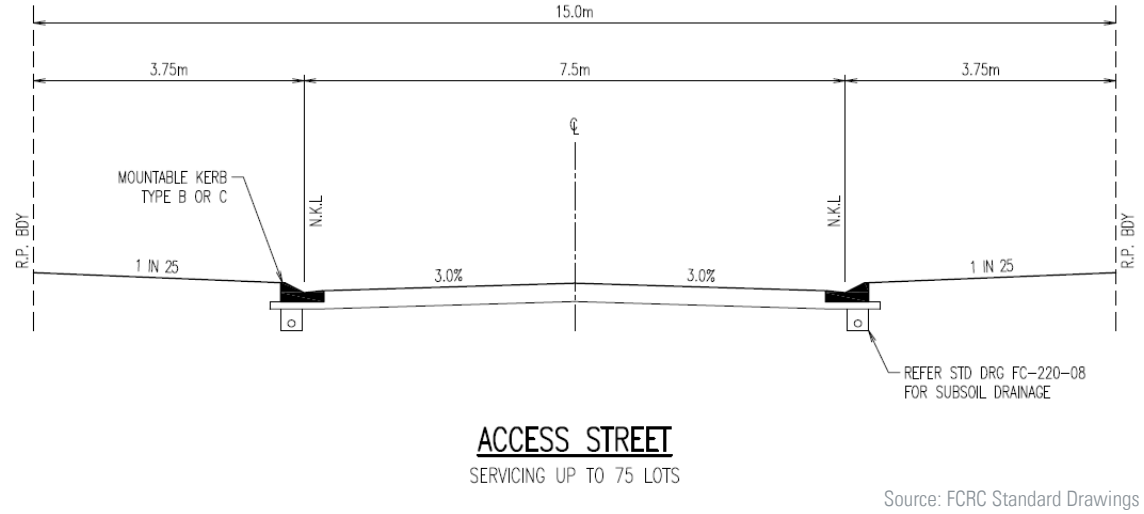
The new loop connection (Streets 2 and 3 on **Figure 5-1**) is proposed to be built to the standard of an Access Street to form the basis of the local road network in Precinct 1. Other access streets will be required to service individual development proposals within Precinct 1, and the final alignment of the loop system may be modified to ensure that overall access street system in Precinct 1 is safe, efficient, and cost effective.

Typical cross sections for the proposed local roads and upgrade of existing roads are illustrated in **Figure 5-2** and **Figure 5-3**.

Figure 5-1 Proposed Internal Roads

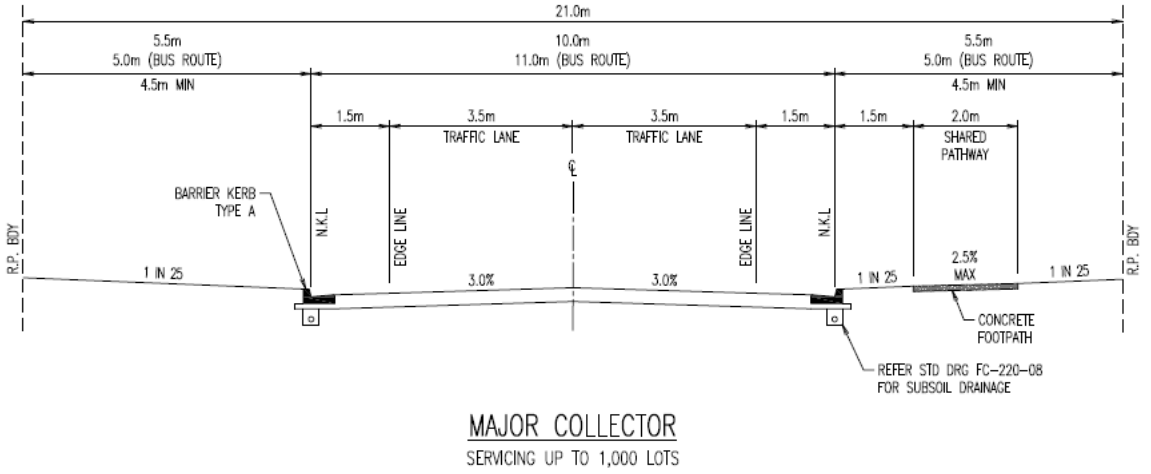
Source: Photomap by nearmap.com

Figure 5-2 Typical Cross Section for New Streets in Precinct 1



Source: FCRC Standard Drawings FC-200-01

Figure 5-3 Typical Cross Section for Proposed Upgrade to Existing Roads (Senor Avenue, Senorita Parade, Walkers Road)



Source: FCRC Standard Drawings FC-200-02

The existing road forms of Walkers, Senorita Parade and Senor Avenue provide for a seal width of 6-7m, which is not in accordance with the current standard FCRC drawing dimensions for a Minor Collector which requires 7.5m seal width. Hughes Road is built in accordance with FCRC standard drawings for a Major Collector road with provision for a seal width of 10m and concrete footpath along one side.

It is noted that these cross sections are the current Fraser Coast Regional Council standard drawings that set out the design standard that would typically be required for roads of the recommended hierarchy. While the full typical cross sections with kerb and drainage infrastructure will provide for a safe and efficient road that meets modern safety and efficiency standards, it is noted that the travel lane widths are similar across the different cross sections and as such provide similar traffic capacity. In this regard, construction to this exact specification is not necessary and the FCRC standard drawings may be used as a guide for the carriageway width which is more relevant in terms of traffic operation. Therefore, it is recommended that Senorita and Senor Roads be upgraded to at least provide for a 7.5m wide sealed carriageway width (Minor Collector standard), and Walkers Road is upgraded to provide for a 10m wide sealed carriageway (Major Collector). Kerb and channel design can be designed as required to suit the local context, and if desired may retain the existing drainage regime of grassed swales to reflect the flat topography of the project area and support cost effective road construction. It is recommended that Council identify and prepare an appropriate road design standard for the required upgrades to provide for a consistent road standard and provide development certainty during the progressive upgrade of the roadways over time.

5.3.1.3 Access Arrangement for Multiple Access Lots

The access arrangement for multiple access lots which do not have direct access onto the local roads within the structure plan area will require access via a cul-de-sac street or a private easement road treatment. This will be the predominant form of access in Precinct 2 due to the large lot nature of the Precinct. Cul-de-sac streets will have road reserve widths of approximately 15m. Easement roads are expected to connect from the local roads to the last lot and will adopt a width of approximately 6.0m in width.

5.3.2 Traffic Operational Assessment

5.3.2.1 Study Area

For the purpose of this traffic study, the intersections identified in **Figure 5-4** will be most impacted by the increase in vehicle movements due to the increased population within the structure plan area.

Figure 5-4 Key Intersections

Source: Photomap by nearmap.com

The intersections are:

1. Boundary Road / Booral Road
2. Boundary Road / Walkers Road
3. Boundary Road / Senorita Parade
4. Boundary Road / Robert Street / Hughes Road

A preliminary analysis of intersection operation was undertaken during an earlier part of this project, which identified that mitigation and improvement works (trunk and non-trunk) on all intersections would be required. However, this analysis was based on an assumed yield of approximately 700 total dwellings being established in the structure plan area. The density assumptions for the project have changed over the course of subsequent public notification and stakeholder engagement activities, with the projected dwelling yield now exceeding the value used for the intersection analysis. In this regard, the outputs of the preliminary intersection analysis are not able to be relied upon for detailed design considerations, and the extent of upgrades may be marginally higher than that initially calculated. It is noted that a final analysis of intersection operation and identification of required upgrades/mitigation works will need to be undertaken once the final densities for each Precinct are confirmed.

5.3.3 Summary and Conclusions

Based on the analysis undertaken to date, the internal road network reaches capacity and all intersections will likely require different levels of mitigation to operate within appropriate specifications.

The following summary relating to the impact of development of the structure plan area on the local road network with corresponding recommended mitigation measures is provided below:

Intersections along Boundary Road requiring upgrades include:

The locations of the following upgrades are illustrated on **Figure 5-5**.

- Boundary Road / Booral Road Intersection
    - This upgrade will incorporate Boundary Road / Walkers Road intersection to consolidate as one intersection. The proposed form is as yet unknown however it is expected that the design will be able to accommodate future traffic demands adequately. This work is expected to be undertaken by DTMR.
- Boundary Road / Senorita Parade (upgrade to signals)

The upgrade of Boundary Road / Booral Road is the responsibility of DTMR, and no costs are known. As detailed design for the Boundary Road / Senorita Parade intersection has not been conducted, the final extents of the required intersection form are not known and relevant costs are indicative only.

Road infrastructure upgrades and new roads within the structure plan area include:

Refer to **Figure 5-5** for locations:

- ***(Street 1)*** *Proposed new north-south access street connecting to Boundary Road*
- ***(Street 2)*** *Proposed new access street looping north of Senorita Parade*
- ***(Street 3)*** *Proposed new access street connecting the looping street north of Senorita Parade*
- *Upgrading Senorita Parade, Senor Avenue and Walkers Road to a higher order road (based generally on the road dimensions for Minor/Major Collector) to carry the potential development traffic*

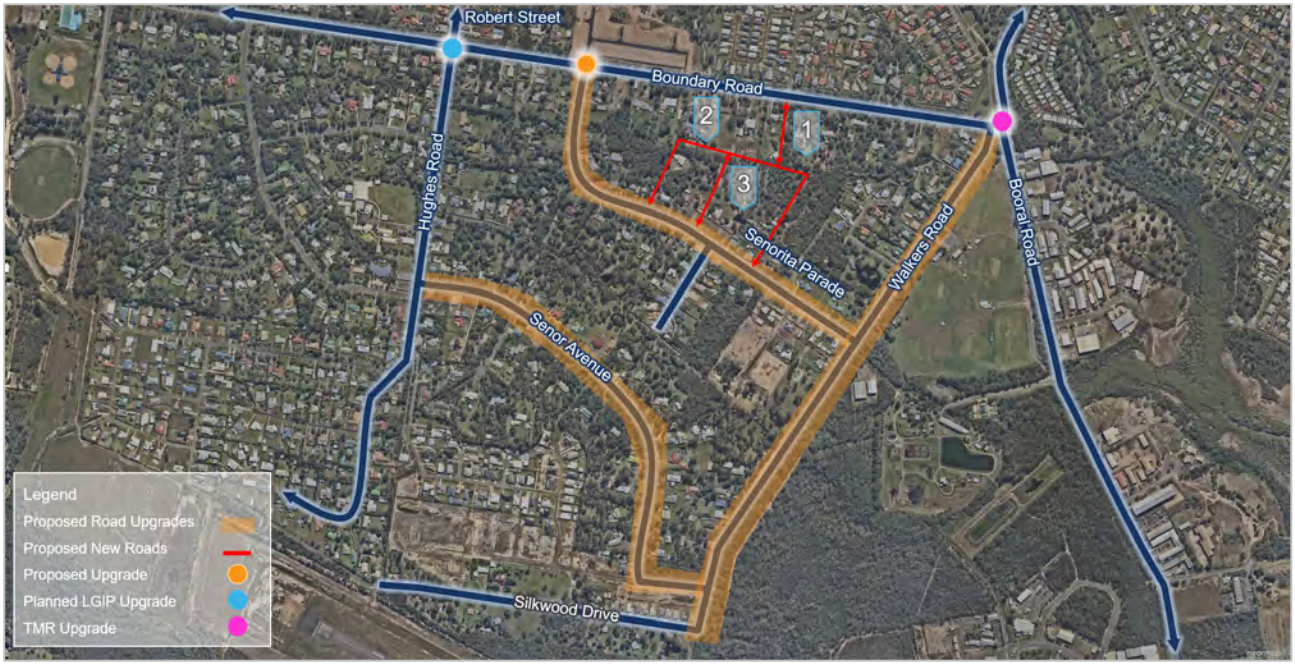
Proposed Upgrades (programmed in current FCRC LGIP and not dependent on development of structure plan area):

- Two (2) Bus stops along Boundary Road scheduled by 2031
- Boundary Road upgraded to 4-lanes median divided scheduled by 2025
- Boundary Road / Roberts Street / Hughes Road upgraded to signals scheduled by 2020

Opportunities for connectivity between the structure plan area and proposed upgrades along Boundary Road include the following:

- Pedestrian footpath planned along Boundary Road scheduled by 2020
- Provide pathway linkages on both sides on Boundary Road, providing connectivity for pedestrians and cyclists to future public transport infrastructure (bus stops) and existing active and public transport networks

Figure 5-5 Summary of Mitigation Measures and Planned Roads



Source: Photomap by nearmap.com

Table 5-4 Summary of Mitigation Works Costs per Option

Location	Description of Mitigation Measure	Indicative Costs per Mitigation Measure[5]
Boundary Road / Booral Road	Traffic Signals	TMR Planned Upgrade
Boundary Road / Walkers Road	Traffic Signals	TMR Planned Upgrade
Boundary Road / Senorita Parade	Traffic Signals	$200,000 (signalisation)
Boundary Road / Hughes Road / Roberts Street	Traffic Signals*	LGIP Planned Upgrade
Senorita Parade – Rear Lot Access Street (Street 1)	New Access Street	$850,000
Senorita Parade Access Loop Street (Street 2)	New Access Street	$4,500,000
Senorita Parade Connecting Loop Street (Street 3)	New Access Street	$1,200,000
Boundary Road	Pedestrian Footpath	LGIP Planned Upgrade
Boundary Road	Pedestrian Footpath connectivity Cycling connectivity	To be included in any infrastructure along Boundary Road
Senorita Parade	Upgrade to higher order road (generally to Minor Collector/Major Collector standard)	$5,000,000
Senor Avenue	Upgrade to higher order road (generally to Minor Collector/Major Collector standard)	$5,600.000
Walkers Road	Upgrade to higher order road (generally to Minor Collector/Major Collector standard)	$6,000,000

*Planned upgrade on FCRC LGIP

[5] Costings are indicative only, subject to detailed civil engineering investigation and design

5.3.4 Drainage Network

The stormwater and drainage solution for the proposed scenario consists of the modification of the major flowpaths, in combination with traditional stormwater drainage (pits and pipes) required to convey stormwater runoff from properties to the major flowpaths.

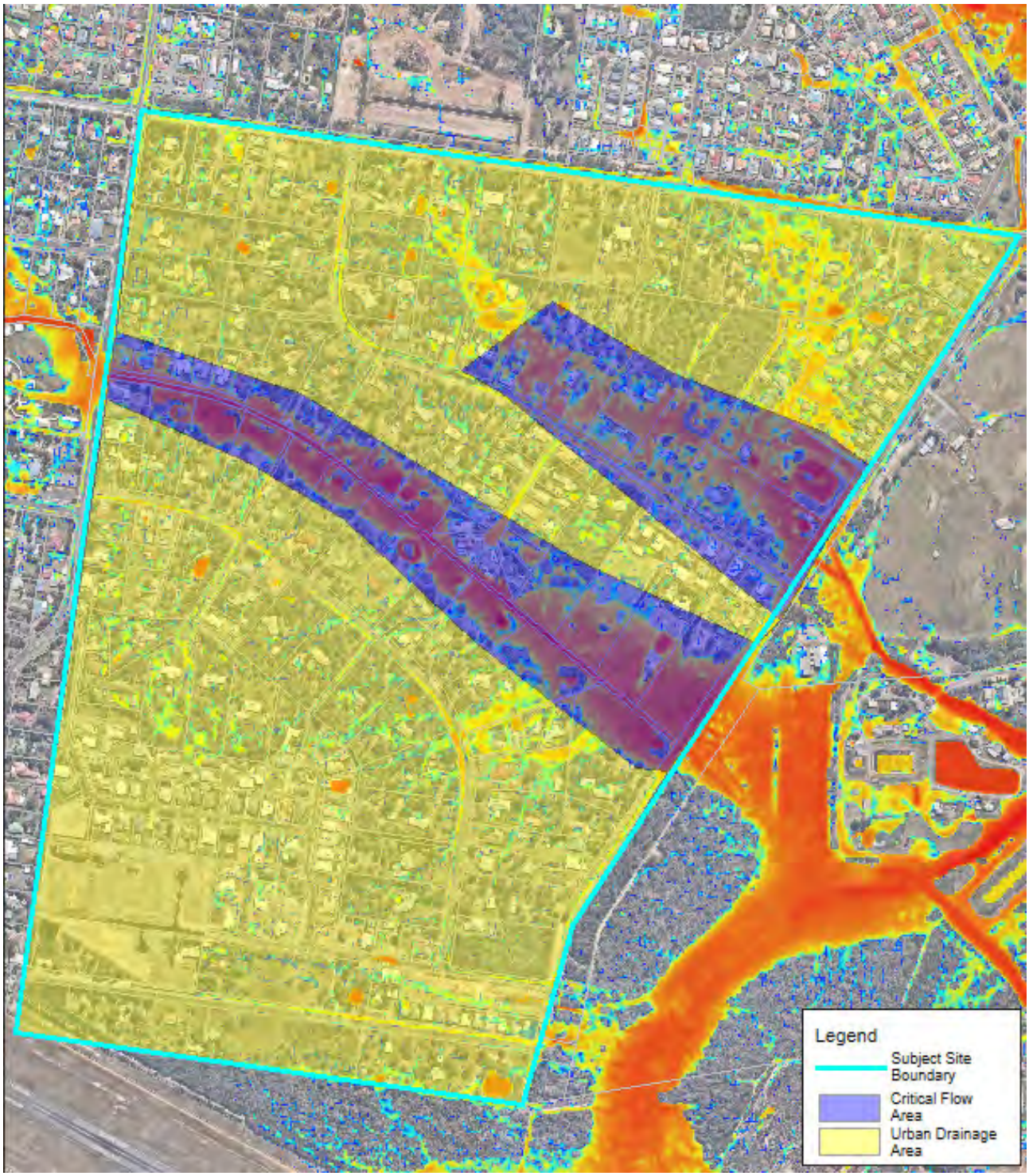
In order to simplify the analysis, it has been proposed to confine the primary flow path of the northern and central precincts to the further investigation area. External to these major overland flow paths, an approximate drainage network is recommended based on as-constructed information for similar development densities within the Pulgul Creek area.

The selected scenario has been completed to satisfy the following objectives:

- Development to be located above the 1% AEP flood level, with appropriate freeboard allowance. Filling of low lying areas may be required to achieve this. Council is not responsible for ensuring that all land outside the flood corridor is filled to achieve this objective.
- Development is to be located above the storm tide inundation level, with due allowance for sea level rise.
- Development must be designed for conveyance of overland flows throughout the structure plan area. This may take the form of road drainage such as stormwater pits and pipes or be similar to the current situation which includes many unformed road edges with table drains and minor culverts at driveway crossovers. The style of drainage used to convey overland flows will be dependent on the density of development and the ultimate design of road chosen. Conveyance of overland flows is not considered to be a barrier to development and should be designed in accordance with QUDM (2017).
- All overland flows are to discharge to legal points of discharge, i.e. to the identified flow paths.
- Overland flow paths are to incorporate natural stream design techniques where possible.

Figure 5-6 below shows the existing flood extent overlaid with the proposed approaches to constrain the inundation. It is noted that inundation is shown outside of the critical flow area. This is a consequence of the methodology used for the flood assessment. The assessment used the 'rainfall on grid' method, which applies rainfall to all cells within the model. This results in ponded areas throughout the model. Many of these areas are not flooding but are isolated ponded areas which can be dealt with through filling associated with appropriate storm water drainage design.

Figure 5-6 Existing flood extent overlaid with the proposed approaches



Preferred Scenario

Similar to the Mixed Lot scenario investigated in the Urangan South Scenario Analysis (refer Context Analysis Report), the infrastructure elements adopted aim to build upon the existing infrastructure and retain a more natural hydraulic regime in the northern and central precincts particularly. This option, as part of the land use strategy, includes an environmental overflow buffer and a widening of the existing channel. To reduce potential flooding, it has also been assumed that the landform for future developments to the north of the central channel will be filled.

As reported in the Urangan South Context Analysis Report, the Maximum Yield Scenario results for the central precinct showed that only minor overflow occurs from the upgraded 12m wide channel drain with a 1 in 6 batter, except near the downstream boundary which is located within the Limited Development Area. The proposed strategy maintains the

effectiveness of flood attenuation from the heavily engineered solution presented in the Maximum Yield Scenario whist incorporating the naturally orientated drainage channel.

The proposed option involves widening the existing channel to 12m, retaining the same depth with the inclusion of a 30m environmental buffer running parallel to the south. Investigation into deepening the channel found that it was ineffective in providing additional conveyance capacity due to the low lying nature of the catchment. There is an opportunity during the excavation works of the channel that any required filling of adjacent lots should be completed simultaneously. Lots that require filling to ensure no inundation north of the drain have been shown in **Figure 5-7**. This achieves a cut fill balance and ensures no double handling of the material. This is under the assumption that the cut material is suitable for use i.e. not contaminated land. **Figure 5-7** shows the proposed arrangement of drain and environmental buffer.

Figure 5-7 **Proposed arrangement of drain and environmental buffer**

The environmental buffer will act as an overflow to capture additional flows from the channel. The proposed 30m wide environmental buffer is intended to follow the natural topography and grade of the catchment. It should be noted that the inclusion of the environmental buffer enables intermediate stormwater quality treatment devices to be placed along the length of the channel, outside of the 100 year ARI flood event

It is noted that these stormwater quality devices must be located outside of the 1% AEP flood extent in order to operate efficiently. The exact locations would be determined during detailed design, with a balance being sought between the number of devices and the effectiveness of the devices. In terms of both maintenance and construction cost, a smaller number of devices tends to be more effective.

Currently, within the northern precinct there is no formal drainage channel present. The flood management strategy would involve the construction of a 14 metre wide drain with a 1 in 6 batter arrangement to contain the overland flow within the proposed extent. In addition, drainage easements will be required to connect runoff from roads to the drainage channels. These easements will typically be shallow trapezoidal channels with an allowance for a maintenance track. Although the dimensions will be determined during detailed design, it is expected that the easements will be 10 – 12 m wide, similar to existing easements located within the Fraser Coast Regional Council area.

5.3.5 Sewer and Water Networks

5.3.5.1 Water Supply Network

The project area was assessed in isolation, under the assumption that the external network has the capacity to accommodate the projected demands[6]. Within the project area, the existing water network does not require any upgrades to meet the projected density. New mains to follow new roads are the only works required. A minimum DN150 mains to accommodate firefighting would be recommended.

Water supply mains will be provided by developers as required, as non-trunk infrastructure.

5.3.5.2 Sewerage Network

The southern precinct already has the required infrastructure to meet existing demand, and demand in this precinct does not change. Extension to the existing network would be required and provided by developers, as non-trunk infrastructure.

The northern precinct will require new mains to service the area. While some sewer mains are already existing in this vicinity, to accommodate additional lots and development, they will need extension. To unlock development not sewered, some of these mains would need to be provided and classified as trunk in nature to in order to secure easements for their installation and to activate and encourage development activity.

The proposed mains within the Structure Plan are have been identified as DN150 PVC, based on a design flow equal to 2,250L/ED/day. It has been assumed that the existing DN600 main has sufficient capacity to service the additional load and does not need upgrading. This is due to the relatively small increase in demand relative to pipe size, the change in volume in the DN600 would be minimal (<2% of capacity).

An indicative layout for the sewer network is presented in **Figure 5-8**.

[6] No assessment of the potential impact of the project on the external water network has been undertaken based on directions given during project discussions. An assessment of the external water network will be required to ensure that sufficient capacity is available, and identify any required augmentation prior to further development of the structure plan area.

Figure 5-8 Proposed Sewer Network

5.3.6 Summary of Key Infrastructure Elements

Having regard to the above analysis, the key infrastructure elements to be provided pursuant to the structure plan, to enable the structure plan outcomes to be achieved, comprise the following. These items are also represented on the infrastructure plan in **Appendix F – Infrastructure Plan**.

Table 5-5 Key Infrastructure Elements

Infrastructure Item	Details	Allocation / Apportionment Recommendation
Transport Network		
1. Senorita Parade upgrades	Senorita Parade to be primary collector street (generally to Minor Collector/Major Collector standard). No change to alignment. Minimum construction of 7.5m seal carriageway width. Construction of formalised verge, kerb and channel recommended however alternative verge and drainage treatments may be appropriate.	Non-trunk works. Condition frontage upgrades as part of development application. Alternatively, Council may wish to undertake as trunk works, to enable a consistent and attractive streetscape to encourage investment. $5,000,000

Infrastructure Item	Details	Allocation / Apportionment Recommendation
2. Senor Avenue upgrades	Senor Avenue to be primary collector street (generally to Minor Collector/Major Collector standard). No change to alignment. Minimum construction of 7.5m seal carriageway width. Construction of formalised verge, kerb and channel recommended however alternative verge and drainage treatments may be appropriate. Actual design standard to be prepared and confirmed by Council.	Non-trunk works. Condition frontage upgrades as part of development application. Alternatively, Council may wish to undertake as trunk works, to enable a consistent and attractive streetscape to encourage investment. $5.600.000
3. Walkers Road upgrades	Walkers Road to be primary collector street (generally to Minor Collector/Major Collector standard). No change to alignment. Minimum construction of 10m seal carriageway width. Construction of formalised verge, kerb and channel recommended however alternative verge and drainage treatments may be appropriate. Actual design standard to be prepared and confirmed by Council.	Non-trunk works. Condition frontage upgrades as part of development application. Alternatively, Council may wish to undertake as trunk works, to enable a consistent and attractive streetscape to encourage investment. $6,000,000
4. Boundary Road / Hughes Road intersection upgrade	Upgrade to signalised intersection	Trunk works. Upgrade already planned as trunk works by Council (i.e. excluded from Structure Plan works and costs).
5. Boundary Road / Senorita Parade intersection upgrade	Upgrade to signalised intersection	Trunk works if not undertaken as part of Boundary Road Upgrade. $200,000
6. New road and left-in / left-out intersection (Street 1)	New road to facilitate access to Precinct 1 from Boundary Road and enable orderly planning of structure plan area. Construction to access street standard (actual design standard to be prepared and confirmed by Council).	Non-trunk works. Provides an enabling mechanism for development of Precinct 1. If Street 2 is not delivered in a timely manner, Council could identify Street 1 as trunk works to open up development of Precinct 1. $850,000
7. New road (Street 2)	New loop road to facilitate access to Precinct 1. Construction to access street standard (actual design standard to be prepared and confirmed by Council). Expectation of construction in tandem with development activity, however if delay in uptake could be delivered by Council.	Non-trunk works. Condition delivery as part of development applications. $4,500,000
8. New road (Street 3)	New road to facilitate access to development sites. Construction to access street standard (actual design standard to be prepared and confirmed by Council). Aligns with stub of road within existing approval, so generally consistent with existing layout expectations.	Non-trunk works. Provides an enabling mechanism for development. $1,200,000
9. Boundary Road / Walker Road intersection	Details to be confirmed by DTMR	DTMR responsibility and cost obligation.

Infrastructure Item	Details	Allocation / Apportionment Recommendation
Other Transport Network infrastructure matters: > Cost estimates for new roads and road upgrades are based on design standards from Council's standard drawing cross sections given that actual design standards are not known. In some scenarios, it is likely that the roads will not be constructed to the full Council standard and as such, the estimated costs would be an upper limit. Council should identify and prepare an appropriate road design standard for the required upgrades to provide for a consistent road standard and provide development certainty during the progressive upgrade of the roadways over time. > Additional roads beyond those identified will be required for individual development proposals (i.e. non-trunk roads). > No direct access is to be provided to Boundary Road as a consequence of its proposed upgrades (four lane, median-divided road). Internal roads for development sites in Precinct 1 will need to accommodate rear-lot access. > The precise location of Street 1 may differ to facilitate early development, subject to the maintenance of appropriate intersection distances being maintained between Boundary Road intersections. A Traffic Impact Assessment will be required to demonstrate the suitability of the final location of Street 1.		
Drainage Network		
1. Central drainage corridor	a. Acquire easements for drainage channel and corridor b. Widen existing channel (12m wide) for increased capacity c. Identify buffer (30m wide) along southern edge of corridor	a. Trunk works. Council to secure additional easements or land acquisition for central drainage corridor widening as required b. Trunk works. Construction of drainage channel to be conditioned as part of individual development proposals as required. Council to prepare a channel design to facilitate delivery through individual development applications where practicable. c. No works required – easement to be secured by condition in development applications to provide buffer area; design requirements in Local Area Plan to secure setbacks to habitable structures. May accommodate water sensitive urban design and water quality treatment. $2,617,500
2. Northern drainage corridor	a. Acquire land or secure easements over all affected properties to allow upstream properties to develop with a lawful point of discharge b. Construct 14m wide drain with a 1/6 batter (natural setting).	a. Trunk. Council to acquire land for northern drainage corridor b. Non-trunk works. Council to prepare a channel design to facilitate delivery through individual development applications where practicable. $1,335,000
3. Existing conveyance channels	a. Acquire easements of 10-12 m (as required) b. Construct trapezoidal channels	a. Council to secure easements for minor conveyance channels Not costed due to variability of design approaches (i.e. may be grassed swales, piped conveyance, lined open channel etc)
Other Drainage Network infrastructure matters: > The central channel is proposed with a southern buffer (rather than northern), as: – the southern side of the corridor is intended to accommodate a larger lot development outcome; – the southern corridor is not substantially disrupted by existing lots and approved lots (as occurs on the northern side); and – the southern side will allow for an easement to be obtained and dwellings to be setback as land is progressively developed (as there is currently limited development activity). > Constructed channels and other built drainage infrastructure should be low intensity and maintain the more natural character and amenity of the locality (e.g. similar to the existing rock-lined channel). > Water sensitive urban design and water quality treatment may be incorporated into southern buffer to central drainage channel. Water quality treatment to be above the 100 year ARI flood level. > Stormwater quality will be managed in accordance with the Water Sensitive Urban Design (WSUD) principles. The environmental buffer has been proposed to allow an easement to place water treatment devices such as but not limited to gross pollutant traps		

Infrastructure Item	Details	Allocation / Apportionment Recommendation
	(GPT), bio retention basins and wetlands along its length. As there will be no intensification of development within the Limited Development Area, larger stormwater treatment devices can be allocated to treat the runoff.	
>	Once the central and northern drainage corridors enter the Limited Development (Constrained Land) Zone, beyond stormwater quality treatments, they have the opportunity to overspill as currently occurs.	
>	Stormwater quantity and quality management must be addressed by detailed design for individual development applications.	
>	Council will undertake to prepare a detailed design for the required northern and central channels. This design will inform progressive delivery of the constructed channels as development approvals are acted upon and ensure that the final drain maintains a consistent and effective design and operational standard.	
Sewer Network		
1.	Central sewer main	Trunk main already conditioned on existing approval	Trunk (constructed) Not considered in costing calculations
2.	Central sewer main extension	Extending approximately 800m into Precinct 2 generally along the alignment of the central drainage corridor	Trunk $400,000
>	A number of different alignments for the sewer trunk main were proposed and examined during the course of the investigation. The proposed alignment and cost included in the structure plan have been determined by Council as a preferred alignment to build on existing infrastructure and facilitate a cost effective roll-out.	
Water and Other Networks		
>	Potable water supply is provided throughout the structure plan area, which is expected to allow for consistent pressure and flow delivery throughout the network, servicing all portions / precincts. No upgrades are expected to be required to the water network to allow for the proposed structure plan outcomes.	
>	Energy and telecommunications infrastructure exists and is available for urban development	

5.3.7 Indicative infrastructure costs and contributions

This section summarises the potentially available infrastructure contributions (**Table 5-6**) and a summary of potential infrastructure costs arising from the new infrastructure required to service the structure plan area (**Table 5-8**). **Table 5-6** is a calculation of the total contributions potentially available from the structure plan area including those contributions that have already been made from existing development. **Table 5-7** is a calculation of the potential contributions based only on the additional dwellings that may establish in future. Given that the LGIP does not currently identify any future trunk infrastructure within the structure plan area (except for Boundary Rd upgrade along the northern extent), the contributions already collected have been effectively allocated to other planned infrastructure projects. Should new trunk infrastructure items be included in a future LGIP, it is the additional contributions that will add to the contributions available to fund planned infrastructure across all networks.

It is noted that the preliminary cost estimates for the land acquisition for the northern drainage corridor and central drainage corridor widening are based on a metrage rate derived from recent Infrastructure Agreements within the Fraser Coast region for similar drainage purposes. Land acquisition costs are significantly variable, and the actual cost of any land acquisitions will be subject to the outcomes of negotiations with landholders at the time of the acquisition.

In this regard, the preliminary costings are extremely high level estimates and are based on conservative assumptions of likely works and costs. Costs have been based on assumptions of typical or common design standards and works costs, however until detail design is undertaken the costs should not be relied upon for any detailed financial planning. Ultimate costs will vary from these estimates.

Table 5-6 Total Infrastructure Contributions (existing and future lots)

Total Dwellings[7]	Charges Rate[8]	Total Contributions[9]
768 dwellings	$22,800	$17,510,400

Table 5-7 Gross Infrastructure Contributions from new development

Additional Dwellings[10]	Charges Rate[11]	Additional Contributions[12]
532 dwellings	$22,800	$12,129,600

Table 5-8 Infrastructure Cost Estimates

Network	Costs	Notes
Drainage Network (proposed trunk)	$35,000 $2,617,500	Acquisition of land for northern corridor (acquisition of approx. 650m x 15m) Central channel widened to 12m (including acquisition for widening of existing corridor of approx.. 1000m x 5m) Total cost includes acquisition, earthworks, and required channelization works An average rate of $3.50m^2 has been applied for land acquisition, based on recent Infrastructure Agreements for the purpose of providing land for similar drainage infrastructure.
Drainage Network (proposed non-trunk)	$1,300,000	Northern channel new 14m wide channel with 1/6 batter.
Water Network	$0	No upgrades required
Sewer Network (proposed trunk)	$400,000	Central sewer main to provide for Precinct 1 and Precinct 2 Cost estimate advised by Council engineering officers
Transport Network (proposed trunk)	$200,000	Intersection upgrades and signalisation (Boundary Road / Senorita Parade) (Includes 25% contingency)
Transport Network (committed trunk)	Not costed	Intersection upgrades responsibility of DTMR (Boundary Road / Hughes Road)
Transport Network (proposed non-trunk)	$23,150,000	Road upgrades (Senorita Parade, Senor Avenue, Walkers Road) New Streets in Precinct 1 (Street 1, Street 2, Street 3)
Total (proposed trunk)	**$3,252,500**	

On this basis, the total estimated cost of trunk infrastructure ($3,252,500) is less than the total additional contributions ($12,129,600) potentially available within the structure plan area.

This does not suggest that the trunk infrastructure within the structure plan area will be paid for by the available contributions or will be cost neutral. The current LGIP has been prepared on the basis of assumptions about residential growth under the current planning scheme within specific catchments, and the cost of required trunk infrastructure to support this growth. In this regard, assumptions about growth within the structure plan area have already been included in current infrastructure planning. If additional trunk infrastructure is included in the LGIP (in future amendments), the total cost of all infrastructure required for the respective catchment will increase.

To understand the full cost implications of the inclusion of potential additional trunk infrastructure, the assumptions for demand and cost estimates for additional infrastructure that inform the current LGIP would need to be recalculated and remodelled to take into account the potential changes to the Urangan South structure plan area.

[7] As per Table 5-2

[8] Assumed all dwellings are 3 or more bedrooms. Rates as per *Adopted Infrastructure Charges Resolution September 2018*

[9] Note that assumptions do not allow for credits for existing allotments.

[10] As per Table 5-2

[11] Assumed all dwellings are 3 or more bedrooms. Rates as per *Adopted Infrastructure Charges Resolution September 2018*

[12] Note that assumptions do not allow for credits for existing allotments.

5.3.7.1 Proportional allocation of contributions across networks

Council has a management policy (Policy #2461019v4) that sets out the proportional allocation of infrastructure contributions between the five (5) trunk infrastructure networks. The allocation to the various networks is based on the trunk costing for the works as detailed in the Local Government Infrastructure Plan.

Based on the total additional contributions potentially able to be levied ($12,129,600), the contributions for each network and comparison with the potential infrastructure costs is provided in **Table 5-9** below.

Table 5-9 Proportional allocation of contributions across networks

	Water Network (7%)	Sewer Network (21%)	Transport Network (53%)	Parks / Community Facilities Network (11.5%)	Stormwater (7.5%)
Potential estimated proposed trunk infrastructure cost	$0	$400,000	$200,000	$0	$2,652,500
Allocation of total additional contributions per network ($12,129,600)	$849,072	$2,547,216	$6,428,688	$1,394,904	$909,720

The potential additional infrastructure contributions will in total exceed the total trunk infrastructure cost estimate.

It is important to note that infrastructure contributions collected in a given catchment are not necessarily allocated to the provision of infrastructure in that catchment, and development across the region will contribute to the overall funding available for planned infrastructure. However, it is important for the financial sustainability of the region to ensure that overall planned infrastructure costs are recouped from contributions to the greatest extent practicable over the life of the infrastructure asset.

Under Section 114 of the *Planning Act 2016*, a local government may adopt a different charge for development in different parts of the local government's area. To better match the estimated costs of infrastructure provision for the individual networks, Council may consider:

- Increasing the infrastructure charges in the structure plan area to the maximum regulated charge available (currently $28, 311.20); and/or
- altering the proportional split of infrastructure contributions for development within the structure plan area.

This would provide additional surety that the infrastructure contributions collected for development within the structure plan area are appropriately allocated to ensure that the highest cost networks such as stormwater drainage works are appropriately recognised. It is noted that any such changes would require a change to the current LGIP which would require a major amendment process, and any such changes should be considered in conjunction with a broader review of the infrastructure requirements and costs across the entire local government area.

5.3.7.2 Identification of trunk infrastructure

The proposed trunk infrastructure for the structure plan area is identified in **Table 5-10**.

Table 5-10 Potential trunk infrastructure elements

Network	Costs	Trunk elements
Drainage/Stormwater Network	$2,652,500	Land for northern drainage corridor (approx. 650m x 15m) (Drainage Network - refer Item 2 on Appendix F) Land for widening of central drainage corridor (approx. 1000m x 5m) (Drainage Network - refer Item 1 on Appendix F) Construction of central drainage channel (Drainage Network - refer Item 1 on Appendix F)

Network	Costs	Trunk elements
Sewer Network	$400,000	New sewer main aligned along the north-eastern perimeter of the structure plan area (Sewer Network – Item 2 on Appendix F)
Transport Network (proposed trunk)	$200,000	Intersection upgrades and signalisation (Boundary Road / Senorita Parade) (Transport Network – Item 5 on Appendix F) (Includes 25% contingency)

The intention is that this trunk infrastructure is included in a future LGIP amendment and forms part of the planning scheme. On this basis, contributions may be levied to fund the trunk infrastructure components of the required works.

Under The Minister's Guidelines and Rules (MGR), the LGIP can only identify trunk infrastructure which is defined as 'development infrastructure' in Schedule 2 of the *Planning Act 2016*.

Having regard to Schedule 2 of the Act, 'development infrastructure' is defined as:

(a) land or works, or both land and works, for—

(i) water cycle management infrastructure, including infrastructure for water supply, sewerage, collecting water, treating water, stream managing, disposing of waters and flood mitigation, but not water cycle management infrastructure that is State infrastructure; or

(ii) transport infrastructure, including roads, vehicle lay-bys, traffic control devices, dedicated public transport corridors, public parking facilities predominantly serving a local area, cycleways, pathways and ferry terminals; or

(iii) public parks infrastructure, including playground equipment, playing fields, courts and picnic facilities; or

(b) land, and works that ensure the land is suitable for development, for local community facilities, like—

(i) community halls or centres; or

(ii) public recreation centres; or

(iii) public libraries.

Further guidance regarding what can be included as trunk infrastructure is provided in 'Statutory guideline 03/14 – Local government infrastructure plans'. Section 2.3 of the guideline provides the following statements:

To assist local governments in making a determination as to whether infrastructure is trunk infrastructure, the following matters should be considered:

- *function – does the infrastructure provide a distribution function, collection function or service to a wider catchment comprising multiple development sites?*
- *number of users – does it service multiple development sites or catchments of users?*
- *development certainty – can the planning of the infrastructure be undertaken without knowing the details of individual developments? For example, can the infrastructure be planned without knowing the detailed layout for lot reconfigurations or the design of the development?*

Additionally, Appendix B of the guideline provides an indicative list of trunk infrastructure. Relevantly, the list includes:

> Stormwater network - Land or works for the following stormwater infrastructure:
  - Bio-retention swale
  - Channel
  - Culvert
  - Pipe

- Revegetation
- Stormwater quality devices
- Retention basin / wetland
- Detention basin

> Transport network – Land or works for:

- Collector and higher order roads including associated intersections, traffic lights, roundabouts, bridges and culverts;
- Standard items associated with the road profile of a local government road, including kerb and channelling, lighting, signage, foot and cycle paths and basic verge plantings
- Pedestrian and cycle paths which perform a city wide or district function
- Bus stops constructed as part of a local government road specified above.

> Sewerage network – land or works for:

- Sewage treatment plant systems;
- Gravity sewers;
- Rising mains;
- Pumping stations;
- Emergency storage.

It is noted that the definitions for trunk infrastructure are reasonably broad, and there are no specific definitions or size/capacity thresholds that automatically make any given piece of infrastructure trunk or non-trunk. In this regard, Council has a high degree of discretion in determining what infrastructure can be considered to have a trunk function within the broader infrastructure networks. Having regard to the relevant statutory framework, the proposed trunk network items identified as part of the structure plan are considered to be appropriately categorised as trunk on the basis that:

> The proposed drainage channels will improve the stormwater functions of Precincts 1 and 2, and allow for multiple sites to be developed and achieve the planning scheme settlement pattern which envisages a low density residential precinct in the locality;

> The sewer gravity main functions as the main sewerage reticulation element that collects and transports sewerage from the whole northern and central precincts of the structure plan area, therefore providing a trunk function that benefits multiple sites;

> The proposed intersection works and signalisation (Boundary Road and Senorita Parade) are located on an intersection with an existing trunk road (Boundary Road) and are required to maintain the safety and efficiency of the road and the broader trunk transport network;

> The proposed trunk infrastructure items are broadly consistent with the current sewer, stormwater, and transport items identified in the LGIP.

Ultimately, the decision as to what items of infrastructure are included as trunk infrastructure is a decision for Council. Should Council not include all (or any) of the proposed trunk infrastructure items, or seek to include additional items as trunk infrastructure, the cost basis of the structure plan will be necessarily altered.

5.4 Indicative development phasing

In consideration of the land characteristics, infrastructure requirements and structure plan layout within the Urangan South structure plan area, development phasing is required in order to deliver a logical and orderly sequence of development. At the outset, it is important to note that the development phasing is indicative, and alternate phasing may be possible where a proponent demonstrates that the key drainage and transport network matters can be suitably addressed in accordance with the structure plan concept (**Appendix C - Urangan South Structure Plan Concept**) and infrastructure Plan (**Appendix F – Infrastructure Plan**).

The proposed phasing plan is identified in **Appendix G – Phasing Plan** and described below.

- Precinct 1 - To enable the orderly delivery of the proposed northern drainage corridor and, to a lesser extent, the proposed access road network, the following phasing is recommended:

    1. Drainage easements/ land acquisitions are secured by Council over all relevant properties in Precinct 1, to allow upstream (west) properties to have lawful points of discharge over downstream properties. This will allow for progressive roll-out development across the precinct. Land can be acquired either:

        - by seeking easements over the whole required corridor through Council undertaking individual negotiation with landowners;
        - easements could be required as conditions of development approvals to progressively secure the corridor; or
        - acquisition of the land required for the whole corridor through Council undertaking individual negotiation with landowners.

        The preferred option would be for Council to secure the corridor via acquisition or easements. This would provide certainty as to the alignment of the corridor, and ensure that any early development in the central and western part of the Precinct will have legal point of discharge and can proceed without waiting for downstream development to occur.

    2. To ensure consistency, Council should design the required channelization works. This would provide certainty in terms of ensuring a consistent design approach across the whole corridor and provide for an integrated drainage solution to be progressively delivered by individual developments.
    3. Properties in the south-central part of the Precinct 1 should proceed first, to provide for the new proposed loop road to establish and commence the drainage corridor at the most upstream extent of the corridor practicable.
    4. In this manner, upstream properties can commence with development utilising the downstream easement. However, it is noted that this approach will potentially result in stormwater flows not conforming to the alignment of the intended channel during early phases of development, resulting in potential impacts which would need to be managed through interim development controls.
    5. Properties adjacent to Boundary Road may only develop when they have a point of access other than Boundary Road, and subsequent to the proposed new primary road network to Senorita Parade being available.

- Amalgamation of properties is encouraged, to manage the implications of phasing and delay.
- Precinct 2 has no particular phasing requirements. The entrenched pattern of development has most existing dwellings and outbuildings outside the limits of flood impacts, and any individual development for larger lot sizes should be able to provide a lot layout that can provide any required drainage easement to the central drainage channel and maintain the safety of people and property.

- The intended large lot nature of development in Precinct 2 will also allow for the central drainage channel to be progressively constructed. Council may proactively provide or extend the drainage works as financial and engineering feasibility warrants, or to catalyse development in the Precinct.
- Precinct 3 has no phasing requirements given that it is already committed to development.

This preferred sequence of development in the structure plan area will provides for the efficient extension of existing infrastructure networks. The preferred sequence of development should be considered indicative and able to be adapted depending upon the manner in which development applications come forward and the infrastructure arrangements that are proposed to be put in place to provide the supporting infrastructure. In this context, development sequencing for the structure plan area is a temporal consideration that can be revised and updated over time to take account of emerging circumstances and opportunities.

5.5 Principles and strategies

This section provides overarching principles to guide development within the structure plan area and also provides a description and a series of objectives for the land use and infrastructure elements which will support the preferred pattern of development as presented on the Urangan South structure plan concept.

The objectives describe the desired outcomes to be achieved in completed development and that could potentially be brought forward into a local area plan in Council's new planning scheme.

5.5.1 Overarching principles

To guide future development and help realise the stated vision for the Urangan South structure plan area (refer to Section 4 of this report), the following overarching principles have been identified:-

1. The structure plan area is developed as a sustainable extension to Hervey Bay's urban area, and accommodates a high quality residential neighbourhood with a mix of residential densities providing for a diversity of residents and for housing choice.
2. Residential development integrates with the character of the existing neighbourhood, through retention of vegetation where possible and low-scale residential forms.
3. Development does not encroach on the continuing safe and efficient operation of the Pulgul Creek WWTP and the Hervey Bay Airport. No further residential development is anticipated in the buffer areas to these facilities (as included in the Limited Development (Constrained Land) Zone).
4. Development is delivered in a coherent and appropriately phased manner, to manage the transitioning of the community from a very low density environment to an urban residential environment with limited impacts on amenity and infrastructure provision. Development occurs generally in accordance with the Phasing Plan.
5. Development in the structure plan area maintains the flood storage and conveyance capacity of the existing drainage corridors. Drainage solutions are provided to the central drainage channel and northern drainage channel to allow appropriate urban development to occur. Drainage channels are design to be low intensity and maintain the natural character and amenity of the locality.
6. Development in the structure plan area avoids the disturbance of environmentally sensitive areas and incorporates suitable buffers and separation distances to maintain ecological functions and processes.
7. Development is serviced by an integrated transport network that provides a balanced hierarchy of collector, primary and secondary roads, high levels of integration and access to the existing road network in the Hervey Bay urban area, and provides for active transport connections.
8. The safety and efficiency of Boundary Road is protected, with no direct access provided to Boundary Road and a landscape buffer protecting the amenity of adjacent development.

5.5.2 Residential strategy

The overall objectives of the residential strategy are as follows:-

1. Development provides for a diversity of residential lot sizes and housing forms that provides housing options for a range of household sizes, income groups and lifestyles.
2. Urangan South will primarily comprise residential land uses, across a series of precincts as follows:
    a. Precinct 1 (Northern Precinct) – This precinct comprises dwelling houses of allotments of generally 800m^2, having regard to its accessible location adjacent to Boundary Road and proximity to established urban residential areas. Residential development only occurs in conjunction with the delivery of suitable road and stormwater infrastructure, identified in the structure plan and infrastructure plan. Development in this precinct is serviced by all urban infrastructure networks.
    b. Precinct 2 (Central Large Lot Precinct) – This precinct comprises dwelling houses of allotments of minimum 1,500m^2. Development is provided in a natural setting through retention of vegetation and natural land forms. The layout of development provides for allotments on the southern side of the drainage corridor with a 30 metre setback from the central drainage corridor (dedicating a drainage easement in favour of Council), to provide for stormwater conveyance associated with the central drainage channel.
    c. Precinct 3 (Southern Precinct) – This precinct comprises dwelling houses developed in accordance with the provisions of the Low Density Residential Zone.
3. Subdivision design provides for the establishment or maintenance of strong connections (both in terms of physical connections and sympathetic built form character) to adjoining and existing residential neighbourhoods both within and external to the local plan area.
4. Lot layout in Precinct 2 provides access that is appropriate to maintain the large lot character and amenity of the Precinct.
5. Housing is compatible with and integrates with adjoining development and contributes to a cohesive and attractive streetscape.
6. Development located adjacent to drainage channels provides housing that overlooks the channel, to ensure casual surveillance of those areas. Fence heights and built form outcomes will be incorporated into Local Area Plan controls to facilitate a high quality and safe urban design outcome.

5.5.3 Transport and mobility strategy

The overall objectives of the transport and mobility strategy are the following:-

1. Opportunities for connectivity between the structure plan area and the broader Hervey Bay urban area are maximised through the establishment of an integrated and legible road and transport network.
2. A transport network that supports the preferred settlement pattern for the structure plan area is provided.
3. Access for large lots in Precinct 2 utilises a mix of cul-de-sacs, easements, and access handles that are appropriate to cater for the low speed and low intensity traffic environment while ensuring the safety and efficiency of the broader transport network.
4. Development ensures the proposed road network is able to cater for the increased traffic demand by analysing road link capacities and identifying roads and intersections which require upgrade.
5. The proposed transport network is rolled out in sequence with urban development to meet the emerging needs of the structure plan area.
6. Development design and layout provides opportunities for future public transport routes.

7. The proposed transport network integrates with planned upgrades in the surrounding locality (both on Council and State Controlled road infrastructure).

5.5.4 Water supply and sewerage network strategy

The objectives of the water supply and sewerage strategy are the following:-

1. Networks have or are provided with capacity to cater for the projected increase in demand for the variety of residential densities within the Urangan South structure plan area.
2. Efficiency of the networks is optimised to achieve the required level of service for the various land use areas.
3. All sewerage trunk infrastructure network elements are located within existing and proposed drainage reserves, or at the rear of properties, or in previously disturbed areas, as much as possible.
4. Until such time as the Council's Local Government Infrastructure Plan incorporates the relevant trunk upgrades associated with the structure plan area, infrastructure can potentially be provided through individual infrastructure agreements based on the expected demand levels generated by the development.
5. Water supply and sewerage services upgrades are provided at the time of development to ensure:-
    - the structure plan area has sufficient service capacity to meet its specific needs;
    - the proposed infrastructure network integrates into the whole of the structure area plan network scheme;
    - the proposed network augmentations take into account the expected demands of the broader structure plan area's land use requirements; and
    - the formalisation of the required infrastructure networks protects and enhances the function of the water supply and sewerage infrastructure.

5.5.5 Stormwater and drainage network strategy

The objectives of the stormwater and drainage network strategy are as follows:-

1. Stormwater drainage strategies that build upon the existing drainage infrastructure and retain a more natural hydraulic regime in the northern and central precincts
2. The impact of overland flow upon the local plan area is minimised by providing additional conveyance capacity to the existing channels
3. Flood immunity within the local plan area is to be in accordance with the specific levels for the relevant land uses and incorporates the necessary freeboard and safety access requirements.
4. Stormwater quality treatment to be in accordance with WSUD guidelines
5. All drainage systems augmented as part of the development of the local plan area are to enhance the management of flooding and minimise the risk of floodwaters impacting on the development and surrounding use areas.
6. Development within the structure plan area is to incorporate best practice principles of water sensitive urban design to protect the aquatic ecosystems by managing the water quantity and water quality discharges from the various land use areas.

6 Conclusion and recommendations

The Urangan South structure plan area is a complex urban growth area. The land use characteristics, particularly drainage matters, have made coherent and coordinated development difficult to achieve, and the absence of structure planning has also resulted in uncoordinated and ad hoc urban outcomes being realised in recent years.

In order to facilitate a coordinated approach to future development of the structure plan area, the structure plan concept seeks to strike a balance between development expectations set by the existing planning scheme and existing approvals, community preferences for urban intensity, key constraints such as drainage matters, and a sensitive response to physical and environmental characteristics.

This has resulted in the identification of a residential community comprising a range of densities, with key infrastructure items identified for the orderly and logical development of the area.

It is recommended that this structure plan area report and accompanying structure plan concept be endorsed by Council for the following purposes:-

1. To provide a broad land use structure to guide future development in a manner that appropriately provides for residential development while sensitively responding to physical values and constraints.
2. To help guide and inform Council's assessment and decision making process for existing and emerging development applications within the structure plan area.
3. To inform amendments to the Fraser Coast Planning Scheme 2014, particularly in relation to the drafting of specific local plan provisions applicable to the Urangan South structure plan area.
4. To inform future infrastructure planning exercises within the structure plan area, particularly in relation to the planning assumptions and plans for upfront capital works and trunk infrastructure that may be applied to the local plan area (which we recommend are required to enable development activity).

Urangan South Land Use Strategy and Local Area Plan Project

Draft Structure Plan Report

Figures

Prepared for Fraser Coast Regional Council
HRP18074.R02.005

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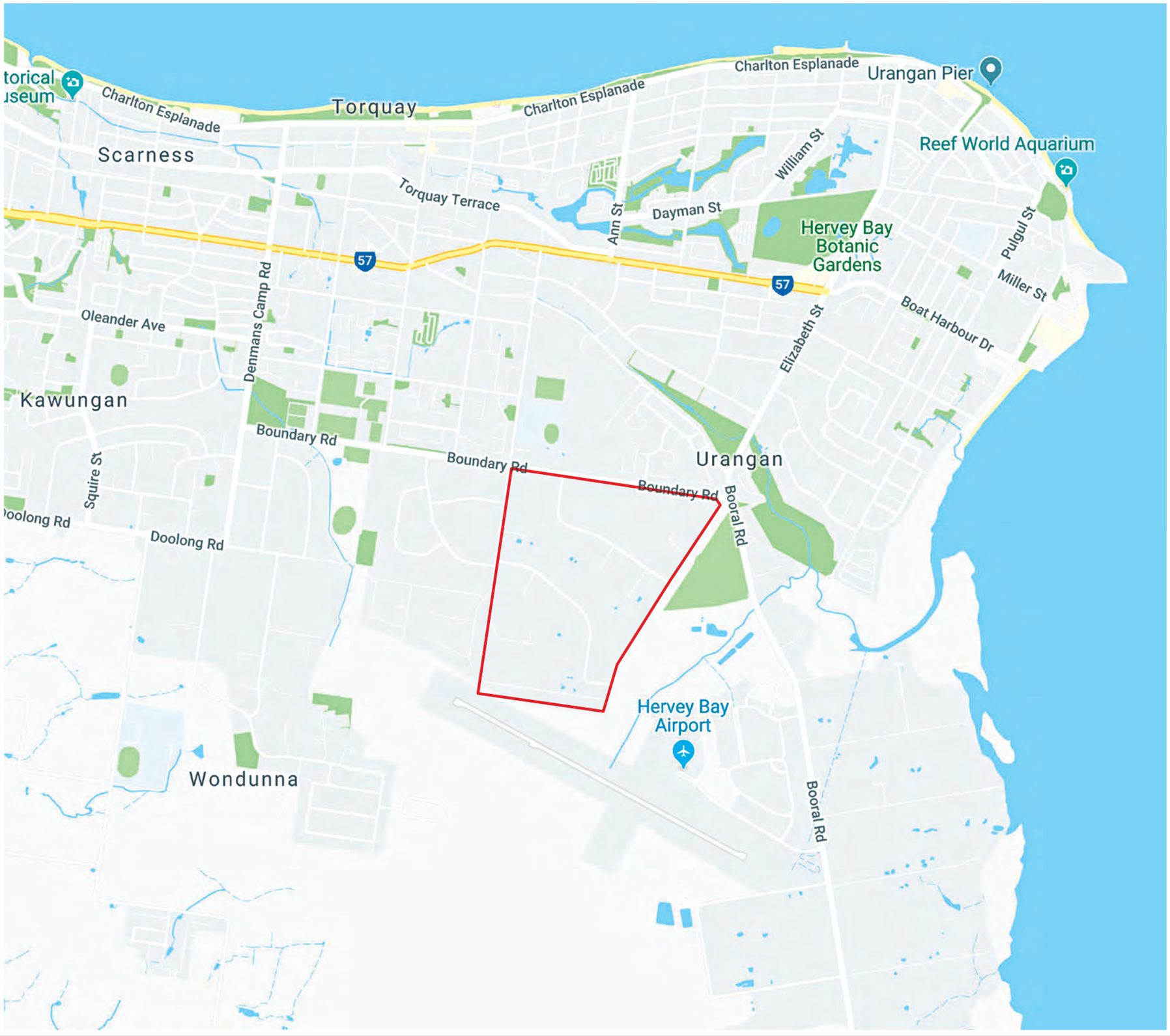

[LEGEND]

Structure Plan Area Boundary

1

N
W
E
S

0 0.25 0.5 0.75 1.0 1.25

1:25,000 (kilometres)

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LAND USE STRATEGY and LOCAL PLAN AREA

Location Map

FILENAME >	LOCATION MAP.ai	DATE >	14 May 2019
JOB NO. >	HRP18074	AMENDED >	n/a
SCALE >	1:25,000	VERSION >	1.0
SOURCE >	Map data © GOOGLE MAPS, online map downloaded 14/05/2019.		

FIGURE 1

[LEGEND]

Structure Plan Area Boundary

The cadastre shown on this map was downloaded from the Queensland Government website 'Q Spatial'- (Department of Natural Resources, Mines and Energy) and is current and correct as of **14 May 2019.**

N W E S

0 80 160 240 320 400

1:8,000 (metres)

GDA 94; MGA Zone 56

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LAND USE STRATEGY and LOCAL PLAN AREA

Structure Plan Area Map

FILENAME >	STUCTURE PLAN AREA MAP.ai	DATE >	14 May 2019
JOB NO. >	HRP18074	AMENDED >	n/a
SCALE >	1:8,000	VERSION >	1.0
SOURCE >	Map data © NearMap; imagery dated 25/10/2018.		

FIGURE 2

[LEGEND]

- Structure Plan Area Boundary
- Undergoing Assessment
- Approved - Not Completed
- Approved - Completed

The cadastre shown on this map was downloaded from the Queensland Government website 'Q Spatial'- (Department of Natural Resources, Mines and Energy) and is current and correct as of **14 May 2019.**

N W E S

0 80 160 240 320 400

1:8,000 (metres)

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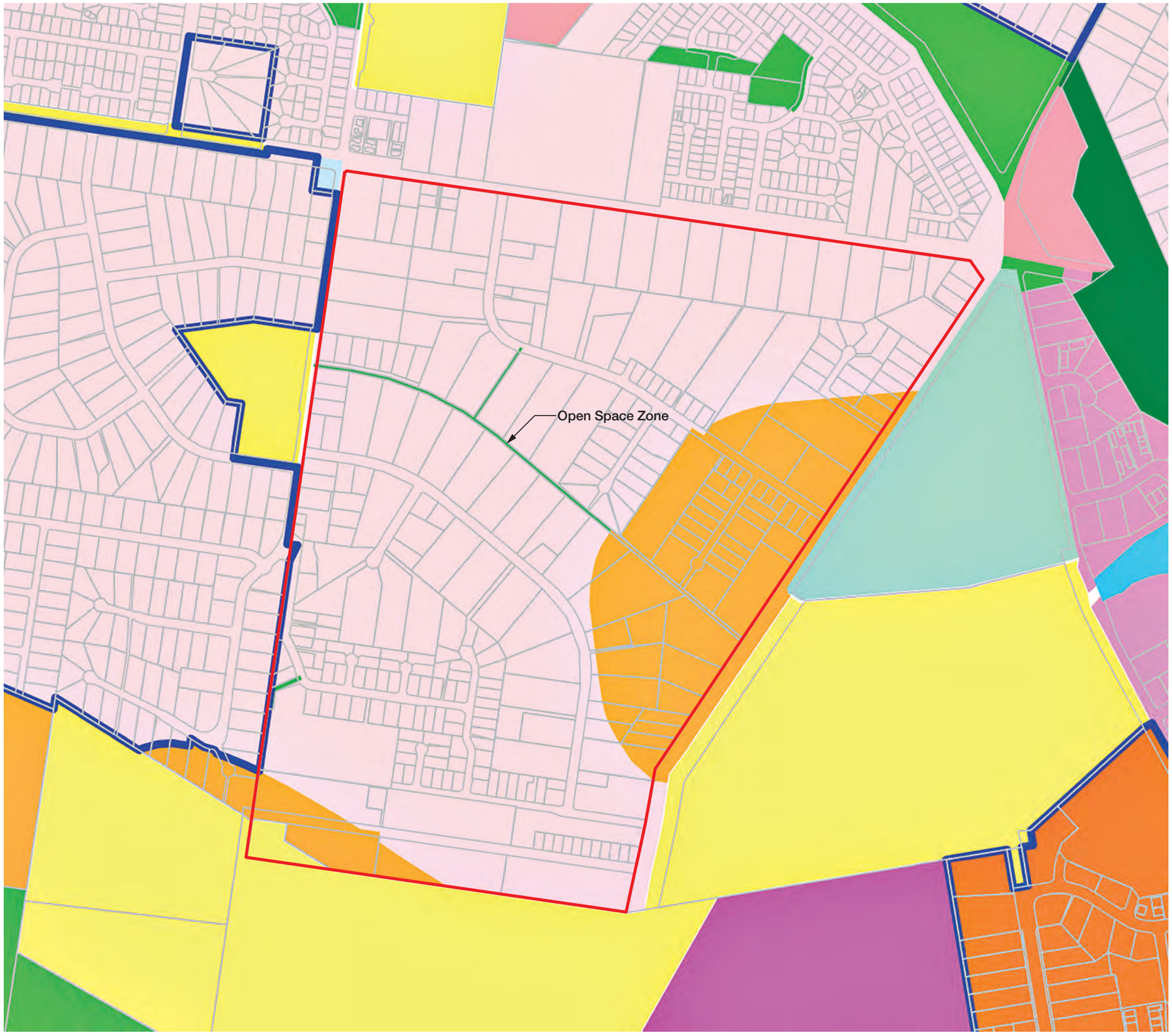
Development Activity Map

FILENAME >	DEVELOPMENT ACTIVITY.ai	DATE >	14 May 2019
JOB NO. >	HRP18074	AMENDED >	n/a
SCALE >	1:8,000	VERSION >	1.0

FIGURE 3



[LEGEND]

- Structure Plan Area Boundary
- Low Density Residential
- Open Space
- Community Facilities
- Limited Development (constrained land)
- Medium Density Residential
- Neighbourhood Centre
- Medium Impact Industry
- High Impact Industry
- Sport and Recreation
- Mixed Use
- Environmental Management and Conservation
- Zone Precinct

N W E S

0 80 160 240 320 400

1:8,000 (metres)

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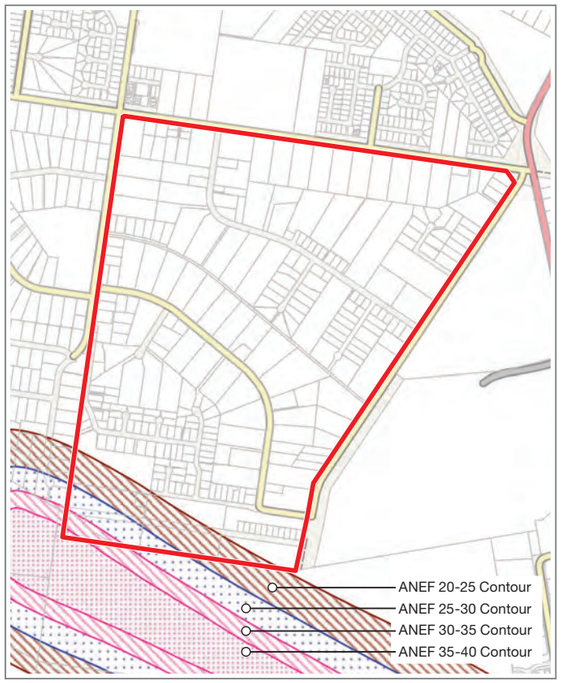
Zoning Map

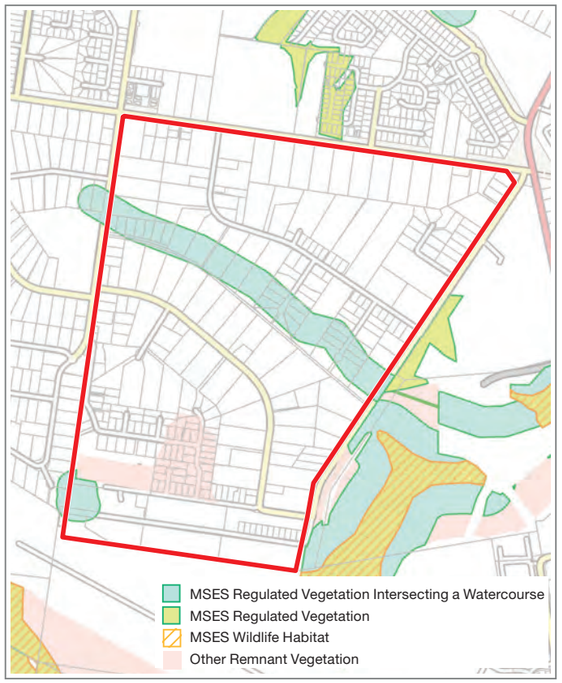
FILENAME >	ZONING MAP.ai	DATE >	14 May 2019
JOB NO. >	HRP18074	AMENDED >	n/a
SCALE >	1:8,000	VERSION >	1.0
SOURCE >	Map data © Fraser Coast Regional Council; online mapping downloaded 14/05/2019.		

FIGURE 4

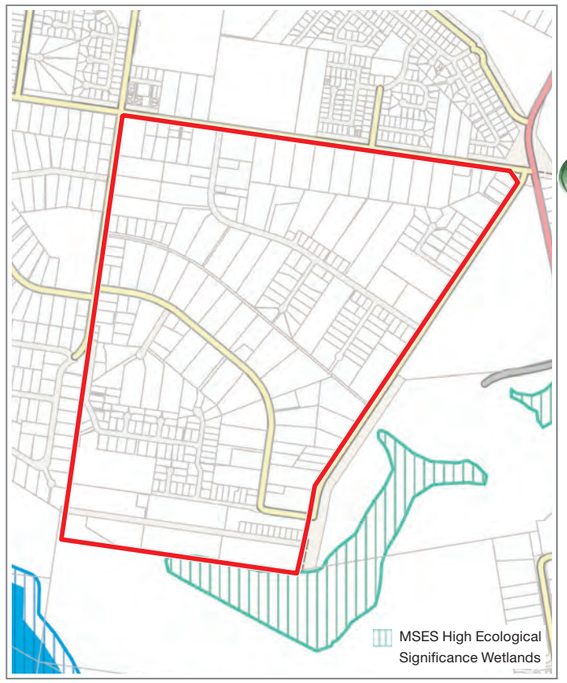
Acid Sulfate Soils



Airport and Aviation Facilities

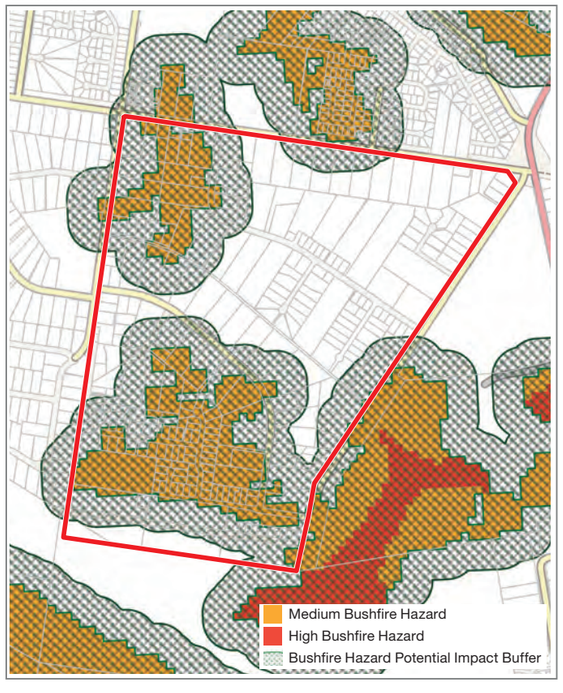


Biodiversity Areas, Waterways and Wetlands (B)



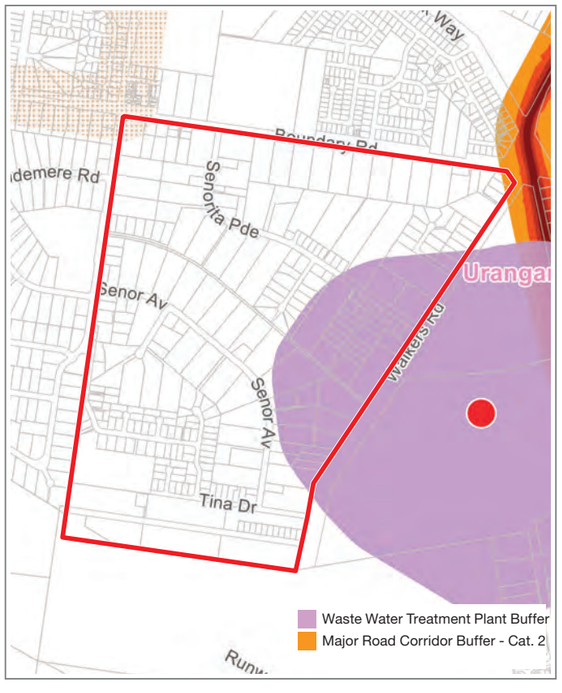
Biodiversity Areas, Waterways and Wetlands (W)

Bushfire



Flood Hazard

Infrastructure



[LEGEND]

Structure Plan Area Boundary

N W E S

0 200 400 600 800 1000

1:20,000 (metres)

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LAND USE STRATEGY and LOCAL PLAN AREA

Overlay Maps

FILENAME >	OVERLAY MAPS.ai	DATE >	14 May 2019
JOB NO. >	HRP18074	AMENDED >	n/a
SCALE >	1:20,000	VERSION >	1.0
SOURCE >	Map data © Fraser Coast Regional Council; online mapping downloaded 14/05/2019.		

FIGURE 5

[LEGEND]

- Structure Plan Area Boundary
- Catchment Boundary

Flood Hazard (m^2/s)

- 0.0 to 0.4
- 0.4 to 0.6
- 0.6 to 1.5
- 1.5 to 5.0

The cadastre shown on this map is current and correct as of the date when the flood hazard modelling was undertaken which was the **7 September 2018.**

N W E S

0 80 160 240 320 400

1:8,000 (metres)

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Flood Hazard Map

100 Year ARI (2090 Climate Scenario)- Maximum Flood Hazard

FILENAME >	FLOOD HAZARD MAP.ai	DATE >	14 May 2019
JOB NO. >	HRP18074	AMENDED >	n/a
SCALE >	1:8,000	VERSION >	1.0
SOURCE >	Flood data © Cardno Pty Ltd: Pulgul Creek Catchment Analysis – Flood Risk, dated 07/09/2018.		

FIGURE 6

[LEGEND]

- Structure Plan Area Boundary
- MSES - Wildlife Habitat
- MSES - Regulated Vegetation (category B)
- MSES - Regulated Vegetation (category R)
- MSES - Regulated Vegetation (essential habitat)
- MSES - Regulated Vegetation (wetland)
- MSES - Regulated Vegetation (intersecting a watercourse)
- MSES - High Ecological Sigfificance Wetlands

The cadastre shown on this map was downloaded from the Queensland Government website 'Q Spatial'- (Department of Natural Resources, Mines and Energy) and is current and correct as of **14 May 2019.**

N W E S

0 80 160 240 320 400

1:8,000 (metres)

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Matters of State Environmental Significance Map

FILENAME >	MSES MAP.ai	DATE >	14 May 2019
JOB NO. >	HRP18074	AMENDED >	n/a
SCALE >	1:8,000	VERSION >	1.0
SOURCE >	Map data © Queensland Government. MSES datasets downloaded from the Queensland Spatial Catalogue website on 14/05/2019.		

FIGURE 7

[LEGEND]

- Structure Plan Area Boundary
- Land Constrained by the following Fraser Coast Regional Council Overlay Maps:
  - Airport and Aviation Facilities
  - Biodiversity Areas, Waterways and Wetlands
  - Flood Hazard
  - Infrastructure

The cadastre shown on this map was downloaded from the Queensland Government website 'Q Spatial'- (Department of Natural Resources, Mines and Energy) and is current and correct as of **14 May 2019.**

N W E S

0 80 160 240 320 400

1:8,000 (metres)

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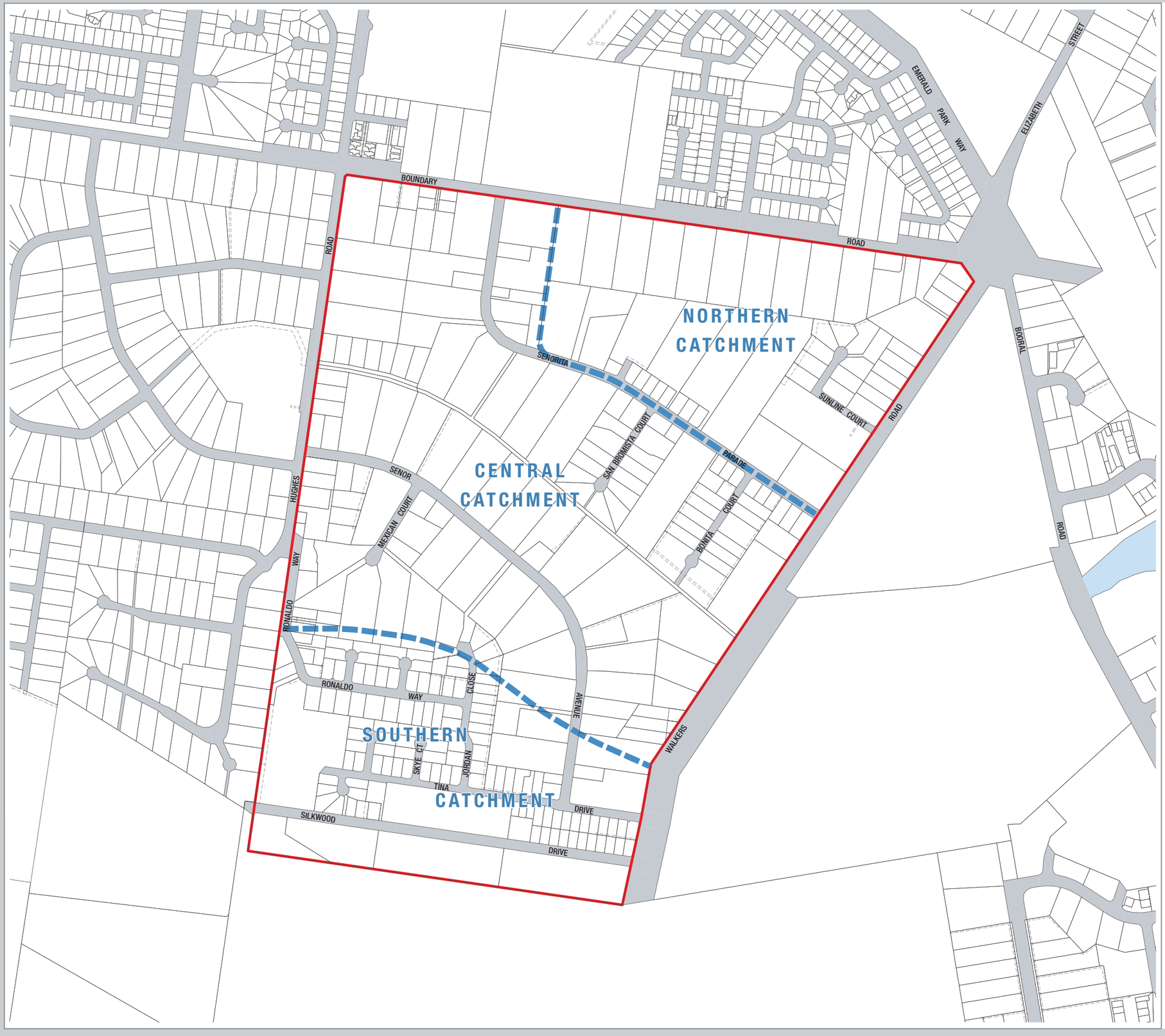
Analysis Map
(potentially developable land)

FILENAME >	ANALYSIS MAP.ai	DATE >	14 May 2019
JOB NO. >	HRP18074	AMENDED >	n/a
SCALE >	1:8,000	VERSION >	1.0
SOURCE >	Analysis data © State of Queensland (Department of Natural Resources, Mines and Energy) 2019; dated 14/05/2019.		

FIGURE 8



[LEGEND]

- Structure Plan Area Boundary
- Catchment Boundary

The cadastre shown on this map was downloaded from the Queensland Government website 'Q Spatial'- (Department of Natural Resources, Mines and Energy) and is current and correct as of **14 May 2019.**

N W E S

0 80 160 240 320 400

1:8,000 (metres)

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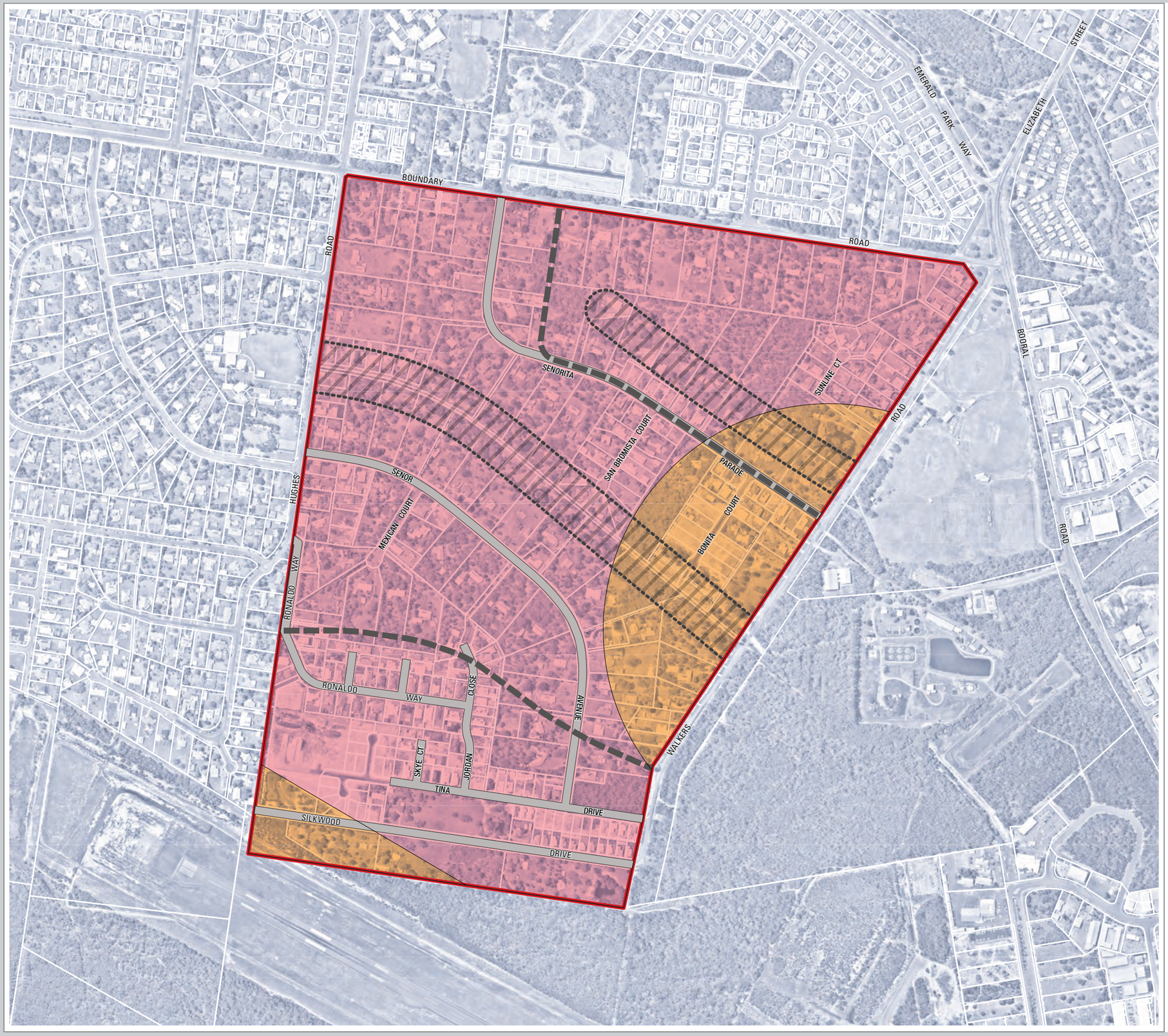
LAND USE STRATEGY and LOCAL PLAN AREA

Catchment Map

FILENAME >	CATCHMENT MAP.ai	DATE >	14 May 2019
JOB NO. >	HRP18074	AMENDED >	n/a
SCALE >	1:8,000	VERSION >	1.0

FIGURE 9



[LEGEND]

- Structure Plan Area Boundary
- Catchment Boundary
- Road Network
- Further Investigation Area (drainage and environmental corridor)
- Odour (limited development zone)
- Low Density Residential - minimum 500m² lot size (20 dwellings/hectare)

The cadastre shown on this map was downloaded from the Queensland Government website 'Q Spatial'- (Department of Natural Resources, Mines and Energy) and is current and correct as of **14 May 2019.**

N W E S

0 80 160 240 320 400

1:8,000 (metres)

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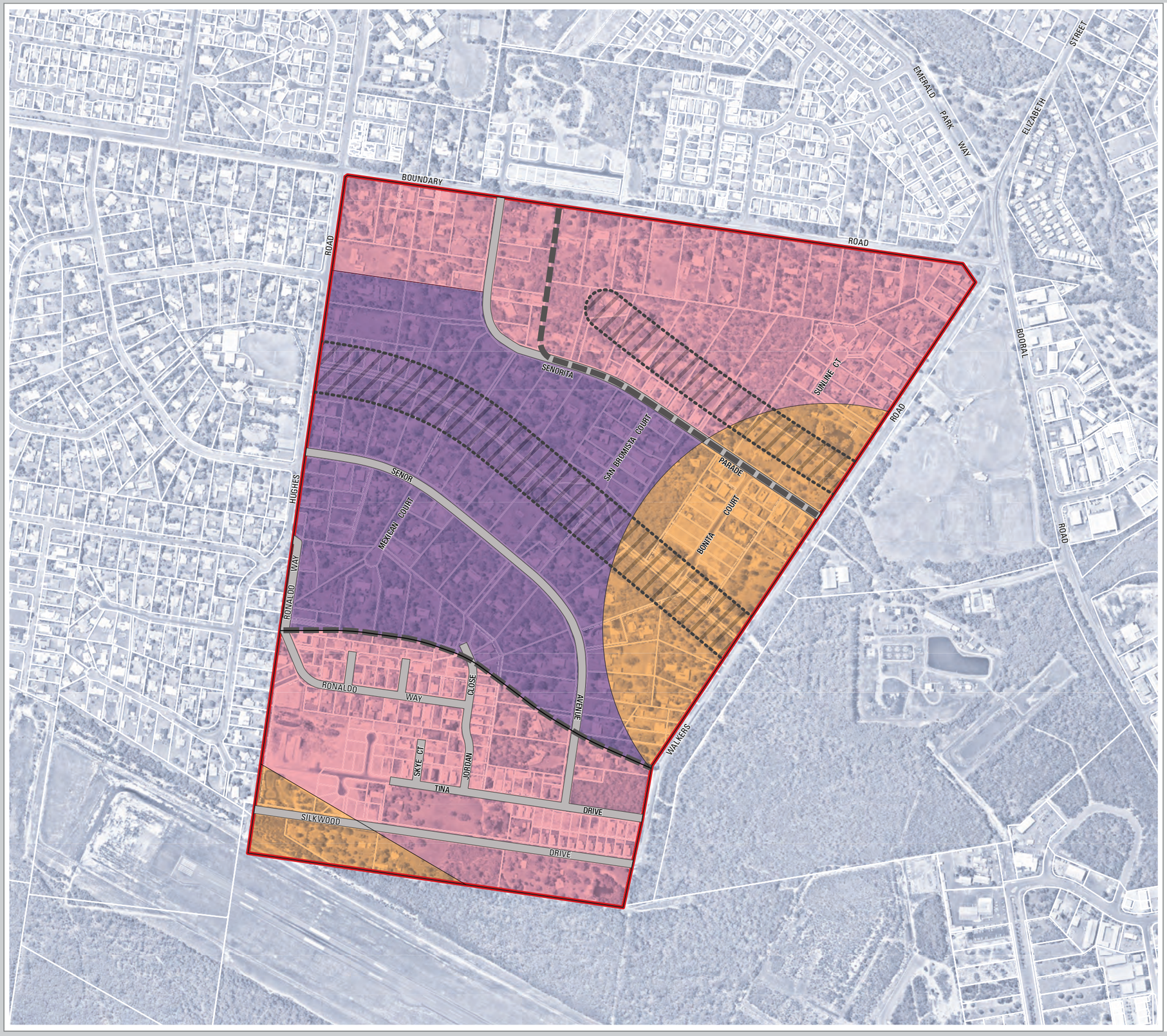
LAND USE STRATEGY and LOCAL PLAN AREA

Maximum Yield (Existing Zoning) Scenario Map

FILENAME >	MAXIMUM YIELD MAP.ai	DATE >	14 May 2019
JOB NO. >	HRP18074	AMENDED >	n/a
SCALE >	1:8,000	VERSION >	1.0
SOURCE >	Map data © NearMap; imagery dated 25/10/2018.		

FIGURE 10



[LEGEND]

- Structure Plan Area Boundary
- Catchment Boundary
- Road Network
- Further Investigation Area (drainage and environmental corridor)
- Odour (limited development zone)
- Low Density Residential - minimum 500m² lot size (20 dwellings/hectare)
- Low Density Residential - minimum 2,000m² lot size (5 dwellings/hectare)

The cadastre shown on this map was downloaded from the Queensland Government website 'Q Spatial'- (Department of Natural Resources, Mines and Energy) and is current and correct as of **14 May 2019.**

N W E S

0 80 160 240 320 400

1:8,000 (metres)

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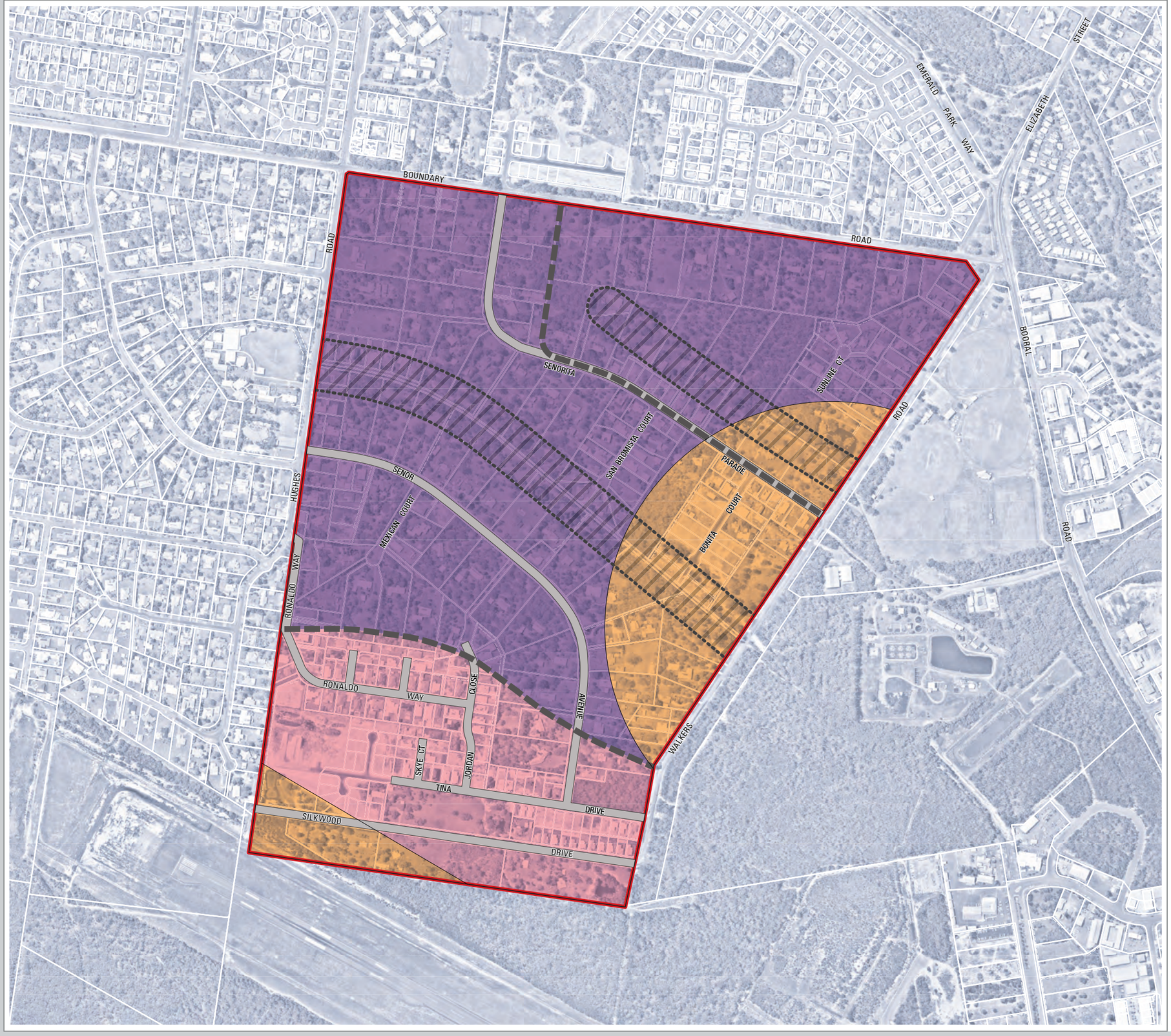
LAND USE STRATEGY and LOCAL PLAN AREA

Mixed Lot Scenario Map

FILENAME >	MIXED LOT SCENARIO MAP.ai	DATE >	14 May 2019
JOB NO. >	HRP18074	AMENDED >	n/a
SCALE >	1:8,000	VERSION >	1.0
SOURCE >	Map data © NearMap; imagery dated 25/10/2018.		

FIGURE 11



[LEGEND]

- Structure Plan Area Boundary
- Catchment Boundary
- Road Network
- Further Investigation Area (drainage and environmental corridor)
- Odour (limited development zone)
- Low Density Residential - minimum 500m² lot size (20 dwellings/hectare)
- Low Density Residential - minimum 2,000m² lot size (5 dwellings/hectare)

The cadastre shown on this map was downloaded from the Queensland Government website 'Q Spatial'- (Department of Natural Resources, Mines and Energy) and is current and correct as of **14 May 2019.**

N W E S

0 80 160 240 320 400

1:8,000 (metres)

GDA 94; MGA Zone 56

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LAND USE STRATEGY and LOCAL PLAN AREA

Large Lot Scenario Map

FILENAME >	LARGE LOT SCENARIO MAP.ai	DATE >	14 May 2019
JOB NO. >	HRP18074	AMENDED >	n/a
SCALE >	1:8,000	VERSION >	1.0
SOURCE >	Map data © NearMap; imagery dated 25/10/2018.		

FIGURE 12

Urangan South Land Use Strategy and Local Area Plan Project

Draft Structure Plan Report

Appendix A

Development Activity within the project area – approvals and applications

Prepared for Fraser Coast Regional Council
HRP18074.R02.005Ref: HRP18075

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	Location and Description	Application Date	Type of Application	Development / Application Status	Yield	Key Infrastructure
	Undergoing Assessment					
1	9 Mexican Court Lot 78 on RP218665	RAL18/0044 Lodged: 05.07.2018	ROL 1 into 4 (lot sizes 2,077m² - 3,000m²)	Application Stage (as of 17.07.2018) Compliance notice due 19.07.2018	No plans on PD Online as of 17.07.2018 4 lots (lot sizes 2,077m² - 3,000m²) Prelodgement Notes: *"Council advised that holding off on submitting any application until the study [Urangan South Structure Plan] has concluded is also an option"*	
2	2-26 Silkwood Drive Lot 6 RP162668	RAL19/0009 Lodged: 01.02.2019	ROL 1 into 7 lots	Current	1 into 7 lots	
3	27-51 Silkwood Drive	RAL19/0010 Lodged: 07.02.2019	ROL 9 into 21 lots (Other change – associated with ROL143041)	Current	9 into 21 lots	
4	26-30 Hughes Road Lot 47 RP170704	RAL18/0076 Lodged: 31.10.2018	ROL 1 into 4 lots	Decision Stage Decision period extend due: 12.03.2019	1 into 4 lots	
5	26 Senorita Parade Lot 33 RP172638	RAL19/0003	ROL 1 into 15 lots	Awaiting response to information required (as of 31.01.2018)	1 into 15 lots	
	Total Potential Lots – Undergoing Assessment				**30**	
	Approved but not Completed					
6	27-51 Silkwood Drive and 55 Walkers Road Lots 2 and 3 on RP162667	ROL-143041 (and subsequent Change applications) Lodged: 06.06.2014 Latest Approval: 01.12.2015 RAL19/0010 Other Change application lodged 07.02.2019 – see above for details	ROL 2 into 35 lots (3 stages)	Approved No stages completed Stages 1 & 2 under construction	ROL 2 into 35 lots Stage 1: Lots 1-11 (11 lots) Stage 2: 12-26 (15 lots) Stage 3: 101-109 (9 lots) Associated OPW: OP-166054	Stormwater from Stages 1 and 2 to discharge east into Lot 100 on SP226980. Upgrade to existing infrastructure required. Water connection to existing mains in Walkers Road Existing Sewer exists to the site. Manholes and maintenance assets to be altered to reflect new site levels.

	Location and Description	Application Date	Type of Application	Development / Application Status	Yield	Key Infrastructure
7	10 Senor Avenue Lot 1 on SP286720	RAL18/0034 Lodged: 23.05.2018 Approved:	ROL 1 into 2 lots	Decision Stage (as of 13.07.2018) Decision due 26.07.2018 Approved:	1 into 2 lots Lots sizes: 2,000m² and 4,027m²	
8	6 Senor Avenue and 56 & 60 Ronaldo Way Lot 66 on RP180355 and Lots 22 & 23 on SP287644	RAL18/0041 Lodged: 26.06.2018 Approved	ROL 3 into 9 lots	Applicant response to action notice (due 12.08.2018) Approved: OPW recently approved	3 into 9 lots Lot sizes: 710m2 to 4,107m2	Sewer will be provided to all lots
9	5 Senor Avenue Lot 64 on RP180345	ROL-163046 Lodged: 26.07.2016 Approved: 13.09.2016	ROL 1 into 18 (2 stages)	Approved Stage 1 completed Stage 2 not started	ROL 1 into 18 Stage 1: Lot 1 and balance Stage 2: Lots 2-18 Lot sizes 516m² to 665m², and 1,530m²	No OPW lodged
10	14 Boundary Road Lot 3 on SP287618	ROL-173011 Lodged: 17.02.2017 Approved: 28.03.2017 Expires: 30.03.2019	ROL 1 into 2 lots and access easement	Approved Not started	ROL 1 into 2 Lot sizes 2,633m² and 2,791m²	Inter-allotment stormwater drainage provided through adjoining development to the south. Onsite sewer treatment and disposal provided Water meters to be installed once dwellings constructed
11	14-18 Hughes Road Lot 45 on RP170704	RAL17/0028 Lodged: 25.10.2017 Approved: 04.12.2017	ROL 1 into 3 lots and access easement	Approved Not Started	ROL 1 into 3 Lot sizes 5,245m², 2,740m² and 2,015m²	Stormwater discharge to Hughes Road Onsite sewer treatment and disposal provided Water meters to be installed once dwellings constructed
12	38 Senorita Parade Lot 36 on RP172637	ROL-163048 Lodged: 02.08.2016 Approved: 19.12.2016 Expired: 19.12.2018	ROL 1 into 2 lots and access easement	Approved Not started	ROL 1 into 2 Lot sizes 6,787m² and 4,586m²	Onsite sewer treatment and disposal provided Stormwater dispersal trench supported, where discharge to street to achievable. Water service to the retained dwelling to be revised to not encroach new lot. Proposed Lot 2 to be provided water meter during dwelling house construction.

	Location and Description	Application Date	Type of Application	Development / Application Status	Yield	Key Infrastructure
13	56 Senorita Parade Lot 41 on RP153688	RAL18/0018 Lodged: 19.03.2018 Approved: 24.05.2018 Approval takes effect: 02.07.2018	ROL 1 into 8 lots	Approved Not Started	ROL 1 into 8 Lot sizes 806m² to 953m² and 2,226m² Associated OPW: OPW18/0019 (Vegetation Clearing)	Sewer main connection provided through Senorita Parade. Water main connection provided through Senorita Parade. Stormwater discharge provided to Senorita Parade, discharging south
	Senorita Parade Lot 4 on SP279629, Lots 1, 7 and 8 on SP297015	RAL18/0070	ROL 4 into 9 lots plus easements (Other change application associated with ROL15/3072)	Approved Not started	ROL 4 into 9 lots	Easements provided for roads and drainage channels that provide connection to the north and west of the site.
	Total Potential Lots – Approved but not completed				**79**	
	Approved and completed					
14	6 and 10 Senorita Parade Lots 28 and 29 on RP170702	ROL-143012 (and subsequent change applications) Lodged: 27.05.2014 Latest approval: 08.12.2017	ROL 2 into 23 lots (5 stages)	Stages 1 & 2 completed Stages 3-5 not completed	ROL 2 into 23 (5 stages) Lot sizes 790m² - 3,297m² Associated OPW: OPW17/0001 (Civil), OP-166056 (Civil) & OP-176017 (Civil)	Stormwater discharged to drainage reserve along southern boundary and table drain along road frontage. Sewer for Stage 1 and 2 provided through existing infrastructure in Senorita Parade. Sewer for Stages 3 to 5 provided through proposed trunk upgrade along drainage reserve to the south, with connection into existing mains to the east. Water connection provided from existing main along Senorita Parade.
15	21, 25 Senorita Parade Lot 19 and 18 on RP172636	ROL-153072 Lodged: 27.10.2015 Approved: 06.09.2016	ROL 2 into 18 lots	Approved Stage 1 completed Stage 2 not completed	ROL 2 into 18 Stage 1: Lots 1-6 (plus two balance lots) Stage 2: Preliminary Approval Lots 7-17, 29 (with structure plan for further 15 lots on Lot 19 (Now Lot 8 on SP297015) Additional OPW: OP-176019 (Civil Works) & OP-156022 (Vegetation Clearing)	Sewer connection to Senorita Parade. Stormwater connection provided to Senorita Parade and interim detention basin provided within Stage 2 of the development. Water connection provided to existing main in Senorita Parade

	Location and Description	Application Date	Type of Application	Development / Application Status	Yield	Key Infrastructure
16	38 Senor Avenue Lot 1 on SP261100	ROL-163006 Lodged: 04.02.20616 Approved: 01.03.2016	ROL 1 into 3 lots	Approved Completed	ROL 1 into 3 Lot sizes 1,802m², 1,809m² and 4,723m² Associated OPW: OP-166029 (Civil)	On-site sewer treatment Water connection provided via Senor Ave Stormwater to table drain in Mexican Court and Senor Avenue
17	25 Walkers Road Lot 27 on RP170702	ROL-143032 Lodged: 22.08.2014 Latest Approval: 04.11.2014	ROL 1 into 5 lots	Approved Completed	ROL 1 into 5 Lot sizes 1,330m² - 1,610m², 4,000m² and 14,278m² Associated OPW: OP-156016	Sewer connection provided into Walkers Road Water main available on both Walkers Road and Senorita Parade Stormwater Discharge into road reserve
18	31 Senor Avenue Lot 57 on RP213315	ROL-143020 Lodged: 20.06.2014 Approved: 27.08.2015	ROL 1 into 2 lots	Approved Completed	ROL 1 into 2 Lot sizes 2,225m² and 7,841m² Associated OPW: OP-156068 (Civil)	Swale drain provided with discharge into drainage reserve along the northern boundary Onsite sewer treatment provided Water mains within Senor Ave
19	33 Walkers Road Lot 2 on RP227258	514/3-082183 Lodged: 16.09.2008 Approved: 10.06.2011 (by court order) Subsequent GIA (07755-05): 28.04.2015	ROL 1 into 3 lots	Approved Completed	ROL 1 into 3 Lot sizes 6,920m², 13,046m² and 4,290m² Changed by GIA to 12,306m², 8,044m² and 4,290m² Associated OPW: OP-156017 (Civil)	On-site sewer treatment Water main within Walkers Road Stormwater to table drain in frontage
20	46 Senor Avenue Lot 82 on RP183522	ROL-163007 Lodged: 16.02.2016 Approved 15.03.2016	ROL 1 into 5 lots	Approved Completed	ROL 1 into 5 lots Lot sizes 2,000m² to 2,196m² Associated OPW: OP-166042 (Civil)	On-site sewer treatment Stormwater provided to table drain Water mains located in Senor Ave
21	Ronaldo Way Lot 21 on SP281518	ROL-173028 Lodged: 17.05.2017 Approved: 29.05.2017	ROL 1 into 2 lots	Approved Completed	ROL 1 into 2 lots Lot sizes 500m² and 476m² Associated OPW: OP-176036 (Civil)	Sewer rising main provided to both lots Water main located in Hughes Rd Stormwater kerb adapters provided to the street.
22	100 Boundary Road Lot 42 on RP153688	ROL-163034 Lodged: 05.11.2015 Approved: 07.09.2016	ROL 1 into 6 lots	Approved Completed	ROL 1 into 6 lots Lot sizes 4 x 800m², and 2 x 3,400m² Associated OPW: OP-166058 (Civil)	Sewer connection provided through to mains in Boundary Road. Water connections provided to Boundary Road. Stormwater connection provided for front 4 x 800m² lots to Boundary Road. Rear lots not serviced.

	Location and Description	Application Date	Type of Application	Development / Application Status	Yield	Key Infrastructure
23	14 Boundary Road Lot 2 on RP153688	ROL-153074 Lodged: Not recorded Approved: 23.12.2015	ROL 1 into 3 lots	Approved Completed	ROL 1 into 3 lots Lot sizes 2,008m², 2,728m² and 5,423m²	On-site sewer treatment Water main located within Boundary Road Stormwater not provided/conditioned
24	17 Senorita Parade Lot 20 on RP172636	ROL-103049 Lodged: 08.10.2010 Approved: 18.09.2012	ROL 1 into 9 lots Stage 1 – 1 into 4 Stage 2 – 1 into 6 (Preliminary Approval)	Approved Completed (Stage 1) Not Completed (Stage 2)	ROL 1 into 4 lots Lot sizes 1,000m² to 1,024m² and 17,958m²	Sewer and Water mains provided along Senorita Parade Stormwater provided for front three lots to table drain along Senorita Parade.
25	108 Boundary Road Lot 43 RO153688	ROL-163020 Lodged: 05.05.2016 Approved: 17.05.2016	ROL 1 into 4 lots	Approved Completed	ROL 1 into 4 Lot sizes 2,200m² - 2,610m²	On-site sewer treatment provided Water provide from Boundary Road Stormwater unknown
26	2 San Bromista Court Lot 1 on SP178228	RAL17/0002 Lodged: 24.07.2017 Approved: 09.08.2017	ROL 1 into 2 lots	Approved Not started	ROL 1 into 2 Lot sizes 859m² and 1,365m²	No OPW conditioned due to scale of development. Stormwater connections provided to road reserve. Sewer mains existing in Senorita Parade and along the eastern boundary. Water main available in both San Bromista Court and Senorita Parade. Water and Sewer Connections approved directly with Wide Bay Water Corporation.
27	43 Senorita Parade Lot 1 on SP164963	RAL17/0013 Lodged: 23.08.2017 Approved: 31.08.2017	ROL 1 into 2 lots	Approved Not started	ROL 1 into 2 Lot sizes 728m² and 2,022m² Associated OPW: OPW17/0025	Water provided via mains in Senorita Parade. Tunnel bore required. Sewer Connection provided via the existing mains located in the adjoining lot 4 on SP164963 Stormwater Lot 1 discharge to Senorita Parade and Lot 2 no connection provided.
Huntingdale Woods Stages 1-8						
28	20, 22 & 34 Ronaldo Way Lots 51-53 on SP239193	ROL-133038 Lodged: 04.12.2013 Latest Approval: 06.02.2014	ROL 3 into 5	Approved Completed	ROL 3 into 5 Lot sizes 803m² - 885m² Associated OPW: OP-146018 (Civil)	Stormwater to Ronaldo Way with outlet provided to table drain on opposite side of the road. Sewer and Water provided through mains. Sewer along the eastern boundary and Water in Ronaldo Way.

	Location and Description	Application Date	Type of Application	Development / Application Status	Yield	Key Infrastructure
29	Stage 1 66 Hughes Road & 28A Senor Ave Lot 1 on RP88547 and Lot 72 on RP213315	514/3-082005 Lodged: Originally Approved: 12.08.2009 Change Approval: 10.05.2011	ROL 2 into 53 Lots	Approved Completed	ROL 2 into 53 lots Lot sizes 1,000m² - 8,360m² Associated OPW: (516/3) OP-096157 (Civil and Vegetation Removal), & OP-106081 (Civil)	Sewer provided to the entire development from the south-western corner of the master plan area. Water mains provided throughout and upgraded as necessary Stormwater solution provided through road and also inter-allotment drainage to the south and east.
30	Stage 2 Ronaldo Way Lot 500 on SP239193, Lot 2 on RP162667 and Lot 3 on RP162667	ROL-143014 Lodged: 06.06.2014 Approved: 19.09.2014 Change Application (AS150029): 30.07.2015	ROL 3 into 22 lots	Approved Completed	Altered the configuration of lots 17-35 as shown in the Stage 1 approved plans and created an additional 2 residential lots Lot sizes 943m² - 1,825m², and 23,960m² (balance lot for future subdivision) Associated OPW: OP-146088 (Civil)	
31	Stages 3 to 7 Ronaldo Way, 21-27 and 37-41 Ronaldo Way, and 2 Senor Avenue Lot 500 on SP239193, Lots 3-6 on SP239193, Lots 11-13 on SP239193, and Lot 65 on RP180355	ROL-143036 Lodged: 01.09.2014 Approved: 08.07.2015	ROL 9 into 54 lots	Approved Completed (Stages 3 & 4) Uncompleted (Stages 5-7)	Creates additional lots as well as alters some lots as shown within Stage 1 ROL 9 into 54 lots Lot sizes 767m² - 1,281m² Associated OPW: OP-156062 (Civil – Stages 3 & 4) & OP176011 (Civil – Stages 5-8)	
32	Stage 8 25 Ronaldo Way Lot 5, 6, 11 and 12 on SP239193 and Lot 1 on RP162667	ROL-163040 Lodged: 12.07.2016 Approved: 08.09.2016	ROL 1 into 14 lots (Stage 8), including adjacent lots Stage 1 – Frontage works to Lot 1 Stage 2 – Lots 2 - 14	Approved Not constructed	Creates additional lots within Stage 8 ROL 1 into 14 Lot sizes 585m² to 4,108m²	
	Total Potential Lots – Constructed				**166**	

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Appendix B

Water and Sewer Figures

Prepared for Fraser Coast Regional Council
HRP18074.R02.005ef: HRP18075

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LEGEND

- LABELS Infrastructure
  - Az Water Main Diameter and Material Labels
  - Az Water Conduit Diameter and Material Labels
- Water Infrastructure
  - Water Hydrants
  - Water Valves
    - Stop
    - Scour
    - Ball
    - Boundary
    - Butterfly
    - Air
    - Sluice
    - Non return
    - Altitude
    - Press Relief
    - OTHER
  - Water Pump Stations
  - Water Connections
    - Water Connections
    - Water Connections (non WBW)
    - Reuse Connections
  - Water Conduit
  - Water Mains
  - Decommissioned Water Mains
- Property Boundaries
  - Land Parcels
  - Easements
  - Land Parcels Tenure
    - Freehold
    - Housing Lease
    - Land Lease
    - National Park
    - Reserve
    - Railway
    - State Forest
    - State Land
- Base Map (BM) Layers
  - Fraser Coast Regional Council Boundary Line bm
  - Roads bm
    - State Roads
    - Major Roads
    - Rural Roads
    - Streets
    - Unformed Roads
    - Proposed Roads
    - Other Road
  - Dam / Waterbodies bm
  - Waterbodies bm
  - Land Parcels bm

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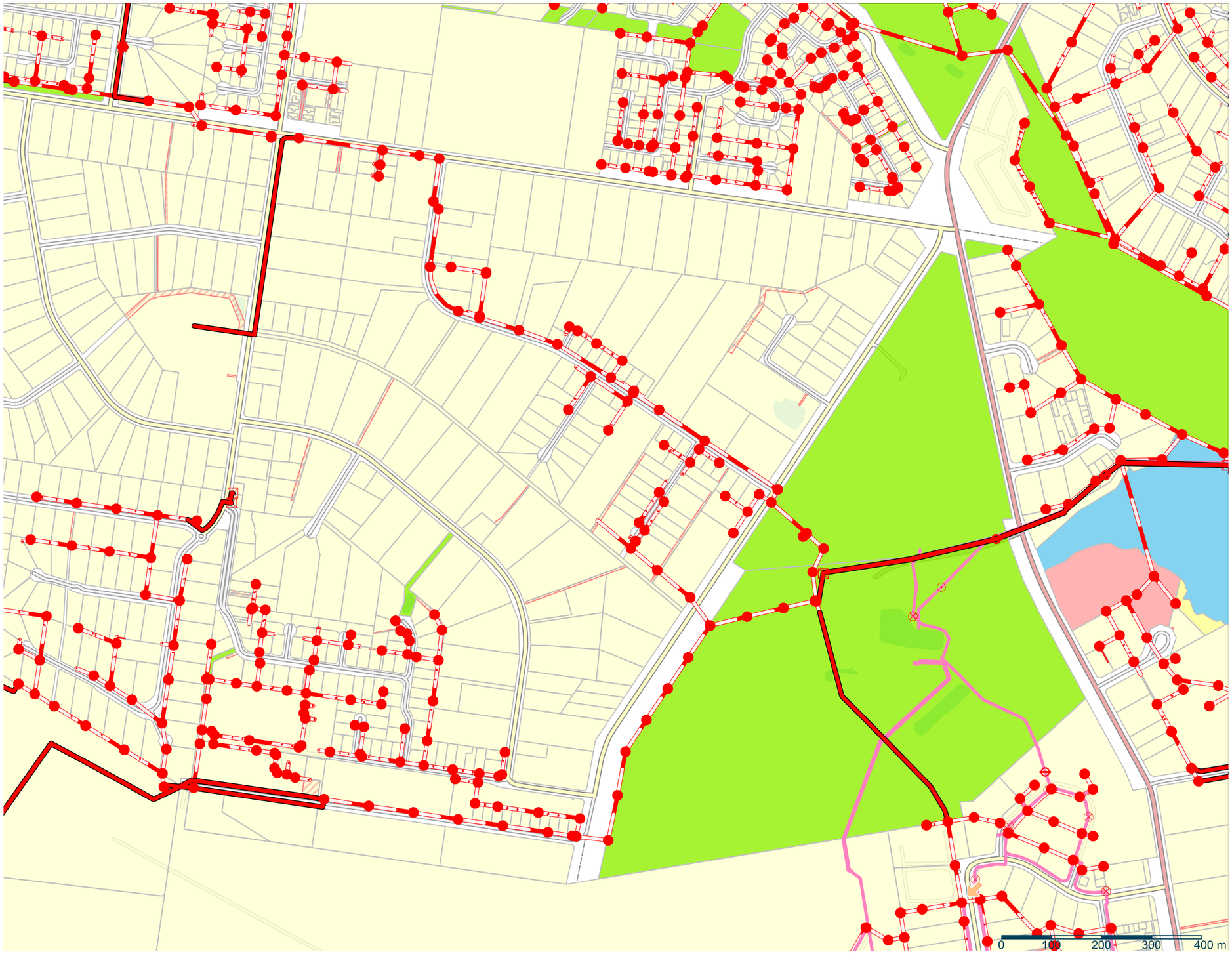

LEGEND

- LABELS Infrastructure
  - Sewer Manhole SL and IL Labels
  - Sewer Gravity Main Diameter and Material Labels
  - Sewer Rising Main Diameter and Material Labels
- Sewer Infrastructure
  - Sewer Effluent Manhole
  - Sewer Effluent Valves
    - Scour
    - Air
    - Sluice
    - Non return
  - Sewer Valve
    - Scour
    - Air
    - Sluice
    - Ball
    - Stop
    - Non Return
  - Sewer Manholes
    - Sewer Inspection Shaft
    - Sewer Manhole
  - Sewer House Connections
    - Sewer House Connections
    - Sewer House Connections (non WBW)
  - Sewer Rising Mains
  - Sewer Effluent Main
  - Sewer Gravity Mains
  - Decommissioned Sewer Mains
- Property Boundaries
  - Land Parcels
  - Easements
  - Land Parcels Tenure
    - Freehold
    - Housing Lease
    - Land Lease
    - National Park
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    - Streets
    - Unformed Roads
    - Proposed Roads
    - Other Road

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Appendix C

Urangan South Structure Plan Concept

Prepared for Fraser Coast Regional Council
HRP18074.R02.005

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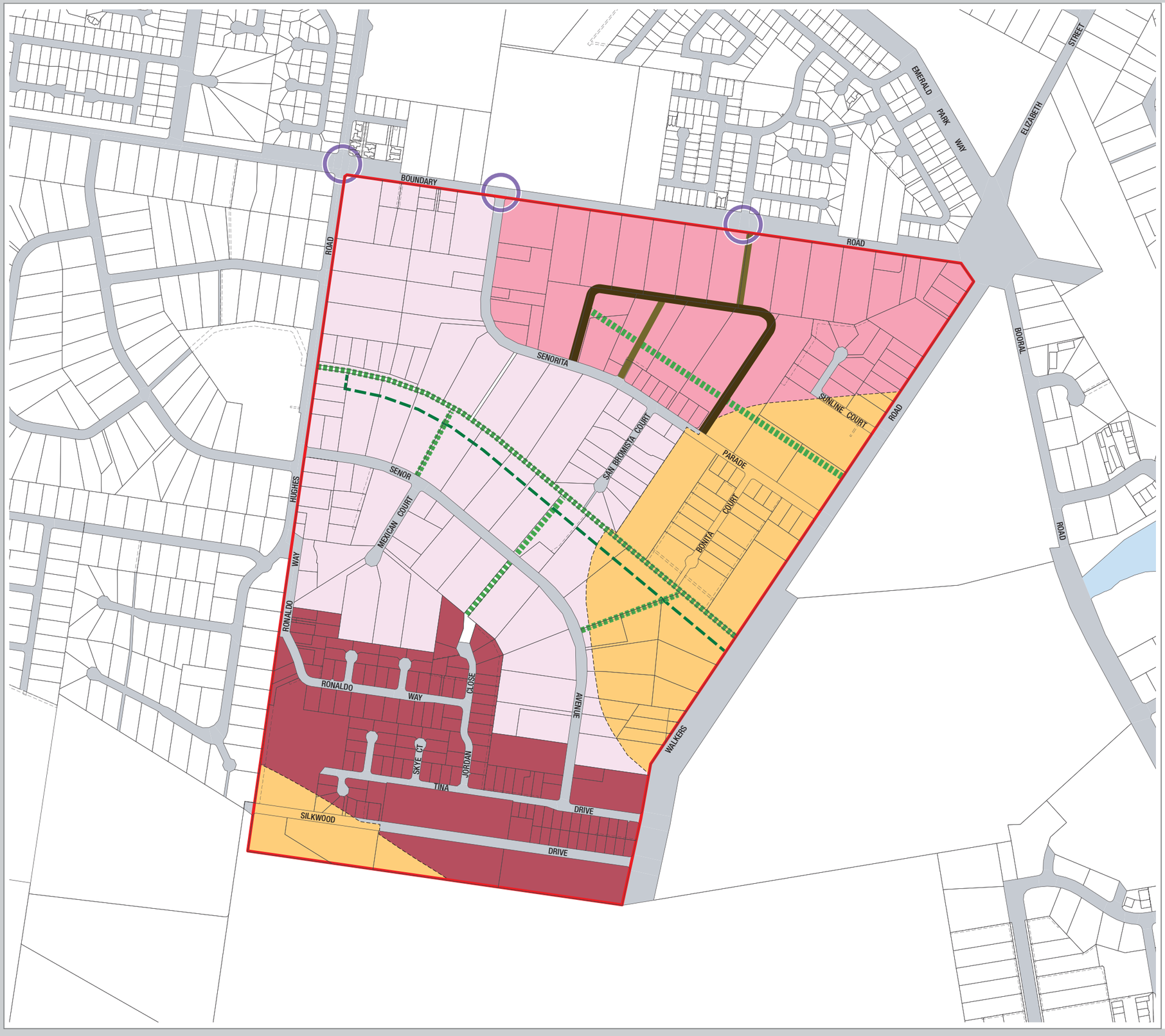

[LEGEND]

- Structure Plan Area Boundary
- 800m² Allotment
- 1500m² Allotment
- 500m² Allotment (existing controls)
- Constrained Land
- Proposed Road - Primary
- Proposed Road - Secondary
- Intersection (upgrade or new)
- Drainage Corridor
- Drainage Buffer

Other Elements

- Cadastre
- Existing Road
- Waterbody

The cadastre shown on this map was downloaded from the Queensland Government website 'Q Spatial'- (Department of Natural Resources, Mines and Energy) and is current and correct as of **14 May 2019.**

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Structure Plan Concept

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SCALE >	1:8,000	VERSION >	1.0

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Appendix D

Precinct Plan

Prepared for Fraser Coast Regional Council
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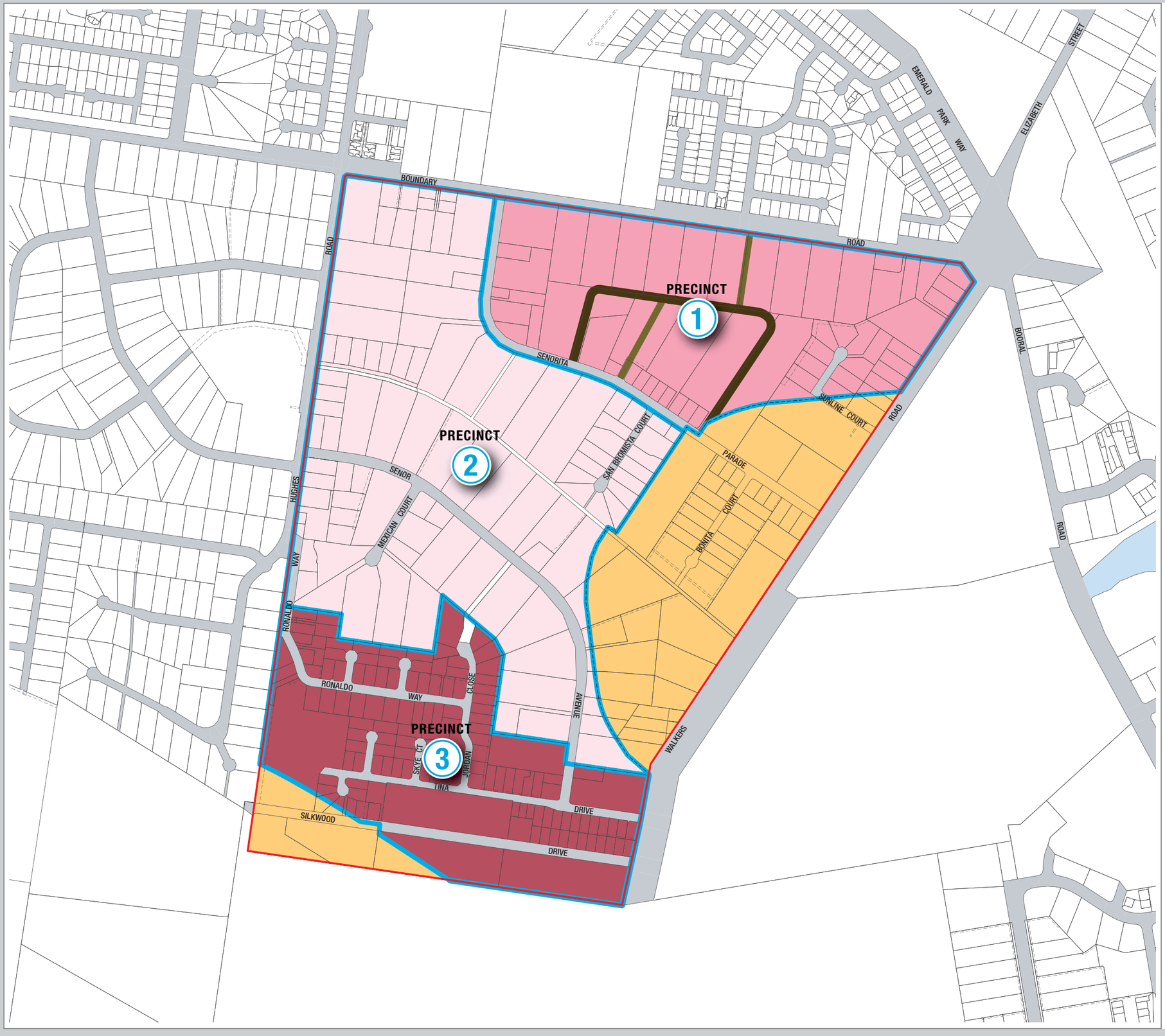

[LEGEND]

- Structure Plan Area Boundary
- Precinct Boundary
- 800m² Allotment
- 1500m² Allotment
- 500m² Allotment (existing controls)
- Constrained Land
- Proposed Road - Primary
- Proposed Road - Secondary

Other Elements

- Cadastre
- Existing Road
- Waterbody

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Precinct Plan

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Appendix E

Preliminary Area Analysis

Prepared for Fraser Coast Regional Council
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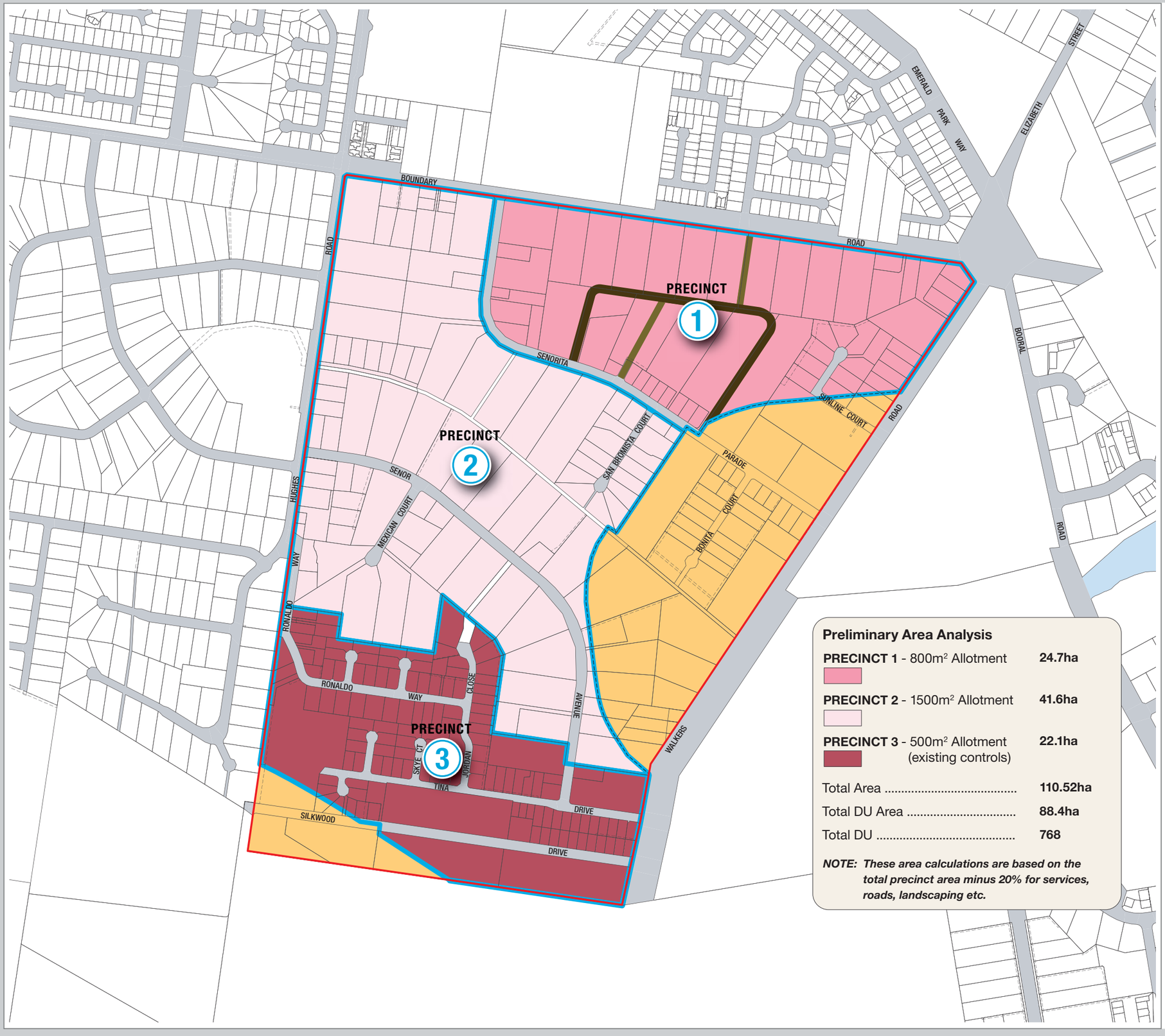

[LEGEND]

- Structure Plan Area Boundary
- Precinct Boundary
- Constrained Land
- Proposed Road - Primary
- Proposed Road - Secondary
- Cadastre
- Existing Road
- Waterbody

Preliminary Area Analysis

PRECINCT 1 - 800m² Allotment	**24.7ha**
PRECINCT 2 - 1500m² Allotment	**41.6ha**
PRECINCT 3 - 500m² Allotment (existing controls)	**22.1ha**
Total Area	**110.52ha**
Total DU Area	**88.4ha**
Total DU	**768**

***NOTE:** These area calculations are based on the total precinct area minus 20% for services, roads, landscaping etc.*

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Preliminary Area Analysis Plan

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Appendix F

Infrastructure Plan

Prepared for Fraser Coast Regional Council
HRP18074.R02.005

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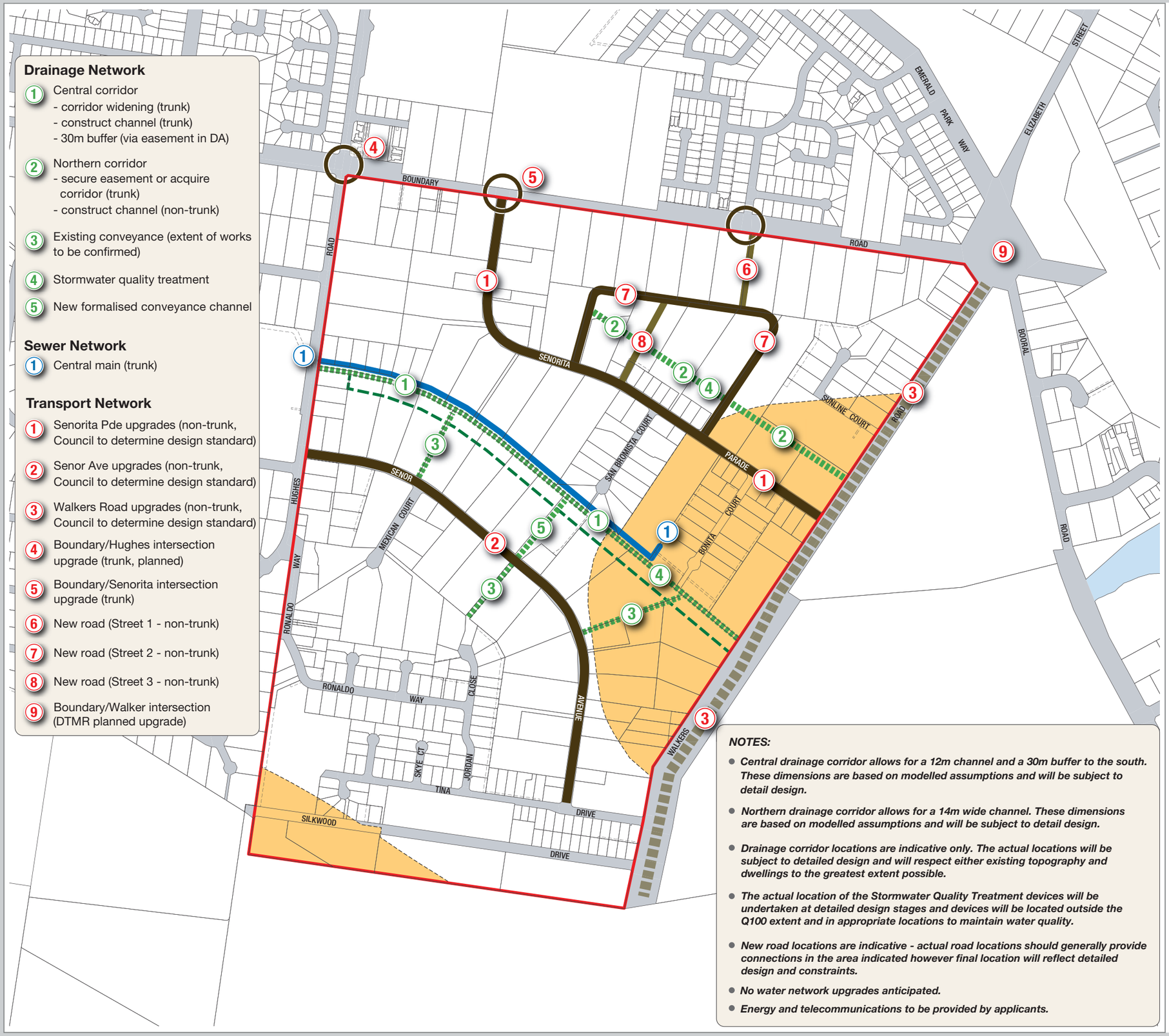

Drainage Network

1. Central corridor
   - corridor widening (trunk)
   - construct channel (trunk)
   - 30m buffer (via easement in DA)
2. Northern corridor
   - secure easement or acquire corridor (trunk)
   - construct channel (non-trunk)
3. Existing conveyance (extent of works to be confirmed)
4. Stormwater quality treatment
5. New formalised conveyance channel

Sewer Network

1. Central main (trunk)

Transport Network

1. Senorita Pde upgrades (non-trunk, Council to determine design standard)
2. Senor Ave upgrades (non-trunk, Council to determine design standard)
3. Walkers Road upgrades (non-trunk, Council to determine design standard)
4. Boundary/Hughes intersection upgrade (trunk, planned)
5. Boundary/Senorita intersection upgrade (trunk)
6. New road (Street 1 - non-trunk)
7. New road (Street 2 - non-trunk)
8. New road (Street 3 - non-trunk)
9. Boundary/Walker intersection (DTMR planned upgrade)

NOTES:

- ***Central drainage corridor allows for a 12m channel and a 30m buffer to the south. These dimensions are based on modelled assumptions and will be subject to detail design.***
- ***Northern drainage corridor allows for a 14m wide channel. These dimensions are based on modelled assumptions and will be subject to detail design.***
- ***Drainage corridor locations are indicative only. The actual locations will be subject to detailed design and will respect either existing topography and dwellings to the greatest extent possible.***
- ***The actual location of the Stormwater Quality Treatment devices will be undertaken at detailed design stages and devices will be located outside the Q100 extent and in appropriate locations to maintain water quality.***
- ***New road locations are indicative - actual road locations should generally provide connections in the area indicated however final location will reflect detailed design and constraints.***
- ***No water network upgrades anticipated.***
- ***Energy and telecommunications to be provided by applicants.***

[LEGEND]

- Structure Plan Area Boundary
- Constrained Land
- Proposed Road - Primary
- Proposed Road - Secondary
- Intersection (upgrade or new)
- Drainage Corridor
- Drainage Buffer
- Sewer

Other Elements

- Cadastre
- Existing Road
- Waterbody

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Infrastructure Plan

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Urangan South Land Use Strategy and Local Area Plan Project

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Appendix G

Phasing Plan

Prepared for Fraser Coast Regional Council
HRP18074.R02.005Ref: HRP18075

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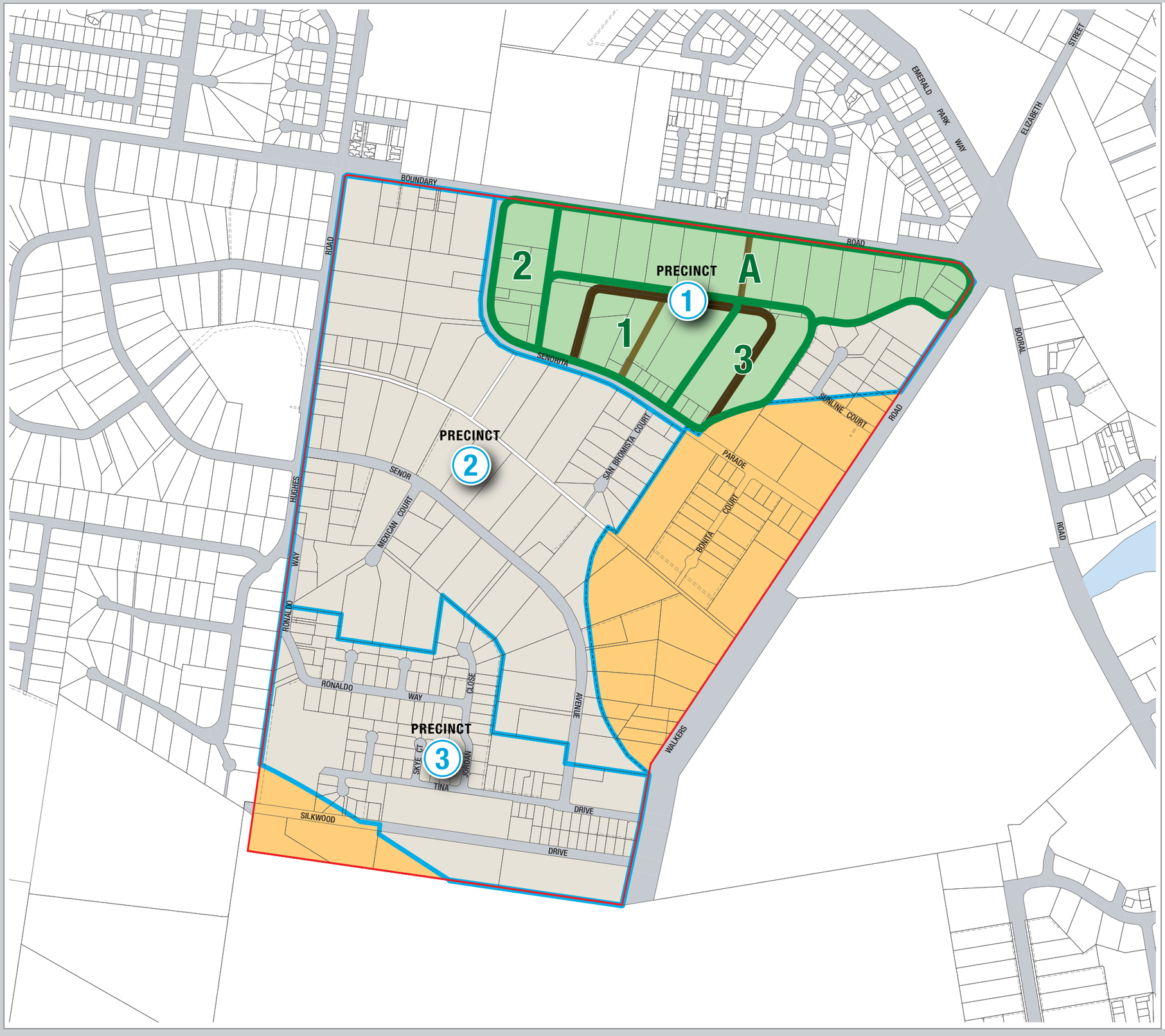

[LEGEND]

- No Phasing Limitations
- 1 Can Commence First in Precinct 1
- 2 Cannot Commence Until Phase 1 Complete
- 3 Cannot Commence Until Phase 2 Complete
- A Cannot Commence Without Internal Access Road Constructed
- Structure Plan Area Boundary
- Precinct Boundary
- Constrained Land
- Proposed Road - Primary
- Proposed Road - Secondary

Other Elements

- Cadastre
- Existing Road
- Waterbody

NOTES:

Phasing is indicative to manage drainage and road matters. Alternative phasing may be possible where development demonstrates drainage and road matters are suitably addressed in accordance with the Structure Plan.

Amalgamation of lots is encouraged to manage implications of phasing.

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Phasing Plan

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Urangan South Land Use Strategy and Local Area Plan Project

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Appendix H

Revised Scenario Costing

Prepared for Fraser Coast Regional Council
HRP18074.R02.005

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REVISED INFRASTRUCTURE COSTINGS FOR PRELIMINARY OPTIONS ANALYSIS

Prior to embarking on the structure planning exercise, as part of the previous Context Analysis and Options Review stage of the project it was decided to undertake a high level options analysis of a range of development scenarios. The process was intended to provide an opportunity to understand and consider the comparative opportunities and constraints for a range of development options, as well as a preliminary high level estimate of trunk infrastructure requirements and their costs.

It has been discovered that the cost estimates prepared for the trunk drainage network for the initial options had included parts of the network not likely to be included as trunk infrastructure. Including this additional infrastructure overstated the estimated cost of the likely trunk drainage network, and consequently the overall cost estimate for each scenario is inflated. In the interests of full transparency, the revised cost estimates for the initial options analysis is provided below. **Table H1** is extracted from the previous Context Analysis and Options Review report and updated to show the revised estimated costing for the drainage network (highlighted in red). It is noted that the cost estimates remain based on the assumptions attributed to the three options in the previous Context Analysis and Options Review Report. The assumptions used to estimate costs for the Structure Plan infrastructure identified in **Table 5-19** of this Structure Plan Report are based on a refinement of these assumptions, which results in the discrepancy between the cost estimates in the two reports.

Table H1 – Revised scenario costings

	Option 1 **Maximum Yield (Existing Zoning) Scenario**	**Option 2** **Mixed Lot Scenario**	**Option 3** **Large Lot Scenario**
Land use mix	All LDR @ 20DU/Ha	Mix of LDR @ 20 DU/Ha and larger lots (2,000m^2)	Predominantly large lot (2,000m^2)
Indicative Dwellings	2,040	1,380	1,107
Indicative Population	4,692	3,174	2,339
Water Network Upgrades and Costs	Not required	Not required	Not required
Sewer Network Upgrades and Costs	Northern catchment Central catchment **$1,860,000**	Northern catchment **$810,000**	Not required
Transport Network Upgrades and Costs	Intersection upgrades (Boundary Road / Booral Road, Boundary Road / Walkers Road, Boundary Road / Senorita Parade Existing road upgrades (Senor Avenue, Senorita Parade, Walkers Road to Major Collector) New Access Road (northern catchment) **$4,800,000**	Intersection upgrades (Boundary Road / Booral Road, Boundary Road / Walkers Road, Boundary Road / Senorita Parade Existing road upgrades (Senor Avenue, Senorita Parade, Walkers Road to Major Collector) New Access Road (northern catchment) **$4,800,000**	Intersection upgrades (Boundary Road / Booral Road, Boundary Road / Walkers Road, Boundary Road / Senorita Parade Existing road upgrades (Senor Avenue, Senorita Parade, Walkers Road to Major Collector) New Access Road (northern catchment) **$4,800,000**
Drainage Upgrades and Costs	Central channel new 15m wide channel and corridor (3,000,000) Northern channel new 10m wide channel 1/6 batter ($1,000,000) **Previous Cost $22,000,000** **Revised Cost $4,000,000**	Central channel retained but incorporates corridor ($400,000) Northern channel new 14m wide channel with 1/8 batter ($1,000,000) **Previous Cost $13,000,000** **Revised Cost $1,400,000**	Not required (minor maintenance only) **Previous Cost $7,000,000** **Revised Cost $0**
Previous Total Cost Estimate	$28.6 million	$18.6 million	$11.8 million
Revised Total Costs Estimate	$10.66 million	$7.01 million	$4.8 million

It is noted that the intention of this preliminary costing exercise in the Context Analysis and Options Review was not to provide a highly detailed cost estimate, but rather to understand the relative costs for each option. In this regard, while the overall cost estimates were overstated, the relative costs between the options were appropriately represented. This was considered appropriate for the purpose of the options analysis, and provided a reasonable basis on which to assess the relative costs between each of the options presented.

About Cardno

Cardno is a professional infrastructure and environmental services company, with expertise in the development and improvement of physical and social infrastructure for communities around the world. Cardno's team includes leading professionals who plan, design, manage and deliver sustainable projects and community programs. Cardno is an international company listed on the Australian Securities Exchange [ASX:CDD].

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