

Rise Urban

PART ONE | IMPLEMENTATION

Lot 590 Spinnaker Boulevard STRUCTURE PLAN





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TITLE: Lot 590 Spinnaker Boulevard

Structure Plan - Part One | Implementation

REFERENCE: REP003-0042020

DATE: 26 July 2020

PREPARED BY: Rise Urban

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This structure plan is prepared under the provisions of the City of Busselton Local Planning Scheme No. 21

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON:

18 August 2020

Signed for and on behalf of the Western Australian Planning	g Commission
Bigah.	
an officer of the Commission duly authorised by the Comm Section 16 of the Planning and Development Act 2005 for the presence of:	
Spralies	Witness
19 August 2020	Date
18 August 2030	Date of Expiry

Executive Summary

The Lot 590 Spinnaker Boulevard Structure Plan (the Structure Plan) facilitates further development of the estate known as Port Geographe. The Structure Plan, which comprises the entirety of Lot 590 Spinnaker Boulevard, captures approximately 1.32 hectares of land and is located at the western end of Spinnaker Boulevard.

The site is zoned 'Tourist' under the City of Busselton Local Planning Scheme No.21 (LPS 21), however an amendment referred to as Amendment 28 (Omnibus Amendment 3), to LPS 21 to rezone the land to 'Urban Development' is currently being progressed. Given the substantial progression of Amendment 28, the Structure Plan is lodged in anticipation of its future zoning as 'Urban Development' and in accordance with LSP 21 which requires a structure plan prior to development and subdivision for land zoned 'Urban Development'. This approach is supported by the Western Australian Planning Commission in correspondence dated 27 August 2018.

The Structure Plan is responsive to the surrounding land use context and natural environment whilst accommodating a range of residential opportunities consistent with State Government density targets. The Structure Plan also fulfils the strategic planning objectives identified in the draft Leeuwin Naturaliste Sub-regional Planning Strategy which identifies the need for infill development. The Structure Plan supports residential densities of R30 – R60 and will deliver approximately 25 – 30 dwellings per site hectare consistent with State Government targets.

The Structure Plan also provides for a small commercial site adjacent to the Port Geographe lagoon which is intended to provide a restaurant/ café amenity for tourists and nearby residents as well as creating opportunities for mixed use development.

The site can be readily serviced, with essential infrastructure already located within the adjacent road reserve and easily extended to the structure plan area. An Engineering and Servicing Report has been prepared in support of the Structure Plan.

In addition, a Coastal Hazard Risk Management Plan has been prepared to demonstrate that the Structure Plan is consistent with the State Coastal Planning Policy. The Management Plan provides appropriate management strategies for future development, and ensures that the effects of climate change can be avoided within the 100 year planning horizon.

This Structure Plan report comprehensively addresses all of the relevant planning considerations, and demonstrates that the land is suitable for urban development in the form proposed.

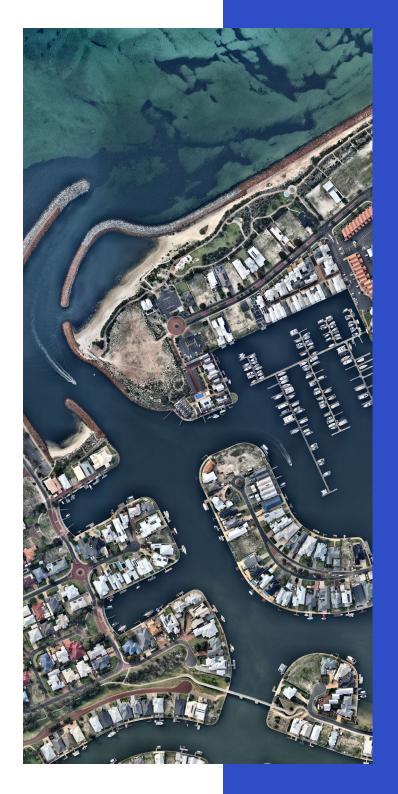
Table 1: Land Use Summary

Table 1 provides a land use summary of the Structure Plan.

ltem	Data	Section number reference within the Structure Plan Explanatory Report 1.2	
Total area covered by the structure plan	1.32 hectares		
Area of each land use proposed			
Zones (as per the Scheme)			
 Residential 	0.96 hectares		
Local Centre	0.12 hectares	3.2	
Reserves (as per the Scheme and MRS)			
Road Reserves	0.24 hectares		
Total estimated lot yield	30 - 40 lots	3.2	
Estimated number of dwellings	30 - 40 dwellings	3.2	
Estimated residential site density			
 Dwellings per gross urban zoned hectare 	23 - 30 dwellings per gross urban zoned hectare	3.2	
Dwellings pre site hectare	27 - 37 dwellings per site hectare		
Estimated population	84 - 112 people @ 2.8 people per household	3.2	

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1.0 Structure Plan Area

The Structure Plan Area is shown on Plan A: Structure Plan Map.

2.0 Structure Plan Content

This Structure Plan comprises:

- Part One Implementation Section
- Part Two Explanatory Report
- Appendices Technical Reports

Part One of the Structure Plan comprises the Structure Plan Map and planning provisions. Part Two of the Structure Plan is the planning report component which can be used to interpret and implement the requirements of Part One.

3.0 Operation

This Structure Plan comes into effect on the date that it is endorsed by the Western Australian Planning Commission (WAPC).

4.0 Interpretation and Relationship with Statutory Planning Framework

The Structure Plan constitutes a Structure Plan pursuant to the City of Busselton Local Planning Scheme 21 and the Planning and Development (Local Planning Schemes) Regulations 2015 Schedule 2 - Deemed provisions for local planning schemes.

The Structure Plan Map (Plan A) outlines future land use, zones and reserves applicable within the structure plan area.

Pursuant to the *Planning and Development (Local Planning Schemes) Regulations 2015*Schedule 2 - Deemed provisions for local planning schemes, a decision maker of an application for development approval or subdivision approval is to have due regard to the provisions of this Structure Plan, including the Structure Plan Map, Implementation Report, Explanatory Report and Technical Appendices.

5.0 Staging

Development staging will follow an orderly sequence and shall not exceed the extension of essential service infrastructure or constructed road access.

6.0 Land Use and Subdivision

6.1 Land Use and Zones

The subdivision and development of land is to generally be in accordance with the Structure Plan.

6.2 Residential

6.2.1 Dwelling Target

In accordance with the requirements of Liveable Neighbourhoods, subdivisions are to achieve an average residential density of 22 dwellings per site hectare across the Structure Plan area.

6.2.2 Density

Residential densities applicable to the Structure Plan shall be those residential densities shown on the Local Structure Plan Map.

7.0 Development

7.1 Local Development Plans

The preparation of a Local Development Plan in accordance with Part 6 of the *Planning and Development (Local Planning Schemes) Regulations 2015* Schedule 2 - Deemed provisions for local planning schemes may be required by the WAPC, on the advice of the City of Busselton, as a condition of subdivision approval for all land in the structure plan area. The Local Development Plan is to be in accordance with the Port Geographe Villiage Centre Design Guidelines.

7.2 Subdivision and Development Requirements

The following requirements shall apply to subdivision and development:

Finished floor levels of all habitable rooms shall achieve a minimum of 3.8m AHD.

7.3 Notifications on Title

In respect of applications for the subdivision of land, the Council shall recommend to the Western Australian Planning Commission that a condition be imposed on the grant of subdivision approval for a notification to be placed on the Certificate(s) of Title(s) to advise of the following:

Lots are capable of use for short stay accommodation purposes subject to approval of the City of Busselton.

Vulnerable coastal area - This lot is located in an area likely to be subject to coastal erosion and/or inundation over the next 100 years.

8.0 Other Requirements

8.1 Conditions of Subdivision Approval

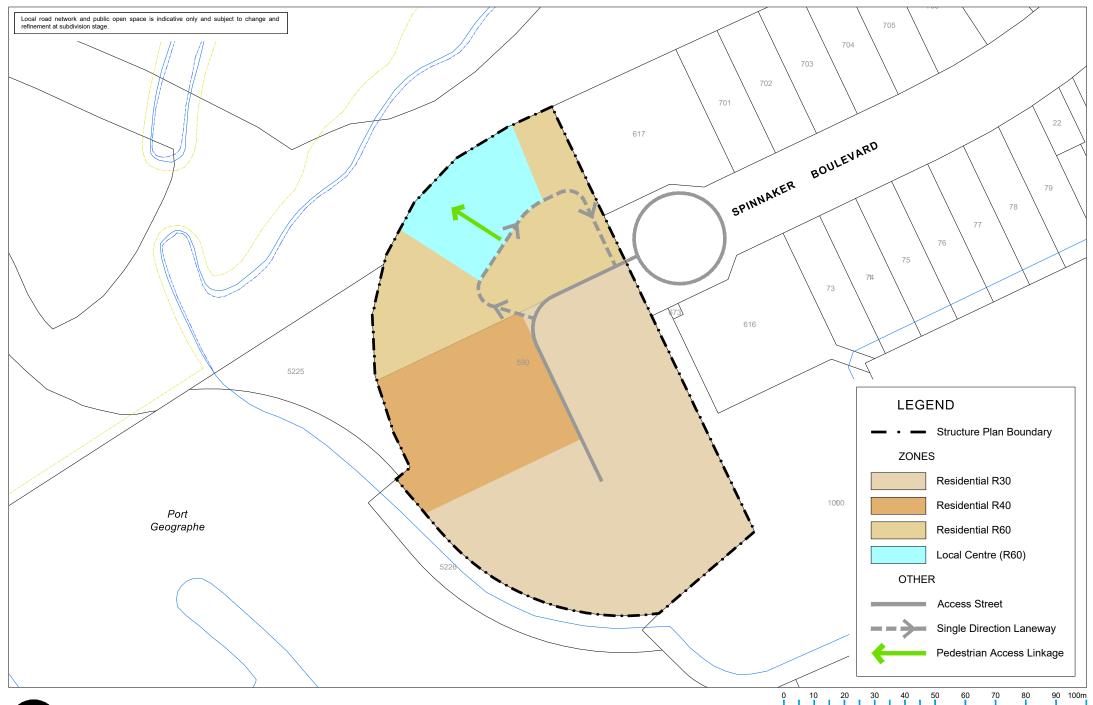
The following technical reports / strategies are to be prepared and submitted as a condition of subdivision approval (where applicable):

Urban Water Management Plan.

8.2 Prerequisite Scheme Amendment

Prior to any further subdivision or development, the City's Local Planning Scheme No. 21 is required to be amended to include 'additional site and development requirements', pursuant to Schedule 1, Part 4, cl. 33 of the *Planning and Development (Local Planning Schemes) Regulations 2015*, and to introduce the following requirements for the subject land:

- The land is to be filled and retained to ensure a minimum finished floor level of 3.8m AHD can be achieved (i.e. a minimum fill level of 3.7m AHD); and
- The retaining walls associated with the above-mentioned filling of the land shall be
 designed and certified by a coastal engineer to withstand the anticipated coastal
 processes as determined by State Planning Policy 2.6 State Coastal Planning Policy,
 to the satisfaction of the local government in consultation with the Department of
 Transport.





plan no: **3160-12B-01** date: 13 July 2020 scale: 1:1,250 @ A4

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PART TWO | EXPLANATORY REPORT

Lot 590 Spinnaker Boulevard STRUCTURE PLAN





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TITLE: Lot 590 Spinnaker Boulevard

Structure Plan - Part Two | Explanatory Report

REFERENCE: REP005-0042020

DATE: 16 August 2020

PREPARED BY: Rise Urban

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Appendices

Appendix 1: Correspondence from Western Australian Planning Commission August 2018

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1.0 Introduction

1.1 Purpose

The Lot 590 Spinnaker Boulevard Structure Plan is a structure plan for the purposes of clause 15 Schedule 2 – Deemed Provisions of the *Planning and Development (Local Planning Schemes) Regulations 2015*, and the resolution of the Western Australian Planning Commission dated 27 August 2018.

Lot 590 Spinnaker Boulevard is one of the last remaining undeveloped precincts within the Port Geographe Village Centre precinct. The site has long been identified for tourism based land uses however notwithstanding its physical location fronting the Port Geographe marina and sheltered beach area, the site has not been developed as envisaged by the current planning framework.

The purpose of this structure plan is to establish a contemporary planning framework that provides for consolidated development of the site, whilst also recognising the changing nature of tourist accommodation in the south west of Western Australia. The Structure Plan recognises the high-amenity location of the site, and responds by providing for a small commercial precinct to compliment the sheltered beach and foreshore area.

1.2 Site Context

Site Description and Ownership

Lot 590 Spinnaker Boulevard ("the site") is located at the western end of Spinnaker Boulevard, adjacent to the ocean entrance to the marina. The site abuts a narrow coastal foreshore reserve to the north, while the western boundary directly abuts the entry channel to the Port Geographe Marina. The eastern and southern boundaries abut a public car park and existing 2-3 storey town houses in a private complex. It is understood that these town houses provide for a mix of short and long stay accommodation.

The site is 1.32ha in area, and is encumbered by two separate easements:

- A 3m wide easement for drainage purposes in favour of the City of Busselton that connects the public car park (lot 616) to the east, with the marina on the western boundary of the site; and
- Two small 'cut out' easements of approximately 15m² each that abut the eastern boundary adjacent to lot 589. These two easements form part of a larger easement over lot 589, and are in favour of the Water Corporation for the purpose of sewerage and drainage.

These easements are not an impediment to development of the site and will be considered further at subsequent stages in the planning process.

A legal description and ownership of the site is set out in Table 1 below.

Table 1 - Lot 590 Spinnaker Boulevard - Legal Description

Lot	Diagram	Volume	Foilo	Owner
590	23071	2149	686	Zermatt Holdings Pty Ltd

The site contains two grouped dwellings located in the north eastern corner. These dwellings sit on the parent title and are currently utilised as short stay accommodation. The remainder of the site is undeveloped and is currently being utilised as temporary laydown / outdoor storage of construction equipment. The site has been filled and levelled as part of earlier subdivision and has an approximate finished lot level of 3.2m – 3.5m AHD.

A site plan and orthophoto is Figure 1.

Figure 1: Site Plan



Figure 2: Coastal Context



November 2012 August 2018

Port Geographe Coastal Works

The Port Geographe marina and associated coastal protection works were substantially redesigned and reconstructed in the period between 2013 – 2014 in order to address some ongoing concerns by Government and the broader community in relation to coastal processes. These modifications have resulted in some considerable changes to the coastal configuration immediately to the north of the site, including construction of an east-west sea wall / breakwater on a parallel alignment with the northern boundary of the site, and a resultant sheltered beach and ocean pool between the site and the sea wall. There are opportunities to capitalise on this improved coastal interface through the provision of some high amenity non-residential land uses along the northern boundary of the site that will complement the sheltered beach area and benefit the Port Geographe community.

A plan depicting the 'before and after' coastal context is Figure 2.

2.0 Planning Context

2.1 Statutory Planning Context

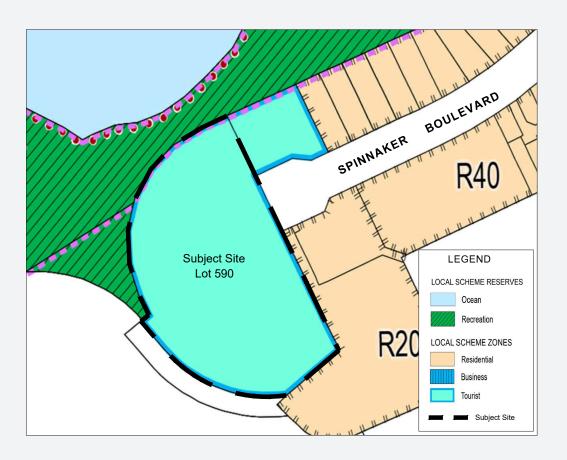
The following provides a brief synopsis of those statutory planning instruments and decisions that are directly relevant to the proposed Structure Plan.

City of Busselton Local Planning Scheme No.21

The site is currently zoned 'Tourist' pursuant to the City of Busselton Local Planning Scheme No.21 (LPS21). The coastal foreshore area to the north of the site is reserved for 'Recreation', while the surrounding area to the east is predominantly 'Residential' (R15-R20) zone. The waterbody immediately to the west of the site which forms the entry to the marina is unzoned.

A zoning plan is Figure 3.

Figure 3: Local Planning Scheme 21 Zonings



Port Geographe Development Plan

The Port Geographe Development Plan ("PGDP") was prepared in the early 2000s, and provided the original planning context for the broader Port Geographe area. The zones and development standards established by the PGDP were largely normalised into LPS21 when it was gazetted in October 2014. As such the PGDP, bares little relevance to the ongoing planning and development for the area. Notwithstanding, the PGDP retains its status as a current 'structure plan' pursuant to LPS21.

The PGDP identifies the site as 'Tourist Accommodation' and does not include any development standards or requirements specific to the site.

The current PGDP is Figure 4.

Consistent with advice received from WAPC in August 2018, it is necessary to amend the PGDP to exclude the subject land. This process is to occur in parallel with the determination of this Structure Plan.

Figure 4 : Port Geographe Development Plan



Port Geographe Village Centre Precinct Plan

The Port Geographe Village Centre Precinct Plan ("VCPP") was endorsed by the City of Busselton and WAPC in 2008. The VCPP was prepared as a supplementary planning instrument to the PGDP, and provides a more detailed framework for the development of the Village Centre precinct, which includes the site. The status of the VCPP is unclear; however the Department of Planning, Lands and Heritage has advised that the VCPP is to be treated as a 'structure plan' for the purpose of this proposal.

Like the PGDP, the VCPP identifies the site as 'Tourist Accommodation' and does not include any development standards or requirements specific to the site.

The current VCPP is Figure 5.

Figure 5: Port Geographe Village Centre Precinct Plan



Amendment 28 to LPS21 - Omnibus Amendment 3

The City of Busselton resolved to initiate Amendment 28 (Omnibus Amendment 3) to Local Planning Scheme 21 in April 2018. As part of this Amendment, it is proposed to rezone the undeveloped portions of land in the Port Geographe village centre area, including the site, to 'Urban Development' zone in order to facilitate a coordinated planning response for these sites via a structure planning process. It is on this basis that this Structure Plan has been prepared.

Decision of Western Australian Planning Commission to Prepare a Structure Plan

Clause 15 Schedule 2 – Deemed Provisions of the *Planning and Development (Local Planning Schemes) Regulations 2015* prescribes the circumstances in which a structure plan may be prepared, and states:

A structure plan in respect of an area of land in the Scheme area may be prepared if -

- (a) The area is –
- i. All or part of a zone identified in this Scheme as an area suitable for urban or industrial development; and
- ii. Identified in this Scheme as an area requiring a structure plan to be prepared before any future subdivision or development is undertaken;

or

- (b) A State planning policy requires a structure plan to be prepared for the area; or
- (c) The Commission considers that a structure plan for the area is required for the purposes of orderly and proper planning.

Although Amendment 28 to rezone the land to Urban Development zone has been initiated by the City and will ultimately satisfy clause 15(a) above, it may be some time before it is finalised and gazetted.

On this basis, and in the interests of progressing structure planning over the land in the interim period, CLE wrote to the Western Australian Planning Commission to request that the Commission resolve to exercise its discretion under clause 15(c) and formally determine that a structure plan for the site (and other areas within the VCPP area) is required for the purposes of orderly and proper planning. The Commission responded in August 2018, and advised that a structure plan (or plans) would be required. In addition, the Commission advised that it would be necessary to concurrently amend the PGDP to exclude the site and note that the site would be subject to separate structure planning.

A copy of the Commission's decision letter of August 2018 is Appendix 1.

2.2 Strategic Planning and Policy Context

The following provides a brief description of the key strategic planning and policy documents that have informed the proposed Structure Plan.

Draft Leeuwin Naturaliste Sub-regional Planning Strategy (WAPC 2017)

The Leeuwin-Naturaliste Sub-regional Planning Strategy is an overarching planning document that outlines the WAPC's approach to future planning and development within the City of Busselton and the Shire of Augusta-Margaret River. The Strategy was advertised as a draft in 2017 and at the time of writing had not been finalised by the WAPC.

The Strategy highlights the importance of urban infill and consolidation in established areas such as the suburb of Geographe as a cost-effective means of delivering infrastructure and ensuring sustainable growth in urban areas.

The Strategy does not contain any specific provisions or requirements that influence the land uses contemplated by this Structure Plan.

City of Busselton Local Tourism Planning Strategy (City of Busselton 2011)

The City of Busselton's Local Tourism Planning Strategy ("LTPS") was prepared by the City in 2011, and provides the high level strategic framework to guide planning decisions around tourism proposals.

The LTPS classifies tourist accommodation sites in the following basis:

- Strategic tourism sites of State level importance to be retained for tourism only
 purposes (to be assessed by a State Government tourism committee, allocation of
 sufficient resources and establishment of a framework at the State level required).
- Strategic tourism locations or activity locations (to also be assessed by a State Government tourism committee, allocation of sufficient resources and establishment of a framework at the State level required).
- Non-strategic tourist zoned land suitable for tourist development.
- Tourist zoned land where alternative zonings may be considered.

The LTPS identifies the site as 'Tourist zoned land where alternative zonings may be considered', and, in relation to the site and the nearby Lot 612 Spinnaker Boulevard, states:

"Building heights greater than 3 storeys may be considered for these sites, subject to further consideration of detailed issues and consultation with the community. The land may be zoned to allow for the full range of permissible uses in 'Residential', 'Tourist' and 'Commercial', but the tourist accommodation component is to be a minimum of 30 per cent of the total number of residential units of development."

The recommendations of the LTPS have been taken into consideration in the formulation of this Structure Plan.

State Planning Policy 2.6 - State Coastal Planning Policy (WAPC 2013)

State Planning Policy 2.6 - State Coastal Planning Policy ("SPP 2.6") is the State Government's response to land use planning in coastal areas throughout Western Australia, and includes specific policy considerations and requirements for both infill and greenfields scenarios across a 100 year planning horizon.

SPP 2.6 was prepared by the Western Australian Planning Commission in 2013, and superseded earlier versions of the policy.

SPP 2.6 requires the consideration of coastal processes and climate change in the assessment of planning proposals in coastal areas. These coastal processes include erosion, storm surge and coastal inundation as a result of extreme storm events.

SPP 2.6 is applicable to this structure plan by virtue of the site's proximity to the coast. The Structure Plan's response to SPP 2.6 is set out in detail in section 3.5 and Appendix 2 of this report.

3.0 Proposed Structure Plan

3.1 Overview

The Structure Plan Map at Figure 6 provides the framework for a robust infill development within the broader context of the Geographe suburb, whist also recognising the unique location and context of the site. The Structure Plan Map provides a level of detail that builds upon and refines the principles of the planning framework described in the previous section, whilst also remaining flexible in recognition of more detailed stages of planning still to come.

The Development Concept Plan at Figure 7 demonstrates indicatively one possible manner in which development could occur on the site consistent with the Structure Plan requirements.

The following outlines the fundamental design principles of the Structure Plan.

- Allow for the creation of a diverse range of medium density housing choices, meeting affordable living objectives and promoting housing diversity within an area that currently has limited housing choice.
- Enable both short and long stay residential options, recognising the evolving nature of tourist accommodation and the opportunity for tourist accommodation within a residential setting.
- Provide a high amenity interface to the modified coast through the inclusion of small scale commercial land uses such as restaurants and / or cafes, as well as facilitating opportunities for mixed use housing.
- Deliver a permeable road and path network through the site, recognising the irregular shape of the site, the absence of any 'through-connection' to the east, and the need to provide vehicle access to the existing dwellings on the site.
- Ensure that future development takes into consideration the risk presented by coastal processes across the 100 year planning horizon.

Based on these key principles, the Structure Plan provides a framework for the creation of:

- A total of approximately 30-40 residential dwellings. Higher residential densities
 are focused to the north of the site adjacent to the protected beach, with slightly
 lower densities to the south of the site.
- A small commercial precinct adjacent to the foreshore and sheltered beach area, creating opportunities for future integration with the foreshore and provision of food and beverage based amenity for users of the beach and foreshore area, as well as enabling mixed use development.
- A single local access street, maximising efficiency and ensuring safe and efficient vehicle movement internally, as well as providing for both walking and cycling.
 The access street connects to the surrounding road network via the existing roundabout at the termination of Spinnaker Boulevard to the east of the site.

The following sections provide a more detailed analysis of the Structure Plan and its response to the opportunities and constraints identified in section 2, as well as the key land use elements described above.

Figure 6: Structure Plan Map

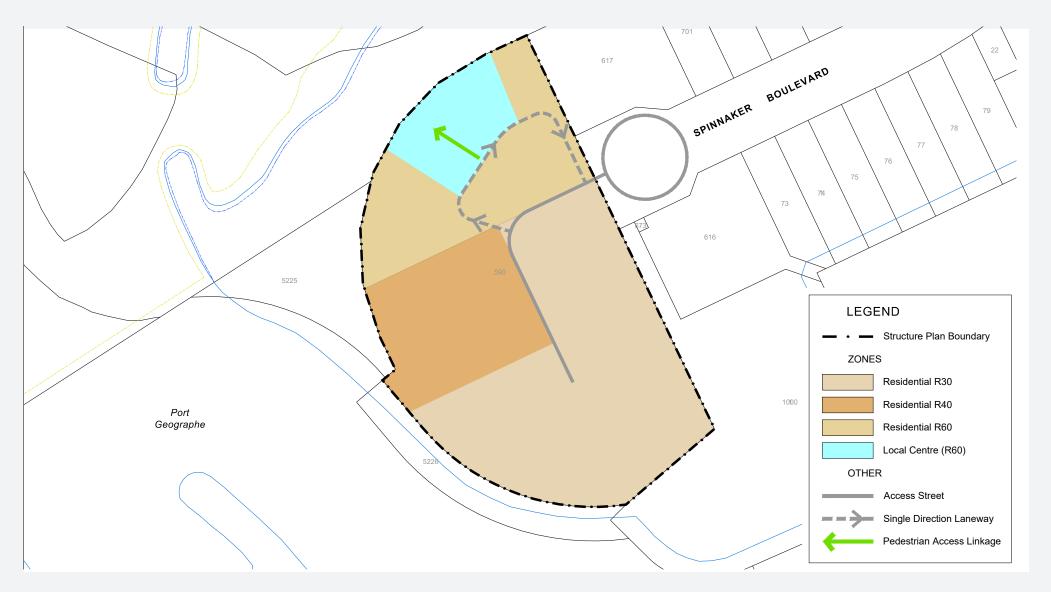


Figure 7: Development Concept Plan



3.2 Land Use and Zoning

The Structure Plan proposes a 'Local Centre' zoning across the northern portion of the site, recognising opportunities for future small scale commercial uses associated with the adjacent beach and marina. A residential density code of R60 has been allocated to the Local Centre zone and immediate surrounds, maximising potential for future mixed use development should market conditions prove favourable for this form of development in the future.

The remainder of the site is zoned 'Residential' with density codes ranging from R30 in the eastern and southern parts of the site, to R40 in the western area adjacent to the waterbody. This range of density coding allows for a variety of housing typologies, including potential for smaller 'four pack' style lots which are ideally suited for short stay tourist accommodation, as well as larger 'premium' lots fronting the marina waterbody to the south. The precise lot sizes and resultant housing typologies will be largely determined by market conditions and will be confirmed at subdivision stage, however it is intended that the structure plan deliver some different housing choices to those which are presently available in the vicinity.

As noted in the previous section, the site is currently zoned Tourist in LPS21, and is identified for 'Tourist Accommodation' in the PGDP. The nature of non-strategic tourism development and accommodation in the south-west of WA has changed significantly in recent times with the advent of private short-stay accommodation services such as Air BnB. The rise of private letting has taken a large portion of the tourism demand that would previously have sought accommodation in a tourist resort style facility. The advent of private short stay rentals, coupled with a declining international tourism market and financiers' reluctance to fund traditional tourist accommodation projects warrants a different planning response to developing this site.

The Structure Plan balances the historic planning intent for the site as being suitable for tourist accommodation with the need to facilitate a broader range of land uses within the site. On this basis, the Structure Plan not only provides for a small commercial precinct adjacent to the sheltered beach, but also enables both short-stay and permanent residential land uses. In order to minimise potential for future conflict between short-stay and permanent occupants, the structure plan includes a requirement to include notifications on titles at subdivision stage advising all prospective purchasers that short stay accommodation is permissible in this precinct.

Overall the Structure Plan has the potential to deliver 30-40 residential dwellings, equating to 23-30 dwellings per gross hectare.

3.3 Movement Network

Vehicle Movement

The Structure Plan recognises the lack of through-connection and the low traffic generating nature of the residential land uses, and balances this with the need for access and circulation to the existing short-stay dwellings and commercial precinct to the north of the site. This is achieved through provision for a single cul-de-sac access street that connects to the existing roundabout at the eastern entry to the site, and extends towards the south of the site. To the north of the local access street is a one-way laneway that connects to the rear of the existing short stay dwellings and proposed commercial precinct, and loops back around to the access street. This laneway configuration and single direction movement allows for safe and efficient circulation to the higher intensity uses, as well as providing a public road frontage to the existing dwellings.

The local access street and laneway will be constructed in accordance with the City's specifications, with the precise width and cross sections to be determined at subdivision design stage.

Given that the Structure Plan does not contemplate any increase in land use intensity from the PGDP and tourist uses previously foreshadowed, there is sufficient capacity within the existing external road network to accommodate traffic arising from the proposed structure plan without the need for any substantial upgrades and / or changes to the road hierarchy.

Pedestrian Movement

The Structure Plan recognises the unique location and context of the site, and provides for an activation and surveillance of the existing foreshore path network to the north of the site. Within the site itself, pedestrian movement will be via a footpath within the road reserve. The Structure Plan provides for a pedestrian link through the commercial precinct in the northern portion of the site, connecting the site with the foreshore path network. The form and tenure of this pedestrian link can be determined at subsequent stages in the planning process, and can either be a dedicated pedestrian access way, or incorporated into the built form of the commercial use(s) at DA stage.

Public Open Space

The site is well serviced by an existing established open space network in the locality. The existing foreshore area to the north and east provides a high amenity interface to the coast, while there is also a designated area of open space at the opposite end of Spinnaker Boulevard. A plan depicting the existing open space network is Figure 8.

The PGDP provided for an overall public open space provision of 17.7% (north of Layman Road), thereby exceeding the minimum 10% requirement established via State policy. It is not clear whether the site was included as part of the original calculation of gross subdividable area, however given the nature of the proposed tourist accommodation uses proposed at the time, it is reasonable to assume that it was. On this basis, the Structure Plan does not propose to provide any additional public open space. There are however opportunities to undertake specific improvements to the foreshore area adjacent to the site which will be considered in consultation with the City at the time of development.

Figure 8: Open Space Network



3.4 Coastal Processes and Coastal Interface

The Structure Plan satisfies the requirements of SPP 2.6 with respect to coastal processes and climate change.

SPP 2.6 requires consideration of coastal process in conjunction with the effects of climate change across a 100 year planning horizon as part of planning decision making in coastal areas. In particular, SPP 2.6 requires consideration of sea level rise (as a result of climate change), coastal erosion, wave overtopping, and storm surge / coastal inundation in severe storm events.

In order to address the specific requirements of SPP 2.6, the applicant has engaged coastal engineers MP Rogers and Associates to undertake an assessment of coastal hazards in accordance with SPP 2.6.

Key conclusions and recommendations from the MP Rogers assessment are summarised below, while a full copy of the MP Rogers report is included as Appendix 2.

Coastal erosion - Consideration of coastal erosion is not relevant to this structure plan on the basis that the existing coastal protection structure (sea wall) will prevent any significant erosion of the site during the planning timeframe.

Wave overtopping - Wave overtopping the coastal structures during severe weather events is a relevant consideration. MP Rogers concludes that given the presence of the two parallel sea walls that provide the entry to the marina, as well as the separation distance between the sea walls and the site (approximately 100m), that wave overtopping in a severe weather event will not adversely impact the site.

Coastal Inundation - Consistent with advice from the City of Busselton, MP Rogers adopts the Department of Transport's Design Storms for Western Australian Coastal Planning – Tropical Cyclones as a conservative basis from which to determine future impacts of coastal inundation in the event of a major storm event. The report concludes that the 500 year Average Recurrence Interval (ARI) inundation level for Busselton to be 2.9m AHD. When factoring in the established 0.9m allowance for sea level rise over the next 100 years, this results in a required development level of 3.8m AHD in order to avoid coastal inundation risks over the 100 year planning horizon. Current site levels are 3.2m – 3.5m AHD, and as such, some further works will be required at subdivision and / or development application stage in order to achieve these finished levels.

Structure Plan Response

On the basis of the existing coastal protection works and the recommendations of the MP Rogers assessment, there is no need for a specific structure plan response in relation to coastal erosion or wave overtopping. In relation to the potential for coastal inundation during a major storm event, the Structure Plan includes a provision requiring all habitable floor levels to be at or above 3.8m AHD within the Structure Plan area.

3.5 Infrastructure Coordination, Servicing and Staging

Wood & Grieve Engineers have prepared a comprehensive servicing strategy in order to demonstrate the availability and capacity of service infrastructure in order to service the site. A copy of this servicing strategy is included as Appendix 3.

The servicing strategy confirms that the site is connected to all essential service infrastructure, and that there is sufficient capacity within the existing network to accommodate development of the site as envisaged by the Structure Plan.

The following section summarises the engineering considerations in the Engineering Servicing Report.

Earthworks Strategy

The Report demonstrates that the finished floor levels (FFL) are capable of achieving 3.8m AHD to meet the requirements of SPP2.6. In order to achieve FFLs of 3.8m, retaining walls will likely be required at the existing lot boundary and at entry points. Fill is likely to be required to achieve increased road and lot levels which will require ramping at entry points. Final road and retaining wall levels will be determined at detailed design stage in consultation with the City of Busselton.

Drainage and Water Management

The Report demonstrates that the site, once developed, is capable of managing stormwater runoff in a manner which is consistent with the City's requirements, and best practice urban water management. A plan depicting the principles of the drainage strategy for the site is Figure 9.

Key elements of the drainage strategy are:

- The first 15mm (1 year ARI) run off is proposed to be captured via a variety of on-lot soak wells, roadside swales and rain gardens.
- Run off from the 5 year ARI storm events will enter rain gardens
 with excess run-off diverted into the pit and pipe system open
 base soakwell pits with additional soakage devices to assist with
 additional volume storage infiltration.
- Stormwater will be attenuated consistently with drainage infrastructure for the 1 and 5 year ARI events discussed above with bypass flowing along roads. Lot levels will be designed at 500mm above the 1% AEP floor level to protect from the larger storm events.

This strategy has been prepared in consultation with the City of Busselton, and it is intended that it will be refined and formalised as an Urban Water Management Plan at subdivision stage in the usual manner.

Figure 9: Drainage Strategy



Waste Water

The Structure Plan area is located within the catchment of the existing vacuum wastewater pumping station, with existing gravity and vacuum storage infrastructure located within the Layman Road and Spinnaker Boulevard reserves. Lots will be connected to DN150 gravity sewerage infrastructure that flows to a collection chamber with a separate connected vacuum valve pit. Vacuum valves will connect to a common DN100 vacuum main which will extend through the Structure Plan area and into the existing mains in Spinnaker Boulevard.

Water Supply

The Structure Plan will be provided with reticulated potable water via the existing DN150 PVC water main within the Spinnaker Boulevard road reserve. DN 100 PVC water mains will be provided to lots within the proposed subdivision and connected to the DN150 PVC main.

Power Supply

Existing 22kV HV & LV Distribution lines are located on the southern side of the Spinnaker Boulevard road reserve will service the Structure Plan area. Lot 590 is fed from an existing Uni Pillar on the southern portion of the lot fronting Spinnaker Boulevard which is fed from the existing 630kVA transformer located within Lot 616 Spinnaker Boulevard.

Gas Supply

An existing DN100 350kpa high pressure polyethylene gas main is located in Spinnaker Boulevard adjacent to the site. ATCO Gas has provided advice confirming that the existing network can be extended to service the proposed development.

Communications

The Structure Plan is located within an area that has NBN Co services available. The design and installation of pit and pipe infrastructure will be undertaken at the developers cost and will be extended within the communications corridor to service two lots per pit. The pit and pipe system can be designed and installed the same time as other NBN services and handed over to NBN to reticulate cabling as required.

3.6 Development Contribution Arrangements

The City has advised that the site is subject to the 'Port Geographe Developer Contribution and Staging Plan' which, in conjunction with the original development deed for the Port Geographe area, provides the statutory basis for development contributions towards community infrastructure in the locality. This development contribution framework is not included in Schedule 15 of LPS21, and it is understood that it is implemented via a separate deed between the landowners and the City.

Contributions are typically levied as conditions of subdivision and / or development approval, and given that the contribution agreement is separate to the planning framework, it is not necessary for the structure plan to duplicate these requirements.

Appendices

Appendix 1: Correspondence from Western Australian Planning Commission August 2018 Appendix 2: Coastal Hazard Assessment (MP Rogers and Associates) Appendix 3: Engineering Servicing Report (Wood & Grieve Engineers)

Appendix 1





Enquiries: Our Ref: Your Ref: Mr Frank Scibilia DP/13/00969 3153Ltr26

CLE Town Planning and Design PO Box 796 SUBIACO WA 6904

Attention: Mr Cameron Leckey

Dear Cameron

PORT GEOGRAPHE VILLAGE CENTRE REMNANT LAND - INTENT TO PREPARE STRUCTURE PLAN

I refer to your correspondence dated 1 August 2018 seeking support from the Western Australian Planning Commission for the preparation of a structure plan for Lots 585, 590, 612 and portion of Lot 9501, Layman Road and Spinnaker Boulevard, at the Port Geographe Village Centre.

The Western Australian Planning Commission has resolved, pursuant to Schedule 2 Part 4 r.15(c) of the *Planning and Development (Local Planning Schemes) Regulations 2015*, that:

1. three structure plans are required for Lots 590, 612 and for Lots 585 and portion of 9501, respectively, for the purposes of orderly and proper planning.

Further to the above, a structure plan amendment to the Port Geographe Development Plan, identifying the abovementioned sites for separate structure plans, is expected to be undertaken prior to or concurrently with the structure plans for the abovementioned sites.

Please call Mr Frank Scibilia of this office if you have any further queries.

Yours sincerely

David Brash

Principal Planning Officer

South West Regions, Land Use Planning

27 August 2018

Cc Mr Paul Needham, City of Busselton

Appendix 2

m p rogers & associates pl ABN 14 062 681 252

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R1279 Rev 2

May 2020

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breakwaters

Heath Development Company

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Lot 590 Spinnaker Boulevard, Port Geographe Coastal Hazard Risk Management dredging

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erosion

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beaches

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K1577, Report R1279 Rev 2 Record of Document Revisions

Rev	Purpose of Document	Prepared	Reviewed	Approved	Date
Α	Draft for MRA & Client review	C Doak	A Clapin	C Doak	26.9.19
0	Issued for Client use	C Doak	A Clapin	C Doak	27.9.19
1	Updated with minor change	C Doak	A Clapin	C Doak	26.5.20
2	Updated with additional minor change	C Doak	A Clapin	C Doak	28.5.20

Form 035 18/06/2013

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1. Introduction

Lot 590 Spinnaker Boulevard is a coastal lot within the Port Geographe development precinct (refer Figure 1.1). This Lot is owned by Heath Development Company, who is seeking to progress development planning for the proposed subdivision of the Lot.



Figure 1.1 Location Plan

Given the proximity of the Lot to the coastline, development planning requires consideration of coastal hazard risks in accordance with the requirements of State Planning Policy 2.6 – the State Coastal Planning Policy (SPP2.6; WAPC 2013).

1.1 Approach to Coastal Hazard Risk Management

SPP2.6 presents a hierarchy for coastal hazard risk management which is primarily focused on promoting future flexibility for coastal managers. However, for the Port Geographe precinct, which underwent a major State Government funded coastal protection structure reconfiguration in 2014, the development approach has been to protect the broader development precinct. Lot 590 benefits from this protection, as do a number of other freehold title lots that exist along the coastal frontage of the Port Geographe development precinct. Consequently, the standard requirements of coastal hazard risk management and adaptation planning outlined within SPP2.6 do not apply to the development of Lot 590. Instead, development planning needs only consider the avoidance of coastal hazards that could directly impact the sites despite the presence of the coastal protection structures.

This means that coastal hazards associated with wave overtopping of the coastal structures and inundation of the site need to be considered. Coastal erosion hazards do not need to be considered given the protection structures mitigate any associated risks.

This report provides details regarding potential overtopping levels and required development levels for the site.

2. Wave Overtopping Hazards

Wave overtopping occurs when waves impact or run-up a structure, resulting in a volume of water passing over (overtopping) the crest. Wave overtopping can be in the form of sheet flow, where waves run-up over the crest and result in what is known as 'green water' impacting the adjacent area. Alternatively, wave overtopping can be in the form of splash from waves breaking on the seaward face of the structure (often termed 'white water'). This splash can be carried over the structure by momentum or as a result of onshore winds. Volumes of overtopping associated with run-up over the crest of a structure are generally more problematic than overtopping caused by breaking waves, however both can be significant with respect to safety of people and property.

Design of the reconfigured coastal structures at Port Geographe was completed by WorleyParsons and is described in their design report (WorleyParsons, 2014). In accordance with sound engineering practices, the design of the structures included assessment of wave overtopping rates based on both the most advanced literature available, as well as from the results of physical model testing.

Appropriately, the crest design of the structures was completed based on guideline overtopping limits presented in EurOtop (2007), which represented the best available information for use in the design process. The crest design included consideration of overtopping rates to ensure no damage to the structures as a result of wave overtopping during the 100 year Average Recurrence Interval (ARI) design event, whilst also preserving the safety of pedestrians during conditions experienced relatively frequently (the 1 year ARI event). Relevant acceptable limits of wave overtopping are presented in Table 2.1, as recommended in EurOtop and referenced by WorleyParsons.

 Table 2.1
 Acceptable Wave Overtopping Limits for Different Scenarios

Hazard Type and Reason	Relevant Design Event for Overtopping Level to be Achieved	Acceptable Mean Overtopping Discharge (l/s/m)
Damage to grassed or lightly protected promenade or reclamation cover for Revetment Seawalls	100 year ARI	50
Damage to Building Structural Elements	100 year ARI	1
Aware pedestrian, clear view of the sea, not easily upset or frightened, able to tolerate getting wet, wider walkway	1 year ARI	0.1

As is common practice for the development of coastal protection structures, a 50 year design life was adopted for the design of the Port Geographe structures. Adoption of this design life means that a 0.3 m allowance for sea level rise was used in the determination of appropriate design conditions, as agreed with Department of Transport during the design process. Further more, WorleyParsons discussed that "Department of Transport expressed a preference for adaptive structures. This includes a reservation of space for additional future strengthening of the structures in case the anticipated sea level rise is exceeded during the design life. It also includes consideration of an increased wave height as a result of an unexpected large sea level rise. This should not necessarily lead to a larger armour stone size but can also involve accepting more damage during a storm event. The adaptive measures are further discussed in Section 10.3 of

this design report based on a sea level rise of 0.9m. According to [Ref. L1] this corresponds to a design horizon of 100 years for sea level rise." Further discussion regarding the proposed adaptation strategies is provided in Section 2.2 of this report.

2.1 Wave Overtopping – Lot 590

Lot 590 is afforded protection from both the outer breakwater and the inner breakwater surrounding the lagoon. Within the design report these were termed the Western Breakwater and Eastern Breakwater respectively, as shown in Figure 2.1. Additionally, it is noted that Lot 590 is also protected by an existing rock revetment structure where it directly fronts the canal waterway. This rock revetment structure was not upgraded during the reconfiguration of the entrance structures.

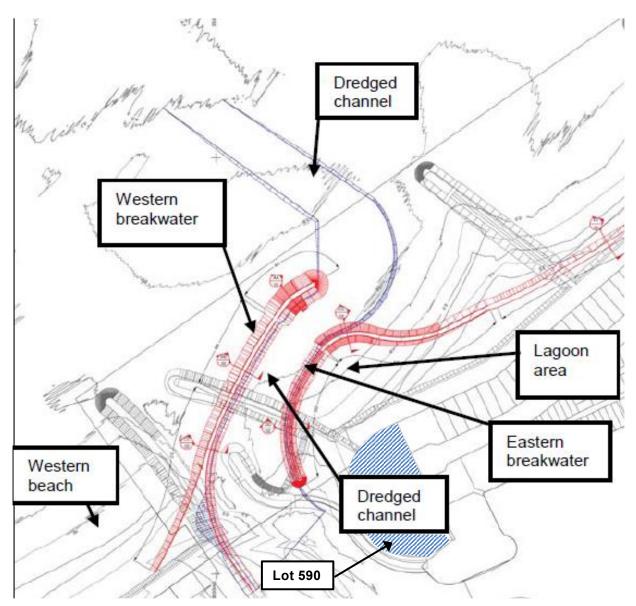


Figure 2.1 Structure Naming Convention Adopted within the WorleyParsons Design Report (WorleyParsons 2014)

Given the level of protection that is received from the Western Breakwater, WorleyParsons note that the only overtopping risk that exists along the Eastern Breakwater is for the exposed section

near the entrance. A calculation of the potential overtopping rate for this section was completed and suggests that the overtopping rate at the crest of the eastern breakwater is approximately 6.5 l/s/m during the 100 year design event, including a 0.3 m increase in sea level over the 50 year design life of the structure. However, Lot 590 is more than 100 m from the crest of the eastern breakwater, therefore the extent of overtopping at the site would be negligible and certainly not a risk to safety or property. Similarly, a sea level rise of 0.9 m, which would be representative of a 100 year planning horizon, would also result in negligible overtopping at the site.

With regard to the potential overtopping risks associated with the existing rock revetment fronting Lot 590, it is noted that the potential for wave impact on this revetment is extremely limited given the small fetch across the waterway (generally less than around 200 m). As a result, wave heights in this area will generally be less than 0.3 m and will not pose an overtopping risk, even though the revetment wall in this area has a relatively low crest height.

Over longer planning horizons it is possible that the existing rock revetment would be completely inundated during severe events. SPP2.6 specifies that the 500 year ARI event is the relevant condition for the assessment of overtopping hazards on a structure. MRA have been advised that recent modelling work completed in the area has identified a 500 year ARI water level for Port Geographe of 3.4 mAHD, including a 0.9 m allowance for sea level rise.

As outlined in the following section, the proposed development of Lot 590 will be retained to a height of 3.8 mAHD. Development at this elevation will therefore provide protection from wave effects given the 0.4 m freeboard above the predicted steady water level associated with the 500 year ARI event at the end of the planning horizon. A small degree of wave overtopping of the retained area would be expected, though calculations suggest that the overtopping rates would be less than 1 l/s/m at the boundary of the retaining (calculations suggest an overtopping rate of around 0.6 l/s/m). This would mean that dwelling locations would be unrestricted within the development area. It is noted that the overtopping levels appear to be in excess of those adopted for pedestrian safety (as presented in Table 2.1), however EurOtop (2018) does suggest that in certain circumstances wave heights less than 0.5 m do not pose an overtopping risk. This is expected to be the case in this instance, as forces associated with wave heights of 0.3 m or less are not significant and are not believed to present a risk to pedestrian safety.

2.2 Adaptation Strategies for Coastal Protection Structures

As previously mentioned, with direction from Department of Transport, the design by WorleyParsons considered future adaptation requirements for the coastal protection structures to ensure that they would be "adaptive" for sea level rise values higher than that included in the design. Recommendations within the WorleyParsons report for future adaption of these structures included the following:

- "Placement of additional larger armour stone in front of the exposed sides of the breakwaters and revetment:
- Use additional rock to make a berm in front of the exposed sides of the breakwaters and revetment. A berm at around design water level will decrease wave overtopping;
- Raise the crest at locations where possible. Sufficient space should be reserved along the eastern revetment to enable raising and strengthening of the crest. At a minimum, the 5m wide core crest width should be reserved to allow an additional layer of armour to be placed;

- Carry out sand nourishment in front of the eastern revetment to raise the foreshore, this will decrease the wave loads on the structure; and
- To determine the most effective and suitable measure among the above possible measures (and possible others) should be evaluated and quantified in a separate breakwaters and revetment strengthening assessment study and re-design when it becomes necessary. This study should take into account the new value (and prediction) for sea level rise, the effect of sea level rise on design wave conditions and the condition (performance) of the structures at the time of the strengthening works."

The above recommendations provide logical strategies for modification to the coastal protection structures should this be required in the future. As the coastal protection structures sit outside of private landholdings it is anticipated that any upgrade to these structures would be completed by the relevant public authority when required.

The frontage of Lot 590 to the Port Geographe waterway is a rock revetment wall (refer Figure 2.2), though this wall was not updated as part of the entrance reconfiguration. Given this rock revetment is located within the Port Geographe waterway it is sheltered from the effects of offshore wave conditions. The revetment is therefore expected to remain stable both now and into the future, even with a 0.9 m rise in sea level over a 100 year planning horizon. However, in the event that maintenance or upgrade of this structure is required in the future, this structure also sits outside of private landholdings so it is expected that any upgrade would be completed by the relevant public authority when required.

Nevertheless, the proposed development of Lot 590 will have a finished development level of 3.8 mAHD, which will be achieved through retaining. Therefore, even if this revetment is inundated, the actual development site will remain unaffected and will maintain a freeboard of 0.4 m above the peak steady water level experienced during the 500 year ARI event at the end of a 100 year planning horizon. This approach is similar to the vast majority of the other canal lots which have low elevation canal walls (which are frequently inundated), with additional retaining behind the canal wall to provide protection and inundation resistance for the dwellings.

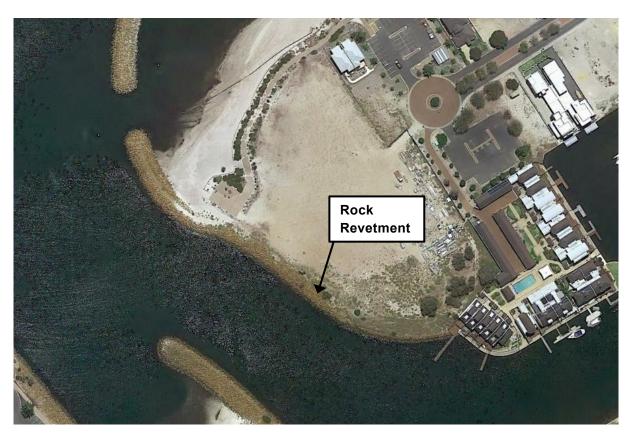


Figure 2.2 Rock Revetment Fronting Lot 590

3. Coastal Inundation Hazards

SPP2.6 outlines that development within the coastal zone should avoid risks associated with inundation resulting from an event with a "0.2 percent or one-in-five hundred probability of being equalled or exceeded in any given year over the planning time frame". Despite not being in a region that is commonly impacted by cyclones, the severity of the required design event described above means that the impact of cyclones needs to be considered.

As outlined previously, MRA have been advised that recent modelling completed in the area has determined that the 500 year ARI water level for Port Geographe is 3.4 mAHD, including a 0.9 m allowance for sea level rise. This water level therefore represents the 500 year ARI water level at the end of a 100 year planning horizon. As previously discussed, there will be some local waves in this area, which though expected to be less than 0.3 m, require a freeboard above the 500 year ARI steady water level. A retained **development level of 3.8 mAHD** is therefore proposed for Lot 590 to avoid inundation and overtopping hazards.

4. Conclusion

The reconfiguration of the Port Geographe coastal structures provides protection to the overall Port Geographe development precinct. As a result, the majority of risks typically posed by coastal hazards no longer need to be considered when contemplating development of coastal land areas that are protected by these structures.

The design for the reconfiguration of the coastal structures considered the potential impacts of wave overtopping from the perspective of structural stability, pedestrian safety and avoidance of damage to building structures located on adjacent freehold lots. As a result of this design process, the overtopping levels at Lot 590 Spinnaker Boulevard do not impose any restrictions on development, either over a 50 or 100 year planning horizon. Whilst Lot 590 benefits from protection by coastal protection structures, these structures lie outside of land under private ownership. As a result, if any upgrades to these structures are required in the future then these upgrades will be completed by the relevant public authority when required.

Whilst the structures provide protection against wave overtopping, which includes wave run-up, the elevation of the proposed development still needs to be high enough to avoid risks posed by severe inundation events. Review of inundation and overtopping hazards has identified that development of Lot 590 needs to be at or above 3.8 mAHD.

5. References

- EurOtop, 2007. Wave Overtopping of Sea Defences and Related Structures: Assessment Manual.
- EurOtop, 2018. Wave Overtopping of Sea Defences and Related Structures: Assessment Manual Second Edition.
- WAPC, 2013. State Planning Policy 2.6: State Coastal Planning Policy. Government of Western Australia.
- WorleyParsons, 2014. *Port Geographe Reconfiguration of Coastal Structures IFC Design Report*. Report 301012-01577-CS-REP-003 prepared for the Department of Transport.

m p rogers & associates pl

www. coasts and ports. com. au

Appendix 3



Lots 590 & 612 Spinnaker Bvd, Port Geographe

Engineering Servicing Report

Prepared for:

Heath Development Company c/- CLE Town Planning & Design

Prepared by:

 $\begin{tabular}{ll} \textbf{Richard Martin}\\ \textbf{Project No. 40254}\\ \textbf{\wge-bus-fs-01\projects\40254\project documentation\civil\documents\& reports\servicing\ report\ci-re-times and the project of the proje$

Date: 17 October 2018

PO Box 1276, 10 / 44-48 Queen Street, Busselton WA 6280 T: (08) 9754 4244 E: busselton@wge.com.au W: www.wge.com.au

Revision

REVISION	DATE	COMMENT	PREPARED BY	APPROVED BY
001	17/10/2018	Preliminary Issue	R. Fowler	R. Martin

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1. Introduction

1.1 General

Wood & Grieve Engineers (WGE) has been engaged by Heath Development Company c/- CLE Town Planning & Design to prepare this report in support of structure plans for the proposed subdivisions of Lots 590 and 612 Spinnaker Boulevard, Port Geographe in the City of Busselton.

Concept layouts for both sites have been prepared by CLE Town Planning & Design, and are included as Appendix A.

This report discusses the following engineering and infrastructure items necessary to service the proposed subdivisions:

- Earthworks
- Roadworks and Footpaths
- Stormwater Drainage
- **Sewer Reticulation**
- Water Reticulation
- **Power Reticulation**
- Communications
- **Gas Reticulation**

Both sites are covered in this report (rather than a separate report for each site) due to their close proximity and similar nature. WGE has been advised that the City of Busselton confirmed this approach is acceptable.

The information presented in this report is based on preliminary advice from the relevant service authorities and their available strategic planning information.

1.2 Site Description

1.2.1 Site Location, Topography, and Existing Features

Both subject sites are located on Spinnaker Boulevard, Port Geographe within the City of Busselton, approximately 5km east of the Busselton CBD. The two subject sites are separated by approximately 500m. The location of the two sites is presented in *Figure 1* below.

Lot 590 is approximately 1.32Ha in size, and is bounded by existing residential properties, existing public carparks, Port Geographe Marina, and foreshore reserve. A preliminary survey indicates that the site is relatively level, with a slight grade from a height of approximately 3.60m AHD at the southern site boundary to approximately 3.20m AHD at the northern site boundary. The vast majority of site is clear of significant vegetation, having been used as a lay-down area in the recent past, as evidenced by historical aerial photography. There is sparse minor vegetation and approximately six existing trees present in the southern portion of the site. An existing two-story structure is present in the northern corner of the site, and concept plans indicate this is to remain and be incorporated into the proposed subdivision.

Lot 612 is approximately 2.59Ha in size, and is bounded by Layman Road, Spinnaker Boulevard, existing residential properties, and foreshore recreation reserve. A preliminary survey indicates that the site is relatively level, with heights ranging from approximately 3.40m AHD to 3.50m AHD across the site, a small trapped low area at approximately 3.20-3.30m AHD in centre of the site, and a high area at approximately 3.60m AHD on the northern boundary. The vast majority of site is clear of significant vegetation, with some minor vegetation present in the south-eastern corner of the site.



Figure 1: Site Location

1.2.2 Site Geology, Acid Sulphate Soil Risk, and Groundwater

Detailed geotechnical investigations have not been undertaken across the subject sites, however a desktop study has been undertaken based on geological mapping published by the Department of Mines, Industry Regulation and Safety. This geological mapping indicates that previous to any canal development the subject sites were located in areas of S1 and S13 calcareous sands, overlying Q-kt-WA limestone, overlying K-WR-ss sandstone, siltstone, and shale.

S1, and	white fine to medium-grained sub-rounded quartz and shell debris of eolian origin
S13	white medium grained rounded quartz and shell debris well sorted of eolian origin
Q-kt-WA	Limestone, dominantly eolian calcarenite; lesser siliciclastic sandstone
K-WR-ss	Interbedded sandstone, siltstone and shale

Groundwater levels at the subject sites are likely to be influenced by the ocean water level due to their coastal location.

Acid Sulphate Soils (ASS) risk mapping published by the Department of Water and Environmental Regulation indicates that both sites are located within areas of "High to moderate ASS disturbance risk (<3m from natural surface)". Given that the sites have been filled above natural ground levels it is anticipated that ASS investigations may be required for deeper services installations, which may necessitate the need for an ASS Management Plan.



Figure 2: Acid Sulphate Soil Risk Mapping (Department of Water and Environmental Regulation 2018)

1.2.3 **Planning**

The subject sites are currently zoned as "Tourist" under the City of Busselton Local Planning Scheme No. 21. WGE understands that these lots will be re-zoned to allow for the proposed subdivisions.

2. **Earthworks**

2.1 Coastal Hazard Risk Management

Due to the coastal location of the subject sites, consideration needs to be given to coastal hazard risks in accordance with the requirements of State Planning Policy 2.6 (SPP2.6). A Coastal Hazard Risk Management Report (CHRMR) has been prepared by MP Rogers & Associates, and is included as Appendix G.

The CHRMR identifies that the existing coastal structures (sea walls) provide protection to the proposed developments from wave overtopping, however, severe inundation events and the potential extent of sea level rise need to also be considered. In this regard, and in the absence of detailed investigations, the CHRMR concludes that "development of Lots 590 and 612 will need to be located at or above 3.8m AHD". This conclusion is based on conservative estimations of required development levels put forward in a 2018 report prepared for the Department of Transport (Design Storms for Western Australian Coastal Planning – Tropical Cyclones (Seashore Engineering 2018)).

Further clarification sought from MP Rogers & Associates confirmed that this minimum level "...will apply to all development within the precinct, not just [the proposed lots] closest to the seawalls." (Clinton Doak -MP Rogers & Associates, email dated 20/09/2018)

SPP2.6 is not clear as to whether the 3.8m AHD minimum development level applies to lot levels, road levels, or finished floor levels (FFL). It is assumed that in this case the minimum level will apply to FFLs. It is not possible for all roads within the proposed developments to meet the minimum development level due to the need to tie-in to existing roads which are much lower than this level.

The concept plan for Lot 590 indicates that the existing short stay accommodation in the north east corner of this lot is to remain. This existing structure is outside the extent of preliminary survey pickup, however it is unlikely that this existing structure meets the minimum development level of 3.8m AHD. investigations into whether this existing structure can remain at its current level are required, and if so detailed design (eg. of roads and retaining walls) will need to consider and incorporate this.

2.2 **Retaining Walls**

In order to achieve the minimum development level of 3.8m AHD identified in the CHRMR, retaining walls will likely be required to most of the boundaries of the current lots, due to existing development around the two subject sites being lower than this level.

The existing road levels of Spinnaker Boulevard and Layman Road at tie-in locations for the proposed roads within the developments are, in all three cases, over 1m lower than the 3.8m AHD minimum development level. Therefore entrance roads will need to "ramp up" into the developments, and subsequently, it is anticipated that retaining walls may also be required at the boundary of some of the lots adjacent the proposed entrance roads. Detailed design will need to consider the steepness of driveways for lots closest to the entrance roads where retaining walls are not feasible (ie. along front boundaries).

Where sections of the southern and eastern boundaries of Lot 590 adjoin existing residential properties, any retaining walls will need to be designed so as not to impact on the existing structures.

There is an existing rock wall on the western boundary of Lot 590 where it abuts the Port Geographe Marina. This existing rock wall will need to be checked for its suitability for the proposed development and how it will be incorporated to achieve the minimum development level.

Roadworks and Footpaths 3.

Roads within the proposed developments will need to be designed and constructed in accordance with City of Busselton requirements. It is anticipated that roads will generally be constructed to a sealed width of 6.0m, and laneways to a sealed width of 5.4m, subject to detailed design. Detailed design of roads and intersections will also need to consider the requirements of the proposed commercial lots (eg. expected delivery vehicles).

The proposed road network for Lot 590 requires one new intersection onto Spinnaker Boulevard which will form an additional leg to the existing roundabout where Spinnaker Boulevard currently terminates.

The proposed road network for Lot 612 requires an intersection onto Layman Road and an intersection onto Spinnaker Boulevard. In both cases the existing median islands in Spinnaker Boulevard and Layman Road will require modification to allow full movement at these proposed intersections.

It is anticipated that 2m wide concrete footpaths will be required throughout both developments to provide connectivity to the City of Busselton's existing footpaths.

Detailed design of roads and footpaths at the proposed intersections will need to consider how to treat the level difference between the proposed developments and the existing roads, as well as the steepness of driveways for lots that have front boundaries adjacent these intersections.

Stormwater Drainage 4.

High level stormwater drainage concepts were prepared for both sites and provided to the City of Busselton who confirmed their acceptance of the general concepts. These concepts were prepared in order to demonstrate that the sites will be capable of achieving an approved drainage methodology for development, however no detailed design or hydraulic calculations have been undertaken. The drainage concepts and correspondence with the City of Busselton is included as Appendix B.

The drainage concept is the same for both proposed developments and can be described as follows:

Run-off from the 1EY (1yr ARI/first 15mm) storm events is proposed to be captured via a variety of proposed on-lot soakwells, roadside swale systems and rain gardens. These systems will control both the volume and quality of the first flush events being infiltrated.

Run-off from the 0.2EY (5yr ARI) storm events will enter the proposed rain gardens, with excess run-off diverted into a proposed pit and pipe system. It is proposed to utilise open base soakwell pits with additional soakage devices such as "Stormtech" chambers to assist with additional volume storage and infiltration.

Run-off from storm events greater than 0.2EY (10yr ARI and above) will be attenuated within drainage structures mentioned above and bypass will flow along the proposed roads as indicated below. Future detailed design will ensure that flood routing for these larger storm events will protect people and property, with proposed lot levels being a minimum 500mm above the 1% AEP flood level.

A drainage connection exists to the eastern boundary of Lot 590 (approximately in line with the southern boundary of nearby Lot 616), however is not usable with the proposed development layout. Discussions will need to be held with the City of Busselton regarding its removal during detailed design, along with the removal of any easement(s) that currently exist over it.

Detailed design will also need to consider:

- the management of groundwater (eg. via subsoil drainage) with consideration also given to the potential for rise in ocean level and the effect this will have on groundwater levels
- the effect of retaining walls (potentially around the entire development) on the management of groundwater
- tailwater levels if connecting into the City's existing piped drainage network which currently discharges into the Port Geographe Marina

5. **Sewerage Reticulation**

Water Corporation operates a vacuum sewerage network in the Port Geographe area. Both subject sites are located within the catchment of the existing vacuum wastewater pumping station (WWPS) referred to within Water Corporation's Long Term Conceptual Scheme Planning as Busselton Pumping Station No. 12. Existing gravity and vacuum sewerage infrastructure exists within the Layman Road and Spinnaker Boulevard road reserves, as indicated in Figure 3 and Figure 4 on the following page.

Water Corporation's 'ESInet' system indicates that there are three existing vacuum sewer access chambers immediately adjacent to Lot 590 (with two of the three potentially located within Lot 590). There are three existing vacuum sewer access chambers immediately adjacent to Lot 612.

The concept layouts for both subject sites were provided to Water Corporation, who were asked to confirm if the proposed developments could be serviced via extension of the existing sewerage network, and to advise of any issues they could foresee. Correspondence with Water Corporation is included as Appendix C.

Water Corporation has advised that the existing sewerage system can be extended to serve the proposed subdivisions. Water Corporation also provided markups indicating which of the existing vacuum sewer access chambers would need to remain in place, and which would need to be removed. These markups are included within Appendix C. Removal of the existing access chambers will need to also consider any easements that currently exist over the existing access chambers.

A combination of gravity and vacuum sewerage infrastructure will need to be constructed to service the proposed subdivisions. As a general indication (subject to detailed design), lots will need to be connected (in groups of potentially six to seven) to DN150 gravity sewerage infrastructure that flows to a collection chamber with a separate connected vacuum valve pit. Vacuum valves within the vacuum valve pits will connect to a common DN100 vacuum main which will extend through the proposed subdivisions and connect into existing vacuum mains in Spinnaker Boulevard / Layman Road.

Monetary 'headworks' contributions and fees will be payable to Water Corporation at the time of subdivision.

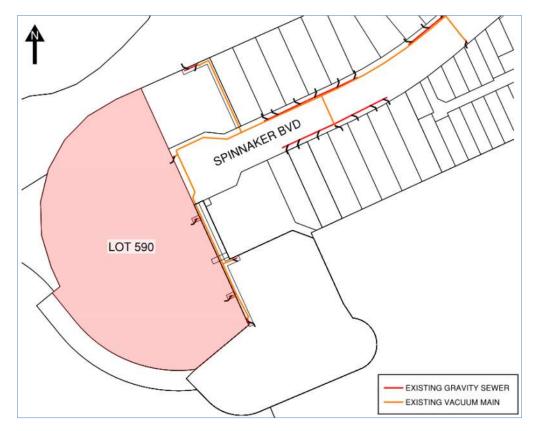


Figure 3: Existing Sewerage Infrastructure (Data: Water Corporation 2018, Landgate 2018)

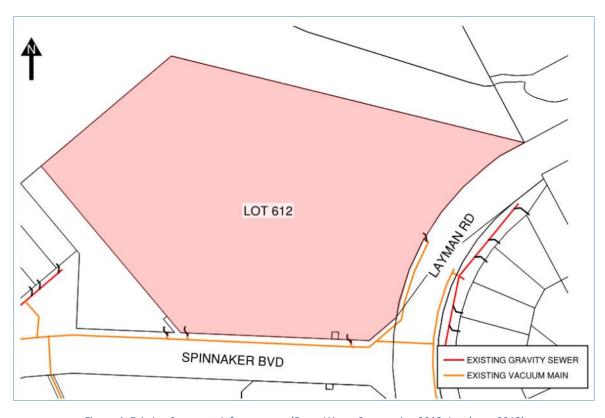


Figure 4: Existing Sewerage Infrastructure (Data: Water Corporation 2018, Landgate 2018)

6. Water Reticulation

Busselton Water operates a reticulated potable water network in the Port Geographe area, and has an existing DN150 PVC water main within the Spinnaker Boulevard road reserve adjacent to both sites.

It is anticipated that, subject to detailed design, DN100 PVC water mains will be connected to the existing DN150 main, and extended into the proposed subdivisions. Fire hydrants and valves will need to be provided.

Busselton Water has advised that they do not foresee any issues in providing water services to the proposed lots, subject to hydraulic verification during detailed design. Correspondence with Busselton Water is included as *Appendix D*.

Monetary 'headworks' contributions and fees will be payable to Busselton Water at the time of subdivision.

7. Power Reticulation

Refer to the Electrical Services Report included as *Appendix F*.

8. Communications

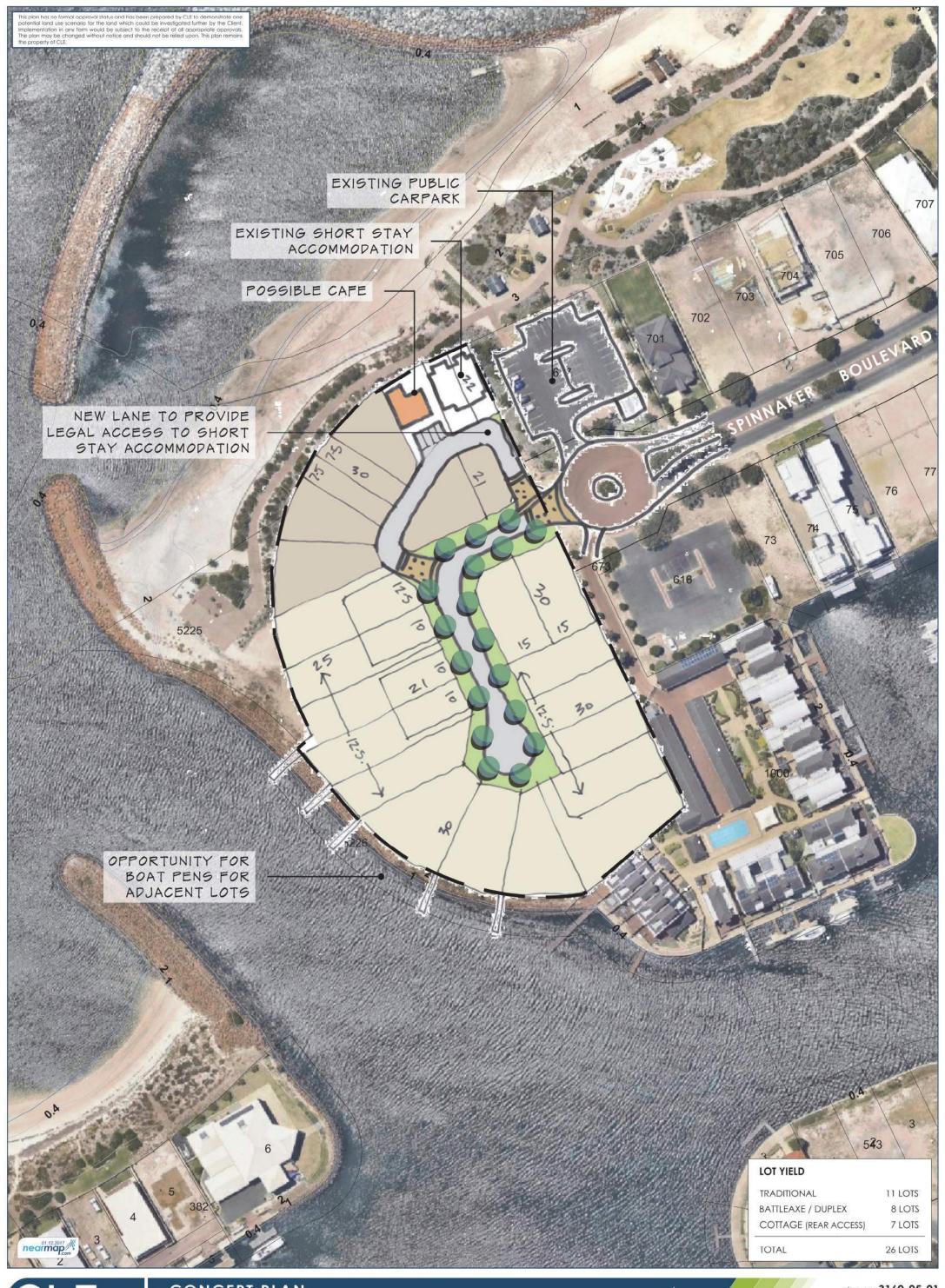
Refer to the Electrical Services Report included as Appendix F.

9. Gas Reticulation

ATCO Gas operates a reticulated gas network in the Port Geographe area, and has an existing DN100 350kPa high pressure polyethylene gas main in Spinnaker Boulevard and Layman Road, adjacent to both subject sites.

ATCO Gas provided advice that their existing network can be extended into the proposed developments to provide gas services to proposed lots. Correspondence with ATCO Gas is included as *Appendix E*.

APPENDIX A Concept Layouts





CONCEPT PLAN
Lot 590 Spinnaker Boulevard
Port Geographe









DRAFT





APPENDIX B Drainage Concepts & City Of Busselton Correspondence

LOT 590 SPINNAKER BOULEVARD, PORT GEOGRAPHE

STORMWATER DRAINAGE CONCEPT

Run-off from the 1EY (1yr ARI/first 15mm) storm events are proposed to be captured via a variety of proposed on-lot soakwells, roadside swale systems and rain gardens. These systems will control both the volume and quality of the first flush events being infiltrated. An example of a rain garden is pictured in Figure 1.

Run-off from the 0.2EY (5yr ARI) storm events will enter the proposed rain gardens, with excess run-off diverted into a proposed pit and pipe system. It is proposed to utilise open base soakwell pits with additional soakage devices such as "stormtech" chambers to assist with additional volume storage and infiltration.

Run-off from storm events greater than 0.2EY (10yr ARI and above) will be attenuated within drainage structures mentioned above and bypass will flow along the proposed roads as indicated below. Future detailed design will ensure that flood routing for these larger storm events will protect people and property, with proposed lot levels being a minimum 500mm above the 1% AEP flood level.

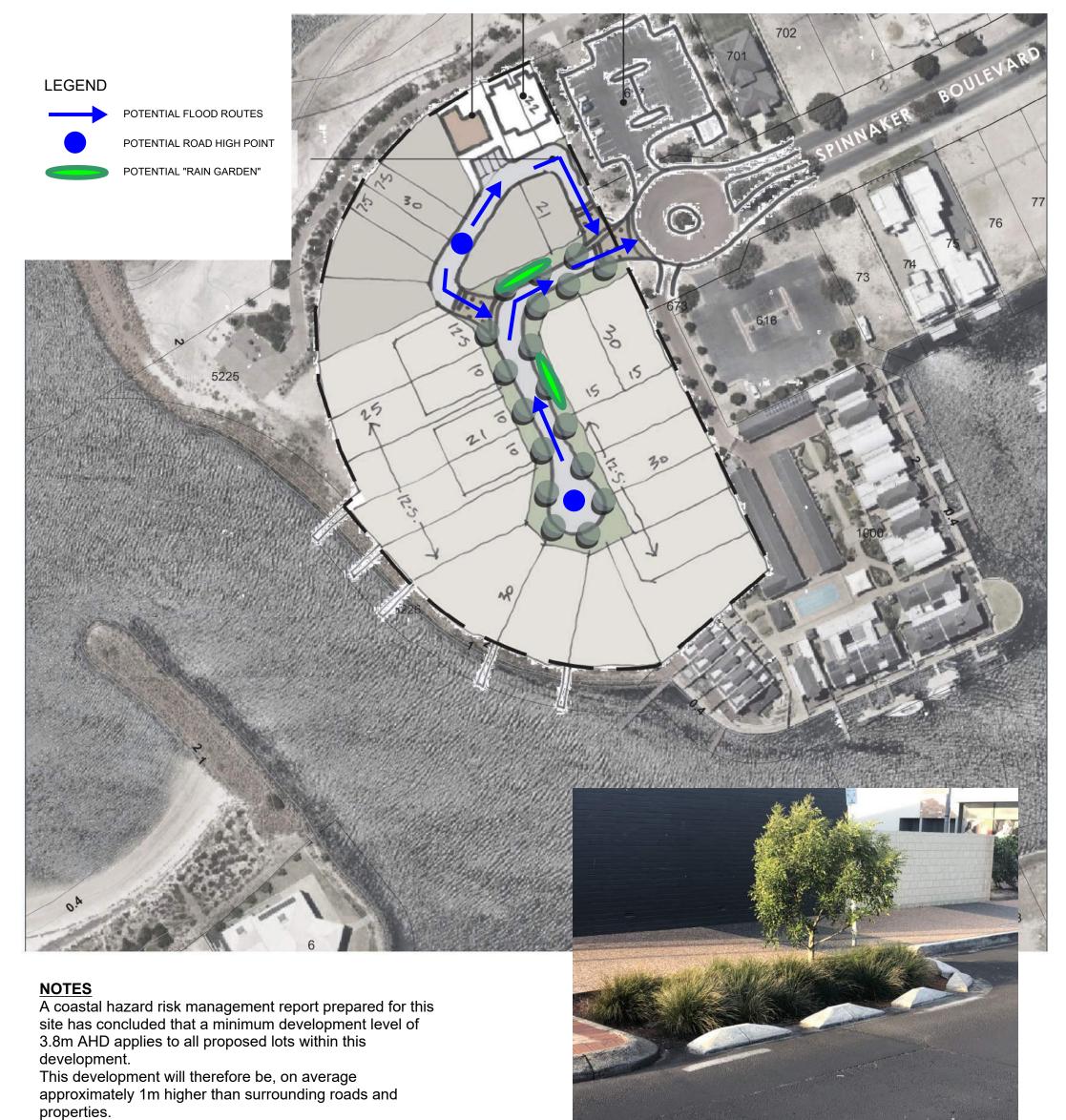
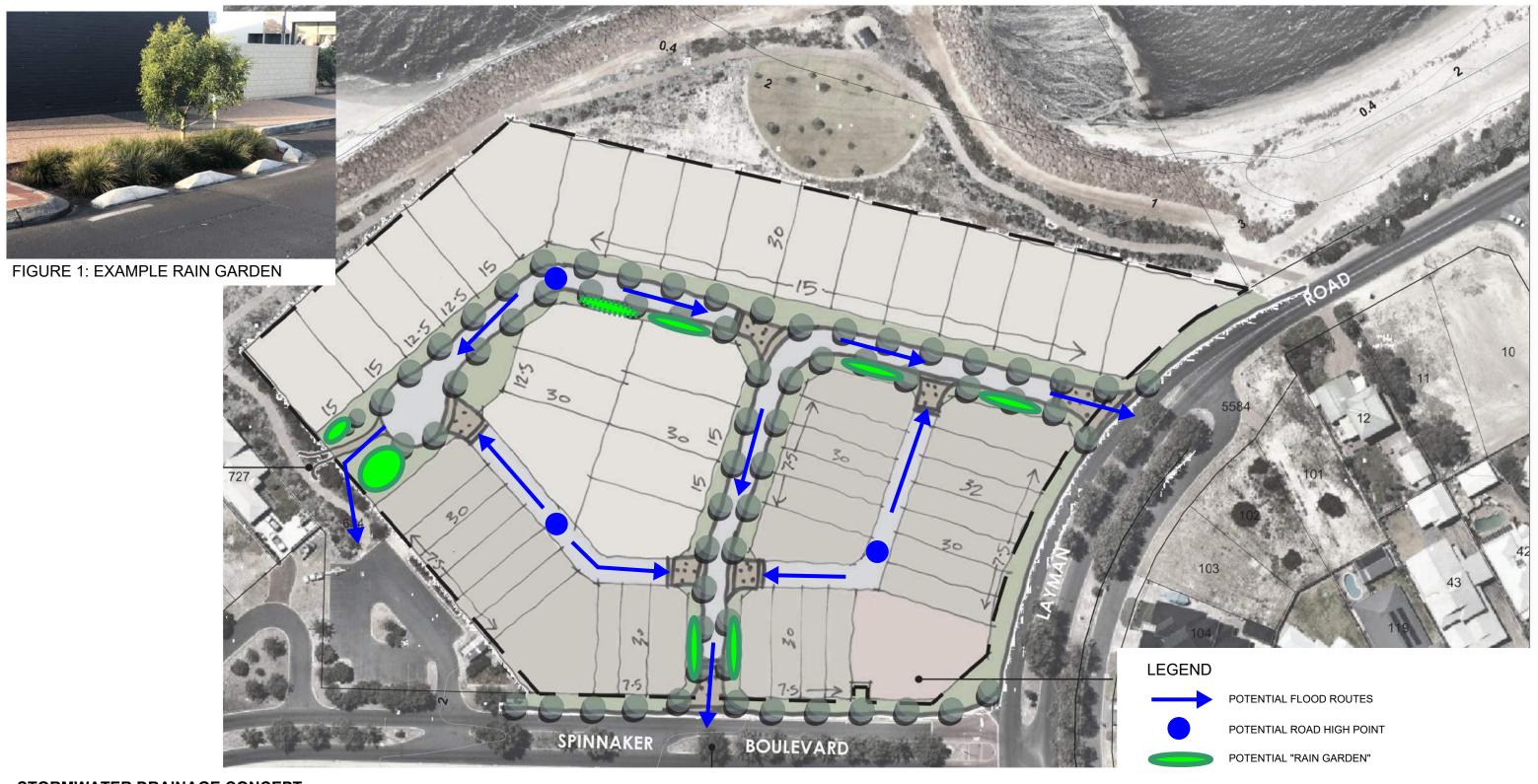


FIGURE 1: EXAMPLE RAIN GARDEN

LOT 612 SPINNAKER BOULEVARD, PORT GEOGRAPHE



STORMWATER DRAINAGE CONCEPT

Run-off from the 1EY (1yr ARI/first 15mm) storm events are proposed to be captured via a variety of proposed on-lot soakwells, roadside swale systems and rain gardens. These systems will control both the volume and quality of the first flush events being infiltrated. An example of a rain garden is pictured in Figure 1.

Run-off from the 0.2EY (5yr ARI) storm events will enter the proposed rain gardens, with excess run-off diverted into a proposed pit and pipe system. It is proposed to utilise open base soakwell pits with additional soakage devices such as "stormtech" chambers to assist with additional volume storage and infiltration.

Run-off from storm events greater than 0.2EY (10yr ARI and above) will be attenuated within drainage structures mentioned above and bypass will flow along the proposed roads as indicated below. Future detailed design will ensure that flood routing for these larger storm events will protect people and property, with proposed lot levels being a minimum 500mm above the 1% AEP flood level.

NOTES

A coastal hazard risk management report prepared for this site has concluded that a minimum development level of 3.8m AHD applies to all proposed lots within this development.

This development will therefore be, on average approximately 1m higher than surrounding roads and properties.

40254\drainage concepts

Rhys Fowler

From: Oscar Staples <Oscar.Staples@busselton.wa.gov.au>

Sent: Tuesday, 16 October 2018 11:31 AM

To: Rhys Fowler

Cc: Ronald Wildschut; Richard Martin

Subject: RE: Lots 590 & 612 Spinnaker Bvd, Port Geographe - drainage concepts

Attachments: Coastal groundwater and Climate change_final.pdf

Hi Rhys,

Following a review of the drainage concept plans for Lots 590 and 612 Spinnaker Bvd, Port Geographe as submitted on 04/10/2018 the City of Busselton confirms their agreement with what the concepts propose in general.

Please note the detailed design will need to consider the following:

- Groundwater management due to the use of retaining structures to achieve required lot fill levels, groundwater will need to be managed. The proximity of the lots to the ocean will mean that groundwater levels will be partially influenced by ocean water levels. Short term high ocean water level events may impact on groundwater levels and monitoring will be required to determine the extent to which this occurs. In addition, with sea level rise (SLR) over the planning timeframe (100 years) groundwater levels could rise by 1m. I have attached a paper from the CoastAdapt website (https://coastadapt.com.au/) that may be of use.
- The stormwater system will need to continue to function under high ocean water level events (situations where there is effectively no outflow from the stormwater system due to tide locking for the period of a high ocean water level event).
- The use of "stormtech" stormwater chambers is unlikely to assist with infiltration, as it is a detention system.
- The City does not generally and has not previously (from my knowledge) accepted the use of
 "stormtech" stormwater chambers within the road reserve. Further discussions with the City
 maintenance staff will be required to understand if this is acceptable or not. Alternative locations for the
 installation of the "stormtech" stormwater chambers not in the road reserve should also be considered

If you have any queries on any of the above, please do not hesitate to contact me.

Kind regards,

Oscar Staples

Development Control Officer p: (08) 9781 1750 m: 0418 895 933 Oscar.Staples@busselton.wa.gov.au

City of Busselton

2 Southern Drive, Busselton WA 6280 Locked Bag 1, Busselton WA 6280 p: (08) 9781 0444 www.busselton.wa.gov.au

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From: Richard Martin < richard.martin@wge.com.au>

Sent: Thursday, 4 October 2018 10:19 AM

To: Ronald Wildschut <Ronald.Wildschut@busselton.wa.gov.au>; Oscar Staples

<Oscar.Staples@busselton.wa.gov.au>

Cc: Rhys Fowler < Rhys. Fowler@wge.com.au>

Subject: Lots 590 & 612 Spinnaker Bvd, Port Geographe - drainage concepts

Morning Ronnie/Oscar. Rhys is on site and asked me to send this on his behalf....

Hi Oscar & Ronnie,

Please refer to the attached drainage concepts for Lots 590 and 612 Spinnaker Boulevard.

These concepts have been prepared as part of an engineering servicing report to support structure plans for these developments, and to demonstrate that the sites will be capable of achieving an approved drainage methodology.

We would like to get the City's agreement on these concepts for their subsequent inclusion into the report. Can you please confirm the City is in agreement with what these concepts propose. WGE do not see any issues with the proposed developments and their ability to adequately adhere to best practice.

Your earliest advice would be greatly appreciated. Any queries please let me know.

Regards,

Rhys Fowler

Civil Engineer

Wood & Grieve Engineers

D: (08) 9717 6103 | T: (08) 9754 4244

E: Rhys.Fowler@wge.com.au

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Rhys Fowler

Ross Crockett < Ross.Crockett@watercorporation.com.au> From:

Sent: Thursday, 13 September 2018 11:03 AM

To: Rhys Fowler

Subject: RE: Lots 590 & 612 Spinnaker Bvd, Port Geographe **Attachments:** Lots 590 & 612 Spinnaker Bvd, Port Geographe.pdf

Hi Rhys

Assuming that Lots are green titled (Gazetted Roads), the vacuum system can be extended to serve the proposed subdivisions.

See the attached suggested required layout for each Lot.

Regards

Ross Crockett

Development Planner **Development Services**

E: Ross.Crockett@watercorporation.com.au

T: (08) 9420 2013









W: watercorporation.com.au

From: Rhys Fowler [mailto:Rhys.Fowler@wge.com.au]

Sent: Thursday, 30 August 2018 4:28 PM

To: Land Planning

Subject: Lots 590 & 612 Spinnaker Bvd, Port Geographe

Hi,

Wood & Grieve Engineers has been engaged to investigate and prepare engineering and servicing advice to support structure plans for the proposed residential subdivisions of Lots 590 and 612 Spinnaker Bvd, Port Geographe WA 6280.

An overview of the lot locations is attached, along with preliminary concept layouts for both lots. Water Corporation's scheme planning indicates that these lots are included within the catchment of the existing vacuum WWPS shown as Busselton PS No. 12.

Does the Water Corporation foresee any issues with the proposals, extending the existing vacuum sewerage network, the capacity of the existing network/wwps, or any other issues in providing sewerage services to the proposed lots?

Regards,

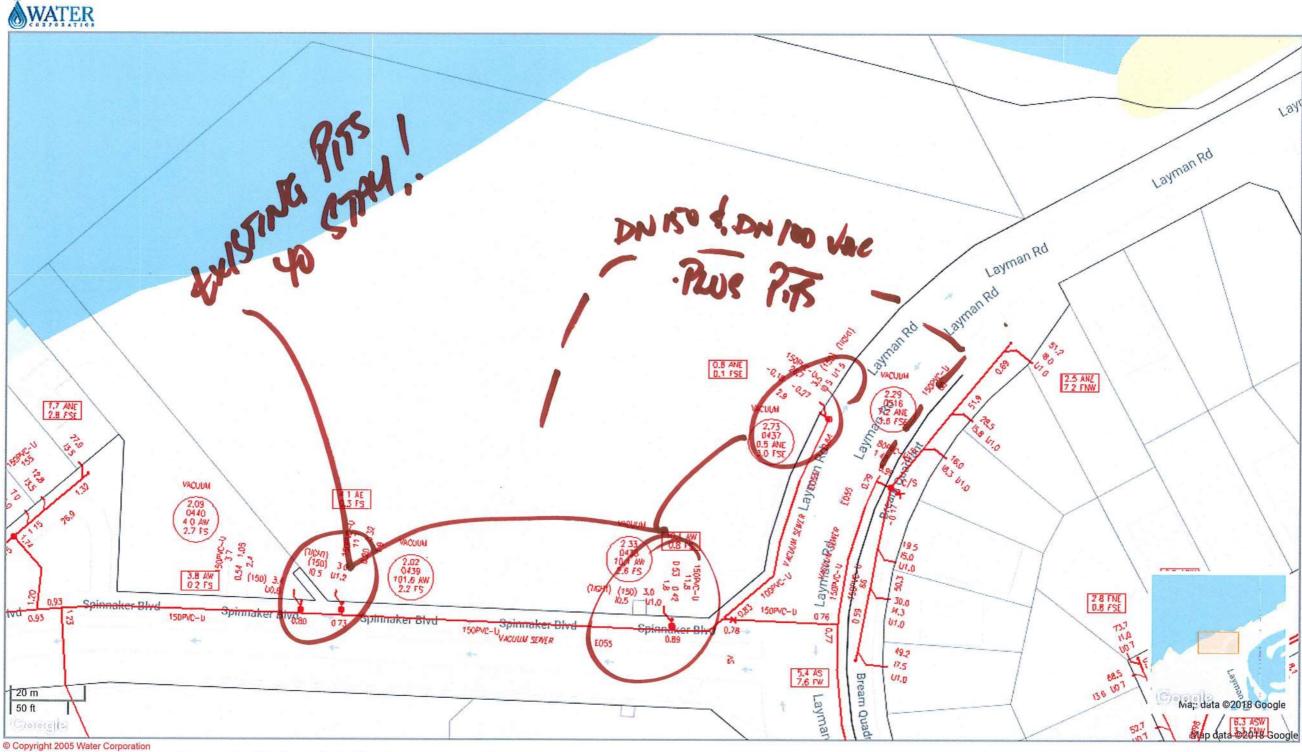


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Rhys Fowler

To: Jarrad Leaver

Subject: RE: Lots 590 & 612 Spinnaker Bvd, Port Geographe

From: Jarrad Leaver < jarrad.leaver@busseltonwater.wa.gov.au>

Sent: Friday, 31 August 2018 8:00 AM

To: Rhys Fowler < Rhys. Fowler@wge.com.au>

Subject: RE: Lots 590 & 612 Spinnaker Bvd, Port Geographe

Hi Rhys,

I see no issue with the servicing of the proposed lots as per the plans. Both areas would need to be hydraulically verified by BW once the proposal becomes a reality.

Thanks

Jarrad Leaver

Planning / Safety Officer

+61 8 9781 0516 | 0417 910 637

busseltonwater.wa.gov.au | 1 Fairbairn Road Busselton WA 6280 | PO Box 57 Busselton WA 6280



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From: Rhys Fowler [mailto:Rhys.Fowler@wge.com.au]

Sent: Thursday, 30 August 2018 4:07 PM

To: Jarrad Leaver

Subject: Lots 590 & 612 Spinnaker Bvd, Port Geographe

Hi Jarrad,

WGE has been engaged to investigate and prepare engineering and servicing advice to support structure plans for the proposed residential subdivisions of Lots 590 and 612 Spinnaker Bvd, Port Geographe.

An overview of the lot locations is attached, along with preliminary concept layouts for both lots. Dial Before You Dig enquiries indicate there are existing DN150 PVC mains adjacent both lots.

Does Busselton Water foresee any issues with the proposals, extending the existing network, the capacity of the existing network, or any other issues in providing water services to the proposed lots?

Regards,



E: Rhys.Fowler@wge.com.au

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Rhys Fowler

Subject:

RE: Lots 590 & 612 Spinnaker Bvd, Port Geographe - ES201808106

From: Trifunoski, Oliver < Oliver. Trifunoski@atcogas.com.au >

Sent: Thursday, 27 September 2018 9:41 AM **To:** Rhys Fowler <<u>Rhys.Fowler@wge.com.au</u>>

Subject: RE: Lots 590 & 612 Spinnaker Bvd, Port Geographe - ES201808106

Hi Rhys

The model has been finalised and the information is as follows:

This is in regards to checking if the network has the capacity to supply the proposed development at Lots 590 and 612 Spinnaker Bvd. By using the following assumptions:

- PEHP Busselton 2019 model.
- 100% Connection and consumption by 2020.
- Lot 590 consists of 26 domestic customers with AL8 meter.
- lot 612 consists of 51 domestic customers with AL8 meter, and 1 commercial customer with a maximum consumption of 100SCMH.

Results:

The network has the capacity to supply both lots without any reinforcement.

Based on the above assumptions, ATCO Gas does not foresee any issues with extending the existing network, or the capacity of the existing network, to supply the proposed lots.

Kind Regards

Oliver Trifunoski

Project Engineer – Engineering Services Gas, Australia

E. oliver.trifunoski@atcogas.com.au

T. +61 8 6163 5238 M. +61 437 167 109

A. 81 Prinsep Road, Jandakot, Western Australia, 6164

W. atcogas.com.au



From: Rhys Fowler [mailto:Rhys.Fowler@wge.com.au]
Sent: Wednesday, 26 September 2018 3:15 PM

To: Trifunoski, Oliver < Oliver. Trifunoski@atcogas.com.au>

Subject: RE: Lots 590 & 612 Spinnaker Bvd, Port Geographe - ES201808106

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Hi Oliver,

caution**

Are you please able to advise on the below enquiry?

Regards,

Rhys Fowler

Civil Engineer

Wood & Grieve Engineers

D: (08) 9717 6103 | T: (08) 9754 4244

E: Rhys.Fowler@wge.com.au

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From: Rhys Fowler

Sent: Wednesday, 19 September 2018 10:26 AM

To: Trifunoski, Oliver < Oliver. Trifunoski@atcogas.com.au >

Subject: RE: Lots 590 & 612 Spinnaker Bvd, Port Geographe - ES201808106

Thanks Oliver,

Do you have an ETA on this?

Cheers,

Rhys Fowler

Civil Engineer

Wood & Grieve Engineers

D: (08) 9717 6103 | T: (08) 9754 4244

E: Rhys.Fowler@wge.com.au

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From: Trifunoski, Oliver <Oliver.Trifunoski@atcogas.com.au>

Sent: Wednesday, 12 September 2018 1:38 PM **To:** Rhys Fowler <<u>Rhys.Fowler@wge.com.au</u>>

Subject: RE: Lots 590 & 612 Spinnaker Bvd, Port Geographe - ES201808106

HI Rhys

A model is being created to determine the feasibility of the proposed network extensions.

I will contact you if we require any further information.

Feel free to contact me directly if you have any questions.

Kind Regards

Oliver Trifunoski

Project Engineer – Engineering Services Gas, Australia

E. oliver.trifunoski@atcogas.com.au

T. +61 8 6163 5238 M. +61 437 167 109

A. 81 Prinsep Road, Jandakot, Western Australia, 6164

W. atcogas.com.au

From: Enquiries

Sent: Friday, 31 August 2018 11:44 AM

To: Engineering Services < Engineering.services@atcogas.com.au

Cc: Enquiries < Enquiries@atcogas.com.au >

Subject: FW: Lots 590 & 612 Spinnaker Bvd, Port Geographe - ES201808106

From: Rhys Fowler [mailto:Rhys.Fowler@wge.com.au]

Sent: Thursday, 30 August 2018 4:09 PM **To:** Enquiries < Enquiries@atcogas.com.au>

Subject: Lots 590 & 612 Spinnaker Bvd, Port Geographe

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Hi,

Wood & Grieve Engineers has been engaged to investigate and prepare engineering and servicing advice to support structure plans for the proposed residential subdivisions of Lots 590 and 612 Spinnaker Bvd, Port Geographe WA 6280.

An overview of the lot locations is attached, along with preliminary concept layouts for both lots. Dial Before You Dig enquiries indicate there is an existing DN110 PE 350kPa gas main adjacent both of these lots. DBYD Sequence numbers are 74291980 and 74291794, in case this is of assistance.

Does ATCO Gas foresee any issues with the proposals, extending the existing network, the capacity of the existing network, or any other issues in providing gas services to the proposed lots?

Regards,



Rhys Fowler
Civil Engineer
Wood & Grieve Engineers

D: (08) 9717 6103 | T: (08) 9754 4244

E: Rhys.Fowler@wge.com.au

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APPENDIX F Electrical and Communications
Services Report





Lots 590 & 612 SPINNAKER BLVD Port Geographe

Electrical Services Infrastructure Report

Prepared for:

Heath Development Company c/- CLE Town Planning & Design

Prepared by:

Sharni Millman
Project No. 40254-PER-U
P:\40254\project documentation\upd\design\power\reports\u_dr_001.docx

Date:20th September 2018

Ground Floor, 226 Adelaide Terrace, Perth WA 6000 **T:** (08) 6222 7000 **F:** (08) 6222 7100 **E:** perth@wge.com.au **W:** www.wge.com.au

Revision

REVISION	DATE	COMMENT	APPROVED BY
0	18/09/18	Preliminary	SM

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Introduction

1. Introduction

This servicing report is to provide commentary on the proposed Western Power (WPC) authority works required to facilitate the future development of a 52 lot green title development at Lot 612 Spinnaker Boulevard and the future development of a 27 lot green title development at Lot 590 Spinnaker Boulevard Port Geographe.

The extent of the lots within the development area are shown in Figure 1 from the CLE Concept plan for the area.





Figure 1: Structure Plan

The objectives of this report are to provide the following:

- Assessment of existing Western Power Infrastructure
- Establish the network augmentation requirements for power supply upgrades

This report has been prepared based on the following information:

CLE Concept Plan no: 3160-03-01, 3160-04-01 & 3160-05-01 dated 27th February 2018

Power Supply

2. Power Supply

2.1 Existing Infrastructure

An analysis of Western Powers DFIS system has been conducted in order to determine the existing power supply configuration surrounding the development. The existing Western Power network surrounding the site consists of 22kV HV & LV Distribution lines along the southern side of Spinnaker Boulevard.

Lot 612 is fed from an existing Uni Pillar which is directly adjacent to a 500kVA Transformer located on the south western portion of the lot. This Transformer appears to have 4 spare LV circuits.

Lot 590 is fed from an existing Uni Pillar on the southern portion of the lot fronting Spinnaker Blvd which is fed from an existing 630kVA Transformer located within Lot 616 Spinnaker Blvd. This Transformer appears to have 3 spare LV circuits.

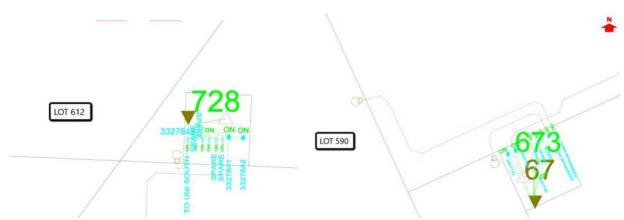


Figure 2: Existing Western Power Transmission & Distribution Assets

2.2 Western Power Methodology

Western Power's Underground Distribution Scheme (UDS) policy details that all new land developments are provided with an authority point of connection via an underground power service. New residential subdivisions within Port Geographe are provided with a minimum load allocation of 4.7kVA per single residential dwelling with Commercial lots provided with a minimum load allocation of 200kVA per hectare.

Typically, a mini pillar is provided to Green title lots strategically placed to feed 2 lots, with Commercial lots provided with a Universal Pillar. Lots with a power demand in excess of 315Amps (226kVA) require a Transformer to be installed within the subject lot.

Where Subdivision of land occurs and the Developer creates new lots then the Developer is the applicant of the Electricity Infrastructure works and pays and installs the required distribution infrastructure which is then handed over to Western Power at the completion of works.

The HV distribution system is reticulated via 22kV cables to switchgears at various points throughout the subdivision where each switchgear can feed between 2 -3 transformers per unit via a fused cable. Each transformer steps down the voltage to 415V and provides the LV distribution system to the development via low voltage cables.

This equipment is typically installed within the developed lots as an extension of road reserve, and are required to be placed 0.5mtrs above the 1 in 100 year flood level.

Power Supply

2.3 Western Power Charging Methodology

As the Developer whether creating new subdivision lots or developing an existing title is the applicant of the Electricity Infrastructure works, they pay and install the required distribution infrastructure. These works are charged at full cost for subdivisions.

Western Power will provide a quotation for the Interface works to take over ownership of the assets and connect to their network. This quote will also include a HV pool charge. This charge is currently \$261 per kVA of connected load. In addition to this charge should the development install HV equipment, there is a HV pool rebate available to offset a portion of the costs to ensure that one developer does not benefit from another developer installing HV equipment. This rebate if applicable is included within the interface quotation.

Industrial Developments that create new subdivided lots are not permitted to participate within the HV Pool and also attract a 13.9% Tax on Capital Contributions. As this development is predominately residential the Tax on Capital Contributions is not applicable in this instance.

The size of the development has no bearing on the works required, once the network is at capacity it is the respective developer's responsibility to fund the necessary network reinforcements to provide the subdivision with the necessary power as Western Power being a state operated entity currently do not have the ability to fund developer driven works.

In addition, Western Power do not reserve capacity and in the event that the infrastructure is installed to facilitate the overall development, however the load is not utilized, there is the risk that Western Power will utilize this load with other developments in the vicinity even though the Developer has pre-funded these works, and as such it's critical that the infrastructure is installed Just in time.

2.4 **Development Electrical Load**

The overall Development load was calculated based on Western Power's standard power allocation of 4.7kVA per residential lot and 200kVA per hectare for Commercial. The total power demand was calculated at approximately 477kVA and was applied to the lots as follows:

Site	Usage	No of	Load
		Dwellings	(kVA)
Lot 612	Residential – Green title	51	239.7
Lot 612	Commercial	1	20
Lot 590	Residential – Green title	26	122.2
Lot 590	Commercial – New	1	20
Lot 590	Commercial – Existing Short stay*	1	75
	Total	79 new	476.9

^{*}Existing short stay load has been assumed

2.5 **Initial Conceptual Solutions**

Based on the current maximum yields provided above and on the basis Standard Residential dwellings will be constructed, we have estimated the maximum demand load to be as follows:

- Lot 612 51 Residential lots & 1 x Commercial lot 260kVA
- Lot 590 26 Residential lots & 1 x Commercial lot 213kVA + the existing load for the short stay accommodation is to be maintained.

A feasibility study application was placed with Western Power, requesting confirmation that the existing network in the vicinity has the capacity to support the proposed development. Western Power responded (refer appendix A) confirming that a desktop

Power Supply

study had indicated that there was sufficient capacity in the adjacent network preventing any immediate need for network augmentation works.

Lot 612

Based on the above advice received from WPC the existing 500kVA Transformer located on the South Eastern side of the proposed development has the capacity to take on this development load and LV cables can be extended to pillars within the respective development as required.

The existing Substation site sits as an extension of road reserve and therefore does not encumber the proposed development. The only consideration is to ensure compliance with both noise and fire regulations in relation to the position of the existing Transformer. A minimum of 6mtrs separation from a habitable space for noise and 3mtrs from a residential boundary for fire and 6mtrs for Commercial will need to be maintained.

Lot 590

The existing 630kVA Transformer located within the lot to the east of the site at #63 Spinnaker Blvd has the capacity to take on this development and LV cables can be extended to pillars within the development as required.

The substation site achieves the minimum set back distances from the lot boundary for both fire and noise compliance.

2.6 Conclusion

Based on the response received from Western Power on the 17th September 2018 in regards to the feasibility study application the existing HV network within the immediate vicinity of the development has the spare capacity to take on the proposed developments.

Due to the Dynamic nature of Western powers network, the above conclusion is indicative only. Network connection points referenced within this report may differ when DIP applications are placed.

Communications

Communications 3.

The proposed development appears to be within an area that has NBN Co services available.

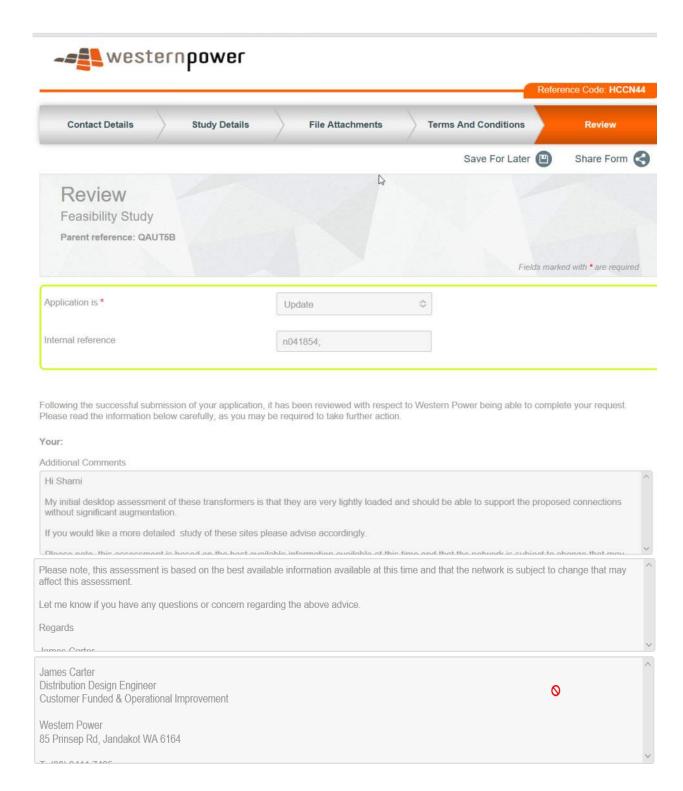
Developers are required to install and fund a pit and pipe system to NBN requirements and then transfer ownership of the Infrastructure to NBN via the execution of a Master Developers agreement in exchange for the provision of data infrastructure within that pit and pipe.

A pit and pipe system is extended within the communications corridor inside the development area with communications pits strategically located to enable the connection of two lots from one pit. This pit and pipe system can be designed and installed at the same time as the other services to NBN specifications and handed over to NBN to reticulate their cabling as required.

There will be an NBN deployment charge applicable of \$600 per lot.

Appendix 1 – Response to Feasibility application

Appendix 1 – Response to Feasibility application



APPENDIX G Coastal Hazard Risk Management Report and Correspondence

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K1577, Report R1078 Rev 0 Record of Document Revisions

Rev	Purpose of Document	Prepared	Reviewed	Approved	Date
А	Draft for MRA & Client review	C Doak	T Hunt	C Doak	17.8.18
0	Issued for Client use	C Doak	T Hunt	C Doak	22.8.18

Form 035 18/06/2013

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1. Introduction

Lot 590 and Lot 612 Spinnaker Boulevard are coastal lots within the Port Geographe development precinct (refer Figure 1.1). Both of these lots are owned by Heath Development Company, who is seeking to progress development planning for the proposed subdivision of both Lots.

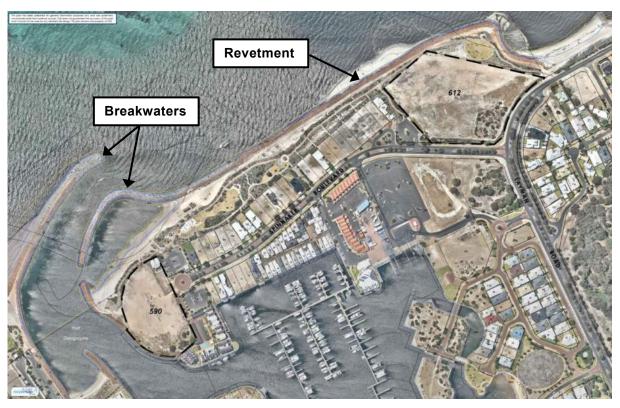


Figure 1.1 Location Plan

Given the proximity of both lots to the coastline, development planning requires consideration of coastal hazard risks in accordance with the requirements of State Planning Policy 2.6 – the State Coastal Planning Policy (SPP2.6; WAPC 2013).

1.1 Approach to Coastal Hazard Risk Management

SPP2.6 presents a hierarchy for coastal hazard risk management which is primarily focused on promoting future flexibility for coastal managers. However, for the Port Geographe precinct, which underwent a major State Government funded coastal protection structure reconfiguration in 2014, the development approach has been to protect the broader development precinct. Lots 590 and 612 benefit from this protection. Consequently, the standard requirements of coastal hazard risk management and adaptation planning outlined within SPP2.6 do not apply to the development of these Lots. Instead, development planning needs only consider the avoidance of coastal hazards that could directly impact the sites despite the presence of the coastal protection structures.

This means that coastal hazards associated with wave overtopping of the coastal structures and inundation of the site need to be considered. Coastal erosion hazards do not need to be considered given the protection structures mitigate any associated risks.

This report provides details regarding potential overtopping levels and required development levels for the site.

2. Wave Overtopping Hazards

Wave overtopping occurs when waves impact or run-up a structure, resulting in a volume of water passing over (overtopping) the crest. Wave overtopping can be in the form of sheet flow, where waves run-up over the crest and result in what is known as 'green water' impacting the adjacent area. Alternatively, wave overtopping can be in the form of splash from waves breaking on the seaward face of the structure (often termed 'white water'). This splash can be carried over the structure by momentum or as a result of onshore winds. Volumes of overtopping associated with run-up over the crest of a structure are generally more problematic than overtopping caused by breaking waves, however both can be significant with respect to safety of people and property.

Design of the reconfigured coastal structures at Port Geographe was completed by WorleyParsons and is described in their design report (WorleyParsons, 2014). In accordance with sound engineering practices, the design of the structures included assessment of wave overtopping rates based on both the most advanced literature available, as well as from the results of physical model testing.

Appropriately, the crest design of the structures was completed based on guideline overtopping limits presented in EurOtop20 (2007), which represented the best available information for use in the design process. The crest design included consideration of overtopping rates to ensure no damage to the structures as a result of wave overtopping during the 100 year Average Recurrence Interval (ARI) design event, whilst also preserving the safety of pedestrians during conditions experienced relatively frequently (the 1 year ARI event). Furthermore, an additional assessment was also completed adjacent to Lot 612 to ensure the overtopping rates were sufficiently low to limit the potential for damage to building elements along the coastal boundary of the Lot. Relevant acceptable limits of wave overtopping are presented in Table 2.1, as recommended in EurOtop and referenced by WorleyParsons. Outcomes of the design are described further below.

Table 2.1 Acceptable Wave Overtopping Limits for Different Scenarios

Hazard Type and Reason	Relevant Design Event for Overtopping Level to be Achieved	Acceptable Mean Overtopping Discharge (l/s/m)
Damage to grassed or lightly protected promenade or reclamation cover for Revetment Seawalls	100 year ARI	50
Damage to Building Structural Elements	100 year ARI	1
Aware pedestrian, clear view of the sea, not easily upset or frightened, able to tolerate getting wet, wider walkway	1 year ARI	0.1

2.1 Wave Overtopping - Lot 590

Lot 590 is afforded protection from both the outer breakwater and the inner breakwater surrounding the lagoon. Within the design report these were termed the western breakwater and eastern breakwater respectively, as shown in Figure 2.1.

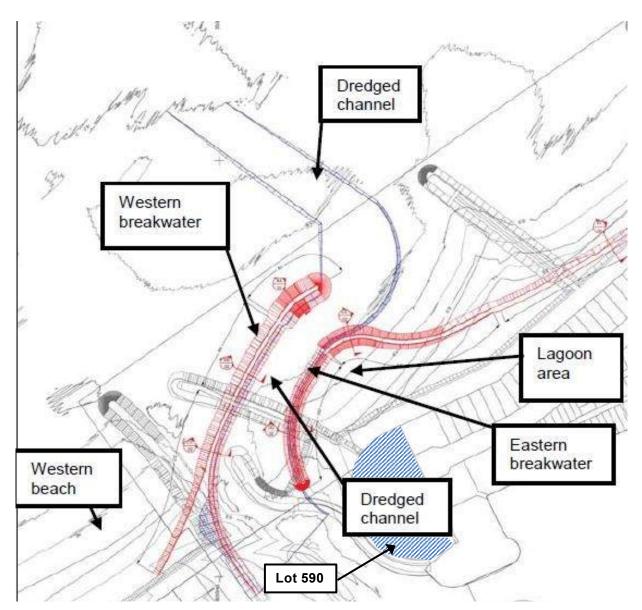


Figure 2.1 Structure Naming Convention Adopted within the WorleyParsons Design Report (WorleyParsons 2014)

Given the level of protection that is received from the Western Breakwater, WorleyParsons note that the only overtopping risk that exists along the Eastern Breakwater is for the exposed section near the entrance. A calculation of the potential overtopping rate for this section was completed and suggests that the overtopping rate at the crest of the eastern breakwater is approximately 6.5 l/s/m during the 100 year design event. However, Lot 590 is more than 100 m from the crest of the eastern breakwater, therefore the extent of overtopping at the site would be negligible and certainly not a risk to safety or property.

2.2 Wave Overtopping – Lot 612

The design for the revetment section fronting Lot 612 was completed primarily to focus on the stability of the structures themselves, as well as the safety of pedestrians immediately behind the structure. Overtopping levels were calculated using EurOtop guidelines and were also tested using a physical model. Results showed that the stability and public safety criteria were acceptable (100 year ARI event – 49.6 l/s/m calculated and 17.3 l/s/m in the physical model; and

1 year ARI event – 0.6 l/s/m calculated and 0.06 l/s/m in the physical model), however a further item was identified which required clarification.

The close proximity of the northern boundary of Lot 612 with the proposed structure presented a challenge in terms or ensuring that the reconfigured structure did not adversely impact the development potential of the lot due to wave overtopping volumes. Therefore an assessment was completed by WorleyParsons to determine the appropriate design response to ensure that Lot 612 could be developed in full without risk of damage to any buildings constructed on the Lot.



Figure 2.2 Northern Boundary of Lot 612 where Design Crest Elevation was Raised

To overcome this issue a new section design was completed for the structure to locally reduce the overtopping rates. This revised section (Section J1 as shown in the design drawings in Appendix A) incorporated a crest height 0.5 m higher than the surrounding structure. The results of this change are discussed in the following excerpt from the WorleyParsons report.

Excerpt from WorleyParsons Report

Section J1 features a raised crest to +5.1mCD in order to reduce overtopping rates. The rear of the crest is situated 5m (rather than 10m) away from the Lot 612 boundary.

This modified Section J1 was tested in the flume at MHL. 100-year overtopping rates were measured at the rear of the crest and 5m landward of the crest. Table 7-7 below presents the results of the measurements. As seen in this table, the 0.5m raise in crest elevation brings the modified Section J1 into compliance with the building elements overtopping criteria a the property boundary.

Table 7-7 Overtopping measurements for modified Section J1

Section	Criterion		Water Level * ¹ [m +CD]	Crest Level [m +CD]	H _s [m]	q [l/s/m]	Criterion Passed
Section J1 (5m from crest)	Building elements	≤1 l/s/m	2.9	5.1	2.5	0.1	Yes

^{*1} water levels include 0.3m sea level rise

As stated within the above excerpt, the revised Section J1 meets the relevant overtopping criterion. Therefore, based on these results, Lot 12 can be safely developed in its entirety without any additional setback to account for wave overtopping issues.

3. Coastal Inundation Hazards

SPP2.6 outlines that development within the coastal zone should avoid risks associated with inundation resulting from an event with a "0.2 percent or one-in-five hundred probability of being equalled or exceeded in any given year over the planning time frame". Despite not being in a region that is commonly impacted by cyclones, the severity of the required design event described above means that the impact of cyclones needs to be considered.

The report *Design Storms for Western Australian Coastal Planning – Tropical Cyclones* (Seashore Engineering 2018) was prepared for the Department of Transport to "provide a preliminary estimate of inundation levels for selected town sites". The report acknowledges that the estimated development levels are "deliberately conservative" and that for "more detailed analysis of coastal hazard, it is recommended to undertake site specific inundation modelling, either through the application of design storms, or more comprehensive methods, such as Monte Carlobased simulation of a synthetic storm database".

The Seashore Engineering (2018) report conservatively estimates the 500 year Average Recurrence Interval (ARI) inundation level for Busselton to be 2.9 mAHD. It is also noted that additional allowance is required in situations where wave run-up may be enhanced due to the installation of revetments or seawalls. However, as outlined in Section 3, the design of the reconfigured coastal structures by WorleyParsons set the crest heights of the structures high enough that wave run-up over the structures would not be an issue. This is illustrated by the overtopping rates meeting the relevant design criteria in all locations.

Nevertheless, whilst the 2.9mAHD inundation level does not need to be increased to account for the impacts of wave run-up, the level does need to be increased to account for the potential extent of sea level rise over a 100 year planning horizon. SPP2.6 outlines that a 0.9 m allowance needs to be included for sea level rise over the coming century. Therefore, in the absence of further more detailed investigations, a **development level of 3.8 mAHD** is required to avoid coastal inundation risks on both lots over a 100 year planning horizon.

4. Conclusion

The reconfiguration of the Port Geographe coastal structures provides protection to the overall Port Geographe development precinct. As a result, the majority of risks typically posed by coastal hazards no longer need to be considered when contemplating development of coastal land areas that are protected by these structures.

The design for the reconfiguration of the coastal structures considered the potential impacts of wave overtopping from the perspective of structural stability, pedestrian safety and avoidance of damage to building structures located on adjacent freehold lots. As a result of this design process, the overtopping levels on Lots 590 and 612 Spinnaker Boulevard do not impose any restrictions on development.

Whilst the structures provide protection against wave overtopping, which includes wave run-up, the elevation of the proposed development still needs to be high enough to avoid risks posed by severe inundation events. In the absence of detailed modelling, a conservative estimate of the inundation level determined by Seashore Engineering has been used. Based on the Seashore Engineering estimates, development of Lots 590 and 612 will need to be located at or above 3.8 mAHD.

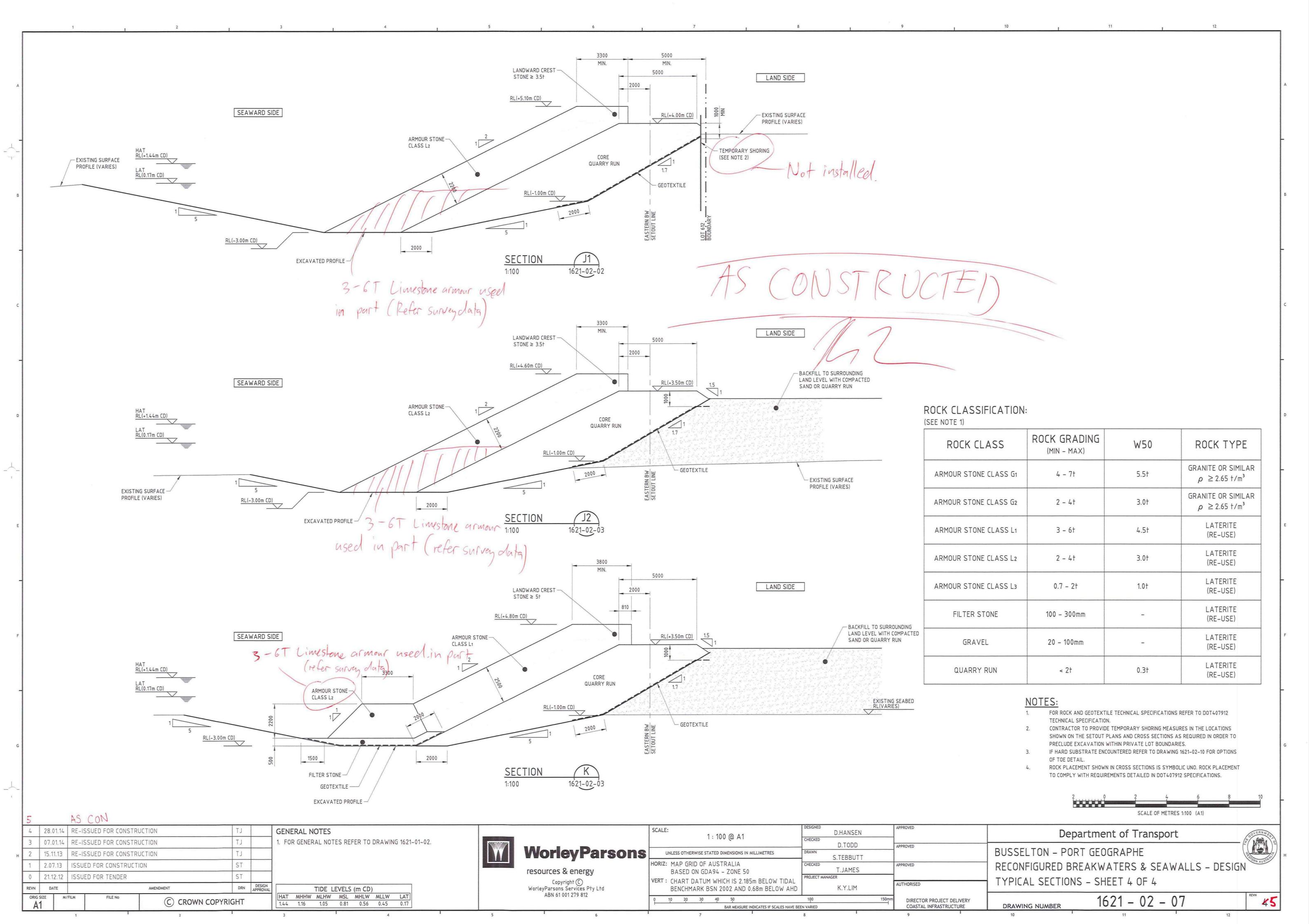
5. References

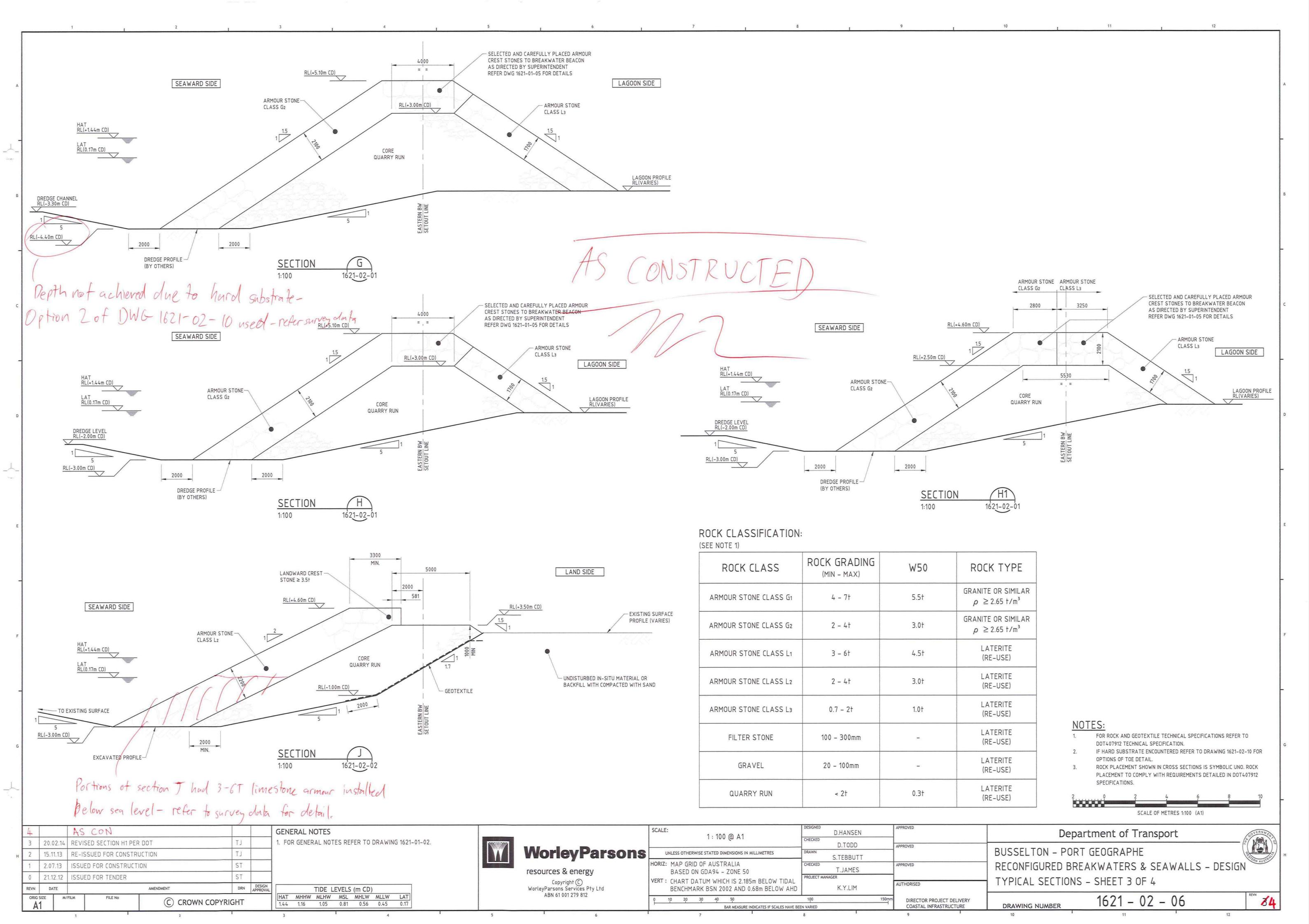
- EurOtop, 2007. Wave Overtopping of Sea Defences and Related Structures: Assessment Manual.
- Seashore Engineering, 2018. *Design Storms for Western Australian Coastal Planning Tropical Cyclones*. Seashore Engineering Report SE015-01 prepared for the Department of Transport.
- WAPC, 2013. State Planning Policy 2.6: State Coastal Planning Policy. Government of Western Australia.
- WorleyParsons, 2014. *Port Geographe Reconfiguration of Coastal Structures IFC Design Report*. Report 301012-01577-CS-REP-003 prepared for the Department of Transport.

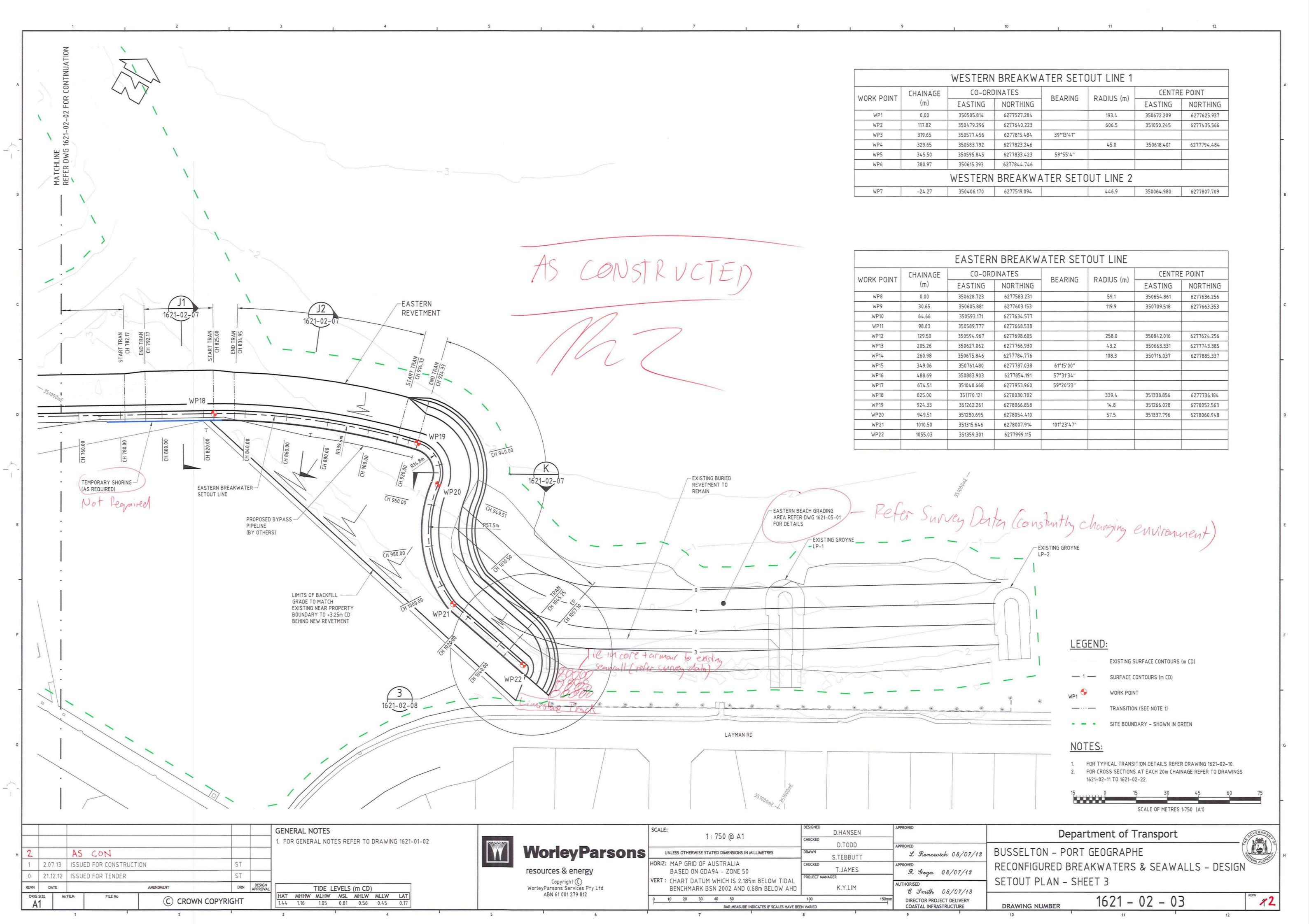
6. Appendices

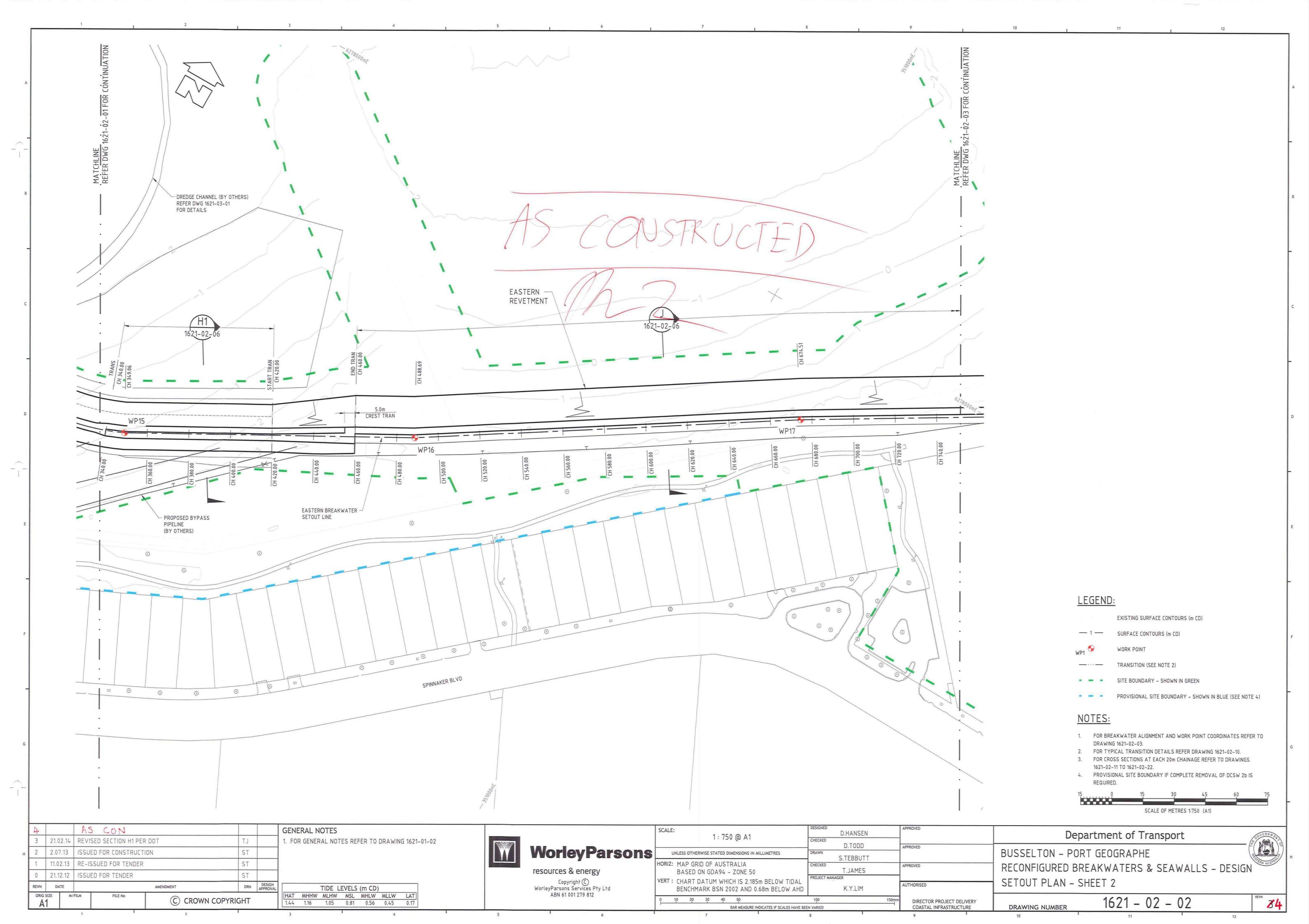
Appendix A As-Constructed Drawings

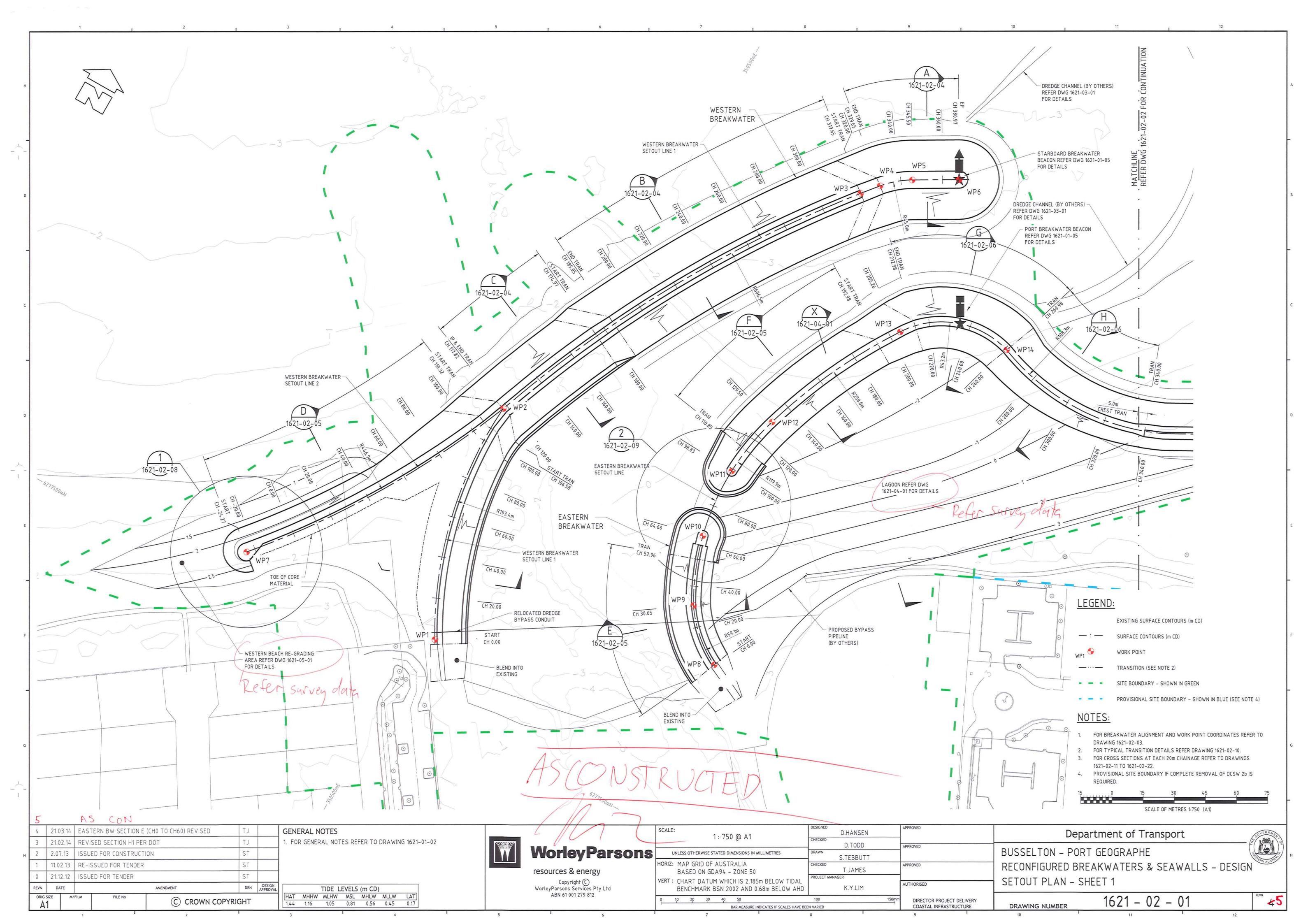
Appendix A As-Constructed Drawings

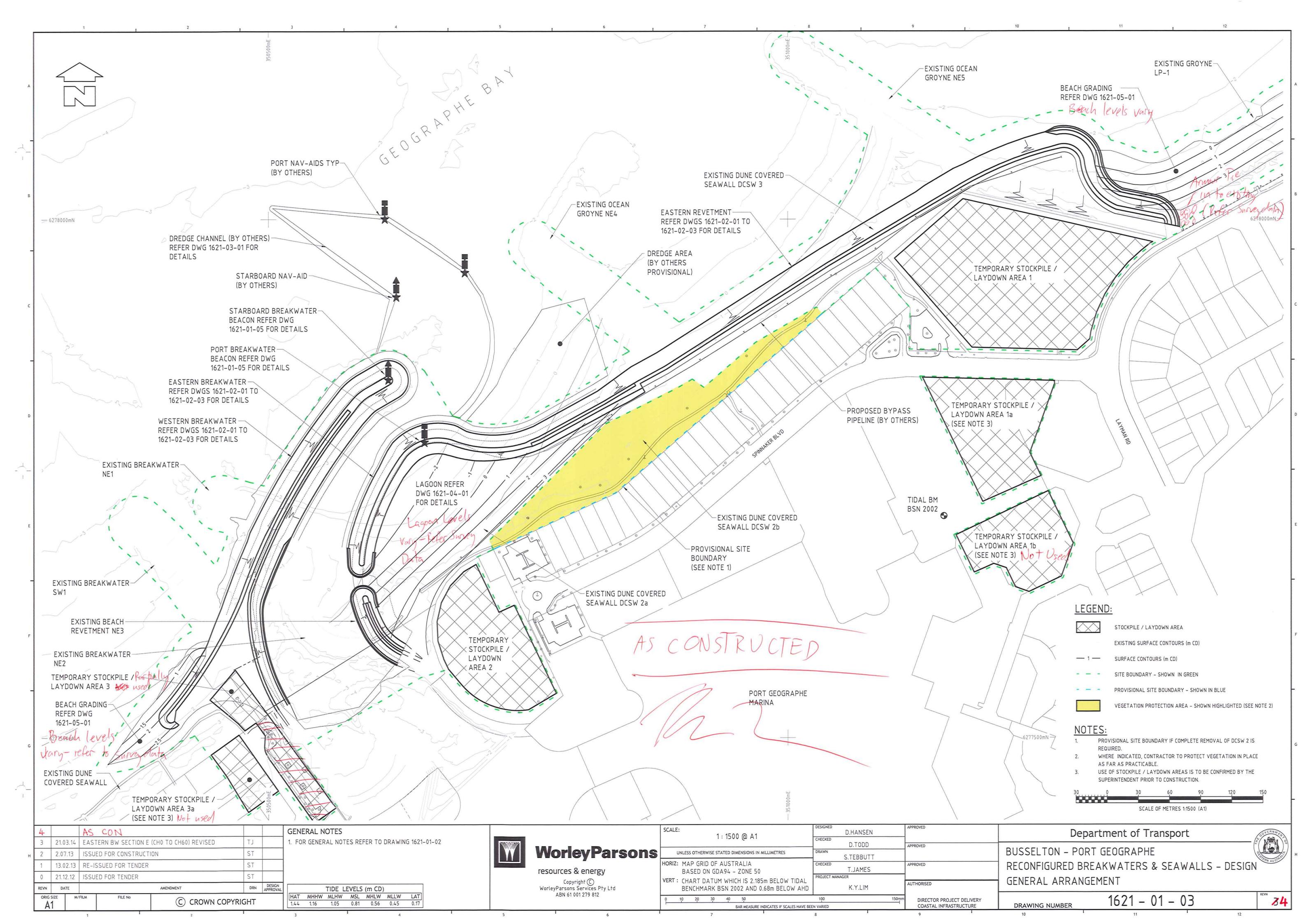












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