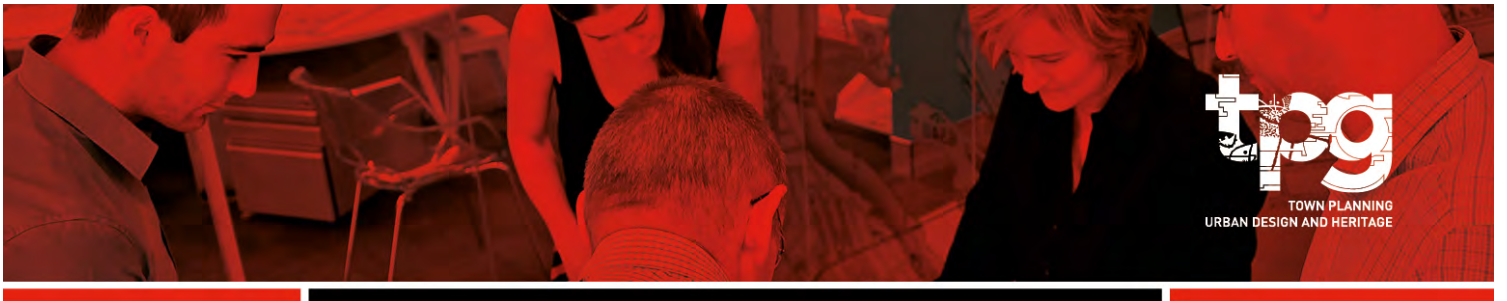


A.1 Community Engagement Plan



City of Greater Geraldton

Geraldton Coastal Hazard Risk Management and Adaptation Plan (CHRMAP)

Community and Stakeholder Engagement Strategy

September 2017

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1. Introduction

The Project Consultant Team, Baird Australia (Baird), TPG+ Place Match (TPG) and Rhelm has been appointed by the City of Greater Geraldton ('The City') to undertake a Coastal Hazard Risk Management and Adaptation Plan (CHRMAP) for Geraldton.

This Community and Stakeholder Engagement Strategy (CSES) seeks to ensure that the community and stakeholders are actively and effectively engaged throughout the CHRMAP process.

The purpose of this CSES is to:

- Provide an understanding of the purpose and intent of the CHRMAP;
- Define the project structure, key roles and responsibilities of the Consultant Team and the City along with communication protocols;
- Establish guiding communication and engagement objectives;
- Identify key project stakeholders;
- Establish an appropriate community engagement approach, tools and techniques;
- Outline the engagement schedule;
- Identify project and engagement risks and provide management approaches; and
- Establish a feedback mechanism.

The CSES has been presented to the Project Steering Committee for consideration prior to commencing the community engagement process.

2. Project Background and Scope

The City of Greater Geraldton is facing the adverse impacts of coastal erosion and inundation on their coastlines. The vulnerability of land use and development within the coastal zone from physical process hazards is expected to increase in the future. Whilst the scientific community has established that human-induced climate change is occurring, uncertainty remains about the magnitude and extent of the impacts. Despite the uncertainty, consideration of coastal hazards and the adaptation management of appropriate planning responses can provide economic, environmental and social benefits.

The City of Greater Geraldton has recently completed a suite of Coastal Inundation and Processes Allowances Studies for the developed coastal zone between Cape Burney and Drummond Cove, Geraldton (refer to Figure 1) which indicates that portions of the coastline are at risk from inundation and erosion coastal hazards over a 100-year planning timeframe. In accordance with State Planning Policy 2.6 – State Coastal Planning Policy (SPP2.6), areas at risk of being affected by coastal hazards require a CHRMAP to address coastal hazard.

The CHRMAP will be developed in consultation with community members and a range of stakeholders and in accordance with SPP2.6 requirements, WAPC guidelines and relevant Australian Standards (AS5334-2013). At the completion of the project the CHRMAP will guide investment decisions by the City in terms of the location and maintenance of coastal infrastructure, and provide guidance for the development of statutory planning controls.

The below engagement approach has been developed with the understanding that the community has been informed of the outcomes of the Coastal Inundation and Processes Allowances Studies and have an understanding of their implications. The CHRMAP preparation will inform stakeholders and community about:

- Potential risks arising from hazards in the coastal zone;
- Key coastal infrastructure and assets at risk within the coastal zone;
- Community and cultural values of the coastal zone; and
- Adaptation pathways and management options that the City and other stakeholders can pursue to address the risks from coastal hazard over time.



Figure 1: Project Extents

3. Engagement Benefits, Risks and Objectives

3.1. Engagement Benefits

Community and stakeholder engagement has a number of identifiable benefits that can be realised during the course of this project. In summary, community and stakeholder engagement:

- Encourages local communities and stakeholders to express their views;
- Fosters a sense of community cohesion;
- Enables the acquisition of local knowledge;
- Creates a mutual sense of ownership and shared responsibility for the process and the outcomes achieved;
- Has the ability to achieve outcomes that are reflective of the aspirations of the community and stakeholders;
- Can assist in producing quality outcomes that are practical, relevant and can be effectively implemented; and
- Has the ability to help manage expectations and allay fears of the unknown and possible change in circumstances.

3.2. Engagement Risks

Risk	Rating	Mitigation/Management Strategy
<u>Low participation numbers</u> Due to the technical nature of the subject matter some community members may be dissuaded from participating.	Moderate	<ul style="list-style-type: none"> • Project team to ensure that the promotional material and all project communications are easy to understand and strategically planned/managed, to reach all interested parties. • Project team to leverage existing local stakeholder networks to 'spread the word' regarding all the engagement opportunities.
<u>Poor quality engagement outputs</u> Due to the technical nature of the subject matter, community responses to the questions may not be of a high enough quality to inform the CHRMAP.	Low	The communication of clear and easily understood information is key to receiving high quality engagement outputs. This will be achieved through the clear project communications and carefully crafted workshop presentations/exercises and survey questions.
<u>Community cynicism in the process</u> We are aware that the community has already been engaged regarding these coastal issues, therefore there is a risk of burn-out, cynicism and over-consultation in the community.	Moderate	<ul style="list-style-type: none"> • Project team to be explicit about the fact that community feedback will inform future coastal planning decisions. • TPG will work with the City's community engagement team to ensure that the engagement sessions work cohesively with other active engagement processes.

<p><u>Lack of Support for Recommendations</u> Due to the complex nature of the project, it is a real risk that one or more stakeholder group may not support the recommendations of the CHRMAP. If this occurs it may be difficult to implement the recommendations.</p>	Moderate	Affected stakeholder groups will be included early on in the process, and throughout the process. By including community and stakeholders at strategic points in the project it will assist in managing this risk.
<p><u>Community Outrage</u> The risk of community outrage is high, particularly in areas of the coast significantly affected by the potential coastal changes. This outrage could be caused by:</p> <ul style="list-style-type: none"> • increased uncertainty surrounding the future of coastal properties; • misunderstandings (or miscommunications) between the City and community/stakeholders; or inconsistent understanding of the objectives of the project or engagement exercise. 	Moderate	<p>The extent of community outrage can be monitored through continued and open dialogue between the City and the community through:</p> <ul style="list-style-type: none"> • clear project communications; and • ease of access between relevant City officers and the community. <p>This ensures the project team can monitor community sentiment as the project progresses.</p> <p>Community outrage can be mitigated and managed through open and transparent communication. The spirit of open and clear communication that the City has already conducted through the recent coastal hazard studies will be continued into the CHRMAP process. Additionally, we would seek legal guidance regarding land ownership issues from the City's legal advisors prior to any community contact. It will be important to manage community expectations, both in their level of involvement in the project and in the realities of its outputs.</p>
Response sample group not representative of the community	Moderate	<p>Project team to ensure that the promotional material is distributed widely, to grow awareness for the project and encourage involvement from a broad cross-section of the community.</p> <p>Project team to leverage existing local stakeholder networks to 'spread the word' regarding all the engagement opportunities.</p>
Conflicting priorities from stakeholders and the community	Moderate	It will also be important to manage community and stakeholder expectations, both in their level of involvement in the project and in the realities of the outputs of the project. This will ensure that it is clear that the project team and Council have ultimate decision-making power.
The Council is currently reviewing lease agreement options for the Point Moore area. There is a risk that this process could be seen to be linked with the CHRMAP process and therefore "take over" the conversation.	Low	Engagement activities have been postponed to ensure that a Council decision regarding Point Moore's lease arrangements is made prior to the workshops commencing.

3.3. Engagement Objectives

In order to

- Identify what assets and values are at risk (natural and built); and
- Identify and assess the preferred options that reduce the impact of coastal erosion and inundation on these assets and values.

The following objectives will guide the ongoing consultation and engagement process for this project:

- Encourage the participation of everyone affected by or interested in the CHRMAP;
- Create an encouraging and supportive engagement environment;
- Ensure information regarding the CHRMAP process is easily accessible and understood;
- Foster an appreciation and understanding of varying views and needs with respect to the CHRMAP;
- Facilitate the building of social capital and functional relationships between different stakeholders;
- Ensure an open, transparent and accountable community and stakeholder engagement process is undertaken;
- Allow sufficient time to participate and engage in the CHRMAP process;
- Provide a consistent approach to community and stakeholder engagement;
- Ensure the communication and engagement expectations of the community and stakeholders are managed and guided in accordance with the CSES; and
- Provide the community with feedback, whilst respecting the privacy and confidentiality of those engaged.

These objectives form the framework around which the detailed engagement methodology is developed, as reflected in Section 7 - Communications and Engagement Actions.

3.4. What will success look like?

THE CITY:	THE STAKEHOLDERS:	THE COMMUNITY:
<p>Project stakeholders are well informed of the project including: project scope and timelines, key technical project information and opportunities to engage.</p> <p>Risks are managed and the engagement process yields high quality project outputs and builds positive relationships.</p>	<p>Affected stakeholders are well informed of the project including: project scope and timelines, key technical project information and opportunities to engage.</p> <p>Stakeholder concerns are addressed and the CHRMAP process is explained so that community expectations are managed.</p> <p>Stakeholders feel that they had the opportunity to contribute to the outputs of the project and were informed along the way.</p>	<p>Affected stakeholders are well informed of the project including: project scope and timelines, key technical project information and opportunities to engage.</p> <p>Community concerns are addressed and the CHRMAP process is explained so that community expectations are managed.</p> <p>Community felt that they had the opportunity to contribute to the outputs of the project and were informed along the way.</p>

4. Stakeholder Identification and Analysis

4.1. Stakeholder Identification

Understanding who the project stakeholders are is a critical element of any project. By understanding who these individuals and groups are it is possible to understand what degree of influence and thus involvement they will and should have as part of the project.

The key stakeholder groups have been identified in Section 4.3 below.

4.2. Stakeholder Analysis

Analysing the stakeholders is an essential part of developing an engagement plan. The following Stakeholder Matrix provides an assessment of the level of influence each group has, their recommended level of engagement and the most appropriate method to engage them with.

Stakeholder Matrix Diagram

	C	B	A
High Power	<i>Manage Closely</i>	<i>Manage Closely and Keep Satisfied</i>	<i>Keep Satisfied</i>
Medium Power	F	E	D
	<i>Monitor and Manage Closely</i>	<i>Manage Closely</i>	<i>Manage Closely and Keep Satisfied</i>
Low Power	I	H	G
	<i>Monitor (Minimum effort)</i>	<i>Monitor and Keep Informed</i>	<i>Keep Informed</i>
	Low Interest	Medium Interest	High Interest

A	High power, highly interested people: these are the people you must fully engage and make the greatest efforts to satisfy.
B	High power, medium interested people: work closely with these people to involve them and ensure they are satisfied.
C	High power, less interested people: work with these people to keep them informed and satisfied, but not so much that they become bored with your message.
D	Medium power, highly interested people: involve these people to ensure their inputs are well understood. Ensure you keep them informed throughout the process.
E	Medium power, medium interest people: again involve these people to ensure their inputs are well understood and there is opportunity for them to be heard.
F	Medium power, low interest people; consult with these people and provide opportunity to engage.
G	Low power, highly interested people: keep these people adequately informed and talk to them to ensure that no major issues are arising. These people can often be very helpful with the detail of your project.
H	Low power, medium interested people: inform these people throughout the process and encourage their engagement.
I	Low power, less interested people: again, monitor these people, but do not bore them with excessive communication.

4.3 Stakeholder Analysis

A summary of the key stakeholders is as follows:

Stakeholder	Key Area of Interest	Communication methods	Communication responsibility	Power/Interest	IAP2 Spectrum	Council Briefing Notes and Briefing Sessions	Communications of Technical Project Information	Community and Stakeholder Survey	Community and Stakeholder Workshop	Information Session	Key External Stakeholder Meetings (as required)	Project Communications / Advertising
Council	Representative of ratepayers, residents and business. Decision makers for local government areas of responsibility.	Briefing notes, council briefing sessions, council meetings.	Project Manager	A High Power/High Interest	All Levels	✓	✓	✓	✓	✓		✓
Chief Executive Officer, Executive Management Team and Project Leadership Team	Responsible to the Council on managing the administration of the local government in all areas of responsibility.	Emails and meetings as required.	Project Manager	A High Power/High Interest	Collaborate	✓	✓				✓	✓
Project Steering Committee	Project committee established by the City to shepherd the project. This group is made of key stakeholders to the project. Members of this group are identified in Section 6.	Emails and meetings as required.	Project Manager	A High Power/High Interest	Collaborate		✓		✓	✓		
State and Local Politicians	State and Local politicians with relevant Ministerial responsibilities and/or representative of local or nearby electorates.	Letters, meetings (as required).	Communications Team	A/B High Power/High to Medium Interest	Involve		✓				✓	✓
Government Departments/ Authorities/Independent Expertise Agencies	Responsible for delivery of various public services and Responsible Authority to approve the final project outputs.	Letters, meetings (as required).	Communications Team	A/B High Power/ High to Medium Interest	Involve		✓	✓	✓	✓	✓	✓
Key Utility and Infrastructure Providers	Responsible for key utilities and infrastructure in the area (such as water, power and transport).	Letters, meetings (as required).	Communications Team	D/E Medium Power/ High to Medium Interest	Involve		✓	✓	✓	✓	✓	✓
Local Education, Cultural and Community Service Providers	Key local education (schools, institutes, universities), cultural (museums, galleries, events, cultural corporations) and community service providers.	Direct mail outs and emails, web updates, Facebook updates, advertisements.	Communications Team	D/E Medium Power/ High to Medium Interest	Involve		✓	✓	✓	✓	✓	✓
Property Owners in the project area (institutions, residential and business)	Residential and business property owners who are living/working within the project area.	Direct mail outs and emails, web updates, Facebook updates, advertisements.	Communications Team	D Medium Power/High Interest	Involve		✓	✓	✓	✓	✓	✓
Residents and Lessees in the project area (institutions, residential and business)	Residents and lessees who are living/working within the project area.	Direct mail outs and emails, web updates, Facebook updates, advertisements.	Communications Team	D/E Medium Power/ High to Medium Interest	Involve		✓	✓	✓	✓		✓
Community Groups/Friends of Groups/Activist Groups	Community interest groups focused on varying issues including societies, friends of groups and associations.	Letters/emails, web updates, Facebook updates, advertisements.	Communications Team	D Medium Power/High Interest	Inform/Involve		✓	✓	✓	✓		✓
Other Key Stakeholders General Public	Various interests.	Direct mail outs, web updates, posters, advertisements.	Communications Team	H/I Low Power/Low to Medium Interest	Inform/ Involve		✓	✓	✓	✓		✓

5. Overview Approach to Communications and Engagement

The community engagement will be delivered in collaboration with the City of Greater Geraldton and in consultation with the Project Steering Committee.

5.1. Level of Engagement

The engagement process will adhere to the International Association for Public Participation (IAP2) platform and the City's Community Engagement Framework, which established five levels of engagement, including:

- **Inform** – to provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.
- **Consult** – to obtain public feedback on analysis, alternatives and/or decisions.
- **Involve** – to work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.
- **Collaborate** – to partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.
- **Empower** – to place final decision making in the hands of the public.

Level of Engagement Goal:

Although this project incorporates various levels of engagement, the most common level is:

Involve: To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered. Involving can take the form of:

- Workshops;
- Project/Strategy planning; and
- Steering Committees.

Engagement Promise:

The promise to the public is: 'We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed, and provide feedback on how public input influenced the decision.'

5.2. Engagement Methods

A variety of communication and engagement activities will be undertaken as part of the CHRMAP engagement process - please refer to Section 7 of this document for an indication of when these processes will be used (and in what order they will be employed). These activities include:

- **Council briefing notes and Councillor briefings:** Communication materials will be prepared and provided to Council by the City. Dissemination of this information will be at key milestones in the project based on the relevance of the information. Council will be briefed by the consultant team prior to public advertising at the 5 September 2017 Council Concept Forum.
- **Government department and service authority communication:** Written and/or verbal communications will be initiated by the City during the preliminary stages of the project to ensure government departments and servicing authorities are made aware of the project and its scope. Feedback on relevant opportunities and constraints will also be sought.

- **Stakeholder and Community Survey:** The City will publish and manage an online survey (utilising Survey Monkey), which will ask affected stakeholders and community members to identify the coastal assets that are most important to them. This survey will ask participants to identify environmental, social and economic assets and explore why these assets are of value.
- **Stakeholder/Community Workshops:** These workshops will take participants through a logical process of understanding the issues, the context and the technical components of the Coastal Hazard Risk Management and Adaptation Plan and encourage community and stakeholders to articulate risk tolerances and community values of coastal assets. Additionally, it will allow stakeholders to provide opportunities to contribute to the proposed management and adaptation, as well as ask questions of the assessment. A range of tools and techniques will be employed to raise awareness of these workshops including traditional and social media platforms using media releases and paid advertisements. Letters of invitation/information will be sent to stakeholders via email and regular mail. Posters/flyers will be displayed at key locations/facilities across the City region. The City website will have webpages dedicated to the project to inform and enable the community to register to take part in engagement activities and read reports on engagement results.
- **Stakeholder and Community Information Session (during Public Advertising Period):** A Community Information Session will be held in Geraldton, displaying key components of the document, including hazard mapping, the long-term adaptation pathways and other relevant information for discussion purposes. The project team will take participants through the key project outputs and be available to answer questions. The above-mentioned awareness raising tools and techniques also be employed to raise awareness of the feedback form process.
- **Stakeholder and Community Feedback (during Public Advertising Period):** As part of the public advertising period, feedback on the CHRMAP will be sought via the City's standard online/hard copy feedback forms. The above-mentioned awareness raising tools and techniques also be employed to raise awareness of the feedback process.

6. Project Communications

6.1. Internal Communications (Project Team)

The following is a list of individuals who comprise the core project team, being the key members of the City's Staff and the Project Consultant Team:

Consultant Project Team

Jim Churchill (Baird) – Project Manager and Lead Coastal Hazard and Risk
Jessica Black (TPG) – Lead Community and Stakeholder Engagement Consultant
Mike Davis (TPG) – Lead Strategic and Statutory Planner
Cath Blake-Powell (TPG) – Stakeholder Engagement Director
Leo Drynan (Rhelm) – Economic Assessment of Adaptation Options
Rhys Thompson (Rhelm) – Economic Assessment of Adaptation Options

City Project Team

Mike Dufour – Acting Manager Engineering Services
Janell Kopplhuber – Communications Officer – Engagement
Executive Management Team
City of Greater Geraldton Council

Project Steering Committee

City of Geraldton representatives (as above)
Ben Bassett – Department of Planning Lands and Heritage
Fangjun Li – Department of Transport
Jamie Cossman – Department of Planning Lands and Heritage
James Duggie – Department of Water and Environmental Regulation
Paul Blundell – Mid West Ports Authority
Mic Payne – Northern Agricultural Catchments Council
Mark Reid – Community Rep, Batavia Coast Network
Mark Canny – Community Rep, Batavia Coast Network

Day-to-day contact regarding the community engagement approach shall be between the Principal Points of Contact:

City of Greater Geraldton: Janell Kopplhuber - Communications Officer – Engagement

TPG: Jessica Black – Lead Community and Stakeholder Engagement Consultant

Mike Dufour (City of Greater Geraldton) and Jim Churchill (Baird Australia) – Project Managers shall be kept informed throughout the project.

Communications between and requests of the City and Project Consultant Team are to be acknowledged and responded to in a timely manner to ensure project timeframes are met.

6.2. External Communications

External project communications are to be controlled through the City and all information produced by the Project Consultant Team shall be distributed by such person, unless otherwise required/agreed.

It is anticipated that the project team will work with the City's Team to prepare the material; TPG shall provide a graphic template for communications (and advice regarding the content) and the City Team shall be responsible for the compilation of this material. The City will be responsible for circulation, via the City's website, social media and/or hard copy distribution.

The following “Communications and Engagement Actions” table also identifies how often general communications and engagement will occur (refer to Section 7).

Key Project Messages – Communications

Communication will form an integral component of this project. The use of readily accessible wording and material preparation for all communication mediums will aim to maximise access and understanding of the project as a whole, key issues and recommendations.

The following outlines the key project messages that will need to be reinforced throughout the project when preparing all communication materials:

1. The City of Greater Geraldton has recently completed studies to examine the potential impacts to its coastal areas over the next 100 years resulting from coastal erosion and coastal inundation: [click here for further details](#). Coastal erosion and inundation of low-lying coastal areas is already impacting sections of our coast, and under projected climate change and sea level rise scenarios these impacts will likely increase in the future.
2. The City is now preparing a Coastal Hazard Risk Management Adaptation Plan (CHRMAP), which will translate scientific coastal analysis (and local community input) into a document that will provide guidance for the development of statutory planning controls and guide investment decisions into the future.
3. We invite you to be part of the process to help identify what makes our coastline special and to examine options to manage coastal hazard risks and plan for its future.
4. There will be a number of opportunities for the community and stakeholders to have their say throughout the CHRMAP process. Community and stakeholder involvement will be sought to:
 - identify key coastal infrastructure/assets that hold community, cultural, and environmental value;
 - describe tolerances to the identified coastal hazard risks; and
 - provide feedback to (and identifying additional) proposed adaptation options to address the risks.
5. Adaptation pathways to be considered by the City will include an assessment of all the options set out in the coastal hazard risk and adaptation planning hierarchy in State Planning Policy 2.6, including:
 - ‘Avoidance’ - Avoid the presence of new development within an area identified to be affected by coastal hazards.
 - ‘Planned or Managed Retreat’ - the relocation or removal of assets within an area identified as likely to be subject to intolerable risk of damage from coastal hazards over the planning time frame.
 - ‘Accommodation’ – design and/or management strategies that render the risks from the identified coastal hazards acceptable.
 - ‘Protection’ - areas where there is a need to preserve the foreshore reserve, public access and public safety, property and infrastructure that is not expendable.
6. Please register your details here: [click here](#) to be kept up-to-date with the project and how to get involved. You can also watch the City’s website and Facebook page for project updates: www.cgg.wa.gov.au.
7. Want to know more? Please contact the Community Engagement Officer, Janell Kopplhuber at the City on 9956 6600 or janellk@cgg.wa.gov.au.

7. Communications and Engagement Actions

Key Tasks	Detailed Description	Indicative Date (may change)	Responsibility	Target Audience	
Component 1 – Establish the Context					
Task 1 – Inception Meeting					
1.1	Project Inception	Meet with the City's Project Team to discuss and clarify project scope of works, including scope of community engagement.	08 th June 2017	All	Project Team
1.2	Stakeholder Identification	Prepare a detailed stakeholder list in conjunction with the City.	Ongoing – updated as the project progresses.	The City – to supply key contacts list TPG – to review and work with the City to determine levels of anticipated involvement in the project.	NA
Task 2 – Identifying Coastal Assets					
2.1	Identify and classify assets (including social, environmental and economic) within each of the units				
2.2	Produce GIS database for mapping by unit				
Task 3 – Prepare Community and Stakeholder Engagement Strategy					
3.1	Draft Community and Stakeholder Engagement Strategy	Following the identification of all relevant stakeholders, prepare a draft Community and Stakeholder Engagement Strategy for review by the Project Steering Committee.	14 th July 2017	TPG (in consultation with the City)	Project Steering Committee
3.2	Community and Stakeholder Engagement Strategy Review	Project Steering Committee to review and provide feedback on the draft Community and Stakeholder Engagement Strategy.	28 th July 2017	Project Steering Committee	Project Team
3.3	Finalise Community and Stakeholder Engagement Strategy	Finalise Community and Stakeholder Engagement Strategy, in response to feedback.	11 th August 2017	TPG (in consultation with the City)	Project Team
Task 4 – Community Values Assessment					
4.1	Council Briefing	City Officers to provide a briefing to Council, informing of the proposed project and engagement process.	TBC – to be scheduled before Communications Launch	The City	Council
4.2	Project Communications and Advertising	<p>Preparation of CHRMAP communications and advertising including:</p> <ul style="list-style-type: none"> • Prepare Frequently Asked Questions (FAQs) for public information, which shall address: <ul style="list-style-type: none"> ○ What are coastal erosion and inundation studies? ○ What is the City of Greater Geraldton Coastal Hazard Risk Management Adaptation Plan (CHRMAP)? ○ Why is the CHRMAP being undertaken? ○ Why is the CHRMAP being undertaken now? ○ Who is preparing the CHRMAP? ○ What will the CHRMAP do? ○ How will my property be affected? ○ How will this affect my insurance? ○ When is the plan being prepared? ○ How can I be involved? ○ Where can you get information on the project? • Prepare letters to inform community and key stakeholders (identified in Stakeholder Analysis) of their opportunity to contribute to the project. Provide workshop and survey details and key (summarised) information from the FAQs; • Prepare newspaper advertisements and media releases for the workshops within local media, which shall include key event information, links to the City webpage, and requests for event RSVP; • Prepare of information flyers/posters; • Establish City contact email address (and phone number/contact name) for individuals to ask questions and register interest for the workshops; • Prepare web content, including: project scope and process, FAQs, links to workshop details (and RSVP form), survey details and City contact details (for questions etc). <p>Launch Communications and Advertising material including:</p> <ul style="list-style-type: none"> • Distribution of letters; • Advertisements within local newspapers; 	Communications Launch: Wednesday 20 th September 2017	<p>TPG – to provide key messages, review comms and provide graphics template.</p> <p>The City – to organise, print/distribute, and manage all questions and RSVPs.</p> <p>Baird – comms materials - technical information.</p>	Community and Stakeholders

		<ul style="list-style-type: none"> • Online communications (eg. Facebook); • Information flyers/posters made available at key locations such as the City's Administration Building and within public gathering places; • Launch web content; • Mail out FAQs and surveys upon request; and • Request stakeholders/steering group members promote the project via their organisation's communications tools (i.e. websites, newsletters and social media). 			
4.3	Community and Stakeholder Survey	<p>The City will publish and manage an online survey (utilising Survey Monkey), which will ask affected stakeholders and community members to identify the coastal assets that are most important to them. This survey will ask participants to identify environmental, social and economic assets and explore why these assets are of value.</p> <p>The survey will be available to anyone via the City's webpage. Additionally, affected stakeholders and known interested parties will be directly targeted. We will use the City's existing databases (from information session attendance lists etc) and the outcomes from the Geraldton Coastal Inundation and Processes Allowance Studies to identify all relevant stakeholders.</p> <p>Survey to close 8am Monday 23rd October 2017.</p>	Monday 02 nd October 2017	<p>TPG – TPG to provide survey wording.</p> <p>The City – to publish the survey on Survey Monkey and manage and collate the responses.</p> <p>Baird – review from a technical perspective.</p>	Community and stakeholders
4.4	Preparation for Workshops	<p>TPG to liaise with City Officer's on the preparation of the workshops. Tasks include:</p> <ul style="list-style-type: none"> • Book venue/s and organise catering, venues that are chosen should be easily accessible by foot and car, and are to be spaces that will feel welcoming to all cultural groups. • Event logistics and engagement materials coordinated. 	28 th August – 14 th October 2017	<p>TPG – engagement materials (inc PowerPoint).</p> <p>The City – Venue hire and catering, engagement materials (inc reviewing and contributing to the PowerPoint).</p> <p>Baird – engagement materials (inc PowerPoint).</p>	NA
4.5	Workshops Level of Engagement: Involve	<p>Facilitate 2, 3-hour workshops including "Cape Burney to West End Workshop" (Saturday morning), "Beresford to Drummond Cove Workshop" (Saturday afternoon). The proposed workshop process is as follows:</p> <ul style="list-style-type: none"> • Introductions and welcome: outline the project, objectives, process, timeframes and opportunities for the community to engage in the process. • Background Information – explain technical information with clear graphics and simple language; • Exercise 1 – COASTAL ASSETS IDENTIFICATION Table exercises in small groups: using a large aerial photograph, participants are asked to identify their valuable coastal assets in the study area. • Coastal Assets: Consequence Scale Explanation and Group Exercise • Exercise 2 – CONSEQUENCE SCALE Each table to discuss assets within table groups and the projected impact from coastal processes over the 100-year planning period for that asset. Determine the consequence for the projected impact from erosion and inundation on the asset. Participants to nominate consequence scale of identified assets. <p>Note: 1 additional workshop may be planned to address issues around the Point Moore area. This will be monitored in the lead up to the other workshops.</p> <p>* Provide printouts of FAQs and other relevant printouts (the City)</p>	Saturday 14 th October 2017	<p>TPG – workshop preparation and facilitation, workshop setup and pack down and compile engagement outputs.</p> <p>The City – catering, assist with workshop, table facilitation, workshop setup and pack down.</p> <p>Baird – presentation and workshop facilitation, workshop setup and pack down.</p>	Community and stakeholders
4.6	Community and Stakeholder Engagement Summary	Following the above, we will analyse the information gathered and summarise the key 'learnings', which will be used by the project team to inform the CHRMAP.	03 rd November 2017	<p>The City – collate and share survey outputs with TPG.</p> <p>TPG – analyse results, compile report.</p>	Project Team
4.7	Feedback to Stakeholders and Community Members	Share the outcomes of the engagement process with key stakeholders and the broader community in a timely manner. Utilise the City's website and other online and print media opportunities to ensure the feedback loop is maintained. This feedback will be provided via the City webpage, Facebook account, and/or emails.	November 2017	The City	Community and stakeholders
Task 5 - Identify Coastal Hazards to Task 14 - Prepare Monitoring and Evaluation Plan					
Task 15 – Prepare Draft CHRMAP					
15.1	Draft CHRMAP	Complete all tasks for development of CHRMAP.	09 th February 2018	Baird	City
15.2	Draft CHRMAP Review Process	Draft CHRMAP to be reviewed by City and Project Steering Group.	12 th February – 06 th April 2018	Baird	City and Project Steering Group
15.3	Draft CHRMAP to Council	Presentation of Final Draft CHRMAP to Councillors at the Council Forum.	Date to be agreed, nominally 09 th April 2018	<p>TPG – preparation and presentation.</p> <p>Baird – preparation and presentation.</p>	Council

15.4	Public Advertising Level of Engagement: Consult	City Officers to prepare public advertising including: <ul style="list-style-type: none"> • Project update and invitations to comment on proposed CHRMAP via Facebook, local media advertisements and posters/flyers at key community locations; • Written invitations to comment on proposed CHRMAP to be mailed to key stakeholders; • Webpage outlining key information, including: summary of process so far, outcomes thus far and rationales for proposed CHRMAP, CHRMAP document (published only after Council consent), links to online survey to provide feedback; and • Draft CHRMAP document to be printed and displayed at Council building (and local Library), alongside printed feedback forms (with same questions as online survey) to enable people to provide hand written feedback. 	11 th April 2018 – 18 th May 2018	The City – to carry out all advertising tasks. Including collate and summarise public advertising/community engagement responses. TPG – to provide advice.	Community and Stakeholders
15.5	Community Information Session	The City and the project team will facilitate a 1.5 hour Community Information Session in Geraldton, which will display key components of the document, including hazard mapping, the long-term adaptation pathways and other relevant information for discussion purposes. Community members will be provided with this information, as well as information on how they can provide formal feedback on the report. This community session would be attended by Jim Churchill (Project Manager, Coastal Hazard Lead) and Mike Davis (Planning Lead) from the project team to present information and answer questions.	Date to be agreed, nominally 11th April 2018	TPG – session presentation preparation, workshop setup and pack down, and presentation of planning information. The City – catering, assist with session logistics, facilitation, session setup and pack down, collation of feedback (if required). Baird – presentation and session setup and pack down.	Community and Stakeholders
15.6	Feedback to Stakeholders and Community Members	Share the outcomes of the CHRMAP with key stakeholders and the broader community in a timely manner. Utilise the City's website and other online and print media opportunities to ensure the feedback loop is maintained. This feedback will be provided via the City webpage, Facebook account, and/or emails.	July 2018	The City	Community and Stakeholders
Task 16 – Finalise CHRMAP Report					
16.1	Final CHRMAP	Following the above the project team will finalise the CHRMAP Report.	May – June 2018	The City – provide feedback on final report TPG – finalise report Baird – finalise report	City and Project Team
16.2	Feedback to Stakeholders and Community Members	Share the outcomes of the CHRMAP Report with key stakeholders and the broader community in a timely manner. Utilise the City's website and other online and print media opportunities to ensure the feedback loop is maintained. This feedback will be provided via the City webpage, Facebook account, and/or emails.	July 2018	The City	Community and Stakeholders

8. Feedback Mechanisms

Providing post-engagement feedback reassures the community that the views and concerns of participants were acknowledged and considered. It enables a greater degree of trust and cooperation to be established between the community and decision-makers. It is also important that accurate feedback be given in a timely manner and that throughout the engagement activities the community is informed of the feedback methodology.

Feedback is to be expressed clearly and logically in ways the community can easily comprehend and should include an analysis of the information and data obtained and an evaluation of the process administered. It shall be administered as and when appropriate and will be guided by Section 7 – Communication and Engagement Actions.

9. Conflict Resolution

In the event there is a conflict resolution requirement within the project the following would apply:

- as soon as identified by an individual on the project team, they shall notify the rest of the project team;
- the project team will work together to understand the origins of the conflict, identify the stakeholders involved and develop an engagement approach to minimise its effects.

A.2 Community Engagement Workshop Summary



City of
Greater Geraldton
a vibrant future



City of Greater Geraldton

Coastal Planning Community Survey Report

January 2018

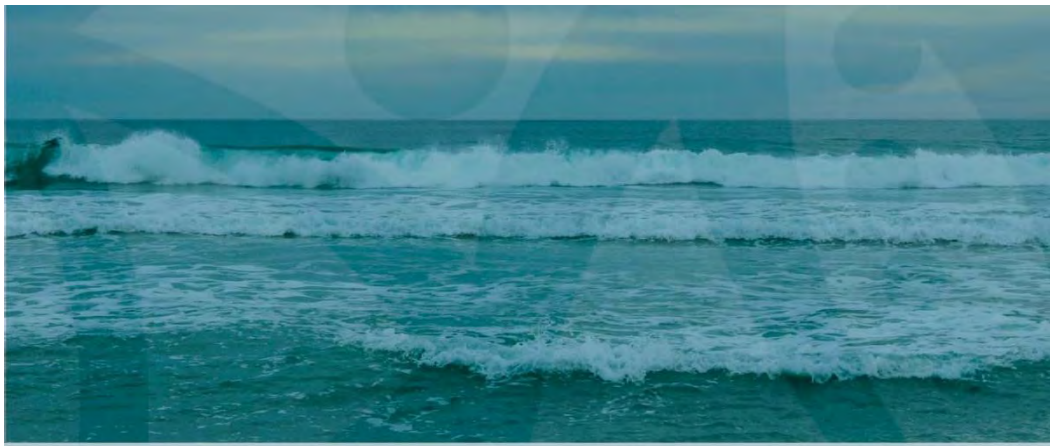


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Coastal Planning Community Survey Report

January 2018

Background

The City of Greater Geraldton is facing the adverse impacts of coastal erosion which is expected to increase due to the effects of sea level rise and climate change. The City recently completed a suite of Coastal Inundation and Processes Allowances Studies for the coastal zone between Cape Burney and Drummond Cove, which indicate that portions of the coastline are at risk from inundation and erosion over a 100-year planning timeframe. The City has since adopted the State Planning Policy 2.6 – State Coastal Planning Policy (SPP2.6) sea level rise estimate of 0.9m over the 100 year planning timeframe. The three completed studies are available on the City’s website at www.cgg.wa.gov.au and include:

- Cape Burney to Greys Beach Inundation and Coastal Processes Allowances Study;
- Point Moore Inundation and Coastal Processes Allowances Study; and
- Town Beach to Drummond Cove Inundation and Coastal Processes Allowances Study.

In accordance with SPP2.6, areas at risk of being affected by coastal hazards require a Coastal Hazard Risk Management and Adaptation Plan (CHRMAP). CHRMAPs are developed with the assistance of stakeholders and the broader community via a community engagement process.

Project Purpose

The purpose of CHRMAP is to utilize both the technical projections in the Coastal Inundation and Processes Allowances Studies and local knowledge to identify key assets and risks, and then use strategic planning, coastal engineering and economic modelling to identify adaptation pathways.

Engaging with the Community

The City and the Project consultant team developed and implemented a community and stakeholder engagement strategy in accordance with SPP2.6 requirements, which included the Coastal Planning Community Survey followed by two Coastal Planning Workshops. The Coastal Planning Community Workshops Final Report is available on the City’s website www.cgg.wa.gov.au

Engagement Promotion

The City undertook extensive promotion of the Coastal Planning Community Survey:

- More than 350 letters of invitation mailed, emailed or hand delivered to project stakeholders including:
 - Utility/infrastructure providers;
 - Federal Government agencies;
 - State Government departments and agencies;
 - Regional agencies and authorities;
 - Local organisations and agencies;
 - Education and training providers;
 - Culture/art institutions;
 - Local and State Government politicians;
 - Community/sporting groups;
 - Local property developers;
 - Landowners/businesses/residents with houses, buildings or other infrastructure located on the ocean side of coastal roads;
 - Commercial/industry/businesses located at the Port and Fisherman’s Wharf; and

- Community members who had previously engaged with the City on coastal related issues.
- Flyers hand delivered to residents/homeowners residing on the ocean side of coastal roads;
- Posters displayed at various venues across the City;
- Numerous City of Greater Geraldton Facebook posts and targeted social media advertising campaigns;
- Newspaper advertising;
- Everything Geraldton online advertising;
- City website consultation page and CHRMAP page;
- Various media releases; and
- Face-to-face invitations extended by City staff members.

Community Coastal Planning Survey

The Community Coastal Planning Survey was conducted from 2-23 October 2017. The objectives of the survey were to:

1. Identify assets the community values at risk from coastal erosion and inundation;
2. Gain a better understanding of how the community values assets which are potentially at risk; and
3. Gain an understanding of how the community rates the consequences of erosion and inundation on these assets.

Survey respondents were asked to identify up to six coastal assets, which were later classified into one or more of 12 coastal compartments, located between Cape Burney in the south and Drummond Cove in the north. They were also asked to state why the asset was significant or important to them, what the assets were used for and to classify assets as either physical/economic, natural or social/cultural. Respondents were then asked to identify the consequence erosion or inundation would have on the asset (using a scale ranging from insignificant to catastrophic), and to explain why they chose that particular consequence. Finally, survey respondents were asked to nominate their most valued asset and explain why it was so important.

Members of the community had the option of completing the survey via an online survey portal or in a hard copy format. Copies of the survey were available at the Civic Centre and Geraldton Regional Library.

Survey Results

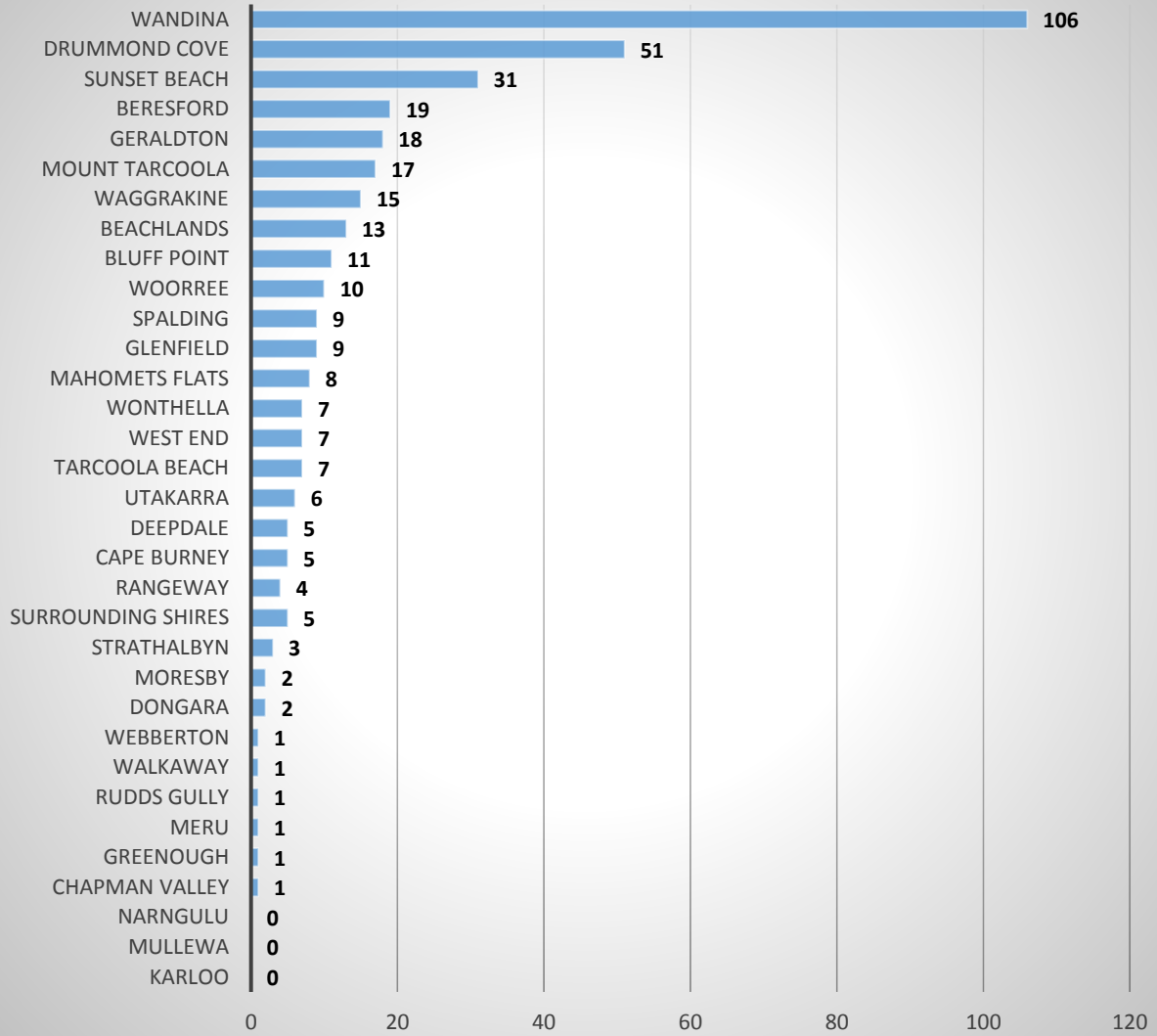
The City received 376 responses to the Coastal Planning Community Survey.

Of these, more than 99% of respondents said they lived within the City region. The majority, or 63%, said they lived within the coastal area, the majority, or 64%, said they recreated within the coastal area and 31% said they owned a property or business within the coastal area.

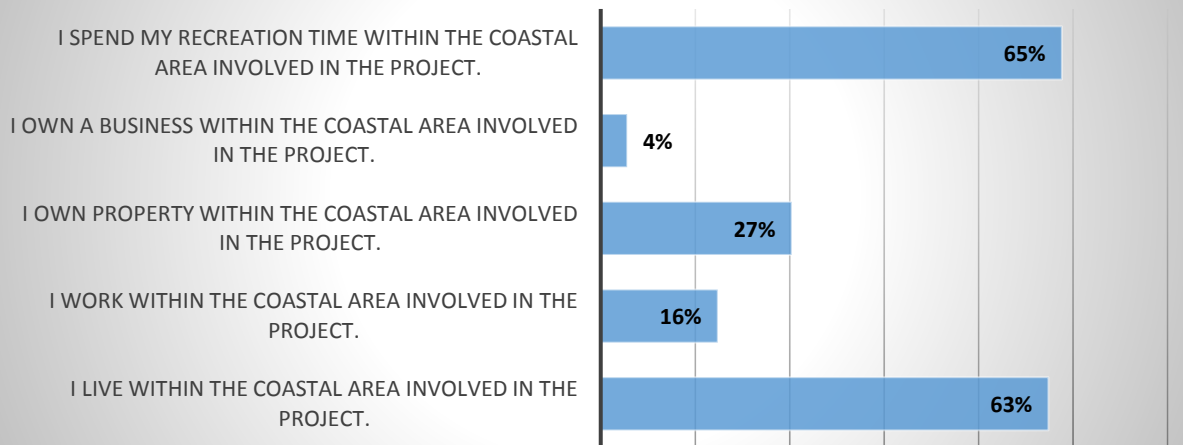
The following tables indicate respondent's place of residency live and what their connection is to the broader coastal area.



Respondents place of residence by locality



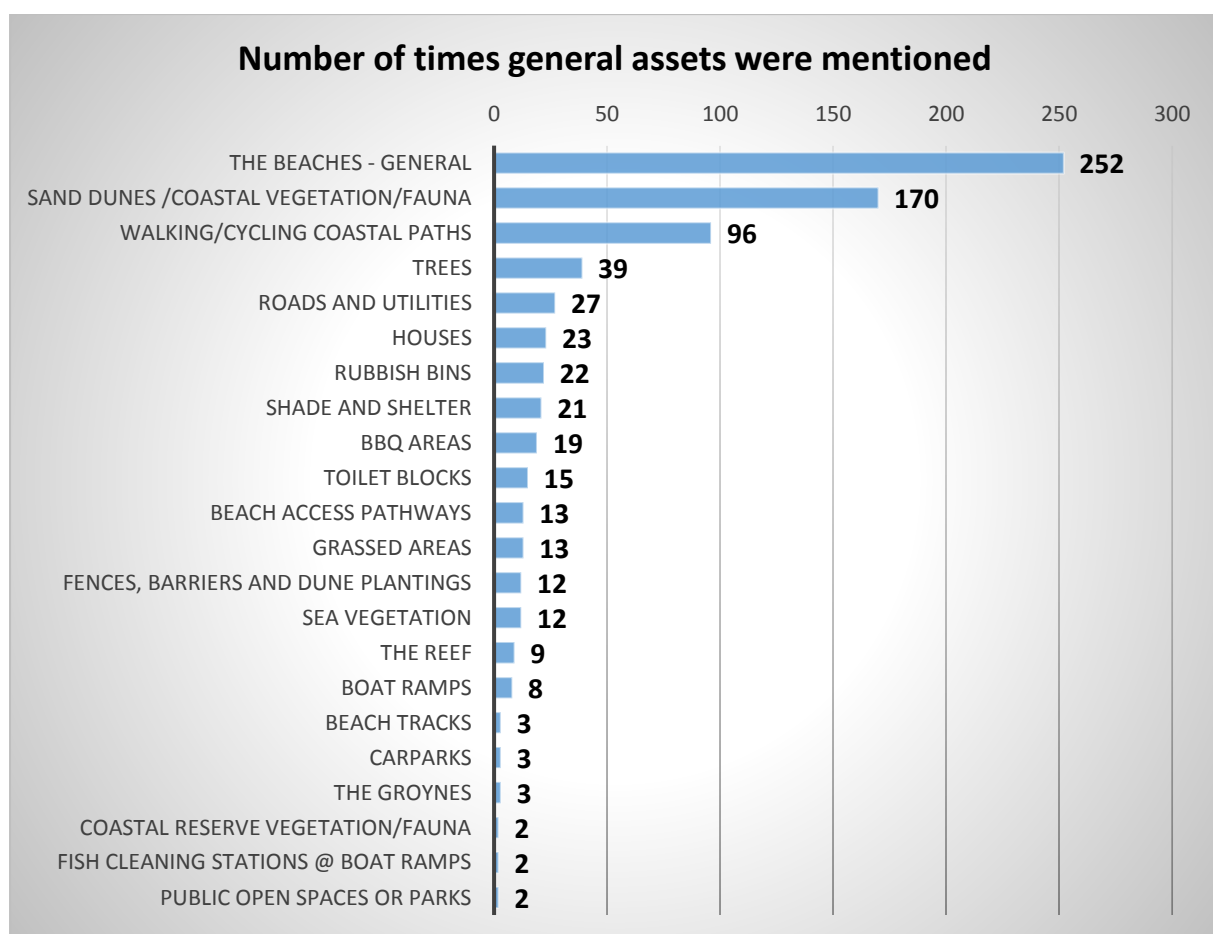
Respondents connection with the broader coastal area



Identifying Coastal Assets

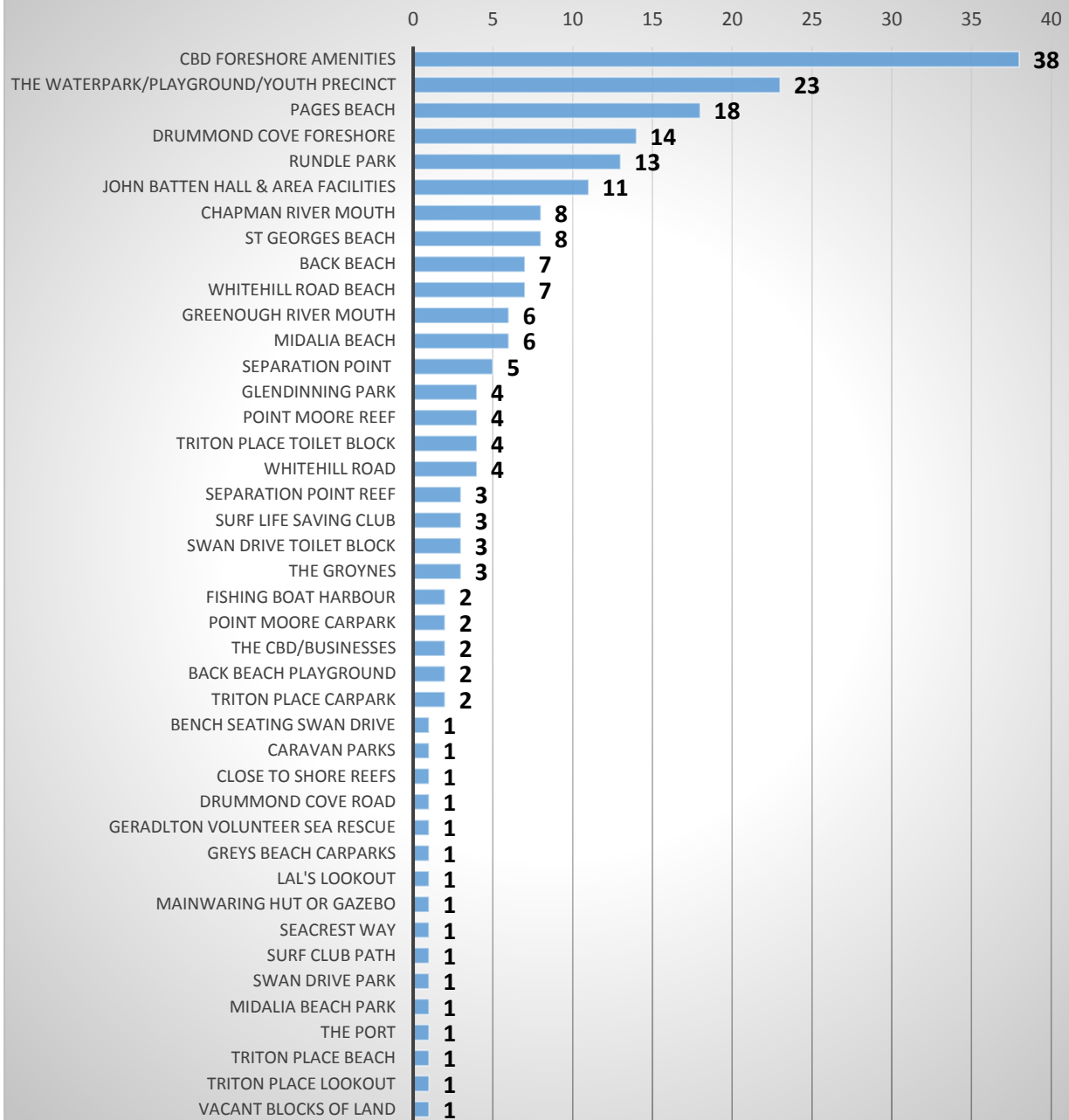
The first survey objective was for respondents to identify assets at risk from coastal erosion or inundation. A large majority, 84% or 302 respondents, said they could identify coastal assets that were of significance or of importance to them. Although 981 assets were identified in the survey, many of the same assets were mentioned by respondents more than once leaving a total of 67 coastal assets identified. The most commonly mentioned assets (identified more than 90 times) were the beaches, sand dunes including their flora and fauna, and coastal walking/cycling paths.

All assets identified in the survey could be separated into three groups. The first group relates to general assets where no specific location was mentioned. For example, respondents mentioned beaches 252 times, without specifying a particular beach or trees were mentioned 39 times without providing details of trees in a particular location. In total, 22 general assets were identified in the survey. These are identified in the bar chart below:

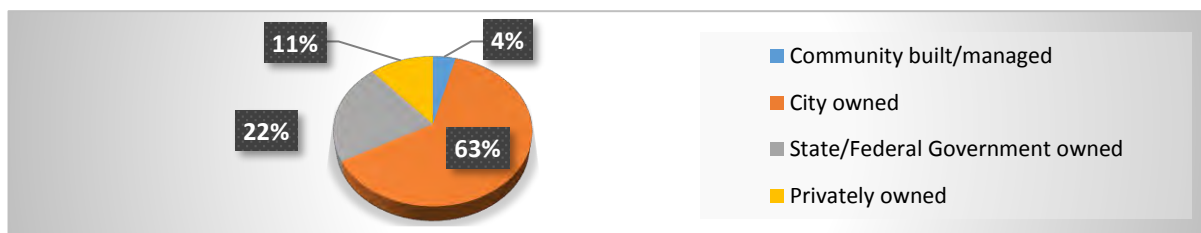


The second group relates to specific assets. These were assets identified at a specific location. For example Foreshore amenities, which include food businesses, the Foreshore Promenade, toilets, showers, shade shelters and barbeques, was mentioned and 38 times or the Foreshore Waterpark, playground and Youth Precinct was mentioned 23 times. In total, 42 specific assets were identified in the survey. These are identified in the bar chart below:

Number of times specific assets were mentioned



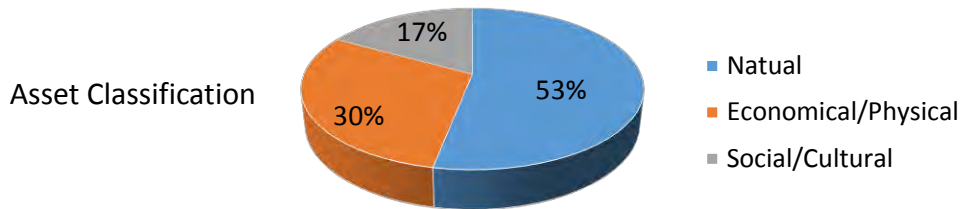
The third group relates to asset ownership. The assets most commonly mentioned are those owned by the City, which include roads, boat ramps, shade shelters, toilet blocks, etc... This was followed by State or Federal Government owned assets such as utilities, the lighthouse, the Port, beaches etc... and then privately owned assets such as homes and businesses. The least identified assets at risk are those the community built/manages/leases and referred to clubhouses, halls, etc... The graph below shows ownership of assets.



Classifying Coastal Assets

Part of identifying coastal assets involved classifying them into one of five categories: natural, economic, physical, social and cultural. The functions, service and values an asset has will depend on the category in which it is classified. For example, beaches classified as a natural asset provide habitat for flora and fauna, support biodiversity and are a natural erosion and inundation barrier. When classified as a social or cultural asset, beaches provide a place for sports and recreation and are a popular socialising space.

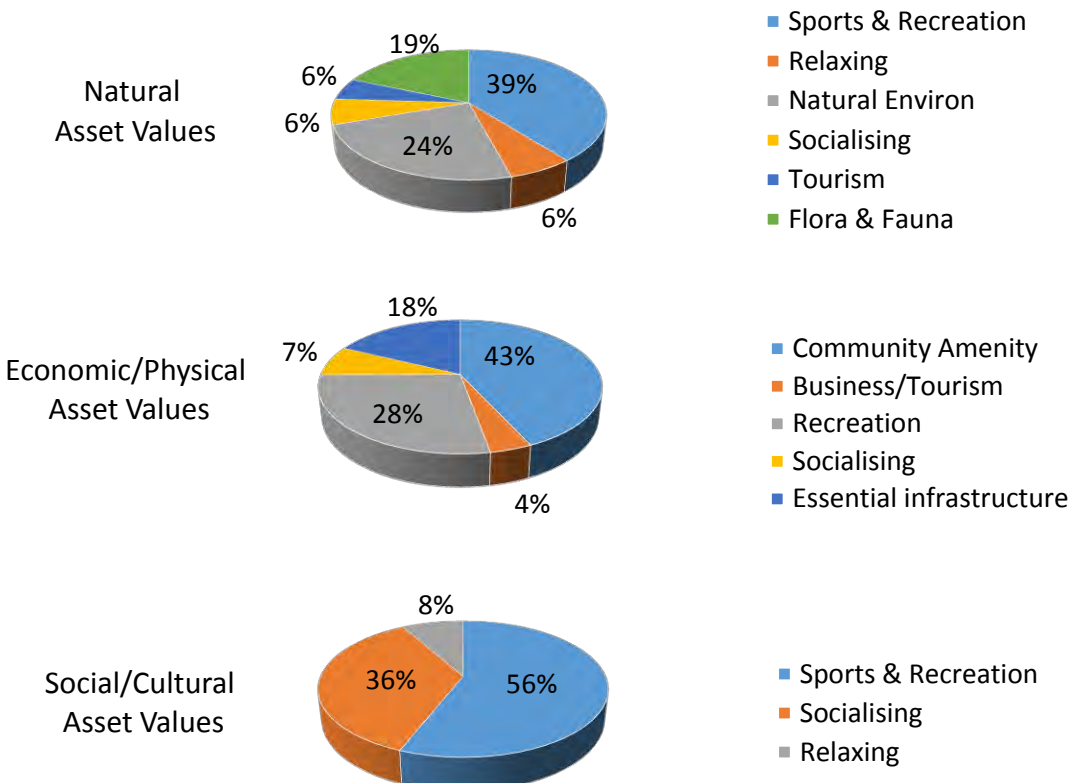
Of the 981 assets mentioned in the survey, 527 were classified as natural, 297 as economical/physical and 169 and social/cultural.



Valuing Assets

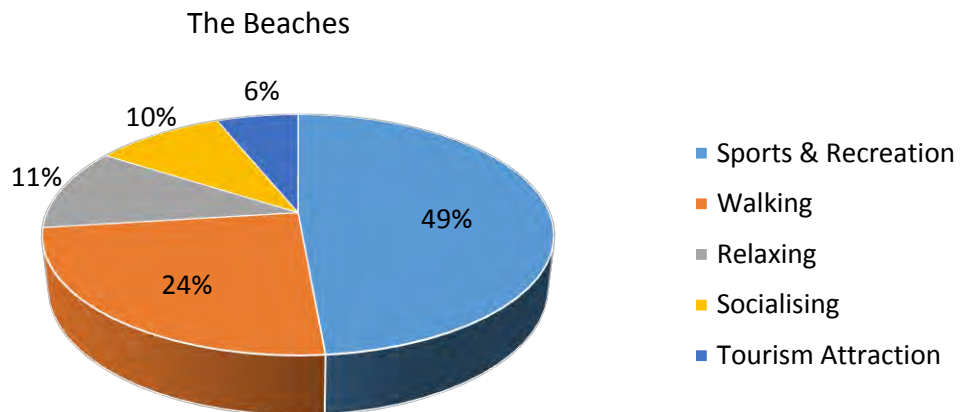
The second objective of the survey was to gain a better understanding of how the community values assets at risk from coastal erosion and inundation. One method of determining the value of an asset is to examine how it is utilised. The survey asked respondents to state what the asset(s) they mentioned were used for or what their function was. With some assets, their function was clear such as trees provide shade or houses are places where people live. With others, such as the beach or CBD Foreshore amenities, a variety of functions and uses were mentioned.

Asset Values by Category

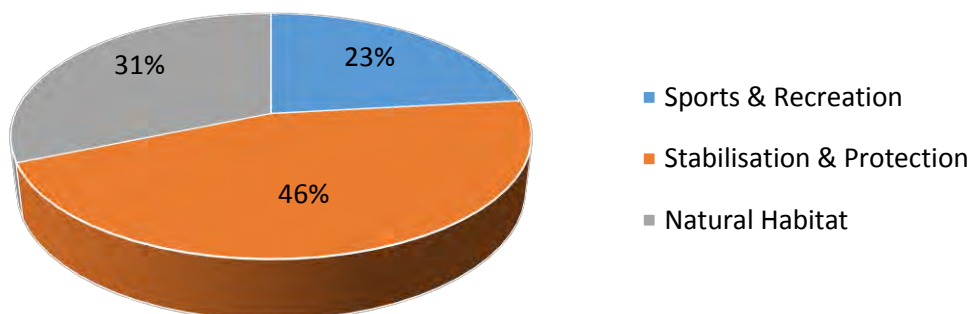


Function or Value of Most Commonly Mentioned Assets

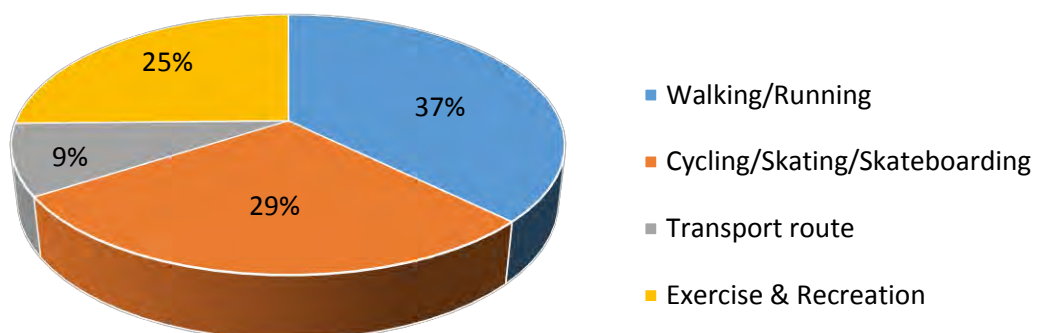
Reviewing the three most commonly mentioned assets: beaches, sand dunes (including their flora and fauna) and coastal walking/cycling paths the following graphs show what respondents said these assets were used for or what their particular function was.



Sand Dunes (including flora and fauna)

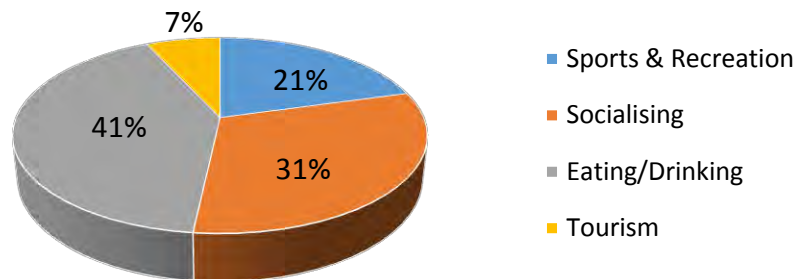


Walking/Cycling Coastal Paths

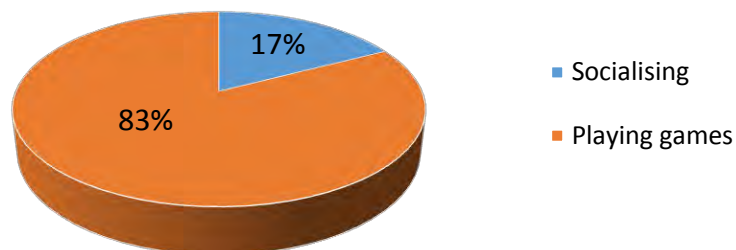


Reviewing the top most commonly mentioned specific assets: CBD Foreshore Amenities, the Waterpark/playground/Youth Precinct, Pages Beach and Drummond Cove Foreshore, the following graphs show what respondents said these assets were used for or what their particular function was.

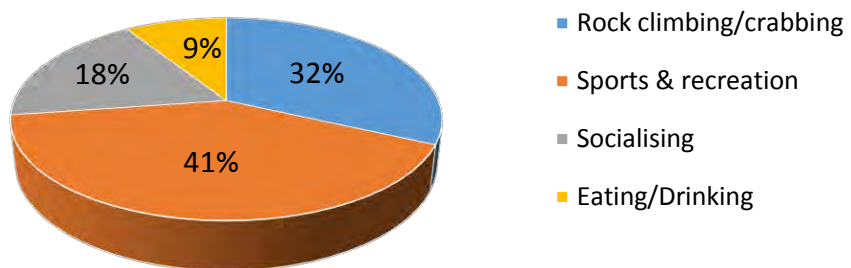
CBD Foreshore Amenities



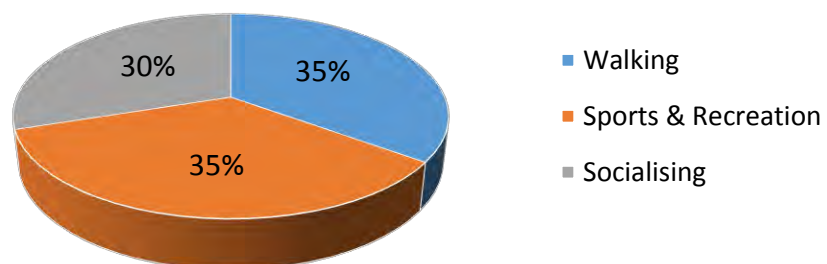
The Waterpark/Playground/Youth Precinct



Pages Beach



Drummond Cove Foreshore



Assessing Risk of Inundation and Erosion

The third objective of the survey was to gain an understanding of how the community rates the consequences of erosion and inundation on the assets they identified as important. To assist respondents, a Consequence Scale Table was presented (see below). Respondents were asked to rate the consequence (insignificant, minor, moderate, major or catastrophic) that inundation and/or erosion would have on the identified asset.

Consequence	Physical/Economic Impact	Environmental Impact	Social /Cultural Impact
Insignificant	Permanent loss or damage <\$20k	Negligible to no loss of flora and fauna	Minimal short term inconvenience <5% of community affected
Minor	Permanent loss or damage \$20k - \$200k	Short term loss of flora and fauna - strong recovery	Small to medium disruption to function <10% of community affected
Moderate	Permanent loss or damage \$200k - \$2 million	Medium term loss of flora and fauna - recovery likely	Minor long term or major short term loss of function <25% of community affected
Major	Permanent loss or damage \$2 - \$5 million	Long-term loss of flora and fauna limited chance of recovery	Medium term or permanent loss of function <50% of community affected
Catastrophic	Permanent loss or damage >\$5 million	Permanent loss of flora and fauna - will not recover	Long term or permanent loss of function >75% of community affected

Consequence Scale Table used in in the Community Coastal Planning Survey.

The following table provides a general overview of the consequences erosion and inundation would have on assets identified in the survey.

Consequence	Impacted Assets
Catastrophic	Houses, properties, beaches, boat ramps and the lighthouse.
Major	Community infrastructure, roads & utilities, public open spaces, caravan parks, sand dunes & vegetation, CBD businesses and beach amenities.
Moderate	Cycle/foot paths, beach access, river mouths, toilet blocks, shade shelters, carparks, Foreshore amenities, clubhouses and community halls.
Minor	Groynes, benches, BBQs, trees, sea vegetation and vacant blocks of land.
Insignificant	Playgrounds, seating, parks, rubbish bins and breakwaters.

Calculating the Overall Consequences of Erosion and Inundation

In order to calculate the overall consequence of erosion or inundation the five consequences were given values from one to five.

Consequence	Value
Catastrophic	1
Major	2
Moderate	3
Minor	4
Insignificant	5

The consequence of erosion or inundation for a particular asset was calculated by averaging the corresponding values listed for a particular asset.

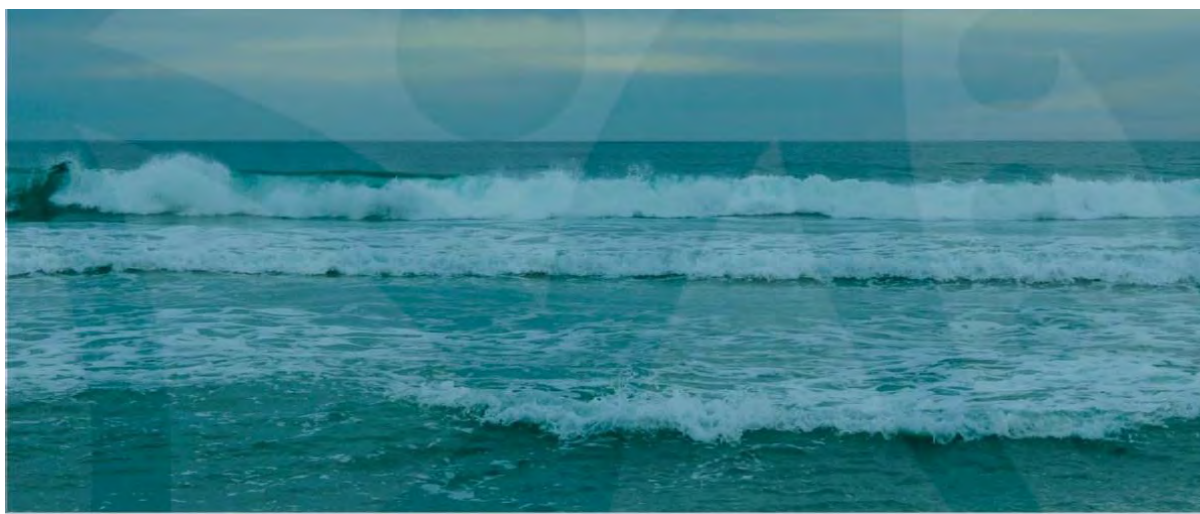
Survey Results Tables

The results of the three survey objectives are presented in the following tables. All assets, both general and specific, identified in the survey have been listed within one or more of the 12 corresponding coastal compartments.

Within each table, there are a number of columns which include:

- Asset name and reason(s) why it is important;
- Number of times the asset was mentioned in the survey;
- Asset classification (economic/physical, social/cultural or natural);
- Number of times it was classified as such;
- Averaged consequence of inundation score for each asset classification;
- Averaged consequence of erosion score for each asset classification; and
- Number of times an asset was prioritised.

A thick black border indicates the highest priority asset for that compartment.



Drummond Cove Assets	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
The beaches - general <i>Why is it important: natural habitat, tourism, sports, recreation, socialising, wellness, tourism</i>	31	Economical/Physical	4	2	2	18
		Natural	27	2	2	
Sand dunes/coastal vegetation/fauna <i>Why is it important: Infrastructure protection, natural habitat, recreation, tourism</i>	19	Natural	19	2	3	9
Drummond Cove Foreshore <i>Why is it important: socialising, wellness, recreation</i>	14	Economical/Physical	3	2	2	7
		Social/Cultural	3	2	2	
		Natural	8	2	2	
John Batten Hall and area facilities <i>Why is it important: socialising, events, recreation</i>	11	Economical/Physical	6	3	2	1
		Social/Cultural	4	2	2	
		Natural	1	2	2	
Whitehill Road beach <i>Why is it important: recreation, connectivity</i>	7	Economical/Physical	4	2	1	2
		Natural	3	1	1	
Shade and shelter <i>Why is it important: socialising, protection, wellness</i>	5	Economical/Physical	3	3	4	0
		Social/Cultural	2	2	2	
Whitehill Road <i>Why is it important: connectivity</i>	4	Economical/Physical	3	2	2	3
		Social/Cultural	1	2	3	
Trees <i>Why is it important: shade, wellness</i>	4	Natural	4	3	4	1
Houses <i>Why is it important: place of residence, socialising, wellness, investment, lifestyle</i>	5	Economical/Physical	5	2	1	4
Toilet block <i>Why is it important: public amenity</i>	3	Economical/Physical	3	4	3	0

Drummond Cove continued	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
Beach access pathways <i>Why is it important: enables sport and recreation</i>	3	Economical/Physical	3	2	2	1
Roads and utilities <i>Why is it important: connectivity, amenity</i>	3	Economical/Physical	3	3	3	0
Boat ramp <i>Why is it important: sports and recreation</i>	3	Economical/Physical	3	3	1	0
Rubbish bins <i>Why is it important: cleanliness</i>	2	Economical/Physical	2	5	5	0
Public open spaces or parks <i>Why is it important: socialising, recreation</i>	2	Economical/Physical	1	2	2	0
		Social/Cultural	1	5	5	
BBQ areas <i>Why is it important: socialising</i>	2	Economical/Physical	1	2	2	0
		Social/Cultural	1	4	4	
Fish cleaning stations at boat ramps <i>Why is it important: sport and recreation</i>	1	Economical/Physical	1	0	0	0
Fences, barriers and dune plantings <i>Why is it important: retains beach and dunes</i>	1	Economical/Physical	1	2	2	0
Beach tracks <i>Why is it important: enables beach access, lifestyle</i>	1	Natural	1	3	3	0
Vacant blocks of land <i>Why is it important: community</i>	1	Economical/Physical	1	1	4	0
Carparks <i>Why is it important: ease of access</i>	1	Economical/Physical	1	1	1	0
Drummond Cove Road <i>Why is it important: access</i>	1	Social/Cultural	2	1	1	0
Seacrest Way <i>Why is it important: access</i>	1	Economical/Physical	1	1	1	0

Drummond Cove continued	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
The reef <i>Why is it important: marine habitat</i>	1	Natural	1	2	3	0
Sea vegetation <i>Why is it important: recreation, marine habitat</i>	1	Natural	1	1	4	0
Close to shore reefs <i>Why is it important: recreation</i>	1	Natural	1	1	5	0
Grassed areas <i>Why is it important: recreation</i>	1	Economical/Physical	1	2	2	0

Glenfield Assets	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
The beaches - general <i>Why is it important: natural habitat, tourism, sports, recreation, socialising, wellness, tourism</i>	20	Economical/Physical	1	3	3	16
		Natural	19	2	2	
Sand dunes/coastal vegetation/fauna <i>Why is it important: infrastructure protection, natural habitat, recreation, tourism</i>	14	Natural	14	2	3	7
Rubbish bins <i>Why is it important: cleanliness</i>	2	Economical/Physical	2	5	5	0
Roads and utilities <i>Why is it important: connectivity, amenity</i>	2	Economical/Physical	2	2	3	0
Fences, barriers and dune plantings <i>Why is it important: retains beach and dunes</i>	1	Economical/Physical	1	2	2	0
Beach access pathways <i>Why is it important: enables sport and recreation</i>	1	Economical/Physical	1	3	3	1

Glenfield continued	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
The reef <i>Why is it important: marine habitat</i>	1	Natural	1	2	3	0
Sea vegetation <i>Why is it important: recreation, marine habitat</i>	1	Natural	1	1	4	0

Sunset Beach Assets	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
The beaches - general <i>Why is it important: natural habitat, tourism, sports, recreation, socialising, wellness, tourism</i>	27	Economical/Physical	1	3	3	18
		Natural	26	2	2	
Sand dunes/coastal vegetation/fauna <i>Why is it important: Infrastructure protection, natural habitat, recreation, tourism</i>	18	Natural	18	2	3	9
Walking/cycling coastal paths <i>Why is it important: recreation, sport, socialising</i>	11	Economical/Physical	4	3	2	5
		Social/Cultural	7	3	3	
Houses <i>Why is it important: place of residence, socialising, wellness, investment, lifestyle</i>	8	Economical/Physical	8	2	2	5
Chapman River mouth <i>Why is it important: biodiversity, recreation, natural habitat</i>	8	Natural	8	3	3	3
Trees <i>Why is it important: shade, wellness</i>	5	Economical/Physical	1	1	1	1
		Natural	4	3	4	
Triton Place toilet block <i>Why is it important: public amenity</i>	4	Economical/Physical	3	2	3	0
		Social/Cultural	1	1	1	

Sunset Beach continued	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
Swan Drive Toilet block <i>Why is it important: public amenity</i>	3	Economical/Physical	3	4	4	1
BBQ areas <i>Why is it important: socialising</i>	3	Economical/Physical	2	2	2	0
		Social/Cultural	1	4	4	
Grassed areas <i>Why is it important: recreation</i>	3	Economical/Physical	3	2	2	0
Triton Place carpark <i>Why is it important: tourism, infrastructure protection</i>	2	Social/Cultural	2	2	2	1
Rubbish bins <i>Why is it important: cleanliness</i>	2	Economical/Physical	2	5	5	0
Fences, barriers and dune plantings <i>Why is it important: retains beach and dunes</i>	2	Economical/Physical	2	2	2	0
Beach access pathways <i>Why is it important: enables sport and recreation</i>	2	Economical/Physical	1	3	3	1
		Social/Cultural	1	2	1	
Roads and utilities <i>Why is it important: connectivity, amenity</i>	2	Economical/Physical	2	2	3	0
Swan Drive Park <i>Why is it important: socialising, recreation</i>	1	Economical/Physical	1	2	3	1
Triton Place beach <i>Why is it important: socialising, recreation</i>	1	Natural	1	2	2	0
Triton Place lookout <i>Why is it important: relaxing</i>	1	Social/Cultural	1	1	1	0
The reef <i>Why is it important: marine habitat</i>	1	Natural	1	2	3	0
Sea vegetation <i>Why is it important: recreation, marine habitat</i>	1	Natural	1	1	4	0

Sunset Beach continued	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
Bench seating Swan Drive <i>Why is it important: wellness, socialising</i>	1	Social/Cultural	1	5	4	0
Sunset Beach Caravan Park <i>Why is it important: tourism, recreation</i>	1	Economical/Physical	1	2	2	0

Bluff Point Assets	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
The beaches - general <i>Why is it important: natural habitat, tourism, sports, recreation, socialising, wellness, tourism</i>	25	Economical/Physical	1	3	2	16
		Social/Cultural	4	2	2	
		Natural	20	5	2	
Walking/cycling coastal paths <i>Why is it important: Recreation, sport, socialising</i>	17	Economical/Physical	5	3	3	7
		Social/Cultural	10	2	2	
		Natural	2	3	3	
Sand dunes/coastal vegetation/fauna <i>Why is it important: infrastructure protection, natural habitat, recreation, tourism</i>	15	Natural	15	2	3	8
Rundle Park <i>Why is it important: recreation, sports, socialising</i>	13	Economical/Physical	1	5	5	3
		Social/Cultural	10	2	3	
		Natural	2	3	3	
St Georges Beach <i>Why is it important: recreation, socialising, leisure</i>	8	Economical/Physical	1	3	2	2
		Social/Cultural	4	2	1	
		Natural	3	2	2	
Trees <i>Why is it important: shade, wellness</i>	4	Natural	4	3	4	1

Bluff Point continued	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
Shade and shelter <i>Why is it important: socialising, protection, wellness</i>	3	Economical/Physical	2	4	4	0
		Social/Cultural	1	2	2	
Boat ramp <i>Why is it important: sports and recreation</i>	3	Economical/Physical	2	2	1	0
		Social/Cultural	1	1	4	
Rubbish bins <i>Why is it important: cleanliness</i>	2	Economical/Physical	2	5	5	0
BBQ areas <i>Why is it important: socialising</i>	2	Economical/Physical	1	2	2	1
		Social/Cultural	1	4	4	
Roads and utilities <i>Why is it important: connectivity, amenity</i>	2	Economical/Physical	1	2	3	0
Toilet block <i>Why is it important: public amenity</i>	2	Economical/Physical	2	4	4	1
Grassed areas <i>Why is it important: recreation</i>	2	Economical/Physical	1	2	2	1
		Social/Cultural	1	2	2	
Fences, barriers and dune plantings <i>Why is it important: retains beach and dunes</i>	1	Economical/Physical	1	2	2	0
Beach access pathways <i>Why is it important: enables sport and recreation</i>	1	Economical/Physical	1	3	3	1
The reef <i>Why is it important: marine habitat</i>	1	Natural	1	2	3	0
Houses <i>Why is it important: place of residence, socialising, wellness, investment, lifestyle</i>	1	Economical/Physical	1	3	2	1
Sea vegetation <i>Why is it important: recreation, marine habitat</i>	1	Natural	1	1	4	0

Beresford Assets	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
The beaches - general <i>Why is it important: natural habitat, tourism, sports, recreation, socialising, wellness, tourism</i>	20	Economical/Physical	2	2	3	15
		Social/Cultural	1	2	1	
		Natural	17	3	2	
Walking/cycling coastal paths <i>Why is it important: recreation, sport, socialising</i>	20	Economical/Physical	10	3	3	10
		Social/Cultural	10	3	2	
Sand dunes/coastal vegetation/fauna <i>Why is it important: infrastructure protection, natural habitat, recreation, tourism</i>	11	Natural	11	2	3	8
Midalia's Beach <i>Why is it important: recreation, socialising, wellness</i>	6	Economical/Physical	1	5	5	0
		Social/Cultural	1	3	3	
		Natural	4	2	2	
Shade and shelter <i>Why is it important: socialising, protection, wellness</i>	3	Economical/Physical	2	4	4	0
		Social/Cultural	1	2	2	
Trees <i>Why is it important: shade, wellness</i>	3	Natural	3	3	4	1
BBQ areas <i>Why is it important: socialising</i>	3	Economical/Physical	1	2	2	0
		Social/Cultural	2	3	3	
Rubbish bins <i>Why is it important: cleanliness</i>	2	Economical/Physical	2	5	5	0
Roads and utilities <i>Why is it important: connectivity, amenity</i>	2	Economical/Physical	2	3	3	0
Fences, barriers and dune plantings <i>Why is it important: retains beach and dunes</i>	1	Economical/Physical	1	2	2	0
Beach access pathways <i>Why is it important: enables sport and recreation</i>	1	Economical/Physical	1	3	3	1

Beresford continued	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
The park <i>Why is it important: socialising, recreation</i>	1	Social/Cultural	1	5	5	0
Grassed areas <i>Why is it important: recreation</i>	1	Social/Cultural	1	2	2	0
The groynes <i>Why is it important: recreation</i>	1	Natural	1	4	4	0
Houses <i>Why is it important: place of residence, socialising, wellness, investment, lifestyle</i>	1	Economical/Physical	1	3	2	1
The reef <i>Why is it important: marine habitat</i>	1	Natural	1	2	3	0
Sea vegetation <i>Why is it important: recreation, marine habitat</i>	1	Natural	1	1	4	0

Geraldton Assets	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
CBD Foreshore amenities <i>Why is it important: recreation, tourism, socialising, sports, employment, commercial activities</i>	38	Economical/Physical	16	3	3	12
		Social/Cultural	21	3	3	
		Natural	1	3	3	
The beaches - general <i>Why is it important: natural habitat, tourism, sports, recreation, socialising, wellness, tourism</i>	28	Economical/Physical	2	3	3	19
		Social/Cultural	8	2	2	
		Natural	18	2	2	
The Waterpark/playground/youth precinct <i>Why is it important: socialising, recreation, sports</i>	23	Economical/Physical	5	3	2	5
		Social/Cultural	18	3	3	

Geraldton continued	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
Walking/cycling coastal paths <i>Why is it important: recreation, sport, socialising</i>	13	Economical/Physical	5	3	3	6
		Social/Cultural	8	3	3	
Trees <i>Why is it important: shade, wellness</i>	6	Natural	6	3	3	2
BBQ areas <i>Why is it important: socialising</i>	4	Economical/Physical	2	4	1	0
		Social/Cultural	2	3	4	
Toilet block <i>Why is it important: public amenity</i>	3	Economical/Physical	3	3	4	1
Shade and shelter <i>Why is it important: socialising, protection, wellness</i>	3	Economical/Physical	2	4	4	0
		Social/Cultural	1	3	3	
The groynes <i>Why is it important: recreation</i>	2	Natural	2	5	5	0
The CBD businesses <i>Why is it important: commerce, employment, recreation</i>	2	Economical/Physical	2	2	2	2
Coastal reserve vegetation and fauna <i>Why is it important: natural habitat, retains beach</i>	2	Natural	2	2	3	3
Grassed areas <i>Why is it important: recreation</i>	2	Economical/Physical	1	2	2	0
		Social/Cultural	1	2	2	
Rubbish bins <i>Why is it important: cleanliness</i>	2	Economical/Physical	2	5	5	0
Fishing Boat Harbour <i>Why is it important: commerce, industry, employment</i>	2	Economical/Physical	2	2	1	1
Boat ramp <i>Why is it important: sports and recreation</i>	2	Economical/Physical	2	1	2	0
Roads and utilities <i>Why is it important: connectivity, amenity</i>	2	Economical/Physical	2	2	3	0

Geraldton continued	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
Fish cleaning stations at boat ramps <i>Why is it important: sport and recreation</i>	1	Economical/Physical	1	0	0	0
Houses <i>Why is it important: place of residence, socialising, wellness, investment, lifestyle</i>	1	Economical/Physical	1	3	2	1
The Port <i>Why is it important: commerce, industry, employment</i>	1	Economical/Physical	1	3	3	0
Sea vegetation <i>Why is it important: recreation, marine habitat</i>	1	Natural	1	1	4	0

West End (Point Moore) Assets	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
The beaches - general <i>Why is it important: natural habitat, tourism, sports, recreation, socialising, wellness, tourism</i>	26	Economical/Physical	3	3	2	16
		Natural	23	3	3	
Pages Beach <i>Why is it important: recreation, socialising, natural habitat, tourism</i>	18	Economical/Physical	2	3	2	3
		Social/Cultural	3	3	3	
		Natural	13	3	3	
The Lighthouse <i>historic, tourism, landmark, vital marine safety infrastructure</i>	18	Economical/Physical	17	2	4	3
		Social/Cultural	1	1	2	
Sand dunes/coastal vegetation/fauna <i>Why is it important: infrastructure protection, natural habitat, recreation, tourism</i>	17	Natural	17	2	3	9

West End (Point Moore) continued	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
Walking/cycling coastal paths <i>Why is it important: recreation, sport, socialising</i>	11	Economical/Physical	3	3	4	5
		Social/Cultural	8	3	2	
Trees <i>Why is it important: shade, wellness</i>	4	Natural	4	2	4	1
Point Moore reef <i>Why is it important: marine habitat, recreation, sports</i>	4	Social/Cultural	1	2	1	1
		Natural	3	2	3	
Homes/cottages at Point Moore <i>Why is it important: place of residence, socialising, wellness, investment, lifestyle</i>	3	Economical/Physical	3	2	1	2
BBQ areas <i>Why is it important: socialising</i>	3	Economical/Physical	1	2	2	1
		Social/Cultural	2	4	4	
Toilet block <i>Why is it important: public amenity</i>	2	Economical/Physical	2	4	4	1
Rubbish bins <i>Why is it important: cleanliness</i>	2	Economical/Physical	2	5	5	0
Fences, barriers and dune plantings <i>Why is it important: retains beach and dunes</i>	2	Economical/Physical	2	3	3	0
Roads and utilities <i>Why is it important: connectivity, amenity</i>	2	Economical/Physical	2	2	3	0
Point Moore carpark <i>Why is it important: ease of access</i>	2	Economical/Physical	1	3	4	2
		Social/Cultural	1	4	4	
Beach access pathways <i>Why is it important: enables sport and recreation</i>	1	Economical/Physical	1	3	3	1
Beach tracks <i>Why is it important: enables beach access, lifestyle</i>	1	Natural	1	3	4	0
Sea vegetation <i>Why is it important: recreation, marine habitat</i>	1	Natural	1	1	4	0

West End (Point Moore) continued	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
Geraldton Volunteer Sea Rescue <i>Why is it important: community service</i>	1	Economical/Physical	1	2	2	0
Grassed areas <i>Why is it important: recreation</i>	1	Economical/Physical	1	2	2	0

Beachlands Assets	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
The beaches - general <i>Why is it important: natural habitat, tourism, sports, recreation, socialising, wellness, tourism</i>	14	Natural	14	3	2	13
Sand dunes/coastal vegetation/fauna <i>Why is it important: infrastructure protection, natural habitat, recreation, tourism</i>	12	Natural	12	2	3	6
Walking/cycling coastal paths <i>Why is it important: recreation, sport, socialising</i>	9	Economical/Physical	3	3	4	4
		Social/Cultural	6	3	2	
Separation Point <i>Why is it important: recreation, marine habitat, sports, socialising, wellness</i>	5	Natural	5	3	2	1
Separation Point reef <i>Why is it important: marine habitat, recreation</i>	3	Natural	3	4	4	1
Roads and utilities <i>Why is it important: connectivity, amenity</i>	3	Economical/Physical	3	2	3	0
Rubbish bins <i>Why is it important: cleanliness</i>	2	Economical/Physical	2	5	5	0

Beachlands continued	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
Fences, barriers and dune plantings <i>Why is it important: retains beach and dunes</i>	1	Economical/Physical	1	2	2	0
Beach access pathways <i>Why is it important: enables sport and recreation</i>	1	Economical/Physical	1	3	3	1
Sea vegetation <i>Why is it important: recreation, marine habitat</i>	1	Natural	1	1	4	0
Greys Beach carparks <i>Why is it important: ease of access</i>	1	Economical/Physical	1	1	1	1
Houses <i>Why is it important: Place of residence, socialising, wellness, investment, lifestyle</i>	1	Economical/Physical	1	3	2	1

Mahomets Flats Assets	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
Sand dunes /coastal vegetation/fauna <i>Why is it important: infrastructure protection, natural habitat, recreation, tourism</i>	15	Natural	15	2	3	6
The beaches - general <i>Why is it important: natural habitat, tourism, sports, recreation, socialising, wellness, tourism</i>	13	Natural	13	3	2	13
Walking/cycling coastal paths <i>Why is it important: recreation, sport, socialising</i>	8	Economical/Physical	3	3	4	4
		Social/Cultural	5	3	2	
Back Beach <i>Why is it important: access, recreation, sports</i>	7	Economical/Physical	1	2	4	1
		Natural	6	4	2	

Mahomets Flats continued	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
Trees <i>Why is it important: shade, wellness</i>	4	Natural	4	2	3	2
Surf Life Saving Club <i>Why is it important: socialising, recreation, community safety</i>	3	Economical/Physical	3	3	2	1
Rubbish bins <i>Why is it important: cleanliness</i>	2	Economical/Physical	2	5	5	0
Toilet Block <i>Why is it important: public amenity</i>	2	Economical/Physical	2	4	4	1
Shade shelters <i>Why is it important: socialising, protection, wellness</i>	2	Economical/Physical	2	3	3	0
The playground <i>Why is it important: recreation, socialising</i>	2	Economical/Physical	1	5	5	0
		Social/Cultural	1	5	5	
Roads and utilities <i>Why is it important: connectivity, amenity</i>	2	Economical/Physical	2	2	3	0
Fences, barriers and dune plantings <i>Why is it important: retains beach and dunes</i>	1	Economical/Physical	1	2	2	0
Beach access pathways <i>Why is it important: enables sport and recreation</i>	1	Economical/Physical	1	3	3	1
Surf club path <i>Why is it important: beach access, community safety</i>	1	Social/Cultural	1	3	3	1
Mainwaring Hut or gazebo <i>Why is it important: the view, wellness</i>	1	Economical/Physical	1	2	0	0
Houses <i>Why is it important: place of residence, socialising, wellness, investment, lifestyle</i>	1	Economical/Physical	1	3	2	1

Mahomets Flats continued	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
The reef <i>Why is it important: marine habitat</i>	1	Natural	1	2	3	0
Sea vegetation <i>Why is it important: recreation, marine habitat</i>	1	Natural	1	1	4	0
Grassed areas <i>Why is it important: recreation</i>	1	Economical/Physical	1	2	2	0

Tarcoola Beach Assets	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
The beaches - general <i>Why is it important: natural habitat, tourism, sports, recreation, socialising, wellness, tourism</i>	16	Natural	16	1	3	16
Sand dunes/coastal vegetation/fauna <i>Why is it important: infrastructure protection, natural habitat, recreation, tourism</i>	15	Natural	15	2	3	7
Walking/cycling coastal paths <i>Why is it important: recreation, sport, socialising</i>	7	Economical/Physical	2	5	4	4
		Social/Cultural	5	2	2	
Trees <i>Why is it important: shade, wellness</i>	4	Natural	4	3	4	1
Glendinning Park <i>Why is it important: socialising, recreation</i>	4	Economical/Physical	1	5	5	0
		Social/Cultural	3	4	4	
Rubbish bins <i>Why is it important: cleanliness</i>	2	Economical/Physical	2	5	5	0
Roads and utilities <i>Why is it important: connectivity, amenity</i>	2	Economical/Physical	2	2	3	0

Tarcoola Beach continued	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
Shade and shelter <i>Why is it important: socialising, protection, wellness</i>	2	Economical/Physical	2	4	4	0
Fences, barriers and dune plantings <i>Why is it important: retains beach and dunes</i>	1	Economical/Physical	1	2	2	0
Beach access pathways <i>Why is it important: enables sport and recreation</i>	1	Economical/Physical	1	3	3	1
Houses <i>Why is it important: place of residence, socialising, wellness, investment, lifestyle</i>	1	Economical/Physical	1	3	2	1
The reef <i>Why is it important: marine habitat</i>	1	Natural	1	2	3	0
Sea vegetation <i>Why is it important: recreation, marine habitat</i>	1	Natural	1	1	4	0
Grassed areas <i>Why is it important: recreation</i>	1	Economical/Physical	1	2	2	0
Carpark <i>Why is it important: ease of access</i>	1	Economical/Physical	1	5	5	1

Southgate Dunes Assets	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
Sand dunes/coastal vegetation/fauna <i>Why is it important: infrastructure protection, natural habitat, recreation, tourism</i>	22	Economical/Physical	1	1	2	14
		Social/Cultural	1	1	1	
		Natural	20	2	3	

Southgate Dunes continued	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
The beaches - general <i>Why is it important: natural habitat, tourism, sports, recreation, socialising, wellness, tourism</i>	16	Natural	16	2	2	8
Roads and utilities <i>Why is it important: connectivity, amenity</i>	2	Economical/Physical	2	2	3	0
The reef <i>Why is it important: marine habitat</i>	1	Natural	1	2	3	0
Sea vegetation <i>Why is it important: recreation, marine habitat</i>	1	Natural	1	1	4	0

Cape Burney Assets	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
The beaches - general <i>Why is it important: natural habitat, tourism, sports, recreation, socialising, wellness, tourism</i>	16	Natural	16	2	2	14
Sand dunes/coastal vegetation/fauna <i>Why is it important: infrastructure protection, natural habitat, recreation, tourism</i>	12	Natural	12	2	3	6
Greenough River mouth <i>Why is it important: recreation, socialising, sports</i>	6	Economical/Physical	1	3	3	2
		Natural	5	3	3	
Trees <i>Why is it important: shade, wellness</i>	5	Natural	5	3	4	1
Toilet block <i>Why is it important: public amenity</i>	3	Economical/Physical	3	4	4	1

Cape Burney continued	No. of mentions	Asset Classification	No. of times classified	Average Inundation Score	Average Erosion Score	No. times prioritised
Shade and shelter <i>Why is it important: socialising, protection, wellness</i>	3	Economical/Physical	2	4	4	0
		Social/Cultural	1	2	5	
Rubbish bins <i>Why is it important: cleanliness</i>	2	Economical/Physical	2	5	5	0
BBQ areas <i>Why is it important: socialising</i>	2	Economical/Physical	1	2	2	0
		Social/Cultural	1	4	4	
Roads and utilities <i>Why is it important: connectivity, amenity</i>	2	Economical/Physical	1	2	3	0
Fences, barriers and dune plantings <i>Why is it important: retains beach and dunes</i>	1	Economical/Physical	1	2	2	0
Beach access pathways <i>Why is it important: enables sport and recreation</i>	1	Economical/Physical	1	3	3	1
Grassed areas <i>Why is it important: recreation</i>	1	Economical/Physical	1	2	2	0
The reef <i>Why is it important: marine habitat</i>	1	Natural	1	2	3	0
Sea vegetation <i>Why is it important: recreation, marine habitat</i>	1	Natural	1	1	4	0
Houses <i>Why is it important: place of residence, socialising, wellness, investment, lifestyle</i>	1	Economical/Physical	1	3	2	1
Lal's Lookout <i>Why is it important: wellness, the views</i>	1	Economical/Physical	1	4	1	0
Carparks <i>Why is it important: ease of access</i>	1	Economical/Physical	1	3	4	1
Beach Tracks <i>Why is it important: enables beach access, lifestyle</i>	1	Natural	1	3	4	0

A.3 Local Planning Summary

Existing Planning Controls

This section is intended to outline existing planning controls with a particular focus on coastal planning and management and identification of issues in the context of the CHRMAP process. A summary of Geraldton's Community Profile is included as well as these key planning documents. The following are included in this review:

- State Planning Policy 2.6: State Coastal Planning Policy
- Draft Planned or Managed Retreat Guidelines
- State Planning Policy 3.4: Natural Hazards and Disasters
- Planning and Development (Local Planning Schemes) Regulations 2015
- City of Greater Geraldton Strategic Community Plan
- City of Greater Geraldton Corporate Business Plan
- Key Infrastructure Projects
- City of Greater Geraldton Local Planning Strategy
- Point Moore Inundation and Coastal Processes Study
- Geraldton Greenough Coastal Strategy & Foreshore Management Plan 2005
- City of Greater Geraldton Local Planning Scheme 1.0
- Local Planning Policy 3.1 - Climate Change
- Local Planning Policy - Geraldton City Centre Revitalisation Plan 2017
- Local Planning Policy - Sunset Beach Precinct Plan
- Local Planning Policy - City Centre
- Local Planning Policy – Design Guidelines: Beresford Beachfront Mixed Use
- Local Planning Policy – Design Guidelines: Marine Terrace Foreshore Precinct Mixed Use

Concise Profile of Greater Geraldton

Geraldton Community Profile

The following information and data has been derived from the City of Greater Geraldton's Community Profile (ABS 2016). Geraldton has an estimated population of 39,496 as of the 2016 census. This represents an increase of 3,760 people (10.52%) from the 2006 total of 35,736 people. Of the total population, 22.3% are below the age of 15 years and 14.7% are above 65 years of age. These figures are both slightly higher than the state average being 20.5% and 14% respectively, requiring lower education and aged care facility focus.

In regards to dwelling structure, a detached house is the most common form of accommodation with 87.98% of the population living in a separate house. Only 1.39% live in a unit or apartment, the dominance of low density housing common in regional areas. It is noted that 30.87% of the population is not in the workforce and the City has an estimated unemployment rate of 3.5% as of the 2011 consensus. Employment and dwelling types are important to analyse when considering social, economic policy and planning purposes.

Corporate Governance Framework

Strategic Community Plan

The City of Greater Geraldton Strategic Community Plan (SCP) is the overarching strategic document providing guidance for the future governance of the City. The Plan addresses development in the region over a 10-year period between 2017-2027, and is to be reviewed every four years. The

document is prepared to deliver clear direction regarding future growth of the City and its community. The document represents a shared community vision and sets out long term strategies designed to strengthen and build on Greater Geraldton's unique assets. Community engagement was a key component in establishing an overarching vision and outlining associated deliverables.

The community vision outlined for the City of Greater Geraldton is:

“A prosperous, diverse, vibrant and sustainable community”.

The Plan outlines actions towards achieving the community vision, categorised under four major goals as follows; Community, Environment (both natural and built), Economy and Governance. Under the strategy, future development focuses on sustainability, ensuring new assets and community infrastructure can serve both current and future generations. The Greater Geraldton community has identified the coastal lifestyle as the City's most valuable asset, making regional living desirable due to the interaction between the built environment and natural coastal activities. It is therefore recognised that the coast is to be used sustainably in maintaining the type of development and infrastructure supporting long-term community benefits.

The City of Greater Geraldton's Corporate Business Plan

The City of Greater Geraldton's Corporate Business Plan is a 4-year plan outlining the City's prioritised strategies and actions towards achieving the community's vision set out in the Strategic Community Plan. Through the development of the Plan, the City has identified key resource capabilities between 2017-2021 including workforce planning, asset management planning and long term financial planning.

Strategy 2.1.3 states the City's intention of assuring natural areas and habitats are cared for and enhanced for the benefit of current and future generations. Actions associated include the development of a long term Coastal Adaption Planning Strategy and the Beresford Foreshore Upgrade, discussed further as a key infrastructure project.

Key Infrastructure Project - Beresford Foreshore Coastal Protection Works and Coastal Enhancement Project

The CGG embarks on a number of new capital works projects, undertaking a variety of facility upgrades or refurbishments. These infrastructure projects offer the community improved services, amenities and facilities unique to the Greater Geraldton region. Within the 2017/18 financial year the City is proposing to invest \$21 million on asset renewals. Developments directly relating to the coastal zone include the Beresford Foreshore Coastal Protection Works and Coastal Enhancement Project.

Project works along the Beresford foreshore began in January 2017 after being identified as a key infrastructure project for the City. The aim of the project is to provide protection against anticipated erosion and coastal processes that impose risk and uncertainty for the associated shoreline. Development involves near-shore works mitigating erosion including a protective 100m breakwater extension to the detached breakwater, a 45m extension to the existing groyne and three shore based rock revetment structures. The protection of the foreshore by the development and upgrade of these structures aims to justify the City's investment in new and refurbished coastal amenity infrastructure along the Beresford foreshore outlined in the Coastal Enhancement Project under phase 2.

The Coastal Enhancement Project aims to utilise the resulting protected stretch of Bereford foreshore, offering its use to the community. This involves amenity works including landscaping, barbeques, picnic settings, benches, bicycle racks, showers, playground equipment, lighting, drinking fountains, shade structures and a toilet block. The project showcases the City's focus in maintaining and emphasising a coastal lifestyle, while ensuring project sustainability and planned long-term investment.

Summary of Existing Planning Framework

Planning and Development (Local Planning Schemes) Regulations 2015

The Planning and Development (Local Planning Schemes) Regulations 2015 (the regulations) were introduced by the State government to ensure a consistent structure, format and approach to local planning schemes across the state of Western Australia.

The regulations contain 'deemed provisions' being Schedule 2 of the Regulations and these provisions automatically apply to all local government planning schemes throughout the state and supersede corresponding provisions of these schemes. The deemed provisions are incorporated into the City's Local Planning Scheme No.1 (LPS1).

Schedule 2 of the Regulations contain provisions relating to various planning mechanisms which have varying degrees of application to implementing adaptation approaches for coastal processes. The planning mechanisms available in the Regulations are examined below.

Local Planning Policy

Division 2 of the deemed provisions relates to the preparation of local planning policies. A local planning policy may apply generally to the Scheme area or deal with a specific class or classes of matters.

In making a determination under the scheme, the City of Greater Geraldton must have regard to each relevant local planning policy, to the extent that the policy is consistent with the scheme. In addition to introducing new policy measures to be considered with the City, a local planning policy may also vary existing deemed-to-comply provisions of the Residential Design Codes, where it is considered appropriate. In the context of coastal hazard and risk planning, a local planning policy could introduce additional design requirements for development, such as elevated habitable floor levels, additional required setback requirements and other relevant matters to ensure coastal hazard issues are appropriately responded to within the planning framework.

Structure Plans and Activity Centre Plans

Part 4 of the deemed provisions relates to the preparation of structure plans while Part 5 relates to the preparation of Activity Centre Plans. A structure plan (or Activity Centre Plan) may be prepared for a specific area if:

- (a) The area is:
 - i. All or part within a zone that is identified by the scheme as being 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.

The relevant decision maker of subdivision and development applications within a structure plan area must have due regard to but is not bound by a structure plan. A structure plan therefore does not have the full force and effect of the scheme. Once adopted, a structure plan which identifies zoning and land use permissibility, would need to be normalised within a scheme by way of a scheme amendment, if the zoning and land use permissibility is to have statutory weight.

Local Development Plans

Regulation 47 of the Regulations provides for the preparation of local development plans (LDP), which states:

‘A local development plan in respect of an area of land in the Scheme area may be prepared if –

- (a) The Commission has identified the preparation of a local development plan as a condition of approval of a plan of subdivision of the area; or
- (b) A structure plan requires a local development plan to be prepared for the area; or
- (c) An activity centre plan requires a local development plan to be prepared for the area; or
- (d) The Commission and the local government considers that a local development plan is required for the purposes of orderly and proper planning.’

Special Control Areas

Special Control Areas (SCA) may be established within Part 5 of the model scheme provisions. SCAs are typically put in place to establish special provisions to target a single issue or related set of issues often overlapping zone and reserve boundaries. The provisions of an SCA would establish the purposes and objectives of the SCA, specific development requirements and, if applicable, referral requirements to relevant agencies. A SCA could therefore be established within a scheme to comprehensively address the specific development issues associated with land prone to coastal hazard and risk issues.

A SCA would be delineated on the scheme maps by way of line work, which could follow the extent of mapped areas known to be prone to storm surge and or coastal physical processes (erosion, sea level rise allowance).

General Development Provisions

Part 4 (Clause 31) of the model scheme has provisions for the establishment of additional site and development requirements in addition to those set out in the R-Codes, activity centre plans, local development plans or State and local planning policies. General development provisions could

technically set out general development requirements relating to areas subject to coastal flooding and / or coastal processes. However, it is considered that given the specific nature of coastal issues, including the varied locational extent to which it may affect land within a district, specific development requirements would more appropriately be established within a Special Control Area as opposed to general provisions within the scheme.

Exemptions from planning approval

Regulation 61 of the Regulations specifies works and land uses that are exempt from requiring planning approval.

The following outlines development for which development approval is not required pursuant to this regulation:

- The carrying out of works that are wholly located on an area identified as a regional reserve under a region planning scheme (no application to the City of Greater Geraldton);
- The carrying out of internal building work which does not materially affect the external appearance of the building, provided that the building is not afforded statutory heritage protection;
- The erection or extension of a single house provided that the single house is not afforded statutory heritage protection;
- The erection or extension of an ancillary dwelling, outbuilding, external fixture, boundary wall or fence, patio, pergola, veranda, garage, carport or swimming pool on the same lot as a single house or a grouped dwelling if the R-Codes are applicable provided that the development is not located in a place that is afforded statutory protection;
- The demolition of a single house, ancillary dwelling, outbuilding, external fixture, boundary wall or fence, patio, pergola, veranda, garage, carport or swimming pool provided that the development is not located in a place that is afforded statutory heritage protection;
- Temporary works which are in existence for less than 48 hours, or a longer period agreed by the local government, in any 12-month period;
- The temporary erection or installation of an advertisement in specific circumstances;
- The erection or installation of a sign in specific circumstances;
- The carrying out of any other works specified in a local planning policy or local development plan that applies to the development as works that do not require development approval;
- The carrying out of works of a type of a type identified elsewhere in this scheme as works that do not require development approval.

This is a consideration of the CHRMAP process, as it has the implication that certain development may be established within an area affected by storm surge or coastal processes without the requirement to obtain planning approval. However, there are ways of addressing this issue. For instance, a local planning policy or local development plan could vary the deemed-to-comply requirements of the R-Codes to put in place additional design requirements that may trigger the requirement for planning approval. Secondly, a Special Control Area could be established over land affected by coastal processes or storm surge, which would trigger the requirement for the prior planning approval to be obtained from the City of Greater Geraldton, including the requirement for the prior planning approval to be obtained for exempted development.

Summary of Options

Statutory planning mechanisms available to address coastal hazards within the City of Greater Geraldton.

Statutory Measure

Advantages

Disadvantages

Structure Plan

Can address location specific issues i.e. identification of coastal physical setbacks and areas affected by storm surge.

Does not have the force and effect of the Scheme.
Decision makers to have due regard only.

Cannot specify / enforce built form requirements.

Location specific only and therefore cannot address coastal hazard issues on a broad scale.

Generally, requires the land to be appropriately zoned to require the preparation of a structure plan.

Local Development Plan

Can specify built form requirements to address location specific coastal hazard issues i.e. increased setbacks, minimum habitable floor levels etc.

Location specific only and therefore cannot address coastal hazard issues on a broad scale.

Has statutory weight of the local planning scheme.

Can vary 'deemed-to-comply' development requirements.

Local Planning Policy

Can address coastal hazard and risk issues at a district (broad) level and/or at a location specific level.

Can include mapping of coastal hazard issues with flexibility to update mapping as and when amendments are required to be undertaken.

Has statutory weight of the local planning scheme.

Can vary 'deemed-to-comply' development requirements.

<u>Special Control Area</u>	SCAs may establish specific provisions to address a specific issue such as storm surge and or coastal processes. SCAs can broadly address unique issues that extend across multiple zones and/ or reserves.	A scheme amendment would potentially need to be progressed every time mapping of the coastal issue is amended and/or updated.
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Of the mechanisms listed in the table above, a Local Planning Policy and/or special control area (SCA) are considered the most suitable to address coastal hazard within the planning framework. See 'City of Greater Geraldton Draft Planned or Managed Retreat Guidelines' under Strategic Planning Framework for the City's approach to addressing coastal hazards and associated impacts.

State Planning Policy 2.6: State Coastal Planning Policy

State Planning Policy 2.6 – State Coastal Planning Policy (SPP 2.6) and associated guidelines have been prepared to guide decision making policy in relation to planning along the state's coastline.

SPP2.6, provides policy on the determination of an appropriate foreshore reserve, which acts as a coastal buffer to accommodate coastal processes as a result of coastal erosion and risk or storm surge inundation in future planning periods.

SPP2.6 seeks to ensure coastal hazard risk management and adaptation planning is established to guide the location and form of development along the coast. The policy establishes a hierarchy for undertaking coastal hazard and risk adaptation planning. The adaptation measures of Avoid, Planned or Managed Retreat, Accommodate and Protect are to operate on a sequential and preferential basis starting with avoid as part of the coastal hazard risk management adaptation planning process.

The State Coastal Planning Policy guidelines were introduced to support draft SPP 2.6. These guidelines identify a range of ongoing risk management and adaptation planning measures that may be considered in the assessment of development proposals located within an area known to be subject to storm surge risk or coastal erosion hazard. The guidelines establish a process for undertaking CHRMAP, as follows:

1. Establish a context;
2. Undertake a risk vulnerability assessment;
3. Determine the likelihood of the hazard occurring;
4. Determine the consequences;
5. Evaluate the risks;
6. Set in place adaptation management measures; and
7. Undertake monitoring and review.

Section 77 of the *Planning and Development Act 2005* requires that local governments when preparing or amending a local planning scheme, have due regard to relevant State policies and guidelines such as SPP2.6 and its associated guidelines and State Planning Policy 3.4.

Draft Planned or Managed Retreat Guidelines

The Draft Planned or Management Retreat Guidelines, provides guidance on how to implement a policy of planned or managed retreat, and is applicable to 'Brownfield' and 'Infill' development, as it is these locations that are currently, and increasingly, vulnerable to coastal hazards with limited opportunities to introduce less vulnerable forms of use or development through planning control. The policy is based on principles of social, environmental and economic sustainability and adheres to objectives set out in State Planning Policy No. 2.6 State Coastal Planning Policy (discussed above). The approach ensures ongoing protection and provision of a coastal foreshore reserve and beach amenity and continuing undiminished public access to beaches. The policy directly references the completion of a comprehensive CHRMAP process, in order to outline necessary guidelines.

Key principles identified are as follows;

- (a) To ensure land in the coastal zone is continuously provided for coastal foreshore management public access, recreation and conservation.
- (b) To ensure public safety and reduce risk associated with coastal erosion and inundation.
- (c) To avoid inappropriate land use and development of land at risk from coastal erosion and inundation.
- (d) To ensure land use and development does not accelerate coastal erosion or inundation risks; or have a detrimental impact on the functions of public reserves.

The draft guidelines outline the approach for implementing the Planned or Managed Retreat Policy, outlining planning mechanisms and their associated levels. Structure planning, local planning scheme amendment and taking of land is the first, second and third (respectively) planning mechanism for the policy.

1) Structure Planning-

- Structure planning is identified as the first mechanism, requiring the consideration of risks identified in the CHRMAP process to feed into subdivision conditions of coastal areas where some degree of comprehensive redevelopment of land remains an option.

2) Local Planning Scheme Amendment-

- A local planning scheme amendment is the second mechanism, and is required to give statutory weight to the proposed Planned or Management Retreat Policy.
- The amendment is to be informed by SPP2.6 and such amendment should classify vulnerable areas as a Special Control Area (SCA).
- The purpose of establishing a SCA is to enable land use and development at risk to be identified within the SPP2.6 100- year planning policy. The identified zone is then subject to a special planning instrument, with the intention to retreat from this 'at risk' area.

3) Taking of Land-

- Taking of land is the third planning mechanism and occurs when it is assumed that land has not been transferred or committed to the public realm through structure planning processes, and that coastal processes have advanced to the point where there is no further economic or social utility in land due to coastal changes.

- Where land is reserved under the relevant planning scheme, options to move this land from private to the public realm include:
 - a. Purchase of the land by the responsible authority if the owner is willing to sell it by ordinary sale pursuant to s 190 of the PD Act; or
 - b. Compulsory taking by the responsible authority without agreement pursuant to s 191 of the PD Act.
- If land cannot be acquired under the above options (land not reserved under local planning scheme), in order to move this land from the private to public realm, it can be argued that the land is acquired for a 'public work' (that is, for the protection of foreshores). Options available for acquiring land for a 'public work' include:
 - a. Taking by agreement under the *Land Administrative Act 1997* (LA Act); or
 - b. Compulsory acquisition by the Minister for Lands for the purpose of a 'public work' under the LA Act.
- It is the preferred approach that the land be purchased by the responsible authority by agreement under the relevant acts above.

State Planning Policy 3.4: Natural Hazards and Disasters

State Planning Policy 3.4- Natural Hazards and Disasters (SPP 3.4) was prepared to ensure that land use planning appropriately considers the risk of natural hazards and disasters. It addresses storm surge as well as a range of other hazards, including overland flooding. With respect to overland flooding events, SPP 3.4 requires that:

- The 100-year average recurrence interval overland flood event by used as the defined flood event in relation to the assessment of proposals.

While SPP3.4 identifies a 100-year ARI (average recurrence interval) event for storm surge, the policy also references SPP2.6, which requires regard to be given to a 500 year ARI storm surge event.

With respect to storm surge, SPP 3.4 further states with respect to cyclonic activity and storm surge:

- Where storm surge studies have been undertaken and show inundation may occur, new permanent buildings should be constructed to take account of the effects of storm surge (including wind and wave set up).
- In areas where storm surge studies have not been undertaken, but evidence is available to demonstrate vulnerability to inundation, any development proposals should be supported by studies that demonstrate inundation will not occur.

City of Greater Geraldton Strategic Planning Framework

City of Greater Geraldton Local Planning Strategy

The City of Greater Geraldton Local Planning Strategy (LPS) is the primary strategic framework forming part of an integrated suite of documents that collectively form the City's planning framework. The City's Community Vision is articulated in the Strategic Community Plan 2013 – 2023:

A creative city-region with the capacity to sustain a population of 80,000 – 100,000 which has a prosperous, diverse and sustainable community within an attractive Western Australian Setting.

The Strategy identifies key planning principles in achieving the City’s overall vision. ‘Environment’, ‘Social’ and ‘Economy’ are three of these principles outlining the following:

- **Environment** – *A sustainable built form and natural environment. We value our natural and built environment and live sustainably: in balance with nature.*
- **Social** – *A strong healthy community which is equitable, connected and cohesive. We value our sense of community, our small two feel and lifestyle opportunities of our coastal location and bushland.*
- **Economy** – *A dynamic, diverse and sustainable economy. We value a healthy thriving economy that provides diverse employment opportunities while protecting the environment and enhancing social and cultural outcomes.*

All three principles centre around the coast and associated lifestyle opportunities. It is apparent throughout the Strategy that the City aims to continue to promote the benefits of coastal living, making the need to manage and mitigate against coastal processes even more important.

The LPS also recognises the pressures placed on the City’s coastal asset, with a majority of the City’s population residing in the Geraldton Urban Area, there is an ever increasing demand and consequently pressure placed on the coastal reserves for recreation pursuits and which have implications for coastal processes. The LPS recognises the need to monitor the adequacy of existing coastal reserves in response to population growth and natural processes.

The LPS includes the following specific strategies and actions relating to the Coast:

4.11 COAST	
Strategies	Actions
<ol style="list-style-type: none"> 1. Consider access, infrastructure requirements and management of coastal recreation activities to enable environmental conservation and protection of natural heritage values of coastal reserves. 2. Consider social amenity and public access requirements in the definition of coastal foreshore reserves. 	<ol style="list-style-type: none"> 1. Implement the land use planning recommendations of the <i>South Greenough to Cape Burney Coastal Planning Strategy</i>. 2. Ensure land use decision making is based on the best available science regarding coastal processes and the need for adequate setbacks.

This CHRMAP responds to the second action in that it maps coastal hazards and identifies appropriate adaptation responses to mitigate the risk of these hazards on coastal assets within the City.

Point Moore Inundation and Coastal Processes Study

The Point Moore Inundation and Coastal Processes Study in accordance with the State Coastal Planning Policy (SPP2.6), provides guidance for calculating the components of a coastal foreshore reserve required to overcome the risks posed by the two main types of coastal hazards (inundation and erosion). The study has determined potential coastal vulnerability lines and inundation extents

for 2015, 2030, 2070 and 2110. The study concluded that Point Moore is vulnerable to coastal processes, deeming a strategy to protect or prepare urban development for coastal impacts necessary.

A large portion of land in Point Moore is delegated as leasehold properties. With current leases ending in 2025 or 2028, the CGG made a decision in October 2017 to alter lease conditions. The CGG offered the residents of Point Moore a choice of either surrendering their current leases and entering new ones defined by trigger points for a period of 21 years or retain their existing lease with no provision for an extension.

Trigger points are a form of management, protecting residents from likely coastal impacts by retreat. If a trigger point is reached, the lease will terminate and leaseholders will be provided with a 6 month vacate notice. Trigger points occur when the area becomes uninhabitable because of rising sea levels, erosion, public health risks, issues with power, waste-water, water supply etc. Point Moore is an example of how CGG is responding to potential coast impacts, employing adaptation strategies such as trigger points to prepare the region and corresponding residents.

Geraldton Greenough Coastal Strategy & Foreshore Management Plan 2005

The purpose of the Coastal Strategy and Foreshore Management Plan is to guide decision making in relation to the management, protection and planning of foreshore and coastal areas. Although outdated, the plan identifies key northern beaches including Drummond Cove and Sunset North outlining key physical and environmental characteristics and associated management plans. The Strategy can be analysed to gain basic knowledge on the coastal areas of Geraldton and information regarding past and current management plans.

City of Greater Geraldton Statutory Planning Framework

City of Greater Geraldton Local Planning Scheme 1.0

The City of Greater Geraldton Local Planning Scheme 1.0 (LPS1) is the primary statutory mechanism for the control of land use and development within the City of Greater Geraldton. Special Control Areas (SCA) have been identified under the scheme, outlining purpose, objectives and additional provisions which apply to each area.

Relevant to coastal management is the South Greenough to Cape Burney Coastal Planning Strategy, identified as Special Control Area 7 under LPS1. The area is becoming increasingly under pressure from human activity, conflicting user demands and accelerated climate change. In considering development applications for the region, the local government must have regard for the South Greenough to Cape Burney Coastal Planning Strategy. SCA7 highlights how a vulnerable region can gain statutory management protection through a scheme amendment. The scheme amendment references the policy relevant to all development within the identified SCA.

City of Greater Geraldton Local Planning Policies

Local Planning Policy 3.1 – Climate Change

Local Planning Policy 3.1 (LPP3.1) outlines the City's need to evaluate climate change implications regarding operational decisions and policy positions. Risk management through appropriate mitigation and adaption strategies is emphasised as a key component in preparing for resulting implications, forming the policies primary aim.

The Policy refers to Section 1.3 (3) of the *Local Government Act 1995*, stating “In carrying out its functions a local government is to use its best endeavours to meet the needs of current and future generations through an integration of environmental protection, social advancement and economic prosperity”. In adherence with this Policy, the City of Greater Geraldton has formed strategies and actions in preparing for the implications of Climate Change on the community. The policy states key objectives the City of Greater Geraldton has identified and is working towards as follows:

- Regionally specific priorities and impacts with regard to their environmental, social and economic opportunities and risks;
- Cooperative, coordinated regional climate change management across the political and operational areas under its jurisdiction;
- Minimising climate change risks to its operations/communities and work together with Commonwealth and State Governments to plan and implement appropriate strategies; and
- A set of internal targets for mitigation and adaptation that are adopted by Council and widely publicised in order to achieve stakeholder and community support.

Climate change imposes numerous implications on the Geraldton coastline including inundation and erosion processes. As a result, development within the affected zones must follow the objectives above, in attempt to minimise impacts and promote resilient community growth.

Local Planning Policy Geraldton City Centre Revitalisation Plan 2017

The Geraldton City Centre Revitalisation Plan is a Local Planning Policy, providing short, medium and long-term aspirations and strategies in redeveloping Geraldton’s city centre to become an accessible, active hub supporting the needs of the greater regional community. The vision for the revitalisation of Geraldton city centre is:

“For Geraldton city centre to develop as the regional capital of the Mid West, as a collaborative and innovative leader that positively harnesses change. The city centre will be a unique place for locals and visitors and an active destination embracing Geraldton’s nautical history and assets. The broader community will come together to deliver this vision and strengthen their city centre heart”.

One of the key objectives outlined is the need to embrace the nautical influences of the Batavia Coast and clearly promote these as assets of the place. The major influence of the coast on the resident lifestyle is in direct accordance with the City of Greater Geraldton Strategic Community Plan.

The foreshore precinct as part of the city centre revitalisation involves the integration of coastal amenities into the centre, rather than separating the city from the coast. Re-establishing the foreshore as a key component of the city is intended to promote community and visitor interaction with coastal amenities. Associated infrastructure and service investment by the City highlights the need implement foreshore protection and preservation strategies.

Local Planning Policy - Sunset Beach Precinct Plan

The Sunset Beach precinct has been identified as a growth area, predicted to support future population fluxes occurring in the Greater Geraldton region. The policy outlines the importance of

planning and sustainable design to ensure the hub forms a functional urban environment, developing to support current and future residents and their corresponding needs.

The Plan emphasises the need to reactivate the urban area with Sunset Beach, reinforcing a coastal development focus. Due to the close proximity between the outlined growth precinct and the foreshore; coastal management, mitigation and adaptation strategies become fundamental. These processes reinforce planning direction towards the sustainable growth of Greater Geraldton, being a highly adaptable, well-designed region.

Local Planning Policy - City Centre

Clause 4.2.8 of the City Centre (LPP) identifies the importance of the Batavia Coast Marina Precinct in connecting the CBD of Greater Geraldton and the waterfront. The Policy outlines a revitalisation plan, providing a vibrant mixed-use precinct defined by a combination of residential, retail, entertainment and commercial land uses along the coast. The development of the Marina will include public and private investment along the associated coastline, with infrastructure subject to implications of coastal processes.

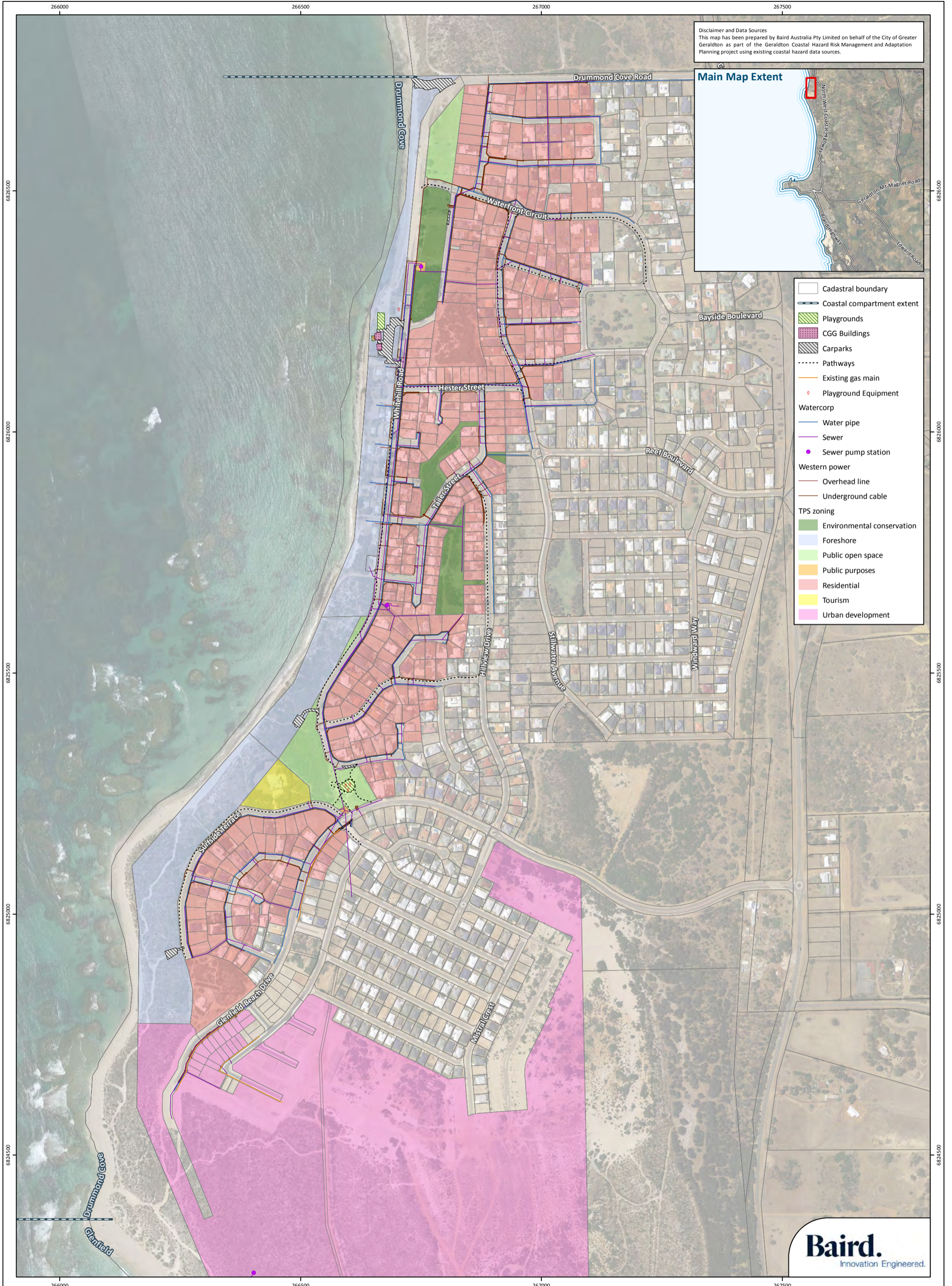
Local Planning Policy – Design Guidelines: Beresford Beachfront Mixed Use

The City of Greater Geraldton’s Beresford Beachfront Mixed Use Local Planning Policy is an outcome of the Geraldton Regional Centre Strategy and aims to guide development in an area defined as the Sub-Precinct area of the Beachfront Precinct, Beresford. The design guidelines outline criteria that the City will measure against subdivision and development within the area. It is noted that following a CHRMAP process, these guidelines may require amendment to support outcomes identified in the CHRMAP.

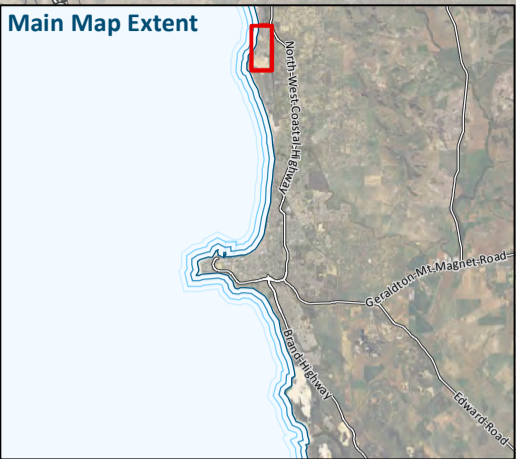
Local Planning Policy – Design Guidelines: Marine Terrace Foreshore Precinct Mixed Use

The Marine Terrace Foreshore Precinct Mixed Use Guidelines are intended to guide and facilitate development and redevelopment within the specified precinct located within the City of Greater Geraldton. The guidelines are intended to provide a flexible development and land use control and facilitation framework that can respond to changing circumstances. The City intends to promote development which responds to and capitalises on the location and context of the site, including its foreshore location, views, interface with the public realm and interface with surrounding residential areas. With the City’s intention to utilise prime land along the foreshore, the need to identify management and mitigation strategies is emphasised. It is noted that amendments to these guidelines may need to occur following the CHRMAP process, aligning with the policies intent to respond to changing circumstances.

A.4 Coastal Asset Register



Disclaimer and Data Sources
 This map has been prepared by Baird Australia Pty Limited on behalf of the City of Greater Geraldton as part of the Geraldton Coastal Hazard Risk Management and Adaptation Planning project using existing coastal hazard data sources.



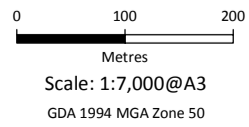
- Cadastral boundary
- Coastal compartment extent
- Playgrounds
- CGG Buildings
- Carparks
- Pathways
- Existing gas main
- Playground Equipment
- Watercorp**
- Water pipe
- Sewer
- Sewer pump station
- Western power**
- Overhead line
- Underground cable
- TPS zoning**
- Environmental conservation
- Foreshore
- Public open space
- Public purposes
- Residential
- Tourism
- Urban development

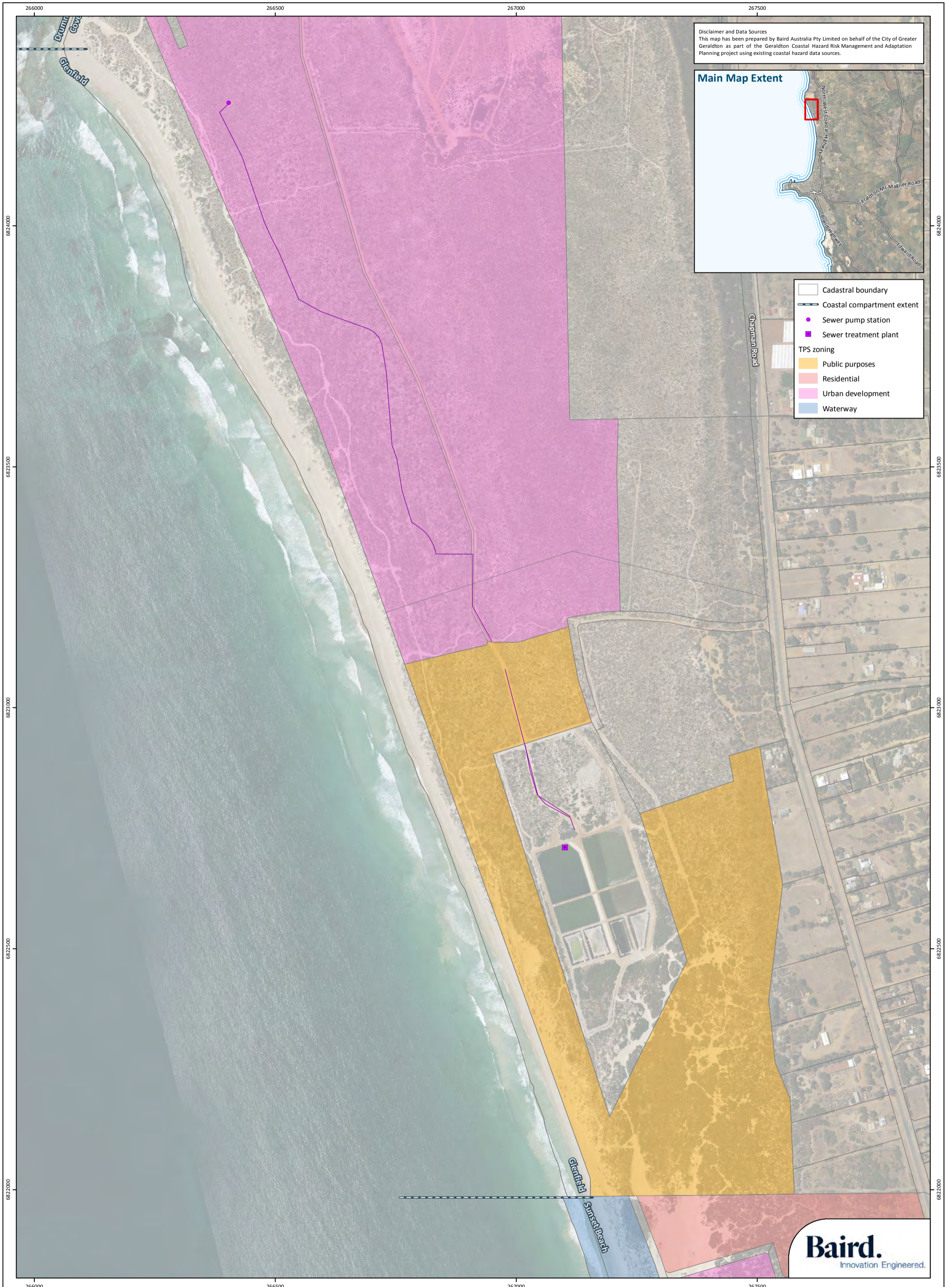
Figure 1 of 12

Coastal Asset Mapping, Drummond Cove

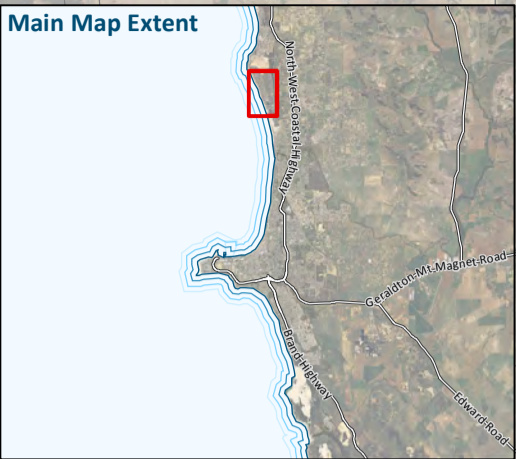
Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F25b
Drawn: KNM
Date: 09/11/2018
Checked: JC
Approved: JC
Date: 09/11/2018

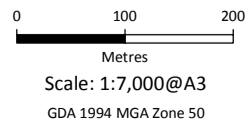


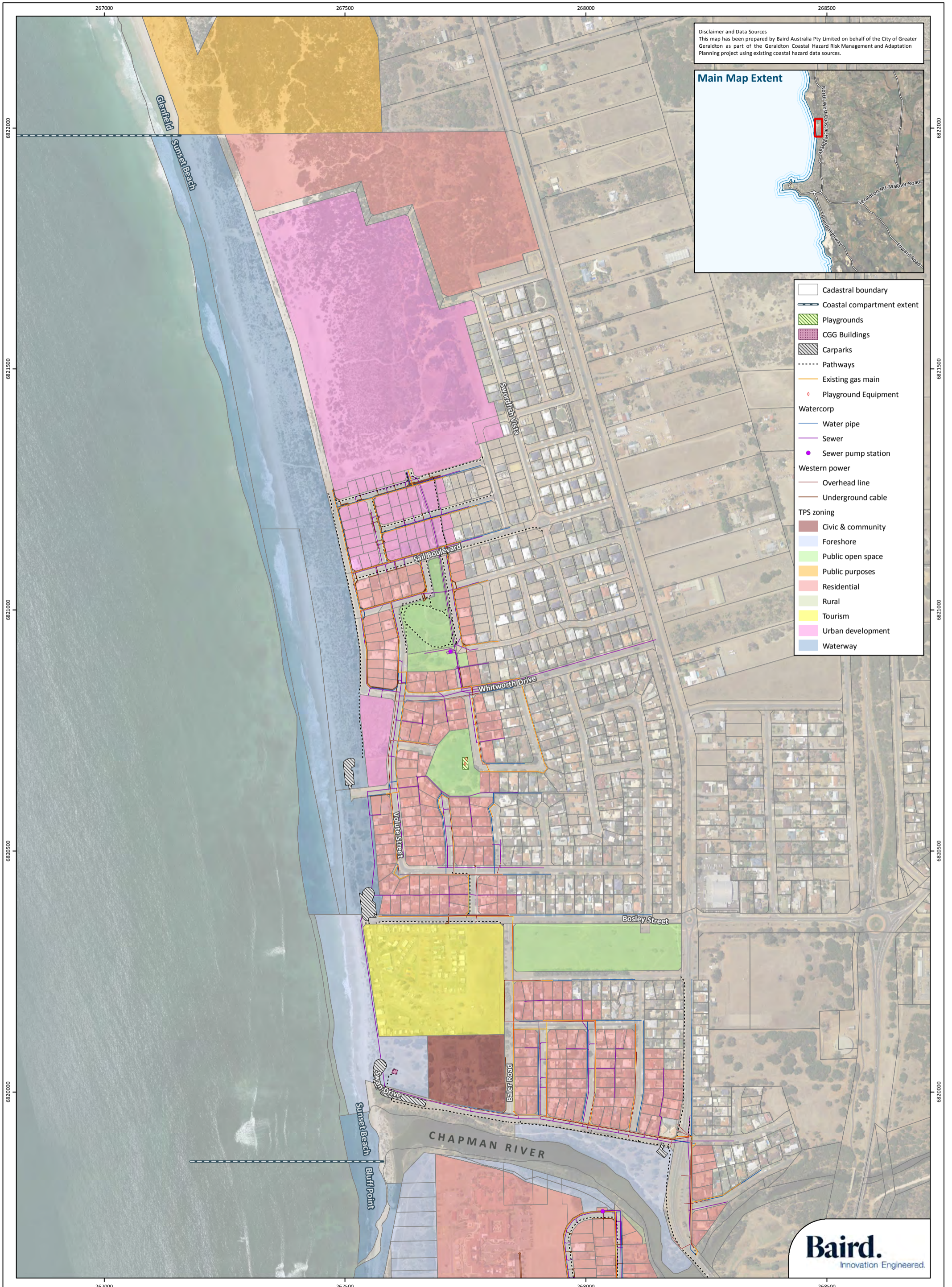


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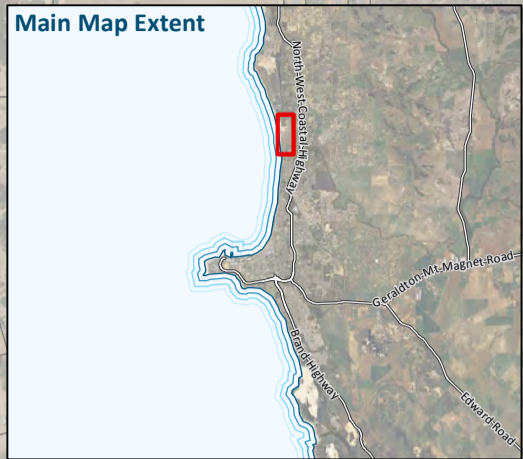


- Cadastral boundary
- Coastal compartment extent
- Sewer pump station
- Sewer treatment plant
- TPS zoning**
- Public purposes
- Residential
- Urban development
- Waterway





Disclaimer and Data Sources
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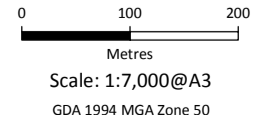


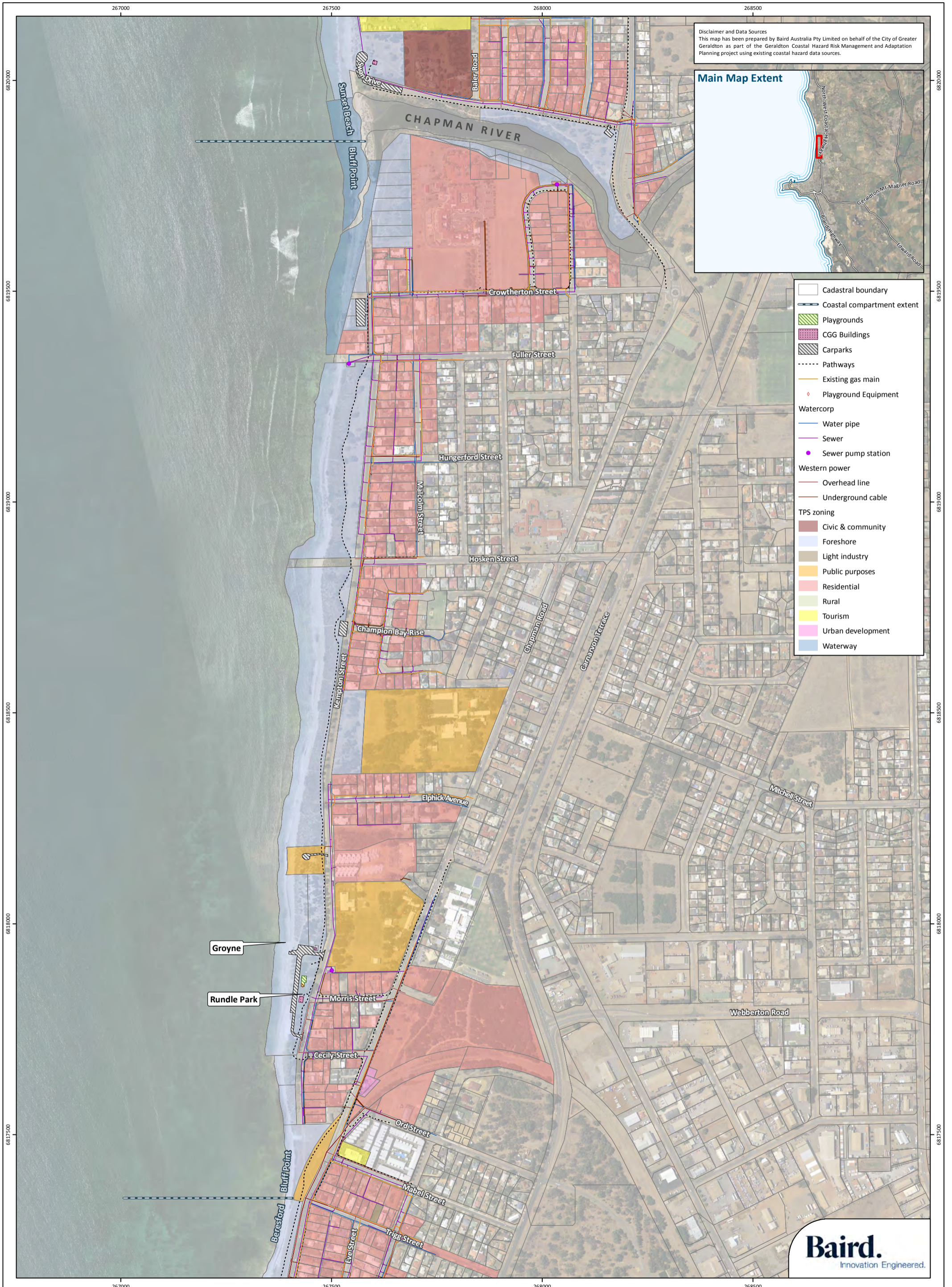
- Cadastral boundary
- Coastal compartment extent
- Playgrounds
- CGG Buildings
- Carparks
- Pathways
- Existing gas main
- Playground Equipment
- Watercorp**
 - Water pipe
 - Sewer
 - Sewer pump station
- Western power**
 - Overhead line
 - Underground cable
- TPS zoning**
 - Civic & community
 - Foreshore
 - Public open space
 - Public purposes
 - Residential
 - Rural
 - Tourism
 - Urban development
 - Waterway



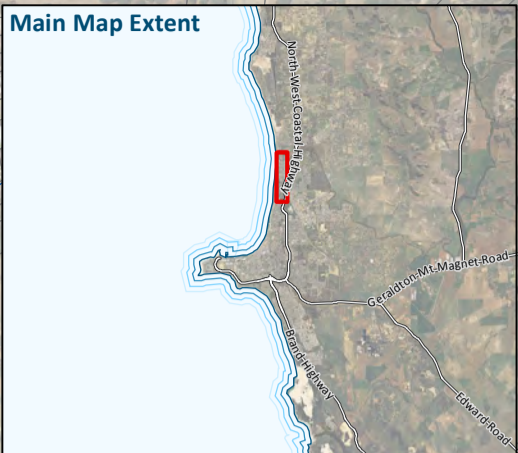
Figure 3 of 12
Coastal Asset Mapping, Sunset Beach
 Project: Geraldton CHRMAP Project
 Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F25b
 Drawn: KNM
 Date: 09/11/2018
 Checked: JC
 Approved: JC
 Date: 09/11/2018





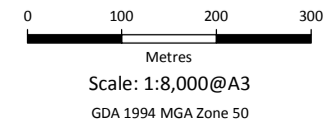
Disclaimer and Data Sources
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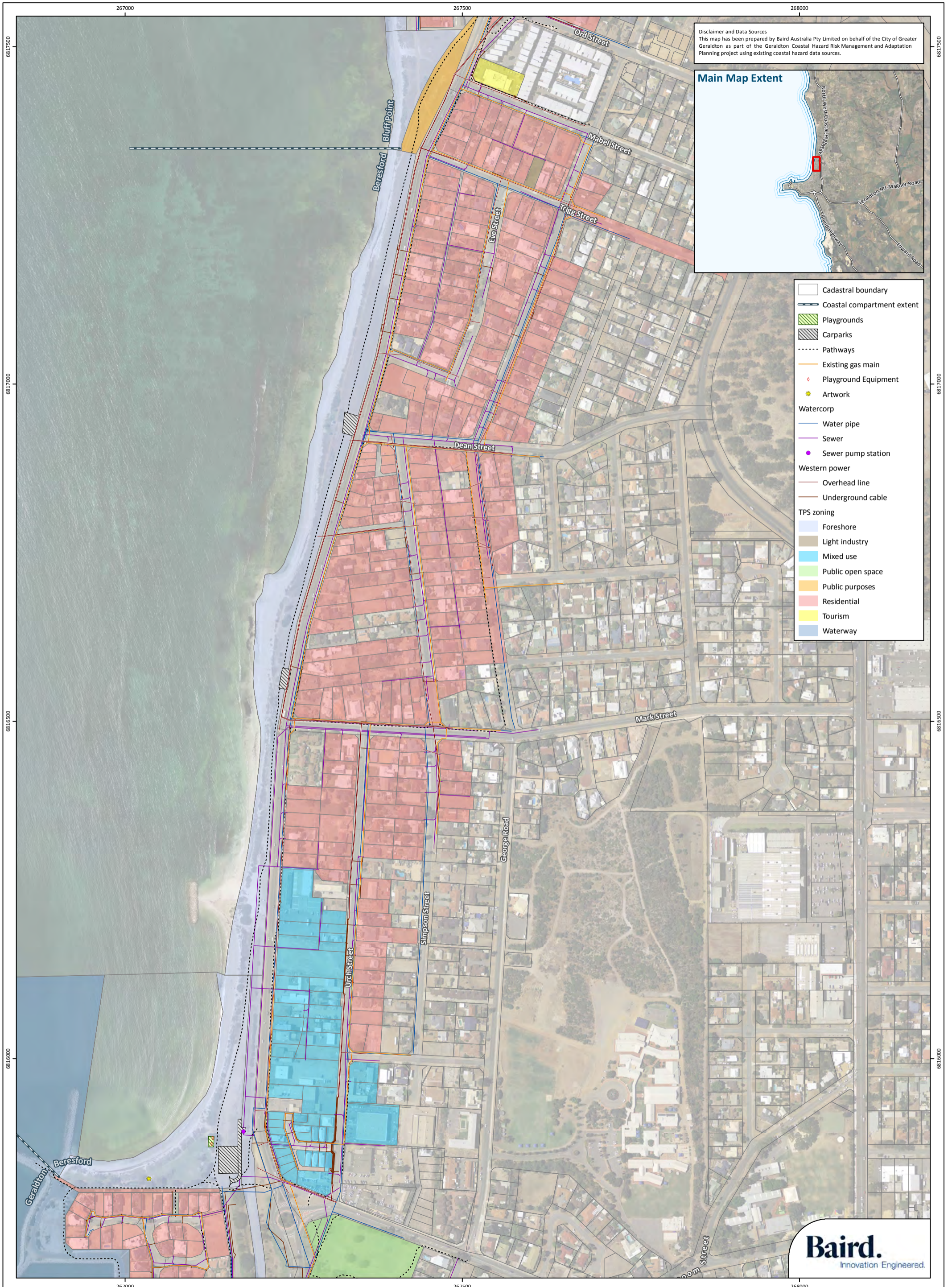


- Cadastral boundary
- Coastal compartment extent
- Playgrounds
- CGG Buildings
- Carparks
- Pathways
- Existing gas main
- Playground Equipment
- Watercorp**
- Water pipe
- Sewer
- Sewer pump station
- Western power**
- Overhead line
- Underground cable
- TPS zoning**
- Civic & community
- Foreshore
- Light industry
- Public purposes
- Residential
- Rural
- Tourism
- Urban development
- Waterway

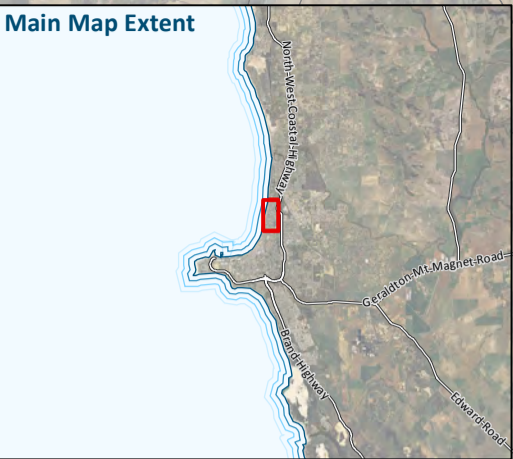
Figure 4 of 12
Coastal Asset Mapping, Bluff Point
 Project: Geraldton CHRMAP Project
 Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F25b
 Drawn: KNM
 Date: 09/11/2018
 Checked: JC
 Approved: JC
 Date: 09/11/2018





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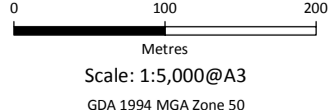
- Cadastral boundary
- Coastal compartment extent
- Playgrounds
- Carparks
- Pathways
- Existing gas main
- Playground Equipment
- Artwork
- Watercorp**
- Water pipe
- Sewer
- Sewer pump station
- Western power**
- Overhead line
- Underground cable
- TPS zoning**
- Foreshore
- Light industry
- Mixed use
- Public open space
- Public purposes
- Residential
- Tourism
- Waterway

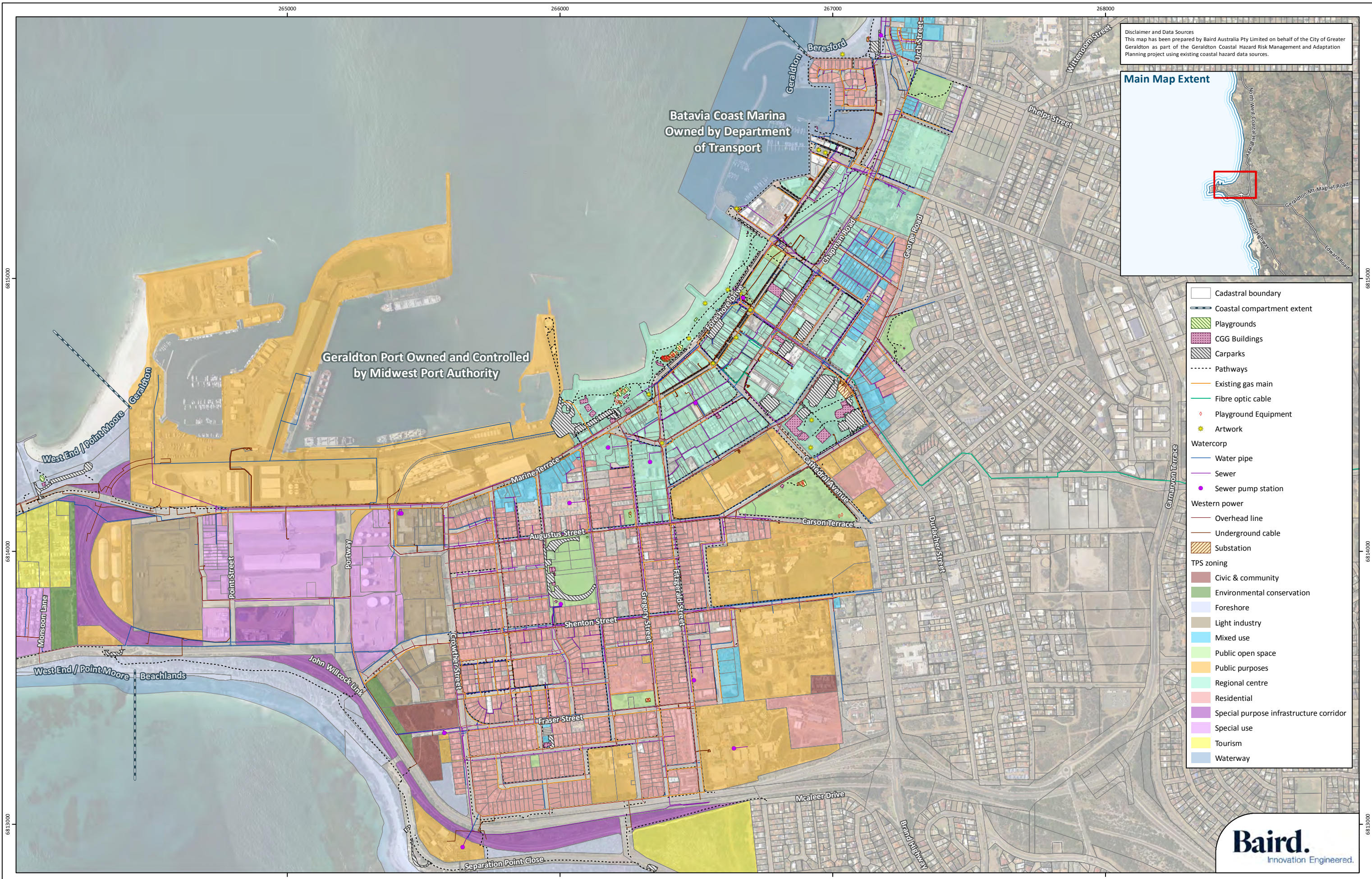
Baird.
 Innovation Engineered.

Figure 5 of 12 Coastal Asset Mapping, Beresford

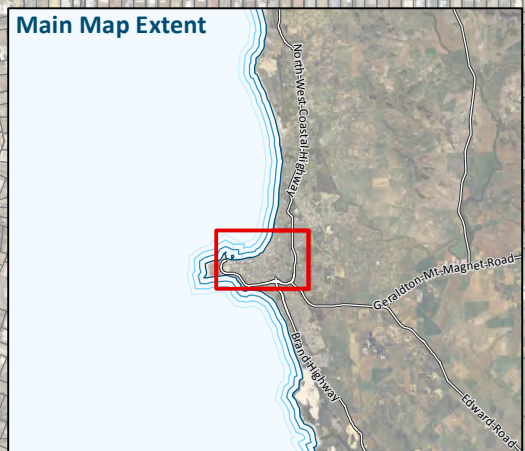
Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F25b
Drawn: KNM
Date: 09/11/2018
Checked: JC
Approved: JC
Date: 09/11/2018





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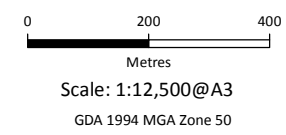


- Cadastral boundary
- Coastal compartment extent
- Playgrounds
- CCG Buildings
- Carparks
- Pathways
- Existing gas main
- Fibre optic cable
- Playground Equipment
- Artwork
- Watercorp**
- Water pipe
- Sewer
- Sewer pump station
- Western power**
- Overhead line
- Underground cable
- Substation
- TPS zoning**
- Civic & community
- Environmental conservation
- Foreshore
- Light industry
- Mixed use
- Public open space
- Public purposes
- Regional centre
- Residential
- Special purpose infrastructure corridor
- Special use
- Tourism
- Waterway



Figure 6 of 12
Coastal Asset Mapping, Geraldton
 Project: Geraldton CHRMAP Project
 Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F26b
 Drawn: KNM
 Date: 09/11/2018
 Checked: JC
 Approved: JC
 Date: 09/11/2018



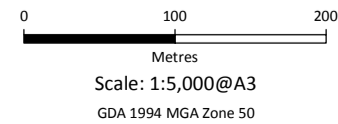
While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used

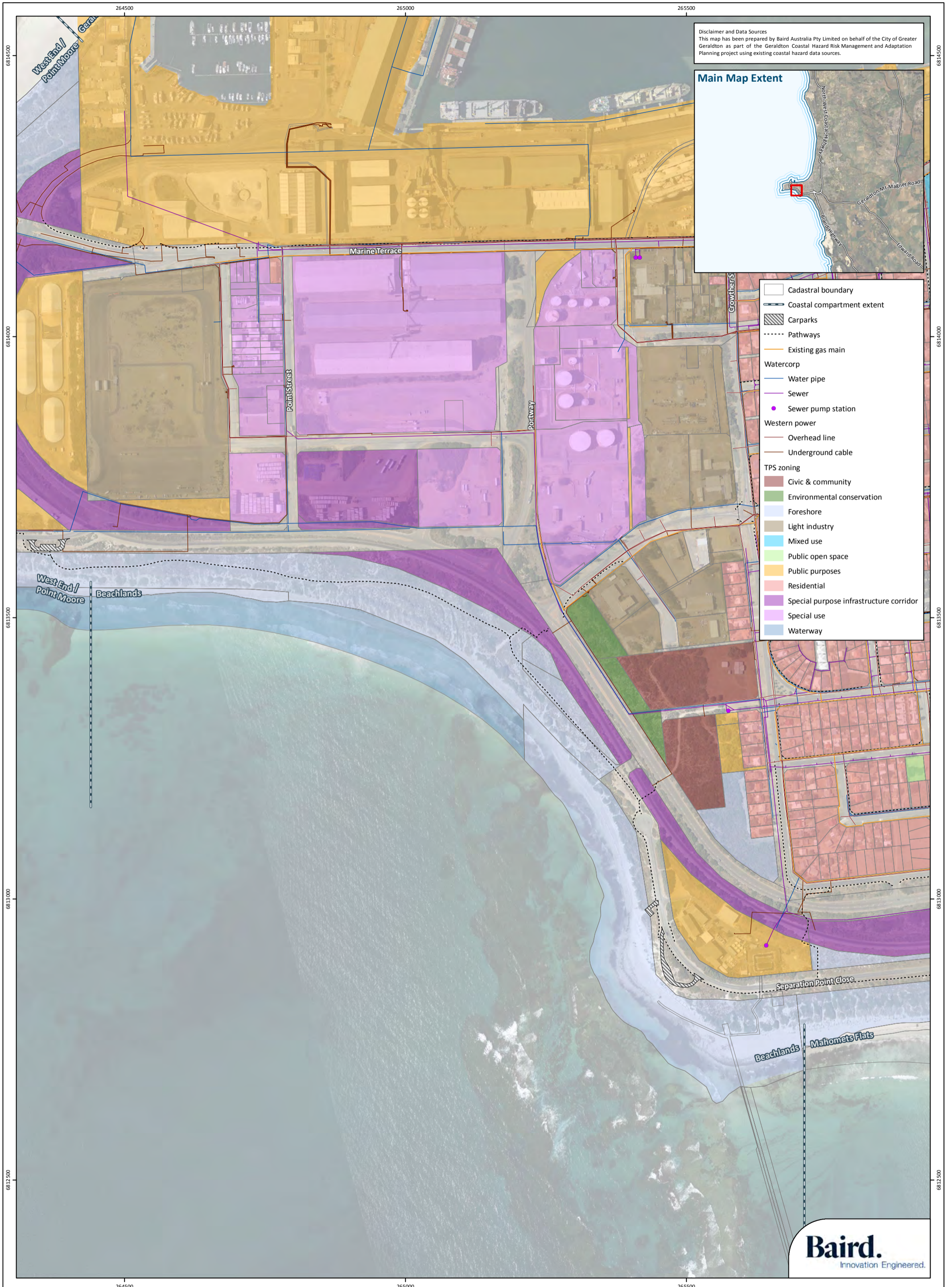


Figure 7 of 12
Coastal Asset Mapping, West End / Point Moore

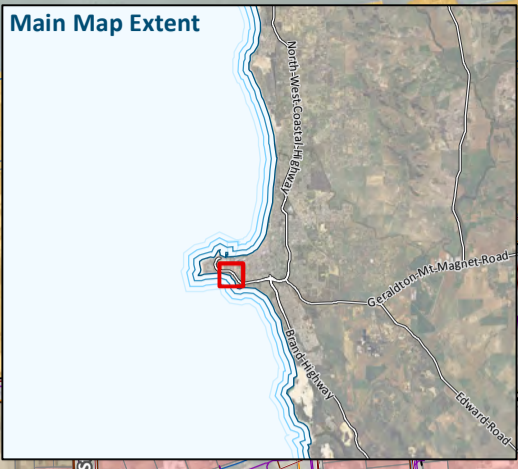
Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F27b
Drawn: KNM
Date: 09/11/2018
Checked: JC
Approved: JC
Date: 09/11/2018





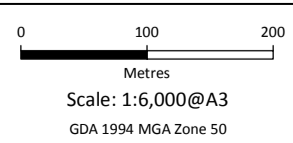
Disclaimer and Data Sources
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- Cadastral boundary
- Coastal compartment extent
- Car parks
- Pathways
- Existing gas main
- Watercorp**
- Water pipe
- Sewer
- Sewer pump station
- Western power**
- Overhead line
- Underground cable
- TPS zoning**
- Civic & community
- Environmental conservation
- Foreshore
- Light industry
- Mixed use
- Public open space
- Public purposes
- Residential
- Special purpose infrastructure corridor
- Special use
- Waterway

Figure 8 of 12
Coastal Asset Mapping, Beachlands
 Project: Geraldton CHRMAP Project
 Client: The City of Greater Geraldton

Plan Number: EP17-099(01)--F25b
 Drawn: KNM
 Date: 09/11/2018
 Checked: JC
 Approved: JC
 Date: 09/11/2018



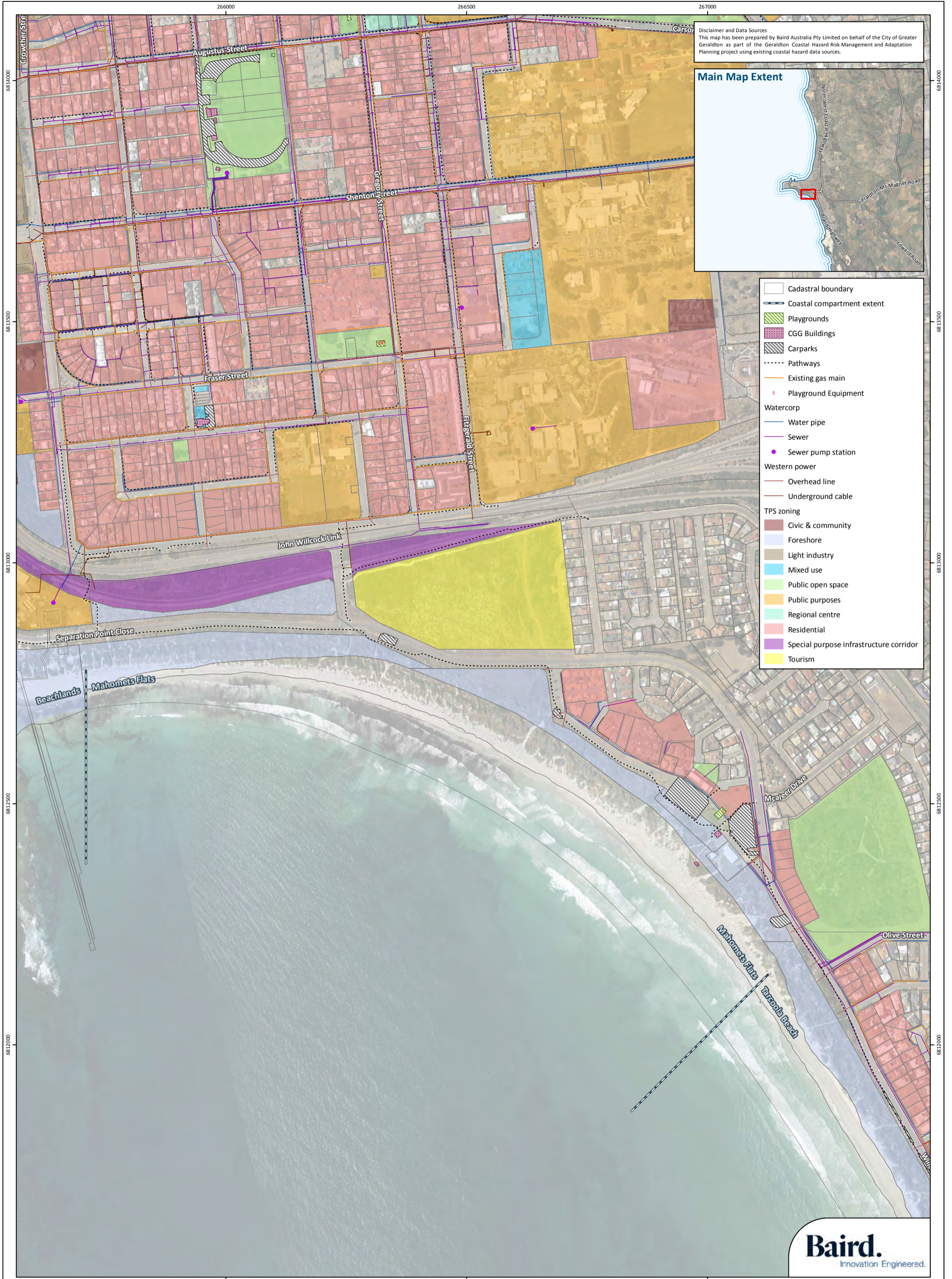
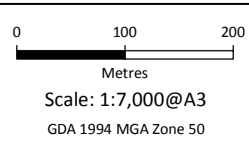


Figure 9 of 12 Coastal Asset Mapping, Mahomets Flats

Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)--F25b
Drawn: KNM
Date: 09/11/2018
Checked: JC
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Date: 09/11/2018



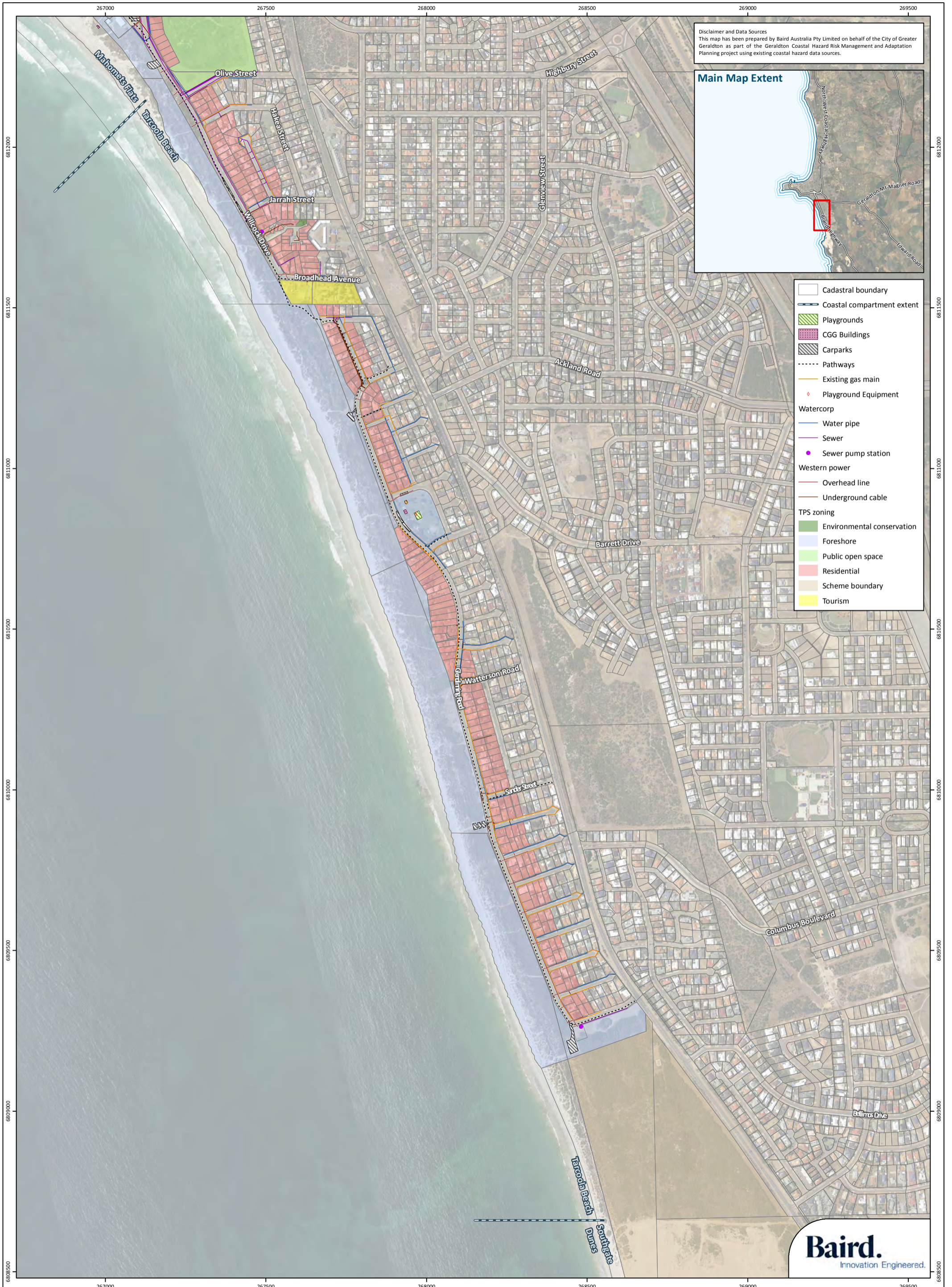
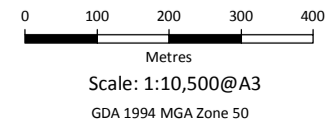
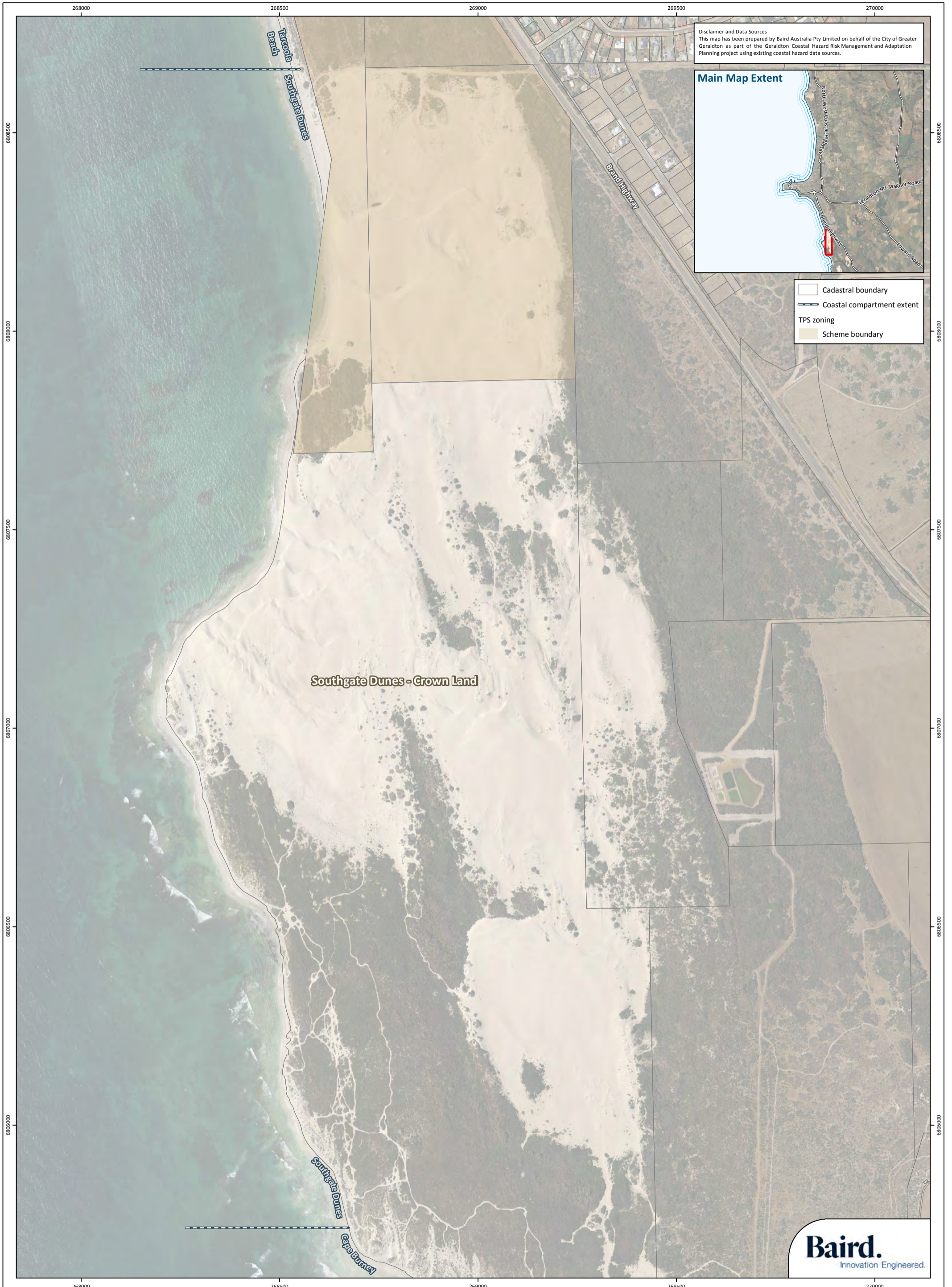


Figure 10 of 12
Coastal Asset Mapping, Tarcoola Beach

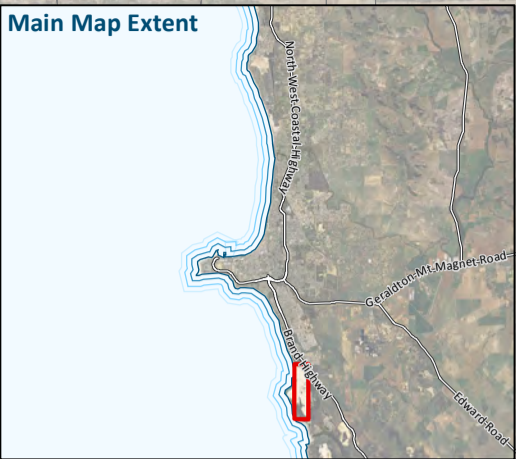
Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F25b
Drawn: KNM
Date: 09/11/2018
Checked: JC
Approved: JC
Date: 09/11/2018





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- Cadastral boundary
- Coastal compartment extent
- TPS zoning
- Scheme boundary

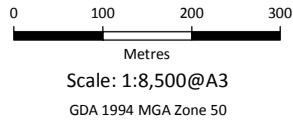
Southgate Dunes - Crown Land

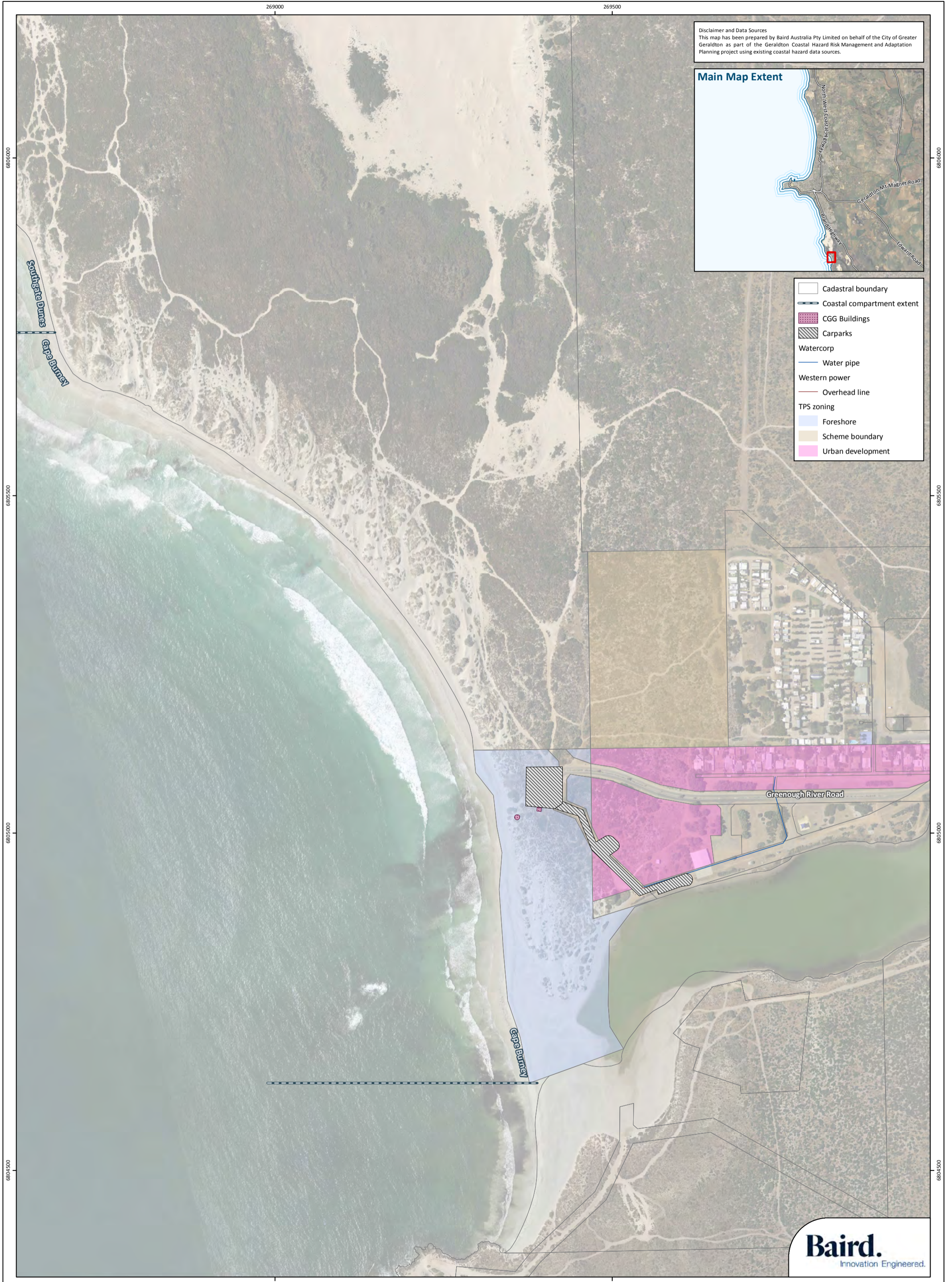


Figure 11 of 12 Coastal Asset Mapping, Southgate Dunes

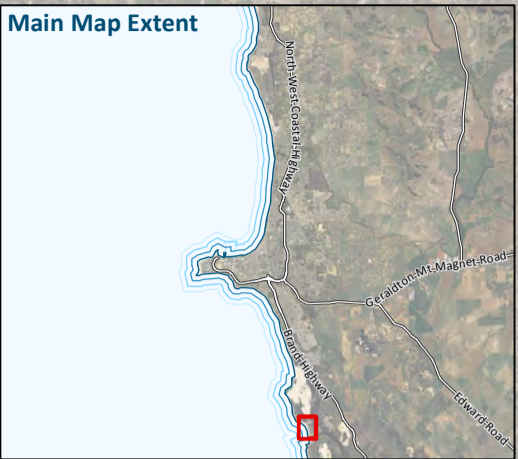
Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F25b
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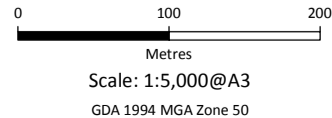
- Cadastral boundary
- Coastal compartment extent
- CGG Buildings
- Carparks
- Watercorp**
- Water pipe
- Western power**
- Overhead line
- TPS zoning**
- Foreshore
- Scheme boundary
- Urban development

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Figure 12 of 12
Coastal Asset Mapping, Cape Borney

Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)--F25b
Drawn: KNM
Date: 09/11/2018
Checked: JC
Approved: JC
Date: 09/11/2018



A.5 Coastal Hazard Mapping for Erosion

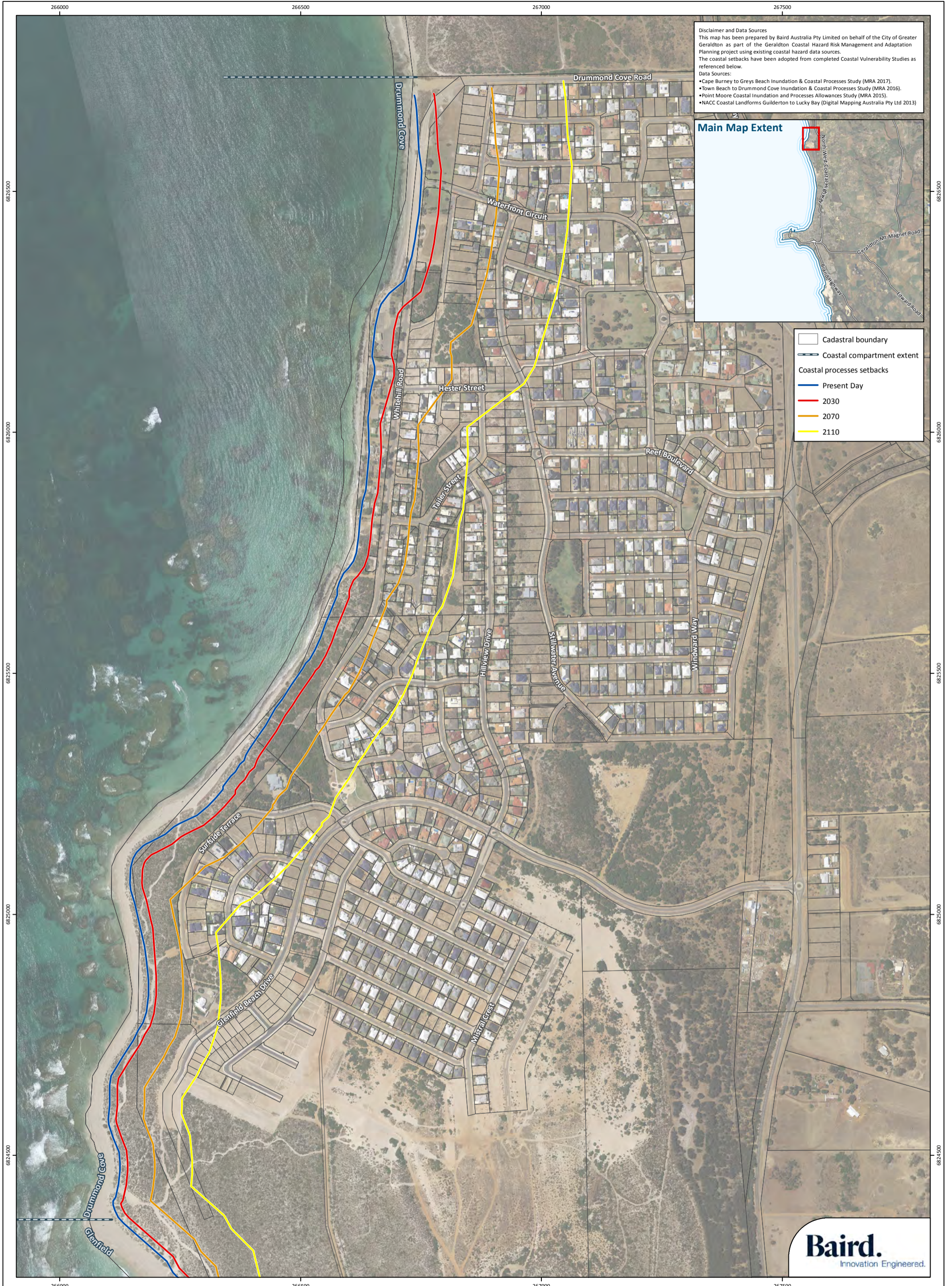


Figure 1 of 12

Coastal Hazard Mapping : Coastal Processes Allowance (Erosion Setback), Drummond Cove

Project: Geraldton CHRMAP Project
 Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F08a
 Drawn: KNM
 Date: 05/04/2018
 Checked: JC
 Approved: JC
 Date: 11/04/2018



0 100 200
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 Scale: 1:7,000@A3
 GDA 1994 MGA Zone 50





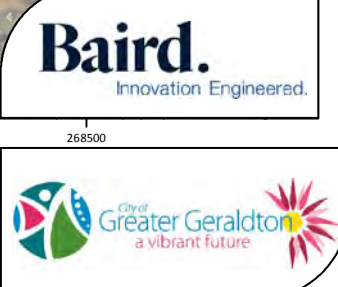
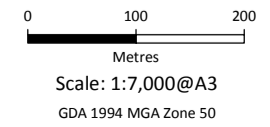


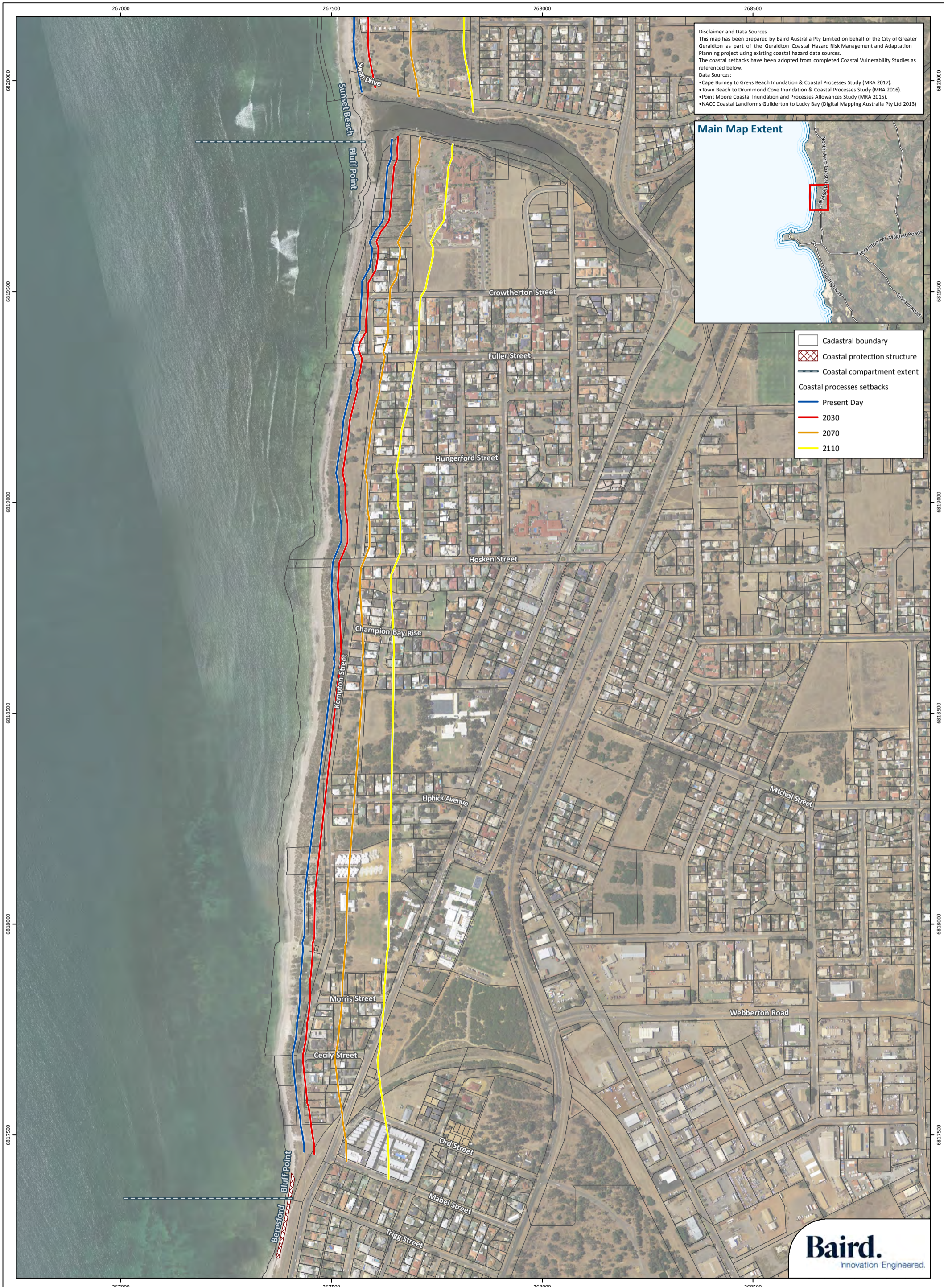
Figure 3 of 12

Coastal Hazard Mapping : Coastal Processes Allowance (Erosion Setback), Sunset Beach

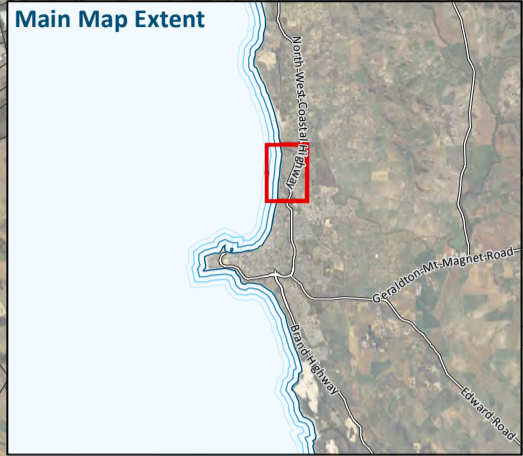
Project: Geraldton CHRMAP Project
 Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F08a
 Drawn: KNM
 Date: 05/04/2018
 Checked: JC
 Approved: JC
 Date: 11/04/2018

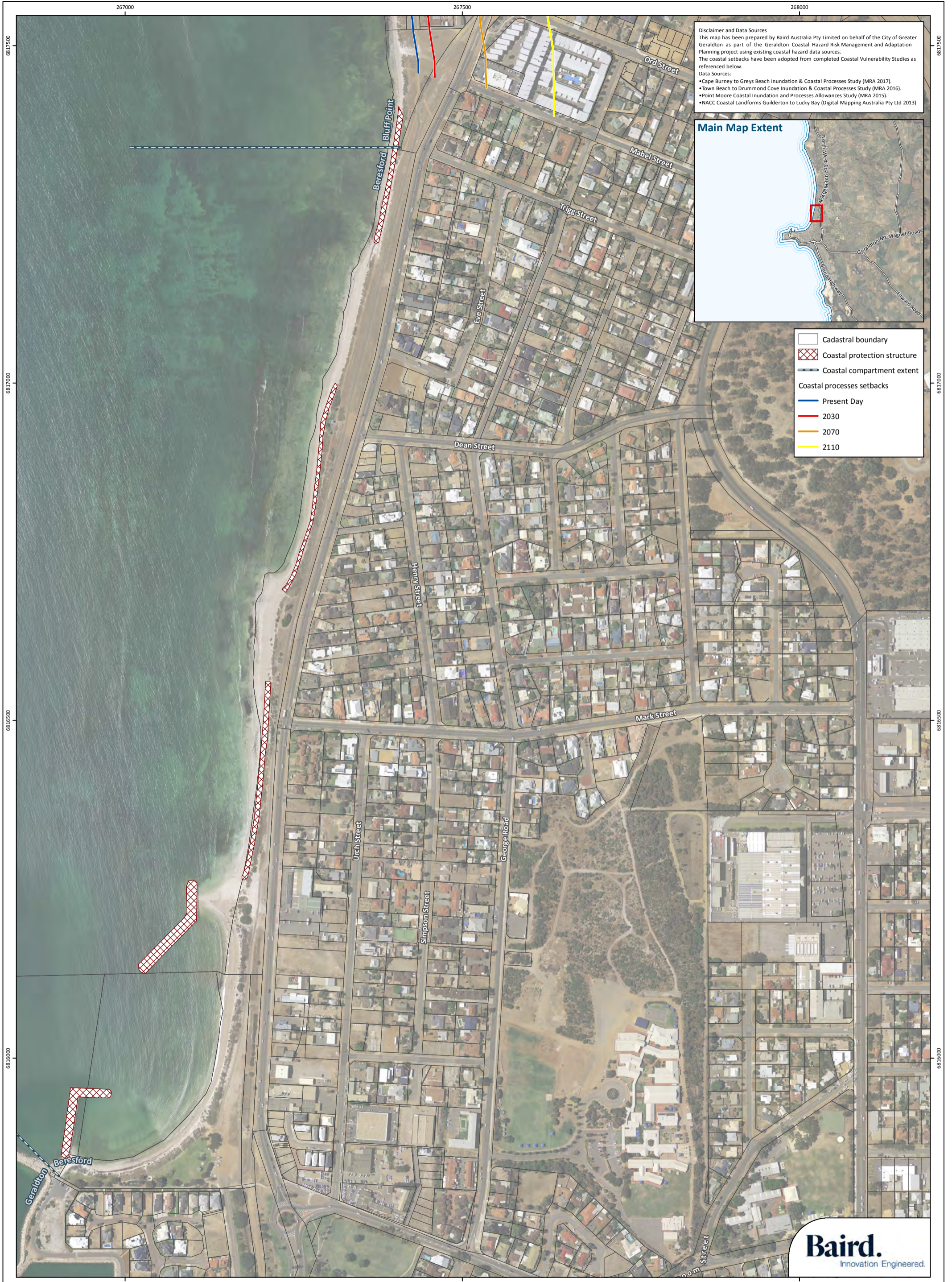




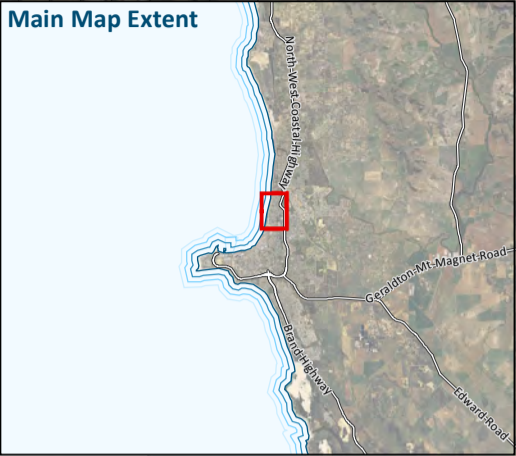
Disclaimer and Data Sources
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 Data Sources:
 • Cape Burney to Greys Beach Inundation & Coastal Processes Study (MRA 2017).
 • Town Beach to Drummond Cove Inundation & Coastal Processes Study (MRA 2016).
 • Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
 • NACC Coastal Landforms Guiderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)



- Cadastral boundary
- Coastal protection structure
- Coastal compartment extent
- Coastal processes setbacks**
- Present Day
- 2030
- 2070
- 2110



Disclaimer and Data Sources
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 • Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
 • NACC Coastal Landforms Guiderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)



- Cadastral boundary
 - Coastal protection structure
 - Coastal compartment extent
- Coastal processes setbacks
- Present Day
 - 2030
 - 2070
 - 2110

Figure 5 of 12

Coastal Hazard Mapping : Coastal Processes Allowance (Erosion Setback), Beresford

Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)--F08a
Drawn: KNM
Date: 05/04/2018
Checked: JC
Approved: JC
Date: 11/04/2018

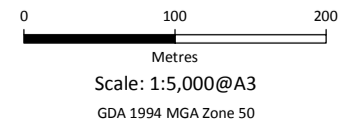




Figure 6 of 12 Coastal Hazard Mapping : Coastal Processes Allowance (Erosion Setback), Geraldton

Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

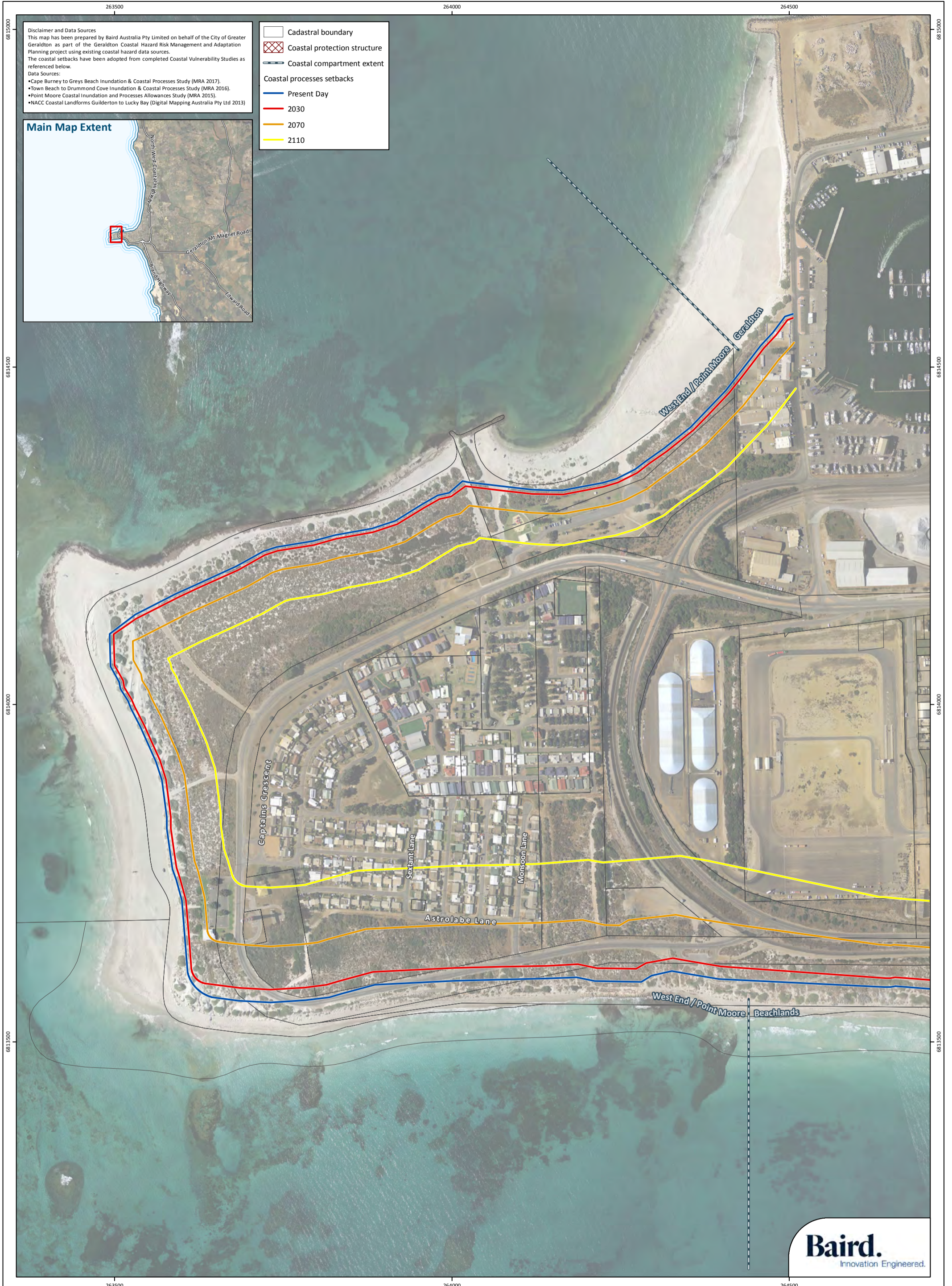
Plan Number: EP17-099(01)-F09a
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Date: 05/04/2018
Checked: JC
Approved: JC
Date: 11/04/2018



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 GDA 1994 MGA Zone 50

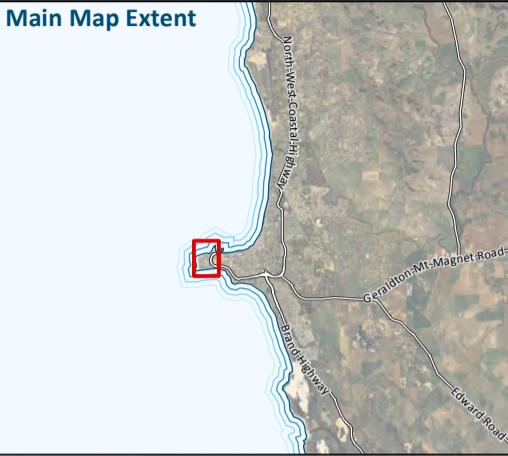


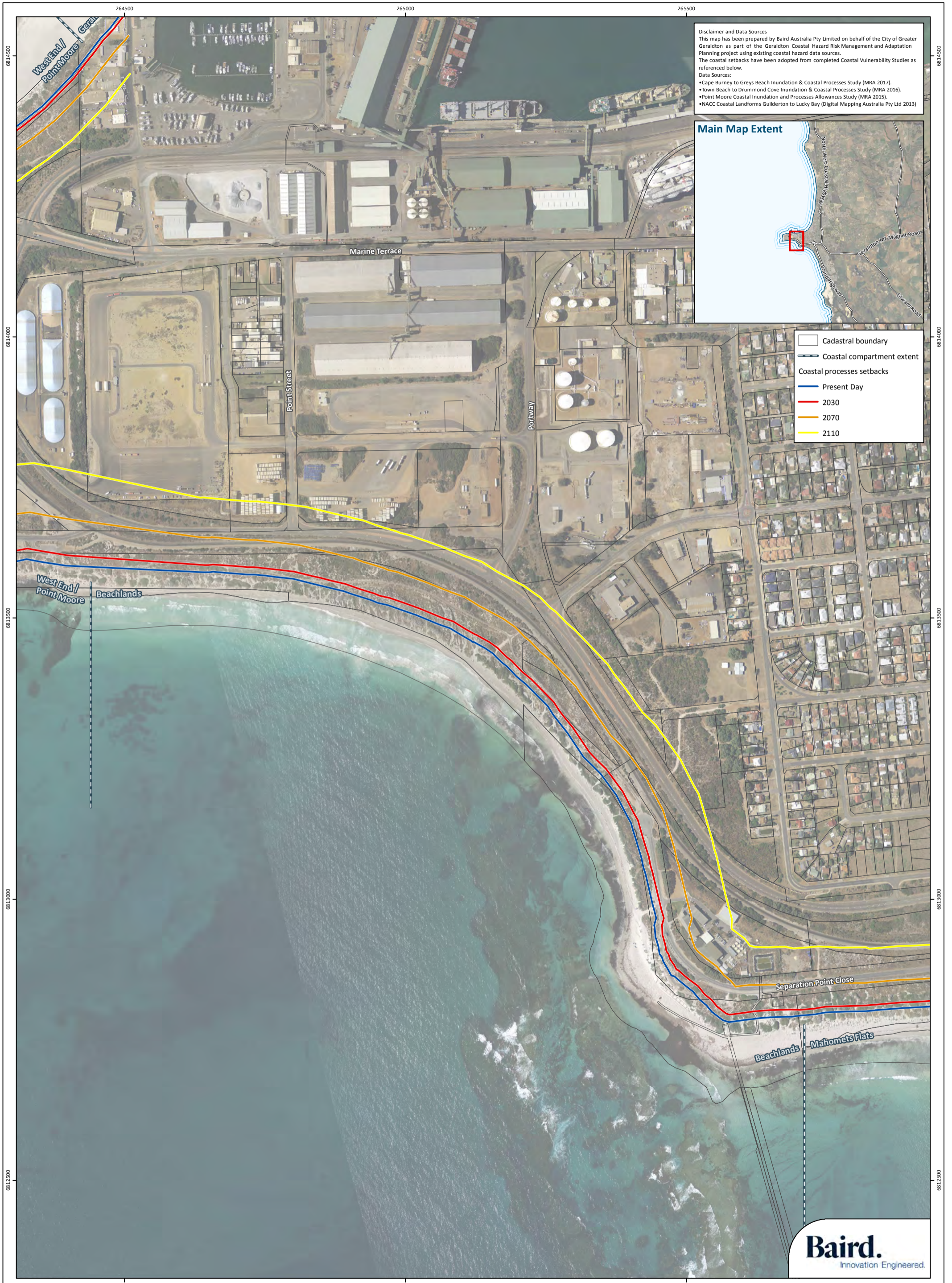
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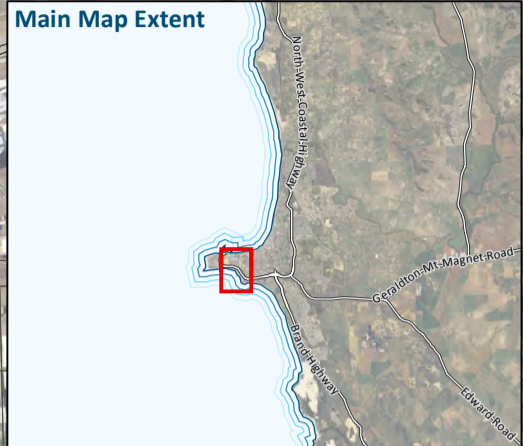
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 The coastal setbacks have been adopted from completed Coastal Vulnerability Studies as referenced below.
Data Sources:
 • Cape Borney to Greys Beach Inundation & Coastal Processes Study (MRA 2017).
 • Town Beach to Drummond Cove Inundation & Coastal Processes Study (MRA 2016).
 • Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
 • NACC Coastal Landforms Guilderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)

- Cadastral boundary
 - Coastal protection structure
 - Coastal compartment extent
- Coastal processes setbacks**
- Present Day
 - 2030
 - 2070
 - 2110

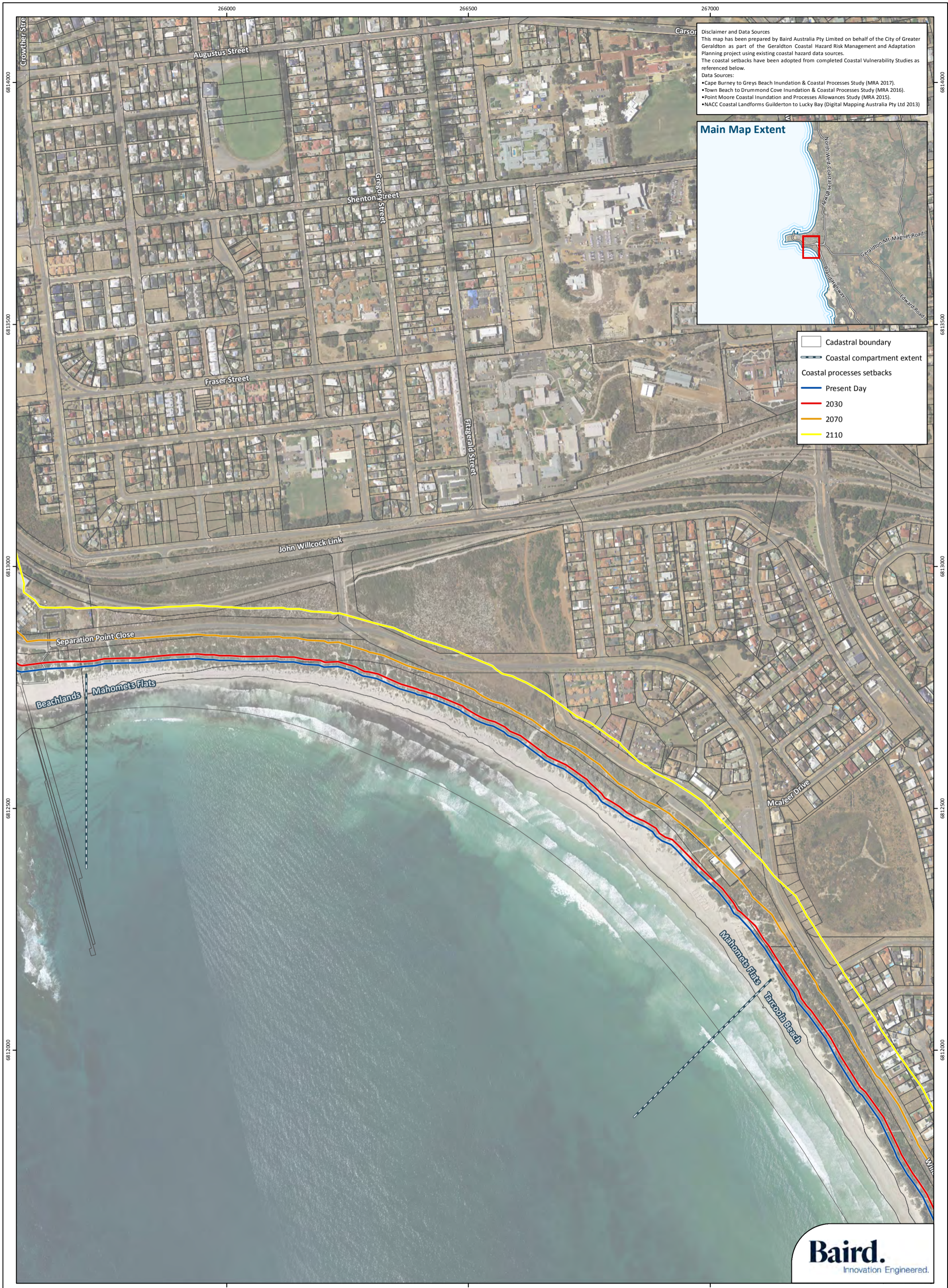




Disclaimer and Data Sources
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 • Town Beach to Drummond Cove Inundation & Coastal Processes Study (MRA 2016).
 • Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
 • NACC Coastal Landforms Guiderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)

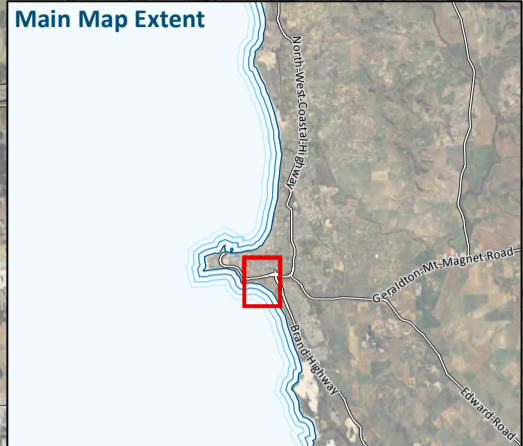


- Cadastral boundary
- Coastal compartment extent
- Coastal processes setbacks**
- Present Day
- 2030
- 2070
- 2110



Disclaimer and Data Sources
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Data Sources:

- Cape Burney to Greys Beach Inundation & Coastal Processes Study (MRA 2017).
- Town Beach to Drummond Cove Inundation & Coastal Processes Study (MRA 2016).
- Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
- NACC Coastal Landforms Guilderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)



- Cadastral boundary
- Coastal compartment extent
- Coastal processes setbacks**
- Present Day
- 2030
- 2070
- 2110





Figure 10 of 12

Coastal Hazard Mapping : Coastal Processes Allowance (Erosion Setback), Tarcoola Beach

Project: Geraldton CHRMAP Project
 Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F08a
 Drawn: KNM
 Date: 05/04/2018
 Checked: JC
 Approved: JC
 Date: 11/04/2018



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 Scale: 1:10,500@A3
 GDA 1994 MGA Zone 50



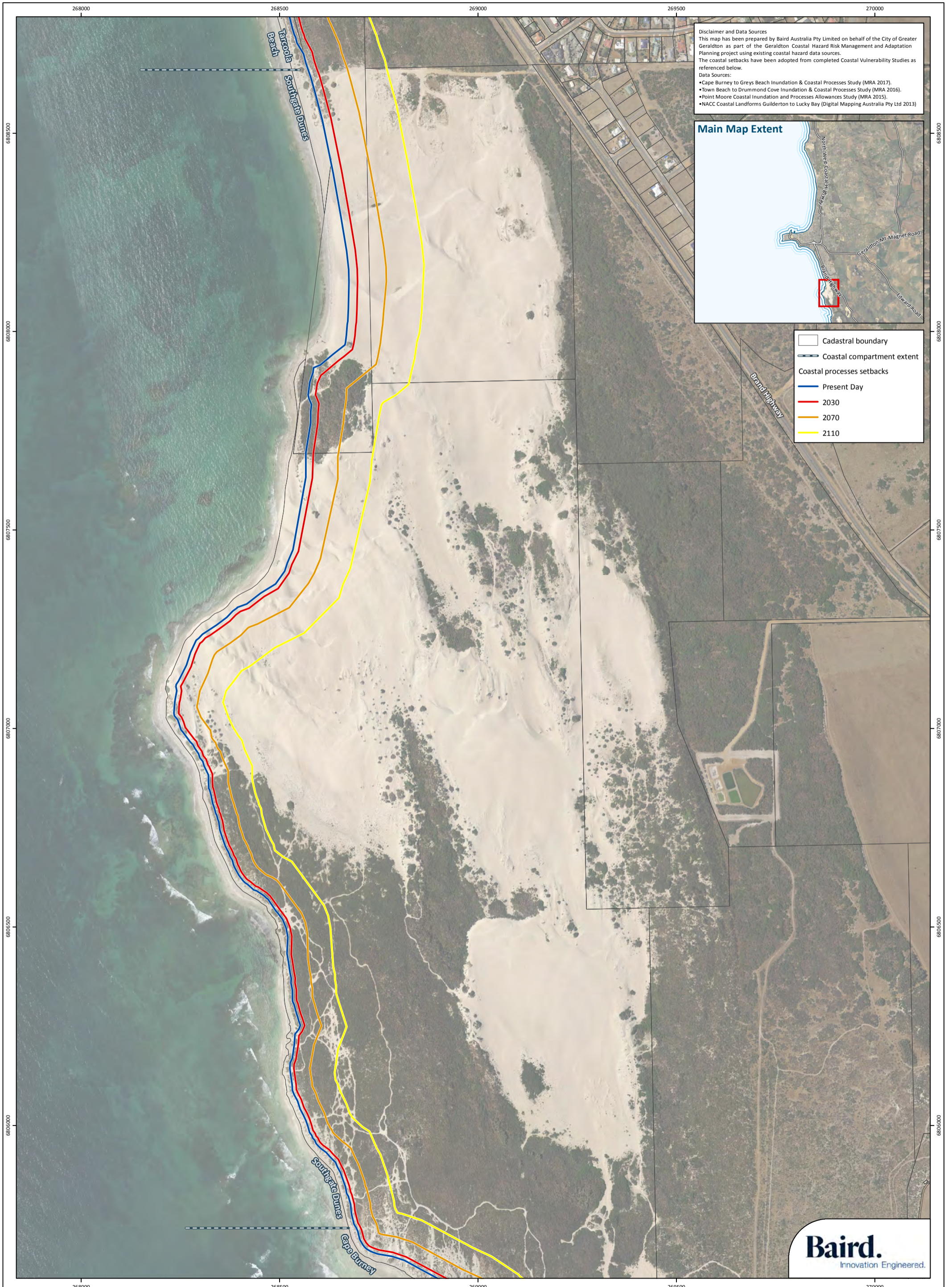


Figure 11 of 12

Coastal Hazard Mapping : Coastal Processes Allowance (Erosion Setback), Southgate Dunes

Project: Geraldton CHRMAP Project
 Client: The City of Greater Geraldton

Plan Number: EP17-099(01)--F08a
 Drawn: KNM
 Date: 05/04/2018
 Checked: JC
 Approved: JC
 Date: 11/04/2018

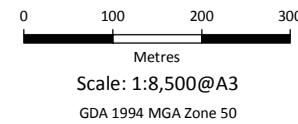


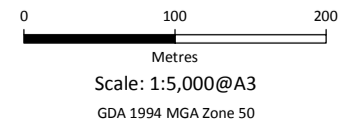


Figure 12 of 12

Coastal Hazard Mapping : Coastal Processes Allowance (Erosion Setback), Cape Borney

Project: Geraldton CHRMAP Project
 Client: The City of Greater Geraldton

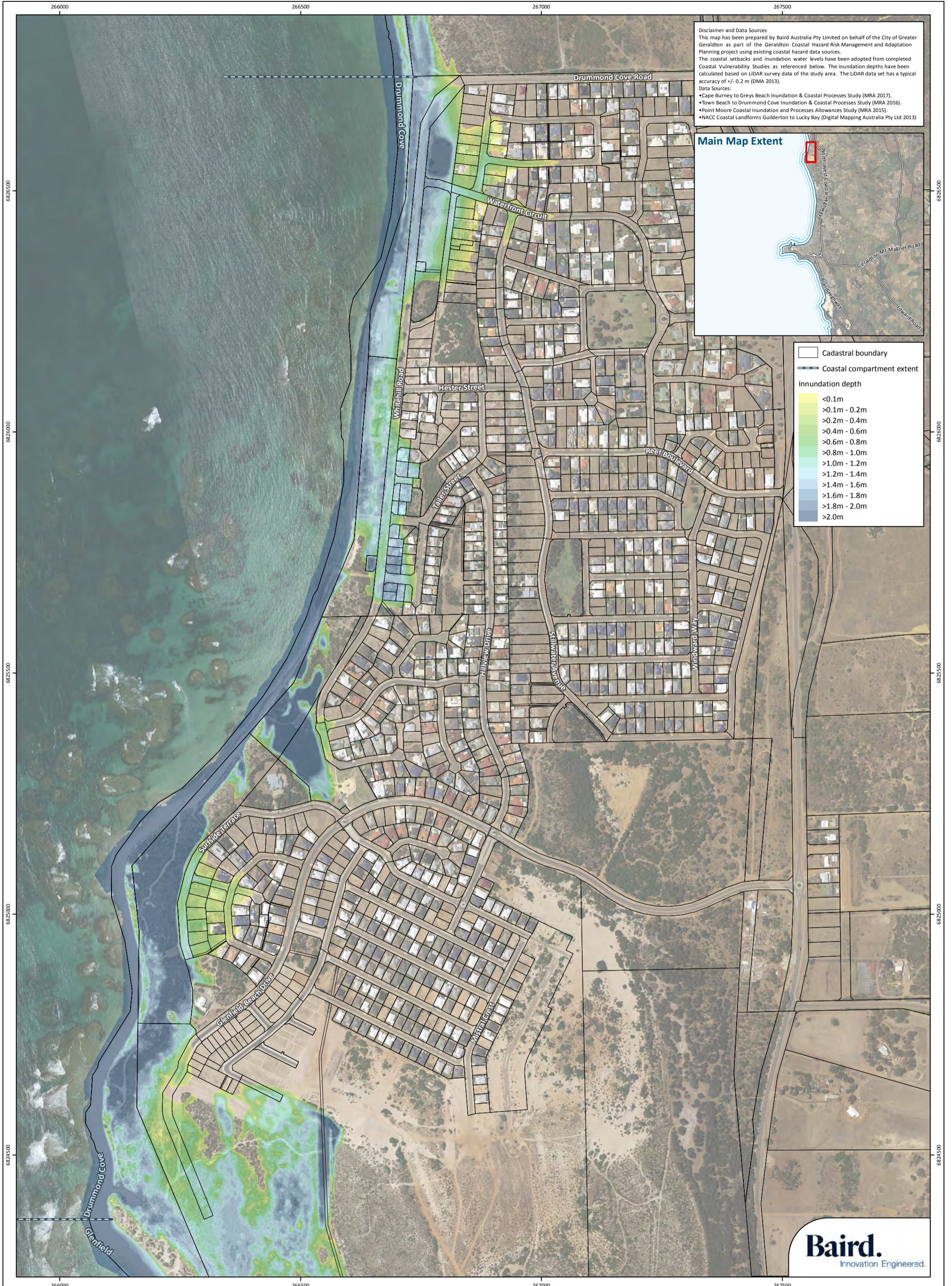
Plan Number: EP17-099(01)--F08a
 Drawn: KNM
 Date: 05/04/2018
 Checked: JC
 Approved: JC
 Date: 11/04/2018



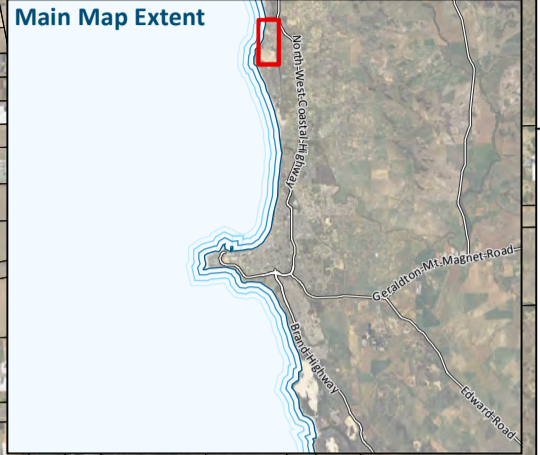
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 Innovation Engineered.



A.6 Coastal Hazard Mapping for Inundation

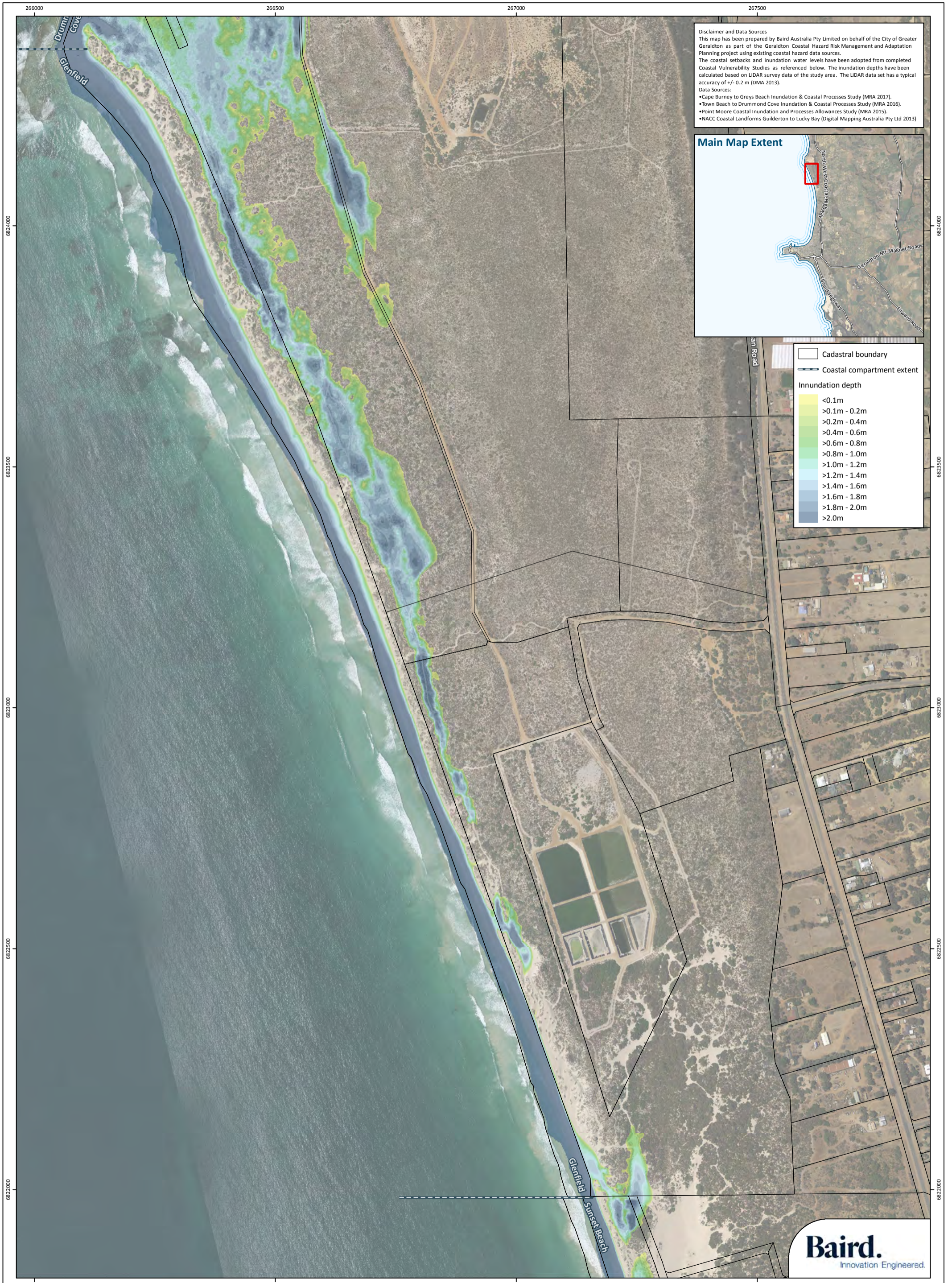


Disclaimer and Data Sources
 This map has been prepared by Baird Australia Pty Limited on behalf of the City of Greater Geraldton as part of the Geraldton Coastal Hazard Risk Management and Adaptation Planning project using existing coastal hazard data sources.
 The coastal setbacks and inundation water levels have been adopted from completed Coastal Vulnerability Studies as referenced below. The inundation depths have been calculated based on LiDAR survey data of the study area. The LiDAR data set has a typical accuracy of +/- 0.2 m (DMA 2013).
Data Sources:
 • Cape Burney to Greys Beach Inundation & Coastal Processes Study (MRA 2017).
 • Town Beach to Drummond Cove Inundation & Coastal Processes Study (MRA 2016).
 • Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
 • NACC Coastal Landforms Guilderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)

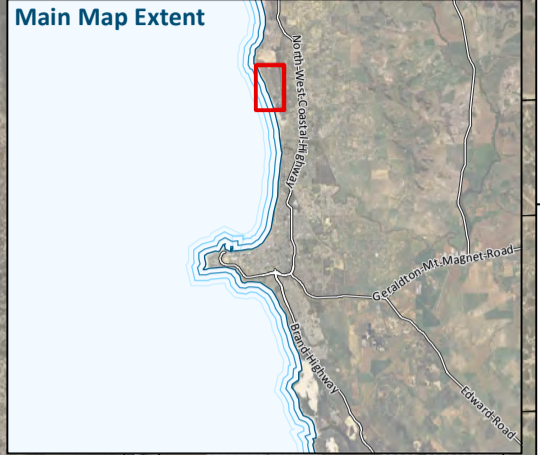


Cadastral boundary
 Coastal compartment extent
Inundation depth
 <0.1m
 >0.1m - 0.2m
 >0.2m - 0.4m
 >0.4m - 0.6m
 >0.6m - 0.8m
 >0.8m - 1.0m
 >1.0m - 1.2m
 >1.2m - 1.4m
 >1.4m - 1.6m
 >1.6m - 1.8m
 >1.8m - 2.0m
 >2.0m





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 • Town Beach to Drummond Cove Inundation & Coastal Processes Study (MRA 2016).
 • Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
 • NACC Coastal Landforms Guilderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)



Cadastral boundary
 Coastal compartment extent

Inundation depth

<0.1m
>0.1m - 0.2m
>0.2m - 0.4m
>0.4m - 0.6m
>0.6m - 0.8m
>0.8m - 1.0m
>1.0m - 1.2m
>1.2m - 1.4m
>1.4m - 1.6m
>1.6m - 1.8m
>1.8m - 2.0m
>2.0m



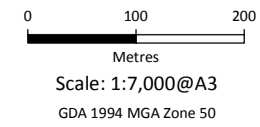


Figure 3 of 12

Coastal Hazard Mapping : 2110 Coastal Inundation Depth 500yr ARI Event, Sunset Beach

Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F11a
Drawn: KNM
Date: 06/04/2018
Checked: JC
Approved: JC
Date: 09/04/2018



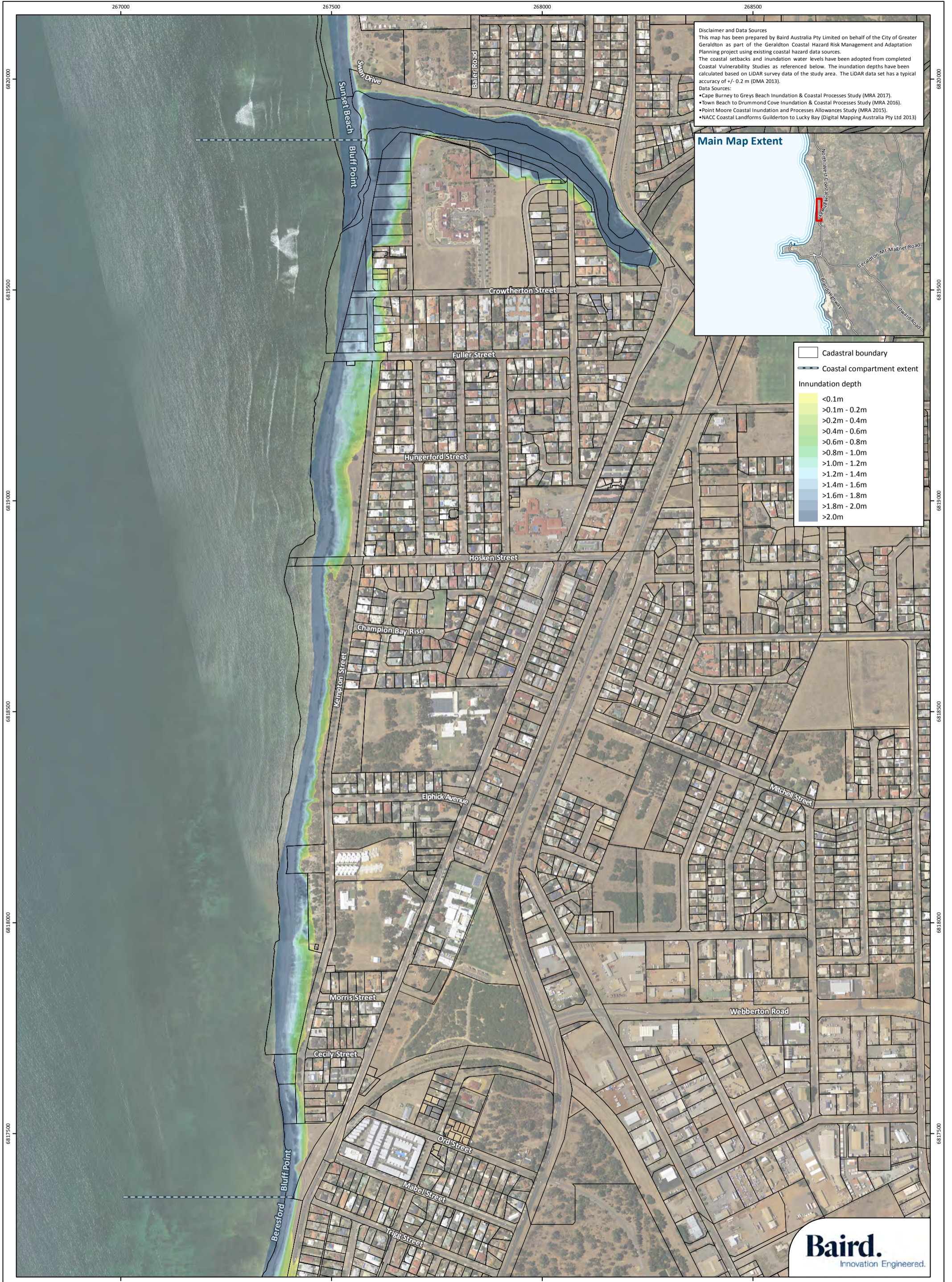
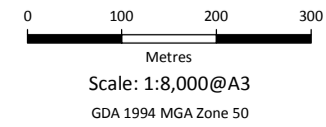


Figure 4 of 12 Coastal Hazard Mapping : 2110 Coastal Inundation Depth 500yr ARI Event, Bluff Point

Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F11a
Drawn: KNM
Date: 06/04/2018
Checked: JC
Approved: JC
Date: 09/04/2018



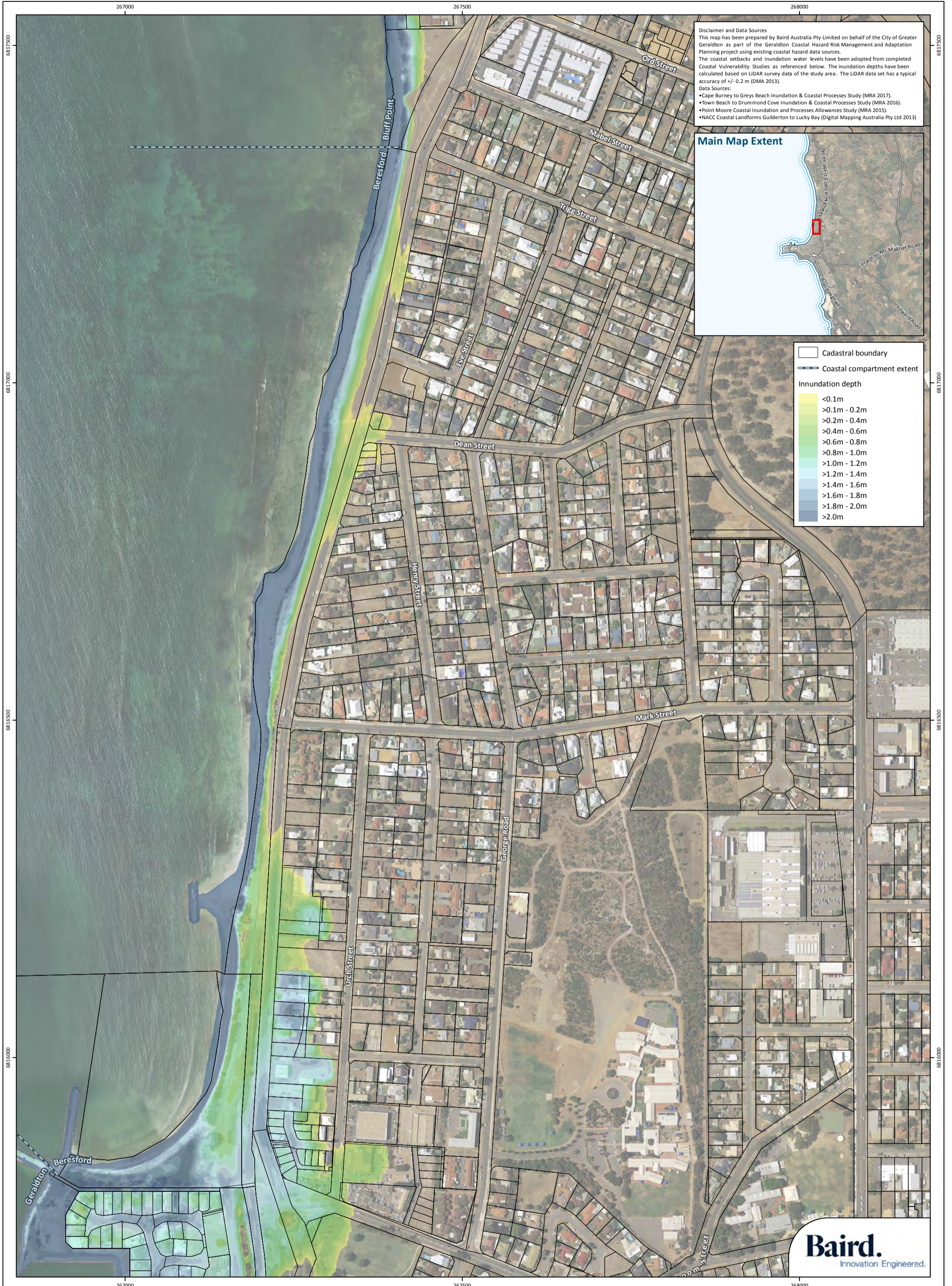
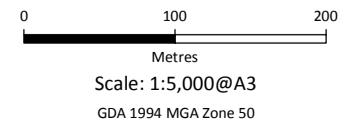


Figure 5 of 12

Coastal Hazard Mapping : 2110 Coastal Inundation Depth 500yr ARI Event, Beresford

Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)--F11a
Drawn: KNM
Date: 06/04/2018
Checked: JC
Approved: JC
Date: 09/04/2018



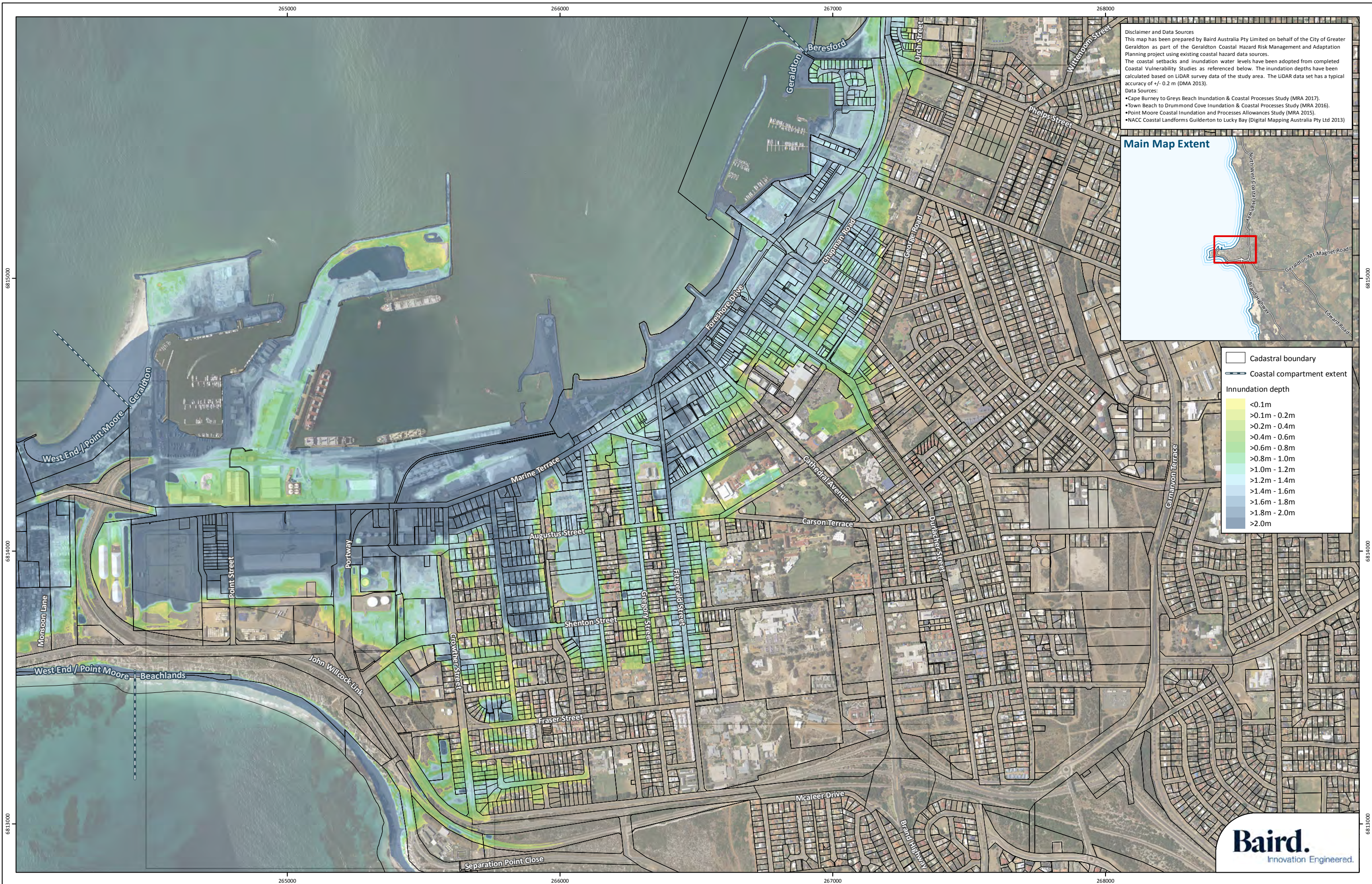


Figure 6 of 12
Coastal Hazard Mapping : 2110 Coastal Inundation Depth 500yr ARI Event, Geraldton
 Project: Geraldton CHRMAP Project
 Client: The City of Greater Geraldton

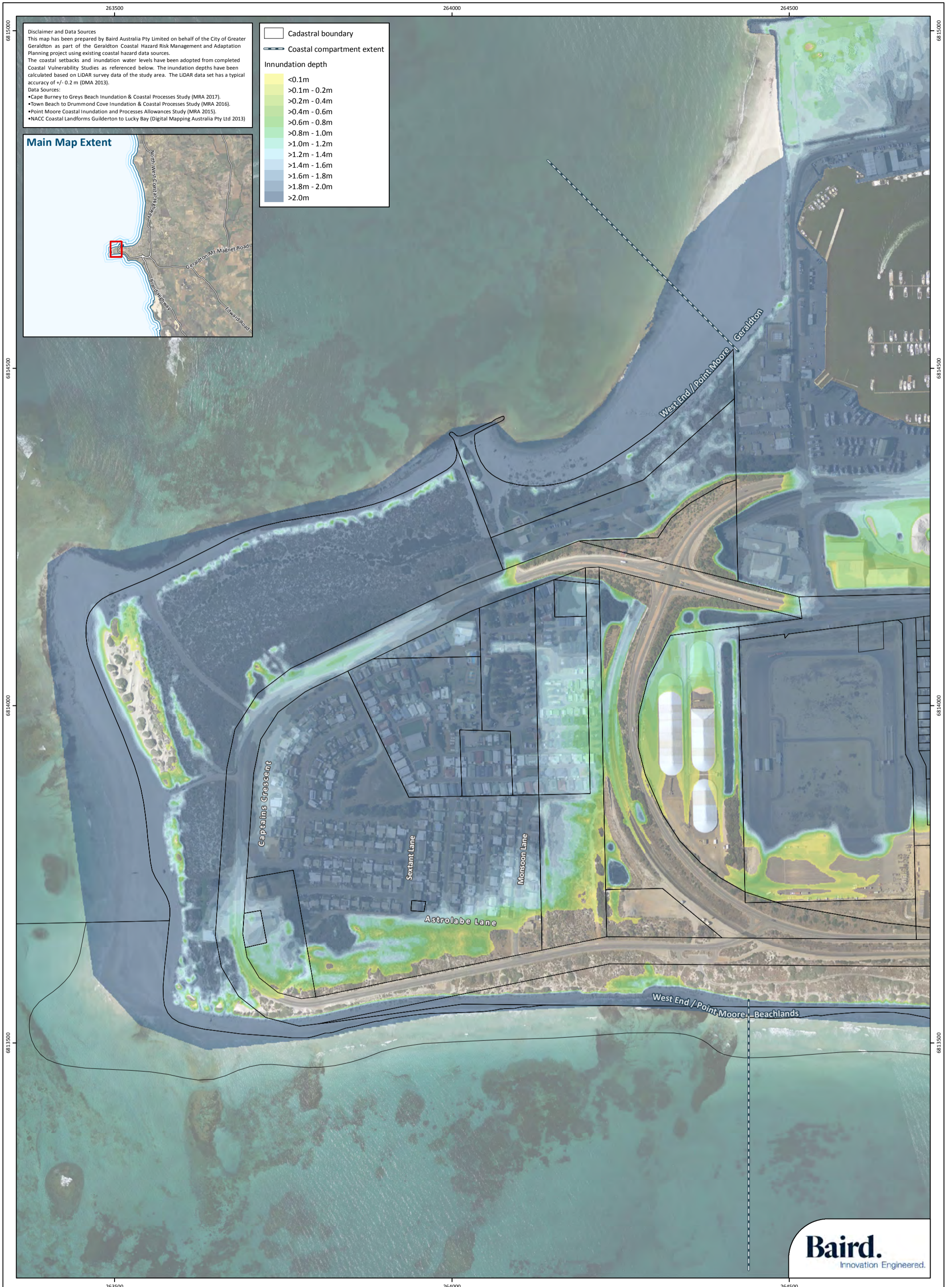
Plan Number:
 EP17-099(01)-F12a
 Drawn: KNM
 Date: 06/04/2018
 Checked: JC
 Approved: JC
 Date: 09/04/2018



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 GDA 1994 MGA Zone 50



While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used

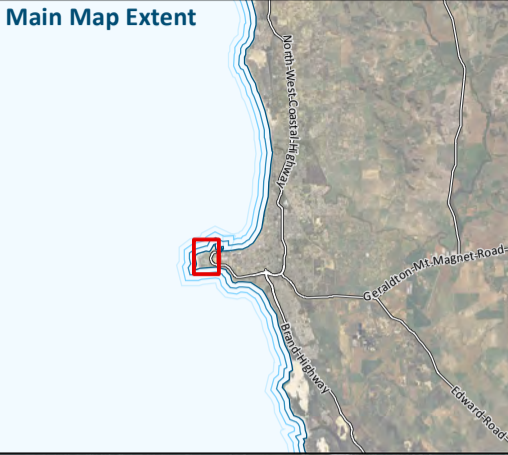


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 Data Sources:
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 • Town Beach to Drummond Cove Inundation & Coastal Processes Study (MRA 2016).
 • Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
 • NACC Coastal Landforms Guilderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)

Cadastral boundary
 Coastal compartment extent

Inundation depth

- <0.1m
- >0.1m - 0.2m
- >0.2m - 0.4m
- >0.4m - 0.6m
- >0.6m - 0.8m
- >0.8m - 1.0m
- >1.0m - 1.2m
- >1.2m - 1.4m
- >1.4m - 1.6m
- >1.6m - 1.8m
- >1.8m - 2.0m
- >2.0m



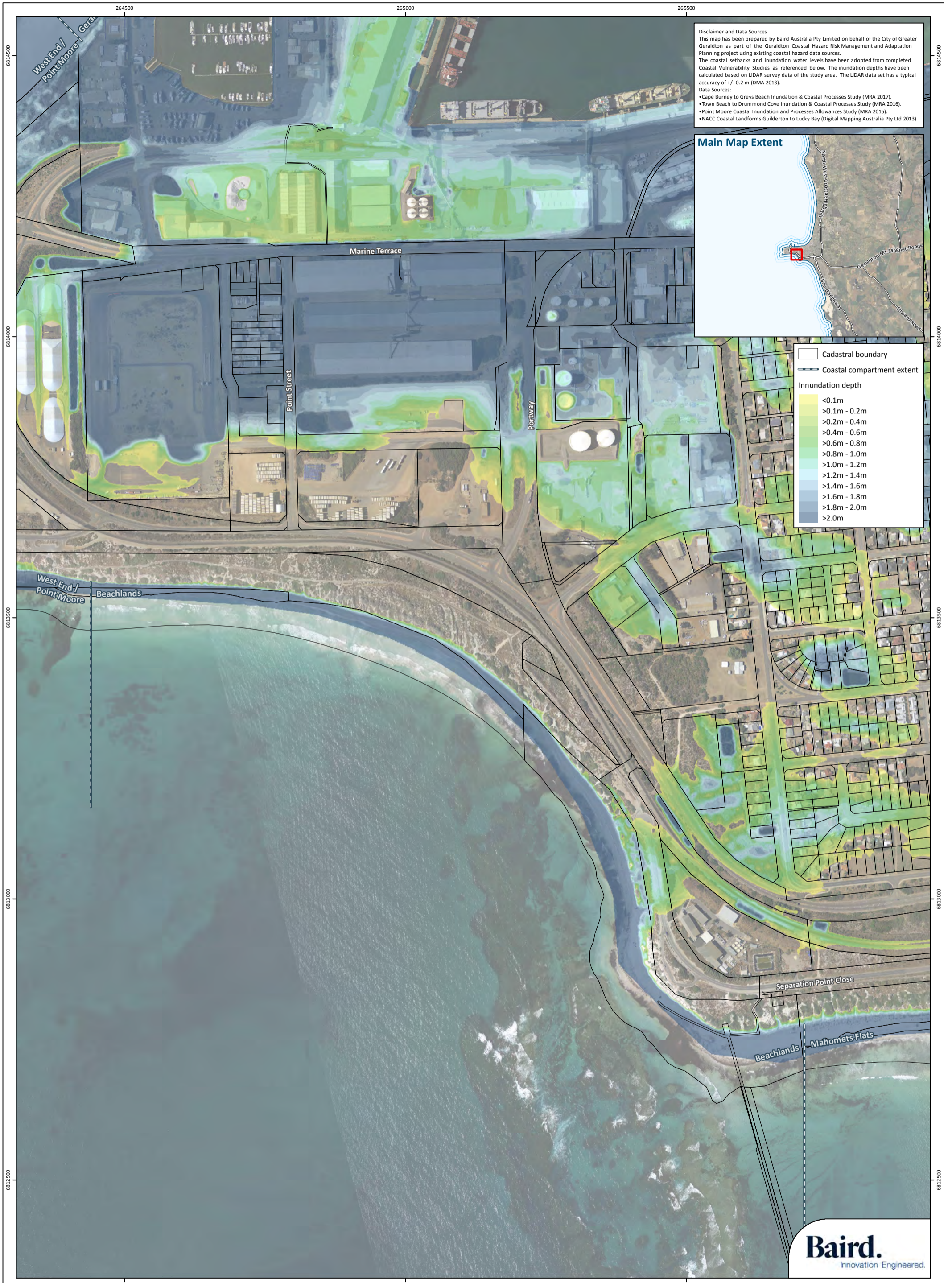
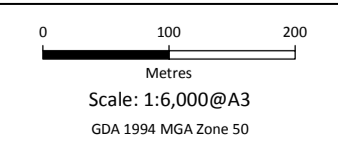
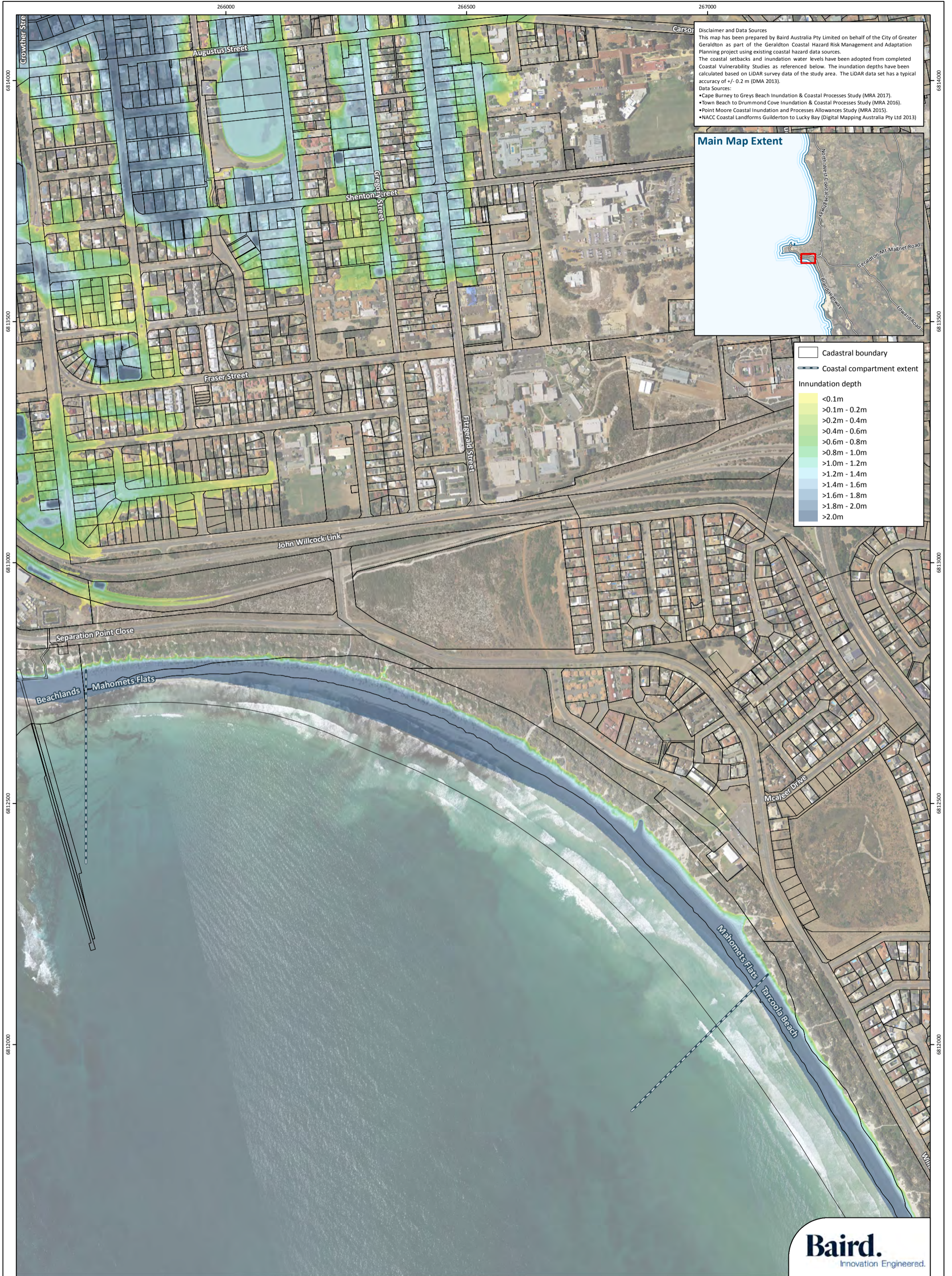


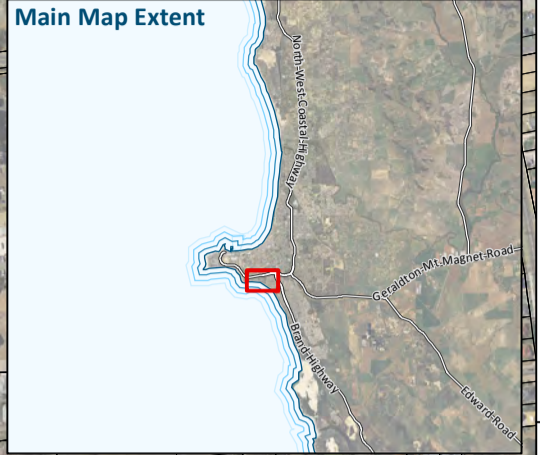
Figure 8 of 12
Coastal Hazard Mapping : 2110 Coastal Inundation Depth 500yr ARI Event, Beachlands
 Project: Geraldton CHRMAP Project
 Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F11a
 Drawn: KNM
 Date: 06/04/2018
 Checked: JC
 Approved: JC
 Date: 09/04/2018





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 • Town Beach to Drummond Cove Inundation & Coastal Processes Study (MRA 2016).
 • Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
 • NACC Coastal Landforms Guilderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)



Cadastral boundary
 Coastal compartment extent
Inundation depth
 <0.1m
 >0.1m - 0.2m
 >0.2m - 0.4m
 >0.4m - 0.6m
 >0.6m - 0.8m
 >0.8m - 1.0m
 >1.0m - 1.2m
 >1.2m - 1.4m
 >1.4m - 1.6m
 >1.6m - 1.8m
 >1.8m - 2.0m
 >2.0m



Figure 9 of 12
Coastal Hazard Mapping : 2110 Coastal Inundation Depth 500yr ARI Event, Mahomets Flats
 Project: Geraldton CHRMAP Project
 Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F11a
 Drawn: KNM
 Date: 06/04/2018
 Checked: JC
 Approved: JC
 Date: 09/04/2018

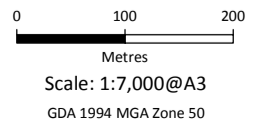




Figure 10 of 12

Coastal Hazard Mapping : 2110 Coastal Inundation Depth 500yr ARI Event, Tarcoola Beach

Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)--F11a
Drawn: KNM
Date: 06/04/2018
Checked: JC
Approved: JC
Date: 09/04/2018



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 GDA 1994 MGA Zone 50



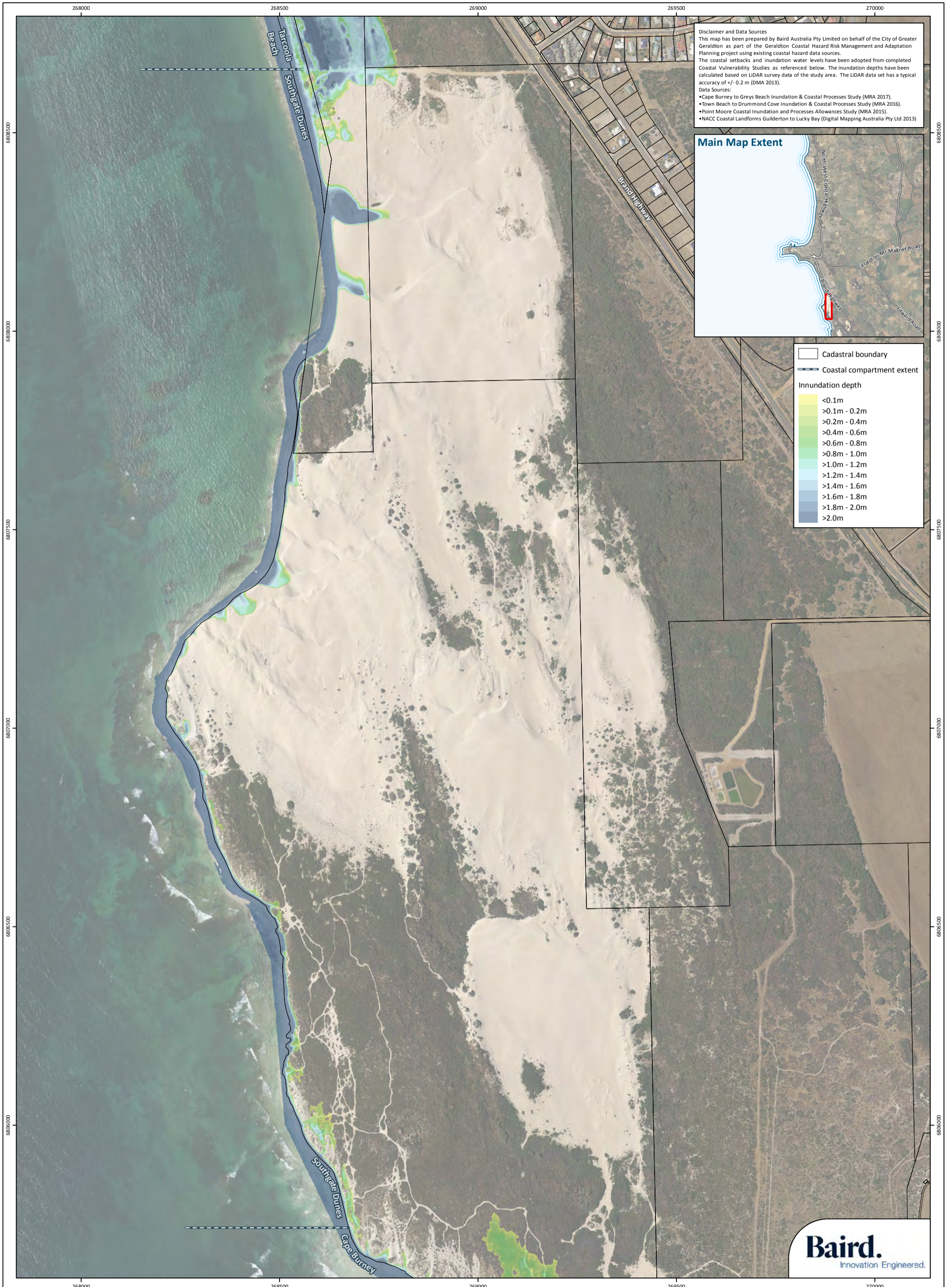


Figure 11 of 12

Coastal Hazard Mapping : 2110 Coastal Inundation Depth 500yr ARI Event, Southgate Dunes

Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)--F11a
Drawn: KNM
Date: 06/04/2018
Checked: JC
Approved: JC
Date: 09/04/2018



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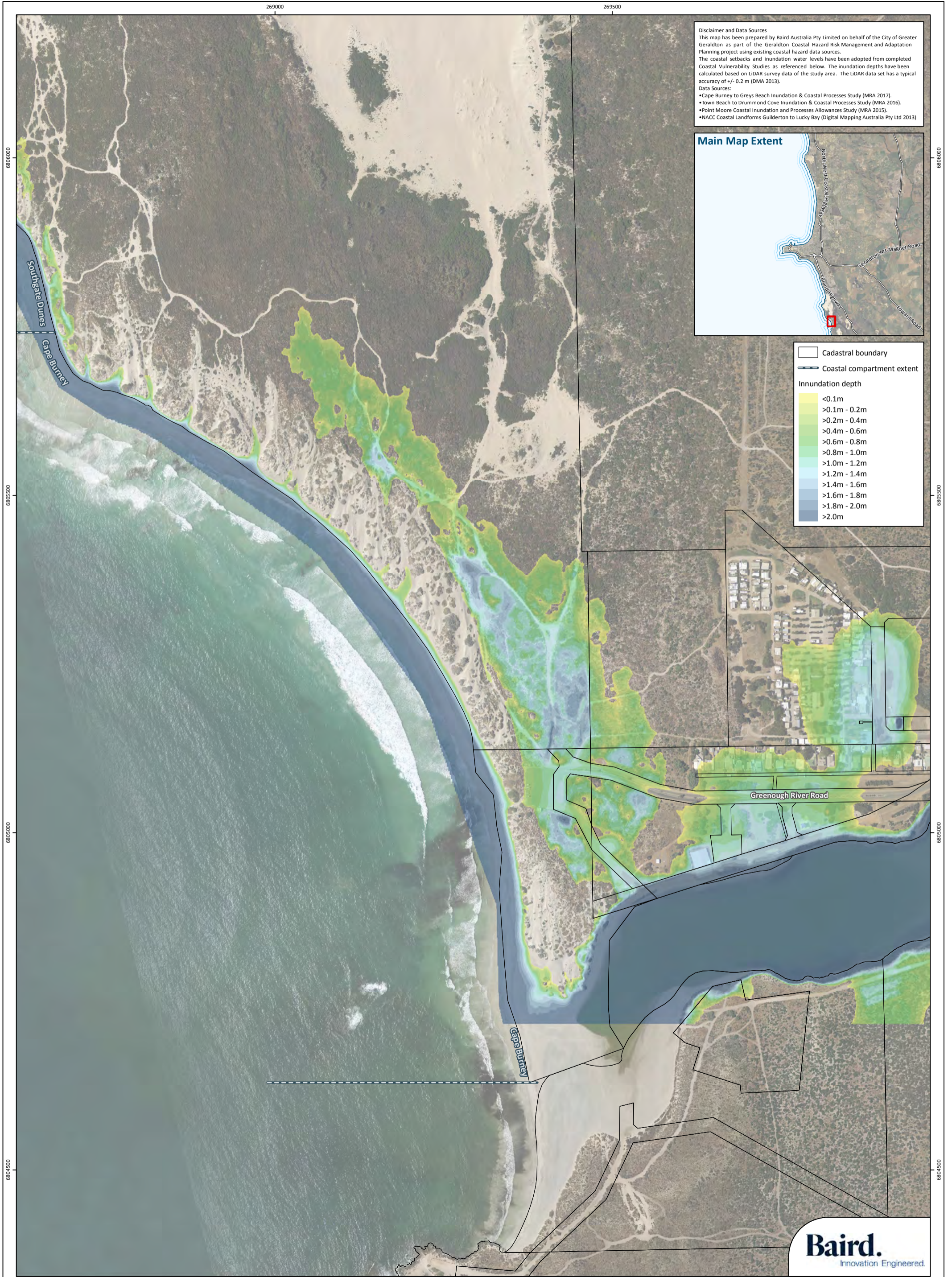


Figure 12 of 12

Coastal Hazard Mapping : 2110 Coastal Inundation Depth 500yr ARI Event, Cape Burney

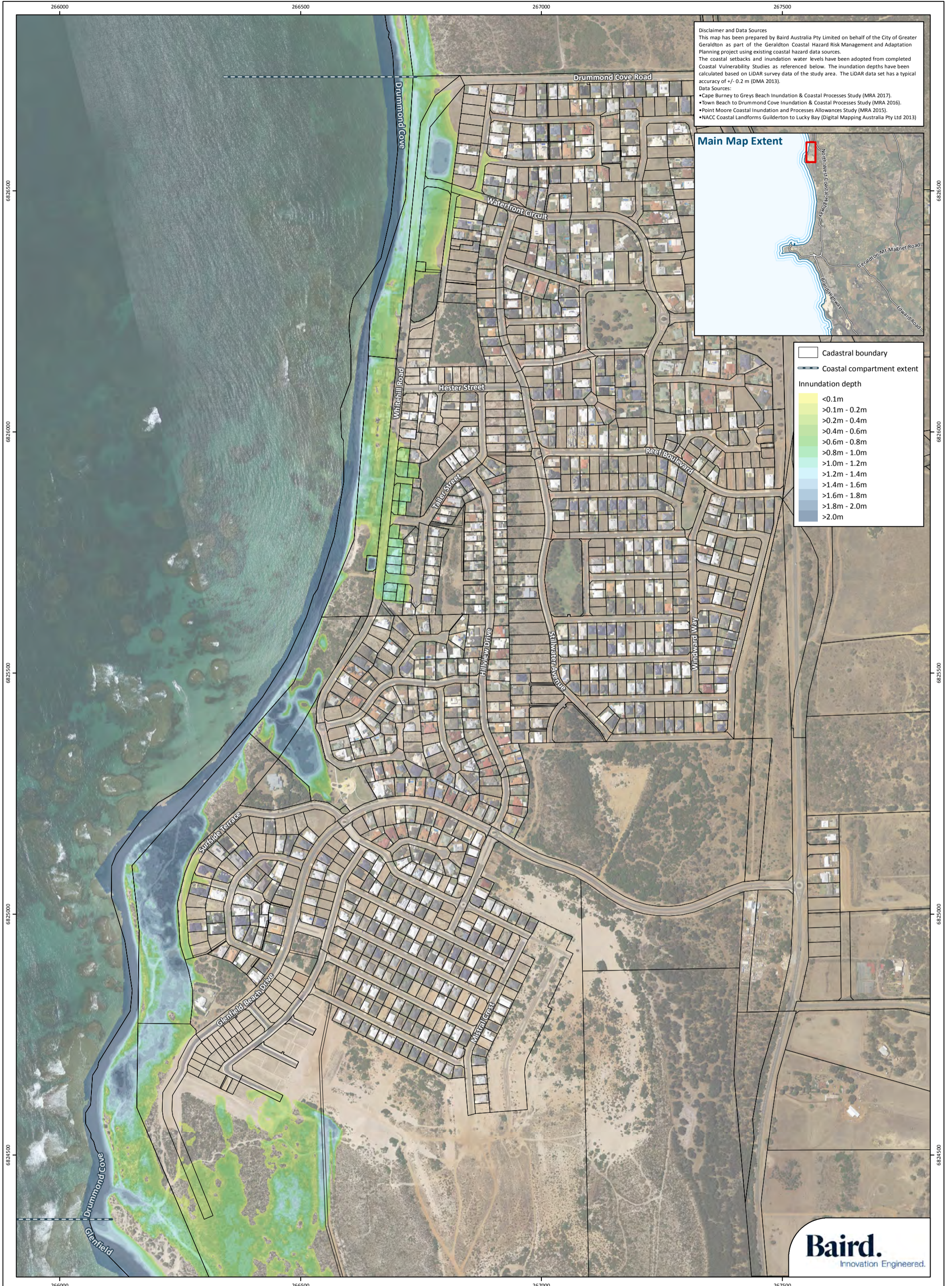
Project: Geraldton CHRMAP Project
 Client: The City of Greater Geraldton

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 Drawn: KNM
 Date: 06/04/2018
 Checked: JC
 Approved: JC
 Date: 09/04/2018

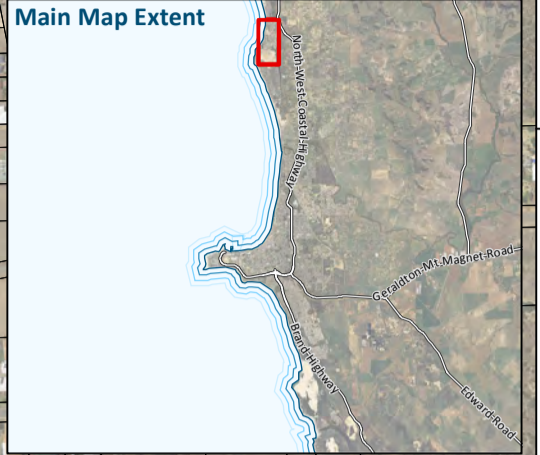


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 GDA 1994 MGA Zone 50





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Data Sources:
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 • Town Beach to Drummond Cove Inundation & Coastal Processes Study (MRA 2016).
 • Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
 • NACC Coastal Landforms Guilderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)

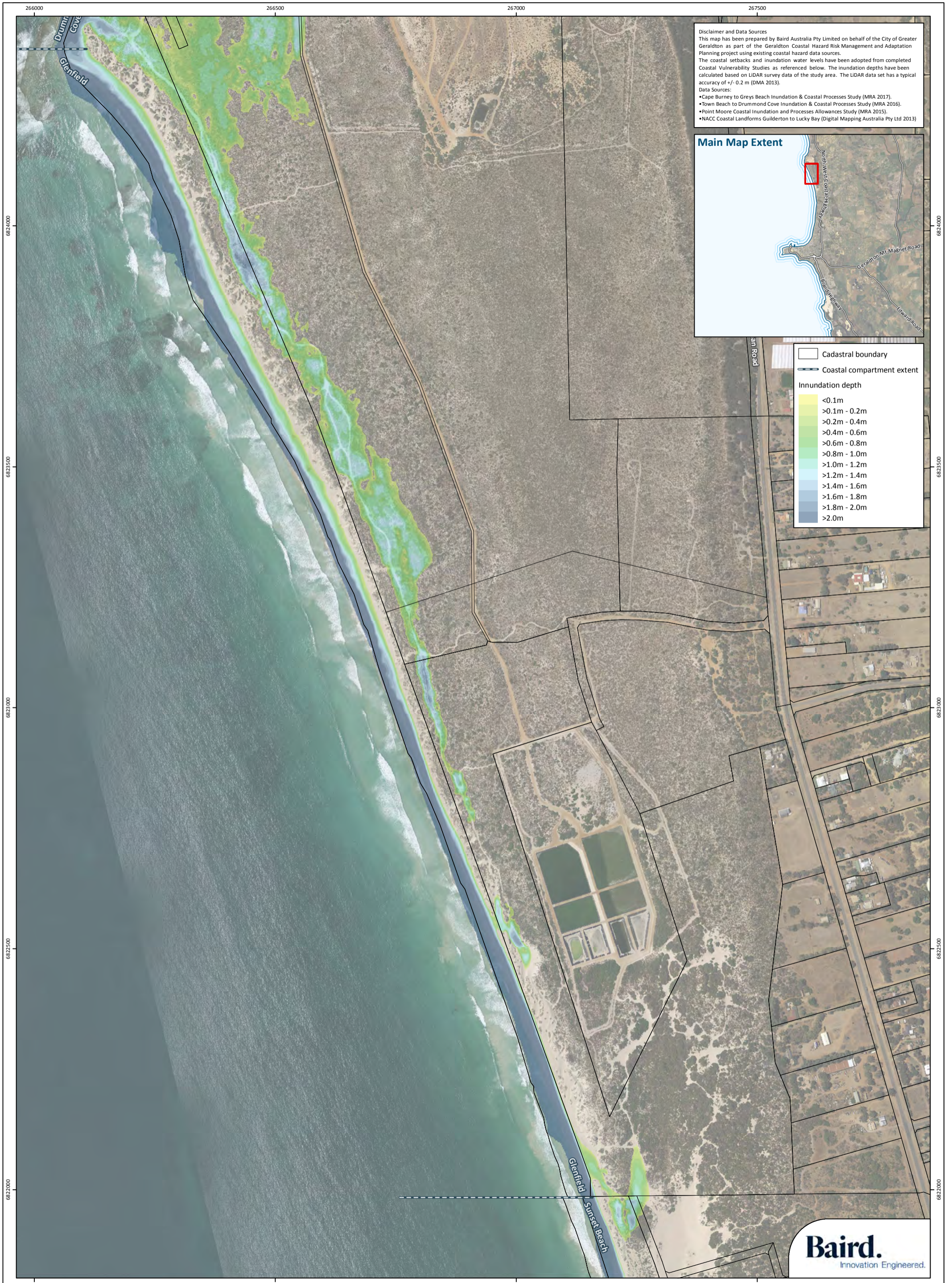


Cadastral boundary
 Coastal compartment extent

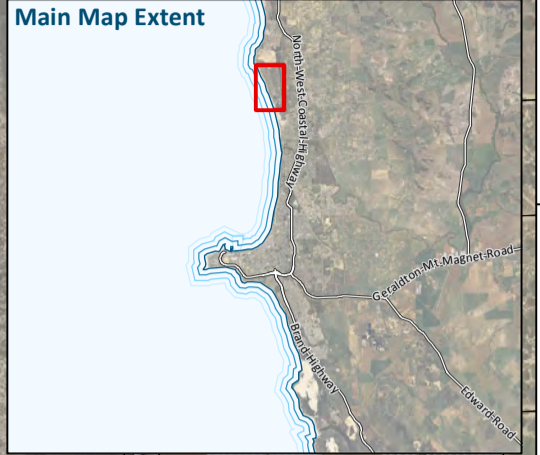
Inundation depth

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>0.2m - 0.4m
>0.4m - 0.6m
>0.6m - 0.8m
>0.8m - 1.0m
>1.0m - 1.2m
>1.2m - 1.4m
>1.4m - 1.6m
>1.6m - 1.8m
>1.8m - 2.0m
>2.0m





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 • NACC Coastal Landforms Guilderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)



Cadastral boundary
 Coastal compartment extent

Inundation depth

<0.1m
>0.1m - 0.2m
>0.2m - 0.4m
>0.4m - 0.6m
>0.6m - 0.8m
>0.8m - 1.0m
>1.0m - 1.2m
>1.2m - 1.4m
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>1.6m - 1.8m
>1.8m - 2.0m
>2.0m





Figure 3 of 12

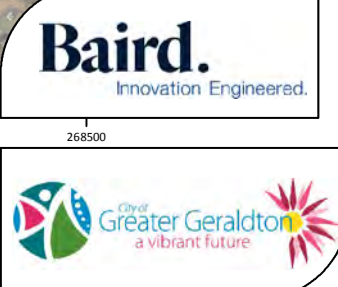
Coastal Hazard Mapping : 2110 Coastal Inundation Depth 100yr ARI Event, Sunset Beach

Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F37
Drawn: KNM
Date: 09/04/2018
Checked: JC
Approved: JC
Date: 09/04/2018



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 Scale: 1:7,000@A3
 GDA 1994 MGA Zone 50



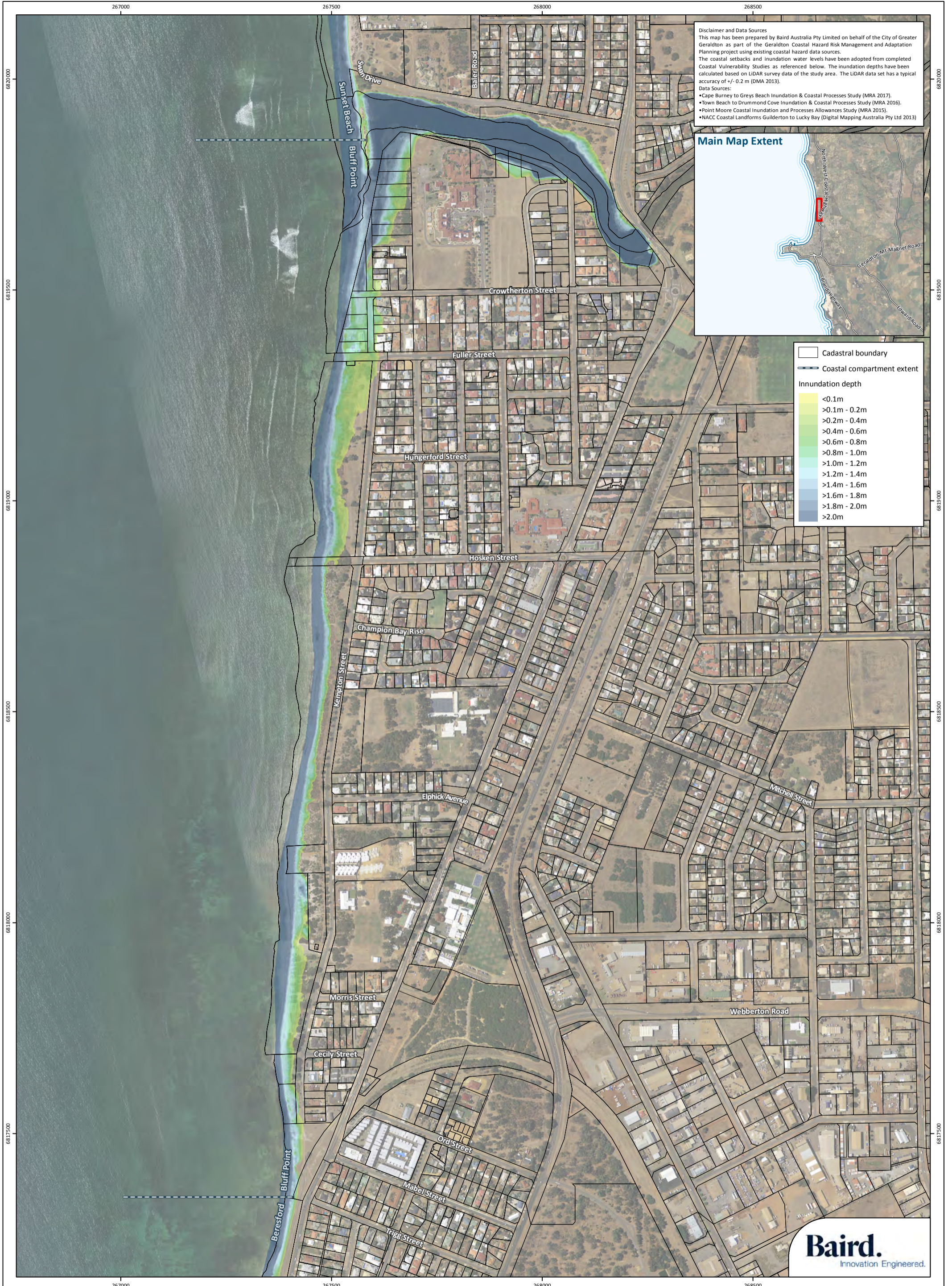
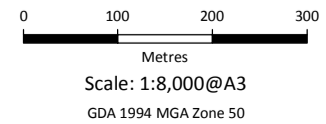


Figure 4 of 12 Coastal Hazard Mapping : 2110 Coastal Inundation Depth 100yr ARI Event, Bluff Point

Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F37
Drawn: KNM
Date: 09/04/2018
Checked: JC
Approved: JC
Date: 09/04/2018



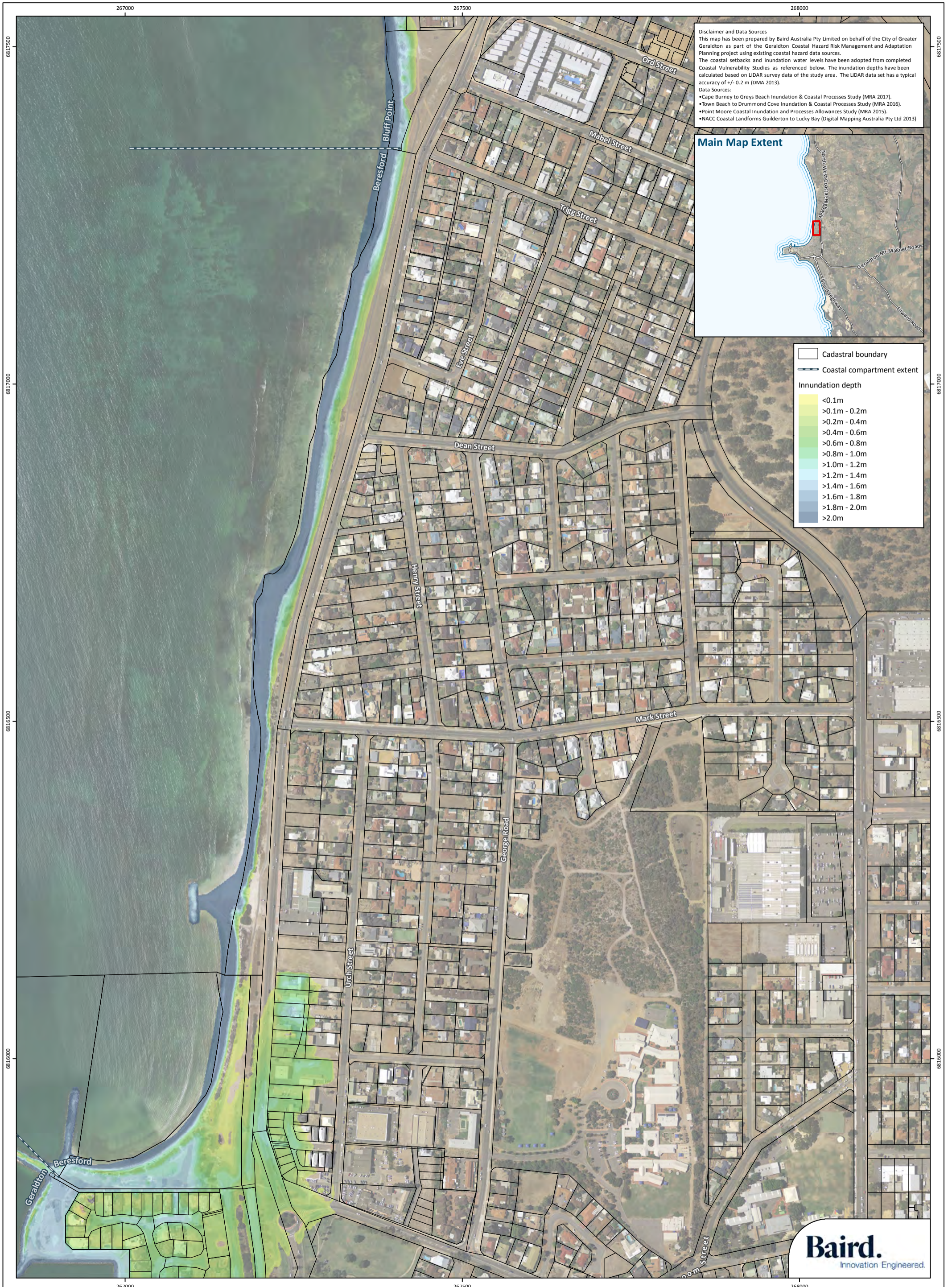
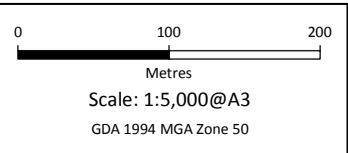


Figure 5 of 12
Coastal Hazard Mapping : 2110 Coastal Inundation Depth 100yr ARI Event, Beresford

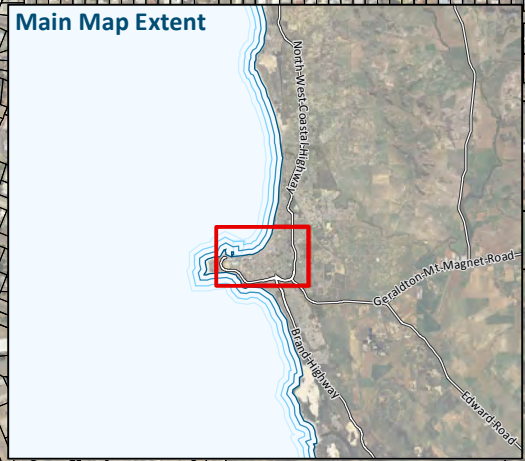
Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)--F37
Drawn: KNM
Date: 09/04/2018
Checked: JC
Approved: JC
Date: 09/04/2018





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 • Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
 • NACC Coastal Landforms Guilderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)



Cadastral boundary
 Coastal compartment extent

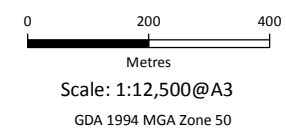
Inundation depth

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>0.2m - 0.4m
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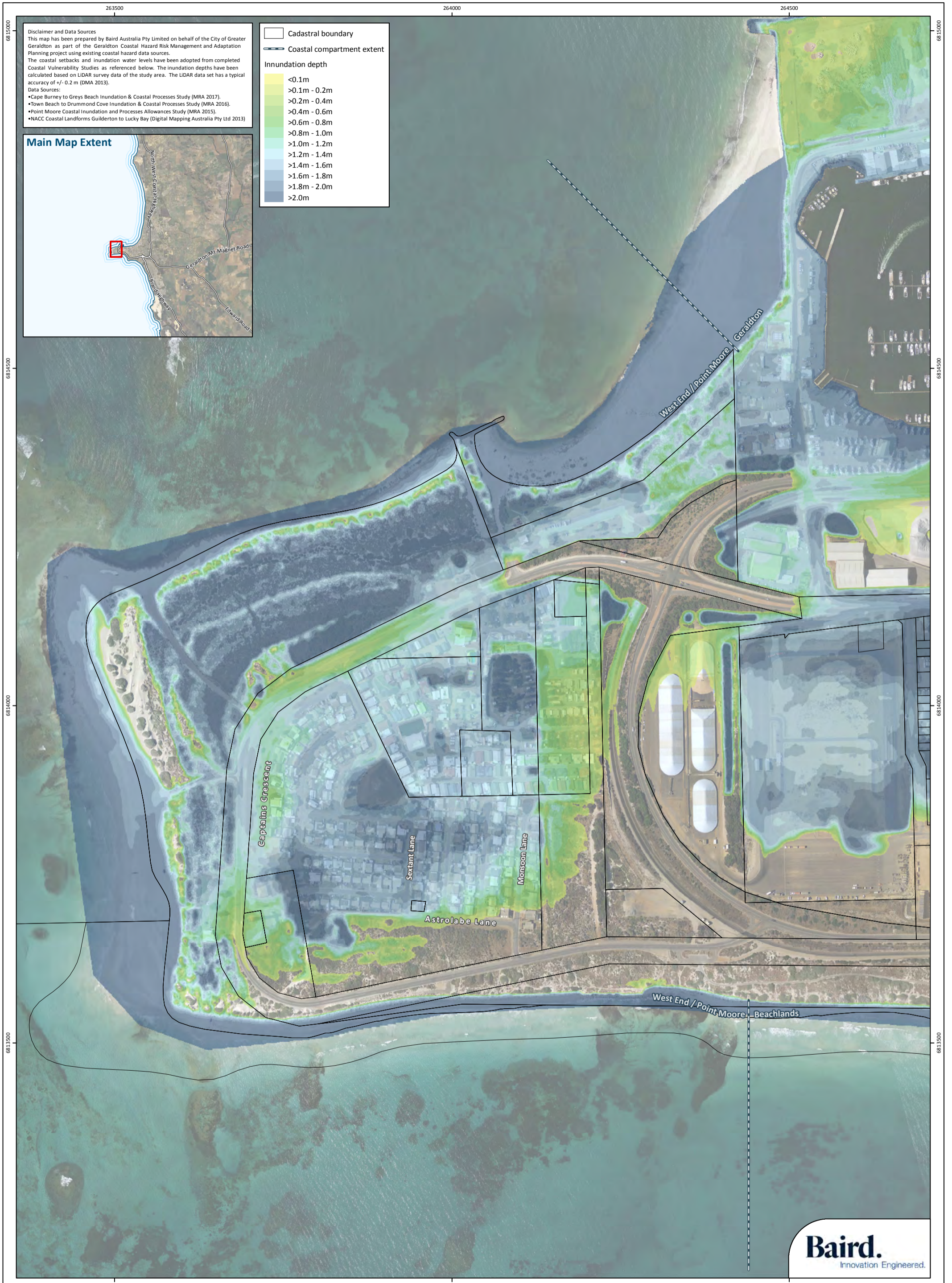
Baird.
 Innovation Engineered.

Figure 6 of 12
Coastal Hazard Mapping : 2110 Coastal Inundation Depth 100yr ARI Event, Geraldton
 Project: Geraldton CHRMAP Project
 Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F38
 Drawn: KNM
 Date: 09/04/2018
 Checked: JC
 Approved: JC
 Date: 09/04/2018

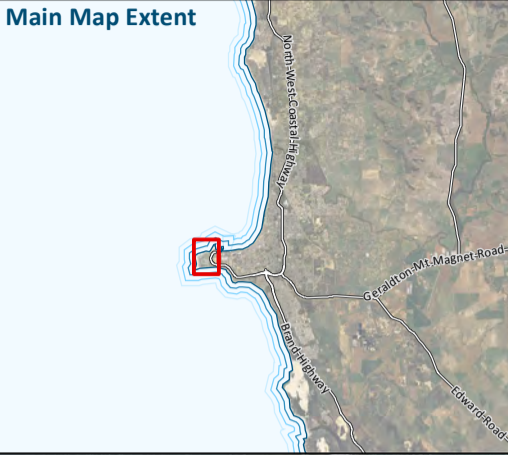


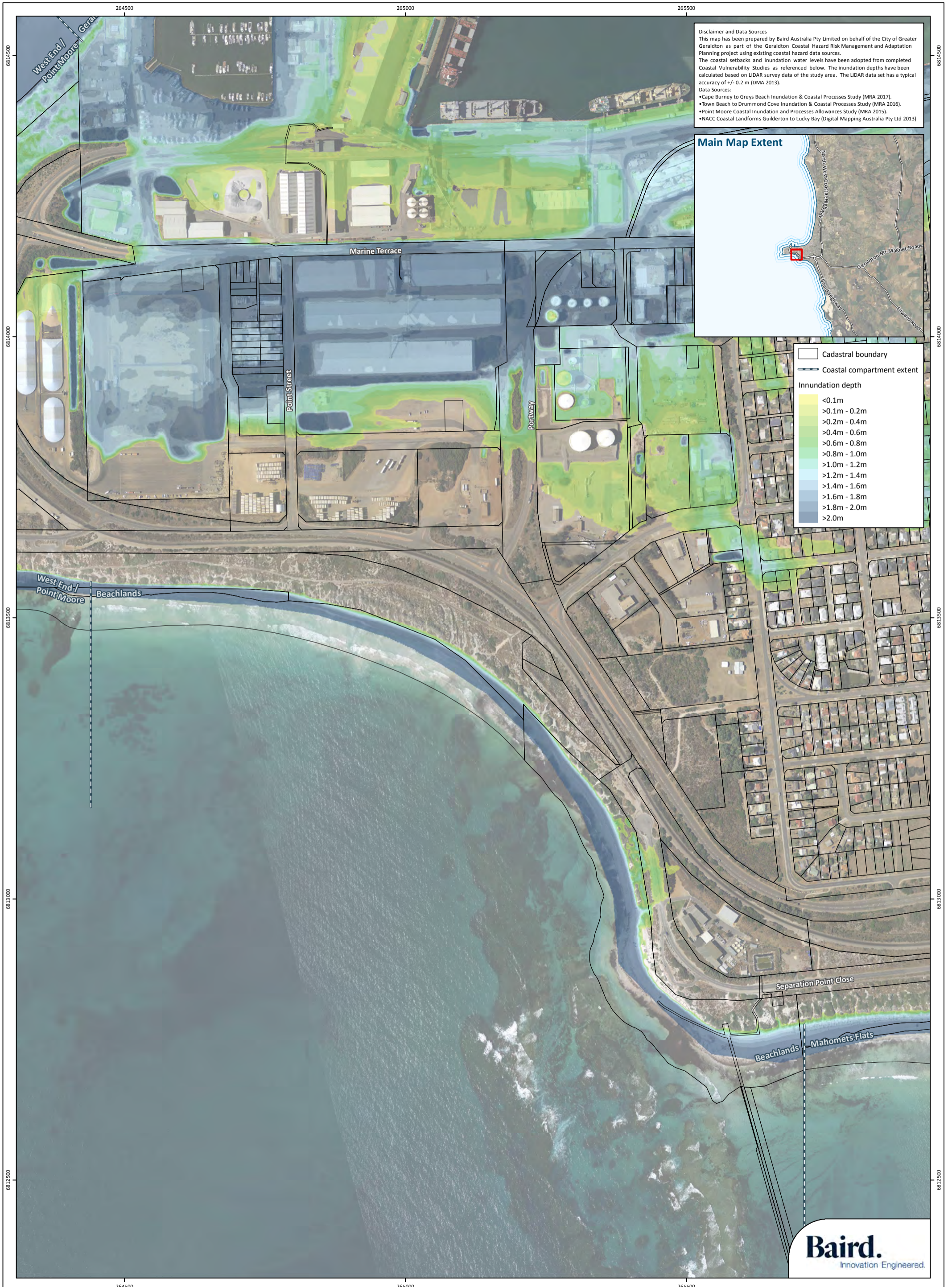
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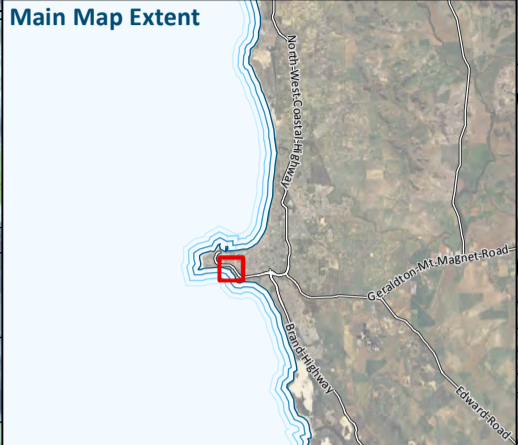
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 • NACC Coastal Landforms Guilderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)

Cadastral boundary
 Coastal compartment extent
Inundation depth
 <0.1m
 >0.1m - 0.2m
 >0.2m - 0.4m
 >0.4m - 0.6m
 >0.6m - 0.8m
 >0.8m - 1.0m
 >1.0m - 1.2m
 >1.2m - 1.4m
 >1.4m - 1.6m
 >1.6m - 1.8m
 >1.8m - 2.0m
 >2.0m





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 • Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
 • NACC Coastal Landforms Guilderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)



Cadastral boundary
 Coastal compartment extent
Inundation depth
 <math><0.1\text{m}</math>
 >0.1m - 0.2m
 >0.2m - 0.4m
 >0.4m - 0.6m
 >0.6m - 0.8m
 >0.8m - 1.0m
 >1.0m - 1.2m
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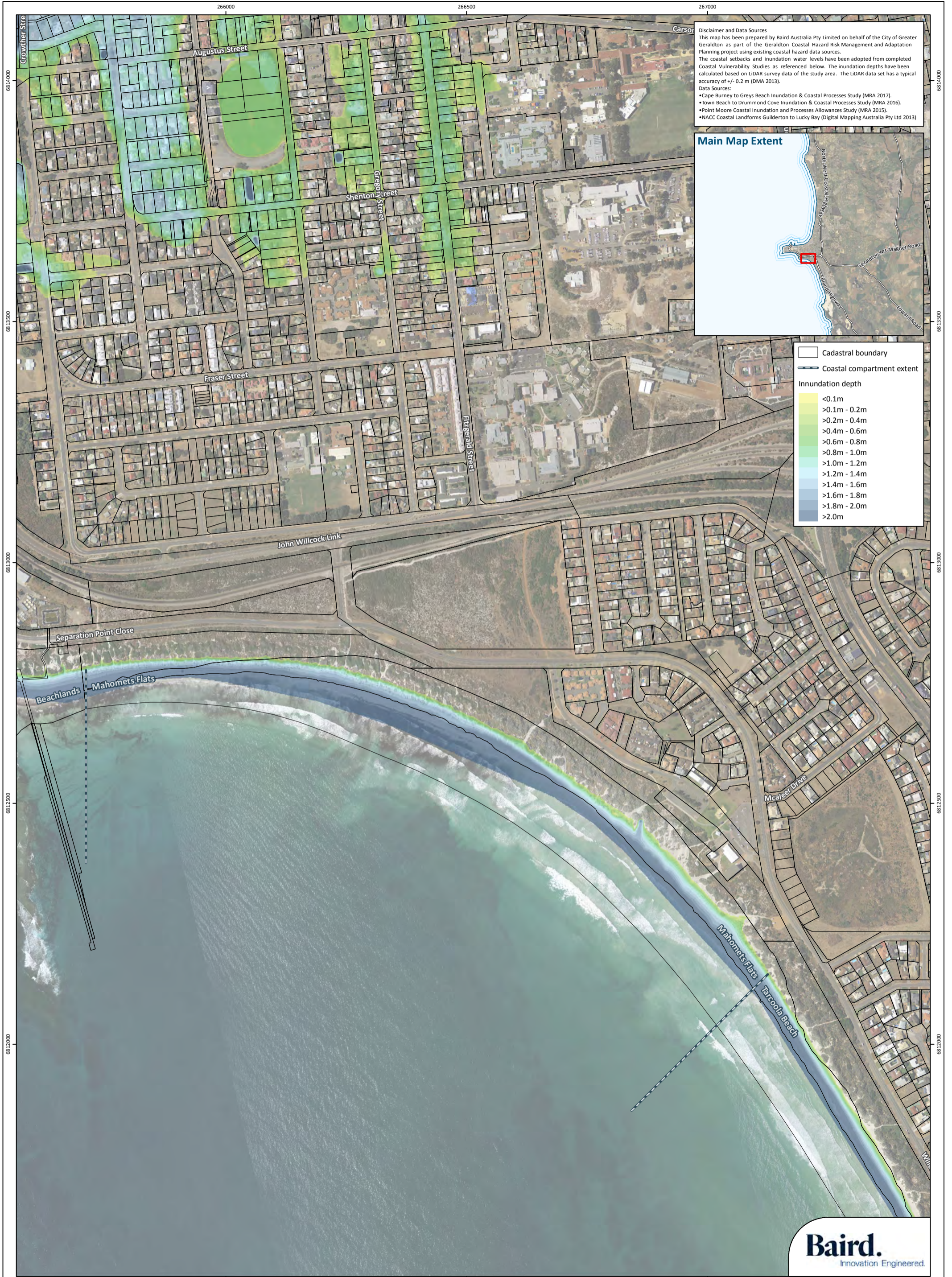


Figure 9 of 12

Coastal Hazard Mapping : 2110 Coastal Inundation Depth 100yr ARI Event, Mahomets Flats

Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F37
Drawn: KNM
Date: 09/04/2018
Checked: JC
Approved: JC
Date: 09/04/2018

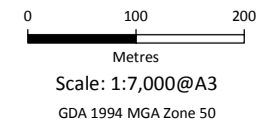
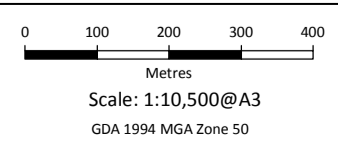




Figure 10 of 12
Coastal Hazard Mapping : 2110 Coastal Inundation Depth 100yr ARI Event, Tarcoola Beach
 Project: Geraldton CHRMAP Project
 Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F37
 Drawn: KNM
 Date: 09/04/2018
 Checked: JC
 Approved: JC
 Date: 09/04/2018



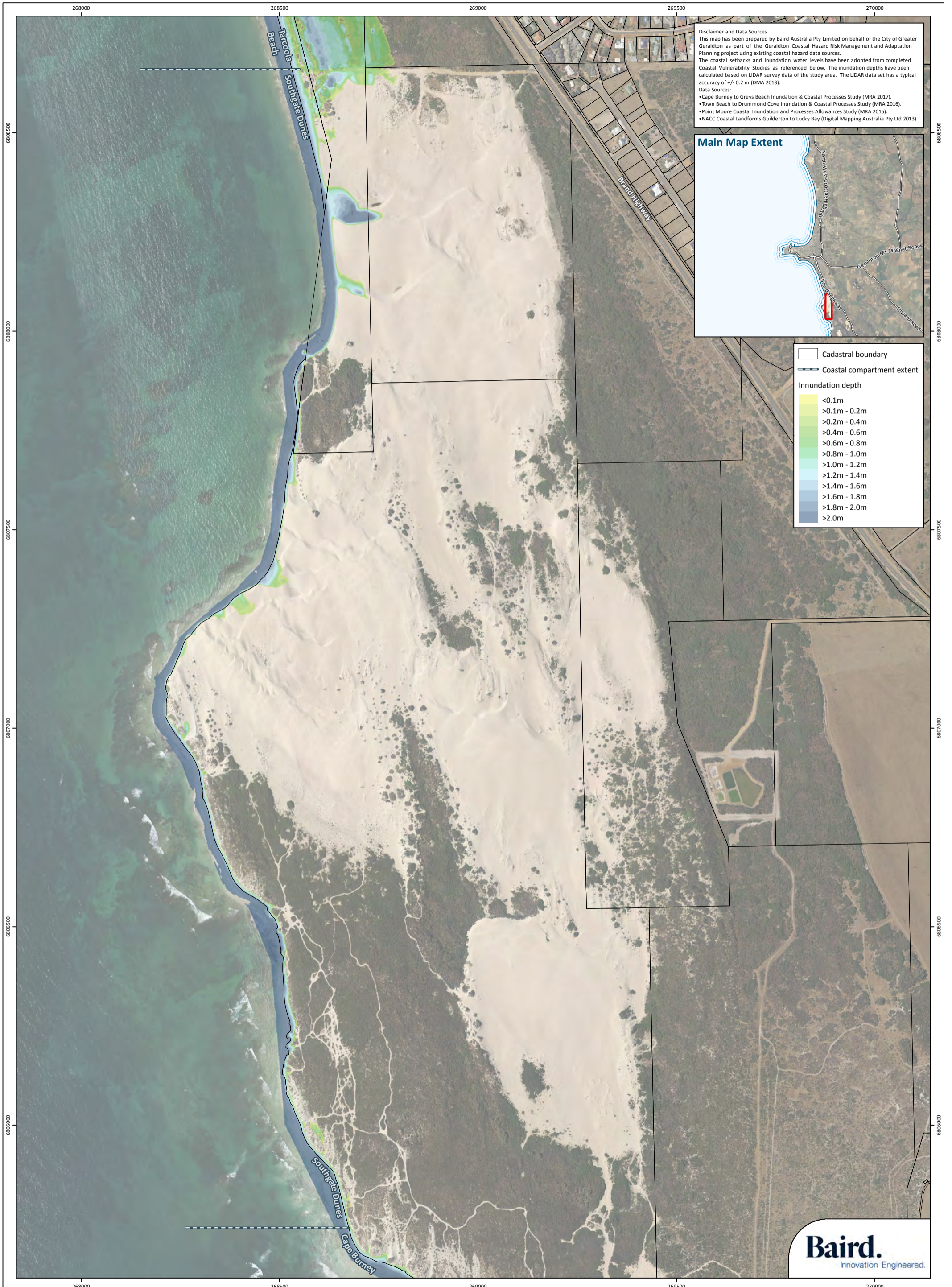


Figure 11 of 12

Coastal Hazard Mapping : 2110 Coastal Inundation Depth 100yr ARI Event, Southgate Dunes

Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)--F37
Drawn: KNM
Date: 09/04/2018
Checked: JC
Approved: JC
Date: 09/04/2018



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 Scale: 1:8,500@A3
 GDA 1994 MGA Zone 50



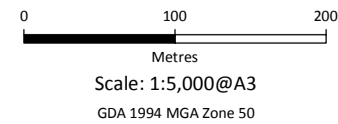


Figure 12 of 12

Coastal Hazard Mapping : 2110 Coastal Inundation Depth 100yr ARI Event, Cape Burney

Project: Geraldton CHRMAP Project
 Client: The City of Greater Geraldton

Plan Number: EP17-099(01)--F37
 Drawn: KNM
 Date: 09/04/2018
 Checked: JC
 Approved: JC
 Date: 09/04/2018



A.7 Economic Analysis

Project Number :	12693.101	Date	6 November 2018
Author :	Jim Churchill, Leo Drynan (Rhelm)		
Reviewer	Rhian Wardley		
Title :	Geraldton CHRMAP Economic Framework		
Summary / Description :	Summary of the Valuation of Coastal Assets and Economic Framework		
File Reference :	12693.101.GeraldtonEconomicFramework		

Background

The CHRMAP project for Geraldton is being developed in consultation with CGG, the local community and a range of stakeholders, and is delivered in accordance with local and national guidelines and standards (WAPC2014, AS5334-2013). The CHRMAP will provide a range of recommendations to guide investment decisions by the City in terms of the location and maintenance of its coastal infrastructure, and provide guidance for the development of statutory planning controls.

The CHRMAP will assess coastal hazard in 12 Coastal Management Units (CMU) across the 30km of Geraldton's coastline. Adaptation responses to mitigate coastal hazard will be identified in the coastal management units, and a multi-criteria analysis and cost benefit analysis will be undertaken to support the selection of the preferred adaptation option.

The economic evaluation of adaptation options will be led by Rhelm with support and input from the other areas of the consultant team (coastal hazard, planning, GIS). The economic evaluation process follows the following broad steps:

- Determining **economic value** of assets at risk to coastal hazards;
- Determining the current and future annual **cost of hazards** to susceptible assets in the CGG Coastal Zone;
- Determining the **cost of options** to mitigate coastal hazards; and
- **Economic evaluation** of reduction in costs of hazards to susceptible assets as a result of mitigation options.

The evaluation of the adaptation options task has two key components:

- Multi-Criteria Analysis (MCA); and
- Cost Benefits Analysis (CBA).

Economic Value

A number of sources have been used to value the infrastructure in the CGG Coastal zone.

The CGG provided the cadastral data for properties in the coastal zone. This information provided the following fields that were used in the economic assessment:

- Rateable value of properties (Attachment 1. Note only high and low asset value scale shown for privacy reasons)
- Town planning scheme zoning (Attachment 2)

The CGG were requested to provide the cost for replacement of assets under their control. The unit costs are shown in Table 1.

Table 1: Replacement Costs for CGG Assets

Asset Type	\$ per unit	unit	Comment
Roads	\$63.00	m2	Replacing Sealed Surface including
Footpaths / Pathways	\$150.00	m2	Paths with kerb replacement and high
Carparks	\$50.00	m2	
Cycle Path	\$150.00	m2	
Fencing	\$125.00	m	
Retaining Wall	\$130.00	m	
Landscaping (grass, planting)	\$18.00	m2	
Barbeque	\$11,000.00	each	
Toilets	\$250,000.00	each	
Picnic Tables	\$3,320.00	each	Picnic Setting (Table & Chairs)
Beach Shelter	\$13,400.00	each	Gazebo
Lighting	\$14,000.00	avg / each	
Signs small (eg beach access)	\$500.00	avg / each	
Signs laege (eg car park)	\$1,000.00	avg / each	
Signs specialist (eg walktrail/heritage)	\$3,000.00	avg / each	
Street Furniture	\$2,500.00	avg / each	
Seawalls (eg Beresford, Town Beach) ¹	\$7,000	m	\$10,000/m for deeper/higher structures
Groynes (eg Town Beach) ¹	\$7,000	m	\$10,000/m for deeper/higher structures
Jetties (eg Frances St Finger Jetty)	\$500,000	each	
Boat Ramp	\$4,000,000	each	
Stormwater Drainage Pipes	\$2,000.00	m	
Drainage Pits	\$4,500.00	m	
Play System	\$50,000.00	each	
Neos Wall	\$100,000.00	each	
Double Swing	\$8,000.00	each	
Rage Cage	\$220,000.00	each	

Note 1. This cost estimate provided by CGG based on recent projects completed in the area

Non-Market Assets

The above assets and those in Attachment 1 and 2 represent assets able to be expressed by market prices. However, there are a number of assets within the coastal zone that are unable to valued at market prices and require estimates of values to be determined through other approaches. Such assets include, amongst others:

- Beach visitation and use value;
- Coastal amenity and landscape character; and
- Environmental values.

These assets may be affected by erosion and inundation, and differ in the extent to which mitigation options address potential loss of value. A value for this in the economic calculations is assigned based on a range of approaches that reflect the available asset data, including:

- Revealed preference approaches (e.g. Travel-cost method – the cost incurred by individual to access or utilise and asset, Hedonic pricing – generates a relationship between market data and the non-market characteristic of interest)
- Stated preference approaches (e.g. Contingent valuation – determine how much an individual is Willing to Pay to access / use and asset, Choice modelling – determine an individuals hypothetical valuation of specific environmental attributes.

Based on the results of the Community and Stakeholder Engagement and the studies previously completed on the communities use of the coast (eg Beckwith 2010), a series of travel-cost, hedonic pricing, and contingent valuation methods are applied to estimate the non-market assets. Considerable literature exists on the economic value of coastal assets, against which the estimates will be ground-truthed (e.g. Pascoe et al. 2017, Costanza et al. 2013).

Cost of Hazards

Erosion Impacts

The assessment of the properties affected by coastal hazard was completed using a GIS led approach. The coastal hazard lines for erosion setback were used to determine the number of properties affected through the planning periods 2030, 2070 and 2110. The approach defines a property as impacted once any part of the property boundary is affected by the erosion setback line.

The value of the properties impacted in the CMU's has been estimated based on publicly available data on median property price for each suburb using values as given in realestate.com.au. It is noted that the value of beach front properties may potentially be higher although the suburb wide averages have conservatively been adopted. In the final analysis presented in the CBA, sensitivity on price assumptions is tested with +/- 20% and +/- 40% ranges.

A similar GIS approach to determine the impact to the other coastal assets listed in Table 1 was completed. This assumes that assets are valued at replacement value and does not take into account the age of the asset.

The present value of asset cost due to erosion is determined over the 2017 – 2110 period.

Inundation Impacts

The assessment of the properties affected by inundation hazard was completed using a GIS led approach similar to that employed for the erosion. The inundation areas were overlain on the cadastre data and depth of inundation assessed.

An example of the analysis technique is presented in Figure 1. As shown in Figure 1, the maximum and average flood depth (in cm) is determined for each of the unique properties in the project area. The analysis method summarised the inundation impacts, applying the freeboard assumption (0.3m) and disregarding the properties where minimal lot area was impacted (<15%).

It is noted that finished floor levels are not detailed in the project areas, and that the inundation mapping does not consider the actual height of the floor level in the flooding assessment. In determining the flood impacts to properties, a freeboard of 0.3m was assumed across the areas. This is broadly representative of a slab construction. The properties in the coastal areas may have floor levels set at a higher level, and it will be of value in future work to understand these true floor level for critical sections of the coast where inundation is highlighted as a significant risk.

Average annual damage costs associated with inundation (assuming damage would be repaired) is determined based on the depth of flooding, type of asset, and frequency of event, and considering how this varies over time. Using data such as the NSW Office of Environmental and Heritage residential damage curves, RAMs which is typically adopted in

Victoria, and other in-house data on damages, the potential costs of inundation during storm events would be estimated.

In addition to impacts to private properties, the cost of inundation will be evaluated for all assets (both market and non-market) assets will be considered, based on their estimated value and any inundation impacts.

The present value of asset cost due to inundation is determined over the 2017 – 2110 period.



Figure 1: Inundation impacts assessment – Example from Drummond Cove

Cost of Options

A range of adaptation tools available to mitigate coastal risk in the Avoid-Managed Retreat -Accommodate-Protect categories is summarised in Table 1. Options have been developed from a range of sources including WAPC 2014 and the National Climate Change Adaptation Research Facility (NCCARF) Coast Adapt tools, as well as incorporating options provided through the community involvement in the CHRMAP workshops.

The next step of the CHRMAP process is to establish the viability of each option within each of the CMUs. As part of this, indicative whole of life capital, operational and maintenance costs for implementation of each option will be determined in consultation with CGG. Determination of the existing, business-as-usual, coastal management measures

adopted by CCG will form a critical part of this as these costs will form part of the base case against which the options will be compared the MCA and CBA.

Table 1: Adaptation Options Toolbox Summary for Risk Mitigation of Coastal Assets (from Geraldton CHRMAP, Baird 2018)

	Code	Adaptation Type	Applicable
Avoid	Av.1	Setback Controls	Erosion and Inundation
	MR.1	Leaving Assets Unprotected	Erosion and Inundation
Managed Retreat	MR.2	Removal of Assets	Erosion and Inundation
	MR.3	Prevent Further Development	Erosion and Inundation
	MR.4	Land Swap	Erosion and Inundation
	Ac.1	Notification on Title	Erosion and Inundation
Accommodate	Ac.2	Building Design	Inundation
	Ac.3	Emergency Evacuation	Inundation
	Ac.4	Appropriate Finished Floor Levels	Inundation
	Ac.5	Filling Land	Inundation
	Temporary Protect / Improve Resilience	TPIR.1	Coastal Re-Vegetation
TPIR.2		Dune Management	Erosion and Inundation
TPIR.3		Beach Nourishment	Erosion
TPIR.4		Geotextile Sand Bags – Groynes and Seawalls	Erosion
Protect	Pr.1	Groynes	Erosion
	Pr.2	Seawalls	Erosion
	Pr.3	Flood Mitigation Structure	Erosion and Inundation
	Pr.4	Artificial Reefs	Erosion

Economic Evaluation

Following completion of the above steps the reduction in costs due to hazards as a result of each option will be determined and considered in light of associated option implementation costs. The reduction in costs due to erosion and inundation hazards achieved by each option (i.e. the avoided costs of coastal hazards) represents the benefit associated with each option¹. Where the present value of these benefits exceeds the capital, operational and maintenance costs of implementation, the option would be considered economically viable, generating a positive Net Present Value and a Benefit Cost Ratio greater than one.

The economic assessment of the adaptation options will apply multi-criteria analysis and cost benefit analysis to support the decision-making process for the preferred adaptation responses in CHRMAP. Due to the number of CMUs,

¹ An option may also generate new benefits to community members of the environment that did not exist previously that would also need to be considered.

number of options and level of detail required for full cost benefit analysis, a multi-criteria assessment will be utilised to do an initial comparison of options within each CMU.

Multi-Criteria Assessment

The multi-criteria analysis would be used to compare and contrast the identified list of adaptation options **within** CMUs. The analysis would incorporate criteria related to economic, social and environmental impacts. A score for each option, including the base case (business as usual scenario) as an option, will be derived based on:

- The asset types present within each CMU
- The importance of the asset types to the community at each CMU
- The manner and extent in which erosion will affect each asset under the option (either a quantitative or qualitative metric will be used to evaluate this) at both 2030 and 2070
- The manner and extent in which inundation will affect each asset under the option (either a quantitative or qualitative metric will be used to evaluate this) at both 2030 and 2070

For each option, a score will be assigned for each asset type. Based on the relative importance of the asset type to the local community and cumulative score for each option within each CMU will be determined. This cumulative score would then be compared against an estimate of the option implementation capital, operational and maintenance costs, to derive a Cost Effectiveness Ratio. The relative performance of each option within each CMU will be able to be ranked and compared in terms of the costs of hazard faced given the cost of implementation.

An example of the Multi-Criteria Analysis is shown in **Attachment 3**. Up to two of the most cost effective options would be carried forward to be assessed through a full CBA.

Cost Benefit Analysis

The identified short-list of preferred options within each CMU will be assessed for their economic feasibility through a cost-benefit analysis. This process will also enable options **between** CMUs to be compared and contrasted (e.g. the multi-criteria process may identify that beach nourishment is the preferred option in two CMUs. The CBA would aid in determining which, of the two investments in beach nourishment, would generate the greatest net benefit to CGG and community as a whole.)

The cost benefit analysis for each option will determine the dollar value of costs/benefits (direct and indirect) for both the base case, business as usual, scenario and the option scenario. The difference between the costs/benefits of the scenarios representing the net value associated in undertaking the proposed coastal management measure, over continuing with the current level of coastal management.

Costs to be quantified include:

- Construction costs
- Property acquisition
- Operational and Maintenance costs
- Decommissioning costs
- Council rates
- Municipal service requirements

Benefits to be quantified include:

- Reduction in ecological habitat lost
- Reduction in lost WTP for surfing
- Reduction in lost WTP for recreational fishing
- Reduction in lost WTP for general beach recreation
- Reduction in loss of private property
- Reduction in loss of public infrastructure (incl. roads, toilets .etc)
- Reduction in loss of other recreational space

- Economic contribution of saved private property
- Economic value of saved local commerce

The costs and benefits would consider both erosion and inundation contributions to loss/reductions. The cost benefit analysis will focus on the planning period to 2070, as the longer planning period (to 2110) involves too many uncertainties and economic discounting makes any benefits generated in these later years, largely negligible. Standard economic indicators (NPV, IRR, BCR) will be provided for each option, and sensitivity testing undertaken on “Almost Certain” and “Rare” erosion scenarios to provide a better understanding of the resilience associated with each of the options.

An example of the CBA summary output is shown in **Attachment 4**.

In addition, a discussion and evaluation of distribution analysis will be provided. The distribution analysis will assess the degree to which the costs and benefits are born by a concentrated or diverse number of individuals / agencies / communities.

References

Beckwith Environmental Planning 2010, City of Geraldton-Greenough Coastal Communities Study, Prepared for the Northern Agricultural Catchments Council (NACC), May 2010

Costanza et al. 2013, Changes in the global value of ecosystem services, *Global Environmental Change* 26 (2014) 152–158

Pascoe et al. 2017, What’s my beach worth? Economic values of NSW coastal assets, 26th Annual NSW Coastal Conference, November 2017

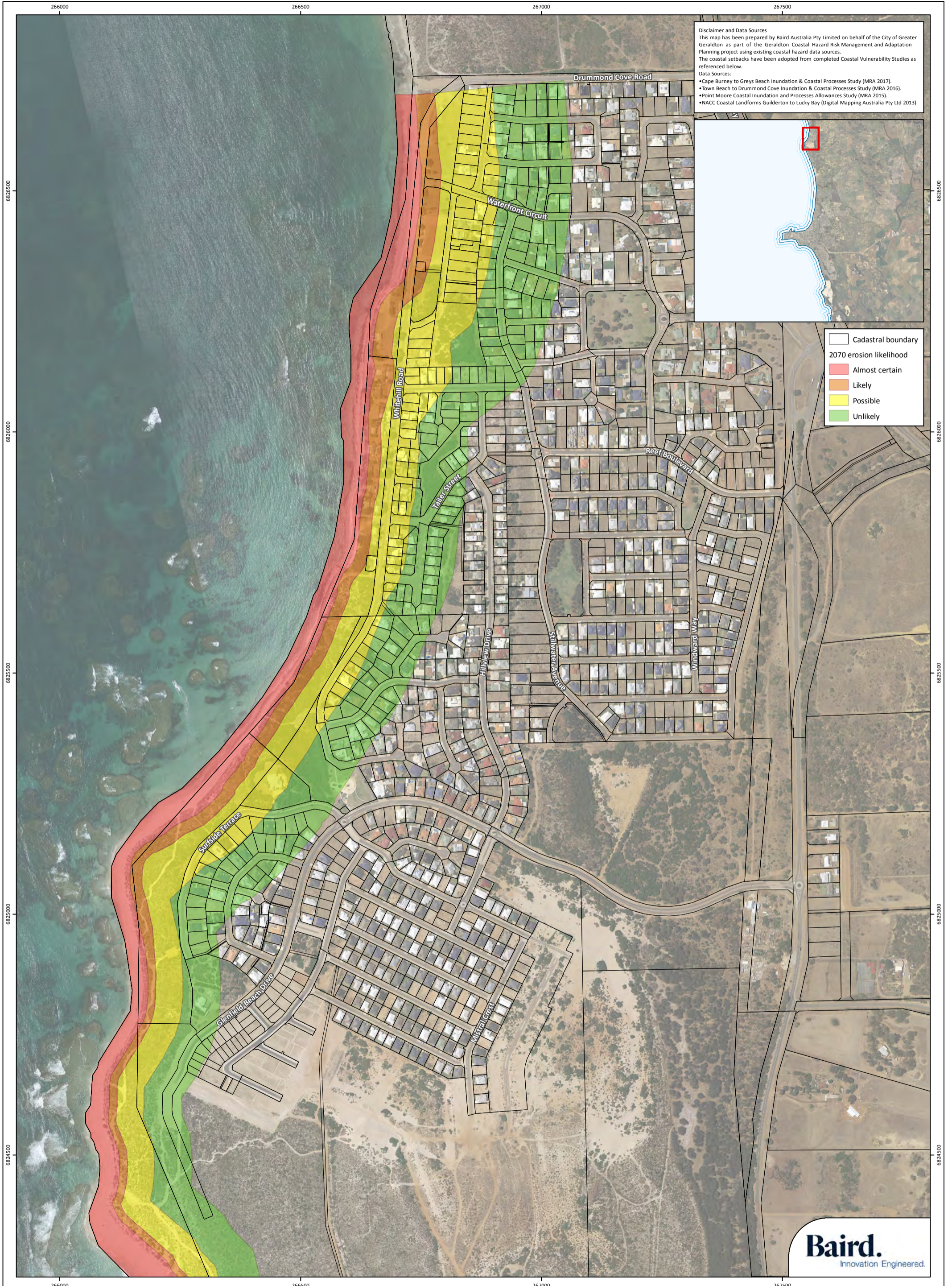
Attachment 1 - Rateable value of properties

Attachment 2 – Town Planning Scheme Zoning

Attachment 3 – MCA Example

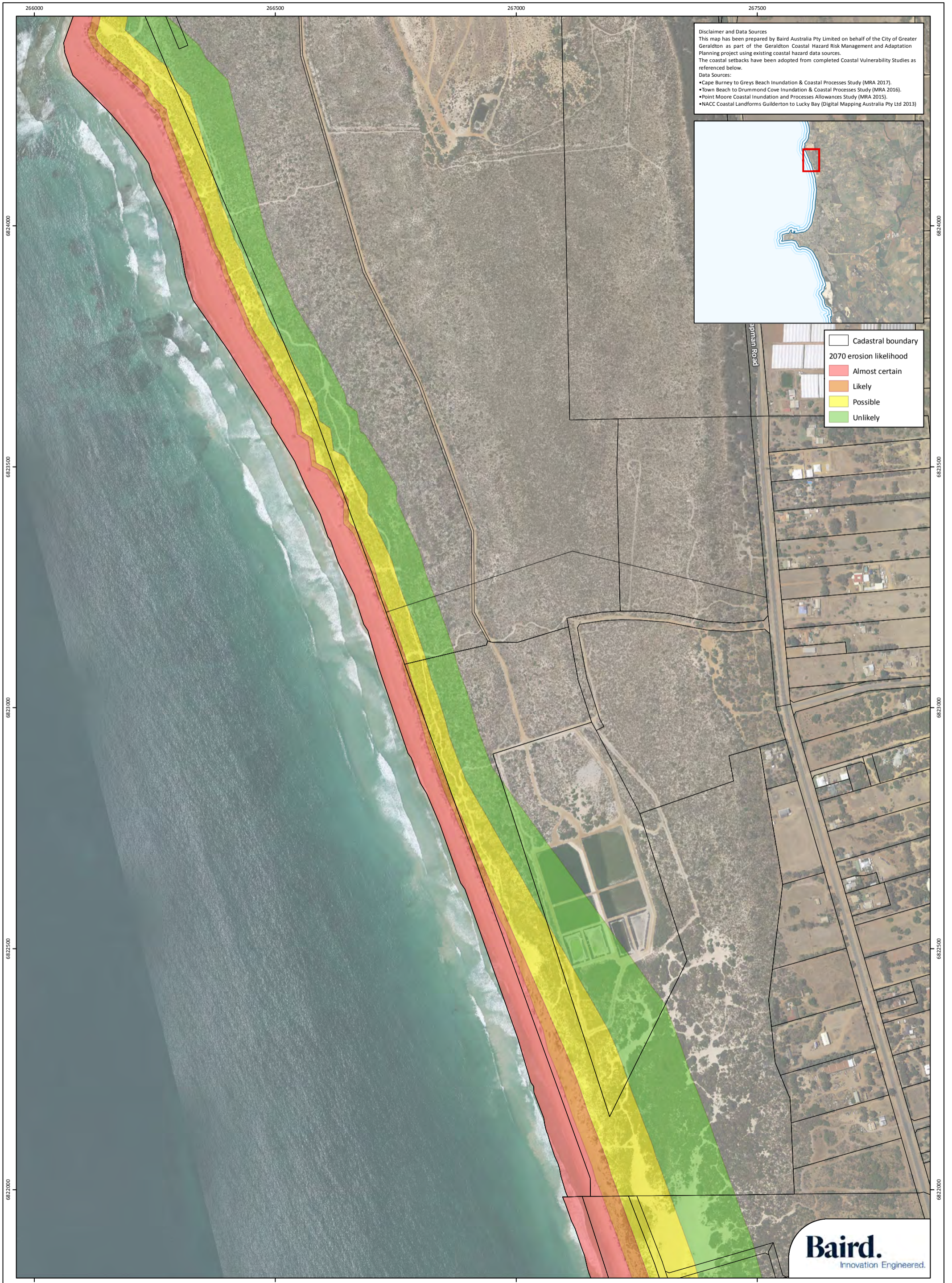
Attachment 4 – CBA Example

A.8 Likelihood Mapping for Coastal Erosion



Disclaimer and Data Sources
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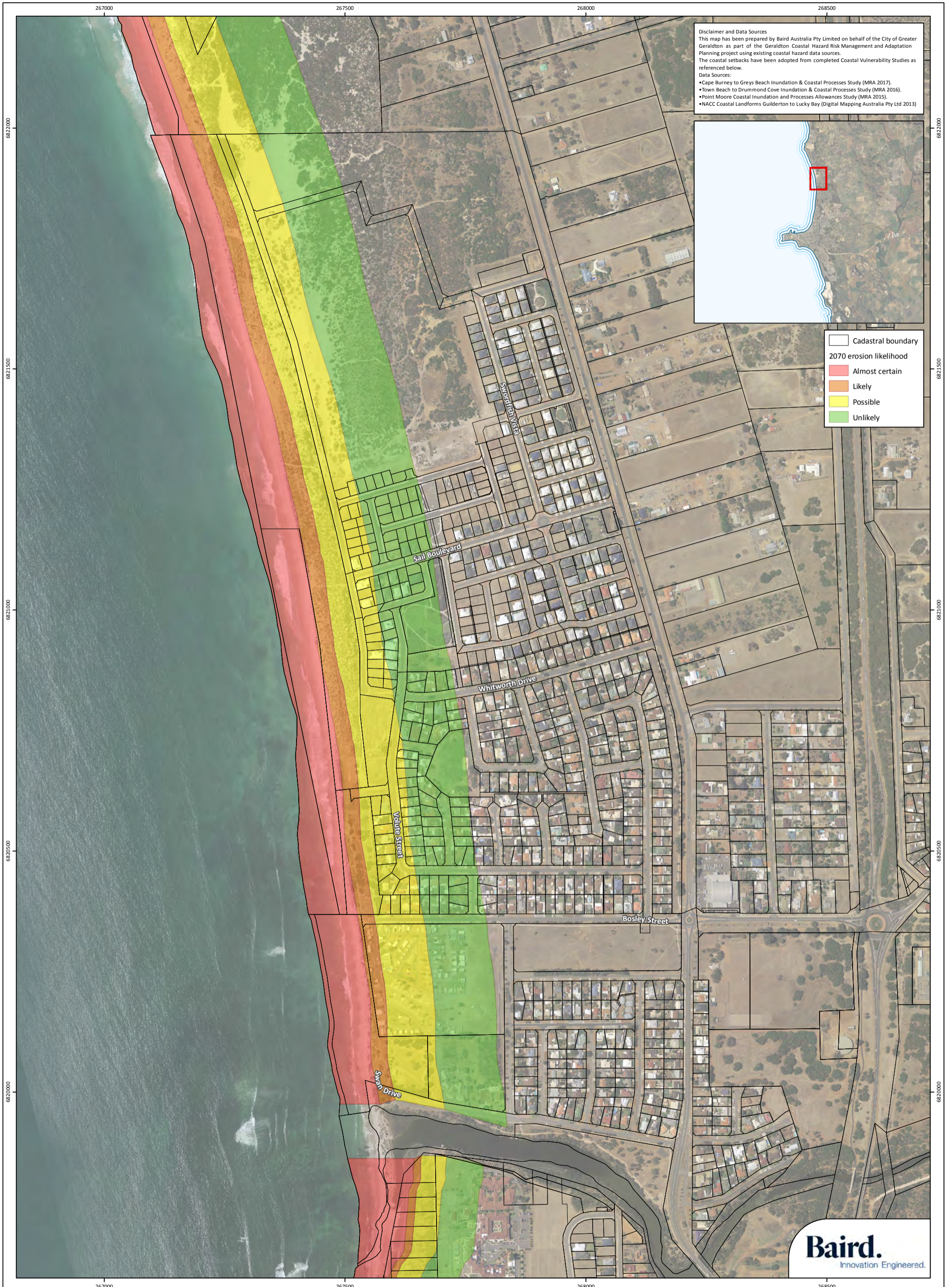
- Cadastral boundary
- 2070 erosion likelihood**
- Almost certain
- Likely
- Possible
- Unlikely



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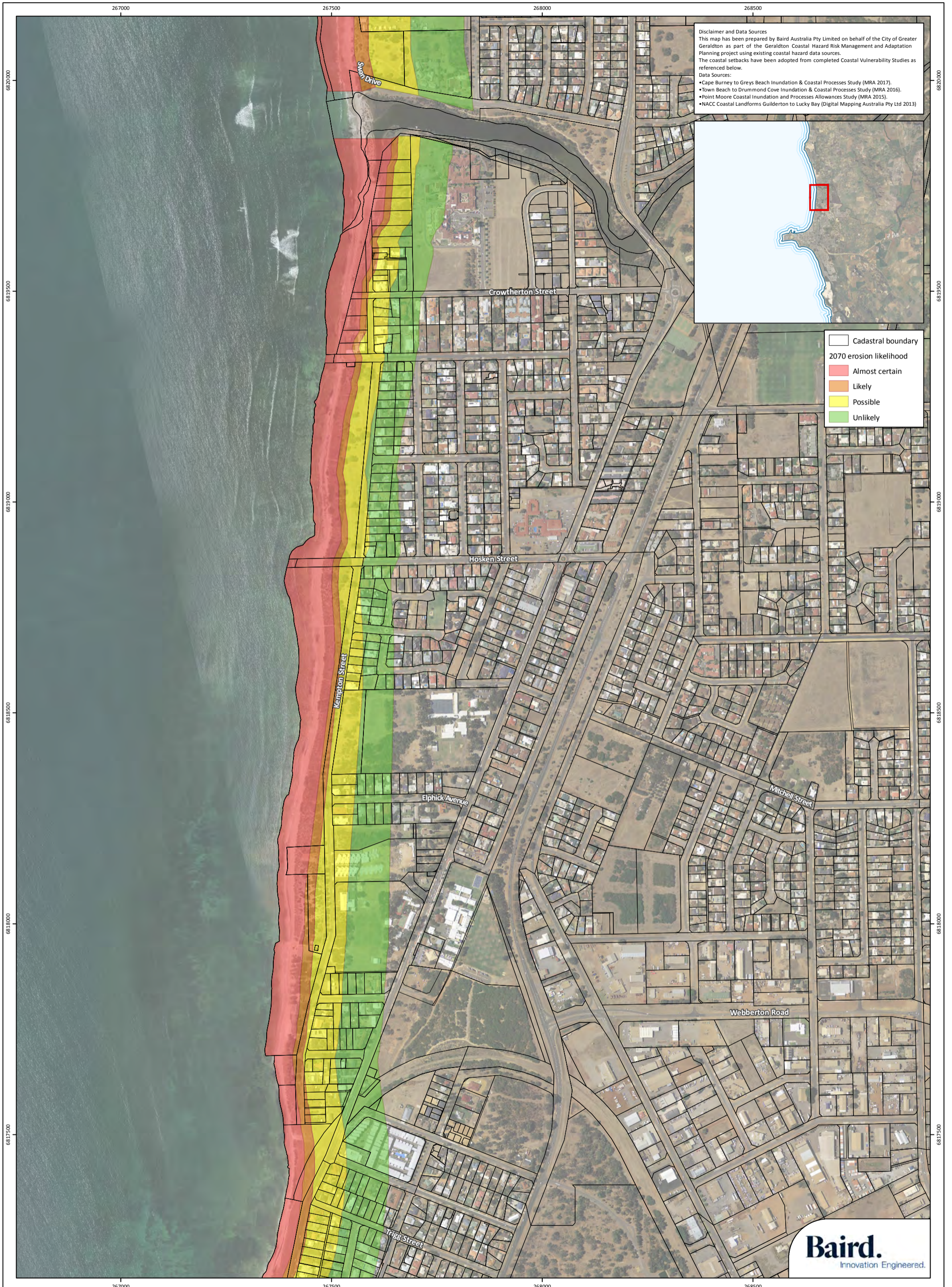
- Cadastral boundary
- 2070 erosion likelihood
- Almost certain
- Likely
- Possible
- Unlikely





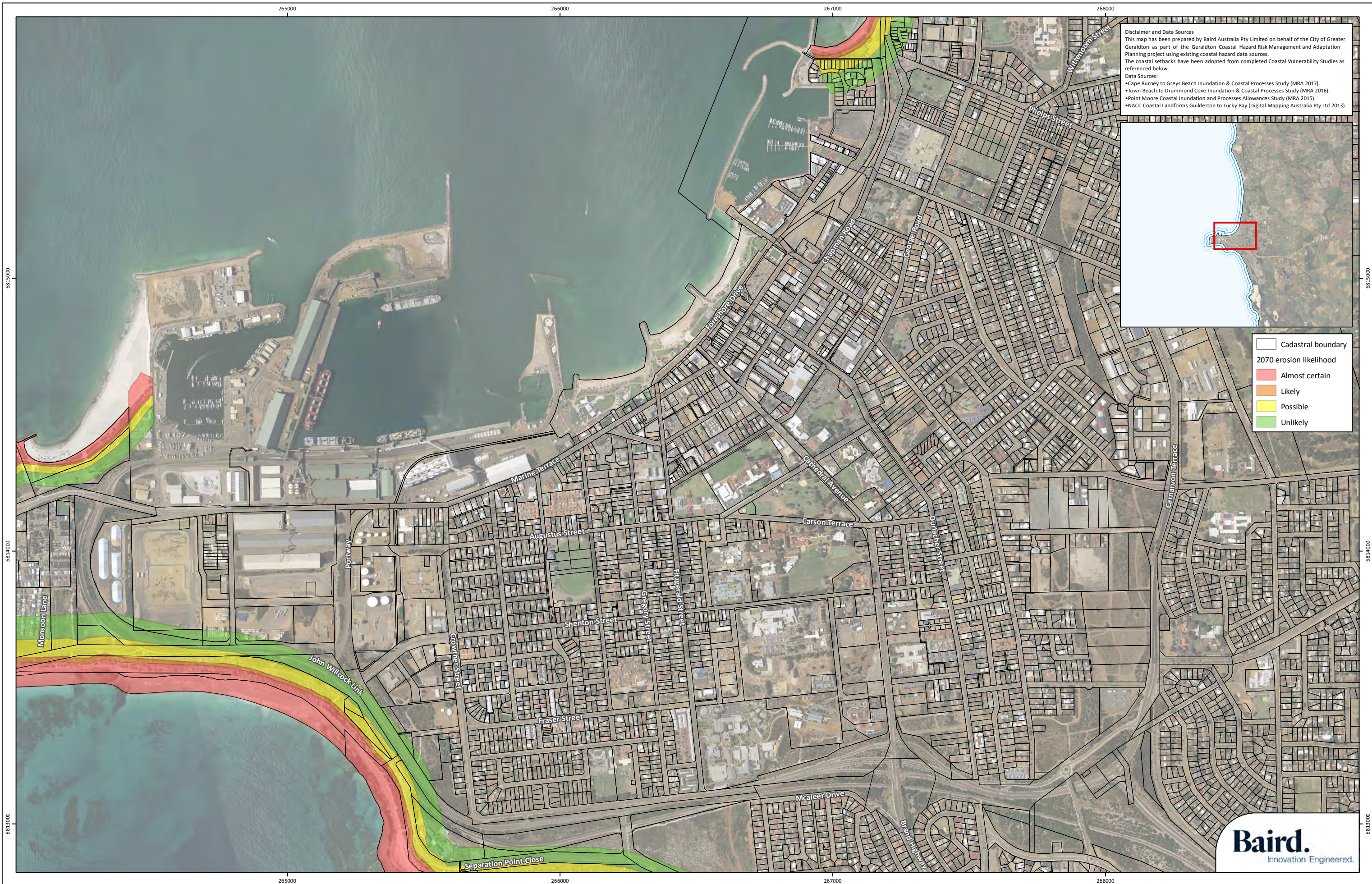
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- Cadastral boundary
- 2070 erosion likelihood
- Almost certain
- Likely
- Possible
- Unlikely



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- ▭ Cadastral boundary
- 2070 erosion likelihood**
- ▭ Almost certain
- ▭ Likely
- ▭ Possible
- ▭ Unlikely



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Cadastral boundary
2070 erosion likelihood
 Almost certain
 Likely
 Possible
 Unlikely

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Figure 6 of 12
Coastal Hazard Mapping : 2070 Erosion Likelihood, Geraldton
 Project: Geraldton CHRMAP Project
 Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F23
 Drawn: KNM
 Date: 21/11/2017
 Checked: DRAFT
 Approved: DRAFT
 Date: -/-/-



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 GDA 1994 MGA Zone 50



While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used

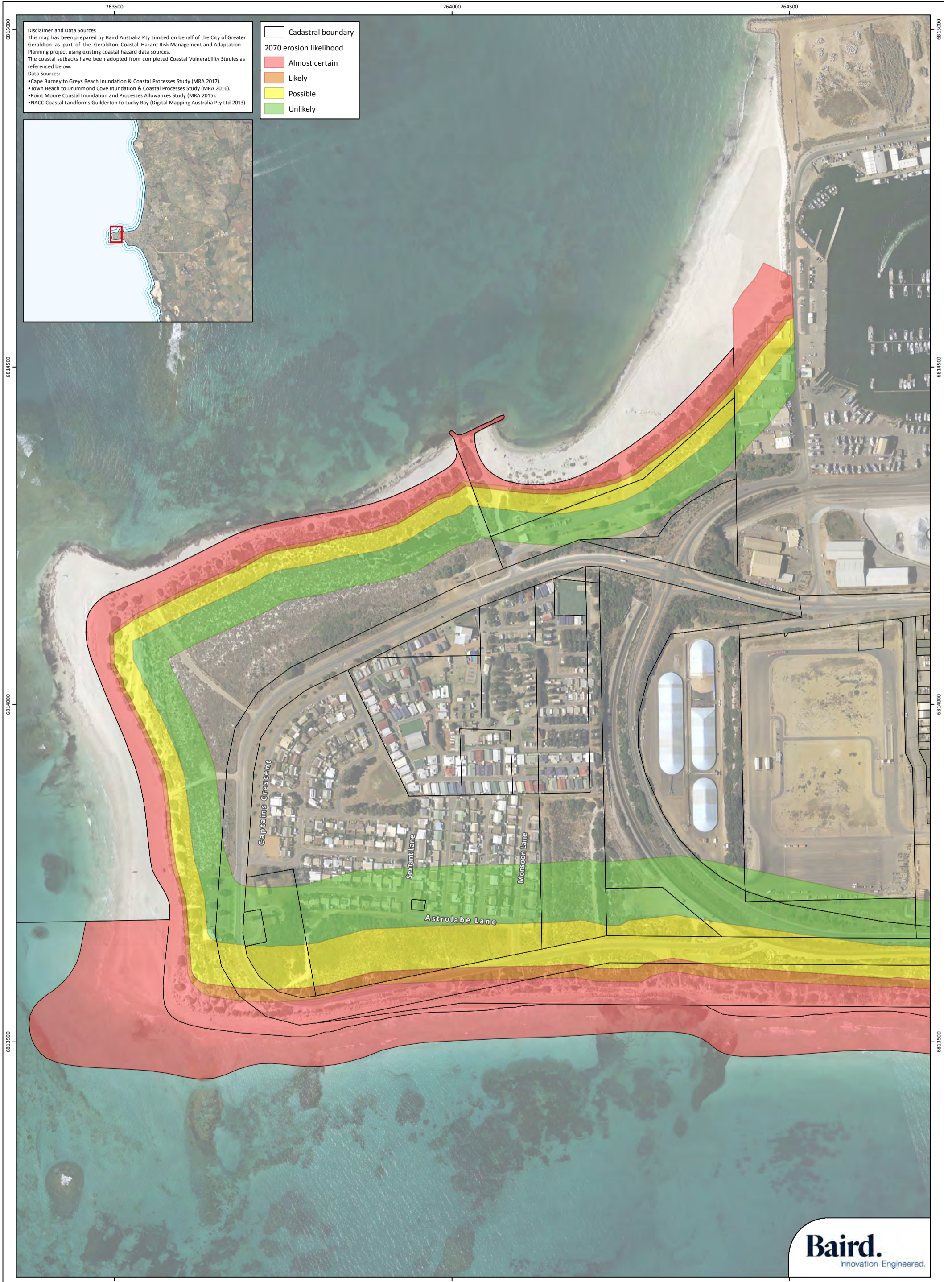
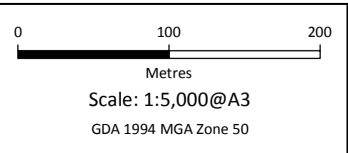


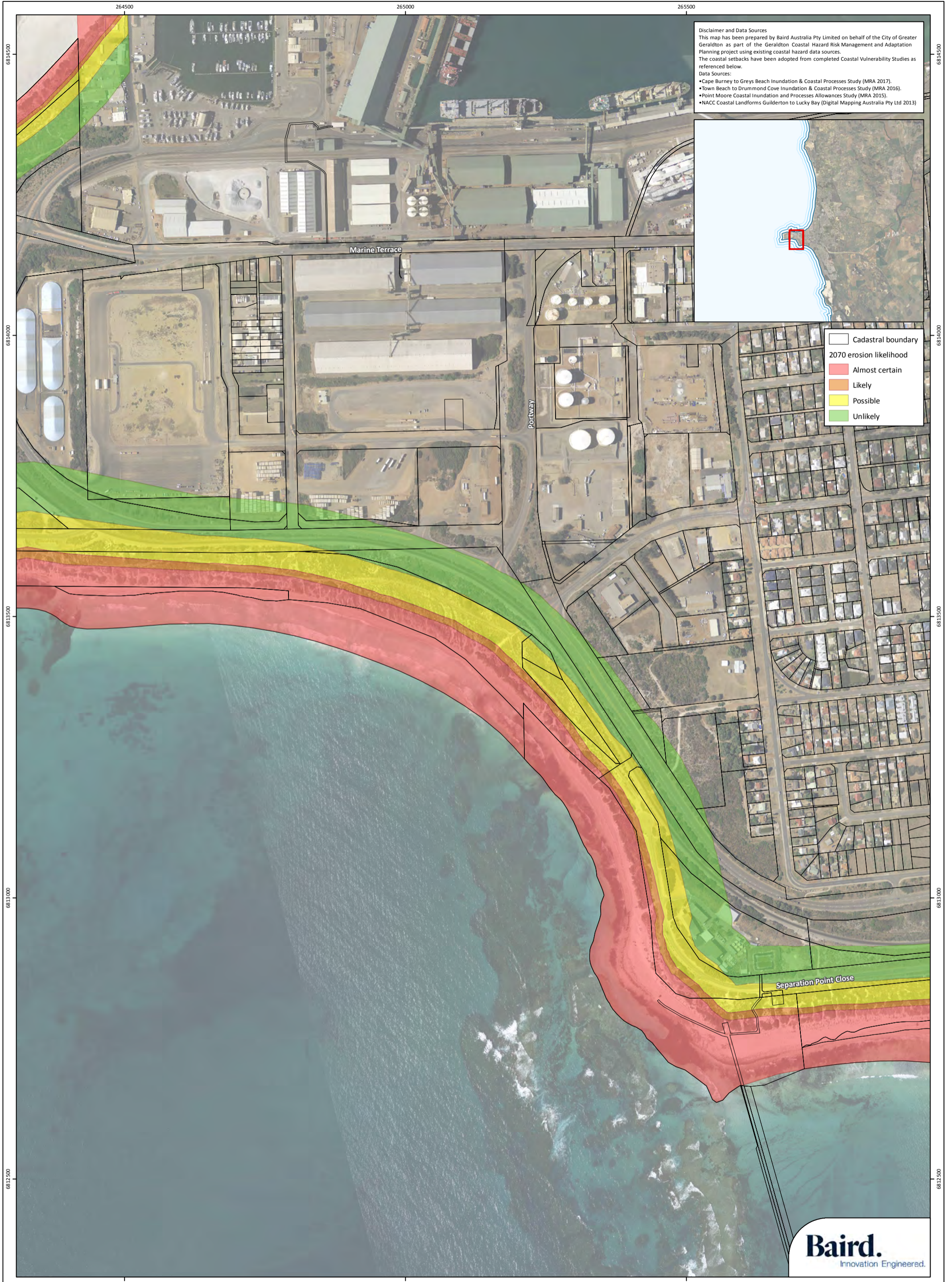
Figure 7 of 12 Coastal Hazard Mapping : Coastal Hazard Mapping : 2070 Erosion Likelihood, West End / Point Moore

Project: Geraldton CHRMAP Project

Client: The City of Greater Geraldton

Plan Number: EP17-099(01)--F24
Drawn: KNM
Date: 21/11/2017
Checked: DRAFT
Approved: DRAFT
Date: --/--

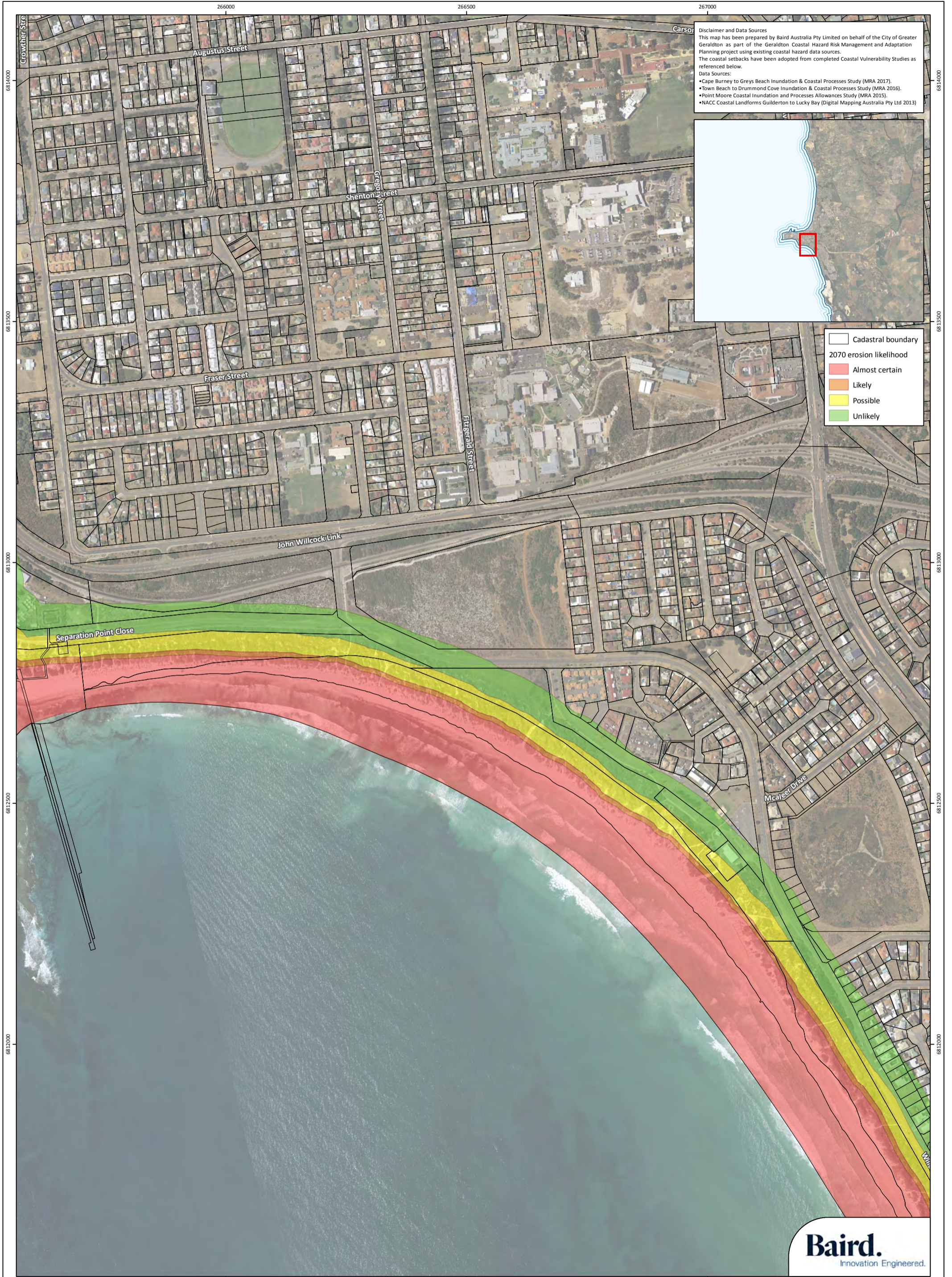




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[] Cadastral boundary
2070 erosion likelihood
 [Red] Almost certain
 [Orange] Likely
 [Yellow] Possible
 [Green] Unlikely





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[] Cadastral boundary
 2070 erosion likelihood
 [Red] Almost certain
 [Orange] Likely
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 [Green] Unlikely





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Cadastral boundary
2070 erosion likelihood
 Almost certain
 Likely
 Possible
 Unlikely

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Figure 10 of 12 Coastal Hazard Mapping : 2070 Erosion Likelihood, Tarcoola Beach

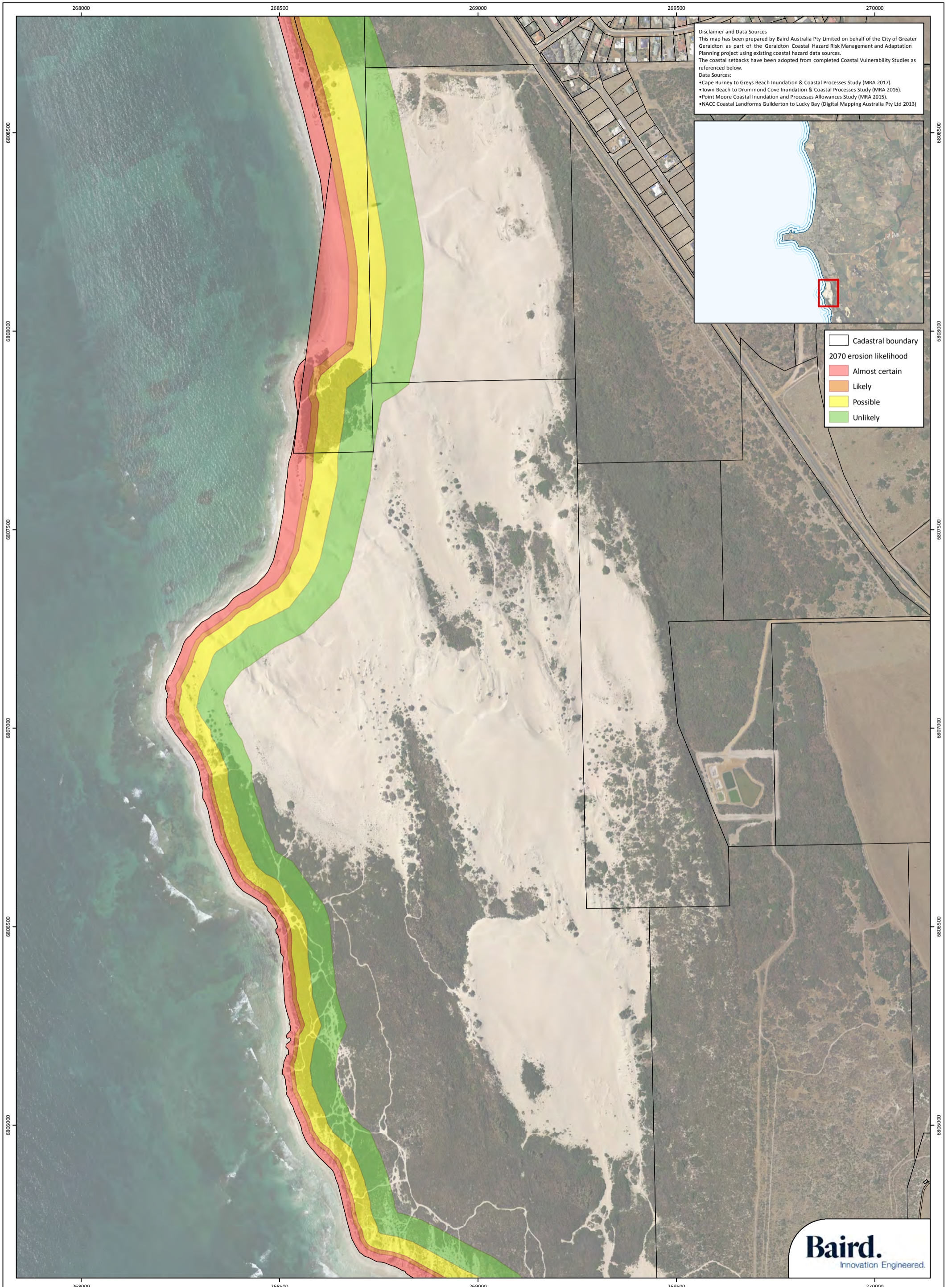
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Client: The City of Greater Geraldton

Plan Number: EP17-099(01)--F22
Drawn: KNM
Date: 21/11/2017
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 GDA 1994 MGA Zone 50





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- Cadastral boundary
- 2070 erosion likelihood
- Almost certain
- Likely
- Possible
- Unlikely

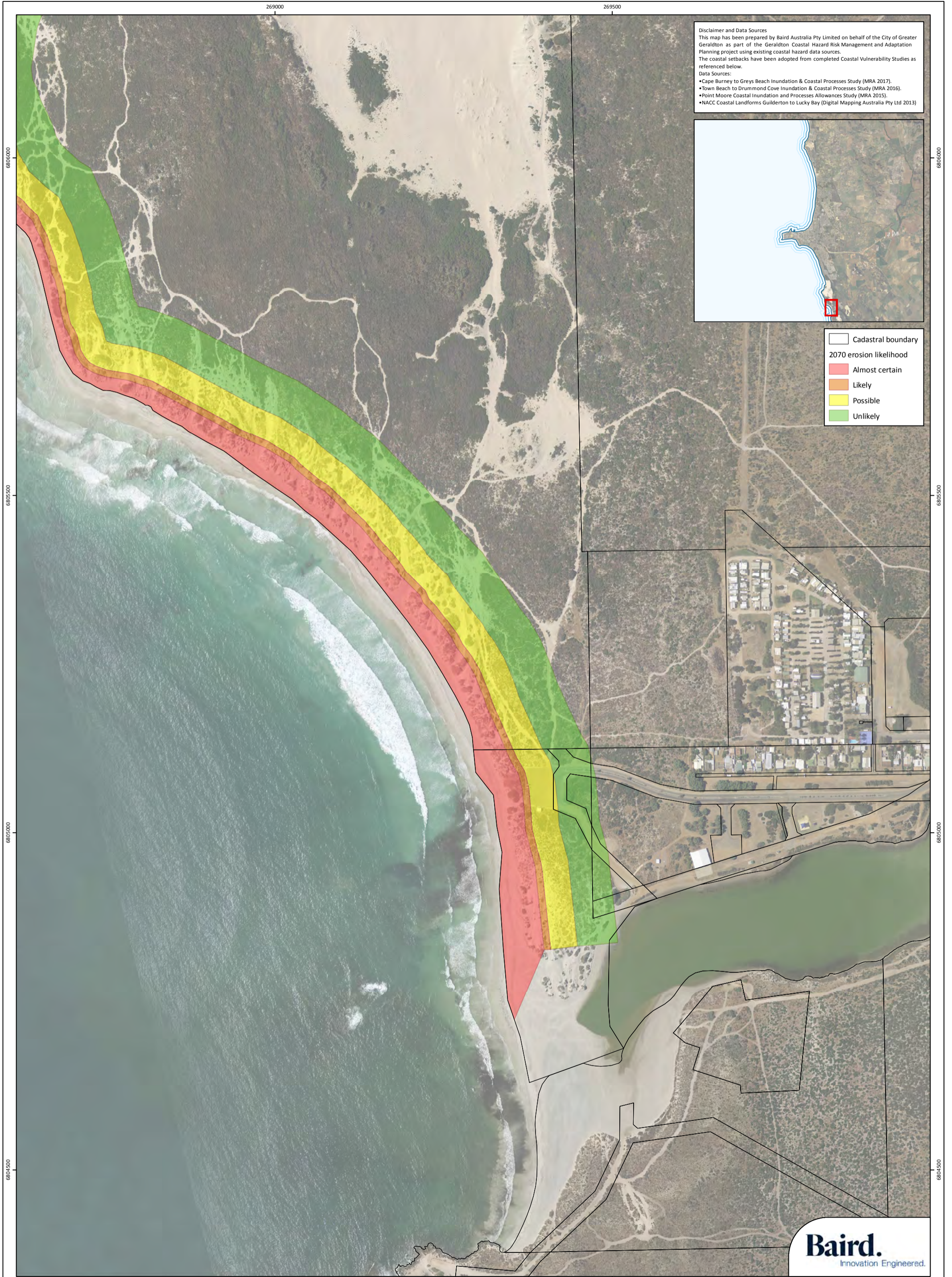
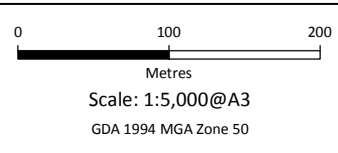


Figure 12 of 12
Coastal Hazard Mapping : 2070 Erosion Likelihood, Cape Burney
 Project: Geraldton CHRMAP Project
 Client: The City of Greater Geraldton

Plan Number: EP17-099(01)--F22
 Drawn: KNM
 Date: 21/11/2017
 Checked: DRAFT
 Approved: DRAFT
 Date: --/--



A.9 Likelihood Mapping for Coastal Inundation

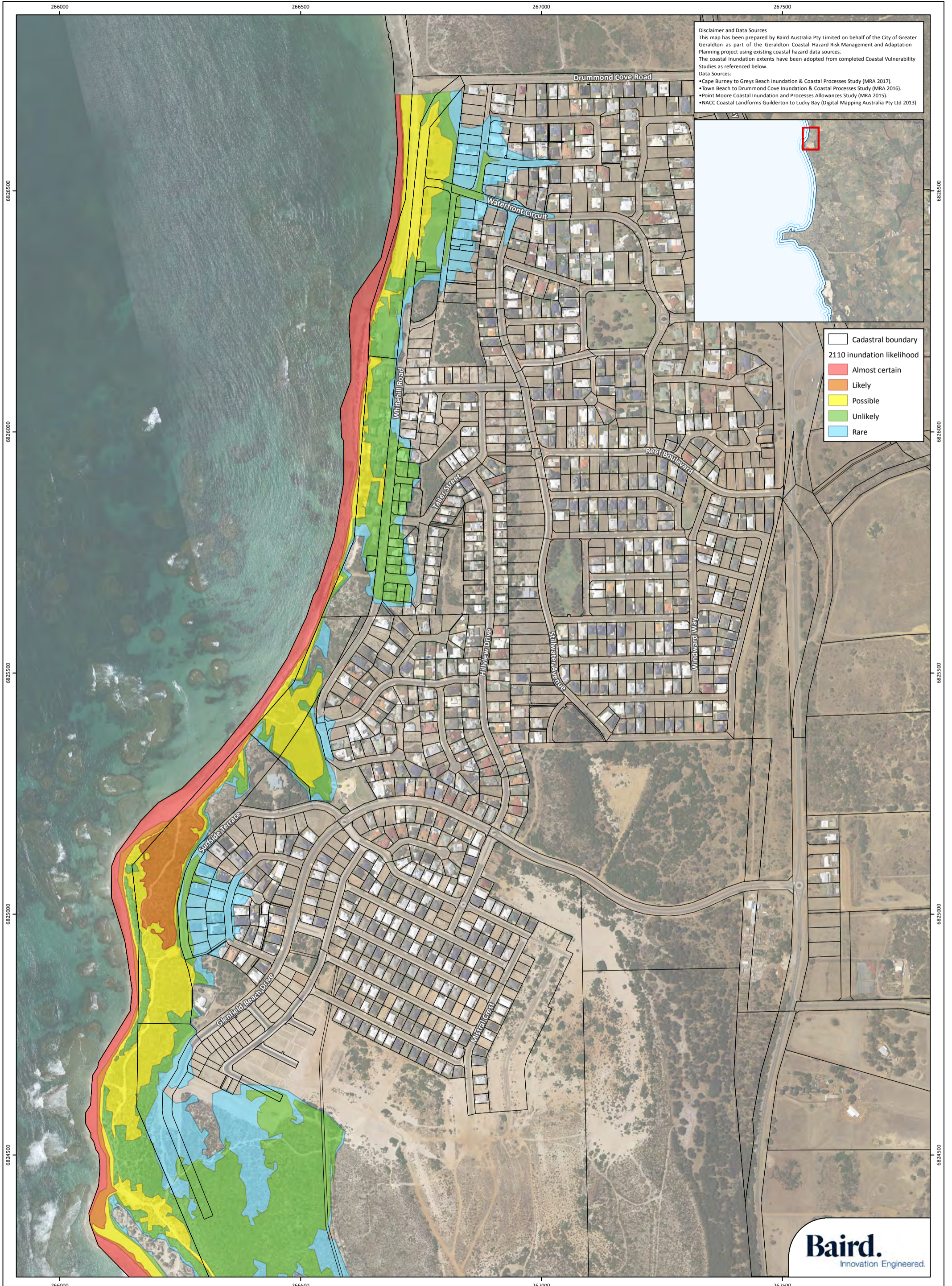


Figure 1 of 12 Coastal Hazard Mapping : 2110 Inundation Likelihood, Drummond Cove

Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

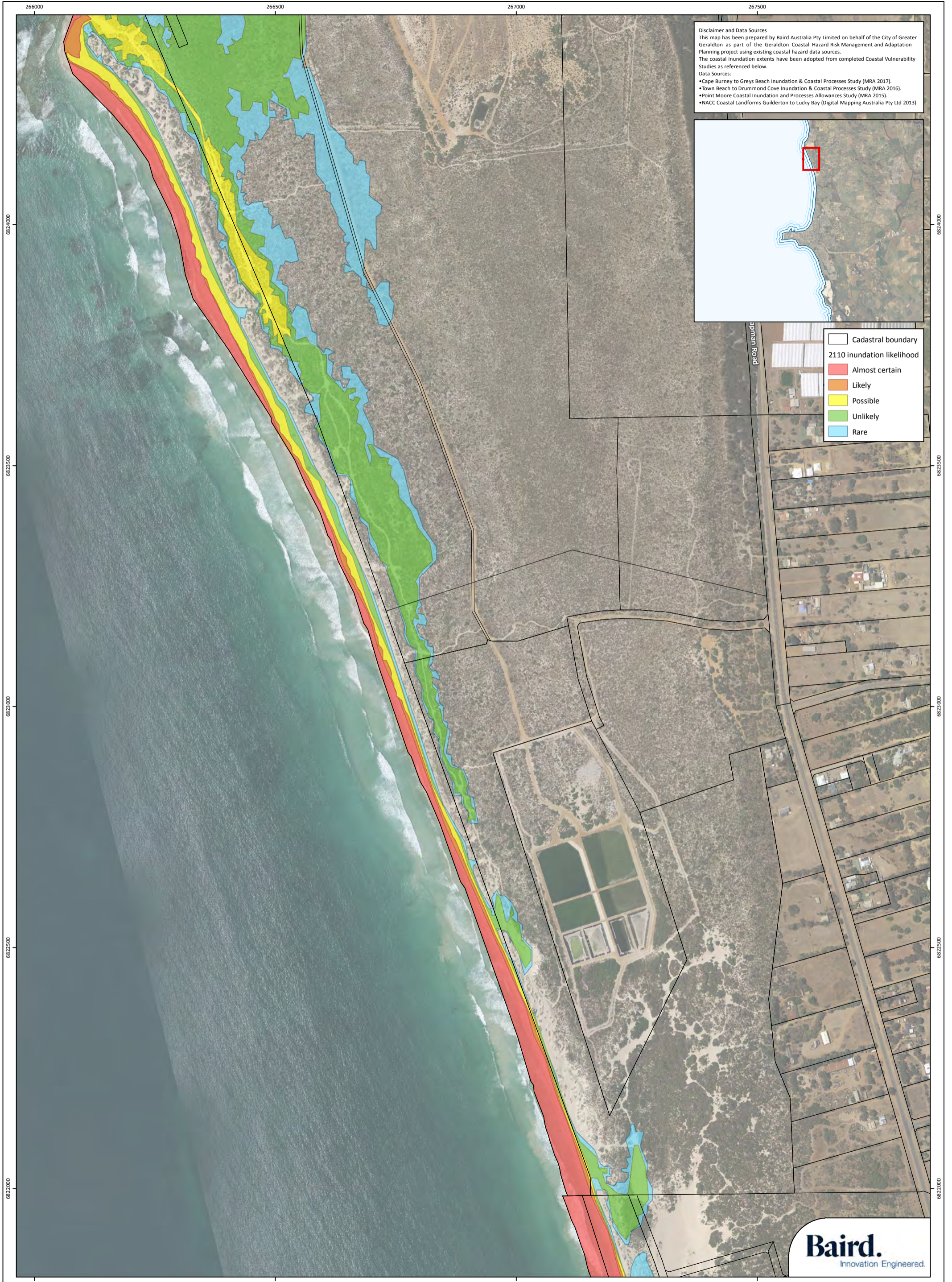
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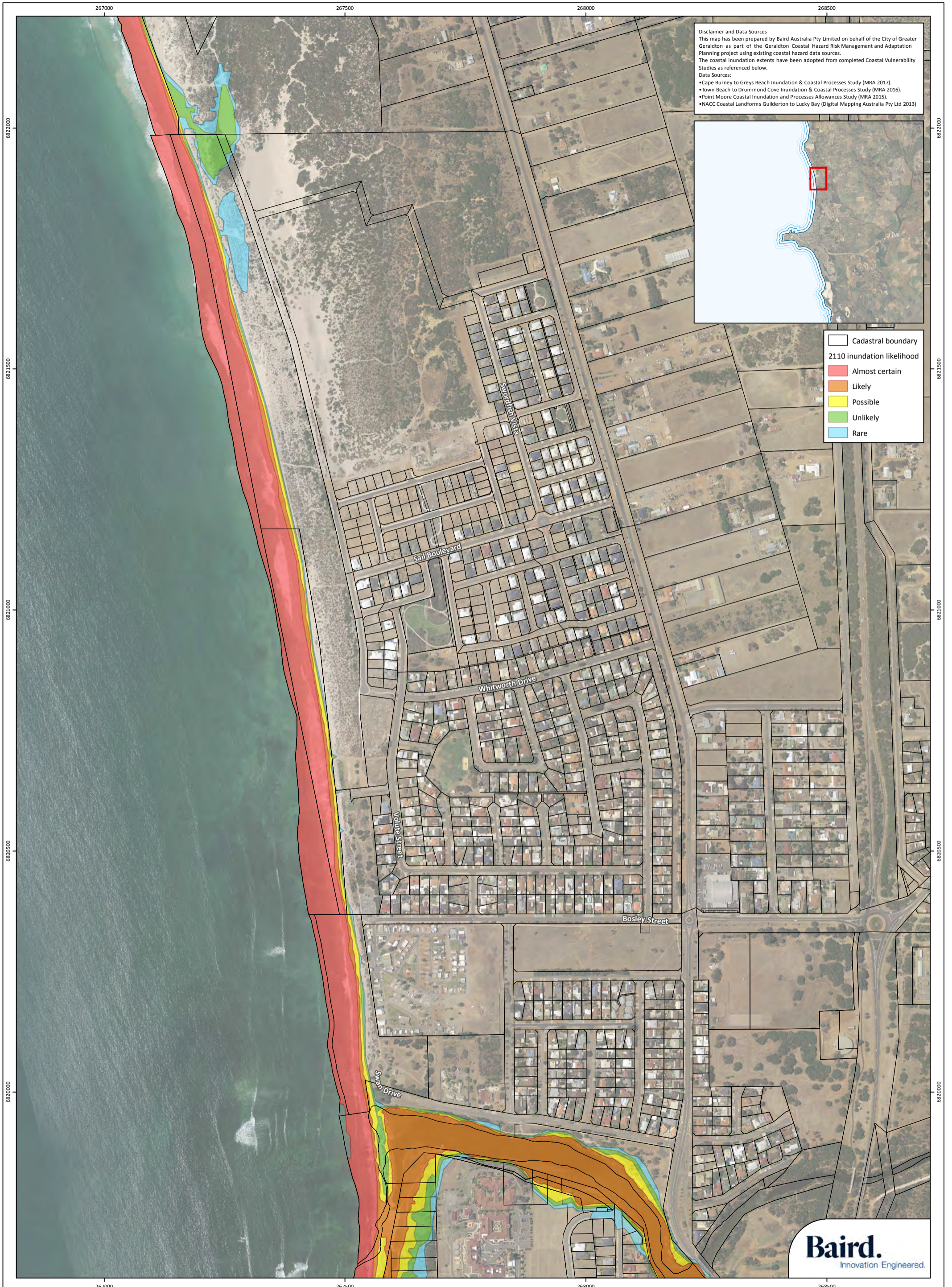


Disclaimer and Data Sources
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 • Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
 • NACC Coastal Landforms Guilderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)



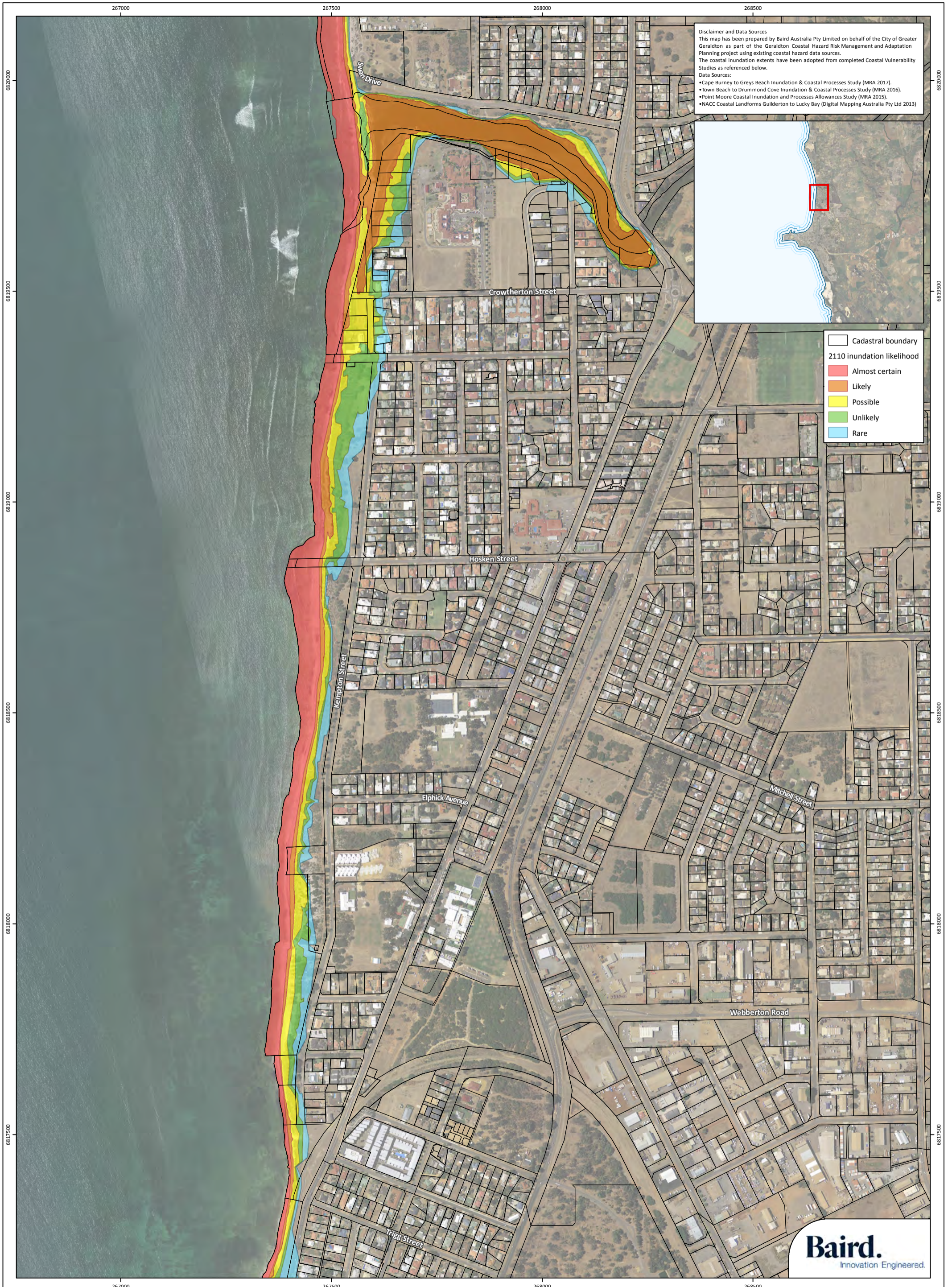
- Cadastral boundary
- 2110 inundation likelihood**
- Almost certain
- Likely
- Possible
- Unlikely
- Rare





Disclaimer and Data Sources
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 • NACC Coastal Landforms Guiderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)

- Cadastral boundary
- 2110 inundation likelihood
- Almost certain
- Likely
- Possible
- Unlikely
- Rare



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 • Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
 • NACC Coastal Landforms Guilderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)



- Cadastral boundary
- 2110 inundation likelihood**
- Almost certain
- Likely
- Possible
- Unlikely
- Rare

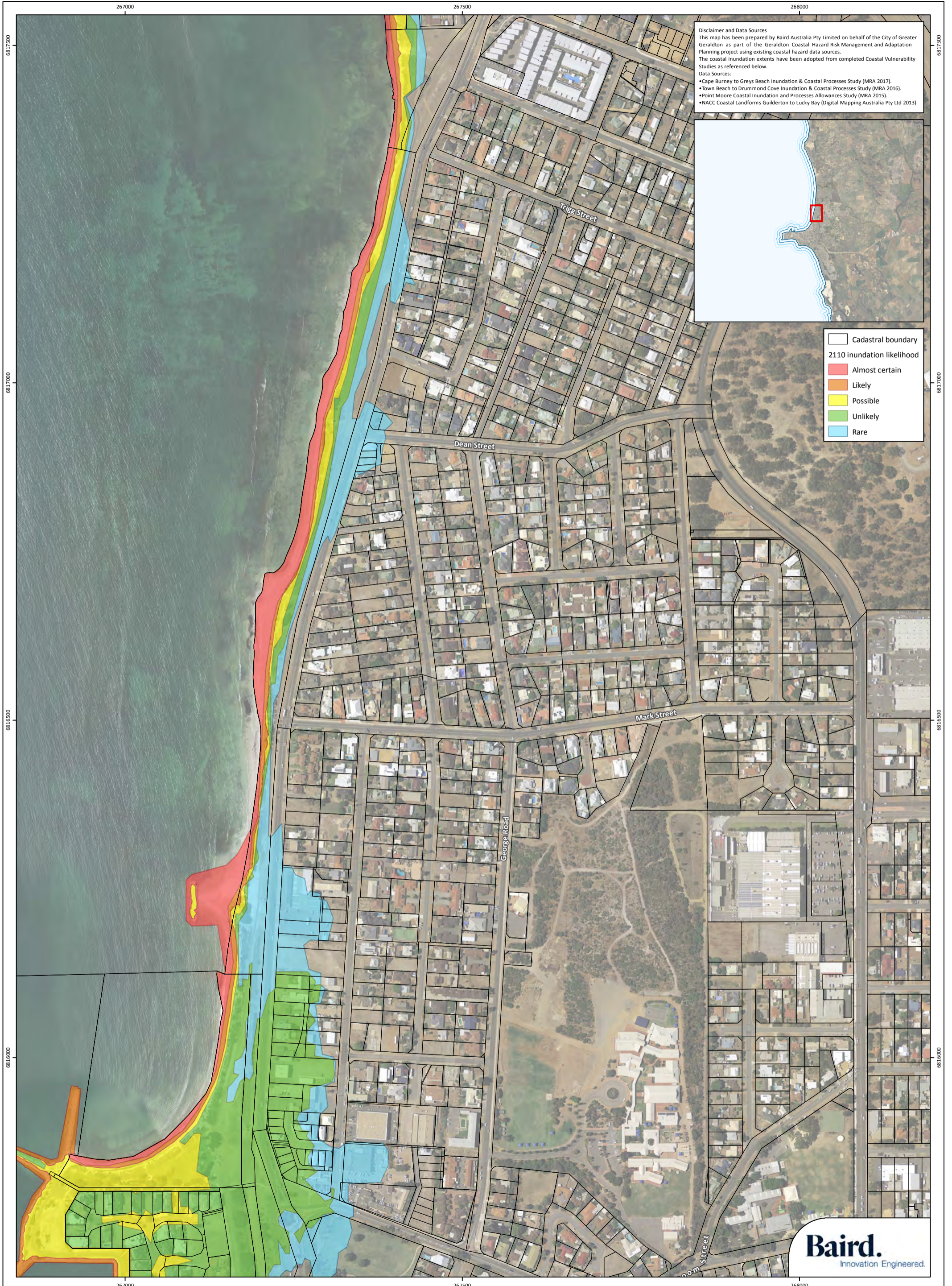


Figure 5 of 12 Coastal Hazard Mapping : 2110 Inundation Likelihood, Beresford

Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)--F31
Drawn: KNM
Date: 30/11/2017
Checked: DRAFT
Approved: DRAFT
Date: --/--



0 100 200
 Metres
 Scale: 1:5,000@A3
 GDA 1994 MGA Zone 50



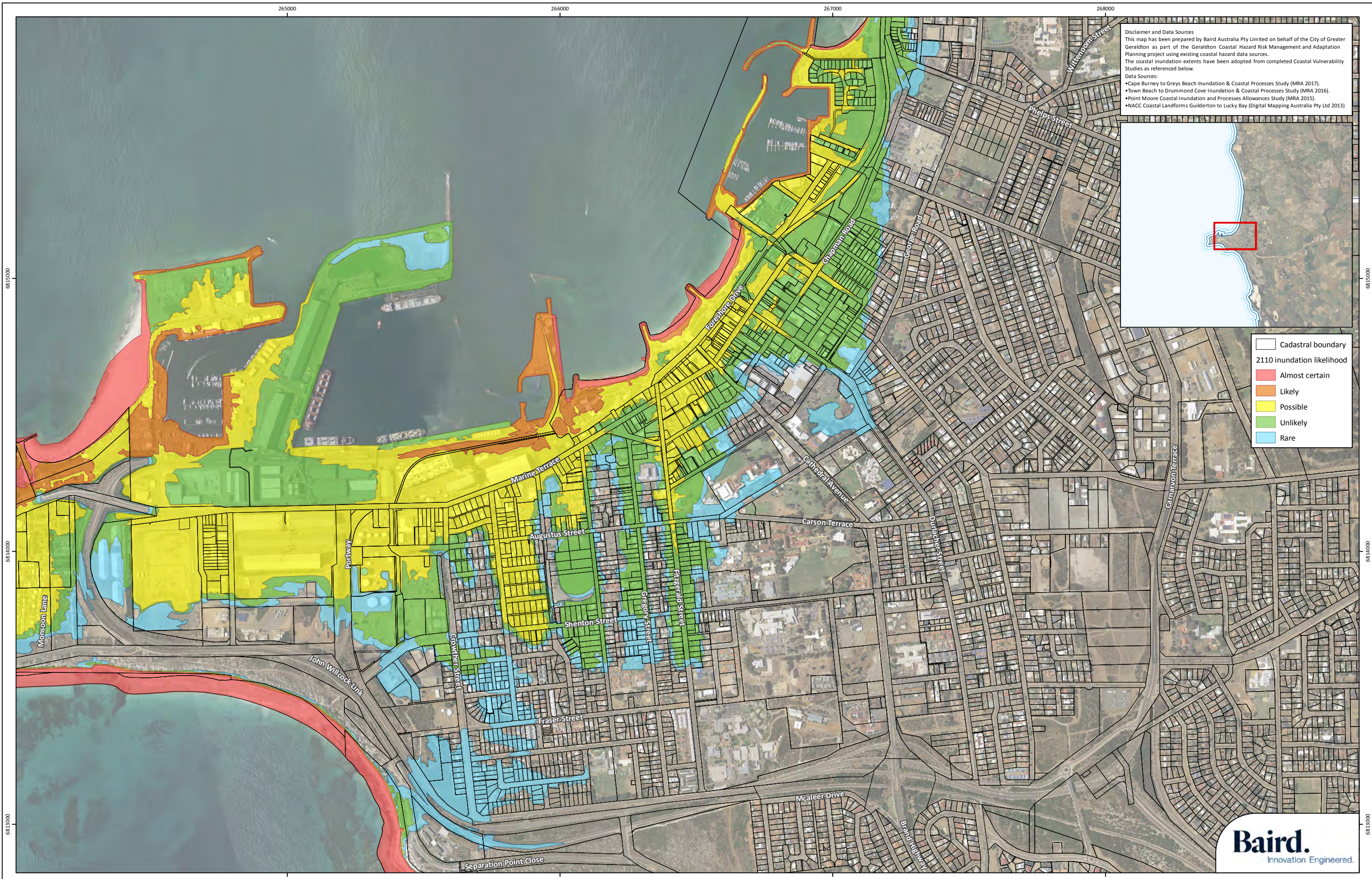


Figure 6 of 12 Coastal Hazard Mapping : 2110 Inundation Likelihood, Geraldton

Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)-F32
Drawn: KNM
Date: 30/11/2017
Checked: DRAFT
Approved: DRAFT
Date: -/-/-



0 200 400
 Metres
 Scale: 1:12,500@A3
 GDA 1994 MGA Zone 50



While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used



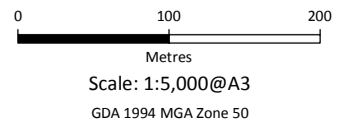
Disclaimer and Data Sources
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 The coastal inundation extents have been adopted from completed Coastal Vulnerability Studies as referenced below.

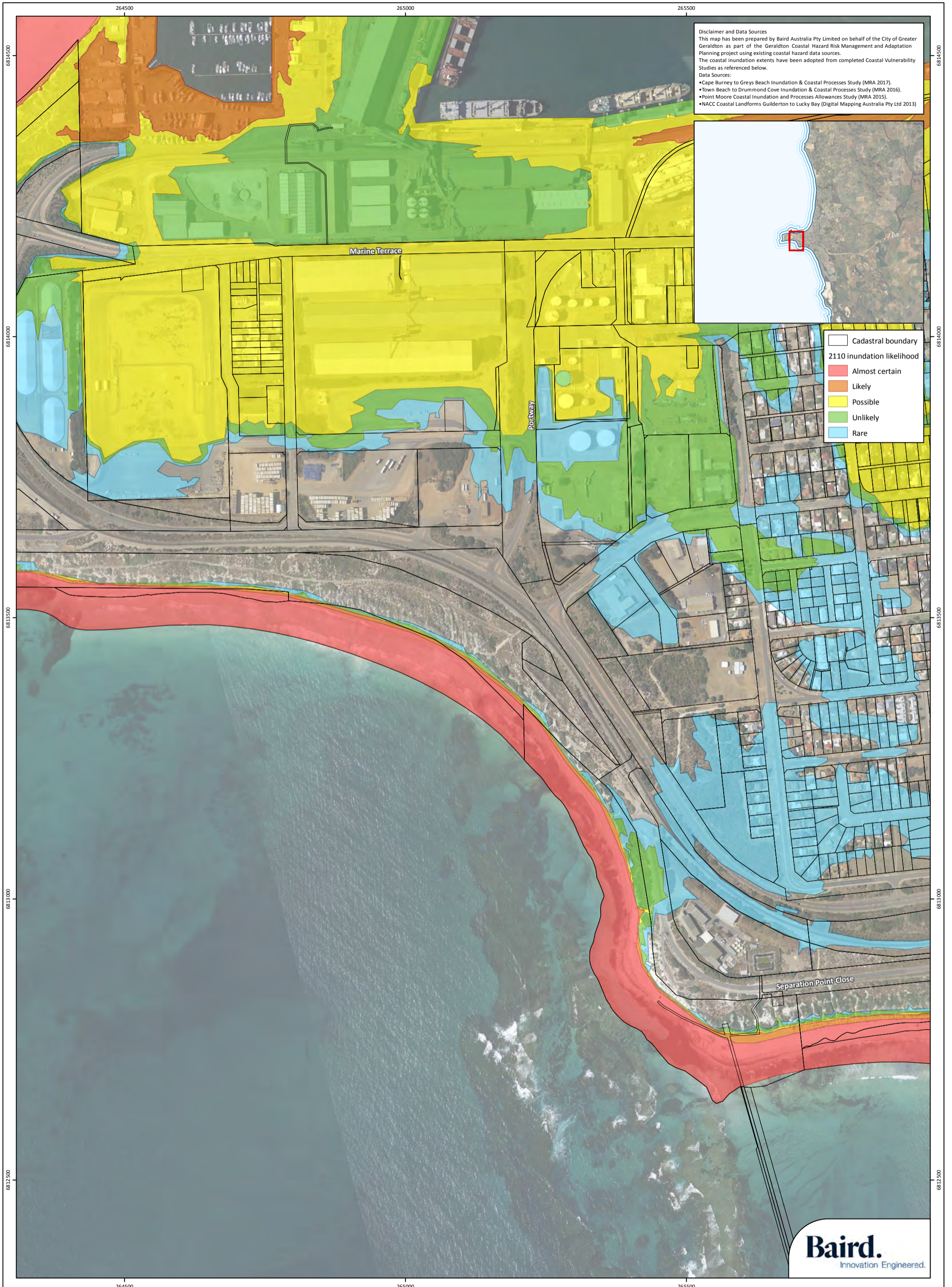
- Data Sources:**
- Cape Burney to Greys Beach Inundation & Coastal Processes Study (MRA 2017).
 - Town Beach to Drummond Cove Inundation & Coastal Processes Study (MRA 2016).
 - Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
 - NACC Coastal Landforms Guilderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)

2110 inundation likelihood

- Almost certain
- Likely
- Possible
- Unlikely
- Rare

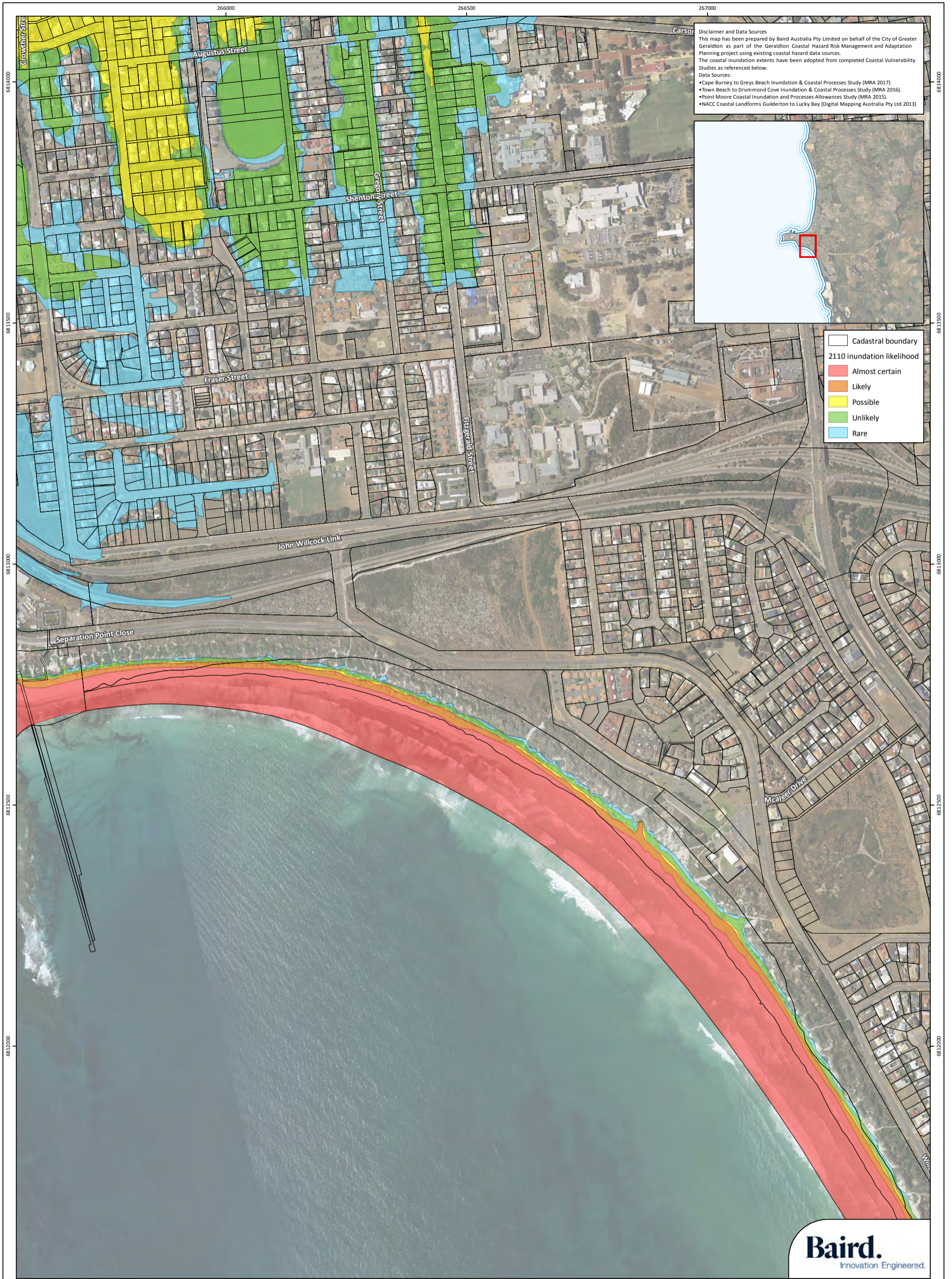
Cadastral boundary





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 • Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
 • NACC Coastal Landforms Guilderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)

- ▭ Cadastral boundary
- 2110 inundation likelihood**
- ▭ Almost certain
- ▭ Likely
- ▭ Possible
- ▭ Unlikely
- ▭ Rare



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- Town Beach to Drummond Cove Inundation & Coastal Processes Study (MRA 2016).
- Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
- NACC Coastal Landforms Guilderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)

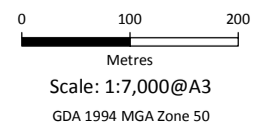
- Cadastral boundary
- 2110 inundation likelihood**
- Almost certain
- Likely
- Possible
- Unlikely
- Rare

Figure 9 of 12

Coastal Hazard Mapping : 2110 Inundation Likelihood, Mahomets Flats

Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)--F31
Drawn: KNM
Date: 30/11/2017
Checked: DRAFT
Approved: DRAFT
Date: --/--





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 • Town Beach to Drummond Cove Inundation & Coastal Processes Study (MRA 2016).
 • Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
 • NACC Coastal Landforms Guiderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)

- Cadastral boundary
- 2110 inundation likelihood
- Almost certain
- Likely
- Possible
- Unlikely
- Rare

Figure 10 of 12

Coastal Hazard Mapping : 2110 Inundation Likelihood, Tarcoola Beach

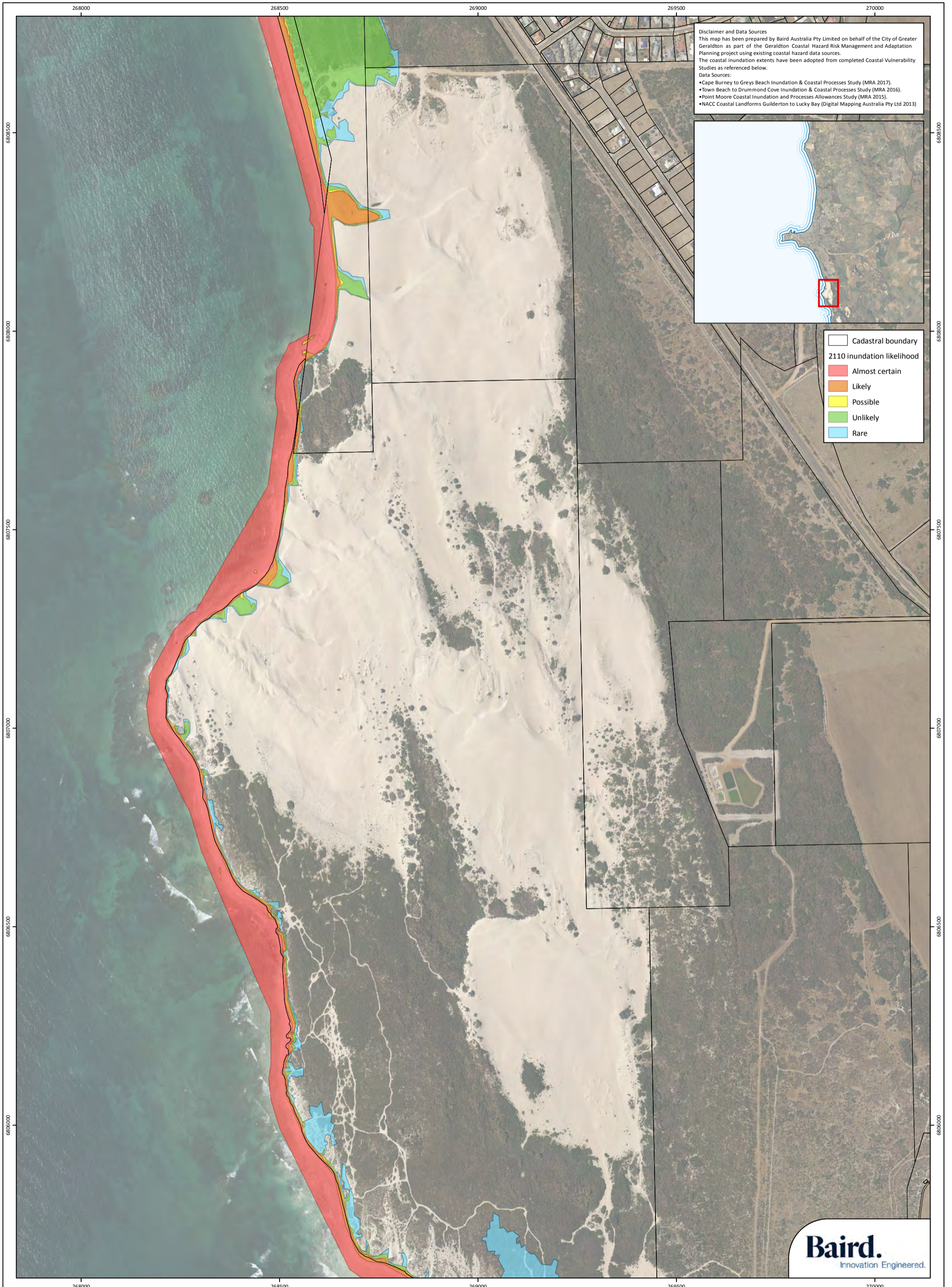
Project: Geraldton CHRMAP Project
Client: The City of Greater Geraldton

Plan Number: EP17-099(01)--F31
Drawn: KNM
Date: 30/11/2017
Checked: DRAFT
Approved: DRAFT
Date: --/--



0 100 200 300 400
 Metres
 Scale: 1:10,500@A3
 GDA 1994 MGA Zone 50

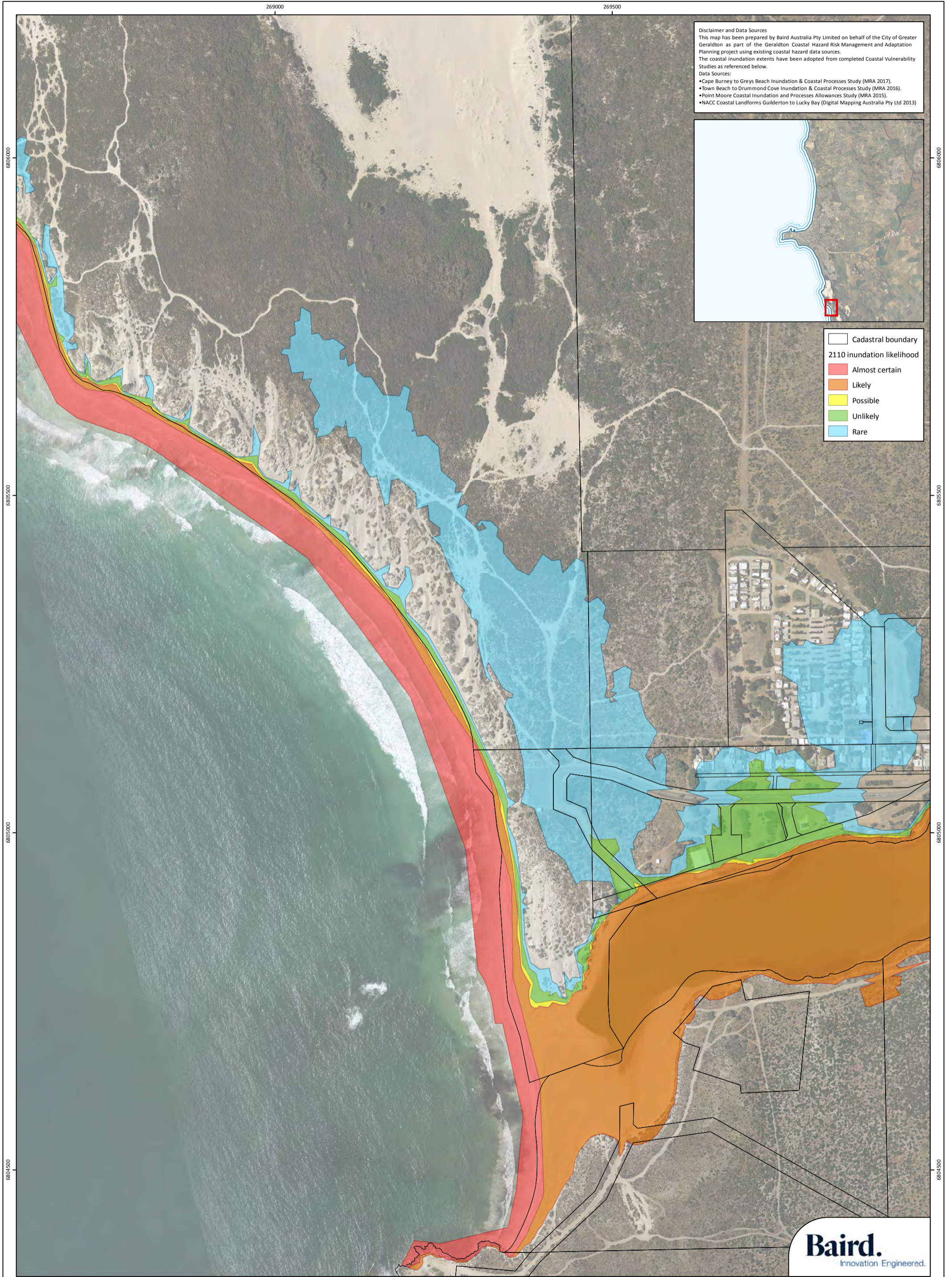




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 • Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
 • NACC Coastal Landforms Guilderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)

Cadastral boundary
2110 inundation likelihood
 Almost certain
 Likely
 Possible
 Unlikely
 Rare





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 • Point Moore Coastal Inundation and Processes Allowances Study (MRA 2015).
 • NACC Coastal Landforms Guilderton to Lucky Bay (Digital Mapping Australia Pty Ltd 2013)

- Cadastral boundary
- 2110 inundation likelihood**
- Almost certain
- Likely
- Possible
- Unlikely
- Rare

A.10 Erosion Risk Assessment

Erosion Risk Drummond Cove (CMU1)

CMU	Description	Erosion Consequence				Adaptive Cap.	Erosion Likelihood Category				Potential Exposure Rating				Vulnerability - Incl. Adaptive Capacity			
		Economic	Env	Social	Heritage		2018	2030	2070	2110	2018	2030	2070	2110	2018	2030	2070	2110
1	Houses (Whitehill Rd, Surfside Tce)	Major	Insignificant	Moderate	Insignificant	Low	Rare	Unlikely	Possible	Likely	L	M	H	H	M	H	E	E
1	Houses (Tailer St, StillwaterAve)	Major	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	H	M	M	H	E
1	Beaches	Moderate	Major	Moderate	Moderate	High	Possible	Likely	Almost Certain	Almost Certain	H	H	E	E	M	M	H	H
1	Toilets	Minor	Insignificant	Moderate	Minor	Low	Unlikely	Possible	Likely	Almost Certain	M	M	H	H	H	H	E	E
1	JB Community Hall	Moderate	Insignificant	Major	Moderate	Low	Unlikely	Possible	Likely	Almost Certain	M	H	H	E	H	E	E	E
1	Boat Ramp	Moderate	Insignificant	Minor	Insignificant	Moderate	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	M	H	H	H
1	Beach Shelter	Minor	Insignificant	Moderate	Insignificant	Moderate	Unlikely	Possible	Likely	Almost Certain	M	M	H	H	M	M	H	H
1	Foreshore Reserve	Moderate	Major	Major	Insignificant	Moderate	Unlikely	Possible	Likely	Almost Certain	M	H	H	E	M	H	H	E
1	Roads General	Moderate	Insignificant	Moderate	Insignificant	Low	Rare	Unlikely	Possible	Likely	L	M	M	H	M	H	H	E
1	Whitehill Rd Closed Section	Major	Insignificant	Moderate	Insignificant	Low	Possible	Likely	Almost Certain	Almost Certain	H	H	E	E	E	E	E	E
1	Carpark Drummond Cove Rd	Moderate	Insignificant	Moderate	Insignificant	Low	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	H	E	E	E
1	Carpark JB Hall	Moderate	Insignificant	Moderate	Insignificant	Low	Unlikely	Possible	Likely	Almost Certain	M	M	H	H	H	H	E	E
1	Carpark Smugglers Pass	Moderate	Insignificant	Moderate	Insignificant	Low	Rare	Unlikely	Possible	Likely	L	M	M	H	M	H	H	E
1	Playground	Insignificant	Insignificant	Moderate	Insignificant	High	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	L	M	M	M
1	Skate Park	Minor	Insignificant	Moderate	Insignificant	Low	Unlikely	Possible	Likely	Almost Certain	M	M	H	H	H	H	E	E
1	Tennis Courts	Minor	Insignificant	Moderate	Insignificant	Low	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	H	E	E	E
1	Dunes	Insignificant	Catastrophic	Minor	Moderate	Moderate	Possible	Likely	Almost Certain	Almost Certain	H	E	E	E	H	E	E	E
1	Reef System (Not Assessed)	Moderate	Moderate	Minor	Moderate													
1	Beach Access Paths	Minor	Moderate	Moderate	Moderate	High	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	L	M	M	M
1	Flora and Fauna	Minor	Major	Minor	Major	High	Possible	Likely	Almost Certain	Almost Certain	H	H	E	E	M	M	H	H
1	Watercorp Pumping Station	Major	Major	Insignificant	Insignificant	Low	Unlikely	Possible	Likely	Almost Certain	M	H	H	E	H	E	E	E

Erosion Risk Glenfield (CMU2)

CMU	Description	Erosion Consequence				Adaptive Cap.	Erosion Likelihood Category				Potential Exposure Rating				Vulnerability - Incl. Adaptive Capacity			
		Economic	Env	Social	Heritage		2018	2030	2070	2110	2018	2030	2070	2110	2018	2030	2070	2110
2	Beaches	Major	Major	Major	Moderate	High	Possible	Likely	Almost Certain	Almost Certain	H	H	E	E	M	M	H	H
2	Dunes	Insignificant	Major	Minor	Moderate	High	Possible	Likely	Almost Certain	Almost Certain	H	H	E	E	M	M	H	H
2	Reef System (Not Assessed)	Moderate	Moderate	Minor	Moderate													
2	Beach Access Paths	Minor	Moderate	Moderate	Moderate	High	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	L	M	M	M
2	Flora and Fauna	Minor	Major	Minor	Major	High	Unlikely	Possible	Likely	Almost Certain	M	H	H	E	L	M	M	H
2	Sewerage Treatment Works	Catastrophic	Catastrophic	Insignificant	Insignificant	Low	Rare	Unlikely	Possible	Likely	M	H	H	E	H	E	E	E

Erosion Risk Bluff Point (CMU4)

CMU	Description	Erosion Consequence				Adaptive Cap.	Erosion Likelihood Category				Potential Exposure Rating				Risk - Incl. Adaptive Capacity			
		Economic	Env	Social	Heritage		2018	2030	2070	2110	2018	2030	2070	2110	2018	2030	2070	2110
4	Houses West of Kempton Street	Major	Insignificant	Moderate	Insignificant	Low	Possible	Likely	Almost Certain	Almost Certain	H	H	E	E	E	E	E	E
4	Houses North Kempton / Crowtherston St	Major	Insignificant	Moderate	Insignificant	Low	Unlikely	Possible	Likely	Almost Certain	M	H	H	E	H	E	E	E
4	Houses East of Kempton Street	Major	Insignificant	Moderate	Insignificant	Low	Rare	Unlikely	Possible	Likely	L	M	H	H	M	H	E	E
4	Houses Kempton St, South of Cecily St	Major	Insignificant	Moderate	Insignificant	Low	Unlikely	Possible	Likely	Almost Certain	M	H	H	E	H	E	E	E
4	Nazareth House	Major	Insignificant	Major	Moderate	Low	Rare	Rare	Unlikely	Possible	L	L	M	H	M	M	H	E
4	Roads - Kempton street	Moderate	Insignificant	Moderate	Insignificant	Low	Unlikely	Possible	Likely	Almost Certain	M	M	H	H	H	H	E	E
4	Roads - Cecily, Morris, Elphick, Crowtherston	Moderate	Insignificant	Moderate	Insignificant	Low	Rare	Unlikely	Possible	Almost Certain	L	M	M	H	M	H	H	E
4	Beaches	Moderate	Major	Major	Moderate	High	Possible	Likely	Almost Certain	Almost Certain	H	H	E	E	M	M	H	H
4	Foreshore Reserve	Moderate	Major	Major	Insignificant	Moderate	Possible	Likely	Almost Certain	Almost Certain	H	H	E	E	H	H	E	E
4	Beach St Georges	Moderate	Major	Major	Moderate	Moderate	Possible	Likely	Almost Certain	Almost Certain	H	H	E	E	H	H	E	E
4	Toilets St Georges	Moderate	Insignificant	Moderate	Insignificant	Low	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	H	E	E	E
4	Car Park St Georges	Moderate	Insignificant	Moderate	Insignificant	Low	Unlikely	Possible	Likely	Almost Certain	M	M	H	H	H	H	E	E
4	Picnic Shelters St Georges	Minor	Insignificant	Moderate	Insignificant	High	Unlikely	Possible	Likely	Almost Certain	M	M	H	H	L	L	M	M
4	Beach Shelter / BBQs St Georges	Minor	Insignificant	Moderate	Insignificant	High	Unlikely	Possible	Likely	Almost Certain	M	M	H	H	L	L	M	M
4	Rundle Park St Georges	Moderate	Major	Major	Insignificant	Moderate	Possible	Likely	Almost Certain	Almost Certain	H	H	E	E	H	H	E	E
4	Playground St Georges	Minor	Insignificant	Minor	Insignificant	High	Unlikely	Possible	Likely	Almost Certain	L	M	M	H	L	L	L	M
4	Boat Ramp at St Georges	Moderate	Insignificant	Moderate	Insignificant	Moderate	Possible	Almost Certain	Almost Certain	Almost Certain	M	H	H	H	M	H	H	H
4	Carpark Bluff Point 'Leading Lights'	Minor	Insignificant	Minor	Insignificant	Moderate	Possible	Likely	Almost Certain	Almost Certain	M	M	H	H	M	M	H	H
4	Carpark Opposite Crowtherston St	Moderate	Insignificant	Moderate	Insignificant	Moderate	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	M	H	H	H
4	Cycling / Walking Tracks	Moderate	Insignificant	Major	Insignificant	Moderate	Unlikely	Possible	Likely	Almost Certain	M	H	H	E	M	H	H	E
4	Minor Infrastructure (bins, fences, signs)	Minor	Insignificant	Minor	Insignificant	High	Possible	Likely	Almost Certain	Almost Certain	M	M	H	H	L	L	M	M
4	Beach Access Paths	Minor	Moderate	Moderate	Moderate	High	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	L	M	M	M
4	Dunes	Insignificant	Major	Moderate	Moderate	Moderate	Possible	Likely	Almost Certain	Almost Certain	H	H	E	E	H	H	E	E
4	Reef System (Not Assessed)	Moderate	Major	Minor	Moderate													
4	Trees	Minor	Moderate	Minor	Moderate	Moderate	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	M	H	H	H
4	Midden Site, Bluff Point Kempton St	Minor	Moderate	Moderate	Catastrophic	Low	Unlikely	Possible	Likely	Almost Certain	H	H	E	E	E	E	E	E
4	Watercorp Infrastructure - Fuller St West	Moderate	Moderate	Insignificant	Insignificant	Low	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	H	E	E	E

Erosion Risk Point Moore (CMU7)

CMU	Description	General Cat.	Erosion Consequence				Adaptive Cap.	Erosion Likelihood Category				Potential Exposure Rating				Vulnerability - Incl. Adaptive Capacity			
			Economic	Env	Social	Heritage		2018	2030	2070	2110	2018	2030	2070	2110	2018	2030	2070	2110
7	Point Moore Lighthouse	Cultural / Heritage	Major	Insignificant	Major	Catastrophic	Low	Rare	Rare	Unlikely	Possible	M	M	H	H	H	H	E	E
7	Lighthouse Keepers Cottage and Storage	City Infrastructure	Minor	Insignificant	Minor	Moderate	Low	Rare	Rare	Unlikely	Possible	L	L	M	M	M	M	H	H
7	Houses South Side - Astrolabe Lane	Private Asset	Major	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	H	M	M	H	E
7	Marine Terrace South Side	City Infrastructure	Moderate	Insignificant	Moderate	Insignificant	Low	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	H	E	E	E
7	Marine Terrace West Side	City Infrastructure	Moderate	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	M	M	M	H	H
7	Beach Pages Beach ¹	Environmental	Moderate	Major	Major	Moderate	High	Possible	Likely	Almost Certain	Almost Certain	H	H	E	E	M	M	H	H
7	Toilets Pages Beach	City Infrastructure	Moderate	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	M	M	M	H	H
7	Car Park Pages Beach	City Infrastructure	Moderate	Insignificant	Moderate	Insignificant	Low	Rare	Unlikely	Possible	Likely	L	M	M	H	M	H	H	E
7	Picnic Shelters Pages Beach	City Infrastructure	Minor	Insignificant	Moderate	Insignificant	High	Rare	Unlikely	Possible	Likely	L	M	M	H	L	L	L	M
7	BBQs Pages Beach	City Infrastructure	Minor	Insignificant	Moderate	Insignificant	High	Rare	Unlikely	Possible	Likely	L	M	M	H	L	L	L	M
7	Foreshore Park Pages Beach	Parks	Minor	Major	Major	Moderate	Moderate	Rare	Unlikely	Possible	Likely	L	M	H	H	L	M	H	H
7	Playground Pages Beach	City Infrastructure	Minor	Insignificant	Minor	Insignificant	High	Rare	Rare	Unlikely	Possible	L	L	L	M	L	L	L	L
7	Beach Point Moore	Environmental	Moderate	Major	Major	Moderate	High	Possible	Likely	Almost Certain	Almost Certain	H	H	E	E	M	M	H	H
7	Foreshore Park Point Moore	Parks	Minor	Moderate	Moderate	Insignificant	Moderate	Rare	Unlikely	Possible	Likely	L	M	M	H	L	M	M	H
7	Volunteer Rescue	City Infrastructure	Major	Insignificant	Moderate	Insignificant	Low	Rare	Unlikely	Possible	Likely	L	M	H	H	M	H	E	E
7	Carpark Point Moore	City Infrastructure	Moderate	Insignificant	Moderate	Insignificant	Low	Rare	Unlikely	Possible	Likely	L	M	M	H	M	H	H	E
7	Toilets Point Moore	City Infrastructure	Minor	Insignificant	Moderate	Insignificant	Low	Rare	Unlikely	Possible	Likely	L	M	M	H	M	H	H	E
7	Picnic Shelters Point Moore	City Infrastructure	Minor	Insignificant	Moderate	Insignificant	High	Rare	Unlikely	Possible	Likely	L	M	M	H	L	L	L	M
7	BBQs Point Moore	City Infrastructure	Minor	Insignificant	Moderate	Insignificant	High	Rare	Unlikely	Possible	Likely	L	M	M	H	L	L	L	M
7	Carpark Greys Beach West (Closed)	City Infrastructure	Moderate	Insignificant	Moderate	Insignificant	Low	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	H	E	E	E
7	Carpark Greys Beach East	City Infrastructure	Moderate	Insignificant	Moderate	Insignificant	Low	Unlikely	Possible	Likely	Almost Certain	M	M	H	H	H	H	E	E
7	Minor Infrastructure (bins, fences, signs)	City Infrastructure	Minor	Insignificant	Minor	Insignificant	High	Rare	Unlikely	Possible	Likely	L	L	M	M	L	L	L	L
7	4WD Access to Beach	City Infrastructure	Minor	Insignificant	Moderate	Insignificant	Moderate	Unlikely	Possible	Likely	Almost Certain	M	M	H	H	M	M	H	H
7	Cycle / Walking Paths (South Side)	City Infrastructure	Minor	Moderate	Moderate	Insignificant	Moderate	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	M	H	H	H
7	Beach Access Paths	Social	Minor	Moderate	Moderate	Moderate	High	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	L	M	M	M
7	Dunes - NW	Environmental	Insignificant	Major	Moderate	Moderate	Moderate	Possible	Likely	Almost Certain	Almost Certain	H	H	E	E	H	H	E	E
7	Dunes - South	Environmental	Insignificant	Major	Moderate	Moderate	Moderate	Unlikely	Possible	Likely	Almost Certain	M	H	H	E	M	H	H	E
7	Reef System (Not Assessed)	Environmental	Moderate	Major	Moderate	Moderate													
7	Trees and Coastal Vegetation	Environmental	Minor	Moderate	Moderate	Moderate	Moderate	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	M	H	H	H
7	Wetland Aboriginal	Cultural / Heritage	Minor	Moderate	Moderate	Major	Low	Rare	Rare	Unlikely	Possible	L	L	M	H	M	M	H	E

Notes 1. Considered to have high recovery capacity due to sand deposition observed historically

Erosion Risk Beachlands (CMU8)

CMU	Description	Erosion Consequence				Adaptive Cap.	Erosion Likelihood Category				Potential Exposure Rating				Risk - Incl. Adaptive Capacity			
		Economic	Env	Social	Heritage		2018	2030	2070	2110	2018	2030	2070	2110	2018	2030	2070	2110
8	Batavia Coast Marine Institute	Major	Insignificant	Major	Insignificant	Low	Rare	Unlikely	Possible	Likely	L	M	H	H	M	H	E	E
8	Rail Lines	Major	Insignificant	Moderate	Insignificant	Low	Rare	Unlikely	Possible	Likely	L	M	H	H	M	H	E	E
8	John Willcock Link	Moderate	Insignificant	Moderate	Insignificant	Low	Rare	Unlikely	Possible	Likely	L	M	M	H	M	H	H	E
8	Separation Point Close	Moderate	Insignificant	Moderate	Insignificant	Low	Unlikely	Possible	Likely	Almost Certain	M	M	H	H	H	H	E	E
8	Car Park Separation Point Lookout	Moderate	Insignificant	Moderate	Insignificant	Low	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	H	E	E	E
8	Cycle / Walking Paths West	Minor	Moderate	Moderate	Insignificant	Moderate	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	M	H	H	H
8	Cycle / Walking Paths East	Minor	Moderate	Moderate	Insignificant	Moderate	Unlikely	Possible	Likely	Almost Certain	M	M	H	H	M	M	H	H
8	Beach Greys , Separation Point	Moderate	Major	Major	Moderate	Moderate	Possible	Likely	Almost Certain	Almost Certain	H	H	E	E	H	H	E	E
8	Minor Infrastructure (bins, fences, signs)	Minor	Insignificant	Minor	Insignificant	High	Unlikely	Possible	Likely	Almost Certain	L	M	M	H	L	L	L	M
8	Beach Access Paths	Minor	Moderate	Moderate	Moderate	High	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	L	M	M	M
8	Dunes - South	Insignificant	Major	Moderate	Moderate	Moderate	Possible	Likely	Almost Certain	Almost Certain	H	H	E	E	H	H	E	E
8	Trees and Coastal Vegetation	Minor	Moderate	Moderate	Moderate	Moderate	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	M	H	H	H

Erosion Risk Mahomet Flats (CMU9)

CMU	Description	Erosion Consequence				Adaptive Cap.	Erosion Likelihood Category				Potential Exposure Rating				Risk - Incl. Adaptive Capacity			
		Economic	Env	Social	Heritage		2018	2030	2070	2110	2018	2030	2070	2110	2018	2030	2070	2110
9	Surf Club - Main Building	Major	Insignificant	Major	Moderate	Low	Rare	Unlikely	Possible	Likely	L	M	H	H	M	H	E	E
9	Surf Club - Storage	Moderate	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	M	M	M	H	H
9	Surf Club - Foreshore Area	Minor	Major	Major	Moderate	Moderate	Rare	Rare	Unlikely	Possible	L	L	M	H	L	L	M	H
9	Surf Club - Playground	Minor	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	M	M	M	H	H
9	Surf Club - Picnic Tables and Shelters	Minor	Insignificant	Moderate	Insignificant	High	Rare	Unlikely	Possible	Likely	L	M	M	H	L	L	L	M
9	Surf Club - BBQs	Minor	Insignificant	Moderate	Insignificant	High	Rare	Unlikely	Possible	Likely	L	M	M	H	L	L	L	M
9	Surf Club - Toilets	Moderate	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	M	M	M	H	H
9	Car Park - Surf Club	Moderate	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	M	M	M	H	H
9	Car Park - Hadda Way (north of Surf Club)	Moderate	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	M	M	M	H	H
9	Car Park - South Pipe (south of Surf Club)	Minor	Insignificant	Minor	Insignificant	Low	Rare	Unlikely	Possible	Likely	L	L	M	M	M	M	H	H
9	Houses	Major	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	H	M	M	H	E
9	Willcock Drive	Moderate	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	M	M	M	H	H
9	Hadda Way	Moderate	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	M	M	M	H	H
9	Rail Lines	Major	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	H	M	M	H	E
9	Separation Point Close	Moderate	Insignificant	Moderate	Insignificant	Low	Rare	Unlikely	Possible	Likely	L	M	M	H	M	H	H	E
9	Car Park - Wimps, Wilcock Drive	Minor	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	M	M	M	H	H
9	Car Park - Wimps, Hadda Way	Minor	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	M	M	M	H	H
9	Cycle / Walking Paths	Minor	Moderate	Moderate	Insignificant	Moderate	Rare	Rare	Unlikely	Possible	L	L	M	M	L	L	M	M
9	Beaches	Moderate	Major	Major	Moderate	High	Possible	Likely	Almost Certain	Almost Certain	H	H	E	E	M	M	H	H
9	Minor Infrastructure (bins, fences, signs)	Minor	Insignificant	Minor	Insignificant	High	Rare	Unlikely	Possible	Likely	L	L	M	M	L	L	L	L
9	Beach Access Paths	Minor	Moderate	Moderate	Moderate	High	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	L	M	M	M
9	Dunes	Insignificant	Major	Moderate	Moderate	Moderate	Unlikely	Possible	Likely	Almost Certain	M	H	H	E	M	H	H	E
9	Trees and Coastal Vegetation	Minor	Moderate	Moderate	Moderate	Moderate	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	M	H	H	H

Erosion Risk Tarcoola Beach (CMU10)

CMU	Description	Erosion Consequence				Adaptive Cap.	Erosion Likelihood Category				Potential Exposure Rating				Risk - Incl. Adaptive Capacity			
		Economic	Env	Social	Heritage		2018	2030	2070	2110	2018	2030	2070	2110	2018	2030	2070	2110
10	Houses	Major	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	H	M	M	H	E
10	Willcock Drive	Moderate	Insignificant	Moderate	Insignificant	Low	Rare	Unlikely	Possible	Likely	L	M	M	H	M	H	H	E
10	Glendenning Rd	Moderate	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	M	M	M	H	H
10	Glendenning Park	Minor	Moderate	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	M	M	M	H	H
10	Car Park - Glendenning Rd North	Minor	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	M	M	M	H	H
10	Car Park - Glendenning Rd Opp Buchanan Place	Minor	Insignificant	Moderate	Insignificant	Low	Rare	Unlikely	Possible	Likely	L	M	M	H	M	H	H	E
10	Car Park - Glendenning Foreshore Southern Carpark	Minor	Insignificant	Moderate	Insignificant	Low	Rare	Rare	Unlikely	Possible	L	L	M	M	M	M	H	H
10	Beach Shelters, Tables	Minor	Insignificant	Moderate	Insignificant	High	Rare	Rare	Unlikely	Possible	L	L	M	M	L	L	L	L
10	Cycle / Walking Paths	Minor	Moderate	Moderate	Insignificant	Moderate	Rare	Rare	Unlikely	Possible	L	L	M	M	L	L	M	M
10	Beaches	Moderate	Major	Major	Moderate	High	Possible	Likely	Almost Certain	Almost Certain	H	H	E	E	M	M	H	H
10	Minor Infrastructure (bins, fences, signs)	Minor	Insignificant	Minor	Insignificant	High	Rare	Rare	Unlikely	Possible	L	L	L	M	L	L	L	L
10	Beach Access Paths	Minor	Moderate	Moderate	Moderate	High	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	L	M	M	M
10	Dunes	Insignificant	Major	Moderate	Moderate	Moderate	Unlikely	Possible	Likely	Almost Certain	M	H	H	E	M	H	H	E
10	Trees and Coastal Vegetation	Minor	Moderate	Moderate	Moderate	Moderate	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	M	H	H	H

Erosion Risk Southgate Dunes (CMU11)

CMU	Description	General Cat.	Erosion Consequence				Adaptive Cap.	Erosion Likelihood Category				Potential Exposure Rating				Risk - Incl. Adaptive Capacity			
			Economic	Env	Social	Heritage		2018	2030	2070	2110	2018	2030	2070	2110	2018	2030	2070	2110
11	Southgate Dunes	Environmental	Insignificant	Major	Moderate	Moderate	Moderate	Unlikely	Possible	Likely	Almost Certain	M	H	H	E	M	H	H	E
11	Beach Access Paths	Social	Minor	Moderate	Moderate	Moderate	High	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	L	M	M	M
11	Rare Vegetation (TBC)	Environmental	Insignificant	Catastrophic	Moderate	Moderate	Moderate	Unlikely	Possible	Likely	Almost Certain	H	H	E	E	H	H	E	E
11	Aboriginal Heritage Site (TBC)	Environmental	Insignificant	Major	Moderate	Catastrophic	Moderate	Unlikely	Possible	Likely	Almost Certain	H	H	E	E	H	H	E	E
11	Trees and Coastal Vegetation	Environmental	Minor	Moderate	Moderate	Moderate	Moderate	Possible	Likely	Almost Certain	Almost Certain	M	H	H	H	M	H	H	H

A.11 Inundation Risk Assessment

Inundation Risk Drummond Cove (CMU1)

CMU	Description	Inundation Consequence				Adaptive Cap.	Inundation Likelihood Category				Potential Impact Rating				Risk - Incl. Adaptive Capacity			
		Economic	Env	Social	Heritage		2018	2030	2070	2110	2018	2030	2070	2110	2018	2030	2070	2110
1	Houses - Whitehill Rd	Major	Insignificant	Minor	Insignificant	Moderate	Rare	Rare	Unlikely	Unlikely	L	L	M	M	L	L	M	M
1	Houses - Surfside Tce	Major	Insignificant	Minor	Insignificant	Moderate	Rare	Rare	Rare	Rare	L	L	L	L	L	L	L	L
1	Houses - Boat Cove, Wave Crest Crescent	Major	Insignificant	Minor	Insignificant	Moderate	Rare	Rare	Rare	Rare	L	L	L	L	L	L	L	L
1	Beaches	Insignificant	Minor	Minor	Minor	High	most Certain	most Certain	Almost Certain	Almost Certain	H	H	H	H	M	M	M	M
1	Toilets	Minor	Insignificant	Minor	Insignificant	Moderate	Rare	Rare	Unlikely	Unlikely	L	L	L	L	L	L	L	L
1	JB Community Hall	Moderate	Insignificant	Minor	Minor	Moderate	Rare	Rare	Unlikely	Unlikely	L	L	M	M	L	L	M	M
1	Boat Ramp	Minor	Insignificant	Minor	Insignificant	High	most Certain	most Certain	Almost Certain	Almost Certain	H	H	H	H	M	M	M	M
1	Beach Shelter	Insignificant	Insignificant	Minor	Insignificant	High	Unlikely	Unlikely	Possible	Possible	L	L	M	M	L	L	L	L
1	Foreshore Reserve	Minor	Minor	Minor	Insignificant	High	Unlikely	Unlikely	Possible	Possible	L	L	M	M	L	L	L	L
1	Roads General	Minor	Insignificant	Minor	Insignificant	Moderate	Rare	Rare	Unlikely	Unlikely	L	L	L	L	L	L	L	L
1	Whitehill Rd Closed Section*	Minor	Insignificant	Minor	Insignificant	Moderate	Possible	Possible	Possible	Possible	M	M	M	M	M	M	M	M
1	Carpark Drummond Cove Rd*	Minor	Insignificant	Minor	Insignificant	High	Possible	Possible	Possible	Possible	M	M	M	M	L	L	L	L
1	Carpark JB Hall	Minor	Insignificant	Minor	Insignificant	High	Rare	Rare	Unlikely	Unlikely	L	L	L	L	L	L	L	L
1	Carpark Smugglers Pass	Minor	Insignificant	Minor	Insignificant	High	Unlikely	Unlikely	Possible	Possible	L	L	M	M	L	L	L	L
1	Playground	Insignificant	Insignificant	Insignificant	Insignificant	High	Possible	Possible	Likely	Likely	L	L	L	L	L	L	L	L
1	Skate Park	Minor	Insignificant	Minor	Insignificant	Moderate	Unlikely	Unlikely	Possible	Possible	L	L	M	M	L	L	M	M
1	Tennis Courts	Insignificant	Insignificant	Minor	Insignificant	Moderate	Unlikely	Unlikely	Possible	Possible	L	L	M	M	L	L	M	M
1	Dunes	Insignificant	Minor	Minor	Insignificant	High	Possible	Possible	Likely	Likely	M	M	M	M	L	L	L	L
1	Reef System (Not Assessed)	Moderate	Moderate	Minor	Moderate													
1	Beach Access Paths	Insignificant	Minor	Minor	Insignificant	High	Possible	Possible	Likely	Likely	M	M	M	M	L	L	L	L
1	Flora and Fauna	Minor	Minor	Minor	Insignificant	High	Likely	Likely	Almost Certain	Almost Certain	M	M	H	H	L	L	M	M
1	Watercorp Pumping Station	Minor	Minor	Insignificant	Insignificant	Low	Rare	Rare	Unlikely	Unlikely	L	L	L	L	M	M	M	M

Inundation Risk Beresord (CMU5)

CMU	Description	Inundation Consequence				Adaptive Cap.	Inundation Likelihood Category				Potential Impact Rating				Risk - Incl. Adaptive Capacity			
		Economic	Env	Social	Heritage		2018	2030	2070	2110	2018	2030	2070	2110	2018	2030	2070	2110
5	Houses - Marina (Mayhill Quay, Stanford Cove, Windsor Ct)	Major	Insignificant	Minor	Insignificant	Moderate	Rare	Rare	Unlikely	Unlikely	L	L	M	M	L	L	M	M
5	Houses Chapman Rd	Major	Insignificant	Minor	Insignificant	Moderate	Rare	Rare	Rare	Rare	L	L	L	L	L	L	L	L
5	Industrial / Commercial Chapman / Phelps St	Major	Insignificant	Minor	Insignificant	Moderate	Rare	Rare	Unlikely	Unlikely	L	L	M	M	L	L	M	M
5	Roads - Chapman Rd	Minor	Insignificant	Minor	Insignificant	Moderate	Rare	Rare	Unlikely	Unlikely	L	L	L	L	L	L	L	L
5	Roads - Dean St, Urch St	Minor	Insignificant	Minor	Insignificant	Moderate	Rare	Rare	Rare	Rare	L	L	L	L	L	L	L	L
5	Beaches	Insignificant	Moderate	Minor	Insignificant	High	Possible	Possible	Almost Certain	Almost Certain	M	M	H	H	L	L	M	M
5	Foreshore Reserve Marina Park	Minor	Minor	Minor	Insignificant	Moderate	Unlikely	Unlikely	Possible	Possible	L	L	M	M	L	L	M	M
5	Cycling and Walking Paths	Minor	Insignificant	Minor	Insignificant	Moderate	Unlikely	Unlikely	Possible	Possible	L	L	M	M	L	L	M	M
5	BBQ, Shelters	Insignificant	Insignificant	Minor	Insignificant	High	Unlikely	Unlikely	Possible	Possible	L	L	M	M	L	L	L	L
5	Coastal Vegetation	Minor	Minor	Minor	Insignificant	High	Likely	Likely	Almost Certain	Almost Certain	M	M	H	H	L	L	M	M

Inundation Risk Geraldton Town Centre (CMU6)

CMU	Description	Inundation Consequence				Adaptive Cap.	Inundation Likelihood Category				IPotential Impact Rating				Risk - Incl. Adaptive Capacity			
		Economic	Env	Social	Heritage		2018	2030	2070	2110	2018	2030	2070	2110	2018	2030	2070	2110
6	CBD Foreshore Amenities	Moderate	Moderate	Moderate	Insignificant	Moderate	Unlikely	Unlikely	Possible	Possible	M	M	M	M	M	M	M	M
6	Foreshore Beaches	Moderate	Major	Major	Insignificant	High	Likely	Likely	Almost Certain	Almost Certain	H	H	E	E	M	M	H	H
6	Waterpark / Playground / Youth Precinct	Moderate	Moderate	Moderate	Insignificant	High	Unlikely	Unlikely	Possible	Possible	M	M	M	M	L	L	L	L
6	Walking and Cycling Paths	Moderate	Moderate	Moderate	Insignificant	High	Unlikely	Unlikely	Possible	Possible	M	M	M	M	L	L	L	L
6	Trees, Grassed areas, Coastal Reserve	Insignificant	Moderate	Insignificant	Insignificant	High	Unlikely	Unlikely	Possible	Possible	M	M	M	M	L	L	L	L
6	Dome - Foreshore	Moderate	Insignificant	Minor	Insignificant	Moderate	Unlikely	Possible	Possible	Possible	M	M	M	M	M	M	M	M
6	Toilet Block and Café - Foreshore Playground	Moderate	Insignificant	Moderate	Insignificant	Moderate	Unlikely	Possible	Possible	Possible	M	M	M	M	M	M	M	M
6	Minor Infrastructure (bins, fences, signs)	Insignificant	Insignificant	Insignificant	Insignificant	High	Unlikely	Possible	Possible	Likely	L	L	L	L	L	L	L	L
6	Shade Structures in Foreshore	Minor	Insignificant	Moderate	Insignificant	High	Unlikely	Unlikely	Possible	Possible	M	M	M	M	L	L	L	L
6	BBQs in Foreshore	Minor	Insignificant	Moderate	Insignificant	High	Unlikely	Unlikely	Possible	Possible	M	M	M	M	L	L	L	L
6	Houses - Marine Terrace, Foreshore Drive	Major	Insignificant	Moderate	Insignificant	Moderate	Unlikely	Unlikely	Possible	Possible	M	M	H	H	M	M	H	H
6	Houses - Low Lying Block of Marine Terrace, Crowther, Duboulay, Burgess, Shenton, Cunningham St	Major	Insignificant	Moderate	Insignificant	Low	Unlikely	Unlikely	Possible	Possible	M	M	H	H	H	H	E	E
6	Houses - Shenton St, Gregory St, Fitzgerald St, Chapman Rd	Major	Insignificant	Moderate	Insignificant	Moderate	Rare	Rare	Unlikely	Unlikely	L	L	M	M	L	L	M	M
6	Houses - Fraser St, Crowther St	Major	Insignificant	Moderate	Insignificant	Moderate	Rare	Rare	Rare	Rare	L	L	L	L	L	L	L	L
6	Houses - Batavia Coast Marina	Major	Insignificant	Moderate	Insignificant	Moderate	Rare	Rare	Unlikely	Unlikely	L	L	M	M	L	L	M	M
6	Commercial Premises - Batavia Coast Marina, Foreshore Drive	Major	Insignificant	Moderate	Insignificant	Moderate	Unlikely	Unlikely	Possible	Possible	M	M	H	H	M	M	H	H
6	Business and Commercial Premises in CBD	Major	Insignificant	Moderate	Insignificant	Moderate	Unlikely	Unlikely	Possible	Possible	M	M	H	H	M	M	H	H
6	Business and Commercial Premises in CBD at low lying section cnr Foreshore Drive and Marine Terrace	Major	Insignificant	Moderate	Insignificant	Low	Unlikely	Unlikely	Possible	Possible	M	M	H	H	H	H	E	E
6	Port Loading, Storage and Berth Areas	Major	Insignificant	Moderate	Insignificant	Moderate	Rare	Rare	Unlikely	Unlikely	L	L	M	M	L	L	M	M
6	Port Administration	Major	Insignificant	Moderate	Insignificant	Moderate	Unlikely	Unlikely	Possible	Possible	M	M	H	H	M	M	H	H
6	Southern side Marine Terrace	Major	Insignificant	Moderate	Insignificant	Moderate	Unlikely	Unlikely	Possible	Possible	M	M	H	H	M	M	H	H
6	Batavia Marina Foreshore Elements	Major	Insignificant	Moderate	Insignificant	High	Unlikely	Unlikely	Possible	Possible	M	M	H	H	L	L	M	M
6	Batavia Marina Carparking and Structures for Mantra	Moderate	Insignificant	Moderate	Insignificant	High	Rare	Rare	Unlikely	Unlikely	L	L	M	M	L	L	L	L
6	Playground Boat Harbour	Minor	Insignificant	Minor	Insignificant	High	Unlikely	Unlikely	Possible	Possible	L	L	M	M	L	L	L	L
6	Francis St Jetty and Boat Ramp	Minor	Insignificant	Minor	Insignificant	High	Possible	Possible	Likely	Likely	M	M	M	M	L	L	L	L
6	Carparks Francis St Foreshore	Moderate	Insignificant	Minor	Insignificant	High	Possible	Possible	Likely	Likely	M	M	H	H	L	L	M	M
6	Carparks Foreshore Drive / Marine Terrace	Moderate	Insignificant	Minor	Insignificant	High	Unlikely	Unlikely	Possible	Possible	M	M	M	M	L	L	L	L
6	Roads - Foreshore Drive, Marine Terrace, Augustus St, Fitzgerald St	Moderate	Insignificant	Minor	Insignificant	Moderate	Unlikely	Unlikely	Possible	Possible	M	M	M	M	M	M	M	M
6	Roads - Chapman Rd, Fitzgerald St, Shenton St	Moderate	Insignificant	Minor	Insignificant	Moderate	Rare	Rare	Unlikely	Unlikely	L	L	M	M	L	L	M	M
6	Groyne Structures	Minor	Insignificant	Minor	Insignificant	High	Almost Certain	Almost Certain	Almost Certain	Almost Certain	H	H	H	H	M	M	M	M

Inundation Risk Beachlands (CMU8)

CMU	Description	Inundation Consequence				Adaptive Cap.	Inundation Likelihood Category				Potential Impact Rating				Risk - Incl. Adaptive Capacity			
		Economic	Env	Social	Heritage		2018	2030	2070	2110	2018	2030	2070	2110	2018	2030	2070	2110
8	Batavia Coast Marine Institute	Moderate	Insignificant	Moderate	Insignificant	Moderate	Rare	Rare	Rare	Rare	L	L	L	L	L	L	L	L
8	Rail Lines	Moderate	Insignificant	Insignificant	Insignificant	Moderate	Rare	Rare	Rare	Rare	L	L	L	L	L	L	L	L
8	John Willcock Link	Minor	Insignificant	Minor	Insignificant	Moderate	Rare	Rare	Rare	Rare	L	L	L	L	L	L	L	L
8	Separation Point Close	Minor	Insignificant	Minor	Insignificant	Moderate	Rare	Rare	Unlikely	Unlikely	L	L	L	L	L	L	L	L
8	Car Park Separation Point Lookout	Minor	Insignificant	Minor	Insignificant	High	Rare	Rare	Rare	Rare	L	L	L	L	L	L	L	L
8	Cycle / Walking Paths West	Minor	Moderate	Minor	Insignificant	Moderate												
8	Cycle / Walking Paths East	Minor	Moderate	Minor	Insignificant	Moderate	Rare	Rare	Unlikely	Unlikely	L	L	M	M	L	L	M	M
8	Beach Greys , Separation Point	Minor	Minor	Minor	Insignificant	High	most Certain	most Certain	Almost Certain	Almost Certain	H	H	H	H	M	M	M	M
8	Minor Infrastructure (bins, fences, signs)	Insignificant	Insignificant	Insignificant	Insignificant	High	Rare	Rare	Possible	Possible	L	L	L	L	L	L	L	L
8	Beach Access Paths	Insignificant	Moderate	Minor	Insignificant	High	Unlikely	Unlikely	Possible	Possible	M	M	M	M	L	L	L	L
8	Dunes - South	Insignificant	Moderate	Minor	Insignificant	Moderate	Rare	Rare	Rare	Rare	L	L	L	L	L	L	L	L
8	Trees and Coastal Vegetation	Minor	Minor	Minor	Minor	High	Unlikely	Unlikely	Possible	Possible	L	L	M	M	L	L	L	L

Inundation Risk Mahomet Flats (CMU9)

CMU	Description	Inundation Consequence				Adaptive Cap.	Inundation Likelihood Category				Potential Impact Rating				Risk - Incl. Adaptive Capacity			
		Economic	Env	Social	Heritage		2018	2030	2070	2110	2018	2030	2070	2110	2018	2030	2070	2110
9	Houses - Crowther St, eliot St, Maley Way	Major	Insignificant	Minor	Insignificant	Moderate	Rare	Rare	Rare	Rare	L	L	L	L	L	L	L	L
9	Rail Lines	Moderate	Insignificant	Insignificant	Insignificant	Moderate	Rare	Rare	Rare	Rare	L	L	L	L	L	L	L	L
9	Beaches	Insignificant	Minor	Minor	Insignificant	High	most Certain	most Certain	Almost Certain	Almost Certain	H	H	H	H	M	M	M	M
9	Minor Infrastructure (bins, fences, signs)	Insignificant	Insignificant	Insignificant	Insignificant	High	Unlikely	Unlikely	Possible	Possible	L	L	L	L	L	L	L	L
9	Beach Access Paths	Insignificant	Minor	Insignificant	Insignificant	High	Unlikely	Unlikely	Possible	Possible	L	L	M	M	L	L	L	L
9	Dunes	Insignificant	Minor	Minor	Insignificant	Moderate	Rare	Rare	Unlikely	Unlikely	L	L	L	L	L	L	L	L
9	Trees and Coastal Vegetation	Insignificant	Minor	Insignificant	Insignificant	High	Unlikely	Unlikely	Possible	Possible	L	L	M	M	L	L	L	L

Inundation Risk Tarcoola Beach (CMU 10)

CMU	Description	Inundation Consequence				Adaptive Cap.	Inundation Likelihood Category				Potential Impact Rating				Risk - Incl. Adaptive Capacity			
		Economic	Env	Social	Heritage		2018	2030	2070	2110	2018	2030	2070	2110	2018	2030	2070	2110
10	Houses - Glendenning Rd	Moderate	Insignificant	Minor	Insignificant	Moderate	Rare	Rare	Unlikely	Unlikely	L	L	M	M	L	L	M	M
10	Houses - Sandown Close, Queenscliffe Close	Moderate	Insignificant	Minor	Insignificant	Moderate	Rare	Rare	Rare	Rare	L	L	L	L	L	L	L	L
10	Car Park - Glendenning Rd Carpark	Minor	Insignificant	Insignificant	Insignificant	High	Rare	Rare	Rare	Rare	L	L	L	L	L	L	L	L
10	Beaches	Minor	Moderate	Minor	Insignificant	High	Almost Certain	Almost Certain	Almost Certain	Almost Certain	H	H	H	H	M	M	M	M
10	Minor Infrastructure (bins, fences, signs)	Insignificant	Insignificant	Insignificant	Insignificant	High	Unlikely	Unlikely	Possible	Possible	L	L	L	L	L	L	L	L
10	Beach Access Paths	Minor	Minor	Minor	Insignificant	High	Unlikely	Unlikely	Possible	Possible	L	L	M	M	L	L	L	L
10	Dunes	Minor	Minor	Minor	Insignificant	Moderate	Rare	Rare	Unlikely	Unlikely	L	L	L	L	L	L	L	L
10	Trees and Coastal Vegetation	Minor	Minor	Minor	Insignificant	Moderate	Unlikely	Unlikely	Possible	Possible	L	L	M	M	L	L	M	M

A.12 Adaptation Toolbox

Geraldton CHRMAP

Adaptation Toolbox

Option Type	Option Number	Option Name	Description how it will help	Hazard Type	Multi-criteria and cost benefit analysis	Potential assets
Avoid	AV1	Planning Controls - Special Control Area	Assets will not be placed in locations vulnerable to coastal hazards.	Erosion and Inundation	Financial resources will not be required to be spent on management and adaption.	All assets in the coastal zone.
Planned/Managed Retreat	MR1	Leaving assets unprotected. Remove Assets over Time as Hazard is Realised.	Accept loss following hazard event. Only implement repairs to maintain public safety. Allow for retreat that allows natural recession of the shoreline over the long-term.	Erosion and Inundation	Save the financial resource for better use.	All low cost/temporary/easily relocatable recreation amenities.
Planned/Managed Retreat	MR2	Demolition/removal/relocation of assets from inside hazard area.	This option relevant for assets of low value where it is impractical both technically and financially to design the asset to withstand the impact of the hazards instead of relocating it.	Erosion and Inundation	Allows amenities to be retained realising the social and economic values until such time that the asset needs to be relocated. Can often coincide with asset replacement. This also enables to cost of relocation to be shared with the cost of asset replacement. This reduces the overall cost in present and future time	All low cost/temporary/easily relocatable recreation amenities.
Planned/Managed Retreat	MR3	Prevention of further development/prohibit expansion of existing use rights.	This option would enable existing development and use rights to continue without increasing them, until such time that impacts arise. Specified in a local planning scheme.	Erosion and Inundation	Generally applicable where protection of assets is not viable.	All assets where it is impractical to ultimately implement protection.

Planned/Managed Retreat	MR4	Land Swap	Mechanism whereby the owners of properties at risk of coastal hazard agree to retreat from their property and in exchange are offered an alternative location to develop (ie vacant land)		This option can be implemented provided appropriate land is readily available nearby. This has been implemented in Geraldton recently for coastal properties at risk of erosion at Drummond Cove	Houses and Business Premises
Accommodate	AC1	Notification on title (can also be relevant to (planned/managed retreat and protect options).	As a requirement of any future subdivision or development, the landowner will be required as a condition of planning approval for the landowner to place a notification on the Certificate of Title pursuant to Section 70A of the Transfer of Land Act 1893 to notify prospective purchasers that the lot(s) is located in an area that may be subject to coastal inundation over the next 100 years.	Erosion and Inundation	This option allows vulnerability of asset to hazards to be conveyed to existing and future owners. One means of implementation that is low cost, is through decision-making for subdivision and development.	All assets located within an area vulnerable to the adverse impacts of coastal erosion and inundation within the planning timeframe.
Accommodate	AC2	Design assets to withstand impacts	On land that has been identified as having lower levels of flooding as a result of storm surge (i.e. 500mm or less above natural ground level), it may be considered appropriate to require new developments to have habitable / lettable floor levels (including freeboard) above the identified flood level. .	Erosion and Inundation	This option is aimed at retaining existing assets in locations but reducing the consequences of the inundation hazard. It is cheaper to mitigate the impacts with initial design outcomes as opposed to retrofitting existing assets in the future.	Roads, car parks, residential property, hospitals, aged care facilities, schools, child care facilities, surf life saving clubs
Accommodate	AC3	Emergency evacuation plans	The City to prepare an Emergency Evacuation Plan in the event of a cyclonic / storm surge event to safely evacuate occupants from the City Centre. Such plans are important in managing the safety of community and stakeholders.	Inundation	This option is a low cost option in addressing the consequences of inundation with regard to safety to lives as the impact occurs. Escape routes need to consider safety and access in extreme events, including depth of flooding and velocity of flood waters	Roads (with particular regard to managing traffic flows during an event), car parks, residential property, hospitals, aged care facilities, schools, child care facilities, surf life saving clubs

Accommodate	AC4	Appropriate Finished Floor Levels	Raise finished floor levels above a level determined to provide immunity against flooding in extreme events	Inundation	Can be implemented in new housing, not easily retrofitted to existing properties	Houses and Business Premises
Accommodate	AC5	Filling Land	Raise land levels above a level determined to provide immunity against flooding in extreme events	Inundation	Can be financially viable where the supply of fill is readily and cheaply available. Where suitable sources are not readily available or a considerable distance away, costs are increased. Must consider impacts to surrounding property and aesthetics	Houses
Temporary Protect / Improve Resilience	TPIR1	Coastal Revegetation	Planting along the coastal edge. Providing resilience against wave attack and erosion through reducing wave energy and roots binding the soil together	Erosion	Relatively Low cost, nature based option. Option currently applied at a number of coastal locations by community groups	Eroding shorelines
Temporary Protect / Improve Resilience	TPIR2	Dune Management	Controls to limit impact to dunes (eg preventing vehicle access) or measures to promote sand accumulation (eg sand fences) to act as a buffer against erosion	Erosion and Inundation	Relatively Low cost, nature based option. Option currently applied at a number of coastal locations.	Eroding shorelines and areas in need of inundation protection
Temporary Protect / Improve Resilience	TPIR3	Beach nourishment or replenishment	This option involves the placement of sand on the upper beach face and dunes to re-establish the beach and provide a sediment supply through use of trucks or sand delivered via sand pumping. Currently applied for town beaches and northern beaches (GPA).	Erosion	Where suitable sources are not readily available or a considerable distance away, costs are increased. If the nourishment sand is significantly finer than the existing beach sand the nourishment sand will be lost quickly.	High use beaches and foreshore reserves where retreat is not an option.

<p>Temporary Protect / Improve Resilience</p>	<p>TPIR4</p>	<p>Geotextile Sand Bags – Groynes and Seawalls</p>	<p>This option involves the construction of groynes or seawalls to stop or restrict the movement of sand and provide protection to assets behind the beach/foreshore reserve.</p>	<p>Erosion</p>	<p>Cost needs to be weighed up against the value of the assets being protected. Groynes form a cross-shore barrier that traps sand that moves alongshore. Groynes are not 100% effective as a means of protecting the coast during short-term storm erosion, dependant on the extent of the trapped sediment which offers sacrificial protection.</p>	<p>High use beaches and foreshore reserves where retreat is not an option. Where assets value is high and relocation is not an option.</p>
<p>Protect</p>	<p>PR1</p>	<p>Groynes</p>	<p>This option involves the construction of groynes to stop or restrict the movement of sand around the end of the structure, to provide protection to assets behind the beach/foreshore reserve. They are primarily effective where there is longshore sand supply. Generally permanent rock structures.</p>	<p>Erosion</p>	<p>Groynes could be expensive and change the nature and appearance of the coast. This needs to be weighed up against the value of the assets being protected. Groynes form a cross-shore barrier that traps sand that moves alongshore. Groynes are not 100% effective as a means of protecting the coast during short-term storm erosion, dependant on the extent of the trapped sediment which offers sacrificial protection.</p>	<p>High use beaches and foreshore reserves where retreat is not an option. Where assets value is high and relocation is not an option.</p>
<p>Protect</p>	<p>PR2</p>	<p>Seawalls</p>	<p>This option involves construction usually along an entire section of shoreline. Where a beach is to be retained, this option should generally be accompanied with beach nourishment or replenishment.</p>	<p>Erosion</p>	<p>Seawalls are expensive and change the nature and appearance of the coast. Seawalls protect the land not the beaches. Needs to be accompanied by greater beach nourishment/replenishment, which adds to the cost of option. This needs to be weighed up against the value of the assets being protected.</p>	<p>High use beaches and foreshore reserves where retreat is not an option. Where assets value is high and relocation is not an option.</p>



Protect	PR3	Flood Mitigation Structure	This option involves construction to protect a low-lying section of shoreline providing an impenetrable barrier to protect against an extreme flood level. Can be in the form of a dyke, levee, or a storm surge barrier. Barriers can be removable (eg sandbags)	Inundation	Generally, an Expensive option and requires land area over which the structure can be constructed and consideration of impact on sight lines to the coast. This needs to be weighed up against the value of the assets being protected	High value developed areas where retreat is not an option.
Protect	PR4	Artificial Reefs	Artificial reefs are placed offshore to dissipate wave energy impacting the shore by causing the waves to break. Creates additional beach width on the lee (sheltered) side.	Erosion	Can be an expensive option. Varying success in applications nationally and internationally. Recent example on Gold Coast Qld (Palm Beach) shows this is a potentially viable alternative to hard engineering. Previous studies undertaken for Back Beach Geraldton.	Eroding shorelines

