Central Coast Council

Guideline for Management

St Huberts Island Canals

May 2017

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1. Introduction

1.1 Purpose of the Guideline for Management

The purpose of this Guideline for Management ('the Guideline') is to enable residents and Central Coast Council (Council) to conduct maintenance and improvement activities within the St Huberts Island Drainage Reserves (canals) in an informed and consistent manner.

More specifically, the Guideline provides direction for Council, residents and contractors to conduct activities associated with improving the condition and operational value of the canals and structures within and surrounding the canals in line with relevant environmental and planning controls. The Guideline provides advice and direction for the undertaking of activities to protect and restore foreshores, seawalls and canal depths in a manner that minimises impacts on the hydraulic, sedimentary or ecological processes occurring within the canals, foreshores and surrounding water body (Brisbane Water).

1.2 Project Area

The project area which this Guideline applies to (Table 2, highlighted magenta), is limited to the St Huberts Island Canals, which are as follows:

- Marina Cove;
- Trial Inlet;
- Crescent Cove;
- Sandy Cove;
- Sandy Inlet;
- Shelter Cove; and
- Nannygai Inlet.

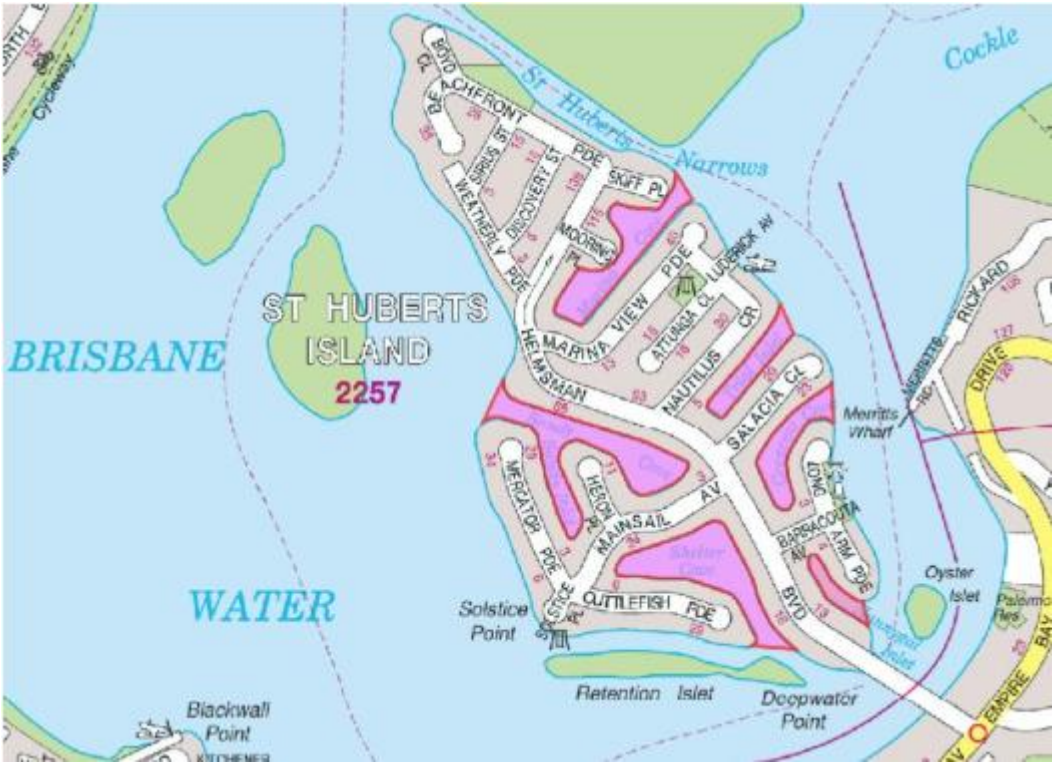

Figure 1 Project area - waterways highlighted in magenta

1.3 Scope and Limitations

This report: has been prepared by GHD for Central Coast Council and may only be used and relied on by Central Coast Council for the purpose agreed upon between GHD and the Central Coast Council as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than Central Coast Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section 1.4 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Central Coast Council and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1.4 Assumptions

In preparing the Guideline, GHD has made the following assumptions:

- The results of the 2016 residents' survey summary, collected and compiled by the St Huberts Island Residents Association, are assumed to represent an accurate summary of all residents' feedback.
- A site audit and condition assessment of structures within the canals has not been undertaken as part of the current engagement. Any information derived regarding the canal's condition has been inferred from survey feedback, previous reports and anecdotal evidence. The list of reports that has been used to guide this PoM is provided below:
    - Recommended Guide-Lines for Plan of Management for the drainage reserves of St Hubert Island (February 1997) further referred to as Draft Guidelines.
    - Development Control Plan No 145 'Mooring Facilities on St Huberts Island (DCP145) (November 2000)
    - Brisbane Water Estuary Processes Study (March 2008)
    - DECC's Environmentally Friendly Seawalls: A Guide to Improving the Environmental Value of Seawalls and Seawall-lined Foreshores in Estuaries (June 2009) (EFS Guide)
    - Brisbane Water Estuary Management Study (October 2010)
    - The Coastal Zone Management Plan for Brisbane Water (CZMP) (July 2012)
    - Gosford Development Control Plan (GDCP) Chapter 3.16 Water Recreation Structures (2013) and relevant sub chapters as described in Section 3.2.3
    - Brisbane Water Flood Study (July 2013)
    - Brisbane Water Foreshore Floodplain Risk Management Study (March 2015)

- Brisbane Water Foreshore Floodplain Risk Management Plan (November 2015)

- No major errors or omissions have been identified in the existing planning instruments. The Guidelines are intended to complement the existing planning instruments by providing additional design advice and guidance regarding the existing planning instruments.

2. Background Information

2.1 Canal Layout and Geometry

Canals are artificial waterways where land has been excavated or reclaimed for the purpose of providing drainage or navigable water access. The St Huberts Island Canals are inundated by and drained to the surrounding Brisbane Waters. The extent of the canals of St Huberts Island are displayed below in Figure 2.

With the exception of Trail Inlet and Nannygai Inlet, the canals are largely non-uniform in shape. This results in uneven exposure to wind, waves, currents and distribution of sediments throughout the canals. Whilst the waterways surrounding St Huberts Island see significant tidal flows, due to the narrow entrances to the canals and relatively small land based catchment area for the drainage of overland flows and stormwater, flow rates and flushing within the canals are relatively low.

Figure 2 Canals of St Huberts Island

2.2 Land Classification and Ownership

The St Huberts Canals, defined as both artificial waterways and submerged blocks of Council owned land, are managed differently to natural waterways with Council assuming authority over the canals.

The canals are classified as 'Operational land' under the *Local Government Act* 1993. Operational land comprises land that serves a commercial or operational function (eg. a works depot, car park, sewage pump station), or land that is being retained for commercial or strategic reasons. The range of controls that apply to Community Land do not apply to the use and management of Operational land.

Under the Gosford Local Environment Plan (LEP) 2014 the canals are zoned as W2 - Recreational Waterways. The objectives of W2 zone are as follows:

- To protect the ecological, scenic and recreation values of recreational waterways.
- To allow for water-based recreation and related uses.
- To provide for sustainable fishing industries and recreational fishing.

Lands of St Huberts Island are within State Environmental Planning Policy (SEPP) 71 – Coastal Protection and have been classified by Council as high risk Potential Acid Sulfate Soils.

A detailed summary of the environmental constraints and planning approvals are provided in Section 3.

2.3 History of Canal Management

In 1997, in accordance with the State Environmental Planning Policy No. 50 – Canal Estate Development, new canal estate developments were prohibited in NSW. The canals of St Huberts Island were approved and developed in the mid-1970's as an island-canal residential estate. It was formed by dredging sand from the bed of Brisbane Water south of Riley's Island to form an island about 1.4 km in the north-west to south-east direction and 800 m in the northeast to south-west direction.

The St Huberts Island Residents Association (SHIRA) was formed in 1976 to raise and seek to address maintenance, monitoring and regulatory issues within the canals and the surrounding land. The largest issue sought to be addressed by SHIRA at the time, was the management, approval and regulation of moorings and pontoons within the drainage reserves.

The Draft Guidelines were produced by the St Huberts Island Drainage Reserves Task Group in February 1997, herein referred to as the 'Draft Guidelines'. This stipulated many of the existing requirements and regulations to be followed by Council and residents. The Draft Guidelines also considered the results of a survey that was completed by the Drainage Reserve Task Group. More specifically, the Draft Guidelines addressed:

- Permitted Development (Waterfront Residential) within the Drainage Reserves
- Minimum Width Waterfrontages for (Waterfront Residential) Development
- Design Criterions for:
  - Boat Ramps
  - Floating Pontoons and associated Walkways
- Works Prohibited within the Drainage Reserves
- Works Required to be carried out by the former Council (Gosford City Council)
- Matters Requiring attention in each of the six named drainage reserves
- Schedules of existing boating facilities in each of the six named drainage reserves

In 2006, the final Development Control Plan 145 – Mooring Facilities on St Huberts Island (DCP 145) was released. DCP 145 provided more detailed guidelines for the development of the land having regard to the provision of boating facilities and berthing of vessels within the drainage reserves. DCP 145 was developed in conjunction with the Brisbane Water Plan of Management.

DCP 145 was superseded by Gosford Development Control Plan (GDCP 2013), which sets out the objectives of development in the canals of St Huberts Island, and provides controls for construction of waterway structures.

2.4 Relevant Planning Controls

Legislation and planning instruments that need to be considered for management of the St Huberts Island drainage reserves include:

- Gosford Local Environmental Plan 2014
- Gosford Development Control Plan 2013
- NSW Environmental Planning and Assessment Act 1979
- NSW Coastal Protection Act 1979. Note that a NSW Coastal Management Act 2016 is expected to commence following public consultation and enactment of the draft Coastal Management State Environmental Planning Policy (SEPP) and corresponding maps
- Draft coastal management manual and a draft Coastal Management State Environmental Planning Policy (SEPP) with related maps
- NSW SEPP (Infrastructure) 2007
- NSW SEPP No 71 - Coastal Protection
- NSW Local Government Act 1993
- NSW Fisheries Management Act 1994
- NSW Native Vegetation Act 2003
- NSW Threatened Species Conservation Act 1995
- NSW Water Management Act 2000
- Commonwealth Environment Protection and Biodiversity Conservation Act 1999

Further details of the environmental constraints and planning approvals are provided in Section 3.

2.5 Coastal Zone Management for Brisbane Water Estuary

A series of specific management goals were developed as part of the Coastal Zone Management for Brisbane Water Estuary 2012. These goals represent the specific, desired outcomes for the estuary and were used to guide the development of the CZMP. They should be considered when undertaking activities in the Brisbane Water catchment. Table 1 provides the management goals relevant to this Guideline.

Table 1 Management goals of the CZMP for Brisbane Water - St Huberts Island

Category	Goal
Water and Sediment Quality	To achieve a standard of water and sediment quality that protects and promotes a healthy aquatic ecosystem, and allows aesthetic enjoyment and appropriate recreational us
Sedimentary Processes	To seek to: Minimise catchment generated sedimentation and erosion of creeklines and the foreshore caused by the effects of human activities; Maintain access and amenity, as well as the navigability of the waterway, while recognising the natural sedimentary processes and the natural depth constraints that occur in the estuary; and Minimise (where possible) erosion and sedimentation where natural sedimentary processes are impacting on public or private property.
Foreshore Flooding	To minimise the impact of flood management measures on estuarine processes.
Habitat and Species Conservation	To protect, retain and rehabilitate existing habitat for estuarine species, rehabilitate degraded habitat and provide for ecological connectivity throughout the Brisbane Water catchment.
Visual Amenity and Landscape Character	To maintain or enhance the visual experience of the landscape from vantage points on the waterway and in the catchment.
Recreational Usage	To encourage and provide facilities which support appropriate recreational usage of the estuary waterways and foreshores while maintaining ecosystem viability.
Foreshore Development	To undertake strategic planning for development adjacent to the Brisbane Water foreshore, taking into account: The potential impacts of climate change; Access and amenity; The preservation of important foreshore habitats; With respect to existing foreshore development, the aim is to: Seek opportunities to implement environmentally sustainable modifications during the course of ongoing maintenance and repair. Recognise and report on inappropriate foreshore development and take action to remedy where possible.
Information, Communications and Education	To regularly provide information to the public about the estuary, including details of: Current estuarine health (including aquatic ecosystem and human health indicators); „ Current planning and development activities; The impact that current and future land and waterway usage has on estuarine values; and The contributions that the community can make toward reducing adverse impacts on, and enhancing the condition of, the estuary. To facilitate the active involvement of the community in implementation of the Plan wherever possible

3. Environmental Constraints and Planning Approvals

3.1 Environmental Constraints

A search of relevant online databases identified a variety of environmental constraints relating to the canals of St Huberts Island. These are summarised along with the required permits and approvals in Table 2.

Table 2 High-Level Environmental Constraints

Act	Relevance to the proposal	Required permits and approvals	
		Residents undertaking works	Council undertaking works
NSW Legislation			
Coastal Protection Act 1979	The Coastal Protection Act 1979 contains provisions relating to the use and occupation of the coastal region of NSW and regulates the carrying out of development and certain coastal protection work within the coastal zone established under the Act. The Brisbane Water estuary and foreshores lie within this defined coastal zone. Under Clause 38 of the Act concurrence from the Minister for Environment and Heritage is required for development within the coastal zone undertaken or approved by a public authority. This ensures that proposed developments are designed appropriately, to minimise adverse environmental impacts, withstand coastal processes and uphold the NSW Coastal Policy (1997). Note that a NSW Coastal Management Act 2016 is expected to commence following public consultation and enactment of the draft Coastal Management State Environmental Planning Policy (SEPP) and corresponding maps.	If works are proposed within the coastal zone, then the need for concurrence by the Minister should be confirmed.	

Act	Relevance to the proposal	Required permits and approvals	
		Residents undertaking works	Council undertaking works
Contaminated Land Management Act 1997	The EPA must be notified in writing of any contamination identified when undertaking works or if the activities undertaken have contaminated land, in accordance with the requirements of section 60 of the *Contaminated Land Management Act 1997*	None unless contaminated land is encountered. No contaminated sites (listed on the NSW EPA contaminated land record) have been identified in St Huberts Island or Daleys Point.	
Crown Lands Act 1989	The *Crown* Lands Act 1989 sets out how Crown land is to be managed. In relation to actions affecting Crown land: • all actions are to be consistent with the 'principles of Crown land management' • an assessment must be carried out prior to any dealings in Crown land (such as a lease). • specific use of Crown land generally needs to be authorised by a lease, licence or other permit. Submerged land is generally classified as a type of Crown land. Bordering the coast of NSW it lies below the mean high water mark and also includes most coastal estuaries, many large riverbeds, many wetlands and the State's territorial waters. The St Huberts Island Canals do not constitute Crown land, however the waters surrounding the island do.	Works on Crown land that require development approval must have landowner consent. Development may also require authorisation (i.e. lease, licence or similar) to occupy Crown land.	Where works on Crown land require development approval then a copy of the application must be provided before consent is given. Where works on Crown land are classified as 'development that does not need consent' then an environmental assessment may need to be provided to the Department of Industry (Lands). Development may also require authorisation (i.e. lease, licence or similar) to occupy Crown land.

Act	Relevance to the proposal	Required permits and approvals	
		Residents undertaking works	**Council undertaking works**
Fisheries Management Act 1994 (FM Act)	One of the objectives of the *Fisheries Management Act 1994* is to 'conserve key fish habitats'. Waters surrounding St Huberts Island are mapped as Key Fish Habitat (KFH) (refer to the former Gosford LGA KFH map). The Act protects KFH by regulating the activities that can occur and where. A permit is required under Part 7 of the Act for activities that involve dredging and reclamation work, temporarily or permanently obstruct fish passage, and/or harm marine vegetation.: Dredging work means any work that involves excavating or removing material from water land (land submerged by water either permanently or intermittently and whether a natural or artificial body of water). Reclamation work means either using any material to fill in or reclaim water land, or depositing material on water land for the purpose of constructing anything over water land, or draining water for the purpose of its reclamation.	Section 201 provides for circumstances in which a person may carry out dredging or reclamation works. A permit is required unless the work is authorised under the *Crown Lands Act*, or work has been authorised by a relevant public authority.	Section 200 provides for circumstances in which a local government authority may carry out dredging or reclamation. A permit is required unless the work is authorised under the *Crown Lands Act*, or work has been authorised by a relevant public authority
		A permit is required under Section 205 to harm (gather, cut, destroy, dig up, remove etc) marine vegetation including mangroves.	
Heritage Act 1977	Under the *Heritage Act 1977*, it is an offence to disturb an item of heritage significance without consent. Any work which would impact on an item listed on the State Heritage Register requires approval under Section 57(1) of the Act. In addition, under Section 139, an excavation permit is required to disturb or excavate any land containing or likely to contain a relic (any deposit, artefact, object or material evidence that relates to the settlement of the area that comprises NSW and is of State or local heritage significance).	None. No heritage items listed under the Heritage Act were identified in the suburbs of St Huberts Island and Dales Point. Given that the majority of works would be undertaken on land which has been formed from dredged sand taken from the bed of Brisbane Water the presence of relics is considered unlikely. However, relics includes historic shipwrecks and a number have occurred in Brisbane Water. If works within Brisbane Water have the potential to move, damage or destroy historic shipwrecks (including any articles associated with the ship) then a historic shipwrecks permit is required under Section 51 of the Act.	

Act	Relevance to the proposal	Required permits and approvals	
		Residents undertaking works	Council undertaking works
National Parks and Wildlife Act 1974	The *National Parks and Wildlife Act 1979* (NPW Act) covers matters relating to reserving lands, managing certain reserved lands, the protection of Aboriginal objects and places, the protection of fauna and the protection of native vegetation. Under Section 86, a person must not harm, knowingly or unknowingly, an Aboriginal object or declared Aboriginal place. In accordance with Section 90 of the NPW Act an Aboriginal Heritage Impact Permit (AHIP) is required to authorise harm or desecration of an Aboriginal object or Aboriginal place, or potential Aboriginal object.	The majority of works would be undertaken on land which has been formed from dredged sand taken from the bed of Brisbane Water therefore the presence of intact Aboriginal objects and places is considered unlikely. However, a basic AHIMs search was undertaken which encompassed the majority of St Huberts Island (1 km buffer around Lot 147 DP243182) and found 30 Aboriginal sites are recorded in or near the above location. Therefore, if subsurface works are proposed then an assessment would need to be undertaken in accordance with the Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (DECCW, 2010). Where the due diligence assessment identifies that the proposed activity has the potential to cause or permit harm to an Aboriginal Place or an Aboriginal object than an AHIP is required.	
Native Vegetation Act 2003	The *Native Vegetation Act 2003* regulates the clearing of native vegetation on all land in NSW except for land listed in Schedule 1 of the Act. Native vegetation is classified as any species of vegetation that existed in NSW before pastoral settlement. Marine vegetation is managed under the *Fisheries Management Act 1994*.	Approval under Part 3 is required to clear native vegetation, other than excluded clearing.	Approval under the Native Vegetation Act is not required for proposals subject to Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).
Protection of the Environment Operations Act 1997 (POEO Act)	The POEO Act relates to noise, air and water pollution and waste management for activities that may cause water pollution. 'Scheduled activities' as listed under Schedule 1 of the POEO Act require an Environment Protection Licence (EPL) from the EPA, unless clauses in Schedule 1 specify otherwise.	Marinas and boat repairs (Schedule 1, clause 25) may potentially trigger the requirement for an EPL if the capacities detailed in Schedule 1 are exceeded. Based on the scale of the activities proposed in this guideline this is considered unlikely, however the requirement for an EPL should be reviewed if boat construction/maintenance or boot mooring/storage activities are proposed.	

Act	Relevance to the proposal	Required permits and approvals	
		Residents undertaking works	Council undertaking works
Threatened Species Conservation Act 1995 (TSC Act)	The TSC Act provides the statutory framework for the conservation of biota of significance in NSW. The TSC Act aims to, among other things, 'conserve biological diversity and promote ecologically sustainable development'. Section 5A of the EP&A Act lists a number of factors to be taken into account in deciding whether there is likely to be a significant impact on threatened species, populations or ecological communities or their habitats. Should a threatened species or community be impacted, a test of significance must be completed to determine the significance of the impact (Seven-part test). A species impact statement (SIS) is required if there is likely to be a significant impact on a threatened species, population or ecological community or its habitat.	St Huberts Island and the waters surrounding it contain many threatened ecological species listed under the TSC Act. Where works have the potential to impact threatened species, populations, ecological communities or their habitat then a seven-part test must be completed in accordance with Section 5A of the EP&A Act.	
Water Management Act 2000 (WM Act)	The WM Act controls extracting and using water, constructing works such as dams and weirs, and carrying out activities in or near water sources in NSW. 'Water sources' are defined very broadly and include any river, lake, estuary or place where water occurs naturally on or below the surface of the ground, and NSW coastal waters. If a 'controlled activity' is proposed on 'waterfront land', an approval is required under the WM Act (Section 91E). Under the WM Act, 'waterfront land' is defined as land within 40 metres of a river, lake, estuary or shoreline. A	A controlled activity approval under section 91E of the WM Act may be required if activities which meet the definition of 'controlled activities' are proposed within 40 m of the foreshore.	Under Section 38 of the Water Management (General) Regulation 2011 a public authority is exempt from Section 91E of the WM Act in relation to all controlled activities that it carries out in, on or under waterfront land. As Council is a public authority, approval would not be required under Section 91E of the WM Act

Act	Relevance to the proposal	Required permits and approvals	
		Residents undertaking works	Council undertaking works
	river includes 'any watercourse, whether perennial or intermittent and whether comprising a natural channel or a natural channel artificially improved'. Controlled activities include the erection of a building or the carrying out of work (within the meaning of the EP&A Act), the removal of material or vegetation from land, the deposition of material or the carrying out of any other activity that affects the quantity or flow of water in a water source. If extraction of groundwater is proposed during excavation works than an aquifer interference approval may be required under Section 91F of the WM Act.	Previous consultation with the NSW Office of Water has indicated that an aquifer interference approval is generally only required if more than three megalitres per year would be extracted from excavations such as trenches. Based on the type of works proposed an aquifer interference approval is unlikely to be required	
Commonwealth legislation			
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	The primary objective of the EPBC Act is to 'provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance.' Environmental approvals under the EPBC Act may be required for an action that has, will have or that is likely to have a significant impact on: • Matters of national environmental significance (known as 'NES matters'), or • The environment on Commonwealth land (whether or not the action is occurring on Commonwealth land). An action is considered to include a project, development, undertaking, activity or series of activities.	A search of the EPBC Act matter of national environmental significance (NES) was undertaken on 22 December for a 10 kilometre radius around the centre of the island. The search found that within this area there is: • One national heritage place • Three threatened ecological communities • 84 listed threatened species • 65 listed migratory species Any works undertaken would need to assess whether it will, or is likely to have a significant impact on these items. If the answer is yes then the development may require referral to the Commonwealth Minister for the Environment,	

3.2 Review of Planning Approval Requirements

3.2.1 Environmental Planning and Assessment Act 1979

Development in NSW is assessed in accordance with the provisions of the EP&A Act and the *Environmental Planning and Assessment Regulation 2000* (the Regulation). The EP&A Act institutes a system for environmental assessment, including approvals and environmental impact assessment for proposed developments. Implementation of the EP&A Act is the responsibility of the Minister for Planning, statutory authorities and local councils.

The EP&A Act contains three parts that impose requirements for planning approval. These are generally as follows:

- Part 4 provides for control of 'local development' that requires development consent from the local Council. State significant development, is also assessed under Part 4 (Division 4.1).
- Part 5 provides for control of 'activities' that do not require development consent or the approval of the Minister for Planning.
- Part 5.1 provides for control of State significant infrastructure.

The need or otherwise for development control is set out in environmental planning instruments – State environmental planning policies (SEPPs), regional environmental plans (these are now deemed SEPPs), or local environmental plans (LEPs).

Part 4 of the EP&A Act

Development under Part 4 of the EP&A Act can consist of development which requires consent, development which does not need consent or development that is prohibited, as defined under a local environmental plan (LEP) or State environmental planning policy (SEPP). Relevant LEPs and SEPPs to the proposed works are discussed in the sections below.

Part 5 of the EP&A Act

Under Part 5 of the EP&A Act, a determining authority is defined as:

'a Minister or public authority and, in relation to any activity, means the Minister or public authority by or on whose behalf the activity is or is to be carried out or any Minister or public authority whose approval is required in order to enable the activity to be carried out'.

Council therefore meet the definition of a determining authority and under Section 111(1) of Part 5 of the EP&A Act a determining authority is required to '…examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.'

Section 112 provides that a determining authority shall not approve or carry out an activity that is likely to significantly affect the environment (including critical habitat) or threatened species, populations or ecological communities, or their habitats, unless it has considered an environmental impact statement in respect of the activity. In addition, if the proposal was to be carried out on land that is critical habitat, or if the determining authority decides the proposal would be likely to significantly affect a threatened species, population or ecological community or its habitat, then it must obtain and consider a species impact statement.

Where Council undertake activities that do not require development consent, as defined under an LEP or SEPP, then an environmental assessment would be required to meet the requirements of Part 5 of the EP&A Act. Relevant LEPs and SEPPs to the proposed works are discussed in the sections below.

3.2.2 Local Environmental Plan

The Gosford Local Environmental Plan 2014 (the Gosford LEP) applies to land within the Central Coast local government area. The majority of works proposed would be likely to occur within land zoned W2 (Recreational Waterways). However, there are also some areas zoned RE1 (Public Recreation) located along the foreshore in which works may occur.

The following works are permitted without consent in zone W2: environmental facilities; environmental protection works; moorings.

The following works are permitted with consent in zone W2: boat sheds, car parks, food and drink premises; function centres; kiosks; marinas; markets; mooring pens[1]; water recreation structures[2].

The following works are prohibited in zone W2: industries, multi dwelling housing; residential flat buildings; seniors housing; warehouse or distribution centres; any other development not specified above.

The following works are permitted without consent in zone RE1: environmental facilities, environmental protection works.

The following works are permitted with consent in zone RE1: camping grounds; car parks; caravan parks; child care centres; community facilities; kiosks; recreation areas; recreation facilities (indoor); recreation facilities (major); recreation facilities (outdoor); respite day care centres; restaurants or cafes; roads; water recreation structures.

The following works are prohibited in zone RE1: any development not specified in the above.

The majority of identified management issues discussed in Section 5 are likely to meet the definition of environmental protection works therefore, would be classified as development permitted without consent. Where activities are proposed that meet the definition of works that can be undertaken without consent the Council would need consider the environmental impacts associated with the works, in accordance with Part 5 of the EP&A Act. Individuals undertaking works which are permitted without consent would need to ensure other relevant regulatory requirements are met, as per those detailed in Table 2.

Additionally, with regards to works undertaken by Council, clause 5.12 of the LEP states that '…this Plan does not restrict or prohibit, or enable the restriction or prohibition of, the carrying out of any development, by or on behalf of a public authority, that is permitted to be carried out with or without development consent, or that is exempt development, under *State Environmental Planning Policy (Infrastructure) 2007*'.

3.2.3 Gosford Development Control Plan

The objectives of development in the canals of St Huberts Island, as per the Gosford Development Control Plan (GDCP 2013), are as follows:

- To provide private water recreation structures for boats within the canals of St Huberts Island.
- To ensure that the water recreation structures will not result in difficulty of physical manoeuvring of vessels within the canals.

[1] Mooring pen means an arrangement of freestanding piles or other restraining devices designed or used for the purpose of berthing a vessel

[2] Water recreation structure means a structure used primarily for recreational purposes that has a direct structural connection between the shore and the waterway, and may include a pier, wharf, jetty or boat launching ramp.

- To ensure that the number and location of water recreation structures will not adversely affect the visual amenity of the neighbourhood.
- To ensure the water recreation structures will not result in visibly unattractive concentrations or locations of vessels.

The following subsections of the GDCP provide controls for construction of waterway structures and underpin the Guidelines:

- 3.16.8: Objectives of development in canals of St Huberts Island
- 3.16.9: Specific Requirements for Water Recreation Structures in Canals on St Huberts Island
- 3.16.10: Management Principles for Water Recreation Structures for Canals on St Huberts Island
- 3.16.11: Development Criteria for Boat Ramps for Canals on St Huberts Island
- 3.16.12: Development Criteria for Pontoon and Associated Walkways for Canals on St Huberts Island
- 3.16.13: Positive Covenant and Licence for development in canals of St Huberts Island

The above subsections of the GDCP have been reproduced in Appendix B for ease of reference, however these should be considered as for reference only and should be verified as current prior to use.

Key approval requirements outlined in Section 3.16.13 of the GDCP (2013) which must be met prior to construction of any approved pontoon and associated walkway are as follows:

- The owner shall make appropriate arrangements with Council's Property Services Unit for the granting of a licence for use of the drainage reserve including payment of any licence fee; and
- The owner shall create a positive covenant which is attached to the land owned by the person who receives the benefit of a licence and requires the landowner to:
    - maintain insurance;
    - maintain the structure in a safe condition;
    - provide an identification and licence number;
    - allow Council to carry out repairs or remove the pontoon if appropriate;
    - allow Council to recover costs for the repairs and removal;
    - pay Council's costs to create the covenant; and
    - where appropriate, allow a right of access to others who share the facility.

The owner shall be responsible for Council's legal and administrative costs in relation to the licence and positive covenant.

The annual fee for pontoons is set out in Council's Fees and Charges Schedule.

Specific requirements and development criteria for Boat Ramps, and Pontoons and Associated Walkways for Canals on St Huberts Island can be found in Sections 5.6 and 5.7 respectively. These again respectively comply with sections 3.16.11 and 3.16.12 of the GDCP 2013.

3.2.4 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 *(*Infrastructure SEPP) aims to facilitate the effective delivery of infrastructure across the State. Infrastructure SEPP sets out the consent arrangements for certain infrastructure projects.

Clause 68 (1) of the Infrastructure SEPP permits development for the purposes of port facilities to be carried out, by or on behalf of a public authority, without consent on land in prescribed zone. Prescribed zones include land zoned W2 and RE1.

Clause 68 (2) of the Infrastructure SEPP permits development for the purposes of navigation and emergency response facilities and environmental management works associated with a port, wharf or boating facility, to be carried out by or on behalf of a public authority without consent.

Clause 68 (4) permits development for the purpose of wharf or boating facilities to be carried out by or on behalf of a public authority without consent on any land.

Clause 68 (5) provides further detail as to the works that can be undertaken under this clause.

A number of the identified management issues detailed in Section 5 are likely to fit within the definition of works allowed without consent by a public authority under clause 68 of the Infrastructure SEPP. Therefore, where these activities are undertaken by, or on behalf of Council they can be assessed under Part 5 of the EP&A Act.

3.2.5 State Environmental Planning Policy 71 – Coastal Protection

State Environmental Planning Policy No. 71 – Coastal Protection (SEPP 71) controls development within the Coastal Zone (as defined under the *Coastal Protection Act 1979*). As noted above Brisbane Waters is within the coastal zone.

SEPP 71 applies when determining a development application for a development (as required by Clause 7). Clause 8 of SEPP 71 lists the matters for consideration by a consent authority when it determines a development application under Part 4 of the EP&A Act to carry out development on any land to which this policy applies. The applicability of these would need to be considered as part of any development within the coastal zone which requires development consent.

3.2.6 State Significant development/infrastructure

State significant development and State significant infrastructure are defined by section 89C and clause 115U (respectively) of the EP&A Act and *State Environmental Planning Policy (State and Regional Development) 2011* (the State and Regional Development SEPP).

If an EIS was to be required, the works would meet the definition of State significant infrastructure under section 115U(3). It would then be subject to approval by the Minister for Planning under Part 5.1 of the EP&A Act.

Based on the type of works likely to be required, as detailed in Section 5.1, the requirements of State significant development are unlikely to be met.

4. Community Feedback

Residents of St Huberts Island were asked to provide feedback with regard to each of the seven key areas as listed below.

- Canal depths and sedimentation
- Foreshore management
- Shoreline erosion and accretion
- Seawalls
- Boat ramps
- Pontoons and walkways
- Miscellaneous (including wrack and debris build-up)

In general, the survey indicated that residents generally desired a set of requirements that are more prescriptive for management of sedimentation and dredging, shoreline erosion/accretion and the maintenance and uniformity of seawalls.

Specific results of this survey have been summarised under relevant management issues in Section 5.

Survey results were also compiled and summarised by the SHIRA with the summary of key points provided in Appendix A.

5. Management Issues and Requirements

5.1 Overview of Management Issues

As outlined in Section 2.1 the residents of St Huberts Island were asked to provide feedback on key management issues in the canals. These issues were compiled with those identified by Council and have been summarised below in Table 4. It is recognised that other minor issues may exist within the canals; however, it is anticipated that these will be addressed on a case-by-case basis.

Table 3 Overview of Management Areas and Issues

Key management areas	Identified existing and/ future management issues
Canal Depths and Sedimentation	As navigable waterways, the canals are required to provide operational waters with boat access to jetties/pontoons and ramps. Areas of sediment accretion and erosion have been noted with the depths of the canals changing with time. While canal depths have changed and sedimentation has occurred in specific areas, as there has been no maintenance dredging undertaken in the canals since their construction over 40 years ago, it can be assumed that periodic maintenance, based on ongoing monitoring, will be sufficient to meet operational and environmental requirements.
Foreshore Management	Foreshore management is intrinsically linked with all other key management areas. Appropriate foreshore management incorporates management solutions and materials within the foreshore area to support the environmental and operational requirements of the canals. Poor foreshore management leads to: • foreshore erosion and accretion • wave overtopping and damage/ inundation of property and seawalls • accumulation of debris, wrack and rubbish in specific areas • increased rates of sedimentation in navigation channels Appropriate foreshore management minimises these issues by seeking continuity in the materials, gradient, shoreline contours and structures within the foreshore area. Boat ramps, seawalls, pontoons and jetties and other structures in the foreshore area often lead to challenging foreshore management solutions. These elements are often not considered holistically within a waterway and can lead to poor foreshore management.
Shoreline Erosion and Accretion	Shoreline erosion and accretion is exacerbated by poor foreshore management. Erosion of the shoreline can lead to undermining of seawall structures or damage to adjacent property. Accretion of the shoreline can lead to boating access within the canals and to boat ramps, pontoons and jetties becoming restricted.

Seawalls	Seawalls provide management options for the canals. Seawalls need to consider of a number of design criterions to ensure that they provide appropriate protection of adjacent land and property, whilst also minimising rates of shoreline erosion and accretion.
Boat Ramps	Boat ramps provide boating access from properties to the canals, however also provide a smooth impermeable surface that can lead to sediment accumulation or erosion depending on the orientation and surrounding conditions. Boat ramps should be constructed and maintained in accordance with specifications that minimise disturbance to the local coastal processes. Management issues also arise when boat ramps are not built to appropriate specification, leading to structure cracking and maintenance requirements.
Pontoons and Walkways	Jetties, pontoons and overwater walkways (gangways) can lead to cluttering of the waterway whereby structures extend into navigable waters. This can minimise waterway access and lead to navigation safety issues. These structures also decrease the quantity of light penetrating the water column and reaching the sand bed, which can reduce biodiversity and damage habitats and ecosystems.
Wrack and other debris build-up	Wrack and debris collection on foreshores is a natural process, however with poor foreshore management can lead to excessive build-up as a result of dominant wind, wave and/or currents. Excessive wrack and debris build up can lead to reduced foreshore accessibility, reduced aesthetics and can lead to foul odours.

5.2 Canal Depths and Sediment Transport

5.2.1 Overview

Canals tend to gradually silt up due to surface run-off of fine sediments and sediments deposited in areas of relatively slow moving waters. Natural sedimentary processes are likely to contribute to erosion of corner sections and deposition of sediment in adjacent sections. Sediment accumulation within and surrounding St Huberts Island is an issue, acknowledged in the Brisbane Water Estuary Process Study. Reduced water depths typically reduces amenity while presenting a hazard to navigation and access. The SHIRA has previously requested that maintenance dredging be carried out within the canals due to sustained sedimentation and erosion, however without design or operational requirements and limited ongoing monitoring of bed levels the works could not be justified.

In addition to the cost of maintenance dredging works, consideration must also be given to the effect re-suspension of sediment in intertidal areas has on the surrounding marine environment and aquaculture operations, in particular oyster leases. High levels of sediment can increase vulnerability to disease as well as increasing nutrient levels in the water column which can further lead to the development of algal blooms.

Stakeholder feedback suggests that there have been changes to the depth of the canals due to sedimentation, sand movement and activities by residents including depositing of sand onto the canal beaches. Feedback also suggests that no official works have been undertaken since canal construction to maintain depths and access, and that there may be links between the

growth of seagrass and accumulation of sand shoals. Community feedback indicated a raised concern over navigability of canals at present. One concern that was raised by residents is the quality of potential dredge material given it would be made up of 45 years of deposited sediments and stormwater runoff. If dredged material is deemed to be of suitable quality, it could be used to replenish eroded foreshores, else appropriate disposal or remediation solutions may be required.

With regards to vessel sizes that access the canals, Gosford DCP Chapter 3.16 specified that vessel length is not to exceed ten metres. Stakeholder feedback suggested this was being adhered to, and as a result, deep drafted vessels are not of particular concern.

There is demand for specific intervention levels to be set at which point dredging should be undertaken, such that unobstructed boating access can be achieved across all tides, at all locations, specified as navigable within the drainage reserves.

5.2.2 Existing Guidelines

The Draft Guidelines (1997) specifies the following works to be undertaken by Council:

- All sand movements within the canal areas shall be the subject of a professional investigation and report by an adequately qualified consultant.
- Dredging of the drainage reserves to restore design or minimum depth for boating in such drainage reserves.
- All funds collected from the permissive occupancies are to be accumulated together, with the interest earned, for the exclusive use for maintenance and improvements within the canals. Supplementary funding can be provided as allocated by the council.

In addition, Gosford DCP Chapter 3.16 specified the following:

- Jetties/wharves under this Chapter are only intended to facilitate access for private boating where a reasonable depth of water can be achieved without the necessity for an extended structure.
- Length of vessels shall not exceed ten (10) metres or the waterfrontage of the property, whichever is the lesser.

Recommendations for canal depths and sedimentation are found in Table 4 below.

Table 5 lists the 100 Year ARI Wind Generated Waves (Cardno, 2013), which will be considered in management and design.

Table 4 Recommendations for canal depths and sedimentation

Topic	Existing Recommendations	Further Recommendations
Development Applications	**Brisbane Water CZMP:** The guidelines that specify the design of water recreation structures need to ensure consistency with the goals and objectives of the Brisbane Water Estuary Management Study and Plan. In particular, explicit consideration of sedimentary processes should form part of the assessment process for all development applications.	Continued consideration of the impact on sedimentary processes for all Development Applications.
Program of Monitoring and Maintenance	**Brisbane Water CZMP:** Ongoing program of maintenance is required to restore the drainage canals of St Huberts Island to their original design criteria. Identify the desired profile of canals and likely maintenance dredging requirements to allow for unobstructed boating access to be achieved across all tides at all locations within the drainage reserves. The purpose of this action is to provide clear information to residents of St Huberts Island and manage community expectations in relation to maintenance of navigation channels, while acknowledging natural rates of sediment transport in these locations and likely environmental impacts. This process should be informed by the Sediment Management Plan provided in the Brisbane Water Estuary Management Study (Appendix I).	**Surveying and Monitoring of Sedimentation:** A program of monitoring should be undertaken to verify canal depths and sedimentation through hydrographic survey. Hydrographic surveys should be undertaken on a regular basis to verify canal depths and sedimentation and identify dredging requirements should these be required. As there has been no dredging maintenance works undertaken within the canals since their construction over 40 years ago, it should be adequate to undertake hydrographic surveying of the canals every 10 years unless deemed necessary after an erosion-inducing events such as coastal wind wave, or flood events.

Topic	Existing Recommendations	Further Recommendations
Canal Service Levels		AS3962-2001 Guidelines for the Design of Marinas specifies a number of recommendations and requirements for serviceable navigation channels, entrances and other navigation related considerations. The following requirements provide guidelines for the minimum specifications for the canals to provide an appropriate level of service aligned with their design intent. • Entrance channels should have a minimum navigable width of 20 m • Navigation channels where the base of the dredged channel consists of soft material (sand, silt etc.) should have a minimum depth below of 2.1 m below LAT plus half of the significant wave height* as defined in Table 5. This depth includes an allowance of 0.3 m below the keel draught of the 10 m design yacht (1.8 m) • Navigation channels where the base of the dredged channel consists of hard material (stiff clay, gravel, rock etc.) should have a minimum depth of 2.3 m below LAT plus half of the significant wave height* as defined in Table 5. This depth includes an allowance of 0.5 m below the keel draught of the 10 m design yacht (1.8 m) • The depths at Council approved berths should have minimum depth requirements consistent with the requirements for the canal navigation channels Where these requirements are not met and this is verified by a Hydrographic Survey, Council should undertake the following: • Comparison of current bed levels to those originally constructed in order to determine whether any further action is required. • Investigations into the geochemical properties of the proposed dredge material (contamination and acid sulphate soil).

		Investigations into available onshore dredge material management areas. Consideration of other opportunities and constraints presented at the time of dredging (including opportunities to group packages of work as a single dredging campaign, beneficial reuse in areas of scour within the canals or in foreshore areas that may benefit from sand nourishment, and commercial partnerships for sale of sand). Preparation of a dredging and disposal strategy. The strategy should be developed following consideration of the required dredging volume. Review available funds to determine whether dredging works are economically feasible.
Environmental Management Measures	Maintenance dredging works should consider the implications that the re-suspension of sediment in intertidal areas has on aquaculture operations, in particular oyster leases. High levels of sediment can increase vulnerability to disease as well as increasing nutrient levels in the water column, which can lead to the development of algal blooms.	Maintenance dredging works must mitigate potential environmental impacts associated with the re-suspension of sediment in intertidal areas, ensuring that seagrass, benthic biota, etc are not impacted. Dredging works must therefore be subject to an environmental assessment that may stipulate the use of silt curtains and other management techniques where necessary. The necessary environmental assessment must also consider any requirements to undertake sediment quality assessment to test for contamination and acid sulfate soils prior to removal of any material.

*Note that significant wave heights have been derived using wind generated waves as listed for locations around St Huberts Island in the Brisbane Water Foreshore Flood Study (Cardno, 2013). Vessel wake has not been considered as the canals of St Huberts Island are 4 knot zones.

Table 5100 Year ARI Wind Generated Waves (Cardno, 2013)

Canal	Location**	100 Year ARI Significant Wave Height (m)
Marina Cove	Entrance (076)	0.39
	Interior (077)	0.24
Sandy Cove	Entrance (087)	0.53
	Interior (088)	0.31
Sandy Inlet	*As per Interior Location for Sandy Cove*	
Trial Inlet	Entrance (078)	0.45
	Interior (079)	0.20
Crescent Cove	*As per Entrance Location for Trial Inlet*	
	Interior (080)	0.27
Shelter Cove	Entrance (084)	0.62
	Interior (085)	0.40
Nannygai Inlet	Entrance (082)	0.31
	Interior (081)	0.28

**The location is based on the numbered foreshore output locations for the Brisbane Water Foreshore Flood Study (Cardno, 2013).

5.3 Foreshore Management

5.3.1 Overview

The foreshore area consists of the seawall interface, the sandy shoreline in front of the seawall (where present) and the infilled area behind the seawall. As outlined above, foreshore management is intrinsically linked with all other key areas of management.

Stakeholder feedback has suggested that previous storm events, such as June 2016 which generated elevated water levels, short period sea-waves and significant levels of stormwater runoff, have identified vulnerable sections of the island's foreshore including the seawalls and blocked drains. To counter this, some residents have introduced materials such as sand bags, bricks, concrete blocks and other construction materials as ad-hoc protection works, detracting from the visual amenity and resilience of foreshores. Further stakeholder feedback suggests that there are a number of potential solutions including:

- suitably and consistently designed seawalls
- native vegetation to stabilise foreshores
- sufficiently wide sandy beach fronts

Stakeholders have also identified the potential to utilise boat ramps as small sloping groynes to restrict erosion and minimise accumulation in internal canal corners.

5.3.2 Existing Guidelines

Gosford DCP Chapter 3.16 specified the following: Residential development forms the principal component of the developed foreshore use and built character. It is important therefore, to ensure that the character and style of residential foreshore development is sympathetic to the natural character of the waterway.

Previous documents (Draft Guidelines and DCP No. 145) did not provide guidelines with regards to foreshore management.

Recommendations for foreshore management and introduced foreshore material can be found below in Table 6.

Table 6 Recommendations for foreshore management and introduced foreshore material

Topic	Existing Recommendations	Further Recommendations
Existing Structures	**Brisbane Water Estuary Management Study:** Foreshore structures such as boat ramps and seawalls need to be audited and those that are found to be exacerbating erosion or accretion issues for other properties need to be modified or retrofitted to mitigate these issues.	Refer to Section 5.5.3 for recommendations for the management of foreshore accretion and erosion. Where structures cause erosion or accretion, management should impose alternate options, such as replace these existing structures with alternates. Refer to Section 5.5.3 for recommendations for the retrofitting of existing or construction of new seawalls.
Vegetated Shorelines	**Brisbane Water Estuary Management Study:** Promote reinstatement of a natural vegetated shoreline **Brisbane Water CZMP:** The prohibition of mowing vegetation to the water's edge on both public and private property is to be enforced in order to minimise foreshore erosion and impacts on estuarine vegetation and Endangered Ecological Communities.	Many existing vegetated foreshore portions are natural shorelines and should be maintained and enhanced where possible. Reinstatement of native riparian vegetation on the landward side of existing and new seawalls and estuarine vegetation directly in front of existing and new seawalls in accordance with Section 3.1.1 and 3.1.2 of the Environmentally Friendly Seawalls Guide (Department of Environment and Climate Change NSW, 2009). Reinstatement of native riparian and estuarine vegetation not only assists in minimising erosion by providing support to existing foreshore sediments, but also enhances the foreshores ability to dissipate wave energy and maximises habitat diversity and complexity.
Guidelines	**Brisbane Water CZMP:** Foreshore property owners require information/guidelines about what constitutes good and bad practice with respect to foreshore management (e.g. stabilisation works, etc.). Develop guidelines for foreshore stabilisation via the establishment of locally native estuarine plant species. The guidelines should provide details of the benefits of	Foreshore property owners should consider the foreshores of adjacent properties and the surrounding area to ensure consistency is achieved between adjacent properties. Where existing adjacent foreshore employ poor foreshore management solutions, enhanced foreshore management solutions should be incorporated based on the following guidelines: • Section 3.1 of the Environmentally Friendly Seawalls Guide prepared by the then Department of Environment and Climate Change (DECC, 2009)

Topic	Existing Recommendations	Further Recommendations
	soft stabilisation works, advice on the species to be used and how to establish plantings	• Assessment and Decision Frameworks for Seawall Structures prepared by the Sydney Coastal Councils Group (SCCG, 2013) Enhanced foreshore management solutions should ensure that there is a gradual transition from different foreshore management solutions to ensure that any issues associated with the nearshore coastal processes are not exacerbated at adjacent locations. Guidance on native plant species suitable for establishment along the shores of Brisbane Waters has been prepared by the Central Coast Australian Plants Society District Group and is available online (CCAPS, 2016). Specific guidance in relation to other methods of foreshore stabilisation is provided in Section 5.5.3.
Wave Run-Up	**Brisbane Water Foreshore Floodplain Risk Management Study & Plan:** Existing foreshores at St Huberts Island affected by wave run-up are to be modified to incorporate wave energy dissipating designs.	Wave energy dissipating designs minimise inundation and damage to land adjacent to the foreshore by reducing the extent of wave run-up and decrease risk of foreshore erosion by reducing the quantity of energy drawing back away from the structure. Natural vegetation can play a role in reducing/dissipation wave run up and should be maintained or supported where appropriate. When this is not possible, following recommendations are made: Wave energy dissipating designs should seek to incorporated three design principles:) Increasing the length of foreshore over which waves interact – this is achieved by having sloped foreshore with lower gradients) Increasing the permeability of a structure – this is achieved by incorporating gaps or paths through structures such as

Topic	Existing Recommendations	Further Recommendations
		through the design of a seawall that does not require grout between adjacent blocks or placing well-graded rock that has significant gaps through the structure) Increasing the roughness of a structure – this is achieved by limiting smooth impermeable surfaces and incorporating odd shapes and surfaces across the foreshore In addition to managing wave run-up, wave energy dissipating designs also assist in managing shoreline erosion and accretion and assist in maximising habitat diversity and complexity.
Seawalls	**Brisbane Water Foreshore Floodplain Risk Management Study & Plan:** Foreshore management is intrinsically linked to the design and maintenance of seawalls.	Refer to Section 5.5.3 for recommendations for the retrofitting of existing or construction of new seawalls.
Program of Monitoring		In conjunction with the surveying and monitoring of sedimentation program, a program of visual monitoring for foreshore management should be undertaken. Similarly, this should be undertaken every three to five years, after significant storm events or on an as required basis should the service levels of the canals be restricted. The monitoring would include:) identification of foreshores that have seen notable erosion or accretion) an audit of existing structures, their condition and concurrence with guidelines and recommendations) identification of areas where there has been notable build-up of wrack or debris

5.4 Shoreline Erosion and Accretion

5.4.1 Overview

As part of the Brisbane Water Estuary Process Study, samples from the St Huberts Island foreshores were examined and were found to be generally sandy with some fine silts and organic matter (root fibres). This is as expected given the island is made up of dredged sand from the bed of Brisbane Water.

Stakeholder feedback has suggested that shoreline accretion and erosion is common within the St Huberts Island canals. In particular, accretion is evident in internal corner canal properties and in the vicinity of drainage outlets. Stakeholders suggest that historically there has been a varied response to shoreline erosion and accretion and that there is a clear need for guidelines to be established to allow for suitable canal maintenance.

One issue identified during the stakeholder consultation phase was vessel speed and wash, and the impact this can have on foreshore erosion and seawall damage. A suggestion was to strategically place 4 knot speed limit and no wash signs around canal shorelines and police these limits.

Further stakeholder feedback suggests that erosion may be exacerbated on shoreline areas at canal entrances that are exposed to wave activity, strong tidal flow and have significant curvature in plan view. To manage this, residents have resorted to make-shift shoreline protection works to protect the seawall and property.

Estuarine morphology and coastal processes are also effected through the construction of foreshore infrastructure and structures, such as jetties, seawalls and boat ramps, much of which has been unregulated. Foreshore structures can directly impact on patterns of sediment transport by forming a physical barrier, and indirectly by altering coastal processes (e.g. waves, currents) which govern sediment transport. This can lead to accretion in some areas and erosion in others. Additionally, there are a number of stormwater culverts within the St Huberts canals, the majority of which are located well inside the entrance of the canals. These culverts deposit, amongst other things, sediment into the canal system. Due to low water velocities within the canals, these sediments do not settle far from the outlets potentially resulting in a disproportionate build-up of sediment in the vicinity of these culverts.

Finally, erosion and accretion is influenced by local processes. Although not of high energy, local-sea waves caused by periods of high winds can cause intermittent sediment transport. This transport is often greater in one direction as winds from other directions do not have a fetch length large enough to reverse the sediment transport. Similarly, local currents caused by the interaction of tidal and storm water flows can affect sediment transport. Often the local conditions create sediment transport processes that are dominated by a specific direction.

5.4.2 Existing Guidelines

Recommendations for shoreline erosion and accretion can be found in Table 7. Council requirements stipulate that proponents provide a coastal/sediment processes report as part of any development application associated with foreshore protection works. This assists in identifying impacts from proposed works and mitigating risks.

Gosford DCP Chapter 3.16 specifies the following:

Objectives of development relating to Brisbane Water: ensure that structures or their usage do not obstruct water circulation or cause rubbish accumulation in a manner which is likely to adversely affect water quality, cause weed accumulation or exacerbate sediment accretion, or erosion, particularly to adjoining waterfront land.

Table 7 Recommendations for shoreline erosion and accretion

Topic	Existing Recommendations	Further Recommendations
Sediment Control	**Brisbane Water Estuary Management Study:** Appropriate sediment control works are required to address sediment erosion and accretion issues at St Huberts Island	While sedimentation may be an issue in specific areas, sedimentation in the canals as a whole is not reported to be occurring at a high rate. As such the foreshore management recommendations proposed in Table 6 are considered sufficient.
Foreshore Structures and Seawalls	**Brisbane Water CZMP:** Across all of Brisbane Waters, erosion and accretion is largely due to the impact on sediment transport processes of various foreshore structures, such as seawalls. Suitable measures may be required to address related issues.	Foreshore structures can have significant effects on local coastal processes and can affect erosion and accretion at or adjacent to them. Appropriate designs for foreshore structures, and implementation of recommended foreshore management practices, will minimise negative outcomes from coastal processes. Refer to Section 5.5.3 for recommendations for the retrofitting of existing or construction of new seawalls and Table 6 for recommended foreshore management practices.
Stormwater Culverts and Drains		Any sediment accretion around stormwater culverts and drains would be evaluated during the program of monitoring prescribed in Table 6. It is recommended that dredging of the sediments surrounding any stormwater outlets be deferred until dredging of the relevant canal is required. In the event that localised sediment build-up impacts the functioning of the stormwater outlets or navigation within the canal, consideration could be given to beach scraping or localised dredging using a land-based or barge mounted excavator, or alternatively, diver operated air lifts. If areas within the vicinity of stormwater outlets are to be dredged in isolation to the relevant canal, the material should be relocated to areas of sand scour within the canal, provided such areas exist at the time of dredging and the material is suitable for placing. If

Topic	Existing Recommendations	Further Recommendations
		areas of scour do not exist or the material is unsuitable, then dredged material could be: Let to private contract on the basis that the material be retained for private use; Let to contract and stockpiled to predetermined areas such as building sites; Used for future flood mitigation works; or Transported to an appropriate facility and disposed of off-site. In addition, it is recommended that Council encourages property owners to alert Council if they encounter significant areas of sediment build up in the vicinity of stormwater culverts.
Program of Monitoring		Visual monitoring of areas of erosion and accretion should be undertaken as part of the program of visual monitoring for foreshore management described in Section 5.3

5.5 Seawalls

5.5.1 Overview

Seawalls are an important facet within the drainage reserves given they serve as the interface between the waterway and residential properties. The Brisbane Water Estuary Processes Study identifies that the shorelines of St Huberts Island were developed with sandy beaches and vertical concrete revetment walls at the rear. Reclamation levels in the order of 2.3 m AHD were developed at the shoreline.

The common practice of building seawalls and infilling the area behind is to prevent erosion and inundation but also to enhance the amenity value of residential property. Unfortunately, it is evident in some locations of St Huberts Island that seawall design has not considered access to the foreshore, public safety, aesthetics, the ability of such structures to supplement natural habitat for intertidal or subtidal organisms, or the impact such structures have on sediment dynamics.

Stakeholder feedback has suggested that some residents have attempted remediation of damaged seawalls by using construction waste, such as bricks and tiles, while other residents have neglected to carry out necessary maintenance. The stakeholder feedback indicated that there was a general understanding that vertical walls do not constitute good design given the likelihood of scour at the toe, and that design of seawalls needs to consider the potential for erosion to foreshores of adjacent properties. As such, guidance regarding seawall design is required to ensure consistency. It is also important to note that the majority of residents were not in favour of a mandated “one size fits all” seawall design.

When designing a seawall, it is important to accurately assess the various loads and related stresses of the different structural parts of the seawall. There main hydraulic responses that need to be considered for the design of a seawall: wave runup level; wave overtopping; and wave impact and reflection. For vertical or near vertical structures, consideration must also be given to the forces applied by the backfill soil and pore water, which can result in slip circle failure and or settlement of the seawall.

As outlined in SCCG 2013, the main failure modes of seawalls include:

- undermining, in which the sand or rubble toe level drop below the footing of the wall, causing the wall to subside and collapse in the hole. Adequate toe levels are critical to prevent undermining failure of the structure due to the increase of scour and resulting lowering of the beach levels.
- sliding, in which the wall topples away from the retained profile
- overturning, in which the wall topples over
- slip circle failure, in which the entire embankment fails
- differential settlement
- loss of structural integrity, due to wave impact, or
- erosion of the backfill, caused by wave overtopping, high water table levels, inadequate drainage or leaching through the seawall.

5.5.2 Existing Guidelines

The Recommended Draft Guidelines for Plan of Management for the Drainage Reserves of St Huberts Island (1997) recommended the following:

- Works to be removed from the Drainage Reserves include unauthorised retaining structures, including reclamation works, rocks, bricks, concrete and the like, following the replacement of the sand adjacent to the sea-wall in the eroded areas and provision of alternative civil works.

DCP No. 145 (now superseded by the Gosford DCP) provided the following additions:

- All unauthorised structures must submit a Development Application to Council. Non-compliance will result in removal of such structures.
- Residential waterfront development, which falls into disrepair or is a danger to the public use of the drainage reserve is to be removed from the drainage reserves by, or at the expense of, the owner of the structure.

As outlined in Section 3, a development application is required prior to the construction of new seawalls. Any upgrades, maintenance and enhancement of such structures should be undertaken with consideration to this guideline. If works are proposed to seawalls that alter the height, depth or footprint of an existing seawall structure property owners are likely to require submission of a development application.

There objectives of development in canals of St Huberts Island should also be noted as outlined in Section 3.16.8 of the Gosford DCP 2013 and reproduced in Appendix B.

5.5.3 Recommendations for Seawalls

The following tables outline a number of recommendations for the upgrade, maintenance and enhancement of seawalls. Seawalls around St Huberts Island were reportedly constructed within the boundary of the associated property to ensure that property owners were responsible for their maintenance and renewal. Seawalls that are falling into disrepair, have used makeshift materials to assist in maintaining an old structure or where the effects of local coastal processes are seen to be accentuated, should be brought to the attention of Council to recommend management options to property owners.

In general, the NSW Governments Guidelines for Environmentally Friendly Seawalls (DECC, 2009) should be consulted when installing new structures and the Assessment and Decision Frameworks for Seawall Structures (SCCG, 2013) consulted when considering monitoring and maintenance of existing structures.

More specifically, any new development application for a seawall around St Huberts Island should refer to the design parameters set out in Table 9. Consideration should be given to the seawalls of adjacent and surrounding properties, with development applications being assessed based on the continuity of the proposed seawall in conjunction with surrounding properties. Note that whilst Table 9 and *In areas where the ground elevation is less than the nominated minimum crest elevation, the crest of the seawall may be reduced to match the height of the existing ground on the landward side of the seawall.

Table 10 provide a good basis to design seawalls, a design specific to each location should be undertaken by a suitably experienced coastal engineer prior to construction or development approval.

The recommended crest elevation has been derived from an analysis of the wave run-up and flood planning levels derived in the Brisbane Water Foreshore Flood Study (Cardno, 2013). To ensure consistency around St Huberts Island one crest elevation has been selected that considers the following:

- the design water level for a 100 year ARI event
- the effect of seawall structures on wave run up
- 0.5 m for sea level rise*

**It is noted that seawalls designed for a relatively short design life may justify adoption of a reduced allowance for sea level rise as appropriate for the proposed design life of the structure.*

For a 100 year ARI event, at specific areas around the canals, these structures are likely to see some overtopping. It is anticipated however, that, if the seawalls have been constructed in

accordance with an appropriate coastal engineer design, there will be minimal consequential damage.

A summary of seawall types, their options, and characteristics has been documented in the Literature Review of the Assessment and Decision Frameworks for Seawall Structures by the Sydney Coastal Councils Group, where recommendations for seawall structures are made for various circumstances (SCCG, 2013).

Table 8 Recommendations for seawalls

Topic	Existing Recommendations	Further Recommendations
Guidelines for Seawalls	**Brisbane Waters CZMP:** Foreshore property owners require guidelines about what constitutes good and bad practice with respect to foreshore management (e.g. design, maintenance, stabilisation works, etc.). This should include advice on retro-fitting existing structures as well as constructing new seawalls	Where there are existing seawalls, it is recommended that environmentally friendly features be incorporated into the design, such as those specified in the Environmentally Friendly Seawalls Guide (DECC, 2009). The benefits of such environmentally friendly features include shoreline protection, nutrient cycling, buffering water quality, sediment trapping and the ability to assimilate seagrass wrack. Recommended applications of these features are outlined below in *In areas where the ground elevation is less than the nominated minimum crest elevation, the crest of the seawall may be reduced to match the height of the existing ground on the landward side of the seawall. Table 10. Specific guidelines on monitoring and maintenance of existing seawalls are provided in SCCG 2013. An extract of the guidelines has been included as Appendix C for ease of reference. Whilst there are benefits to mandating a single continuous seawall design, it is recognised the design would need to be customised to suit the varying design considerations throughout the canals. In addition, it is likely there would be opposition to mandating a seawall design given the varying designs and condition of existing seawalls. Consequently, it is recommended that Council undertake consultation with the Resident's Association and if supported, investigate the feasibility of developing a mandated seawall design(s).
Guidelines for Wave Run-Up	**Brisbane Water Foreshore Floodplain Risk Management Study & Plan:** Guidelines for the management of wave run-up is required. Foreshores are to incorporate wave energy dissipating designs to assist in the protection of individual properties not already identified as	Standard recommended characteristics for seawall design is outlined below in *In areas where the ground elevation is less than the nominated minimum crest elevation, the crest of the seawall may be reduced to match the height of the existing ground on the landward side of the seawall. Table 10.

Topic	Existing Recommendations	Further Recommendations
	flood affected. The majority of the foreshore of St Huberts Island would benefit from designs which dissipate wave energy, and as such, this recommendation is to be standardised for all canal-fronting properties.	
Enforcement		It is recommended that Council consult and liaise with the community to agree an acceptable point of disrepair at which Council should enforce standards of maintenance of seawalls.

Table 9 Recommended design parameters for seawalls

Seawall Type	Slope (vertical: horizontal)	Material	Min. Crest Elevation (mAHD)	Min. Toe Elevation (mAHD)	Advantages/*Disadvantages
Vertical Concrete	Vertical	Concrete	2.7 m*	- 0.9 m	*Impermeable structure can exacerbate erosion at toe and affect accretion/erosion at adjacent properties *Cannot be easily maintained or altered if it fails structurally *Limited dissipation of wave or current energy *Limits intertidal zone to vertical plane *Flat impermeable structure provides limited support for intertidal habitats *Toe depth must be adequate to minimise risk of failure since rigid concrete structures have little capacity to accommodate settlement *Adequate drainage must be provided to minimise interaction with ground water and hydrostatic pressures leading to failure. →This type of seawall should only be constructed if part of the repair of an existing seawall structure and adjacent and surrounding seawalls are of similar design. Enhancements from *In areas where the ground elevation is less than the nominated minimum crest elevation, the crest of the seawall may be reduced to match the height of the existing ground on the landward side of the seawall. Table 10 should be incorporated into the design.
Rock Armoured	1:1.5 (or flatter)	Rock (Armour	2.7 m*	- 0.9 m	Can be easily topped up with additional rock if it slumps or is damaged

Seawall Type	Slope (vertical: horizontal)	Material	Min. Crest Elevation (mAHD)	Min. Toe Elevation (mAHD)	Advantages/*Disadvantages
		Layer / Filter Layer)			Void space between rocks (~30%) increases capacity to dissipate wave and current energy Slope provides greater length of structure over which wave energy is dissipated Slope provides greater area of intertidal zone Void space between rocks support intertidal habitats Can be easily extended to higher elevation to meet future requirements for sea level rise Can be enhanced with the addition of native plants
Stepped Permeable (blocks)	1:1	Sandstone blocks (or similar), no grout	2.7 m*	- 0.9 m	**Cannot be easily maintained or altered if it fails structurally* Void space between blocks (<10%) increases seawalls capacity to dissipate wave and current energy when compared to a smooth impermeable wall Slope provides greater length of structure over which wave energy is dissipated Stepped profile at 1:1 slope provides slightly greater length of intertidal zone Void space between blocks support intertidal habitats Can be easily extended to higher elevations to meet future requirements for sea level rise Can include benches with estuarine or riparian native vegetation.

Seawall Type	Slope (vertical: horizontal)	Material	Min. Crest Elevation (mAHD)	Min. Toe Elevation (mAHD)	Advantages/*Disadvantages
Stepped Impermeable (concrete)	1:1 to 1:3	Concrete	2.7 m*	- 0.9 m	*Impermeable structure can exacerbate erosion at toe and affect accretion/erosion at adjacent properties *Cannot be easily maintained or altered if it fails structurally Slope provides greater length of structure over which wave energy is dissipated Slope provides greater length of intertidal zone *Impermeable structure provides limited support for intertidal habitats →This type of seawall should only be constructed if it is an upgrade of an existing structure and adjacent and surrounding seawalls are of similar design. Enhancements from *In areas where the ground elevation is less than the nominated minimum crest elevation, the crest of the seawall may be reduced to match the height of the existing ground on the landward side of the seawall. Table 10 should be incorporated into the design.
Natural Rock	1:5	Sandstone (or similar) blocks	2.7 m*	- 0.9 m	Structure imitates a natural rock foreshore with mild slope. *Cannot be easily maintained or altered if it fails structurally. Due to mild slope of structure, failure is very unlikely. *Requires a larger quantity of blocks and a larger length of foreshore. Void space between blocks (<10%) increases seawalls capacity to dissipate wave and current energy

Seawall Type	Slope (vertical: horizontal)	Material	Min. Crest Elevation (mAHD)	Min. Toe Elevation (mAHD)	Advantages/*Disadvantages
					Slope provides greater length of structure over which wave energy is dissipated Stepped profile that seeks to imitate a natural rocky foreshore greatly increases the length of intertidal zone Void space between blocks supports intertidal habitats Can be easily extended to higher elevations to meet future requirements for sea level rise →If space permits this is a preferred seawall option.
Natural Sand and revetment protection	1:10 (sand) 1:1.5 (rock) 1:1 (gabion)	Sand/Silt atop rock or gabion protection	2.7 m*	- 0.9 m	Structure imitates a natural sandy foreshore with a mild slope and rock or gabion basket protection under the natural sand level. **Can be difficult to maintain sand levels unless supported by appropriate vegetation.* Slope provides extensive length of structure over which wave energy is dissipated **Requires a larger length of foreshore to accommodate beach area.* Can be easily extended to higher elevation to meet future requirements for sea level rise Can be enhanced with the addition of native plants

*In areas where the ground elevation is less than the nominated minimum crest elevation, the crest of the seawall may be reduced to match the height of the existing ground on the landward side of the seawall.

Table 10 Recommended seawall features or additions

Existing Structure	Description	Recommendations
Vertical Concrete	Landward Vegetation	Plant native riparian vegetation. Ensure diversity in size and species.
	Seawall Face	Increase roughness and texture of seawall by attaching objects or creating holes or cavities in the surface.
	Seaward Vegetation	Plant native estuarine vegetation in front of vertical seawall.
	Seaward Artificial Reefs	Create artificial reefs through the addition of rocks or large woody debris at the toe of the seawall
Rock Armoured	Landward Vegetation	Plant native riparian vegetation. Ensure diversity in size and species.
	Intertidal Vegetation	Incorporate estuarine plants within the intertidal zone by creating benches or steps in the rock armoured seawall.
Stepped Permeable (blocks)	Intertidal Vegetation	Create deeper steps between seawall blocks in the intertidal zone that can incorporate and support estuarine plants.
	Crevices	Ensure blocks are placed such that there are numerous crevices to create intertidal habitats. Place blocks such that these crevices do not line up in the vertical plane.
	Landward Vegetation	Plant native riparian vegetation. Ensure diversity in size and species.
Stepped Impermeable (concrete)	Landward Vegetation	Plant native riparian vegetation. Ensure diversity in size and species.
	Seaward Vegetation	Plant native estuarine vegetation in front of stepped seawall.
	Seaward Artificial Reefs	Create artificial reefs through the addition of rocks or large woody debris at the toe of the seawall
Natural Rock	Crevices	Place rock to imitate natural rocky foreshore with a number of crevices and gaps in the intertidal zone
	Intertidal Vegetation	Identify locations to incorporate and support estuarine plants in the intertidal zone.

Existing Structure	Description	Recommendations
	Landward Vegetation	Plant native riparian vegetation. Ensure diversity in size and species.
Natural Sand	Intertidal Vegetation	Incorporate estuarine plants in the intertidal zone to provide support and stability to the sandy profile.
	Landward Vegetation	Plant native riparian vegetation. Ensure diversity in size and species.

5.6 Boat Ramps

5.6.1 Overview

Natural processes of sediment transport and beach evolution may be effected by human activities through the construction of boat ramps and other infrastructure. Apart from the immediate impacts of habitat loss, such structures may have longer term, ongoing ecological impacts. Foreshore structures have the potential to significantly affect sediment transport patterns by forming a physical barrier, but also indirectly by altering coastal processes (e.g. waves, currents) ultimately leading to accretion in some areas and erosion in others. Consequently, correct design, construction and maintenance of all boat ramps is critical.

In addition to canal-wide impacts, improper design, construction or maintenance of boat ramps will also impact upon individual properties. Such mismanagement will ultimately lead to failure due to undermining, sagging, development of cracks or collapse.

Stakeholder feedback illustrated that residents are well aware of the requirements, guidelines and approval pathways regarding development and maintenance of boat ramps, and these are specified in the Gosford DCP 2013.

5.6.2 Existing Guidelines

The Draft Guidelines specified the following:

- Boat ramps shall be constructed at the level of the floor of, and follow the contour of, the canal and shall not exceed 3 metres in width.
- Any application for shared boat ramps will be considered on their merits.
- Boat ramps not in accordance with these guidelines are prohibited within Drainage Reserves.
- Works to be Removed from the Drainage Reserves include concrete ramps which falls into disrepair or is a danger to the public use of the drainage reserve.

DCP No. 145 (now superseded by the Gosford DCP) provided the following additions:

- All unauthorised structures must submit a Development Application to Council. Non-compliance will result in removal of such structures.
- Any concrete ramp which falls into disrepair or is a danger to the public use of the drainage reserve is to be removed from the drainage reserves by, or at the expense of, the owner of the structure.

Gosford DCP Chapter 3.16 made the following additions:

- Development is permitted within the canals subject to the criteria within this clause, only with the formal Development Approval of Council.
- Any lighting contained within the residential property and associated with a ramp shall be minimal and only used for the safe use of the structure. Such lighting shall be neither red nor green.
- Applications for ramps in the canal corners shall be considered on their individual merits.
- Boat ramps shall be constructed at the level of the floor of, and follow the contour of, the canal and shall not exceed three (3) metres in width.
- Applications for shared boat ramps will be considered on their merits.
- All boat ramps and associated works are to be maintained in a condition that prevents failure and is acceptable to the Council.

- Any lighting contained within the residential property and associated with a ramp shall be minimal and only used for the safe use of the structure. Such lighting shall be neither red nor green.
- Applications for ramps in the canal corners shall be considered on their individual merits.

Table 11 Recommendations for Boat Ramps

Topic	Existing Recommendations	Further Recommendations
Guidelines	**Brisbane Water CZMP:** There is a need to develop environmentally friendly design and construction guidelines for foreshore infrastructure such as boat ramps. This should include advice on retro-fitting existing structures to be more environmentally friendly. The guidelines should be made publicly available and distributed to all foreshore property owners.	When siting a boat ramp within the canals, the boat ramp site should: • Have an adequate water depth of 1.0 m above LAT for launching of the design vessel • Not be located in an area of increased shoreline erosion or accretion, • Allow for water approaches of sufficient area to allow for low speed manoeuvres without blocking existing fairways and navigation channels • Have approaches that are free from navigation hazards • Consider the design requirements set out in Table 13 Recommendations for pontoons and walkways • Consider surrounding properties and the potential for sharing ramps
Enforcement	**Brisbane Water CZMP:** Council should be stopping boat ramps being installed which breach the existing design requirements. Council should enforce standards of maintenance.	Council to consult and liaise with the community to develop an acceptable point of disrepair at which Council should enforce standards of maintenance of boat ramps.

Table 12 Summary of recommended design parameters for boat ramps (RMS, 2015)

Parameter	Value	Comment
Ramp Width	3.0 m	Boat ramp widths are prescribed to be no wider than 3.0 m in the Draft Guidelines. It is recommended that the existing site specific guidelines for management be maintained.
Toe Depth	1.0 m	Sealed toe of ramp to extend to 1.0 m below LAT.
Ramp Slope	1V:8H	The recommended range is between 1V:9H to 1V:7H.
Ramp Crest Level	500 mm above HAT	This level is a minimum. It is recommended that the ramp crest level is constructed to meet and tie in with the crest of the property's seawall.
Boat Ramp Surfacing	Moulded Groves	Moulded grooves should be cast. These should be 25 mm deep, 25 mm wide, square shouldered grooves at an angle of 45 degrees to the ramp contours and at 100 mm centres. The surface finish should be otherwise smooth. Below the mean water level, precast concrete planks should also have grooves.
Foundations	It is recommended that a geotechnical investigation is undertaken to determine foundation conditions. Generally, foundations for boat ramps in the canals should comprise; a minimum 200 mm thick layer of compacted 50 mm to 100 mm sized igneous rock or equivalent; and, a suitably designed non-woven geotextile filter fabric underlay.	
Edge/Scour Protection	Rock	Rock scour protection should comprise at least two armour rocks thick, extend down to a level of approximately 0.6 m (or one design wave height) below the Design Low Water Level and extend up to the level of maximum wave run-up (or neatly tie in with the adjacent seawall). This scour protection should be underlain by suitable filtration layers (geotextile or layers of appropriately sized filter rock). Alternatively reinforced concrete cut-off walls or dry concrete mix in geotextile fabric bags may be considered.
Structural Design	The following should be incorporated into the structural design of boat ramps within the St Huberts Island canals in conjunction with consideration of the design life of the ramp: - exposure classification of C2 as outlined in AS 3600; - concrete mix design satisfying the recommendations provided within AS 4997-2005; - concrete class of SC50 in accordance with AS 1379 (to satisfy recommendations provided within AS 4997-2005 for mix design, suppliers would need to provide a special class, 50 MPa concrete mix);	

Parameter	Value	Comment
	- the durability class of aggregates should be Class C in compliance with AS 2758.1; - cover to reinforcement should be 65 mm or greater; - galvanised reinforcement should be specified in combination with stainless steel or galvanised tie wire; - black steel reinforcement should be specified in combination with mild steel tie wire; - design stresses for serviceability actions should remain less than or equal to 150 MPa to control crack widths; - any cast-in fixtures, or doweled connections used should be stainless steel (Duplex Grade 2205) and electrically isolated from internal reinforcement; and, - expansion joints should be located in slabs at maximum 10 metre centres in both longitudinal and transverse directions.	

5.7 Pontoons and Walkways

5.7.1 Overview

Given the significant number of waterfront properties on St Huberts Island and the benefits to waterway access that a pontoon can provide, such structures are common within the canals.

Stakeholder feedback illustrated that residents are well aware of the requirements, guidelines and approval pathways regarding development of pontoons and walkways, and these are specified in the Gosford DCP 2013.

However, the stakeholder feedback also identified a number of issues, including:

- In narrow canals such as Trial Inlet, pontoons are encroaching on navigable waterways
- Obstruction to waterway access within the canals is becoming an issue due to an increasing number of pontoons, especially for internal corner properties. Residents without pontoons are losing accessibility making the canals hazardous to navigate.
- Council could be more vigilant in enforcing the requirements specified in DCP No. 145 and Gosford DCP 2013 such that illegal developments or those that breach the development criteria are removed.

5.7.2 Existing Guidelines

DCP No. 145 (now superseded by the Gosford DCP) specified the following:

- Pontoons and walkways not in accordance with this plan are prohibited within Drainage Reserves.
- Residential waterfront development which falls into disrepair or is a danger to the public use of the drainage reserve is to be removed from the drainage reserves by, or at the expense of, the owner of the structure.

The NSW Boat Ramp Facility Guidelines (RMS, 2015) provides the following advice regarding pontoons:

- Pontoons should be designed to float level with decks 350 mm to 450 mm above the water (i.e. freeboard). Where pontoons are accessed by non-powered craft and/or PWCs, consideration should be given to providing a lower freeboard for sections of the pontoon or vertical fendering to accommodate the low height of these craft

Gosford DCP Chapter 3.16 specified the following:

- The following development is permitted within the canals subject to the criteria within this clause, only with the formal Development Approval of Council: Structures in the form of floating pontoon and associated walkways at a minimum ratio of one (1) pontoon per two (2) adjoining premises, to provide access to vessels berthed thereto in accordance with this chapter.
- Management Principles for Water Recreation Structures for Canals on St Huberts Island:
    - Pontoons and walkways shall be shared structures at a ratio of one (1) pontoon per two (2) adjoining premises considered on their merits and may not be permitted at premises of narrow frontage of less than nine (9) metres or near to canal corners or ends.
    - Development Approval shall be for a share arrangement of one (1) pontoon per two (2) adjoining premises, however, a maximum share arrangement of up to one (1) pontoon per four (4) adjoining premises may be considered by Council.

- Pontoon walkways are to be located at a common property boundary.
- Council, as the canal landowner, may refuse to authorise submission of a development application that does not generally comply with the provisions of this Chapter. Existing development that requires consent but has been constructed without consent can be regularised if Council approves a building certificate and grants development consent for the use of the structure. This will apply only to structures that satisfy the requirements of this Chapter.
- Only vessels owned by residents with canal frontage properties will be permitted to be berthed at a pontoon within the canals.
- Boat ramps, pontoons or walkways which fall into disrepair or are a danger to the public use of the canals are to be removed by, or at the expense of, the owner of the structure.
- Generally, Council will not accept a development application for a pontoon unless made by a minimum of two (2) adjoining landowners.
- Pontoons may be Integrated Development requiring approval under the NSW Fisheries Management Act from the NSW Department of Primary Industries. Relevant documentation submitted with any application should include a plan showing location of adjacent structures, water depth contours, and location of any seagrasses and/or mangroves including species and photographs of the area at low tide.
- Approvals for applications not submitted as Integrated Development applications will be conditioned to obtain the relevant consents/permits from relevant Integrated bodies. If those consents/permits cannot be obtained any development consent would be invalid and unable to be acted upon.
- A mooring will be relinquished and removed upon installation of a pontoon in accordance with this Chapter.

- Development Criteria for Pontoon and Associated Walkways:
  - Pontoons shall be permitted in minimum depth water of 900 mm at mean low water, larger vessels or keel vessels which cannot achieve water access to pontoons in accordance with this plan are not considered appropriate for berthing and will have to make other arrangements.
  - Length of vessels shall not exceed ten (10) metres or the waterfrontage of the property, whichever is the lesser.
  - Pontoons shall be of a maximum size of 3 metres x 4 metres.
  - All pontoons shall be of similar design, of fibreglass or similar construction. All materials used in the construction of a pontoon and walkway shall be new and of good quality.
  - All pontoons and walkways shall be finished in suitable and appropriate colours to the satisfaction of Council.
  - Pontoons shall be secured by means of a storm anchor chain and the minimum of sufficient piles for the designated number of vessels to the bed of the drainage reserve to a maximum height of 1.85 metres above the Australian Height Datum (AHD).
  - Walkways to provide access to the floating pontoons shall:
    - maximise the free flow of water beneath the structure;

        - be constructed on piles, not on solid fill;
        - be of a maximum width of 1.2 metres; and
        - be constructed at right angles to the shoreline.
    - The maximum length of any walkway shall be no more than that required to achieve a water depth at the pontoon of 0.9 metres at mean low water.
    - The height of walkways shall be a maximum of 1.15 metres above AHD to the uppermost surface of the walkway.
    - A single handrail may be provided on one side of the structure only, with the design and construction to be such that access along the foreshore is not restricted. Handrails may be omitted for appearance where appropriate.
    - Pedestrian access along the beach area of the drainage reserve shall not be restricted by the construction of any pontoon or walkway and provision for access shall be incorporated in any design of the pontoon or walkway.
    - No permanent lighting or power facility shall be provided on any approved pontoon or walkway.
    - Any lighting contained within the residential property and associated with a pontoon or walkway shall be minimal and only used for the safe use of the structure. Such lighting shall be neither red nor green.
    - All pontoons, piles and associated works shall be maintained in a condition that prevents failure and is acceptable to the Council.
    - Pontoons and walkways shall be adequately maintained or Council may direct their removal.
    - No portion of the pontoon or vessel berthed thereto shall be within five (5) metres of the centreline of the canal.
    - All pontoons and walkways shall be the subject of all necessary applications to Council, including Development Application and "Permissive Occupancy" application and annual licence from the Council.
    - Applications for pontoons and walkways in the narrower canals shall be carefully considered on their individual merits.
- Prior to construction of any approved pontoon and associated walkway, the owner shall:
    - make appropriate arrangements with Council's Property Services Unit for the granting of a licence for use of the drainage reserve including payment of any licence fee; and
    - create a positive covenant which is attached to the land owned by the person who receives the benefit of a licence and requires the landowner to:
        - maintain insurance;
        - maintain the structure in a safe condition;
        - provide an identification and licence number;
        - allow Council to carry out repairs or remove the pontoon if appropriate;
        - allow Council to recover costs for the repairs and removal;
        - pay Council's costs to create the covenant; and
        - where appropriate, allow a right of access to others who share the facility.

- The owner shall be responsible for Council's legal and administrative costs in relation to the licence and positive covenant.
- The annual fee for pontoons is set out in Council's Fees and Charges Schedule.
- The length of jetties shall comply with the following criteria:
  - The length of the jetty shall:
    - Not exceed the average length of jetties within 100 metres on either side of the subject site;
    - Achieve the 'basic' length necessary to provide a water depth of 900 mm minimum or 1.5 metres maximum at mean low water at the jetty head;
    - Not exceed a maximum 'basic' length of 50 metres with a possible 5 metres additional length; and
    - Council may consider minor extensions (up to a maximum of 5 metres increase) to the length subject to the concurrence of the NSW Maritime, Department of Primary Industries (Fisheries), and Department of Environment and Climate Change.
  - If a jetty cannot reach a water depth of 900 mm at mean low water and with a 'basic' length of 50 metres, plus any 5 metres approved extension, it will not be approved.
  - A jetty will not be permitted to extend into or restrict any navigation area or channel.
  - Where an existing facility could be relocated to a common boundary to be used as a shared facility Council will give consideration to permitting a facility of the same length as the previous structure, depending on its merits.
- Building materials used both in, and for the construction shall include plantation grown timber and timber removed with approval from State Forests. Mesh decking is considered acceptable.
- Buildings and Structures should be constructed of materials having non-reflective surfaces, and colours appropriate to the setting, in order to minimise their conspicuousness in the landscape. Natural tones and finishes which complement native foreshore vegetation will be required. Suitable colours include olive greens, ochres, browns and greys.
- The outermost piles of the structure shall be painted white above high water mark. Reflectors shall be provided on the structure as required by the Maritime Services Board.

Common construction materials for pontoons include high density polyethylene (HDPE) and concrete. Steel is also used, but is relatively expensive and less common. Slatted timber decks are occasionally incorporated for aesthetic reasons. A composite pontoon may comprise a HDPE shell and concrete deck. The draft of a pontoon controls wave transmission, and pontoon depth (draft plus freeboard) in relation to pontoon width dictates stability against rolling. While HDPE pontoons are UV tolerant and durable, these lightweight structures may not control wave transmission should this be required, or develop acceptable stability against rolling. Concrete on-ramp pontoons are generally more stable and provide superior wave attenuation, although can be susceptible to cracking due to slamming on the boat ramp from wave action (RMS, 2015).

Table 13 Recommendations for pontoons and walkways

Topic	Existing Recommendations	Further Recommendations
Disabled Access	**Brisbane Water Estuary Management Study:** Consideration should be given to the provisions of the Disability Services Act 1993 when improving or constructing pontoons and walkways. The NSW Boat Ramp Facility Guidelines provides guidance on how to comply with disability access and safety requirements.	New development applications that consider and are approved based on the guidelines in Section 5.6 should also consider the provision of disabled access where appropriate. Disabled access provisions for public facilities are outlined in the NSW Boat Ramp Facility Guidelines (RMS, 2015).
Sediment Processes	**Brisbane Waters CZMP:** There is a need to consider sedimentary processes when assessing development applications pertaining to the canal.	Development applications should consider the sedimentary processes within the canals, but should also consider the canal service levels as specified in Table 4.
Navigation Obstructions		Where pontoons or jetties are encroaching on navigable waterways, development applications should be assessed with consideration to AS3942-2001, which prescribes a minimum width of 20 m for the interior channels of marinas.
Pontoon/Walkway Decking	**Brisbane Water CZMP:** Encourage transparent or mesh deck materials to permit light penetration in areas containing seagrass habitat	Reducing the amount of light penetrating the water column to the canal bed significantly impacts upon the health of the waterway. FRP or other polymer products can often provide the appropriate properties to meet structural and other requirements for decking, whilst maximising the quantity of light that can pass through the structure.
Jetty/Pontoon Sharing	**Brisbane Water CZMP:** Encourage jetty sharing arrangements via the leasing mechanism such that each jetty services 2-3 properties. This should involve a review of applications for new leases as well as license/lease renewals.	Pontoon and jetty sharing is a part of the existing guidelines outlined in Section 5.7.2. Minimising restrictions to navigable waters is essential to maintaining the service levels of the canals.
Enforcement		Council to consult and liaise with the community to develop an acceptable point of disrepair at which Council should enforce standards of maintenance for pontoons and walkways.

5.8 Wrack and Debris Build-Up

5.8.1 Overview

The Canal has the potential to capture debris, especially during and after flood events. Such debris can obstruct navigation and be a safety hazard. It can also be deposited on canal foreshore areas restricting access to the waterway and affecting environmental implications. Any foreign debris within the waterway must be removed to maintain safe navigation and minimise disruption to foreshore access and amenity.

5.8.2 Existing Guidelines

The Draft Guidelines (1997) recommends the following works to be undertaken by Council:

- Removal of minor water borne litter on the beach front is the responsibility of land owners.
- Removing, trimming, shrub pruning and waste removal from the beach front areas is the responsibility of land owners.

No reference is made in the guidelines as to who is responsible for removing large debris within the drainage reserves. Large debris requires mechanical equipment such as loaders, barges and trucks for handling, disposal and transportation. As stated above, the removal of small debris, including wrack (seaweed), is the responsibility of land owners. Recommendations for debris build-up are given in Table 14.

Table 14 Recommendations for wrack and debris build-up

Topic	Existing Recommendations	Further Recommendations
Wrack Management	**Brisbane Water CZMP:** Council should develop a Wrack Management Policy that: Clarifies the regulatory requirements that must be addressed in order to remove seagrass wrack from foreshore areas, The manner in which this removal should be undertaken by landowners, and how Council can assist, and Suitable secondary uses for wrack such as garden fertiliser or composting	Council should provide residents with further information regarding the existing supporting services for disposal, collection or use of wrack. A distinction should be made between small and large flood debris where management of small debris is the responsibility of property owners and management of large debris the responsibility of Council. Debris should be defined in the following two categories: Small debris: as being able to be handled and disposed of by one or two people, and can be transported by trailer or small truck. Large debris requires mechanical equipment such as loaders, barges and trucks for handling, disposal and transportation. The build-up and deposition of debris should be identified by Council during the program of monitoring outlined in Table 6. Upon identification, the removal and management of large debris should be undertaken by Council. Property owners are required to clean up and remove small flood debris on their foreshore in order to maintain waterway access and foreshore amenity.

6. Review of these Guidelines

It is important to note that many of the recommended guidelines for management outlined in this plan are based on those specified in overarching regional or state-wide guidelines. In the event that any conflicts arise between this document and subsequent revisions of the overarching guidelines, the revised guidelines shall take precedence.

Furthermore, it is recommended that this document be reviewed and where necessary updated at Council's discretion every 5 – 10 years or following any of the following:

- changes in relevant government policies or legislation
- advancements in relevant technologies or approaches to management of the issues identified within the guidelines
- identification of new management issues requiring consideration
- changes to funding availability
- revision of the Coastal Zone Management Plan for Brisbane Water Estuary

7. References

Cardno, 2008, Brisbane Water Estuary Processes Study. For: Gosford City Council and Department of Environment and Climate Change, LJ2255/R2262. [http://www.gosford.nsw.gov.au/docs/default-source/environment-and-waste-documents/environmental-management-and-planning/brisbane-water-estuary-process-study-2009.pdf?sfvrsn=2]

Cardno, 2010, Brisbane Water Estuary Management Study. For: Gosford City Council, LJ2717/R2471/V3. [http://search.gosford.nsw.gov.au/documents/00/08/44/40/0008444082.pdf]

Cardno, 2012. Coastal Zone Management Plan for Brisbane Water Estuary. For: Gosford City Council, LJ2717/R2683/V7. [http://search.gosford.nsw.gov.au/documents/00/12/05/23/0012052359.pdf]

Cardno, 2013, Brisbane Water Foreshore Flood Study. For Gosford City Coundil and Department of Environment and Climate Change, LJ2523/R2353. [http://search.gosford.nsw.gov.au/documents/00/13/00/89/0013008913.pdf]

Cardno, 2015, Brisbane Water Foreshore Floodplain Risk Management Plan. For: Gosford City Council, LJ2828/R002. [http://search.gosford.nsw.gov.au/documents/00/20/60/21/0020602145.pdf]

CCAPS 2016, *Plant Lists*, Central Coast Australian Plants Society District Group [http://www.australianplants.org/Home/index.php/plant-lists#Foreshores_of_Brisbane_Waters]

Department of Environment and Climate Change NSW, 2009, Environmentally Friendly Seawalls: A Guide to Improving the Environmental Value of Seawalls. For: Sydney Metropolitan Catchment Management Authority. [http://www.hornsby.nsw.gov.au/__data/assets/pdf_file/0017/41291/Environmentally-Friendly-Seawalls.pdf]

Gosford City Council 1997, *Recommended Guide-Lines for Plan of Management for the drainage reserves of St Hubert Island* (February 1997)

RMS, 2015, *NSW Boat Ramp Facility Guidelines*, Roads and Maritime Services, September 2015

Sydney Coastal Councils Group, 2013, Assessment and Decision Frameworks for Seawall Structures. Appendix A Literature Review. [http://www.sydneycoastalcouncils.com.au/sites/default/files/Appendix%20A%20Literature%20Review%20010613.pdf]

St Huberts Island Residents Association Inc, St Huberts Island Canals – A Plan Of Management: Resident Survey Summary. Attached in Appendix A.

Appendices

Appendix A – Community Feedback

St Huberts Island Residents Association Inc

St Huberts Island Canals - A Plan Of Management

RESIDENT SURVEY SUMMARY

SURVEY RETURNS

	Maximum Surveys Possible	Surveys Returned	Returned Survey Methods		
			Paper	Email	Web
ALL RESIDENTS	529	128	90	19	19
CANAL blocks	275	86	63	11	12
DRY blocks	160	18	10	4	4
OUTSIDE blocks	85	20	15	2	3
CANAL/OUTSIDE blocks	9	4	2	2	0

RESPONSES

	Surveys Returned	Question 1		Question 2		Question 3		Question 4		Question 5		Question 6		Question 7	
		YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
ALL RESIDENTS	128	121	3	122	2	120	2	121	2	116	6	112	8	118	7
CANAL blocks	86	80	2	82	0	79	1	80	1	76	5	73	7	79	5
DRY blocks	18	17	1	17	1	17	1	17	1	17	1	17	1	17	1
OUTSIDE blocks	20	20	0	19	1	20	0	20	0	19	0	18	0	18	1
CANAL/OUTSIDE blocks	4	4	0	4	0	4	0	4	0	4	0	4	0	4	0

Intentionally
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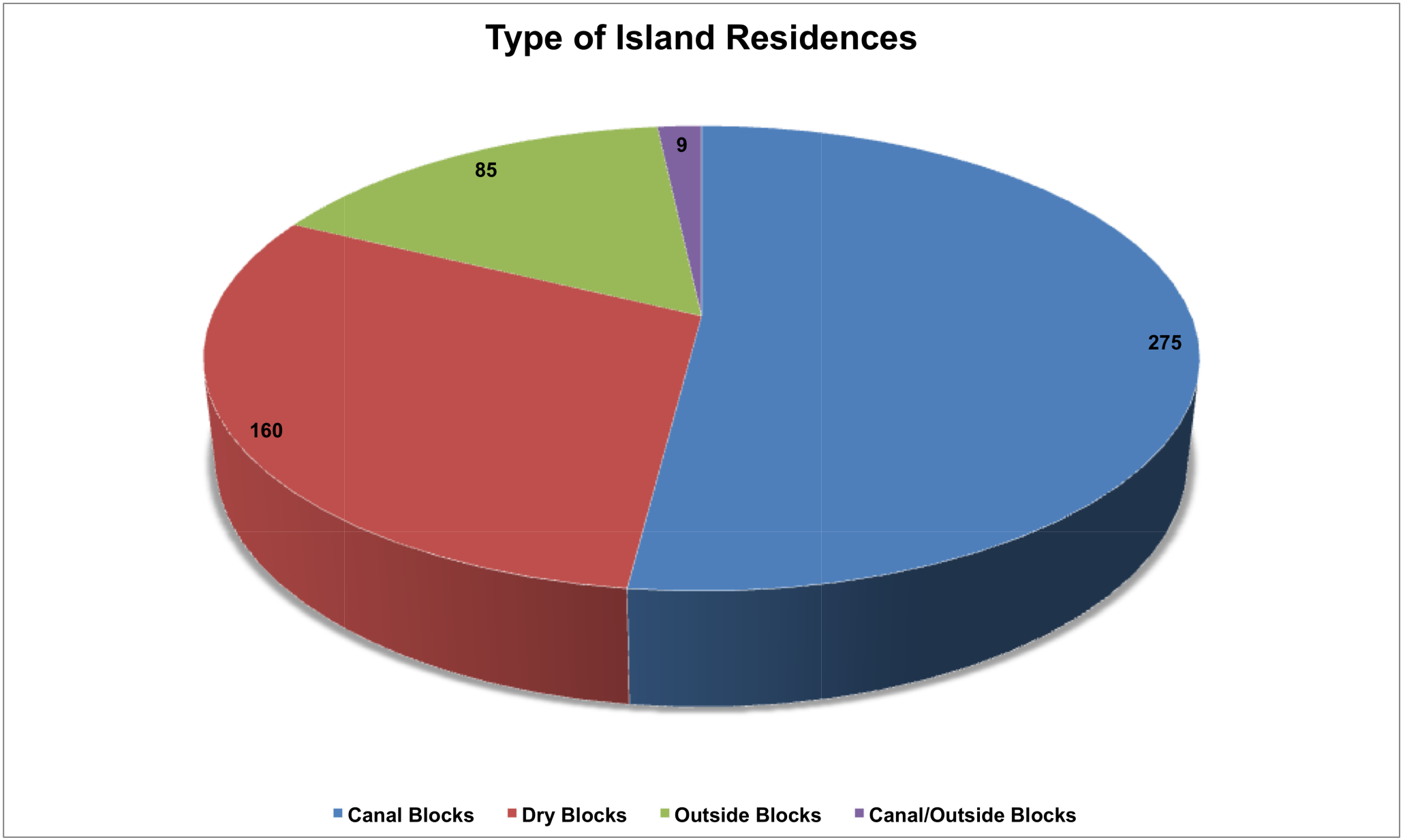
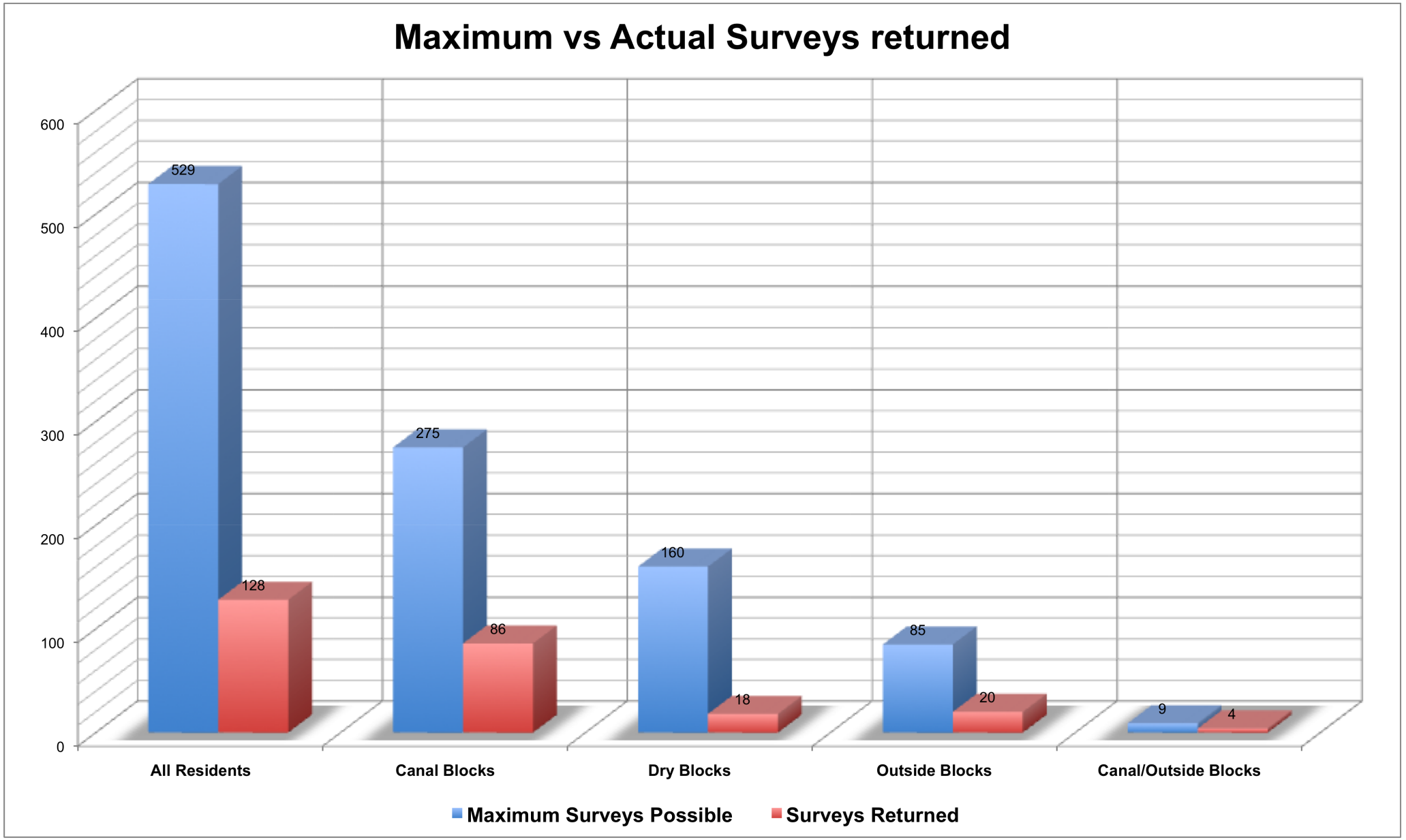
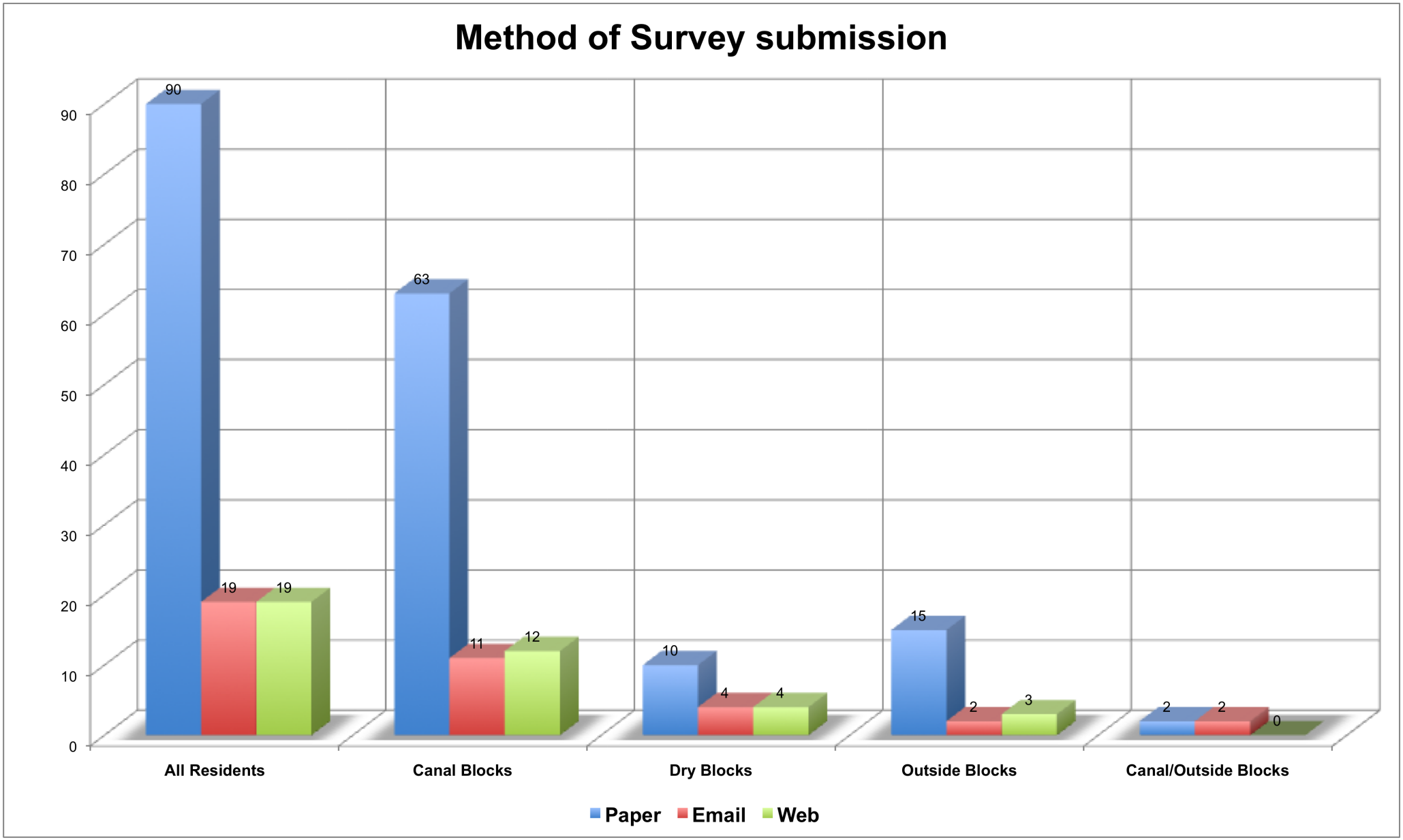
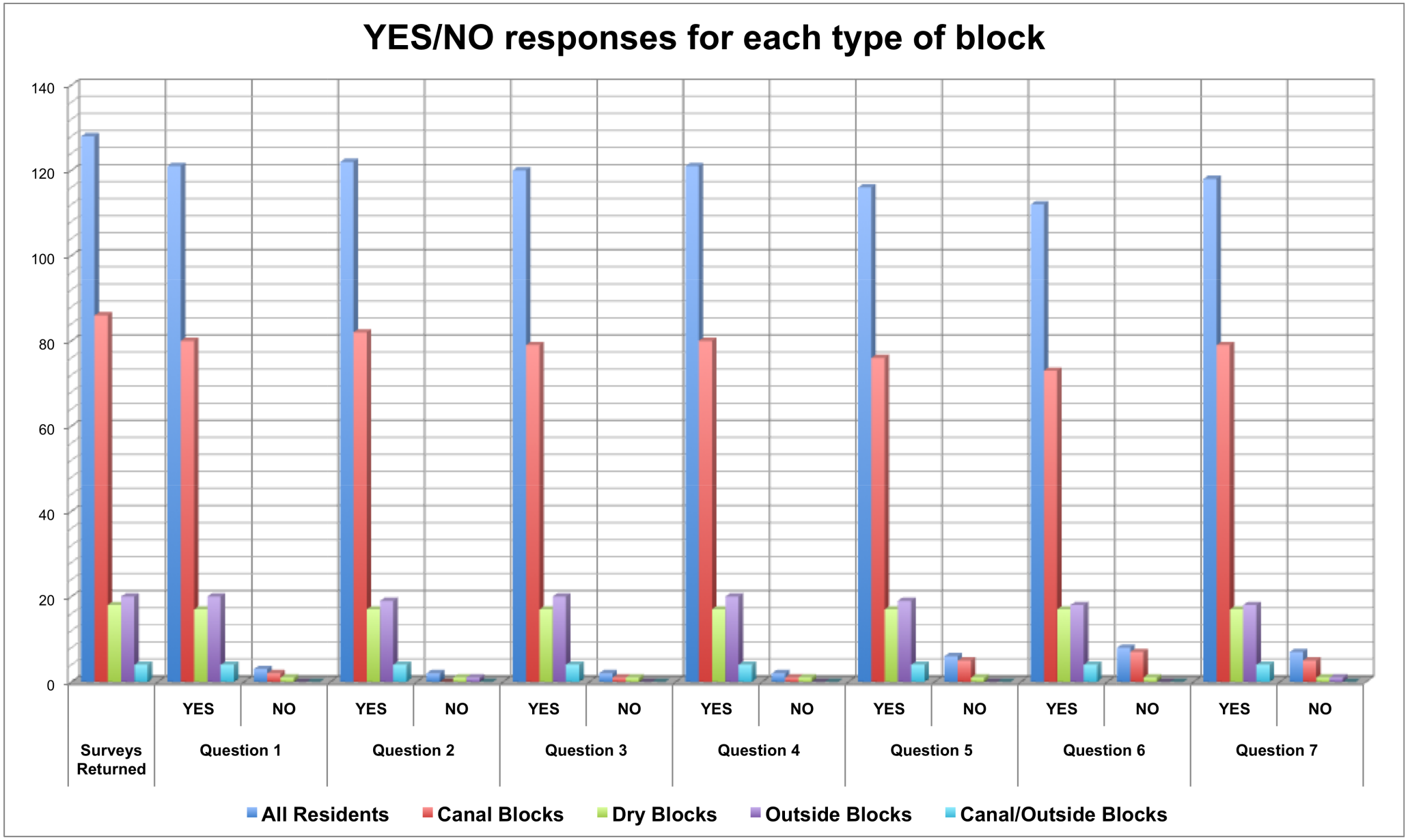

Type of Island Residences
9
85
275
160
Canal Blocks
Dry Blocks
Outside Blocks
Canal/Outside Blocks


Maximum vs Actual Surveys returned
600
500
400
300
200
100
0
529
128
275
86
160
18
85
20
9
4
All Residents
Canal Blocks
Dry Blocks
Outside Blocks
Canal/Outside Blocks
Maximum Surveys Possible
Surveys Returned


Method of Survey submission
90
80
70
60
50
40
30
20
10
0
90
19
19
63
11
12
10
4
4
15
2
3
2
2
0
All Residents
Canal Blocks
Dry Blocks
Outside Blocks
Canal/Outside Blocks
Paper
Email
Web


YES/NO responses for each type of block
140
120
100
80
60
40
20
0
YES
NO
Surveys Returned
Question 1
Question 2
Question 3
Question 4
Question 5
Question 6
Question 7
All Residents
Canal Blocks
Dry Blocks
Outside Blocks
Canal/Outside Blocks

QUESTION 1 COMMENTS

Canal Depths & Sedimentation

"Provide advice regarding intervention levels at which point dredging should be undertaken"

Respondent's answer to Question 1	Respondent's Question 1 Comment
	I believe the sand originally placed against the seawalls is now held by the seagrass which only grows in a certain depth of water. A long reach excavator could probably recover this (seagrass) sand more cheaply than a dredge - at low tide. This results in little change to the canal bottom as this sand isn't touched. The seagrass will replace itself - the same way that it got here.
	Having a restriction of up to 30' for boats is good. Most boats have very little draft and dredging would be a minimum unless urgent.
	No problems.
NO	Dredging should not be an option. The marine environment should not be disturbed.
YES	All canals need to be looked at.
YES	New to the area - about a year ago.
YES	My property is an outside waterfront so the outcome doesn't directly affect me. We need a simple plan with minimum Council interference.
YES	The canals should be dredged. Our waterfront is turning in to a delta from sediment from drains and erode foreshore swept around.
YES	Sedimenatation of canal certainly evident. Stabilisation of foreshore required.
YES	Removal of mud to landfill.
YES	There is a strong tide flow in some canal entrances. This will cause problems.
YES	Canal depths are less than half of what they were initially.
YES	If dredging used, I'm concerned with the possible quality of material that would be dredged from the bottom and put back against seawalls - it may well be very muddy and very smelly!!!. Don't want smelly, dirty material against seawalls.
YES	Where would the sand from the dredging be placed?
YES	Silting at the entrance of Crescent Cove is increasing progressively and narrowing the channel for boat access. The sand bank could be dredged and the sand used to replenish the canal beaches and barricades.
YES	During the life of the canals there has been considerable changes to the design on the canals due to sedimentation, sand movement, activities by residents including depositing of sand into the canal beaches. Clear advice is necessary for a co-ordinated approach to the maintenance and dredging of the canals by council or by residents.
YES	Providing it is regular and efficient.
YES	What does the intervention from Council look like and how often will they review it. Who is responsible for the dredging? Why should they only provide advice!
YES	Depth should be a minimum of 2m at low tide. The depth at the end of my pontoon is barely 1m at low tide. In that same spot in Marina Cove, it was 3m when I first moved here in March 1989. To the best of my knowledge, no depth maintenance has been done in the time I've lived here.
YES	Canals bad. No work done in the 15 years I have been here.
YES	Also include the outside channels, particularly between the Island and Orange Grove/Blackwall.
YES	Dredging would be the best outcome to restore depth and beaches. However dredged material could be quite muddy after 45 years of drainage into canals.
YES	The residents off St Hubert's island live there for the atmosphere it creates. Boating access to the canals is 100% of this.
YES	Boating is already threatened in many areas due to sediment build-up in canals and approaches to the canals.
YES	I'm at the beginning of Sandy Cove canal so there are no problems that I can see that need dredging.
YES	Also waterways around the outside of the Island used for boating.
YES	We need clear access in canals at all times.
YES	Clear mangroves planted at entrance of canals. Pathways?

QUESTION 1 COMMENTS

Canal Depths & Sedimentation

"Provide advice regarding intervention levels at which point dredging should be undertaken"

Respondent's answer to Question 1	Respondent's Question 1 Comment
YES	Canals need to be kept available.
YES	The canals are much shallower than when I moved here 20 years ago.

QUESTION 2 COMMENTS

Foreshore Management

"Identify preferred practices for the management of the canal foreshore"

Respondent's answer to Question 2	Respondent's Question 2 Comment
YES	Consideration for access to foreshores to assist fishing
YES	The Council as far as we know have never maintained in the 39 years that we have been here.
YES	Previous storms have shown vulnerable sections, such as the bridge sea walls, gum trees, and blocked drains
YES	While the seagrass is an important component of our canals, it was never in our canals before - it has grown after canal construction. It MUST BE A MAJOR FACTOR to protect seagrasses while any foreshore/seawall maintenance occurs, however, any unintentional damage would evenyually grow back. If the public is to have access and use of the canal edges (sand) then the Council MUST maintain these areas including removal of oysters attached to drainage outlets and buried in the sand.
YES	I would much prefer to see sandy beach fronts at sea wall meeting place & not sand bags, bricks, concrete blocks that are evident in many places around the Island & in canals.
YES	St Huberts Island is all sand. Nothing is like it on the Central Coast and Hawkesbury River - they are all rocky foreshores and islands. That is what we on St Huberts need - last June 3/4s storm caused damage to ours and others seawalls. More rock walls need to be put into place to stop the surge of water that came through, to slow it down, also king tides and roaring winds did not help.
YES	1. Management is best when material on foreshores is stabilised i.e. not moving. Moving sediment essentially results in erosion somewhere and deposition mostly into navigable waterways. 2. Vegetation can be useful to help stabilise foreshores. It does not need to be mangroves eg. bullrushes, salt tolerant grasses, etc 3. Some properties may not need full seawalls, but may achieve foreshore stability by use of sloping groynes in key locations. These groynes are located like environmentally friendly seawalls, but are not full width. They currently exist. Boat ramps are groynes.
YES	Foreshore management is necessary for a number of reasons including the adequate protection of the sea walls.
YES	I don't understand what Council's role is in maintaining the canals and they should be advising what the practices are.
YES	I think this definition could be a clearer.
YES	Clean all wood and rocks. It is very bad and terrible sight to look at.
YES	Also include outside of Island above mean high-water mark which is also controlled by Council (ie not just canals).
YES	Perhaps larger stone blocks laid to form protective walls against sand being removed from frontages during storms or high water/King tides
YES	Remove building materials used to support seawalls (bricks etc).

QUESTION 3 COMMENTS

Shoreline Erosion/ Accretion (build-up)

"Provide general advice regarding management measures and approval pathways for these measures"

Respondent's answer to Question 3	Respondent's Question 3 Comment
	No problems
NO	Natural build-up should not be disturbed, having lived on the Island for 38 years, we note there is no need for action.
YES	We have two drainage outlets on each side. One on Cuttlefish Pde and the other on Mainsail causing build up of road debris.
YES	32 years residency. No erosion due to installation. Maintenance of foreshore lawn areas.
YES	Council right-of-way from the road to the canals should be clear.
YES	Should be specific with the amount of sand to be cleared. Our understanding is you can't move any.
YES	Is there a type of grass (short not long) that can be planted along the sand in front of the sea wall that will bind and stop the sand being washed away. This will extend the life of every sea wall on the island?
YES	Vessel speed control is ESSENTIAL in canals to aid in control of erosion and seawall damage in particular, otherwise any erosion and accretion control methods are USELESS.
YES	As noted in previous point, management is best when material on foreshores is stabilised. i.e. not moving.
YES	Shoreline Accretion (Build-up) and Erosion is common place around the island canals and has been evident for the life of the development. For many years there has been a varied approach for the protection of the sea walls, including sand nourishment from the canal floor. There is a clear need for guide lines to be established to allow council and residents to maintain the canals.
YES	Long overdue. Extensive accretion has and continues to occur without any action for dredging or other remediation.
YES	Will they really provide approval. I think we need to understand and agree on the steps and hold council accountable.
YES	Must be careful not to make Council fully responsible for fix people land that has been neglected. Because this alone could use up all funds.
YES	Also include outside of Island above mean high-water mark which is also controlled by Council (ie not just canals).

QUESTION 4 COMMENTS

Seawalls

"Provide guidelines to ensure consistent future design of seawalls"

Respondent's answer to Question 4	Respondent's Question 4 Comment
	No problems
	Is Council prepared to contribute to the repair and/or maintenance of seawalls considering 30 years of neglect resulting in collapse and undermining of foundations of seawalls?
YES	Our seawall is not too bad
YES	Very important a some residents have propped up seawalls with construction waste - eg tiles etc, which are visually offensive to neighbours and visitors to our waterways. Also groynes - some of which detract from the picturesque nature of our foreshore
YES	It is obvious that seawall maintenance is not considered important to some owners. Owners with damaged and dilapidated seawalls should be compelled to carry out necessary repairs.
YES	Council's failure to maintain the canals and sand at the seawalls is a direct cause of the failure of resident's seawalls.
YES	Seawalls must not have smooth faces eg brick or concrete. Need surface that breaks the wave motion.
YES	Council's incompetence/reluctance/refusal to maintain their land (aka the Canals) has resulted in the collapse and damage to canal seawalls, and thus the significant costs to owners for their repair and prevention of loss of their land onto Council's land. Our rates are higher due to our backing on to Council land and our greater rates should be used to rectify this damage. Council should be financially responsible for repair of our seawalls rather than only some of us (the pontoon owners) paying a fee to a minimally growing Maintenance fund that probably won't achieve anything significant before money runs out!!
YES	1. No seawalls should be allowed if they present hard vertical surface to oncoming wave action. This type of seawall causes erosion in front and also easily/mostly erosion to adjacent areas also. Unjust to others and the erosion leads to deposition of sediment into waterways. 2. It is important when locating seawalls that the foreshores on adjacent properties be taken into account. EG. If a property has been badly eroded is alongside another property which has a good foreshore, then the seawall should not act detrimentally to that property. 3. Overall, no work should be done on anyones foreshore that would detrimentally affect any adjacent or nearby areas which have an environmentally friendly sloping foreshore
YES	The original design for seawalls was that such walls were erected 300mm within the residential property to necessitate any seawall maintenance to be the responsibility of the land owner. Due to neglect by the owner of the canals (Gosford City Council now Central Coast Council) there has been considerable damage to seawalls due to the erosion and sand movement within the canal. Seawall design, I believe, is the responsibility of the residential land owner and requirements could only be seen as guide-lines and not a mandatory requirement.
YES	Same as above - we would need to review and agree to the guidelines to ensure they work in the residents favour.
YES	However, several schemes are appropriate to cater for some who don't mind spending on a sandstone or marble wall, and others who only want to pay for something fit for purpose and adequate.
YES	Very bad design. I have no sand left to my seawall. Sand brought in only fills up the canals. All falling down.
YES	Also include outside of Island above mean high-water mark which is also controlled by Council (ie not just canals).
YES	My seawall was newly done when I moved here 7 years ago
YES	Include repairs to existing sea walls
YES	We have noticed large amounts of rock fill have been deposited into our canal, barrow loads have been tipped into waterway. It is unsightly and will have an effect on the tidal flow. Council needs to be notified of this action.
YES	In the beginning all sea walls had sand level to their top. The council was supposed to maintain the canals and sand at the sea walls. Council's failure to do has caused the resident's seawalls to degrade from loss of sand holding the wall up from falling down. Council's ban on residents with huge fines for pulling up sand from the canals means we can't stop our walls subsiding.

QUESTION 5 COMMENTS

Boat Ramps

"Provide guidelines for the design criteria and approval pathway for upgrades and construction of existing and new boat ramps"

Respondent's answer to Question 5	Respondent's Question 5 Comment
	Not decided
NO	Council has had design requirements for more than 30 years. Its' failure to have a plan for boat ramps and approvals that resulted in non-compliant constructions.
NO	Approach and Outcome not supported as requirements have been previously established. DCP 145 and now Gosford DCP 2013 provide a certain amount of guide-lines for boat ramps. Approval pathways are already established in this DCP. It must also be remembered that boat ramps are and have always been excluded from any license fee associated with the use of the canal property.
YES	Consideration for launching of canoes and kayaks
YES	Don't like boat ramps, hazardous to walk across also the beach front I have is minimal and we would like it left as sand. The boat ramp next to our property was built without approval by previous owners.
YES	Correct design of ALL boat ramps is essential. If they aren't designed and constructed correctly they will inevitably be undermined, collapse, sag, crack etc. Tidal flow and water are persistent and always successful in their destructive efforts.A break in the walkway where it meets the seawall is essential if the public is to have easy access to the Councils land i.e. the canals and the sand around their edges.
YES	They need to fix up the public boat ramp so it's useable.
YES	Should be a sand level
YES	Also include outside of Island above mean high-water mark which is also controlled by Council (ie not just canals).
YES	Boat ramp at end of Nautilus is pretty well unusable, this needs either extending or rebuilding
YES	Council should be stopping boat ramps being installed which breach the existing design requirements of 30 years. Instead they have let non-compliant boat ramps be installed without taking any action.

QUESTION 6 COMMENTS

Pontoons/ Walkways

"Provide guidelines for the design criteria and approval pathway for upgrades and construction of existing and new pontoons/walkways"

Respondent's answer to Question 6	Respondent's Question 6 Comment
	Not decided
	Unable to work around canals. Pontoons have path all the way from seawall to pontoon and boat.
	Why does it take so long to seek Council approval for a DA consent for works to proceed for installations --> up to 18 months.
NO	Already done.
NO	Approach and Outcome not supported as requirements have been previously established. Much work has been done in respect to pontoons and walkways over the past 20 years. DCP 145 and now Gosford DCP 2013 provide extensive guide-lines for these structures. Approval pathways are already established in this DCP for pontoons and walkways.
NO	In narrow canals such as ours, Trial Inlet, pontoons are encroaching navigable waterways. We had a long barge in our canal for 2 weeks installing a pontoon and blocking marine access.
NO	There are existing pontoon guidelines that council should be enforcing and using to block illegal developments or any in breach of standards.
YES	Pontoons should not be built in canals.
YES	Application for shared pontoon pending.
YES	A break in the walkway where it meets the seawall is essential if the public is to have easy access to the Councils land i.e. the canals and the sand around their edges. Prevent (unfortunately) internal corner canal properties from having pontoons due to "pontoon congestion" in the corners of canals.
YES	Clogging and obstruction of canals with pontoons has become an increasing problem. Some restrictions are urgently needed as owners without pontoons are losing accessibility and amenity and the canals become navigation hazards for vessels.
YES	Still with the restriction of construction of corner blocks (important)
YES	Same feedback as above.
YES	Also include outside of Island above mean high-water mark which is also controlled by Council (ie not just canals).
YES	(... and a **NO** tick as well, but no comment)

QUESTION 7 COMMENTS

Wrack (seaweed) and debris build-up

"Recommendations for the removal and management of wrack/debris"

Respondent's answer to Question 7	Respondent's Question 7 Comment
	Seaweed washed onto foreshore should be Council's responsibility as it is their "land". However it is not a big job for land owner to rake up and put on garden or in green bin.
NO	This is a manageable issue by Island residents.
NO	Approach and Outcome not supported. Wrack (seaweed) and debris build up is of particular concern to residents of the island on canal properties in the corners of canals where the wrack and debris accumulates under certain winds and tide conditions. NSW Fisheries have certain requirements for the commercial removal of the wrack under a document "Marine vegetation collection for commercial purposes - information kit". Removal of this wrack is not seen by Fisheries as a commercial activity. It has been my experience, being in a canal corner where wrack and debris gathers in times of southerly and westerly winds, that Fisheries advised in correspondence in early 1900's that residents could remove up to 20kg of wrack per day per property and that council at that time agreed that upon request to remove the material when bagged and placed out for collection. This has been a successful practice over approximately 20 years.
NO	Seaweed is natural grass and gives good fish habitat, it usually washes out on high tide. No need to rake and send off to Council in black plastic bags.
YES	Seaweed has been increasing in the channel entrance in front of my house, also lots of discarded palm fronds.
YES	We have a lot of build up of seaweed for years. We have been removing but has been extremely difficult.
YES	Minor debris should be removed by owners - seaweed should not be pushed into the water to float into neighbours.
YES	Many residents clear their own beaches.
YES	Storm water drains sediment needs to be removed and back filled with fresh sand as it was.
YES	Additional help needed after heavy storms for Shelter Cove residents at Nos 40 & 42 Helmsman, and Nos 2,4,6,8 Mainsail for wrack and debris collection and removal.
YES	Again our understanding is we must bag the seaweed and call Council to collect. Already bagged 108 large bags. Would be good to have a small truck on sand to do, say 2 x times in April - October when seaweed is bad.
YES	Many residents don't realise there is a process in place for them to handle their own wrack. It must be made clear what any disposal process is as some owners end up with massive amounts of wrack in front of them at times.
YES	My observation is that the sea grasses provide sanctuary for breeding fish, stingrays and other crustaceans
YES	Some areas seem to build up large amounts of wrack at certain times of the year. Disposing of this far exceeds the capacity of your green bin and can generate huge amounts for green pickup. Perhaps recommendations for how to treat this so it could be used as garden fertiliser(?) may be an idea..?
YES	Wrack is a consistent problem with our position due to being at the end of the canal, tide movement and wind direction. It is a hazard for any shoreline activity.
YES	What are the recommendations and what are the Schedules of maintaining this.
YES	Seaweed should be cleaned up regularly by land owners or Council
YES	Also include outside of Island above mean high-water mark which is also controlled by Council (ie not just canals).
YES	The wrack sails past me to the end of the canal where there are big problems with it
YES	I am always raking up seaweed which gets caught around the slip.
YES	We should be allowed to dispose of it ourselves as well (via green bin)
YES	Some residents have their entire beach covered by the wrack and have to clear it or they would have no beach. It comes back every tide.

EXTRA Key Areas

KEY AREA	PREFERRED APPROACH	PREFERRED OUTCOME	COMMENT
(BLANK)	---->	---->	**General Comments** The current survey and consultancy, I believe, is mainly in respect to the maintenance, resident activity and possible dredging of the canals to protect seawalls and to return the canals to their original design criteria. Previous Surveys carried out by the St Huberts Island Residents Association Inc. in conjunction with Gosford City Council should also be considered by the consultants. These surveys include a survey in 1996 by and included in the St Huberts Island Drainage Reserves Task report of 1997. Also a further survey carried out in respect to the proposed Entry Statement in/or about 2002.
1. St Huberts Bridge Lighting --- **2. Garden at Bottom of Bridge**	There are about only 5 lights out of 10 working --- Needs clean-up and maintenance work on so-called beds.	Fix them ---	
Branches Off Trees	Need a pick-up truck to collect debris on roads and footpaths	Once a month	
Speed Bumps on St Huberts Island	---->	---->	(NIL)
Access on and off the island should be restricted to residents and people invited onto the island by residents	Take control of the island away from Council	**T**he Island to become a private estate owned , maintained and operated by the residents	
Get rid of the Real Estate shop on Helmsman	**R**eplace it with a boutique convenience store/ post office / licenced bottle shop	More convenience for all residents	
(BLANK)	---->	---->	Having a dry block I have no idea of the needs or maintenance of canals - Sorry I can't be more helpful
Boat ramp maintenance	**E**nforce boatramp standards of maintenance		
Relevant signage to protect shorelines	Adequate speed limit and no wash signs strategically placed around canal shorelines	**L**ess erosion of foreshores and protection of seawalls and boat ramps	
Brisbane Water approaches to canals	Provide advice regarding intervention levels at which point dredging should be undertaken.	Maintain unobstructed boating access to St Huberts Island canal systems	
Canal on Beachfront Pde	Dredge mud and clear undergrowth along the canal to stop rubbish and garden clippings being dumped	Useable beach instead of mud	
Council Trees	Council Works Prgram	Periodic pruning of gum trees - near bus sheds, and of course in front of my house.	Made contact with a Council Officer following the big storm in April 2015 to have pruning a priority. This request has been continually repeated by me.
Speed Restriction of Trucks and Buses	Notice at bridge - "Please Slow Down - Vibration Area"	Overweight trucks - 20 kph Maintain limit - 50 kph	Advise Busways to inform drivers.
Easements	Keep Clear	Kept clear for all public access	All easements must be kept clear. No parking of trucks, cars, boats, etc. Must be available for public access.

EXTRA Key Areas

KEY AREA	PREFERRED APPROACH	PREFERRED OUTCOME	COMMENT
Foreshore between low tide and high tide	Keep walkway available	Letter or advice to any walkway blockage	I believe the foreshore is a public area and not be restricted
Storm water drains	Advise or repair storm water flowing into bays	To be kept in working order	Some storm drains hold stagnant water and can smell in summer
Interface between Council submerged land in canals and Crown submerged Land	Council should work closely with Crown Land NSW to remove inconsistency of approach.	Common standards and approaches to infrastructure and dredging to maintain channel depth. The previously dredged channels on the outside of the island have the same purpose and need for consistent maintenance as the canals - one of boating access.	
Liability collapsing sea walls	Identify council's liability for causing sea walls to collapse	Agree to compensate residents for damage to sea walls caused by not dredging the canals to to replace the sand at the sea walls which stops the seawalls falling down.	
Fixing and maintaining sea walls	Council agree to conduct regular maintenance of sea walls to stop collapse	Council needs to approve sand being replaced to fix the sea walls. And council needs to agree to conduct regular maintenance of dredging the sand up from the canal and pushing it up against the sea wall to hold it up.	
Liability for Seawalls	Determine Councils liability for residents seawall failure	Residents have tried to maintain the sand at their seawalls, but council have threatened prosecution for this. Council should be liable for wall collapses because they failed to keep their property (the canals) in proper condition, causing adjacent properties to have seawall collapses.	
(BLANK)	---->	---->	It is understood that the original developers put up a bond into council to maintain the canals. Council also collected "waterfront" rates which were put into general revenue, rather than maintain the canals.
Moorings	Ban moorings (floating)	No moorings	
Speeds	Adequate 4 knot speed signage	Minimise wave damage	
Outer Foreshore	Provide advice regarding intervention levels at which point dredging should be undertaken. At present we are limited in the usage of our boat	Achieve unobstructed boating access within channel across all tides and identify the trigger point and approval pathway for any maintenance work requirements.	
Shoreline Erosion/Accretion on Outer Foreshore	Provide general advice regarding management measures and approval pathways for these measures.	Clear steps required to undertaken works and recommendations for any further works necessary to support implementation of these works and gain best results.	
Prevention of erosion in around seawalls	"No Wash" signage zones in all canals	Boating community to adopt Responsible/safe speed limits - creating no Wash	
Stop long term mooring of boats in all canals	Maritime Boating Officers to monitor & give notice to offenders & need be fine	Canals were not intended for mooring vessels- authorised moorings are available in Bris.Waters	
Public access to waterfront between houses	Notify offenders to remove all offending items	Remove all cars, trucks, trailers + any other items from freeway	Public access should be kept clear at all times as required by Council. Owners should keep everything on their own property.

EXTRA Key Areas

KEY AREA	PREFERRED APPROACH	PREFERRED OUTCOME	COMMENT
Road Signs	---->	---->	A few 50 km signs around the Island
Road signs	---->	---->	A sign to indicate the direction where to go to the bridges at the junction of Mainsail, Cuttlefish and Mercator as motorists get confused when leaving the Island
Sand Erosion	Dredging	To have minimum height of sand against our sea walls	
Extra Structures	Removal of extra structures in canals	Removal of stone or rock or brick structures against sea walls	
Sea and Birdlife preservation	The bird and sealife of the Island is a huge drawcard for living here. Maintaining the quality of water in all that is planned will assure they survive and flourish	Guidelines in all the Key Areas for use of materials that will assure water quality, water flora and practises that will consider the safety and well being of all the animal life on and around the Island	
Sea Walls	**A**ll canal properties to have a sea wall	Healthier canal system	
Siltation of storm water drains over 40 years	Remove (dredge of dig out from land base) to original depth. Back fill with sand.	Corner of Helmsman Blvd and Mainsail, restore to original status	Siltation from both stormwater drains in this corner over 40 years has filled this area with 1 to 1.5 metres of toxic siltation off the streets, roads and gutters. I have had samples from the area analysed 5 years ago with the report given to the Council with NO response. The beaches in this area are disgusting. Because it is so shallow all the debris from southerly winds ends up here and can't get away in the shallow water.
Some resolution regarding the construction of a boat ramp or jetty in the end of canals where three or for resident are clustered at the end	As the ramp or jetty would protrude into the area all residents would be affected . Therefore design and consents need to be considered, in addition to usage etc		
Speed 4 knots at entrance to channel	4 knots signs on channel markers	Some peace for our waders who when feeding are frightened by high speed watercraft	We used to get lots of eastern curlews, pied oyster catchers etc - now only a few. The curlew is migratory and needs to feed when it can so it can make its return to Siberia. Can we stop people taking nippers from the sand flats?
Speed Control in Canals	More 4 knot signage (which may work!!), Council/MSB patrol/police and actively inform vessels "drivers" of the speed in Canals. Maybe a system is set up for residents to inform of speeders.	Vessels will not exceed 4 knots in Canals	As mentioned elsewhere in our survey responses - "Vessel speed control is ESSENTIAL in canals to aid in control of erosion and seawall damage in particular, otherwise any erosion and accretion control methods are USELESS."
The Canal Maintenance Fund	Council levies a compulsory amount on **all Canal property owners** which is then paid into the current Canal Maintenance Fund	All Canal property owners contribute to this fund which is used on all canals for the benefit of all Canal property owners. The fund increases in value rapidly and more can be done to the canals sooner.	Probably not a popular levy/fee, but **all owners benefit**. Council needs to be creative in collecting this. It probably should be determined on length of Canal Frontage so boat ramp access only owners aren't overcharged.
Speeding Watercraft	Install speed limit signage at entrance to canals and have regular policing	No wash speeds in canals are enforced and compliance by all watercraft.	**E**xcessive watercraft speeding in canals in warmer months creating wash and presenting danger to canal users is a major problem that is getting worse each summer.

EXTRA Key Areas

KEY AREA	PREFERRED APPROACH	PREFERRED OUTCOME	COMMENT
St Huberts Road bridge	---->	---->	The footprint of the bridge is part of the Brisbane Water bed and consideration should be given.
Stabilisation is the goal		**F**oreshore material best if stabilised i.e. not moving	
No loss of environmentally friendly foreshore		No work should detrimentally affect any adjacent area which has an environmentally friendly sloping foreshore	
Street Drainage	Extend piping and water spreader much further into canals		Sand moves back and forth on beaches with wind and water movement - eventually being swept into canals during rainfall
Gutter rubbish collection	---->	---->	The Trial Inlet that I live on has been reported to have a minimum of 1 metre of sediment in deepest areas (centre of canal)
Two Parks	Children's play equipment	Replace slippery-dip, swings and razzle-dazzle removed from Solstice park years ago (not broken).	Council removed this play equipment, only the swings needed small repair.
Open Spaces	Helmsman Bvd and Long Arm Pde	Very stark	Add swing or some play equipment for kids.
Wash Damage	Install necessary notices and provide guidelines to communicate and manage vessel speeds in channels and canals.	Wash damage minimised through vessels obeying speed limits by installing necessary advisory notices and providing pathway/process to address regular breachers.	Required to manage erosion on the outside of Island through wash from vessels exceeding 4 knots and actions are all executable from Council controlled land above mean high water mark.
Waterways	Clear and numerous signs indicating boat speed limit	Less erosion and damage	
Roadways	Several signs re speed limits. *speed bumps * speed cameras as cars enter/leave the bridge		

Appendix B – Gosford DCP Extract

3.16.8 Objectives of development in canals of St Huberts Island

The objectives of development in the canals of St Huberts Island are as follows:

1. To provide private water recreation structures for boats within the canals of St Huberts Island.
2. To ensure that the water recreation structures will not result in difficulty of physical manoeuvring of vessels within the canals.
3. To ensure that the number and location of water recreation structures will not adversely affect the visual amenity of the neighbourhood.
4. To ensure the water recreation structures will not result in visibly unattractive concentrations or locations of vessels.

3.16.9 Specific Requirements for Water Recreation Structures in Canals on St Huberts Island

In respect to the provision of water recreation structures in the canals of St Huberts Island the following development is permitted within the canals subject to the criteria within this clause, only with the formal Development Approval of Council:

1. Boat ramps used for access for vessels to the canals from the adjoining residential property.
2. Structures in the form of floating pontoon and associated walkways at a minimum ratio of one (1) pontoon per two (2) adjoining premises, to provide access to vessels berthed thereto in accordance with this chapter.

Note:

Under the Gosford LEP 2014 moorings are permitted without development consent. However all moorings require a licence from NSW Maritime.

3.16.10 Management Principles for Water Recreation Structures for Canals on St Huberts Island

1. Pontoons and walkways shall be shared structures at a ratio of one (1) pontoon per two (2) adjoining premises considered on their merits and may not be permitted at premises of narrow frontage of less than nine (9) metres or near to canal corners or ends.
2. Development Approval shall be for a share arrangement of one (1) pontoon per two (2) adjoining premises, however, a maximum share arrangement of up to one (1) pontoon per four (4) adjoining premises may be considered by Council.
3. Pontoon walkways are to be located at a common property boundary.
4. Council, as the canal landowner, may refuse to authorise submission of a development application that does not generally comply with the provisions of this Chapter. Existing development that requires consent but has been constructed without consent can be regularised if Council approves a building certificate and grants development consent for the use of the structure. This will apply only to structures that satisfy the requirements of this Chapter.
5. Only vessels owned by residents with canal frontage properties will be permitted to be berthed at a pontoon within the canals.
6. Boat ramps, pontoons or walkways which fall into disrepair or are a danger to the public use of the canals are to be removed by, or at the expense of, the owner of the structure.
7. Generally Council will not accept a development application for a pontoon unless made by a minimum of two (2) adjoining landowners.
8. Pontoons may be Integrated Development requiring approval under the NSW Fisheries Management Act from the NSW Department of Primary Industries. Relevant documentation submitted with any application should include a plan showing location of adjacent structures, water depth contours, and location of any seagrasses and/or mangroves including species and photographs of the area at low tide.

   Approvals for applications not submitted as Integrated Development applications will be conditioned to obtain the relevant consents/permits from relevant Integrated bodies. If those consents/permits cannot be obtained any development consent would be invalid and unable to be acted upon.
9. A mooring will be relinquished and removed upon installation of a pontoon in accordance with this Chapter.

10. NSW Maritime is the authority responsible for the issuing of mooring licences required under the Management of Waters and Waterside Lands Regulations - NSW. This is separate to Council's license fee structure.

3.16.11 Development Criteria for Boat Ramps for Canals on St Huberts Island

1. Boat ramps shall be constructed at the level of the floor of, and follow the contour of, the canal and shall not exceed three (3) metres in width.
2. Applications for shared boat ramps will be considered on their merits.
3. All boat ramps and associated works are to be maintained in a condition that prevents failure and is acceptable to the Council.
4. Any lighting contained within the residential property and associated with a ramp shall be minimal and only used for the safe use of the structure. Such lighting shall be neither red nor green.
5. Applications for ramps in the canal corners shall be considered on their individual merits.

3.16.12 Development Criteria for Pontoon and Associated Walkways for Canals on St Huberts Island

1. Pontoons shall be permitted in minimum depth water of 900mm at mean low water, larger vessels or keel vessels which cannot achieve water access to pontoons in accordance with this plan are not considered appropriate for berthing and will have to make other arrangements.
2. Length of vessels shall not exceed ten (10) metres or the waterfrontage of the property, whichever is the lesser.
3. Pontoons shall be of a maximum size of 3 metres x 4 metres.
4. All pontoons shall be of similar design, of fibreglass or similar construction. All materials used in the construction of a pontoon and walkway shall be new and of good quality.
5. All pontoons and walkways shall be finished in suitable and appropriate colours to the satisfaction of Council.
6. Pontoons shall be secured by means of a storm anchor chain and the minimum of sufficient piles for the designated number of vessels to the bed of the drainage reserve to a maximum height of 1.85 metres above the Australian Height Datum (AHD).
7. Walkways to provide access to the floating pontoons shall:
    1. maximise the free flow of water beneath the structure;
    2. be constructed on piles, not on solid fill;
    3. be a maximum width of 1.2 metres; and
    4. ibe constructed at right angles to the shoreline.
8. The maximum length of any walkway shall be no more than that required to achieve a water depth at the pontoon of 0.9 metres at mean low water.
9. The height of walkways shall be a maximum of 1.15 metres above AHD to the uppermost surface of the walkway.
10. A single handrail may be provided on one side of the structure only, with the design and construction to be such that access along the foreshore is not restricted. Handrails may be omitted for appearance where appropriate.
11. Pedestrian access along the beach area of the drainage reserve shall not be restricted by the construction of any pontoon or walkway and provision for access shall be incorporated in any design of the pontoon or walkway.
12. No permanent lighting or power facility shall be provided on any approved pontoon or walkway.
13. Any lighting contained within the residential property and associated with a pontoon or walkway shall be minimal and only used for the safe use of the structure. Such lighting shall be neither red nor green.
14. All pontoons, piles and associated works shall be maintained in a condition that prevents failure and is acceptable to the Council.
15. Pontoons and walkways shall be adequately maintained or Council may direct their removal.
16. No portion of the pontoon or vessel berthed thereto shall be within five (5) metres of the centreline of the canal.
17. All pontoons and walkways shall be the subject of all necessary applications to Council, including Development Application and "Permissive Occupancy" application and annual licence from the Council.
18. Applications for pontoons and walkways in the narrower canals shall be carefully considered on their individual merits.

3.16.13 Positive Covenant and Licence for development in canals of St Huberts Island

Prior to construction of any approved pontoon and associated walkway, the owner shall:

1. make appropriate arrangements with Council's Property Services Unit for the granting of a licence for use of the drainage reserve including payment of any licence fee; and
2. create a positive covenant which is attached to the land owned by the person who receives the benefit of a licence and requires the landowner to:
    1. maintain insurance;
    2. maintain the structure in a safe condition;
    3. provide an identification and licence number;
    4. allow Council to carry out repairs or remove the pontoon if appropriate;
    5. allow Council to recover costs for the repairs and removal;
    6. pay Council's costs to create the covenant; and
3. where appropriate, allow a right of access to others who share the facility.

The owner shall be responsible for Council's legal and administrative costs in relation to the licence and positive covenant.

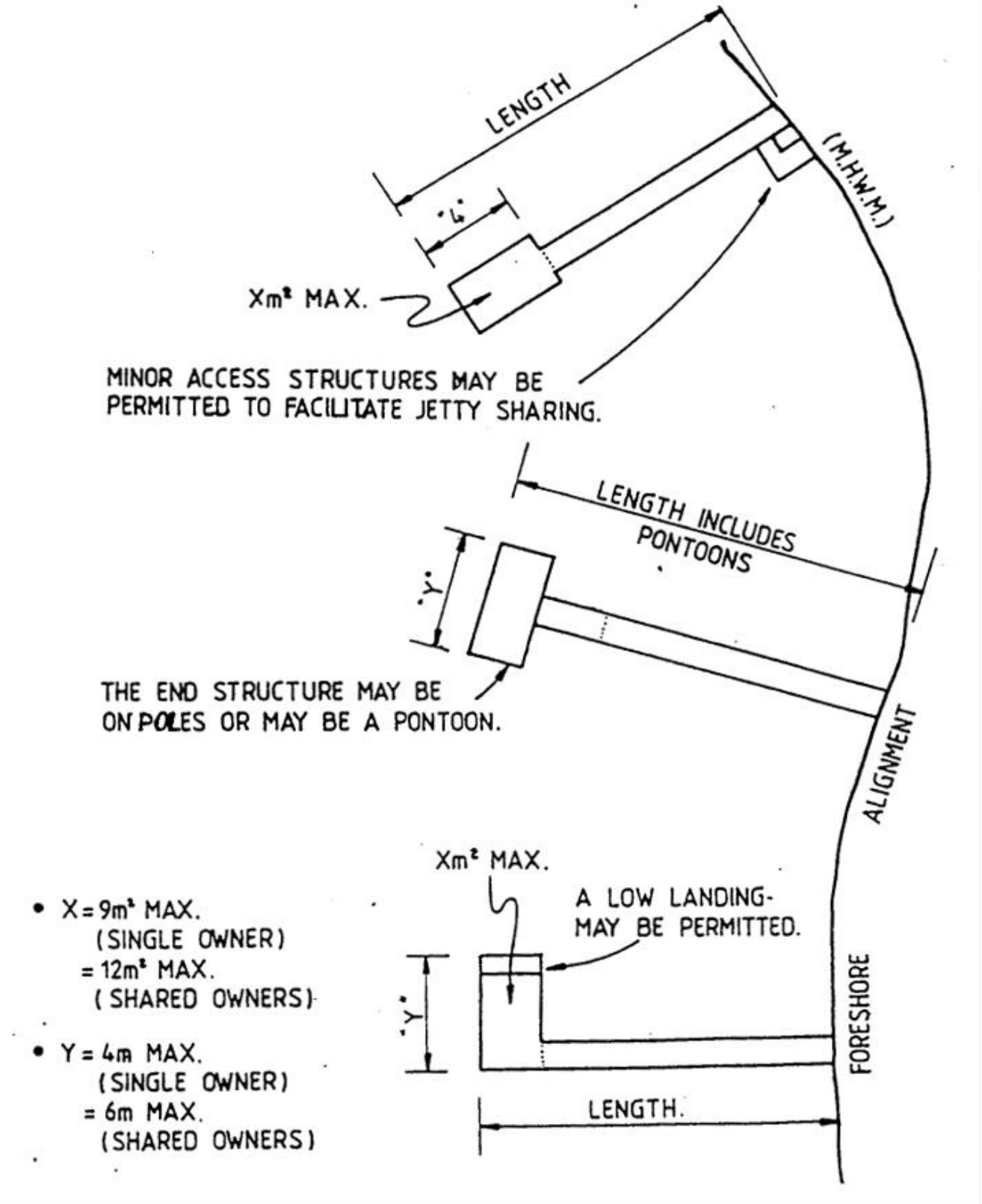
The annual fee for pontoons is set out in Council's Fees and Charges Schedule.

Appendix - Length of Jetties in Brisbane Water

The length of jetties shall comply with the following criteria and associated diagrams (refer Figures 1 and 2).

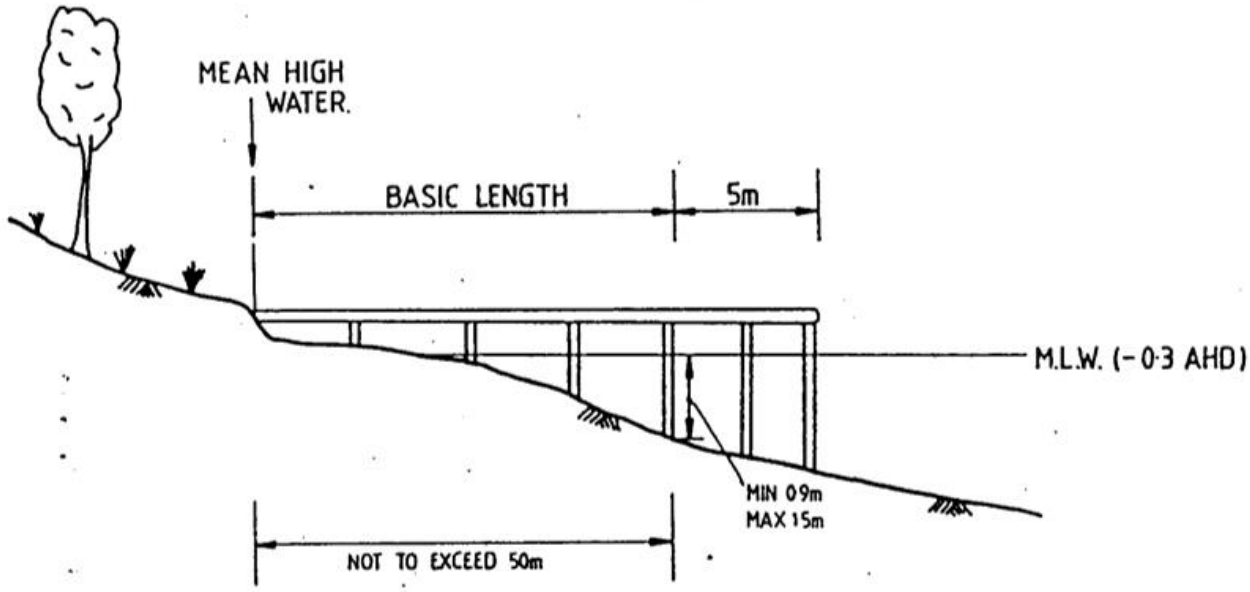
1. The length of the jetty shall:
    1. Not exceed the average length of jetties within 100 metres on either side of the subject site;
    2. Achieve the 'basic' length necessary to provide a water depth of 900mm minimum or 1.5 metres maximum at mean low water at the jetty head;
    3. Not exceed a maximum 'basic' length of 50 metres with a possible 5 metres additional length and subject to approval under item (d); and
    4. With regards to (c) above, Council may consider minor extensions (up to a maximum of 5 metres increase) to the length subject to the concurrence of the NSW Maritime, Department of Primary Industries (Fisheries), and Department of Environment and Climate Change.
2. If a jetty cannot reach a water depth of 900mm at mean low water and with a 'basic' length of 50 metres, plus any 5 metres approved extension, it will not be approved.
3. A jetty will not be permitted to extend into or restrict any navigation area or channel.
4. Where an existing facility could be relocated to a common boundary to be used as a shared facility Council will give consideration to permitting a facility of the same length as the previous structure, depending on its merits.

Figure 1 - Typical Jetty Layout - Plan View



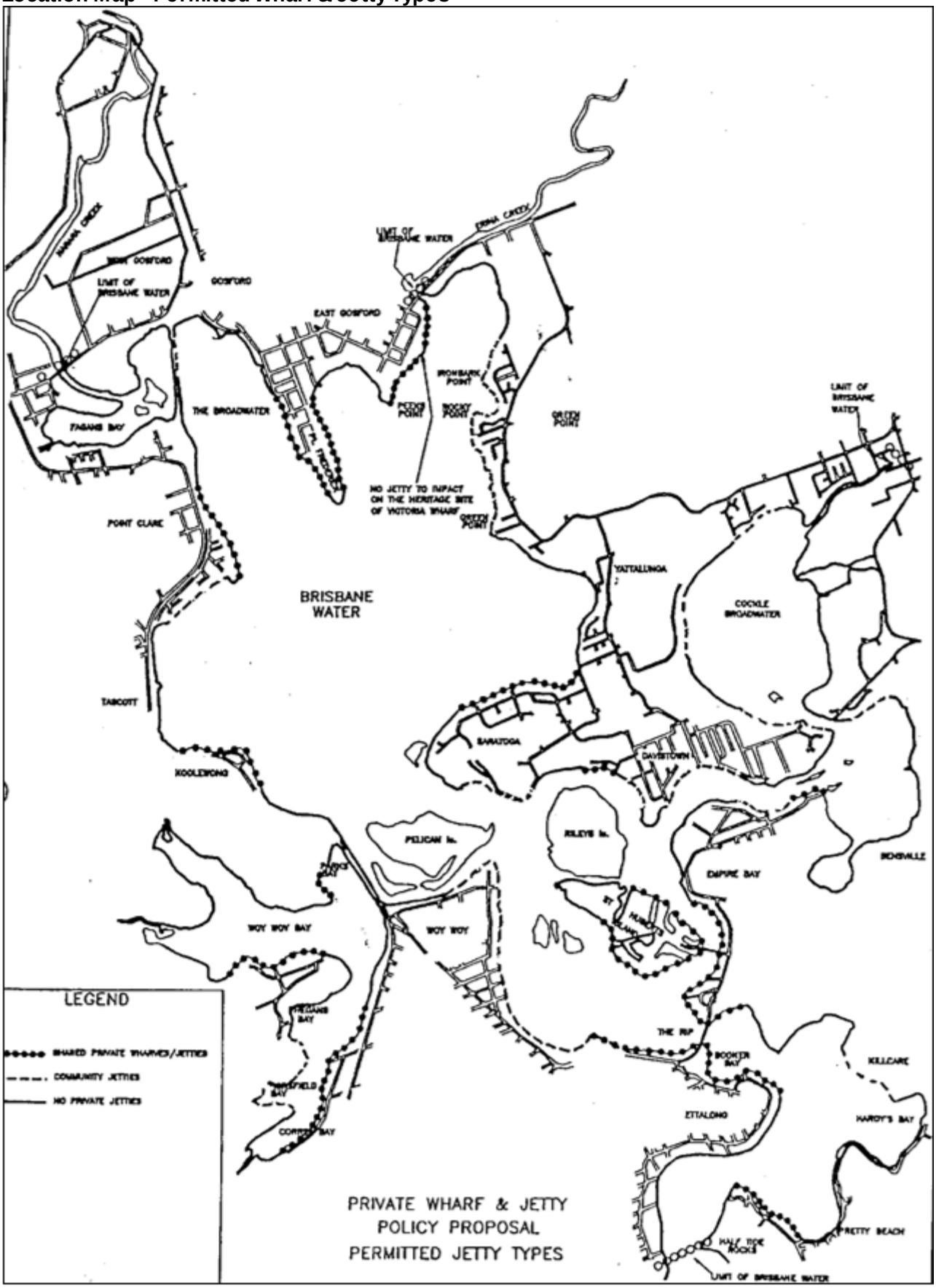
Note: Extract only. Accessed January 2017
https://plan.gosford.nsw.gov.au/Pages/Plan/Book.aspx?exhibit=GCCPLANAug2014

Figure 2 - Typical Jetty Elevation



Note: Extract only. Accessed January 2017
https://plan.gosford.nsw.gov.au/Pages/Plan/Book.aspx?exhibit=GCCPLANAug2014

Location Map - Permitted Wharf & Jetty Types



Note: Extract only. Accessed January 2017
https://plan.gosford.nsw.gov.au/Pages/Plan/Book.aspx?exhibit=GCCPLANAug2014

Appendix C – Extract *Assessment and Decision Frameworks for Seawall Structures*

Extract from *Assessment and Decision Frameworks for Seawall Structures*
Sydney Coastal Councils Group, 2013

Seawall monitoring can typically be divided between condition monitoring and performance monitoring. Condition monitoring is the basis for the implementation of a successful preventive maintenance program. Seawall condition monitoring should involve at least visual inspection of the structure, and in some cases, the inspection is augmented with measurements meant to quantify the current structure condition relative to the baseline condition. Seawall inspections can be described according to the following terminology:

- Superficial Inspections: this type of visual inspection can be undertaken many times a year and identifies any defect changes or unusual features of the seawall
- General Inspections: this type of inspection, carried out by trained technical staff, is more formal and detailed, and is recommended to take place approximately every two years.
- Principal Inspections: principal inspections include a detailed examination of all aspects of the seawall, including any areas underwater or with difficult access. These inspections should be carried out at intervals of between two and ten years, depending of the age of the structure and are carried out by qualified engineers
- Special Inspections: these investigations are carried out following specific events such as extreme floods, storms or when any other inspection indicates a cause for major concern.

Performance monitoring of seawalls should mainly focus on the assessment of the principal function of preventing or alleviating overtopping and flooding of the land and the structures behind the seawall due to storm surge and waves. Key structural parameters of seawalls include:

- seawall toe and crest levels
- seawall composition
- structural integrity of the seawall
- wave overtopping
- beach scour and bedrock levels
- water table levels

The maintenance solution for a seawall is highly dependent on the type of structure, as well as the use and the environmental conditions it is subjected to (i.e. estuarine processes). The main types of repair/rehabilitations works include:

- modifying loads on the seawall
- remedial works to the seawall toe
- increasing seawall stability
- repair of the wall structure
- replacement of the seawall by a new structure.

Finally, it is recommended that seawalls be included on the Asset Management Plan of councils with the following key pieces of information:

- location
- surveyed level key parameters (toe and crest levels)
- construction type/description
- grade or rating of overtopping risk
- grade or rating of stability risk
- previous and next scheduled monitoring inspection.

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