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Manly Hydraulics Laboratory



Review of NSW OEH automatic water level recorder network
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Foreword

The NSW Office of Environment and Heritage (OEH) manages an extensive coastal network of automatic water level recorders (AWLR) to directly support the NSW Government's floodplain, estuary and coastal management programs. The coastal data network is operated and maintained by Manly Hydraulics Laboratory (MHL) under an annual contract with OEH.

The NSW government's professional specialist advisor, MHL was commissioned by OEH to review all MHL's AWLR and present concise details of each station involved in the OEH program along the east coast of NSW. This publication been formulated as a summary of each water level station and is designed to act as a tool by which station details can be efficiently accessed.

The data collected by the water level stations is used by OEH, Bureau of Meteorology, State Emergency Service, local councils, universities, and the general public, for a wide array of purposes. This includes NSW coastal event flood warning/forecasting, input into the preparation of local floodplain, estuary, and coastal zone management plans, NSW tidal planes development, operational navigation and management of NSW coastal waterways, and climate change studies. There are currently 254 operational stations in the network maintained under funding from OEH. Administratively, the data collection effort from the coastal network is divided into floodplain, estuary, ocean tide, and storm surge (offshore tide) monitoring sub-programs.

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Executive summary

This report updates the previously published report *MHL1419 Review of DECCW Automatic Water Level Recorder Network* (May 2010).

It contains:

- Section 1 Introduction: This outlines the network history, and provides and overview of the methodology applied in developing this publication, and data types included. It provides details of the supplementary datums included (where relevant in addition to Australian Height Datum), water level sampling frequencies applied in the network, and tidal plane functionality categorisation.
- Section 2 automatic water level recorder (AWLR) status: This includes a summary listing and the operational status of all stations in the network. For each AWLR station it includes:
    - A detailed map (1:25,000 scale) and photograph of the station location.
    - An adjoining summary page of tabular information for each AWLR containing station information, instrumentation, survey, tidal planes and station characteristics details.
- Appendix A: An outline of the terminology used in this report.

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1. Introduction

This publication presents detailed information for each automatic water level recorder currently operated and maintained by Manly Hydraulics Laboratory (MHL) for the NSW Office of Environment and Heritage (OEH) as at September 2018. Some minor updates between Septermber 2018 and March 2019 have been included; please refer to the revision date on the individual metadata pages for further detail. Administratively, the data collection effort is divided into floodplain, estuary, ocean tide, and storm surge (offshore tide) monitoring sub-programs. The report summarises station details for the water level recording stations on the east coast of NSW in geographical order from north to south.

1.1 Data collection program history

The current NSW OEH has managed and funded the coastal data collection program for its entirety (over 30 years). During that time, the Office has had a number of name changes to reflect its charter. From most recently:

- NSW Office of Environment and Heritage
- NSW Department of Environment, Climate Change and Water
- NSW Department of Environment and Climate Change
- NSW Department of Natural Resources
- NSW Department of Sustainable Natural Resources
- NSW Department of Infrastructure, Planning and Natural Resources
- NSW Department of Sustainable Natural Resources
- NSW Department of Land and Water Conservation
- NSW Public Works Department.

Throughout this time, the coastal network has been operated and maintained by MHL, under annual contract with OEH.

The following sections provide guidance notes on how to use this report.

1.2 How to use this report and interpret AWLR station status

Each station is detailed by a map and photograph of its location, accompanied by a tabular page of station details for easy reference. The tabular page is collated and arranged into the following five major categories:

- station identification
- instrumentation
- survey details
- tidal planes
- station characteristics.

Descriptions of how the station details are recorded are given in **Table 1-1**.

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Table 1-1 Station details

Category	Station details	Explanation
Station Identification	River/Estuary system	Details of the river or estuary on which the station is located.
	Station name	Name of the station
	AWRC number	AWRC station number assigned following conventions established by the Australian Water Resources Commission.
	BoM number	Station number given by Bureau of Meteorology.
	MGA co-ordinates zone/Easting/Northing	Map Grid of Australia zones/ Eastward-measured distance (or the x-coordinate) / Northward-measured distance (or the y-coordinate)
	Geographic co-ordinate system/Latitude/Longitude	Map Grid of Australia geographic co-ordinates at, or as close to, the gauge orifice as possible.
	Local office file reference and TRIM reference	Local office file TRIM reference number (MHL)
	LGA	Local government area
	Rainfall district	Rainfall district defined by BoM
Instrumentation *Refer also to Section 1.4 with sampling rate supplementary information*	Logger type	Details on the current type of logger. Typically, two main logger types are used: 1. Multi-channel programmable logger (4 communication ports, 8 differential inputs). 2. Multi-channel programmable logger (2 communication ports, 3 differential inputs).
	Communication type	Details the method of telemetry for the station. Typically, there are four main types used: 1. Satellite 2. Radio 3. PSTN LL (land line) 4. Mobile 3G/4G. Satellite currently has minimal use in the NSW Coastal Zone due to higher cost. It is 'push' data. Data latency (and risk and reliability) is highly location dependent for this communication type. Radio is utilised in river basins with established radio repeater and base station infrastructure. It is 'push' data. It has low latency, with transmissions every increment

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Category	Station details	Explanation
		change in level and minimal data acquisition and publishing steps. PSTN LL is the public switched telephone network landline. It is utilised only in individual stations with trenched landlines from telephone exchanges. It is 'pull' data, and utilises circuit switch dialling. It may have a moderate to high latency, due to a fixed transfer schedule, in addition to data acquisition and publishing steps. Mobile 3G/4G has wide applicability, and is utilised in all river basins. There are three subsets available: • Dial-up. This is 'pull' data. It may have a moderate to high latency, due to a fixed transfer schedule, and data acquisition and publishing steps. • IP – internet protocol. This is 'push' data. It may have a moderate latency due to data acquisition and publishing steps. • IPM – improved internet protocol. This is 'push' data. It has a very low latency due to optimised data acquisition and publishing steps. Note: In this context, 'latency' refers to the total currency of the data available to the user at the time of publishing, and comprises both the data transmission regime, and publishing steps. The risk and reliability of each communication type is location and application specific.
	Primary and secondary sensor type	Details on the current type of primary and secondary sensor. Typically, there are four main types: 1. Gas purge 2. Submersible pressure transducer 3. Radar 4. Shaft encoder.
	Secondary sensor type	Details on the current type of

Category	Station details	Explanation
		secondary sensor.
	Primary sensor installation date	Date that primary sensor was installed.
	Secondary sensor installation date	Date that secondary sensor was installed.
	Range of primary level sensor (m)	The range of water level the primary sensor is capable of measuring.
	Range of secondary level sensor (m)	The range of water level the secondary sensor is capable of measuring.
	Primary sensor sampling regime	Details on primary sensor data collection intervals and data type, i.e. instantaneous or average. The abbreviation B/A indicates “before and after” the logged value.
	Secondary sensor sampling regime	Details on secondary sensor data collection intervals and data type, i.e. instantaneous or average.
Survey Details *Refer also to Section 1.3 with Station Datum supplementary information.*	PM/SSM reference	Permanent Mark or State Survey Mark from the NSW Department of Lands’ SCIMS database that are used for reference surveys.
	Order of accuracy	The PM/SSM reference mark order of accuracy taken from the SCIMS database. Some station reference marks are “U” undefined due to the unavailability of higher order benchmarks in the local vicinity.
	PM/SSM RL	Reduced level (RL) of PM/SSM referenced in metres AHD. If RL value is not available in AHD it is presented in the local datum.
	Local BM description	Detail the local bench mark description referenced in the local datum.
	Local BM location	Detail the local bench mark location referenced in the local datum.
	Local BM RL	Reduced level (RL) of local bench mark in metres AHD. If RL value is not available in AHD it is presented in the local datum.
	Station datum	The station datum the water level is recorded in.
	Date of last survey	The date of the last reference survey. MHL undertakes a reference survey to permanent mark/ state survey mark every 6 years, where applicable.
	Surveyed by	The responsible surveyor of the last reference survey.

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Category	Station details	Explanation
	Gauge plate offset to gauge zero	The adjustment to gauge zero of the station's datum from the last survey conducted.
Tidal Planes *Refer to Section 1.5 for tidal planes categorisation supplementary information.*	Period analysed	The time period that tidal planes analysis was undertaken.
	Tidal planes functionality	A categorisation of the functionality of the station's tidal planes based on tidal range, hydraulic characteristics, and accuracy of analysis program for that station. See section 1.3 for more details.
	Tidal planes	Analysis of tidal data sets for the full range of data collected produces the following tidal planes: High High Water Solstices Spring (HHWSS) Mean High Water Spring (MHWS) Mean High Water (MHW) Mean High Water Neap (MHWN) Mean Sea Level (MSL) Mean Low Water Neap (MLWN) Mean Low Water (MLW) Mean Low Water Spring (MLWS) Indian Spring Low Water (ISLW). Tidal range (HHWSS – ISLW) The tidal planes are presented in AHD and are further explained in the Glossary in Appendix A.
Station Characteristics	General comments	General comments details of additional sensors present (e.g. rainfall or water quality monitoring) and any changes to the sensor type since the previous MHL1419 publication.
	Peak flood of record	Peak flood level reached at the station since its installation.
	1% AEP	1% annual exceedance probability. These levels are indicative only for management of the flood gauge network. They are not to be used for land use planning purposes. Up to date levels should be obtained from current Floodplain Risk Management Plans accessible from local councils.
	Instrumentation height	The bottom box height of the instrumentation, above which the station cannot reliably record data.
	Hydraulic characteristics	Details stations hydraulic characteristics. Three broad classes include: 1. Tidal

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Category	Station details	Explanation
		2. Intermittently closed and open lakes and lagoons (ICOLLs) 3. Non-tidal.
	Purpose of installation and current functionality	Describes the purpose of the station installation and the stations current functionality.
	Station shown on BoM website	Describes if station data is displayed on BoM website or not. Please note that all stations sent via File Transfer Protocol direct from MHL's telemetry system to the BoM will be in local datum, if applicable. Datum shown on BoM website is in AHD, unless otherwise stated.
	SES flood classification	Locally-defined flood levels used in flood warnings to give an indication of the severity of flooding (minor, moderate or major) expected. These levels are defined and then used by the NSW SES and the BoM in flood bulletins and flood warnings.
	Data used for BoM flood forecasting	Describes if data from this station is used for BoM flood forecasting.
	Revision date	Date of last station information revision.

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1.3 Station datum – Australian Height Datum (AHD 1971)

All the floodplain, estuary and ocean tide water level stations are available on MHL's website in Australian Height Datum (AHD (reference to AHD 1971) and local datum (if applicable) with some exceptions. Where the local datum relates to a local port datum, it generally equates to Indian Springs Low Water (ISLW). An indicative adjustment of AHD to each station approximate local datum level is show in **Table 1-2.** These ISLW levels were calculated circa 1990 for MHL by NSW Public Works Survey, using range ratio method and tidal harmonic analysis over varying time periods. These values should be used with caution, as AHD levels are revised from time to time and improvements in GPS surveying techniques may provide additional refinement. Notable exceptions to availability in AHD, include:

- Lord Howe Island and Norfolk Island, which were not included in the original 1990 NSW Public Works survey that obtained the AHD adjustments.
- Logans Crossing and Mount George are in the Local Water Resources Datum (LWRD) only.
- Woolgoolga Creek is in cease to flow of control structure.
- Kooroowi, Tuncurry Wetlands and Ashley Bridge Downstream are in an Assumed Datum.
- The storm surge (offshore tide) stations at Tweed, Port Macquarie, Shoalhaven and Batemans Bay are not related to a datum, but provide valuable astronomical constituent information and anomalies. For each annual deployment, the elevation of mean sea level above chart datum (Z_0) is calculated using Foreman tidal planes analysis and then an offset is applied based on the calculated Z_0. Therefore, each deployment will have a different Z_0 adjustment.

Table 1-2 Summary of adjustment from AHD to Local Datum

Station AWRC No.	River/Estuary	Station	Adjustment from AHD (1971) to Local Datum	Local Datum *
201448	Cobaki Broadwater	Cobaki	+0.863	TRHD
201428	Terranora Inlet	Dry Dock	+0.875	TRHD
201447	Terranora Broadwater	Terranora	+0.853	TRHD
201472	Tweed River	Tweed Entrance South	+0.893	TRHD
201429	Tweed River	Letitia 2A	+0.886	TRHD
201426	Tweed River	Barneys Point	+0.883	TRHD
201432	Tweed River	Tumbulgum	+0.893	TRHD
201420	Tweed River	North Murwillumbah	+0.909	TRHD
201465	Tweed River	Murwillumbah Bridge	+0.909	TRHD

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Station AWRC No.	River/Estuary	Station	Adjustment from AHD (1971) to Local Datum	Local Datum *
201455	Tweed River	Bray Park Weir	+0.934	TRHD
201422	Rous River	Kynnumboon	+0.926	TRHD
202403	Brunswick River	Brunswick Heads	+0.024	BRFMD
202416	Cudgen Creek	Bogangar	+0.051	BRFMD
202418	Cudgen Creek	Kingscliff	+0.066	BRFMD
202434	Cudgen Creek	Kingscliff Upstream	+0.066	BRFMD
202475	Marshalls Creek	Orana Bridge	+0.024	BRFMD
202400	Marshalls Creek	Billinudgel	+0.019	BRFMD
202402	Brunswick River	Mullumbimby	+0.010	BRFMD
203421	Richmond River	Ballina	+0.860	LWOST
203465	Richmond River	Missingham Bridge	+0.860	RRVD
203461	Richmond River	Byrnes Point	+0.857	RRVD
203468	Richmond River	Wardell	+0.824	RRVD
203412	Richmond River	Woodburn	+0.815	RRVD
203462	Evans River	Evans River Fishing Co-op	+0.809	RRVD
203475	Evans River	Iron Gates	+0.819	RRVD
203480	Tucombil Canal	Tucombil Highway Bridge	+0.815	RRVD
203434	Tucombil Canal	Tucombil Floodgate	+0.815	RRVD
203432	Rocky Mouth Creek	Rocky Mouth Creek	+0.815	RRVD
203450	Richmond River	Bungawalbin	+0.809	RRVD
2034133	Richmond River	Bungawalbin Creek	+0.891	RRVD
203403	Richmond River	Coraki	+0.815	RRVD
203427	Wilsons River	East Gundurimba	+0.831	RRVD
203443	Leycester Creek	Tuncester	+0.855	RRVD
203402	Wilsons River	Woodlawn College	+0.826	RRVD
204454	Clarence	Yamba	+0.895	IPD

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Station AWRC No.	River/Estuary	Station	Adjustment from AHD (1971) to Local Datum	Local Datum *
	River			
205470	Coffs Harbour	Coffs Harbour	+0.882	CHPD
208471	Crowdy Head	Crowdy Head	+0.911	CHD
209402	Wallis Lake Entrance	Forster	+1.061	FHD
209461	Port Stephens	Mallabula Point	+0.959	PSHD
209474	Port Stephens	Shoal Bay	+0.944	PSHD
211417	Wyong River	Wyong Weir Upstream	-0.930	WC
213470	Sydney	Port Jackson	+0.925	ZFD
213435	Silverwater Bridge	Parramatta River	+0.925	ZFD
213400	Liverpool Weir	Georges River	-2.762	WC
214452	Port Hacking	Bundeena	+0.925	ISLW
216470	Jervis Bay	HMAS Creswell	+1.070	Chart Datum
219470	Bermagui River	Bermagui	+0.714	BLHD
220470	Eden Wharf	Eden Boat Harbour	+0.924	TBHD

*TRHD - Tweed River Hydro Datum, BRFMD - Brunswick River Flood Mitigation Datum, LWOST – Low Water Ordinary Spring Tide, RRVD - Richmond River Valley Datum, IPD - Iluka Port Datum, CHPD - Coffs Harbour Port Datum, CHD - Crowdy Head Datum, FHD - Forster Hydro Datum, PSHD - Port Stephens Hydro Datum, WC – Weir Crest, ZFD – Zero Fort Denison, ISLW - Indian Spring Low Water, BLHD - Bermagui Local Hydro Datum, TBHD - Twofold Bay Hydro Datum

1.4 Data sampling regime

The data sampling regime of water levels differs between the floodplain, estuary, ocean tide and storm surge (offshore tide) sub-programs. This is due to the different data requirements and environmental conditions between the programs, and to enable some stations to be used to study different physical processes and characteristics in NSW waterways. Table 2-1 lists each station and which program it is funded by.

1.4.1 Floodplain and estuary stations

The majority of the floodplain and estuary stations log an instantaneous water level every 15 minutes on the quarter hour.

For stations that experience a lot of turbulence or wind wave action, a 10-second average is used to reduce the non-tidal effect, and improve the accuracy of the 15 minute sample.

Stations that have a radar or ultrasonic sensor sample, sample for 1 minute before and after the quarter hour, to improve the accuracy of the 15 minute sample.

In addition to the 15 minute sample, stations in the Lake Macquarie, Lake Illawarra and Clarence River waterways have been configured to log values at one-minute intervals which

are averaged 30 seconds either side of each minute.

1.4.2 Ocean tide stations

Ocean tide stations log a value every 15 minutes on the quarter hour. The logged value is an average of 120 samples taken one minute either side of the quarter hour, to improve the accuracy of the 15 minute sample.

In addition to the 15 minute sample, all the ocean tide stations are configured to log values at one-minute intervals which are averaged 30 seconds either side of each minute.

In addition to the 15 minute sample, and one minute sample, a sub-set of ocean tide sites have been configured to sample every second to an on-site data storage card. These stations include: Tweed Entrance South, Coffs Harbour, Port Macquarie, Lord Howe, Shoal Bay, Patonga, Jervis Bay, Sydney, Princess Jetty and Eden.

1.4.3 Storm surge (offshore tide) stations

The four storm surge stations are fitted with a combination of Aanderaa and RBR pressure transducers, that record total pressure, and are compensated using recorded NSW barometric pressure data.

Storm surge stations that have Aanderaa equipment log every 60 minutes on the hour, integrating sampling over a 40 second period, before the logged value.

Storm surge stations that have RBR equipment logs every 5 minutes, integrating sampling over the 40 second period, before the logged value.

Definition of sampling acronyms used in the station summaries:

- Instantaneous 15 minute - logs an instantaneous reading on the quarter hour
- 15 sec average 15 minute - a 15-second average is used to reduce the non-tidal effect on the quarter hour
- 60 sec average B/A 15 minute - a radar or ultrasonic sensor sample for a 1 minute before and after the quarter hour
- 30 sec average B/A 1 minute - one-minute intervals which are averaged 30 seconds either side of each minute
- Instantaneous 1 second - sampling every second to an onsite data storage card
- 40 second integration B 60 minute - Storm surge stations that have Aanderaa equipment log every 60 minutes on the hour
- 40 second integration B 5 minute - RBR equipment logs every 5 minutes.

Refer to the station summaries for details of the sampling method used at each station.

1.5 Data transmission regime

The data transmission regime of water levels differs between the floodplain, estuary, ocean tide and storm surge (offshore tide) sub-programs. This is due to the different data requirements between the programs, and dependent on the priority classification of stations for flood warning.

1.5.1 Floodplain and estuary stations

Data from stations classified by the Bureau of Meteorology as high priority for flood warning, are transmitted to MHL's database systems on an hourly basis. Data from other stations are

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transmitted at a lower frequency of 3-8 hourly. All incoming data is then processed and presented on MHL's public webpage, which may take up to an additional 45 minutes.

During 2018/19, MHL has commenced the upgrade of communication, data acquisition and publishing steps, for all floodplain and estuary stations. Over time, all OEH/MHL stations will be upgraded to transmit to MHL's database on an hourly basis, or more frequently. All incoming data would also be published on MHL's public webpage, within 5 minutes of transmission.

1.5.2 Ocean tide stations

Data from ocean tide stations is transmitted to MHL's database systems at a frequency of 1-6 hourly. All incoming data is then processed and presented on MHL's public webpage, which may take up to an additional 45 minutes.

During 2018/19, MHL has commenced the upgrade of communication, data acquisition and publishing steps, for all ocean tide stations. Over time, all OEH/MHL stations will be upgraded to transmit to MHL's database on an hourly basis, or more frequently. All incoming data would also be published on MHL's public webpage, within 5 minutes of transmission.

1.5.3 Storm surge (offshore tide) stations

Data from offshore tide stations is not telemetered due to limitations in technology, cost, and the physical location of offshore tide stations in up to 30 m ocean water depth. Instruments are recovered on an annual basis, and data manually imported into MHL's database system. Data is available via data request.

1.6 Data editing and quality control

Data is edited and quality coded by a data analyst using the following steps:

- Comparison of station observer readings to the raw data and note any comments made by the field operator during the field visit that may impact the data quality.
- Compare the station with upstream and downstream locations by calculating a residual to identify any possible anomalies. Also, being alert to possible "real" anomalies such as coastal trapped waves, tsunamis or meteotsunamis; which are to be retained in the record.
- Adjust the data by linear interpolation, stretch factor or parallel shift if deemed necessary based on comparisons.
- Adjust the data for any survey adjustments or calibration results as required.
- Interpolation of gaps is only performed where the gap is 2 hours or less and not at the high or low tide. Replacing data with a predicted tidal trace or reverse rating methods are not employed.
- A quality code is applied to the data based on the definitions provided in **Table 1-3** and comments are tagged to the data outlining the edits performed and the reasons.
- The data is then sent to a senior data analyst for review and promotion/locking of the processed time series.

Note: An uneditable raw time series and a processed time series is stored in the database for every monitoring station.

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Table 1-3 Quality code definitions

Quality Code		Water Level*	Rainfall	Barometric Pressure*	Temperature *	Conductivity*^
5 (Very Good)	Records processed to	±5mm	±3% of calibration	±0.5mbar	±0.5ºC	±2mS/m
6 (Good)	Records processed to	±10mm		±1mbar	±1.0ºC	±2mS/m
55 (Fair)	Records processed to	±20mm	±5% of calibration	±2mbar	±2.0ºC	±5mS/m
100 (Leost Code)	Data from previous MHL database, processed to	±20mm	±3% of calibration	±1mbar		
105 (Poor)	Records processed to	±50mm	±10% of calibration	±5mbar	±5.0ºC	±10mS/m
208 (Very Poor)	Records processed to greater than	±50mm	±10% of calibration	±5mbar	±5.0ºC	±10mS/m
41 (Fitted Data)	Fitted data	Uncertainty is not defined for fitted data				
150 (Un-coded)	Un-coded – data not yet quality controlled	Raw data from the instrument with only preliminary quality checks performed				
1, 161, 204, 205, 206, 207, 250, 255	Sensor is dry or data loss or missing data					

* A quality code is assigned under the conditions that at least 95% of the data meets the quality code requirements, based on single point calibration

^ Conductivity quality code definitions are applicable for freshwater only.

1.7 Tidal plane functionality

The functionality of performing tidal plane analysis on a data set has been described by Good, Fair, Poor or Not Calculated categories. The definition of these categories is described in **Table 1-4**. The tidal planes shown in this report are the annual average results from report MHL2053 *OEH NSW tidal planes analysis: 1990 – 2010 harmonic analysis,* that was published in October 2012. Tidal planes may not be displayed in this report due to:

- insufficient tidal influence
- limited record during the analysis period
- the hydraulics being too variable to average the yearly tidal planes results (though annual results are still available in report MHL2053).

Irrespective of whether it is Flood or Estuary Program, all stations are used for tidal analysis if applicable.

Table 1-4 Tidal plane functionality

Category	General description
Good	The tidal cycle is not restricted by shoaling, or the station is not influenced by shallow water tidal constituents. The root mean square error for tidal plane analysis is <120mm.
Fair	The system may be restricted by shoaling or shallow water tidal constituents for short periods of time, or is an ICOLL with an open entrance for at least 90% of the year.
Poor	The system is an ICOLL that is closed to the ocean for long periods of time, or the system is dominated by shallow water constituents so the tidal analysis regime has limited

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	capabilities. Generally, the tidal planes for stations nominated with poor functionality are not calculated. Should the tidal planes be required for special projects they will be calculated as required, with limitations documented.
Not Calculated	The tidal influence or period of record is considered to be insufficient for the purposes of tidal planes analysis.

2. Automatic water level recorder status

The following chapter contains each AWLR station map and associated station summary page. **Table 2-1** lists the river/estuary, the station number & name, the program (F for floodplain, E for estuary, OT for ocean tide, SS for storm surge and Other for stations partly or fully funded by other entities), and the figure number for each station location map.

Table 2-1 Automatic water level recorder summary listing

River/estuary system	Station AWRC no.	Station name	Program (F= floodplain E= estuary OT= ocean tide SS= storm surge and other)	Status	Figure no.
Tweed River	201472	Tweed Entrance South	OT	Operating (2018)	1
Cobaki Broadwater	201448	Cobaki	F	Operating (2018)	2
Offshore	201450	Tweed Offshore	SS	Operating (2018)	3
Tweed River	201429	Letitia 2A	F	Operating (2018)	4
Terranora Inlet	201428	Dry Dock	F	Operating (2018)	5
Terranora Broadwater	201447	Terranora	F	Operating (2018)	6
Tweed River	201426	Barneys Point	F	Operating (2018)	7
Tweed River	201432	Tumbulgum	F	Operating (2018)	8
Rous River	201422	Kynnumboon	F	Operating (2018)	9
Tweed River	201420	North Murwillumbah	F	Operating (2018)	10
Tweed River	201465	Murwillumbah Bridge	F	Operating (2018)	11
Tweed River	201455	Bray Park Weir	F	Operating (2018)	12
Cudgen Creek	202418	Kingscliff	F	Operating (2018)	13
Cudgen Creek	202434	Kingscliff Upstream	F	Operating (2018)	14
Cudgen Lake	202416	Bogangar	F	Operating (2018)	15
Marshalls Creek	202400	Billinudgel	F	Operating (2018)	16
Marshalls Creek	202475	Orana Bridge	F	Operating (2018)	17
Brunswick River	202403	Brunswick Heads	OT	Operating (2018)	18
Brunswick River	202402	Mullumbimby	F	Operating (2018)	19

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River/estuary system	Station AWRC no.	Station name	Program (F= floodplain E= estuary OT= ocean tide SS= storm surge and other)	Status	Figure no.
Lennox Head	203455	Lake Ainsworth	E	Operating (2018)	20
Wilsons River	203402	Woodlawn College	F	Operating (2018)	21
Leycester Creek	203443	Tuncester	F	Operating (2018)	22
Wilsons River	203427	East Gundurimba	F	Operating (2018)	23
Richmond River	203465	Missingham Bridge	F	Operating (2018)	24
Richmond River	203461	Byrnes Point	F	Operating (2018)	25
Richmond River	203425	Ballina Breakwall	OT	Operating (2018)	26
Richmond River	203468	Wardell	F	Operating (2018)	27
Richmond River	203403	Coraki	F	Operating (2018)	28
Richmond River	203450	Bungawalbin	F	Operating (2018)	29
Richmond River	203412	Woodburn	F	Operating (2018)	30
Tucombil Canal	203480	Tucombil Highway Bridge	F	Operating (2018)	31
North Tasman Sea	240401	Norfolk Island	OT	Decommissioned (Sept 2015)	32
Tucombil Canal	203434	Tucombil Floodgate	F	Decommissioned (Aug 2015)	33
Rocky Mouth Creek	203432	Rocky Mouth Creek	F	Operating (2018)	34
Evans River	203462	Evans River Fishing Co-op	E	Operating (2018)	35
Evans River	203475	Iron Gates	E	Operating (2018)	36
Bungawalbin Creek	2034133	Bungawalbin Creek	F	Operating (2018)	37
Clarence River	204454	Yamba	OT	Operating (2018)	38
Clarence River	204451	Oyster Channel	F	Operating (2018)	39
Palmers Channel	204426	Palmers Island Bridge	F	Operating (2018)	40
Clarence River	204410	Maclean	F	Operating (2018)	41
Lake Wooloweyah	204485	Lake Wooloweyah	F	Operating (2018)	42

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River/estuary system	Station AWRC no.	Station name	Program (F= floodplain E= estuary OT= ocean tide SS= storm surge and other)	Status	Figure no.
Clarence River	204453	Lawrence	F	Operating (2018)	43
Clarence River	204465	Tyndale	F	Operating (2018)	44
Clarence River	204406	Brushgrove	F	Operating (2018)	45
Clarence River	204414	Rogans Bridge	F	Operating (2018)	46
Clarence River	204480	Ulmarra	F	Operating (2018)	47
Clarence River	204400	Grafton	F	Operating (2018)	48
Clarence River	204476	The Avenue Downstream	F	Operating (2018)	49
Clarence River	204475	The Avenue Upstream	F	Operating (2018)	50
Wooli River	205463	Wooli Caravan Park	F	Operating (2018)	51
Wooli River	205462	Wooli Entrance	F	Operating (2018)	52
Corindi Creek	205450	Red Rock	E	Operating (2018)	53
Woolgoolga lake	205455	Woolgoolga Lake	E	Operating (2018)	54
Woolgoolga Creek	205441	Woolgoolga	F	Operating (2018)	55
Moonee Creek	205435	Moonee Creek	E	Operating (2018)	56
Coffs Creek	205439	Coffs Creek Highway Bridge	F	Operating (2018)	57
Tasman Sea	205470	Coffs Harbour	OT	Operating (2018)	58
Newports Creek	205460	Newports Creek	F	Operating (2018)	59
Boambee Creek	205438	Boambee	F	Operating (2018)	60
Boambee Creek	205475	Boambee Entrance	E	Operating (2018)	61
Bonville Creek	205480	Bonville	E	Operating (2018)	62
Bellinger River	205403	Repton	F	Operating (2018)	63
Bellinger River	205442	Bellingen Bridge	F	Operating (2018)	64
Kalang River	205440	Kooroowi	F	Operating (2018)	65
Kalang River	205407	Urunga	F	Operating (2018)	66

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River/estuary system	Station AWRC no.	Station name	Program (F= floodplain E= estuary OT= ocean tide SS= storm surge and other)	Status	Figure no.
Kalang River	205458	Upstream Newry Island	F	Operating (2018)	67
Deep Creek	205485	Deep Creek	E	Operating (2018)	68
Nambucca River	205425	Bowraville Downstream	F	Operating (2018)	69
Nambucca River	205466	Stuarts Island Downstream	F	Operating (2018)	70
Nambucca River	205465	Stuarts Island	F	Decommissioned (Dec 2012)	71
Nambucca River	205416	Macksville	F	Operating (2018)	72
Taylors Arm	205414	Utungun	F	Operating (2018)	73
Warrell Creek	205490	Warrell Creek	E	Operating (2018)	74
Borirgala Creek	206450	Borirgala Creek	E	Operating (2018)	75
Saltwater Lagoon	206460	Saltwater Lagoon	E	Operating (2018)	76
Macleay River	206456	South West Rocks	F	Operating (2018)	77
Macleay River	206406	Smithtown	F	Operating (2018)	78
Korogoro Creek	206465	Hat Head	E	Operating (2018)	79
Macleay River	206402	Kempsey	F	Operating (2018)	80
Macleay River	206459	Aldavilla Downstream	F	Operating (2018)	81
Macleay River	206458	Euroka Upstream	F	Decommissioned (Dec 2011)	82
Killick Creek	207452	Crescent Head	E	Operating (2018)	83
Maria River	207406	Green Valley	F	Operating (2018)	84
Wilson River	207415	Telegraph Point	F	Operating (2018)	85
Hastings River	207418	Settlement Point	F	Operating (2018)	86
Hastings River	207444	Dennis Bridge Downstream	F	Operating (2018)	87
Hastings River	207420	Port Macquarie	OT	Operating (2018)	88
Offshore	207450	Port Macquarie Offshore	SS	Operating (2018)	89
Hastings River	207401	Wauchope Railway Bridge	F	Operating (2018)	90

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River/estuary system	Station AWRC no.	Station name	Program (F= floodplain E= estuary OT= ocean tide SS= storm surge and other)	Status	Figure no.
Tasman Sea	240402	Lord Howe Island	OT	Operating (2018)	91
Lake Cathie	207441	Lake Cathie	F	Operating (2018)	92
Camden Haven River	207428	Logans Crossing	F	Operating (2018)	93
Queens Lake	207475	Lakewood	F	Operating (2018)	94
Stingray Creek	207437	West Haven	F	Operating (2018)	95
Camden Haven River	207423	North Haven	F	Operating (2018)	96
Camden Haven River	207425	Laurieton	F	Operating (2018)	97
Watson Taylors Lake	207480	Watson Taylors Lake	F	Operating (2018)	98
Tasman Sea	208471	Crowdy Head Boat Harbour	OT	Operating (2018)	99
Dingo Creek	208436	Ashlea Bridge Downstream	F	Operating (2018)	100
Manning River	208425	Harrington	F	Operating (2018)	101
Manning River	208400	Wingham	F	Operating (2018)	102
Manning River	208404	Croki	F	Operating (2018)	103
Manning River	208440	Mount George	F	Operating (2018)	104
Manning River	208430	Dumaresq Island	F	Operating (2018)	105
Manning River	208410	Taree	F	Operating (2018)	106
Manning River	208415	Farquhar Inlet	F	Operating (2018)	107
Wallamba River	209404	Nabiac	F	Operating (2018)	108
Wallamba River	209451	Tuncurry Wetlands	F	Decommissioned (Nov 2017)	109
Wallamba River	209401	Tuncurry	F	Decommissioned (Oct 2016)	110
Wallamba River	209401D	Tuncurry Downstream	F	Operating (2018)	111
Wallis Lake Entrance	209402	Forster	OT	Operating (2018)	112
Wallis Lake	209403	Tiona	F	Decommissioned (July 2015)	113
Wallis Lake	209406	Pacific Palms Wharf	F	Operating (2018)	114

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River/estuary system	Station AWRC no.	Station name	Program (F= floodplain E= estuary OT= ocean tide SS= storm surge and other)	Status	Figure no.
Smiths Lake	209465	Tarbuck Bay	E	Operating (2018)	115
Myall River	209460	Bulahdelah	F	Operating (2018)	116
Myall River	209475	Bombah Point	E	Operating (2018)	117
Myall River	209480	Tea Gardens	E	Operating (2018)	118
Karuah River	209485	Karuah	F and E	Operating (2018)	119
Port Stephens	209474	Shoal Bay (Port Stephens)	OT	Operating (2018)	120
Port Stephens	209461	Mallabula Point	F	Operating (2018)	121
Paterson River	210402	Gostwyck	F	Operating (2018)	122
Paterson River	210406	Paterson Railway Bridge	F	Operating (2018)	123
Williams River	210462	Seaham	F	Operating (2018)	124
Paterson River	210409	Dunmore	F	Operating (2018)	125
Hunter River	210475	Oakhampton Railway Bridge	F	Operating (2018)	126
Hunter River	210459	Bolwarra Upstream	F	Operating (2018)	127
Hunter River	210451	Bolwarra Downstream	F	Operating (2018)	128
Paterson River	210410	Hinton Bridge	F	Operating (2018)	129
Hunter River	210455	McKimms Corner	F	Operating (2018)	130
Hunter River	210430	Morpeth	F	Operating (2018)	131
Hunter River	210432	Green Rocks	F	Operating (2018)	132
Hunter River	210458	Belmore Bridge	F	Operating (2018)	133
Wallis Creek	210457	Wallis Creek Downstream	F	Operating (2018)	134
Wallis Creek	210428	Wallis Creek Upstream	F	Operating (2018)	135
Williams River	210452	Raymond Terrace	F	Operating (2018)	136
Williams River	210450	Raymond Terrace Backup	F	Operating (2018)	137
Wallis Creek	210453	Louth Park	F	Operating (2018)	138

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River/estuary system	Station AWRC no.	Station name	Program (F= floodplain E= estuary OT= ocean tide SS= storm surge and other)	Status	Figure no.
Hunter River	210448	Hexham Bridge	F	Operating (2018)	139
Hunter River	210456	Stockton Bridge	F	Operating (2018)	140
Cockle Creek	211450	Barnsley Vale	F	Operating (2018)	141
Cockle Creek	211455	Cockle Railway Station	F	Operating (2018)	142
Lake Macquarie	211460	Marmong Point	F	Operating (2018)	143
Lake Macquarie	211461	Belmont	F	Operating (2018)	144
Dora Creek	211470	Cooranbong	F	Operating (2018)	145
Dora Creek	211475	Kalang Road	F	Operating (2018)	146
Lake Macquarie	211462	Swansea Channel	E	Operating (2018)	147
Stockton Creek	211480	Morisset	F	Operating (2018)	148
Wallarah Creek	211420	Wallarah Creek Bridge	F	Operating (2018)	149
Tuggerah Lake	211401	Toukley	F	Operating (2018)	150
Wyong River	211417	Wyong Weir Upstream	F	Operating (2018)	151
Ourimbah Creek	211425	Lees Bridge	F	Operating (2018)	152
Tuggerah Lake	211418	Long Jetty	F	Operating (2018)	153
Tumbi Umbi Creek	211419	Tumbi Umbi	F	Operating (2018)	154
Narara Creek	211435	Manns Road	F	Operating (2018)	155
Wamberal Lagoon	212450	Wamberal Lagoon	E	Operating (2018)	156
Terrigal Lagoon	212455	Terrigal Bridge	E	Operating (2018)	157
Avoca Lagoon	212452	Avoca Lagoon	E	Operating (2018)	158
Cockrone Lake	212453	Cockrone Lake	E	Operating (2018)	159
Erina Creek	212436	Erina	F	Operating (2018)	160
Erina Creek	212433	Punt Bridge	F	Operating (2018)	161
Brisbane Water	212423	Ettalong	F	Operating (2018)	162

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River/estuary system	Station AWRC no.	Station name	Program (F= floodplain E= estuary OT= ocean tide SS= storm surge and other)	Status	Figure no.
Brisbane Water	212422	Koolewong	F	Decommissioned (Nov 2016)	163
Brisbane Water	2124301	Koolewong 2	F	Operating (2018)	164
Hawkesbury River	212440	Patonga	OT	Operating (2018)	165
Hawkesbury River	212431	Spencer	F	Operating (2018)	166
Hawkesbury River	212429	Gunderman Caravan Park	F	Operating (2018)	167
Hawkesbury River	212460	Wisemans Ferry	F	Operating (2018)	168
Hawkesbury River	212408	Webbs Creek	F	Operating (2018)	169
Colo River	212407	Colo Junction	F	Operating (2018)	170
Hawkesbury River	212465	Sackville Upstream	F	Decommissioned (Aug 2011)	171
Hawkesbury River	212406	Sackville	F	Operating (2018)	172
Hawkesbury River	212438	Sackville Downstream	F	Decommissioned (Nov 2010)	173
Hawkesbury River	212427	Ebenezer	F	Operating (2018)	174
Hawkesbury River	212426	Windsor	F	Operating (2018)	175
Hawkesbury River	212410	Freemans Reach	F	Operating (2018)	176
Nepean River	212404	Castlereagh	F	Operating (2018)	177
Narrabeen Lagoon	213408	Narrabeen Caravan Park	Other	Decommissioned (May 2017)	178
Narrabeen Lagoon	213408D	Ocean Street Bridge	Other	Operating (2018)	179
Narrabeen Lagoon	213422	Narrabeen Bridge	E	Operating (2018)	180
Dee Why Lagoon	213424	Dee Why	Other	Operating (2018)	181
Curl Lagoon	213426	Curl	E	Operating (2018)	182
Manly Lagoon	213413	Riverview Parade	Other	Operating (2018)	183
Manly Lagoon	213414	Queenscliff Bridge	Other	Operating (2018)	184
Lane Cover River	213476	Fullers Bridge	F	Operating (2018)	185

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River/estuary system	Station AWRC no.	Station name	Program (F= floodplain E= estuary OT= ocean tide SS= storm surge and other)	Status	Figure no.
Port Jackson	213470	Sydney	OT	Operating (2018)	186
Port Jackson	213472	Sydney Backup	OT	Operating (2018)	187
Parramatta River	213435	Silverwater Bridge	F	Operating (2018)	188
Cooks River	213411	Canterbury Road	F	Operating (2018)	189
Cooks River	213420	Illawarra Road Bridge	F	Operating (2018)	190
Cooks River	213415	Tempe Bridge	F	Operating (2018)	191
Georges River	213410D	Picnic Point Downstream	F	Operating (2018)	192
Georges River	213425	Como Bridge	F	Operating (2018)	193
Georges River	213405	Milperra	F	Operating (2018)	194
Prospect Creek	213402	Lansdowne Bridge	F	Operating (2018)	195
Georges River	213401	Lansvale	F	Operating (2018)	196
Cabramatta Creek	213407	Irelands Bridge	F	Operating (2018)	197
Georges River	213404	Scrivener Street	F	Operating (2018)	198
Georges River	213400	Liverpool Weir	F	Operating (2018)	199
Port Hacking	214452	Bundeena	OT	Operating (2018)	200
Hewitts Creek	214410	Hewitts Creek Upstream	F	Operating (2018)	201
Hewitts Creek	214411	Hewitts Creek Downstream	F	Operating (2018)	202
Hewitts Creek	214408	Hewitts Creek Entrance	E	Operating (2018)	203
Bellambi Lagoon	214488	Bellambi	E	Operating (2018)	204
Towradgi Creek	214477	Towradgi Creek Upstream	F	Operating (2018)	205
Towradgi Creek	214475	Towradgi Creek Downstream	F	Operating (2018)	206
Cabbage Tree Creek	214409	Balgownie Road	F	Operating (2018)	207
Cabbage Tree Creek	214405	Cabbage Tree Creek Upstream	F	Operating (2018)	208

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River/estuary system	Station AWRC no.	Station name	Program (F= floodplain E= estuary OT= ocean tide SS= storm surge and other)	Status	Figure no.
Cabbage Tree Creek	214406	Cabbage Tree Creek Downstream	F	Operating (2018)	209
Fairy Creek	214403	Fairy Creek Upstream	F	Operating (2018)	210
Fairy Creek	214404	Fairy Creek Downstream	F	Operating (2018)	211
Byarong Creek	214425	Koloona Ave Upstream	F	Operating (2018)	212
Byarong Creek	214426	Koloona Ave, Downstream	F	Operating (2018)	213
Byarong Creek	214420	Byarong Creek (F6)	F	Operating (2018)	214
American Creek	214430	Blackmans Parade Upstream	F	Operating (2018)	215
American Creek	214431	Blackmans Parade Upstream	F	Operating (2018)	216
Mullet Creek	214400	Mullet Creek	F	Operating (2018)	217
Lake Illawarra	214440	Koonawarra Bay	F	Operating (2018)	218
Lake Illawarra	214416	Cudgeree Bay	F	Operating (2018)	219
Lake Illawarra	214417	Lake Illawarra Entrance	F	Operating (2018)	220
Lake Illawarra	214402	Princes Highway (Macquarie Rivulet)	F	Operating (2018)	221
Little Lake	214467	Little Lake Entrance	F	Operating (2018)	222
Little Lake	214466	Little Lake	F	Decommissioned (Oct 2014)	223
Minamurra River	214442	Minnamurra	E	Operating (2018)	224
Werri Lagoon	214445	Werri Lagoon	E	Operating (2018)	225
Crooked River	215410	Gerroa	E	Operating (2018)	226
Shoalhaven River	215470	Shoalhaven Heads	E	Operating (2018)	227
Shoalhaven River	215415	Hay Street	F	Operating (2018)	228
Shoalhaven River	215420	Terara	F	Operating (2018)	229
Shoalhaven River	215411	Nowra Bridge	F	Operating (2018)	230

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River/estuary system	Station AWRC no.	Station name	Program (F= floodplain E= estuary OT= ocean tide SS= storm surge and other)	Status	Figure no.
Shoalhaven River	215430	Gradys Caravan Park	E	Operating (2018)	231
Shoalhaven River	215452	Gradys	E	Decommissioned (Nov 2010)	232
Crookhaven River	215408	Crookhaven Heads	OT	Operating (2018)	233
Shoalhaven River	215417	Greenwell Point	F	Operating (2018)	234
Offshore	215450	Shoalhaven Offshore	SS	Operating (2018)	235
Wollumboola Lake	215454	Wollumboola	E	Operating (2018)	236
Currarong Creek	216405	Currarong Creek	E	Operating (2018)	237
St Georges Basin	216415	Island Point	E	Operating (2018)	238
Jervis Bay	216470	Jervis Bay	OT	Operating (2018)	239
Sussex Inlet	216412	Sussex Inlet	F	Operating (2018)	240
Swan Lake	216425	Swan Lake	E	Operating (2018)	241
Lake Conjola	216420	Lake Conjola	E	Decommissioned (Jul 2017)	242
Lake Conjola	216420D	Lake Conjola Downstream	E	Operating (2018)	243
Narrawallee Inlet	216430	Narrawallee	E	Operating (2018)	244
Tasman Sea	216471	Ulladulla	OT	Operating (2018)	245
Burrill Lake	216435	Burrill Lake Bridge	F	Operating (2018)	246
Lake Tabourie	216440	Lake Tabourie	E	Operating (2018)	247
Durras Lake	216445	Durras Lake	E	Operating (2018)	248
Clyde River	216453	Nelligen	F	Operating (2018)	249
Clyde River	216410	Princess Jetty,	OT	Operating (2018)	250
Offshore	216450	Batemans Bay Offshore	SS	Operating (2018)	251
Tomaga River	216455	George Bass Drive	E	Operating (2018)	252
Moruya River	217402	Moruya Hospital	F	Operating (2018)	253
Moruya River	217410	Moruya Bridge	F	Operating (2018)	254
Coila Lake	218405	Coila Lake	E	Operating (2018)	255

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River/estuary system	Station AWRC no.	Station name	Program (F= floodplain E= estuary OT= ocean tide SS= storm surge and other)	Status	Figure no.
Tuross River	218410	Tuross Head	E	Operating (2018)	256
Wagonga Inlet	218415	Barlows Bay	E	Operating (2018)	257
Wallaga Lake	219405	Regatta Point	E	Operating (2018)	258
Bermagui River	219470	Bermagui	OT	Operating (2018)	259
Bega River	219410	Bega River	E	Operating (2018)	260
Back Lagoon	219415	Back Lagoon	E	Operating (2018)	261
Merimbula Lake	220405	Merimbula Lake	F	Operating (2018)	262
Merimbula Lake	220410	Merimbula Wharf	F	Operating (2018)	263
Pambula Lake	220415	Pambula Lake	F	Operating (2018)	264
Lake Curalo	220420	Lake Curalo	E	Operating (2018)	265
Tasman Sea	220470	Eden Boat Harbour	OT	Operating (2018)	266
Wonboyn Lake	220425	Agnew Wharf	E	Decommissioned (August 2018)	267
Wonboyn Lake	220452	Wonboyn Lake	E	Operating (2018)	268

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STATION SUMMARIES

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STATION LOCATION
Tweed Entrance South

MHL 2546

Figure 1

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tweed River		Station name: Tweed Entrance South	
AWRC No: 201472		BoM No: 558059	
MGA co-ordinates zone: 56		Easting: 554109	Northing: 6883772
Geographic co-ordinate system:		Latitude: -28.17063900	Longitude: 153.55118600
TRIM reference: FILE17/73403		LGA: Tweed Shire Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Radar		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: May 2014		Secondary sensor installation date: May 2014	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): 7	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 182920 Order of accuracy: L3 PM/SSM RL (mAHD): 3.087 Local BM description: Dynabolt. Local BM location: In concrete block surrounding pump out pipe outside wharf fence.		Local BM RL (mAHD): 4.604 Station datum: Tweed River Hydro Datum (TRHD) and AHD Date of last survey: 3 September 2014 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good – not calculated due to limited monitoring period.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Site commissioned 20 May 2014 to replace previous site Tweed Heads 201431 on northern side of river.			
Peak flood of record (mAHD): 1.56	1% AEP (mAHD): NA	Instrumentation height (mAHD): 6.1	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: This gauge was installed under the Ocean Tide Program to monitor tidal behaviour and flood levels in the Tweed River.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: NA	
Station recommendations: Maintain		Revision date: 27 March 2019	

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Cobaki



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Cobaki

MHL 2546

Figure 2

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Cobaki Broadwater		Station name: Cobaki	
AWRC No: 201448		BoM No: 558045	
MGA co-ordinates zone: 56		Easting: 549344	Northing: 6883128
Geographic co-ordinate system:		Latitude: -28.17663864	Longitude: 153.50267704
TRIM reference: FILE17/58373		LGA: Tweed Shire Council	Rainfall district:58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Floatwell		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: December 1987		Secondary sensor installation date: December 2014	
Range of primary water level sensor (m): 4.5		Range of secondary water level sensor (m): 3.5	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: Instantaneous 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 178477 Order of accuracy: 2 PM/SSM RL (mAHD): 1.120 Local BM description: TBM nail in sheoak tree Local BM location: Eastern side of clearing and opposite station		Local BM RL (mAHD): 1.005 Station datum: Tweed River Hydro Datum (TRHD) and AHD Date of last survey: 25 March 2015 Surveyed by: Daniel Jung (SASIS) Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.705 MHWS: 0.394 MHW: 0.330 MHWN: 0.267 MSL: 0.052	0.031 0.026 0.025 0.024 0.024	MLWN: -0.163 MLW: -0.226 MLWS: -0.290 ISLW: -0.512 Tidal range (HHWSS – ISLW): 1.216	0.027 0.029 0.032 0.035 0.046
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.94	1% AEP (mAHD): 2.3	Instrumentation height (mAHD): 3.3	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The Cobaki Broadwater is a relatively small catchment area. Inundation of the region is generally from the Tweed River backwater flooding and/or ocean storm surges. The Broadwater is a high development area and the gauge provides information to assist in flood warning and development of the region.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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South Pacific Ocean

Coral Sea

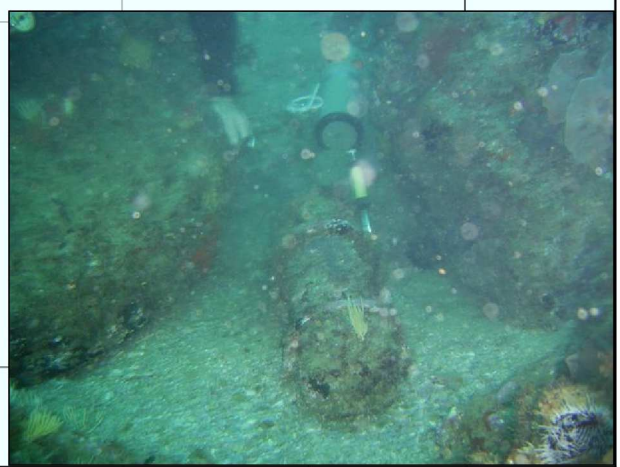
Tweed Offshore

GUY ROCK

COOK ISLAND

COOK ISLAND NATURE RESERVE

INNER REEF



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Map courtesy of Spatial Services 2017

Manly Hydraulics Laboratory

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STATION LOCATION
Tweed Offshore

MHL 2546

Figure 3

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tasman Sea		Station name: Tweed Heads Offshore	
AWRC No: 201450		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 558309	Northing: 6882591
Geographic co-ordinate system:		Latitude: -28.18111947	Longitude: 153.59403058
TRIM reference: FILE17/75224		LGA: NA	Rainfall district: 58
INSTRUMENTATION			
Logger type: Paroscientific RBR and Aanderaa		Communication type: NA	
Primary sensor type: Paroscientific pressure sensor		Secondary sensor type: Aanderaa – pressure controlled oscillator	
Primary sensor installation date: July 2012		Secondary sensor installation date: December 1982	
Range of primary water level sensor (m): 50		Range of secondary water level sensor (m): 60	
Primary sensor sampling regime: 40 second integration B 5 minute		Secondary sensor sampling regime: 40 second integration B 60 minute	
SURVEY DETAILS			
PM/SSM reference: Order of accuracy: PM/SSM RL (mAHD): Local BM description: Local BM location:		Local BM RL (mAHD): Station datum: Approximated to Mean Sea Level Date of last survey: Surveyed by: Gauge plate offset to gauge zero (m):	
TIDAL PLANES (m Approximate Mean Sea Level)			
Period analysed: August 1983 to November 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.083 MHWS: 0.688 MHW: 0.532 MHWN: 0.376 MSL: 0.000	0.013 0.010 0.008 0.009 0.006	MLWN: -0.377 MLW: -0.532 MLWS: -0.688 ISLW: -0.971 Tidal range (HHWSS – ISLW): 2.054	0.013 0.010 0.010 0.013 0.022
STATION CHARACTERISTICS			
General comments: Paroscientific sensor installed on 18 July 2012.			
Peak flood of record (mAHD): NA	1% AEP (mAHD): NA	Instrumentation height (mAHD): NA	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: This gauge was installed under the Storm Surge Program and is an offshore gauge to measure ocean level outside of river entrance and determine downstream tailwater level for river flooding investigations, as this station is not impacted by riverine flooding. This station is stand alone and no real-time data is shown on the MHL public web. The sensor and logger is recovered from the ocean floor on an annual basis.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Letitia 2A

MHL 2546

Figure 4

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tweed River		Station name: Letitia 2A	
AWRC No: 201429		BoM No: 558041	
MGA co-ordinates zone: 56		Easting: 554309	Northing: 6882407
Geographic co-ordinate system:		Latitude: -28.18295183	Longitude: 153.55328813
TRIM reference: FILE17/59370		LGA: Tweed Shire Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: Floatwell	
Primary sensor installation date: October 2014		Secondary sensor installation date: November 1987	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): 3.5	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: Instantaneous 15 minute	
SURVEY DETAILS			
PM/SSM reference: SSM186201 Order of accuracy: L3 PM/SSM RL (mAHD): 1.518 Local BM description: SSM 186201 Local BM location: Brass plaque in concrete in sand 10.5m SE from instrumentation tank.		Local BM RL (mAHD): 1.520 Station datum: Tweed River Hydro Datum (TRHD) and AHD Date of last survey: 26 March 2015 Surveyed by: Daniel Jung (SASIS) Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.849	0.046	MLWN: -0.228	0.032
MHWS: 0.511	0.042	MLW: -0.328	0.032
MHW: 0.411	0.039	MLWS: -0.428	0.033
MHWN: 0.311	0.037	ISLW: -0.670	0.032
MSL: 0.041	0.033	Tidal range (HHWSS – ISLW): 1.519	0.041
STATION CHARACTERISTICS			
General comments: Submersible pressure transducer installed Oct 2014 is the primary sensor as floatwell cannot capture WL below 1.4m.			
Peak flood of record (mAHD): 1.58	1% AEP (mAHD): 2.4	Instrumentation height (mAHD): 2.6	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: Commissioned for a sediment transport study of the lower Tweed River, the station currently provides baseline tidal data. There are currently AWLR stations upstream and downstream in close proximity.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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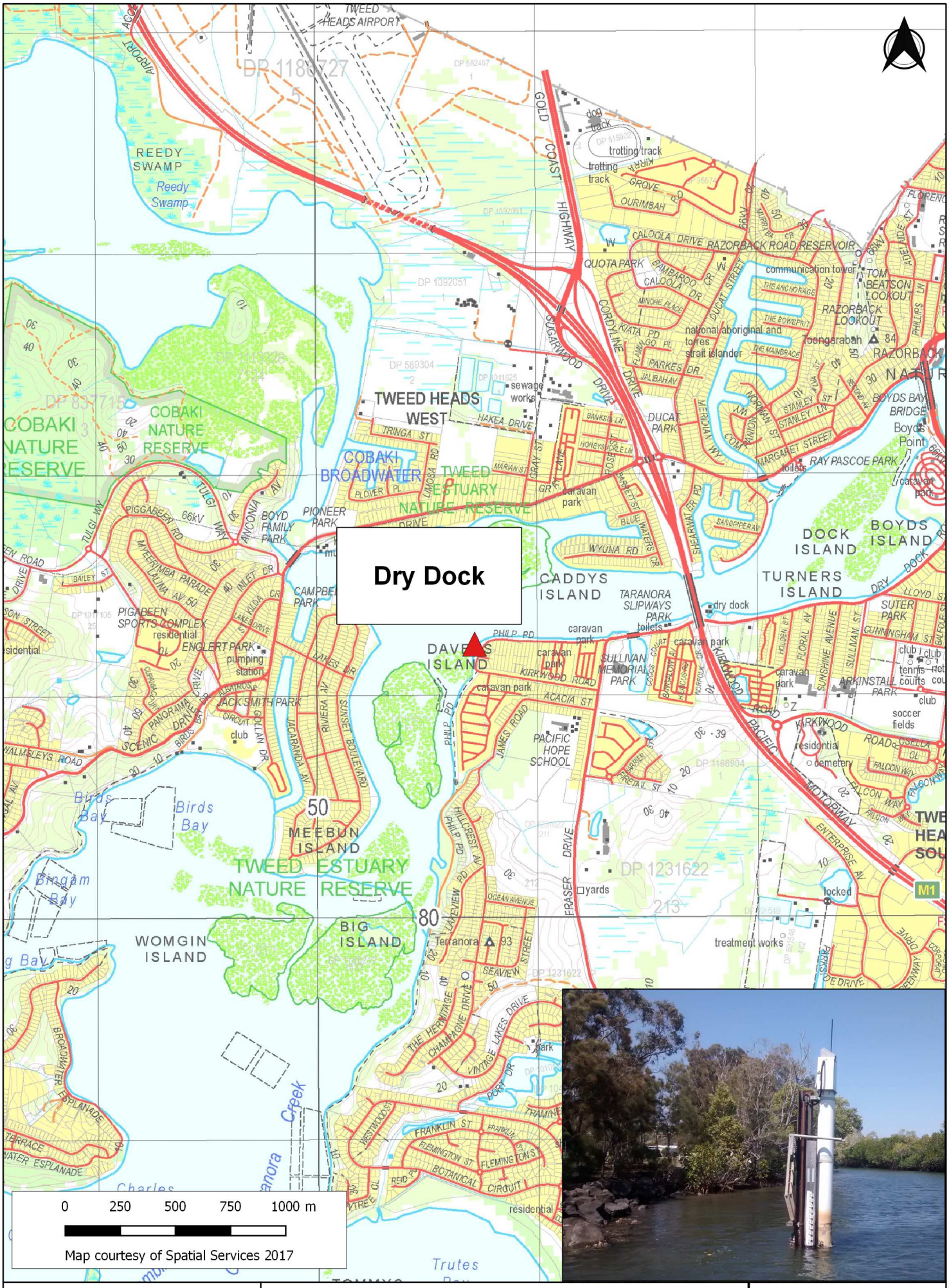

NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Dry Dock**	**MHL 2546** **Figure 5** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Terranora Inlet		Station name: Dry Dock	
AWRC No: 201428		BoM No: 558029	
MGA co-ordinates zone: 56		Easting: 550715	Northing: 6881235
Geographic co-ordinate system:		Latitude: -28.19367417	Longitude: 153.51672538
TRIM reference: FILE17/59374		LGA: Tweed Shire Council	Rainfall district:58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Floatwell		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: December 1987		Secondary sensor installation date: December 2014	
Range of primary water level sensor (m): 4.5		Range of secondary water level sensor (m): 3.5	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: Instantaneous 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 41586 Order of accuracy: L3 PM/SSM RL (mAHD): 1.536 Local BM description: PM 41587 Local BM location: Steel pin in cover box at intersection of Philip Parade and Stephen Place.		Local BM RL (mAHD): 1.390 Station datum: Tweed River Hydro Datum (TRHD) and AHD Date of last survey: 25 March 2015 Surveyed by: Daniel Jung (SASIS) Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.738 MHWS: 0.423 MHW: 0.357 MHWN: 0.292 MSL: 0.075	0.045 0.039 0.037 0.035 0.031	MLWN: -0.142 MLW: -0.208 MLWS: -0.273 ISLW: -0.498 Tidal range (HHWSS – ISLW): 1.235	0.031 0.032 0.034 0.035 0.049
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.61	1% AEP (mAHD): 2.3	Instrumentation height (mAHD): 3.0	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge has a significant role in reviewing regional flood damage and in capturing time series data for numerical model development.			
Station shown on BoM website: Radio transmission event data from a Tweed Shire Council station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Terranora



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Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Terranora

MHL 2546

Figure 6

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Terranora Inlet		Station name: Terranora	
AWRC No: 201447		BoM No: 558056	
MGA co-ordinates zone: 56		Easting: 548955	Northing: 6880384
Geographic co-ordinate system:		Latitude: -28.20142241	Longitude: 153.49882931
TRIM reference: FILE17/59375		LGA: Tweed Shire Council	Rainfall district:58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Floatwell		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: December 1987		Secondary sensor installation date: February 2013	
Range of primary water level sensor (m): 4.5		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: Instantaneous 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 182918 Order of accuracy: L3 PM/SSM RL (mAHD): 1.502 Local BM description: SSM 186208 Local BM location: Brass plaque in concrete slab near waters edge.		Local BM RL (mAHD): 1.410 Station datum: Tweed River Hydro Datum (TRHD) and AHD Date of last survey: 17 June 2014 Surveyed by: Daniel Jung (SASIS) Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.726 MHWS: 0.424 MHW: 0.366 MHWN: 0.307 MSL: 0.104	0.041 0.036 0.034 0.032 0.028	MLWN: -0.099 MLW: -0.157 MLWS: -0.215 ISLW: -0.431 Tidal range (HHWSS – ISLW): 1.157	0.027 0.027 0.027 0.028 0.040
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.75	1% AEP (mAHD): 2.3	Instrumentation height (mAHD): 3.0	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program and is well situated to monitor flood levels in this highly developed area and to observe tidal behaviour in conjunction with nearby gauges.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Barneys Point



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STATION LOCATION
Barneys Point

MHL 2546

Figure 7

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tweed River		Station name: Barneys Point	
AWRC No: 201426		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 554110	Northing: 6877710
Geographic co-ordinate system:		Latitude: -28.22535799	Longitude: 153.55147852
TRIM reference: FILE17/59369		LGA: Tweed Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: March 1987		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 41441 Order of accuracy: L2 PM/SSM RL (mAHD): 2.174 Local BM description: PM 41440 Local BM location: PM 41440 on footpath at the end of jetty.		Local BM RL (mAHD): 1.926 Station datum: Tweed River Hydro Datum (TRHD) and AHD Date of last survey: 3 April 2017 Surveyed by: David Griffin Gauge plate offset to gauge zero (m): -0.020m on 1-2m gauge plate	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2006		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.748 MHWS: 0.426 MHW: 0.354 MHWN: 0.281 MSL: 0.053	0.024 0.024 0.024 0.024 0.025	MLWN: -0.175 MLW: -0.247 MLWS: -0.319 ISLW: -0.549 Tidal range (HHWSS – ISLW): 1.297	0.027 0.029 0.030 0.032 0.028
STATION CHARACTERISTICS			
General comments: Floatwell was decommissioned in July 2011 and replaced with a submersible pressure transducer on the bank.			
Peak flood of record (mAHD): 2.22	1% AEP (mAHD): 2.9	Instrumentation height (mAHD): 3.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge has significant function in reviewing flood damage from floods and storm surges.			
Station shown on BoM website: Radio transmission event data from a Tweed Shire Council operated station is displayed.			
SES flood classification: None The SES flood classifications in the Service Level Specification ver. 3.0 relate to the Tweed Council operated station Barneys Point (Station no. 558010), which is located on the opposite side of the river from this station.			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Tumbulgum



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Map courtesy of Spatial Services 2017

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STATION LOCATION
Tumbulgum

MHL 2546

Figure 8

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tweed River		Station name: Tumbulgum	
AWRC No: 201432		BoM No: 558014	
MGA co-ordinates zone: 56		Easting: 545172	Northing: 6871999
Geographic co-ordinate system:		Latitude: -28.27724627	Longitude: 153.46060830
TRIM reference: FILE17/59368		LGA: Tweed Shire Council	Rainfall district:58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: Floatwell	
Primary sensor installation date: August 2012		Secondary sensor installation date: July 1985	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): 7	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: Instantaneous 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 40629 Order of accuracy: L2 PM/SSM RL (mAHD): 2.757 Local BM description: PM 40629 Local BM location: Steel pin in cover box at intersection of Riverside Dr and Government Rd.		Local BM RL (mAHD): 2.757 Station datum: Tweed River Hydro Datum (TRHD) and AHD Date of last survey: 2 April 2017 Surveyed by: David Griffin Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.820 MHWS: 0.504 MHW: 0.435 MHWN: 0.366 MSL: 0.121	0.045 0.039 0.037 0.034 0.027	MLWN: -0.123 MLW: -0.193 MLWS: -0.262 ISLW: -0.487 Tidal range (HHWSS – ISLW): 1.307	0.025 0.025 0.026 0.028 0.053
STATION CHARACTERISTICS			
General comments: Submersible pressure transducer replaced floatwell as the primary sensor in 2015.			
Peak flood of record (mAHD): 3.96	1% AEP (mAHD): 3.9	Instrumentation height (mAHD): 5.2	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge is located at the confluence of the Rous and Tweed rivers and provides flood hydrographs for the combined waters of these rivers.			
Station shown on BoM website: Radio transmission event data connected to MHL's sensor is displayed in AHD.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Kynnumboon



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STATION LOCATION
Kynnumboon

MHL 2546

Figure 9

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Rous River		Station name: Kynnumboon	
AWRC No: 201422		BoM No: 558051	
MGA co-ordinates zone: 56		Easting: 538179	Northing: 6867895
Geographic co-ordinate system:		Latitude: -28.31451111	Longitude: 153.38944004
TRIM reference: FILE17/59354		LGA: Tweed Shire Council	Rainfall district:58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: August 1990		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 72703 Order of accuracy: 2 PM/SSM RL (mAHD):2.437 Local BM description: BM 2/HO Triangle cut into concrete Local BM location: At middle of eastern end of large Telstra pit, NW corner of intersection of Numinbah Rd and Tomewin Rd.		Local BM RL (mAHD): 3.138 Station datum: Tweed River Hydro Datum (TRHD) and AHD Date of last survey: 4 July 2014 Surveyed by: Daniel Jung (SASIS) Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.871 MHWS: 0.549 MHW: 0.477 MHWN: 0.405 MSL: 0.137	0.047 0.041 0.040 0.039 0.032	MLWN: -0.130 MLW: -0.202 MLWS: -0.275 ISLW: -0.504 Tidal range (HHWSS – ISLW): 1.375	0.029 0.029 0.029 0.029 0.041
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 5.69	1% AEP (mAHD): 4.5	Instrumentation height (mAHD): 6.6	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The Rous River contributes a significant proportion of floodwaters to the Tweed River. This gauge provides an early warning for potential flooding near the township of Murwillumbah.			
Station shown on BoM website: Radio transmission event data connected to MHL's sensor is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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North Murwillumbah



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STATION LOCATION
North Murwillumbah

MHL 2546

Figure 10

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tweed River		Station name: North Murwillumbah	
AWRC No: 201420		BoM No: 058186	
MGA co-ordinates zone: 56		Easting: 539329	Northing: 6866467
Geographic co-ordinate system:		Latitude: -28.32736973	Longitude: 153.40121717
TRIM reference: FILE17/59376		LGA: Tweed Shire Council	Rainfall district:58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: January 1987		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 186213 Order of accuracy: L3 PM/SSM RL (mAHD):5.999 Local BM description: BM 2/SS Triangle cut into concrete. Local BM location: At top of concrete flood wall next to tide gauge, opposite Tweed Shire Council on Tumbulgum Rd.		Local BM RL (mAHD): 6.664 Station datum: Tweed River Hydro Datum (TRHD) and AHD Date of last survey: 4 July 2014 Surveyed by: Daniel Jung (SASIS) Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1992 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.854 MHWS: 0.525 MHW: 0.449 MHWN: 0.374 MSL: 0.104	0.055 0.046 0.042 0.039 0.031	MLWN: -0.165 MLW: -0.240 MLWS: -0.316 ISLW: -0.551 Tidal range (HHWSS – ISLW): 1.405	0.026 0.025 0.025 0.026 0.057
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 6.13	1% AEP (mAHD): 6.4	Instrumentation height (mAHD): 17.0	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The station provides real time flood data for flood monitoring and evacuation planning. The gauge also has significant function in assisting in the review of flood damage to the region.			
Station shown on BoM website: Radio transmission event data connected to MHL's sensor is displayed in AHD using the name Murwillumbah on BoM webpage.			
SES flood classification: Minor 3.0m, Moderate 4.0m, Major 4.8m (AHD)			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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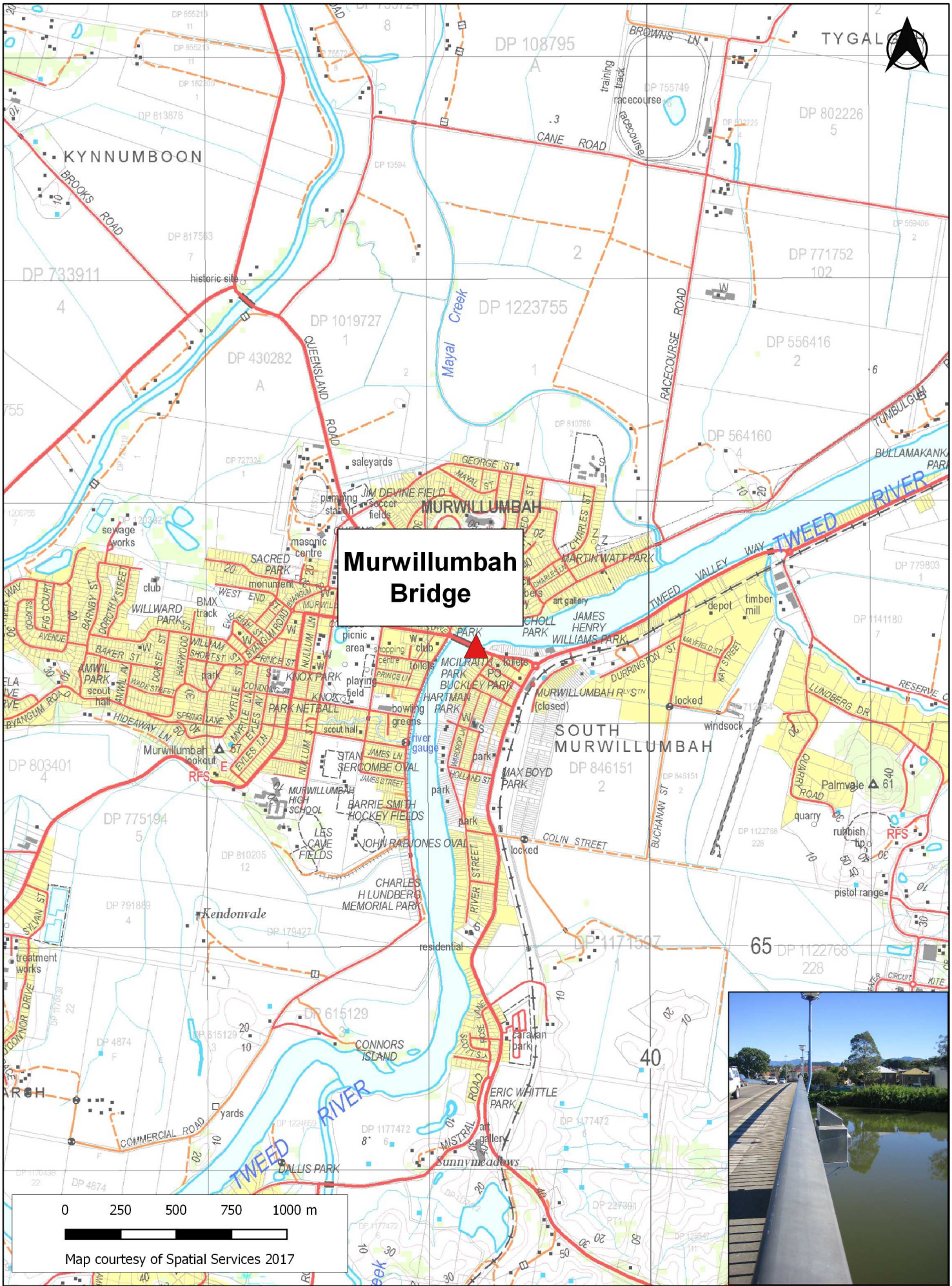

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Murwillumbah Bridge

MHL 2546

Figure 11

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tweed River		Station name: Murwillumbah Bridge	
AWRC No: 201465		BoM No: 558067	
MGA co-ordinates zone: 56		Easting: 539219	Northing: 6866353
Geographic co-ordinate system:		Latitude: -28.32840206	Longitude: 153.40009887
TRIM reference: FILE17/59377		LGA: Tweed Shire Council	Rainfall district:58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: November 2002		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 15		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 186200 Order of accuracy: L3 PM/SSM RL (mAHD):5.731 Local BM description: BM nail in concrete. Local BM location: Nail on bridge near triangle at instrumentation cabinet.		Local BM RL (mAHD): 8.671 Station datum: Tweed River Hydro Datum (TRHD) and AHD Date of last survey: 2 April 2017 Surveyed by: David Griffin Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2003 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.916 MHWS: 0.579 MHW: 0.504 MHWN: 0.429 MSL: 0.147	0.032 0.028 0.027 0.026 0.021	MLWN: -0.136 MLW: -0.210 MLWS: -0.285 ISLW: -0.526 Tidal range (HHWSS – ISLW): 1.442	0.015 0.015 0.015 0.012 0.024
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 5.84	1% AEP (mAHD): 6.9	Instrumentation height (mAHD): 10.0	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: This gauge has been installed as a backup to the North Murwillumbah station, and is used for flood monitoring and evacuation purposes.			
Station shown on BoM website: Radio transmission event data connected to MHL's sensor is displayed in AHD.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Bray Park Weir

MHL 2546

Figure 12

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tweed River		Station name: Bray Park Weir	
AWRC No: 201455		BoM No: 558065	
MGA co-ordinates zone: 56		Easting: 536209	Northing: 6864484
Geographic co-ordinate system:		Latitude: -28.34535948	Longitude: 153.36945078
TRIM reference: FILE17/59406		LGA: Tweed Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: November 2002		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 76451 Order of accuracy: L3 PM/SSM RL (mAHD):6.708 Local BM description: BM BPW Plug in concrete. Local BM location: Plug in concrete slab, south corner, closest to gauge post.		Local BM RL (mAHD): 3.218 Station datum: Tweed River Hydro Datum (TRHD) and AHD Date of last survey: 2 April 2017 Surveyed by: David Griffin Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 9.25	1% AEP (mAHD): 9.2	Instrumentation height (mAHD): 14.2	
Hydraulic characteristics: Station is not tidal, located upstream of a weir			
Purpose of installation and current functionality: The station was installed under the Floodplain Management Program and is used for flood monitoring upstream of Murwillumbah. This station also provides information to Tweed Shire Council of tidal ingress upstream of the Bray Park Weir and its potential impact on the drinking water supply (weir height is approximately 1m AHD).			
Station shown on BoM website: Radio transmission event data connected to MHL's sensor is displayed in AHD.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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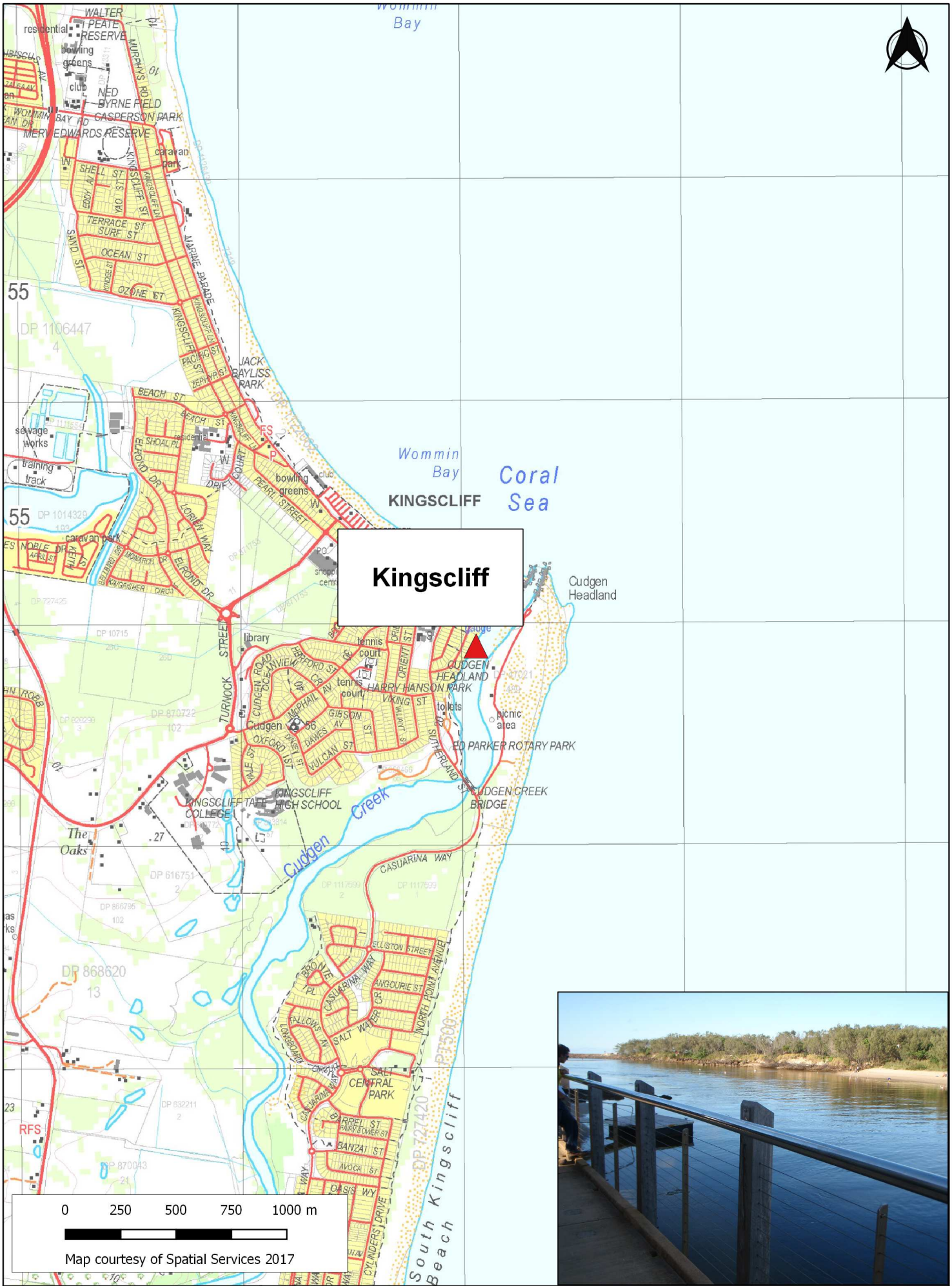

Manly Hydraulics Laboratory	**STATION LOCATION** **Kingscliff**	**MHL 2546** **Figure 13** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Cudgen Creek		Station name: Kingscliff	
AWRC No: 202418		BoM No: 558050	
MGA co-ordinates zone: 56		Easting: 557064	Northing: 6873896
Geographic co-ordinate system:		Latitude: -28.25966041	Longitude: 153.58177064
TRIM reference: FILE17/59407		LGA: Tweed Shire Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: May 1985		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 63882 Order of accuracy: L3 PM/SSM RL (mAHD): 1.182 Local BM description: BM King1 Plug in concrete. Local BM location: Concrete on the edge of walkway above sensor orifice line.		Local BM RL (mAHD): 2.027 Station datum: Tweed River Hydro Datum (TRHD) and AHD Date of last survey: 4 July 2014 Surveyed by: Daniel Jung (SASIS) Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2008		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.948 MHWS: 0.575 MHW: 0.448 MHWN: 0.321 MSL: -0.011	0.032 0.028 0.025 0.023 0.027	MLWN: -0.342 MLW: -0.470 MLWS: -0.597 ISLW: -0.863 Tidal range (HHWSS – ISLW): 1.812	0.034 0.035 0.037 0.039 0.047
STATION CHARACTERISTICS			
General comments: The changing sand base in Cudgen Creek has led to the sensor not reading the full tidal trace. A new station was installed upstream as a radar on Sutherland Street bridge. Pressure readings taken since Sep 1999.			
Peak flood of record (mAHD): 1.50	1% AEP (mAHD): 2.5	Instrumentation height (mAHD): 3.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge is useful for monitoring entrance conditions, and in conjunction with the water quality station on Cudgen Creek records the tidal characteristics of the system.			
Station shown on BoM website: MHL data for this station is displayed in TRHD.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Kingscliff Upstream



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Kingscliff Upstream

MHL 2546

Figure 14

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Cudgen Creek		Station name: Kingscliff Upstream	
AWRC No: 202434		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 557030	Northing: 6873280
Geographic co-ordinate system:		Latitude: -28.26522220	Longitude: 153.58145420
TRIM reference: FILE17/59407		LGA: Tweed Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: May 2014		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 182917 Order of accuracy: L3 PM/SSM RL (mAHD): 2.907 Local BM description: Plug in concrete. Local BM location: Concrete on NE side of bridge footpath, halfway across the bridge.		Local BM RL (mAHD): 4.198 Station datum: Tweed River Hydro Datum (TRHD) and AHD Date of last survey: 4 July 2014 Surveyed by: Daniel Jung (SASIS) Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good – not calculated due to limited monitoring period	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Kingscliff relocated upstream to catch full tides. Vandalised since 14 Jan 2017, not rebuilt yet. The original Kingscliff is being used at present.			
Peak flood of record (mAHD): 1.51	1% AEP (mAHD): 2.5	Instrumentation height (mAHD): 4.6	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge is useful for monitoring entrance conditions, and in conjunction with the water quality station on Cudgen Creek records the tidal characteristics of the system.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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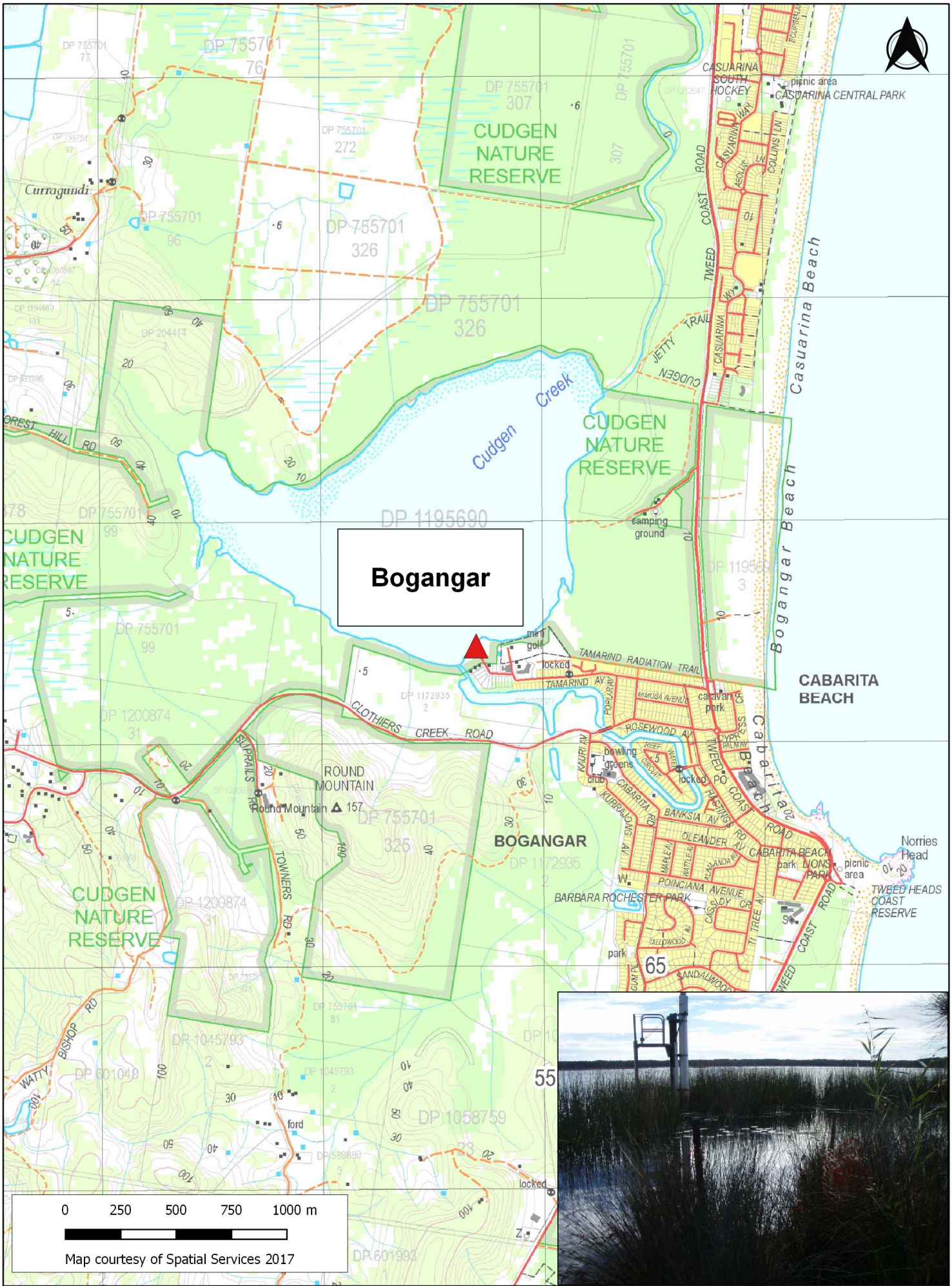

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STATION LOCATION
Bogangar

MHL 2546

Figure 15

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Cudgen Lake		Station name: Bogangar	
AWRC No: 202416		BoM No: 558043	
MGA co-ordinates zone: 56		Easting: 554698	Northing: 6866441
Geographic co-ordinate system:		Latitude: -28.32705338	Longitude: 153.55800094
TRIM reference: FILE17/59409		LGA: Tweed Shire Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: PSTN LL (land line)	
Primary sensor type: Floatwell		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: December 1985		Secondary sensor installation date: February 2013	
Range of primary water level sensor (m): 4.5		Range of secondary water level sensor (m): 7	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: Instantaneous 15 minute	
SURVEY DETAILS			
PM/SSM reference: SSM 186202 Order of accuracy: L3 PM/SSM RL (mAHD): 2.356 Local BM description: BM1/DL Pin and triangle cut into concrete. Local BM location: Pin and triangle cut on west side concrete boat ramp at the end of Willow Avenue.		Local BM RL (mAHD): 0.350 Station datum: Brunswick River Flood Mitigation Datum (BRFMD) and AHD Date of last survey: 4 July 2014 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 3.23	1% AEP (mAHD): 2.9	Instrumentation height (mAHD): 4.1	
Hydraulic characteristics: Shallow tidal lagoon with small tidal range (less than 5cm).			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program.			
Station shown on BoM website: MHL data for this station is displayed in BRFMD.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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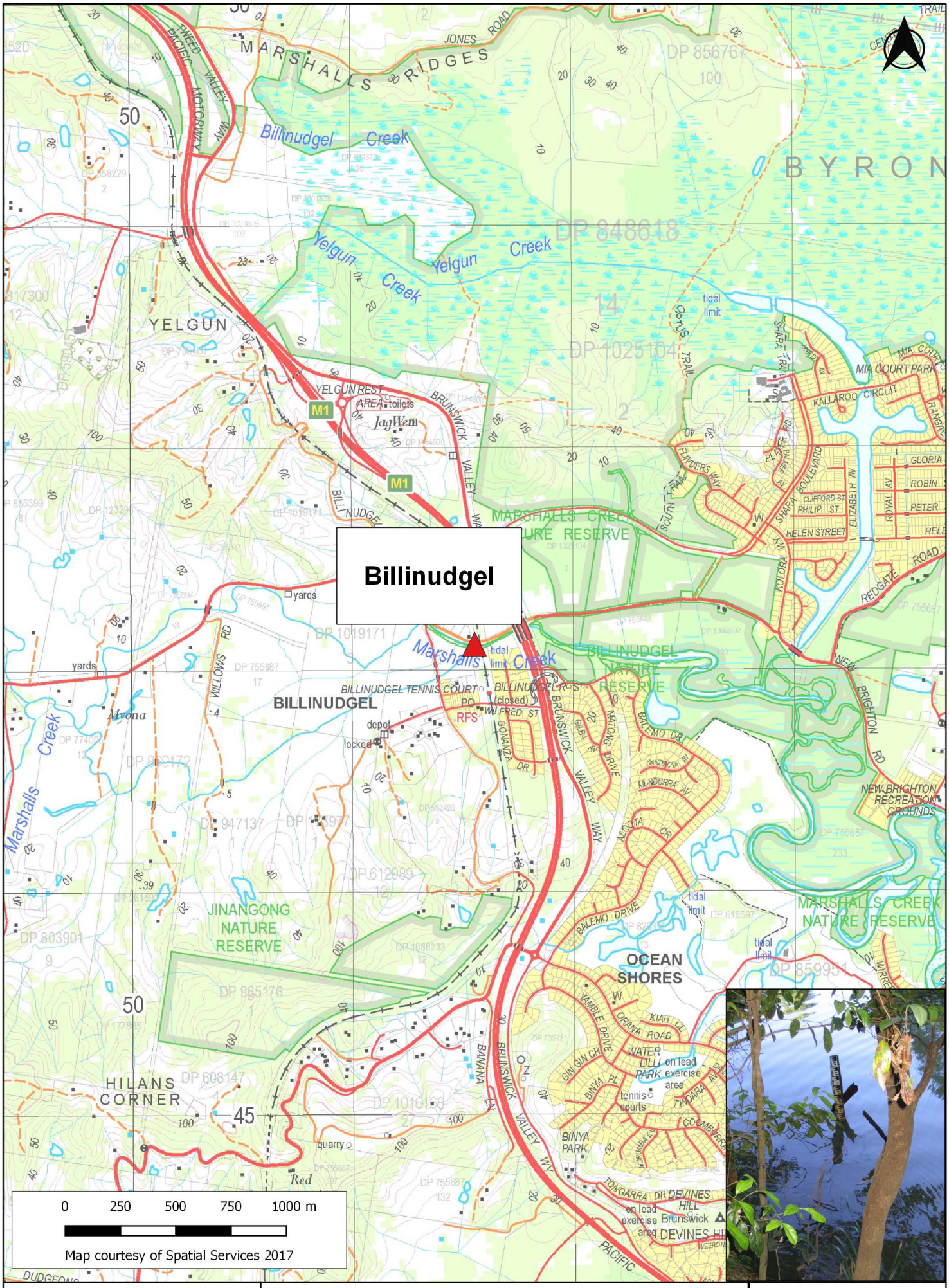

Manly Hydraulics Laboratory

STATION LOCATION
Billinudgel

MHL 2546

Figure 16

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Marshalls Creek		Station name: Billinudgel	
AWRC No: 202400		BoM No: 558020	
MGA co-ordinates zone: 56		Easting: 551554	Northing: 6847116
Geographic co-ordinate system:		Latitude: -28.50161532	Longitude: 153.52679111
TRIM reference: FILE17/59410		LGA: Byron Shire Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Floatwell		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: January 1986		Secondary sensor installation date: December 2016	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): 7	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: Instantaneous 15 minute	
SURVEY DETAILS			
PM/SSM reference: SSM 71621 Order of accuracy: L2 PM/SSM RL (mAHD): 2.978 Local BM description: Bolt in tree stump. Local BM location: Bolt in stump of camphor laurel adjacent to gauging station.		Local BM RL (mAHD): 3.066 Station datum: Brunswick River Flood Mitigation Datum (BRFMD) and AHD Date of last survey: 31 May 2007 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.596 MHWS: 0.387 MHW: 0.362 MHWN: 0.337 MSL: 0.269	0.047 0.038 0.036 0.035 0.030	MLWN: 0.201 MLW: 0.176 MLWS:0.151 ISLW: 0.001 Tidal range (HHWSS – ISLW):0.595	0.027 0.027 0.027 0.027 0.046
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 4.45	1% AEP (mAHD): 4.3	Instrumentation height (mAHD): 6.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge is used to review flood damage and also for monitoring changes to catchment response and creek hydrodynamics.			
Station shown on BoM website: Radio transmission event data connected to MHL's sensor is displayed in BRFMD.			
SES flood classification: Minor 2.5m, Moderate 3.0m, Major 3.5m (BRFMD)			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Orana Bridge

SOUTH GOLDEN BEACH

NEW BRIGHTON

OCEAN SHORES

MARSHALLS CREEK NATURE RESERVE

BILLINUDGEL NATURE RESERVE

BRUNSWICK HEADS NATURE RESERVE

Crabbes Creek Beach

Marshalls Creek

0 250 500 750 1000 m

Map courtesy of Spatial Services 2017



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STATION LOCATION
Orana Bridge

MHL 2546

Figure 17

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Marshalls Creek		Station name: Orana Bridge	
AWRC No: 202475		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 553611	Northing: 6845534
Geographic co-ordinate system:		Latitude: -28.51581170	Longitude: 153.54788303
TRIM reference: FILE17/60367		LGA: Byron Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: November 2002		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 61764 Order of accuracy: L2 PM/SSM RL (mAHD): 8.225 Local BM description: BM 20/L triangle cut into concrete. Local BM location: Triangle cut into concrete footpath at NE end of bridge.		Local BM RL (mAHD): 4.102 Station datum: Brunswick River Flood Mitigation Datum (BRFMD) and AHD Date of last survey: 20 June 2007 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2003 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.902	0.041	MLWN: 0.000	0.028
MHWS: 0.559	0.027	MLW: -0.068	0.031
MHW: 0.491	0.024	MLWS: -0.136	0.034
MHWN: 0.423	0.022	ISLW: -0.381	0.045
MSL: 0.211	0.019	Tidal range (HHWSS – ISLW): 1.283	0.077
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.17	1% AEP (mAHD): 2.6	Instrumentation height (mAHD): 6.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge is valuable in capturing major flooding levels in the New Brighton/Ocean Shores area.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

STATION LOCATION
Brunswick Heads

MHL 2546

Figure 18

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Brunswick River		Station name: Brunswick Heads	
AWRC No: 202403		BoM No: 558063	
MGA co-ordinates zone: 56		Easting: 554078	Northing: 6843182
Geographic co-ordinate system:		Latitude: -28.53702500	Longitude: 153.55276900
TRIM reference: FILE17/60504		LGA: Byron Shire Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: February 1986		Secondary sensor installation date: July 2010	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 42174 Order of accuracy: L3 PM/SSM RL (mAHD): 2.022 Local BM description: Triangle cut into concrete. Local BM location: Triangle cut onto slab supporting brace rods for the gauge instrument box, 300m downstream of entrance in bush area.		Local BM RL (mAHD): 2.270 Station datum: Brunswick River Flood Mitigation Datum (BRFMD) and AHD Date of last survey: 1 May 2011 Surveyed by: Land & Property Information Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.028	0.023	MLWN: -0.352	0.026
MHWS: 0.634	0.022	MLW: -0.489	0.027
MHW: 0.497	0.023	MLWS: -0.626	0.028
MHWN: 0.360	0.023	ISLW: -0.907	0.028
MSL: 0.004	0.024	Tidal range (HHWSS – ISLW): 1.936	0.014
STATION CHARACTERISTICS			
General comments: Floatwell sensor till Jun 2009. Gauge is located in river approximately 500m upstream of the entrance. The river entrance is maintained open by a training wall on either side of the river.			
Peak flood of record (mAHD): 1.56	1% AEP (mAHD): NA	Instrumentation height (mAHD): 3.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: To monitor flood levels and tidal behaviour in Brunswick River as a part of the Ocean Tide Program.			
Station shown on BoM website: MHL data for this station is displayed in BRFMD.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Mullumbimby



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Mullumbimby

MHL 2546

Figure 19

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Brunswick River		Station name: Mullumbimby	
AWRC No: 202402		BoM No: 558006	
MGA co-ordinates zone: 56		Easting: 548580	Northing: 6841766
Geographic co-ordinate system:		Latitude: -28.55002021	Longitude: 153.49662932
TRIM reference: FILE17/75291		LGA: Byron Shire Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Floatwell		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: July 1984		Secondary sensor installation date: February 2018	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: Instantaneous 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 39189 Order of accuracy: L3 PM/SSM RL (mAHD): 5.573 Local BM description: BM 1/DL Pin and triangle cut into concrete. Local BM location: On wing wall at NW corner of bridge over the Brunswick River on Main Arm Rd.		Local BM RL (mAHD): 5.566 Station datum: Brunswick River Flood Mitigation Datum (BRFMD) and AHD Date of last survey: 15 August 2007 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.080	0.032	MLWN: -0.259	0.023
MHWS: 0.677	0.029	MLW: -0.379	0.021
MHW: 0.557	0.027	MLWS: -0.498	0.020
MHWN: 0.437	0.025	ISLW: -0.786	0.018
MSL: 0.089	0.023	Tidal range (HHWSS – ISLW): 1.866	0.023
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 4.53	1% AEP (mAHD): 5.2	Instrumentation height (mAHD): 6.9	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge is useful for reviewing flood damage in the township and establishing changes to the river hydrodynamics.			
Station shown on BoM website: Radio transmission event data connected to MHL's sensor is displayed in BRFMD.			
SES flood classification: Minor 2.5m, Moderate 3.5m, Major 4.5m (BRFMD)			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Lake Ainsworth



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

Manly Hydraulics Laboratory

STATION LOCATION
Lake Ainsworth

MHL 2546

Figure 20

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Lake Ainsworth		Station name: Lake Ainsworth	
AWRC No: 203455		BoM No: 558052	
MGA co-ordinates zone: 56		Easting: 557863	Northing: 6816160
Geographic co-ordinate system:		Latitude: -28.78075797	Longitude: 153.59282403
TRIM reference: FILE17/59411		LGA: Byron Shire Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: September 1994		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 39107 Order of accuracy: L3 PM/SSM RL (mAHD): 4.807 Local BM description: BM JP2 Triangle cut into concrete. Local BM location: Concrete border of driveway within 20m from the box, under a stairwell of a building on the lake which holds watercraft.		Local BM RL (mAHD): 3.057 Station datum: AHD Date of last survey: 24 August 2017 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Rain gauge installed since October 1994. Water quality monitoring occurred from 1995 to 1996. Monitoring of temperature and electrical conductivity has recommenced in April 2018.			
Peak flood of record (mAHD): 3.18	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 4.6	
Hydraulic characteristics: Permanently closed lake.			
Purpose of installation and current functionality: This gauge was installed under the Estuary Program to provide input into the balanced, long-term management of the lake and its surrounds. Installation was prompted by Lake Ainsworth being used as a recreational resource and the occurrence of algal blooms in the lake.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

STATION LOCATION
Woodlawn College

MHL 2546

Figure 21

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wilsons River		Station name: Woodlawn College	
AWRC No: 203402		BoM No: 558012	
MGA co-ordinates zone: 56		Easting: 529528	Northing: 6815751
Geographic co-ordinate system:		Latitude: -28.78541179	Longitude: 153.30253893
TRIM reference: FILE17/60369		LGA: Lismore City Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: March 1980		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 55424 Order of accuracy: 5 PM/SSM RL (mAHD): 6.850 Local BM description: Triangle cut into concrete. Local BM location: SW corner of concrete floor of tide recorder shed.		Local BM RL (mAHD): 14.632 Station datum: Richmond River Valley Datum (RRVD) and AHD Date of last survey: 23 September 2014 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.752 MHWS: 0.480 MHW: 0.427 MHWN:0.375 MSL: 0.158	0.047 0.043 0.042 0.042 0.047	MLWN: -0.058 MLW: -0.111 MLWS: -0.163 ISLW: -0.357 Tidal range (HHWSS – ISLW): 1.109	0.052 0.052 0.053 0.052 0.033
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 12.17	1% AEP (mAHD): 12.9	Instrumentation height (mAHD): 14.8	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. In conjunction with the Tuncester gauge, the Woodlawn College gauge assists in the monitoring of floodwaters at Lismore, the review of flood damage at Lismore and issuing of warnings downstream.			
Station shown on BoM website: Radio transmission event data connected to MHL's sensor is displayed in AHD.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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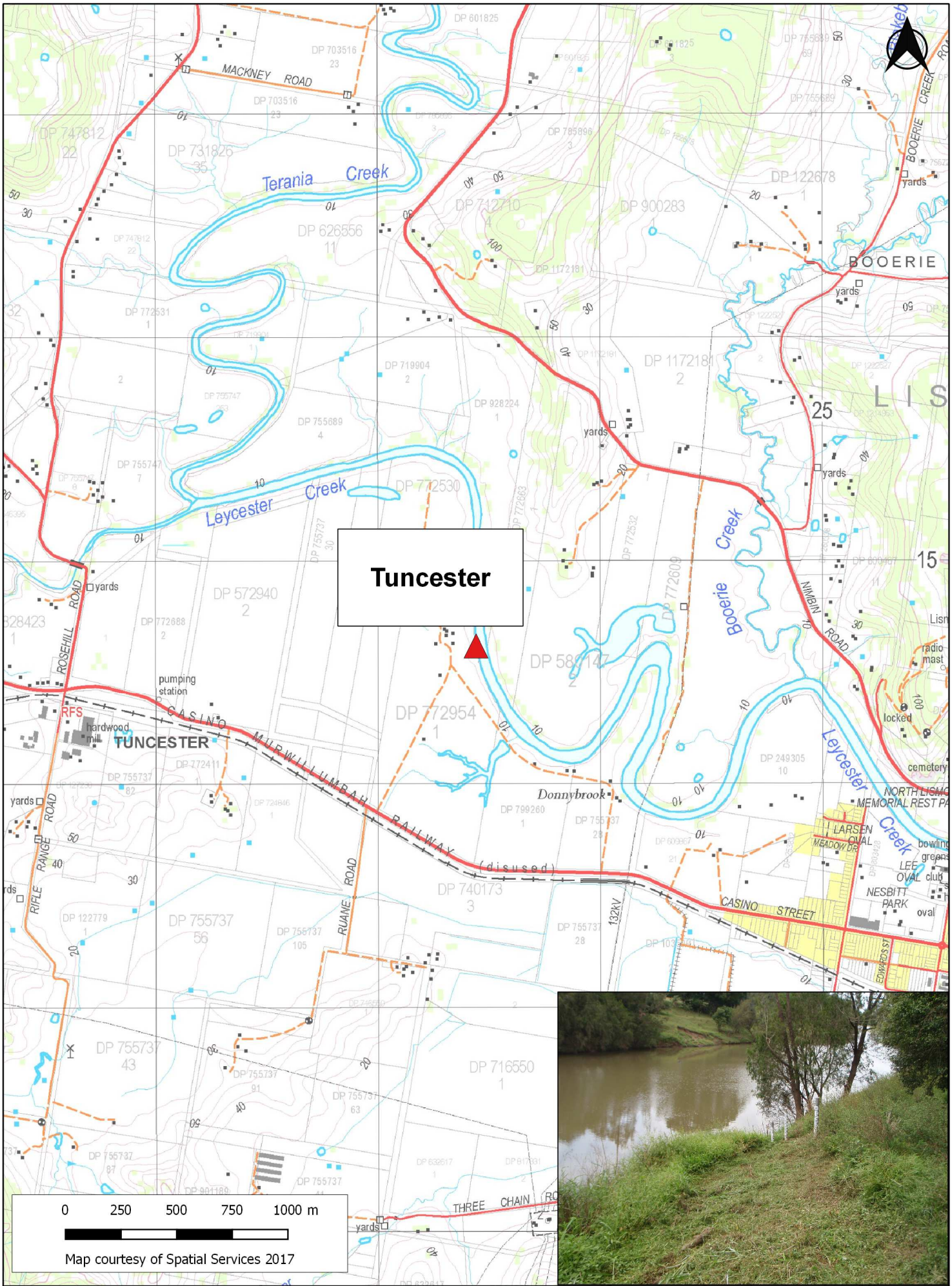

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Tuncester

MHL 2546

Figure 22

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Leycester Creek		Station name: Tuncester	
AWRC No: 203443		BoM No: 058201	
MGA co-ordinates zone: 56		Easting: 523441	Northing: 6814619
Geographic co-ordinate system:		Latitude: -28.79575471	Longitude: 153.24019648
TRIM reference: FILE17/60373		LGA: Lismore City Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: March 1980		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 123164 Order of accuracy: L4 PM/SSM RL (mAHD): 12.082 Local BM description: BM 32/NF Triangle cut into concrete. Local BM location: Concrete near SE corner of old dairy building.		Local BM RL (mAHD): 14.330 Station datum: Richmond River Valley Datum (RRVD) and AHD Date of last survey: 22 May 2015 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.740 MHWS: 0.463 MHW: 0.408 MHWN:0.354 MSL: 0.132	0.059 0.055 0.054 0.053 0.056	MLWN: -0.089 MLW: -0.144 MLWS: -0.198 ISLW: -0.396 Tidal range (HHWSS – ISLW): 1.136	0.060 0.059 0.059 0.057 0.027
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 14.12	1% AEP (mAHD): 14.0	Instrumentation height (mAHD): 15.0	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge assists in the monitoring of floodwaters at Lismore, the review of flood damage at Lismore and issuing flood warnings for downstream regions. The significant impact of flooding on the centre of Lismore warrants the continued operation of both the Tuncester and Woodlawn College gauges.			
Station shown on BoM website: Radio transmission event data connected to MHL's sensor is displayed in AHD.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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East Gundurimba



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
East Gundurimba

MHL 2546

Figure 23

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wilsons River		Station name: East Gundurimba	
AWRC No: 203427		BoM No: 558047	
MGA co-ordinates zone: 56		Easting: 526034	Northing: 6809079
Geographic co-ordinate system:		Latitude: -28.84570949	Longitude: 153.26689381
TRIM reference: FILE17/60377		LGA: Lismore City Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: March 1980		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 59096 Order of accuracy: L3 PM/SSM RL (mAHD): 10.153 Local BM description: BM 34/M Triangle cut in concrete. Local BM location: SW corner of concrete slab of tide recorder shed.		Local BM RL (mAHD): 9.933 Station datum: Richmond River Valley Datum (RRVD) and AHD Date of last survey: 8 November 2017 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1993 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.723 MHWS: 0.451 MHW: 0.401 MHWN:0.351 MSL: 0.144	0.059 0.053 0.052 0.051 0.054	MLWN: -0.064 MLW: -0.114 MLWS: -0.163 ISLW: -0.358 Tidal range (HHWSS – ISLW): 1.081	0.057 0.057 0.056 0.054 0.025
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 10.33	1% AEP (mAHD): 11.1	Instrumentation height (mAHD): 11.7	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge assists in the reviewing of flood damage at Lismore, however, its major function is data acquisition for numerical model calibration and the flood warning system downstream.			
Station shown on BoM website: MHL data for this station is displayed in RRVD.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Missingham Bridge



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Map courtesy of Spatial Services 2017

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STATION LOCATION
Missingham Bridge

MHL 2546

Figure 24

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Richmond River		Station name: Missingham Bridge	
AWRC No: 203465		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 556161	Northing: 6806420
Geographic co-ordinate system:		Latitude: -28.86874414	Longitude: 153.57587082
TRIM reference: FILE17/59413		LGA: Ballina Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: November 2003		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 69161 Order of accuracy: L2 PM/SSM RL (mAHD): 6.815 Local BM description: Dip point painted yellow. Local BM location: Yellow paint marked corner of station instrumentation box bracket.		Local BM RL (mAHD): 8.501 Station datum: Richmond River Valley Datum (RRVD) and AHD Date of last survey: 1 May 2013 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good – not calculated due to limited record length.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.46	1% AEP (mAHD): NA	Instrumentation height (mAHD): 7.6	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. It is an effective backup to Ballina for flood monitoring in the lower estuary.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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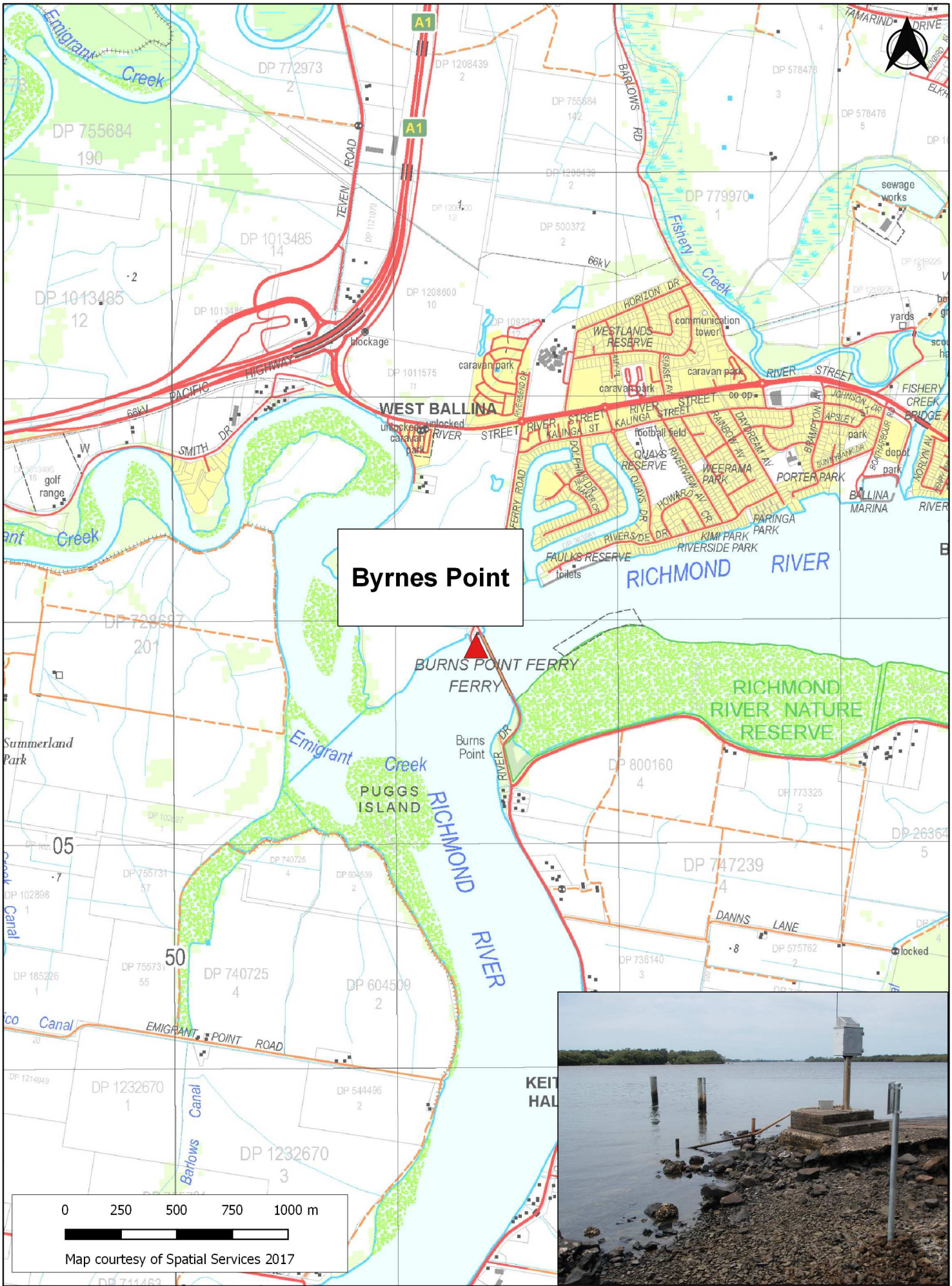

Manly Hydraulics Laboratory

STATION LOCATION
Byrnes Point

MHL 2546

Figure 25

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Richmond River		Station name: Byrnes Point	
AWRC No: 203461		BoM No: 558044	
MGA co-ordinates zone: 56		Easting: 551362	Northing: 6805886
Geographic co-ordinate system:		Latitude: -28.87376511	Longitude: 153.52668832
TRIM reference: FILE17/59416		LGA: Ballina Shire Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: November 1990		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 92289 Order of accuracy: 2 PM/SSM RL (mAHD): 1.363 Local BM description: Stainless steel bolt and nut in concrete painted yellow. Local BM location: Concrete plinth at the shore end of boat ramp.		Local BM RL (mAHD): 1.232 Station datum: Richmond River Valley Datum (RRVD) and AHD Date of last survey: 19 September 2014 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1991 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.929 MHWS: 0.559 MHW: 0.445 MHWN:0.331 MSL: 0.018	0.028 0.027 0.026 0.026 0.027	MLWN: -0.296 MLW: -0.410 MLWS: -0.524 ISLW: -0.788 Tidal range (HHWSS – ISLW): 1.718	0.029 0.028 0.028 0.029 0.016
STATION CHARACTERISTICS			
General comments: Floatwell decommissioned in September 2012 and new sensor relocated to bank.			
Peak flood of record (mAHD): 1.40	1% AEP (mAHD): 2.0	Instrumentation height (mAHD): 2.6	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. It is useful for monitoring the magnitude of storm surges and recording the events in relation to flooding of the town of Ballina. The gauge is also used for the determination of flood and tidal gradients.			
Station shown on BoM website: MHL data for this station is displayed in RRVD.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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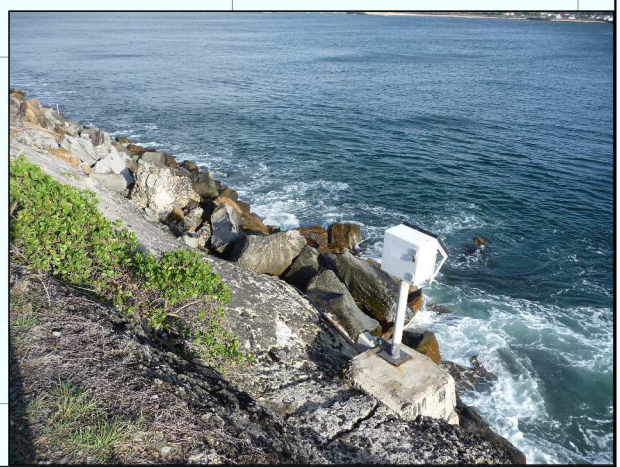
Ballina Breakwall



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Map courtesy of Spatial Services 2017

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STATION LOCATION
Ballina Breakwall

MHL 2546

Figure 26

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Richmond River		Station name: Ballina Breakwall	
AWRC No: 203425		BoM No: 558097	
MGA co-ordinates zone: 56		Easting: 556992	Northing: 6805681
Geographic co-ordinate system:		Latitude: -28.87537745	Longitude: 153.58442879
TRIM reference: FILE17/73512		LGA: Ballina Shire Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: December 2008		Secondary sensor installation date: July 2010	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): 7	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 170699 Order of accuracy: 2 PM/SSM RL (mAHD): 6.745 Local BM description: BM 7/DL Bolt in concrete. Local BM location: In concrete slab next to station, before beach car park on breakwall.		Local BM RL (mAHD): 3.119 Station datum: Richmond River Valley Datum (RRVD) and AHD Date of last survey: 23 April 2015 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good – not calculated due to limited record length.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Gauge is located on river approximately 700m upstream of the entrance. Electromagnetic wave staff sensor was replaced in May 2011 by pressure sensors			
Peak flood of record (mAHD): 1.39	1% AEP (mAHD): NA	Instrumentation height (mAHD): 4.3	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: To monitor flood levels and tidal behaviour in the Richmond River as part of the Ocean Tides Program. The gauge was installed to capture true ocean tides. It replaces the Ballina EWS station which was located inside the half tide wall and therefore did not capture the full tidal range.			
Station shown on BoM website: MHL data for this station is displayed in RRVD.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Wardell**	**MHL 2546** **Figure 27** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Richmond River		Station name: Wardell	
AWRC No: 203468		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 545282	Northing: 6797087
Geographic co-ordinate system:		Latitude: -28.95341219	Longitude: 153.46469697
TRIM reference: FILE17/59417		LGA: Ballina Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: October 2002		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 6279 Order of accuracy: L1 PM/SSM RL (mAHD): 6.926 Local BM description: Triangle cut in concrete. Local BM location: Concrete at the bottom of stairs at the bridge, next to telecom pit.		Local BM RL (mAHD): 2.858 Station datum: Richmond River Valley Datum (RRVD) and AHD Date of last survey: 24 September 2014 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2003 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.892	0.061	MLWN: -0.234	0.044
MHWS: 0.553	0.055	MLW: -0.332	0.043
MHW: 0.455	0.053	MLWS: -0.430	0.041
MHWN:0.357	0.051	ISLW: -0.672	0.039
MSL: 0.062	0.046	Tidal range (HHWSS – ISLW): 1.564	0.040
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.71	1% AEP (mAHD): 3.0	Instrumentation height (mAHD): 7.2	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge is used to monitor flood levels and for comparison with nearby sites such as Woodburn and Byrnes Point.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Coraki



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Map courtesy of Spatial Services 2017

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STATION LOCATION
Coraki

MHL 2546

Figure 28

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Richmond River		Station name: Coraki	
AWRC No: 203403		BoM No: 058175	
MGA co-ordinates zone: 56		Easting: 527981	Northing: 6793775
Geographic co-ordinate system:		Latitude: -28.98380196	Longitude: 153.28723405
TRIM reference: FILE17/60379		LGA: Richmond Valley Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: PSTN LL (land line)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: December 1987		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 40477 Order of accuracy: L1 PM/SSM RL (mAHD): 5.770 Local BM description: PM 40477 Stainless steel pin in concrete. Local BM location: Concrete with cover box outside Police station. PWD mark at the box.		Local BM RL (mAHD): 5.770 Station datum: Richmond River Valley Datum (RRVD) and AHD Date of last survey: 18 June 2015 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1991 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.641	0.045	MLWN: 0.006	0.042
MHWS: 0.391	0.040	MLW: -0.032	0.041
MHW: 0.353	0.039	MLWS: -0.070	0.041
MHWN:0.315	0.038	ISLW: -0.249	0.040
MSL: 0.160	0.039	Tidal range (HHWSS – ISLW): 0.890	0.032
STATION CHARACTERISTICS			
General comments: Flood camera installed since Aug 2013.			
Peak flood of record (mAHD): 5.97	1% AEP (mAHD): 6.2	Instrumentation height (mAHD): 6.8	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The Coraki gauge assists in the assessment of flood damage to the township and provides a useful indicator to farmers planning feed stock requirements during periods of receding floodwaters. Conductivity and temperature sensors installed in June 2010 under a program funded by the WaterNSW (formerly Office of Water) for a Water Sharing Plan.			
Station shown on BoM website: MHL data for this station is displayed in RRVD.			
SES flood classification: Minor 3.4m, Moderate 5.0m, Major 5.7m (RRVD)			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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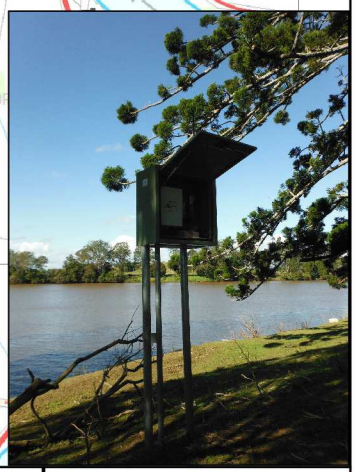
Bungawalbin



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Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Bungawalbin

MHL 2546

Figure 29

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Richmond River		Station name: Bungawalbin	
AWRC No: 203450		BoM No: 058184	
MGA co-ordinates zone: 56		Easting: 527031	Northing: 6788276
Geographic co-ordinate system:		Latitude: -29.03345559	Longitude: 153.27761472
TRIM reference: FILE17/60382		LGA: Richmond Valley Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: September 2002		Secondary sensor installation date: November 2012	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: Instantaneous15 minute		Secondary sensor sampling regime: Instantaneous15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 44353 Order of accuracy: L1 PM/SSM RL (mAHD): 4.574 Local BM description: BM 10/DL Stainless steel pin in triangle cut into concrete. Local BM location: Concrete is located 1m from the SE corner of house block.		Local BM RL (mAHD): 5.395 Station datum: Richmond River Valley Datum (RRVD) and AHD Date of last survey: 18 June 2001 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2003 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.653	0.035	MLWN: 0.032	0.045
MHWS: 0.404	0.034	MLW: -0.011	0.046
MHW: 0.361	0.035	MLWS: -0.055	0.048
MHWN:0.317	0.036	ISLW: -0.233	0.050
MSL: 0.175	0.040	Tidal range (HHWSS – ISLW): 0.886	0.034
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 4.82	1% AEP (mAHD): 5.5	Instrumentation height (mAHD): 6.7	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge is frequently used in reporting flooding levels on the Richmond River. Conductivity and temperature sensors were installed in Oct 2009 under a program funded by the WaterNSW (Office of Water) for a Water Sharing Plan.			
Station shown on BoM website: MHL data for this station is displayed in RRVD.			
SES flood classification: Minor 3.0m, Moderate 4.5m, Major 5.0m (RRVD)			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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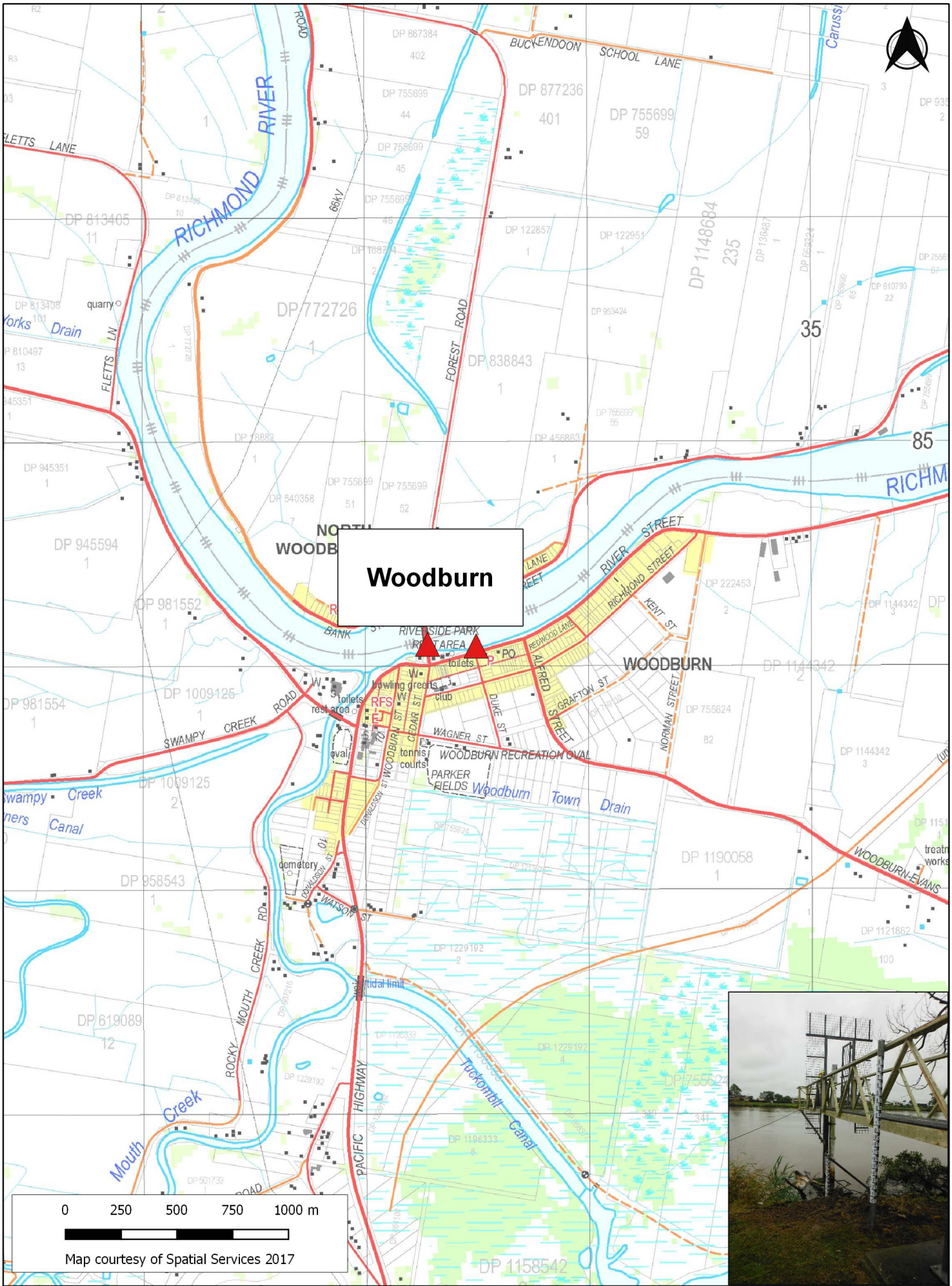

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Woodburn

MHL 2546

Figure 30

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Richmond River		Station name: Woodburn	
AWRC No: 203412		BoM No: 058061	
MGA co-ordinates zone: 56		Easting: 533496	Northing: 6784089
Geographic co-ordinate system:		Latitude: -29.07109272	Longitude: 153.34413632
TRIM reference: FILE17/59418		LGA: Richmond Valley Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Floatwell		Secondary sensor type: Radar	
Primary sensor installation date: September 1985		Secondary sensor installation date: Dec 2015	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: 60 sec average B/A15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 34926 Order of accuracy: L1 PM/SSM RL (mAHD): 3.915 Local BM description: BM 1/PL Bolt painted yellow. Local BM location: Bolt at east side of the bridge, start of pedestrian walking area.		Local BM RL (mAHD): 3.855 Station datum: Richmond River Valley Datum (RRVD) and AHD Date of last survey: 23 June 2017 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.690 MHWS: 0.412 MHW: 0.353 MHWN:0.293 MSL: 0.094	0.035 0.030 0.029 0.028 0.030	MLWN: -0.105 MLW: -0.164 MLWS: -0.224 ISLW: -0.422 Tidal range (HHWSS – ISLW): 1.112	0.034 0.035 0.036 0.039 0.043
STATION CHARACTERISTICS			
General comments: The secondary radar sensor was installed in December 2015 on the bridge approximately 200m upstream (refer to map for location).			
Peak flood of record (mAHD): 3.75	1% AEP (mAHD): 4.7	Instrumentation height (mAHD): 8.6 (9.4 radar)	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge provides valuable data of lower floodplain levels for the determination of flood gradients along the river. This is useful for the development of a numerical model for the catchment and in reviewing flood damage for the region.			
Station shown on BoM website: MHL data for this station is displayed in RRVD.			
SES flood classification: Minor 3.2m, Moderate 3.7m, Major 4.2m (RRVD)			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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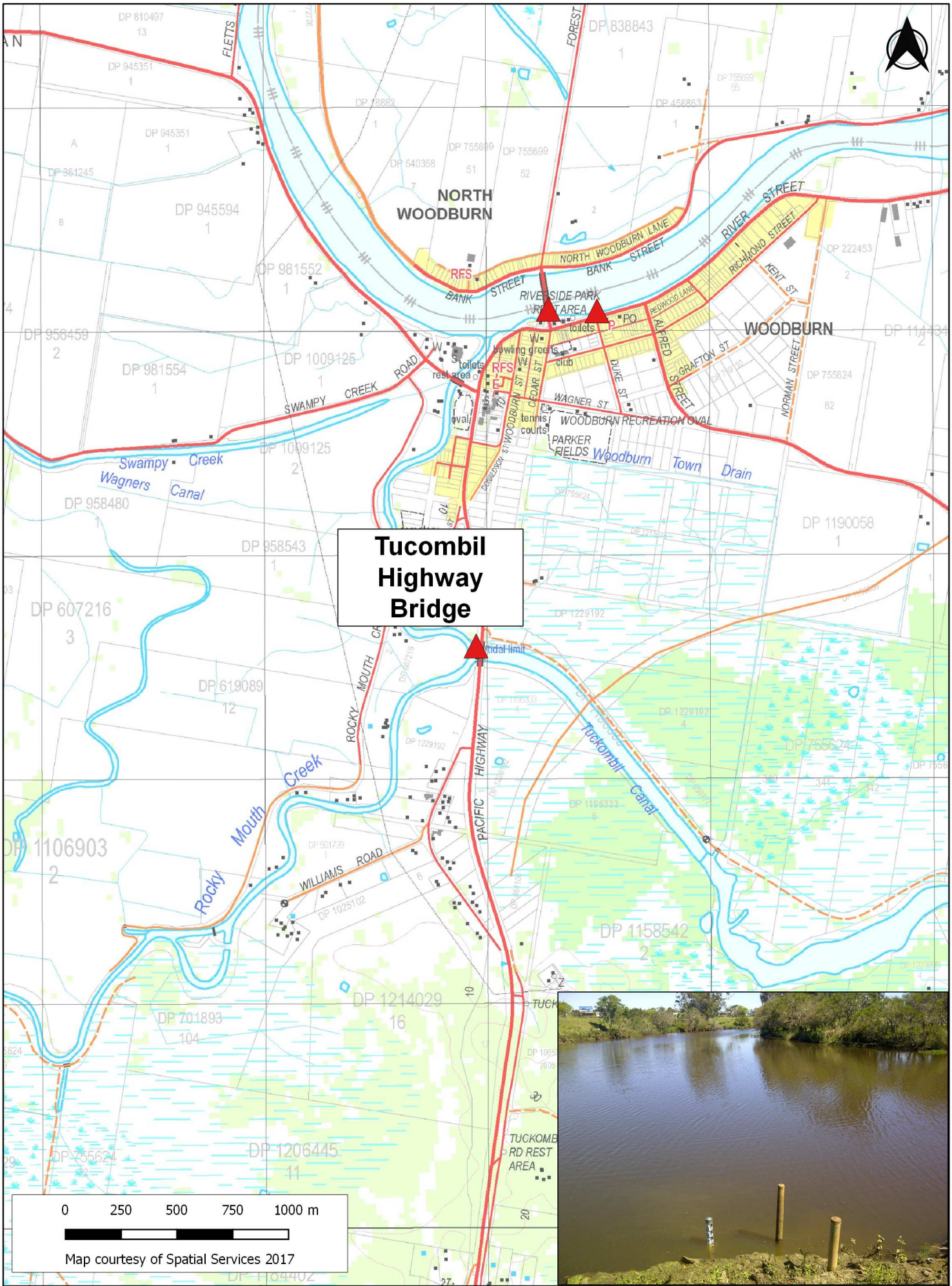

Manly Hydraulics Laboratory

STATION LOCATION
Tucombil Highway Bridge

MHL 2546
Figure 31
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tucombil Canal		Station name: Tucombil Highway Bridge	
AWRC No: 203480		BoM No: 558058	
MGA co-ordinates zone: 56		Easting: 532949	Northing: 6782596
Geographic co-ordinate system:		Latitude: -29.08458239	Longitude: 153.33856060
TRIM reference: FILE17/60402		LGA: Richmond Valley Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: December 1989		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 34919 Order of accuracy: 2 PM/SSM RL (mAHD): 4.105 Local BM description: Triangle cut into concrete. Local BM location: Concrete at NW corner of Tucombil Canal bridge.		Local BM RL (mAHD): 5.372 Station datum: Richmond River Valley Datum (RRVD) and AHD Date of last survey: 1 March 2013 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1994 to June 2007		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.666	0.036	MLWN: -0.080	0.028
MHWS: 0.398	0.031	MLW: -0.134	0.027
MHW: 0.344	0.030	MLWS: -0.189	0.026
MHWN:0.289	0.029	ISLW: -0.379	0.024
MSL: 0.105	0.028	Tidal range (HHWSS – ISLW): 1.045	0.022
STATION CHARACTERISTICS			
General comments: Tucombil Highway Bridge gas purge site (203480), commissioned on 20 May 2010, is 25m downstream of the decommissioned floatwell site (203411). The decommissioned floatwell data was combined with gas purge site data in the database. Floatwell data period is from 1/12/1989-30/6/2011.			
Peak flood of record (mAHD): 3.24	1% AEP (mAHD): 4.8	Instrumentation height (mAHD): 6.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge's primary function is to monitor the level of floodwaters diverted into the Evans River from the Richmond River.			
Station shown on BoM website: MHL data for this station is displayed in RRVD.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Norfolk Island



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Norfolk Island

MHL 2546

Figure 32

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: North Tasman Sea		Station name: Norfolk Island	
AWRC No: 240401		BoM No: NA	
MGA co-ordinates zone: 58		Easting: 787557	Northing: 6781940
Geographic co-ordinate system:		Latitude: -29.05842500	Longitude: 167.95330000
TRIM reference: Local office file FILE16/72224		LGA: Norfolk Island Regional Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: NA	
Primary sensor type: Floatwell		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: September 1994		Secondary sensor installation date: June 2009	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: SSM 167258 Order of accuracy: NA PM/SSM RL (mLAT): 3.573 Local BM description: BM bolt in pylon. Local BM location: Dip point on pylon next to water level sensor.		Local BM RL (mLAT): 4.984 Station datum: Lowest Astronomical Tide (LAT) Date of last survey: 15 September 2015 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mLAT)			
Period analysed: July 1995 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.816 MHWS: 1.617 MHW: 1.461 MHWN: 1.305 MSL: 0.935	0.059 0.061 0.061 0.060 0.061	MLWN: 0.566 MLW: 0.410 MLWS: 0.253 ISLW: 0.112 Tidal range (HHWSS – ISLW): 1.704	0.062 0.061 0.061 0.063 0.010
STATION CHARACTERISTICS			
General comments: Site decommissioned 1 September 2015.			
Peak flood of record (mLAT): 2.18	1% AEP (mAHD): NA	Instrumentation height (mAHD): NA	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: This gauge was installed under the Offshore Tide Program to monitor tidal behaviour in the North Tasman Sea. The station was decommissioned due to data duplication of the nearby NTC station.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Decommissioned		Revision date: 17 September 2018	

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Tucombil Floodgate



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

Manly Hydraulics Laboratory

STATION LOCATION
Tucombil Floodgate

MHL 2546

Figure 33

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tucombil Canal		Station name: Tucombil Floodgate	
AWRC No: 203434		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 534031	Northing: 6781670
Geographic co-ordinate system:		Latitude: -29.09291166	Longitude: 153.34970653
TRIM reference: Local office file FILE16/65675		LGA: Richmond Valley Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: NA	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: October 1990		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 34919 Order of accuracy: 3 PM/SSM RL (mAHD): 4.105 Local BM description: BM 33N/F Triangle cut into concrete. Local BM location: Eastern headwall at floodgate.		Local BM RL (mAHD): 2.232 Station datum: Richmond River Valley Datum (RRVD) and AHD Date of last survey: 1 March 2013 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1995 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.833 MHWS: 0.489 MHW: 0.422 MHWN:0.355 MSL: 0.118	0.023 0.022 0.021 0.020 0.022	MLWN: -0.118 MLW: -0.186 MLWS: -0.253 ISLW: -0.499 Tidal range (HHWSS – ISLW): 1.332	0.027 0.027 0.027 0.034 0.041
STATION CHARACTERISTICS			
General comments: Station decommissioned on 29 July 2015.			
Peak flood of record (mAHD): 2.83	1% AEP (mAHD): NA	Instrumentation height (mAHD): NA	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge was installed to monitor the tides and saltwater intrusion into Rocky Mouth Creek and the Richmond River as a result of the damaged Fabridam. The gauge has captured sufficient baseline data for the purpose of establishing tidal gradients. The Fabridam is replaced and this gauge has served its function and is now decommissioned.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: NA	
Station recommendations: Decommissioned		Revision date: 17 September 2018	

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Rocky Mouth Creek



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Rocky Mouth Creek

MHL 2546

Figure 34

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Rocky Mouth Creek		Station name: Rocky Mouth Creek	
AWRC No: 203432		BoM No: 558054	
MGA co-ordinates zone: 56		Easting: 531748	Northing: 6781331
Geographic co-ordinate system:		Latitude: -29.09603047	Longitude: 153.32625613
TRIM reference: FILE17/60422		LGA: Richmond Valley Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: September 1994		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 123205 Order of accuracy: L3 PM/SSM RL (mAHD): 2.828 Local BM description: BM 1/DL Triangle cut into concrete. Local BM location: Northern wing wall at upstream side of floodgate.		Local BM RL (mAHD): 2.027 Station datum: Richmond River Valley Datum (RRVD) and AHD Date of last survey: 1 March 2013 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1997 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.677	0.041	MLWN: -0.066	0.039
MHWS: 0.412	0.039	MLW: -0.121	0.039
MHW: 0.357	0.038	MLWS: -0.176	0.039
MHWN:0.302	0.038	ISLW: -0.365	0.038
MSL: 0.118	0.038	Tidal range (HHWSS – ISLW): 1.042	0.020
STATION CHARACTERISTICS			
General comments: Floatwell was changed to submersible pressure transducer on the bank to reduce safety risks in Jun 2014.			
Peak flood of record (mAHD): 3.54	1% AEP (mAHD): 4.9	Instrumentation height (mAHD): 4.1	
Hydraulic characteristics: Tidal, flood heights affected by flood gates			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge was installed to monitor the tides and saltwater intrusion into Rocky Mouth Creek and the Richmond River as a result of the damaged Fabridam.			
Station shown on BoM website: MHL data for this station is displayed in RRVD.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Evans River Fishing Co-op**	**MHL 2546** **Figure 35** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Evans River		Station name: Evans River Fishing Co-op	
AWRC No: 203462		BoM No: 558048	
MGA co-ordinates zone: 56		Easting: 542250	Northing: 6778375
Geographic co-ordinate system:		Latitude: -29.12240415	Longitude: 153.43428897
TRIM reference: FILE17/60420		LGA: Richmond Valley Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: March 1997		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 34734 Order of accuracy: L1 PM/SSM RL (mAHD): 3.152 Local BM description: BM 1/DL Pin in triangle cut into concrete. Local BM location: Concrete loading wharf opposite the station (3m distance).		Local BM RL (mAHD): 2.290 Station datum: Richmond River Valley Datum (RRVD) and AHD Date of last survey: 21 June 2017 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1997 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.058	0.026	MLWN: -0.309	0.027
MHWS: 0.658	0.025	MLW: -0.443	0.026
MHW: 0.525	0.024	MLWS: -0.577	0.026
MHWN:0.391	0.023	ISLW: -0.863	0.027
MSL: 0.041	0.024	Tidal range (HHWSS – ISLW): 1.921	0.023
STATION CHARACTERISTICS			
General comments: Floatwell was removed on 11 June 2016 due to access issues. A temporary standalone sensor was installed before 22 Nov 2016, then a radar installed after the jetty was refurbished.			
Peak flood of record (mAHD): 1.63	1% AEP (mAHD): NA	Instrumentation height (mAHD): 2.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: This gauge was installed under the former Waterways Program (Estuary Program) to collect information on the river entrance and for lower catchment flooding.			
Station shown on BoM website: MHL data for this station is displayed in RRVD.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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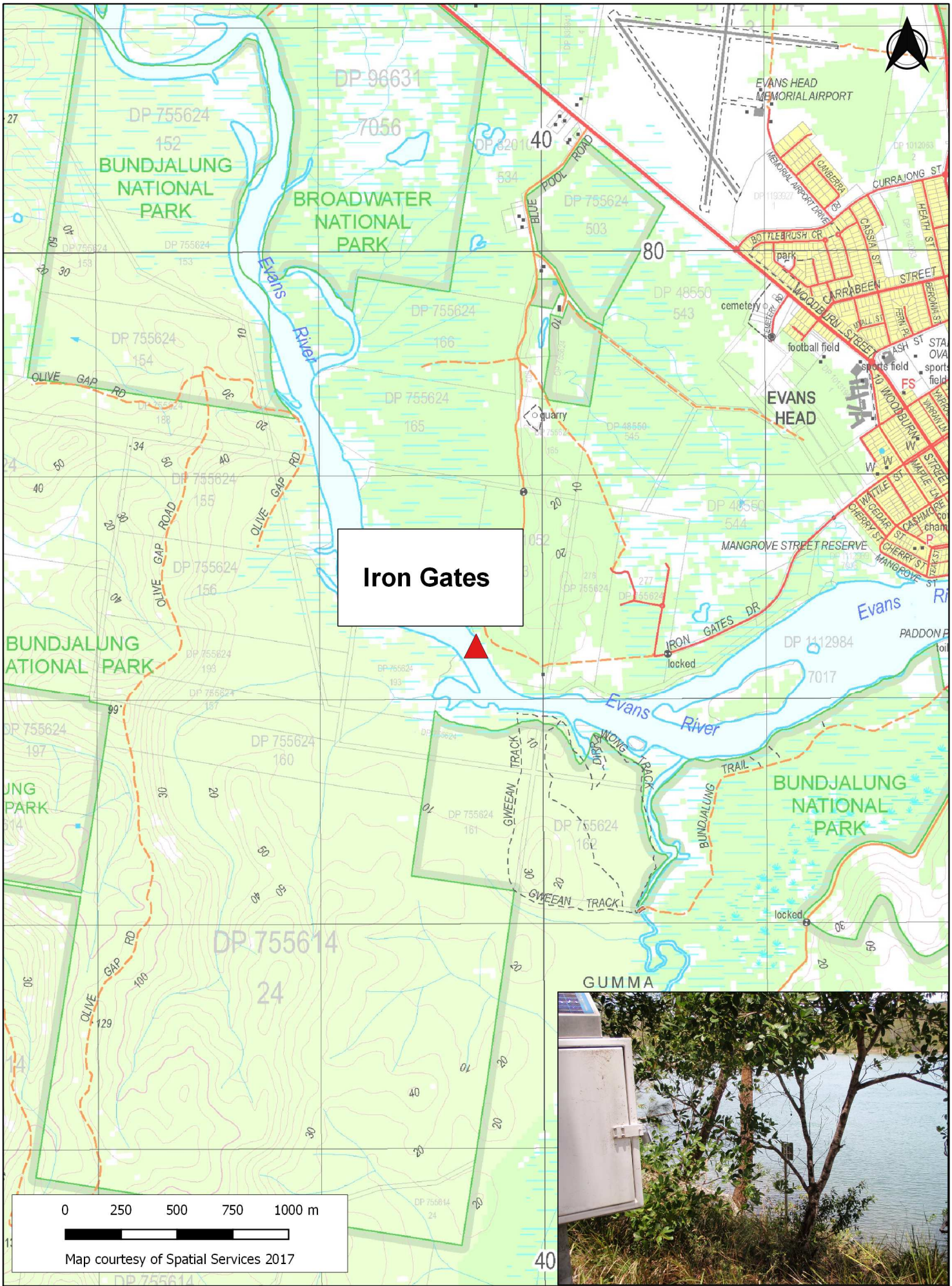

NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Iron Gates**	**MHL 2546** **Figure 36** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Evans River		Station name: Iron Gates	
AWRC No: 203475		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 539700	Northing: 6778241
Geographic co-ordinate system:		Latitude: -29.12369592	Longitude: 153.40808279
TRIM reference: FILE17/60423		LGA: Richmond Valley Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: December 1992		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 38979 Order of accuracy: L2 PM/SSM RL (mAHD): 2.532 Local BM description: Bolt in triangle cut into concrete. Local BM location: On station concrete pad.		Local BM RL (mAHD): 0.477 Station datum: Richmond River Valley Datum (RRVD) and AHD Date of last survey: 1 May 2006 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1997 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.978 MHWS: 0.590 MHW: 0.488 MHWN:0.387 MSL: 0.083	0.025 0.024 0.023 0.022 0.020	MLWN: -0.222 MLW: -0.323 MLWS: -0.425 ISLW: -0.702 Tidal range (HHWSS – ISLW): 1.680	0.022 0.021 0.021 0.026 0.032
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.50	1% AEP (mAHD): 3.1	Instrumentation height (mAHD): 6.2	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: This gauge was installed under the Estuary Program. Water level data from this gauge is used in tidal analysis and for monitoring the impact of Iron Gates on flooding in the lower catchment.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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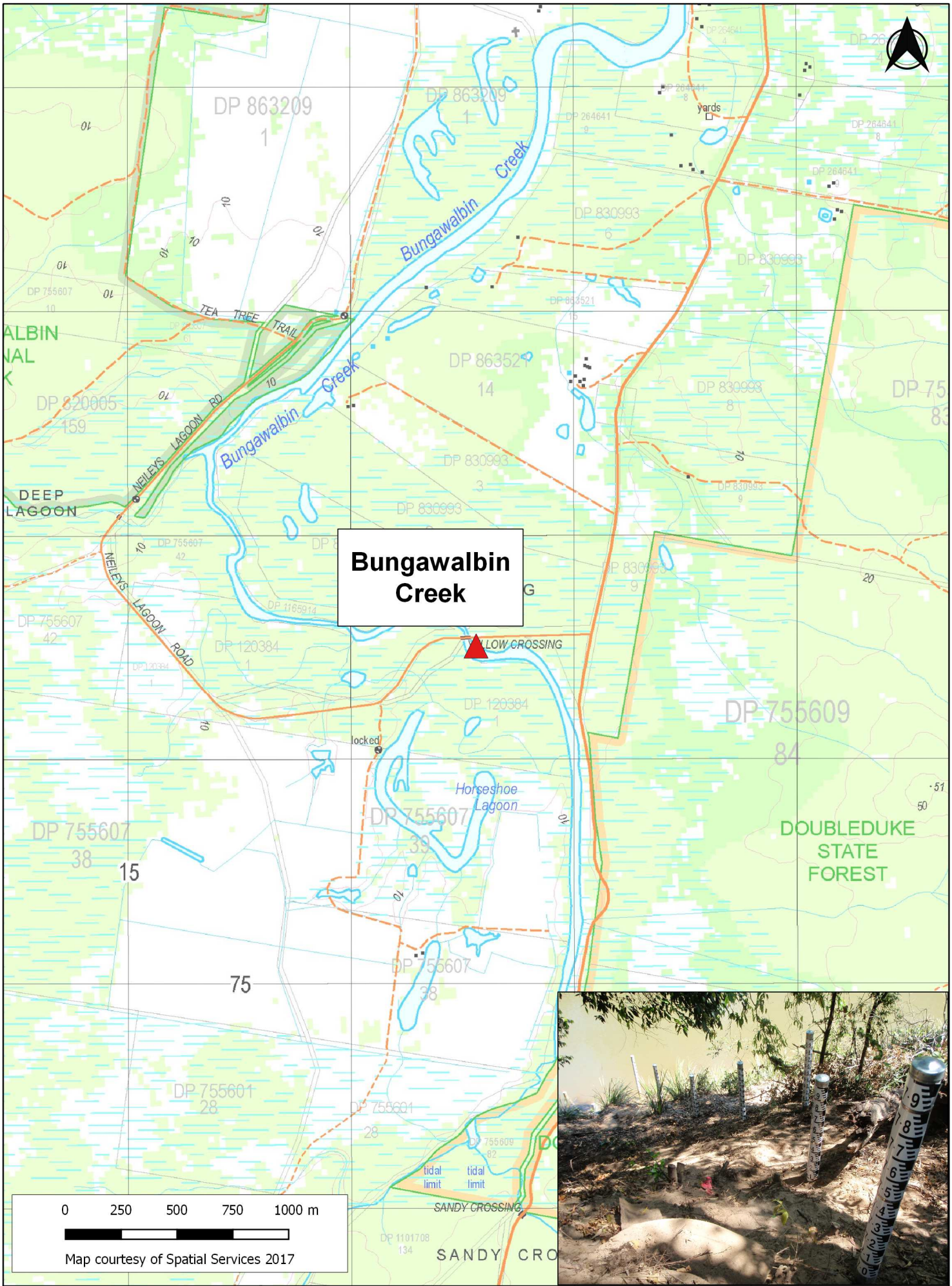

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STATION LOCATION
Bungawalbin Creek

MHL 2546

Figure 37

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Richmond River		Station name: Bungawalbin Creek	
AWRC No: 2034133		BoM No: 558101	
MGA co-ordinates zone: 56		Easting: 516561	Northing: 6776508
Geographic co-ordinate system:		Latitude: -29.13985053	Longitude: 153.17026047
TRIM reference: FILE17/72096		LGA: Richmond Valley Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: August 2015		Secondary sensor installation date: February 2016	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: Instantaneous15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 104534 Order of accuracy: B2 PM/SSM RL (mAHD): 3.387 Local BM description: TBM11 Bolt in concrete. Local BM location: SE corner of Neileys Lagoon Road bridge.		Local BM RL (mAHD): 4.463 Station datum: Richmond River Valley Datum (RRVD) and AHD Date of last survey: 21 October 2015 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated due to limited record.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 9.33	1% AEP (mAHD): 10.0	Instrumentation height (mAHD): 10.2	
Hydraulic characteristics: Near tidal limit.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program.			
Station shown on BoM website: MHL data for this station is displayed in RRVD.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Yamba

MHL 2546

Figure 38

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Clarence River		Station name: Yamba	
AWRC No: 204454		BoM No: 558062	
MGA co-ordinates zone: 56		Easting: 535118	Northing: 6744433
Geographic co-ordinate system:		Latitude: -29.42895800	Longitude: 153.36206100
TRIM reference: FILE17/73629		LGA: Clarence Valley Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: July 1986		Secondary sensor installation date: July 2010	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: SSM 38357 Order of accuracy: L2 PM/SSM RL (mAHD): 27.449 Local BM description: BM bolt. Local BM location: Bolt in seawall rock, which is adjacent to instrumentation tide pole.		Local BM RL (mAHD): 1.971 Station datum: Iluka Port Datum (IPD) and AHD Date of last survey: 1 May 2011 Surveyed by: Land & Property Information Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.987 MHWS: 0.633 MHW: 0.500 MHWN:0.367 MSL: 0.025	0.041 0.041 0.042 0.043 0.044	MLWN: -0.318 MLW: -0.450 MLWS: -0.583 ISLW: -0.836 Tidal range (HHWSS – ISLW): 1.822	0.047 0.048 0.049 0.050 0.023
STATION CHARACTERISTICS			
General comments: Electromagnetic wave staff sensor was replaced by a pressure sensor in May 2011. Radar installation in Aug 2013.			
Peak flood of record (mAHD): 1.45	1% AEP (mAHD): NA	Instrumentation height (mAHD): 6.3	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: To monitor flood levels and tidal behaviour in the Clarence River as a part of the Ocean Tides Program.			
Station shown on BoM website: MHL data for this station is displayed in IPD.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Oyster Channel

MHL 2546

Figure 39

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Clarence River		Station name: Oyster Channel	
AWRC No: 204451		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 530468	Northing: 6744254
Geographic co-ordinate system:		Latitude: -29.43069947	Longitude: 153.31412358
TRIM reference: FILE17/60488		LGA: Clarence Valley Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Ultrasonic		Secondary sensor type: NA	
Primary sensor installation date: November 2002		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 12970 Order of accuracy: L2 PM/SSM RL (mAHD): 1.775 Local BM description: Triangle cut into concrete. Local BM location: Concrete at the SE corner of Oyster Channel bridge.		Local BM RL (mAHD): 3.406 Station datum: AHD Date of last survey: 1 June 2017 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2003 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.668 MHWS: 0.429 MHW: 0.355 MHWN:0.282 MSL: 0.073	0.019 0.019 0.020 0.022 0.023	MLWN: -0.136 MLW: -0.209 MLWS: -0.282 ISLW: -0.453 Tidal range (HHWSS – ISLW): 1.121	0.025 0.027 0.029 0.030 0.020
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.62	1% AEP (mAHD): 2.2	Instrumentation height (mAHD): 4.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge was installed for the purpose of monitoring the lower catchment for tidal and flood events upstream of the town of Yamba.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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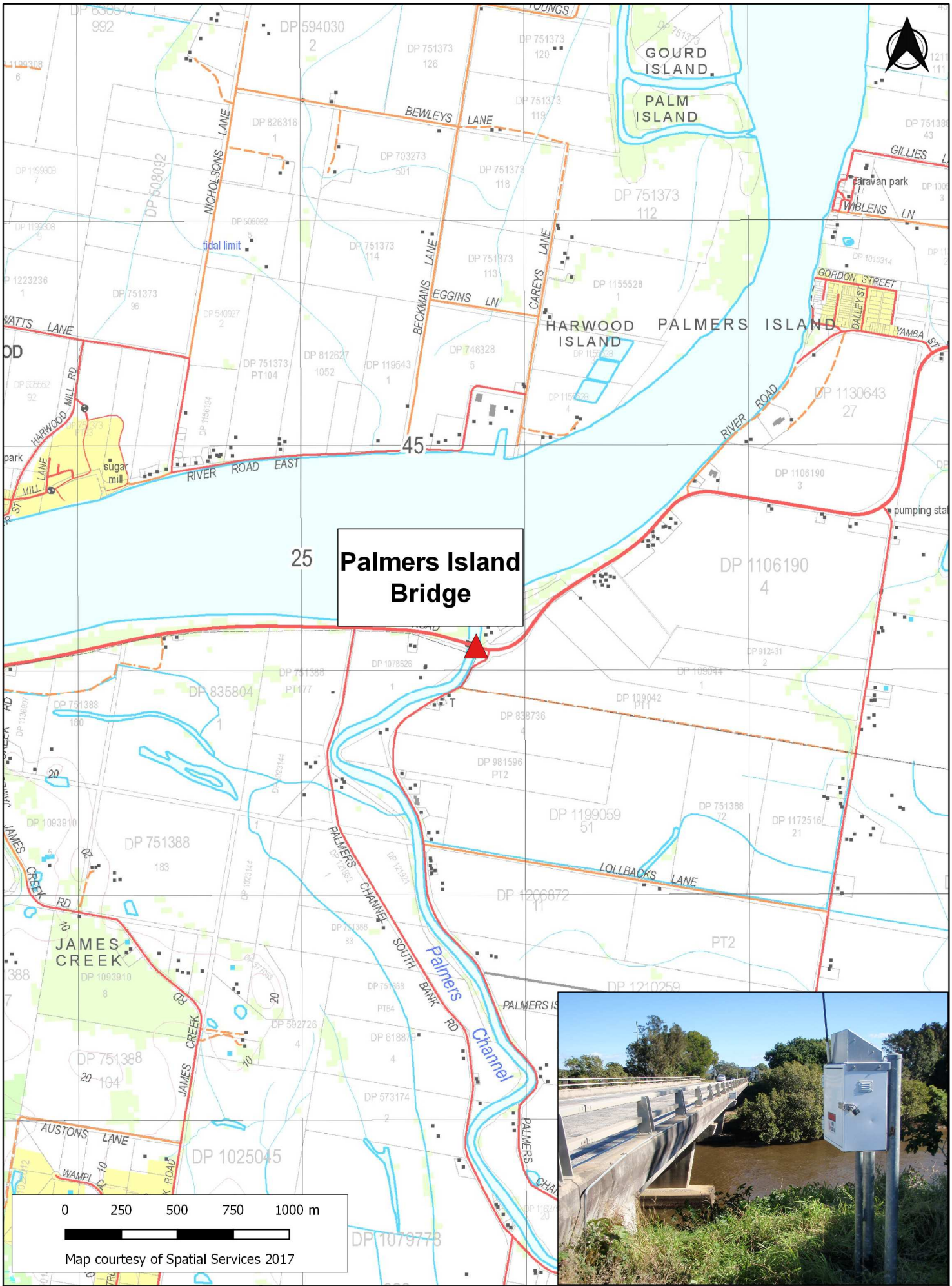

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Palmers Island Bridge

MHL 2546

Figure 40

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Palmers Channel		Station name: Palmers Island Bridge	
AWRC No: 204426		BoM No: 558042	
MGA co-ordinates zone: 56		Easting: 525780	Northing: 6744108
Geographic co-ordinate system:		Latitude: -29.43211940	Longitude: 153.26578999
TRIM reference: FILE17/60508		LGA: Clarence Valley Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Ultrasonic		Secondary sensor type: NA	
Primary sensor installation date: December 2001		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 12966 Order of accuracy: L2 PM/SSM RL (mAHD): 2.513 Local BM description: BM 5/DL Triangle cut into concrete. Local BM location: NE corner of bridge abutment, on top of concrete wall at Palmers Island Channel.		Local BM RL (mAHD): 6.553 Station datum: AHD Date of last survey: 16 March 2017 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2002 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.653 MHWS: 0.417 MHW: 0.340 MHWN:0.262 MSL: 0.089	0.034 0.032 0.033 0.033 0.034	MLWN: -0.083 MLW: -0.161 MLWS: -0.239 ISLW: -0.407 Tidal range (HHWSS – ISLW): 1.061	0.036 0.037 0.038 0.038 0.024
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.62	1% AEP (mAHD): 3.0	Instrumentation height (mAHD): 7.2	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge is useful for tidal monitoring and to monitor major flooding in the area.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Maclean**	**MHL 2546** **Figure 41** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Clarence River		Station name: Maclean	
AWRC No: 204410		BoM No: 558022	
MGA co-ordinates zone: 56		Easting: 518999	Northing: 6741473
Geographic co-ordinate system:		Latitude: -29.45602524	Longitude: 153.19592770
TRIM reference: FILE17/60483		LGA: Clarence Valley Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Floatwell		Secondary sensor type: NA	
Primary sensor installation date: January 1990		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 71124 Order of accuracy: L2 PM/SSM RL (mAHD): 2.031 Local BM description: BM 7/SS triangle cut into concrete. Local BM location: Concrete at top of ramp at the rear of fisheries department garage.		Local BM RL (mAHD): 2.116 Station datum: AHD Date of last survey: 16 March 2017 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.538 MHWS: 0.319 MHW: 0.275 MHWN:0.230 MSL: 0.085	0.039 0.034 0.032 0.031 0.028	MLWN: -0.060 MLW: -0.105 MLWS: -0.149 ISLW: -0.306 Tidal range (HHWSS – ISLW): 0.844	0.028 0.028 0.028 0.028 0.037
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 3.21	1% AEP (mAHD): 3.7	Instrumentation height (mAHD): 4.7	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge is useful in the monitoring of flood events and for tidal analysis in the Yamba to Lawrence region.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 1.6m, Moderate 2.2m, Major 2.5m (AHD)			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

STATION LOCATION
Lake Wooloweyah

MHL 2546

Figure 42

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Lake Wooloweyah		Station name: Lake Wooloweyah	
AWRC No: 204485		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 533141	Northing: 6739053
Geographic co-ordinate system:		Latitude: -29.47756940	Longitude: 153.34184003
TRIM reference: FILE17/60476		LGA: Clarence Valley Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: June 2009		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 48748 Order of accuracy: L3 PM/SSM RL (mAHD): 17.210 Local BM description: BM 2/DL triangle cut into concrete. Local BM location: NW corner of concrete slab for picnic table.		Local BM RL (mAHD): 0.979 Station datum: AHD Date of last survey: 17 March 2017 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Fair - not calculated due limited record.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Barometric station since Sep 2009.			
Peak flood of record (mAHD): 1.21	1% AEP (mAHD): 1.8	Instrumentation height (mAHD): 2.9	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge is used in the monitoring of the exchange of tidal water and flooding in the area.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Lawrence

MHL 2546

Figure 43

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Clarence River		Station name: Lawrence	
AWRC No: 204453		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 510259	Northing: 6736948
Geographic co-ordinate system:		Latitude: -29.49696691	Longitude: 153.10583881
TRIM reference: FILE17/60484		LGA: Clarence Valley Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: November 2002		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 43119 Order of accuracy: L3 PM/SSM RL (mAHD): 17.247 Local BM description: BM 12/DL road bolt in tree. Local BM location: Road bolt placed into the side of sheoak tree, 10m east of track to gauge in river.		Local BM RL (mAHD): 3.062 Station datum: AHD Date of last survey: 20 October 2016 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2003 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.544 MHWS: 0.318 MHW: 0.280 MHWN:0.242 MSL: 0.103	0.039 0.031 0.030 0.029 0.027	MLWN: -0.036 MLW: -0.074 MLWS: -0.112 ISLW: -0.274 Tidal range (HHWSS – ISLW): 0.818	0.026 0.026 0.025 0.026 0.034
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 4.43	1% AEP (mAHD): 5.3	Instrumentation height (mAHD): 10.0	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The station is used to monitor flooding of the mid-Clarence catchment.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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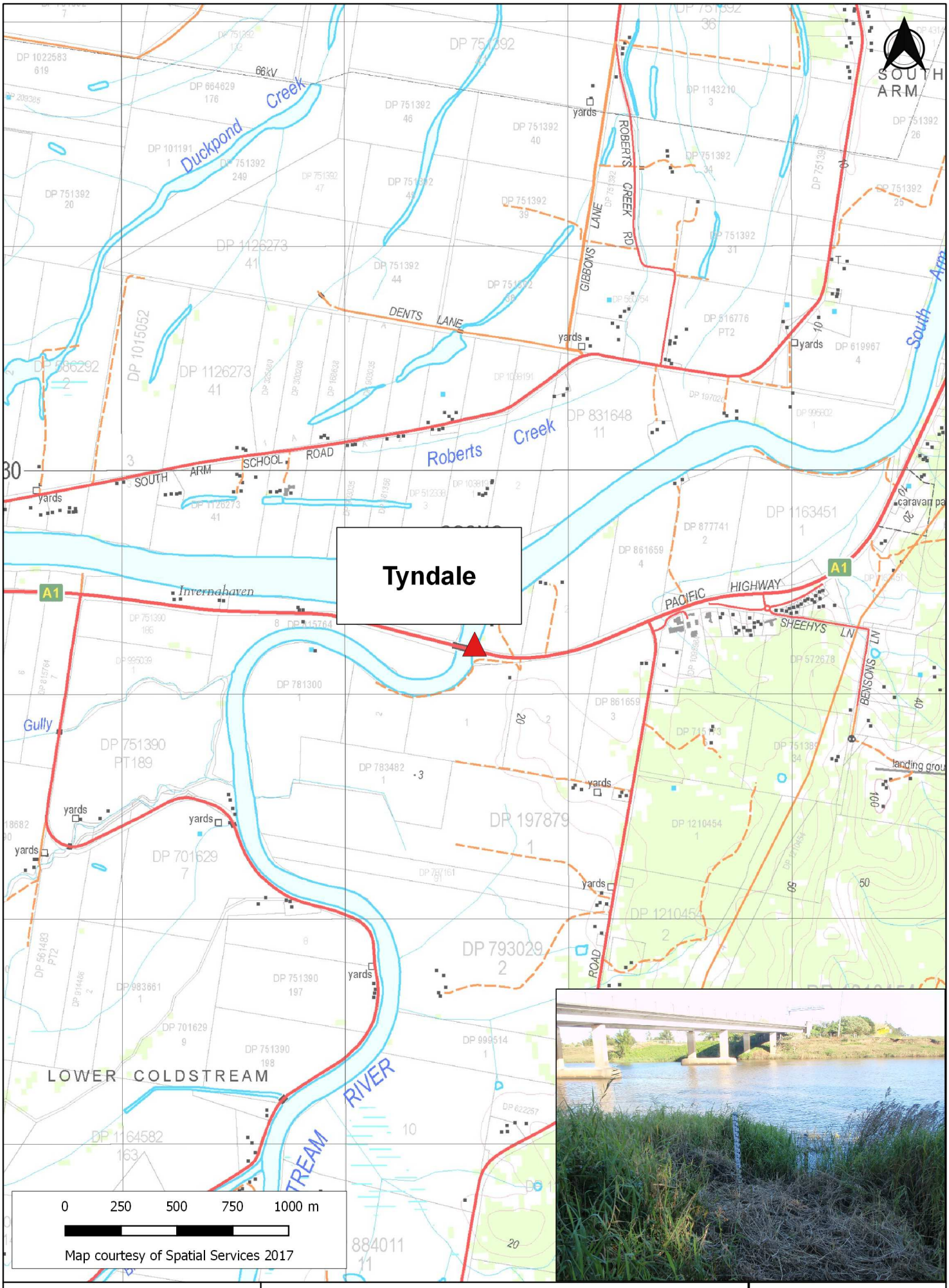

Manly Hydraulics Laboratory	**STATION LOCATION** **Tyndale**	**MHL 2546** **Figure 44** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Clarence River		Station name: Tyndale	
AWRC No: 204465		BoM No: 558073	
MGA co-ordinates zone: 56		Easting: 512580	Northing: 6729227
Geographic co-ordinate system:		Latitude: -29.56662948	Longitude: 153.12987277
TRIM reference: FILE17/60538		LGA: Clarence Valley Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: November 2002		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 47329 Order of accuracy: L3 PM/SSM RL (mAHD): 21.762 Local BM description: Bolt painted yellow. Local BM location: Bolt in support post for instrumentation box.		Local BM RL (mAHD): 4.365 Station datum: AHD Date of last survey: 20 October 2016 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2003 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.581 MHWS: 0.350 MHW: 0.313 MHWN:0.277 MSL: 0.121	0.036 0.028 0.028 0.029 0.027	MLWN: -0.035 MLW: -0.072 MLWS: -0.108 ISLW: -0.273 Tidal range (HHWSS – ISLW): 0.853	0.025 0.026 0.026 0.024 0.027
STATION CHARACTERISTICS			
General comments: The radar was removed from the bridge in June 2011and new gas line installed on bank due to safety issue.			
Peak flood of record (mAHD): 4.41	1% AEP (mAHD): 5.7	Instrumentation height (mAHD): 5.3	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The Tyndale gauge is useful in monitoring the flooding of the Coldstream and Clarence rivers at the Tyndale township.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Brushgrove

MHL 2546
Figure 45
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Clarence River		Station name: Brushgrove	
AWRC No: 204406		BoM No: 558027	
MGA co-ordinates zone: 56		Easting: 507508	Northing: 6729089
Geographic co-ordinate system:		Latitude: -29.56791583	Longitude: 153.07751172
TRIM reference: FILE17/60524		LGA: Clarence Valley Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: September 1989		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 43161 Order of accuracy: L3 PM/SSM RL (mAHD): 3.152 Local BM description: PM 43157 Local BM location: Behind kerb in Clarence Street near entrance of Brushgrove hotel, NW corner of the building.		Local BM RL (mAHD): 3.976 Station datum: AHD Date of last survey: 30 September 2016 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1992 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.582 MHWS: 0.356 MHW: 0.316 MHWN:0.276 MSL: 0.120	0.041 0.036 0.035 0.034 0.033	MLWN: -0.036 MLW: -0.076 MLWS: -0.116 ISLW: -0.277 Tidal range (HHWSS – ISLW): 0.859	0.033 0.032 0.032 0.029 0.023
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 4.86	1% AEP (mAHD): 5.8	Instrumentation height (mAHD): 7.9	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The Brushgrove gauge is used to capture flood events for the upper to mid Clarence catchment.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Rogans Bridge

MHL 2546

Figure 46

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Clarence River		Station name: Rogans Bridge	
AWRC No: 204414		BoM No: 558055	
MGA co-ordinates zone: 56		Easting: 488813	Northing: 6723401
Geographic co-ordinate system:		Latitude: -29.61921949	Longitude: 152.88445004
TRIM reference: FILE17/60511		LGA: Clarence Valley Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: July 1993		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 43054 Order of accuracy: B2 PM/SSM RL (mAHD): 11.377 Local BM description: BM 48/E Triangle cut into concrete. Local BM location: NW corner of kerb on Rogans Bridge.		Local BM RL (mAHD): 3.281 Station datum: AHD Date of last survey: 19 October 2016 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1993 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.725 MHWS: 0.470 MHW: 0.415 MHWN:0.359 MSL: 0.130	0.038 0.033 0.033 0.033 0.034	MLWN: -0.101 MLW: -0.156 MLWS: -0.211 ISLW: -0.393 Tidal range (HHWSS – ISLW): 1.118	0.036 0.037 0.037 0.035 0.019
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 15.42	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 16.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge is useful as a major flood station due to it being upstream of the township of Grafton. Conductivity and temperature sensors have been installed since Dec 2009 under a program funded by WaterNSW (formerly Office of Water) for the Water Sharing Plan.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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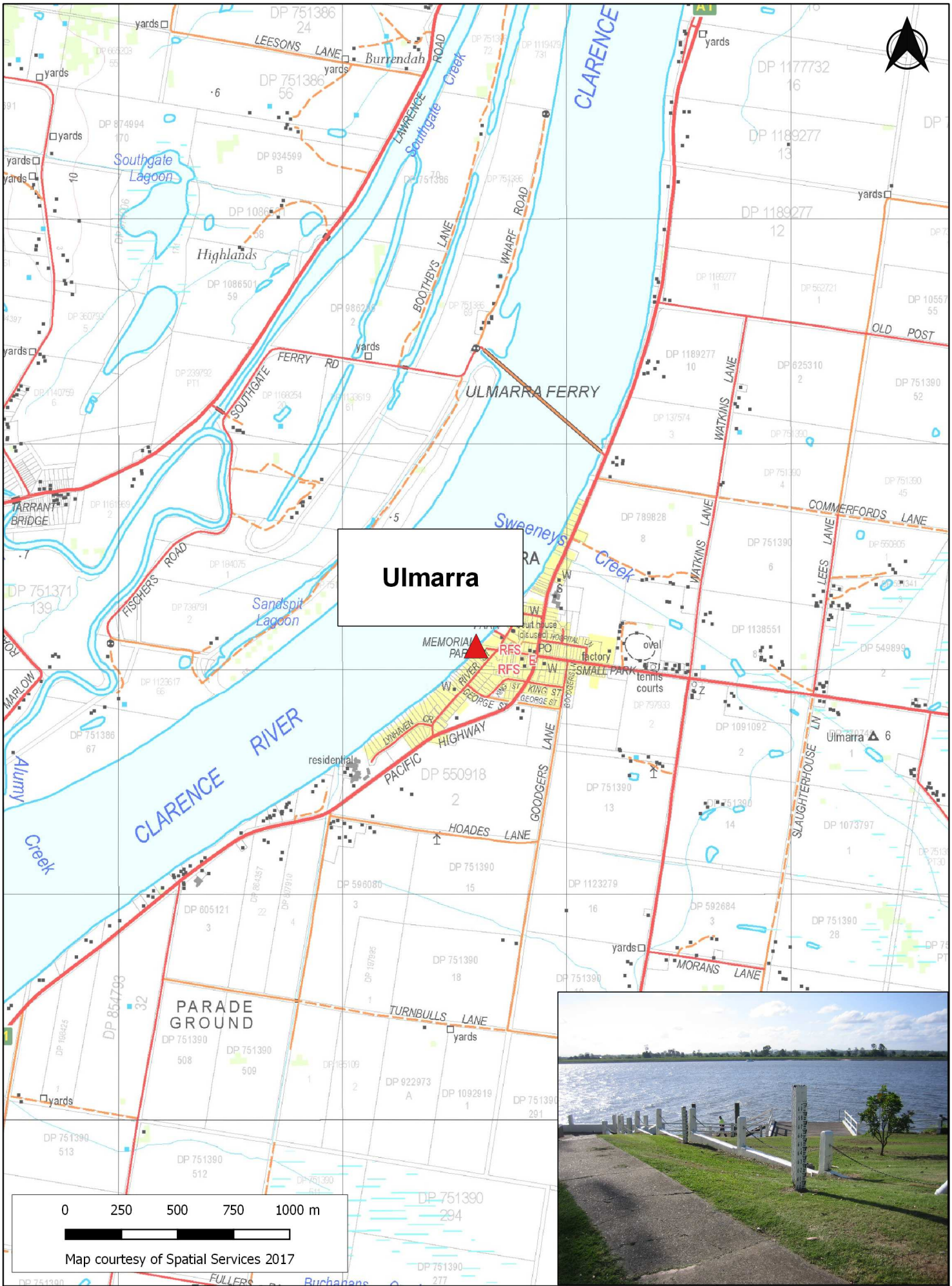

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STATION LOCATION
Ulmarra

MHL 2546

Figure 47

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Clarence River		Station name: Ulmarra	
AWRC No: 204480		BoM No: 058188	
MGA co-ordinates zone: 56		Easting: 502596	Northing: 6722105
Geographic co-ordinate system:		Latitude: -29.63096744	Longitude: 153.02681748
TRIM reference: FILE17/60516		LGA: Clarence Valley Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: September 2002		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 34913 Order of accuracy: L2 PM/SSM RL (mAHD): 4.386 Local BM description: SS102296. Brass plate in concrete. Local BM location: Brass plate in concrete below soil layer. At west end of Coldstream St., approx. 50m from the intersection of Coldstream St. and River St.		Local BM RL (mAHD): 6.016 Station datum: AHD Date of last survey: 16 September 2016 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2002 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.652 MHWS: 0.416 MHW: 0.364 MHWN:0.313 MSL: 0.136	0.058 0.037 0.037 0.037 0.029	MLWN: -0.041 MLW: -0.093 MLWS: -0.144 ISLW: -0.313 Tidal range (HHWSS – ISLW): 0.965	0.024 0.025 0.028 0.028 0.066
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 6.08	1% AEP (mAHD): 6.35	Instrumentation height (mAHD): 8.0	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge is used in the monitoring of floods in the Ulmarra area in conjunction with nearby stations.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 2.1m, Moderate 3.4m, Major 4.9m (AHD)			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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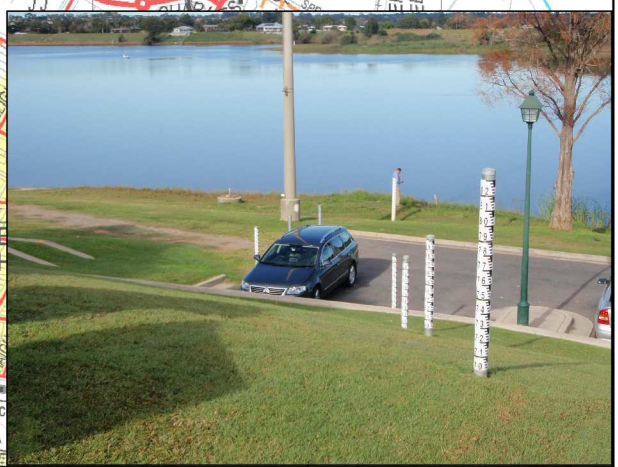
Grafton



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Grafton

MHL 2546

Figure 48

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Clarence River		Station name: Grafton	
AWRC No: 204400		BoM No: 058178	
MGA co-ordinates zone: 56		Easting: 493388	Northing: 6715141
Geographic co-ordinate system:		Latitude: -29.69380313	Longitude: 152.93165355
TRIM reference: FILE17/60512		LGA: Clarence Valley Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: July 1987		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 48311 Order of accuracy: L3 PM/SSM RL (mAHD): 5.846 Local BM description: Triangle cut into concrete. Local BM location: Bottom concrete step of stairs, east of the gauge posts and carpark.		Local BM RL (mAHD): 3.450 Station datum: AHD Date of last survey: 9 November 2017 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.715 MHWS: 0.467 MHW: 0.418 MHWN:0.369 MSL: 0.160	0.043 0.037 0.036 0.035 0.035	MLWN: -0.049 MLW: -0.098 MLWS: -0.147 ISLW: -0.324 Tidal range (HHWSS – ISLW): 1.038	0.035 0.035 0.034 0.032 0.026
STATION CHARACTERISTICS			
General comments: Flood camera installed since Nov 2012. Once construction of the new Grafton Bridge is completed, a radar will be installed as the secondary sensor, as this is a high priority flood warning station.			
Peak flood of record (mAHD): 8.06	1% AEP (mAHD): 8.3	Instrumentation height (mAHD): 8.3	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge is useful for reviewing flood damage at both north and south Grafton. Conductivity and temperature sensors were installed in Dec 2009 under a program funded by the WaterNSW (formerly Office of Water) for the Water Sharing Program.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 2.1m, Moderate 3.6m, Major 5.4m (AHD)			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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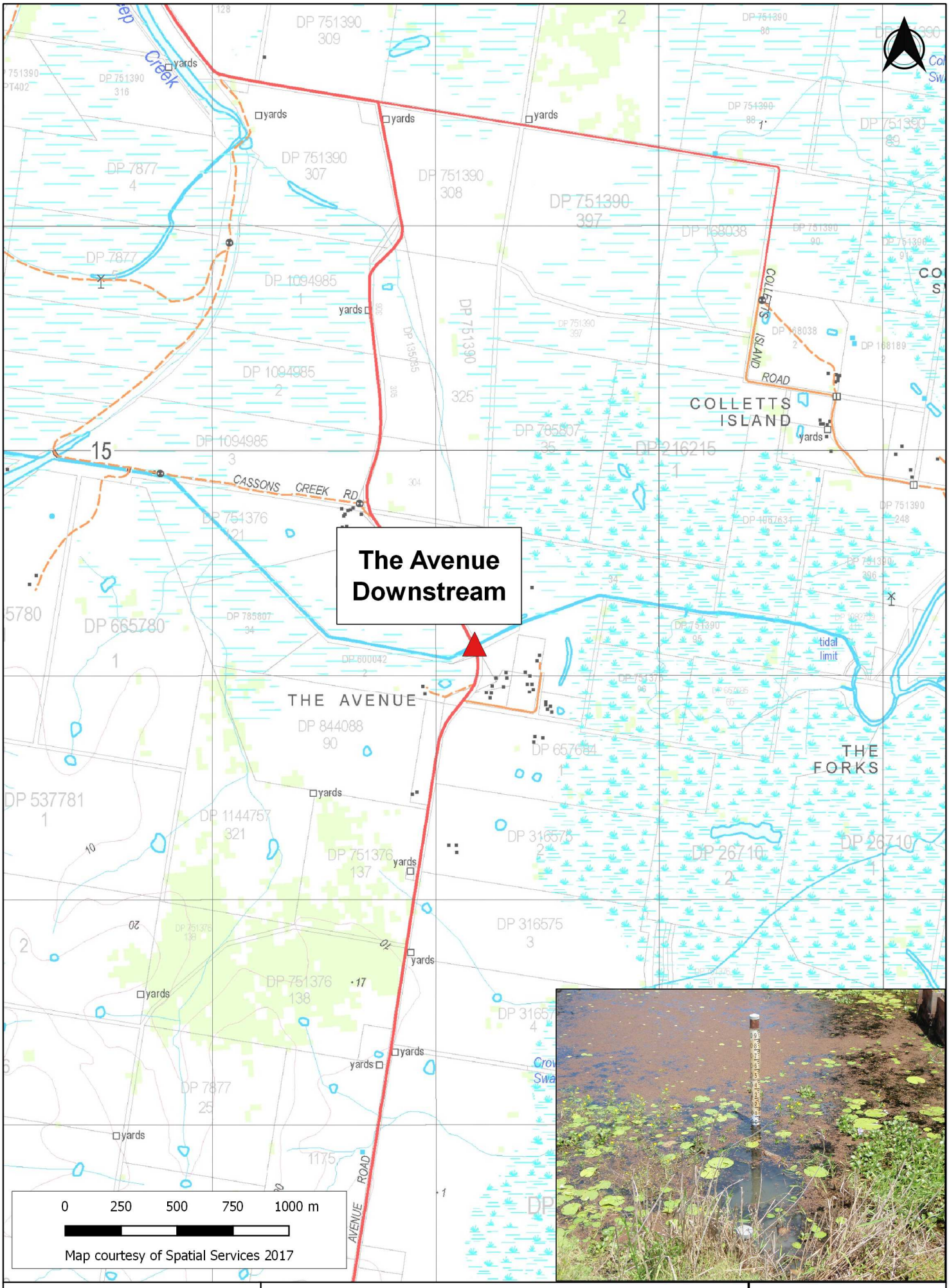

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
The Avenue Downstream

MHL 2546
Figure 49
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Clarence River		Station name: The Avenue Downstream	
AWRC No: 204476		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 507174	Northing: 6714140
Geographic co-ordinate system:		Latitude: -29.70283404	Longitude: 153.07416232
TRIM reference: FILE17/72098		LGA: Clarence Valley Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: November 2002		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 18881 Order of accuracy: L1 PM/SSM RL (mAHD): 46.185 Local BM description: BM TI/77 Triangle cut into concrete. Local BM location: Concrete at the north end of upstream headwall floodgate.		Local BM RL (mAHD): 0.770 Station datum: AHD Date of last survey: 9 November 2017 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 4.09	1% AEP (mAHD): 6.0	Instrumentation height (mAHD): 6.7	
Hydraulic characteristics: Partially-tidal. Tidal trace at times distorted or non-tidal.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge is useful for capturing flood events, which may occur on either side of the levee bank for use in flood modelling. It also assists with water use management in the Coldstream River.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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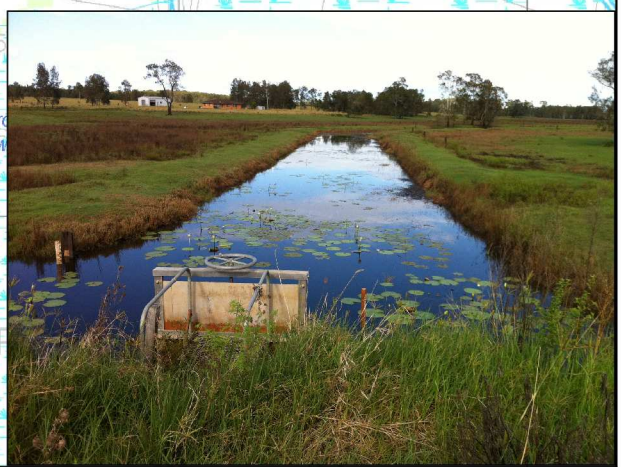
The Avenue Upstream



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
The Avenue Upstream

MHL 2546
Figure 50
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Clarence River		Station name: The Avenue Upstream	
AWRC No: 204475		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 507150	Northing: 6714123
Geographic co-ordinate system:		Latitude: -29.70298761	Longitude: 153.07391433
TRIM reference: FILE17/72099		LGA: Clarence Valley Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: November 2002		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 18881 Order of accuracy: L1 PM/SSM RL (mAHD): 46.185 Local BM description: BM TI/77 Triangle cut into concrete. Local BM location: Concrete at the north end of upstream headwall floodgate.		Local BM RL (mAHD): 0.770 Station datum: AHD Date of last survey: 9 November 2017 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 4.08	1% AEP (mAHD): 6.0	Instrumentation height (mAHD): 6.7	
Hydraulic characteristics: Non-tidal, upstream of weir.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge is useful for capturing flood events, which may occur on either side of the levee bank for use in flood modelling. It also assists with water use management in the Coldstream River.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Wooli Caravan Park



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Wooli Caravan Park

MHL 2546

Figure 51

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wooli River		Station name: Wooli Caravan Park	
AWRC No: 205463		BoM No: 558060	
MGA co-ordinates zone: 56		Easting: 524551	Northing: 6697797
Geographic co-ordinate system:		Latitude: -29.85009999	Longitude: 153.25417003
TRIM reference: FILE17/60649		LGA: Clarence Valley Council	Rainfall district: 58
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: March 1991		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 32206 Order of accuracy: L2 PM/SSM RL (mAHD): 2.117 Local BM description: Tack in concrete painted pink. Local BM location: Concrete slab of power box, approx. 10m away from the equipment housing.		Local BM RL (mAHD): 2.201 Station datum: AHD Date of last survey: 15 March 2017 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1991 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.733 MHWS: 0.418 MHW: 0.360 MHWN:0.303 MSL: 0.097	0.030 0.029 0.028 0.027 0.025	MLWN: -0.109 MLW: -0.167 MLWS: -0.225 ISLW: -0.449 Tidal range (HHWSS – ISLW): 1.182	0.023 0.022 0.021 0.021 0.014
STATION CHARACTERISTICS			
General comments: Rain gauge station installed since June 1997. In June 2011, the floatwell on a timber pile was removed and a new sensor installed on the river bank for easy access and safer maintenance. The rain gauge was relocated to a new location which is around 1km away from the water level station. ALERT equipment was installed to provide the BoM with flood warning.			
Peak flood of record (mAHD): 1.91	1% AEP (mAHD): 2.8	Instrumentation height (mAHD): 2.6	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge was installed to provide flood warning and verification of the numerical model developed for the Wooli River Flood Study.			
Station shown on BoM website: Radio transmission event data from a non-MHL station is displayed.			
SES flood classification: Minor 1.9m, Moderate 2.2m, Major 2.5m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

STATION LOCATION
Wooli Entrance

MHL 2546

Figure 52

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wooli River		Station name: Wooli Entrance	
AWRC No: 205462		BoM No: 559044	
MGA co-ordinates zone: 56		Easting: 525680	Northing: 6693338
Geographic co-ordinate system:		Latitude: -29.89032249	Longitude: 153.26596587
TRIM reference: FILE17/60646		LGA: Clarence Valley Council	Rainfall district: 59
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: May1991		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 82042 Order of accuracy: L3 PM/SSM RL (mAHD): 2.290 Local BM description: Triangle in concrete painted yellow. Local BM location: Concrete slab of picnic table at the south end of South Terrace Road.		Local BM RL (mAHD):2.643 Station datum: AHD Date of last survey: 21 October 2016 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1991 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.923 MHWS: 0.572 MHW: 0.450 MHWN:0.328 MSL: -0.006	0.032 0.032 0.031 0.031 0.032	MLWN: -0.340 MLW: -0.462 MLWS: -0.585 ISLW: -0.835 Tidal range (HHWSS – ISLW): 1.758	0.034 0.034 0.034 0.034 0.017
STATION CHARACTERISTICS			
General comments: In July 2011, the floatwell on a timber pile was removed and a submersible pressure transducer was installed on the river bank for easy access and safer maintenance.			
Peak flood of record (mAHD): 1.58	1% AEP (mAHD): 2.1	Instrumentation height (mAHD): 2.8	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. It assists in the monitoring of entrance conditions during extreme events, flood forecasting and modelling.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

STATION LOCATION
Red Rock

MHL 2546

Figure 53

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Corindi River		Station name: Red Rock	
AWRC No: 205450		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 521919	Northing: 6683065
Geographic co-ordinate system:		Latitude: -29.98310525	Longitude: 153.22722432
TRIM reference: FILE17/60630		LGA: Coffs Harbour City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: February 2004		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 32171 Order of accuracy: L2 PM/SSM RL (mAHD): 2.151 Local BM description: Tack in concrete of picnic table. Local BM location: Picnic table 15m SW of gauge.		Local BM RL (mAHD): 1.897 Station datum: AHD Date of last survey: 24 May 2018 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2004 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.029 MHWS: 0.680 MHW: 0.579 MHWN: 0.478 MSL: 0.177	0.061 0.077 0.074 0.070 0.069	MLWN: -0.125 MLW: -0.226 MLWS: -0.326 ISLW: -0.583 Tidal range (HHWSS – ISLW): 1.622	0.070 0.068 0.066 0.066 0.049
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.84	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 3.8	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: This gauge was installed under the Estuary Program to monitor tide and flood conditions in the Corindi River.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Woolgoolga Lake



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Woolgoolga Lake

MHL 2546

Figure 54

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Woolgoolga Lake		Station name: Woolgoolga Lake	
AWRC No: 205455		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 519091	Northing: 6669486
Geographic co-ordinate system:		Latitude: -30.10569619	Longitude: 153.19815163
TRIM reference: FILE17/60626		LGA: Coffs Harbour City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: May 2007		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 48707 Order of accuracy: L2 PM/SSM RL (mAHD): 3.897 Local BM description: Triangle cut in concrete path. Local BM location: Concrete path approx. 6m away from the equipment housing.		Local BM RL (mAHD): 4.137 Station datum: AHD Date of last survey: 18 February 2016 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.02	1% AEP (mAHD): 2.9	Instrumentation height (mAHD): 5.7	
Hydraulic characteristics: Intermittently closed and open lake or lagoon (ICOLL).			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor water levels in the lake, and to be used as an input into the Entrance Management Strategy.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 01 February 2019	

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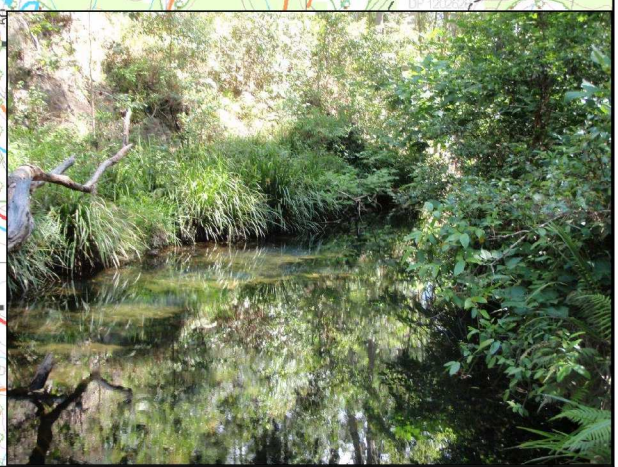
Woolgoolga



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Woolgoolga

MHL 2546

Figure 55

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Woolgoolga Creek		Station name: Woolgoolga	
AWRC No: 205441		BoM No: 559043	
MGA co-ordinates zone: 56		Easting: 515783	Northing: 6668246
Geographic co-ordinate system:		Latitude: -30.11693052	Longitude: 153.16383999
TRIM reference: FILE17/60399		LGA: Coffs Harbour City Council	Rainfall district: 59
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Floatwell		Secondary sensor type: NA	
Primary sensor installation date: March 1990		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 73745 Order of accuracy: L2 PM/SSM RL (mAHD): 20.342 Local BM description: Triangle cut into concrete step. Local BM location: Concrete step approx. within 1m of equipment housing.		Local BM RL (mAHD): 19.973 Station datum: Cease to flow of control structure Date of last survey: 30 May 2017 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 20.84	1% AEP (mAHD): 21.3	Instrumentation height (mAHD): 21.5	
Hydraulic characteristics: Non-tidal, upstream of weir			
Purpose of installation and current functionality: The Department of Water Resources installed the gauge for the purposes of town water supply planning and also gives council indication of water coming down into the lake.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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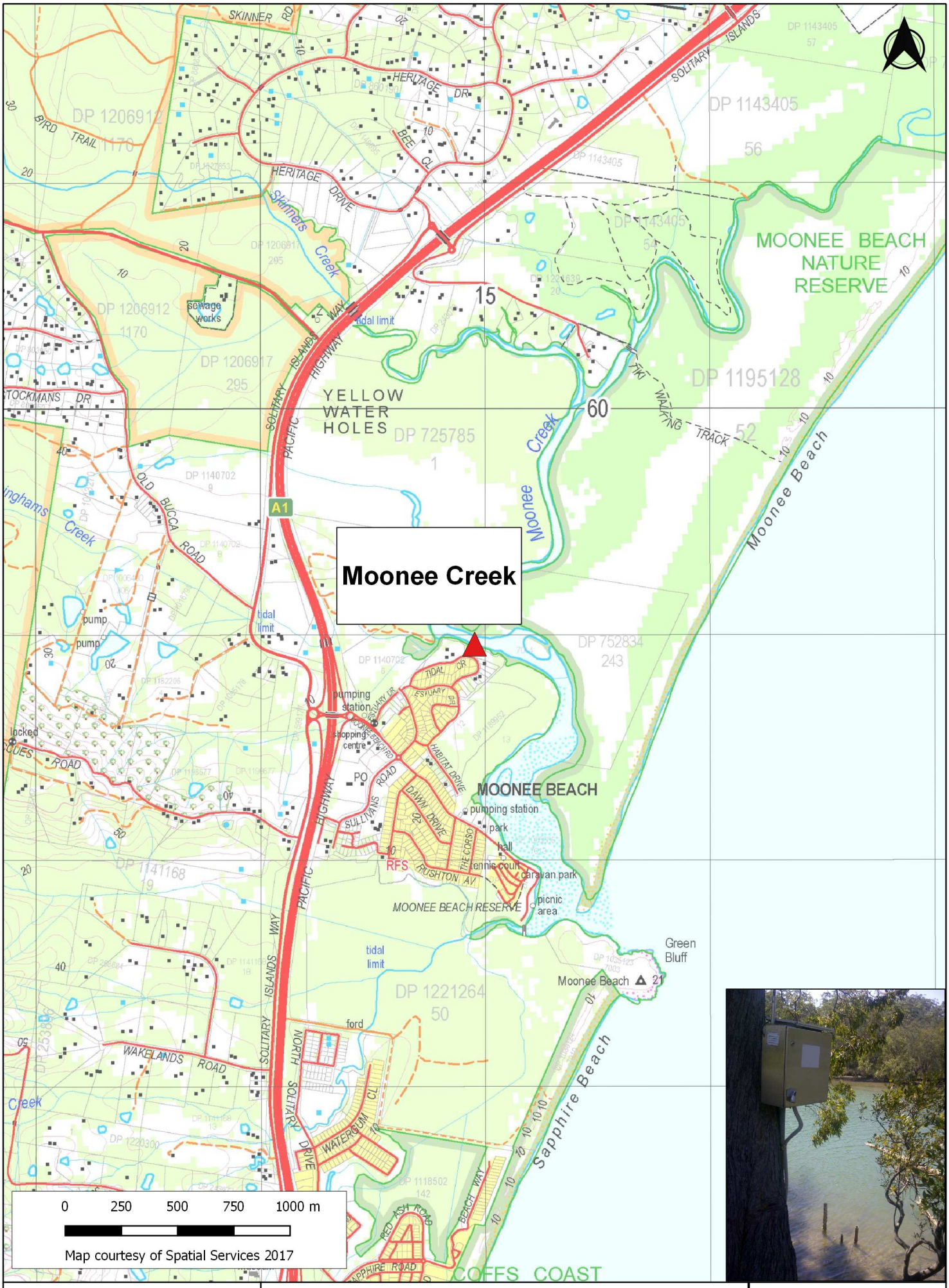

Manly Hydraulics Laboratory

NSW GOVERNMENT

STATION LOCATION
Moonee Creek

MHL 2546

Figure 56

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Moonee Creek		Station name: Moonee Creek	
AWRC No: 205435		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 514953	Northing: 6658959
Geographic co-ordinate system:		Latitude: -30.20075004	Longitude: 153.15535002
TRIM reference: FILE17/60623		LGA: Coffs Harbour City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: August 2002		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 36746 Order of accuracy: L1 PM/SSM RL (mAHD): 19.430 Local BM description: BM 1/PL Stainless steel pin in galvanised iron pipe painted yellow. Local BM location: Pin in pipe, 5m south of instrumentation box.		Local BM RL (mAHD): 0.976 Station datum: AHD Date of last survey: 16 September 2014 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2002 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.765 MHWS: 0.498 MHW: 0.456 MHWN: 0.413 MSL: 0.306	0.062 0.050 0.047 0.045 0.042	MLWN: 0.198 MLW: 0.155 MLWS: 0.113 ISLW: -0.078 Tidal range (HHWSS – ISLW): 0.843	0.048 0.052 0.057 0.066 0.097
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.10	1% AEP (mAHD): 2.7	Instrumentation height (mAHD): 3.2	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: This gauge was installed under the Estuary Program to monitor the water level and entrance conditions in Moonee Creek.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Coffs Creek Highway Bridge



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Coffs Creek Highway Bridge

MHL 2546

Figure 57

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Coffs Creek		Station name: Coffs Creek Highway Bridge	
AWRC No: 205439		BoM No: 559012	
MGA co-ordinates zone: 56		Easting: 511160	Northing: 6648716
Geographic co-ordinate system:		Latitude: -30.29323055	Longitude: 153.11605005
TRIM reference: FILE17/60683		LGA: Coffs Harbour City Council	Rainfall district: 59
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: December 1980		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 12136 Order of accuracy: L2 PM/SSM RL (mAHD): 5.007 Local BM description: Triangle cut into concrete. Local BM location: Concrete floor of gauge shed.		Local BM RL (mAHD): 4.268 Station datum: AHD Date of last survey: 19 February 2016 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.925 MHWS: 0.593 MHW: 0.520 MHWN: 0.448 MSL: 0.232	0.034 0.033 0.029 0.025 0.022	MLWN: 0.016 MLW: -0.056 MLWS: -0.129 ISLW: -0.366 Tidal range (HHWSS – ISLW): 1.292	0.027 0.029 0.031 0.035 0.053
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 5.13	1% AEP (mAHD): 5.1	Instrumentation height (mAHD): 5.7	
Hydraulic characteristics: Tidal, level is affected immediately following any rainfall event.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The station was commissioned to provide flood warning and long-term data on Coffs Creek. It is ideally located to assist in the monitoring of any development impact and in verifying and re-calibrating numerical models.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 3.0m, Moderate NA, Major 4.7m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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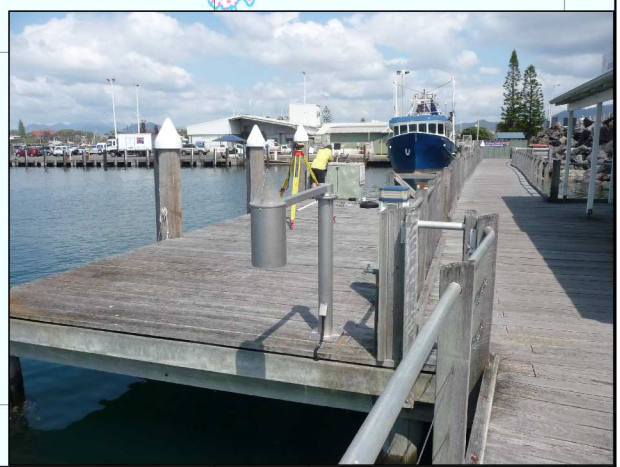
Coffs Harbour



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Coffs Harbour

MHL 2546

Figure 58

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Coffs Harbour		Station name: Coffs Harbour	
AWRC No: 205470		BoM No: 559014	
MGA co-ordinates zone: 56		Easting: 514052	Northing: 6647645
Geographic co-ordinate system:		Latitude: -30.30286900	Longitude: 153.14614400
TRIM reference: FILE17/62542		LGA: Coffs Harbour City Council	Rainfall district: 59
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: December 1986		Secondary sensor installation date: July 2010	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: SSM 59001 Order of accuracy: 2 PM/SSM RL (mAHD): 2.112 Local BM description: Bolt Local BM location: Side of jetty above pressure transducer conduit.		Local BM RL (mAHD): 2.497 Station datum: Coffs Port Datum (CPD) and AHD Date of last survey: 5 April 2016 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.077	0.033	MLWN: -0.395	0.031
MHWS: 0.687	0.032	MLW: -0.543	0.033
MHW: 0.539	0.031	MLWS: -0.691	0.035
MHWN: 0.391	0.031	ISLW: -0.969	0.037
MSL: -0.002	0.030	Tidal range (HHWSS – ISLW): 2.046	0.037
STATION CHARACTERISTICS			
General comments: The EWS sensor was replaced by a pressure sensor in April 2012 before a radar unit was installed in November 2012.			
Peak flood of record (mAHD): 1.57	1% AEP (mAHD): NA	Instrumentation height (mAHD): 1.6	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: This gauge was installed under the Ocean Tide Program to monitor tidal behaviour in Coffs Harbour. Position of gauge has changed over time established at the outer jetty from 1987-1996 before being shifted to the inner jetty from 1996 to improve capture of seiching effects.			
Station shown on BoM website: MHL data for this station is displayed in CPD.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Newports Creek



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Newports Creek

MHL 2546

Figure 59

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Newports Creek		Station name: Newports Creek	
AWRC No: 205460		BoM No: 559039	
MGA co-ordinates zone: 56		Easting: 510016	Northing: 6645652
Geographic co-ordinate system:		Latitude: -30.32088972	Longitude: 153.10418584
TRIM reference: FILE17/60656		LGA: Coffs Harbour City Council	Rainfall district: 59
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: November 1990		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 123209 Order of accuracy: L3 PM/SSM RL (mAHD): 4.380 Local BM description: SSM 123209 Local BM location: Brass plaque set in concrete top of embankment approaching NE corner of bridge.		Local BM RL (mAHD): 4.380 Station datum: AHD Date of last survey: 14 March 2017 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1991 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.871 MHWS: 0.552 MHW: 0.490 MHWN: 0.428 MSL: 0.220	0.043 0.037 0.034 0.031 0.029	MLWN: 0.012 MLW: -0.049 MLWS: -0.111 ISLW: -0.339 Tidal range (HHWSS – ISLW): 1.211	0.035 0.037 0.040 0.044 0.065
STATION CHARACTERISTICS			
General comments: In May 2011, the floatwell was removed and a new sensor installed on the river bank for easy access and safer maintenance.			
Peak flood of record (mAHD): 2.64	1% AEP (mAHD): 2.9	Instrumentation height (mAHD): 4.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge was installed to monitor flood levels for possible future development of the region.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 01 February 2019	

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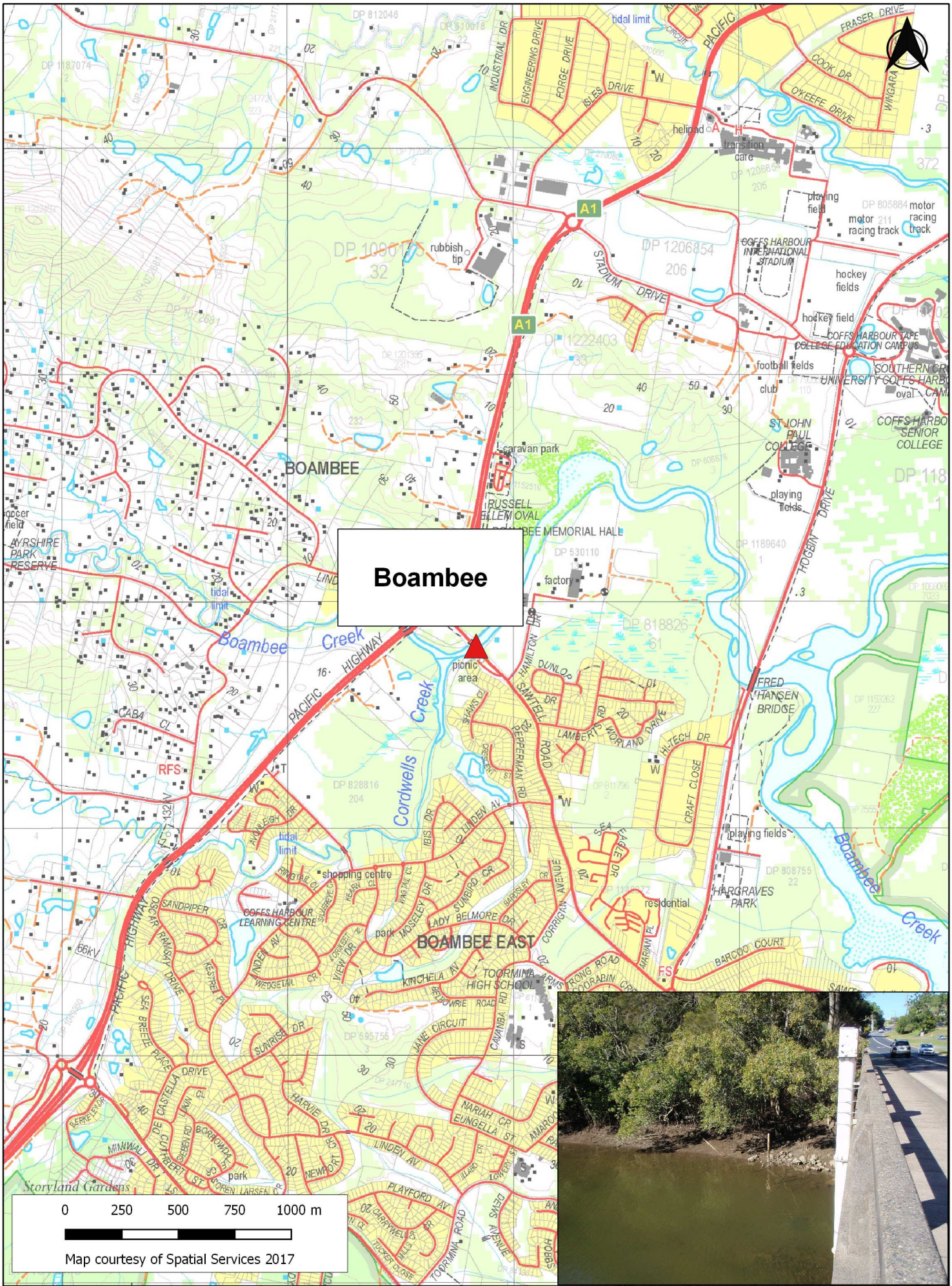

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STATION LOCATION
Boambee

MHL 2546

Figure 60

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Boambee Creek		Station name: Boambee	
AWRC No: 205438		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 507834	Northing: 6643805
Geographic co-ordinate system:		Latitude: -30.33757343	Longitude: 153.08150263
TRIM reference: FILE17/60620		LGA: Coffs Harbour City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Floatwell		Secondary sensor type: NA	
Primary sensor installation date: January 1980		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 76115 Order of accuracy: L2 PM/SSM RL (mAHD): 23.066 Local BM description: Triangle cut into concrete. Local BM location: 1st BM, concrete at NW corner of the bridge. 2nd BM, concrete at NE corner of the bridge.		Local BM RL (mAHD): 3.579 (1st BM); 3.587 (2nd BM) Station datum: AHD Date of last survey: 22 May 2018 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.907 MHWS: 0.579 MHW: 0.513 MHWN: 0.448 MSL: 0.226	0.042 0.037 0.033 0.029 0.023	MLWN: 0.005 MLW: -0.061 MLWS: -0.126 ISLW: -0.360 Tidal range (HHWSS – ISLW): 1.267	0.028 0.030 0.033 0.037 0.064
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 3.14	1% AEP (mAHD): 3.2	Instrumentation height (mAHD): 4.9	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, and monitors floodwater levels in relation to the nearby industrial estate, which is subject to inundation.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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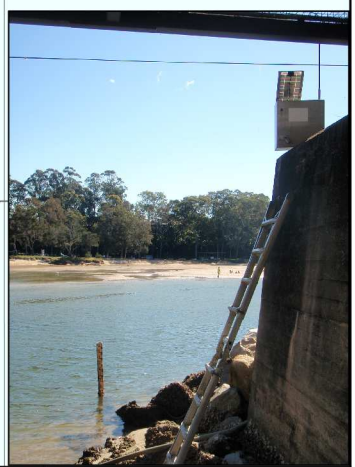
Boambee Entrance

0 250 500 750 1000 m

Map courtesy of Spatial Services 2017



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STATION LOCATION
Boambee Entrance

MHL 2546

Figure 61

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Boambee Creek		Station name: Boambee Entrance	
AWRC No: 205475		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 509896	Northing: 6642068
Geographic co-ordinate system:		Latitude: -30.35323320	Longitude: 153.10297145
TRIM reference: FILE17/66448		LGA: Coffs Harbour City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: March 2005		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 24606 Order of accuracy: L2 PM/SSM RL (mAHD): 14.103 Local BM description: Pin in triangle into concrete. Local BM location: Concrete in bridge abutment.		Local BM RL (mAHD): 0.632 Station datum: AHD Date of last survey: 22 May 2018 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2005 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.961 MHWS: 0.630 MHW: 0.539 MHWN: 0.448 MSL: 0.186	0.057 0.055 0.048 0.043 0.042	MLWN: -0.075 MLW: -0.167 MLWS: -0.258 ISLW: -0.494 Tidal range (HHWSS – ISLW): 1.455	0.059 0.061 0.064 0.075 0.106
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.92	1% AEP (mAHD): 2.7	Instrumentation height (mAHD): 3.1	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: This gauge was installed under the Estuary Program to assist in monitoring the entrance behaviour at Boambee Creek.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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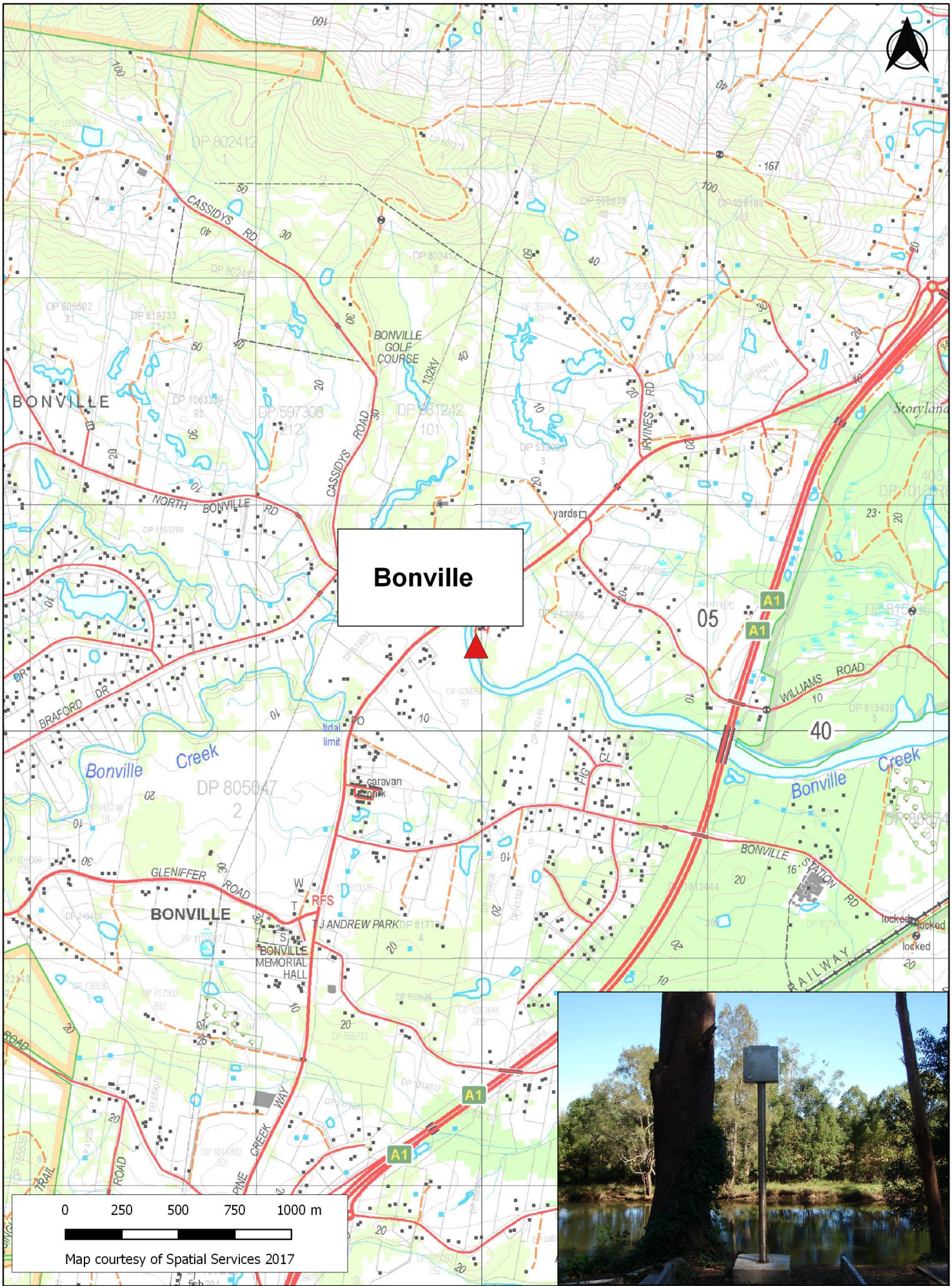

Manly Hydraulics Laboratory

STATION LOCATION
Bonville

MHL 2546

Figure 62

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Bonville Creek		Station name: Bonville	
AWRC No: 205480		BoM No: 559050	
MGA co-ordinates zone: 56		Easting: 503975	Northing: 6640378
Geographic co-ordinate system:		Latitude: -30.36851796	Longitude: 153.04136775
TRIM reference: FILE17/60615		LGA: Coffs Harbour City Council	Rainfall district: 59
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: August 2009		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 85878 Order of accuracy: B2 PM/SSM RL (mAHD): 12.596 Local BM description: Triangle cut into concrete. Local BM location: Concrete of drain.		Local BM RL (mAHD): 4.279 Station datum: AHD Date of last survey: 10 November 2017 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good – not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.29	1% AEP (mAHD): 4.9	Instrumentation height (mAHD): 5.9	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: Station installed under the Estuary Program to monitor tide levels.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None (local SES)			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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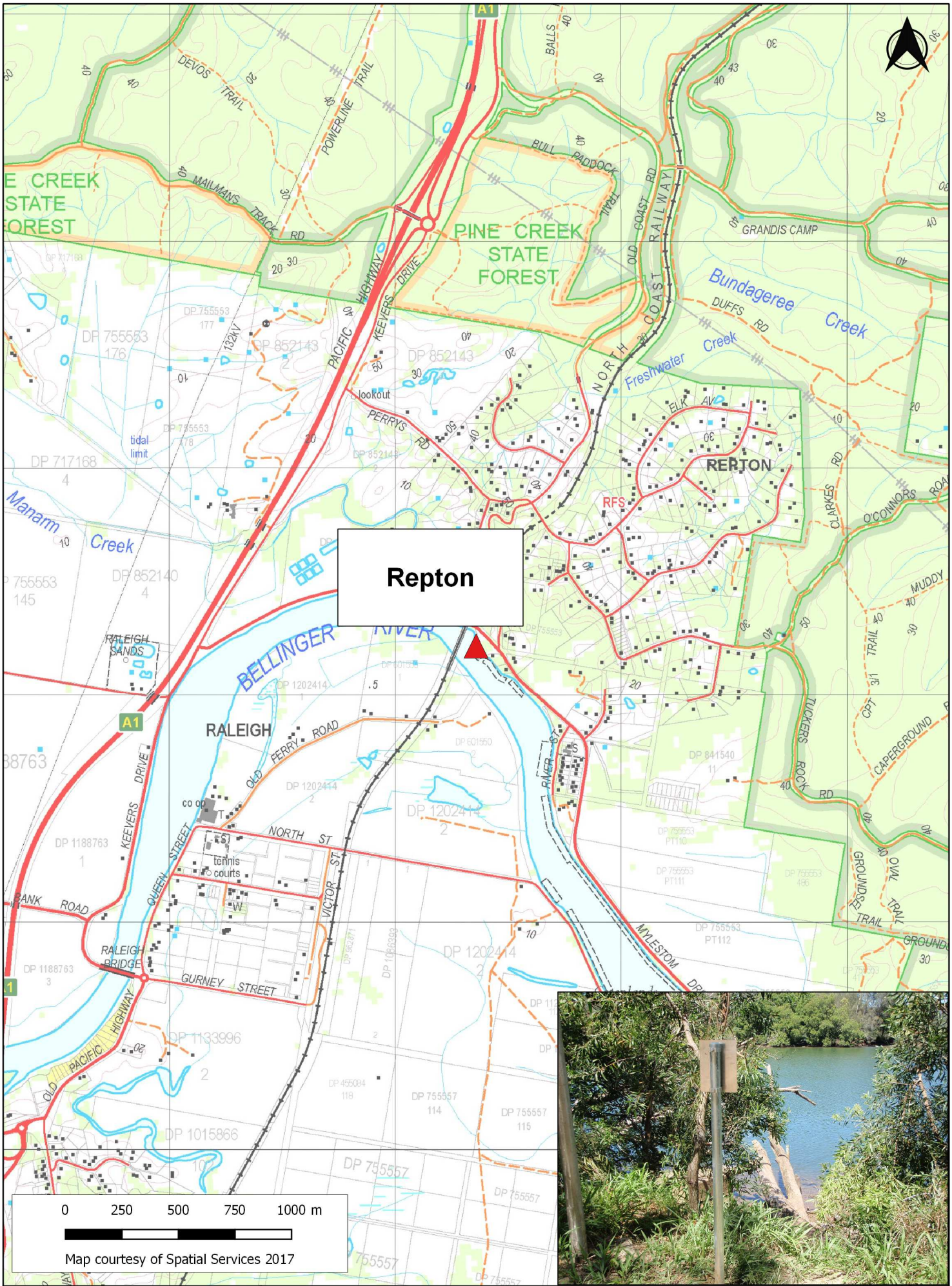

NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Repton**	**MHL 2546** **Figure 63** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Bellinger River		Station name: Repton	
AWRC No: 205403		BoM No: 559024	
MGA co-ordinates zone: 56		Easting: 502358	Northing: 6632218
Geographic co-ordinate system:		Latitude: -30.44215846	Longitude: 153.02455808
TRIM reference: FILE17/60608		LGA: Bellingen Shire Council	Rainfall district: 59
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: June 1988		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 43007 Order of accuracy: L3 PM/SSM RL (mAHD): 4.289 Local BM description: Galvanised iron pipe. Local BM location: 2m south from garbage bin, 80mm underground.		Local BM RL (mAHD): 2.969 Station datum: AHD Date of last survey: 18 October 2016 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1991 to June 2009		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.921 MHWS: 0.591 MHW: 0.519 MHWN: 0.446 MSL: 0.192	0.049 0.046 0.041 0.037 0.034	MLWN: -0.062 MLW: -0.135 MLWS: -0.208 ISLW: -0.443 Tidal range (HHWSS – ISLW): 1.364	0.038 0.041 0.044 0.048 0.071
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 3.53	1% AEP (mAHD): 4.9	Instrumentation height (mAHD): 5.9	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. It collects tide and flood levels for the lower Bellinger River.			
Station shown on BoM website: Radio transmission event data from an independent sensor located at the same station is displayed. MHL maintains the independent sensor and ERTS equipment under contract with Bellingen Shire Council.			
SES flood classification: Minor 2.0m, Moderate NA, Major 3.0m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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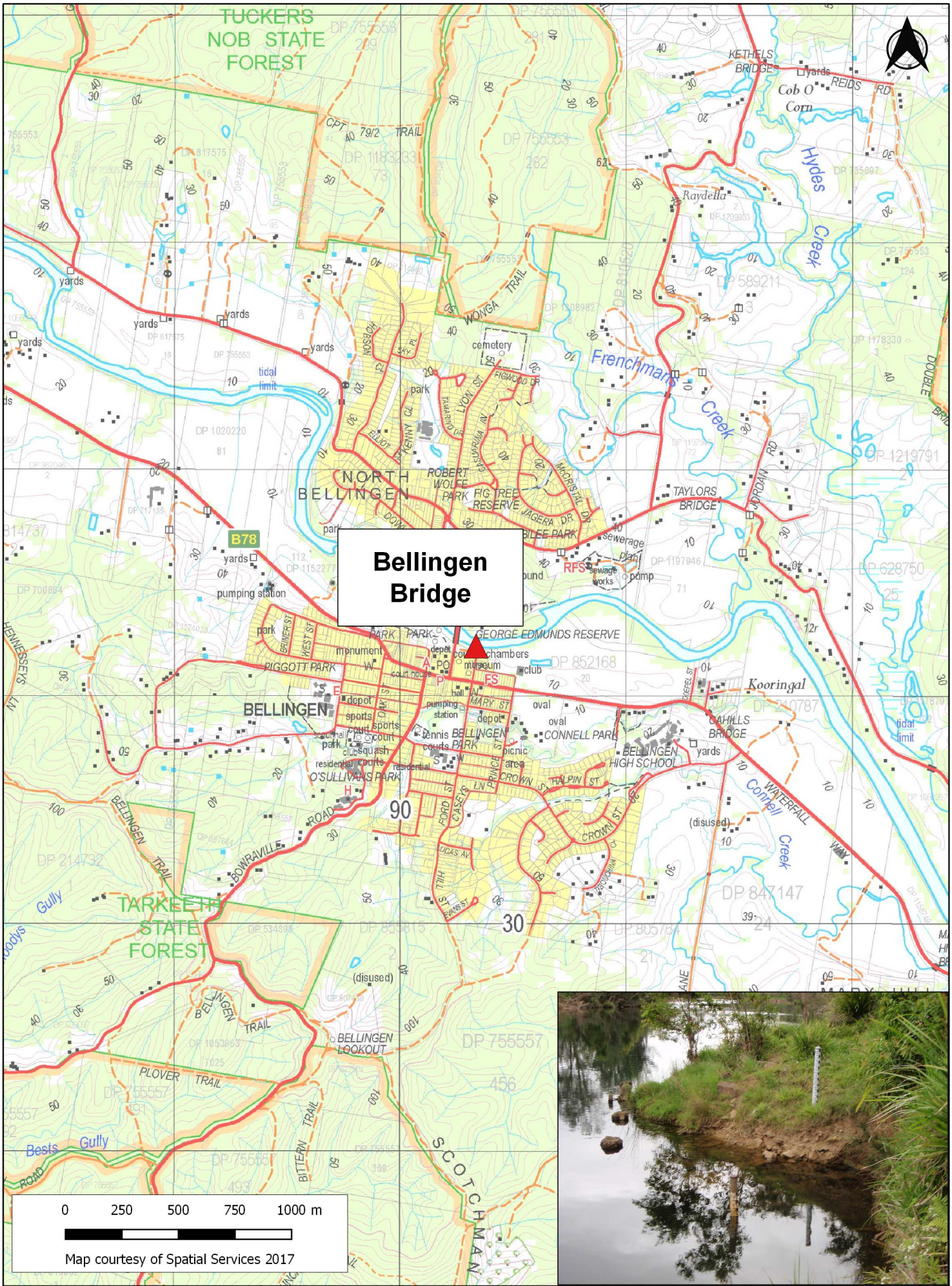

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Bellingen Bridge

MHL 2546
Figure 64
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Bellinger River		Station name: Bellingen Bridge	
AWRC No: 205442		BoM No: 059126	
MGA co-ordinates zone: 56		Easting: 490336	Northing: 6631224
Geographic co-ordinate system:		Latitude: -30.45109180	Longitude: 152.89934227
TRIM reference: FILE17/60605		LGA: Bellingen Shire Council	Rainfall district: 59
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: July 1996		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 36413 Order of accuracy: L3 PM/SSM RL (mAHD): 15.215 Local BM description: Stainless steel pin in galvanised iron pipe. Local BM location: Pin in pipe next to 7m gauge plate.		Local BM RL (mAHD): 6.075 Station datum: AHD Date of last survey: 13 September 2018 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor - Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 8.87	1% AEP (mAHD): 11.6	Instrumentation height (mAHD): 14.0	
Hydraulic characteristics: Partially tidal, near tidal limit of Bellinger River.			
Purpose of installation and current functionality: The gauge is useful in providing time series data, in the event of a major flood, for the verification or recalibration of numerical models and in reviewing flood damage in the township of Bellingen. Bellingen Bridge is a critical location as an indicator for flooding in the Bellinger Valley.			
Station shown on BoM website: Radio transmission event data connected to MHL's sensor is displayed. MHL maintains the ERTS equipment under contract with Bellingen Shire Council.			
SES flood classification: Minor 3.7m, Moderate 6.7m, Major 8.2m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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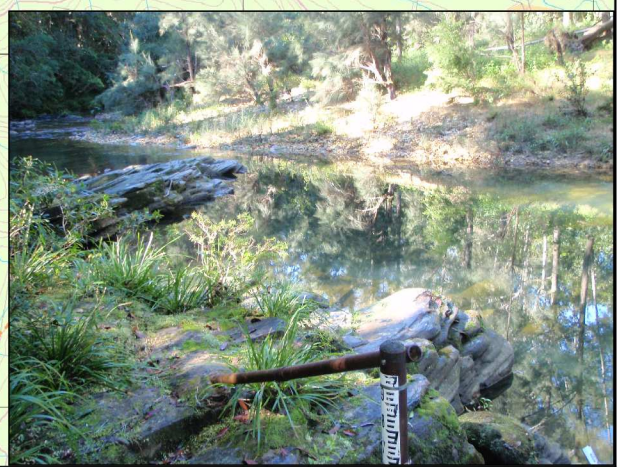
Kooroowi



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Kooroowi

MHL 2546

Figure 65

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Kalang River		Station name: Kooroowi	
AWRC No: 205440		BoM No: 559008	
MGA co-ordinates zone: 56		Easting: 482967	Northing: 6629647
Geographic co-ordinate system:		Latitude: -30.46524077	Longitude: 152.82256313
TRIM reference: FILE17/60593		LGA: Bellingen Shire Council	Rainfall district: 59
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: May 1985		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: NA Order of accuracy: NA PM/SSM RL (mAHD): NA Local BM description: Cross Local BM location: Cross on shed floor at door entrance		Local BM RL (mAHD): 16.011 Station datum: Assumed Datum (AD) Date of last survey: 23 May 2018 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Rain gauge station since May 1991. Assumed datum for this station is the cease to flow level.			
Peak flood of record (**mAD**): 9.57	1% AEP (**mAHD**): 36.0	Instrumentation height (**mAD**): 16.911	
Hydraulic characteristics: Non-tidal.			
Purpose of installation and current functionality: The gauge was installed to provide discharge data in time of flood, however the station is no longer gauged during events.			
Station shown on BoM website: Radio transmission event data connected to MHL's sensor is displayed. MHL maintains the ERTS equipment under contract with Bellingen Shire Council.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Urunga



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Urunga

MHL 2546

Figure 66

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Kalang River		Station name: Urunga	
AWRC No: 205407		BoM No: 559011	
MGA co-ordinates zone: 56		Easting: 501233	Northing: 6626813
Geographic co-ordinate system:		Latitude: -30.49093469	Longitude: 153.01284784
TRIM reference: FILE17/60591		LGA: Bellingen Shire Council	Rainfall district: 59
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: September 1993		Secondary sensor installation date: August 2012	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): 7	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: Instantaneous 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 42986 Order of accuracy: L3 PM/SSM RL (mAHD): 9.344 Local BM description: Pin in triangle cut into concrete Local BM location: Concrete base of instrumentation box.		Local BM RL (mAHD): 3.127 Station datum: AHD Date of last survey: 2 June 2017 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1993 to June 2009		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.868 MHWS: 0.542 MHW: 0.477 MHWN: 0.412 MSL: 0.177	0.050 0.043 0.038 0.034 0.035	MLWN: -0.058 MLW: -0.122 MLWS: -0.187 ISLW: -0.420 Tidal range (HHWSS – ISLW): 1.289	0.046 0.050 0.054 0.062 0.090
STATION CHARACTERISTICS			
General comments: Station relocated to the opposite side of the river in June 2009 due to flood damage at the original location.			
Peak flood of record (mAHD): 2.82	1% AEP (mAHD): 3.8	Instrumentation height (mAHD): 4.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to record flood levels in the Urunga area.			
Station shown on BoM website: Radio transmission event data connected to MHL's sensor is displayed. MHL maintains the ERTS equipment under contract with Bellingen Shire Council.			
SES flood classification: Minor 1.5m, Moderate 2.0m, Major 2.4m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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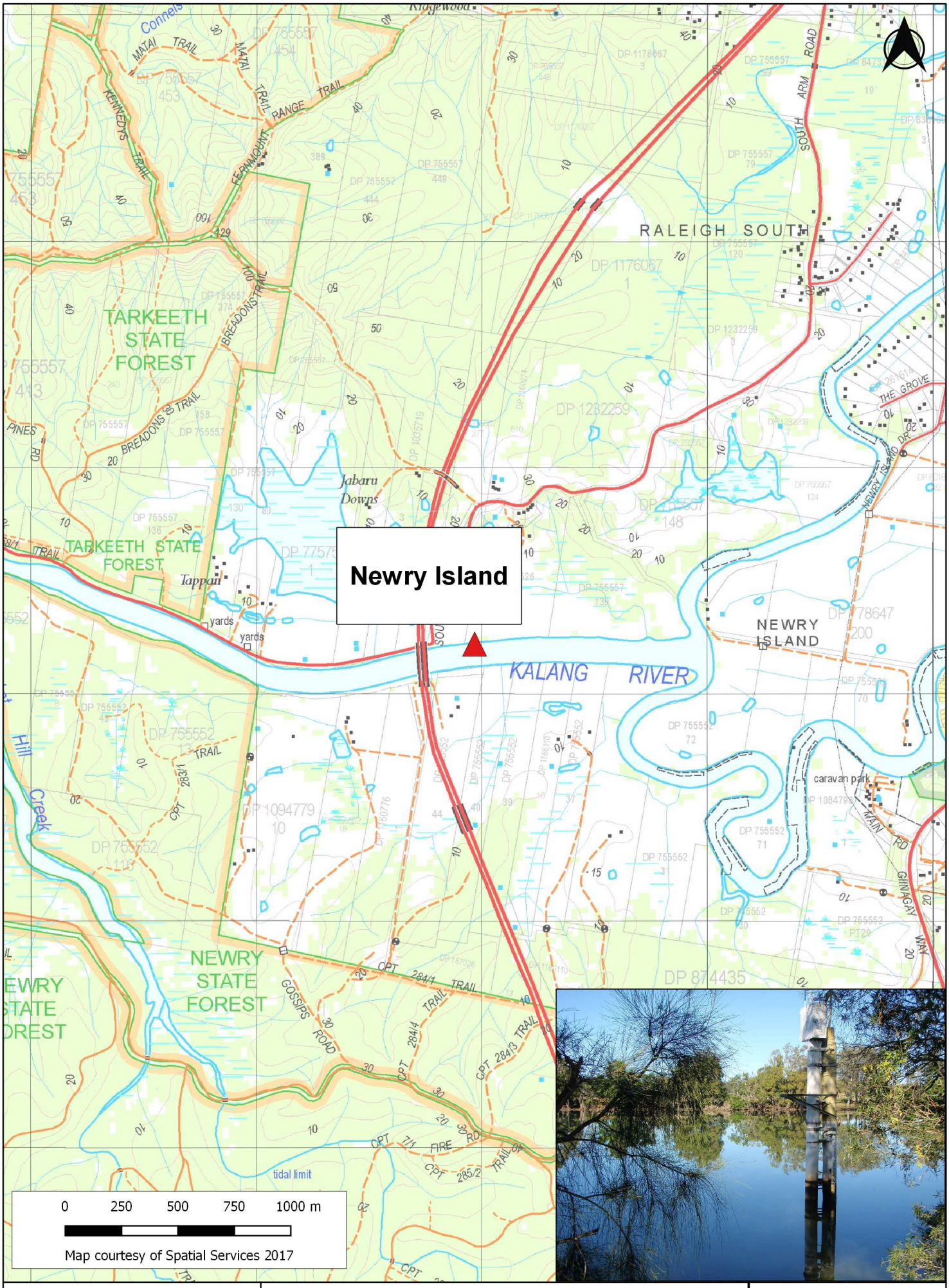

Manly Hydraulics Laboratory

STATION LOCATION
Newry Island

MHL 2546

Figure 67

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Kalang River		Station name: Upstream Newry Island	
AWRC No: 205458		BoM No: 559020	
MGA co-ordinates zone: 56		Easting: 497967	Northing: 6625224
Geographic co-ordinate system:		Latitude: -30.50527225	Longitude: 152.97881108
TRIM reference: FILE17/60586		LGA: Bellingen Shire Council	Rainfall district: 59
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Floatwell		Secondary sensor type: NA	
Primary sensor installation date: September 1989		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 77507 Order of accuracy: B2 PM/SSM RL (mAHD): 1.791 Local BM description: Star picket in concrete Local BM location: Concrete ground level hydro mark on river bank adjacent to the station.		Local BM RL (mAHD): 3.076 Station datum: AHD Date of last survey: 24 October 2012 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good – not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.890 MHWS: 0.561 MHW: 0.491 MHWN: 0.420 MSL: 0.163	0.059 0.050 0.043 0.038 0.039	MLWN: -0.093 MLW: -0.164 MLWS: -0.235 ISLW: -0.470 Tidal range (HHWSS – ISLW): 1.360	0.054 0.060 0.066 0.073 0.108
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 4.19	1% AEP (mAHD): 4.5	Instrumentation height (mAHD): 4.3	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge was installed to record flood levels at Newry Island during periods of flooding.			
Station shown on BoM website: Radio transmission event data connected to MHL's sensor is displayed. MHL maintains the ERTS equipment under contract with Bellingen Shire Council.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 27 March 2019	

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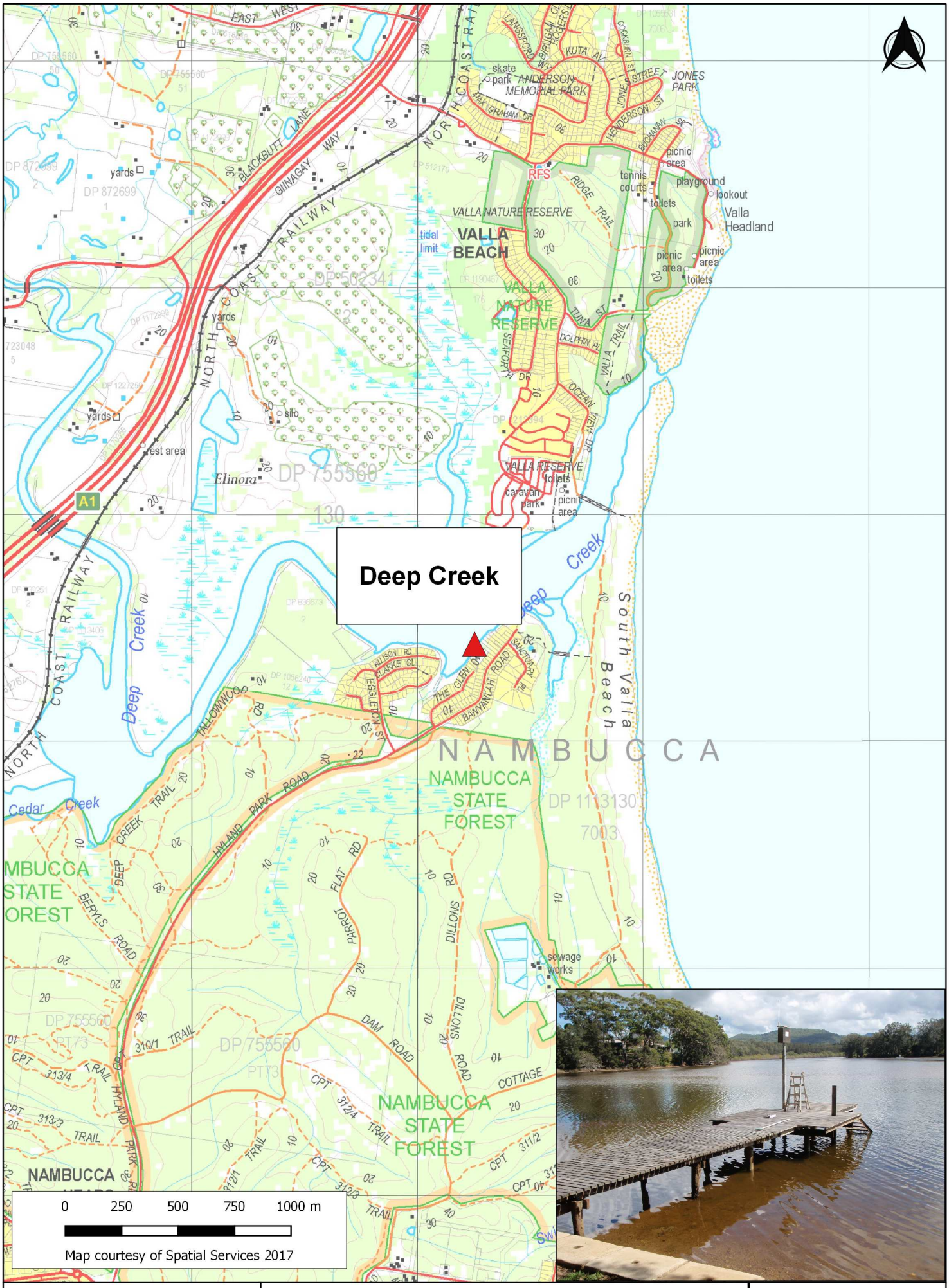

NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Deep Creek**	**MHL 2546** **Figure 68** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Deep Creek		Station name: Deep Creek	
AWRC No: 205485		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 500253	Northing: 6613431
Geographic co-ordinate system:		Latitude: -30.61169246	Longitude: 153.00263952
TRIM reference: FILE17/60538		LGA: Nambucca Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: April 2002		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 65173 Order of accuracy: B2 PM/SSM RL (mAHD): 3.785 Local BM description: Stainless steel pin in galvanised iron pipe. Local BM location: Pin in pipe in garden, 5m east of jetty.		Local BM RL (mAHD): 2.481 Station datum: AHD Date of last survey: 11 September 2018 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.14	1% AEP (mAHD): 3.0	Instrumentation height (mAHD): 3.6	
Hydraulic characteristics: Tidal, dependent on entrance conditions.			
Purpose of installation and current functionality: This gauge was installed under the Estuary Program to monitor water levels in Deep Creek and provide data to an Entrance Management Plan.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

STATION LOCATION
Bowraville Downstream

MHL 2546

Figure 69

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Nambucca River		Station name: Bowraville Downstream	
AWRC No: 205425		BoM No: 559072	
MGA co-ordinates zone: 56		Easting: 486768	Northing: 6608695
Geographic co-ordinate system:		Latitude: -30.65435553	Longitude: 152.86189146
TRIM reference: FILE17/60537		LGA: Nambucca Shire Council	Rainfall district: 59
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: December 2008		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 23389 Order of accuracy: D4 PM/SSM RL (mAHD): 3.785 Local BM description: Top of post painted yellow. Local BM location: Top of post at bank, which is approx. 10m away from gauge plate.		Local BM RL (mAHD): 3.471 Station datum: AHD Date of last survey: 15 September 2016 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Fair - not calculated due to limited record.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 7.51	1% AEP (mAHD): 9.8	Instrumentation height (mAHD): 10.2	
Hydraulic characteristics: Tidal, close to tidal limit at Lanes Bridge, Bowraville			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program to provide water level and flood data at Bowraville.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Stuarts Island Downstream



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Stuarts Island Downstream

MHL 2546

Figure 70

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Nambucca River		Station name: Stuarts Island Downstream	
AWRC No: 205466		BoM No: 559042	
MGA co-ordinates zone: 56		Easting: 499519	Northing: 6608564
Geographic co-ordinate system:		Latitude: -30.65561091	Longitude: 152.99497951
TRIM reference: FILE17/62540		LGA: Nambucca Shire Council	Rainfall district: 59
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: November 2008		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 37175 Order of accuracy: L3 PM/SSM RL (mAHD): 1.906 Local BM description: SSM 61124 Local BM location: River bank 3m northwest from the equipment housing.		Local BM RL (mAHD): 1.906 Station datum: AHD Date of last survey: 15 September 2016 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good - not calculated due to limited record.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Rain gauge station since October 1998.			
Peak flood of record (mAHD): 2.00	1% AEP (mAHD): 2.4	Instrumentation height (mAHD): 3.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, it monitors water levels and flooding in the lower reaches of the Nambucca River.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Stuarts Island

MHL 2546

Figure 71

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Nambucca River		Station name: Stuarts Island	
AWRC No: 205465		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 499274	Northing: 6608252
Geographic co-ordinate system:		Latitude: -30.65843051	Longitude: 152.99241999
TRIM reference: NA		LGA: Nambucca Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: NA	
Primary sensor type: Floatwell		Secondary sensor type: NA	
Primary sensor installation date: July 1991		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 88291 Order of accuracy: 2 PM/SSM RL (mAHD): 3.758 Local BM description: PM 71294 Local BM location: Near first green at water's edge.		Local BM RL (mAHD): 1.244 Station datum: AHD Date of last survey: 19 January 2007 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1992 to June 2008		Tidal planes functionality: Poor	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.767 MHWS: 0.473 MHW: 0.419 MHWN: 0.365 MSL: 0.179	0.058 0.047 0.043 0.039 0.034	MLWN: -0.006 MLW: -0.060 MLWS: -0.114 ISLW: -0.324 Tidal range (HHWSS – ISLW): 1.091	0.036 0.036 0.037 0.045 0.078
STATION CHARACTERISTICS			
General comments: Station decommissioned on 7 December 2012.			
Peak flood of record (mAHD): 2.09	1% AEP (mAHD): 2.4	Instrumentation height (mAHD): 4.5	
Hydraulic characteristics: Tidal, the station is located behind a half tide wall therefore the tide phases are not representative of the main arm of the Nambucca River.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, it monitors water levels and flooding in the lower reaches of the Nambucca River.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Decommissioned		Revision date: 17 September 2018	

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Macksville



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Macksville

MHL 2546

Figure 72

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Nambucca River		Station name: Macksville	
AWRC No: 205416		BoM No: 559006	
MGA co-ordinates zone: 56		Easting: 492382	Northing: 6602967
Geographic co-ordinate system:		Latitude: -30.70609212	Longitude: 152.92044497
TRIM reference: FILE17/62548		LGA: Nambucca Shire Council	Rainfall district: 59
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Gas purge		Secondary sensor type: Radar	
Primary sensor installation date: May 1983		Secondary sensor installation date: March 2016	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: SSM 64276 Order of accuracy: L2 PM/SSM RL (mAHD): 2.985 Local BM description: Triangle cut into concrete. Local BM location: 1st BM, concrete at picnic table 2m away from instrumentation box. 2nd BM, concrete at bottom of radar box bracket.		Local BM RL (mAHD): 1.806 (1st BM); 7.748 (2nd BM) Station datum: AHD Date of last survey: 11 September 2018 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.858	0.065	MLWN: -0.016	0.033
MHWS: 0.544	0.050	MLW: -0.076	0.036
MHW: 0.483	0.044	MLWS: -0.137	0.039
MHWN: 0.422	0.039	ISLW: -0.361	0.049
MSL: 0.203	0.029	Tidal range (HHWSS – ISLW): 1.219	0.098
STATION CHARACTERISTICS			
General comments: The secondary radar sensor was installed on 24 March 2016 on the bridge and is located 100m downstream of the gas purge sensor (refer to map for location).			
Peak flood of record (mAHD): 2.51	1% AEP (mAHD): 3.7	Instrumentation height (mAHD): 4.2 (7.7 for radar)	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: This station was installed to provide water level and flood data at Macksville.			
Station shown on BoM website: MHL data for this station is not displayed. ERTS data is displayed. ERTS canister in cabinet of gas purge station, which is owned by Nambucca Shire Council, is connected to MHL's gas line.			
SES flood classification: Minor 1.7m, Moderate 2.1m, Major 2.6m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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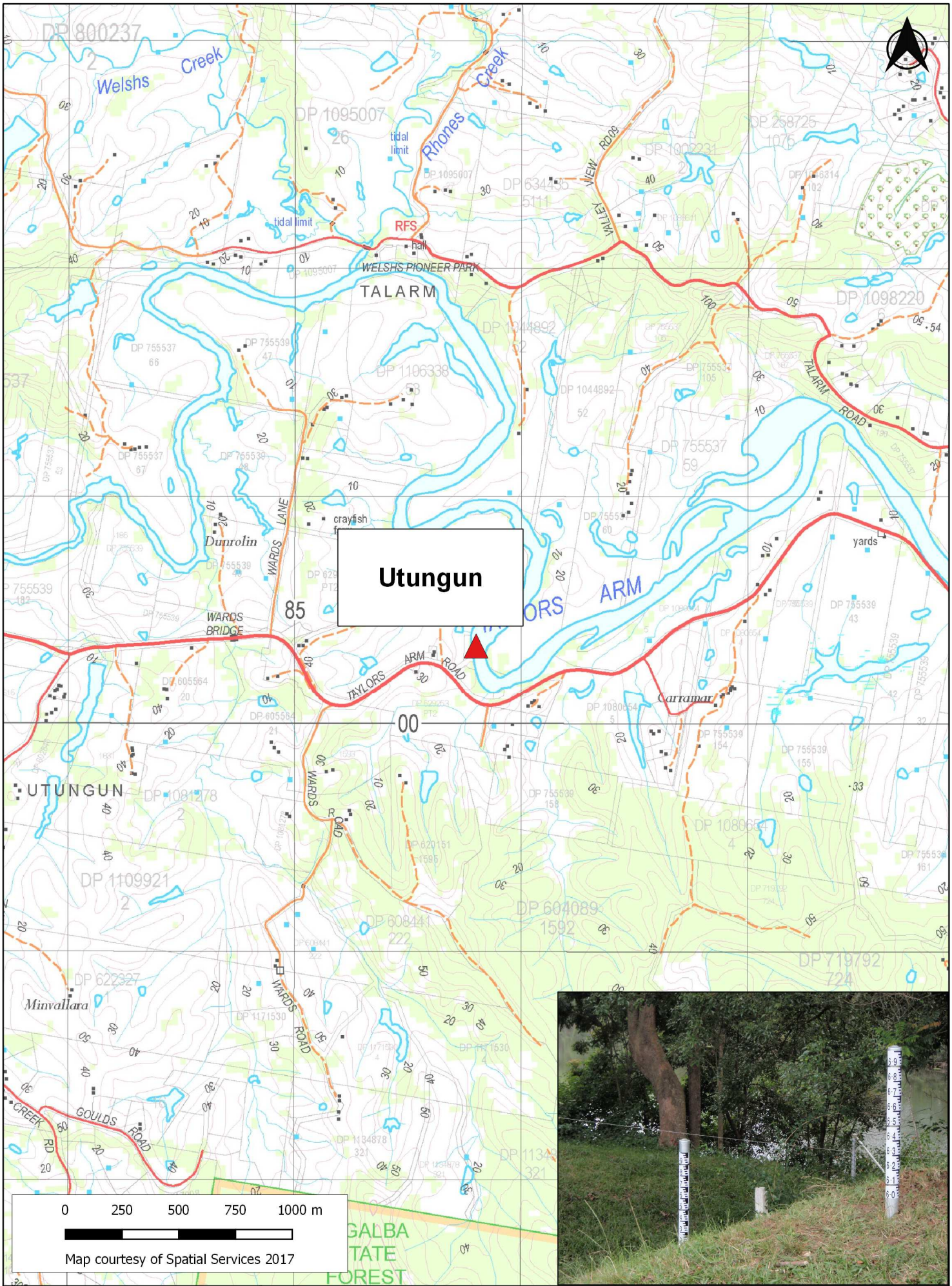

Manly Hydraulics Laboratory

STATION LOCATION
Utungun

MHL 2546

Figure 73

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Taylors Arm		Station name: Utungun	
AWRC No: 205414		BoM No: 559005	
MGA co-ordinates zone: 56		Easting: 485800	Northing: 6600344
Geographic co-ordinate system:		Latitude: -30.72970069	Longitude: 152.85167285
TRIM reference: FILE17/62568		LGA: Nambucca Shire Council	Rainfall district: 59
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: October 1991		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 140278 Order of accuracy: U PM/SSM RL (mAHD): 7.222 Local BM description: Stainless steel pin in galvanised iron pipe Local BM location: Pin in pipe at the west side of the shed.		Local BM RL (mAHD): 6.592 Station datum: AHD Date of last survey: 12 September 2018 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1991 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.861 MHWS: 0.557 MHW: 0.495 MHWN: 0.434 MSL: 0.210	0.060 0.048 0.044 0.041 0.032	MLWN: -0.014 MLW: -0.075 MLWS: -0.136 ISLW: -0.354 Tidal range (HHWSS – ISLW): 1.215	0.036 0.037 0.039 0.047 0.086
STATION CHARACTERISTICS			
General comments: Rain gauge station since November 1991.			
Peak flood of record (mAHD): 5.99	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 11.0	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to record upstream flood levels on the Taylors Arm.			
Station shown on BoM website: MHL data for this station is not displayed. ERTS data is displayed. ERTS canister in cabinet of gas purge station, which is owned by Nambucca Shire Council, is connected to MHL's gas line.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Warrell Creek



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Warrell Creek

MHL 2546

Figure 74

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Warrell Creek		Station name: Warrell Creek	
AWRC No: 205490		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 491986	Northing: 6600076
Geographic co-ordinate system:		Latitude: -30.73217677	Longitude: 152.91628700
TRIM reference: FILE17/62579		LGA: Nambucca Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: February 2010		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 73227 Order of accuracy: L2 PM/SSM RL (mAHD): 23.951 Local BM description: Bolt in concrete. Local BM location: Concrete within half a metre of the equipment housing.		Local BM RL (mAHD): 9.954 Station datum: AHD Date of last survey: 14 September 2018 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Fair – not calculated due to limited record.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 4.49	1% AEP (mAHD): 5.8	Instrumentation height (mAHD): 11.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: This station was installed under the Estuary Program and is used as part of an Entrance Management Plan.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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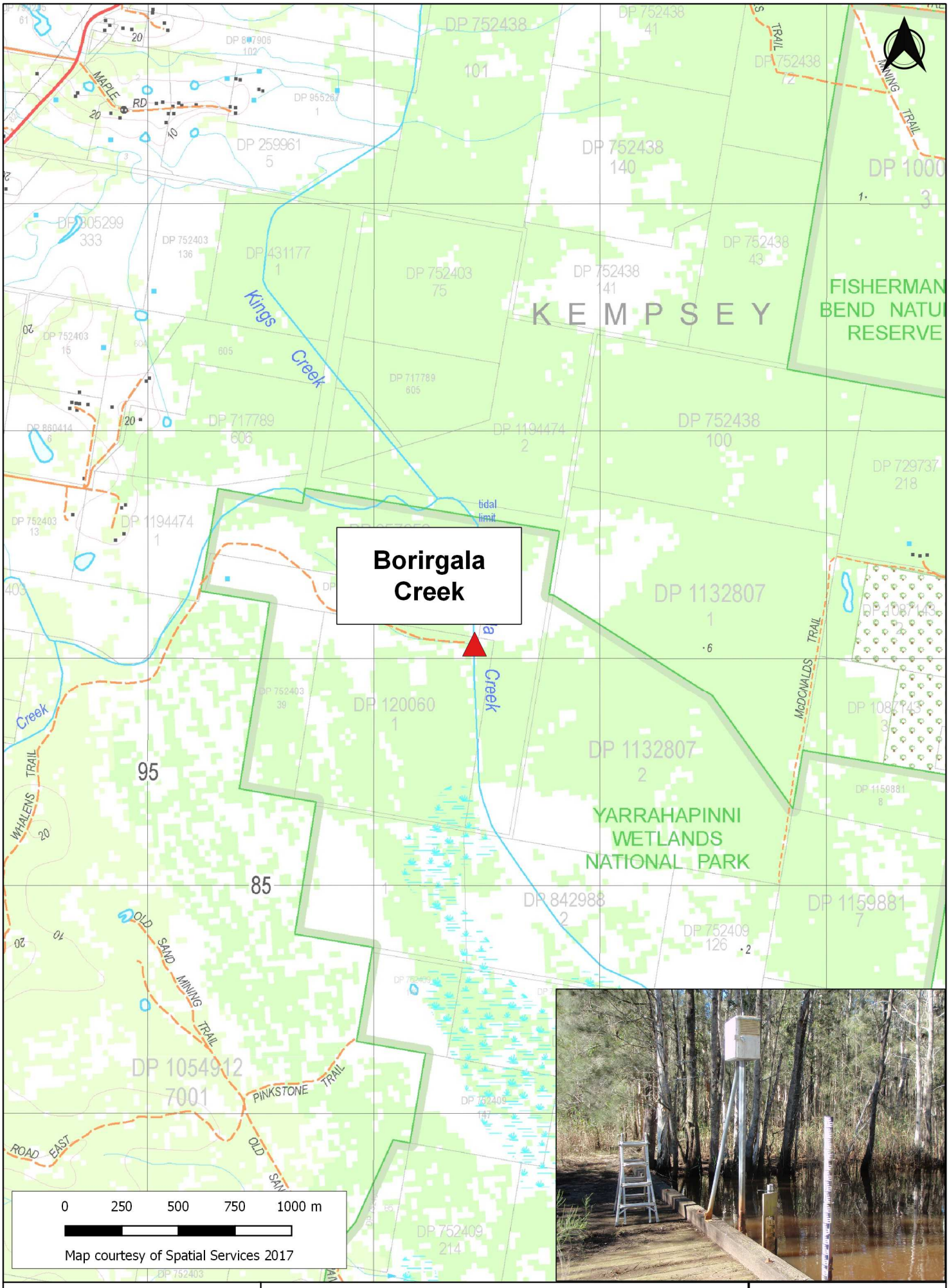

Manly Hydraulics Laboratory

NSW GOVERNMENT

STATION LOCATION
Borirgala Creek

MHL 2546

Figure 75

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Borirgala Creek		Station name: Borirgala Creek	
AWRC No: 206450		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 496445	Northing: 6586064
Geographic co-ordinate system:		Latitude: -30.85863586	Longitude: 152.92681638
TRIM reference: FILE17/67428		LGA: Kempsey Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: April 2001		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 33137 Order of accuracy: L3 PM/SSM RL (mAHD): 24.421 Local BM description: Star picket Local BM location: Star picket on west side of bridge, 1.5m away from wooden borders.		Local BM RL (mAHD): 0.616 Station datum: AHD Date of last survey: 22 March 2010 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.30	1% AEP (mAHD): 3.3	Instrumentation height (mAHD): 3.0	
Hydraulic characteristics: Non-tidal creek, upstream of floodgates in a wetland.			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program, to monitor water levels that will contribute to the management of Yarrahappini Wetlands.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Saltwater Lagoon

MHL 2546
Figure 76
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Saltwater Lagoon		Station name: Saltwater Lagoon	
AWRC No: 206460		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 506119	Northing: 6582610
Geographic co-ordinate system:		Latitude: -30.88979219	Longitude: 153.06402256
TRIM reference: FILE17/62582		LGA: Kempsey Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: July 2004		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 46500 Order of accuracy: L3 PM/SSM RL (mAHD): 2.257 Local BM description: Bolt in concrete painted yellow Local BM location: Bolt on the downstream side of the middle of the bridge. Bridge is located 100m north of BIG4 Sunshine Hotel on Phillip Drive, South West Rocks.		Local BM RL (mAHD): 3.198 Station datum: AHD Date of last survey: 25 March 2010 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.23	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 2.9	
Hydraulic characteristics: Intermittently closed and open lake or lagoon (ICOLL), rarely open.			
Purpose of installation and current functionality: This station was installed under the Estuary Program and is used as part of an Entrance Management Plan.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

NSW GOVERNMENT

STATION LOCATION
South West Rocks

MHL 2546

Figure 77

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Macleay River		Station name: South West Rocks	
AWRC No: 206456		BoM No: 559041	
MGA co-ordinates zone: 56		Easting: 501638	Northing: 6582579
Geographic co-ordinate system:		Latitude: -30.89008662	Longitude: 153.01713830
TRIM reference: FILE17/62584		LGA: Kempsey Shire Council	Rainfall district: 59

INSTRUMENTATION	
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)	Communication type: Mobile 3G/4G (IP)
Primary sensor type: Submersible pressure transducer	Secondary sensor type: NA
Primary sensor installation date: April 1988	Secondary sensor installation date: NA
Range of primary water level sensor (m): 7	Range of secondary water level sensor (m): NA
Primary sensor sampling regime: Instantaneous 15 minute	Secondary sensor sampling regime: NA

SURVEY DETAILS	
PM/SSM reference: PM 74277 Order of accuracy: L3 PM/SSM RL (mAHD): 1.364 Local BM description: SSM 49870. Bolt in concrete block painted yellow. Local BM location: 10m north of station cabinet on water side of New Entrance Rd, South West Rocks.	Local BM RL (mAHD): 1.463 Station datum: AHD Date of last survey: 12 September 2018 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA

TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.928	0.043	MLWN: -0.250	0.031
MHWS: 0.591	0.040	MLW: -0.355	0.032
MHW: 0.485	0.037	MLWS: -0.461	0.034
MHWN: 0.380	0.035	ISLW: -0.702	0.035
MSL: 0.065	0.032	Tidal range (HHWSS – ISLW): 1.630	0.047

STATION CHARACTERISTICS		
General comments: Aug 2011 floatwell on timber pile removed and new sensor installed on river bank for easy access and safer maintenance.		
Peak flood of record (mAHD): 1.60	1% AEP (mAHD): 3.1	Instrumentation height (mAHD): 3.1
Hydraulic characteristics: Tidal, 1km upstream from river entrance.		
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to monitor flood levels and their interaction with ocean tides and storm surges.		
Station shown on BoM website: MHL data for this station is displayed.		
SES flood classification: None		
Data used for BoM flood forecasting: Yes		BoM priority: Low
Station recommendations: Maintain		Revision date: 17 September 2018

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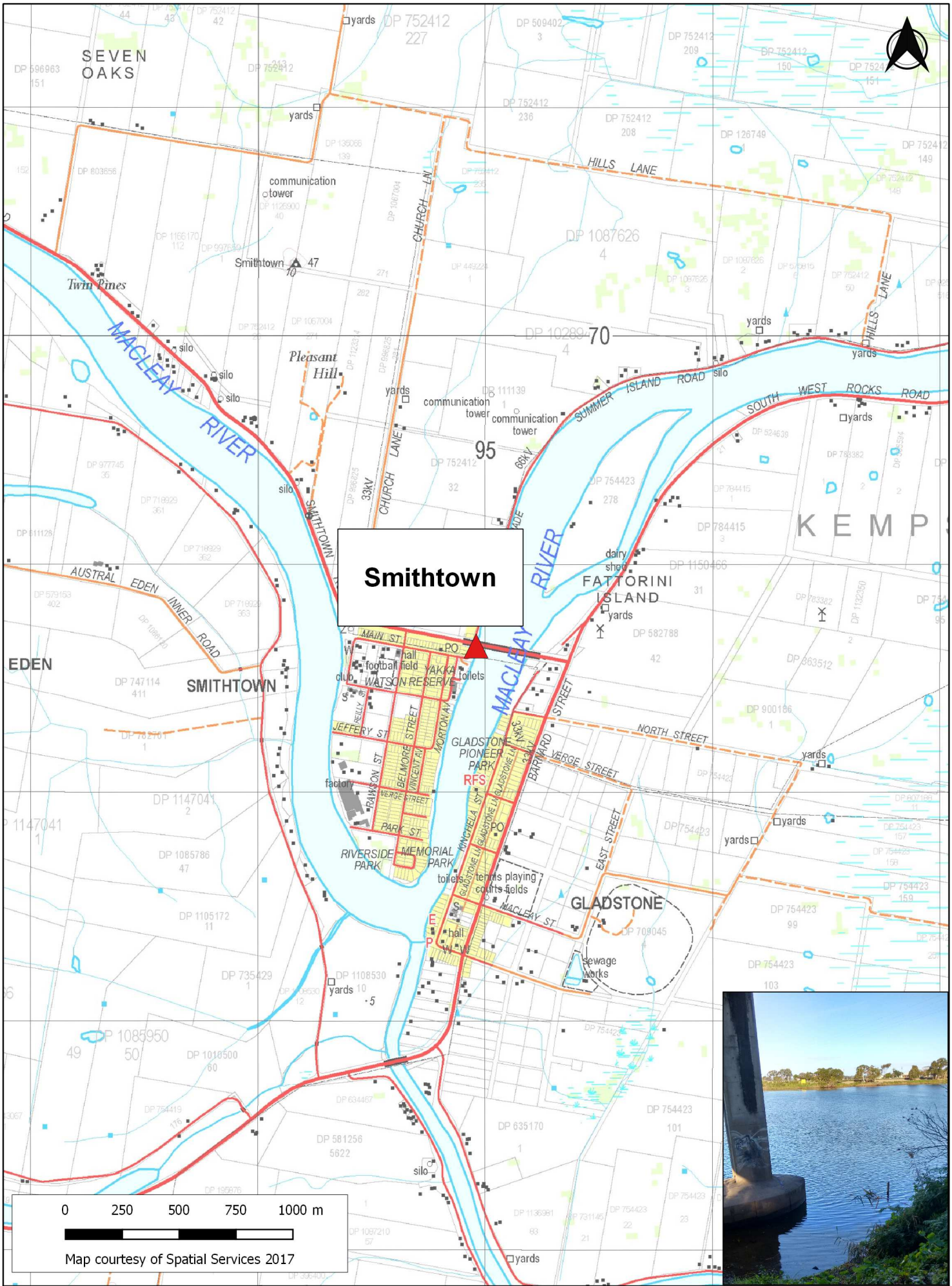

NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Smithtown**	**MHL 2546** **Figure 78** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Macleay River		Station name: Smithtown	
AWRC No: 206406		BoM No: 559040	
MGA co-ordinates zone: 56		Easting: 494960	Northing: 6568643
Geographic co-ordinate system:		Latitude: -31.01582554	Longitude: 152.94719765
TRIM reference: FILE17/62587		LGA: Kempsey Shire Council	Rainfall district: 59
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: February 1986		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 81070 Order of accuracy: L3 PM/SSM RL (mAHD): 2.931 Local BM description: Triangle cut into concrete kerb painted yellow Local BM location: Triangle in kerb under traffic bridge on station hut side of the road.		Local BM RL (mAHD): 3.718 Station datum: AHD Date of last survey: 3 October 2012 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.789	0.049	MLWN: -0.080	0.033
MHWS: 0.497	0.045	MLW: -0.136	0.031
MHW: 0.441	0.043	MLWS: -0.193	0.030
MHWN: 0.384	0.040	ISLW: -0.402	0.029
MSL: 0.152	0.036	Tidal range (HHWSS – ISLW): 1.191	0.033
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 4.32	1% AEP (mAHD): 5.0	Instrumentation height (mAHD): 4.7	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. Smithtown has similar flooding problems to Kempsey and the gauge is accessed by the SES, BoM and Kempsey Shire Council for real time flood monitoring and evacuation planning.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 3.4m, Moderate 4.0m, Major 4.2m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

NSW GOVERNMENT

STATION LOCATION
Hat Head

MHL 2546

Figure 79

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Korogoro Creek		Station name: Hat Head	
AWRC No: 206465		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 505462	Northing: 6563993
Geographic co-ordinate system:		Latitude: -31.05778140	Longitude: 153.05724859
TRIM reference: FILE17/62588		LGA: Kempsey Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: January 2004		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 30850 Order of accuracy: B2 PM/SSM RL (mAHD): 1.600 Local BM description: Triangle cut into concrete painted yellow. Local BM location: Triangle cut into concrete at picnic table located north side of wooden walkway bridge where instrumentation box is fixed to.		Local BM RL (mAHD): 3.271 Station datum: AHD Date of last survey: 26 September 2012 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2004 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.874	0.088	MLWN: -0.161	0.056
MHWS: 0.540	0.076	MLW: -0.247	0.066
MHW: 0.454	0.066	MLWS: -0.333	0.076
MHWN: 0.367	0.058	ISLW: -0.572	0.084
MSL: 0.103	0.042	Tidal range (HHWSS – ISLW): 1.445	0.149
STATION CHARACTERISTICS			
General comments: The submersible pressure transducer was replaced by a radar unit on 19 October 2016.			
Peak flood of record (mAHD): 1.89	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 3.1	
Hydraulic characteristics: Tidal. Entrance can silt up, reducing tidal range. Shallow water influence on harmonic constituents when the entrance silts up.			
Purpose of installation and current functionality: This station was installed under the Estuary Program and was used as input into an Estuary Management Plan.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Kempsey



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Kempsey

MHL 2546

Figure 80

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Macleay River		Station name: Kempsey	
AWRC No: 206402		BoM No: 059127	
MGA co-ordinates zone: 56		Easting: 485137	Northing: 6561355
Geographic co-ordinate system:		Latitude: -31.08150296	Longitude: 152.84417857
TRIM reference: FILE17/72102		LGA: Kempsey Shire Council	Rainfall district: 59
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: July 1983		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 33668 Order of accuracy: L2 PM/SSM RL (mAHD): 6.520 Local BM description: Triangle cut into floor Local BM location: Triangle cut into concrete floor of station hut inside hut door.		Local BM RL (mAHD): 8.284 Station datum: AHD Date of last survey: 26 September 2012 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.843	0.072	MLWN: -0.057	0.039
MHWS: 0.545	0.059	MLW: -0.112	0.036
MHW: 0.490	0.055	MLWS: -0.167	0.035
MHWN: 0.435	0.052	ISLW: -0.380	0.032
MSL: 0.189	0.044	Tidal range (HHWSS – ISLW): 1.222	0.063
STATION CHARACTERISTICS			
General comments: Flood camera installed since Nov 2013.			
Peak flood of record (mAHD): 6.94	1% AEP (mAHD): 9.1	Instrumentation height (mAHD): 8.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The township of Kempsey is exposed to major flooding. The gauge is vital for verifying the numerical model and reviewing flood damage. Conductivity and temperature sensors were installed in Feb 2010 under a program funded by WaterNSW (formerly NSW Office of Water) for the Water Sharing Plan.			
Station shown on BoM website: MHL data for this station is not displayed. ERTS data is displayed. ERTS canister in shed collects data from Kempsey Shire Council's radar sensor, all the instrumentation is separate to MHL's installation but share the same shed.			
SES flood classification: Minor 4.5m, Moderate 5.7m, Major 6.6m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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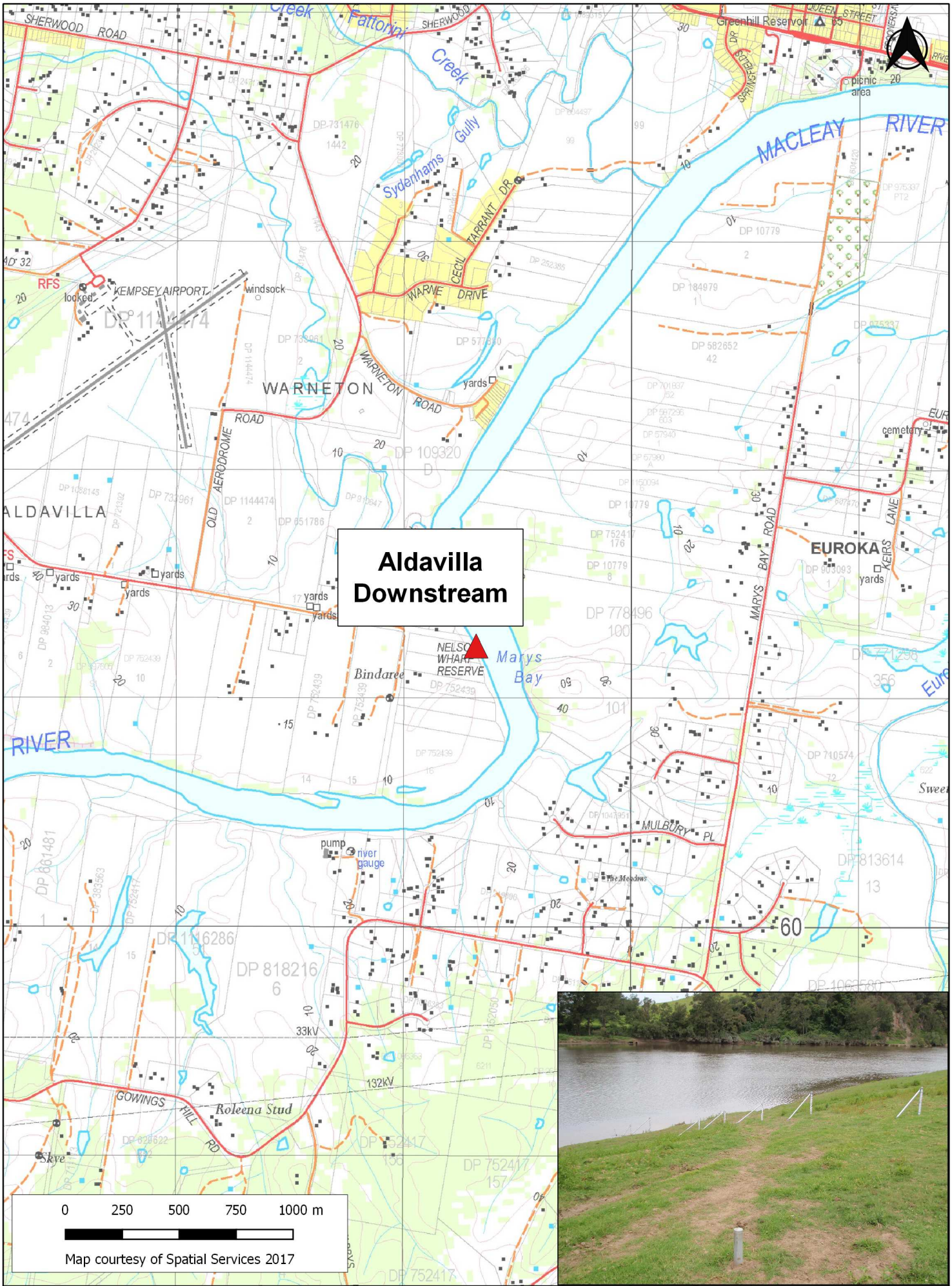

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Aldavilla Downstream

MHL 2546
Figure 81
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Macleay River		Station name: Aldavilla Downstream	
AWRC No: 206459		BoM No: 559151	
MGA co-ordinates zone: 56		Easting: 479318	Northing: 6561231
Geographic co-ordinate system:		Latitude: -31.08253367	Longitude: 152.78317083
TRIM reference: FILE17/72105		LGA: Kempsey Shire Council	Rainfall district: 59
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: December 2011		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 104338 Order of accuracy: B2 PM/SSM RL (mAHD): 13.368 Local BM description: Stainless bolt in concrete painted yellow Local BM location: Stainless bolt in concrete at the base of the station equipment hut platform.		Local BM RL (mAHD): 13.368 Station datum: AHD Date of last survey: 10 November 2011 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good – not calculated due to limited record	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Rain gauge station since December 2011.			
Peak flood of record (mAHD): 9.65	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 14.2	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge is to support verifying the numerical model and reviewing flood damage of the Macleay river.			
Station shown on BoM website: MHL data for this station is displayed. ERTS canister in cabinet collects data from Kempsey Shire Council's sensor which is connected to MHL's gas line.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Euroka Upstream

MHL 2546

Figure 82

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Macleay River		Station name: Euroka Upstream	
AWRC No: 206458		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 478817	Northing: 6560507
Geographic co-ordinate system:		Latitude: -31.08906111	Longitude: 152.77789996
TRIM reference: Local office file FILE16/65930		LGA: Kempsey Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: NA	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: July 1990		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 33687 Order of accuracy: 2 PM/SSM RL (mAHD): 29.523 Local BM description: Stainless steel (SS) pin Local BM location: BM in the box adjacent to shelter		Local BM RL (mAHD): 17.870 Station datum: AHD Date of last survey: 25 October 2007 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1991 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.748 MHWS: 0.472 MHW:0.420 MHWN: 0.368 MSL: 0.153	0.058 0.046 0.044 0.043 0.048	MLWN: -0.061 MLW: -0.113 MLWS: -0.165 ISLW: -0.362 Tidal range (HHWSS – ISLW): 1.110	0.068 0.072 0.078 0.090 0.119
STATION CHARACTERISTICS			
General comments: Station decommissioned 19 Dec 2011.			
Peak flood of record (mAHD): 11.87	1% AEP (mAHD): NA	Instrumentation height (mAHD): NA	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, and records flood levels upstream of Kempsey near the Macleay River tidal limit to facilitate the establishment of flood design levels for possible future developments on the Aldavilla floodplain.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Decommissioned		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

STATION LOCATION
Crescent Head Killick Creek

MHL 2546

Figure 83

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Killick Creek		Station name: Crescent Head	
AWRC No: 207452		BoM No: 559033	
MGA co-ordinates zone: 56		Easting: 497704	Northing: 6549628
Geographic co-ordinate system:		Latitude: -31.18741107	Longitude: 152.97590000
TRIM reference: FILE17/62612		LGA: Kempsey Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: April 2001		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 12883 Order of accuracy: L3 PM/SSM RL (mAHD): 1.038 Local BM description: Nail painted yellow Local BM location: BM located 20m D/S of station box on post. Nail in concrete edging of holiday apartment yards on bank. BM2 located next to green irrigation pit at base of station box on post.		Local BM RL (mAHD): 2.036 Station datum: AHD Date of last survey: 3 March 2010 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.12	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 4.2	
Hydraulic characteristics: Intermittently closed and open lake or lagoon (ICOLL), dependent on entrance conditions.			
Purpose of installation and current functionality: This gauge was initially installed under the Estuary Program to monitor the tidal regime of the creek and to develop an Entrance Management Strategy.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT

STATION LOCATION
Green Valley

MHL 2546

Figure 84

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Maria River		Station name: Green Valley	
AWRC No: 207406		BoM No: 560003	
MGA co-ordinates zone: 56		Easting: 486416	Northing: 6540068
Geographic co-ordinate system:		Latitude: -31.27358997	Longitude: 152.85729963
TRIM reference: FILE17/62615		LGA: Kempsey Shire Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: December 1992		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 61127 Order of accuracy: 2 PM/SSM RL (mAHD): 1.659 Local BM description: Star picket Local BM location: Star picket adjacent to instrument cabinet		Local BM RL (mAHD): 1.896 Station datum: AHD Date of last survey: 20 April 2015 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1993 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.697 MHWS: 0.425 MHW: 0.370 MHWN: 0.315 MSL: 0.080	0.043 0.038 0.037 0.036 0.031	MLWN: -0.155 MLW: -0.210 MLWS: -0.265 ISLW: -0.460 Tidal range (HHWSS – ISLW): 1.157	0.029 0.028 0.028 0.028 0.035
STATION CHARACTERISTICS			
General comments: Rain gauge station since December 1992.			
Peak flood of record (mAHD): 2.89	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 3.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The Maria River is a significant contributor to the Hastings River during periods of flood. The gauge was established to monitor water level/flooding in the north-east sector of the Hastings River catchment in unison with the Telegraph Point gauge.			
Station shown on BoM website: MHL data for this station is displayed. It is called Maria River on BoM Web.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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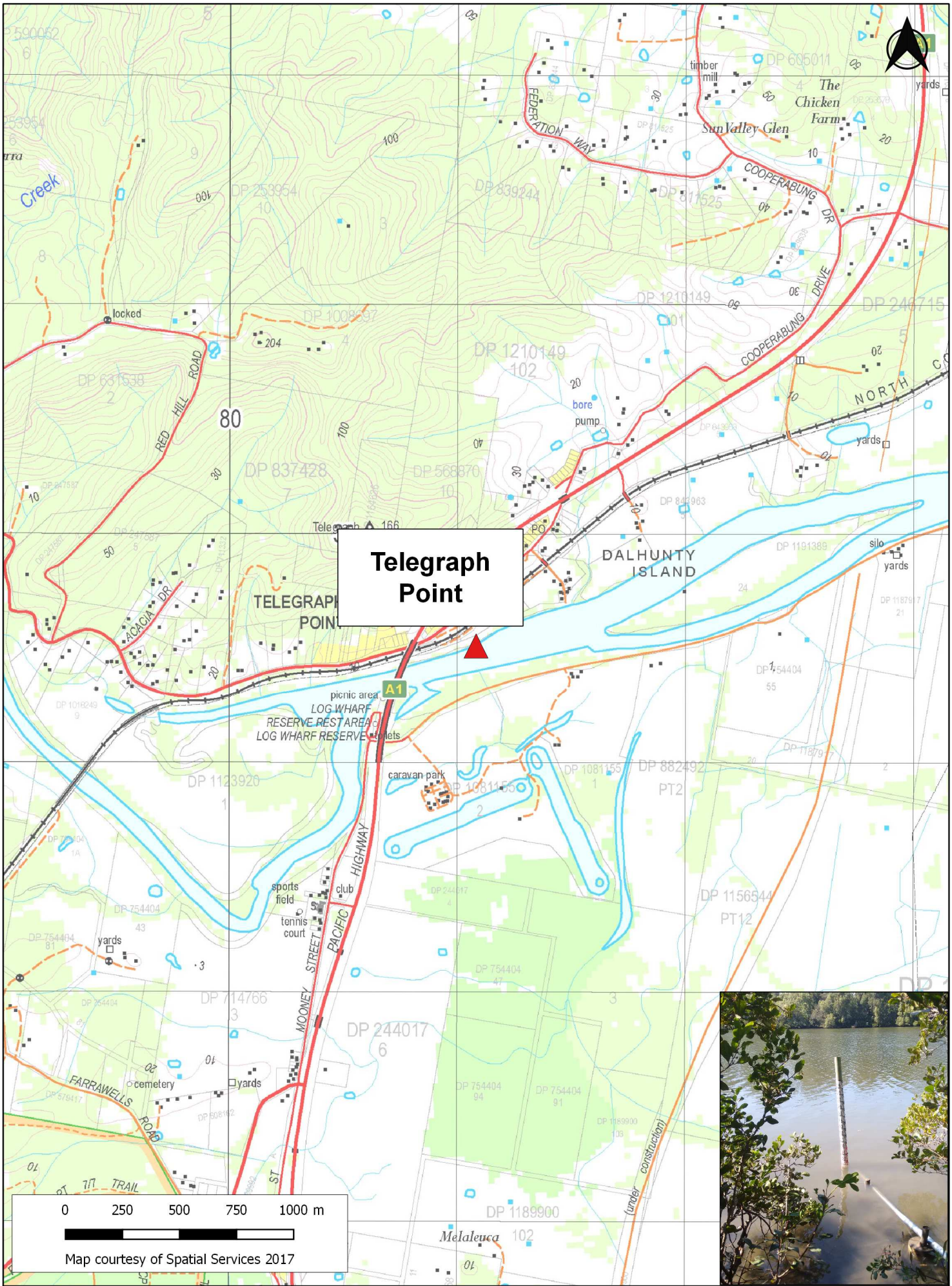

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Telegraph Point

MHL 2546

Figure 85

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wilson River		Station name: Telegraph Point	
AWRC No: 207415		BoM No: 560011	
MGA co-ordinates zone: 56		Easting: 481082	Northing: 6534512
Geographic co-ordinate system:		Latitude: -31.32364594	Longitude: 152.80116080
TRIM reference: FILE17/66449		LGA: Port Macquarie-Hastings Council	Rainfall district: 60

INSTRUMENTATION	
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)	Communication type: Mobile 3G/4G (IP)
Primary sensor type: Gas purge	Secondary sensor type: NA
Primary sensor installation date: September 1989	Secondary sensor installation date: NA
Range of primary water level sensor (m): 10	Range of secondary water level sensor (m): NA
Primary sensor sampling regime: Instantaneous 15 minute	Secondary sensor sampling regime: NA

SURVEY DETAILS	
PM/SSM reference: PM 57254	Local BM RL (mAHD): 7.304
Order of accuracy: L2	Station datum: AHD
PM/SSM RL (mAHD): 9.181	Date of last survey: 18 October 2012
Local BM description: SS 44661	Surveyed by: Phil Lee
Local BM location: SS 44661 located next to train track 30m west from station shed.	Gauge plate offset to gauge zero (m): NA

TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.695	0.041	MLWN: -0.179	0.032
MHWS: 0.412	0.039	MLW: -0.235	0.031
MHW: 0.356	0.038	MLWS: -0.292	0.031
MHWN: 0.300	0.036	ISLW: -0.493	0.031
MSL: 0.060	0.034	Tidal range (HHWSS – ISLW): 1.188	0.027

STATION CHARACTERISTICS		
General comments: Rain gauge station since September 1989.		
Peak flood of record (mAHD): 2.64	1% AEP (mAHD): 3.7	Instrumentation height (mAHD): 4.5
Hydraulic characteristics: Tidal		
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The Wilson River sub-catchment is a significant contributor to the Hastings River during flood events. The gauge was installed to provide flood warning and verification of numerical modelling.		
Station shown on BoM website: MHL data for this station is displayed.		
SES flood classification: None		
Data used for BoM flood forecasting: Yes		BoM priority: High
Station recommendations: Maintain		Revision date: 17 September 2018

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STATION LOCATION
Settlement Point

MHL 2546
Figure 86
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hastings River		Station name: Settlement Point	
AWRC No: 207418		BoM No: 060133	
MGA co-ordinates zone: 56		Easting: 490636	Northing: 6525312
Geographic co-ordinate system:		Latitude: -31.40677103	Longitude: 152.90149218
TRIM reference: FILE17/62618		LGA: Port Macquarie-Hastings Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: February 1986		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 45131 Order of accuracy: B2 PM/SSM RL (mAHD): 1.290 Local BM description: SS17679 Local BM location: In gutter across road from Ferry ramp 34m down towards Settlement Point Reserve carpark. Station box approx. 120m west of SS17679 on Settlement Point Rd.		Local BM RL (mAHD): 1.308 Station datum: AHD Date of last survey: 2 October 2012 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.817	0.035	MLWN: -0.306	0.031
MHWS: 0.491	0.033	MLW: -0.400	0.031
MHW: 0.397	0.032	MLWS: -0.495	0.031
MHWN: 0.302	0.032	ISLW: -0.728	0.031
MSL: -0.002	0.031	Tidal range (HHWSS – ISLW): 1.545	0.023
STATION CHARACTERISTICS			
General comments: Barometer installed in September 1999. In May 2011, the floatwell on a timber pile was removed and a new submersible pressure transducer was installed on the river bank for easy access and safer maintenance.			
Peak flood of record (mAHD): 1.72	1% AEP (mAHD): 2.7	Instrumentation height (mAHD): 3.2	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This station monitors tide and flood levels combined with storm surges and entrance conditions.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 1.2m, Moderate 1.5m, Major 1.75m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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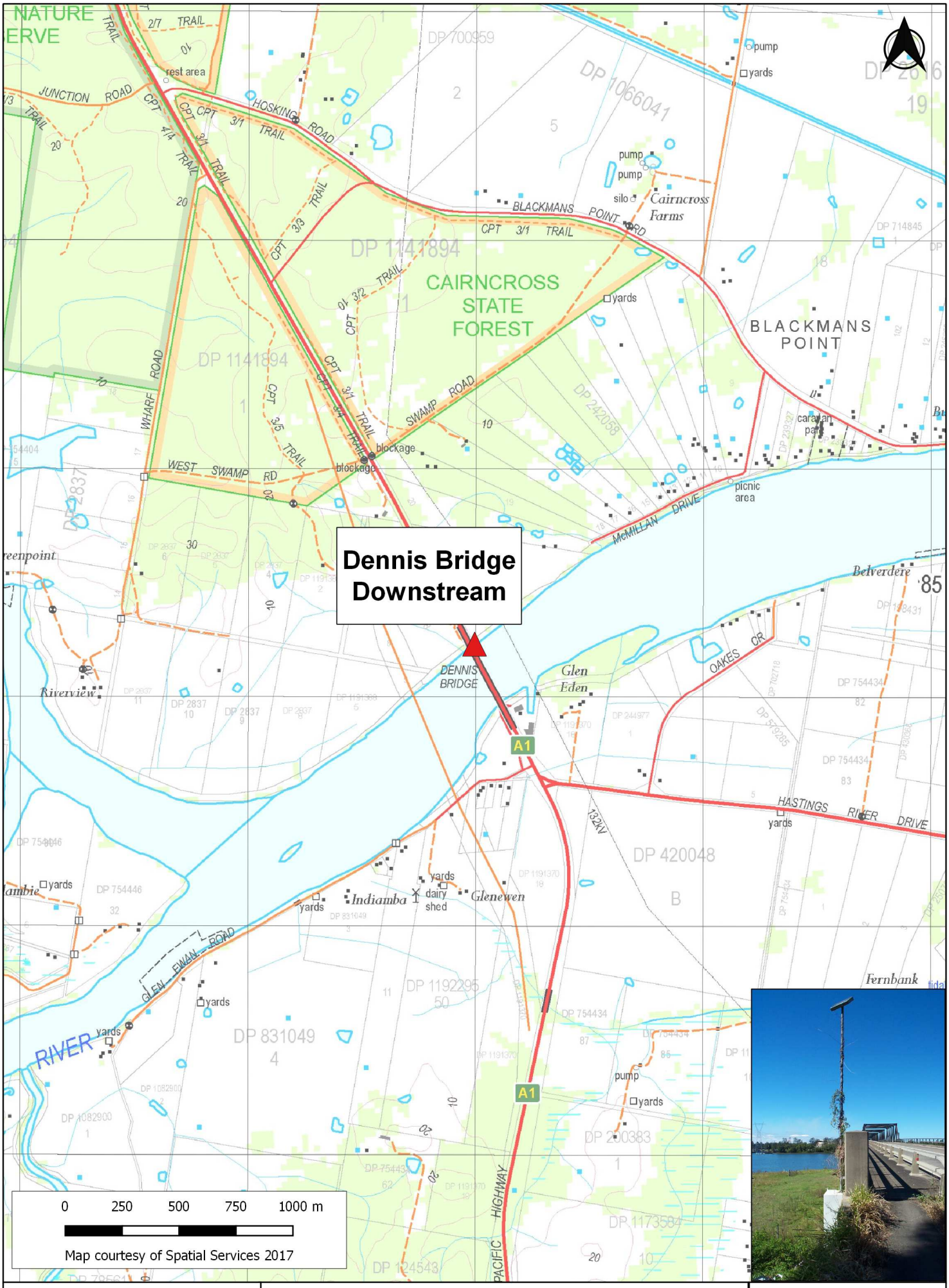

Manly Hydraulics Laboratory

NSW GOVERNMENT

STATION LOCATION
Dennis Bridge Downstream

MHL 2546

Figure 87

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hastings River		Station name: Dennis Bridge Downstream	
AWRC No: 207444		BoM No: 560042	
MGA co-ordinates zone: 56		Easting: 482995	Northing: 6525235
Geographic co-ordinate system:		Latitude: -31.40737880	Longitude: 152.82110900
TRIM reference: FILE17/62621		LGA: Port Macquarie-Hastings Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: May 1994		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 15		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 33236 Order of accuracy: L2 PM/SSM RL (mAHD): 4.336 Local BM description: Triangle cut (3/CW) on cross beam. Local BM location: Cross beam underneath the bridge 50m from station hut towards waters edge. BM based on reference point SS33236D - which is located approx. 240m north of station box on west side of Hastings River Dr.		Local BM RL (mAHD): 2.411 Station datum: AHD Date of last survey: 6 November 2012 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1994 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.895	0.033	MLWN: -0.311	0.034
MHWS: 0.557	0.032	MLW: -0.410	0.034
MHW: 0.458	0.032	MLWS: -0.509	0.035
MHWN: 0.360	0.032	ISLW: -0.750	0.035
MSL: 0.024	0.032	Tidal range (HHWSS – ISLW): 1.646	0.021
STATION CHARACTERISTICS			
General comments: The gas purge sensor was replaced by a radar unit on 15 May 2012.			
Peak flood of record (mAHD): 2.76	1% AEP (mAHD): 3.8	Instrumentation height (mAHD): 8.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to record flood events and tides in the Hastings River. This station was installed in conjunction with Dennis Bridge Upstream (which has since been decommissioned) to monitor any flood gradient through the bridge caused by highway enhancement.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

STATION LOCATION
Port Macquarie

MHL 2546

Figure 88

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION		
River/estuary system: Hastings River	Station name: Port Macquarie	
AWRC No: 207420	BoM No: 560050	
MGA co-ordinates zone: 56	Easting: 491554	Northing: 6523090
Geographic co-ordinate system:	Latitude: -31.42682500	Longitude: 152.91112500
TRIM reference: FILE17/73660	LGA: Port Macquarie-Hastings Council	Rainfall district: 60

INSTRUMENTATION	
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)	Communication type: Mobile 3G/4G (IP)
Primary sensor type: Radar	Secondary sensor type: Submersible pressure transducer
Primary sensor installation date: April 2013	Secondary sensor installation date: July 2010
Range of primary water level sensor (m): 10	Range of secondary water level sensor (m): 10
Primary sensor sampling regime: 30 sec average B/A 1 minute	Secondary sensor sampling regime: 60 sec average B/A 15 minute

SURVEY DETAILS	
PM/SSM reference: SSM 10544 Order of accuracy: L2 PM/SSM RL (mAHD): 2.399 Local BM description: Gauge post Local BM location: Above the 0-1.9m gauge plate, side of breakwall adjacent to station box on walking path, outside caravan park.	Local BM RL (mAHD): 1.965 Station datum: AHD Date of last survey: 5 April 2016 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA

TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.879	0.034	MLWN: -0.318	0.040
MHWS: 0.544	0.033	MLW: -0.428	0.041
MHW: 0.434	0.034	MLWS: -0.538	0.043
MHWN: 0.324	0.035	ISLW: -0.777	0.042
MSL: 0.003	0.037	Tidal range (HHWSS – ISLW): 1.656	0.019

STATION CHARACTERISTICS		
General comments: The original floatwell that was installed in February 1986 was replaced by a gas purge system in December 1996 and then this was replaced with a submersible pressure transducer in June 2009. A radar was installed in April 2013.		
Peak flood of record (mAHD): 1.50	1% AEP (mAHD): NA	Instrumentation height (mAHD): 3.4
Hydraulic characteristics: Tidal		
Purpose of installation and current functionality: To monitor ocean tide levels at Port Macquarie as part of the Ocean Tide Program.		
Station shown on BoM website: The data for this station is displayed under Hastings River at Entrance (560050) on BoM web.		
SES flood classification: None		
Data used for BoM flood forecasting: Yes	BoM priority: NA	
Station recommendations: Maintain	Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Port Macquarie Offshore**	**MHL 2546** **Figure 89** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tasman Sea		Station name: Port Macquarie Offshore	
AWRC No: 207450		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 494823	Northing: 6520319
Geographic co-ordinate system:		Latitude: -31.45185004	Longitude: 152.94551112
TRIM reference: FILE17/75233		LGA: NA	Rainfall district: NA
INSTRUMENTATION			
Logger type: RBR for Paroscientific and Aanderaa data storage unit		Communication type: NA	
Primary sensor type: Paroscientific pressure sensor		Secondary sensor type: Aanderaa – Pressure controlled oscillator	
Primary sensor installation date: April 2012		Secondary sensor installation date: December 1984	
Range of primary water level sensor (m): 50		Range of secondary water level sensor (m): 60	
Primary sensor sampling regime: 40 second integration B 5 minute		Secondary sensor sampling regime: 40 second integration B 60 minute	
SURVEY DETAILS			
PM/SSM reference: Order of accuracy: PM/SSM RL (mAHD): Local BM description: Local BM location:		Local BM RL (mAHD): Station datum: Approximated to Mean Sea Level Date of last survey: Surveyed by: Gauge plate offset to gauge zero (m):	
TIDAL PLANES (m Approximate Mean Sea Level)			
Period analysed: June 1985 to January 2011		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.031 MHWS: 0.657 MHW: 0.517 MHWN: 0.378 MSL: 0.001	0.009 0.008 0.005 0.006 0.005	MLWN: -0.376 MLW: -0.515 MLWS: -0.654 ISLW: -0.922 Tidal range (HHWSS – ISLW): 1.952	0.010 0.010 0.013 0.015 0.022
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): NA	1% AEP (mAHD): NA	Instrumentation height (mAHD): NA	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: Installed under the Storm Surge Program. Offshore gauge to measure ocean level outside of river entrance and determine downstream tailwater level for river flooding investigations as the station is not impacted by riverine flooding. This station is stand alone and no real-time data is shown on the MHL public web. The sensor and logger is recovered from the ocean floor on an annual basis.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Wauchope Railway Bridge

MHL 2546

Figure 90

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hastings River		Station name: Wauchope Railway Bridge	
AWRC No: 207401		BoM No: 060124	
MGA co-ordinates zone: 56		Easting: 474995	Northing: 6520192
Geographic co-ordinate system:		Latitude: -31.45273433	Longitude: 152.73682331
TRIM reference: FILE17/62622		LGA: Port Macquarie-Hastings Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: October 1985		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 34956 Order of accuracy: L2 PM/SSM RL (mAHD): 8.791 Local BM description: Triangle cut in shed. Local BM location: Based on reference PM 34948 which is located on grass next to power pole on the corner of Wallace St and Alma St. 70m SW of station hut.		Local BM RL (mAHD): 8.783 Station datum: AHD Date of last survey: 6 October 2011 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2009		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.898	0.038	MLWN: -0.331	0.031
MHWS: 0.558	0.036	MLW: -0.429	0.030
MHW: 0.460	0.035	MLWS: -0.527	0.029
MHWN: 0.362	0.033	ISLW: -0.770	0.029
MSL: 0.015	0.032	Tidal range (HHWSS – ISLW): 1.668	0.022
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 7.23	1% AEP (mAHD): 8.9	Instrumentation height (mAHD): 9.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to measure freshwater flows into the tidal reaches of the river system and for monitoring catchment and river response in relation to rainfall. The station is accessed by the SES during flood times.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 2.5m, Moderate 4.3m, Major 5.5m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Lord Howe Island

MHL 2546

Figure 91

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tasman Sea		Station name: Lord Howe Island	
AWRC No: 240402		BoM No: NA	
MGA co-ordinates zone: 57		Easting: 505521	Northing: 6512362
Geographic co-ordinate system:		Latitude: -31.52363797	Longitude: 159.05815000
TRIM reference: FILE17/73691		LGA: Unincorporated Government Area	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: PSTN LL (land line)	
Primary sensor type: Radar		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: August 1994		Secondary sensor installation date: July 2010	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 1084 Order of accuracy: L2 PM/SSM RL (mLHIHD): 7.678 Local BM description: Stainless steel bolt Local BM location: Bolt on wharf deck above the gauge plate.		Local BM RL (mLHIHD): 3.124 Station datum: Lord Howe Island Hydro Datum (LHIHD) Date of last survey: 24 July 2013 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): 0.144	
TIDAL PLANES (mLHIHD)			
Period analysed: July 1995 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 2.165	0.048	MLWN: 0.665	0.050
MHWS: 1.865	0.048	MLW: 0.489	0.049
MHW: 1.689	0.047	MLWS: 0.312	0.049
MHWN: 1.512	0.047	ISLW: 0.099	0.049
MSL: 1.089	0.048	Tidal range (HHWSS – ISLW): 2.066	0.008
STATION CHARACTERISTICS			
General comments: In June 2012, the floatwell sensor was replaced by a radar unit. The LHIHD is approximately 1.10m below MSL for this station.			
Peak flood of record (mLHIHD): 2.70	1% AEP (mAHD): NA	Instrumentation height (mLHIHD): 4.3	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: This gauge was installed under the Offshore Tide Program to monitor tidal behaviour in the North Tasman Sea.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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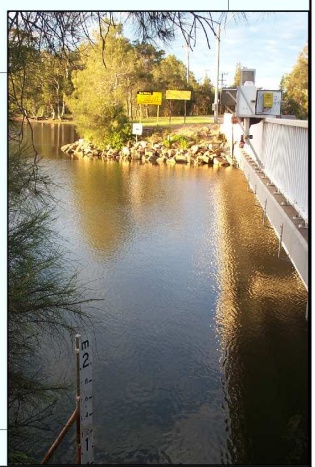
Lake Cathie



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

Manly Hydraulics Laboratory

STATION LOCATION
Lake Cathie

MHL 2546

Figure 92

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Lake Cathie		Station name: Lake Cathie	
AWRC No: 207441		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 486162	Northing: 6509679
Geographic co-ordinate system:		Latitude: -31.54777536	Longitude: 152.85420800
TRIM reference: FILE17/62623		LGA: Port Macquarie-Hastings Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: August 1992		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 69665 Order of accuracy: L2 PM/SSM RL (mAHD): 3.567 Local BM description: SSM 69665. Pin painted yellow. Local BM location: 40m south from station box on pathway, corner of Ocean Dr and Tallong Dr.		Local BM RL (mAHD): 3.567 Station datum: AHD Date of last survey: 8 September 2011 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.05	1% AEP (mAHD): 2.63	Instrumentation height (mAHD): 4.1	
Hydraulic characteristics: Intermittently closed and open lake or lagoon (ICOLL), rarely open. Port Macquarie Hastings Council opens lagoon entrance when the water levels reach 1.6m AHD.			
Purpose of installation and current functionality: Station was established on behalf of Estuary management group of Public Works Department to monitor the tidal phenomenon within the lake.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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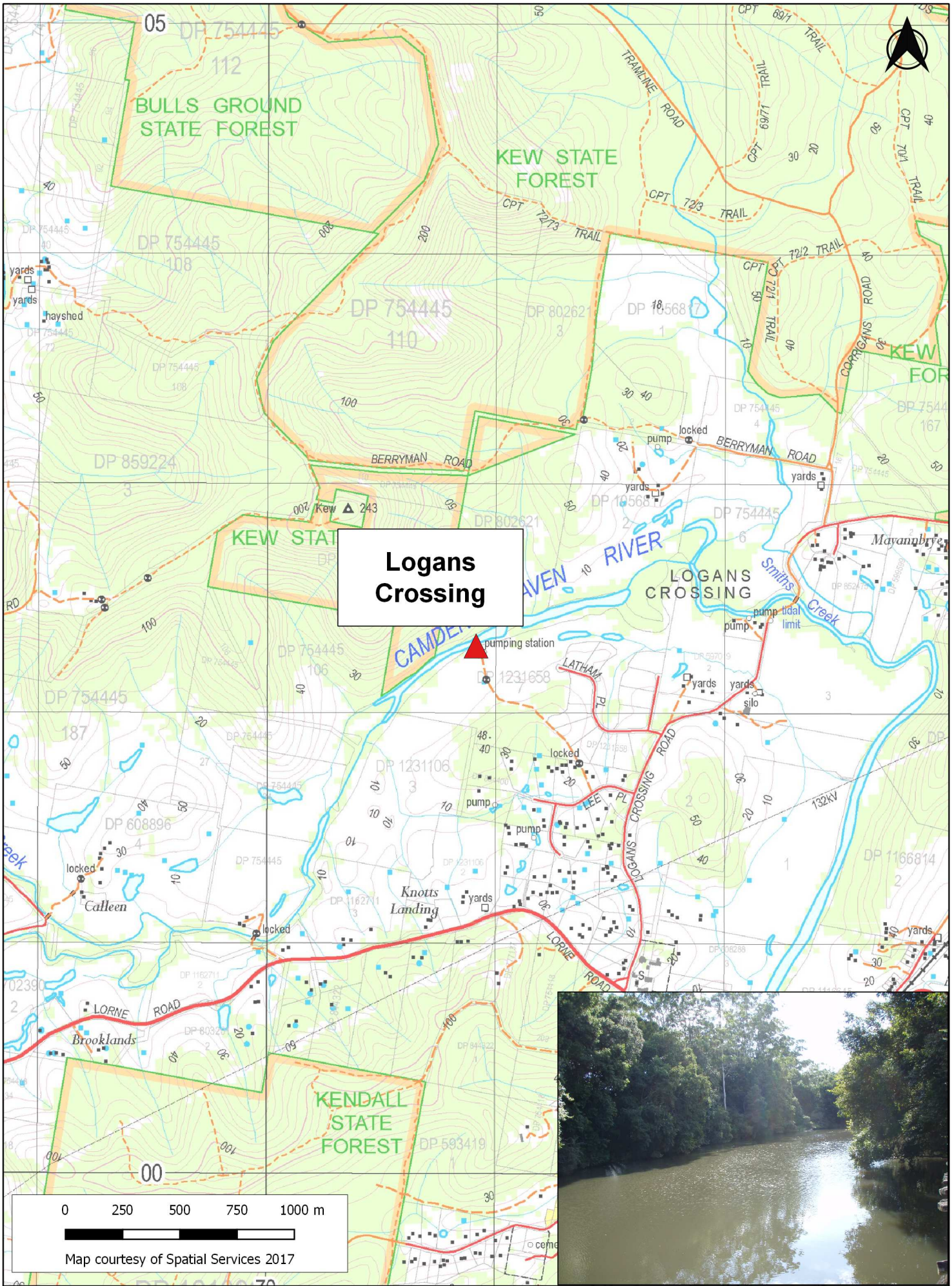

Manly Hydraulics Laboratory

STATION LOCATION
Logans Crossing

MHL 2546

Figure 93

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Camden Haven River		Station name: Logans Crossing	
AWRC No: 207428		BoM No: 560017	
MGA co-ordinates zone: 56		Easting: 470913	Northing: 6502295
Geographic co-ordinate system:		Latitude: -31.61411178	Longitude: 152.69333362
TRIM reference: FILE17/62625		LGA: Port Macquarie-Hastings Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: October 1989		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 78505 Order of accuracy: L3 PM/SSM RL (mAHD): 17.971 Local BM description: BM GS500. Pin in concrete block. Local BM location: Kendall water pumping station next to station shed. Yellow building.		Local BM RL (mAHD): 10.995 Station datum: Local Water Resources Datum (LWRD) Date of last survey: 3 July 1997 Surveyed by: C Connington Gauge plate offset to gauge zero (m**AHD**): +2.035	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Rain gauge station since December 1989.			
Peak flood of record (mAHD): 9.97	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 12.7	
Hydraulic characteristics: Non-tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, and is used to measure freshwater flow into the lower Camden Haven system and hence monitoring flooding at Kendall and downstream. The station is an integral part of the Camden Haven Floodwatch system.			
Station shown on BoM website: Continuous data from a non-MHL station is displayed.			
SES flood classification: Minor 7.0m, Moderate 7.6m, Major 7.9m			
Data used for BoM flood forecasting: No		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Lakewood

MHL 2546
Figure 94
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Queens Lake		Station name: Lakewood	
AWRC No: 207475		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 477455	Northing: 6500578
Geographic co-ordinate system:		Latitude: -31.62975000	Longitude: 152.76226645
TRIM reference: FILE17/62627		LGA: Port Macquarie-Hastings Council	Rainfall district: NA

INSTRUMENTATION	
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)	Communication type: Mobile 3G/4G (IP)
Primary sensor type: Submersible pressure transducer	Secondary sensor type: NA
Primary sensor installation date: December 2001	Secondary sensor installation date: NA
Range of primary water level sensor (m): 3.5	Range of secondary water level sensor (m): NA
Primary sensor sampling regime: Instantaneous 15 minute	Secondary sensor sampling regime: NA

SURVEY DETAILS	
PM/SSM reference: SSM 80708	Local BM RL (mAHD): 0.677
Order of accuracy: L2	Station datum: AHD
PM/SSM RL (mAHD): 5.701	Date of last survey: 19 October 2012
Local BM description: Triangle cut in concrete	Surveyed by: Phil Lee
Local BM location: In 1.4m concrete path, west side at start of jetty. Jetty located at end of Sirius Dr.	Gauge plate offset to gauge zero (m): NA

TIDAL PLANES (mAHD)			
Period analysed: July 2007 to June 2010		Tidal planes functionality: Poor	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.172	0.007	MLWN: 0.016	0.012
MHWS: 0.101	0.008	MLW: 0.006	0.012
MHW: 0.092	0.008	MLWS: -0.003	0.012
MHWN: 0.083	0.008	ISLW: -0.053	0.013
MSL: 0.049	0.010	Tidal range (HHWSS – ISLW): 0.225	0.009

STATION CHARACTERISTICS		
General comments: None		
Peak flood of record (mAHD): 1.18	1% AEP (mAHD): 3.0	Instrumentation height (mAHD): 3.6
Hydraulic characteristics: Mix of tidal and non-tidal depending on conditions. Occasional silt build-up at confluence of Stingray Creek/Queens Lake can make the lake non-tidal for short periods.		
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to monitor water levels and flooding in Queens Lake and to provide data for Camden Haven Floodwatch model for flooding at Laurieton.		
Station shown on BoM website: MHL data for this station is not displayed.		
SES flood classification: None		
Data used for BoM flood forecasting: No		BoM priority: NA
Station recommendations: Maintain		Revision date: 17 September 2018

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STATION LOCATION
West Haven

MHL 2546

Figure 95

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Stingray Creek		Station name: West Haven	
AWRC No: 207437		BoM No: 560047	
MGA co-ordinates zone: 56		Easting: 480664	Northing: 6499768
Geographic co-ordinate system:		Latitude: -31.63711657	Longitude: 152.79608872
TRIM reference: FILE17/62629		LGA: Port Macquarie-Hastings Council	Rainfall district: 60

INSTRUMENTATION	
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)	Communication type: Mobile 3G/4G (Dial-up)
Primary sensor type: Submersible pressure transducer	Secondary sensor type: NA
Primary sensor installation date: October 1986	Secondary sensor installation date: NA
Range of primary water level sensor (m): 10	Range of secondary water level sensor (m): NA
Primary sensor sampling regime: Instantaneous 15 minute	Secondary sensor sampling regime: NA

SURVEY DETAILS	
PM/SSM reference: PM 73687	Local BM RL (mAHD): 2.307
Order of accuracy: L3	Station datum: AHD
PM/SSM RL (mAHD): 5.775	Date of last survey: 13 September 2018
Local BM description: Triangle cut in concrete	Surveyed by: D Lee and N Wells
Local BM location: Triangle cut in concrete at toilet block at Male entrance.	Gauge plate offset to gauge zero (m): NA

TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.435	0.024	MLWN: -0.119	0.029
MHWS: 0.262	0.024	MLW: -0.163	0.030
MHW: 0.218	0.025	MLWS: -0.208	0.032
MHWN: 0.173	0.026	ISLW: -0.331	0.033
MSL: 0.027	0.027	Tidal range (HHWSS – ISLW): 0.767	0.019

STATION CHARACTERISTICS		
General comments: In May 2011, the floatwell on a timber pile was removed and a new submersible pressure transducer was installed on the river bank for easy access and safer maintenance.		
Peak flood of record (mAHD): 1.21	1% AEP (mAHD): 3.0	Instrumentation height (mAHD): 3.4
Hydraulic characteristics: Tidal		
Purpose of installation and current functionality: This station assists in the monitoring of flood waters for the township of North Haven. The station is part of the Camden Haven Floodwatch System.		
Station shown on BoM website: MHL data for this station is displayed.		
SES flood classification: None		
Data used for BoM flood forecasting: Yes		BoM priority: Medium
Station recommendations: Maintain		Revision date: 17 September 2018

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STATION LOCATION
North Haven

MHL 2546

Figure 96

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Camden Haven River		Station name: North Haven	
AWRC No: 207423		BoM No: 560045	
MGA co-ordinates zone: 56		Easting: 483134	Northing: 6499413
Geographic co-ordinate system:		Latitude: -31.64035842	Longitude: 152.82213034
TRIM reference: FILE17/67422		LGA: Port Macquarie-Hastings Council	Rainfall district: 60

INSTRUMENTATION	
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)	Communication type: Mobile 3G/4G (IP)
Primary sensor type: Submersible pressure transducer	Secondary sensor type: NA
Primary sensor installation date: October 1986	Secondary sensor installation date: NA
Range of primary water level sensor (m): 10	Range of secondary water level sensor (m): NA
Primary sensor sampling regime: Instantaneous 15 minute	Secondary sensor sampling regime: NA

SURVEY DETAILS	
PM/SSM reference: PM 28953 Order of accuracy: L2 PM/SSM RL (mAHD): 2.314 Local BM description: PWD 116. Pin in concrete. Local BM location: Concrete slab 10m from picnic table to waters edge. Station cabinet is 25m west of picnic table.	Local BM RL (mAHD): 2.086 Station datum: AHD Date of last survey: 24 May 2018 Surveyed by: David Duncan Gauge plate offset to gauge zero (m): NA

TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.726	0.035	MLWN: -0.335	0.033
MHWS: 0.444	0.032	MLW: -0.434	0.033
MHW: 0.345	0.032	MLWS: -0.534	0.034
MHWN: 0.246	0.032	ISLW: -0.735	0.034
MSL: -0.045	0.032	Tidal range (HHWSS – ISLW): 1.462	0.023

STATION CHARACTERISTICS		
General comments: In May 2011, the floatwell on a timber pile was removed and a new submersible pressure transducer was installed on the river bank for easy access and safer maintenance.		
Peak flood of record (mAHD): 1.29	1% AEP (mAHD): 2.5	Instrumentation height (mAHD): 3.1
Hydraulic characteristics: Tidal		
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. North Haven is prone to flooding from both the Camden Haven River and the Herons Creek/Queens Lake waters. This gauge monitors their combined effect as well as the effect of storm surge and wave setup on water levels of North Haven.		
Station shown on BoM website: MHL data for this station is displayed.		
SES flood classification: Minor 1.0m, Moderate 1.5m, Major 1.7m		
Data used for BoM flood forecasting: Yes		BoM priority: High
Station recommendations: Maintain		Revision date: 17 September 2018

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Laurieton



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Laurieton

MHL 2546

Figure 97

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Camden Haven River		Station name: Laurieton	
AWRC No: 207425		BoM No: 560018	
MGA co-ordinates zone: 56		Easting: 480923	Northing: 6497744
Geographic co-ordinate system:		Latitude: -31.65538195	Longitude: 152.79878070
TRIM reference: FILE17/62633		LGA: Port Macquarie-Hastings Council	Rainfall district: 60

INSTRUMENTATION	
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)	Communication type: Mobile 3G/4G (IP)
Primary sensor type: Submersible pressure transducer	Secondary sensor type: NA
Primary sensor installation date: August 1990	Secondary sensor installation date: NA
Range of primary water level sensor (m): 10	Range of secondary water level sensor (m): NA
Primary sensor sampling regime: Instantaneous 15 minute	Secondary sensor sampling regime: NA

SURVEY DETAILS	
PM/SSM reference: SSM 73659	Local BM RL (mAHD): 1.679
Order of accuracy: L2	Station datum: AHD
PM/SSM RL (mAHD): 5.729	Date of last survey: 19 October 2012
Local BM description: Triangle cut in concrete.	Surveyed by: Phil Lee
Local BM location: Triangle cut in concrete which is approx. 2m north of the gauge, off the jetty on the corner of a shed.	Gauge plate offset to gauge zero (m): NA

TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.602	0.023	MLWN: -0.208	0.033
MHWS: 0.357	0.022	MLW: -0.277	0.035
MHW: 0.289	0.023	MLWS: -0.345	0.037
MHWN: 0.221	0.025	ISLW: -0.519	0.038
MSL: 0.006	0.029	Tidal range (HHWSS – ISLW): 1.121	0.026

STATION CHARACTERISTICS		
General comments: In March 2011, the floatwell on a timber pile was removed and a new submersible pressure transducer was installed on the river bank for easy access and safer maintenance.		
Peak flood of record (mAHD): 1.29	1% AEP (mAHD): 3.0	Instrumentation height (mAHD): 3.4
Hydraulic characteristics: Tidal		
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge is useful for monitoring the rates of rise of flood waters for evacuation planning. The station is an integral part of the Camden Haven Floodwatch system.		
Station shown on BoM website: MHL data for this station is displayed.		
SES flood classification: Minor 1.1m, Moderate 1.5m, Major 1.7m		
Data used for BoM flood forecasting: No		BoM priority: High
Station recommendations: Maintain		Revision date: 17 September 2018

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NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Watson Taylors Lake**	**MHL 2546** **Figure 98** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Watson Taylors Lake		Station name: Watson Taylors Lake	
AWRC No: 207480		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 475578	Northing: 6491082
Geographic co-ordinate system:		Latitude: -31.71538631	Longitude: 152.74223740
TRIM reference: FILE17/62635		LGA: MidCoast City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: December 2001		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 33647 Order of accuracy: L3 PM/SSM RL (mAHD): 5.913 Local BM description: Bolt in concrete painted yellow Local BM location: Bolt in concrete with galvanized iron (GI) pipe surround on the right bank, approx. 15m west of station box on bank.		Local BM RL (mAHD): 4.886 Station datum: AHD Date of last survey: 21 July 2011 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2002 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.393 MHWS: 0.221 MHW: 0.192 MHWN: 0.162 MSL: 0.057	0.025 0.022 0.022 0.022 0.021	MLWN: -0.048 MLW: -0.077 MLWS: -0.107 ISLW: -0.229 Tidal range (HHWSS – ISLW): 0.622	0.020 0.020 0.020 0.018 0.009
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.53	1% AEP (mAHD): 3.5	Instrumentation height (mAHD): 3.6	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge is useful for monitoring the rates of rise of flood waters for evacuation planning. The station is an integral part of the Camden Haven Floodwatch system.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Crowdy Head**	**MHL 2546** **Figure 99** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Crowdy Head Harbour		Station name: Crowdy Head	
AWRC No: 208471		BoM No: 560051	
MGA co-ordinates zone: 56		Easting: 476346	Northing: 6477415
Geographic co-ordinate system:		Latitude: -31.83870600	Longitude: 152.75001400
TRIM reference: FILE17/73754		LGA: MidCoast City Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Radar		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: April 2013		Secondary sensor installation date: April 2013	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: SSM 59002 Order of accuracy: U PM/SSM RL (mAHD): 3.072 Local BM description: Galvanised bracket dip point Local BM location: On pile, below station at the far end of the wharf.		Local BM RL (mAHD): 1.055 Station datum: Crowdy Head Datum (CHD) and AHD Date of last survey: 24 March 2015 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: 1990 - 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.014	0.035	MLWN: -0.437	0.031
MHWS: 0.619	0.033	MLW: -0.576	0.032
MHW: 0.480	0.032	MLWS: -0.716	0.033
MHWN: 0.340	0.032	ISLW: -0.998	0.033
MSL: -0.048	0.031	Tidal range (HHWSS – ISLW): 2.012	0.029
STATION CHARACTERISTICS			
General comments: Gauge located on Fishermans Wharf since April 2013. Electromagnetic wave staff sensor replaced by radar sensor. The original gauge in Crowdy Head Harbour on Fuel Wharf (208470) was subject to greater seiching within the harbour. Reference survey mark surveyed in by Public Works Survey Branch however the order of accuracy was not uploaded to SCIMS.			
Peak flood of record (mAHD): 1.42	1% AEP (mAHD): NA	Instrumentation height (mAHD): 2.6	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: To monitor the tidal behaviour at Crowdy Head Boat Harbour as a part of the Ocean Tide Program.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: High	
Station recommendations: Maintain		Revision date: 27 March 2019	

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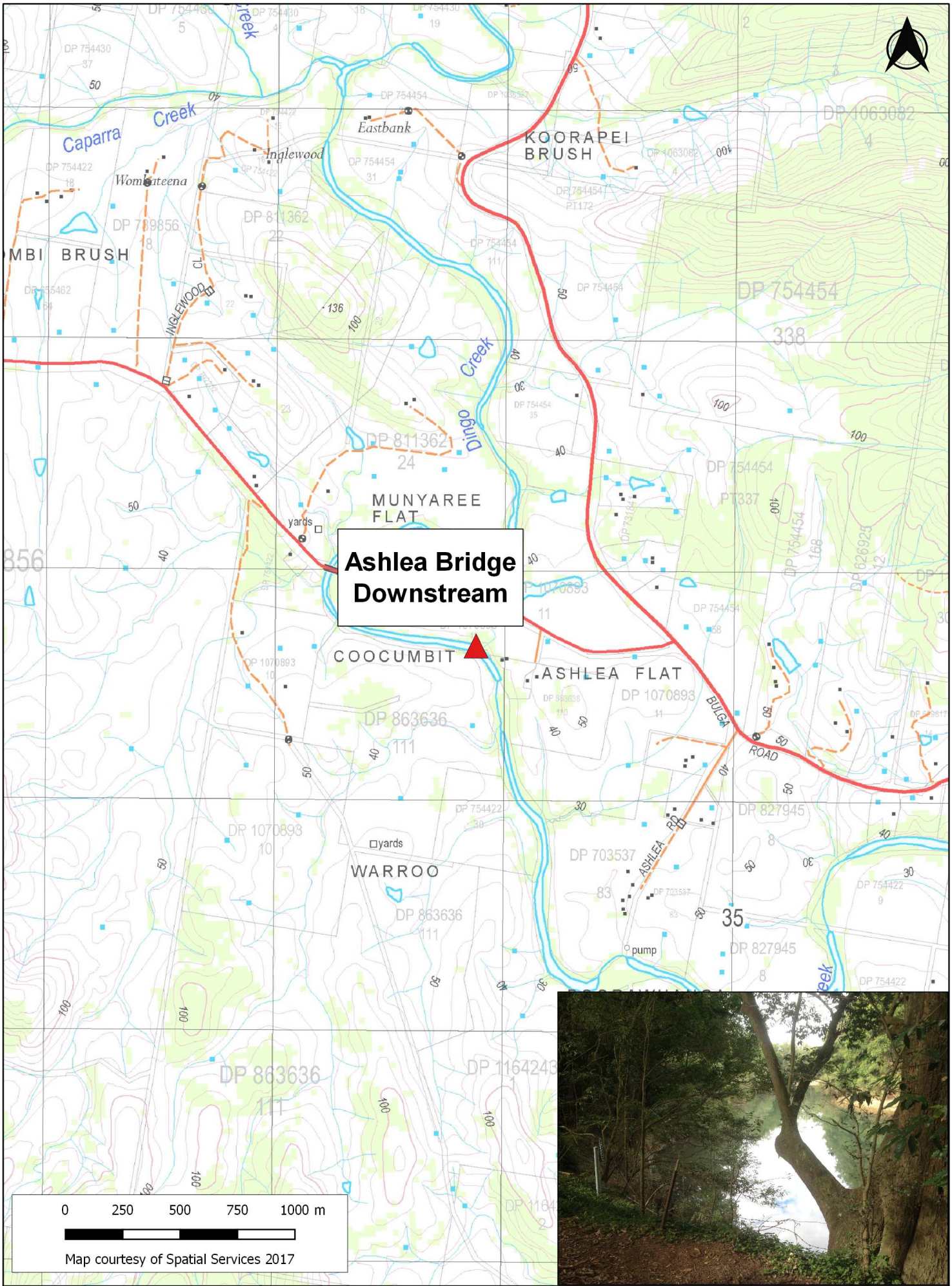

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Ashlea Bridge Downstream

MHL 2546
Figure 100
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Dingo Creek		Station name: Ashlea Bridge Downstream	
AWRC No: 208436		BoM No: 560065	
MGA co-ordinates zone: 56		Easting: 433875	Northing: 6476673
Geographic co-ordinate system:		Latitude: -31.84372695	Longitude: 152.30112425
TRIM reference: FILE17/53411		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: April 2011		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 59002 Order of accuracy: L2 PM/SSM RL (mAD): 74.354 Local BM description: Bolt set in concrete Local BM location: In concrete with galvanized iron pipe surround adjacent to station cabinet		Local BM RL (mAD): 37.257 Station datum: Assumed Datum (AD) Date of last survey: 30 June 2011 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): Gauge zero 27.239 AHD	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Dingo Creek at Munyaree Flat (AWRC No. 208019) was decommissioned on 11 Oct 2009 due to access issues, this gauge replaces the old gauge.			
Peak flood of record (mAHD): 10.23	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 13.0	
Hydraulic characteristics: Non-tidal			
Purpose of installation and current functionality: This gauge was to replace Munyaree Flat and installed for flood monitoring and warning as it had been reported that discharges from Dingo Creek can significantly influence the magnitude and duration of flood peaks downstream of the Manning-Dingo confluence.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory	**STATION LOCATION** **Harrington**	**MHL 2546** **Figure 101** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Manning River		Station name: Harrington	
AWRC No: 208425		BoM No: 560027	
MGA co-ordinates zone: 56		Easting: 470255	Northing: 6473391
Geographic co-ordinate system:		Latitude: -31.87486801	Longitude: 152.68551634
TRIM reference: FILE17/53420		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: July 1987		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 90917 Order of accuracy: L2 PM/SSM RL (mAHD): 2.386 Local BM description: Pin in concrete poured into galvanised pipe painted yellow Local BM location: At ground level under station box in breakwall.		Local BM RL (mAHD): 1.853 Station datum: AHD Date of last survey: 28 November 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Fair – Annual tidal planes results not averaged as hydraulics are too variable	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Periods of the data at this station appears noisy, but this gauge was in a floatwell until Aug 2007 and naturally dampened. The "noise" in the trace is more likely sea conditions overtopping the bar at the entrance to the channel.			
Peak flood of record (mAHD): 1.80	1% AEP (mAHD): 2.01	Instrumentation height (mAHD): 2.8	
Hydraulic characteristics: Tidal, tidal planes results are not averaged due to relocation or infrastructure issues.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to monitor water levels in the lower reaches of the Manning River. The station was relocated further up the breakwall since Aug 2008.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 1.9m, Moderate 2.2m, Major 2.8m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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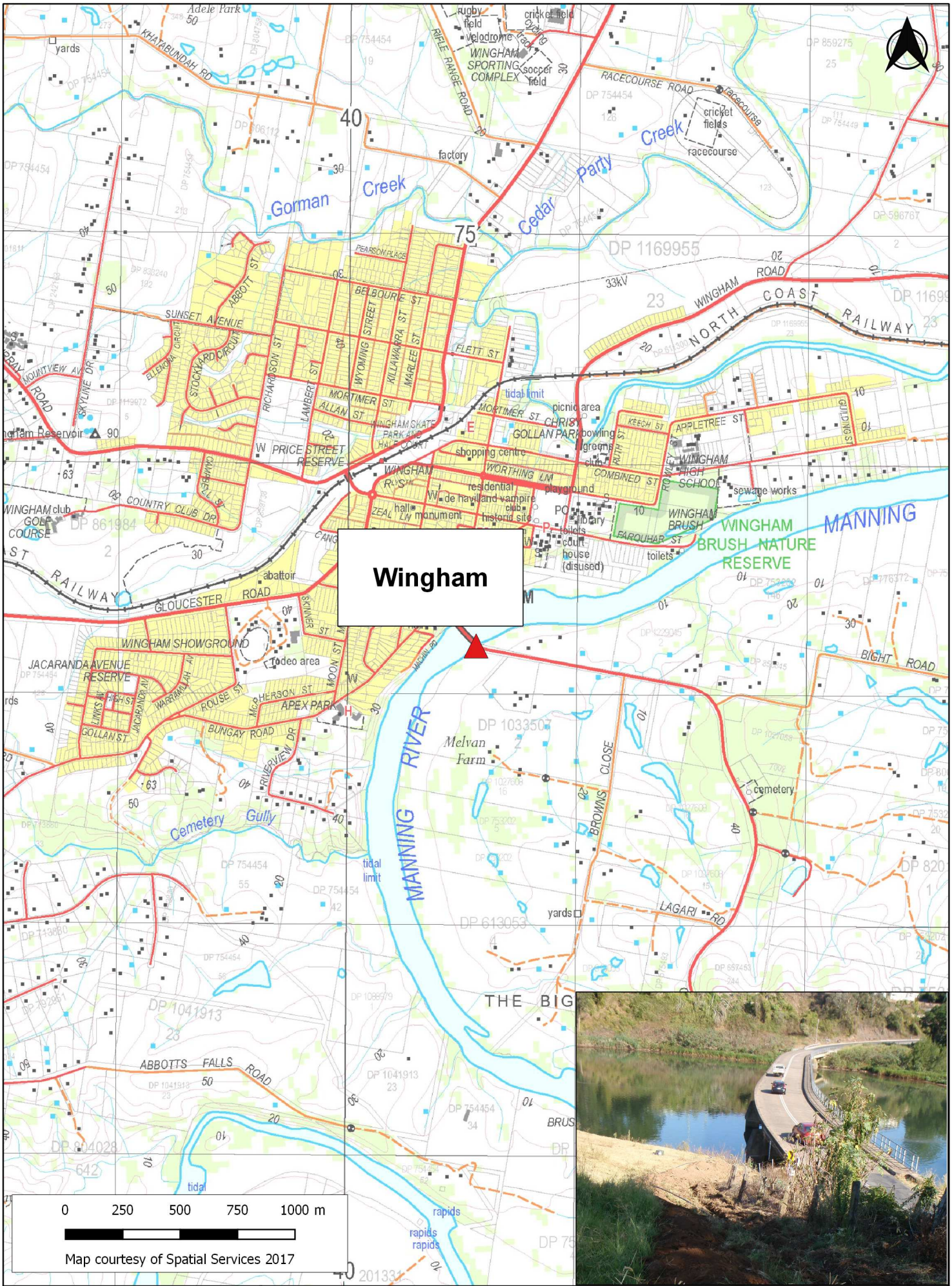

NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Wingham**	**MHL 2546** **Figure 102** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Manning River		Station name: Wingham	
AWRC No: 208400		BoM No: 060120	
MGA co-ordinates zone: 56		Easting: 440559	Northing: 6473212
Geographic co-ordinate system:		Latitude: -31.87531872	Longitude: 152.37155190
TRIM reference: FILE17/53470		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: July 1989		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 78091 Order of accuracy: L2 PM/SSM RL (mAHD): 18.763 Local BM description: BM 5/L Local BM location: Triangle cut at left side end of Wingham Bridge on downstream side of the abutment		Local BM RL (mAHD): 4.905 Station datum: AHD Date of last survey: 29 June 2011 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 12.24	1% AEP (mAHD): 14.7	Instrumentation height (mAHD): ~22	
Hydraulic characteristics: Tidal, shallow water influence on harmonic constituents, near the tidal limit. Tidal plane data not averaged as hydraulics are too variable.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge is useful in the assessment and review of flood damage following major events, and is useful in monitoring saltwater intrusion from the ocean during drought conditions. Conductivity and temperature sensors were installed in Dec 2009 under a program funded by WaterNSW (NSW Office of Water) for the Water Sharing Plan.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 4.9m, Moderate 8.9m, Major 11.9m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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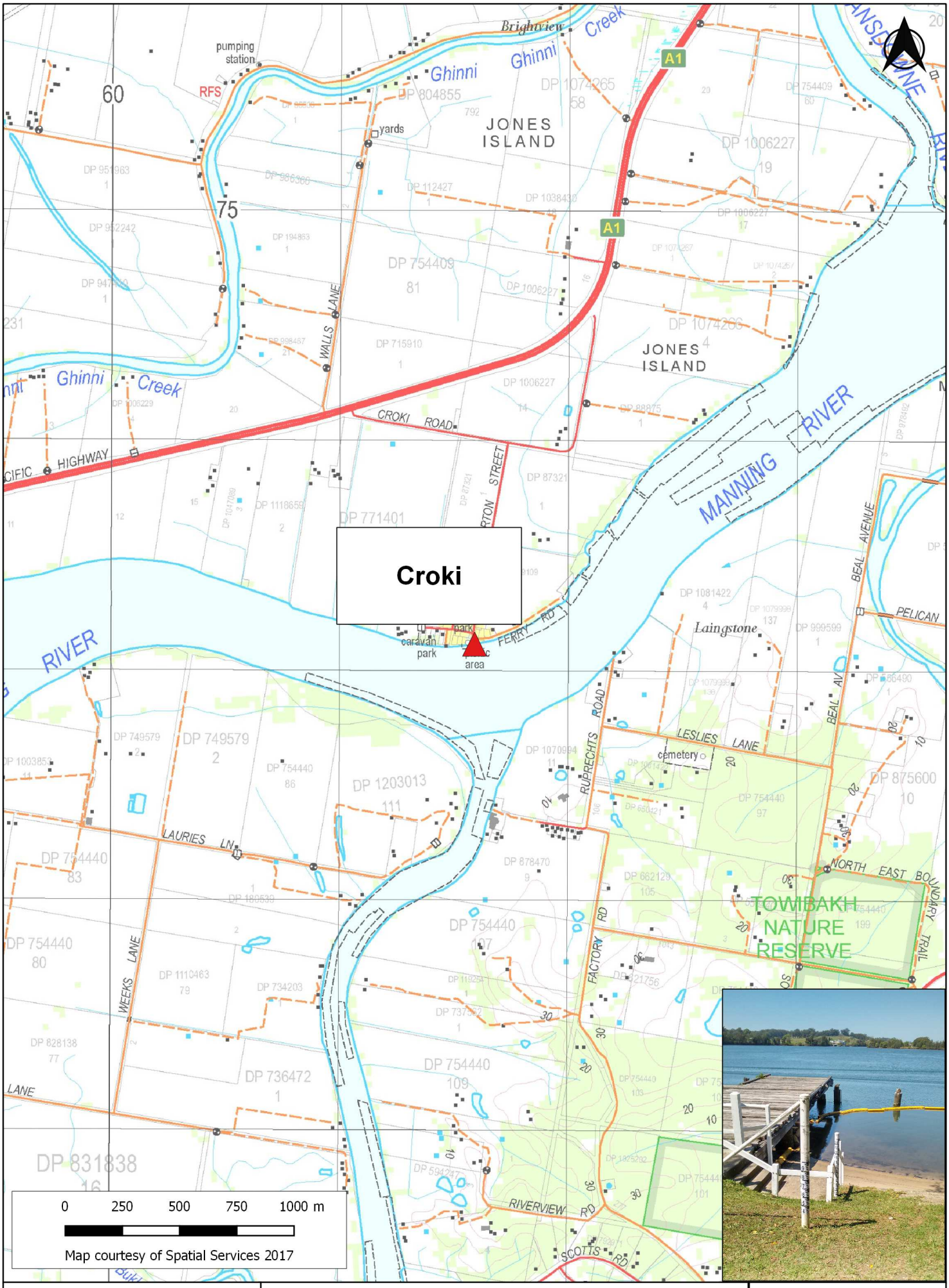

Manly Hydraulics Laboratory

STATION LOCATION
Croki

MHL 2546

Figure 103

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Manning River		Station name: Croki	
AWRC No: 208404		BoM No: 560008	
MGA co-ordinates zone: 56		Easting: 461590	Northing: 6473115
Geographic co-ordinate system:		Latitude: -31.87709843	Longitude: 152.59389510
TRIM reference: FILE17/53551		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: January 1992		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 78056 Order of accuracy: 4 PM/SSM RL (mAHD): 1.293 Local BM description: Triangle cut into slab Local BM location: Triangle cut into slab Picnic BBQ table in car park. Located 15m away from station door.		Local BM RL (mAHD): 2.627 Station datum: AHD Date of last survey: 24 November 2008 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Fair – Data not averaged as hydraulics are too variable	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.04	1% AEP (mAHD): 2.75	Instrumentation height (mAHD): 3.9	
Hydraulic characteristics: Tidal, tidal plane data not averaged as hydraulics are too variable. Tidal planes results are influenced by opening and closing of second entrance at Farquhar Inlet.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, as part of the flood gauge network on the lower Manning River.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 1.5m, Moderate NA, Major NA			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Mount George**	**MHL 2546** **Figure 104** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Manning River		Station name: Mount George	
AWRC No: 208440		BoM No: 060117	
MGA co-ordinates zone: 56		Easting: 419229	Northing: 6472262
Geographic co-ordinate system:		Latitude: -31.88257410	Longitude: 152.14597708
TRIM reference: FILE17/53559		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: January 1992		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: N/A Order of accuracy: N/A PM/SSM RL (mAHD): N/A Local BM description: BM based on SS 42481 Triangle. Local BM location: Triangle located in gauge shed floor.		Local BM RL (mAD): 20.000 Station datum: Local Water Resources Datum (LWRD) Date of last survey: 21 June 2012 Surveyed by: Keith Hutchinson Gauge plate offset to gauge zero (m): Gauge zero approximately 29.04m to AHD	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated – no tidal influence	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Station located too far away from a useable PM/SSM to reference to AHD. Rain gauge station since March 1991.			
Peak flood of record (mAHD): 12.18	1% AEP (mAHD): NA	Instrumentation height (mAHD): 20.0	
Hydraulic characteristics: Non-tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, and provides flood data and warnings for the upper reaches of the Manning River.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 5.5m, Moderate 7.6m, Major 10.6m LWRD			
Data used for BoM flood forecasting: No		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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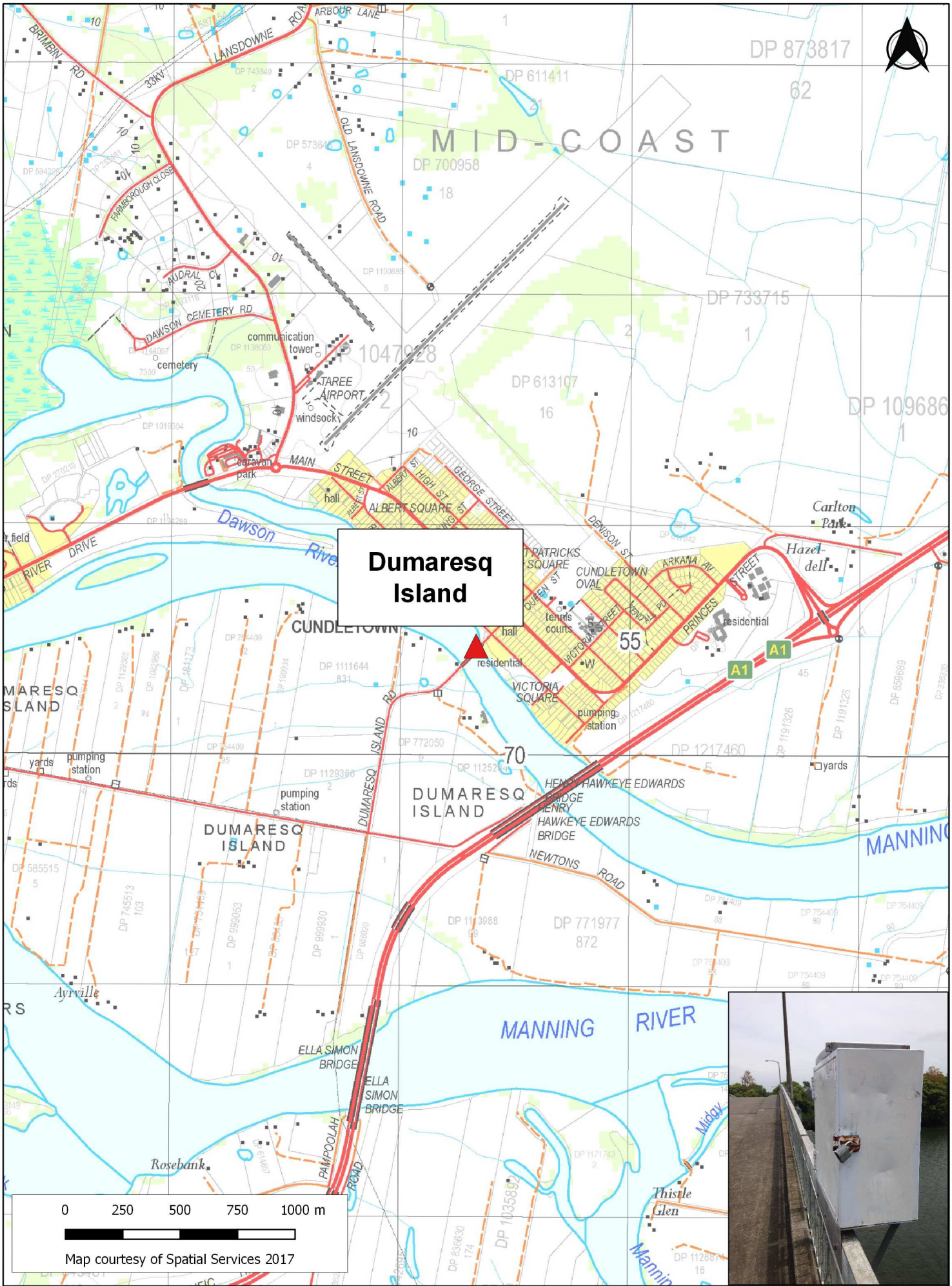

NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Dumaresq Island**	**MHL 2546** **Figure 105** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Manning River		Station name: Dumaresq Island	
AWRC No: 208430		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 454329	Northing: 6470475
Geographic co-ordinate system:		Latitude: -31.90064721	Longitude: 152.51700316
TRIM reference: FILE17/53590		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: August 2001		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 13847 Order of accuracy: L3 PM/SSM RL (mAHD): 7.965 Local BM description: PM 13847 Local BM location: NE corner of River St and Queen St, 2m away from power pole.		Local BM RL (mAHD): 7.965 Station datum: AHD Date of last survey: 28 November 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: 2001 - 2010		Tidal planes functionality: Fair – Data not averaged as hydraulics are too variable	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 3.19	1% AEP (mAHD): 4.2	Instrumentation height (mAHD): 11.8	
Hydraulic characteristics: Tidal, tidal planes results not averaged as hydraulics too variable. Tidal planes results are influenced by opening and closing of entrance at Farquhar Inlet.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to provide flood data at the township of Cundletown, between Croki and Taree.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

STATION LOCATION
Taree

MHL 2546

Figure 106

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Manning River		Station name: Taree	
AWRC No: 208410		BoM No: 060119	
MGA co-ordinates zone: 56		Easting: 448687	Northing: 6468633
Geographic co-ordinate system:		Latitude: -31.91702412	Longitude: 152.45724042
TRIM reference: FILE17/53602		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: September 1985		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 13704 Order of accuracy: L3 PM/SSM RL (mAHD): 9.671 Local BM description: Triangle cut on kerb Local BM location: Triangle cut on kerb SE corner of the carpark, 10m from station door.		Local BM RL (mAHD): 7.664 Station datum: AHD Date of last survey: 27 November 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: 1990 - 2010		Tidal planes functionality: Fair – Data not averaged as hydraulics are too variable	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Flood camera installed since Mar 2017. Conductivity and temperature sensors were installed from Feb 2010 to Jan 2016 under a program funded by the WaterNSW (NSW Office of Water) for the Water Sharing Plan.			
Peak flood of record (mAHD): 4.49	1% AEP (mAHD): 5.54	Instrumentation height (mAHD): 8.2	
Hydraulic characteristics: Tidal, tidal plane data not averaged as the hydraulics are too variable.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to record flood levels for modelling and flood warning purposes.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 1.8m, Moderate 2.4m, Major 3.7m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Farquhar Inlet

MHL 2546
Figure 107
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Manning River		Station name: Farquhar Inlet	
AWRC No: 208415		BoM No: 560041	
MGA co-ordinates zone: 56		Easting: 461745	Northing: 6466021
Geographic co-ordinate system:		Latitude: -31.94110371	Longitude: 152.59525381
TRIM reference: FILE17/53636		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: August 1987		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 78083 Order of accuracy: L3 PM/SSM RL (mAHD): 2.002 Local BM description: PM 78083 Local BM location: End of Cowans Ln at bank		Local BM RL (mAHD): 2.002 Station datum: AHD Date of last survey: 10 December 2015 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: 1992 - 2010		Tidal planes functionality: Fair – Data not averaged as hydraulics are too variable	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Jun 2011 floatwell on timber pile removed and new sensor installed on river bank for easy access and safer maintenance.			
Peak flood of record (mAHD): 1.91	1% AEP (mAHD): 2.2	Instrumentation height (mAHD): 3.7	
Hydraulic characteristics: Tidal, with periodic opening of Farquhar Inlet entrance. Tidal planes are influenced by periodic entrance closing of Farquhar Inlet.			
Purpose of installation and current functionality: This station was installed to monitor the tide levels and flooding in the south arm of the Manning River.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Nabiac

MHL 2546

Figure 108

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wallamba River		Station name: Nabiac	
AWRC No: 209404		BoM No: 560048	
MGA co-ordinates zone: 56		Easting: 436831	Northing: 6446432
Geographic co-ordinate system:		Latitude: -32.11670562	Longitude: 152.33038606
TRIM reference: FILE17/53767		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: November 1983		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 17088 Order of accuracy: L2 PM/SSM RL (mAHD): 31.101 Local BM description: BM 261/J Local BM location: Plug at S end of concrete block wall outside of cottage, close to shed		Local BM RL (mAHD): 17.576 Station datum: AHD Date of last survey: 29 September 2011 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Rain gauge installed in June 1983.			
Peak flood of record (mAHD): 11.67	1% AEP (mAHD): NA	Instrumentation height (mAHD): 17.8	
Hydraulic characteristics: Non-tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge is used for flood monitoring at the township of Nabiac and further downstream the gauge provides flood warning at the coastal townships of Forster and Tuncurry. The gauge is also useful in reviewing flood damage at Nabiac and surrounding low-lying districts.			
Station shown on BoM website: The Radio transmission event data connected to MHL's sensor is displayed. There is a council commissioned ERTS canister on site which is serviced by MHL under a contract between MHL and MidCoast Council. Council data is using the same gas line as MHL's station, but with different sensing unit. Council data is utilised by BoM.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Tuncurry Wetlands



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Tuncurry Wetlands

MHL 2546

Figure 109

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wallamba River		Station name: Tuncurry Wetlands	
AWRC No: 209451		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 447501	Northing: 6442917
Geographic co-ordinate system:		Latitude: -32.14896271	Longitude: 152.44329427
TRIM reference: FILE17/53880		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: March 2001		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: BM Order of accuracy: NA PM/SSM RL (mAD): 10.000 Local BM description: Telstra post Local BM location: Top of Telstra post 21 m west of station box		Local BM RL (mAD): 10.000 Station datum: Assumed Datum (AD) Date of last survey: 19 April 2007 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Site identified for decommissioning.			
Peak flood of record (mAD): 0.18	1% AEP (mAHD): 2.22	Instrumentation height (mAHD): NA	
Hydraulic characteristics: Station measures surface water during flood events, generally dry (non-tidal)			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, and was designed to monitor flow across the wetland. The site is in proximity to the Wallamba River and monitors flow when the river breaks out across the wetlands and flows back into the river further downstream at Tuncurry. This process of bank overtopping was thought to have an impact on local flooding. The monitoring conducted between 2001 and 2017 sufficiently concluded that overland flooding was not an issue.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Site decommissioned Nov 2017		Revision date: 17 September 2018	

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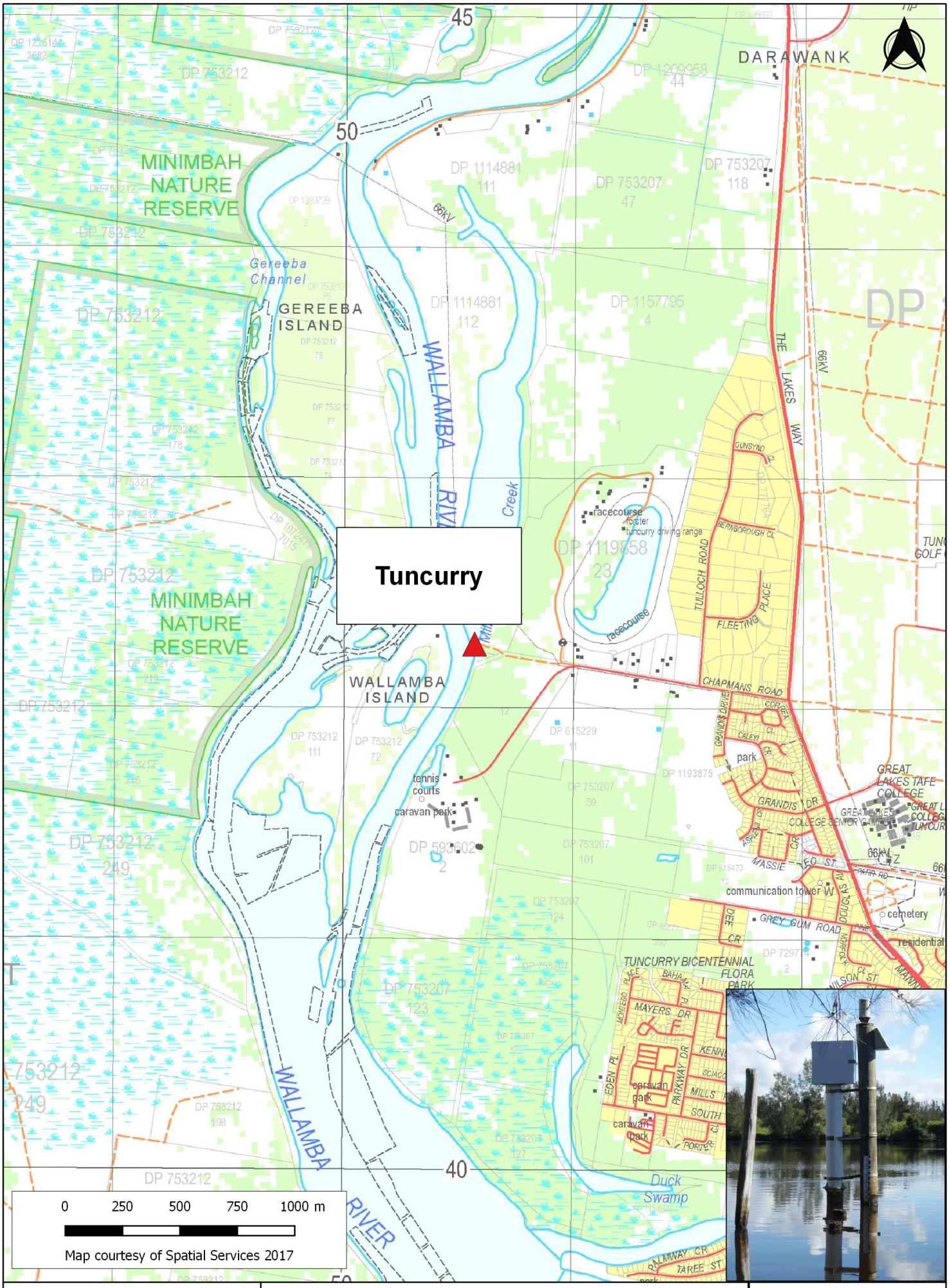

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Tuncurry

MHL 2546

Figure 110

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wallamba River		Station name: Tuncurry	
AWRC No: 209401		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 450568	Northing: 6442279
Geographic co-ordinate system:		Latitude: -32.15485713	Longitude: 152.47578296
TRIM reference: Local office FILE16/65962		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: NA	
Primary sensor type: Floatwell		Secondary sensor type: NA	
Primary sensor installation date: August 1985		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 95980 Order of accuracy: L4 PM/SSM RL (mAHD): 5.151 Local BM description: Yellow pin. Local BM location: At start of jetty 10m away from station hut. Adjacent to entry into water		Local BM RL (mAHD): 0.700 Station datum: AHD Date of last survey: 20 March 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.310 MHWS: 0.188 MHW: 0.166 MHWN: 0.144 MSL: 0.058	0.037 0.033 0.032 0.031 0.028	MLWN: -0.029 MLW: -0.051 MLWS: -0.073 ISLW: -0.160 Tidal range (HHWSS – ISLW): 0.469	0.026 0.025 0.025 0.025 0.029
STATION CHARACTERISTICS			
General comments: Rain gauge installed in Aug 2002. Station decommissioned on 18 Oct 2016 and relocated nearby to a downstream jetty to improve safe access and remove the need to access through private land.			
Peak flood of record (mAHD): 1.32	1% AEP (mAHD): 2.2	Instrumentation height (mAHD): NA	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. Data captured at this site for a major flood event is used to verify numerical models and in monitoring flood levels in relation to river runoff, lake levels and ocean tides.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Decommissioned		Revision date: 17 September 2018	

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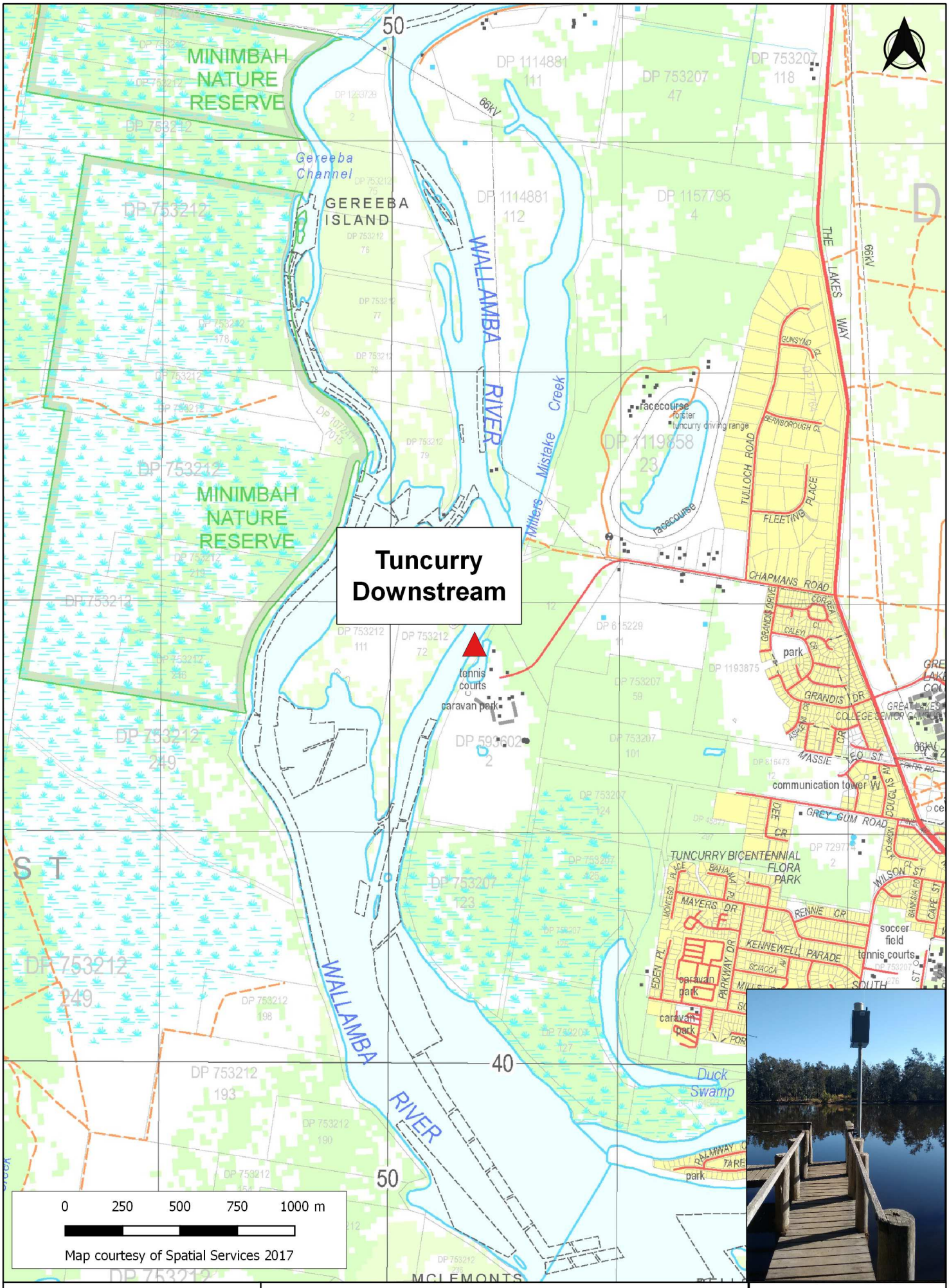

Manly Hydraulics Laboratory

STATION LOCATION
Tuncurry Downstream

MHL 2546

Figure 111

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wallamba River		Station name: Tuncurry Downstream	
AWRC No: 209401D		BoM No: 560053	
MGA co-ordinates zone: 56		Easting: 450368	Northing: 6441819
Geographic co-ordinate system:		Latitude: -32.15900300	Longitude: 152.47364300
TRIM reference: FILE17/53906		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: June 2016		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 95980 Order of accuracy: L4 PM/SSM RL (mAHD): 5.150 Local BM description: Triangle cut Local BM location: Centre of drain at entrance to car park.		Local BM RL (mAHD): 0.944 Station datum: AHD Date of last survey: 9 August 2016 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good – not calculated due to limited record.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Rain gauge installed in June 2016. This station to replaces Tuncurry (209401), this was decommissioned in Oct 2016.			
Peak flood of record (mAHD): 0.61	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 3.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was to replace Tuncurry 209401 which was installed under the Floodplain Management Program. Data captured at this site for a major flood event is used to verify numerical models and in monitoring flood levels in relation to river runoff, lake levels and ocean tides.			
Station shown on BoM website: Radio transmission event data connected to MHL's sensor is displayed. There is a council commissioned ERTS transmitter on site which is serviced by MHL under a contract between MHL and MidCoast Council.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Forster

MHL 2546

Figure 112

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wallis Lake Entrance		Station name: Forster	
AWRC No: 209402		BoM No: 560044	
MGA co-ordinates zone: 56		Easting: 453635	Northing: 6440173
Geographic co-ordinate system:		Latitude: -32.17398600	Longitude: 152.50820600
TRIM reference: FILE17/73803		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: March 1986		Secondary sensor installation date: July 2010	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): 7	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: SSM 57816 Order of accuracy: 4 PM/SSM RL (mAHD): 2.305 Local BM description: Baseplate Local BM location: On the underside of the baseplate of the instrumentation box where Forster gauge is mounted. Pile just off northern breakwall edge walkway.		Local BM RL (mAHD): 4.961 Station datum: Forster Hydro Datum (FHD) and AHD Date of last survey: 1 May 2011 Surveyed by: Land & Property Information Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.802 MHWS: 0.494 MHW: 0.380 MHWN: 0.266 MSL: -0.067	0.043 0.038 0.036 0.034 0.032	MLWN: -0.401 MLW: -0.514 MLWS: -0.628 ISLW: -0.848 Tidal range (HHWSS – ISLW): 1.650	0.033 0.033 0.033 0.035 0.044
STATION CHARACTERISTICS			
General comments: Electromagnetic wave staff sensor replaced by submersible pressure transducers in Feb 2011.			
Peak flood of record (mAHD): 1.05	1% AEP (mAHD): 1.45	Instrumentation height (mAHD): 5.0	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: To monitor ocean tide levels at Forster as part of the Ocean Tide Program.			
Station shown on BoM website: MHL data for this station is displayed in FHD.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Tiona

MHL 2546

Figure 113

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wallis Lake		Station name: Tiona	
AWRC No: 209403		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 454412	Northing: 6425971
Geographic co-ordinate system:		Latitude: -32.30213885	Longitude: 152.51576941
TRIM reference: Local office FILE16/65974		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: NA	
Primary sensor type: Floatwell		Secondary sensor type: NA	
Primary sensor installation date: August 1985		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 15480 Order of accuracy: L2 PM/SSM RL (mAHD): 3.007 Local BM description: Triangle cut Local BM location: In concrete at SE corner of conference centre.		Local BM RL (mAHD): 1.887 Station datum: AHD Date of last survey: 21 September 2011 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.195 MHWS: 0.112 MHW: 0.101 MHWN: 0.090 MSL: 0.041	0.044 0.038 0.037 0.037 0.035	MLWN: -0.007 MLW: -0.018 MLWS: -0.029 ISLW: -0.088 Tidal range (HHWSS – ISLW): 0.283	0.034 0.034 0.034 0.032 0.027
STATION CHARACTERISTICS			
General comments: The station was decommissioned on 4 July 2015 due to Work Health and Safety access issues. It is relocated at Pacific Palms Wharf since 15 October 2013.			
Peak flood of record (mAHD): 0.94	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): NA	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge compliments the gauge at Tuncurry by providing lake levels for periods of river flooding in the townships of Forster and Tuncurry. It is generally accepted that higher lake levels increase the severity of flooding at Forster and Tuncurry.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Decommissioned		Revision date: 17 September 2018	

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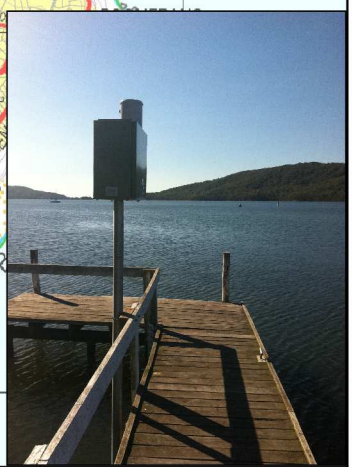
Pacific Palms Wharf



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Pacific Palms Wharf

MHL 2546

Figure 114

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wallis Lake		Station name: Pacific Palms Wharf	
AWRC No: 209406		BoM No: 560066	
MGA co-ordinates zone: 56		Easting: 455401	Northing: 6422551
Geographic co-ordinate system:		Latitude: -32.33302843	Longitude: 152.52611124
TRIM reference: FILE17/57850		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: October 2013		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 84206 Order of accuracy: 2 PM/SSM RL (mAHD): 6.696 Local BM description: Triangle cut in concrete Local BM location: In concrete at start of the wharf		Local BM RL (mAHD): 0.610 Station datum: AHD Date of last survey: 15 October 2013 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1986 to June 2015		Tidal planes functionality: Good (Tiona and Pacific Palms combined)	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.218 MHWS: 0.133 MHW: 0.122 MHWN: 0.111 MSL: 0.061	0.061 0.055 0.056 0.056 0.052	MLWN: 0.011 MLW: 0.000 MLWS: -0.011 ISLW: -0.072 Tidal range (HHWSS – ISLW): 0.290	0.050 0.050 0.051 0.049 0.030
STATION CHARACTERISTICS			
General comments: Tiona was decommissioned on 4 July 2015 due to work health and safety access issues. It is relocated to Pacific Palms Wharf on 15 October 2013. The rain gauge was relocated in Oct 2013.			
Peak flood of record (mAHD): 0.80	1% AEP (mAHD): 2.0	Instrumentation height (mAHD): 2.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge compliments the gauge at Tuncurry by providing lake levels for periods of river flooding in the townships of Forster and Tuncurry. It is generally accepted that higher lake levels increase the severity of flooding at Forster and Tuncurry.			
Station shown on BoM website: Radio transmission event data connected to MHL's sensor is displayed . There is a Council commissioned ERTS transmitter on site which is serviced by MHL under a contract between MHL and MidCoast Council.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Tarbuck Bay
Smiths Lake



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Tarbuck Bay Smiths Lake

MHL 2546

Figure 115

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Smiths Lake		Station name: Tarbuck Bay	
AWRC No: 209465		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 451548	Northing: 6417906
Geographic co-ordinate system:		Latitude: -32.37477031	Longitude: 152.48493494
TRIM reference: FILE17/57826		LGA: MidCoast Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: May 1996		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 15488 Order of accuracy: L2 PM/SSM RL (mAHD): 5.326 Local BM description: Pin in grey gum bench Local BM location: . In Brambles reserve, 10m to the left of boat ramp and 15m NW of picnic table.		Local BM RL (mAHD): 2.559 Station datum: AHD Date of last survey: 27 September 2011 Surveyed by: Daryl Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Rain gauge installed May 1996.			
Peak flood of record (mAHD): 2.25	1% AEP (mAHD): 2.35	Instrumentation height (mAHD): 4.5	
Hydraulic characteristics: Intermittently closed and open lakes and lagoons (ICOLL)			
Purpose of installation and current functionality: This station was commissioned under the Estuary Program to monitor the water level and rainfall at Tarbuck Bay and Smiths Lake. Lake levels rise due to runoff from the catchment and localised flooding can occur. The lake entrance is closed for the majority of time and is opened during these flooding events.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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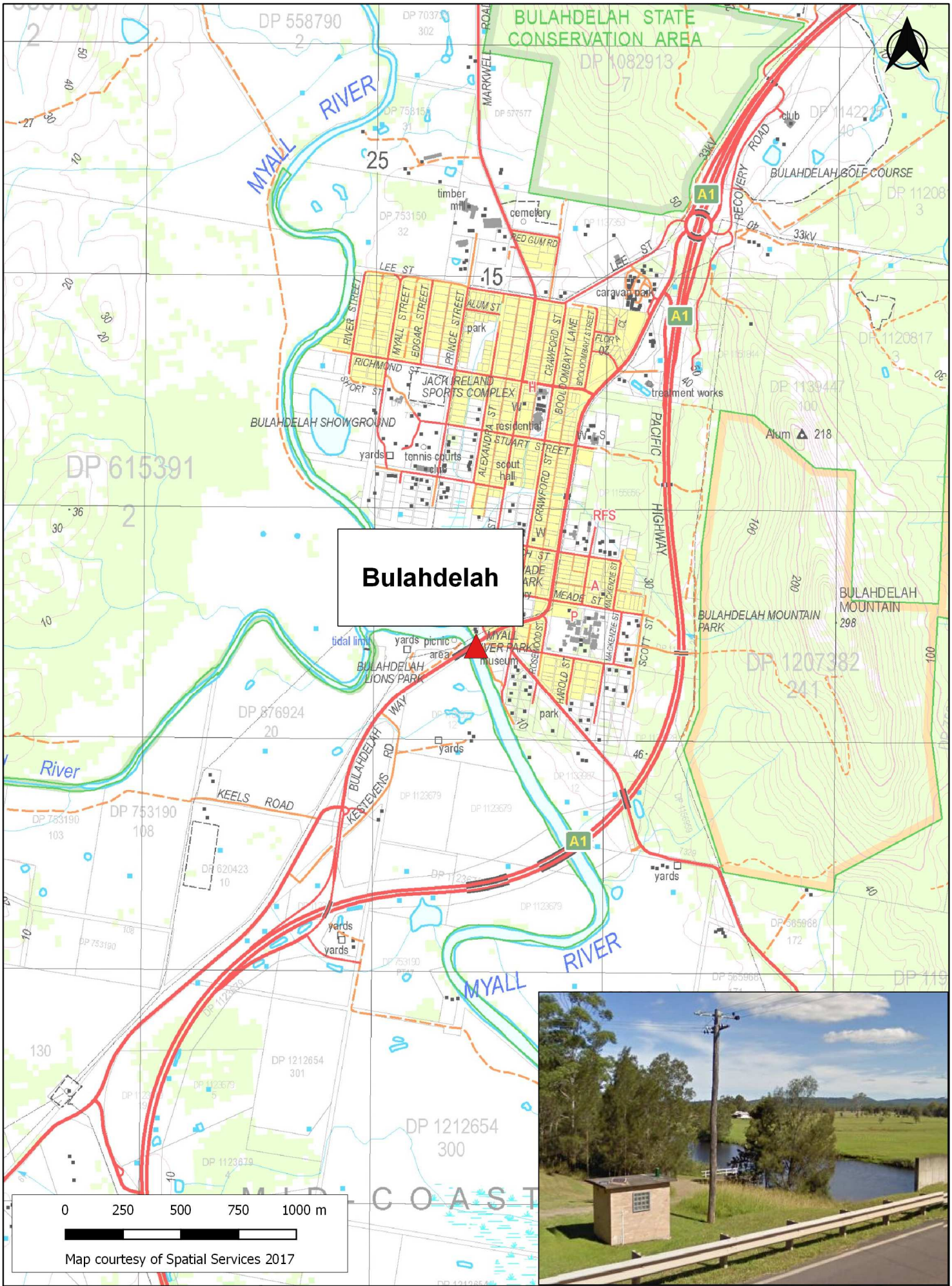

NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Bulahdelah**	**MHL 2546** **Figure 116** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Myall River		Station name: Bulahdelah	
AWRC No: 209460		BoM No: 560040	
MGA co-ordinates zone: 56		Easting: 425442	Northing: 6413407
Geographic co-ordinate system:		Latitude: -32.41391408	Longitude: 152.20708148
TRIM reference: FILE17/58197		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: October 1985		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 139591 Order of accuracy: 2 PM/SSM RL (mAHD): 14.273 Local BM description: BM pin Local BM location: Pin in shed door entrance		Local BM RL (mAHD): 7.103 Station datum: AHD Date of last survey: 16 October 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Rain gauge installed in Aug 1996.			
Peak flood of record (mAHD): 4.10	1% AEP (mAHD): 5.55	Instrumentation height (mAHD): 7.1	
Hydraulic characteristics: Tidal, very small tidal range (around 1cm). Close to tidal limit.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge monitors flood levels at Bulahdelah and assists in reviewing flood damage for the region. MidCoast Council, BoM and SES currently use the information for flooding predictions and early warning evacuations for the low-lying areas downstream.			
Station shown on BoM website: Radio transmission event data from an independent sensor located at the same station is displayed. There is a council commissioned ERTS canister on site which is serviced by MHL under a contract between MHL and MidCoast Council. Council data is using the same gas line as MHL's station, but with different sensing unit. Council data is utilised by BoM.			
SES flood classification: Minor 3.0m, Moderate n/a, Major 4.5m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Bombah Point

MHL 2546
Figure 117
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Myall River		Station name: Bombah Point	
AWRC No: 209475		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 434682	Northing: 6403309
Geographic co-ordinate system:		Latitude: -32.50558301	Longitude: 152.30464200
TRIM reference: FILE17/58219		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: July 2001		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 82038 Order of accuracy: L3 PM/SSM RL (mAHD): 2.630 Local BM description: BM pin on path Local BM location: Pin located on path to hut front door. Guest hut located 20m south of station.		Local BM RL (mAHD): 1.332 Station datum: AHD Date of last survey: 29 April 2009 Surveyed by: Steven Holtznagel Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.75	1% AEP (mAHD): 2.38	Instrumentation height (mAHD): 3.2	
Hydraulic characteristics: Lake with a very small tidal range			
Purpose of installation and current functionality: This station was commissioned to record water level in Myall Lakes after an event in the upper catchment under the Estuary Program. Station part of OEH salinity program from July 2001			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Tea Gardens

MHL 2546

Figure 118

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Myall River		Station name: Tea Gardens	
AWRC No: 209480		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 421723	Northing: 6385111
Geographic co-ordinate system:		Latitude: -32.66889123	Longitude: 152.16517526
TRIM reference: FILE17/58244		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: December 2008		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 29992 Order of accuracy: L2 PM/SSM RL (mAHD): 1.201 Local BM description: BM triangle cut Local BM location: Triangle in SW corner of jetty, outside maritime building		Local BM RL (mAHD): 1.507 Station datum: AHD Date of last survey: 16 March 2010 Surveyed by: Phil Lee Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good - Not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.30	1% AEP (mAHD): 1.45	Instrumentation height (mAHD): 2.2	
Hydraulic characteristics: Tidal, insufficient record length for tidal planes analysis			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor tides and flood levels. Conductivity and temperature sensors were installed in Oct 2009 under the salinity program funded by OEH. .			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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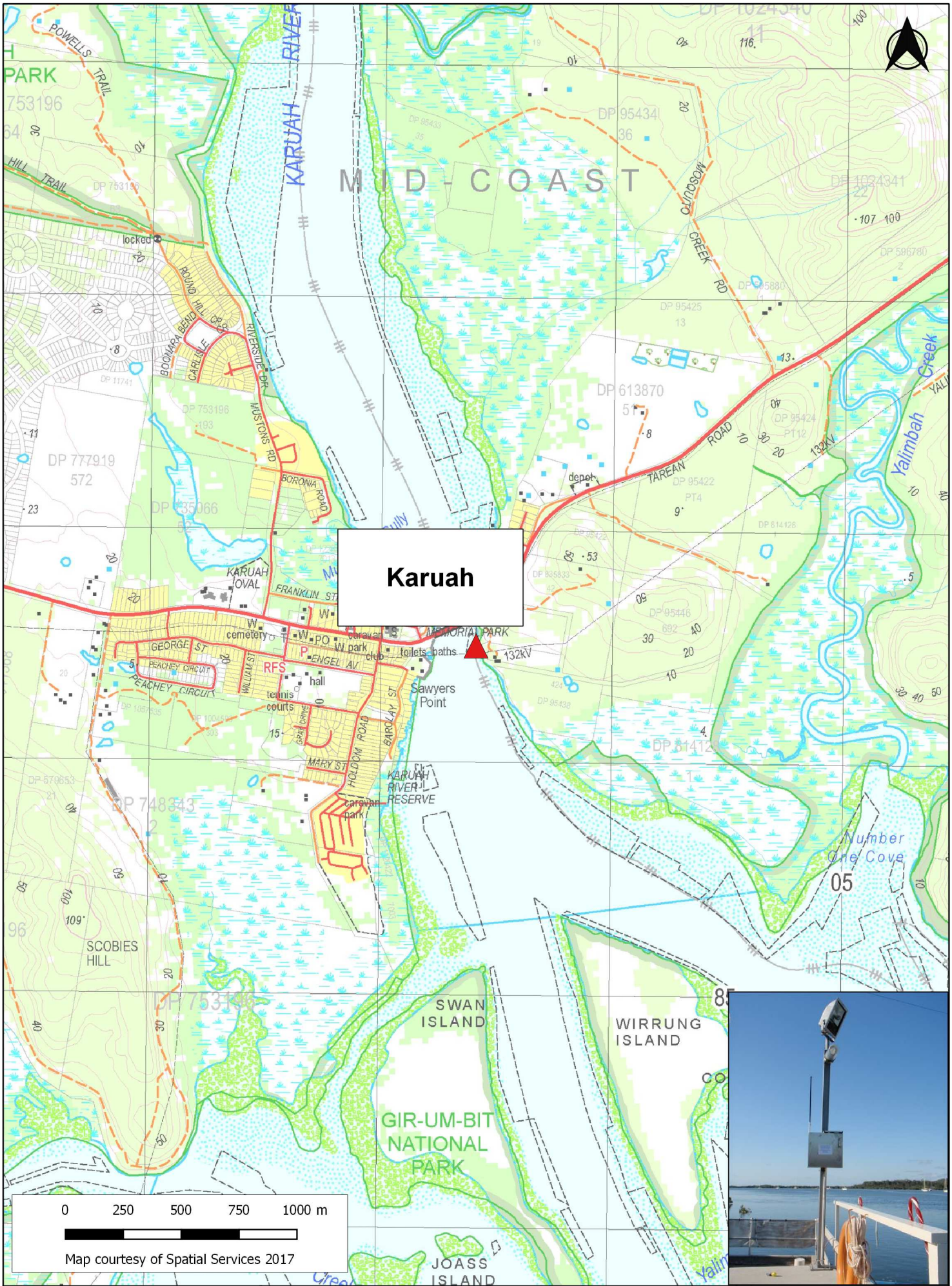

Manly Hydraulics Laboratory

STATION LOCATION
Karuah

MHL 2546

Figure 119

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Karuah River		Station name: Karuah River	
AWRC No: 209485		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 403411	Northing: 6386503
Geographic co-ordinate system:		Latitude: -32.65488516	Longitude: 151.97004633
TRIM reference: FILE17/58246		LGA: MidCoast Council	Rainfall district: 60
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: December 2009		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 77143 Order of accuracy: L3 PM/SSM RL (mAHD): 1.822 Local BM description: BM triangle cut Local BM location: Yellow triangle on kerb just below station box adjacent to gauge post		Local BM RL (mAHD): 1.424 Station datum: AHD Date of last survey: 15 December 2009 Surveyed by: Keith Hutchinson Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good - Not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.41	1% AEP (mAHD): 1.97	Instrumentation height (mAHD): 3.5	
Hydraulic characteristics: Tidal, insufficient record length for tidal planes analysis.			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor tides and flood levels.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Shoal Bay (Port Stephens)

MHL 2546

Figure 120

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Port Stephens		Station name: Shoal Bay	
AWRC No: 209474		BoM No: 561153	
MGA co-ordinates zone: 56		Easting: 422749	Northing: 6379489
Geographic co-ordinate system:		Latitude: -32.71967200	Longitude: 152.17565000
TRIM reference: FILE17/73844		LGA: Port Stephens Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Radar		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: April 2014		Secondary sensor installation date: August 2014	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): 7	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 120624 Order of accuracy: L4 PM/SSM RL (mAHD): 3.478 Local BM description: BM bolt Local BM location: Underside of concrete headstock, at bottom of eastern staircase on side of jetty.		Local BM RL (mAHD): 0.813 Station datum: Port Stephens Hydro Datum (PSHD) and AHD Date of last survey: 27 July 2016 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good - not calculated due to limited record	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Station commissioned on 10/4/2014 following Tomaree (209450) station being decommissioned due to the wharf being condemned.			
Peak flood of record (mAHD): 1.30	1% AEP (mAHD): NA	Instrumentation height (mAHD): 3.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: To monitor ocean tides at Port Stephens as part of the Ocean Tide Program.			
Station shown on BoM website: MHL data for this station is displayed in PSHD.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

STATION LOCATION
Mallabula Point

MHL 2546

Figure 121

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Port Stephens		Station name: Mallabula Point	
AWRC No: 209461		BoM No: 561060	
MGA co-ordinates zone: 56		Easting: 407770	Northing: 6379228
Geographic co-ordinate system:		Latitude: -32.72087476	Longitude: 152.01580178
TRIM reference: FILE17/58380		LGA: Port Stephens Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: July 1992		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 71564 Order of accuracy: L2 PM/SSM RL (mAHD): 4.266 Local BM description: BM triangle in concrete painted yellow Local BM location: Triangle in concrete on SW jetty		Local BM RL (mAHD): 2.334 Station datum: Port Stephens Hydro Datum (PSHD) and AHD Date of last survey: 20 June 2013 Surveyed by: Keith Hutchinson Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1992 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.080	0.037	MLWN: -0.440	0.035
MHWS: 0.690	0.035	MLW: -0.575	0.035
MHW: 0.555	0.035	MLWS: -0.709	0.035
MHWN: 0.421	0.034	ISLW: -0.988	0.034
MSL: -0.010	0.034	Tidal range (HHWSS – ISLW):2.068	0.020
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.32	1% AEP (mAHD): NA	Instrumentation height (mAHD): 3.8	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The station is to monitor ocean tides and flood events at Mallabula within the Karuah catchment.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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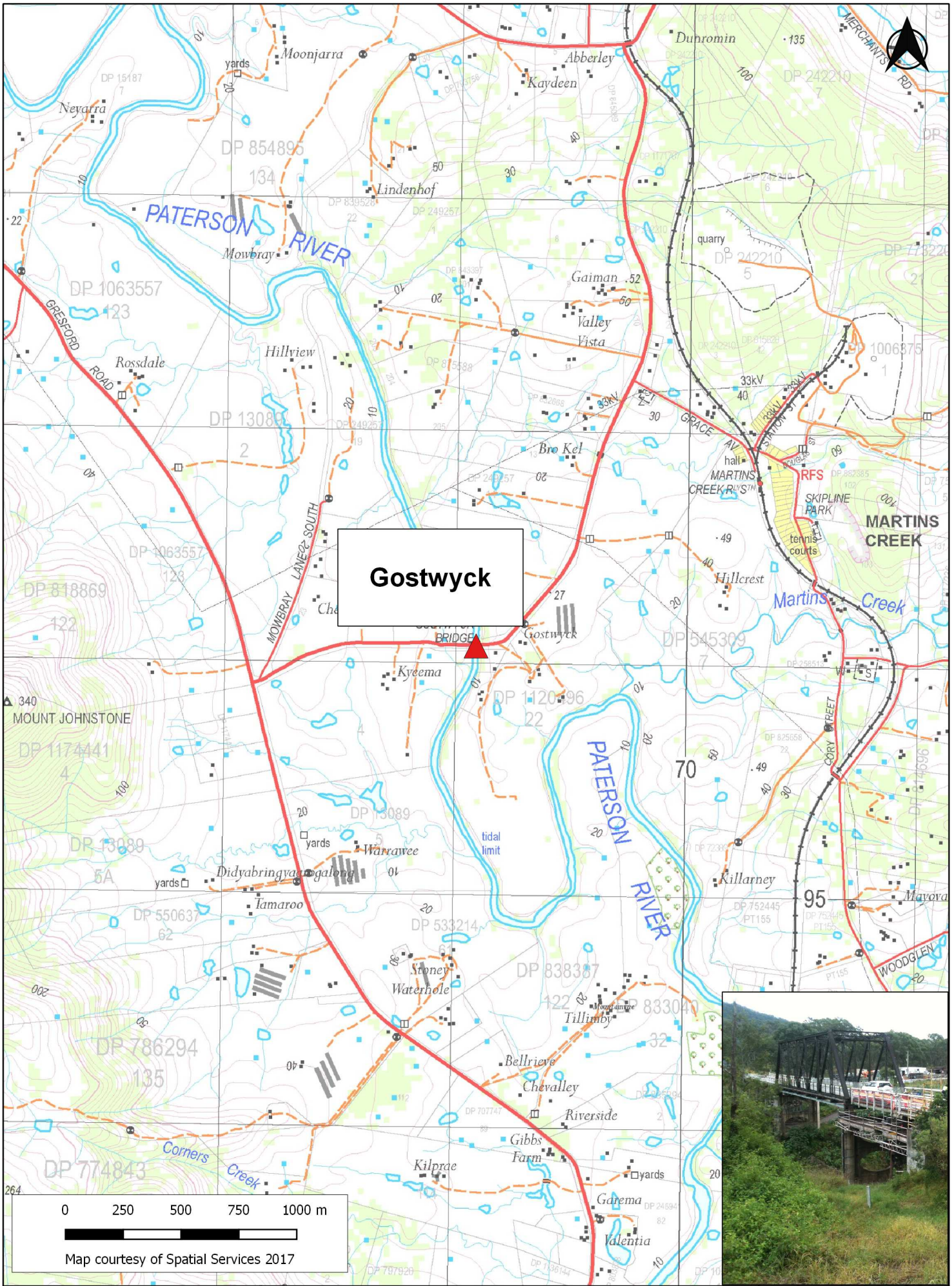

NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Gostwyck**	**MHL 2546** **Figure 122** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Paterson River		Station name: Gostwyck	
AWRC No: 210402		BoM No: 061349	
MGA co-ordinates zone: 56		Easting: 369088	Northing: 6396074
Geographic co-ordinate system:		Latitude: -32.56503515	Longitude: 151.60547114
TRIM reference: FILE17/48270		LGA: Dungog Shire Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: October 1988		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 43232 Order of accuracy: 2 PM/SSM RL (mAHD): 22.804 Local BM description: Plug Local BM location: In doorway of recorder shed		Local BM RL (mAHD): 22.380 Station datum: AHD Date of last survey: 18 October 2008 Surveyed by: M. Waud Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: N/A		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Sensor is predominantly dry, station is for flood warning. Rain gauge station since Oct 1999.			
Peak flood of record (mAHD): 16.12	1% AEP (mAHD): 19.3	Instrumentation height (mAHD): 23.4	
Hydraulic characteristics: Non-tidal			
Purpose of installation and current functionality: The gauge is funded under the Floodplain Management Program to monitor flood levels. The station was commissioned for the Hunter Valley Flood Mitigation Scheme.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 9.1m, Moderate 10.7m, Major 12.2m			
Data used for BoM flood forecasting: No		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Paterson Railway Bridge



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Paterson Railway Bridge

MHL 2546

Figure 123

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Paterson River		Station name: Paterson Railway Bridge	
AWRC No: 210406		BoM No: 561032	
MGA co-ordinates zone: 56		Easting: 370303	Northing: 6392399
Geographic co-ordinate system:		Latitude: -32.59832049	Longitude: 151.61790207
TRIM reference: FILE17/48371		LGA: Dungog Shire Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: December 1984		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 66279 Order of accuracy: L3 PM/SSM RL (mAHD): 17.333 Local BM description: BM8/W. Plug in corner of Telstra pit. Local BM location: Telstra concrete pit approx. 2m from recorder hut.		Local BM RL (mAHD): 13.271 Station datum: AHD Date of last survey: 21 June 2013 Surveyed by: M. Riley/K. Hutchinson Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.883 MHWS: 0.591 MHW: 0.527 MHWN: 0.463 MSL: 0.166	0.060 0.058 0.056 0.056 0.064	MLWN: -0.131 MLW: -0.195 MLWS: -0.259 ISLW: -0.468 Tidal range (HHWSS – ISLW): 1.350	0.076 0.077 0.078 0.081 0.062
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 12.00	1% AEP (mAHD): 12.7	Instrumentation height (mAHD): 13.3	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge is funded under the Floodplain Management Program. The station's lengthy records are of historical significance for monitoring changes to temporal rainfall and catchment response. This station was commissioned for the Hunter Valley Flood Mitigation Scheme.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 6.1m, Moderate 7.6m, Major 9.1m			
Data used for BoM flood forecasting: No		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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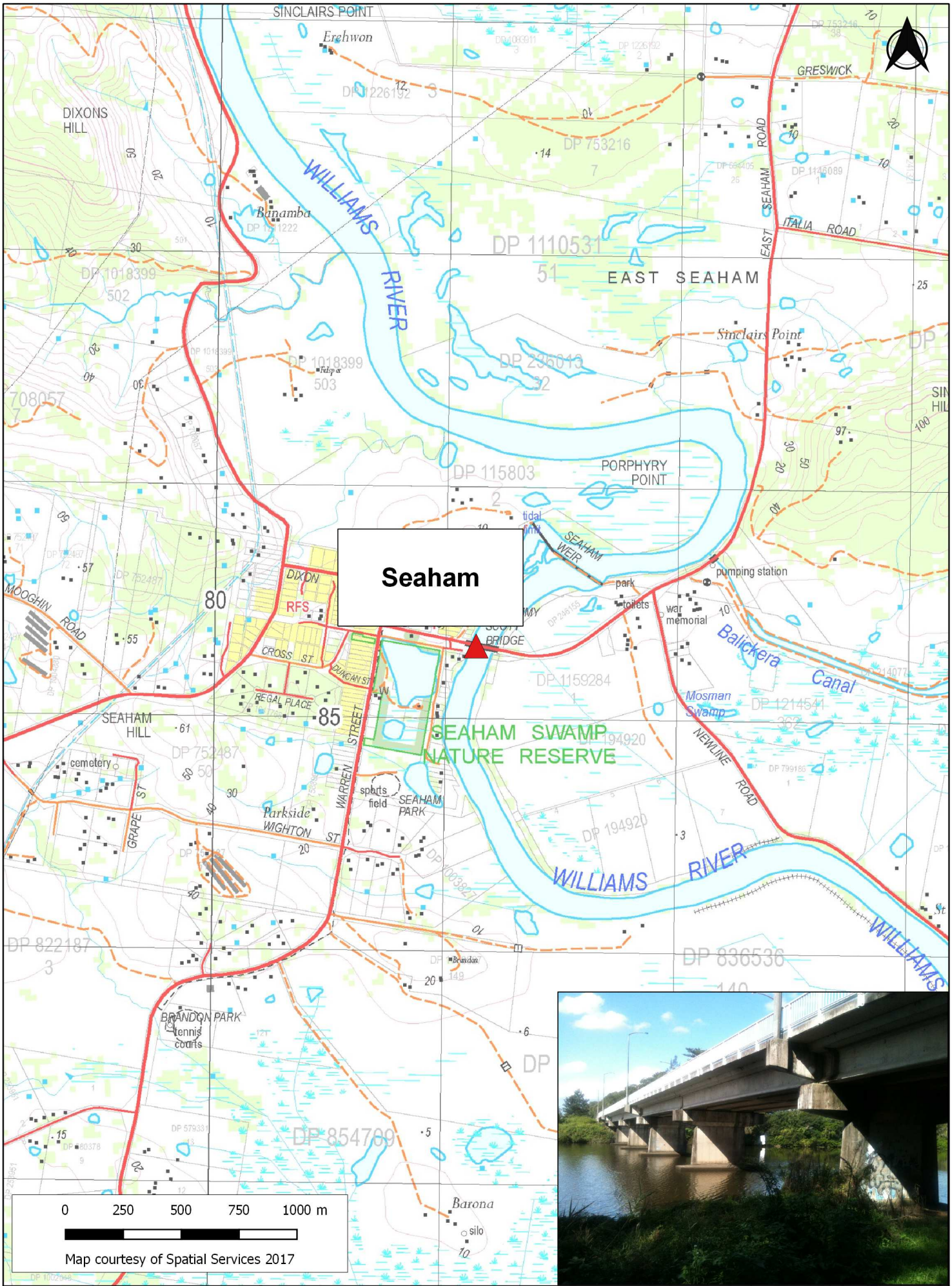

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STATION LOCATION
Seaham

MHL 2546

Figure 124

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Williams River		Station name: Seaham	
AWRC No: 210462		BoM No: 561087	
MGA co-ordinates zone: 56		Easting: 381130	Northing: 6385316
Geographic co-ordinate system:		Latitude: -32.66341340	Longitude: 151.73235000
TRIM reference: FILE17/48368		LGA: Port Stephens Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: December 1995		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 83577 Order of accuracy: L3 PM/SSM RL (mAHD): 7.801 Local BM description: BM 52/B plug Local BM location: In centre of doorway to shed		Local BM RL (mAHD): 4.983 Station datum: AHD Date of last survey: 15 October 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1996 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.064 MHWS: 0.720 MHW: 0.619 MHWN: 0.517 MSL: 0.111	0.041 0.042 0.042 0.042 0.050	MLWN: -0.294 MLW: -0.396 MLWS: -0.498 ISLW: -0.734 Tidal range (HHWSS – ISLW):1.807	0.060 0.063 0.066 0.069 0.056
STATION CHARACTERISTICS			
General comments: Gas line damaged on 13 Oct 2016, replaced with radar since 24 Nov 2016. Rain gauge station since Sep 1999.			
Peak flood of record (mAHD): 3.83	1% AEP (mAHD): 4.9	Instrumentation height (mAHD): 7.9	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: This station was commissioned for the Hunter Valley Flood Mitigation scheme to monitor flood levels. It is currently funded under the Floodplain Management Program.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Dunmore



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Dunmore

MHL 2546

Figure 125

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Paterson River		Station name: Dunmore	
AWRC No: 210409		BoM No: 561075	
MGA co-ordinates zone: 56		Easting: 369277	Northing: 6383252
Geographic co-ordinate system:		Latitude: -32.68068942	Longitude: 151.60569213
TRIM reference: FILE17/48483		LGA: Maitland City Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: November 1984		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 75306 Order of accuracy: 2 PM/SSM RL (mAHD): 6.431 Local BM description: Triangle cut Local BM location: In step of hut		Local BM RL (mAHD): 6.474 Station datum: AHD Date of last survey: 5 September 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): Survey adjustment +0.026m	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.904 MHWS: 0.605 MHW: 0.544 MHWN: 0.482 MSL: 0.185	0.062 0.058 0.057 0.056 0.056	MLWN: -0.113 MLW: -0.174 MLWS: -0.236 ISLW: -0.449 Tidal range (HHWSS – ISLW):1.354	0.056 0.056 0.055 0.053 0.025
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 6.48	1% AEP (mAHD): 6.6	Instrumentation height (mAHD): 6.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge is funded under the Floodplain Management Program to monitor flood levels. This station was commissioned for the Hunter Valley Flood Mitigation Scheme. Conductivity and temperature sensors were installed in Oct 2009 under a program funded by WaterNSW (formerly NSW Office of Water) for the Water Sharing Plan.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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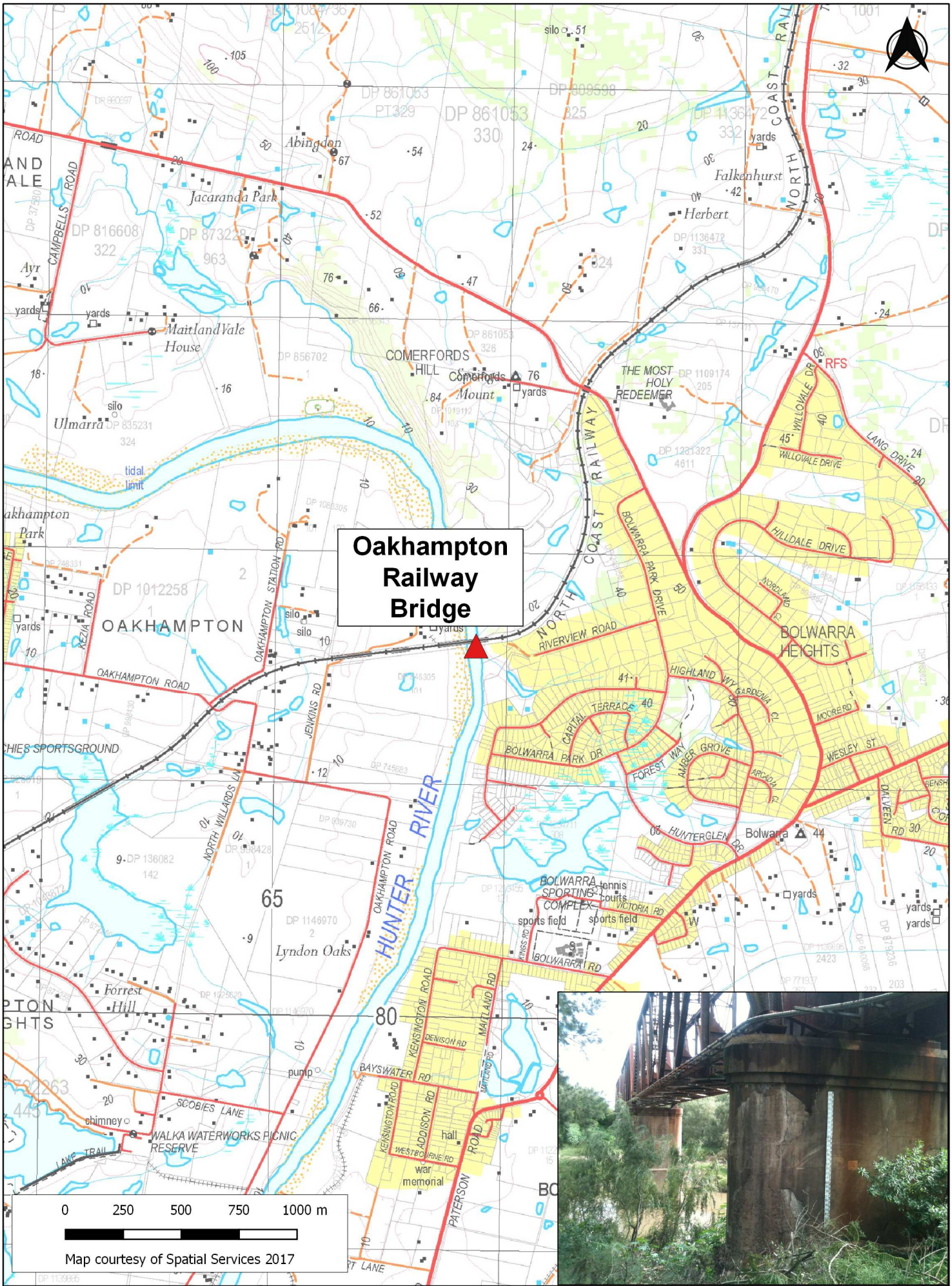

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Oakhampton Railway Bridge

MHL 2546

Figure 126

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hunter River		Station name: Oakhampton Railway Bridge	
AWRC No: 210475		BoM No: 561039	
MGA co-ordinates zone: 56		Easting: 365866	Northing: 6381600
Geographic co-ordinate system:		Latitude: -32.69517761	Longitude: 151.56908200
TRIM reference: FILE17/48534		LGA: Maitland City Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: December 1995		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: RSA 6253 Order of accuracy: Adopted BM schedule No-2 PM/SSM RL (mAHD): 15.619 Local BM description: BM 14/J plug Local BM location: In step of shed		Local BM RL (mAHD): 18.196 Station datum: AHD Date of last survey: 4 September 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): Survey adjustment -0.028m	
TIDAL PLANES (mAHD)			
Period analysed: July 1996 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.758 MHWS: 0.595 MHW: 0.566 MHWN: 0.536 MSL: 0.449	0.080 0.074 0.074 0.074 0.084	MLWN: 0.362 MLW: 0.332 MLWS: 0.303 ISLW: 0.187 Tidal range (HHWSS – ISLW):0.571	0.100 0.103 0.107 0.119 0.119
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 12.24	1% AEP (mAHD): 13.0	Instrumentation height (mAHD): 16.6	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge is funded under the Floodplain Management Program to monitor flood levels. This station was commissioned for the Hunter Valley Flood Mitigation scheme.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Bolwarra Upstream



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Bolwarra Upstream

MHL 2546

Figure 127

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hunter River		Station name: Bolwarra Upstream	
AWRC No: 210459		BoM No: 561061	
MGA co-ordinates zone: 56		Easting: 365828	Northing: 6381130
Geographic co-ordinate system:		Latitude: -32.69941145	Longitude: 151.56860907
TRIM reference: FILE17/48565		LGA: Maitland City Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: August 1980		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 118941 Order of accuracy: 3 PM/SSM RL (mAHD): 16.060 Local BM description: BM 14/J plug Local BM location: In step of shed		Local BM RL (mAHD): 18.196 Station datum: AHD Date of last survey: 13 March 2007 Surveyed by: M. Waud Gauge plate offset to gauge zero (m): Survey adjustment -0.013m	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good (post 2002) - Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 11.81	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 19.4	
Hydraulic characteristics: Tidal. Tidal planes is not calculated as the tidal trace was truncated for a large part of the 1990 – 2010 analysis period, until the orifice was lowered in 2002.			
Purpose of installation and current functionality: The gauge is funded under the Floodplain Management Program. The two Bolwarra gauges are located on a relatively straight section of the Hunter River. A primary function of the gauges is to measure flood water levels and gradient. This station was commissioned for the Hunter Valley Flood Mitigation Scheme. This station is to be decommissioned in June 2019 as the station is no longer used for the Hunter Valley Flood Mitigation Scheme.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 27 March 2019	

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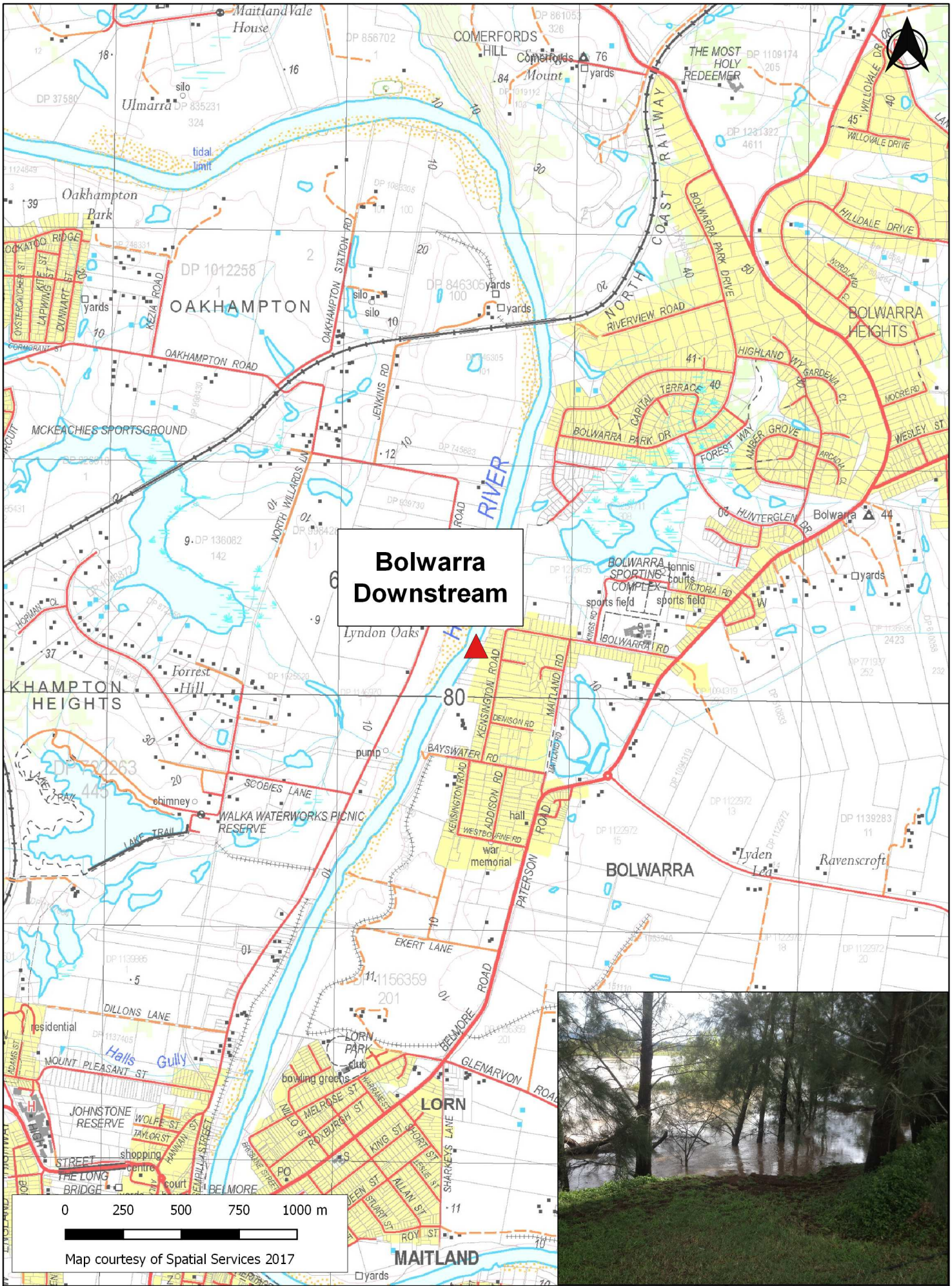

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STATION LOCATION
Bolwarra Downstream

MHL 2546

Figure 128

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hunter River		Station name: Bolwarra Downstream	
AWRC No: 210451		BoM No: 561071	
MGA co-ordinates zone: 56		Easting: 365591	Northing: 6380224
Geographic co-ordinate system:		Latitude: -32.70755285	Longitude: 151.56595066
TRIM reference: FILE17/48584		LGA: Maitland City Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: March 1986		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 30934 Order of accuracy: L2 PM/SSM RL (mAHD): 14.496 Local BM description: PM 30934 Local BM location: Southwest corner at the intersection of Bolwarra Rd and Maitland Rd.		Local BM RL (mAHD): 14.496 Station datum: AHD Date of last survey: 2 September 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): Survey adjustment -0.018m	
TIDAL PLANES (mAHD)			
Period analysed: 2004 - 2010		Tidal planes functionality: Fair – data not averaged as hydraulics are too variable	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 11.92	1% AEP (mAHD): 12.5	Instrumentation height (mAHD): 15.3	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The two Bolwarra gauges are located on a relatively straight section of the Hunter River. A primary function of the gauges is to measure flood water levels and gradient. This station was commissioned for the Hunter Valley Flood Mitigation Scheme.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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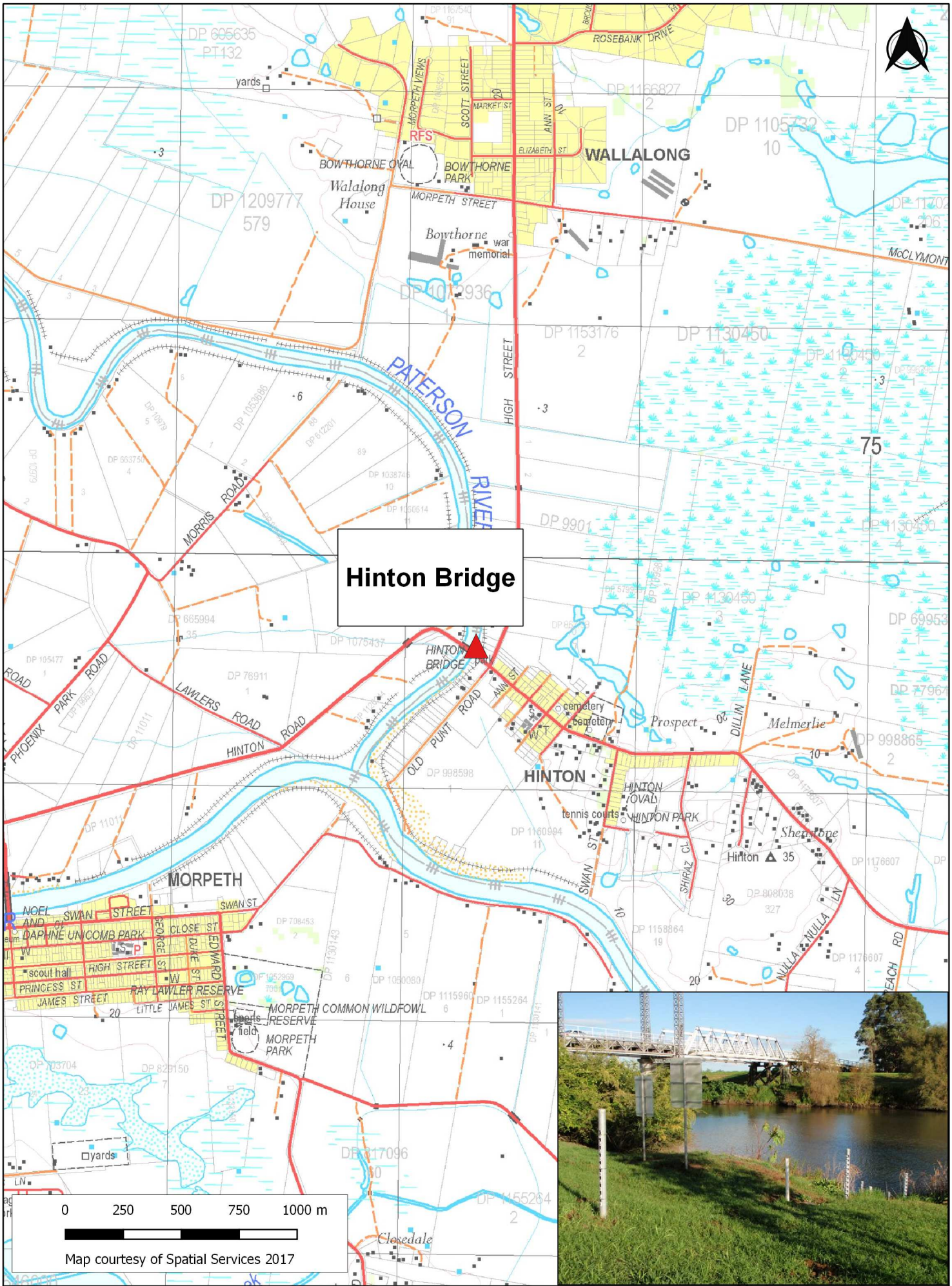

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Hinton Bridge

MHL 2546

Figure 129

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Paterson River		Station name: Hinton Bridge	
AWRC No: 210410		BoM No: 561023	
MGA co-ordinates zone: 56		Easting: 373306	Northing: 6379619
Geographic co-ordinate system:		Latitude: -32.71392306	Longitude: 151.64816159
TRIM reference: FILE17/48745		LGA: Port Stephens Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: August 1979		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 30927 Order of accuracy: 2 PM/SSM RL (mAHD): 6.249 Local BM description: BM 13/B Triangle cut Local BM location: At S end of bottom step of shed		Local BM RL (mAHD): 5.740 Station datum: AHD Date of last survey: 5 September 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): Survey adjustment +0.019m	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.847 MHWS: 0.549 MHW: 0.489 MHWN: 0.430 MSL: 0.138	0.050 0.047 0.045 0.044 0.045	MLWN: -0.153 MLW: -0.213 MLWS: -0.273 ISLW: -0.485 Tidal range (HHWSS – ISLW): 1.332	0.046 0.045 0.044 0.043 0.023
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 5.78	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 7.2	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge is funded under the Floodplain Management Program. The gauge is useful for monitoring the relative timing of Paterson River floodwaters flowing into the Hunter River. This station was commissioned for the Hunter Valley Flood Mitigation Scheme. Conductivity and temperature sensors were installed in Oct 2009 under a program funded by WaterNSW (formerly NSW Office of Water) for the Water Sharing Plan.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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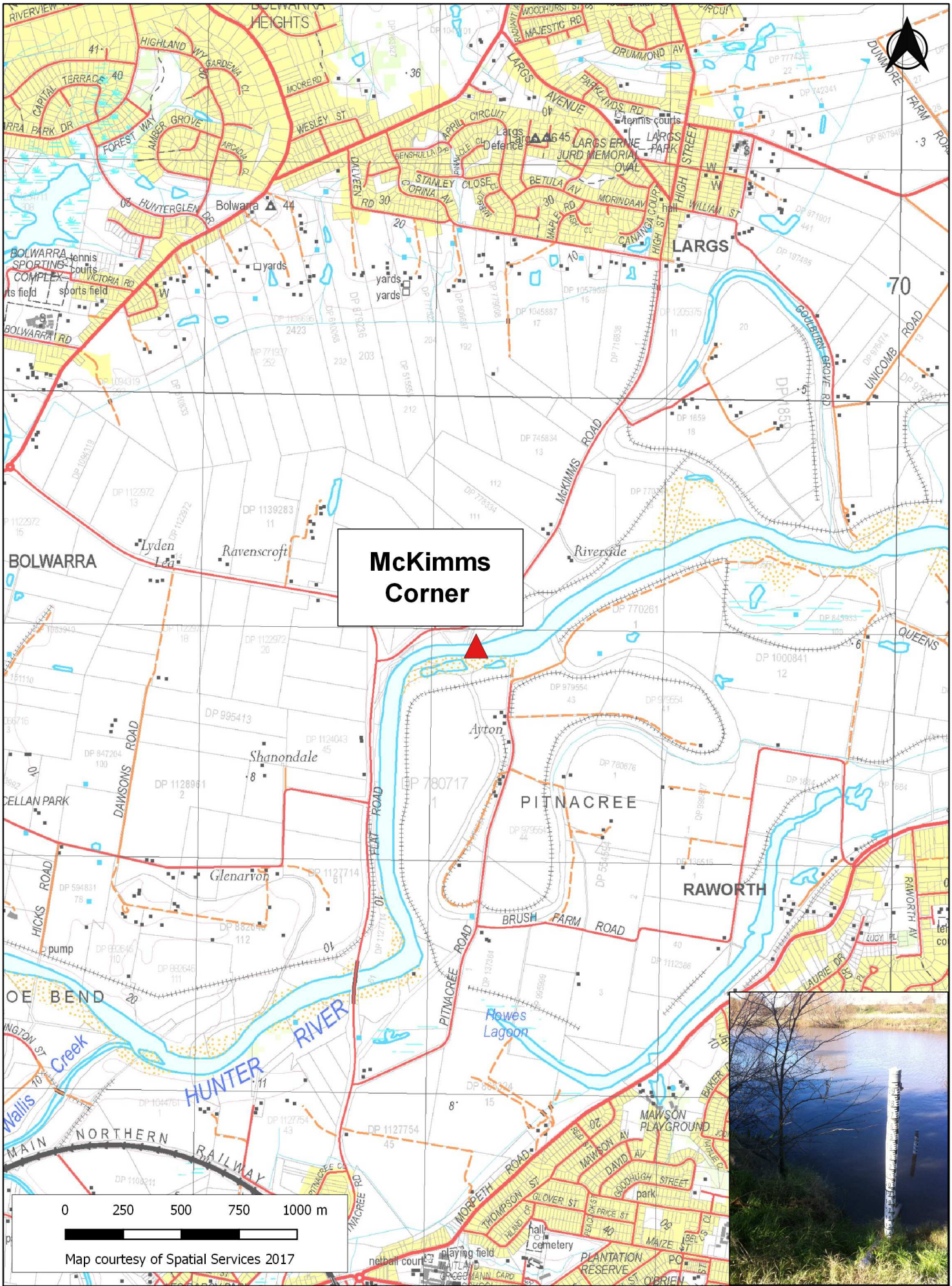

NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **McKimms Corner**	**MHL 2546** **Figure 130** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hunter River		Station name: McKimms Corner	
AWRC No: 210455		BoM No: 561064	
MGA co-ordinates zone: 56		Easting: 368191	Northing: 6378929
Geographic co-ordinate system:		Latitude: -32.71954535	Longitude: 151.59350025
TRIM reference: FILE17/48762		LGA: Maitland City Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: May 1986		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 151591 Order of accuracy: L4 PM/SSM RL (mAHD): 7.465 Local BM description: Triangle cut Local BM location: Stair on shed		Local BM RL (mAHD): 9.220 Station datum: AHD Date of last survey: 6 September 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1991 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.837 MHWS: 0.552 MHW: 0.497 MHWN: 0.441 MSL: 0.179	0.055 0.050 0.048 0.046 0.040	MLWN: -0.083 MLW: -0.138 MLWS: -0.194 ISLW: -0.397 Tidal range (HHWSS – ISLW): 1.234	0.035 0.033 0.032 0.030 0.036
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 8.22	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 9.2	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: This station was commissioned for the Hunter Valley Flood Mitigation Scheme and is currently funded under the Floodplain Management Program, and appears to be duplicating the functions of other gauges in the area. Conductivity and temperature sensors were installed in Oct 2009 under a program funded by WaterNSW (formerly NSW Office of Water) for the Water Sharing Plan.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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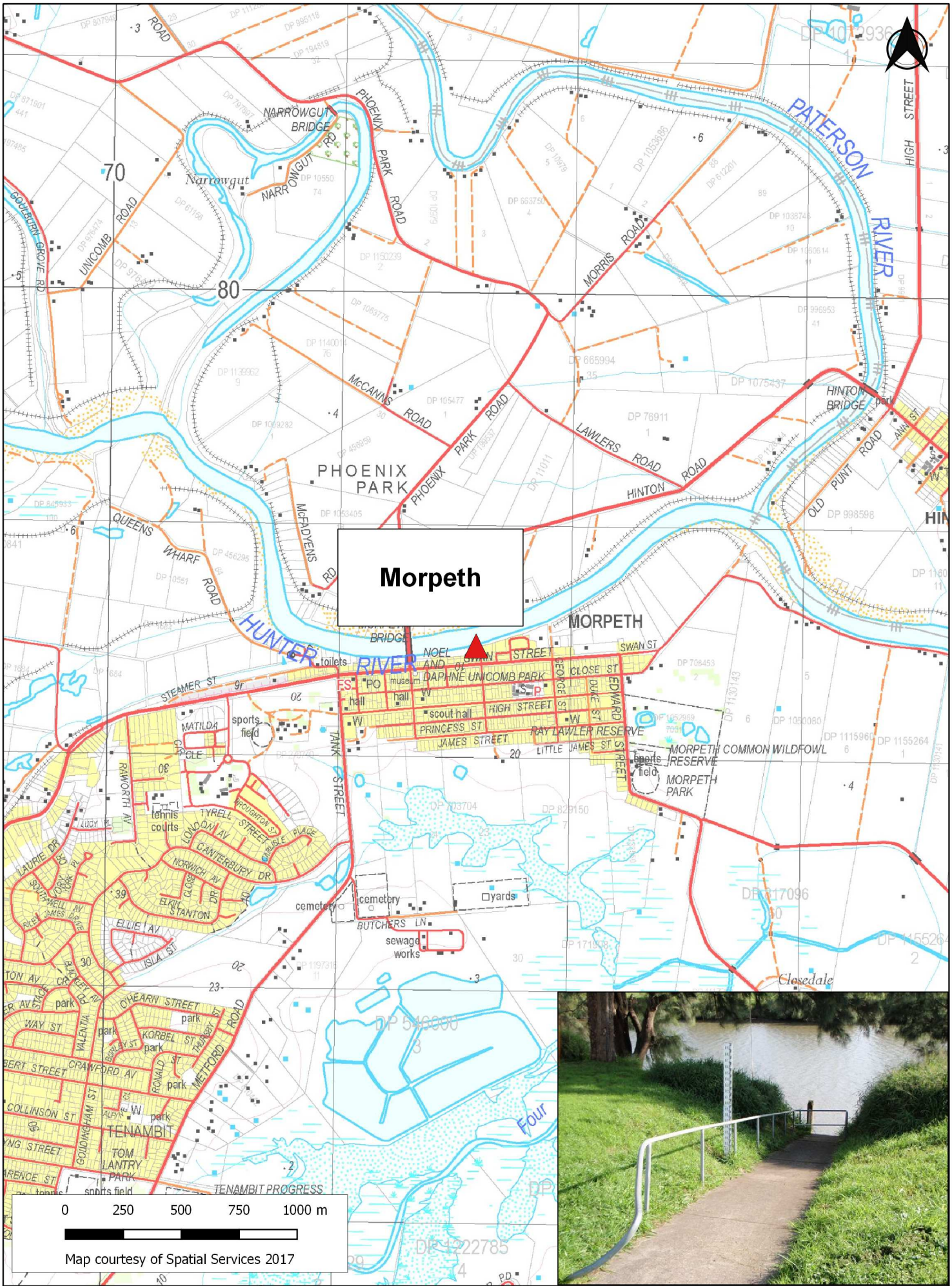

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Morpeth

MHL 2546

Figure 131

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hunter River		Station name: Morpeth	
AWRC No: 210430		BoM No: 561002	
MGA co-ordinates zone: 56		Easting: 371590	Northing: 6378484
Geographic co-ordinate system:		Latitude: -32.72396001	Longitude: 151.62969963
TRIM reference: FILE17/48778		LGA: Maitland City Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: April 1985		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 18506 Order of accuracy: 2 PM/SSM RL (mAHD): 10.859 Local BM description: BM 2/MW plug Local BM location: In concrete at back of first step to wharf		Local BM RL (mAHD): 2.635 Station datum: AHD Date of last survey: 20 January 2017 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.847 MHWS: 0.548 MHW: 0.488 MHWN: 0.429 MSL: 0.133	0.050 0.048 0.047 0.047 0.047	MLWN: -0.163 MLW: -0.222 MLWS: -0.282 ISLW: -0.496 Tidal range (HHWSS – ISLW): 1.343	0.047 0.047 0.047 0.047 0.024
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 6.52	1% AEP (mAHD): 7.2	Instrumentation height (mAHD): 8.1	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge is funded under the Floodplain Management Program. The gauge provides stage height data for the Hunter River immediately upstream of the confluence with the Paterson River. This station was commissioned for the Hunter Valley Flood Mitigation Scheme.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Green Rocks



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Green Rocks

MHL 2546

Figure 132

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hunter River		Station name: Green Rocks	
AWRC No: 210432		BoM No: 561021	
MGA co-ordinates zone: 56		Easting: 377459	Northing: 6378142
Geographic co-ordinate system:		Latitude: -32.72771311	Longitude: 151.69226998
TRIM reference: FILE17/48805		LGA: Port Stephens Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: August 1979		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 75295 Order of accuracy: L3 PM/SSM RL (mAHD): 4.442 Local BM description: Corner of top step Local BM location: Top step of hut		Local BM RL (mAHD): 6.208 Station datum: AHD Date of last survey: 1 February 2007 Surveyed by: M. Waud Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.973 MHWS: 0.642 MHW: 0.556 MHWN: 0.469 MSL: 0.100	0.028 0.029 0.030 0.031 0.043	MLWN: -0.269 MLW: -0.356 MLWS: -0.443 ISLW: -0.679 Tidal range (HHWSS – ISLW): 1.651	0.058 0.061 0.065 0.069 0.064
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 4.36	1% AEP (mAHD): 5.7	Instrumentation height (mAHD): 6.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge is funded under the Floodplain Management Program, to monitor the water levels of the combined Hunter and Paterson floodwaters. These records are of importance for further downstream where the next gauge is at the confluence of the Hunter and Williams rivers at the township of Raymond Terrace. This station was commissioned for the Hunter Valley Flood Mitigation Scheme. Conductivity and temperature sensors were installed in Oct 2009 under a program funded by WaterNSW (formerly NSW Office of Water) for the Water Sharing Plan.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Belmore Bridge



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Belmore Bridge

MHL 2546

Figure 133

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hunter River		Station name: Belmore Bridge	
AWRC No: 210458		BoM No: 061268	
MGA co-ordinates zone: 56		Easting: 364492	Northing: 6377780
Geographic co-ordinate system:		Latitude: -32.72945799	Longitude: 151.55387260
TRIM reference: FILE17/48835		LGA: Maitland City Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: Radar	
Primary sensor installation date: June 1992		Secondary sensor installation date: July 2016	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): 20	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: SSM 12743 Order of accuracy: L3 PM/SSM RL (mAHD): 14.544 Local BM description: SSM 12743 Local BM location: Pin on NW of bridge		Local BM RL (mAHD): 14.544 Station datum: AHD Date of last survey: 4 December 2015 Surveyed by: Ben Cox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: 1992 - 2010		Tidal planes functionality: Poor – data not averaged as the hydraulics are too variable	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Belmore Bridge is a high priority flood station that the Bureau of Meteorology relies on for making predictions downstream. The radar backup sensor was installed in July 2016, the rain gauge was installed in Sep 1995 and the flood camera was installed in Oct 2016.			
Peak flood of record (mAHD): 10.47	1% AEP (mAHD): 11.7	Instrumentation height (mAHD): 14.0/Radar 16.2	
Hydraulic characteristics: Tidal, tidal plane data not averaged as hydraulics too variable.			
Purpose of installation and current functionality: The gauge is funded under the Floodplain Management Program. The gauge was installed for flood monitoring, warning and evacuation planning around the city of Maitland. This station was commissioned for the Hunter Valley Flood Mitigation Scheme.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 5.9m, Moderate 8.9m, Major 10.5m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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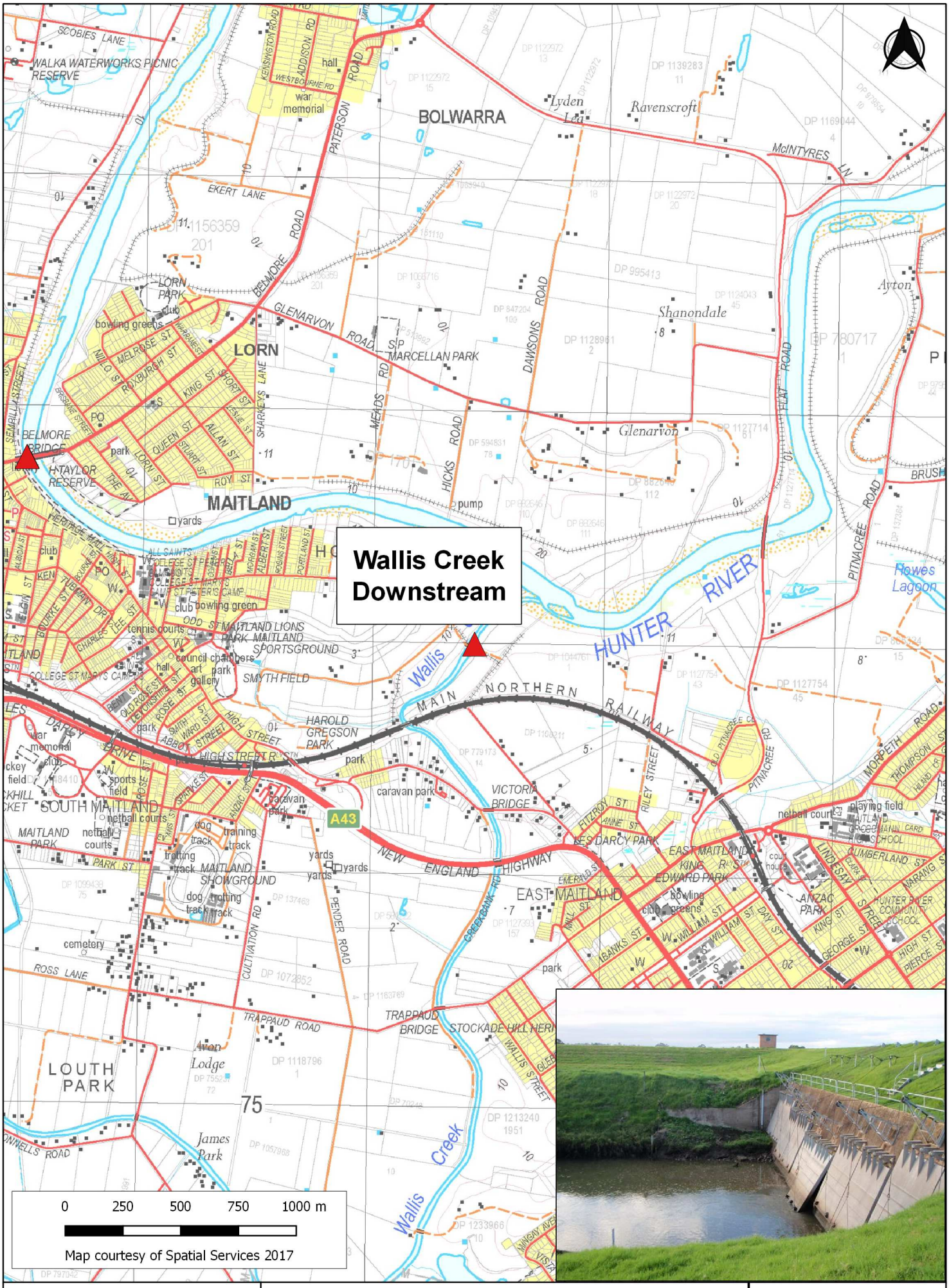

Manly Hydraulics Laboratory

STATION LOCATION
Wallis Creek Downstream

MHL 2546

Figure 134

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wallis Creek		Station name: Wallis Creek Downstream	
AWRC No: 210457		BoM No: 561095	
MGA co-ordinates zone: 56		Easting: 366440	Northing: 6376997
Geographic co-ordinate system:		Latitude: -32.73675711	Longitude: 151.57454346
TRIM reference: FILE17/48946		LGA: Maitland City Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: August 1979		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 18568 Order of accuracy: L2 PM/SSM RL (mAHD): 7.591 Local BM description: BM 5/MW plug Local BM location: In SW corner of concrete slab west of winch house at Wallis Creek Flood Gates		Local BM RL (mAHD): 10.228 Station datum: AHD Date of last survey: 3 September 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): Survey adjustment +0.047m	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.786 MHWS: 0.520 MHW: 0.471 MHWN: 0.422 MSL: 0.197	0.058 0.052 0.050 0.048 0.053	MLWN: -0.028 MLW: -0.077 MLWS: -0.126 ISLW: -0.317 Tidal range (HHWSS – ISLW): 1.103	0.068 0.071 0.074 0.080 0.092
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 9.58	1% AEP (mAHD): 10.0	Instrumentation height (mAHD): 11.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The Wallis Creek downstream gauge is influenced by Hunter River backwaters and because it is close to the confluence, provides a stage hydrograph of the Hunter River and the receding waters of Wallis Creek. The gauge also monitors the mitigation effectiveness of the floodgates. This station was commissioned for the Hunter Valley Flood Mitigation Scheme.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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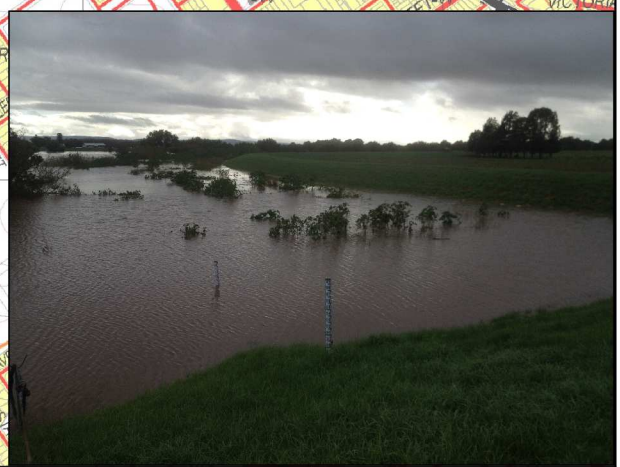
Wallis Creek Upstream



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Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Wallis Creek Upstream

MHL 2546

Figure 135

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wallis Creek		Station name: Wallis Creek Upstream	
AWRC No: 210428		BoM No: 561093	
MGA co-ordinates zone: 56		Easting: 366420	Northing: 6376950
Geographic co-ordinate system:		Latitude: -32.73717853	Longitude: 151.57432331
TRIM reference: FILE17/48955		LGA: Maitland City Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: April 1990		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 18568 Order of accuracy: L2 PM/SSM RL (mAHD): 7.591 Local BM description: BM 3/MW bolt Local BM location: Tip of bolt holding old bracket to concrete wall at bottom of bank E side of flood gates		Local BM RL (mAHD): 10.224 Station datum: AHD Date of last survey: 3 September 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): Survey adjustment +0.010m	
TIDAL PLANES (mAHD)			
Period analysed: July 1991 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.741 MHWS: 0.510 MHW: 0.471 MHWN: 0.432 MSL: 0.229	0.061 0.049 0.048 0.048 0.058	MLWN: 0.027 MLW: -0.012 MLWS: -0.051 ISLW: -0.217 Tidal range (HHWSS – ISLW): 0.958	0.078 0.083 0.089 0.105 0.129
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 6.67	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 11.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The Wallis Creek Upstream gauge was installed to investigate concerns from residents that the floodgates were having an adverse effect in storing floodwaters for too long a period and consequently destroying crops and pasture. The gauges also monitor the mitigation effectiveness of the floodgates. This station was commissioned for the Hunter Valley Flood Mitigation Scheme.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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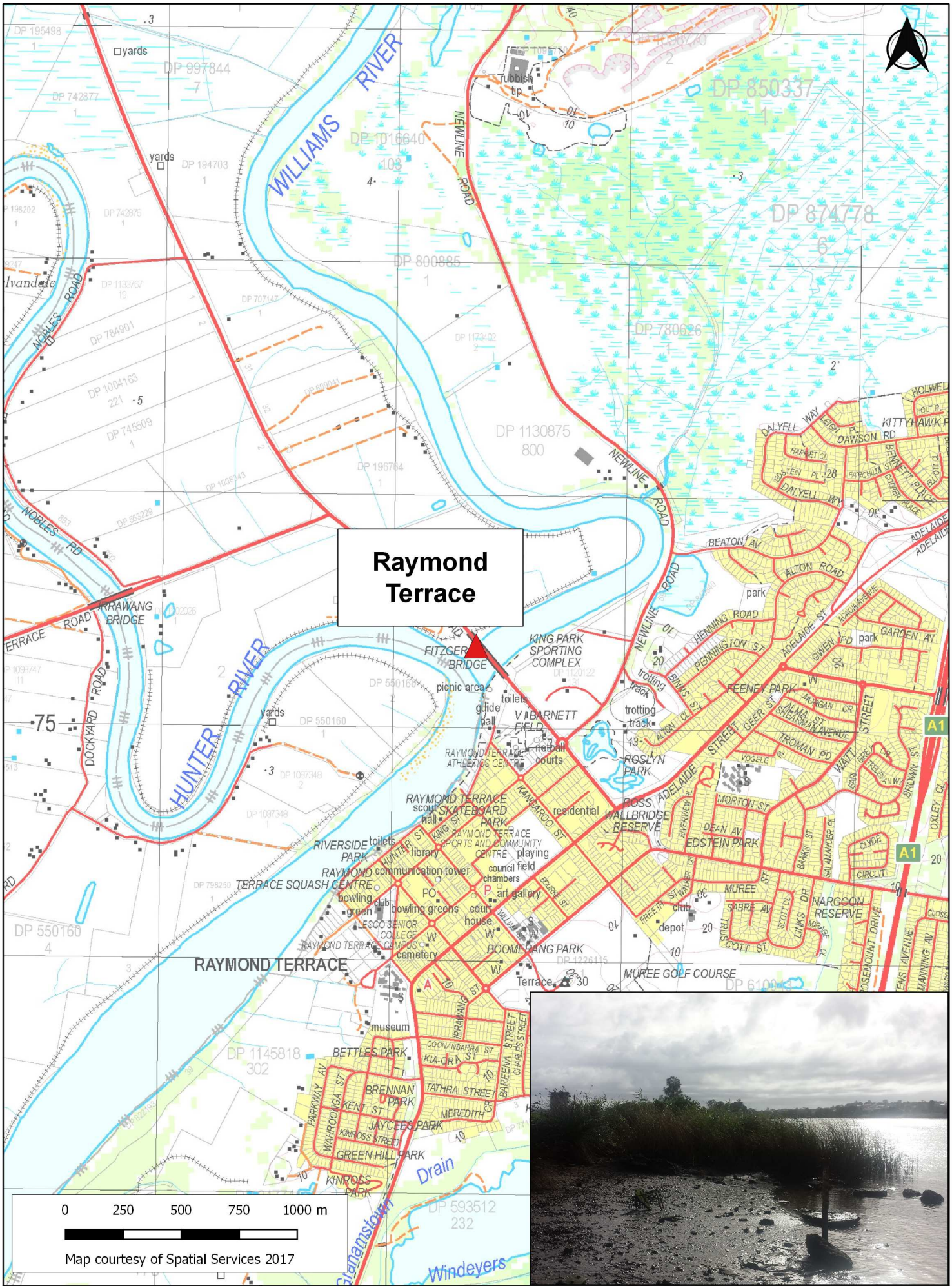

Manly Hydraulics Laboratory

STATION LOCATION
Raymond Terrace

MHL 2546

Figure 136

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Williams River		Station name: Raymond Terrace	
AWRC No: 210452		BoM No: 561037	
MGA co-ordinates zone: 56		Easting: 382357	Northing: 6375355
Geographic co-ordinate system:		Latitude: -32.75338218	Longitude: 151.74417671
TRIM reference: FILE17/48967		LGA: Port Stephens Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: December 1984		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 76363 Order of accuracy: 2 PM/SSM RL (mAHD): 2.579 Local BM description: Triangle cut Local BM location: SW corner bottom step of shed		Local BM RL (mAHD): 2.789 Station datum: AHD Date of last survey: 3 April 2018 Surveyed by: Ben Cox Gauge plate offset to gauge zero (m): Survey adjustment -0.035m	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.038 MHWS: 0.696 MHW: 0.600 MHWN: 0.503 MSL: 0.114	0.056 0.057 0.056 0.055 0.061	MLWN: -0.274 MLW: -0.371 MLWS: -0.468 ISLW: -0.712 Tidal range (HHWSS – ISLW): 1.750	0.069 0.069 0.070 0.073 0.047
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 3.02	1% AEP (mAHD): 4.4	Instrumentation height (mAHD): 4.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge is funded under the Floodplain Management Program. The Raymond Terrace gauge provides useful data for reviewing flood damage in the district as well as verifying the numerical model and assisting in its recalibration in relation to hydrodynamic changes to the river system and catchment. This station was commissioned for the Hunter Valley Flood Mitigation Scheme. Conductivity and temperature sensors were installed in Oct 2009 under a program funded by WaterNSW (formerly NSW Office of Water) for the Water Sharing Plan.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 2.5m, Moderate 3.1m, Major 3.5m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Raymond Terrace Backup



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Raymond Terrace Backup

MHL 2546

Figure 137

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Williams River		Station name: Raymond Terrace Backup	
AWRC No: 210450		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 382352	Northing: 6375361
Geographic co-ordinate system:		Latitude: -32.75333000	Longitude: 151.74412000
TRIM reference: FILE18/45798		LGA: Port Stephens Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: April 2002		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 27676 Order of accuracy: 2 PM/SSM RL (mAHD): 1.161 Local BM description: Triangle cut Local BM location: SW corner bottom step of shed		Local BM RL (mAHD): 2.919 Station datum: AHD Date of last survey: 6 April 2006 Surveyed by: Keith Hutchinson Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good – not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Station access is restricted due to unsafe pedestrian access and traffic management procedures are required.			
Peak flood of record (mAHD): 2.73	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 8.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: This station provides an independent backup for the Raymond Terrace gauge.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Louth Park



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Louth Park

MHL 2546

Figure 138

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wallis Creek		Station name: Louth Park	
AWRC No: 210453		BoM No: 561094	
MGA co-ordinates zone: 56		Easting: 363251	Northing: 6373693
Geographic co-ordinate system:		Latitude: -32.76616031	Longitude: 151.54003132
TRIM reference: FILE17/48982		LGA: Maitland City Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: December 1980		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 60145 Order of accuracy: 2 PM/SSM RL (mAHD): 3.728 Local BM description: Triangle cut Local BM location: SW corner bottom step of shed		Local BM RL (mAHD): 2.870 Station datum: AHD Date of last survey: 6 September 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): Survey adjustment -0.035m	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor - not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 6.70	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 11.5	
Hydraulic characteristics: Tidal, very small tidal range, close to tidal limit.			
Purpose of installation and current functionality: The gauge is funded under the Floodplain Management Program. Flood levels in the Hunter River are influenced by water levels in Wallis Creek, Dagworth and Wentworth swamps. The higher the initial water level the less the temporary storage volume available for Hunter River floodwaters. For this reason, the gauge is used in assessing the hydrodynamics of the flood and the damage caused. This station was commissioned for the Hunter Valley Flood Mitigation Scheme.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Hexham Bridge



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Hexham Bridge

MHL 2546

Figure 139

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hunter River		Station name: Hexham Bridge	
AWRC No: 210448		BoM No: 561022	
MGA co-ordinates zone: 56		Easting: 376568	Northing: 6368156
Geographic co-ordinate system:		Latitude: -32.81767045	Longitude: 151.68143611
TRIM reference: FILE17/49136		LGA: City of Newcastle	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: June 1980		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 57713 Order of accuracy: L2 PM/SSM RL (mAHD): 1.278 Local BM description: Triangle cut Local BM location: 1st step of hut		Local BM RL (mAHD): 1.576 Station datum: AHD Date of last survey: 26 November 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.002 MHWS: 0.652 MHW: 0.547 MHWN: 0.441 MSL: 0.048	0.044 0.044 0.042 0.040 0.041	MLWN: -0.346 MLW: -0.452 MLWS: -0.558 ISLW: -0.807 Tidal range (HHWSS – ISLW): 1.808	0.041 0.040 0.038 0.039 0.015
STATION CHARACTERISTICS			
General comments: Rain gauge station since May1998.			
Peak flood of record (mAHD): 1.87	1% AEP (mAHD): 3.8	Instrumentation height (mAHD): 3.1	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge is funded under the Floodplain Management Program. The gauge is useful in reviewing flood damage to the region and provides water levels and flood gradients for the lower reaches of the Hunter River. This station was commissioned for the Hunter Valley Flood Mitigation Scheme. Conductivity and temperature sensors were installed in April 2011 under a program funded by WaterNSW (formerly NSW Office of Water) for the Water Sharing Plan.			
Station shown on BoM website: MHL data for this station is displayed. ERTS canister in shed connected to MHL level sensor and rain gauge.			
SES flood classification: Minor 1.9m, Moderate 2.9m, Major 3.8m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory	**STATION LOCATION** **Stockton Bridge**	**MHL 2546** **Figure 140** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hunter River		Station name: Stockton Bridge	
AWRC No: 210456		BoM No: 561088	
MGA co-ordinates zone: 56		Easting: 386238	Northing: 6360819
Geographic co-ordinate system:		Latitude: -32.88488487	Longitude: 151.78381259
TRIM reference: FILE17/49139		LGA: City of Newcastle Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: December 1984		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 49777 Order of accuracy: B2 PM/SSM RL (mAHD): 2.617 Local BM description: Triangle cut Local BM location: In SE corner of Stockton Bridge support		Local BM RL (mAHD): 2.190 Station datum: AHD Date of last survey: 22 February 2007 Surveyed by: M. Waud Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.006 MHWS: 0.644 MHW: 0.517 MHWN: 0.390 MSL: -0.011	0.029 0.030 0.029 0.029 0.031	MLWN: -0.413 MLW: -0.540 MLWS: -0.667 ISLW: -0.925 Tidal range (HHWSS – ISLW): 1.931	0.033 0.033 0.032 0.033 0.009
STATION CHARACTERISTICS			
General comments: Barometric station since Feb 2000.			
Peak flood of record (mAHD): 1.37	1% AEP (mAHD): 1.3	Instrumentation height (mAHD): 3.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge is currently funded under the Floodplain Management Program. The gauge was installed to monitor both flood and storm surge events. The data collected is useful in verifying the numerical model. This station was commissioned for the Hunter Valley Flood Mitigation Scheme.			
Station shown on BoM website: MHL data for this station is displayed. ERTS canister in shed connected to MHL level sensor.			
SES flood classification: Minor 1.2m, Moderate 1.3m, Major 1.7m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Barnsley Vale

MHL 2546

Figure 141

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Cockle Creek		Station name: Barnsley Vale	
AWRC No: 211450		BoM No: 561068	
MGA co-ordinates zone: 56		Easting: 369036	Northing: 6354808
Geographic co-ordinate system:		Latitude: -32.93716759	Longitude: 151.59910318
TRIM reference: FILE17/49146		LGA: Lake Macquarie City Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: February 1986		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 15		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 113360 Order of accuracy: 2 PM/SSM RL (mAHD): 5.641 Local BM description: BM 245J plug in triangle Local BM location: In top angle of wingwall		Local BM RL (mAHD): 1.122 Station datum: AHD Date of last survey: 5 September 2017 Surveyed by: M. Waud Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 4.42	1% AEP (mAHD): 3.8	Instrumentation height (mAHD): 6.1	
Hydraulic characteristics: Non-tidal, upstream of weir.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to capture floods in Cockle Creek and to assist in determining the nature and extent of the flood along the tidal reaches of the Cockle Creek system. The gauge assists in the verification of the numerical model developed in the flood study and in reviewing flood damage.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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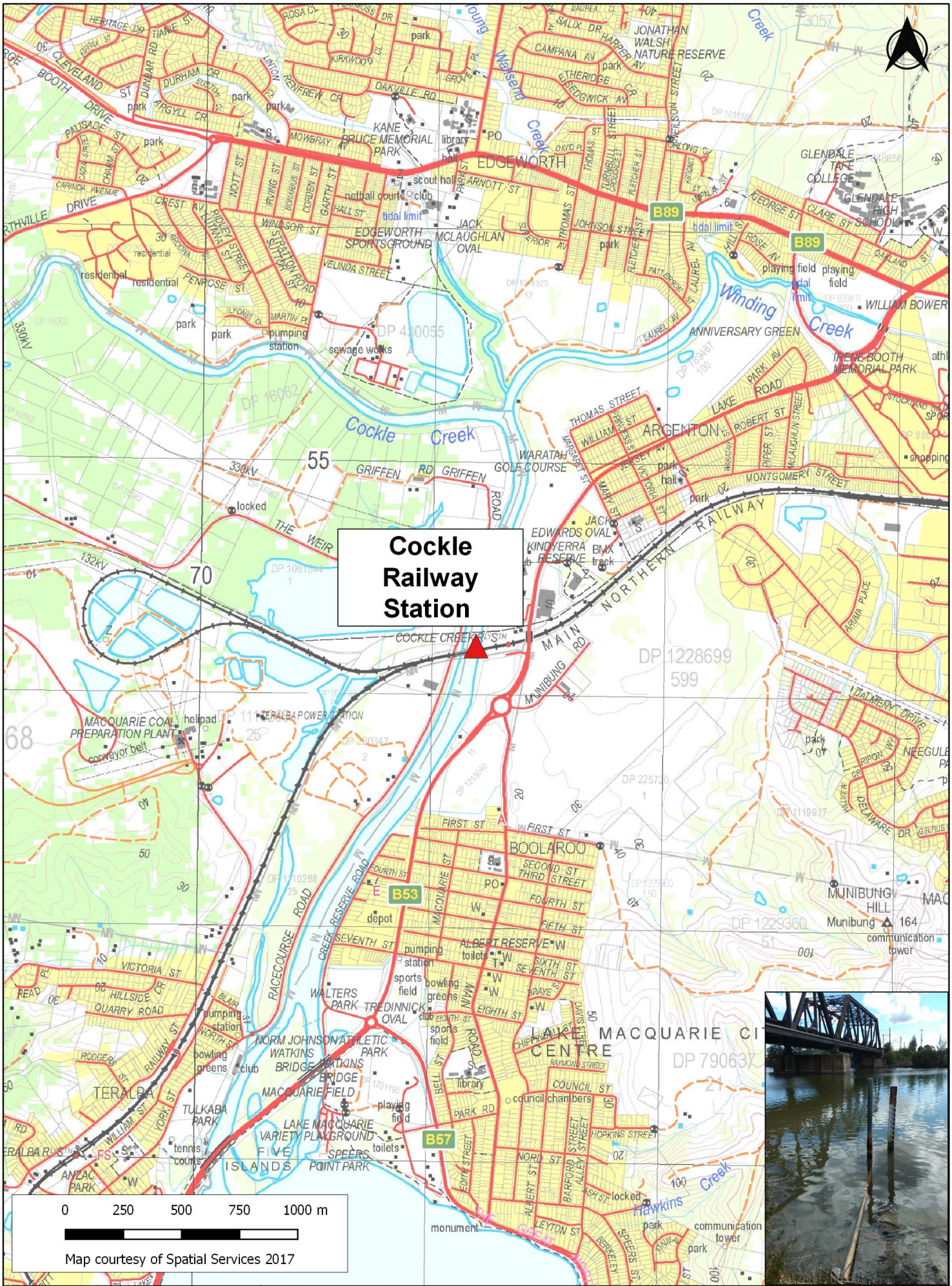

Manly Hydraulics Laboratory

STATION LOCATION
Cockle Railway Station

MHL 2546

Figure 142

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Cockle Creek		Station name: Cockle Railway Station	
AWRC No: 211455		BoM No: 561073	
MGA co-ordinates zone: 56		Easting: 371189	Northing: 6354213
Geographic co-ordinate system:		Latitude: -32.94278925	Longitude: 151.62204436
TRIM reference: FILE17/49170		LGA: Lake Macquarie City Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: February 1985		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 1 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 37993 Order of accuracy: L2 PM/SSM RL (mAHD): 13.179 Local BM description: PM 37993 Local BM location: SW corner of Creek Reserve Rd and Lake Rd		Local BM RL (mAHD): 13.179 Station datum: AHD Date of last survey: 28 August 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): Survey adjustment -0.015m	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.178 MHWS: 0.118 MHW: 0.109 MHWN: 0.099 MSL: 0.063	0.039 0.034 0.034 0.033 0.031	MLWN:0.026 MLW: 0.016 MLWS: 0.007 ISLW: -0.038 Tidal range (HHWSS – ISLW):0.214	0.029 0.028 0.028 0.025 0.020
STATION CHARACTERISTICS			
General comments: 1 minute data recorded since 16 Nov 2016			
Peak flood of record (mAHD): 2.13	1% AEP (mAHD): 2.5	Instrumentation height (mAHD): 8.2	
Hydraulic characteristics: Tidal, small tidal range.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to capture floods in Cockle Creek and to assist in determining the nature and extent of the flood along the tidal reaches of the Cockle Creek system. The gauge assists in the verification of the numerical model developed in the flood study and in reviewing flood damage.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Marmong Point

MHL 2546

Figure 143

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Lake Macquarie		Station name: Marmong Point	
AWRC No: 211460		BoM No: 561063	
MGA co-ordinates zone: 56		Easting: 370992	Northing: 6350370
Geographic co-ordinate system:		Latitude: -32.97742144	Longitude: 151.61939857
TRIM reference: FILE17/49190		LGA: Lake Macquarie City Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: June 1986		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 1 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 25792 Order of accuracy: L2 PM/SSM RL (mAHD): 2.413 Local BM description: BM 244/J plug Local BM location: On Eastern Kerb of Nanda St		Local BM RL (mAHD): 0.971 Station datum: AHD Date of last survey: 24 March 2016 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.167 MHWS: 0.110 MHW: 0.101 MHWN: 0.092 MSL: 0.056	0.041 0.038 0.037 0.037 0.035	MLWN: 0.020 MLW: 0.011 MLWS: 0.002 ISLW: -0.039 Tidal range (HHWSS – ISLW):0.206	0.034 0.033 0.033 0.031 0.017
STATION CHARACTERISTICS			
General comments: Suspect that the structure is sinking and that the nearby survey marks are subject to mine subsidence, various survey adjustments have been applied to the data. 1 minute data recorded since 16 Nov 2016. Aug 2012 floatwell was changed to submersible pressure transducer.			
Peak flood of record (mAHD): 1.14	1% AEP (mAHD): 1.5	Instrumentation height (mAHD): 2.0	
Hydraulic characteristics: Tidal, small tidal range.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The primary purpose of the gauge is to monitor water levels in relation to flooding, the gauges can also assist in the modelling of water quality by means of measuring tidal flushing characteristics and freshwater inflow into the lake.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory	**STATION LOCATION** **Belmont**	**MHL 2546** **Figure 144** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Lake Macquarie		Station name: Belmont	
AWRC No: 211461		BoM No: 561070	
MGA co-ordinates zone: 56		Easting: 374287	Northing: 6343446
Geographic co-ordinate system:		Latitude: -32.04024598	Longitude: 151.65370359
TRIM reference: FILE17/49225		LGA: Lake Macquarie CC	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: May 1986		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 107971 Order of accuracy: 2 PM/SSM RL (mAHD): 10.001 Local BM description: Black triangle on metal 't' bracket Local BM location: First bracket on north side of access walkway, marked with black triangle, opposite walkway from cabinet.		Local BM RL (mAHD): 1.166 Station datum: AHD Date of last survey: 31 March 2016 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.150 MHWS: 0.093 MHW: 0.085 MHWN: 0.076 MSL: 0.041	0.040 0.037 0.036 0.035 0.033	MLWN: 0.005 MLW: -0.004 MLWS: -0.012 ISLW: -0.053 Tidal range (HHWSS – ISLW):0.203	0.031 0.031 0.030 0.028 0.018
STATION CHARACTERISTICS			
General comments: Suspect that the structure is sinking and that the nearby survey marks are subject to mine subsidence, various survey adjustments have been applied to the data. 1 minute data recorded since 11 Sep 2016. Floatwell data till Oct 2010. Submersible pressure transducer data from Oct 2010 to Dec 2014. Radar sensor since Dec 2014.			
Peak flood of record (mAHD): 1.06	1% AEP (mAHD): 1.5	Instrumentation height (mAHD): 2.0	
Hydraulic characteristics: Tidal, small tidal range.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to monitor water levels in relation to flooding. The gauge can also assist in the modelling of water quality by means of measuring tidal flushing characteristics and freshwater inflow into the lake.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 0.7m, Moderate 0.9m, Major 1.1m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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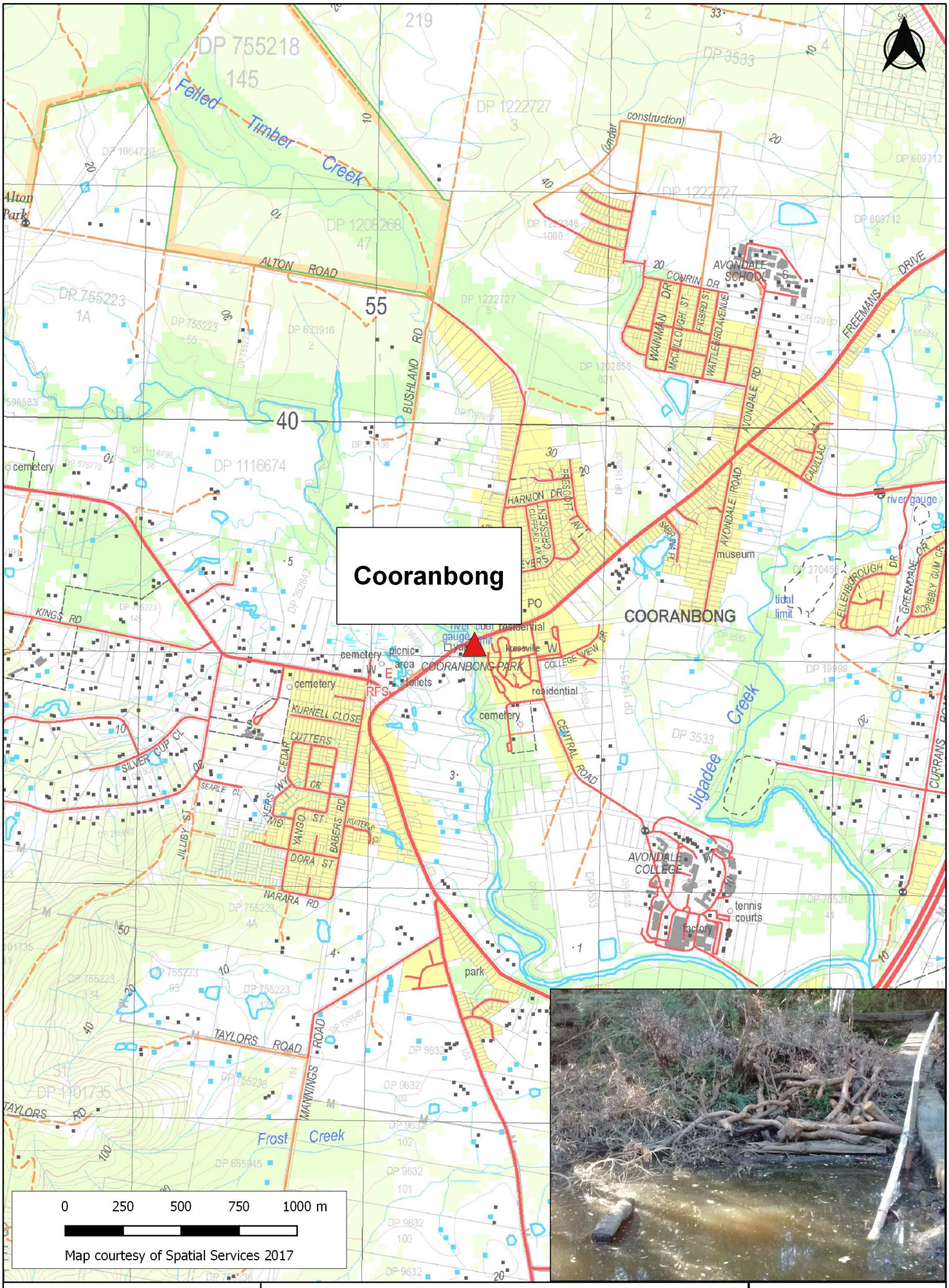

NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Cooranbong**	**MHL 2546** **Figure 145** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Dora Creek		Station name: Cooranbong	
AWRC No: 211470		BoM No: 561074	
MGA co-ordinates zone: 56		Easting: 355446	Northing: 6339055
Geographic co-ordinate system:		Latitude: -33.07749947	Longitude: 151.45129636
TRIM reference: FILE17/49240		LGA: Lake Macquarie City Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: July 1990		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 57470 Order of accuracy: L2 PM/SSM RL (mAHD): 9.219 Local BM description: PM 57470 Local BM location: Along Freemans Dr., approx. 50m east of the bridge crossing Dora Creek		Local BM RL (mAHD): 9.219 Station datum: AHD Date of last survey: 28 August 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 5.40	1% AEP (mAHD): 5.6	Instrumentation height (mAHD): 7.7	
Hydraulic characteristics: Non-tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program to provide flood warning for the downstream town of Dora Creek. The gauge also provides verification of the numerical model, and assists in reviewing localised and downstream flood damage.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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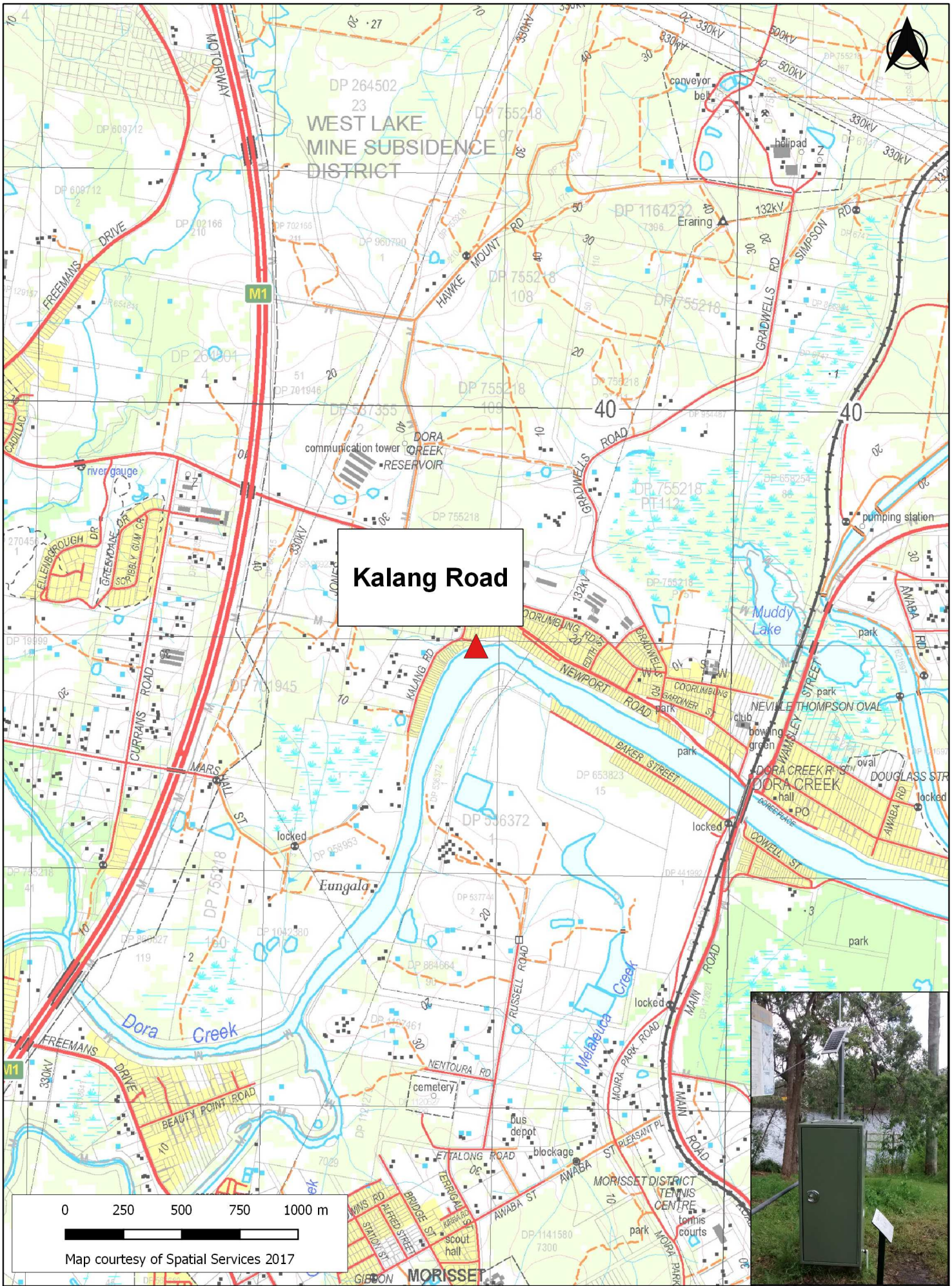

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Kalang Road

MHL 2546

Figure 146

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Dora Creek		Station name: Kalang Road	
AWRC No: 211475		BoM No: 561062	
MGA co-ordinates zone: 56		Easting: 358900	Northing: 6338978
Geographic co-ordinate system:		Latitude: -33.07864786	Longitude: 151.48827819
TRIM reference: FILE17/49246		LGA: Lake Macquarie City Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: September 1993		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 1 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 82744 Order of accuracy: 2 PM/SSM RL (mAHD): 5.826 Local BM description: Plug Local BM location: In concrete footing of 'powerlines overhead' sign		Local BM RL (mAHD): 0.915 Station datum: AHD Date of last survey: 29 August 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1993 to June 2009		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.209 MHWS: 0.144 MHW: 0.134 MHWN: 0.125 MSL: 0.081	0.033 0.031 0.031 0.030 0.029	MLWN: 0.038 MLW: 0.028 MLWS: 0.019 ISLW: -0.027 Tidal range (HHWSS – ISLW):0.236	0.028 0.028 0.028 0.027 0.014
STATION CHARACTERISTICS			
General comments: 1 minute data recorded since 16 Nov 2016. ERTS station since Dec 2014 under agreement between MHL and Lake Macquarie Council. There has been an upgrade of the radio transmission from ERTS canister to compact radio transmitter.			
Peak flood of record (mAHD): 5.16	1% AEP (mAHD): 3	Instrumentation height (mAHD): 5.3	
Hydraulic characteristics: Tidal, small tidal range.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program to monitor flood and water levels in Lake Macquarie			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Swansea Channel

MHL 2546
Figure 147
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Lake Macquarie		Station name: Swansea Channel	
AWRC No: 211462		BoM No: 561090	
MGA co-ordinates zone: 56		Easting: 373155	Northing: 6338270
Geographic co-ordinate system:		Latitude: -33.08679041	Longitude: 151.64086629
TRIM reference: FILE17/49258		LGA: Lake Macquarie City Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: March 1996		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 1 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 28202 Order of accuracy: L2 PM/SSM RL (mAHD): 1.357 Local BM description: Triangle in concrete sprayed yellow Local BM location: SE corner wharf		Local BM RL (mAHD): 1.305 Station datum: AHD Date of last survey: 27 August 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1996 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.692 MHWS: 0.442 MHW: 0.358 MHWN: 0.275 MSL: 0.020	0.041 0.041 0.041 0.040 0.040	MLWN: -0.236 MLW: -0.319 MLWS: -0.403 ISLW: -0.582 Tidal range (HHWSS – ISLW):1.274	0.040 0.040 0.040 0.040 0.015
STATION CHARACTERISTICS			
General comments: 1 minute data recorded since 17 Nov 2016. Jul 2011 floatwell on timber pile removed and new sensor installed on river bank for easy access and safer maintenance.			
Peak flood of record (mAHD): 1.16	1% AEP (mAHD): 1.6	Instrumentation height (mAHD): 2.8	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor flood and water levels in Lake Macquarie.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

NSW GOVERNMENT

STATION LOCATION
Morisset

MHL 2546

Figure 148

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Stockton Creek		Station name: Morisset	
AWRC No: 211480		BoM No: 561089	
MGA co-ordinates zone: 56		Easting: 357710	Northing: 6336566
Geographic co-ordinate system:		Latitude: -33.10024177	Longitude: 151.47515718
TRIM reference: FILE17/49291		LGA: Lake Macquarie City Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: December 1984		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 1 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 23925 Order of accuracy: L2 PM/SSM RL (mAHD): 9.115 Local BM description: BM 248/J Plug Local BM location: In top of wall on corner bridge over Stockton creek		Local BM RL (mAHD): 5.118 Station datum: AHD Date of last survey: 29 August 2013 Surveyed by: Sam Maddox Gauge plate offset to gauge zero (m): Survey adjustment -0.027m	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.186 MHWS: 0.123 MHW: 0.113 MHWN: 0.103 MSL: 0.061	0.038 0.034 0.033 0.033 0.030	MLWN: 0.020 MLW: 0.010 MLWS: 0.000 ISLW: -0.046 Tidal range (HHWSS – ISLW):0.232	0.029 0.029 0.029 0.029 0.026
STATION CHARACTERISTICS			
General comments: 1 minute data recorded since 10 Nov 2016			
Peak flood of record (mAHD): 2.54	1% AEP (mAHD): 3.3	Instrumentation height (mAHD): 3.1	
Hydraulic characteristics: Tidal, small tidal range.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge compliments the Cooranbong gauge by providing flood warning for the downstream township of Dora Creek.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Wallarah Creek Bridge



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Wallarah Creek Bridge

MHL 2546

Figure 149

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tuggerah Lake		Station name: Wallarah Creek Bridge	
AWRC No: 211420		BoM No: 561091	
MGA co-ordinates zone: 56		Easting: 360913	Northing: 6323587
Geographic co-ordinate system:		Latitude: -33.21768960	Longitude: 151.50749013
TRIM reference: FILE17/62786		LGA: Central Coast Council	Rainfall district:61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: May1994		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 min		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM73612 Order of accuracy: L2 PM/SSM RL (mAHD): 1.464 Local BM description: Bolt in 80NB pipe Local BM location: Pipe concreted into ground approx. 1m west of pedestal and cabinet. Next to station concrete slab.		Local BM RL (mAHD): 1.669 Station datum: AHD Date of last survey: 31 January 2017 Surveyed by: Ben Cox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor - not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.65	1% AEP (mAHD): 2.23	Instrumentation height (mAHD): 3.7	
Hydraulic characteristics: Very small tidal range			
Purpose of installation and current functionality: Station installed under the Floodplain Management Program to monitor flood levels in Wallarah Creek.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Toukley

MHL 2546

Figure 150

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tuggerah Lake		Station name: Toukley	
AWRC No: 211401		BoM No: 561000	
MGA co-ordinates zone: 56		Easting: 362599	Northing: 6318531
Geographic co-ordinate system:		Latitude: -33.26349540	Longitude: 151.52481129
TRIM reference: FILE17/62781		LGA: Central Coast Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: February 1985		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 min		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM17504 Order of accuracy: L2 PM/SSM RL (mAHD): 8.011 Local BM description: PM17504 Local BM location: At intersection of Main Rd and Viewpoint Dr, approx. 250m from the bridge		Local BM RL (mAHD): 8.011 Station datum: AHD Date of last survey: 18 September 2013 Surveyed by: Ben Cox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor - not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Rain gauge station since March 1987.			
Peak flood of record (mAHD): 1.68	1% AEP (mAHD): 2.23	Instrumentation height (mAHD): 2.9	
Hydraulic characteristics: Very small tidal range.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The Tuggerah Lakes function as a large storage basin for floodwaters from the catchment regions, the gauge assists in flood monitoring and warning, and in the monitoring of tidal flushing and its impact on water quality.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Wyong Weir Upstream



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

Manly Hydraulics Laboratory

STATION LOCATION
Wyong Weir Upstream

MHL 2546

Figure 151

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wyong River		Station name: Wyong Weir Upstream	
AWRC No: 211417		BoM No: 561066	
MGA co-ordinates zone: 56		Easting: 351596	Northing: 6316778
Geographic co-ordinate system:		Latitude: -33.27784384	Longitude: 151.40643006
TRIM reference: FILE17/62749		LGA: Central Coast Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: July 1990		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 min		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM83020 Order of accuracy: B2 PM/SSM RL (mAHD): 15.333 Local BM description: PM83020 Local BM location: Approx. 30m north from the intersection of Alison Rd and Cape Rd.		Local BM RL (mAHD): 15.333 Station datum: AHD Date of last survey: 6 June 2013 Surveyed by: Ben Cox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 5.72	1% AEP (mAHD): 5.99	Instrumentation height (mAHD): 7.7	
Hydraulic characteristics: Non-tidal, upstream of weir.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, and is used for flood warning for the downstream town of Wyong. The Wyong River is the major stream flowing into Tuggerah Lakes and its contribution to the flooding of the region is significant.			
Station shown on BoM website: MHL data for this station is displayed in AHD.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Lees Bridge
TUGGERAH NATURE RESERVE
DP 1096069
32
TUGGERAH STATE CONSERVATION AREA
communication tower
LAKE ROAD
TUGGERAH
shopping centre
tennis courts
CENTRAL COAST MARINERS CENTRE OF EXCELLENCE
TUGGERAH OVAL
sewage works
The Glen
CHITTAWAY POINT TRAIL
PACIFIC HIGHWAY
MAIN NORTHERN RAILWAY
WYONG ROAD
RELIANCE DR
PIONEER AV
FOWLER RD
Tuggerah Creek
KANGY ANGY RESERVOIR
TONKISS STREET RESERVE
WOODBURY PARK
WYONG ROAD
library
PO
hall
ASPECT CENTRAL COAST SCHOOL TUGGERAH
ST PETER'S CATHOLIC COLLEGE
MILDON RD
TREEVIEW PLACE
ACE CR
GREEN CL
CAVENLOCK RD
HILLVIEW CL
BURBANK DR
BELLWOOD CLOSE
INDICA CL
COLONY CL
TEAMSTER CL
BRYANT DR
MOORAMBA AV
LAGOONA DR
CHURCH ROAD
SUNSHINE RESERVE
GEOFFREY ROAD
HYLES STREET
HENRY STREET
CHITTAWAY ROAD
KALUA DR
ALOHA DR
OBERON ROAD
JANE ELLEN CR
ASTON WILDIE AVENUE
THOMAS WALKER DR
KINSEY CR
TRIGG RD
CHITTAWAY BAY LIONS PARK
CHITTAWAY BAY
ALBATROSS ROAD
PLATYPUS RD
SEAWIND TERRACE
BLACK SWAN STREET
WOMBAT ST
CYGNET DR
ECHIDNA ST
BLENHEIM AV
BUCKINGHAM ROAD
ST JAMES AV
WINDSOR RD
KINGSFORD SMITH DR
LORRAINE AV
LAKEDGE AVENUE
BLUE PARK
residential
MYRTLE BRUSH PARK
medical centre
scout hall
BELINDA
ANORAMA PD
BUNDILLA PD
AUDIE PARADE
GLADYS AVENUE
ROGER CR
JUDITH ANNE CR
KILKENNY PD
DONEGAL ROAD
KENMARE AV
BERKELEY PARK
BERKELEY VALE
SHANNON PD
ELAINE AV
KERRY
JEAN AV
RFS
HAIGH CL
GREENWOOD AVENUE
WYONG
KERRY AV
TED DOYLE OVAL
BERKELEY VALE SPORTING COMPLEX
skate park
TUGGERAH-LAKES SECONDARY COLLEGE BERKELEY VALE
BUNDEENA ROAD
BOMADERRY CR
BERKELEY ROAD
BOTTLEBRUSH DRIVE
GUMNUT CL
ASHWOOD CL
TORRELLIA WY
ASHWOOD CLOSE RESERVE
TUMBI INDOOR SPORTS
ENTERPRISE DRIVE
APPRENTICE DRIVE
SANITARIUM RD
CORELLA CLOSE
CRAFTSMAN AV
RECORD STREET
BRIDGE
BRIDGE
BURNDAH RD
community hall
shopping centre
CHITTAWAY OVAL
JAMES WATT DR
SOVEREIGN
TRIGG
CHITTAWAY RD
NEWBRIDGE
factory
FS
PO
Z
DP 1100181
DP 615308
DP 1176776
DP 874695
DP 1036437
DP 841453
DP 1177776
DP 205858
DP 543729
DP 1165188
DP 1186260
DP 999132
DP 1128053
DP 755263
DP 755283
DP 755253
DP 1095651
DP 1145957
DP 1178776
DP 1178776
DP 1178776

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Ourimbah Creek		Station name: Lees Bridge	
AWRC No: 211425		BoM No: 561086	
MGA co-ordinates zone: 56		Easting: 353684	Northing: 6311538
Geographic co-ordinate system:		Latitude: -33.32537586	Longitude: 151.42799617
TRIM reference: FILE17/62765		LGA: Central Coast Council	Rainfall district:61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: May 1993		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM71192 Order of accuracy: L2 PM/SSM RL (mAHD): 5.821 Local BM description: SBM1001 pin Local BM location: Pin in path under bridge		Local BM RL (mAHD): 3.159 Station datum: AHD Date of last survey: 31 January 2017 Surveyed by: Ben Cox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor - not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Radar installed to replace existing gas purge (removed 7 Aug 2015)			
Peak flood of record (mAHD): 2.77	1% AEP (mAHD): 4.88 (Upstream); 4.07 (Downstream)	Instrumentation height (mAHD): 3.1	
Hydraulic characteristics: Very small tidal range.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, and facilitates emergency and evacuation planning of the Chittaway Bay and Chittaway Point areas.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory	**STATION LOCATION** **Long Jetty**	**MHL 2546** **Figure 153** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tuggerah Lake		Station name: Long Jetty	
AWRC No: 211418		BoM No: 561080	
MGA co-ordinates zone: 56		Easting: 358757	Northing: 6308079
Geographic co-ordinate system:		Latitude: -33.35724236	Longitude: 150.48194187
TRIM reference: FILE17/62745		LGA: Central Coast Council	Rainfall district:61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: September 1991		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM17151 Order of accuracy: L2 PM/SSM RL (mAHD): 6.637 Local BM description: Carved triangle benchmark Local BM location: Second pier from shore on right hand side of jetty		Local BM RL (mAHD): 1.136 Station datum: AHD Date of last survey: 31 October 2013 Surveyed by: Ben Cox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor - not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Floatwell on pile removed and new sensor installed in July 2010 on the jetty for easy access and safer maintenance.			
Peak flood of record (mAHD): 1.64	1% AEP (mAHD): 2.23	Instrumentation height (mAHD): 2.4	
Hydraulic characteristics: Very small tidal range.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The Tuggerah Lakes function as a large storage basin for floodwaters from the catchment regions, the gauge assists in flood monitoring and warning, and in the monitoring of tidal flushing and its impact on water quality.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 0.9m, Moderate 1.8m, Major 2.2m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 27 March 2019	

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Tumbi Umbi



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Tumbi Umbi

MHL 2546

Figure 154

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tumbi Umbi Creek		Station name: Tumbi Umbi	
AWRC No: 211419		BoM No: 561092	
MGA co-ordinates zone: 56		Easting: 355321	Northing: 6307480
Geographic co-ordinate system:		Latitude: -33.36218631	Longitude: 151.44492788
TRIM reference: FILE17/62743		LGA: Central Coast Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: April 1994		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM17799 Order of accuracy: L2 PM/SSM RL (mAHD): 7.056 Local BM description: Dynabolt in top of concrete culvert Local BM location: Culvert approx. 7m NNE of station cabinet		Local BM RL (mAHD): 3.581 Station datum: AHD Date of last survey: 9 February 2011 Surveyed by: Ben Cox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor - not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.26	1% AEP (mAHD): 3.96	Instrumentation height (mAHD): 4.5	
Hydraulic characteristics: Very small tidal range			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program to measure flood levels in Tumbi Umbi Creek.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 27 March 2019	

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STATION LOCATION
Manns Road

MHL 2546

Figure 155

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Narara Creek		Station name: Manns Road	
AWRC No: 211435		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 345890	Northing: 6302955
Geographic co-ordinate system:		Latitude: -33.40167305	Longitude: 151.34282127
TRIM reference: FILE17/62722		LGA: Central Coast Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: July 2014		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 119119 Order of accuracy: B2 PM/SSM RL (mAHD): 3.293 Local BM description: SS 119119 Local BM location: Survey marker on NW corner of Carrington St and Manns Rd, near station.		Local BM RL (mAHD): 3.293 Station datum: AHD Date of last survey: 01 February 2017 Surveyed by: Ben Cox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1996 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.630 MHWS: 0.389 MHW: 0.341 MHWN: 0.293 MSL: 0.093	0.034 0.031 0.030 0.030 0.031	MLWN: -0.108 MLW: -0.156 MLWS: -0.204 ISLW: -0.376 Tidal range (HHWSS – ISLW): 1.006	0.034 0.033 0.033 0.033 0.026
STATION CHARACTERISTICS			
General comments: A floatwell was installed in March 1996 and was replaced with a submersible pressure sensor in July 2014.			
Peak flood of record (mAHD): 3.51	1% AEP (mAHD): 4.75	Instrumentation height (mAHD): 4.7	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: Station installed under the Floodplain Management Program to monitor flood levels flowing into Brisbane Water.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Wamberal Lagoon



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Wamberal Lagoon

MHL 2546

Figure 156

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wamberal Lagoon		Station name: Wamberal Lagoon	
AWRC No: 212450		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 355526	Northing: 6300283
Geographic co-ordinate system:		Latitude: -33.42710549	Longitude: 151.44597588
TRIM reference: FILE17/62739		LGA: Central Coast Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Gas Purge		Secondary sensor type: NA	
Primary sensor installation date: July 1993		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM19277 Order of accuracy: L2 PM/SSM RL (mAHD): 4.398 Local BM description: 80NB pipe shroud with rod inside Local BM location: Pipe near station, approx. 3m SW of station cabinet, possibly buried		Local BM RL (mAHD): 2.487 Station datum: AHD Date of last survey: 15 January 2013 Surveyed by: Ben Cox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor - not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.97	1% AEP (mAHD): 3.1 (rainfall induced); 3.7 (ocean inundation at gauge)	Instrumentation height (mAHD): 3.5	
Hydraulic characteristics: ICOLL, entrance intermittently open.			
Purpose of installation and current functionality: Station installed as a part of the Estuary Program to monitor lagoon entrance/breakout behaviour.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Terrigal Bridge

0 250 500 750 1000 m

Map courtesy of Spatial Services 2017



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STATION LOCATION
Terrigal Bridge

MHL 2546

Figure 157

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Terrigal Lagoon		Station name: Terrigal Bridge	
AWRC No: 212455		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 355079	Northing: 6298683
Geographic co-ordinate system:		Latitude: -33.44147140	Longitude: 151.44091129
TRIM reference: FILE17/62730		LGA: Central Coast Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: June 1993		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM19302 Order of accuracy: L2 PM/SSM RL (mAHD): 2.528 Local BM description: Top of timber gauge post Local BM location: South east corner of top of timber gauge post		Local BM RL (mAHD): 2.282 Station datum: AHD Date of last survey: 16 January 2013 Surveyed by: Ben Cox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor – not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: In Feb 2010 the floatwell was removed and a submersible pressure transducer installed on the opposite bank for easy access and safer maintenance.			
Peak flood of record (mAHD): 2.15	1% AEP (mAHD): 2.9 (rainfall induced); 3.3 (ocean inundation at gauge)	Instrumentation height (mAHD): 3.4	
Hydraulic characteristics: ICOLL, entrance intermittently open.			
Purpose of installation and current functionality: Station installed as a part of the Estuary Program to monitor lagoon entrance/breakout behaviour.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Avoca Lagoon



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Avoca Lagoon

MHL 2546

Figure 158

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Avoca Lagoon		Station name: Avoca Lagoon	
AWRC No: 212452		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 354079	Northing: 6296162
Geographic co-ordinate system:		Latitude: -33.46406584	Longitude: 151.42974689
TRIM reference: FILE17/62726		LGA: Central Coast Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: June 1993		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM19407 Order of accuracy: L3 PM/SSM RL (mAHD): 4.384 Local BM description: Bolt in 80NB pipe Local BM location: Pipe concreted into ground approx. 1m SE of station.		Local BM RL (mAHD): 2.264 Station datum: AHD Date of last survey: 16 January 2013 Surveyed by: Ben Cox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor – not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: The floatwell on the bridge was removed and a submersible pressure transducer was installed in March 2012 on the river bank for easy access and safer maintenance.			
Peak flood of record (mAHD): 2.52	1% AEP (mAHD): 3.2	Instrumentation height (mAHD): 4.0	
Hydraulic characteristics: ICOLL, entrance intermittently open.			
Purpose of installation and current functionality: Station installed as a part of the Estuary Program to monitor lagoon entrance/breakout behaviour.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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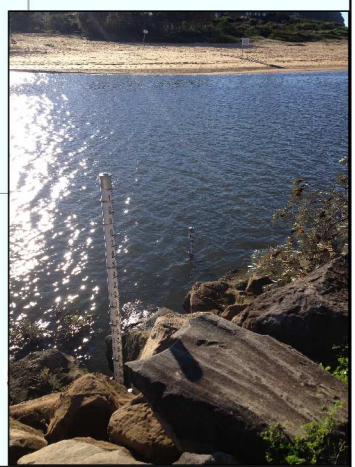
Cockrone Lake



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Cockrone Lake

MHL 2546

Figure 159

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Cockrone Lake		Station name: Cockrone Lake	
AWRC No: 212453		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 353841	Northing: 6292959
Geographic co-ordinate system:		Latitude: -33.49291250	Longitude: 151.42666456
TRIM reference: FILE17/62723		LGA: Central Coast Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: June 1993		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM104443 Order of accuracy: B2 PM/SSM RL (mAHD): 4.810 Local BM description: Bolt in 80NB pipe in bar next to sign Local BM location: Pipe concreted into ground next to eastern sign footing.		Local BM RL (mAHD): 2.879 Station datum: AHD Date of last survey: 16 November 2012 Surveyed by: Ben Cox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor – not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 3.14	1% AEP (mAHD): 3.8	Instrumentation height (mAHD): 4.4	
Hydraulic characteristics: ICOLL, entrance intermittently open.			
Purpose of installation and current functionality: Station installed as a part of the Estuary Program to monitor lagoon entrance/breakout behaviour.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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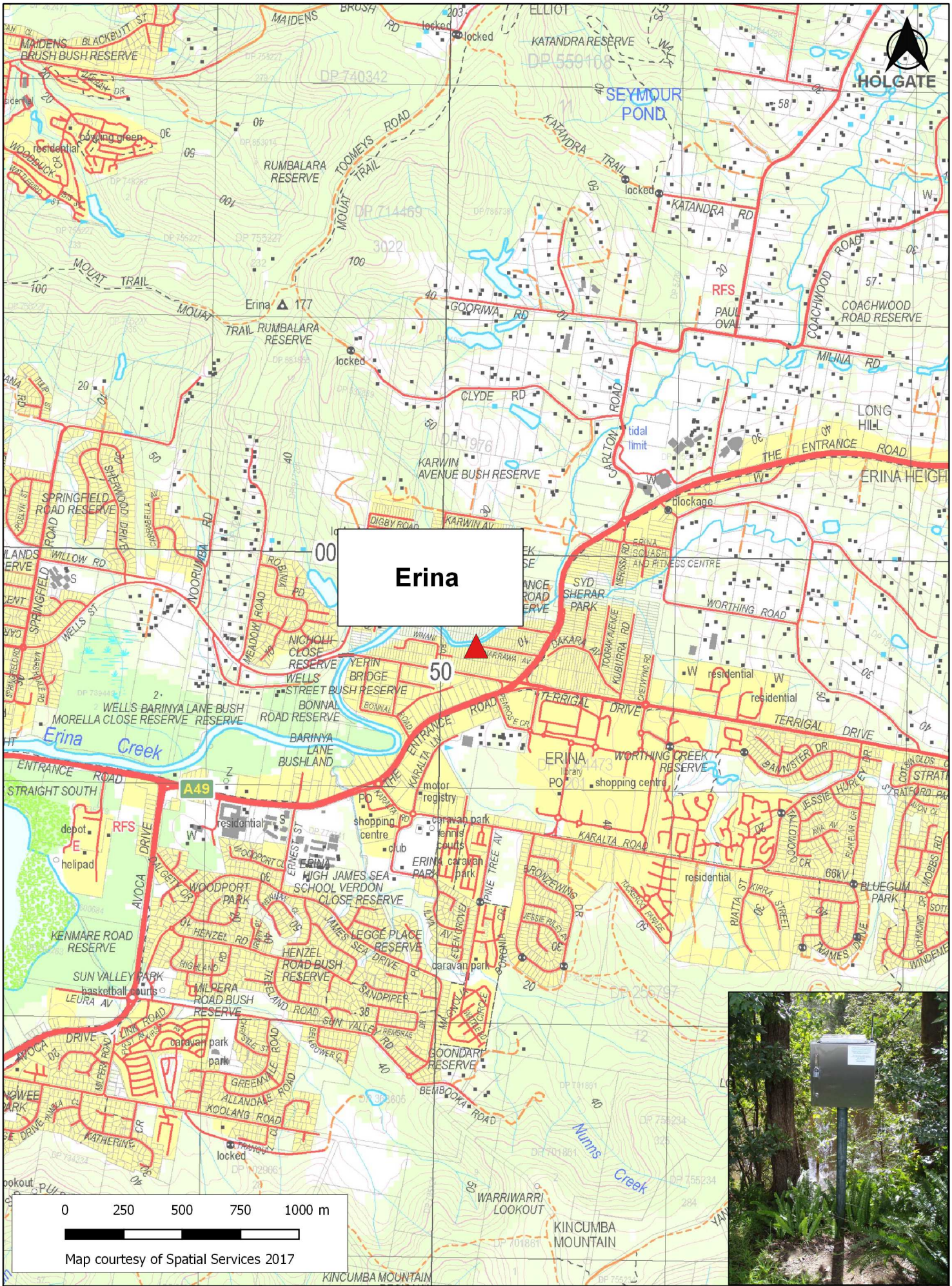

Manly Hydraulics Laboratory

STATION LOCATION
Erina

MHL 2546

Figure 160

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Erina Creek		Station name: Erina	
AWRC No: 212436		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 350150	Northing: 6299610
Geographic co-ordinate system:		Latitude: -33.43243549	Longitude: 151.38805671
TRIM reference: FILE17/62720		LGA: Central Coast Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: June 2007		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM79585 Order of accuracy: B2 PM/SSM RL (mAHD): 24.111 Local BM description: Bolt in 80NB pipe Local BM location: Pipe concreted into ground 2-3m SW of cabinet		Local BM RL (mAHD): 3.667 Station datum: AHD Date of last survey: 01 February 2017 Surveyed by: Ben Cox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor – not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.21	1% AEP (mAHD): 3.6	Instrumentation height (mAHD): 4.0	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, and has been relocated in June 2007 from Erina Bridge to ensure capture of low tides.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 27 March 2019	

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Punt Bridge



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Punt Bridge

MHL 2546

Figure 161

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Erina Creek		Station name: Punt Bridge	
AWRC No: 212433		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 347514	Northing: 6298928
Geographic co-ordinate system:		Latitude: -33.43821270	Longitude: 151.35959545
TRIM reference: FILE17/62718		LGA: Central Coast Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: Feb 2018		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM15093 Order of accuracy: L2 PM/SSM RL (mAHD): 4.946 Local BM description: SSM15093 Local BM location: NE corner of bridge in gap between road and footpath barriers		Local BM RL (mAHD): 4.946 Station datum: AHD Date of last survey: 06 June 2013 Surveyed by: Ben Cox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1994 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.647 MHWS: 0.402 MHW: 0.352 MHWN: 0.302 MSL: 0.091	0.036 0.034 0.034 0.033 0.035	MLWN: -0.120 MLW: -0.170 MLWS: -0.220 ISLW: -0.396 Tidal range (HHWSS – ISLW): 1.042	0.036 0.036 0.036 0.035 0.013
STATION CHARACTERISTICS			
General comments: A floatwell has been in this location since March 1994. The floatwell was decommissioned and replaced with a radar in Feb 2018.			
Peak flood of record (mAHD): 1.35	1% AEP (mAHD): 1.0 (rainfall induced); 3.7 (coastal inundation at gauge)	Instrumentation height (mAHD): 3.8	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: Station installed under the Floodplain Management Program to measure flood levels in Erina Creek that contributes to Brisbane Water.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Ettalong

MHL 2546

Figure 162

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Brisbane Waters		Station name: Ettalong	
AWRC No: 212423		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 346015	Northing: 6290156
Geographic co-ordinate system:		Latitude: -33.51708585	Longitude: 151.34196924
TRIM reference: FILE17/63055		LGA: Central Coast Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: April 1986		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM44729 Order of accuracy: B2 PM/SSM RL (mAHD): 3.760 Local BM description: SSM44729 Local BM location: South end of Schnapper Rd, approx. 80m from the intersection of Ocean View Rd and Schnapper Rd.		Local BM RL (mAHD): 3.760 Station datum: AHD Date of last survey: 1 November 2013 Surveyed by: Ben Cox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2006		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.794 MHWS: 0.512 MHW: 0.430 MHWN: 0.348 MSL: 0.066	0.055 0.053 0.052 0.052 0.052	MLWN: -0.217 MLW: -0.299 MLWS: -0.380 ISLW: -0.581 Tidal range (HHWSS – ISLW): 1.375	0.054 0.053 0.053 0.052 0.022
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.34	1% AEP (mAHD): 1.65 (coastal inundation)	Instrumentation height (mAHD): 3.0	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge records ocean tides and monitors the amplitude of ‘setup’ and ‘setdown’ incidences and their effect on industries such as oyster farming.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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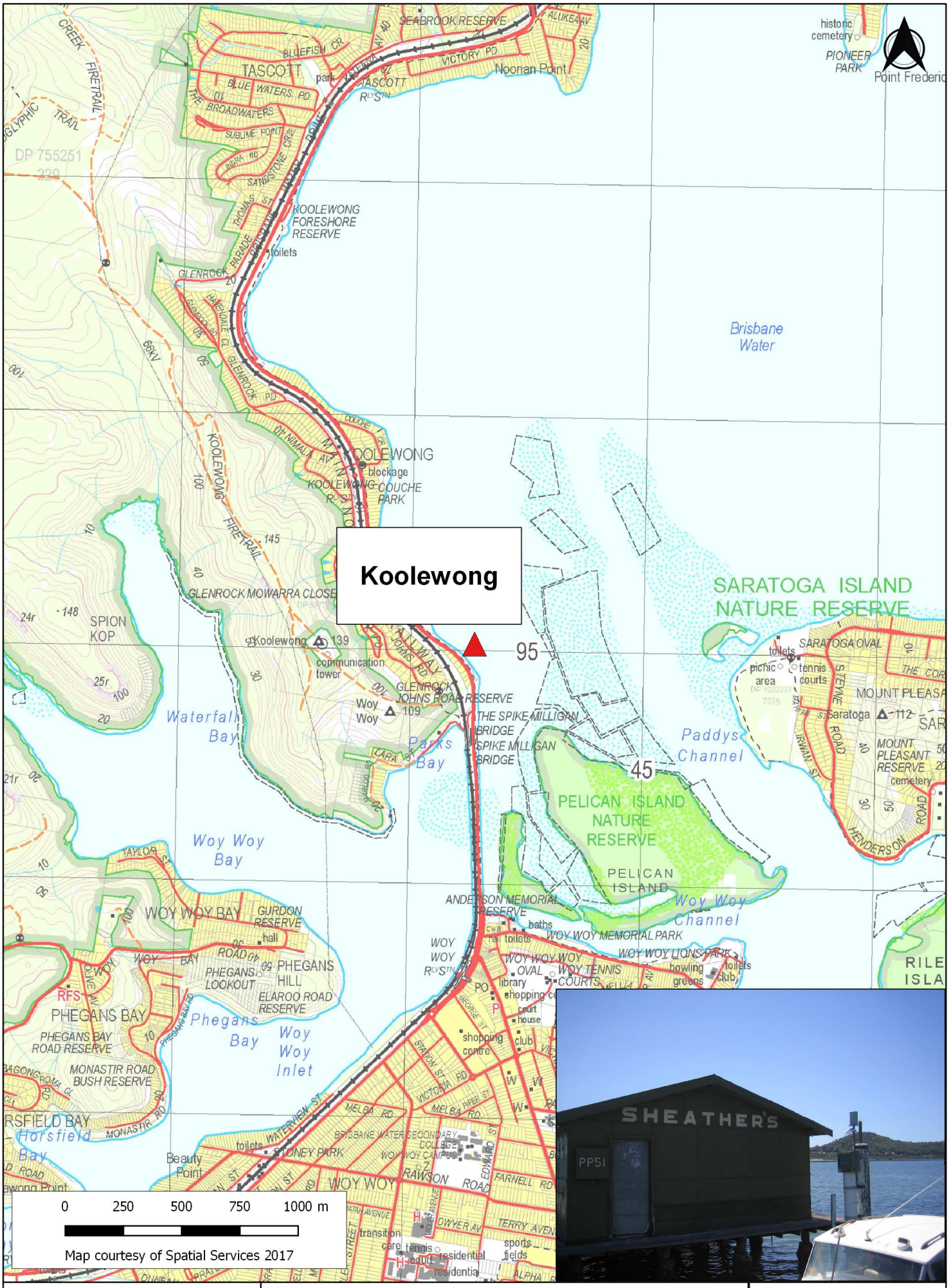

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Koolewong

MHL 2546

Figure 163

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Brisbane Waters		Station name: Koolewong	
AWRC No: 212422		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 344273	Northing: 6295029
Geographic co-ordinate system:		Latitude: -33.47289947	Longitude: 151.32406616
TRIM reference: Local office file FILE16/61087		LGA: Central Coast Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: NA	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: August 1985		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM8060 Order of accuracy: L2 PM/SSM RL (mAHD): 1.559 Local BM description: Bolt in rock Local BM location: Near station		Local BM RL (mAHD): 1.756 Station datum: AHD Date of last survey: 21 August 2008 Surveyed by: Brett Glover Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.637 MHWS: 0.392 MHW: 0.343 MHWN: 0.294 MSL: 0.084	0.035 0.033 0.033 0.033 0.034	MLWN: -0.126 MLW: -0.175 MLWS: -0.224 ISLW: -0.399 Tidal range (HHWSS – ISLW): 1.036	0.035 0.035 0.035 0.035 0.017
STATION CHARACTERISTICS			
General comments: Unable to access due to jetty damage observed on 19 Jul 2016, new station installed. Station decommissioned on 4 Nov 2016. Rain gauge station from May 2006 to November 2016. Floatwell replaced with submersible pressure transducer on Oct 2014.			
Peak flood of record (mAHD): 1.31	1% AEP (mAHD): 1.67 (coastal inundation)	Instrumentation height (mAHD): NA	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The Koolewong gauge installed under the Floodplain Management Program monitors tides and floods in Brisbane Water.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Decommissioned		Revision date: 17 September 2018	

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STATION LOCATION
Koolewong 2

MHL 2546

Figure 164

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Brisbane Waters		Station name: Koolewong 2	
AWRC No: 2124301		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 344294	Northing: 6294668
Geographic co-ordinate system:		Latitude: -33.47616111	Longitude: 151.32423334
TRIM reference: FILE17/63052		LGA: Central Coast Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: July 2016		Secondary sensor installation date: 24 October 2016	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: Instantaneous 15 minute	
SURVEY DETAILS			
PM/SSM reference: SSM70469 Order of accuracy: 2 PM/SSM RL (mAHD): 4.428 Local BM description: Bolt in concrete stand Local BM location: NE corner of base of pedestal below cabinet		Local BM RL (mAHD): 3.328 Station datum: AHD Date of last survey: 23 September 2016 Surveyed by: Ben Cox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good – not calculated due to limited record	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Installed 19 Jul 2016 to replace gauge 213422 which is no longer accessible. Rain gauge station was installed on July 2016.			
Peak flood of record (mAHD): 0.93	1% AEP (mAHD): 1.67 (coastal inundation)	Instrumentation height (mAHD): 5.3	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The Koolewong gauge installed under the Floodplain Management Program monitors tides and floods in Brisbane Water.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Patonga

MHL 2546

Figure 165

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hawkesbury River		Station name: Patonga	
AWRC No: 212440		BoM No: 561149	
MGA co-ordinates zone: 56		Easting: 339822	Northing: 6286295
Geographic co-ordinate system:		Latitude: -33.55098300	Longitude: 151.27461900
TRIM reference: FILE17/73866		LGA: Central Coast Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: June 1992		Secondary sensor installation date: March 2012	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: SSM 94488 Order of accuracy: 2 PM/SSM RL (mAHD): 1.694 Local BM description: SS94488 Local BM location: NW corner at start of jetty		Local BM RL (mAHD): 1.694 Station datum: AHD Date of last survey: 12 March 2013 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1992 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.020 MHWS: 0.683 MHW: 0.558 MHWN: 0.433 MSL: 0.047	0.033 0.033 0.033 0.033 0.034	MLWN: -0.339 MLW: -0.464 MLWS: -0.589 ISLW: -0.830 Tidal range (HHWSS – ISLW): 1.850	0.036 0.036 0.036 0.036 0.006
STATION CHARACTERISTICS			
General comments: Floatwell sensor until March 2013.			
Peak flood of record (mAHD): 1.40	1% AEP (mAHD): 2.0 (as shown on flood contour maps supplied by DLWC)	Instrumentation height (mAHD): 2.9	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, and is essentially monitoring ocean tides. The gauge has a significant role in monitoring the amplitude of setup and setdown incidences and their propagation upstream. River flooding is not a major issue at the entrance. This station has now been transferred to the ocean tide program and upgraded in 2013 to dual sensing.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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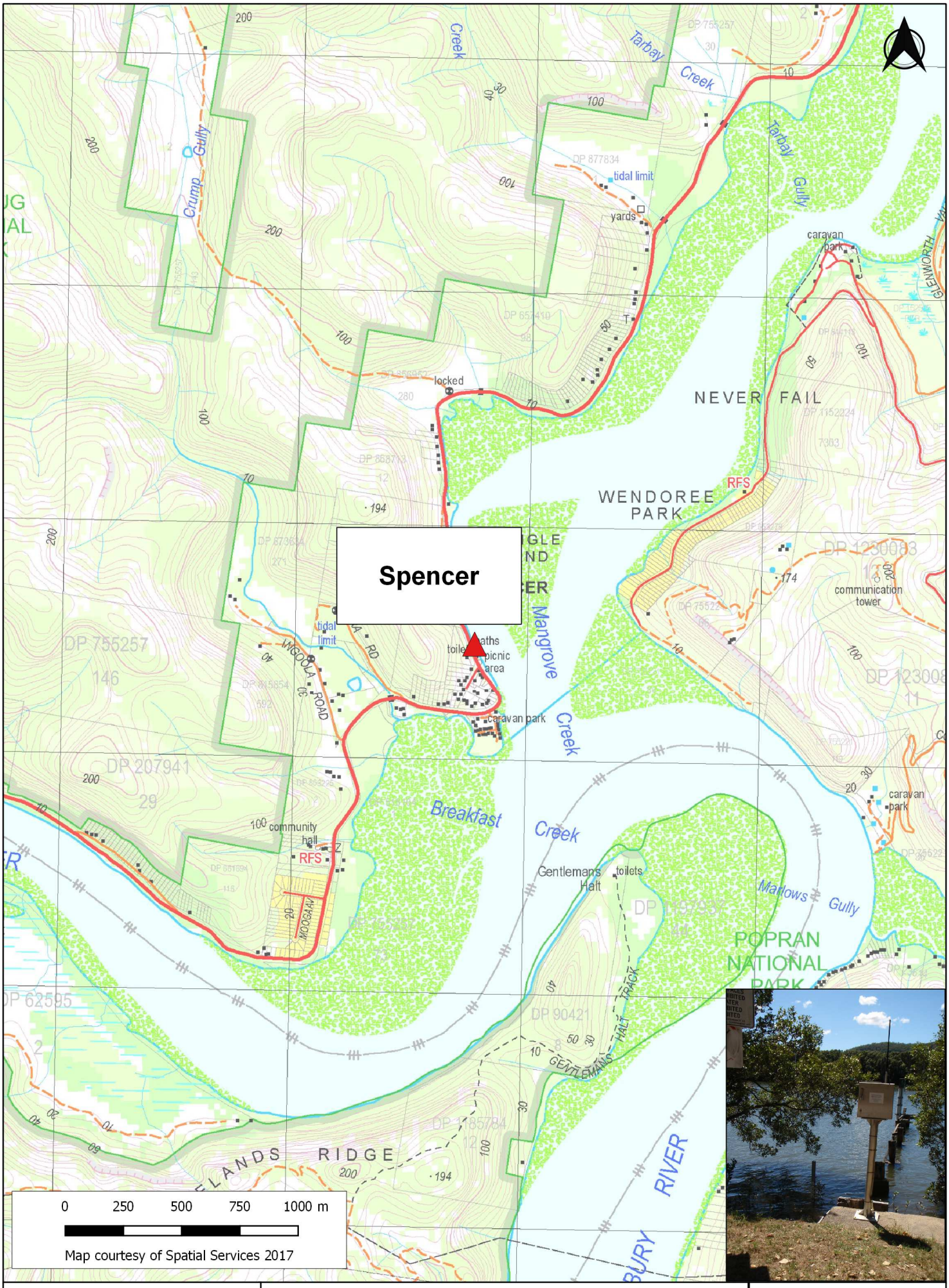

Manly Hydraulics Laboratory

STATION LOCATION
Spencer

MHL 2546

Figure 166

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hawkesbury River		Station name: Spencer	
AWRC No: 212431		BoM No: 561065	
MGA co-ordinates zone: 56		Easting: 327772	Northing: 6296497
Geographic co-ordinate system:		Latitude: -33.45713768	Longitude: 151.14684124
TRIM reference: FILE17/63049		LGA: Central Coast Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: April 1992		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM109300 Order of accuracy: L3 PM/SSM RL (mAHD): 1.270 Local BM description: Bolt at base of pedestal Local BM location: NW corner of instrumentation box pedestal		Local BM RL (mAHD): 1.423 Station datum: AHD Date of last survey: 12 October 2017 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1992 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.090 MHWS: 0.759 MHW: 0.635 MHWN: 0.511 MSL: 0.084	0.038 0.036 0.034 0.033 0.035	MLWN: -0.344 MLW: -0.468 MLWS: -0.592 ISLW: -0.828 Tidal range (HHWSS – ISLW): 1.919	0.036 0.035 0.034 0.033 0.014
STATION CHARACTERISTICS			
General comments: Floatwell on timber pile removed in September 2009 and new sensor installed on the river bank for easy access and safer maintenance.			
Peak flood of record (mAHD): 1.55	1% AEP (mAHD): 2.7	Instrumentation height (mAHD): 2.2	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge provides data for the calibration of a numerical model, although flooding is not an issue in this region of the Hawkesbury. The gauge is more valuable for monitoring tidal anomalies and reviewing the extent of damage caused by such storm/flood events.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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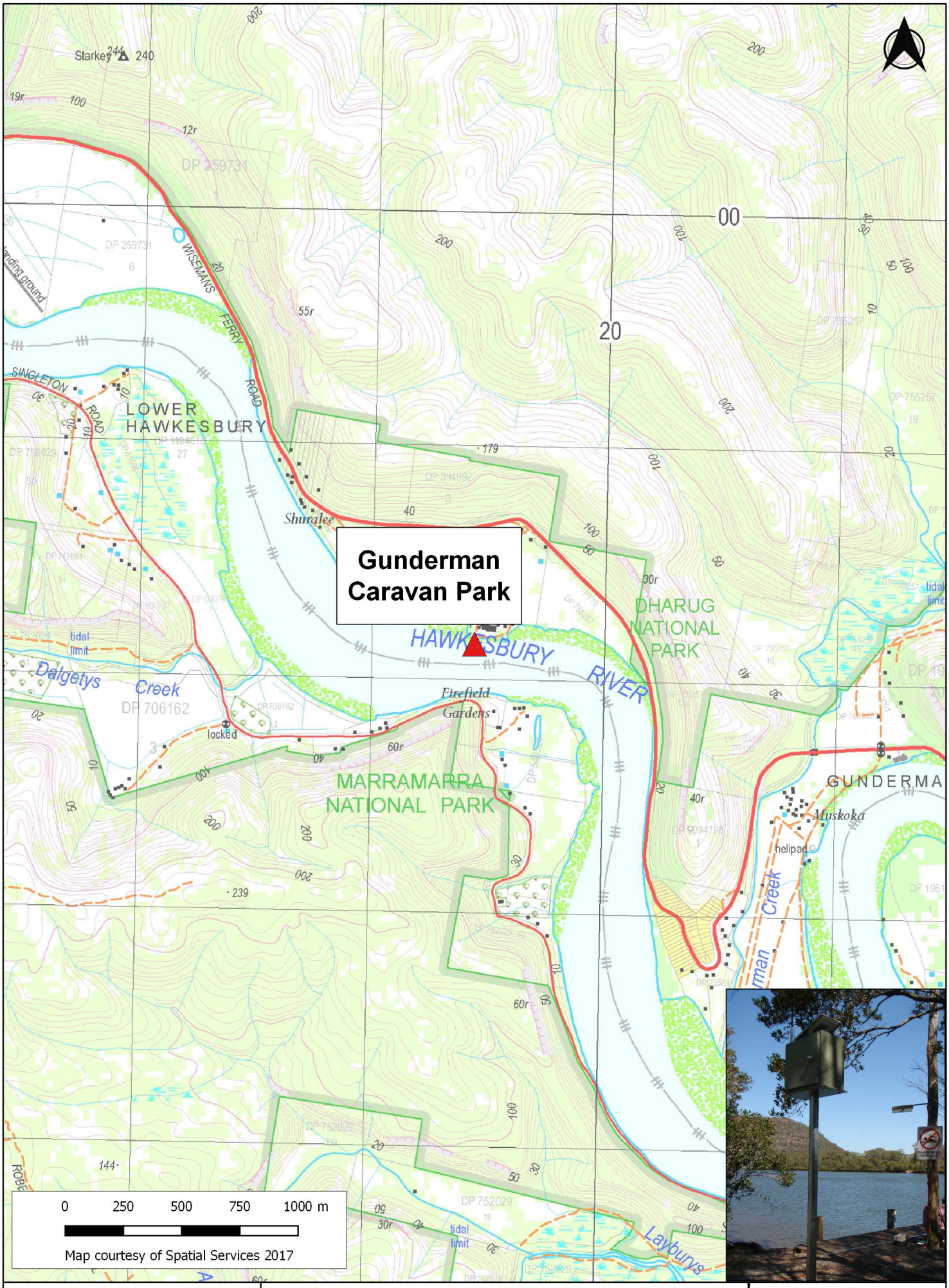

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STATION LOCATION
Gunderman Caravan Park

MHL 2546

Figure 167

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hawkesbury River		Station name: Gunderman Caravan Park	
AWRC No: 212429		BoM No: 561076	
MGA co-ordinates zone: 56		Easting: 319440	Northing: 6298151
Geographic co-ordinate system:		Latitude: -33.44085545	Longitude: 151.05756601
TRIM reference: FILE17/63047		LGA: Central Coast Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: April 1992		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 9		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM130597 Order of accuracy: U/U PM/SSM RL (mAHD): 1.016 Local BM description: SSM130597 Local BM location: SSM 130597 located on boat ramp 5m near 0 to 1m gauge post.		Local BM RL (mAHD): 1.016 Station datum: AHD Date of last survey: 12 October 2017 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1992 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.161 MHWS: 0.830 MHW: 0.702 MHWN: 0.575 MSL: 0.114	0.040 0.038 0.036 0.035 0.033	MLWN: -0.348 MLW: -0.476 MLWS: -0.603 ISLW: -0.839 Tidal range (HHWSS – ISLW): 2.000	0.032 0.030 0.030 0.029 0.023
STATION CHARACTERISTICS			
General comments: Nov-2013 Access Wharf to floatwell damaged and new sensor moved to bank. Reference survey mark surveyed in by Public Works Survey Branch however order of accuracy is not uploaded to SCIMS.			
Peak flood of record (mAHD): 1.71	1% AEP (mAHD): 5.2	Instrumentation height (mAHD): 2.8	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program and is used to monitor flooding in the Hawkesbury River.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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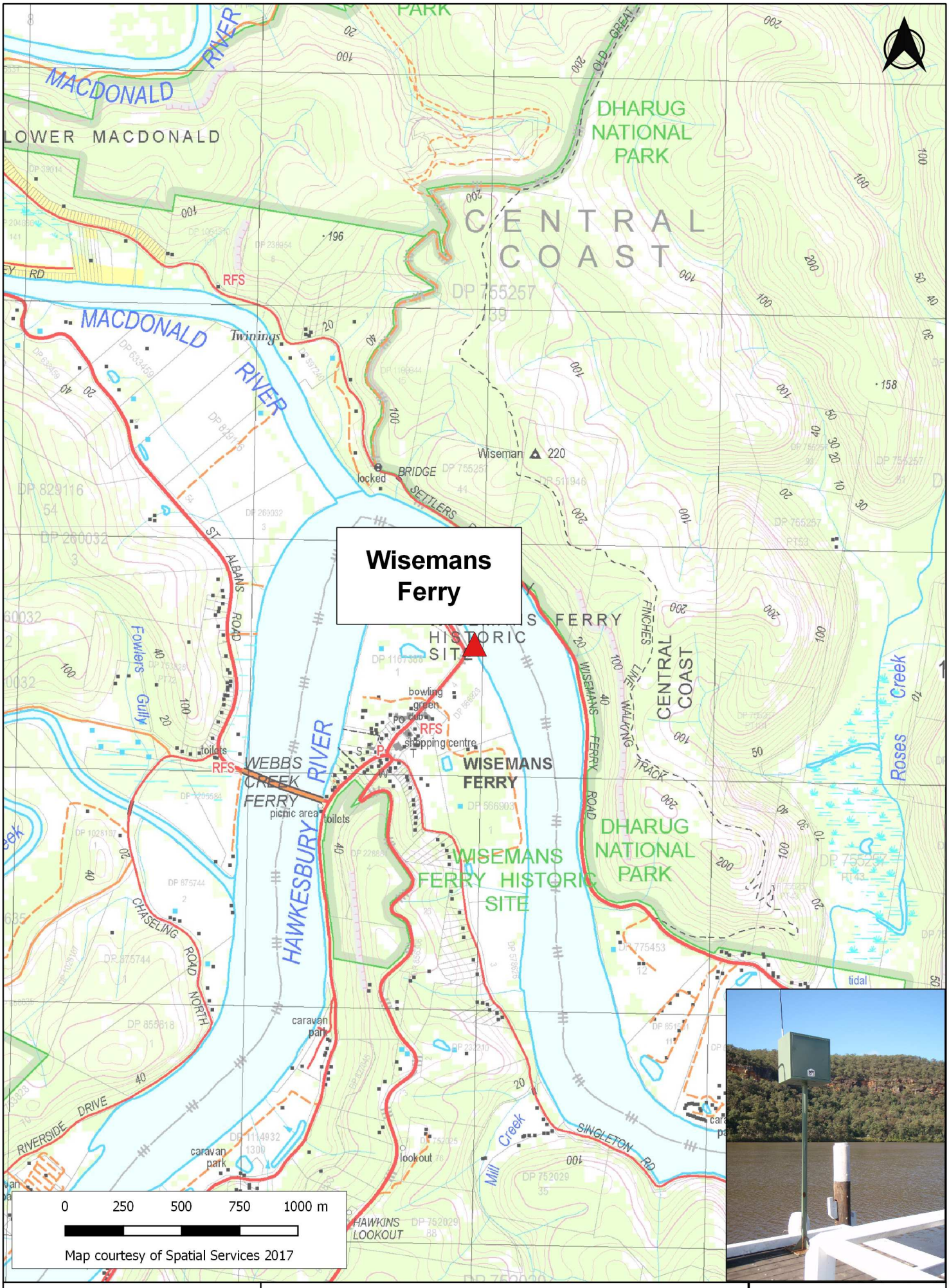

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STATION LOCATION
Wisemans Ferry

MHL 2546

Figure 168

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hawkesbury River		Station name: Wisemans Ferry	
AWRC No: 212460		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 312963	Northing: 6304569
Geographic co-ordinate system:		Latitude: -33.38189150	Longitude: 150.98925835
TRIM reference: FILE17/63046		LGA: Hornsby Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: June 2010		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM47545 Order of accuracy: L3 PM/SSM RL (mAHD): 2.021 Local BM description: Triangle cut into concrete. Local BM location: Concrete on the corner of station slab, southern side at start of wharf.		Local BM RL (mAHD): 1.927 Station datum: AHD Date of last survey: 12 October 2017 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good – not calculated as this station did not form part of the OEH contract during the tidal planes analysis period.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: SLS refers to the Webbs Creek station (212408) as Wisemans Ferry. This station was recommissioned in 2017 and has not yet been assigned a BoM number. Wiseman Ferry was a WaterNSW owned station between July 2010 and July 2017.			
Peak flood of record (mAHD): 1.92	1% AEP (mAHD): 7.02	Instrumentation height (mAHD): 6.2	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program and is used to monitor flooding in the Hawkesbury River. This station was formerly owned by WaterNSW for the Water Sharing Plan. Ownership of this station was transferred to OEH in July 2017. This level gauge assists with HADCP monitoring on site.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Webbs Creek

MHL 2546
Figure 169
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hawkesbury River		Station name: Webbs Creek	
AWRC No: 212408		BoM No: 561004	
MGA co-ordinates zone: 56		Easting: 312331	Northing: 6303939
Geographic co-ordinate system:		Latitude: -33.38746021	Longitude: 150.98233647
TRIM reference: FILE17/63044		LGA: Hornsby Shire Council	Rainfall district: 61
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: June 1981		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM32886 Order of accuracy: L1 PM/SSM RL (mAHD): 26.212 Local BM description: Brass triangle in concrete. Local BM location: PWD936 near station.		Local BM RL (mAHD): 5.738 Station datum: AHD Date of last survey: 13 October 2017 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.217 MHWS: 0.887 MHW: 0.760 MHWN: 0.632 MSL: 0.156	0.043 0.041 0.040 0.036 0.036	MLWN: -0.322 MLW: -0.450 MLWS: -0.576 ISLW: -0.812 Tidal range (HHWSS – ISLW): 2.029	0.039 0.038 0.036 0.035 0.030
STATION CHARACTERISTICS			
General comments: The Service Level Specification refers to this station as Wisemans Ferry. Wisemans Ferry is a different station formerly owned by WaterNSW (formerly Office of Water) for the Water Sharing Program and then transferred to OEH in July 2017. This station also has a rain gauge. The SLS refers to Wisemans Ferry for the water level and the rainfall but it should be Webbs Creek. Both should refer to Webbs Creek and not Wisemans Ferry, as it is in the SLS. The rain gauge was installed in July 1999.			
Peak flood of record (mAHD): 4.30	1% AEP (mAHD): 7.11	Instrumentation height (mAHD): 6.7	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge is used for real time flood monitoring, and data captured assists in the development and verification of a numerical model for the Hawkesbury River.			
Station shown on BoM website: MHL data for this station is displayed using the name Wisemans Ferry on BoM webpage. ERTS equipment is connected to MHL's gas line and is owned by Hornsby Shire Council.			
SES flood classification: Minor NA, Moderate 3.5m, Major 4.2m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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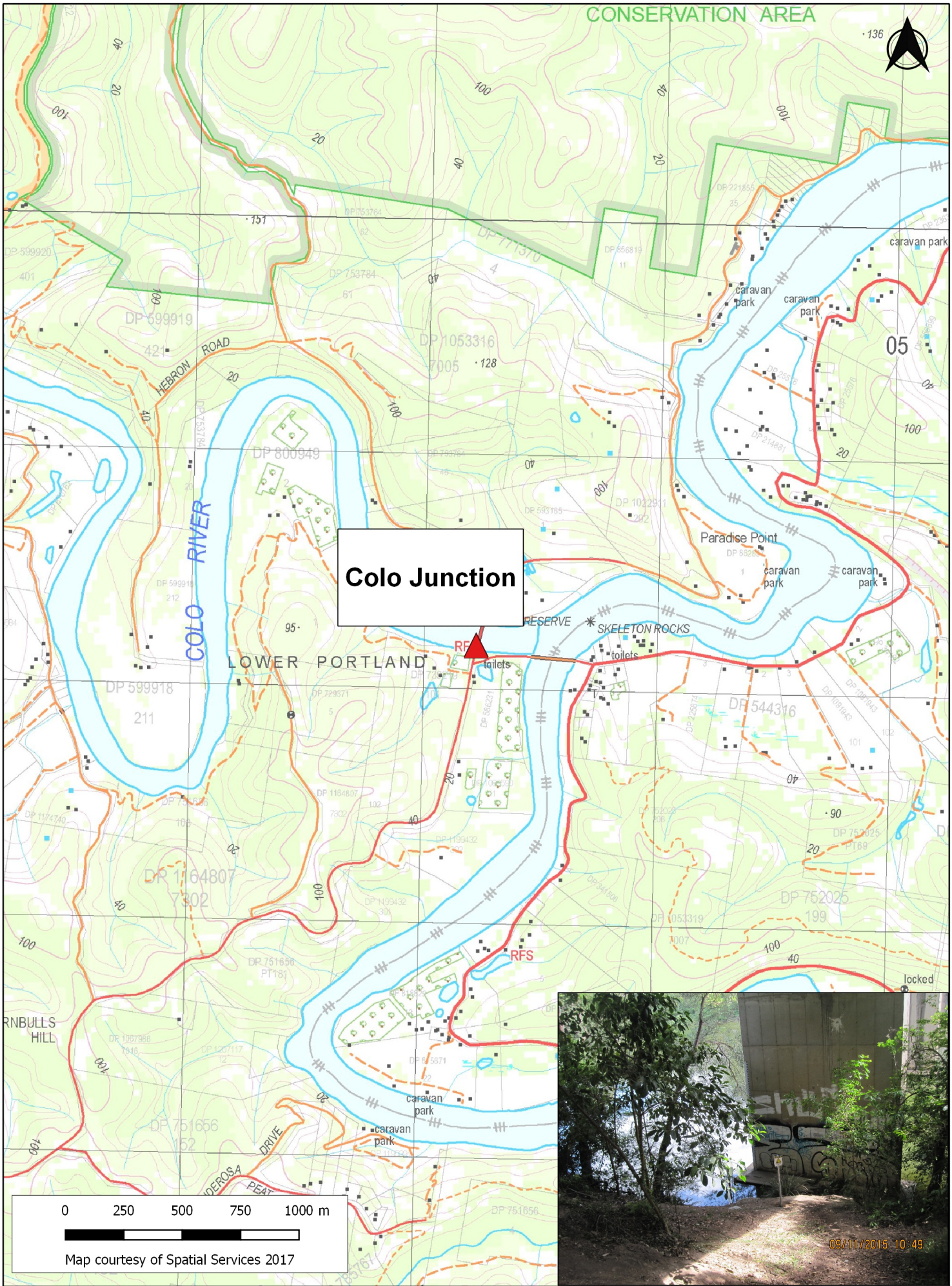

Manly Hydraulics Laboratory

STATION LOCATION
Colo Junction

MHL 2546

Figure 170

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Colo River		Station name: Colo Junction	
AWRC No: 212407		BoM No: 067094	
MGA co-ordinates zone: 56		Easting: 303223	Northing: 6298183
Geographic co-ordinate system:		Latitude: -33.43771231	Longitude: 150.88321274
TRIM reference: FILE17/73116		LGA: Hawkesbury City Council	Rainfall district: 67
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: PSTN LL (land line)	
Primary sensor type: Gas purge		Secondary sensor type: Radar	
Primary sensor installation date: May 1998		Secondary sensor installation date: August 2018	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): 20	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM32892 Order of accuracy: L1 PM/SSM RL (mAHD): 10.792 Local BM description: Nail in triangle in power pole. Local BM location: Power pole attached to RFS building at entrance to station.		Local BM RL (mAHD): 8.948 Station datum: AHD Date of last survey: 18 March 2011 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1998 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.228 MHWS: 0.917 MHW: 0.803 MHWN: 0.689 MSL: 0.236	0.048 0.045 0.044 0.043 0.042	MLWN: -0.217 MLW: -0.331 MLWS: -0.445 ISLW: -0.668 Tidal range (HHWSS – ISLW): 1.896	0.042 0.041 0.041 0.040 0.026
STATION CHARACTERISTICS			
General comments: Rain gauge station since July 1999. Conductivity and temperature sensors were installed from Nov 2009 to Aug 2013 under a program funded by WaterNSW (formerly NSW Office of Water) for the Water Sharing Plan. A radar station has been installed at Lower Portland Bridge and is being run in conjunction with the gas purge station to eventually replace the latter. The gas purge station presents a WHS risk when entering the water for maintenance.			
Peak flood of record (mAHD): 2.63	1% AEP (mAHD): 11.08	Instrumentation height (mAHD): 8.9	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program and monitors flood levels at the junction of the Colo and Hawkesbury rivers.			
Station shown on BoM website: MHL sensor data is displayed using the name Lower Portland on BoM webpage. There is ERTS equipment at this station that is connected to MHL's gas line, the ERTS equipment is owned by Hawkesbury City Council.			
SES flood classification: Minor 4.6m, Moderate 6.1m, Major 7.6m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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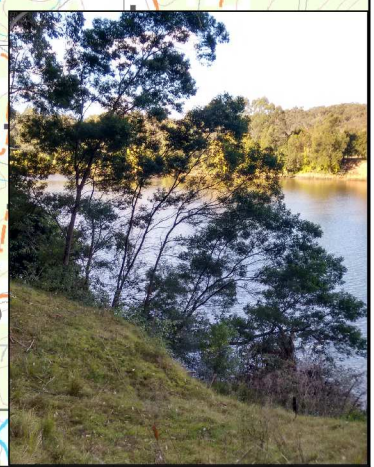
Sackville Upstream



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Sackville Upstream

MHL 2546

Figure 171

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hawkesbury River		Station name: Sackville Upstream	
AWRC No: 212465		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 303625	Northing: 6292550
Geographic co-ordinate system:		Latitude: -33.48856000	Longitude: 150.88630000
TRIM reference: FILE17/63041		LGA: The Hills Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: NA	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: July 1991		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PWD 935 Order of accuracy: U/U PM/SSM RL (mAHD): 7.285 Local BM description: Dynabolt in triangle in concrete. Local BM location: PWD935 Near station.		Local BM RL (mAHD): 7.285 Station datum: AHD Date of last survey: 22 March 2011 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good – not calculated due to large sections of missing data	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Decommissioned 26 Aug 2011, bank subsidence made it unsafe to read the gauge plate. Survey of station undertaken from Sackville reference benchmark.			
Peak flood of record (mAHD): 2.19	1% AEP (mAHD): 13.65	Instrumentation height (mAHD): NA	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This locality historically had been monitored by 3 separate stations (Sackville US 212465, Sackville 212406 and Sackville DS 212438) whose primary function was to measure water levels from which flood gradient and discharges were derived. Flood flows are of primary importance to the development and verification of numerical models. Sackville US 212465 and Sackville DS 212438 was decommissioned in Aug 2011 and August 2012 respectively.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Decommissioned		Revision date: 17 September 2018	

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Sackville



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Sackville

MHL 2546

Figure 172

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hawkesbury River		Station name: Sackville	
AWRC No: 212406		BoM No: 063280	
MGA co-ordinates zone: 56		Easting: 303203	Northing: 6292012
Geographic co-ordinate system:		Latitude: -33.49333109	Longitude: 150.88164450
TRIM reference: FILE17/63038		LGA: The Hills Shire Council	Rainfall district: 63
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: May 1980		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PWD 935 Order of accuracy: U/U PM/SSM RL (mAHD): 7.285 Local BM description: Dynabolt in triangle in concrete. Local BM location: PWD935 Near station.		Local BM RL (mAHD): 7.285 Station datum: AHD Date of last survey: 22 March 2011 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.062 MHWS: 0.794 MHW: 0.708 MHWN: 0.622 MSL: 0.246	0.056 0.048 0.043 0.039 0.033	MLWN: -0.129 MLW: -0.215 MLWS: -0.301 ISLW: -0.493 Tidal range (HHWSS – ISLW): 1.555	0.028 0.025 0.023 0.022 0.051
STATION CHARACTERISTICS			
General comments: Council owned ERTS is located at this station. Reference survey mark historically established by Public Works Survey Branch however the order of accuracy was not uploaded on SCIMS.			
Peak flood of record (mAHD): 9.98	1% AEP (mAHD): 13.50	Instrumentation height (mAHD): 11.2	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This locality historically had been monitored by 3 separate stations (Sackville US 212465, Sackville 212406 and Sackville DS 212438) whose primary function was to measure water levels from which flood gradient and discharges were derived. Flood flows are of primary importance to the development and verification of numerical models. Sackville US 212465 and Sackville DS 212438 was decommissioned in Aug 2011 and August 2012 respectively. Conductivity and temperature sensors were installed in Oct 2009 under a program funded by the WaterNSW (Office of Water) for a Water Sharing Plan.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 4.6m, Moderate 7.3m, Major 9.7m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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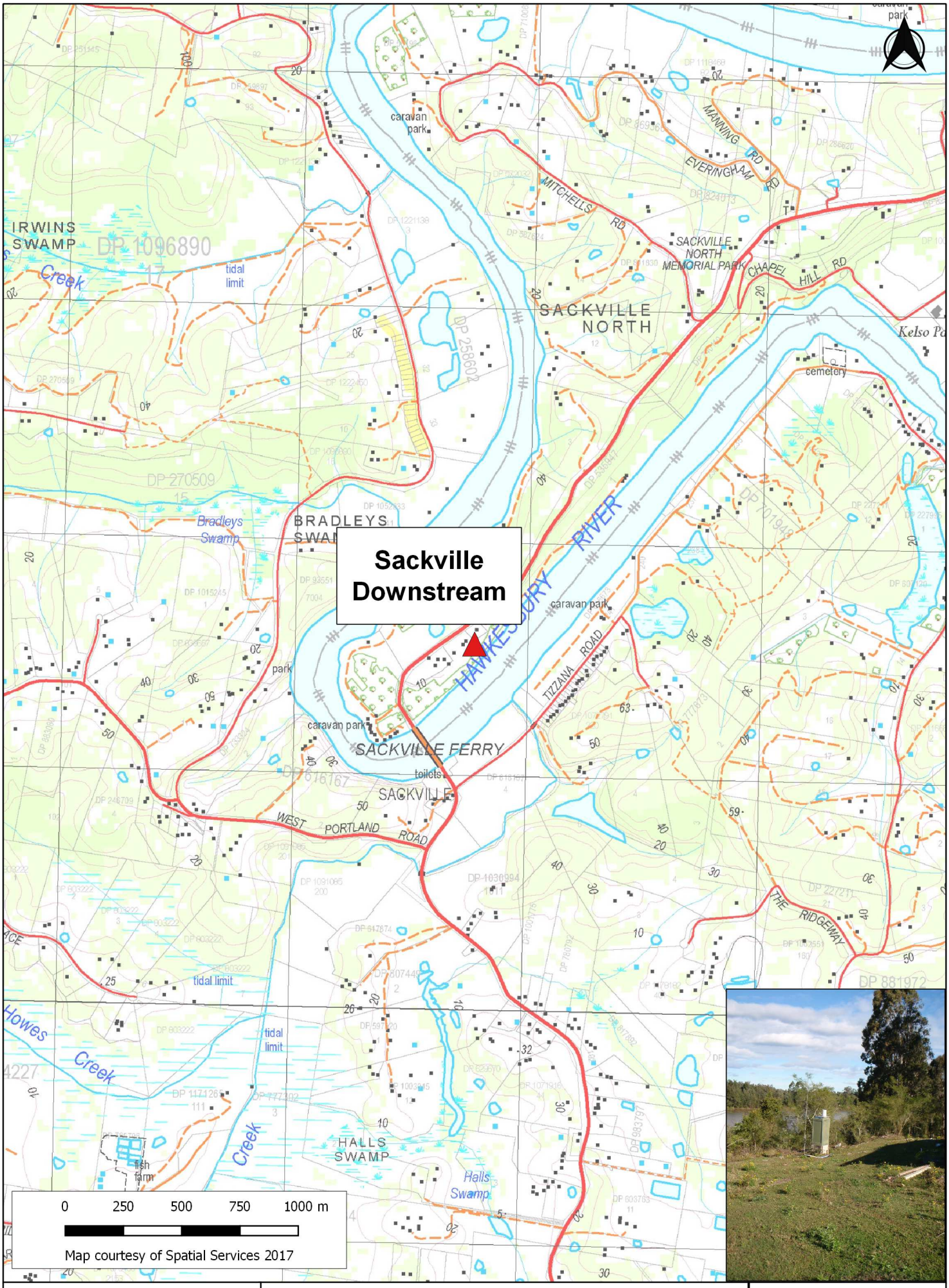

NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Sackville Downstream**	**MHL 2546** **Figure 173** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hawkesbury River		Station name: Sackville Downstream	
AWRC No: 212438		BoM No: 567068 refers to rainfall station	
MGA co-ordinates zone: 56		Easting: 302769	Northing: 6291566
Geographic co-ordinate system:		Latitude: -33.49727115	Longitude: 150.87687748
TRIM reference: FILE17/63036		LGA: The Hills Council	Rainfall district: 67
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dialup - CSD)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: July 1991		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PWD 935 Order of accuracy: U/U PM/SSM RL (mAHD): 7.285 Local BM description: Dynabolt in triangle in concrete. Local BM location: PWD935 Near station.		Local BM RL (mAHD): 15.526 Station datum: AHD Date of last survey: 23 October 2003 Surveyed by: Brett Glover Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good – not calculated – refer to 212406 Sackville tidal planes results.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Water level decommissioned in August 2012, this station is currently rainfall only. Rain gauge was installed in June 1999 and has Council owned ERTS. Survey of station undertaken from Sackville reference benchmark.			
Peak flood of record (mAHD): 7.30	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): NA	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This locality historically had been monitored by 3 separate stations (Sackville US 212465, Sackville 212406 and Sackville DS 212438) whose primary function was to measure water levels from which flood gradient and discharges were derived. Flood flows are of primary importance to the development and verification of numerical models. Sackville US 212465 and Sackville DS 212438 was decommissioned in Aug 2011 and August 2012 respectively.			
Station shown on BoM website: MHL data for this station is not displayed. Rainfall is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes (rainfall only)		BoM priority: High priority rainfall	
Station recommendations: Decommissioned		Revision date: 17 September 2018	

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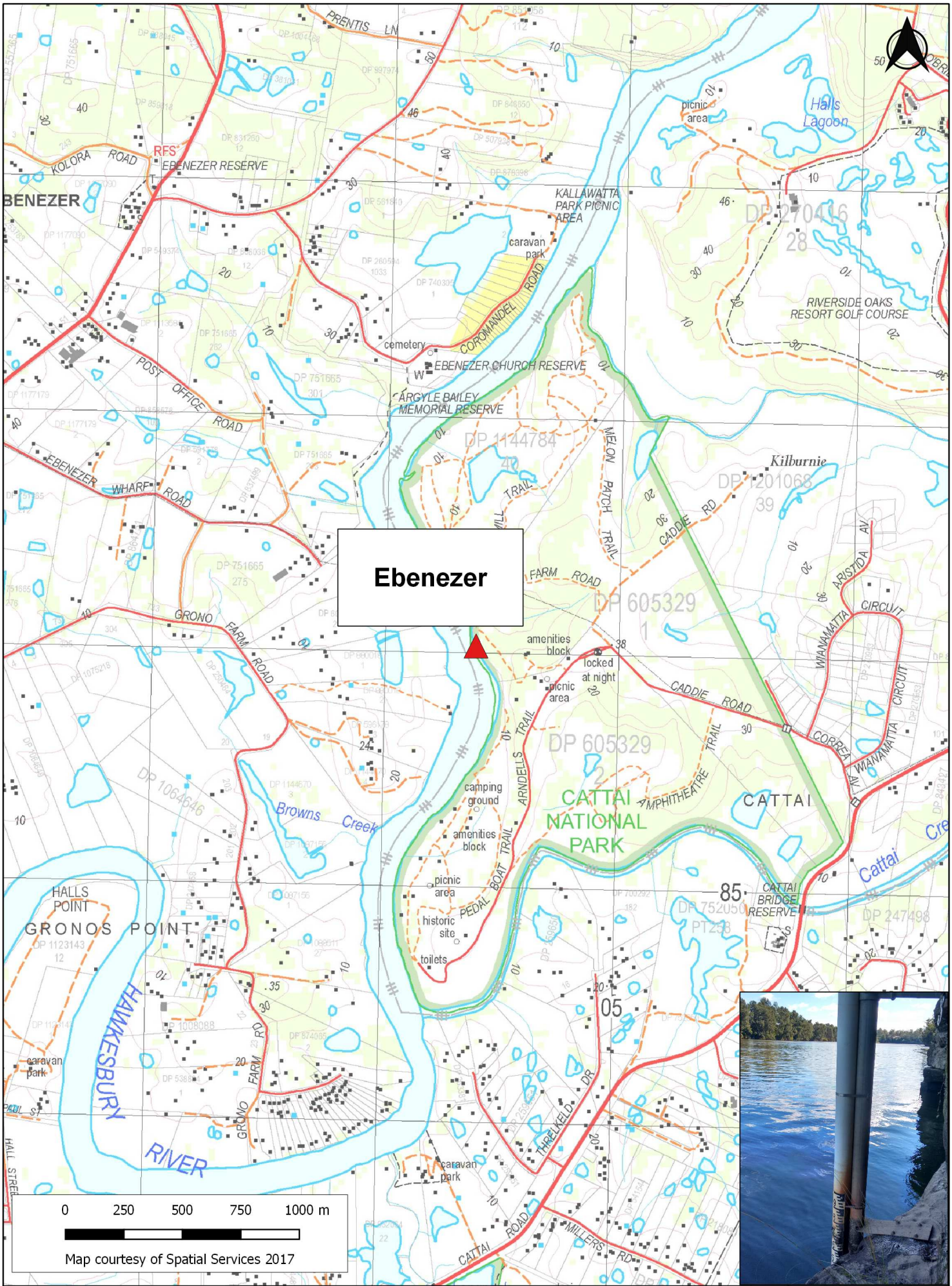

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Ebenezer

MHL 2546

Figure 174

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hawkesbury		Station name: Ebenezer	
AWRC No: 212427		BoM No: 563010	
MGA co-ordinates zone: 56		Easting: 304388	Northing: 6286030
Geographic co-ordinate system:		Latitude: -33.54746726	Longitude: 150.89308507
TRIM reference: FILE17/63035		LGA: The Hills Shire Council	Rainfall district:63
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: December 1989		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 12722 Order of accuracy: L3 PM/SSM RL (mAHD): 15.312 Local BM description: Screw in rock. Local BM location: 10 m SW of instrumentation box.		Local BM RL (mAHD): 0.635 Station datum: AHD Date of last survey: 12 November 2006 Surveyed by: Brett Glover Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1995 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.935 MHWS: 0.701 MHW: 0.638 MHWN: 0.576 MSL: 0.270	0.053 0.047 0.044 0.040 0.034	MLWN: -0.037 MLW: -0.099 MLWS: -0.162 ISLW: -0.329 Tidal range (HHWSS – ISLW): 1.264	0.031 0.028 0.025 0.026 0.044
STATION CHARACTERISTICS			
General comments: Reference survey mark surveyed in by Public Works Survey Branch however the order of accuracy was not uploaded to SCIMS.			
Peak flood of record (mAHD): 9.54	1% AEP (mAHD): 16.62	Instrumentation height (mAHD): 18.8	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. This gauge is located downstream of the extensive floodplains of the Richmond-Windsor area, drainage of the floodplain is monitored by this gauge in combination with the upstream gauges. Data captured enhances the development and verification of the numerical model and assist in the review of flood damage.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Windsor

MHL 2546

Figure 175

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hawkesbury River		Station name: Windsor	
AWRC No: 212426		BoM No: 567044	
MGA co-ordinates zone: 56		Easting: 297588	Northing: 6279514
Geographic co-ordinate system:		Latitude: -33.60492817	Longitude: 150.81841089
TRIM reference: FILE17/63022		LGA: Hawkesbury City Council	Rainfall district:67
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: September 1987		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM1455 Order of accuracy: L1 PM/SSM RL (mAHD): 20.365 Local BM description: Triangle set in concrete. Local BM location: At edge of concrete platform near river bank 2m SE of instrumentation box.		Local BM RL (mAHD): 7.228 Station datum: AHD Date of last survey: 23 March 2011 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1995 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.927 MHWS: 0.707 MHW: 0.652 MHWN: 0.598 MSL: 0.300	0.050 0.044 0.042 0.039 0.036	MLWN: 0.004 MLW: -0.051 MLWS: -0.106 ISLW: -0.263 Tidal range (HHWSS – ISLW): 1.190	0.035 0.034 0.034 0.035 0.048
STATION CHARACTERISTICS			
General comments: WaterNSW has a duplicate station in the same cabinet. ERTS is connected to MHL's sensor and this equipment is owned by Hawkesbury City Council.			
Peak flood of record (mAHD): 13.46	1% AEP (mAHD): 17.33	Instrumentation height (mAHD): 18.0	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program to provide flood warning, monitor the river hydrodynamics, and assist in the review of flood damage between Richmond and Windsor.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

NSW GOVERNMENT

STATION LOCATION
Freemans Reach

MHL 2546
Figure 176
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hawkesbury River		Station name: Freemans Reach	
AWRC No: 212410		BoM No: 563011	
MGA co-ordinates zone: 56		Easting: 294009	Northing: 6283328
Geographic co-ordinate system:		Latitude: -33.56986748	Longitude: 150.78074230
TRIM reference: FILE17/63031		LGA: Hawkesbury City Council	Rainfall district: 63
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: April 1980		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 45523 Order of accuracy: L2 PM/SSM RL (mAHD): 51.538 Local BM description: Triangle cut into concrete. Local BM location: Concrete floor of station shed		Local BM RL (mAHD): 19.595 Station datum: AHD Date of last survey: 28 August 2003 Surveyed by: David Griffin Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.701 MHWS: 0.559 MHW: 0.534 MHWN: 0.508 MSL: 0.401	0.067 0.058 0.056 0.055 0.057	MLWN: 0.293 MLW: 0.268 MLWS: 0.242 ISLW: 0.141 Tidal range (HHWSS – ISLW):0.559	0.062 0.062 0.063 0.065 0.067
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 12.97	1% AEP (mAHD): 17.35	Instrumentation height (mAHD): 24.2	
Hydraulic characteristics: Tidal, shallow water influence on harmonic constituents.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program and monitors the river hydrodynamics and assists in the review of flood damage between Richmond and Windsor.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification:			
Data used for BoM flood forecasting: Yes		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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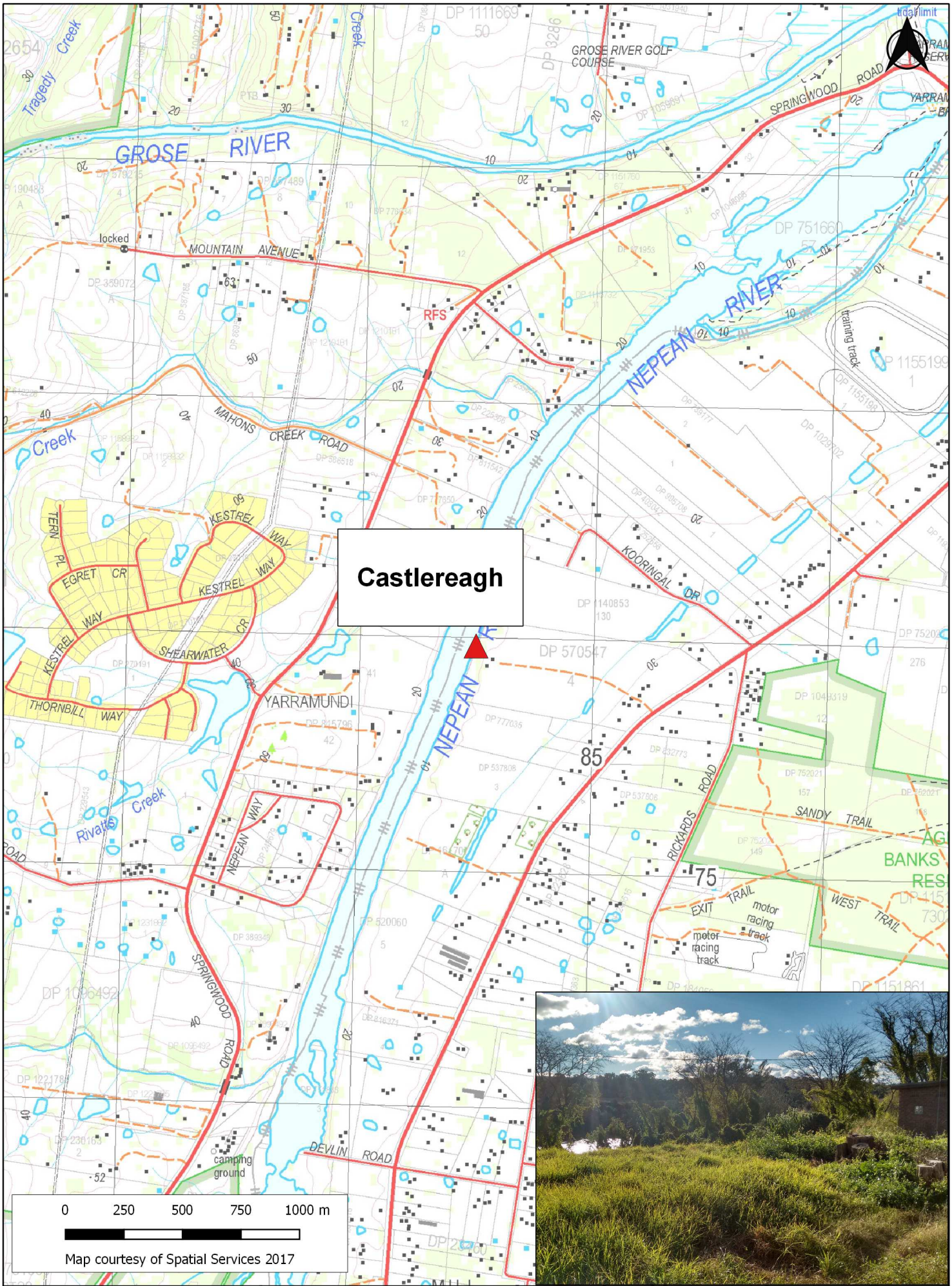

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Castlereagh

MHL 2546
Figure 177
Scale 1:25,000

UTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hawkesbury River		Station name: Castlereagh	
AWRC No: 212404		BoM No: 567045	
MGA co-ordinates zone: 56		Easting: 284495	Northing: 6275964
Geographic co-ordinate system:		Latitude: -33.63435259	Longitude: 150.67653429
TRIM reference: FILE17/67413		LGA: Penrith City Council	Rainfall district: 67
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: November 1981		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 516 Order of accuracy: L1 PM/SSM RL (mAHD): 31.530 Local BM description: PWD 933 Local BM location: near station		Local BM RL (mAHD): 18.469 Station datum: AHD Date of last survey: 10 January 2009 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 14.74	1% AEP (mAHD): 18.45	Instrumentation height (mAHD): 19.4	
Hydraulic characteristics: Non-tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge is used for monitoring the freshwater flows into the river system beyond the tidal reaches and for early flood-warning.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Narrabeen Caravan Park

0 250 500 750 1000 m

Map courtesy of Spatial Services 2017



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STATION LOCATION
Narrabeen Caravan Park

MHL 2546

Figure 178

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Narrabeen Lagoon		Station name: Narrabeen Caravan Park	
AWRC No: 213408		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 342673	Northing: 6269533
Geographic co-ordinate system:		Latitude: -33.70253100	Longitude: 151.30235100
TRIM reference: FILE17/63094		LGA: Northern Beaches Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: August 1994		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 24635 Order of accuracy: L3 PM/SSM RL (mAHD): 1.732 Local BM description: White mark. Local BM location: NW corner of instrumentation box.		Local BM RL (mAHD): 3.440 Station datum: AHD Date of last survey: 09 May 2017 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor - not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Decommissioned on 11 May 2017, replaced by Ocean Street Bridge station.			
Peak flood of record (mAHD): 2.09	1% AEP (mAHD): NA	Instrumentation height (mAHD): NA	
Hydraulic characteristics: ICOLL, entrance intermittently open.			
Purpose of installation and current functionality: Station was maintained by MHL for the Northern Beaches Council.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Decommissioned		Revision date: 17 September 2018	

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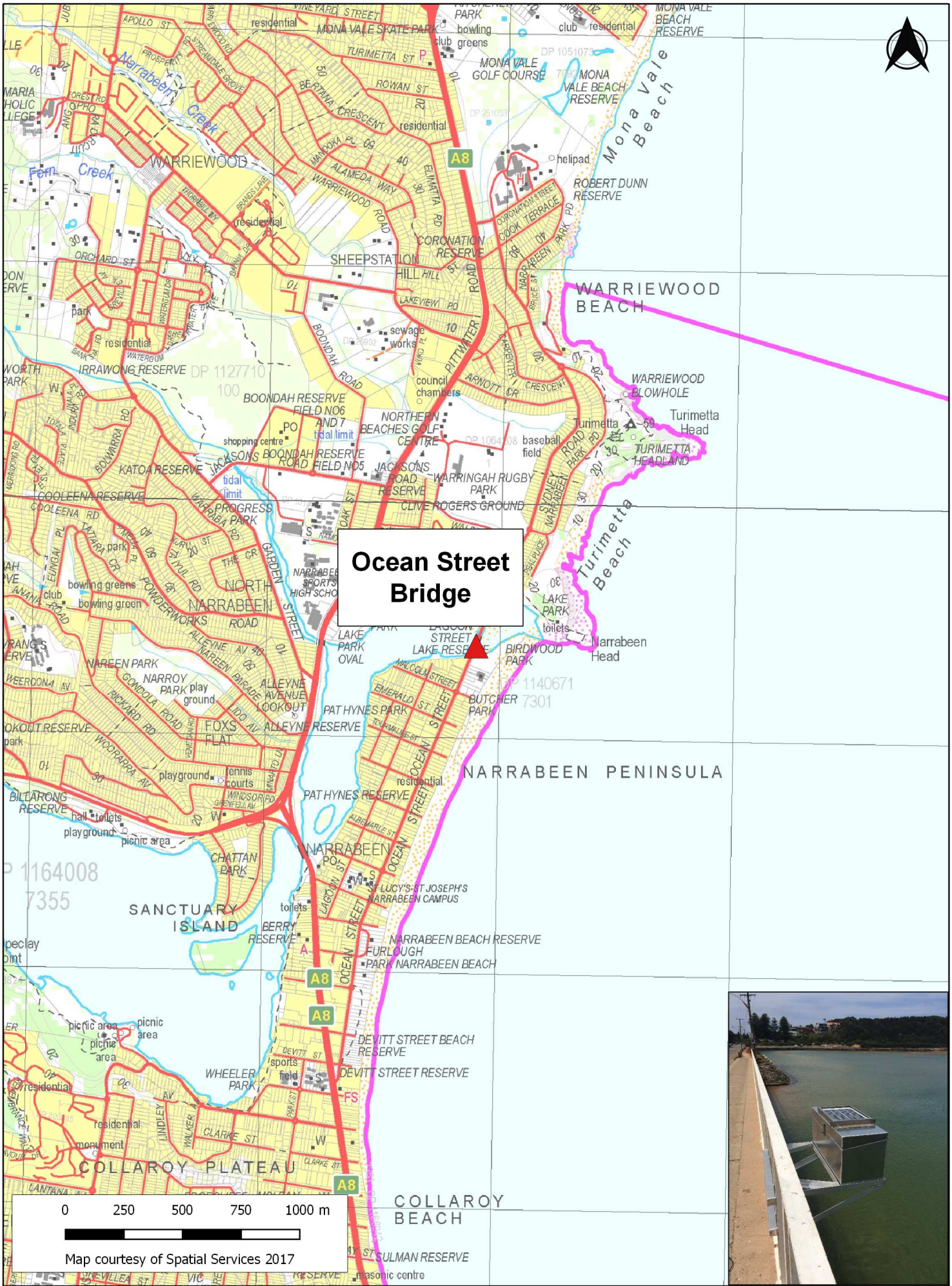

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STATION LOCATION
Ocean Street Bridge

MHL 2546

Figure 179

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Narrabeen Lagoon		Station name: Ocean Street Bridge	
AWRC No: 213408D		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 342897	Northing: 6269396
Geographic co-ordinate system:		Latitude: -33.70379200	Longitude: 151.30475200
TRIM reference: FILE17/73147		LGA: Northern Beaches Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: May 2017		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 24635 Order of accuracy: L3 PM/SSM RL (mAHD): 1.732 Local BM description: Triangle cut with white mark. Local BM location: Dip point on northern side of box bracket.		Local BM RL (mAHD): 4.382 Station datum: AHD Date of last survey: 9 May 2017 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.33	1% AEP (mAHD): 3.0	Instrumentation height (mAHD): 4.2	
Hydraulic characteristics: ICOLL, entrance intermittently open.			
Purpose of installation and current functionality: Station is maintained by MHL for the Northern Beaches Council.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Narrabeen Bridge

MHL 2546

Figure 180

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Narrabeen Lagoon		Station name: Narrabeen Bridge	
AWRC No: 213422		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 342174	Northing: 6268454
Geographic co-ordinate system:		Latitude: -33.71217974	Longitude: 151.29678184
TRIM reference: FILE17/63108		LGA: Northern Beaches Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: August 1994		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 26880 Order of accuracy: L2 PM/SSM RL (mAHD): 2.217 Local BM description: Dynabolt in concrete. Local BM location: SW corner of concrete plinth of instrumentation hut.		Local BM RL (mAHD): 1.465 Station datum: AHD Date of last survey: 10 May 2018 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor – not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Barometric station since Aug 1999.			
Peak flood of record (mAHD): 2.18	1% AEP (mAHD): 3.1	Instrumentation height (mAHD): 3.2	
Hydraulic characteristics: ICOLL, entrance intermittently open.			
Purpose of installation and current functionality: Station is maintained by MHL for OEH, with additional alarm services and a flood warning system funded by Northern Beaches Council.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Dee Why

MHL 2546

Figure 181

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Dee Why Lagoon		Station name: Dee Why	
AWRC No: 213424		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 342725	Northing: 6264718
Geographic co-ordinate system:		Latitude: -33.74594163	Longitude: 151.30206116
TRIM reference: FILE17/63110		LGA: Northern Beaches Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: March 1996		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 53340 Order of accuracy: L3 PM/SSM RL (mAHD): 14.091 Local BM description: Bolt in concrete. Local BM location: SW corner of concrete plinth of old instrumentation hut.		Local BM RL (mAHD): 3.383 Station datum: AHD Date of last survey: 18 August 2009 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor - not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.47	1% AEP (mAHD): 3.0	Instrumentation height (mAHD): 5.1	
Hydraulic characteristics: ICOLL, entrance intermittently open.			
Purpose of installation and current functionality: Used to monitor entrance conditions and water level in Dee Why Lagoon. Station is maintained by MHL for the Northern Beaches Council.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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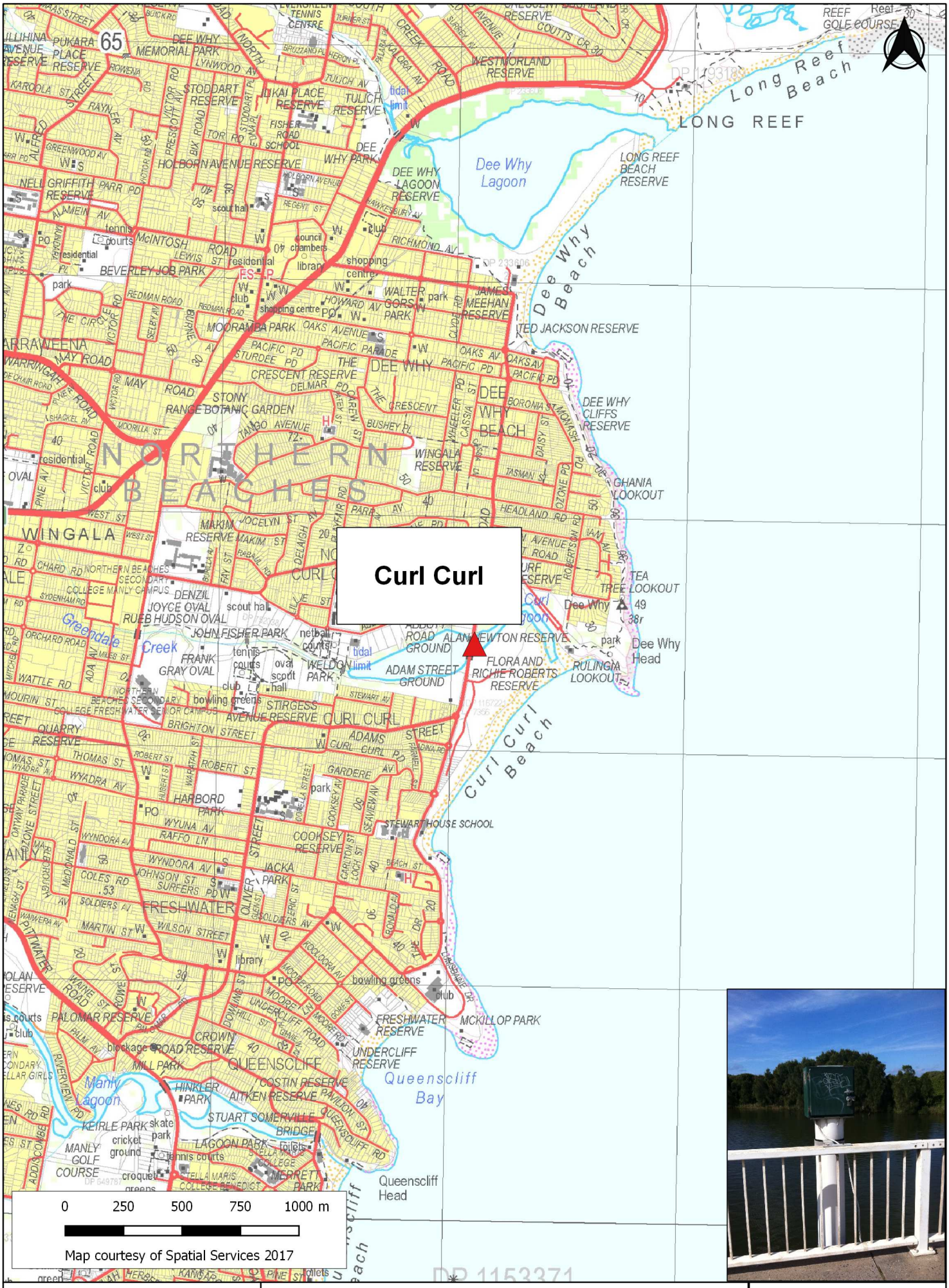

NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Curl Curl**	**MHL 2546** **Figure 182** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Curl Curl Lagoon		Station name: Curl Curl	
AWRC No: 213426		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 342098	Northing: 6262458
Geographic co-ordinate system:		Latitude: -33.76622416	Longitude: 151.29489254
TRIM reference: FILE17/73159		LGA: Northern Beaches Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: August 1991		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 2000 Order of accuracy: L2 PM/SSM RL (mAHD): 5.949 Local BM description: Bolt in concrete. Local BM location: SE corner of bridge.		Local BM RL (mAHD): 3.790 Station datum: AHD Date of last survey: 10 May 2018 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor - not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Floatwell replaced with submersible pressure transducer in Jan 2012. There is also a Northern Beaches Council owned rainfall station at this site.			
Peak flood of record (mAHD): 2.71	1% AEP (mAHD): 3.6	Instrumentation height (mAHD): 4.9	
Hydraulic characteristics: ICOLL, entrance intermittently open.			
Purpose of installation and current functionality: The gauge collects baseline data on entrance breakouts, tidal influence and the hydrodynamic characteristics of the lagoon. Installed under the Estuary Program to monitor impact of restoration project. The station also features additional alarm services and a flood warning system funded by Northern Beaches Council			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Riverview Parade

MHL 2546

Figure 183

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Manly Lagoon		Station name: Riverview Parade	
AWRC No: 213413		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 340504	Northing: 6260457
Geographic co-ordinate system:		Latitude: -33.78402502	Longitude: 151.27732781
TRIM reference: FILE17/63114		LGA: Northern Beaches Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: March 1990		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 731 Order of accuracy: L2 PM/SSM RL (mAHD): 2.293 Local BM description: Triangle cut painted yellow. Local BM location: Top of galvanised pipe attached to cabinet post at base of station post.		Local BM RL (mAHD): 2.032 Station datum: AHD Date of last survey: 2 November 2017 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.611	0.036	MLWN: 0.461	0.037
MHWS: 0.525	0.034	MLW: 0.448	0.038
MHW: 0.513	0.034	MLWS: 0.436	0.039
MHWN: 0.500	0.034	ISLW: 0.375	0.044
MSL: 0.481	0.036	Tidal range (HHWSS – ISLW): 0.236	0.040
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.22	1% AEP (mAHD): 3.2	Instrumentation height (mAHD): 3.5	
Hydraulic characteristics: Originally an ICOLL the lagoon entrance is now permanently open via a trained channel. The entrance regularly silts up affecting water levels in the lagoon.			
Purpose of installation and current functionality: Station is maintained by MHL for the Northern Beaches Council.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Queenscliff Bridge



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Queenscliff Bridge

MHL 2546

Figure 184

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Manly Lagoon		Station name: Queenscliff Bridge	
AWRC No: 213414		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 340963	Northing: 6260561
Geographic co-ordinate system:		Latitude: -33.78315556	Longitude: 151.28230279
TRIM reference: FILE17/63116		LGA: Northern Beaches Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: September 1990		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5m		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 760 Order of accuracy: L2 PM/SSM RL (mAHD): 13.654 Local BM description: Bolt Local BM location: NW metal flange of cabinet on Queenscliff Bridge.		Local BM RL (mAHD): 2.615 Station datum: AHD Date of last survey: 3 June 2005 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): -0.001	
TIDAL PLANES (mAHD)			
Period analysed: July 1991 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.618 MHWS: 0.528 MHW: 0.515 MHWN: 0.502 MSL: 0.481	0.042 0.038 0.038 0.038 0.039	MLWN: 0.461 MLW: 0.448 MLWS: 0.435 ISLW: 0.370 Tidal range (HHWSS – ISLW): 0.248	0.041 0.042 0.043 0.054 0.060
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.21	1% AEP (mAHD): 3.2	Instrumentation height (mAHD): 2.5	
Hydraulic characteristics: Originally an ICOLL the lagoon entrance is now permanently open via a trained channel. The entrance regularly silts up affecting water levels in the lagoon.			
Purpose of installation and current functionality: Station is maintained by MHL for the Northern Beaches Council.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Fullers Bridge

0 250 500 750 1000 m

Map courtesy of Spatial Services 2017



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STATION LOCATION
Fullers Bridge

MHL 2546

Figure 185

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Lane Cove River		Station name: Fullers Bridge	
AWRC No: 213476		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 329370	Northing: 6259278
Geographic co-ordinate system:		Latitude: -33.79291800	Longitude: 151.15689900
TRIM reference: FILE17/63117		LGA: Ryde City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: April 2016		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM50214 Order of accuracy: L2 PM/SSM RL (mAHD): 2.591 Local BM description: PM 50214 Local BM location: South kerb at the intersection of Lady Game Drive and Max Allen Road.		Local BM RL (mAHD): 2.591 Station datum: AHD Date of last survey: 13 May 2016 Surveyed by: Ben Cox Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good – not calculated due to limited record.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.20	1% AEP (mAHD): 6.14	Instrumentation height (mAHD): 2.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: Station installed under the Estuary Management Program and monitors flooding in the Lane Cove River. The station also monitors impact of seiching at this location.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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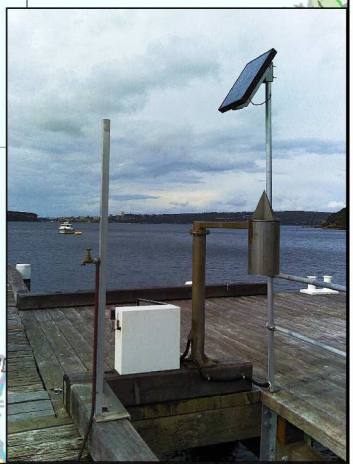
Sydney



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Map courtesy of Spatial Services 2017

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STATION LOCATION
Sydney

MHL 2546

Figure 186

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Sydney Port Jackson		Station name: Sydney	
AWRC No: 213470		BoM No: 566070	
MGA co-ordinates zone: 56		Easting: 338842	Northing: 6255833
Geographic co-ordinate system:		Latitude: -33.82546100	Longitude: 151.25853300
TRIM reference: FILE17/74005		LGA: Mosman Council	Rainfall district: 66
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: September 1987		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 174508 Order of accuracy: U PM/SSM RL (mAHD): 23.781 Local BM description: BM Navy SSM (RAN) mark Local BM location: RAN 004 top of boat ramp, epoxy set node		Local BM RL (mAHD): 2.297 Station datum: Zero Fort Denison (ZFD) and AHD Date of last survey: 22 July 2015 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.995 MHWS: 0.647 MHW: 0.524 MHWN: 0.401 MSL: 0.020	0.034 0.032 0.031 0.030 0.032	MLWN: -0.361 MLW: -0.484 MLWS: -0.607 ISLW: -0.856 Tidal range (HHWSS – ISLW): 1.851	0.034 0.034 0.034 0.035 0.029
STATION CHARACTERISTICS			
General comments: EWS till Aug 2010, then 2 pressure sensors before a radar installed in Feb 2012 replaced both sensors. Reference survey mark surveyed in by Public Works Survey Branch however the order of accuracy was not uploaded to SCIMS.			
Peak flood of record (mAHD): 1.40	1% AEP (mAHD): NA	Instrumentation height (mAHD): 2.3	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: To monitor ocean tides in Sydney Harbour as part of the Ocean Tide Program. This is the primary gauge for tidal predictions that are used for all other estuary sites.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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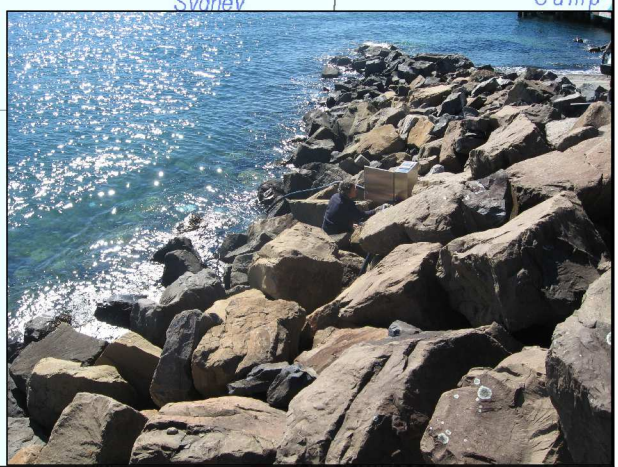
Sydney Backup

0 250 500 750 1000 m

Map courtesy of Spatial Services 2017



NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Sydney Backup

MHL 2546

Figure 187

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Sydney Port Jackson		Station name: HMAS Penguin Sydney Backup	
AWRC No: 213472		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 338726	Northing: 6255734
Geographic co-ordinate system:		Latitude: -33.82633615	Longitude: 151.25726394
TRIM reference: FILE17/74005		LGA: Mosman Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: August 2010		Secondary sensor installation date: August 2010	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 174508 Order of accuracy: U PM/SSM RL (mAHD): 23.781 Local BM description: BM dip point Local BM location: Top of aluminium post at waters edge near instrument orifice		Local BM RL (mAHD): 0.229 Station datum: Zero Fort Denison (ZFD) and AHD Date of last survey: 22 July 2015 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good – not calculated - refer to Sydney.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Two pressure sensors installed to replace Sydney gauge during wharf upgrade. Left in to support and validate Sydney 213470 data. Reference survey mark surveyed in by Public Works Survey Branch however the order of accuracy was not uploaded to SCIMS.			
Peak flood of record (mAHD): 1.34	1% AEP (mAHD): NA	Instrumentation height (mAHD): 2.2	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: To monitor ocean tides in Sydney Harbour as part of the Ocean Tide Program. This is the backup gauge for Sydney tide gauge.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Silverwater Bridge

MHL 2546

Figure 188

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Parramatta River		Station name: Silverwater Bridge	
AWRC No: 213435		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 319683	Northing: 6255592
Geographic co-ordinate system:		Latitude: -33.82453381	Longitude: 151.05155630
TRIM reference: FILE17/63118		LGA: Parramatta City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: April 2012		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM118791 Order of accuracy: L2 PM/SSM RL (mAHD): 6.299 Local BM description: Bolt Local BM location: SW corner of pedestal base.		Local BM RL (mAHD): 1.193 Station datum: Zero Fort Denison (ZFD) and AHD Date of last survey: 15 May 2012 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good – not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.507	1% AEP (mAHD): 2.98	Instrumentation height (mAHD): 3.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The installation of this station has been requested by NSW Maritime and is part of the Floodplain Management Program.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Canterbury Road Bridge

0 250 500 750 1000 m

Map courtesy of Spatial Services 2017



NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Canterbury Road Bridge

MHL 2546

Figure 189

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Cooks River		Station name: Canterbury Road Bridge	
AWRC No: 213411		BoM No: 566007	
MGA co-ordinates zone: 56		Easting: 325944	Northing: 6245849
Geographic co-ordinate system:		Latitude: -33.91340971	Longitude: 151.11725022
TRIM reference: FILE17/73172		LGA: Canterbury-Bankstown Council	Rainfall district: 66
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: September 1991		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM130918 Order of accuracy: L2 PM/SSM RL (mAHD): 3.481 Local BM description: Small metal plate. Local BM location: Middle of the bridge on the downstream side.		Local BM RL (mAHD): 3.980 Station datum: AHD Date of last survey: 16 October 2012 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1995 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.022 MHWS: 0.668 MHW: 0.566 MHWN: 0.464 MSL: 0.093	0.046 0.042 0.038 0.034 0.030	MLWN: -0.278 MLW: -0.380 MLWS: -0.483 ISLW: -0.735 Tidal range (HHWSS – ISLW): 1.757	0.029 0.027 0.027 0.025 0.041
STATION CHARACTERISTICS			
General comments: Installation of a radar as an additional sensor is planned for the end of Feb 2019.			
Peak flood of record (mAHD): 2.89	1% AEP (mAHD): 4.14	Instrumentation height (mAHD): 3.8	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: Station installed under the Floodplain Management Program and monitors flooding in the Cooks River.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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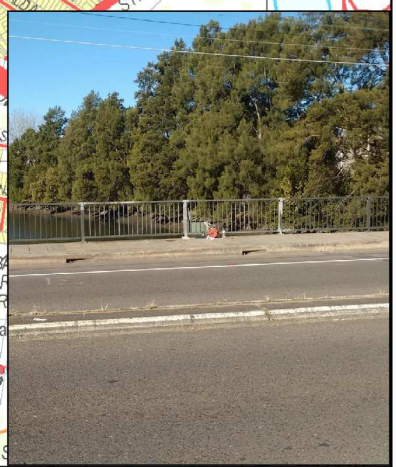
Illawarra Road Bridge



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Illawarra Road Bridge

MHL 2546

Figure 190

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Cooks River		Station name: Illawarra Road Bridge	
AWRC No: 213420		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 328303	Northing: 6244862
Geographic co-ordinate system:		Latitude: -33.92269417	Longitude: 151.14256239
TRIM reference: FILE17/63119		LGA: Canterbury-Bankstown Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: July 2001		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM131511 Order of accuracy: L2 PM/SSM RL (mAHD): 1.536 Local BM description: Bolt in concrete Local BM location: NE side of bridge abutment, on the left bank of the downstream side.		Local BM RL (mAHD): 3.336 Station datum: AHD Date of last survey: 22 February 2018 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2001 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.057 MHWS: 0.702 MHW: 0.576 MHWN: 0.450 MSL: 0.070	0.018 0.016 0.019 0.022 0.023	MLWN: -0.310 MLW: -0.436 MLWS: -0.561 ISLW: -0.815 Tidal range (HHWSS – ISLW): 1.872	0.024 0.028 0.032 0.031 0.023
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.11	1% AEP (mAHD): 2.94	Instrumentation height (mAHD): 3.6	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to monitor flooding in the Cooks River.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Tempe Bridge

MHL 2546

Figure 191

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Cooks River		Station name: Tempe Bridge	
AWRC No: 213415		BoM No: 566012	
MGA co-ordinates zone: 56		Easting: 329694	Northing: 6244231
Geographic co-ordinate system:		Latitude: -33.92860824	Longitude: 151.15748104
TRIM reference: FILE17/63120		LGA: Bayside Council	Rainfall district: 66
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: August 1991		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM11348 Order of accuracy: L2 PM/SSM RL (mAHD): 5.028 Local BM description: SSM11348. Local BM location: On the station end of bridge structure.		Local BM RL (mAHD): 5.028 Station datum: AHD Date of last survey: 22 February 2018 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1996 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.055 MHWS: 0.696 MHW: 0.572 MHWN: 0.447 MSL: 0.057	0.034 0.030 0.029 0.029 0.029	MLWN: -0.334 MLW: -0.458 MLWS: -0.582 ISLW: -0.839 Tidal range (HHWSS – ISLW):1.894	0.032 0.032 0.032 0.034 0.035
STATION CHARACTERISTICS			
General comments: In October 2016 the gas purge system was upgraded to a radar due to access issues.			
Peak flood of record (mAHD): 1.50	1% AEP (mAHD): 2.3	Instrumentation height (mAHD): 5.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, and was established to capture the stage hydrographs of the combined flood waters of the Cooks River and Wolli Creek.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 1.3m, Moderate NA, Major NA			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Picnic Point Downstream



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Picnic Point Downstream

MHL 2546

Figure 192

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Georges River		Station name: Picnic Point Downstream	
AWRC No: 213410D		BoM No: 566011	
MGA co-ordinates zone: 56		Easting: 315269	Northing: 6237999
Geographic co-ordinate system:		Latitude: -33.98234674	Longitude: 151.00018459
TRIM reference: FILE17/72110		LGA: Canterbury Bankstown Council	Rainfall district: 66
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: March 1992		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM32545 Order of accuracy: L3 PM/SSM RL (mAHD): 1.212 Local BM description: SSM103301 Local BM location: Southern entrance of Fitzpatrick Park, near the river.		Local BM RL (mAHD): 1.632 Station datum: AHD Date of last survey: 22 November 2017 Surveyed by: Greg Thatcher Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1992 to June 2009		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.000 MHWS: 0.662 MHW: 0.567 MHWN: 0.472 MSL: 0.111	0.056 0.051 0.051 0.050 0.048	MLWN: -0.250 MLW: -0.345 MLWS: -0.440 ISLW: -0.681 Tidal range (HHWSS – ISLW): 1.681	0.047 0.046 0.046 0.043 0.023
STATION CHARACTERISTICS			
General comments: Picnic Point was relocated to Picnic Point Downstream in 1992. The current station has the AWRC number 213410D. The SLS still uses the old number and the name from the decommissioned Picnic Point			
Peak flood of record (mAHD): 2.27	1% AEP (mAHD): 3.2	Instrumentation height (mAHD): 2.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was established to record flood levels at Picnic Point and to determine flood gradients to the upstream station of Milperra. Data captured is useful in reviewing flood damage in the East Hills region and for verifying the physical and numerical models developed to address the flooding issue.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 2.0m, Moderate NA, Major NA			
Data used for BoM flood forecasting: No		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Como Bridge

0 250 500 750 1000 m

Map courtesy of Spatial Services 2017



NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Como Bridge

MHL 2546

Figure 193

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Georges River		Station name: Como Bridge	
AWRC No: 213425		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 321829	Northing: 6236499
Geographic co-ordinate system:		Latitude: -33.99700099	Longitude: 151.07085865
TRIM reference: FILE17/63123		LGA: Sutherland Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Floatwell		Secondary sensor type: NA	
Primary sensor installation date: February 2001		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM10866 Order of accuracy: L2 PM/SSM RL (mAHD): 9.063 Local BM description: Metal pin on pole. Local BM location: Pole at the west side of pier.		Local BM RL (mAHD): 1.373 Station datum: AHD Date of last survey: 10 October 2012 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2001 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.037 MHWS: 0.687 MHW: 0.569 MHWN: 0.451 MSL: 0.061	0.031 0.028 0.028 0.028 0.028	MLWN: -0.330 MLW: -0.447 MLWS: -0.564 ISLW: -0.815 Tidal range (HHWSS – ISLW): 1.852	0.027 0.027 0.027 0.026 0.008
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.47	1% AEP (mAHD): 1.7	Instrumentation height (mAHD): 3.3	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program to monitor flooding in the Georges River.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Milperra



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Milperra

MHL 2546

Figure 194

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Georges River		Station name: Milperra	
AWRC No: 213405		BoM No: 066168	
MGA co-ordinates zone: 56		Easting: 313222	Northing: 6244042
Geographic co-ordinate system:		Latitude: -33.92751693	Longitude: 150.97932517
TRIM reference: FILE17/63125		LGA: Canterbury Bankstown Council	Rainfall district: 66
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: Radar	
Primary sensor installation date: October 1980		Secondary sensor installation date: November 2018	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 20	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: SS175487 Order of accuracy: L2 PM/SSM RL (mAHD): 4.668 Local BM description: Yellow triangle cut into concrete. Local BM location: Bottom of stairs or ladder of instrumentation hut.		Local BM RL (mAHD): 4.146 Station datum: AHD Date of last survey: 22 November 2017 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1993 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.960 MHWS: 0.630 MHW: 0.547 MHWN: 0.463 MSL: 0.109	0.050 0.044 0.042 0.039 0.036	MLWN: -0.245 MLW: -0.329 MLWS: -0.413 ISLW: -0.648 Tidal range (HHWSS – ISLW): 1.609	0.033 0.030 0.029 0.025 0.030
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 4.88	1% AEP (mAHD): 5.9	Instrumentation height (mAHD): 5.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program to capture flood levels. The data is used for reviewing flood damage and verifying the numerical and physical models developed to address the flooding issue in the area.			
Station shown on BoM website: MHL data for this station is displayed in AHD.			
SES flood classification: Minor 2.0m, Moderate 3.3m, Major 4.2m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Lansdowne Bridge

MHL 2546

Figure 195

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Prospect Creek		Station name: Lansdowne Bridge	
AWRC No: 213402		BoM No: 567067	
MGA co-ordinates zone: 56		Easting: 312039	Northing: 6248143
Geographic co-ordinate system:		Latitude: -33.89034251	Longitude: 150.96741176
TRIM reference: FILE17/63127		LGA: Fairfield City Council	Rainfall district: 67
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: November 1987		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM51653 Order of accuracy: L2 PM/SSM RL (mAHD): 11.969 Local BM description: Triangle cut into concrete. Local BM location: Concrete at the base of stairs, downstream of pier on left hand bank.		Local BM RL (mAHD): 1.669 Station datum: AHD Date of last survey: 23 November 2017 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1994 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.993 MHWS: 0.661 MHW: 0.574 MHWN: 0.487 MSL: 0.122	0.041 0.037 0.034 0.032 0.030	MLWN: -0.243 MLW: -0.330 MLWS: -0.416 ISLW: -0.654 Tidal range (HHWSS – ISLW): 1.648	0.029 0.027 0.026 0.024 0.026
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 4.37	1% AEP (mAHD): 6.5	Instrumentation height (mAHD): 11.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge is useful in capturing data for determining the relative timing of floodwaters from the Georges River and Prospect Creek and their influence on the severity of flooding in the Lansvale area.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Lansvale

0 250 500 750 1000 m

Map courtesy of Spatial Services 2017



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STATION LOCATION
Lansvale

MHL 2546

Figure 196

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Georges River		Station name: Lansvale	
AWRC No: 213401		BoM No: 566014	
MGA co-ordinates zone: 56		Easting: 311150	Northing: 6247099
Geographic co-ordinate system:		Latitude: -33.89959347	Longitude: 150.95757916
TRIM reference: FILE17/63128		LGA: Fairfield City Council	Rainfall district: 66
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: August 1980		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 50715 Order of accuracy: L2 PM/SSM RL (mAHD): 7.878 Local BM description: Triangle cut into concrete. Local BM location: Concrete at base of stairs to instrumentation hut.		Local BM RL (mAHD): 7.792 Station datum: AHD Date of last survey: 23 November 2017 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.961 MHWS: 0.630 MHW: 0.544 MHWN: 0.458 MSL: 0.097	0.043 0.039 0.036 0.035 0.031	MLWN: -0.264 MLW: -0.350 MLWS: -0.437 ISLW: -0.673 Tidal range (HHWSS – ISLW): 1.634	0.029 0.027 0.026 0.024 0.027
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 5.79	1% AEP (mAHD): 6.7	Instrumentation height (mAHD): 7.8	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge monitors changes to the river hydrodynamics resulting from the development of the lake and its influence on flood levels. Water level data is used in assessing flood damage and for verification and recalibration of the physical and numerical models developed to address the flooding issues in the area.			
Station shown on BoM website: MHL data for this station is displayed. It is called Cutler Road on BoM Web.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

STATION LOCATION
Irelands Bridge

MHL 2546

Figure 197

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Cabramatta Creek		Station name: Irelands Bridge	
AWRC No: 213407		BoM No: 567061	
MGA co-ordinates zone: 56		Easting: 309832	Northing: 6246486
Geographic co-ordinate system:		Latitude: -33.90488148	Longitude: 150.94320022
TRIM reference: FILE17/63133		LGA: Fairfield City Council	Rainfall district: 67
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: March 1988		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 51720 Order of accuracy: L2 PM/SSM RL (mAHD): 5.303 Local BM description: SBM bolt. Local BM location: Bolt in rock wall bridge abutment.		Local BM RL (mAHD): 3.230 Station datum: AHD Date of last survey: 26 February 2014 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.969 MHWS: 0.636 MHW: 0.548 MHWN: 0.460 MSL: 0.098	0.048 0.044 0.043 0.042 0.040	MLWN: -0.264 MLW: -0.352 MLWS: -0.440 ISLW: -0.677 Tidal range (HHWSS – ISLW): 1.646	0.038 0.036 0.035 0.034 0.020
STATION CHARACTERISTICS			
General comments: Site varies between monitoring of Georges River back waters and Cabramatta Creek runoff depending on river/creek behaviour.			
Peak flood of record (mAHD): 5.60	1% AEP (mAHD): 6.9	Instrumentation height (mAHD): 6.2	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge was installed to monitor floodwaters with their origin in the Cabramatta Creek catchment.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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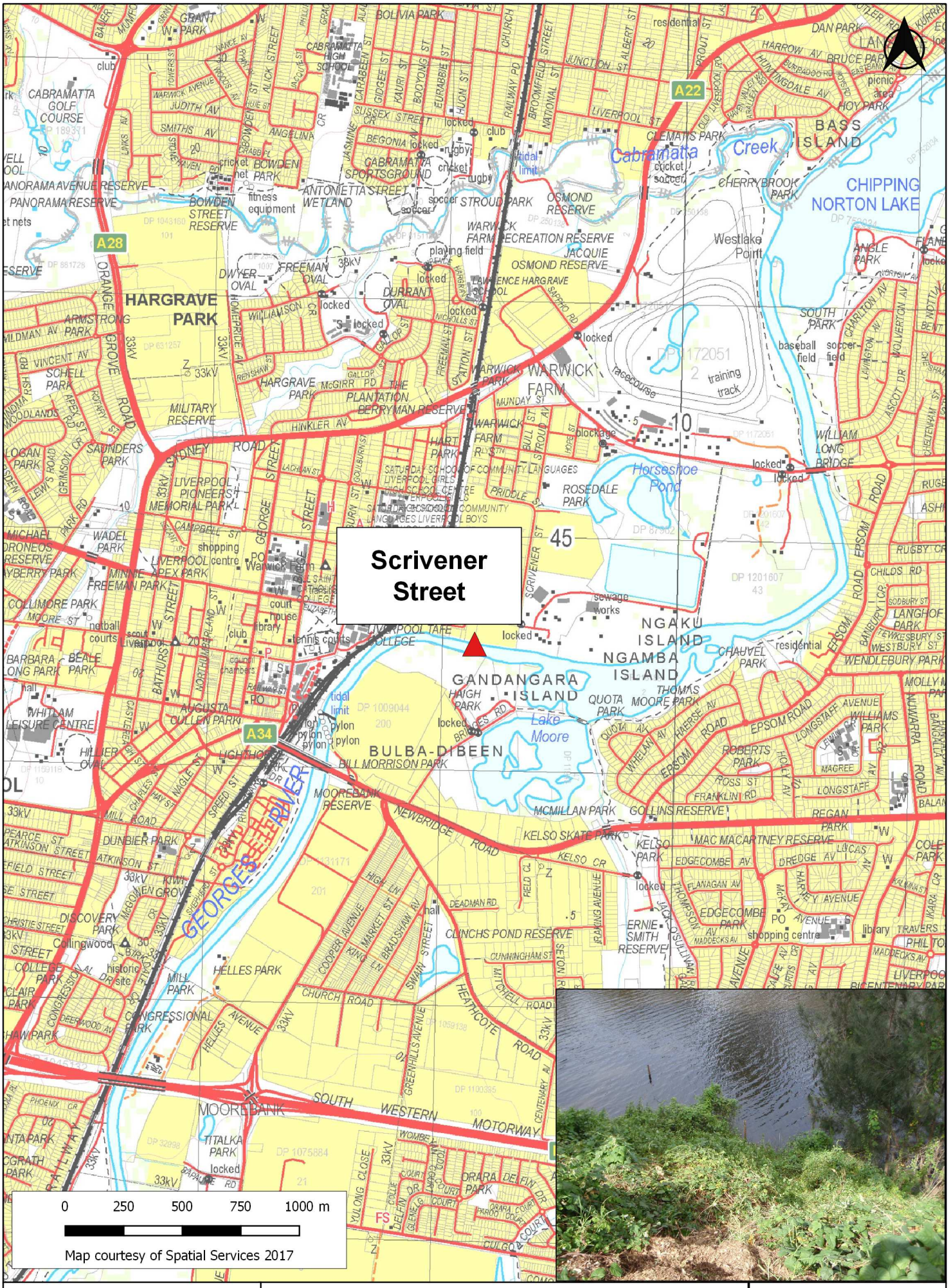

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STATION LOCATION
Scrivener Street

MHL 2546

Figure 198

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Georges River		Station name: Scrivener Street	
AWRC No: 213404		BoM No: 566013	
MGA co-ordinates zone: 56		Easting: 309137	Northing: 6244541
Geographic co-ordinate system:		Latitude: -33.92228638	Longitude: 150.93526467
TRIM reference: FILE17/63135		LGA: Liverpool City Council	Rainfall district: 66
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: October 1980		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 78000 Order of accuracy: U PM/SSM RL (mAHD): 10.348 Local BM description: Bolt in concrete. Local BM location: Concrete at stairs of recorder shed near ladder.		Local BM RL (mAHD): 10.180 Station datum: AHD Date of last survey: 2 June 2015 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.963 MHWS: 0.630 MHW: 0.542 MHWN: 0.455 MSL: 0.088	0.059 0.053 0.051 0.049 0.046	MLWN: -0.280 MLW: -0.367 MLWS: -0.455 ISLW: -0.693 Tidal range (HHWSS – ISLW): 1.656	0.044 0.042 0.041 0.038 0.029
STATION CHARACTERISTICS			
General comments: Rain gauge added to station since July 2010.			
Peak flood of record (mAHD): 5.77	1% AEP (mAHD): 8.6	Instrumentation height (mAHD): 13.2	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. Flood damage in the region is an issue for which the gauge provides data to verify physical and numerical models developed for the Lower Georges River to investigate the flooding problem.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Medium	
Station recommendations: Maintain		Revision date: 17 September 2018	

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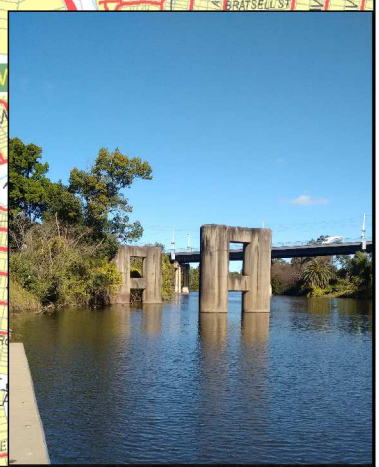
Liverpool Weir



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Liverpool Weir

MHL 2546

Figure 199

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Georges River		Station name: Liverpool Weir	
AWRC No: 213400		BoM No: 566054	
MGA co-ordinates zone: 56		Easting: 308514	Northing: 6244022
Geographic co-ordinate system:		Latitude: -33.92685103	Longitude: 150.92841570
TRIM reference: FILE17/63140		LGA: Liverpool City Council	Rainfall district: 66
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: July 1980		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM176046 Order of accuracy: L2 PM/SSM RL (mAHD): 8.998 Local BM description: Bolt in triangle cut into concrete. Local BM location: Concrete on instrument shed steps.		Local BM RL (mAHD): 9.974 Station datum: AHD Date of last survey: 22 November 2017 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: The weir crest height is 2.772 mAHD.			
Peak flood of record (mAHD): 4.47	1% AEP (mAHD): 9.3	Instrumentation height (mAHD): 10.0	
Hydraulic characteristics: Non-tidal, upstream of weir.			
Purpose of installation and current functionality: The gauge is the most useful of the Georges River network. Water level data captured by the gauge is used for flood warning, evacuation planning, reviewing flood damage, numerical model calibration and verification, and water quality monitoring.			
Station shown on BoM website: Radio transmission event data connected to MHL's sensor is displayed.			
SES flood classification: Minor 2.0m, Moderate 3.0m, Major 4.5m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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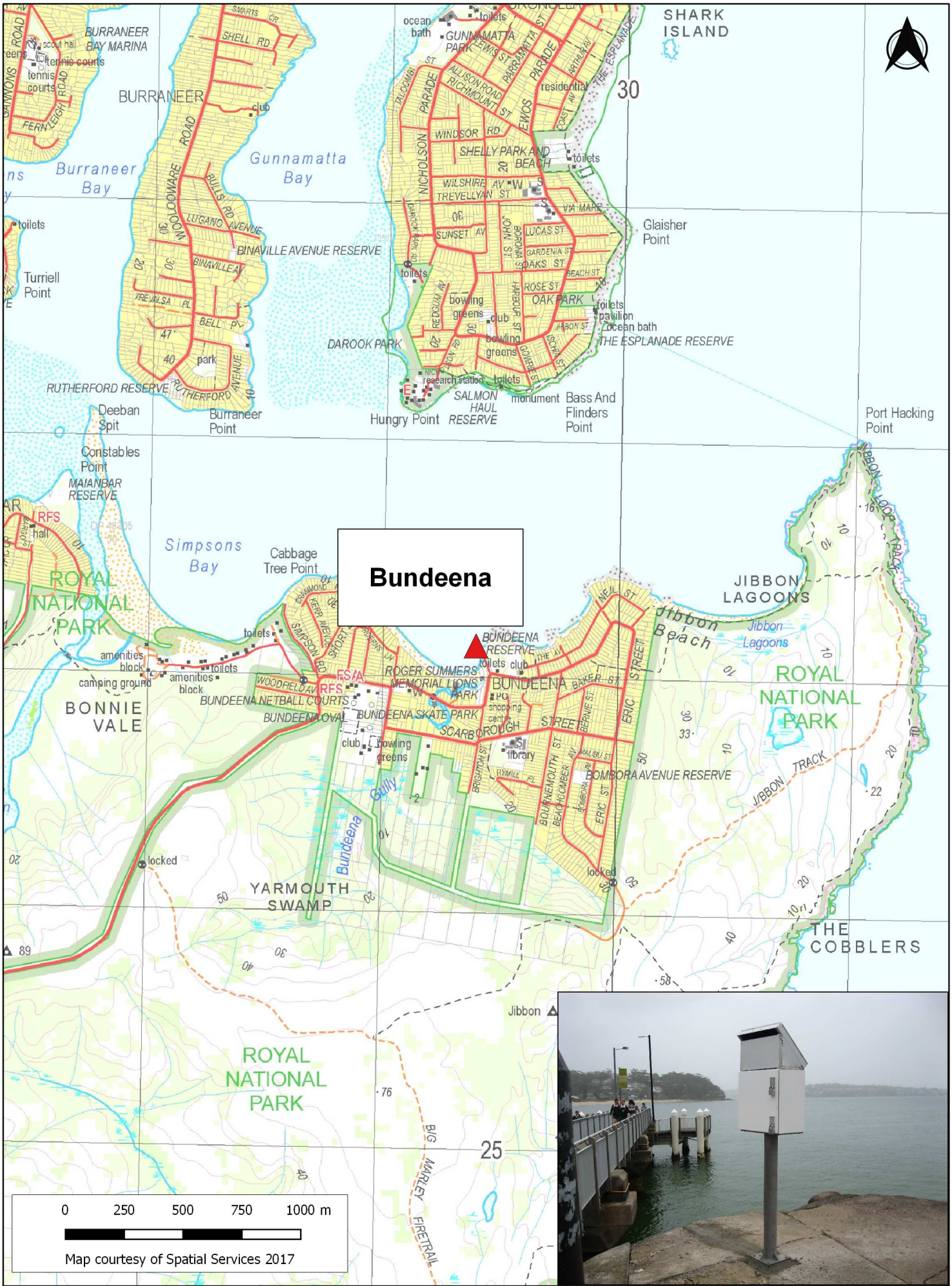

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Bundeena

MHL 2546

Figure 200

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Port Hacking River		Station name: Bundeena	
AWRC No: 214452		BoM No: 566085	
MGA co-ordinates zone: 56		Easting: 329394	Northing: 6227133
Geographic co-ordinate system:		Latitude: -34.08268300	Longitude: 151.15090000
TRIM reference: FILE17/74016		LGA: Sutherland Shire Council	Rainfall district: 66
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: December 2014		Secondary sensor installation date: March 2015	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: PWD 486 Order of accuracy: NA PM/SSM RL (mAHD): 2.636 Local BM description: PWD 486 triangle cut. Local BM location: In concrete, next to instrument box before wharf entrance.		Local BM RL (mAHD): 2.636 Station datum: Zero Fort Denison (ZFD) and AHD Date of last survey: 2 July 2015 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good – not calculated due to limited record.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Station commissioned on 1 Dec 2014 to replace Port Hacking (214451) EWS station.			
Peak flood of record (mAHD): 1.33	1% AEP (mAHD): NA	Instrumentation height (mAHD): 3.8	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: To monitor ocean tide levels at the entrance to the Port Hacking River as a part of the Ocean Tide Program.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Hewitts Creek Upstream



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Hewitts Creek Upstream

MHL 2546

Figure 201

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hewitts Creek		Station name: Hewitts Creek Upstream	
AWRC No: 214410		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 308179	Northing: 6200428
Geographic co-ordinate system:		Latitude: -34.31969306	Longitude: 150.91516808
TRIM reference: FILE17/72115		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: October 2001		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 17194 Order of accuracy: L2 PM/SSM RL (mAHD): 16.877 Local BM description: Triangle cut into concrete. Local BM location: On left bank of upstream culvert wall. 2m south of instrument cabinet.		Local BM RL (mAHD): 12.865 Station datum: AHD Date of last survey: 17 August 2012 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: In Oct 2014 the gas purge system was replaced with a submersible sensor and the sensor was relocated to culvert wing walls.			
Peak flood of record (mAHD): 12.29	1% AEP (mAHD): 14.6	Instrumentation height (mAHD): 13.2	
Hydraulic characteristics: Non-tidal, culvert.			
Purpose of installation and current functionality: Station was installed after 1998 flood under the Floodplain Management Program so that water level data could be collected both upstream and downstream of bridge to determine backwater impact.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Hewitts Creek Downstream



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Hewitts Creek Downstream

MHL 2546

Figure 202

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hewitts Creek		Station name: Hewitts Creek Downstream	
AWRC No: 214411		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 308183	Northing: 6200410
Geographic co-ordinate system:		Latitude: -34.31985500	Longitude: 150.91521200
TRIM reference: FILE17/72592		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: October 2001		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 17194 Order of accuracy: L2 PM/SSM RL (mAHD): 16.877 Local BM description: Triangle cut into concrete. Local BM location: On left bank of upstream culvert wall. 2m south of instrument cabinet.		Local BM RL (mAHD): 12.865 Station datum: AHD Date of last survey: 17 August 2012 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: In Oct 2014 the gas purge system was replaced with a submersible sensor and the sensor was relocated to the culvert wing walls.			
Peak flood of record (mAHD): 12.02	1% AEP (mAHD): 14.08	Instrumentation height (mAHD): 13.2	
Hydraulic characteristics: Non-tidal, culvert.			
Purpose of installation and current functionality: Gauge was installed after 1998 flood under the Floodplain Management Program so that water level data could be collected both upstream and downstream of bridge to determine backwater impact.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Hewitts Creek Entrance

MHL 2546
Figure 203
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Hewitts Creek		Station name: Hewitts Creek Entrance	
AWRC No: 214408		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 308991	Northing: 6199982
Geographic co-ordinate system:		Latitude: -34.32386252	Longitude: 150.92388928
TRIM reference: FILE17/65409		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: May 2005		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 102768 Order of accuracy: 2 PM/SSM RL (mAHD): 3.504 Local BM description: Bolt in concrete footpath. Local BM location: In concrete footpath next to handrail. 4m east of instrument cabinet at the northern end of bridge.		Local BM RL (mAHD): 3.706 Station datum: AHD Date of last survey: 11 April 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.57	1% AEP (mAHD): 2.61	Instrumentation height (mAHD): 3.8	
Hydraulic characteristics: Intermittently tidal			
Purpose of installation and current functionality: To monitor water levels in Hewitts Creek for flood mitigation and management of the entrance opening regime.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

STATION LOCATION
Bellambi Lagoon

MHL 2546

Figure 204

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Bellambi Lagoon		Station name: Bellambi	
AWRC No: 214488		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 308719	Northing: 6194185
Geographic co-ordinate system:		Latitude: -34.37606114	Longitude: 150.91963890
TRIM reference: FILE17/65403		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: October 2012		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 10197 Order of accuracy: 2 PM/SSM RL (mAHD): 3.090 Local BM description: Bolt in concrete slab. Local BM location: In slab of bench seat, 20m SW of cabinet		Local BM RL (mAHD): 2.964 Station datum: AHD Date of last survey: 13 April 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.46	1% AEP (mAHD): 2.62	Instrumentation height (mAHD): 4.5	
Hydraulic characteristics: ICOLL, normally closed			
Purpose of installation and current functionality: To monitor water levels in Bellambi Lagoon for flood mitigation and management of the entrance opening regime.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Towradgi Creek Upstream



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Towradgi Creek Upstream

MHL 2546

Figure 205

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Towradgi Creek		Station name: Towradgi Creek Upstream	
AWRC No: 214477		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 307607	Northing: 6193622
Geographic co-ordinate system:		Latitude: -34.38092497	Longitude: 150.90743059
TRIM reference: FILE17/73203		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: April 1992		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 21642 Order of accuracy: L2 PM/SSM RL (mAHD): 3.674 Local BM description: Steel pin in concrete footpath. Local BM location: In concrete footpath, at NW corner of bridge. 6m east of instrument cabinet.		Local BM RL (mAHD): 4.057 Station datum: AHD Date of last survey: 11 April 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor - not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 4.32	1% AEP (mAHD): 4.13	Instrumentation height (mAHD): 4.7	
Hydraulic characteristics: Station rarely tidal, captures high tides occasionally.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program to provide flood and tidal data to assist in the numerical model for a flood study in the area.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Towradgi Creek Downstream



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Map courtesy of Spatial Services 2017

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STATION LOCATION
Towradgi Creek Downstream

MHL 2546

Figure 206

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Towradgi Creek		Station name: Towradgi Creek Downstream	
AWRC No: 214475		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 307626	Northing: 6193606
Geographic co-ordinate system:		Latitude: -34.38107400	Longitude: 150.90763000
TRIM reference: FILE17/73205		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: October 2006		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 15		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 21642 Order of accuracy: L2 PM/SSM RL (mAHD): 3.674 Local BM description: Steel pin in concrete footpath. Local BM location: In concrete footpath, at NW corner of bridge. 6m east of instrument cabinet.		Local BM RL (mAHD): 4.057 Station datum: AHD Date of last survey: 11 April 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor - not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.26	1% AEP (mAHD): 3.97	Instrumentation height (mAHD): 4.7	
Hydraulic characteristics: Station rarely tidal, captures high tides occasionally.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program to provide flood and tidal data to assist in the numerical model for a flood study in the area.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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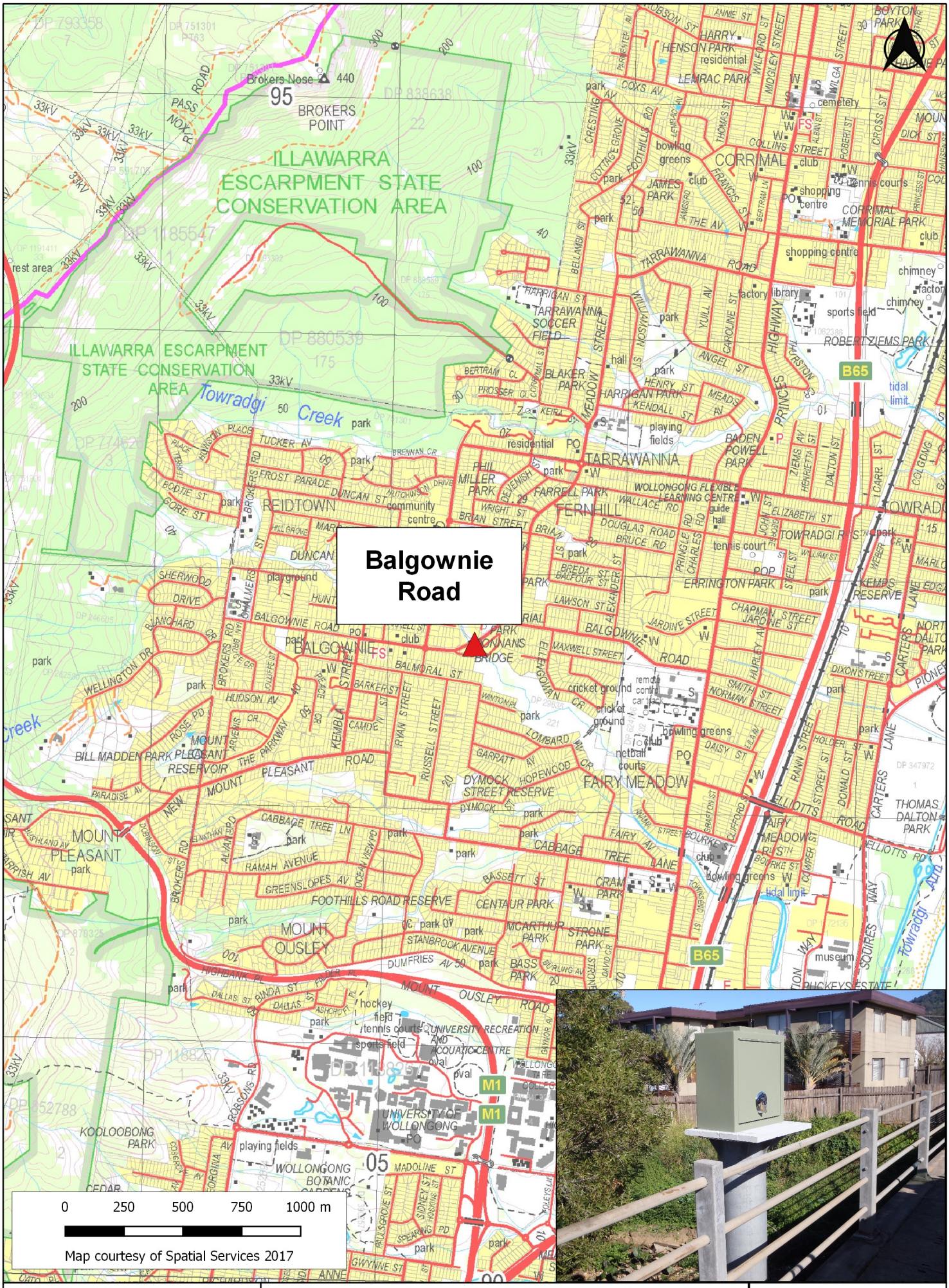

NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Balgownie Road**	**MHL 2546** **Figure 207** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Cabbage Tree Creek		Station name: Balgownie Road	
AWRC No: 214409		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 305367	Northing: 6192700
Geographic co-ordinate system:		Latitude: -34.38881561	Longitude: 150.88287259
TRIM reference: FILE17/65397		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: November 2002		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 17053 Order of accuracy: L2 PM/SSM RL (mAHD): 18.204 Local BM description: Steel bolt in concrete footpath. Local BM location: In concrete footpath, at handrails of bridge. 1m west of instrument cabinet.		Local BM RL (mAHD):16.598 Station datum: AHD Date of last survey: 10 April 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: May 2012 floatwell was replaced by submersible pressure transducer.			
Peak flood of record (mAHD): 14.76	1% AEP (mAHD): 16.6	Instrumentation height (mAHD): 17.8	
Hydraulic characteristics: Creek is normally dry unless raining.			
Purpose of installation and current functionality: This station was installed as a requirement of the development application for a private development at Fairy Meadow in North Wollongong. The gauge provides flood data to assist in the numerical model for a flood study in the area.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Cabbage Tree Creek Upstream



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Cabbage Tree Creek Upstream

MHL 2546

Figure 208

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Cabbage Tree Creek		Station name: Cabbage Tree Creek Upstream	
AWRC No: 214405		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 306254	Northing: 6191850
Geographic co-ordinate system:		Latitude: -34.39664700	Longitude: 150.89232600
TRIM reference: FILE17/73211		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: September 2007		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 9843 Order of accuracy: L2 PM/SSM RL (mAHD): 7.922 Local BM description: Steel pin in concrete footpath. Local BM location: In concrete footpath, at southern end of bridge. 15m south of instrument cabinet.		Local BM RL (mAHD): 8.789 Station datum: AHD Date of last survey: 7 June 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 6.68	1% AEP (mAHD): 8.79	Instrumentation height (mAHD): 10.0	
Hydraulic characteristics: Non-tidal			
Purpose of installation and current functionality: As a backup to Cabbage Tree Creek Downstream to monitor stage heights during flood events and for input into numerical models.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Cabbage Tree Creek Downstream



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Map courtesy of Spatial Services 2017

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STATION LOCATION
Cabbage Tree Creek Downstream

MHL 2546

Figure 209

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Cabbage Tree Creek		Station name: Cabbage Tree Creek Downstream	
AWRC No: 214406		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 306275	Northing: 6191832
Geographic co-ordinate system:		Latitude: -34.39680868	Longitude: 150.89254735
TRIM reference: FILE17/73212		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: April 1985		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 9843 Order of accuracy: L2 PM/SSM RL (mAHD): 7.922 Local BM description: Steel pin in concrete footpath. Local BM location: In concrete footpath, at southern end of bridge. 15m south of instrument cabinet.		Local BM RL (mAHD): 8.789 Station datum: AHD Date of last survey: 7 June 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: In Oct 2011 the floatwell was upgraded to a submersible pressure transducer.			
Peak flood of record (mAHD): 9.01	1% AEP (mAHD): 8.39	Instrumentation height (mAHD): 10.0	
Hydraulic characteristics: Non-tidal culvert			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program to monitor stage heights during flood events and for input into numerical models.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Fairy Creek Upstream

0 250 500 750 1000 m

Map courtesy of Spatial Services 2017



NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Fairy Creek Upstream

MHL 2546

Figure 210

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Fairy Creek		Station name: Fairy Creek Upstream	
AWRC No: 214403		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 306315	Northing: 6189983
Geographic co-ordinate system:		Latitude: -34.41347700	Longitude: 150.89256100
TRIM reference: FILE17/73216		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: December 2005		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 17032 Order of accuracy: L3 PM/SSM RL (mAHD): 3.622 Local BM description: Triangle cut in concrete. Local BM location: In concrete culvert wall on right bank. Right next to instrument cabinet.		Local BM RL (mAHD):4.146 Station datum: AHD Date of last survey: 7 June 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor - not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 3.76	1% AEP (mAHD): 4.42	Instrumentation height (mAHD): 5.4	
Hydraulic characteristics: Intermittently tidal, near tidal limit.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to establish and verify a numerical model. The gauge also assists in reviewing flood damage following events.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Fairy Creek Downstream

MHL 2546

Figure 211

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Fairy Creek		Station name: Fairy Creek Downstream	
AWRC No: 214404		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 306351	Northing: 6189967
Geographic co-ordinate system:		Latitude: -34.41363068	Longitude: 150.89295210
TRIM reference: FILE17/73217		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: April 1985		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 17032 Order of accuracy: L3 PM/SSM RL (mAHD): 3.622 Local BM description: Triangle cut in concrete. Local BM location: In concrete culvert wall on right bank. Next to instrument cabinet.		Local BM RL (mAHD):4.146 Station datum: AHD Date of last survey: 7 June 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor - not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Floatwell was upgraded to submersible pressure transducer in August 2011.			
Peak flood of record (mAHD): 4.12	1% AEP (mAHD): 4.08	Instrumentation height (mAHD): 5.4	
Hydraulic characteristics: Intermittently tidal, near tidal limit.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to establish and verify a numerical model. The gauge also assists in reviewing flood damage following events.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Koloona Ave Upstream



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Koloona Ave Upstream

MHL 2546

Figure 212

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Byarong Creek		Station name: Koloona Avenue Upstream	
AWRC No: 214425		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 302909	Northing: 6189424
Geographic co-ordinate system:		Latitude: -34.41787345	Longitude: 150.85539849
TRIM reference: FILE17/73221		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: July 2001		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 13286 Order of accuracy: L3 PM/SSM RL (mAHD): 37.658 Local BM description: Steel Pin in concrete gutter. Local BM location: On concrete guttering on east side of the road bridge. 20m east of instrument cabinet.		Local BM RL (mAHD):34.135 Station datum: Culvert Bed Date of last survey: 10 April 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: In Oct 2014, the gas purge system was replaced with a submersible pressure transducer and the sensor was relocated to the culvert wing walls.			
Peak flood of record (mAHD): 33.02	1% AEP (mAHD): 36.05	Instrumentation height (mAHD): 34.5	
Hydraulic characteristics: Non-tidal culvert.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. Station installed after 1998 flood to understand the effect the culvert and road bridge have on the water levels during floods. For comparison, there is a station downstream of the bridge.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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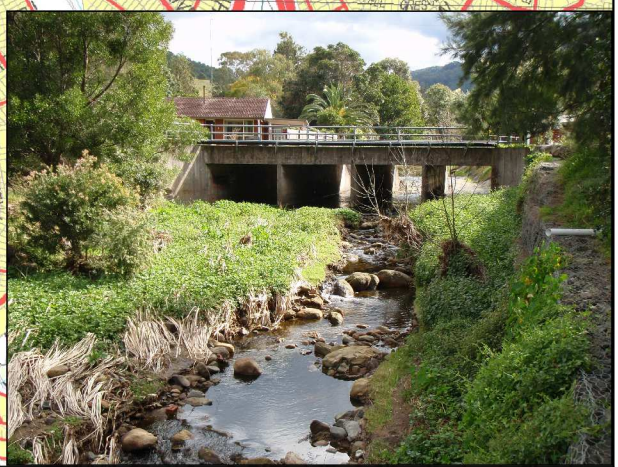
Koloona Ave Downstream



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Koloona Ave Downstream

MHL 2546

Figure 213

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Byarong Creek		Station name: Koloona Avenue Downstream	
AWRC No: 214426		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 302926	Northing: 6189412
Geographic co-ordinate system:		Latitude: -34.41798300	Longitude: 150.85558300
TRIM reference: FILE17/73222		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: July 2001		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 13286 Order of accuracy: L3 PM/SSM RL (mAHD): 37.658 Local BM description: Steel pin in concrete gutter. Local BM location: On concrete guttering on east side of the road bridge. 20m east of instrument cabinet.		Local BM RL (mAHD):34.135 Station datum: Culvert Bed Date of last survey: 10 April 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: In Oct 2014, the gas purge system was replaced with a submersible pressure transducer and the sensor was relocated to the culvert wing walls.			
Peak flood of record (mAHD): 32.32	1% AEP (mAHD): 34.56	Instrumentation height (mAHD): 34.5	
Hydraulic characteristics: Non-tidal culvert.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. Station installed after 1998 flood to understand the effect the culvert and road bridge have on the water levels during floods. For comparison, there is a station upstream of the bridge.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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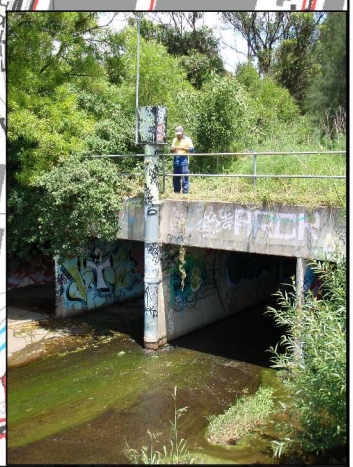
Byarong Creek



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Byarong Creek

MHL 2546

Figure 214

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Byarong Creek		Station name: Byarong Creek	
AWRC No: 214420		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 303773	Northing: 6186987
Geographic co-ordinate system:		Latitude: -34.44000016	Longitude: 150.86423535
TRIM reference: FILE17/67408		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: July 1993		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 36438 Order of accuracy: B2 PM/SSM RL (mAHD): 11.113 Local BM description: Steel bolt in concrete culvert. Local BM location: On the top of concrete culvert structure. 2m west of instrument cabinet.		Local BM RL (mAHD): 9.883 Station datum: AHD Date of last survey: 10 April 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: In April 2011 the floatwell was replaced by a submersible pressure transducer.			
Peak flood of record (mAHD): 9.32	1% AEP (mAHD): 12.18	Instrumentation height (mAHD): 11.1	
Hydraulic characteristics: Non-tidal culvert.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program to record flood levels.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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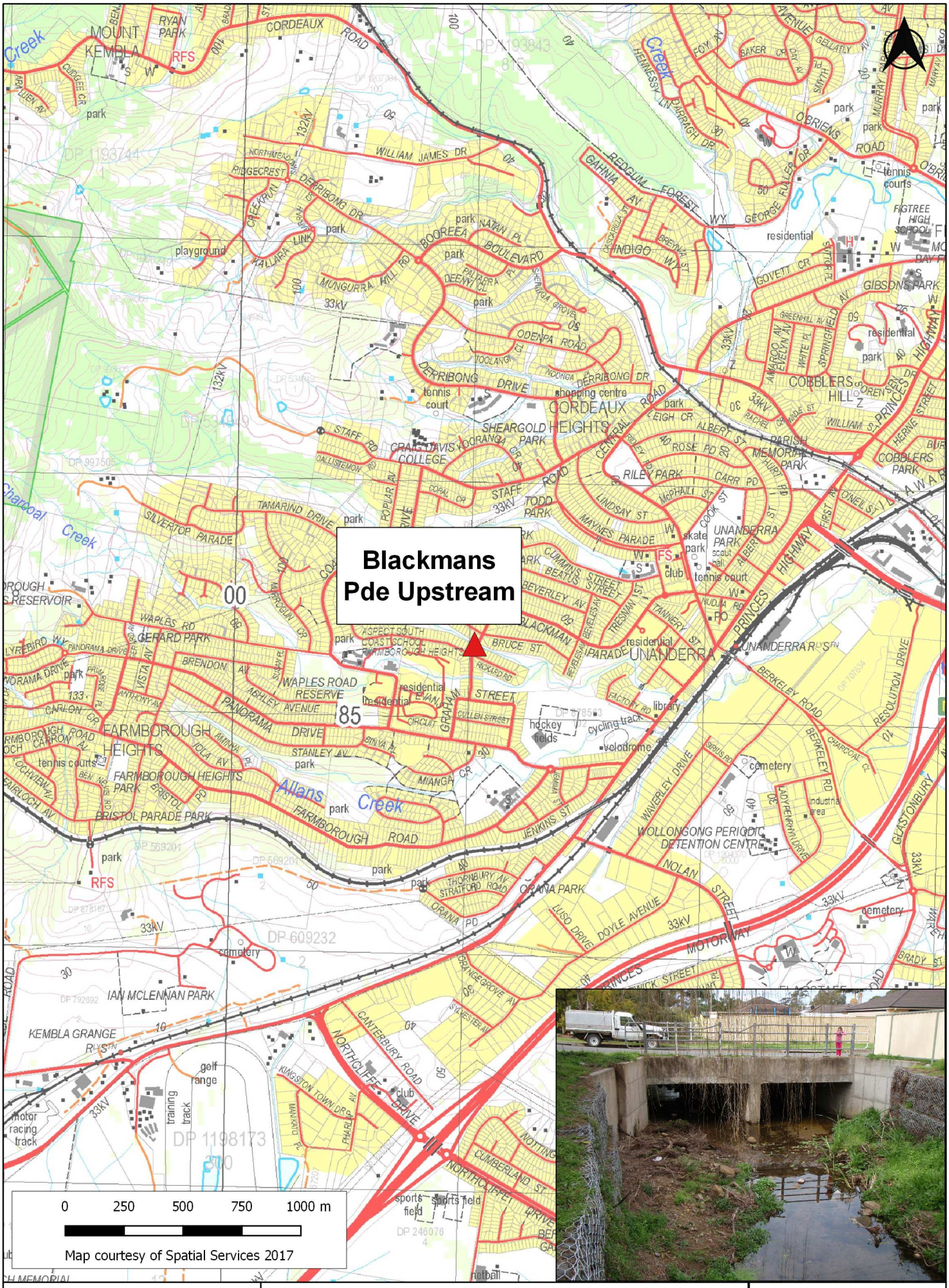

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Blackmans Pde Upstream

MHL 2546

Figure 215

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: American Creek		Station name: Blackmans Parade Upstream	
AWRC No: 214430		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 301022	Northing: 6185316
Geographic co-ordinate system:		Latitude: -34.45453200	Longitude: 150.83392700
TRIM reference: FILE17/73281		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: May 2003		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 16872 Order of accuracy: L3 PM/SSM RL (mAHD): 28.578 Local BM description: Triangle cut in concrete culvert structure. Local BM location: On top of concrete culvert structure, downstream side on left bank. 2m south of instrument cabinet.		Local BM RL (mAHD): 24.453 Station datum: Culvert Bed Date of last survey: 10 April 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 25.19	1% AEP (mAHD): 25.25	Instrumentation height (mAHD): 24.5	
Hydraulic characteristics: Non-tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. Station installed after 1998 flood to understand the effect the culvert and road bridge have on the water levels during floods. For comparison, there is a station downstream of the bridge.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Blackmans Pde Downstream



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Blackmans Pde Downstream

MHL 2546

Figure 216

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: American Creek		Station name: Blackmans Parade Downstream	
AWRC No: 214431		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 301043	Northing: 6185312
Geographic co-ordinate system:		Latitude: -34.45457243	Longitude: 150.83415045
TRIM reference: FILE17/73282		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: October 2001		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 16872 Order of accuracy: L3 PM/SSM RL (mAHD): 28.578 Local BM description: Triangle cut in concrete culvert structure. Local BM location: On top of concrete culvert structure, downstream side on left bank. 2m south of instrument cabinet.		Local BM RL (mAHD): 24.453 Station datum: Culvert Bed Date of last survey: 10 April 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 22.81	1% AEP (mAHD): 25.05	Instrumentation height (mAHD): 24.5	
Hydraulic characteristics: Non-tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. Station installed after 1998 flood to understand the effect the culvert and road bridge have on the water levels during floods. For comparison, there is a station upstream of the bridge.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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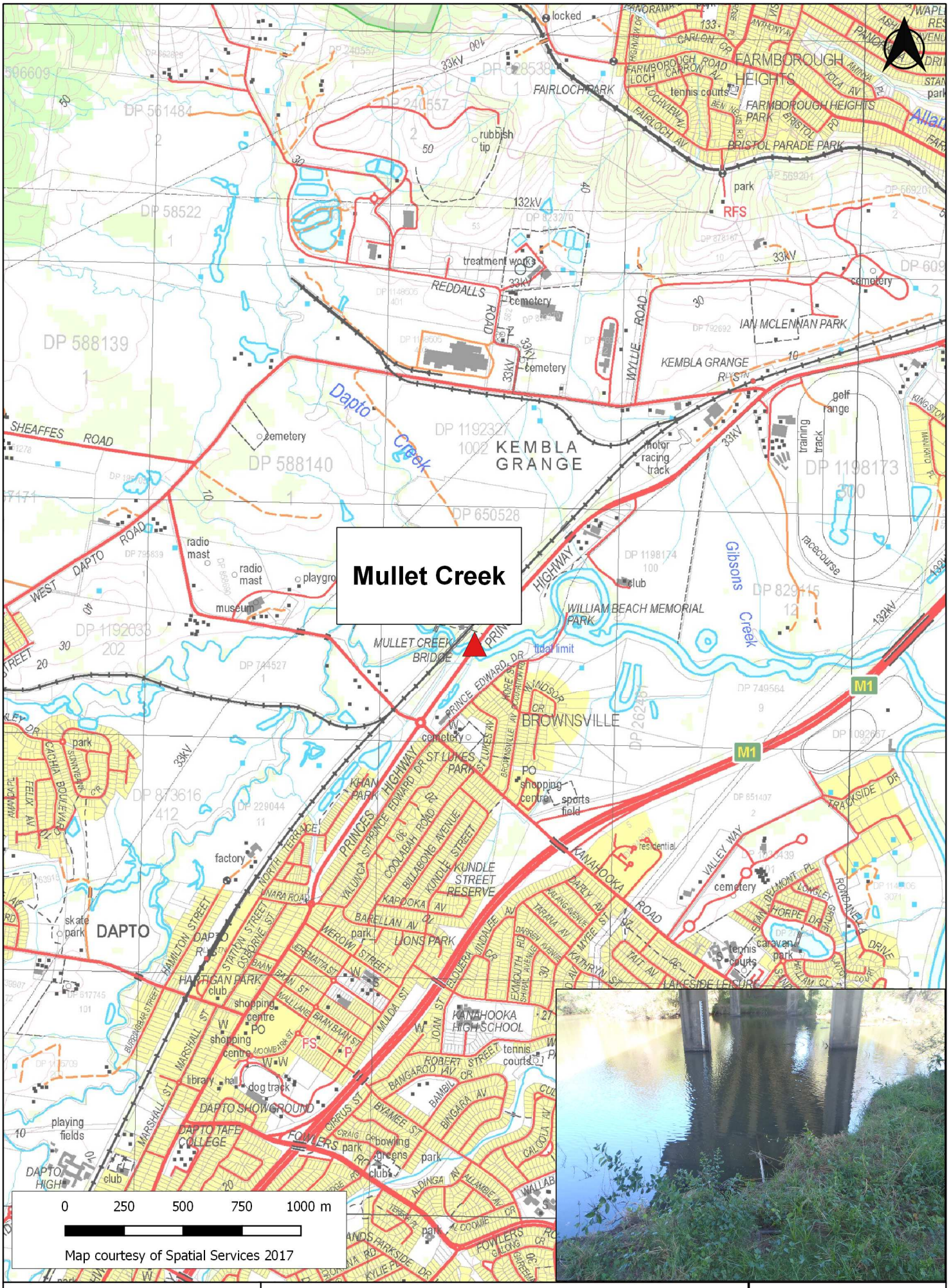

NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Mullet Creek**	**MHL 2546** **Figure 217** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Mullet Creek		Station name: Mullet Creek	
AWRC No: 214400		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 298397	Northing: 6182420
Geographic co-ordinate system:		Latitude: -34.48012037	Longitude: 150.80468201
TRIM reference: FILE17/65391		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: April 1985		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 79341 Order of accuracy: L2 PM/SSM RL (mAHD): 8.156 Local BM description: Pin in concrete slab. Local BM location: In south east edge of concrete slab for the instrument cabinet, next to gate.		Local BM RL (mAHD): 6.027 Station datum: AHD Date of last survey: 6 June 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 4.77	1% AEP (mAHD): 5.59	Instrumentation height (mAHD): 7.5	
Hydraulic characteristics: Non-tidal, upstream of weir.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. In addition to the warning of flood risk at Dapto, the gauge records water level data that can be used to correlate flooding and water quality issues in Lake Illawarra.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Koonawarra Bay

MHL 2546

Figure 218

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Lake Illawarra		Station name: Koonawarra Bay	
AWRC No: 214440		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 300464	Northing: 6179788
Geographic co-ordinate system:		Latitude: -34.50424131	Longitude: 150.82656027
TRIM reference: FILE17/65390		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: June 1994		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 24491 Order of accuracy: 2 PM/SSM RL (mAHD): 19.930 Local BM description: Steel pin in concrete Local BM location In concrete slab of stairway, next to boat ramp. On the eastern side of ramp.		Local BM RL (mAHD): 1.483 Station datum: AHD Date of last survey: 13 April 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2007 to June 2018		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.287 MHWS: 0.216 MHW: 0.207 MHWN: 0.198 MSL: 0.161	0.049 0.034 0.033 0.031 0.025	MLWN: 0.124 MLW: 0.116 MLWS: 0.107 ISLW: 0.056 Tidal range (HHWSS – ISLW): 0.232	0.021 0.021 0.021 0.024 0.056
STATION CHARACTERISTICS			
General comments: In March 2014 the off the shore submersible pressure transducer station was moved to the shore to reduce access safety risks.			
Peak flood of record (mAHD): 1.50	1% AEP (mAHD): 2.24	Instrumentation height (mAHD): 2.7	
Hydraulic characteristics: In 2008, Lake Illawarra had training walls erected and is now well-flushed and the entrance is permanently open.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to monitor water levels in Lake Illawarra for flood mitigation and management of entrance opening regime. Conductivity and temperature sensors installed in July 1993 and pH and DO sensors installed in Oct 2010 are under a project funded by Wollongong City Council. The water quality monitoring is to cease in July 2018.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Cudgeree Bay

MHL 2546

Figure 219

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Lake Illawarra		Station name: Cudgeree Bay	
AWRC No: 214416		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 303934	Northing: 6177233
Geographic co-ordinate system:		Latitude: -34.52793308	Longitude: 150.86374587
TRIM reference: FILE17/65388		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dial-up)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: December 1987		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 16855 Order of accuracy: L2 PM/SSM RL (mAHD): 2.122 Local BM description: Steel pin on top of wooden post. Local BM location: On top of green wooden post. 1m south of instrument cabinet.		Local BM RL (mAHD): 1.610 Station datum: AHD Date of last survey: 12 April 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2007 to June 2018		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.301 MHWS: 0.225 MHW: 0.216 MHWN: 0.208 MSL: 0.164	0.051 0.035 0.033 0.031 0.020	MLWN: 0.121 MLW: 0.112 MLWS: 0.104 ISLW: 0.049 Tidal range (HHWSS – ISLW): 0.252	0.014 0.014 0.014 0.019 0.062
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.55	1% AEP (mAHD): 2.24	Instrumentation height (mAHD): 1.9	
Hydraulic characteristics: In 2008, Lake Illawarra had training walls erected and is now well-flushed and the entrance is permanently open.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge is recording water quality and water level data to assist in developing solutions for the contamination of lake waters and extensive weed growth and its subsequent 'die off'. Conductivity, temperature and pH sensors installed in Feb 1993 are funded by Wollongong City Council. Water quality monitoring of conductivity and pH is to cease in 2018. Temperature monitoring will continue, funded by TRUenergy.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Lake Illawarra Entrance

MHL 2546

Figure 220

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Lake Illawarra		Station name: Lake Illawarra Entrance	
AWRC No: 214417		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 304579	Northing: 6176195
Geographic co-ordinate system:		Latitude: -34.53741012	Longitude: 150.87053098
TRIM reference: FILE17/65376		LGA: Wollongong City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: July 1991		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 99194 Order of accuracy: L3 PM/SSM RL (mAHD): 1.490 Local BM description: Steel bolt in concrete slab. Local BM location: In concrete slab of garbage bin structure 10m north of playground. 20m north of instrument cabinet.		Local BM RL (mAHD): 1.786 Station datum: AHD Date of last survey: 12 April 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1992 – June 2018		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.710 MHWS: 0.480 MHW: 0.420 MHWN: 0.359 MSL: 0.138	0.059 0.042 0.036 0.031 0.023	MLWN: -0.083 MLW: -0.144 MLWS: -0.205 ISLW: -0.369 Tidal range (HHWSS – ISLW): 1.079	0.030 0.036 0.042 0.053 0.102
STATION CHARACTERISTICS			
General comments: In November 1999, this station was moved further upstream of the original location to improve data capture.			
Peak flood of record (mAHD): 1.58	1% AEP (mAHD): 2.00	Instrumentation height (mAHD): 2.7	
Hydraulic characteristics: In 2008, Lake Illawarra had training walls erected and is now well-flushed and the entrance is permanently open.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge provides valuable baseline data relating entrance conditions to water quality and the severity of flooding in the lake.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Princes Highway (Macquarie Rivulet)



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Princes Highway (Macquarie Rivulet)

MHL 2546

Figure 221

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Macquarie Rivulet		Station name: Princes Highway (Macquarie Rivulet)	
AWRC No: 214402		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 296808	Northing: 6174979
Geographic co-ordinate system:		Latitude: -34.54686232	Longitude: 150.78561618
TRIM reference: FILE17/65373		LGA: Shellharbour City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas Purge		Secondary sensor type: Radar	
Primary sensor installation date: December 1984		Secondary sensor installation date: February 2018	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10m	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 21671 Order of accuracy: L3 PM/SSM RL (mAHD): 4.864 Local BM description: Steel bolt in concrete slab. Local BM location: In southern corner of concrete slab for the instrument cabinet, next to gate.		Local BM RL (mAHD): 6.541 Station datum: AHD Date of last survey: 6 June 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor – not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: The secondary radar sensor, located on the bridge, is being used to verify the flood peak data captured by the gas purge system.			
Peak flood of record (mAHD): 3.65	1% AEP (mAHD): 5.44	Instrumentation height (mAHD): 7.5	
Hydraulic characteristics: Very small tidal range, close to tidal limit.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge provides data that can be used for reviewing flood damage in the district and assisting in the assessment of water quality issues in Lake Illawarra.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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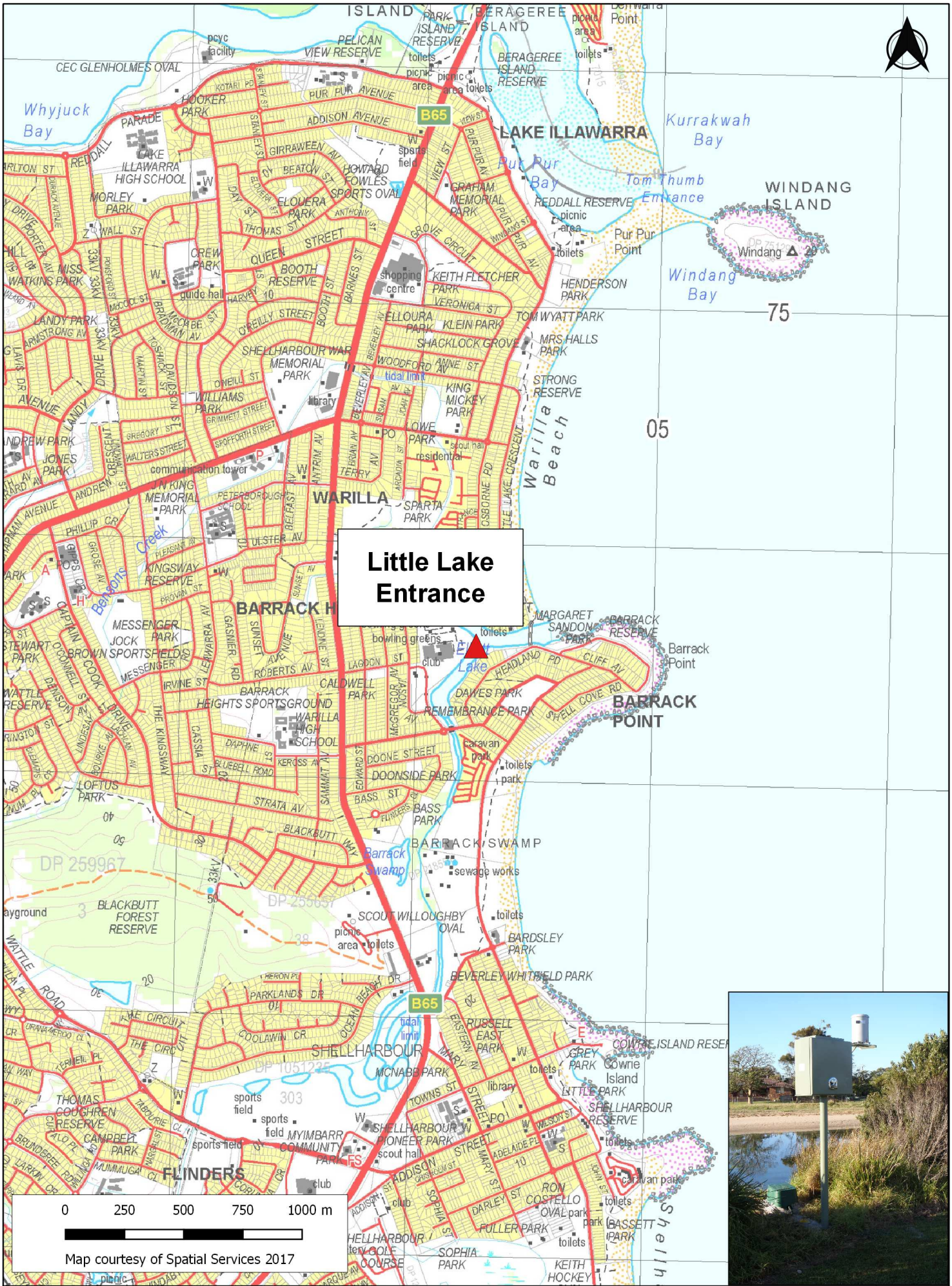

Manly Hydraulics Laboratory

STATION LOCATION
Little Lake Entrance

MHL 2546

Figure 222

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Little Lake		Station name: Little Lake Entrance	
AWRC No: 214467		BoM No: 568190	
MGA co-ordinates zone: 56		Easting: 304250	Northing: 6173571
Geographic co-ordinate system:		Latitude: -34.56099463	Longitude: 150.86634435
TRIM reference: FILE17/65369		LGA: Shellharbour City Council	Rainfall district: 68
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: May 2014		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 128487 Order of accuracy: B4 PM/SSM RL (mAHD): 1.771 Local BM description: Steel pin in concrete. Local BM location: In concrete 1m east of instrument cabinet. Next to instrument access pit.		Local BM RL (mAHD): 1.863 Station datum: AHD Date of last survey: 12 April 2018 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor – not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Rain gauge station since May 2014. The original Little Lake gauge (214466) was decommissioned and moved to this location to capture the full range of the tide.			
Peak flood of record (mAHD): 1.88	1% AEP (mAHD): 2.33	Instrumentation height (mAHD): 3.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge was installed to establish valuable baseline data on tides and entrance stability that is available for use for flood studies.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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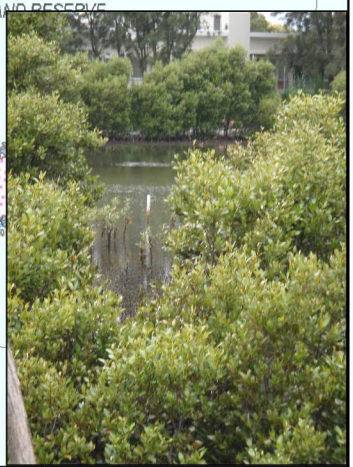
Little Lake



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Map courtesy of Spatial Services 2017

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STATION LOCATION
Little Lake

MHL 2546

Figure 223

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Little Lake		Station name: Little Lake	
AWRC No: 214466		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 304058	Northing: 6173347
Geographic co-ordinate system:		Latitude: -34.56297496	Longitude: 150.86420552
TRIM reference: Local office file FILE16/66993		LGA: Shellharbour City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: NA	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: May 1992		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 14895 Order of accuracy: L3 PM/SSM RL (mAHD): 6.087 Local BM description: Steel pin in concrete slab. Local BM location: In north east corner of concrete slab for the instrument cabinet.		Local BM RL (mAHD): 1.705 Station datum: AHD Date of last survey: 15 August 2012 Surveyed by: Nathan Cameron Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good – data not averaged as the hydraulics are too variable.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Station decommissioned on 17 October 2014 and relocated to Little Lake Entrance. Rain gauge operated from May 1991 to Oct 2014.			
Peak flood of record (mAHD): 1.55	1% AEP (mAHD): NA	Instrumentation height (mAHD): NA	
Hydraulic characteristics: Tidal, shallow not catching low tides.			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge was installed to establish valuable baseline data on tides and entrance stability that is available for use for flood studies.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Decommissioned		Revision date: 17 September 2018	

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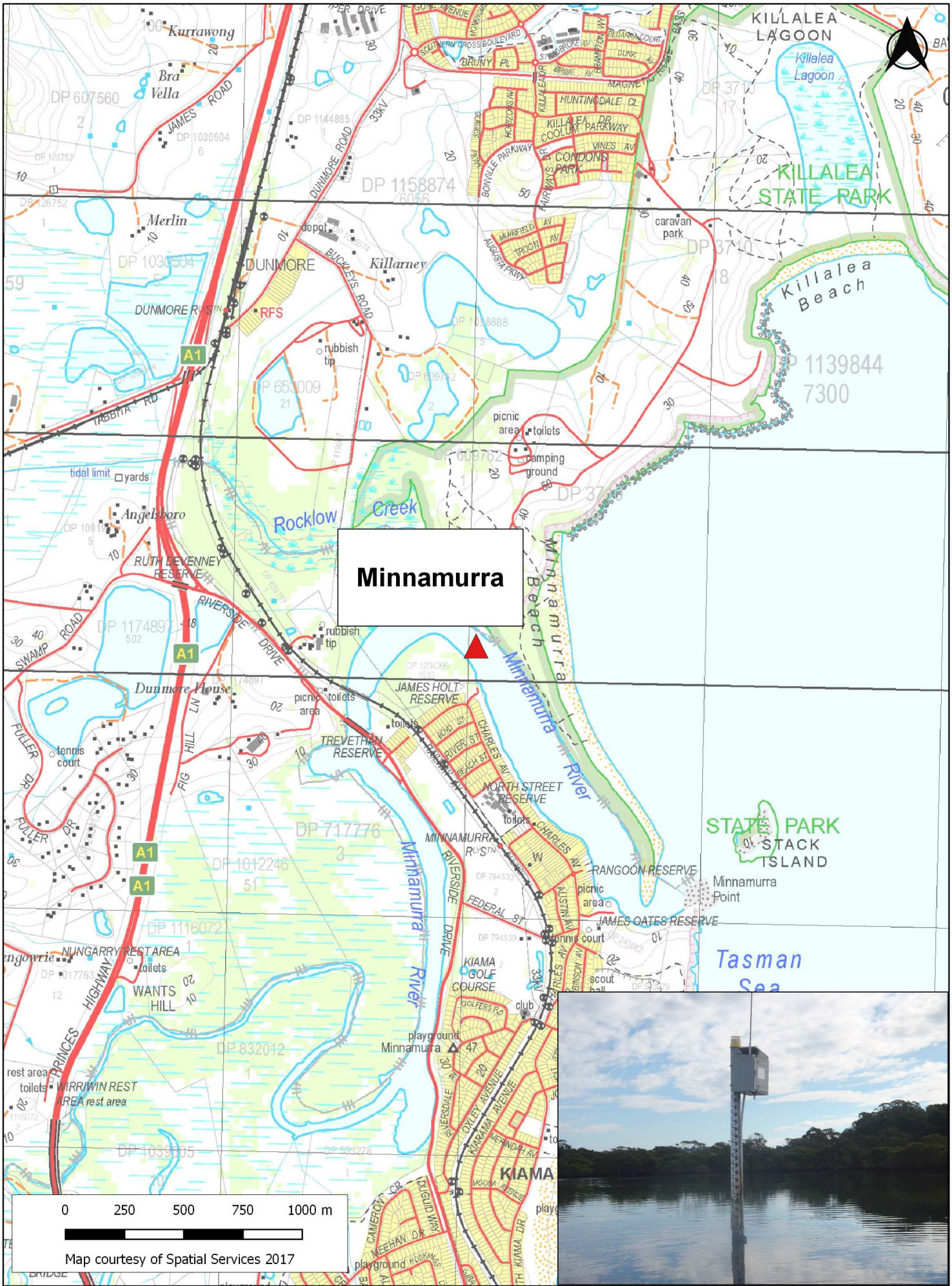

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STATION LOCATION
Minnamurra

MHL 2546

Figure 224

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Minnamurra River		Station name: Minnamurra	
AWRC No: 214442		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 303031	Northing: 6167146
Geographic co-ordinate system:		Latitude: -34.61866188	Longitude: 150.85157504
TRIM reference: FILE17/49742		LGA: Kiama Municipal Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: March 2002		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 81579 Order of accuracy: L2 PM/SSM RL (mAHD): 3.238 Local BM description: TBM top of bolt Local BM location: On SW corner near the top of boat ramp. Boat Ramp located in James Holt Reserve off Charles Avenue.		Local BM RL (mAHD): 3.577 Station datum: AHD Date of last survey: 24 October 2017 Surveyed by: Greg Thatcher Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2002 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.943 MHWS: 0.590 MHW: 0.508 MHWN: 0.427 MSL: 0.113	0.032 0.028 0.026 0.025 0.023	MLWN: -0.201 MLW: -0.282 MLWS: -0.364 ISLW: -0.616 Tidal range (HHWSS – ISLW): 1.558	0.021 0.020 0.021 0.019 0.026
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.78	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 1.9	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: Station was installed to monitor tide and flood levels under the Estuary Program.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Werri Lagoon



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Werri Lagoon

MHL 2546
Figure 225
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Werri Lagoon		Station name: Werri Lagoon	
AWRC No: 214445		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 301816	Northing: 6155035
Geographic co-ordinate system:		Latitude: -34.72756587	Longitude: 150.83549225
TRIM reference: FILE17/49761		LGA: Kiama Municipal Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: August 2002		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 17291 Order of accuracy: L1 PM/SSM RL (mAHD): 7.058 Local BM description: TBM 1 concrete rim of manhole cover. Local BM location: At sewer pump station located in Birriebungie Reserve up stream of tide pole. Station staff gauge located here.		Local BM RL (mAHD): 2.484 Station datum: AHD Date of last survey: 13 October 2008 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor – not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.25	1% AEP (mAHD): 2.8	Instrumentation height (mAHD): 2.1	
Hydraulic characteristics: ICOLL, entrance rarely open. Insufficient tidal influence to perform harmonic analysis.			
Purpose of installation and current functionality: Station was installed to monitor water levels in the lagoon under the Estuary Program as part of an Entrance Management Plan.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Gerroa



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Gerroa

MHL 2546

Figure 226

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Crooked River		Station name: Gerroa	
AWRC No: 215410		BoM No: 568179	
MGA co-ordinates zone: 56		Easting: 299419	Northing: 6150158
Geographic co-ordinate system:		Latitude: -34.77104560	Longitude: 150.80816852
TRIM reference: FILE17/49783		LGA: Kiama Municipal Council	Rainfall district: 68
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: NA	
Primary sensor installation date: February 1999		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: 60 sec average B/A 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 46713 Order of accuracy: L3 PM/SSM RL (mAHD): 3.183 Local BM description: PM 46713. Pin in cast iron box. Local BM location: On eastern side of Crooked River Rd. 10m SE from end of hand rail. Bracket still on bridge near recorder.		Local BM RL (mAHD): 3.183 Station datum: AHD Date of last survey: 24 October 2017 Surveyed by: Greg Thatcher Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.86	1% AEP (mAHD): 2.62	Instrumentation height (mAHD): 5.0	
Hydraulic characteristics: ICOLL, entrance rarely open.			
Purpose of installation and current functionality: Station was installed to monitor water levels in the lagoon under the Estuary Program as part of an Entrance Management Plan.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Shoalhaven Heads

MHL 2546

Figure 227

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Shoalhaven River		Station name: Shoalhaven Heads	
AWRC No: 215470		BoM No: 568195	
MGA co-ordinates zone: 56		Easting: 293877	Northing: 6140761
Geographic co-ordinate system:		Latitude: -34.85461430	Longitude: 150.74534326
TRIM reference: FILE17/49789		LGA: Shoalhaven City Council	Rainfall district: 68
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: February 1991		Secondary sensor installation date: July 2010	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: Instantaneous 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 27434 Order of accuracy: L2 PM/SSM RL (mAHD): 2.022 Local BM description: PM 27434. Pin in cast iron box. Local BM location: On northern side of River Rd, directly opposite recorder.		Local BM RL (mAHD): 2.022 Station datum: AHD Date of last survey: 26 October 2017 Surveyed by: Greg Thatcher Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1991 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.785 MHWS: 0.473 MHW: 0.408 MHWN: 0.342 MSL: 0.080	0.058 0.045 0.039 0.034 0.025	MLWN: -0.183 MLW: -0.248 MLWS: -0.313 ISLW: -0.537 Tidal range (HHWSS – ISLW): 1.322	0.027 0.030 0.034 0.041 0.086
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.26	1% AEP (mAHD): 3?	Instrumentation height (mAHD): 2.5	
Hydraulic characteristics: Tidal, with periodic opening of Shoalhaven Heads entrance impacting on tidal planes.			
Purpose of installation and current functionality: Station was to monitor ocean tide levels at Shoalhaven River entrance as part of the Storm Surge Program with AWRC number of 215421 before 2010. It was relocated to the bank with 2 submersible pressure transducer sensors in 2010.			
Station shown on BoM website: Continuous 15 minute data from a non-MHL station is displayed. MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Hay Street

MHL 2546

Figure 228

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Shoalhaven River		Station name: Hay Street	
AWRC No: 215415		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 292468	Northing: 6140163
Geographic co-ordinate system:		Latitude: -34.85971597	Longitude: 150.72979364
TRIM reference: FILE17/49879		LGA: Shoalhaven City Council	Rainfall district: NA

INSTRUMENTATION	
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)	Communication type: Mobile 3G/4G (IP)
Primary sensor type: Submersible pressure transducer	Secondary sensor type: NA
Primary sensor installation date: January 2002	Secondary sensor installation date: NA
Range of primary water level sensor (m): 10	Range of secondary water level sensor (m): NA
Primary sensor sampling regime: Instantaneous 15 minute	Secondary sensor sampling regime: NA

SURVEY DETAILS	
PM/SSM reference: PM 27439	Local BM RL (mAHD): 1.328
Order of accuracy: L2	Station datum: AHD
PM/SSM RL (mAHD): 1.305	Date of last survey: 24 October 2017
Local BM description: Top of a Dyna Bolt within triangle.	Surveyed by: Greg Thatcher
Local BM location: On SW corner of concrete pad of fish cleaning table. Table 15m south of recorder.	Gauge plate offset to gauge zero (m): NA

TIDAL PLANES (mAHD)			
Period analysed: July 2002 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.801	0.019	MLWN: -0.164	0.014
MHWS: 0.488	0.017	MLW: -0.229	0.015
MHW: 0.423	0.017	MLWS: -0.294	0.015
MHWN: 0.358	0.016	ISLW: -0.518	0.015
MSL: 0.097	0.015	Tidal range (HHWSS – ISLW): 1.318	0.017

STATION CHARACTERISTICS		
General comments: Station was originally at Wharf Road (AWRC No. 215425) and was moved to Hay Street (AWRC No. 205415) in 2002.		
Peak flood of record (mAHD): 2.27	1% AEP (mAHD): 3.3	Instrumentation height (mAHD): 2.9
Hydraulic characteristics: Tidal		
Purpose of installation and current functionality: Gauge was installed for the Floodplain Management Program to monitor flooding of the Shoalhaven River.		
Station shown on BoM website: MHL data for this station is not displayed.		
SES flood classification: None		
Data used for BoM flood forecasting: No		BoM priority: NA
Station recommendations: Maintain		Revision date: 17 September 2018

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STATION LOCATION
Terara

MHL 2546

Figure 229

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Shoalhaven River		Station name: Terara	
AWRC No: 215420		BoM No: 068221	
MGA co-ordinates zone: 56		Easting: 283258	Northing: 6139535
Geographic co-ordinate system:		Latitude: -34.86345216	Longitude: 150.62895721
TRIM reference: FILE17/49885		LGA: Shoalhaven City Council	Rainfall district: 68

INSTRUMENTATION	
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)	Communication type: Mobile 3G/4G (IP)
Primary sensor type: Gas purge	Secondary sensor type: NA
Primary sensor installation date: August 2001	Secondary sensor installation date: NA
Range of primary water level sensor (m): 10	Range of secondary water level sensor (m): NA
Primary sensor sampling regime: Instantaneous 15 minute	Secondary sensor sampling regime: NA

SURVEY DETAILS	
PM/SSM reference: PM 73864 Order of accuracy: U PM/SSM RL (mAHD): 3.124 Local BM description: Pin in SW corner of picnic table pad. Local BM location: Table located 70 m west of recorder opposite Holme St.	Local BM RL (mAHD): 4.641 Station datum: AHD Date of last survey: 11 August 2001 Surveyed by: D McPherson Gauge plate offset to gauge zero (m): NA

TIDAL PLANES (mAHD)			
Period analysed: July 2001 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.764	0.026	MLWN: -0.167	0.038
MHWS: 0.461	0.028	MLW: -0.222	0.039
MHW: 0.406	0.028	MLWS: -0.276	0.039
MHWN: 0.352	0.027	ISLW: -0.493	0.043
MSL: 0.092	0.032	Tidal range (HHWSS – ISLW): 1.256	0.032

STATION CHARACTERISTICS		
General comments: None		
Peak flood of record (mAHD): 3.63	1% AEP (mAHD): 5.5	Instrumentation height (mAHD): 5.5
Hydraulic characteristics: Tidal		
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to monitor tide and flood levels on the Shoalhaven River.		
Station shown on BoM website: MHL data for this station is not displayed. There is a Shoalhaven City Council operated ERTS canister at same location of MHL station connected to the same gas line. Council data is utilised by the BoM.		
SES flood classification: Minor: 2.20m, Moderate: 3.00m, Major: 3.90m		
Data used for BoM flood forecasting: Yes		BoM priority: High
Station recommendations: Maintain		Revision date: 17 September 2018

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Nowra Bridge



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Nowra Bridge

MHL 2546

Figure 230

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Shoalhaven River		Station name: Nowra Bridge	
AWRC No: 215411		BoM No: 068213	
MGA co-ordinates zone: 56		Easting: 280834	Northing: 6139287
Geographic co-ordinate system:		Latitude: -34.86516676	Longitude: 150.60239552
TRIM reference: FILE17/49892		LGA: Shoalhaven City Council	Rainfall district: 68
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: August 1990		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 55662 Order of accuracy: L2 PM/SSM RL (mAHD): 4.811 Local BM description: Galvanised bolt. Part of the support structure of lamp pole. Local BM location: North west bolt. Pole located 50m north east of recorder on boat ramp wharf.		Local BM RL (mAHD): 1.826 Station datum: AHD Date of last survey: 25 October 2017 Surveyed by: Greg Thatcher Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1993 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.786 MHWS: 0.489 MHW: 0.437 MHWN: 0.385 MSL: 0.133	0.054 0.054 0.053 0.052 0.051	MLWN: -0.120 MLW: -0.171 MLWS: -0.223 ISLW: -0.436 Tidal range (HHWSS – ISLW): 1.222	0.053 0.052 0.052 0.057 0.047
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 4.13	1% AEP (mAHD): 6.3	Instrumentation height (mAHD): 6.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. The gauge captures tide and flood events in the Shoalhaven River and is useful in verifying numerical models and providing flood warning.			
Station shown on BoM website: MHL data for this station is not displayed. There is a Shoalhaven City Council operated ERTS canister in the cabinet of MHL station connected to the same gas line. Council data is utilised by the BoM.			
SES flood classification: Minor: 2.30m, Moderate: 3.30m, Major: 4.30m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Gradys Caravan Park

ILLAROO

BURRIER

GELLA

Timbre Laine

Sunny Glen

HUGHES ROAD

BUNDANON ROAD

RIVER

Meadow Creek

tidal limit

conveyor belt

quarry

locked

grave

BURRIER ROAD

OLD BURRIER ROAD

caravan park

Learie Park

Baringella

33KV

330KV

0 250 500 750 1000 m

Map courtesy of Spatial Services 2017



NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Gradys Caravan Park

MHL 2546

Figure 231

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Shoalhaven River		Station name: Gradys Caravan Park	
AWRC No: 215430		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 268094	Northing: 6138339
Geographic co-ordinate system:		Latitude: -34.87088005	Longitude: 150.46287941
TRIM reference: FILE17/49900		LGA: Shoalhaven City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: October 2010		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 144042 Order of accuracy: 2 PM/SSM RL (mAHD):11.232 Local BM description: Wooden peg Local BM location: Located at NE corner of recorder hut.		Local BM RL (mAHD): 17.370 Station datum: AHD Date of last survey: 21 September 2015 Surveyed by: D McPherson Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good - not calculated due to limited record.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Tidal planes functionality is good, however further data is required before tidal planes analysis can be conducted. Station installed to replace Gradys (205452) which was decommissioned in Jan 2010.			
Peak flood of record (mAHD): 11.94	1% AEP (mAHD): 20.6	Instrumentation height (mAHD): 17.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor water levels in the upper river. Conductivity and temperature sensors were installed in Oct 2010 under a program funded by WaterNSW (formerly NSW Office of Water) for the Water Sharing Plan.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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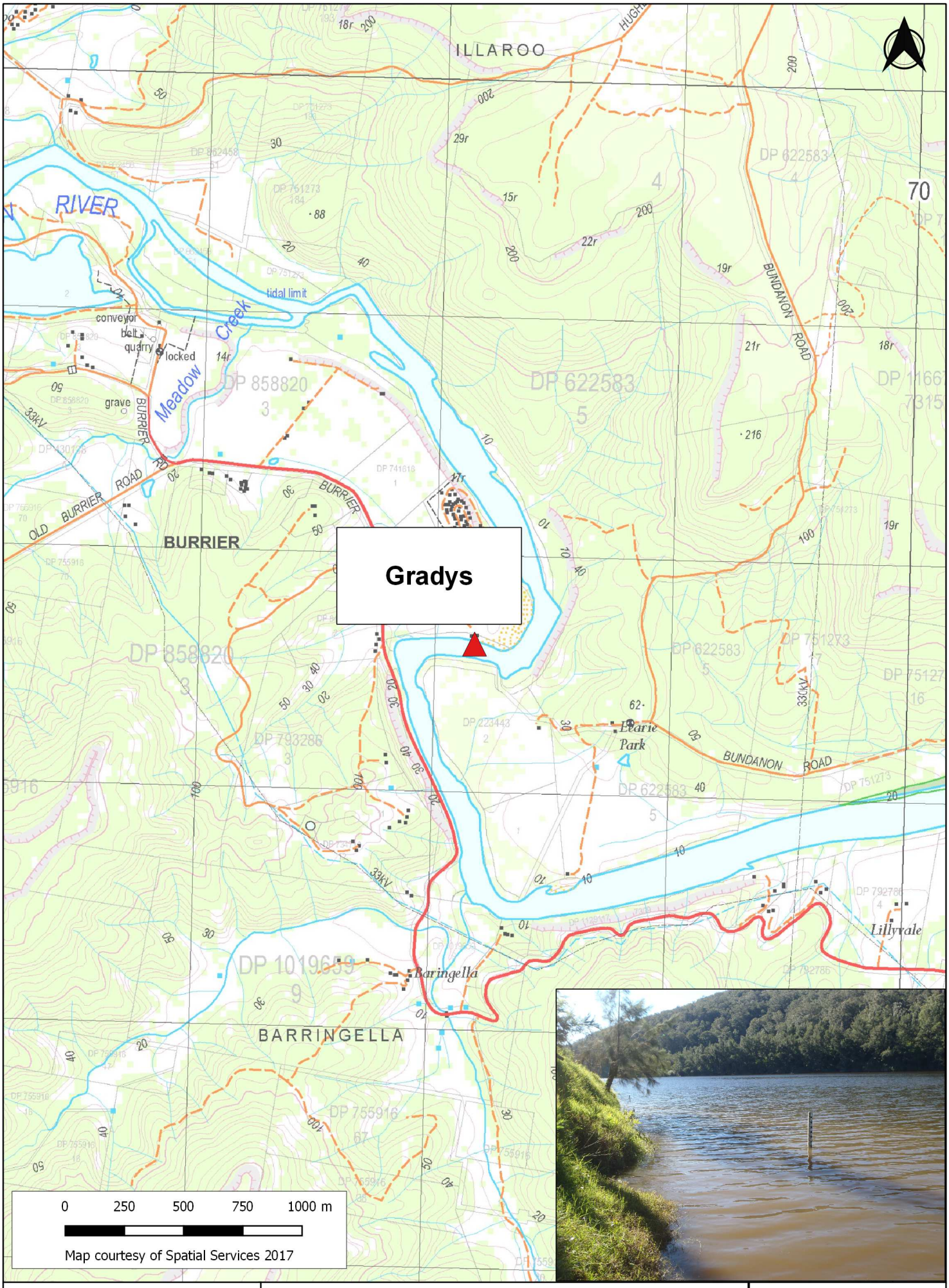

Manly Hydraulics Laboratory

STATION LOCATION
Gradys

MHL 2546

Figure 232

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Shoalhaven River		Station name: Gradys	
AWRC No: 215452		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 268167	Northing: 6137627
Geographic co-ordinate system:		Latitude: -34.87731095	Longitude: 150.46348023
TRIM reference: Local office file FILE16/67047		LGA: Shoalhaven City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: NA	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: February 2006		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 144045 Order of accuracy: 2 PM/SSM RL (mAHD): 7.232 Local BM description: Tek screw Local BM location: Top of new peg on bank		Local BM RL (mAHD): 1.622 Station datum: AHD Date of last survey: 10 August 2006 Surveyed by: Steven Holtznagel Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2006 to June 2009		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.748 MHWS: 0.446 MHW: 0.387 MHWN: 0.328 MSL: 0.035	0.024 0.022 0.021 0.020 0.017	MLWN: -0.259 MLW: -0.318 MLWS: -0.377 ISLW: -0.593 Tidal range (HHWSS – ISLW): 1.340	0.016 0.016 0.015 0.016 0.023
STATION CHARACTERISTICS			
General comments: Data until 7 Jan 2010. Station decommissioned due site owner's decision to revoke access. Replacement station is at Gradys Caravan Park, a short distance upstream.			
Peak flood of record (mAHD): 2.71	1% AEP (mAHD): NA	Instrumentation height (mAHD): NA	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor water levels in the upper river.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Decommissioned		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

STATION LOCATION
Crookhaven Heads

MHL 2546

Figure 233

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Crookhaven River		Station name: Crookhaven Heads	
AWRC No: 215408		BoM No: 568044	
MGA co-ordinates zone: 56		Easting: 295288	Northing: 6135163
Geographic co-ordinate system:		Latitude: -34.90534030	Longitude: 150.75939700
TRIM reference: FILE17/74042		LGA: Shoalhaven City Council	Rainfall district: 68
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: March 1992		Secondary sensor installation date: July 2010	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: SSM 119226 Order of accuracy: E5 PM/SSM RL (mAHD): 1.794 Local BM description: BM dip point Local BM location: Underside of instrument box baseplate		Local BM RL (mAHD): 3.789 Station datum: AHD Date of last survey: 20 November 2015 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1991 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.951 MHWS: 0.589 MHW: 0.487 MHWN: 0.385 MSL: 0.030	0.054 0.044 0.042 0.040 0.037	MLWN: -0.325 MLW: -0.427 MLWS: -0.530 ISLW: -0.788 Tidal range (HHWSS – ISLW): 1.738	0.046 0.048 0.051 0.058 0.085
STATION CHARACTERISTICS			
General comments: EWS until Apr 2011, after which it was converted to a submersible pressure transducer. Reference survey mark surveyed in by Public Works Survey Branch however the order of accuracy was not uploaded to SCIMS.			
Peak flood of record (mAHD): 1.65	1% AEP (mAHD): 3	Instrumentation height (mAHD): 3.8	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: To monitor ocean tide levels at the entrance to the Crookhaven River as a part of the Ocean Tide Program.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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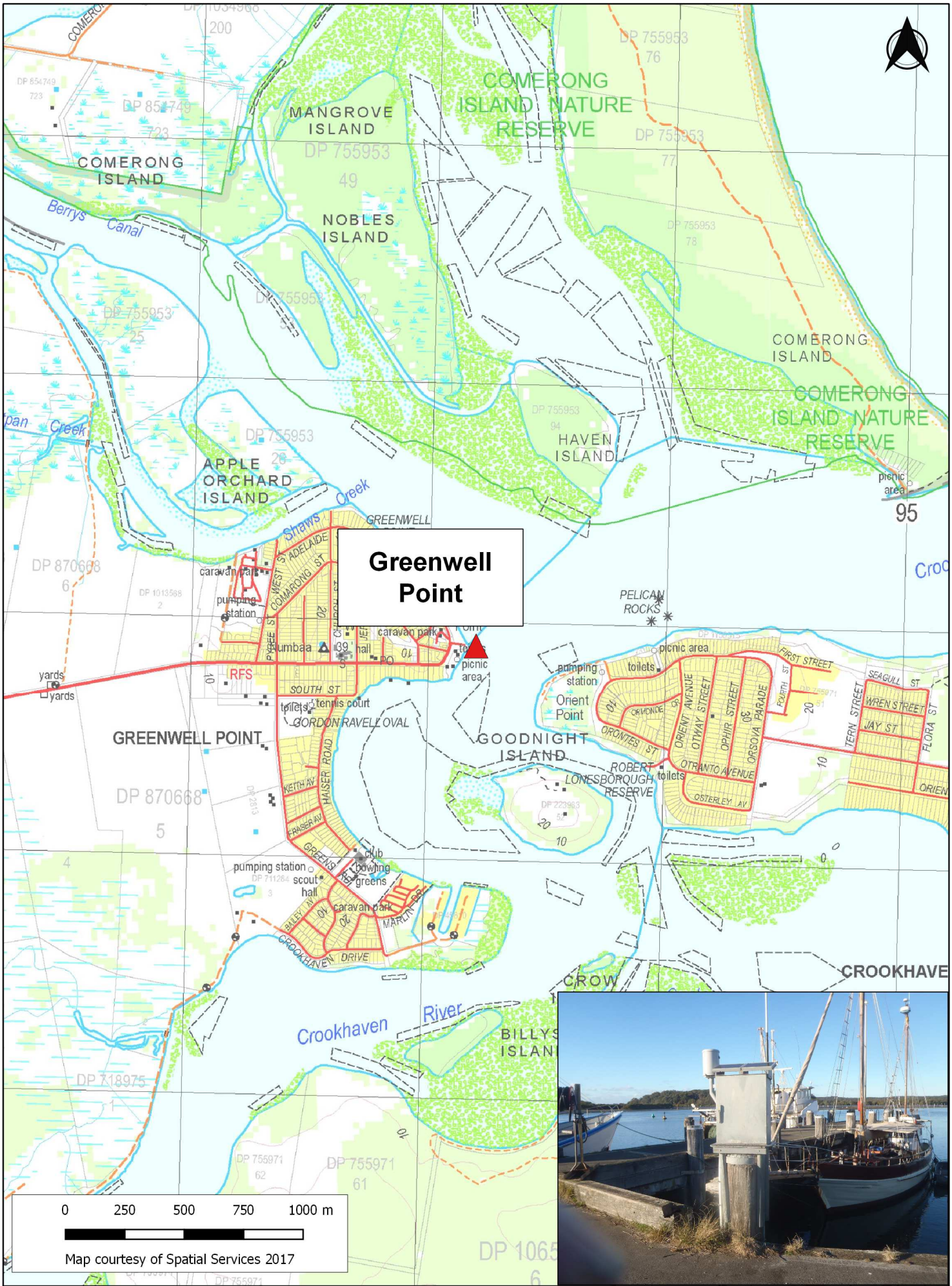

Manly Hydraulics Laboratory	**STATION LOCATION** **Greenwell Point**	**MHL 2546** **Figure 234** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Crookhaven River		Station name: Greenwell Point	
AWRC No: 215417		BoM No: 568180	
MGA co-ordinates zone: 56		Easting: 293199	Northing: 6134901
Geographic co-ordinate system:		Latitude: -34.90727853	Longitude: 150.73648424
TRIM reference: FILE17/49914		LGA: Shoalhaven City Council	Rainfall district: 68

INSTRUMENTATION	
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)	Communication type: Mobile 3G/4G (IP)
Primary sensor type: Submersible pressure transducer	Secondary sensor type: NA
Primary sensor installation date: December 1988	Secondary sensor installation date: NA
Range of primary water level sensor (m): 3.5	Range of secondary water level sensor (m): NA
Primary sensor sampling regime: Instantaneous 15 minute	Secondary sensor sampling regime: NA

SURVEY DETAILS	
PM/SSM reference: SSM 54436 Order of accuracy: L2 PM/SSM RL (mAHD):1.782 Local BM description: SSM 54436. Pin. Local BM location: On NW corner of Greenwell Point Fishermans Wharf 20m from recorder.	Local BM RL (mAHD): 1.782 Station datum: AHD Date of last survey: 17 December 2013 Surveyed by: D McPherson Gauge plate offset to gauge zero (m): NA

TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.827	0.042	MLWN: -0.251	0.040
MHWS: 0.499	0.036	MLW: -0.330	0.043
MHW: 0.420	0.035	MLWS: -0.409	0.046
MHWN: 0.342	0.034	ISLW: -0.642	0.051
MSL: 0.045	0.035	Tidal range (HHWSS – ISLW): 1.469	0.061

STATION CHARACTERISTICS		
General comments: None		
Peak flood of record (mAHD): 1.66	1% AEP (mAHD): 3.4	Instrumentation height (mAHD): 2.9
Hydraulic characteristics: Tidal		
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to record flood and storm surge data. Water level data captured by the gauge is useful for verifying the numerical model and to determine future management criteria to develop flood mitigation measures.		
Station shown on BoM website: MHL data for this station is not displayed. There is a Shoalhaven City Council operated ERTS canister in the cabinet of MHL station connected to a separate submersible pressure transducer. Council data is utilised by the BoM.		
SES flood classification: None		
Data used for BoM flood forecasting: Yes		BoM priority: Low
Station recommendations: Maintain		Revision date: 17 September 2018

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STATION LOCATION
Shoalhaven Offshore

MHL 2546

Figure 235

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tasman Sea		Station name: Shoalhaven Offshore	
AWRC No: 215450		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 297771	Northing: 6133980
Geographic co-ordinate system:		Latitude: -34.91650002	Longitude: 150.78626946
TRIM reference: FILE17/75239		LGA: NA	Rainfall district: NA
INSTRUMENTATION			
Logger type: Paroscientific RBR and Aanderaa		Communication type: NA	
Primary sensor type: Paroscientific pressure sensor		Secondary sensor type: Aanderaa – Pressure controlled oscillator	
Primary sensor installation date: February 2012		Secondary sensor installation date: September 2005	
Range of primary water level sensor (m): 50		Range of secondary water level sensor (m): 60	
Primary sensor sampling regime: 40 second integration B 5 minute		Secondary sensor sampling regime: 40 second integration B 60 minute	
SURVEY DETAILS			
PM/SSM reference: Order of accuracy: PM/SSM RL (mAHD): Local BM description: Local BM location:		Local BM RL (mAHD): Station datum: Approximated to Mean Sea Level Date of last survey: Surveyed by: Gauge plate offset to gauge zero (m):	
TIDAL PLANES (m Approximate Mean Sea Level)			
Period analysed: September 2005 to November 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.985 MHWS: 0.608 MHW: 0.492 MHWN: 0.376 MSL: 0.002	0.005 0.005 0.005 0.006 0.004	MLWN: -0.372 MLW: -0.488 MLWS: -0.604 ISLW: -0.874 Tidal range (HHWSS – ISLW): 1.860	0.003 0.004 0.004 0.004 0.005
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): NA	1% AEP (mAHD): NA	Instrumentation height (mAHD): NA	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: Installed under the Storm Surge Program. Offshore gauge to measure ocean level outside of river entrance and determine downstream tailwater level for river flooding investigations as the station is not impacted by riverine flooding. This station is stand alone and no real-time data is shown on the MHL public web. The sensor and logger is recovered from the ocean floor on an annual basis.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Wollumboola**	**MHL 2546** **Figure 236** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wollumboola Lake		Station name: Wollumboola	
AWRC No: 215454		BoM No: 568183	
MGA co-ordinates zone: 56		Easting: 295853	Northing: 6131507
Geographic co-ordinate system:		Latitude: -34.93839821	Longitude: 150.76468400
TRIM reference: FILE17/49919		LGA: Shoalhaven City Council	Rainfall district: 68
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dialup - CSD)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: July 1991		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 32623 Order of accuracy: L2 PM/SSM RL (mAHD):8.046 Local BM description: Triangle cut into concrete slab near male toilet block. Local BM location: Toilet block located at end of Wollumboola Lane at West Cres.		Local BM RL (mAHD): 4.172 Station datum: AHD Date of last survey: 22 March 2013 Surveyed by: Duncan Macpherson Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor – not calculated due to insufficient tidal influence.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.62	1% AEP (mAHD): 2.79	Instrumentation height (mAHD): 2.9	
Hydraulic characteristics: ICOLL, entrance rarely open. Council opens lake entrance when water level is 2.75m or higher.			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program and provides data on flood levels and on the hydrodynamics associated with the opening and closing of the entrance by artificial or natural means, and the corresponding relationship with water quality.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Currarong Creek

MHL 2546
Figure 237
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Currarong Creek		Station name: Currarong Creek	
AWRC No: 216405		BoM No: 568225	
MGA co-ordinates zone: 56		Easting: 301142	Northing: 6122850
Geographic co-ordinate system:		Latitude: -35.01745747	Longitude: 150.82049172
TRIM reference: FILE17/49949		LGA: Shoalhaven City Council	Rainfall district: 68
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: October 1995		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 27465 Order of accuracy: L2 PM/SSM RL (mAHD): 4.758 Local BM description: Steel ring in concrete wall Local BM location: On concrete wall south side boat ramp, behind boat shed. Accuracy compromised due to undermining and subsidence.		Local BM RL (mAHD): 1.026 Station datum: AHD Date of last survey: 27 October 2017 Surveyed by: D McPherson Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1997 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.840	0.044	MLWN: -0.041	0.019
MHWS: 0.544	0.037	MLW: -0.108	0.019
MHW: 0.477	0.032	MLWS: -0.175	0.020
MHWN: 0.409	0.028	ISLW: -0.387	0.025
MSL: 0.184	0.021	Tidal range (HHWSS – ISLW): 1.228	0.057
STATION CHARACTERISTICS			
General comments: Levels influenced by shoaling in creek. Barometric station since Feb 2000.			
Peak flood of record (mAHD): 1.49	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 1.6	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor water levels in the creek and used as part of Estuary Management Plan.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory	**STATION LOCATION** **Island Point**	**MHL 2546** **Figure 238** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: St Georges Basin		Station name: Island Point	
AWRC No: 216415		BoM No: 568200	
MGA co-ordinates zone: 56		Easting: 280748	Northing: 6113511
Geographic co-ordinate system:		Latitude: -35.09737767	Longitude: 150.59467000
TRIM reference: FILE17/49964		LGA: Shoalhaven City Council	Rainfall district: 68
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: July 1991		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 32970 Order of accuracy: L1 PM/SSM RL (mAHD): 10.156 Local BM description: Triangle cut into concrete. Local BM location: Cut into concrete kerbing.		Local BM RL (mAHD): 0.709 Station datum: AHD Date of last survey: 14 July 2016 Surveyed by: D McPherson Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor – not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.85	1% AEP (mAHD): 2.4	Instrumentation height (mAHD): 2.0	
Hydraulic characteristics: Very small tidal range (5cm), dependent on entrance conditions			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor lake tide and flood levels.			
Station shown on BoM website: Radio transmission event data from an independent sensor located at the same station is displayed.			
SES flood classification: Minor 1.2m, Moderate 1.5m, Major 1.8m			
Data used for BoM flood forecasting: No		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **HMAS Creswell (Jervis Bay)**	**MHL 2546** **Figure 239** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Jervis Bay		Station name: Jervis Bay (HMAS Creswell)	
AWRC No: 216470		BoM No: 568194	
MGA co-ordinates zone: 56		Easting: 291092	Northing: 6111027
Geographic co-ordinate system:		Latitude: -35.12195300	Longitude: 150.70743900
TRIM reference: FILE17/74060		LGA: HMAS Creswell is on Commonwealth land not NSW Local Council	Rainfall district: 68
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Radar		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: September 2009		Secondary sensor installation date: July 2010	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): 7	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 170184 Order of accuracy: U PM/SSM RL (mAHD): 3.461 Local BM description: BM dip point Local BM location: Radar top plate, located on concrete platform off eastern side of timber wharf on naval base.		Local BM RL (mAHD): 2.527 Station datum: Jervis Bay Port Datum (JBPD) and AHD Date of last survey: 2 November 2016 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 1.015	0.038	MLWN: -0.355	0.044
MHWS: 0.642	0.037	MLW: -0.470	0.045
MHW: 0.528	0.035	MLWS: -0.584	0.046
MHWN: 0.413	0.034	ISLW: -0.851	0.050
MSL: 0.029	0.036	Tidal range (HHWSS – ISLW): 1.866	0.052
STATION CHARACTERISTICS			
General comments: EWS decommissioned in June 2011 and replaced with a submersible pressure transducer. Reference survey mark surveyed in by Public Works Survey Branch however the order of accuracy was not uploaded to SCIMS.			
Peak flood of record (mAHD): 1.36	1% AEP (mAHD): NA	Instrumentation height (mAHD): 2.0	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: To monitor ocean tidal levels at Jervis Bay as a part of the Ocean Tide Program.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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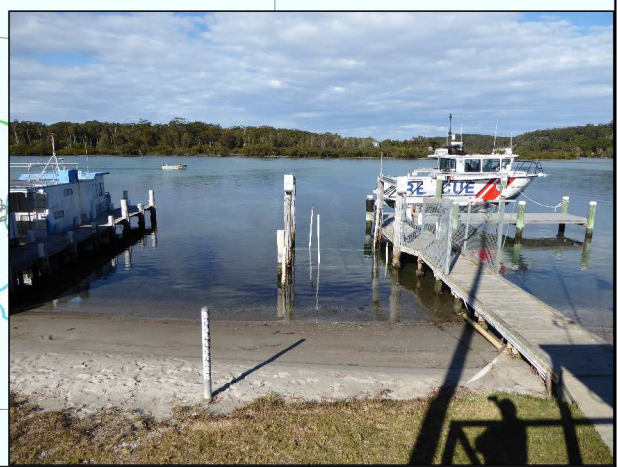
Sussex Inlet



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Sussex Inlet

MHL 2546

Figure 240

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Sussex Inlet		Station name: Sussex Inlet	
AWRC No: 216412		BoM No: 568198	
MGA co-ordinates zone: 56		Easting: 280903	Northing: 6105512
Geographic co-ordinate system:		Latitude: -35.16947661	Longitude: 150.59424908
TRIM reference: FILE17/49976		LGA: Shoalhaven City Council	Rainfall district: 68
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: November 2000		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 124801 Order of accuracy: 2 PM/SSM RL (mAHD): 11.953 Local BM description: Bolt Local BM location: On east corner light post.		Local BM RL (mAHD): 1.310 Station datum: AHD Date of last survey: 17 May 2013 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2001 to June 2010		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.486 MHWS: 0.366 MHW: 0.335 MHWN: 0.304 MSL: 0.205	0.044 0.036 0.033 0.030 0.023	MLWN: 0.106 MLW: 0.075 MLWS: 0.044 ISLW: -0.041 Tidal range (HHWSS – ISLW): 0.527	0.020 0.021 0.022 0.024 0.052
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.46	1% AEP (mAHD): 2.08	Instrumentation height (mAHD): 1.7	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to monitor St Georges Basin and Sussex Inlet for flood events and as part of an Estuary Management Plan.			
Station shown on BoM website: MHL data for this station is not displayed. There is a Shoalhaven City Council operated ERTS canister connected to the same gas line of MHL station which is utilised by the BoM.			
SES flood classification: Minor 0.9m, Moderate 1.2m, Major 1.8m			
Data used for BoM flood forecasting: No		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

NSW GOVERNMENT

STATION LOCATION
Swan Lake

MHL 2546

Figure 241

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Swan Lake		Station name: Swan Lake	
AWRC No: 216425		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 277905	Northing: 6102577
Geographic co-ordinate system:		Latitude: -35.19525987	Longitude: 150.56056608
TRIM reference: FILE17/49983		LGA: Shoalhaven City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: January 2000		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 19577 Order of accuracy: L1 PM/SSM RL (mAHD): 3.322 Local BM description: Top of PVC tube. Local BM location: PVC tube where gauge plate is attached to, next to the instrumentation box.		Local BM RL (mAHD): 4.266 Station datum: AHD Date of last survey: 14 July 2016 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor – not calculated due to insufficient tidal influence.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.18	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 4.6	
Hydraulic characteristics: ICOLL, entrance rarely open.			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor lake water levels and is used as part of an Entrance Management Plan.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Lake Conjola**	**MHL 2546** **Figure 242** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Conjola Lake		Station name: Lake Conjola	
AWRC No: 216420		BoM No: 568182	
MGA co-ordinates zone: 56		Easting: 272446	Northing: 6094316
Geographic co-ordinate system:		Latitude: -35.26845659	Longitude: 150.49837110
TRIM reference: Local office FILE16/67046		LGA: Shoalhaven City Council	Rainfall district: 68
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: September 1992		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 40388 Order of accuracy: L2 PM/SSM RL (mAHD): 1.026 Local BM description: PM 40388 Local BM location: East of the holiday park.		Local BM RL (mAHD): 1.026 Station datum: AHD Date of last survey: 14 July 2016 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor – not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: MHL station decommissioned 6 July 2017 due to instrumentation height lower than 1% AEP level, replaced by Lake Conjola Downstream. Rain gauge station from Jan 1999 to Jul 2017. Council ERTS station is still in place working.			
Peak flood of record (mAHD): 1.94	1% AEP (mAHD): 2.31	Instrumentation height (mAHD): 1.5	
Hydraulic characteristics: ICOLL, entrance is untrained and conditions variable over long periods.			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program and is used for determining the lake's hydrodynamics in relation to tides, tidal flushing, flooding and water quality. The data is used as part of an entrance management strategy.			
Station shown on BoM website: The station is now owned by council and Radio transmission event data of this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Decommissioned		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Lake Conjola Downstream

MHL 2546

Figure 243

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Conjola Lake		Station name: Lake Conjola Downstream	
AWRC No: 216420D		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 272620	Northing: 6094240
Geographic co-ordinate system:		Latitude: -35.26917700	Longitude: 150.50026600
TRIM reference: FILE17/50188		LGA: Shoalhaven City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: September 2016		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 40388 Order of accuracy: L2 PM/SSM RL (mAHD): 1.026 Local BM description: Stainless steel bolt. Local BM location: Bolt in beam of jetty, west of the instrumentation box.		Local BM RL (mAHD): 1.056 Station datum: AHD Date of last survey: 13 July 2016 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor – not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Station commissioned 14 July 2014 to replace Lake Conjola 216420 due to instrumentation height being lower than 1% AEP. Council still owns the old Lake Conjola Station which is shown on BoM web. Rain gauge station since July 2016.			
Peak flood of record (mAHD): 1.11	1% AEP (mAHD): 2.29	Instrumentation height (mAHD): 2.1	
Hydraulic characteristics: ICOLL, entrance is untrained and conditions variable over long periods.			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program and is used for determining the lake's hydrodynamics in relation to tides, tidal flushing, flooding and water quality. The data is used as part of an entrance management strategy.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 27 March 2019	

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Manly Hydraulics Laboratory

STATION LOCATION
Narrawallee Inlet

MHL 2546

Figure 244

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Narrawallee Creek		Station name: Narrawallee	
AWRC No: 216430		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 269839	Northing: 6090673
Geographic co-ordinate system:		Latitude: -35.30067762	Longitude: 150.46871383
TRIM reference: FILE17/49995		LGA: Shoalhaven City Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: August 1993		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 55922 Order of accuracy: L2 PM/SSM RL (mAHD): 3.891 Local BM description: Triangle cut into concrete. Local BM location: Concrete at pump station.		Local BM RL (mAHD): 2.346 Station datum: AHD Date of last survey: 12 September 2003 Surveyed by: Greg Craig Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1993 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.855 MHWS: 0.539 MHW: 0.459 MHWN: 0.379 MSL: 0.072	0.043 0.037 0.033 0.030 0.027	MLWN: -0.234 MLW: -0.314 MLWS: -0.394 ISLW: -0.619 Tidal range (HHWSS – ISLW): 1.474	0.031 0.033 0.036 0.040 0.062
STATION CHARACTERISTICS			
General comments: Station upgraded from gas purge to submersible pressure transducer in 2018.			
Peak flood of record (mAHD): 1.94	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 3.1	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor water levels in the inlet and is used as an input into the Estuary Management Plan.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 27 March 2019	

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NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Ulladulla**	**MHL 2546** **Figure 245** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Ulladulla Harbour		Station name: Ulladulla Boat Harbour	
AWRC No: 216471		BoM No: 569039	
MGA co-ordinates zone: 56		Easting: 270711	Northing: 6084368
Geographic co-ordinate system:		Latitude: -35.35767200	Longitude: 150.47652500
TRIM reference: FILE17/74099		LGA: Shoalhaven City Council	Rainfall district: 69
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: December 2007		Secondary sensor installation date: July 2010	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): 7	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 27335 Order of accuracy: L3 PM/SSM RL (mAHD): 6.225 Local BM description: Bolt Local BM location: In E side of pile at gauge, below instrument box at most western point of wharf.		Local BM RL (mAHD): 2.913 Station datum: AHD Date of last survey: 13 July 2016 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 2008 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.960 MHWS: 0.617 MHW: 0.510 MHWN: 0.403 MSL: 0.040	0.004 0.002 0.000 0.002 0.001	MLWN: -0.325 MLW: -0.431 MLWS: -0.538 ISLW: -0.783 Tidal range (HHWSS – ISLW): 1.743	0.004 0.001 0.000 0.004 0.008
STATION CHARACTERISTICS			
General comments: EWS in place Dec 2007 but problems on site with electrical interference led to no data until it was replaced with a submersible pressure transducer in Jan 2008.			
Peak flood of record (mAHD): 1.48	1% AEP (mAHD): NA	Instrumentation height (mAHD): 1.7	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: Station was installed under the Ocean Tide Program to monitor ocean tides.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Burrill Lake Bridge**	**MHL 2546** **Figure 246** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Burrill Lake	Station name: Burrill Lake Bridge		
AWRC No: 216435	BoM No: 569037		
MGA co-ordinates zone: 56	Easting: 267949	Northing: 6080931	
Geographic co-ordinate system:	Latitude: -35.38799633	Longitude: 150.44518306	
TRIM reference: FILE17/50183	LGA: Shoalhaven City Council	Rainfall district: 69	

INSTRUMENTATION	
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)	Communication type: Internet Protocol (IPM)
Primary sensor type: Submersible pressure transducer	Secondary sensor type: NA
Primary sensor installation date: November 1991	Secondary sensor installation date: NA
Range of primary water level sensor (m): 3.5	Range of secondary water level sensor (m): NA
Primary sensor sampling regime: Instantaneous 15 minute	Secondary sensor sampling regime: NA

SURVEY DETAILS	
PM/SSM reference: PM 56358 Order of accuracy: L2 PM/SSM RL (mAHD): 1.590 Local BM description: Stainless steel bolt. Local BM location: Bolt in timber pile, at the east end of the jetty.	Local BM RL (mAHD): 1.087 Station datum: AHD Date of last survey: 24 November 2015 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA

TIDAL PLANES (mAHD)			
Period analysed: July 1992 to June 2006		Tidal planes functionality: Fair	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.572	0.057	MLWN: 0.145	0.088
MHWS: 0.441	0.034	MLW: 0.121	0.096
MHW: 0.417	0.030	MLWS: 0.098	0.104
MHWN: 0.394	0.028	ISLW: 0.004	0.126
MSL: 0.269	0.049	Tidal range (HHWSS – ISLW): 0.568	0.173

STATION CHARACTERISTICS		
General comments: None		
Peak flood of record (mAHD): 1.57	1% AEP (mAHD): 2.3	Instrumentation height (mAHD): 2.0
Hydraulic characteristics: ICOLL, entrance mostly open, small tidal range influences harmonic constituents.		
Purpose of installation and current functionality: Installed under the Floodplain Management Program to monitor water levels and flood heights in the lake.		
Station shown on BoM website: Radio transmission event data from an independent sensor located at the same station is displayed.		
SES flood classification: None		
Data used for BoM flood forecasting: No		BoM priority: Low
Station recommendations: Maintain		Revision date: 27 March 2019

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STATION LOCATION
Lake Tabourie

MHL 2546

Figure 247

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tabourie Lake		Station name: Lake Tabourie	
AWRC No: 216440		BoM No: 569036	
MGA co-ordinates zone: 56		Easting: 264310	Northing: 6074957
Geographic co-ordinate system:		Latitude: -35.44095376	Longitude: 150.40342821
TRIM reference: FILE17/50210		LGA: Shoalhaven City Council	Rainfall district: 69
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: September 1992		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 4		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 40839 Order of accuracy: 3 PM/SSM RL (mAHD): 1.347 Local BM description: PM 40839 Local BM location: SW corner end of holiday park road		Local BM RL (mAHD): 1.347 Station datum: AHD Date of last survey: 23 October 2014 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor – not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.77	1% AEP (mAHD): 2.63	Instrumentation height (mAHD): 1.6	
Hydraulic characteristics: ICOLL, entrance rarely open.			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program. Water level data captured by the gauge is used for determining the lake's hydrodynamics in relation to tides, tidal flushing, flooding and water quality. Used as part of an Entrance Management Policy.			
Station shown on BoM website: Radio transmission event data from an independent sensor located at the same station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: Low	
Station recommendations: Maintain		Revision date: 27 March 2019	

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NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Durras Lake**	**MHL 2546** **Figure 248** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Durras Lake		Station name: Durras Lake	
AWRC No: 216445		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 255304	Northing: 6052185
Geographic co-ordinate system:		Latitude: -35.64387820	Longitude: 150.29742952
TRIM reference: FILE17/50264		LGA: Eurobodalla Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (Dialup - CSD)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: November 2000		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 8198 Order of accuracy: L3 PM/SSM RL (mAHD): 7.008 Local BM description: Nail in concrete painted white Local BM location: Corner of the concrete pad of the instrumentation box.		Local BM RL (mAHD): 4.583 Station datum: AHD Date of last survey: 3 October 2013 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor – not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.30	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 4.6	
Hydraulic characteristics: ICOLL, entrance rarely open.			
Purpose of installation and current functionality: Installed under the Estuary Program to monitor lake water levels. Used as part of an entrance management policy.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Nelligen

MHL 2546
Figure 249
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Clyde River		Station name: Nelligen	
AWRC No: 216453		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 241369	Northing: 6050944
Geographic co-ordinate system:		Latitude: -35.65150336	Longitude: 150.14329139
TRIM reference: FILE17/50307		LGA: Eurobodalla Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: PSTN LL (land line)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: April 1994		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 65550 Order of accuracy: 4 PM/SSM RL (mAHD): 39.05 Local BM description: Bolt in concrete. Local BM location: Corner concrete slab of instrumentation box.		Local BM RL (mAHD): 5.704 Station datum: AHD Date of last survey: 15 November 2012 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1994 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.985 MHWS: 0.658 MHW: 0.550 MHWN: 0.443 MSL: 0.034	0.028 0.030 0.030 0.030 0.035	MLWN: -0.374 MLW: -0.482 MLWS: -0.589 ISLW: -0.823 Tidal range (HHWSS – ISLW):1.807	0.040 0.041 0.042 0.045 0.032
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.92	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 4.7	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: Installed under the Floodplain Management Program to monitor water levels and flood levels of the Clyde River.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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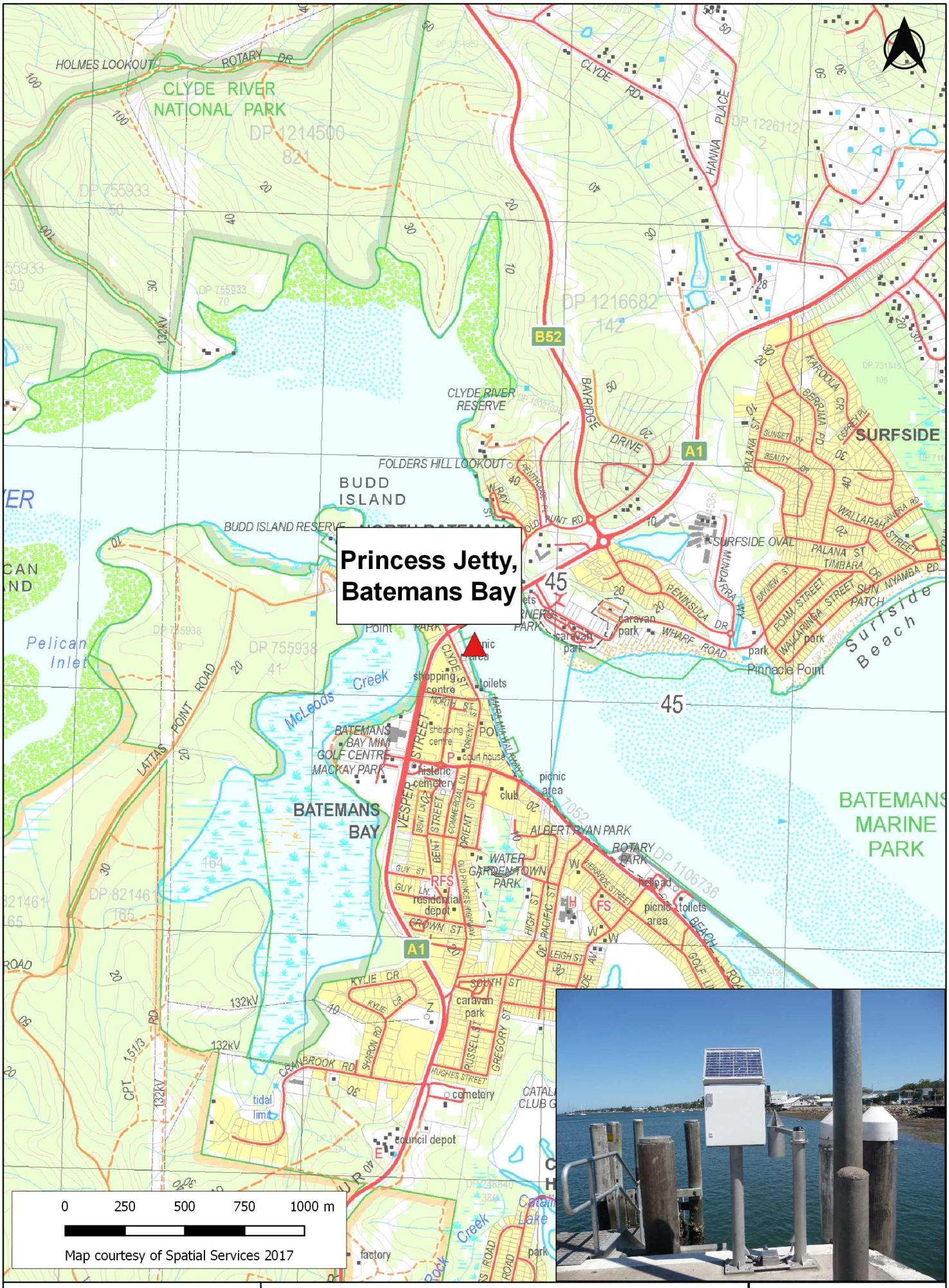

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Princess Jetty, Batemans Bay

MHL 2546

Figure 250

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Batemans Bay Clyde River		Station name: Princess Jetty	
AWRC No: 216410		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 244664	Northing: 6045231
Geographic co-ordinate system:		Latitude: -35.70381100	Longitude: 150.17783100
TRIM reference: FILE17/74113		LGA: Eurobodalla Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Radar		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: December 1985		Secondary sensor installation date: December 2012	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: SSM 12454 Order of accuracy: L3 PM/SSM RL (mAHD): 1.870 Local BM description: BM triangle cut into concrete. Local BM location: Triangle cut in concrete deck at start of entrance to the jetty, western corner.		Local BM RL (mAHD): 1.609 Station datum: AHD Date of last survey: 22 June 2016 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2009		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.920 MHWS: 0.607 MHW: 0.508 MHWN: 0.408 MSL: 0.048	0.044 0.044 0.044 0.044 0.045	MLWN: -0.312 MLW: -0.412 MLWS: -0.511 ISLW: -0.735 Tidal range (HHWSS – ISLW):1.655	0.047 0.047 0.047 0.048 0.016
STATION CHARACTERISTICS			
General comments: Floatwell decommissioned in April 2009. New station installed in Nov 2010, radar installed in Dec 2012.			
Peak flood of record (mAHD): 1.39	1% AEP (mAHD): NA	Instrumentation height (mAHD): 2.8	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: Station was installed under the Ocean Tide Program to monitor ocean tides.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Manly Hydraulics Laboratory

STATION LOCATION
Batemans Bay Offshore

MHL 2546

Figure 251

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tasman Sea		Station name: Batemans Bay Offshore	
AWRC No: 216450		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 251726	Northing: 6037036
Geographic co-ordinate system:		Latitude: -35.77941942	Longitude: 150.25326950
TRIM reference: FILE17/75242		LGA: NA	Rainfall district: NA
INSTRUMENTATION			
Logger type: Paroscientific RBR and Aanderaa		Communication type: NA	
Primary sensor type: Paroscientific pressure sensor		Secondary sensor type: Aanderaa – Pressure controlled oscillator	
Primary sensor installation date: February 2012		Secondary sensor installation date: September 2000	
Range of primary water level sensor (m): 50		Range of secondary water level sensor (m): 60	
Primary sensor sampling regime: 40 second integration B 5 minute		Secondary sensor sampling regime: 40 second integration B 60 minute	
SURVEY DETAILS			
PM/SSM reference: Order of accuracy: PM/SSM RL (mAHD): Local BM description: Local BM location:		Local BM RL (mAHD): Station datum: Approximated to Mean Sea Level Date of last survey: Surveyed by: Gauge plate offset to gauge zero (m):	
TIDAL PLANES (m Approximate Mean Sea Level)			
Period analysed: September 2000 to November 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.895 MHWS: 0.576 MHW: 0.468 MHWN: 0.361 MSL: 0.003	0.004 0.004 0.004 0.004 0.003	MLWN: -0.355 MLW: -0.462 MLWS: -0.570 ISLW: -0.798 Tidal range (HHWSS – ISLW): 1.693	0.006 0.006 0.005 0.006 0.008
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): NA	1% AEP (mAHD): NA	Instrumentation height (mAHD): NA	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: Installed under the Storm Surge Program. Offshore gauge to measure ocean level outside of river entrance and determine downstream tailwater level for river flooding investigations as the station is not impacted by riverine flooding. This station is stand alone and no real-time data is shown on the MHL public web. The sensor and logger is recovered from the ocean floor on an annual basis.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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George Bass Drive



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
George Bass Drive

MHL 2546

Figure 252

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tomaga River		Station name: George Bass Drive	
AWRC No: 216455		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 245110	Northing: 6031671
Geographic co-ordinate system:		Latitude: -35.82603715	Longitude: 150.17844588
TRIM reference: FILE17/50320		LGA: Eurobodalla Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: August 1996		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 38949 Order of accuracy: L2 PM/SSM RL (mAHD): 2.575 Local BM description: Bolt in concrete. Local BM location: In concrete slab of the instrumentation box.		Local BM RL (mAHD): 3.593 Station datum: AHD Date of last survey: 23 October 2014 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1996 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.711 MHWS: 0.454 MHW: 0.407 MHWN: 0.359 MSL: 0.143	0.037 0.034 0.035 0.035 0.035	MLWN: -0.073 MLW: -0.121 MLWS: -0.168 ISLW: -0.352 Tidal range (HHWSS – ISLW):1.063	0.035 0.036 0.036 0.035 0.015
STATION CHARACTERISTICS			
General comments: Floatwell on the bridge was removed in Nov 2010 and replaced with a gas purge sensor on the bank.			
Peak flood of record (mAHD): 1.33	1% AEP (mAHD): 2.9	Instrumentation height (mAHD): 3.6	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor water levels and build on the existing database. Used as part of the Estuary Management Plan.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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Moruya Hospital



0 250 500 750 1000 m

Map courtesy of Spatial Services 2017

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STATION LOCATION
Moruya Hospital

MHL 2546

Figure 253

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Moruya River		Station name: Moruya Hospital	
AWRC No: 217402		BoM No: 069123	
MGA co-ordinates zone: 56		Easting: 235673	Northing: 6022790
Geographic co-ordinate system:		Latitude: -35.90350798	Longitude: 150.07115801
TRIM reference: FILE17/51167		LGA: Eurobodalla Shire Council	Rainfall district: 69

INSTRUMENTATION	
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)	Communication type: Mobile 3G/4G (IP)
Primary sensor type: Gas purge	Secondary sensor type: NA
Primary sensor installation date: October 1990	Secondary sensor installation date: NA
Range of primary water level sensor (m): 20	Range of secondary water level sensor (m): NA
Primary sensor sampling regime: Instantaneous 15 minute	Secondary sensor sampling regime: NA

SURVEY DETAILS	
PM/SSM reference: SSM 60794 Order of accuracy: L3 PM/SSM RL (mAHD): 2.972 Local BM description: Stainless steel bolt. Local BM location: Stainless steel bolt in rock.	Local BM RL (mAHD): 1.032 Station datum: AHD Date of last survey: 23 October 2014 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA

TIDAL PLANES (mAHD)			
Period analysed: July 1991 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.854	0.031	MLWN: -0.306	0.043
MHWS: 0.551	0.029	MLW: -0.395	0.047
MHW: 0.462	0.028	MLWS: -0.483	0.051
MHWN: 0.374	0.028	ISLW: -0.700	0.054
MSL: 0.034	0.033	Tidal range (HHWSS – ISLW):1.554	0.059

STATION CHARACTERISTICS		
General comments: None		
Peak flood of record (mAHD): 3.13	1% AEP (mAHD): 5.6	Instrumentation height (mAHD): 4.0
Hydraulic characteristics: Tidal		
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. Flood data captured assists in reviewing flood damage of the Moruya town and outlying areas.		
Station shown on BoM website: MHL data for this station is displayed.		
SES flood classification: None		
Data used for BoM flood forecasting: Yes		BoM priority: Medium
Station recommendations: Maintain		Revision date: 17 September 2018

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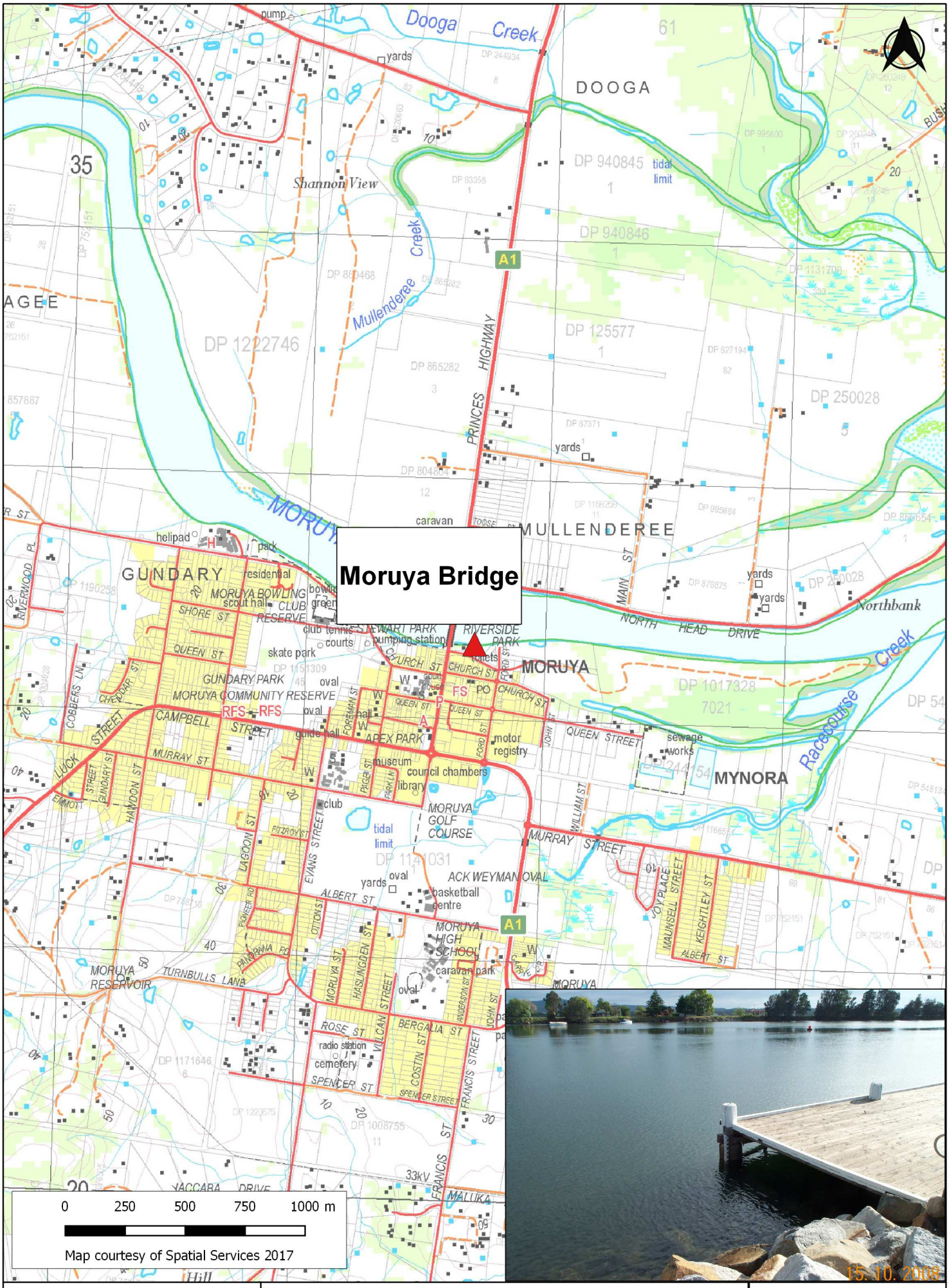

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STATION LOCATION
Moruya Bridge

MHL 2546
Figure 254
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Moruya River		Station name: Moruya Bridge	
AWRC No: 217410		BoM No: 069130	
MGA co-ordinates zone: 56		Easting: 236703	Northing: 6022317
Geographic co-ordinate system:		Latitude: -35.90804476	Longitude: 150.08240101
TRIM reference: FILE17/51193		LGA: Eurobodalla Shire Council	Rainfall district: 69
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: May 1997		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 37854 Order of accuracy: L2 PM/SSM RL (mAHD): 2.991 Local BM description: PM 37854 Local BM location: NW corner of cross of Shore St and Ford St.		Local BM RL (mAHD): 2.991 Station datum: AHD Date of last survey: 18 November 2015 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1997 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.865 MHWS: 0.559 MHW: 0.470 MHWN: 0.381 MSL: 0.042	0.033 0.032 0.031 0.031 0.037	MLWN: -0.297 MLW: -0.386 MLWS: -0.475 ISLW: -0.693 Tidal range (HHWSS – ISLW):1.559	0.045 0.047 0.049 0.052 0.049
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.38	1% AEP (mAHD): 5.1	Instrumentation height (mAHD): 3.8	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program, to monitor water levels and flood levels on the Moruya River.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: Minor 2.0m, Moderate 2.6m, Major 3.2m			
Data used for BoM flood forecasting: Yes		BoM priority: High	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Coila Lake

MHL 2546

Figure 255

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Coila Lake		Station name: Coila Lake	
AWRC No: 218405		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 242279	Northing: 6006865
Geographic co-ordinate system:		Latitude: -36.04867073	Longitude: 150.13909761
TRIM reference: FILE17/51482		LGA: Eurobodalla Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: January 1996		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 87057 Order of accuracy: L3 PM/SSM RL (mAHD): 9.827 Local BM description: Triangle cut into concrete. Local BM location: Concrete path next to the end of the fence.		Local BM RL (mAHD): 7.040 Station datum: AHD Date of last survey: 27 June 2018 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Poor – not calculated due to insufficient tidal influence	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.49	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 5.0	
Hydraulic characteristics: ICOLL, entrance rarely open. Entrance artificially opened.			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor water levels in the lake and used as part of an Entrance Management Policy.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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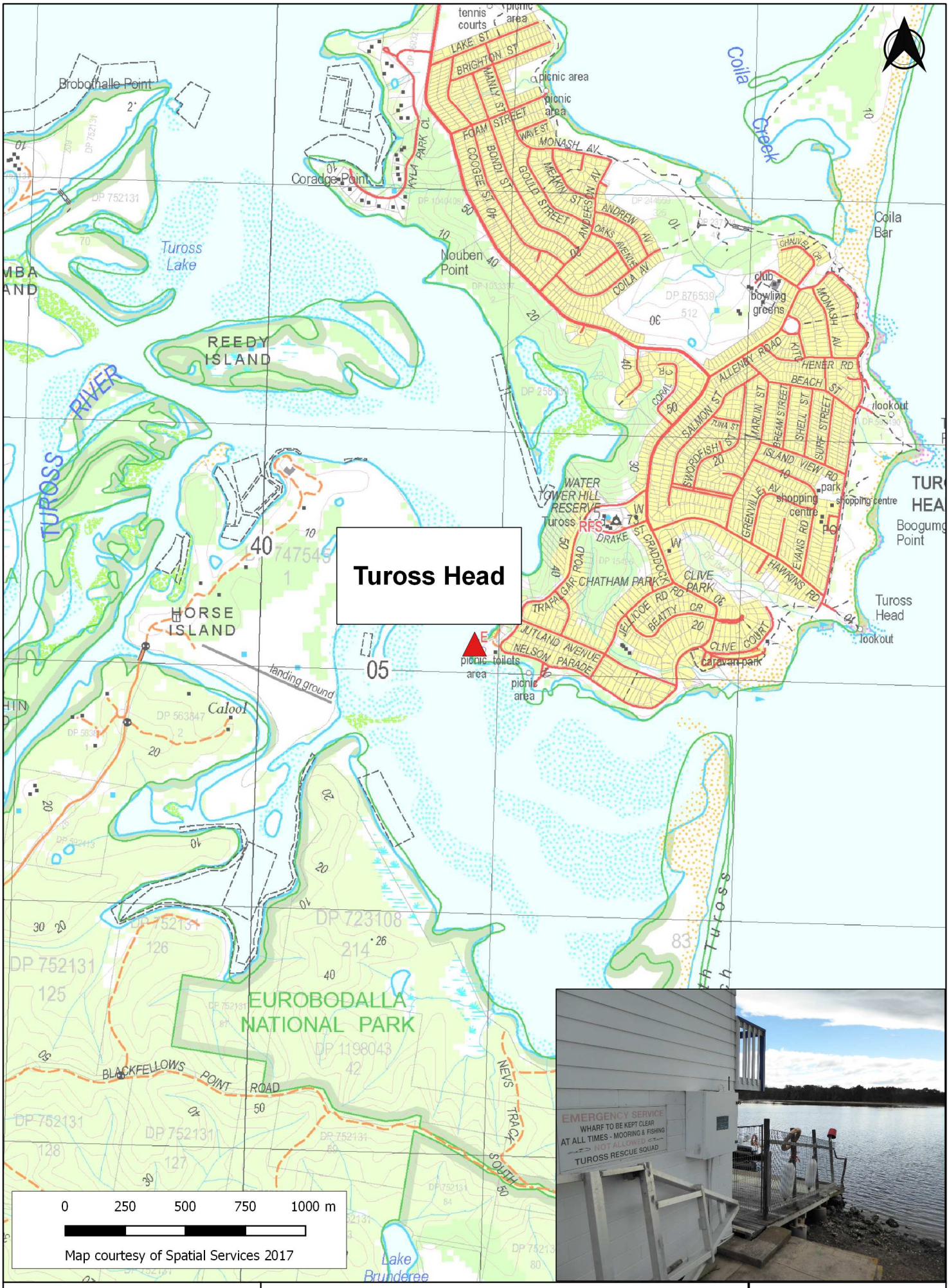

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Tuross Head

MHL 2546

Figure 256

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Tuross River		Station name: Tuross Head	
AWRC No: 218410		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 240898	Northing: 6005120
Geographic co-ordinate system:		Latitude: -36.06401684	Longitude: 150.12321249
TRIM reference: FILE17/51543		LGA: Eurobodalla Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: PSTN LL (land line)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: May 1994		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 73721 Order of accuracy: L3 PM/SSM RL (mAHD): 10.697 Local BM description: Triangle cut into concrete. Local BM location: Concrete bottom step of stairs going to the instrumentation box.		Local BM RL (mAHD): 1.796 Station datum: AHD Date of last survey: 16 May 2013 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: 1994-2010		Tidal planes functionality: Fair – not averaged as the hydraulics are to variable.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Estuary is a shallow complex system which can influence the harmonic constituents from year to year. Barometric station since Aug 2008.			
Peak flood of record (mAHD): 2.08	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 2.0	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor water levels on Tuross River. Used as part of an entrance management strategy.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Barlows Bay

MHL 2546

Figure 257

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wagonga Inlet		Station name: Barlows Bay	
AWRC No: 218415		BoM No: 569031	
MGA co-ordinates zone: 56		Easting: 239464	Northing: 5988955
Geographic co-ordinate system:		Latitude: -36.20918664	Longitude: 150.10195726
TRIM reference: FILE17/51909		LGA: Eurobodalla Shire Council	Rainfall district: 69
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: April 2018		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 4		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 58774 Order of accuracy: L3 PM/SSM RL (mAHD): 0.730 Local BM description: SSM 58774 Local BM location: Brass plaque in rock at water's edge.		Local BM RL (mAHD): 0.730 Station datum: AHD Date of last survey: 27 June 2018 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1996 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.640 MHWS: 0.376 MHW: 0.324 MHWN: 0.272 MSL: 0.040	0.035 0.031 0.029 0.027 0.025	MLWN: -0.192 MLW: -0.245 MLWS: -0.297 ISLW: -0.485 Tidal range (HHWSS – ISLW): 1.125	0.024 0.023 0.022 0.021 0.027
STATION CHARACTERISTICS			
General comments: Rain gauge installed in Aug 1999. This station was a floatwell from August 1996 and was upgraded to a submersible pressure transducer in April 2018.			
Peak flood of record (mAHD): 1.26	1% AEP (mAHD): 2.1	Instrumentation height (mAHD): 1.5	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor water levels in Wagonga Inlet and build on the existing database.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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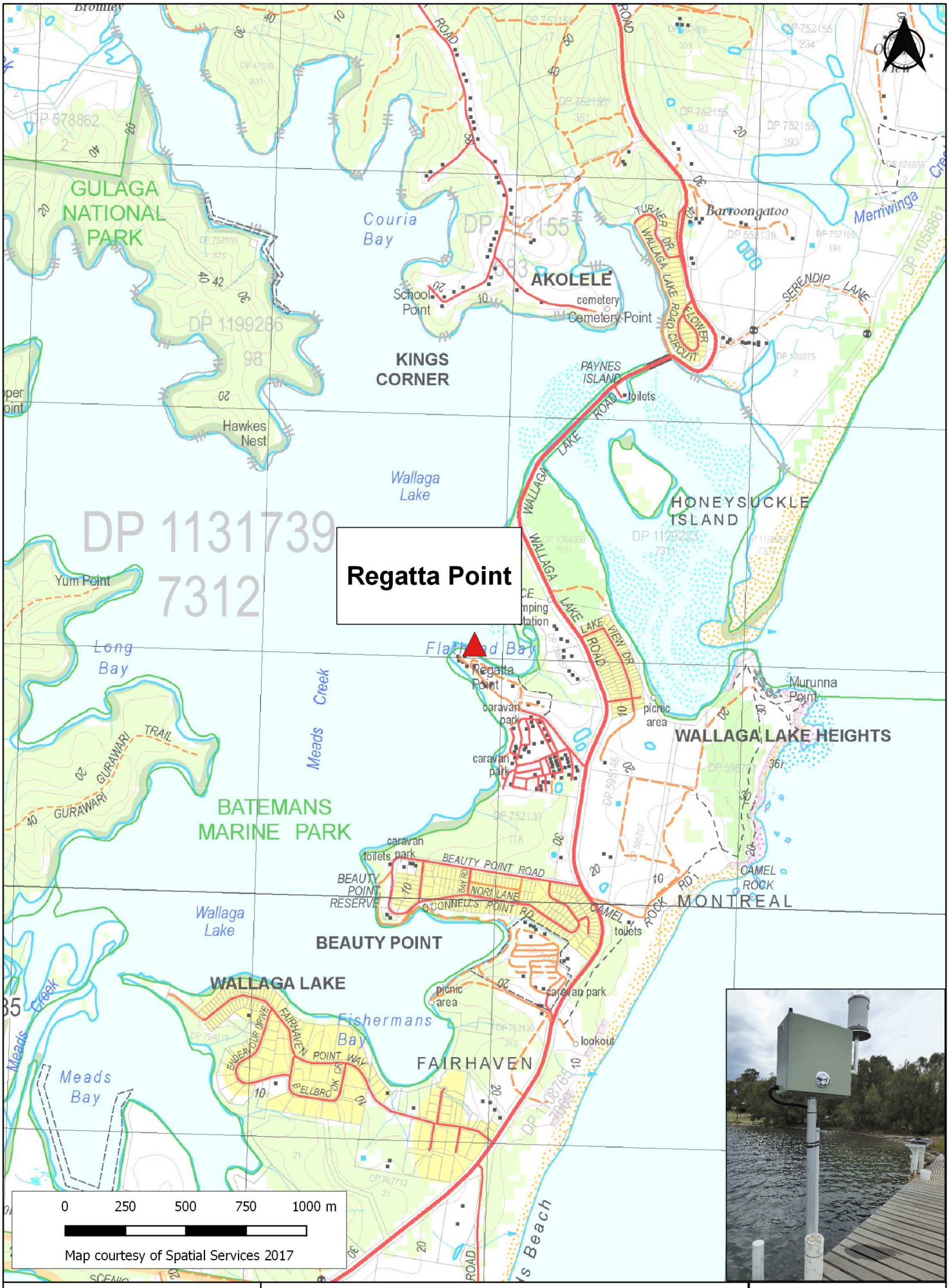

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Regatta Point

MHL 2546
Figure 258
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wallaga Lake		Station name: Regatta Point	
AWRC No: 219405		BoM No: 569032	
MGA co-ordinates zone: 56		Easting: 236881	Northing: 5971060
Geographic co-ordinate system:		Latitude: -36.36960873	Longitude: 150.06723070
TRIM reference: FILE17/48161		LGA: Bega Valley Shire Council	Rainfall district: 69
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: October 1993		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 63819 Order of accuracy: B2 PM/SSM RL (mAHD): 12.165 Local BM description: Drill hole Local BM location: In SE corner of boat ramp.		Local BM RL (mAHD): 0.829 Station datum: AHD Date of last survey: 2 October 2013 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1994 to June 2010		Tidal planes functionality: Poor	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.334 MHWS: 0.277 MHW: 0.267 MHWN: 0.256 MSL: 0.235	0.034 0.038 0.031 0.028 0.032	MLWN:0.213 MLW: 0.203 MLWS: 0.193 ISLW: 0.152 Tidal range (HHWSS – ISLW): 0.181	0.037 0.036 0.038 0.047 0.056
STATION CHARACTERISTICS			
General comments: Rain gauge installed in Jan 1999.			
Peak flood of record (mAHD): 1.78	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 2.0	
Hydraulic characteristics: ICOLL, entrance intermittently open.			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor water levels on Wallaga Lake and is used as part of an Entrance Management Policy.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Bermagui**	**MHL 2546** **Figure 259** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Bermagui River		Station name: Bermagui	
AWRC No: 219470		BoM No: 569033	
MGA co-ordinates zone: 56		Easting: 237453	Northing: 5964777
Geographic co-ordinate system:		Latitude: -36.42633300	Longitude: 150.07147800
TRIM reference: FILE17/74151		LGA: Bega Valley Shire Council	Rainfall district: 69
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: July 1987		Secondary sensor installation date: July 2010	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): 3.5	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 12910 Order of accuracy: L3 PM/SSM RL (mAHD): 2.446 Local BM description: Top of gauge post. Local BM location: Top of 0-1m gauge post, below instrument box on entrance to outer wharf.		Local BM RL (mAHD): 1.278 Station datum: Bermagui Local Hydro Datum (BLHD) and AHD Date of last survey: 27 June 2018 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.865 MHWS: 0.528 MHW: 0.425 MHWN: 0.322 MSL: -0.027	0.031 0.030 0.029 0.028 0.029	MLWN: -0.376 MLW: -0.479 MLWS: -0.581 ISLW: -0.822 Tidal range (HHWSS – ISLW): 1.688	0.030 0.029 0.029 0.028 0.010
STATION CHARACTERISTICS			
General comments: Floatwell was from Jul 1987 until it was replaced by a submersible pressure transducer in Jul 2009.			
Peak flood of record (mAHD): 1.30	1% AEP (mAHD): NA	Instrumentation height (mAHD): 3.2	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: To monitor ocean tide levels at Bermagui as a part of the Ocean Tide Program.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Bega River

MHL 2546

Figure 260

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Bega River		Station name: Bega River	
AWRC No: 219410		BoM No: NA	
MGA co-ordinates zone: 55		Easting: 766021	Northing: 5933983
Geographic co-ordinate system:		Latitude: -36.70261294	Longitude: 149.97785962
TRIM reference: FILE17/51939		LGA: Bega Valley Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Gas purge		Secondary sensor type: NA	
Primary sensor installation date: November 2000		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 106059 Order of accuracy: 4 PM/SSM RL (mAHD): 3.290 Local BM description: PM 106059 Local BM location: NE corner of bridge.		Local BM RL (mAHD): 3.290 Station datum: AHD Date of last survey: 2 October 2013 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Poor – not averaged as the hydraulics are too variable.	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Conductivity and temperature sensors were installed from Feb 2010 to Aug 2012 under a program funded by WaterNSW (formerly NSW Office of Water) for the Water Sharing Plan.			
Peak flood of record (mAHD): 2.98	1% AEP (mAHD): 4.02	Instrumentation height (mAHD): 3.0	
Hydraulic characteristics: ICOLL, entrance rarely open.			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor water levels on Bega River and is used as part of an entrance management policy.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Back Lagoon**	**MHL 2546** **Figure 261** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Back Lagoon		Station name: Back Lagoon	
AWRC No: 219415		BoM No: NA	
MGA co-ordinates zone: 55		Easting: 759850	Northing: 5914073
Geographic co-ordinate system:		Latitude: -36.88357230	Longitude: 149.91565706
TRIM reference: FILE17/52027		LGA: Bega Valley Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: February 2009		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 20		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 28320 Order of accuracy: L2 PM/SSM RL (mAHD): 6.767 Local BM description: Steel pin Local BM location: Survey mark in a box in park.		Local BM RL (mAHD): 1.524 Station datum: AHD Date of last survey: 17 November 2015 Surveyed by: John Vaubell Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 2.44	1% AEP (mAHD): 3.83	Instrumentation height (mAHD): 2.5	
Hydraulic characteristics: ICOLL			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor water levels in the lagoon.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 27 March 2019	

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STATION LOCATION
Merimbula Lake

MHL 2546

Figure 262

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Merimbula Lake		Station name: Merimbula Lake	
AWRC No: 220405		BoM No: NA	
MGA co-ordinates zone: 55		Easting: 756506	Northing: 5913274
Geographic co-ordinate system:		Latitude: -36.89167863	Longitude: 149.87844617
TRIM reference: FILE17/52075		LGA: Bega Valley Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: March 1991		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 47741 Order of accuracy: 4 PM/SSM RL (mAHD): 8.390 Local BM description: Fence post. Local BM location: Centre of corner fence post.		Local BM RL (mAHD): 2.370 Station datum: AHD Date of last survey: 13 November 2012 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1991 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.503 MHWS: 0.259 MHW: 0.225 MHWN: 0.191 MSL: 0.069	0.041 0.036 0.035 0.034 0.029	MLWN: -0.054 MLW: -0.088 MLWS: -0.122 ISLW: -0.296 Tidal range (HHWSS – ISLW): 0.799	0.026 0.024 0.023 0.021 0.028
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.09	1% AEP (mAHD): 1.77	Instrumentation height (mAHD): 1.2	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program to capture data that is used for studying the effect of the road bridge construction on floodwater levels and the general hydrodynamics of the lake. The baseline data is used as part of an Estuary Management Plan for Merimbula Lake.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Merimbula Wharf**	**MHL 2546** **Figure 263** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Merimbula Lake		Station name: Merimbula Wharf	
AWRC No: 220410		BoM No: 569029	
MGA co-ordinates zone: 55		Easting: 759297	Northing: 5913048
Geographic co-ordinate system:		Latitude: -36.89295365	Longitude: 149.90980457
TRIM reference: FILE17/52048		LGA: Bega Valley Shire Council	Rainfall district: 69
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: March 1991		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 81364 Order of accuracy: 2 PM/SSM RL (mAHD): 1.958 Local BM description: Triangle cut into concrete. Local BM location: Corner of concrete pad or base of picnic table.		Local BM RL (mAHD): 2.203 Station datum: AHD Date of last survey: 18 November 2015 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1991 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.745 MHWS: 0.415 MHW: 0.349 MHWN: 0.283 MSL: 0.000	0.028 0.030 0.030 0.030 0.033	MLWN: -0.281 MLW: -0.348 MLWS: -0.414 ISLW: -0.650 Tidal range (HHWSS – ISLW): 1.396	0.036 0.037 0.038 0.041 0.029
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.22	1% AEP (mAHD): 1.72	Instrumentation height (mAHD): 1.4	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program to capture data that is used for studying the effect of the road bridge construction on floodwater levels and the general hydrodynamics of the lake. The baseline data is used as part of an Estuary Management Plan for Merimbula Lake.			
Station shown on BoM website: MHL data for this station is displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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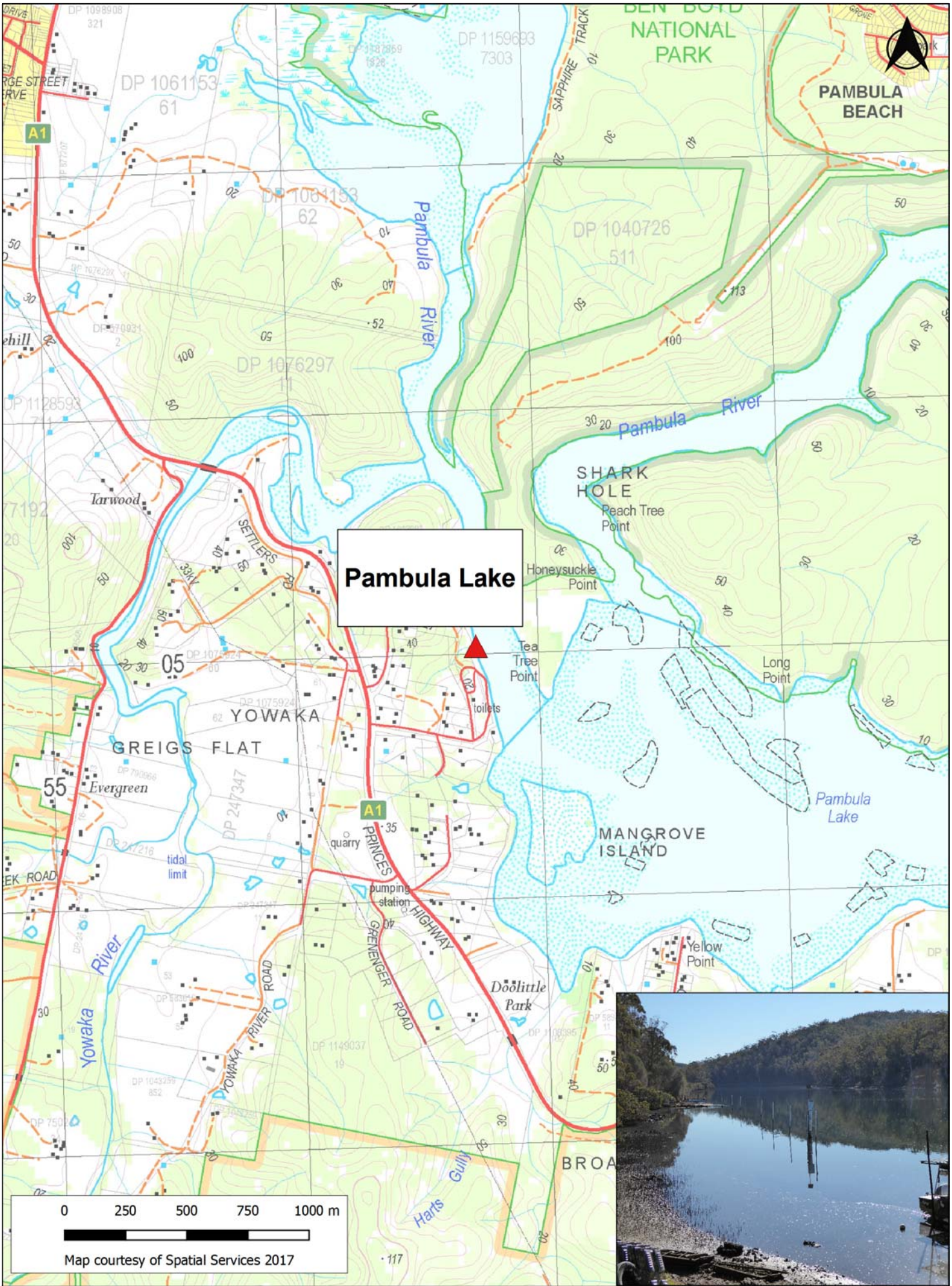

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STATION LOCATION
Pambula Lake

MHL 2546

Figure 264

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Pambula Lake		Station name: Pambula Lake	
AWRC No: 220415		BoM No: NA	
MGA co-ordinates zone: 55		Easting: 756743	Northing: 5905036
Geographic co-ordinate system:		Latitude: -36.96578144	Longitude: 149.88389895
TRIM reference: FILE17/52086		LGA: Bega Valley Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Floatwell		Secondary sensor type: NA	
Primary sensor installation date: March 1991		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: SSM 121450 Order of accuracy: 4 PM/SSM RL (mAHD): 1.446 Local BM description: Bolt painted yellow Local BM location: Bolt in base of gum tree.		Local BM RL (mAHD): 1.996 Station datum: AHD Date of last survey: 16 November 2011 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1991 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.796 MHWS: 0.426 MHW: 0.352 MHWN: 0.277 MSL: -0.032	0.023 0.023 0.024 0.025 0.031	MLWN: -0.342 MLW: -0.416 MLWS: -0.490 ISLW: -0.754 Tidal range (HHWSS – ISLW): 1.550	0.038 0.041 0.044 0.047 0.043
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.90	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 1.9	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: The gauge was installed under the Floodplain Management Program. Data captured is useful in determining the influence of lake levels on upstream flooding and providing baseline data for future estuary management studies.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT

STATION LOCATION
Lake Curalo

MHL 2546

Figure 265

Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Curalo Lagoon		Station name: Lake Curalo	
AWRC No: 220420		BoM No: NA	
MGA co-ordinates zone: 55		Easting: 758413	Northing: 5895378
Geographic co-ordinate system:		Latitude: -37.05227334	Longitude: 149.90594496
TRIM reference: FILE17/52094		LGA: Bega Valley Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: June 2007		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 4		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 23676 Order of accuracy: L2 PM/SSM RL (mAHD): 2.529 Local BM description: Top of bolt with paint mark Local BM location: Corner walkway near the instrumentation box.		Local BM RL (mAHD): 1.170 Station datum: AHD Date of last survey: 14 November 2012 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Not Calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: None			
Peak flood of record (mAHD): 1.45	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 1.8	
Hydraulic characteristics: ICOLL, intermittently open.			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor water levels in the lagoon, and used as an input into an Entrance Management Strategy.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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NSW GOVERNMENT Manly Hydraulics Laboratory	**STATION LOCATION** **Eden Boat Harbour**	**MHL 2546** **Figure 266** Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Twofold Bay		Station name: Eden Boat Harbour	
AWRC No: 220470		BoM No: 569040	
MGA co-ordinates zone: 55		Easting: 758557	Northing: 5893267
Geographic co-ordinate system:		Latitude: -37.07124074	Longitude: 149.90828779
TRIM reference: FILE17/74166		LGA: Bega Valley Shire Council	Rainfall district: 69
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Radar		Secondary sensor type: Submersible pressure transducer	
Primary sensor installation date: September 1986		Secondary sensor installation date: July 2010	
Range of primary water level sensor (m): 10		Range of secondary water level sensor (m): 10	
Primary sensor sampling regime: 30 sec average B/A 1 minute		Secondary sensor sampling regime: 60 sec average B/A 15 minute	
SURVEY DETAILS			
PM/SSM reference: PM 28485 Order of accuracy: L2 PM/SSM RL (mAHD): 9.451 Local BM description: Bolt Local BM location: In pile on steps off to the right entrance of wharf.		Local BM RL (mAHD): 2.145 Station datum: Twofold Bay Hydro Datum (TBHD) and AHD Date of last survey: 10 December 2014 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1990 to June 2010		Tidal planes functionality: Good	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: 0.890 MHWS: 0.484 MHW: 0.380 MHWN: 0.276 MSL: -0.092	0.034 0.031 0.031 0.031 0.030	MLWN: -0.460 MLW: -0.564 MLWS: -0.668 ISLW: -0.958 Tidal range (HHWSS – ISLW): 1.849	0.032 0.033 0.034 0.036 0.036
STATION CHARACTERISTICS			
General comments: EWS was replaced with radar and submersible pressure transducer in Mar 2011.			
Peak flood of record (mAHD): 1.30	1% AEP (mAHD): NA	Instrumentation height (mAHD): 2.1	
Hydraulic characteristics: Tidal			
Purpose of installation and current functionality: To monitor ocean tide levels as a part of the Ocean Tide Program.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: Yes		BoM priority: Low	
Station recommendations: Maintain		Revision date: 17 September 2018	

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STATION LOCATION
Agnew Wharf

MHL 2546
Figure 267
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wonboyn River		Station name: Agnew Wharf	
AWRC No: 220425		BoM No: NA	
MGA co-ordinates zone: 55		Easting: 759146	Northing: 5873220
Geographic co-ordinate system:		Latitude: -37.25155161	Longitude: 149.92185229
TRIM reference: FILE17/52100		LGA: Bega Valley Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (2 communication ports, 3 differential inputs)		Communication type: Mobile 3G/4G (IP)	
Primary sensor type: Submersible pressure transducer		Secondary sensor type: NA	
Primary sensor installation date: August 1997		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 3.5		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 83665 Order of accuracy: 4 PM/SSM RL (mAHD): 0.711 Local BM description: PM 83665 Local BM location: West of timber jetty and boat shed		Local BM RL (mAHD): 0.711 Station datum: AHD Date of last survey: 26 June 2018 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m): NA	
TIDAL PLANES (mAHD)			
Period analysed: July 1998 to June 2010		Tidal planes functionality: Fair – not averaged as the hydraulics are too variable	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: Barometric station since Feb 2000. This station was decommissioned in August 2018 and was relocated within Wonboyn Lake in October 2018 (AWRC 220452) and includes temperature and conductivity parameters.			
Peak flood of record (mAHD): 1.55	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 1.5	
Hydraulic characteristics: Tidal, shoaling entrance, severe shoaling at entrance affects harmonic constituents.			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor water levels and as part of an entrance management policy.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 17 September 2018	

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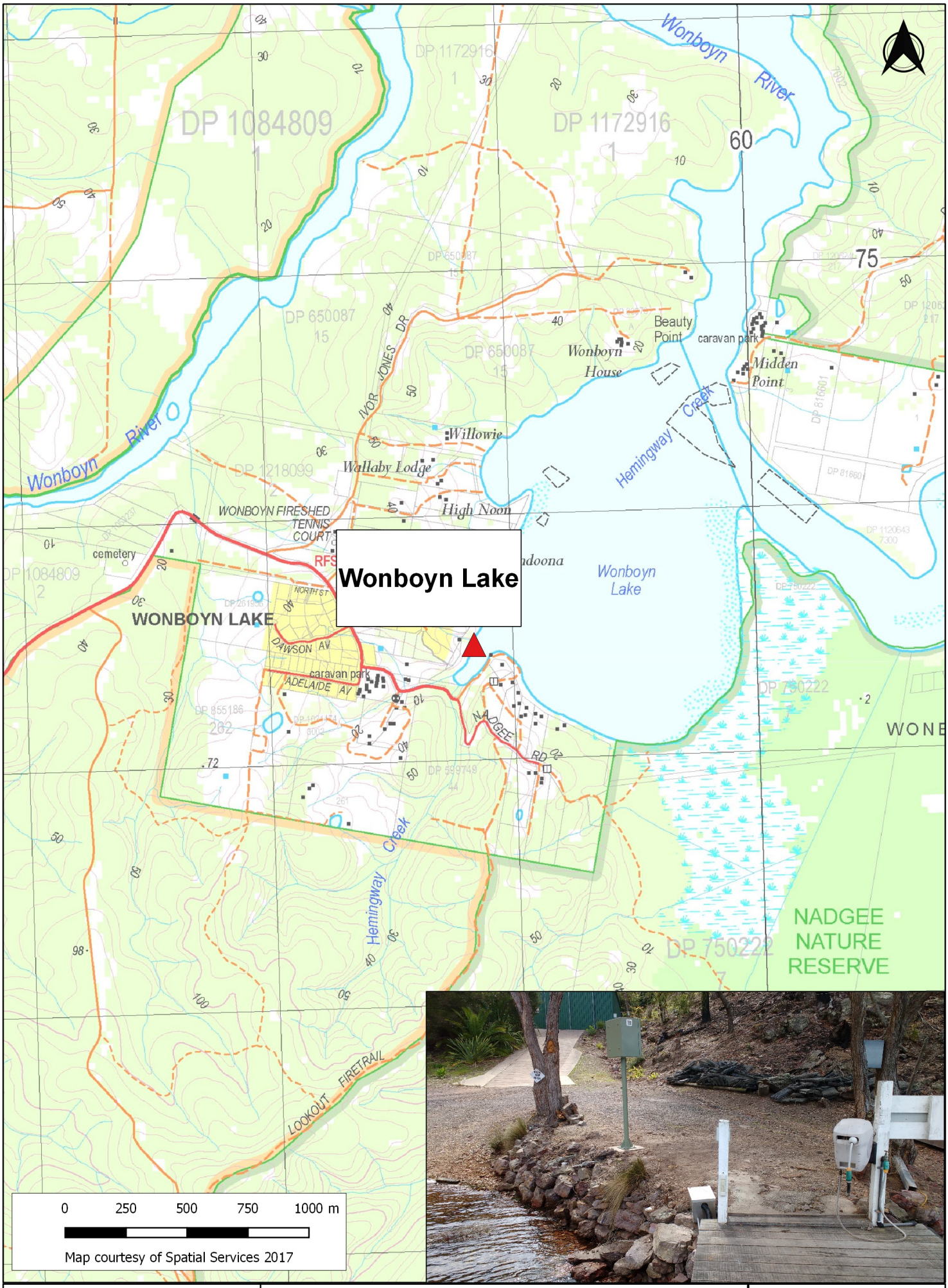

NSW GOVERNMENT Manly Hydraulics Laboratory

STATION LOCATION
Wonboyn Lake

MHL 2546
Figure 268
Scale 1:25,000

AUTOMATIC WATER LEVEL RECORDER STATUS

STATION IDENTIFICATION			
River/estuary system: Wonboyn River		Station name: Wonboyn Lake	
AWRC No: 220452		BoM No: NA	
MGA co-ordinates zone: 56		Easting: 226665.39	Northing: 5873012.42
Geographic co-ordinate system:		Latitude: -37.24936500	Longitude: 149.91830500
TRIM reference: FILE18/70093		LGA: Bega Valley Shire Council	Rainfall district: NA
INSTRUMENTATION			
Logger type: Multi-channel programmable logger (4 communication ports, 8 differential inputs)		Communication type: Internet Protocol (IPM)	
Primary sensor type: Submersible Pressure Transducer		Secondary sensor type: NA	
Primary sensor installation date: October 2018		Secondary sensor installation date: NA	
Range of primary water level sensor (m): 7		Range of secondary water level sensor (m): NA	
Primary sensor sampling regime: Instantaneous 15 minute		Secondary sensor sampling regime: NA	
SURVEY DETAILS			
PM/SSM reference: PM 83665 Order of accuracy: D/4 PM/SSM RL (mAHD): 0.711 Local BM description: Stainless steel bolt in concrete. Local BM location: Concrete slab underneath the instrument cabinet.		Local BM RL (mAHD): 1.102 Station datum: AHD Date of last survey: 24 October 2018 Surveyed by: Phil Clark Gauge plate offset to gauge zero (m):	
TIDAL PLANES (mAHD)			
Period analysed: NA		Tidal planes functionality: Good – not calculated	
Tidal plane result (m)	Std deviation	Tidal plane description (m)	Std deviation
HHWSS: MHWS: MHW: MHWN: MSL:		MLWN: MLW: MLWS: ISLW: Tidal range (HHWSS – ISLW):	
STATION CHARACTERISTICS			
General comments: This station also measures barometric pressure, conductivity and temperature parameters. This station was installed in Oct 2018 as a replacement to the decommissioned Agnew Wharf station.			
Peak flood of record (mAHD): NA	1% AEP (mAHD): Unknown	Instrumentation height (mAHD): 2.9	
Hydraulic characteristics: Tidal, insufficient record length for tidal planes analysis.			
Purpose of installation and current functionality: The gauge was installed under the Estuary Program to monitor water levels as part of an entrance management policy and to monitor water quality for the management of oyster farming.			
Station shown on BoM website: MHL data for this station is not displayed.			
SES flood classification: None			
Data used for BoM flood forecasting: No		BoM priority: NA	
Station recommendations: Maintain		Revision date: 29 January 2019	

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Appendix A Glossary of terms

Aanderaa	High precision recording instruments for determining water level in the open seas. The total pressure is measured by an ultra precise quartz pressure sensor. The total pressure can then be corrected for water density and atmospheric pressure to determine the water level.
AHD	Australian Height Datum (AHD), is a geodetic datum for altitude measurement in Australia. According to Geoscience Australia, in 1971 the mean sea level for 1966-1968 was assigned a value of zero on the Australian Height Datum for 30 tide gauges around the coast of the Australian continent. The resulting datum surface has been termed the Australian height Datum (AHD) and was adopted by the National Mapping Council as the datum to which all vertical control for mapping is to be referred.
Assumed Datum	A datum that has been assumed for the purpose of referencing water level height for a particular local area.
Benchmark (BM)	A fixed physical object or mark used as reference for a vertical datum.
BLHD	Bermagui Local Hydro Datum
BRFMD	Brunswick River Flood Mitigation Datum.
CHD	Crowdy Head Datum
CHPD	Coffs Harbour Port Datum
Estuary	An embayment of the coast in which fresh river water entering at its head mixes with the relatively saline ocean water. When tidal action is the dominant mixing agent it is usually termed a tidal estuary. Also, the lower reaches and mouth of a river emptying directly into the sea where tidal mixing takes place. The latter is sometimes called a river estuary.
EWS	Electromagnetic wave and tide monitoring system. The EWS is a co-axial transmission line having a 50 mm diameter perforated copper staff as its outer conductor that is the tuning element of an electronic oscillator.
FHD	Forster Hydro Datum
Gas Purged Pressure Gauge	A type of analogue tide gauge in which gas, usually nitrogen, is emitted from a submerged tube at a constant rate. Fluctuations in hydrostatic pressure due to changes in tidal height modify the emission rate for recording.
Higher High Water Spring Solstice (HHWSS)	The highest of the high waters (or single high water) of any specified tidal day due to the declination A_l effects of the moon and sun.
ICOLL	Intermittently Closed and Open Lakes or Lagoons.
IPD	Iluka Port Datum
Indian Spring Low Water (ISLW)	A datum originated by Professor G. H. Darwin when investigating the tides of India. It is an elevation depressed below mean sea level by an amount equal to the sum of the amplitudes of the harmonic constituents M_2, S_2, K_1, and O_1.
JBCD	Jervis Bay Chart Datum
LHIHD	Lord Howe Island Hydro Datum
LWOST	Low Water Ordinary Spring Tide

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Mean High Water (MHW)	A tidal datum. The average of all the high water heights observed over the National Tidal Datum Epoch. For stations with shorter series, simultaneous observational comparisons are made with a control tide station in order to derive the equivalent datum.
Mean High Water Springs (MHWS), Mean Low Water Springs (MLWS)	The height of MHWS is the average, throughout a year when the average maximum declination of the moon is 23.5^{o}, of the heights of two successive high waters during those periods of 24 hours (approximately once a fortnight) when the range of the tide is the greatest. The height of MLWS is the average height obtained by the two successive low waters during the same periods.
Mean High Water Neaps (MHWN), Mean Low Water Neaps (MLWN)	The height of MHWN is the average, throughout a year, as defined above, of two successive high waters during those periods of 24 hours (approximately once a fortnight) when the range of the tide is least. The height of MLWN is the average height obtained by the two successive low waters during the same periods.
Mean Low Water (MLW)	A tidal datum. The average of Mean Low Water Spring and Mean Low Water Neap.
Mean Sea Level	MSL is the average level of the sea surface over a long period, preferably 18.6 years or more, or the average level which would exist in the absence of tides.
MGA Coordinates	The Geocentric Datum of Australia (GDA) is a coordinate reference system that uses the Map Grid of Australia (MGA) for co-ordinate projection.
MHL	Manly Hydraulics Laboratory, a business unit within Government and Corporate Services, a division of the Department of Finance, Services and Innovation
Neap Tides	Tides of decreased range or tidal currents of decreased speed occurring semi-monthly as the result of the moon being in quadrature. The neap range (Np) of the tide is the average range occurring at the time of neap tides and is most conveniently computed from the harmonic constants. It is smaller than the mean range where the type of tide is either semi-diurnal or mixed and is of no practical significance where the type of tide is predominantly diurnal. The average height of the high waters of the neap tide is called Neap High Water or High Water Neaps (MHWN) and the average height of the corresponding low waters is called Neap Low Water or Low Water Neaps (MLWN).
NITD	Norfolk Island Tidal Datum
Permanent Survey Mark (PM)	A mark of a permanent nature (usually identified by a combination of letters and numbers) which provides the means for all surveys to be related to the State Survey Control common co-ordinate system.
PSHD	Port Stephens Hydro Datum
Radar	The radar sensor emits microwave pulses, a transmitter receives echo signal and can then determine the height of water by their strength.
RRVD	Richmond River Valley Datum
SCIMS	Survey control information management system
Spring High Water	Same as Mean High Water Springs (MHWS). See Spring Tides.
Spring Low Water	Same as Mean Low Water Springs (MLWS). See Spring Tides and Mean Low Water Springs.

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Spring Tides	Tides of increased range or tidal currents of increased speed occurring semi-monthly as the result of the moon being new or full. The spring range (Sg) of tide is the average range occurring at the time of spring tides and is most conveniently computed from the harmonic constants. It is larger than the mean range where the type of tide is either semi- diurnal or mixed, and is of no practical significance where the type of tide is predominantly diurnal. The average height of the high waters of the spring tides is called Spring High Water or Mean High Water Springs (MHWS) and the average height of the corresponding low waters is called Spring Low Water or Mean Low Water Springs (MLWS).Same as Mean Low Water Springs (MLWS).
State Survey Mark (SSM)	A brass plaque inscribed *survey mark* set in a concrete block which has been approved by the Surveyor-General as a State survey mark.
Storm Surge	The local change in the elevation of the ocean along a shore due to a storm. The storm surge is measured by subtracting the astronomic tidal elevation from the total elevation. It typically has a duration of a few hours. Since wind generated waves ride on top of the storm surge (and are not included in the definition), the total instantaneous elevation may greatly exceed the predicted storm surge plus astronomic tide. It is potentially catastrophic, especially on low-lying coasts with gently sloping offshore topography.
Submersible pressure transducer	A fully submersible sensor with millivolt or milliamp output for measuring hydrostatic liquid levels.
TBHD	Twofold Bay Hydro Datum
TBM	Temporary benchmark – generally a cut triangle
Tidal Characteristics	Principally, those features relating to the time, range, and type of tide.
Tide	The periodic rise and fall of the water resulting from gravitational interactions between Sun, Moon and Earth. The vertical component of the particulate motion of a tidal wave. Although the accompanying horizontal movement of the water is part of the same phenomenon, it is preferable to designate this motion as tidal current.
Tide (Water Level) Gauge	An instrument for measuring height of water level.
Tidal Range	The difference between HHWSS and ISLW.
TRHD	Tweed River Hydro Datum
ZFD	Zero Fort Denison

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