CIVL4120 ADVANCED HYDRAULICS
HYDRODYNAMICS AND WATER QUALITY OF AN ESTUARINE SYSTEM
2018 FIELD WORKS & PROJECT

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Mid-estuary zone of Eprapah Creek at low tide (Left) and high tide (Right) during king tide conditions - View from Site 2 looking downstream on 1 February 2010

Upper estuary zone of Eprapah Creek at low tide (Left) and high tide (Right) during king tide conditions - View from the right bank at Site 3 looking downstream on 2 February 2010

1. Presentation

The purpose of the field work is to introduce undergraduate students to the complexity of an unsteady waterway: i.e., an estuarine system, together with the difficulties associated with field experiments and the interactions between hydraulic engineering, water quality, biology and ecology. The students will (1) survey the creek cross-sections, (2) monitor the water quality and hydraulics in the estuary of a small creek, as well as the bird and wildlife habitats during the same period, and (3) perform some numerical modelling of the creek estuarine zone. They will process and analyse their data, and compare these with the theory (CIVL3140, CIVL4110, CIVL4120 & CIVL4140). The assignment will highlight practical details which must be considered during the study of a system: e.g., tidal effects, ecological issues, public access, impact of a sewage plant. The creek system is located in the Redlands shire close to Brisbane QLD (Table 1-1, Fig. 1-1 & 1-2).

This field work will be some group work to emphasise **team work, collaborative efforts and communication**. A total of 3 sites will be considered within the estuarine zone (Table 1-1, App. III). Each site will be surveyed, analysed and investigated continuously by a group of 4 students from Tuesday 14 August 2018 (5:00am) to Tuesday 14 August 2018 (7:00pm). The project will be concluded by an oral presentation on Wednesday 5 September 2018 and a report submission on 7 September 2018 (Table 1-2). The oral presentations will be assessed by both lecturer and peers.

Table 1-1 - Main locations along Eprapah Creek

Ref. No.	Description	Location UBD 2001	Coordinates	Comments
1	Point Halloran Conservation Area	206 G/H 17	27°34'12.87"S 153°17'24.67"E	Right bank. Access via Orana St. Walk along the Conservation area. Take the left branch. At boundary between forest ad mudflat, turn left toward the river bank.
2	*End of Beveridge St*	*206 F 19*	*27°34'37.16"S 153°17'30.30"E*	*Left bank. Access via Beveridge St. At end follow foot track until platform.*
2B	End of Beveridge St	206 F 19	27°34'38.45"S 153°17'34.07"E	Left bank. Access via Beveridge St. At end follow foot track until platform. Turn right and continue for 150m.
St	Footpath off Aspect Dr (concrete stairs)	206 H20	27°34'43.17"S 153°17'37.60"E	Right bank. Access off Aspect Drive. Follow footpath towards park until concrete steps on the river bank
2C	End of Beveridge St	206 F 19	27°34'40.60"S 153°17'31.78"E	Left bank. Access via Beveridge St. At end follow foot track until platform. Turn right and continue for 80m. Turn right and cut meander.
3	Eprapah Environmental Training Centre Platform (d/s) end Boardwalk	206 E 20	27°34'48.16"S 153°17'9.57"E	Right bank. Access from Eprapah Environmental Training Centre.
3B	*Eprapah Environmental Training Centre Platform [4] Intersection Blue/Green trails*	*206 D 20*		*Right bank. Access from Eprapah Environmental Training Centre. Narrow creek section.*
4	*Eprapah Environmental Training Centre Platform [15] Platypus pool*	*206 D 20*		*Right bank. Access from Eprapah Environmental Training Centre.*

Fig. 1-1 - Sketch of Eprapah Creek estuarine zone

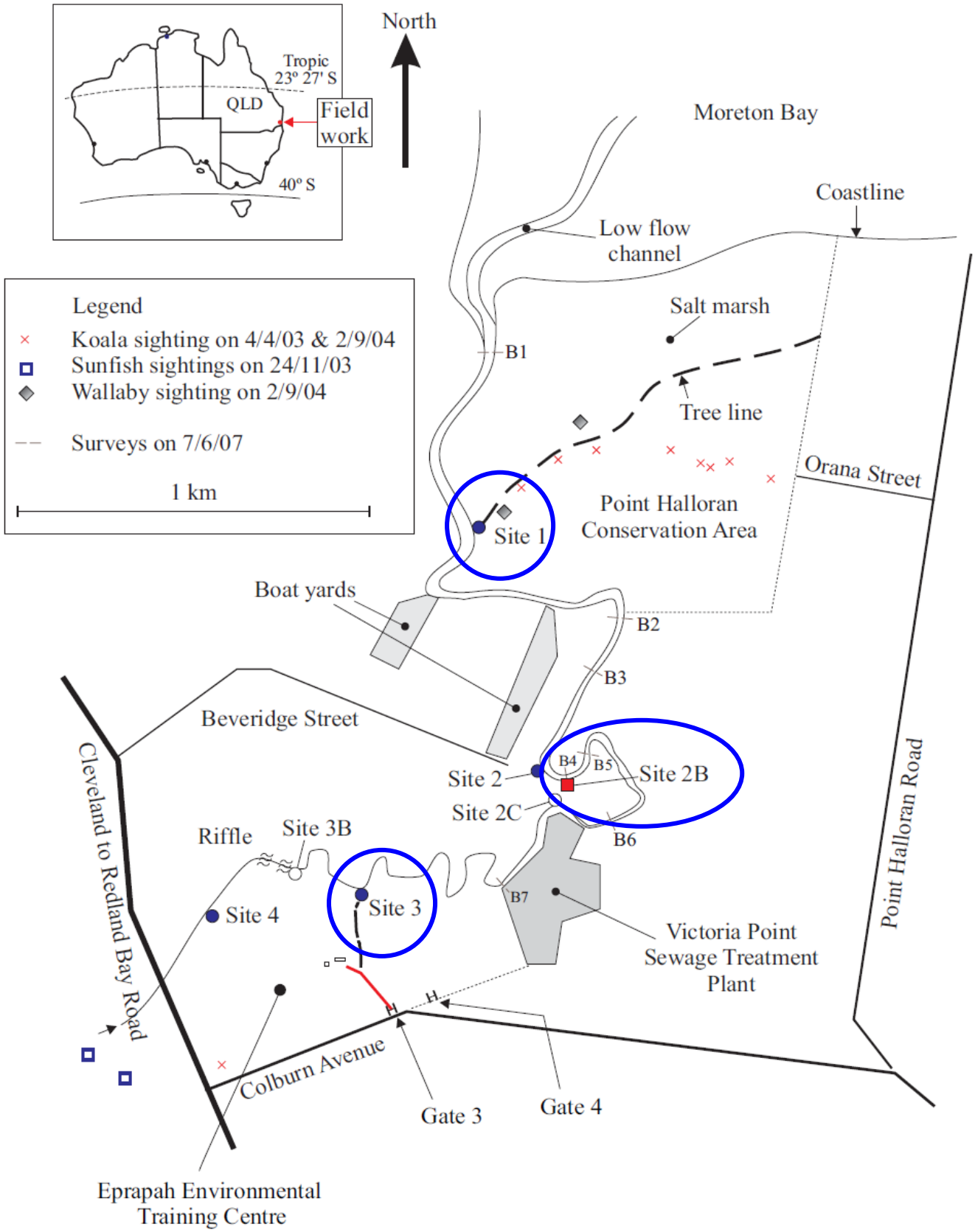

Fig. 1-2 - Sketch of the mid-estuarine zone

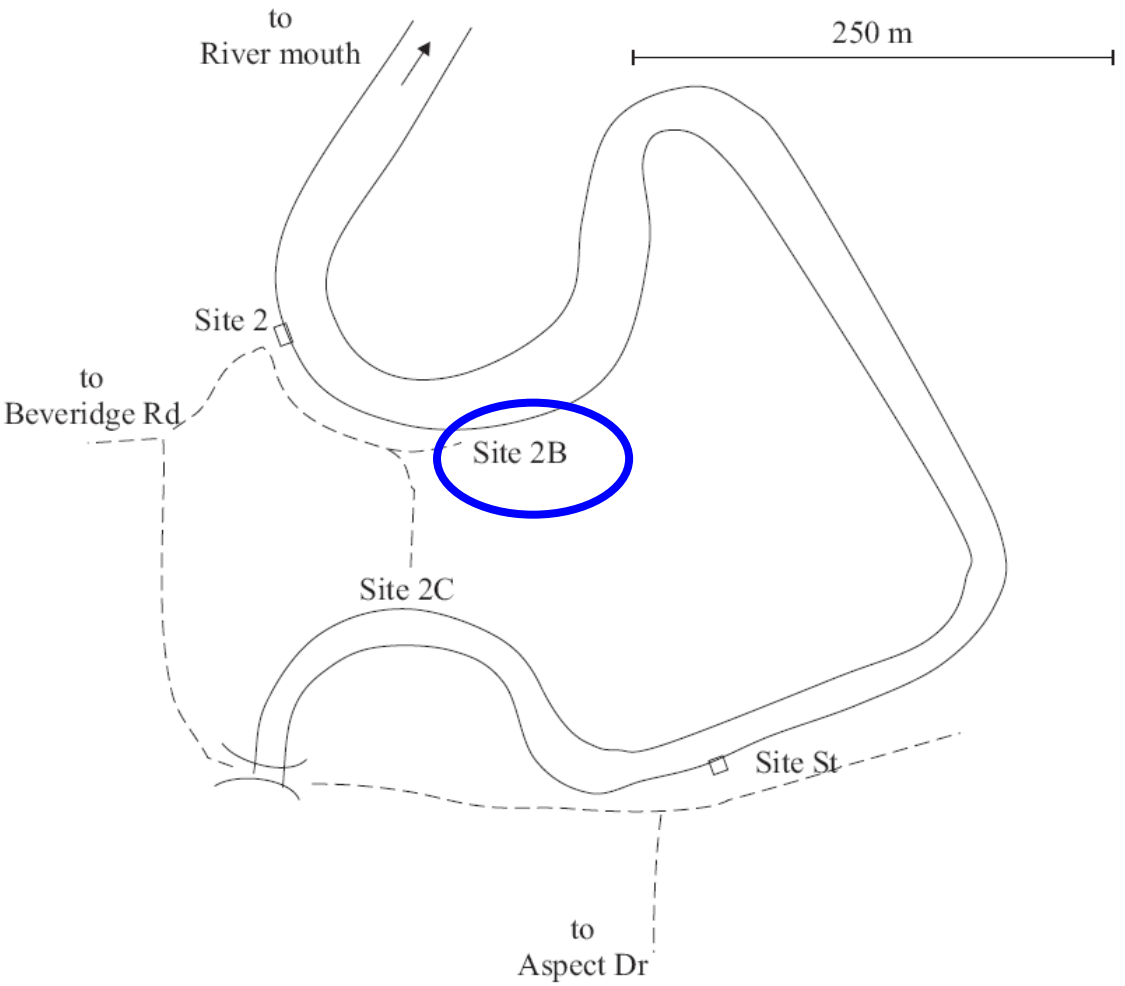

Table 1-2 - Time table

Week	Date	Description	Remarks
	Mid-July 2018	Dates and site location posted on the Internet	
1	Wed. 25 July	Preliminary instructions and dates.	
3	Wed. 8 August	Final instructions.	
3	Wed. 8 August	Final day for group organisation.	
3	Fri 10 August	Training session.	After class. 09:00 in AEB Hydraulics Laboratory to collect equipments and 09:10 at the bridge on the lake (next to AEB).
	9-13 Aug.	Preliminary survey & surveying	
4	Tuesday 14 Aug. 2018	Field works	12 h field measurements from 6:00am to 6:00pm. Compulsory **attendance**
7	Wed. 5 Sept. 2018	Oral presentations for each group (from 08:00).	During class. **Every student must attend**.
7	Fri 7 Sept. 2018	Report submission.	Deadline: 09:50 in Prof. Chanson's hands.

Note: The dates of the project are linked with the tides and cannot be changed.

2. Field works

2.1 Field works

The field works will take place on Tuesday 14 August 2018 (5:00am) to Tuesday 14 August 2018 (7:00pm). A training session will take place on Friday 10 August 2018 at 9:00. Measurements shall be conducted from a low tide to the low tide on the next day: i.e., between 6:00am and 6:00pm to make use of the daylight for setting up and dismantling each sampling site (Tables 2-1, 2-2, 2-3 & 2-4). Some readings will be taken every 15-20 minutes while others may be taken every 30 minutes or every hour possibly (see below, Table 2-3).

Table 2-1 - Tide times (Brisbane bar)

Day	Time	Height (m)
Monday 13 August 2018	23:17	2.60
Tuesday 14 August 2018	05:58	0.27
	11:43	2.07
	17:49	0.30
Wednesday 15 August 2018	00:00	2.45

Notes
Tide predictions
{http://www.bom.gov.au/oceanography/tides/}
Correction for Victoria Point tides
{http://www.msq.qld.gov.au/Tides/Tides-times-for-secondary-ports.aspx}
{http://tides.willyweather.com.au/qld/brisbane/victoria-point.html}
Australian tide manual
{http://www.icsm.gov.au/icsm/tides/tides_msl.html}
Related information:
{http://www.msq.qld.gov.au/Tides.aspx}
{http://www.msq.qld.gov.au/Charts/Faqs-charts.aspx}
{http://www.msq.qld.gov.au/Tides/Tidal-planes.aspx}
{http://www.derm.qld.gov.au/environmental_management/coast_and_oceans/index.html}

Prof. Hubert CHANSON and a number of Civil Engineering School staff will be in the Eprapah catchment on Tuesday 14 August 2018 (6:00am) to Tuesday 14 August 2018 (6:00pm). They will circulate among groups to provide advice. A safety officer will be on site with a first-aid kit on Tuesday 14 August 2018, and he will be contactable by phone (see paragraph 2.5).

Field equipments (see Table 2-2) will be available from Mr Jason VAN DER GEVEL (UQ-CE AEB Hydraulic Laboratory) between Wednesday 8 August 2018 and Friday 10 August 2018 between 08:00am and 2:00 pm.

A training session will take place on Friday 10 August 2018, with equipment collection at 09:00 in the AEB Hydraulics Laboratory and training at the UQ Lake (next to AEB) starting at 09:10.

ALL the equipments must be returned un-damaged and cleaned no later than Tuesday 21 August 2018 before 3:00pm to Mr Jason VAN DER GEVEL (AEB Hydraulic Laboratory). (Lateness in returning the equipment and damage to any equipment shall be heavily penalised.)

Note that some equipment is kindly lent by other departments and institutions. It must be returned undamaged.

PLEASE clean all equipment before returning all the gears undamaged.

Further the field works will be conducted in Conservation Parks and Environmental Centre. Students are requested to take great care to the environment during the field works. (**All refuse, waste and litter generated by the activity MUST BE REMOVED from the reserve areas.**) Any damage attributable to the use of the reserves shall be heavily penalised.

Table 2-2 - List of equipments provided to the University of Queensland student groups

Equipment	Purpose	Remarks
Thermometer for air temperature reading (2 units)	Air temperature measurement	Alcohol thermometers.
Secchi disk (1 unit)	Turbidity	
Hanna turbidity probe	Turbidity	
DO meter / Multi-sensor probe	dissolved oxygen measurements	Multi-sensor probe.
Conductivity / pH / Temperature meter	Water conductivity pH	The range of conductivity is limited. Water samples may need to be diluted with freshwater for conductivity measurements of saline waters.
Total suspended solids suction equipment and filters	Total Suspended Solids (TSS)	Filters must be placed back in the same container as they are provided. Analyses will be conducted on Wednesday 15 August 2018.
Disposable gloves (2 sets)	for any chemical handling	
Level, tripod, spirit level, measuring tape and staff picket	Survey	1 per group. Survey conducted at low tide, preferably **prior** to the field measurement day
Buckets (2) & lid (1)	Water sample collection	
Graduated container		To dilute brackish waters for conductivity testing
Waterproof stopwatch	Surface velocity measurement	

2.2 Field measurements

Each group will conduct a series of hydraulic, water quality and ecological measurements **with the first reading at 6:00am and the last reading at 6:00pm**. Some readings will be taken every 15 minutes while others will be taken at longer intervals (Table 2-3).

In addition, students may keep an eye open with regards to **special features** like saltwater/freshwater fronts, water level surges, boat passages, bird fishing activities, surface slicks, pollution runoff, ... and record these details (incl. photographs). Interesting flow features might also occur around high/low tide slack ...

Students should further record atmospheric events including air temperature, rainfall (time, amount), sun light conditions, wind, wind waves ...

Further you are encouraged to observe and document aquatic plants, benthic vertebrate and invertebrate fauna. These would be reported in your report.

Table 2-3 - List of measurements to be conducted between 6:00am to 6:00pm by each group

Measurement	Timing	Remarks
Air Temperature	Every 20 minutes	
Water Level	Every 15 minutes	At low tide, install a pole with graduation, from where the reading is taken. (Accuracy must be within 1 cm.) The graduation must be readable for all day including at high tide
Water Temperature	Every 20 minutes	Take a water sample near the surface and one near the bottom. Thermometer/conductivity meter.
Conductivity (water)	Every 20 minutes	Take a water sample near the surface and one near the bottom. Thermometer/conductivity meter (compare two instruments) - Dilute the solution accurately if required
pH	Every 20 minutes	Take a water sample near the surface and one near the bottom. Conductivity/pH meter
Turbidity	Every 20 minutes	Secchi disk & Hanna probe
Water surface velocity	Every 20 minutes	By timing suitable floats over a known distance. Using floating matters (e.g. branch, orange).
Climatic conditions	Every 20 minutes	Use water quality survey form (App. IV) based upon the EPA survey form.
Dissolved Oxygen content DO	Every 30 minutes	Take a water sample near the surface and one near the bottom.
Total Suspended Solids	Every hour	Filters must be placed back in the same container as they are provided. Analyses will be conducted on Wednesday 15 August 2018.
Fauna/wildlife numbers and types	Continuously	Visual observations. May need binoculars. Use bird survey form (App. IV).

Practical considerations

ALL THE DATA shall be recorded in writing. These data will constitute a key component of the final report and of the groupwork assessment. Students are very strongly encouraged to think beforehand how they will record the data and to prepare relevant books and notepads. Any loss of field data is not acceptable. Use carbon copies (e.g. accounting books) to backup your data regularly.

Field observations will include some hydraulic, environmental and ecological measurements.

Hydraulics measurements will include (1) the surface velocity by timing suitable floats over a known distance, and (2) the water level using a pole with graduations from where the reading is taken. Importantly, the flow direction shall be carefully recorded and unusual flow patterns at slacks shall be recorded.

Water quality measurements will include (1) air and water temperatures, (2) water conductivity, (3) pH, (4) turbidity, (5) dissolved oxygen concentrations.

Ecological observations will include (1) bird survey from a fixed point, (2) wildlife/fauna observations from a fixed point as well as in the surroundings of the group site, as well as (3) any unusual activity.

The freshwater runoff flow shall be estimated on the day at the Redland Bay/Cleveland Road bridge. This flow will be an input for the numerical modelling works.

The channel cross-section shall be surveyed **at low tide**, preferably a couple days prior to the field work (Table 2-4) or the following day. Sites for the surveys are listed in Table 2-4. The survey shall be conducted during day time and at low tide for safety. In deep water regions, students could consider the use of boat or surfboard.

During the survey of the cross-section, ensure that the survey is conducted **perpendicular to the main flow direction**.

Record the bed material at each sampling point, as well as the water depth and time (within the minute) of each sampling location.

NOTES

- Before each water quality reading, rinse once the bucket with creek waters before collecting the water samples.
- Collect water samples about 20 cm beneath the free-surface.
- Each series of measurements conducted every 15-20 minutes must be reported on a water quality survey form (e.g. App. IV).
- Constant monitoring of birds and wildlife must be reported on a bird/wildlife survey form (App. IV).

+ **For bird observations, each group is strongly advised to have a solid reference book** (e.g. [8] SIMPSON et al. 1999; [9] SLATER 1989).

NB: Reference books should be obtained from libraries prior to the field work.

Table 2-4 - Details of field work sites for each group

Group	1	2	3
Field works on Tuesday 14 August 2018	Site 1	Site 2B	Site 3
UQ Researcher	Dr Alistair Grinham	Ryan Beecroft	--
Cross-sectional survey	Site 1 (or Bridge u/s Site 2C)	Site 2B, at location of previous survey	Site 3 using pole/star picket on opposite bank
Numerical modelling of Eprapah Creek estuarine zone (from river mouth to Redland Bay/Cleveland Road)	13-14 August 2018 00:00 to 24:00	14-15 August. 2018 00:00 to 24:00	15-16 August 2018 00:00 to 24:00

2.3 Preparation

Groups are advised to visit the site at least on weeks prior to the field work and to plan all practicalities associated with the creek survey and the 12-hours long field measurement study.

It cannot be stressed enough that field works require a very thorough preparation.

Surveys of the channel cross-section (Table 2-4) shall be conducted few days before the field trip **at low tide** during daytime, with all appropriate safety measures.

You will need to find the nearest permanent survey marker and its coordinate. Alternately you need to record the low tide level and corrected all data into AHD using relevant tidal charts.

Get a pole/stick and equipment to install strongly a graduated pole/stick for water level readings during the field work. A photograph of the sturdy benchmark (BM) will be included in the report.

Each group must organise a heavy sledge hammer or star picket driver for driving in star pickets and bench mark. The pole/stick must be removed after field works (i.e. after 6:00pm).

Prepare freshwater (if needed to dilute the brackish waters) for conductivity readings ([1]). Take a **graduated container** to dilute saltwater samples if necessary.

[1]The range of the conductivity meters is 0-20 µS. (Check units in the documentation.) The upper range is less than 50% of seawater conductivity.

There is no freshwater available on site. Each group is strongly advised to bring large amounts of fresh/drinking water on site (e.g. 5 L container).

Bring two buckets with a rope (for water collection from a platform).

Get at least one bucket with a lid (to carry samples for DO measurements).

Bring ropes, and relevant tools and equipments.
Some groups may need to bring a robust ladder to climb down the bank (without damaging it) at low tide.

*Bring Waste Bottles for Water wastes. The bottle(s) must be **clearly labelled WASTE**.*

Bring a waterproof stopwatch to record free-surface velocity.
Free-surface velocities are measured by timing suitable floats (e.g. branch) over a known distance.

Bring a camera and films.
Photographic evidence may be useful to support your report and presentation.

Bring permanent marker pens for relevant marking.

Make up clear and waterproof log-in sheets for all the data recordings for all the day. Have a backup system.
Remember that the data set will constitute a substantial part of the report and assessment.

Bring gum boots and fishing boots.

Bring any relevant equipment that may be needed. (For example, a ladder to climb down the river without damaging the banks.)

Be prepared for any type of weather (rain, sun, wind, ...).

Bring lights and torches to setup and pack up your site.

Bring binoculars for bird and wildlife watching. Each group must have a least one reference book [8,9] on bird and wildlife in South-East Queensland.

Do not forget sun screen, sun glasses, hat, gloves, insect repellent ....

A ladder may assist the access to the river bed (Sites 3, 2B, 2C). The ladder should be secured with ropes to a solid place.
A ladder may be obtained from Mr Jason VAN DER GEVEL (UQ-CE AEB Hydraulic Laboratory) prior to the field work and should be returned together with the equipments after the field trip.
Alternately, Mr Jason VAN DER GEVEL (UQ-CE AEB Hydraulic Laboratory) could bring on site the ladder on Tuesday 14 August 2018 before 06:00 but you will have to return it to the UQ-AEB Hydraulics laboratory yourself.

In Addition
You will need to find the nearest permanent survey marker and its coordinate.

Include photographs of the field works and of the permanent marker in your documentation.

Groups may consider obtaining aerial photographs.

Find relevant flood and hydrological studies of the area

Photographs of flood events ...

2.4 Access

Eprapah Creek is located in Victoria point. The sites 3, 3B and 4 are located in the Eprapah Environmental Training Centre (Fig. 1-1). Site 1 is in Point Halloran Environmental Park (Fig. 1-1). Sites 2, 2B and 2C are on the left bank (Fig. 1-2). Site St is accessible off Aspect Drive (Fig. 1-1).

+ By car, go to Victoria Point.

+ By train/bus: Go to Cleveland train station and take the bus to Victoria point.

+ All the sites are accessible on foot. (Be careful of flooding during rain storm periods and storm surges). During the survey and field works, be aware of local residents. Do not trespass on private properties. Be aware of the risk of bush fires.

> Remark: There is a shopping centre (incl. a supermarket, a chemist) at the corner of Colburn Ave and Cleveland-Redland Bay Rd, Victoria Point.

2.5 Safety

Safety is uppermost important during all the field works.

All students/participants must log into the Risk Assessment Database, read and acknowledge the following risk assessment:

Website: https://new.risk.admin.uq.edu.au
Task/Process: 35687 - Eprapah Creek - Day Trip

The risk assessment is compulsory reading. It is the responsibility of each individual to read it before the field work.

The Student Safety Declaration Form for CIVL4120 Field trip to Eprapah Creek must be completed by the Student and given to the Lecturer or Safety Officer before the start of the field trip. No field work should start until this form has been completed.

+ **Students will be working in groups of no less than 3 people at any time on site.**

+ Students shall have at least two mobile phones on site and switched ON at any time. Each group will provide the lecturer with three contact mobile phone numbers by Friday 10 August 2018. These phone numbers shall be operational on Tuesday 14 August 2018 (5:00am) to Tuesday 14 August 2018 (7:00pm) at all times and may be used by the Police, the Emergency Services, the Redland Shire Council and the University of Queensland in case of emergency (e.g. bushfire, storms).
Do make sure that your batteries are charged. Take spare mobile phone batteries for emergencies.

+ No work shall be attempted into water more than waist deep. Persons going into the water must wear a life line secured to the bank. Only confident swimmers are to do the work in the water.

+ Good common sense is recommended to avoid any injury: e.g., do not jump from walls, watch your steps.

+ It is strongly advised to wear adequate shoes or boots. Strong clothing is recommended, incl. shorts and trousers.

+ Hat, sunglasses and sun screen are strongly advised. Bring also mosquito/insect repellent.

+ During or immediately before the field works, DO NOT consume alcohol or other intoxicating substances.

+ Drive safely to and back from the field work.

Contact phones
A safety officer will be based in Victoria Point with a first aid kit, for the duration of the field works from 6:00am to 6:00pm. In emergency, he will be contactable at the following number :

Jason VAN DER GEVEL 5.30am – 12.30pm (**0448 055 011**)
Shane WALKER 12.00pm – 7.00pm (**0434 149 513**)

For emergencies, dial 000.

Hospital (07) 3488 3111 Redland Hospital, Weippin St, Cleveland
Doctors (07) 3401 9555 Victoria Point Medical & Dental Centre, Town Centre, East Building, Cnr Redland Bay-Cleveland Rd, Colburn Ave, Victoria Point QLD 4165
Ambulance 000 Emergency calls.

To get Cleveland Police Station (7-11 Middle St, Cleveland QLD 4163), dial (07) 3824 9333.

To get Brisbane Police Headquarters (200 Roma Street Brisbane QLD 4000), dial (07) 33 64 64 64.

Prof. Hubert CHANSON will be on site all the day and contactable at: 0422 652 248.

2.6 Environmental issues
All field works will be conducted in Conservation Parks and Environmental Centre. Staff and students are requested to take care to the environment during the field works.

+ **All refuse and litter generated by the activity MUST BE REMOVED from the reserve areas.**
Wastes must be removed.

+ Noise and disturbance associated with the field works must be kept at a level which has no negative impact upon the environment (e.g. birds, fish) and surrounding properties.

+ Damage to the banks is not acceptable.

+ Any damage attributable to the use of the reserves will be rectified at cost and the relevant group(s) shall be heavily penalised.

- No vehicles are to access the reserve area.

3. Assignment

An estuary is a water body where the tide meets a river flow and where mixing of freshwater and seawater occurs. Estuaries may be classified as a function of the salinity distribution, and density stratification (CHANSON 2004b). That classification does not express however the unique feature of each estuary, and it does not account for seasonal changes, nor for differences between neap and spring tides. The study of mixing in estuary remains a complex process (IPPEN 1966, FISCHER al. 1979, LEWIS 1997, CHANSON 2004a,b).

Eprapah Creek is a small system in the Redland Shire. The estuary was subjected few years ago to major pollution. The problem was dealt with. The estuarine zone is characterised by two environmental parks (Eprapah Environment Training Centre and Point Halloran Conservation Park), some marinas and boat yards, and a sewage plant.

Table 3-1 - Internet resources on Eprapah Creek

Website	Url
Redland Shire	http://www.redlands.qld.gov.au/
Redland Shire, Tourism at Victoria Point	http://www.redlands.net.au/redlandstourism/seeVictoriaPt.htm
Field works at Eprapah Creek	http://www.uq.edu.au/~e2hchans/eprapa.html

Water quality and ecology are closely monitored at Eprapah Creek. For example, the Qld DSITI Water Monitoring Group has been surveyed the water quality monthly for years, while Waterwatch and landcare groups regularly monitor aquatic and bird lives. This system and the interactions between hydraulic engineering, water quality and ecology are the topics of the advanced hydraulics field work of the CIVL4120 Advanced Hydraulics subject. Each group will produce (Table 2-4) :

1- a detailed data set of hydraulic, water quality and ecological parameters monitored during a 12 hour period on Tuesday 14 August 2018 (6:00am) to Tuesday 14 August 2018 (6:00pm),
2- a comparison of these data with previous observations,
3- a surveyed cross-section of the estuary at the site listed in Table 2-4,
4- a hydraulic modelling of the whole estuarine system for a full day (Table 2-4) based upon St Venant equations, and
5- a complete analysis of the experimental and numerical data over a full tidal cycle, identifying clearly key features of the estuarine system, some obvious
6- recommendations for optimum environmental management of the system (this is not obvious and it requires an solid understanding of the local environment).

Notes
- For the numerical modelling, each group must validate its model with field data collected on Tuesday 14 August 2018. Complete calculations (00:00 to 24:00) will be performed for at least another day (Table 2-4).
- For these calculations, it is essential that the freshwater flow from Eprapah Creek be estimated at the Redland Bay/Cleveland Road crossing for the period 13-14-15-16 August 2018.

Data analysis
The purpose of the numerical modelling is to assist with the data analysis. Once your hydrodynamic model is validated, you should use your results to discuss the interesting features that you observed on the Tuesday 14 August 2018. For example, the hydrodynamic model may provide some insights into the time-variations of conductivity and temperature during the field study.
The combination of field and numerical data is an unique approach that will allow you to gain a better understanding of the complete system. Herein the system is the Eprapah Creek estuarine zone that interacts with the Moreton Bay, Eprapah Creek riverine system ([2])
You may wish also to discuss with relevant experts on the estuarine system, its characteristics and its physio-chemical patterns.

[2]Remember to measure the freshwater inflow at the bridge beneath the Redland Bay to Cleveland Road on Tuesday 14 August 2018 and to get the rainfall record off the B.O.M. website.

4. Assessment

4.1 Presentation

The assessment of field works will take place as:

- a group work during the semester (**40% of CIVL4120 subject**), and
- some individual examination at the end of semester examination.

During the semester, the students will work in groups of 4 people. The groups will be finalised no later than Wednesday 9 August before 09:50. Two sites will be investigated at the locations listed in Table 1-1. This gives room for personal preference in the choice of group number (i.e. site number).

Each student has the responsibility to examine the list of sites (Table 1-1, Fig. 1-1 & 1-2), to find his/her preferred group and to sign up in this group. The composition of a group shall remain un-changed after Wednesday 9 August, unless exceptional considerations after discussion with and approval by Prof CHANSON.

4.2 Assessment

The group work will be assessed as a combination of report submission and oral presentation. The group report will be assessed by the lecturer. The oral presentation will be assessed by the lecturer(s) and by the other groups.

Group report	65% (Note the penalty for lateness below)
Presentation (lecturers' assessment)	20%
Presentation (peers' assessment)	15%

Project peer-assessment

The group submission marks will be influenced by peer review. Individual peer assessment forms will be submitted electronically to each team member for formative and summative assessment and feedback; these forms require you to assign marks to each of your team members and to indicate how you rate your own input. The deadline for peer-assessment submission is Monday 10 Sept. 2018 at 11:00am.

The Course Coordinator will moderate the peer assessment factor (PAF) to ensure that the marks are indicative of individual performance. PAFs are capped at 1.1: that is, a student can potentially receive an additional 10% of the group marks but no student will be overly rewarded. PAFs of 1.1 or less will be directly applied to the group project marks respectively: e.g. if a student receives a PAF of 0.85, he/she will get 85% of the group mark.

Students who fail to complete their PAF on time will have their own marks reduced by 10%. That is, their mark will be equal to 0.90 × PAF × Group mark.

4.3 Instructions for report submission

Each report will be assessed upon:

the field data of the group including the creek cross-sectional survey (33%)
the data quality and presentation (15%)
the technical contents, accuracy and soundness, incl. the hydraulic modelling of estuary (37%)
the presentation style (15%)

4.3.1 Report submission and instructions

For each group, **three copies** of the report & CD/DVD Rom must be submitted in person to Prof CHANSON by Friday 7 September before 09:50. The report will be reviewed by the lecturers.

Note that each group is encouraged to share its data with the other groups. It is expected however that each group will honestly acknowledge any shared data and information in the report and during the group presentation and discussion.

+ Page Limits

Each report must be complete within a limit of 20 pages including front page, table of contents, main text, figures and references, but excluding appendices and drawings attachments. Reports that exceed this limit will be penalised by **5% penalty per extra page**. Shorter reports of significance will be given preferences.
Each report will be single-sided. Each page must be numbered. The text is to be single-spaced, 12 pt Times Roman or similar. The paper is to be printed on plain A4 size paper. The manuscripts must be typed within the area of 255 mm by 170 mm. With a normal A4 size paper, the distances between the edge of the sheet and the text become as follows:

top: 2.0 cm
bottom: 2.0 cm
sides: 2.0 cm

+ Layout of Text
The front page must follow the template given in Appendix II.
The report should contain as a minimum:

- the front page (see Appendix II), followed by
- a table of contents,
- an introduction followed by the text,
- conclusions,
- list of references (bibliography),
- the Appendix I containing all the group data.
- the Appendix II containing all the survey forms (App. IV).
- the Appendix III containing all the surveying data.
- the Appendix IV containing the hydraulic modelling results.

+ Figures and tables
Figures and tables must be placed in the text next to the first reference. These figures and tables would be referred to as "Figure 1" and "Table 1". Titles of figures and tables are to be in 12pt Times Roman.

+ Format for references
Reference should be listed at the end of the paper and should include the following information: Author's family name, Initials. : Paper title, Journal's title, Volume No., (year), pages.
For example:

APELT, C.J. (1983). "Hydraulics of Minimum Energy Culverts and Bridge Waterways." *Australian Civil Engrg Trans.*, I.E.Aust., Vol. CE25, No. 2, pp. 89-95.

CHANSON, H. (1999). "The Hydraulics of Open Channel Flows : An Introduction." *Butterworth-Heinemann*, Oxford, UK, 512 pages. (Reprinted in 2001)

+ **Digital data**
Each group is asked to submit 3 copies of CD/DVD containing all their data set in a digital form. Students should consider either or both digital formats CD-R and DVD+/-R. (Only these formats shall be assessed.)

The CD-ROM/DVD-ROM will also include relevant photographs (JPEG format), some data analysis, the numerical modelling and a copy of the group report (e.g. PDF format).

The digital data must be properly presented. The material may be sub-divided into sub-directories while a text file, acting as map of the CD/DVD-ROM contents, must be placed of the top of the directory tree.

Note: Each group will record a lot of information, (1) on the field work period (Tuesday 14 August 2018), (2) during the surveying, and (3) with the hydraulic modelling. All the information needs to be recorded, including relevant handwritten comments.... (The CD-ROM/DVD-ROM may include a scanned version of the handwritten log-in sheets, relevant photographs, tabulated data sheets, a copy of the report, ...)

The digital informations constitute an integral part of the report supporting material. They will be carefully scrutinised and assessed.

4.3.2 Deadlines

The group reports are due on Friday 7 September 2018 before 09:50. The reports must be submitted directly to Prof Hubert CHANSON who will write down, on the cover page, the submission date and time. (It is the responsibility of each group to find the lecturer and to hand him the report in person.)

Penalty for lateness are 10% per hour of lateness on Friday 7 September 2018 until 12:00noon and 100% for submission on afterwards.

4.4 Instruction for oral presentation

Presentations will take place on Wednesday 5 September 2018 during the class. Each group will be given **15 minutes (maximum) for presentation followed by up to 10 minutes for discussion**. Lecturers and fellow students will contribute to the discussion.

Groups may use Powerpoint presentations, overhead projector transparencies and/or slides. The Powerpoint files must be provided on a CD-ROM to Prof CHANSON no later than Wednesday 5 September 2018 7:30 am. Group presentations on pen disks/flash drives/USB devices shall not be accepted.

Each group is advised to prepare a number of copies of their slides, for distribution to each group and lecturers prior to the start of the presentation.

Each presentation will be judged upon:

the quality of the data set (15%),
the technical content (30%)
the presentation style (20%)
the expertise and ability to answer questions during the discussion (35%)

Notes :

+ The presentations are limited to 15 minutes per group to allow some discussion. Groups which spend longer presentations times shall be penalised for the reduced duration of the discussion time.
+ Each group presentation will be assessed by both lecturers and student peers. Attendance to all the presentation is therefore compulsory.

4.5 Deadlines

Friday 7 September 2018 before 09:50 (in Prof CHANSON's hands)	Complete hydraulic design report Penalty for lateness : - 10% per hour of lateness on Friday 7 September 2018 until 12:00noon. - 100% penalty for submission afterwards
Wednesday 5 August 2018 **between 08:00 and 09:50** CIVL4120 classroom	Group presentation Penalty for lateness to start : - Presentation time and marks reduced accordingly (e.g. 5 minutes lateness = only 20 minutes for presentation & discussion = 20% penalty) - Presentation cancelled and zero marks for any group not ready 10 minutes after the official start time. Penalty for lengthy discussion : Presentation too long = less discussion time ⇒ discussion marks reduced accordingly (e.g. 17 presentation = only 8 minutes for discussion = 20% penalty on discussion marks)

5. References

[1] CHANSON, H. (1999). "The Hydraulics of Open Channel Flows : An Introduction." *Butterworth-Heinemann*, Oxford, UK, 512 pages (ISBN 0 340 74067 1). (Reprinted in 2001) {http://www.uq.edu.au/~e2hchans/reprints/errata.htm}

[2] CHANSON, H. (2004b). "Environmental Hydraulics of Open Channel Flows." *Elsevier*, Oxford, UK (ISBN 0 7506 6165 8).

[3] CHANSON, H. (2004a). "The Hydraulics of Open Channel Flows : An Introduction." *Elsevier*, Oxford, UK, 2nd edition (ISBN 0 7506 5978 5).

[4] "Bird of Eprapah" (1978).

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[6] "The Eprapah Visitors' Booklet" (1997)

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[10] IPPEN, A.T. (1966). "Estuary and Coastal Hydrodynamics." *McGraw-Hill*, New York, USA.

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[11] LEWIS, R. (1997). "Dispersion in Estuaries and Coastal Waters." *John Wiley*, Chichester, UK.312 pages.

[12] ALLEN, G.R., MIDGLEY, S.H. and ALLEN, M. (2002). "Field Guide to the Freshwater Fishes of Australia." *Western Australian Museum*, Perth, Australia, 394 pages. (UQ Library Call Number : QL636 .A436 2002)

[13] Queensland Museum (1995). "Wildlife of Greater Brisbane." *Queensland Museum*, Brisbane, Australia, 340 pages.

[14] TREVETHAN, M., CHANSON, H., and BROWN, R. (2008). "Turbulence Characteristics of a Small Subtropical Estuary during and after some Moderate Rainfall." *Estuarine Coastal and Shelf Science*, Vol. 79, No. 4, pp. 661-670 (DOI: 10.1016/j.ecss.2008.06.006)

[15] CHANSON, H., BROWN, R., and TREVETHAN, M. (2011). "Turbulence Measurements in a Small Subtropical Estuary under King Tide Conditions." *Environmental Fluid Mechanics*, Vol. 12, No. 3, pp. 265-289 (DOI: 10.1007/s10652-011-9234-z)

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[18] CHANSON, H. (2008). "Field Observations in a Small Subtropical Estuary during and after a Rainstorm Event." *Estuarine Coastal and Shelf Science*, Vol. 80, No. 1, pp. 114-120 (DOI: 10.1016/j.ecss.2008.07.013).

Note: the booklets [4], [5], [6] and [7] may be purchased at discount price from the Landcare group/Waterwatch group.

Internet resources

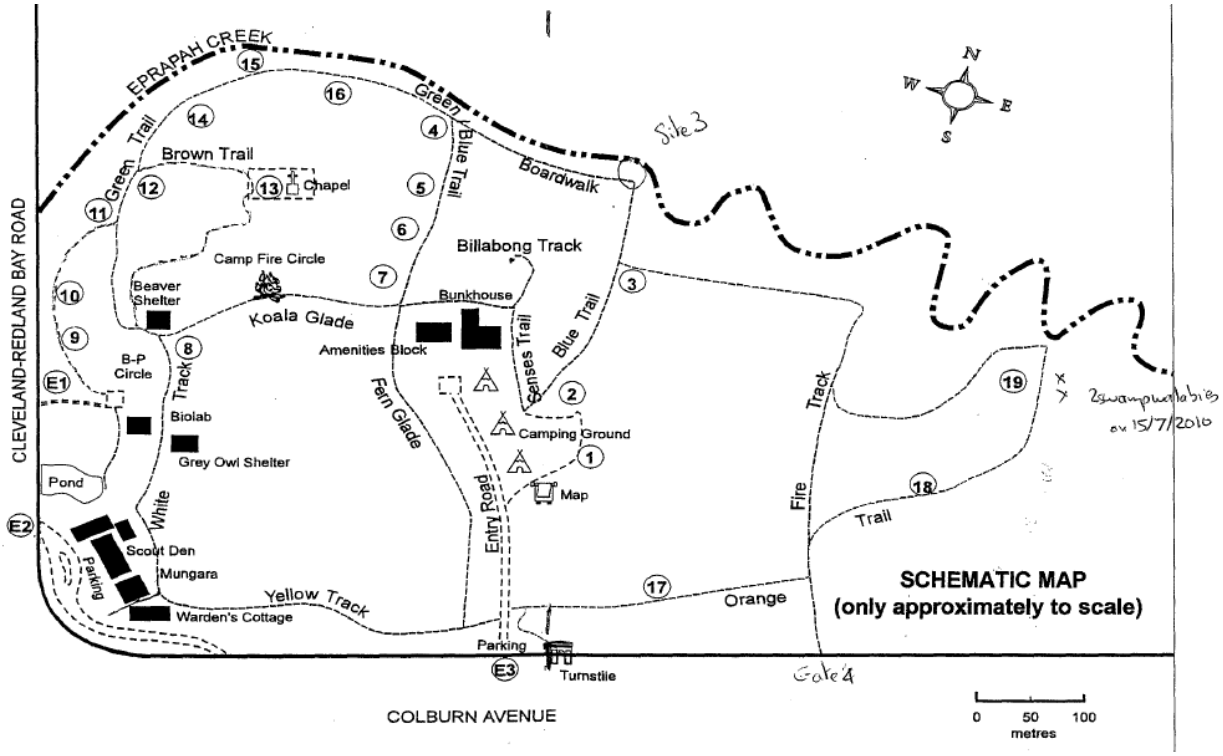
CIVL4120 Advanced Hydraulics *Internet resource*, {http://staff.civil.uq.edu.au/h.chanson/civ4120.html}. Internet address : {http://www.uq.edu.au/~e2hchans/civ4120.html}

CHANSON, H. (2003). "A Hydraulic, Environmental and Ecological Assessment of a Sub-tropical Stream in Eastern Australia: Eprapah Creek, Victoria Point QLD on 4 April 2003." *Internet resource*. Url : {http://www.uq.edu.au/~e2hchans/eprapa.html}

Appendix I - Maps

I-1 Aerial photogaph of Eprapah Creek (Google Earth™)

I-2 The Eprapah Visitor's Map



I-3 Point Halloran Conservation park, Eprapah Creek, Redlands, Queensland (Site 1)

Site 1

Appendix II - Template of the report front page

Multi-disciplinary study of the Site ??? (AMTD ???? km) at Eprapah Creek on 14 August 2018 between 5:00am and 7:00pm

Site Ref. No.	Description	Location	Comments
1			

	Initials	Family name	Student ID No.	Signature
1	I.R.	WOOD	20021978	
2				
3				
4				
5				
6				
7				
8				

Submission date	Time	H. CHANSON's initials

Note : Each student who did the field works and contributed to the group report must sign the report.

Absence of signature shall mean that the person did not contribute to the field works, data analysis or report preparation.

Appendix III - Photographs of some field work sites

Fig. III-1 - Eprapah Creek, Redlands, Queensland on 20 Jan. 2003 around 2:30pm - Downstream of marinas on right bank (Site 1)

Fig. III-2 - Eprapah Creek, Redlands, Queensland on 16 Jan. 2003 around 1:30pm - Platform at end of Beverage Rd (UBD 206 G19), downstream of sewerage plant and upstream of marinas (Site 2) - Looking downstream

Fig. III-3 - Eprapah Creek, Redlands, Queensland in 2003 at low tide - Site 2B during a previous survey - Looking from the left bank

Fig. III-5 - Eprapah Creek, Redlands, Queensland on 15 July 2010 at high tide - Site St, looking from the right bank

Fig. III-5 - Eprapah Creek, Redlands, Queensland on 20 Aug. 2004 at high tide - Site 2C, looking from the left bank

Fig. III-6 - Eprapah Creek, Redlands, Queensland on 15 July 2010 at high tide - Looking downstream towards the deck at Site 3

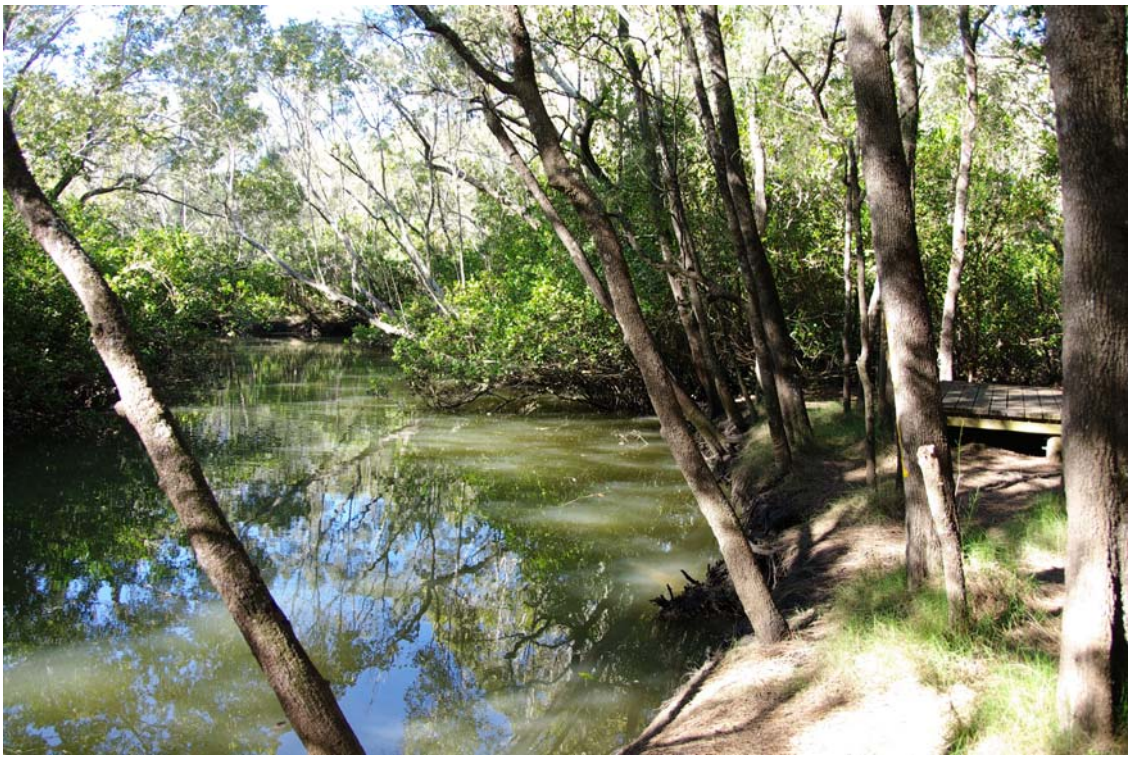


Fig. III-7 - Eprapah Creek, Redlands, Queensland on 16 Jan. 2003 around 1:30pm - View from the platform at Site 3B

Fig. III-8 - Eprapah Creek, Redlands, Queensland on 16 Jan. 2003 around 1:30pm - View from the platform at the Platypus pool (Site 4)

Fig. III-9 - Koala in Point Halloran Conservation park, Eprapah Creek, Redlands, Queensland in Sept. 2004

Fig. III-10 - Swamp wallaby at Site 3, Eprapah reek Environmental training center, Redlands, Queensland in June 2006

Appendix IV - Field work survey forms

IV- 1 Water quality survey form

The following form is based upon the water quality survey form used by the Queensland EPA Water Monitoring Group in their fieldworks.

{http://www.uq.edu.au/~e2hchans/civ4120}
File : TCI402a.pdf

Alternatives :
{http://www.uq.edu.au/~e2hchans/civ4120.html} [Field work]
{http://www.uq.edu.au/~e2hchans/civ4140.html} [Field work]

IV-2 Fish habitat/behaviour survey form

The following document was elaborated by Dr Kevin WARBURTON for Waterwatch groups.

{http://www.uq.edu.au/~e2hchans/civ4120}
File : Fish_sampl.pdf

Alternatives :
{http://www.uq.edu.au/~e2hchans/civ4120.html} [Field work]
{http://www.uq.edu.au/~e2hchans/civ4140.html} [Field work]

IV-3 Bird/wildlife survey form

Bird survey
{http://www.uq.edu.au/~e2hchans/civ4120/}
Files : Bird1.pdf

Alternatives :
{http://www.uq.edu.au/~e2hchans/civ4120.html} [Field work]
{http://www.uq.edu.au/~e2hchans/civ4140.html} [Field work]

Fauna observations
{http://www.uq.edu.au/~e2hchans/civ4120/}
Files : Fauna1.pdf or Fauna2.pdf

Alternatives :
{http://www.uq.edu.au/~e2hchans/civ4120.html} [Field work]
{http://www.uq.edu.au/~e2hchans/civ4140.html} [Field work]