The Nepal Village Health Improvement Program

Report on the Design Workshop for the Jalapadevi Higher Secondary School, Nepal

February 2015

Summary of the Workshop activities

The 10 day workshop included multiple design and health activities summarised as follows.

- Removing human waste safely - Design of new toilet and hand washing facilities and upgrading the existing facilities at the Jalapadevi School. (All participants)
- Design of teeth brushing facilities at the School. (Dental team and all participants)
- Ensuring a water supply and designing waste water treatment and disposal systems (IAPMO plumber and engineer with Surya Lama)
- Assembling a kit of important principles learnt from the design of the real project to assist the Nepali team work on future school projects. (All participants with particular help from Jasper Ludewig) This kit maybe used by the IAPMO team planning future similar works in India.(Grant Stewart and Swathi Saralaya)
- Commence a series of dental health initiatives in the school – screenings, tooth brushing instruction, teacher training and treatment. The detailed design of a toothbrush store for the school tooth brushing program.(Bishnu Shrestha and Dr Sandra Meihubers & design students)
- Write a design course for university study to integrate the activities of the Nepal Workshop into a formal structure. (John Roberts)

The school staff and design team

Some of the students and the design team

Thanks

Students of architecture and design from Griffith and Newcastle Universities in Australia for their work and spirit.
Beau de Belle, Melynda Kensey, Lauren Maher, Noah Stutchbury, Noel Yaxley, Aariel Pazar, Hugh Mills, Kara Simpson, Akira Sutton, Emma Hodgson, Madelyne Dwight, Luke Thomasson.
Thanks to the lecturers **John Roberts** and **Eleni Kalantidou** for their help and enthusiasm.

Teachers - John Roberts and Jasper Ludewig
Plumbers - Grant Stewart IAPMO and Surya Lama (Nepal)
Environmental engineer - Swathi Saralaya IAPMO
Local project manager - Bishnu Shrestha (Nepal)
Dental briefing and support - Dr Sandra Meihubers

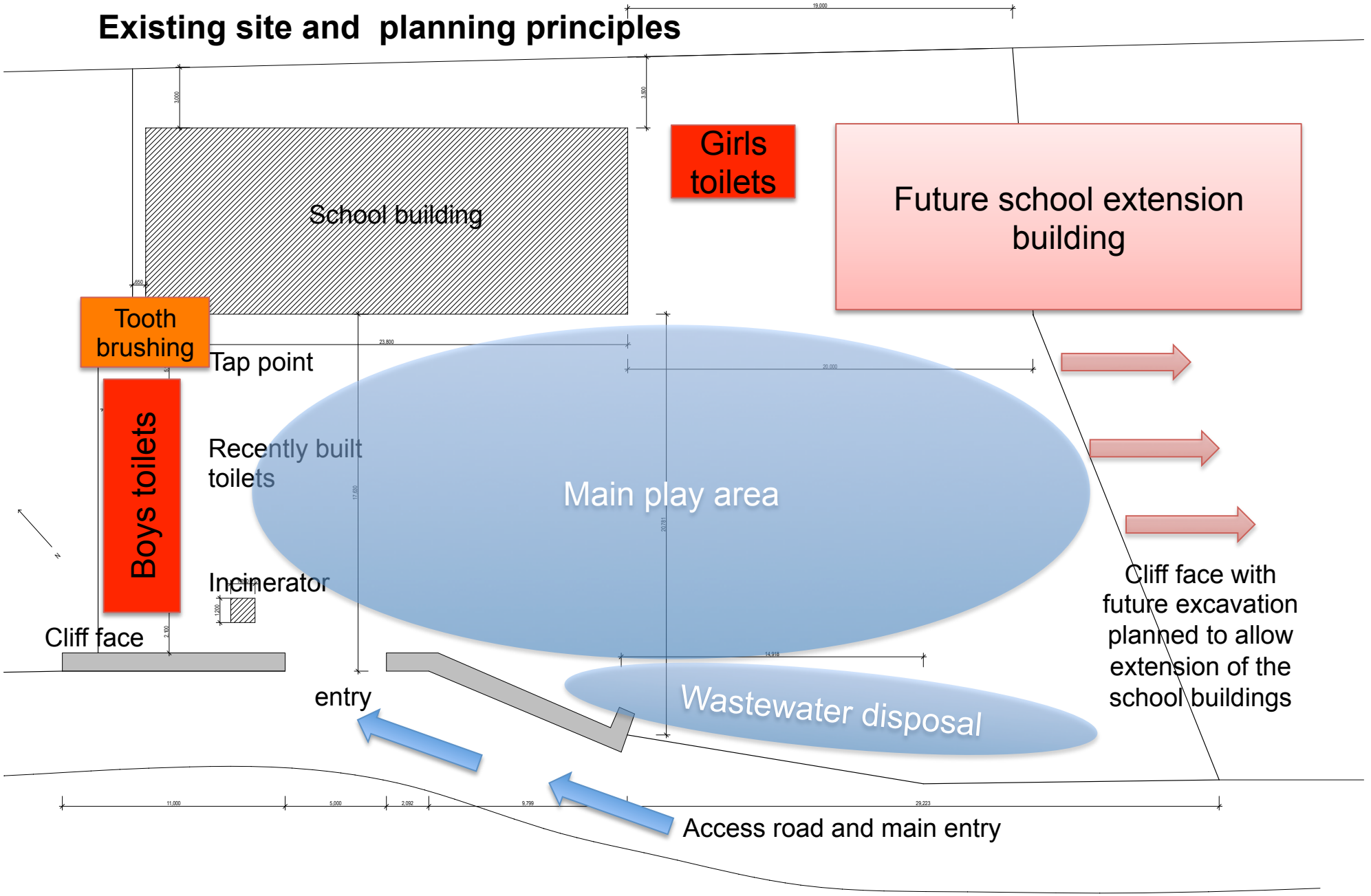
Support for the Workshop and the ongoing construction program
The staff and students of the **Jalapadevi Higher Secondary School.**
The **WorldSkills Foundation, IAPMO and Rotary Australia.**
Funds from the organisation **Emergency Architects Australia** (no longer active) were used to support some student costs.
Anonymous private donors.
Healthabitat

The design activities at the Jalapadevi School site

Briefings from the school staff, management committee and students
Site and project planning
Site peg out of preliminary ideas and walk through
Design development
Infrastructure planning
Research activities on site to inform the design detail and future design works
Developing measurements of design success or failure

Daily design briefings and presentations

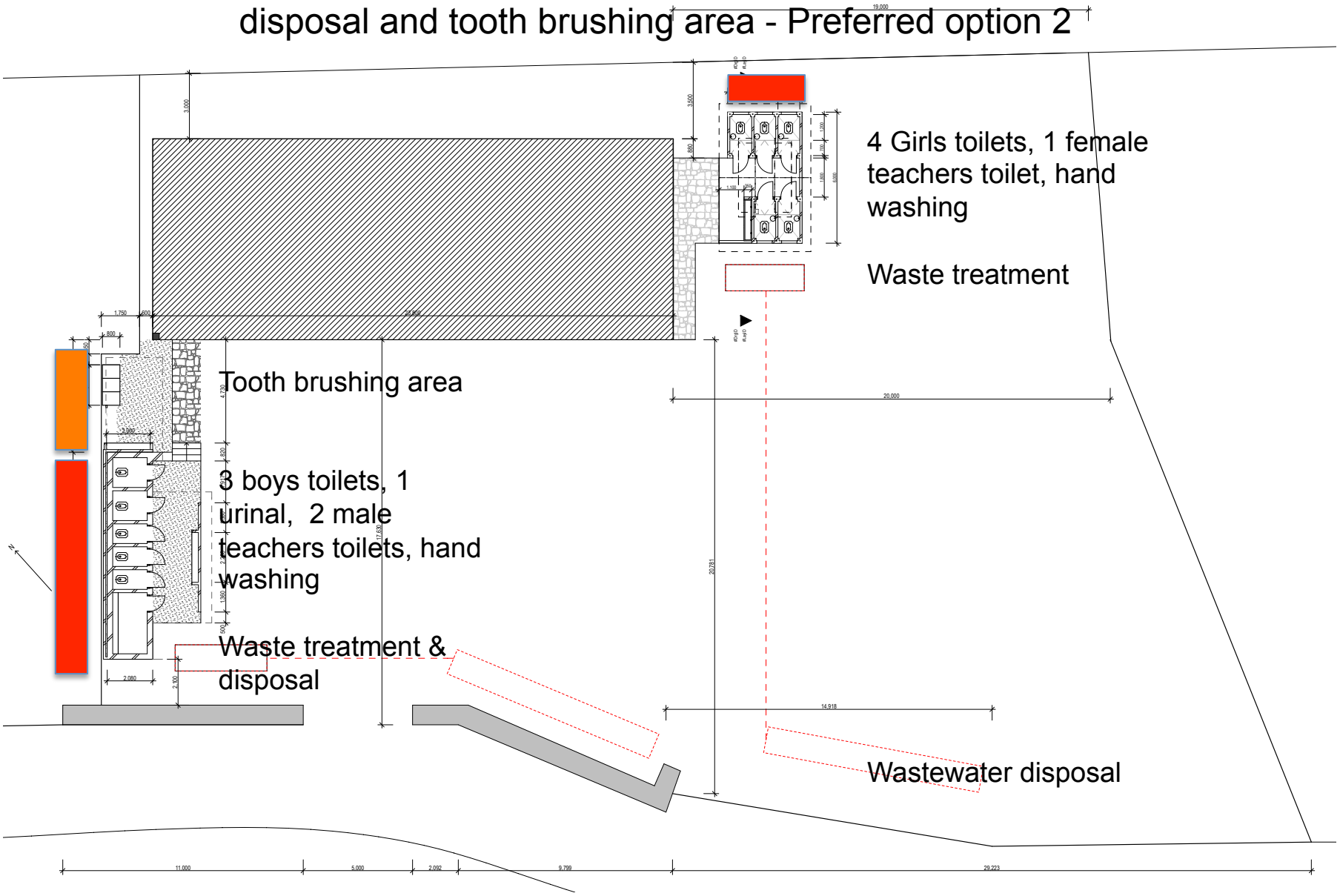
Existing site and planning principles



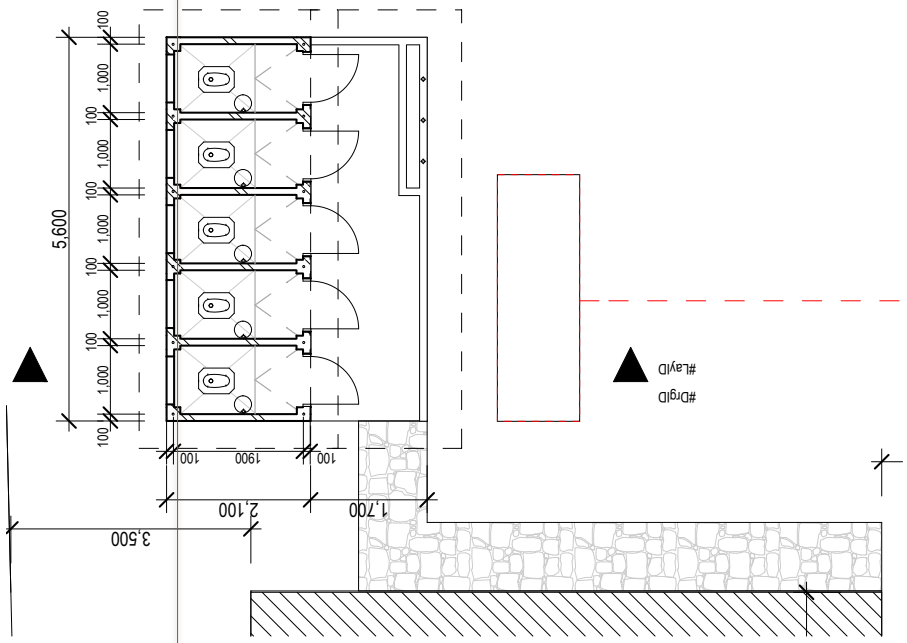
Pegging out

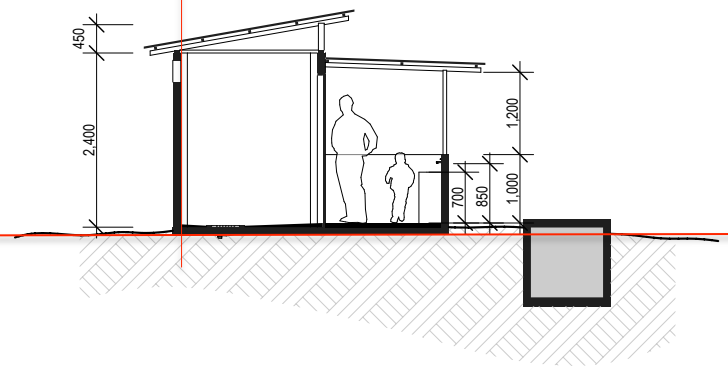
Using the site to peg out preliminary ideas and having daily on site discussions with the school teachers and students helped design development.

Removing human waste safely - boys and girls toilets, hand washing, wastewater disposal and tooth brushing area - Preferred option 2

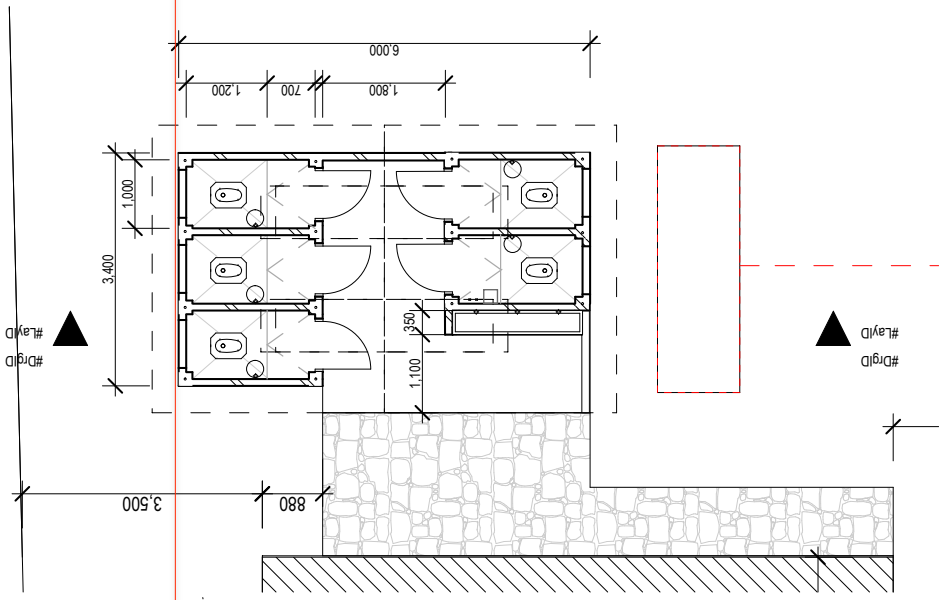


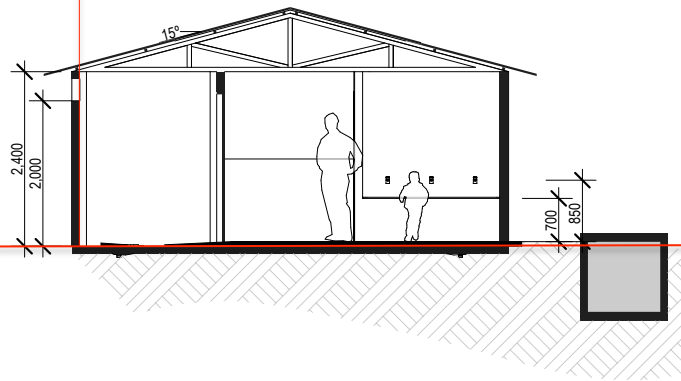
Girls option 1

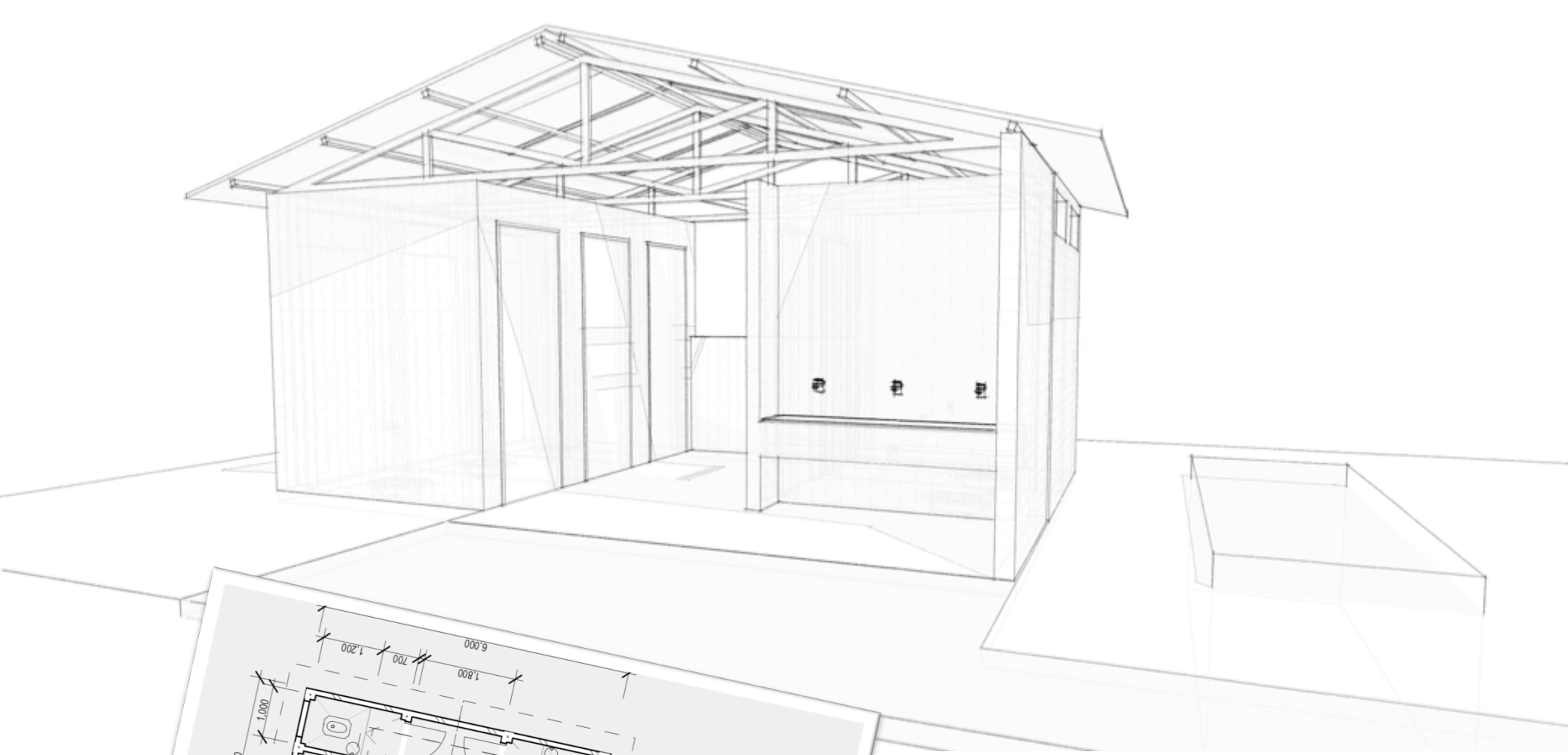


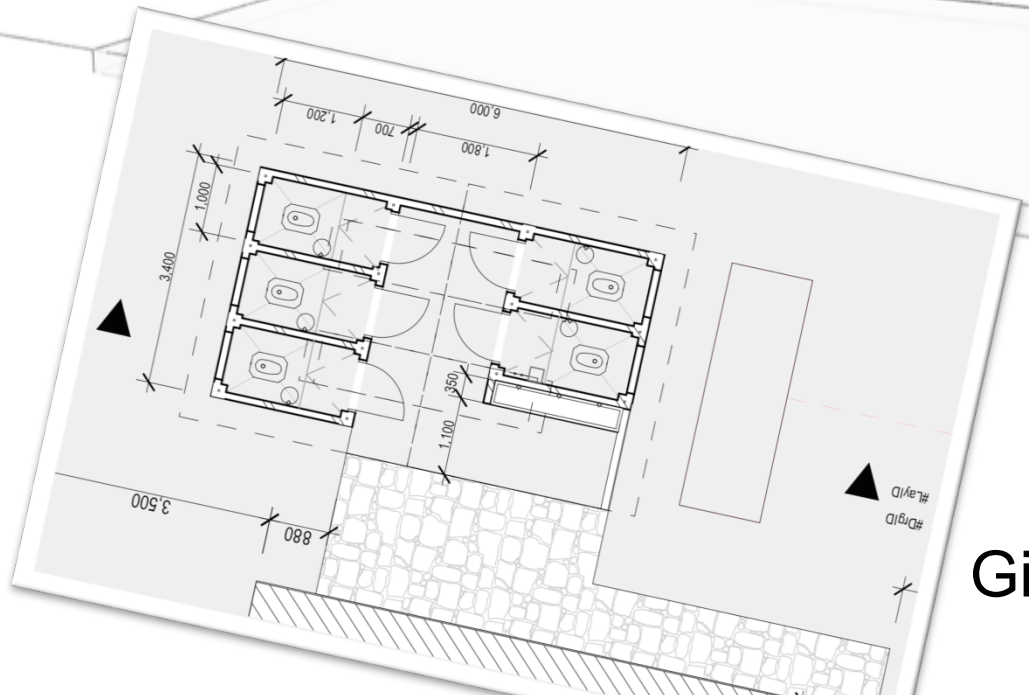


Girls option 2 (preferred)



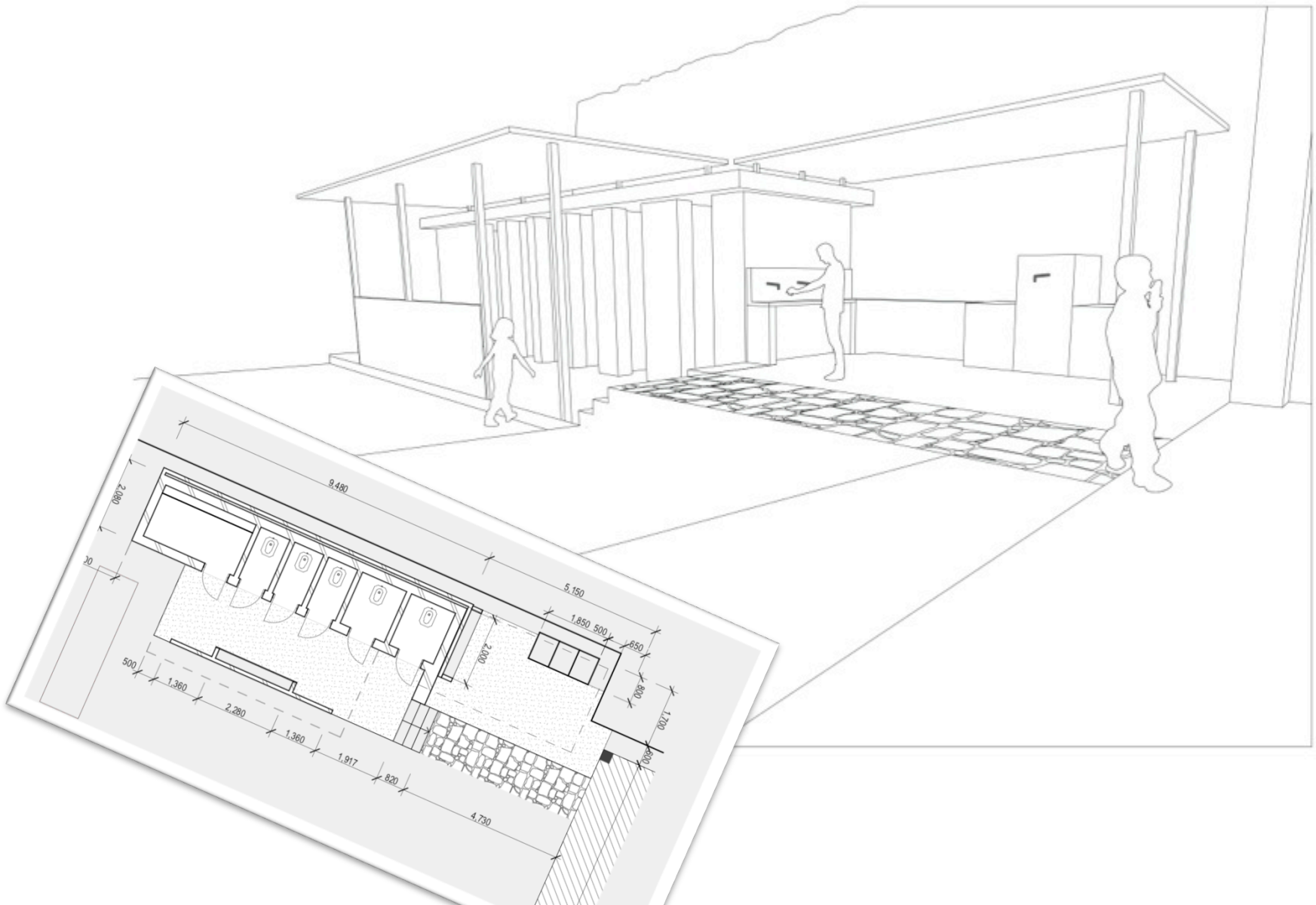




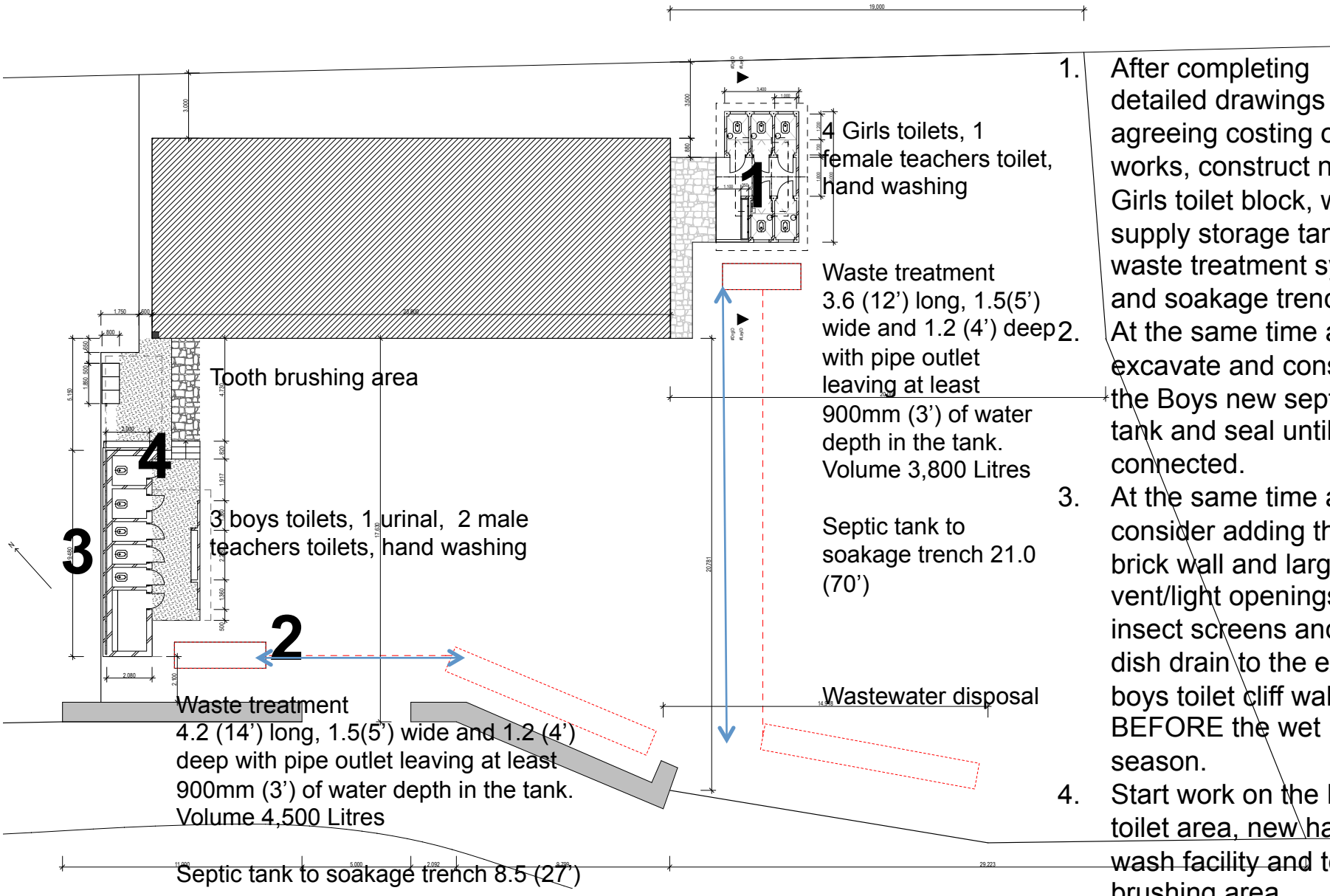


Girls toilets and hand wash area

Boys toilets and tooth brushing area



Future schedule for the works



1. After completing detailed drawings and agreeing costing of the works, construct new Girls toilet block, water supply storage tank waste treatment system and soakage trench
2. At the same time as (1), excavate and construct the Boys new septic tank and seal until connected.
3. At the same time as (1), consider adding the brick wall and larger vent/light openings with insect screens and the dish drain to the existing boys toilet cliff wall, BEFORE the wet season.
4. Start work on the Boys toilet area, new hand wash facility and tooth brushing area.

Infrastructure planning - Water supply, storage, monitoring and future works







Water supply travels approximately 3km from the source.

The pipework is a mix of gal. iron and HDPE in varying condition.

Water supply, storage, monitoring and future works

The water Source 3km from the school

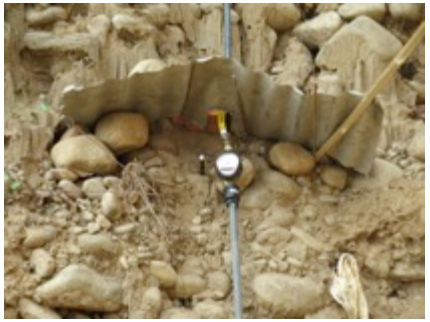
Tanks on main school roof and toilet area currently not connected (1000 and 500 litre tanks)

Meter to tap point installed during the visit

Infrastructure planning -**Water measurement**

The current school supply is also used by the village so any increase in school water use needs to be known. The measurement of water was carried out in various ways during the site visit to determine:

- water needed for tooth brushing and hand washing
- the volume of the water currently being used by the school
- the design the wastewater treatment and disposal system using more accurate, locally tested, water use estimates



Water measurement

Using a water meter, stop valve, a mock up of a basin (school desk) and 3 temporary tap points made of polypipe, a trial of supervised hand washing and teeth brushing was conducted to determine:

- the best heights for basins and taps to allow access by the broadest age range of children,
- the best separation distance between the taps,
- the quantity of water used in the process of supervised tooth brushing and hand washing. This ensures an adequate water supply is available and that wastewater treatment systems and disposal areas are correctly sized .

Water measurement results

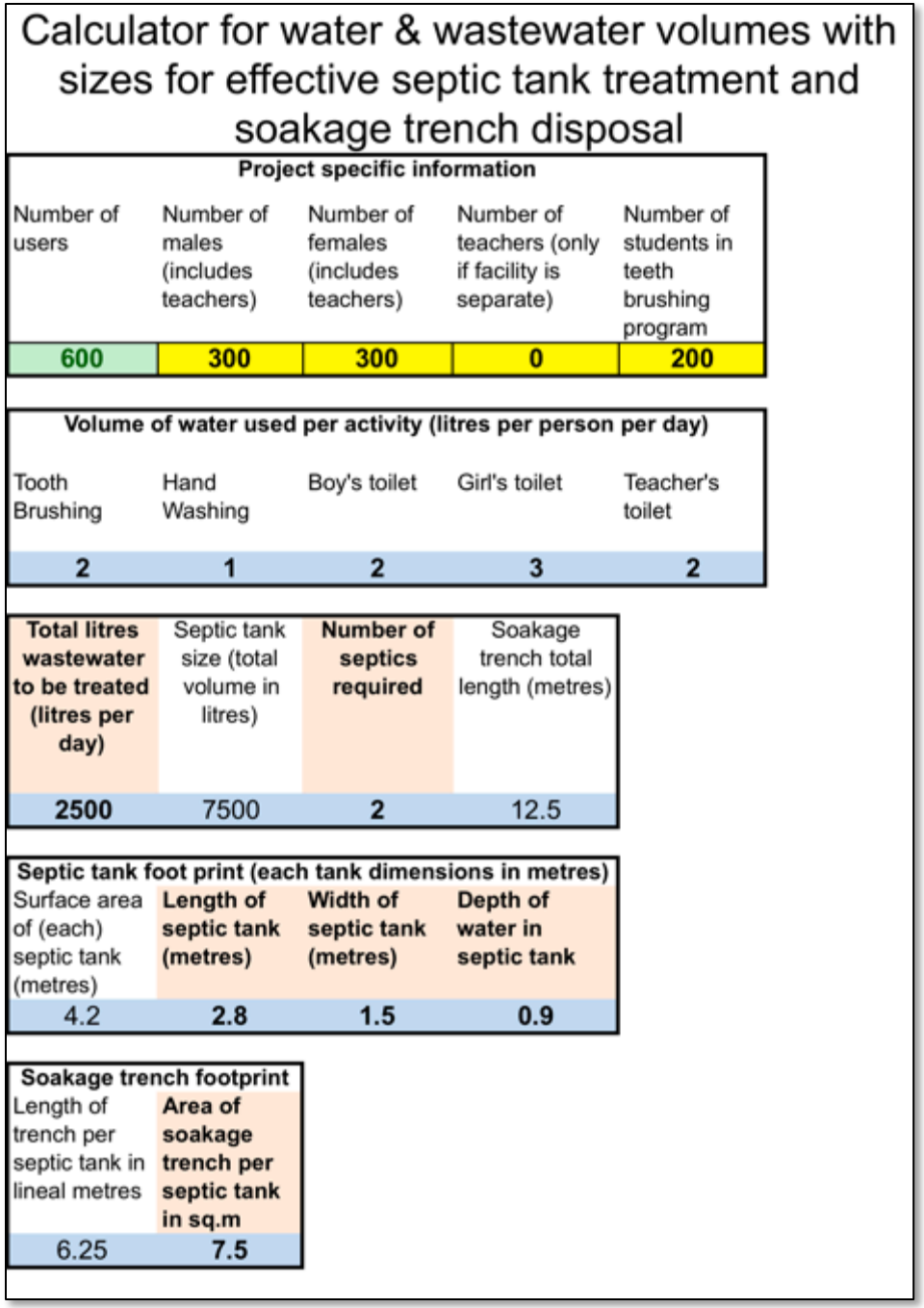




Water use, volume calculation

Tooth Brushing (TB)	3 litres per person per day (with continuous water flow ie the water was not turned on and off during the stages of tooth brushing process)		
Hand Washing (HW)	1 litre per person per day (with continuous water flow)		
WC dip flush (WC)	2 litres per person per day including the cleaning of the toilet area		
Boys toilet area	1 litre (HW) + 2 litres (WC) x 300 people	= 900	
	3 litres (TB) x 200 people (targeted)	= 600	
	Total		**= 1500**
Girls toilet area	1 litre (HW) + 3 litres (WC) x 300 people	= 1200	
	Total		**= 1200**

Total **= 2,700 litres/day**



Calculator for water & wastewater volumes with sizes for effective septic tank treatment and soakage trench disposal

Project specific information

Number of users	Number of males (includes teachers)	Number of females (includes teachers)	Number of teachers (only if facility is separate)	Number of students in teeth brushing program
600	300	300	0	200

Volume of water used per activity (litres per person per day)

Tooth Brushing	Hand Washing	Boy's toilet	Girl's toilet	Teacher's toilet
2	1	2	3	2

Total litres wastewater to be treated (litres per day)	Septic tank size (total volume in litres)	**Number of septics required**	Soakage trench total length (metres)
2500	7500	2	12.5

Septic tank foot print (each tank dimensions in metres)

Surface area of (each) septic tank (metres)	**Length of septic tank (metres)**	**Width of septic tank (metres)**	**Depth of water in septic tank**
4.2	2.8	1.5	0.9

Soakage trench footprint

Length of trench per septic tank in lineal metres	**Area of soakage trench per septic tank in sq.m**
6.25	7.5

Research activities –
A calculator for use in feasibility assessments of school projects.

The top box (yellow and green fields) are where the user can enter the particular school information as part of the feasibility report

The water use per person figures were derived from on site testing and data collected from the Nepal Village Sanitation Program. These numbers will be reviewed annually and adjusted.

The school population, program activities and water use then determine the overall water use, wastewater generated, septic tank sizes & number of tanks to ensure a minimum 3 day detention. Soakage trench lengths for final disposal and also estimated.
Next, the approximate tank sizes are given for preliminary site planning. This is particularly important for the planning of restricted sites.

Finally, similar area sizes of the soakage trenches for final treated wastewater disposal are given for site planning.

Research activities - **Reducing mud entering the toilet area**

Developing the mud test. Briefings from staff and students all mentioned the problem of dust and mud being tracked into the toilet areas. Whilst the mud itself may not constitute a health risk, it may discourage regular cleaning of the toilet areas and mask harmful human waste in the area.

The design team was given the task to develop a way of reducing mud entering the area and began by conducting a ‘mud test’ with school children and teachers.

The mud test: Testing the different distances and ground surfaces needed to reduce dirt and mud entering the toilet area. Different routes, materials and distances were trialed

The school test area

Walk through mud

… then across stones

…then across bricks

…then testing mud on shoes

The test (shoe prints on paper)

6’(1800) mud + concrete = very wet

More mud in the toilet area

6’(1800) mud + 3’ (900) stone + 3’ (900) brick = dry

Less mud in the toilet area

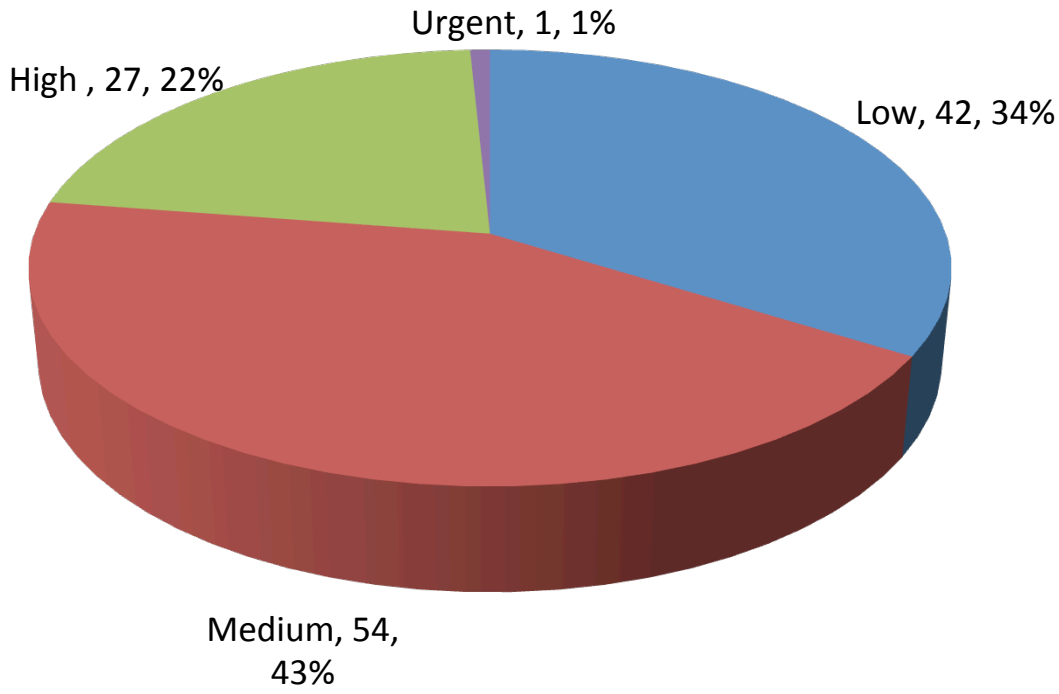
The dental health activities at the Jalapadevi School site

Dental screening for children between nursery and Yr 5
Tooth brushing instruction
Hand washing instruction (run by the dental co-ordinator)
Introduction to the dental program and teacher orientation
Preliminary design and proto-type construction of a method to store and protect school tooth brushes (combined project with dental and design team)

Dental screenings

Dental screening results

Class	Total Screen	Oral Health- Risk Assesment			
		Low / No	Medium	High	Urgent
Nursery	13	5	4	1	
One	17	7	9	1	
Two	25	3	15	3	
Three	24	8	12	3	1
Four	34	11	9	14	
Five	19	8	5	5	
Total	132	42	54	27	1



Tooth brushing instruction

Hand washing instruction

Introduction to the dental program and teacher orientation

Toothbrush store - preliminary design and proto-type construction of a method to store and protect school tooth brushes (a combined project with the dental and design team)

Toothbrush Storage

TOOTHBRUSHES MUST NOT BE SHARED BETWEEN CHILDREN

After Each Use

- Brushes rinsed under running water, flicked dry and stored in the container
- Box shoudl be locked and allowed to air-dry outside in the sun (when possible)

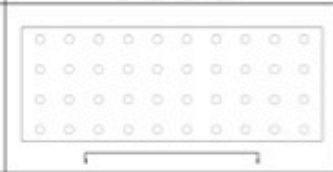
Storage

- Brushes must not touch, or drip on each other
- Brushes are to be labeled with child's name to ensure correct brush is used
- After drying, store box inside
- Box should be store out of reach of children

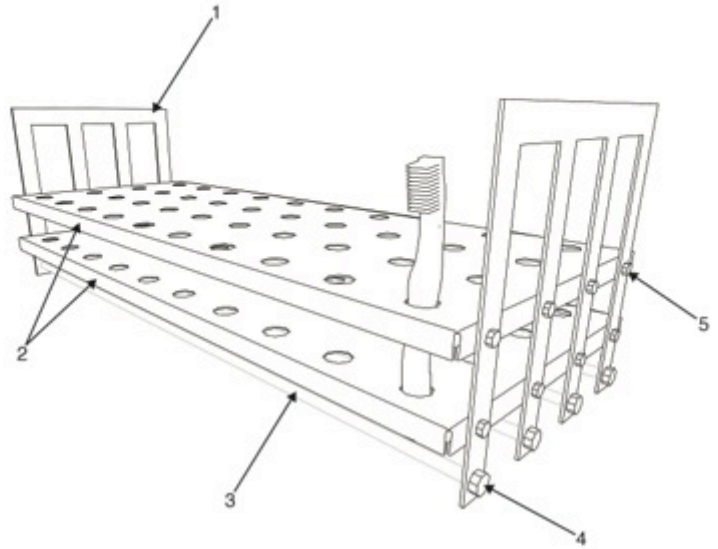
Assembly Instructions

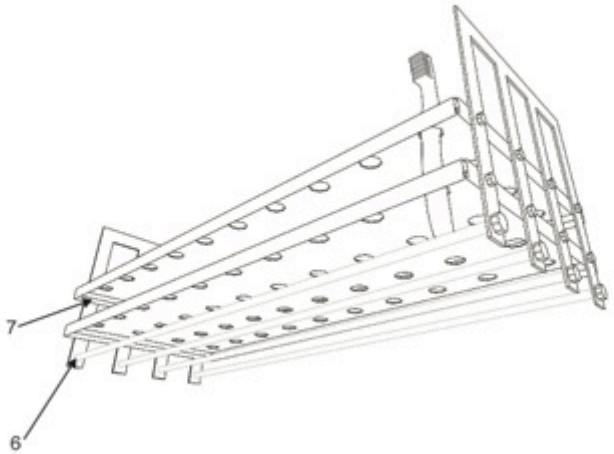
1. Affix four ø7/16" hex bolts to one leg support with four ø7/16" hex nuts
2. Affix top tray to same leg support with four ø1/4" hex bolt and nuts
3. Affix bottom tray to same leg support with four ø1/4" hex bolt and nuts
4. Lay leg support face down on the ground and insert bottom bolts into pipe
5. Affix four ø7/16" hex bolts to remaining leg support with four ø7/16" hex nuts
6. Insert ø7/16" bolts into pipe
7. Align tray holes and insert ø1/4" bolts
8. Tighten ø6mm hex nuts onto ø1/4" bolts

TOOTHBRUSH RACK PARTS

Number	Part	Quantity	Description
1		2	2mm steel flat bar strips, welded and painted
2		2	Gal plate with 9/16" folded edge + safety edge
3		4	Ø 3/8 aluminium pipe
4		8	Ø 7/16" hex bolt
5		8	Ø 7/16" hex nut
6		16	Ø 1/4" hex bolt
7		16	Ø 1/4" hex bolt

Toothbrush Storage



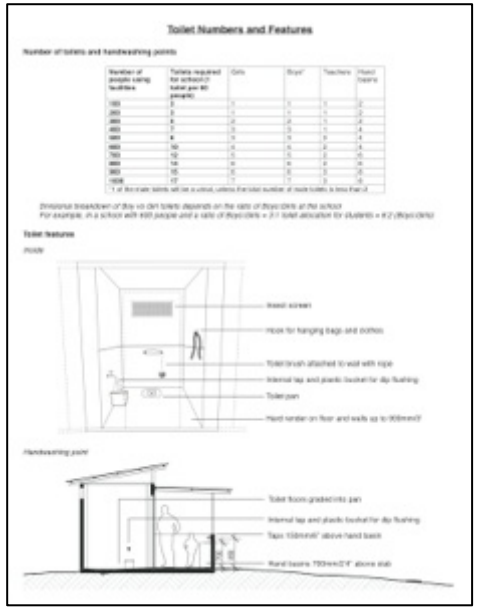


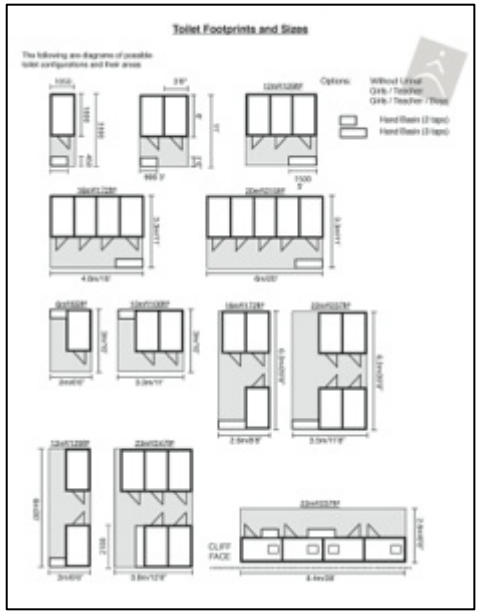
Developing a kit incorporating all the key principles learnt in providing water and sanitation to schools for use by the Nepali team

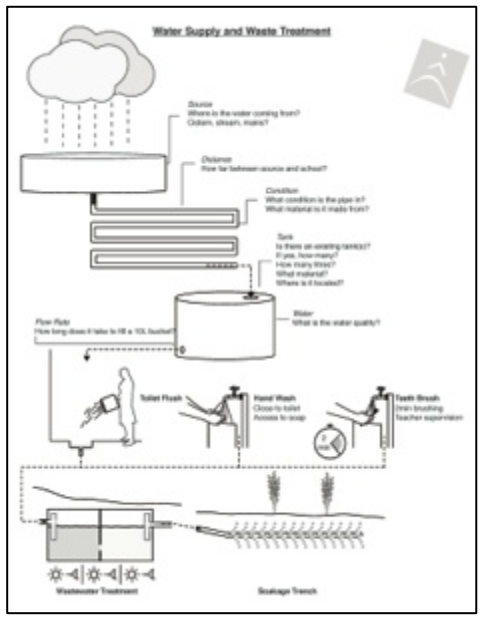
Essential information at the Feasibility stage
Background information and detail for the Nepali team and school management
Electronically stored information to be left with schools as required.

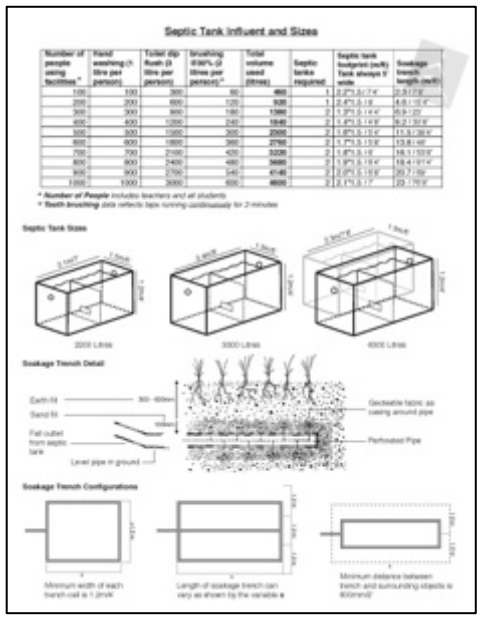
The Nepal Village Health Improvement Program

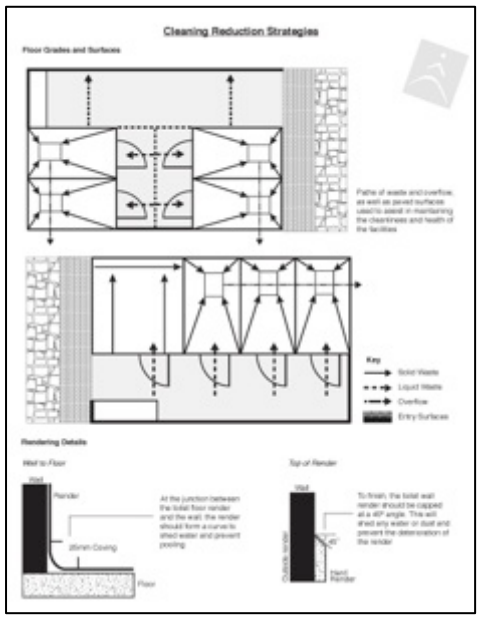
Essential design features to improve the school living environment











Developing a university based design course for similar projects.

Currently, all students attending the Workshop (and similar events in 2013 and 2014 have done so without the support or endorsement of their respective universities. Students have paid their own way to get to the project and on ground costs have been subsidised by Healthabitat with help from supporters. Students have received no course credits towards their degrees. Individual university staff have been supportive and have encouraged students to attend.

The aim of HH inviting a university lecturer to attend the Workshop was to develop an architecture / design course, for university study, that will integrate the activities of the Nepal Workshop (and other similar projects in the future) into a formal structure of credited university study.

Extracts only of the draft course designed to integrate the activities of the Nepal Workshop (and other similar projects in the future) into a formal structure of credited university study

Faculty of Engineering & Built Environment

School of Architecture and Built Environment

ARBE2222: Healthabitat Intensive Studio Elective

BDes(Arch) Callaghan

Semester 2, 2015 – Semester 1, 2016

THE UNIVERSITY OF NEWCASTLE AUSTRALIA

COURSE OUTLINE

www.newcastle.edu.au

CRICOS Provider 00109J

OVERVIEW

Course Description

The course is centred on a 10-day intensive design studio to be carried out as a design project, nominally in a village in Nepal, in February 2016. The course is conducted in association with environmental health consultancy Healthabitat, along with a local community health NGO, industry partners, village committee and community leaders.
The course is conducted in 3 consecutive stages:
Stage 1 Preparation: in Australia: project briefing, orientation, background, preparation, skills, design methodology.
Stage 2 Intensive Studio: in Nepal: Part 1: client briefing, development and presentation of a design; Part 2: production of a practical kit and/or essential tools to assist future design and construction by the local NGO and community.
Stage 3 Evaluation: in Australia: evaluative reflection on the project. Presentation of project summary.

The design project is focused on health issues. It is aimed at developing a series of design strategies to improve people's health in a selected community. These strategies may involve, for example, designing toilets, designing washing facilities, site planning to ensure the separation of wastewater and children's play areas, thermally efficient houses, better cooking places for improved nutrition or assessing and planning house repairs, all framed by the core Healthabitat principle of 'design to stop people getting sick'.

Contact Hours

1. Preparation >16 hrs; including lecture, tutorial, seminar 4 hrs/wk for 3 weeks (Dec 2015 – Jan 2016)
2. Intensive studio / field trip: 80-90 hrs over 10 days intensive studio / field trip (Feb 2016)
3. Reflection / evaluation >24 hrs; incl tutorial 2hrs/ wk for 2 weeks, seminar / presentation 6 hrs (Feb – Mar 2016)
Total 120-130 hrs contact and non-contact

Unit Weighting

10

Workload

Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

thabitat Intensive Studio Elective
aghan
5 – Semester 1, 2016

DULE

eek egins ion	Lecture	Presented By	Assessment Due
0 Nov 015	Stage 1: *Preparation*, AUS Lectures & tutorials 1-11 Dec 2015	John Roberts, Healthabitat + guests	
7 Dec		John Roberts, Healthabitat + guests	
14 Dec		John Roberts, Healthabitat + tutors	Stage 1 *Preparation* Submission 20% 12n Mon 14 Dec 2015
	CHRISTMAS / NEW YEAR RECESS 20 DEC 2015 TO 26 JAN 2016		
7 Feb 2016	Arrive in Nepal		Arrive Kathmandu
8 Feb	Stage 2 *Intensive Studio* Nepal, 8-18 Feb 2016 Arrive Sun 7 Feb Studio begins Mon 8 Feb	Healthabitat + consultants + tutors	Stage 2 Part 1 *Project* submission Sat 13 Feb 2016 25%
6 15 Feb	Stage 2 *Intensive Studio* Nepal, 8-18 Feb 2016 Studio concludes Thu 18 Feb Depart Nepal Fri 18 Feb	Healthabitat + consultants + tutors	Stage 2 Part 2 *Tool* submission Wed 17 Feb 2016 25%
7 22 Feb			
8 29 Feb	Stage 3 *Evaluation*, AUS	John Roberts, Healthabitat + guests	
9 7 Mar	Tutorials	John Roberts	
10 14 Mar		John Roberts, Healthabitat + guests	Stage 3 *Evaluation* Submission Fri 18 Mar 30%
11 21 Mar		Presentation of project at University (students)	
12 28 Mar		Presentation of project beyond University (students)	
11 18 May	Course feedback		
12 25 May	Course review		
13 1 Jun	Course preparation		

PLEASE NOTE: The course co-ordinator reserves the right to make any last minute changes to this lecture and assessment schedule to accommodate any unforeseen circumstances.

ASSESSMENTS

This course has 3 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Stage 1: Project Orientation + Preparation	14 Dec 2015	Individual	20%	1, 2
2	Stage 2: Intensive Studio, Nepal, Part 1 + Part 2	13 Feb 2016, 17 Feb 2016	Group	50%	2, 3, 4
3	Stage 3: Evaluative Reflection	Fri 18 Mar 2016	Individual	30%	2, 5

Page 3 of 7

Studio Elective

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mark for an assessment item submitted after the designated time on the due date, t an approved extension of time, will be reduced by 10% of the possible maximum or that assessment item for each day or part day that the assessment item is late. his applies equally to week and weekend days.

E NOTE: The course coordinator reserves the right to make any last minute changes cture and assessment schedule to accommodate any unforeseen circumstances.

Project Orientation and Preparation

ot presentation, notebook

tion of this assignment the student should be able to demonstrate:
pment of skills, abilities, knowledge for preparation for intensive field studio
pment of skills, abilities, knowledge to participate in fieldwork and group design, to e design outcomes, and reflect on process

epare for intensive studio by project research, brief interpretation, and a design provocations. Self-directed research forms a basis for understanding of other contexts of project location (Australia or international). A set of selected os establish key discourses of studio.

esentation of brief interpretation, research, design methodology; A5 notebook

ing of project
of project location
cal and theoretical underpinnings
mmunication skills

c available in *Course Rubrics* document

materials

tion + written online

e Studio, Nepal, Part 1 + Part 2

iative spreadsheet and checklist

s assessment item the student should be able to demonstrate:
kills, abilities, knowledge to **participate** in fieldwork and group design, tcomes, and **reflect** on processes leading to:
f architectural project, guided by Healthabitat
ument submission, guided by Healthabitat

parts, completed during 10-day intensive studio. Part 1 *Design* is a oject for a particular brief, client and location. Students produce a n, design, details) for health facilities (toilets, hand washing, etc.). In oject's design principles, data and details, students produce (in ool to assist design and construction', for future health planning ith the Healthabitat aim, 'to produce something that will add value Students participate in design activities, evaluate design, and outcomes.

Page 4 of 7

Thanks all round at the end of the workshop

The student team gives a gift of pens and supplies to the school headmaster

Griffith University students receive a gift from the school

Newcastle University students receive a gift from the school

L-R Grant Stewart IAPMO, Swathi Saralaya IAPMO, Jasper Ludewig, Bishnu Shrestha, John Roberts and the Headmaster

The design team prepares to leave the school

Back in Kathmandu on the last day of the Workshop, every team member was presented with a Certificate of Appreciation from the HH Nepal project Manager and Australian Director.