SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING
ASSIGNMENT COVER SHEET

ENGG1000 CVEN 2017

Sustainability Assignment

Individual Assignment

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Surname: Chen **Name: David** **ID: z5117378** **SIGNATURE: David Chen**

Executive Summary

This report will go into more detail about the construction and design of a new Civil Engineering Building and the social impacts it will have on the community, economic differences and impacts on the environment as a result. The primary aim of this report is to provide a detailed description of the site location and the likely impacts of construction this building. From constructing a new Civil Engineering building, the proposal aims to decrease overcrowding of the current building and replace outdated technology to reduce energy consumption. However, before construction can start, impacts that arise during the building process must be assessed. This report determines whether an EIS is necessary (Environmental Impact Statement) and will include an EIA (Environmental Impact Assessment) to determine the potential threats and consequences during construction. This include such factors like:

- Increase Pollution
- Noise pollution
- Potential Spills and Leakages
- Trucking

More so, this report will not only also include the threats to the environment, but also the positive environmental outcomes due to reconstruction. It will also include alternative solutions and problems in this report. In summary, this report recommends an EIA and EIS to be made to minimize risk on the environment whilst improving student life at UNSW.

Site Description and Project Background

The site location for the new Civil Engineering Building will overtake the current location of the old Civil Engineering Building, with the old building being demolished. The new building will be located across the Scientia Lawn, with the construction spanning across Oval Ln and adjacent to Willis St (shown in fig 3). The design will encompass a 200m by 200m base with a height of 5 storeys. The main design will consist of concrete as the main material with glass panels on the side and solar panels at the top of the building. Concrete will be utilised most due to its strong base, its ability to withstand the changes in climate and its flexibility to mould into different shapes to create a better overall design.(infrastructure.sa.go.au, 2017)

Fig 3 Map of Location.

The Civil Engineering Building was primarily used for students to study design, construction and innovate. However, due to increases in enrolment, the building is unable to keep up and provide enough study space. In a response to this, the reconstruction of the Civil Engineering Building is necessary. (Mymanagementguide.com, 2017)

Screening

An EIS (Environmental Impact Statement) will be necessary due to the magnitude of the construction project. An EIS describes the impacts on the environment from proposed activities. Within the EIS, we have the EIA (Environmental Impact Assessment) which is a method of surveying and identifying the likelihood of environmental impact due to a

proposed construction decision to ensure future construction is not damaging as applies under the Environmental Planning and Assessment Regulation 2000 (Legislation.nsw.gov.au, 2017). Generally, for large clearings and deforestation of land, a full EIA is required. However, with the construction for the new Civil Engineering Building being in the same location as the old one, only a preliminary assessment is required. A preliminary assessment will allow decision makers and planners the opportunity to take into not only take into consideration the biological implications of the reconstruction of the Civil Engineering Building.

Under the construction period, potential likely impacts that may affect the environment could include:

- Risk of Pollution Incident
- Increased pollution in the region
- Potential contamination of water
- Increased noise pollution
- May affect ground fertility in the location

Screening Checklist to consider (refer to table 1):

Potential Impacts	**Yes/No**
Will the project produce carbon emissions/hazardous pollutants?	Yes
Will there be any potential contamination of water to surfaces?	Yes
Are there transport routes which may be congested due to construction?	Yes
Is the project highly visible?	Yes
Are there any underground water in that location?	No

Are there existing housing with active people living in the region?	Yes
Is the location susceptible to potential earthquakes or aggressive climatic change which could affect the environment?	No

Table 1 (Jacobs, 2014)

Scope

This report will cover the proposed re-construction of the Civil Engineering Building which its design will include a 200m by 200m base, with a height of 15m. The proposal will be aimed to decrease and minimize the effects of the construction whilst creating a sustainable future through implementing new and more resourceful technology such as solar panels and more efficient energy consumption. Regarding the construction of the project and its geographical location, there will be no major implications on the surrounding environment. Under the Environmental Planning and Assessment Act 1979 (Legislation.nsw.gov.au, 2017), this project aims to identify environmental threats and reduce them in the process, as such also promote ecologically sustainable development.

However, there are always possible potential environmental, economic and social impacts during the construction of the new building. Identified likely environmental impacts could include:

- Contamination of water surfaces
- Increased dust particles in the air which can be hazardous to surrounding animals/humans
- Decrease in soil fertility in that region due to potential hazardous pollutants
- Increase in noise and odour pollution within that region

- Increased release of carbon emission during construction which can be harmful to the environment.

From undergoing a team brain storm, relevant impact factors that were noted which may need to be considered are environmentally friendly resources (materials) that will be used in the project, reducing the amount of noise, air pollution, contamination due to potential use of toxic materials during the construction process and aesthetics of the building. The type of material used in the construction will be mainly concrete. This is supported by the fact of a commercial LCA building constructed with concrete, statistically produces lower amounts of greenhouse versus a steel constructed building over the period of 60 years and is more sustainable versus wood (PCA, 2011). Moreover, during the period of construction, spillages of toxic liquids may potentially be harmful, such as oil from the machines and equipment. This can pose both as a hazard to the community and the surrounding animals (birds) which are nearby. These negative consequences can be combatted through first identifying the possibilities through an EIA, and from this, take proper caution and planning to reduce these risks.

The community consultation will be conducted by having multiple open meetings with the board and the stakeholders around the region. This will allow for better communication between stakeholders and as a result, improve the overall project and mitigate social, economic and environmental impacts. There will be also open mediums for communication such as phone, email and a service desk available from 9 am- 5pm on weekdays for any inquiries about the reconstruction project and how this will affect their lifestyle and the surrounding area.

Community Consultation

Prior to construction, letters and emails regarding the potential disruptions to neighbouring buildings and occupants will be send out to all stakeholders who will be affected by the reconstruction of the Civil Engineering building. To address community consultation, there will be multiple meetings organised between the board and community representatives/student bodies to resolve conflicts, disputes regarding construction and provide feedback on the overall design of the building. By Involving affected stakeholders, this will minimise long-term negative impacts on the communities social and environmental situation (Epublications.bond.edu.au.2017). Furthermore, whilst providing a general overview of construction plans and how it will affect the community in the present and in the future, solutions for alternative routes in transport and commute will be provided. In terms of the students,

Assessment

Through evaluating and brainstorming about the construction of the new Civil Engineering Building, there are positive and negative impacts it can have on the environment during and after construction is finished. (Planningportal.nsw.gov.au, 2017)

A total reconstruction of the faculty is beneficial due to the improvement in technology implemented into the building and in design. In recent finding, acclaimed by the Government, found that only 6% of Australia's total energy contribution came from renewable energy, with non-renewable resources such as oil and coal being the main contributors to Australia's energy (Industry gov, 2016). Through changing such designs and implanting technology such as solar panels which is more power efficient, the faculty could contribute positively by reducing its overall usages.

However, during the construction period, there could be potential spills and leakages which can be fatal towards the surrounding eco-system. The spread of fumes and accidental spilling of oil can be fatal to animals, where oil or fumes can poison creatures or native trees in the area which can have lasting effects long after construction is finished. This can also be detrimental to the soil quality, especially if certain materials are used within the process of construction.

Moreover, there will also be an increase in noise pollution due to trucking, blasting and drilling. These activities are unavoidable, as the movement of construction workers, machinery and trucks being used will generate and contribute to noise pollution. This increase in activity will not only increase noise, but also congest the local roads and region which can be detrimental to the surrounding community. However, noise pollution can be reduced through finishing sections of the building off-site and careful planning to ensure everything is completed on time and efficiently. Regarding trucking, traffic will become more congested in neighbouring regions which will lead vehicles being stuck on the road for a longer period, consequently resulting in an increase in carbon dioxide being released into the atmosphere. A study found that transportation contributes 12% of Australia's total emissions (Australian Government Climate Change Authority, 2012), hence reducing the number of cars actively on the road will reduce impacts on the environment.

As displayed below in figure 2, a statistical representation of the possibilities and dangers that could occur during the construction period are shown.

	Noise and Vibration	Surface or paving	Blasting and Drilling	Spills and Leaks	Industrial Sites and Buildings	Trucking
Water Quality		4/1	4/2	4/10		
Health and Safety	3/3	4/2	4/4	4/9	2/5	4/5
Grass		4/3		4/3		
Deposition, sedimentation		4/5				
Atmospheric Quality			4/8			4/8
Animals (birds)	3/3		4/2	4/7		

Figure 2 – Leopold Matrix (Horizontal is the development actions and vertical are the environmental factors) (Dr. Victor M. Ponce, 1971)

Possible alternatives during the period of construction to reduce congestion could include providing public transport in the region to reduce the number of cars on the road. This not only would decrease road activity and improve the traffic congestion situation, but also reduce carbon emissions produced, as light vehicles contribute to 10% of total greenhouse emission in Australia (Australian Government Climate Change Authority, 2012) .

Identify and describe any practical problems you encounter throughout the project.

A practical problem that came up involved the statistic regarding the commercial building LCA factual findings. It does not describe exactly how much more effective a concrete building is compared to a steel made one and if the concrete material can be recycled for future use versus steel. More so, it also does not include the age of the steel building, so a more modern steel building which has improved designs using technology may potentially be on par or better than concrete.

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