



Lecture  
Notes

# EGB123 Notes

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# Chapter 1

## Week 1

### 1.1 Unit Introduction

#### 1.1.1 Unit Motivation

*Engineers have the task of creating, maintaining and extending the physical infrastructure that allows society to function. This infrastructure has developed over many generations, in response to the needs and demands of society, and has become more complex over time. **Planning** and **design** are the key activities that are used, together with management, to bring projects through to successful completion.*

##### Definition 1.1.1: Unit Overview

This unit introduces the knowledge and skills used to undertake site investigations and project assessments as part of infrastructure planning and management activities to meet stakeholders' needs.

#### 1.1.2 Assessment Overview

The units assessments will consist of the following:

- Assessment 1: **Study Area Investigation** - You will work in a group of four:
  - to investigate functions of a real world engineering system at an urban study area.
  - with co/leadership of sub tasks preassigned to specific members with contribution by all other members.
  - 15% individual across two sub tasks, 15% group (30% total)
  - **Submission:** Group submits, each individual submits a text response on own contribution (Same Due Date).
- Assessment 2: **Major Project Assessment** - Work in a group of four:
  - Prepare a major project assessment that reviews and analyses prescribed technical aspects of two real world major civil engineering projects.
  - 20% individual across two sub tasks, 15% group (35% total)
  - **Submission:** Group submits, each individual submits a text response on own contribution (Same Due Date).
- Assessment 3: **Final Exam** - Individual (35%).

### 1.2 Urban Study Area Investigation

You will be provided a study area investigation brief that contains backgrounds as well as directions on how to conduct investigation. Will work in a group of 4 to complete:

- 4 items in Sub Task A (Each led by one group member)
- 2 items in Sub Task B (Co led by two group members)
- 1 Technical report in Sub Task C (All group members contribute).

### 1.2.1 Investigation

The project will involve three sub tasks:

#### 1. Topography and Water Utilities

- Topography
- Stormwater
- Sewer
- Water Reticulation

#### 2. Bridge Approaches and Bridge Structure

- Bridge Approaches and Abutments
- Bridge Structure

#### 3. Engineering Technical Report

For each item in sub task A, the item will ask you to

- explain the typology of the system with definitions and roles of components.
- Locate certain features on spatial layer documents.
- Annotate responses to queries on spatial layer documents.
- Interpret the system under investigation and discuss how that system relates to street layout, build form, ease of movement.

For sub task B, you will be asked to:

- **B1** Consider bridge approaches and abutments, and how they relate to the street layout and build form. This will be done using six tables, each containing a series of stated forms or stated considerations about bridge approaches and abutments.
- **B2** Consider the bridge structure for a real bridge in the study area.

### 1.2.2 Information Sources

Throughout the unit, the following sources of information will be used:

- Spatial information on Community maps, nearmap, google street view.
- Government and agency documentation from Austroads.

# Chapter 2

## Week 2

### 2.1 Public Utilities

- Public utilities is where most urban civil engineering activities are focused.
- Civil engineers have a **duty of care** to ensure that their activities do not harm public utilities and do not allow public utilities to pose health, environment and safety risks to the public.

We need to know where public utilities are located so that we:

- Can engineer in a way that does not damage them.
- Can accommodate any necessary changes
- don't damage them during construction.
- can coordinate with PU system owners and operators.

#### 2.1.1 What are Public Utilities in the Urban Context?

Systems of infrastructure that:

- Convey something (e.g. water reticulation) and/or
- Change state of something (e.g. voltage transformer)

##### **For community benefit**

Most often, public utilities need to be located in or near public spaces:

- For ease of access for maintenance, operations etc.
- To avoid interference with private land uses

#### 2.1.2 Where are Conveyance Public Utilities Located in the Urban Context?

Where possible, within a strip of public land such as a:

- Casement (road land) OR
- Easement (special purpose land)

Benefits of locating within public land:

- Makes access easier
- Longitudinal configuration of the land often suits conveyance

But technical aspects sometimes require their installation through private land allotments:

- e.g. some stormwater, sewer due to grade alignment requirements for hydraulics (fluid flow) using gravity

## 2.2 Geospatial Mapping

### Definition 2.2.1: What is Geospatial Mapping?

A spatial visualisation method that enables the creation of customised maps to address specific requirements. Its primary aim is to show items with geographic coordinates in a geographical framework, providing a representation of the physical world on a map. Various approaches, solutions, and Geographic Information Systems (GIS) software can be employed to analyze existing geospatial data and geographical and terrestrial databases.

### 2.2.1 Community Maps

Community maps are a geospatial mapping service provided by the Brisbane City Council that provides

#### Theorem 2.2.1 Theorem Name

Theorem Statement

#### Corollary 2.2.2 Corollary Name

Corollary Statement

#### Lemma 2.2.3 Lemma Name

Lemma Statement

#### Claim 2.2.1 Claim Name

Claim Statement

#### Example 2.2.1 (Example Name)

Example explained

### Open Question 2.2.1: Open Question Name

Question Statement

#### Note:-

Special Note

### Wrong Concept 2.1: Wrong Concept topic

Explanation

## **Chapter 3**

# **Second Chapter**

### **3.1 Section 1**