

Introduction

In 2017 the Prince Edward Island government conducted a study and determined that the Souris wastewater treatment plant required an upgrade to support the surrounding community. The upgrade is to replace the existing system with a new sequencing batch reactor (SBR) and sludge holding tank, as well as an accompanying control building to increase capacity and efficiency of the plant.

Project Location



Design Objectives

Tank	Building
Walkway	Divider Walls
Perimeter Walls	Base Slab
	Roof
	Walls
	Slab
	Footings

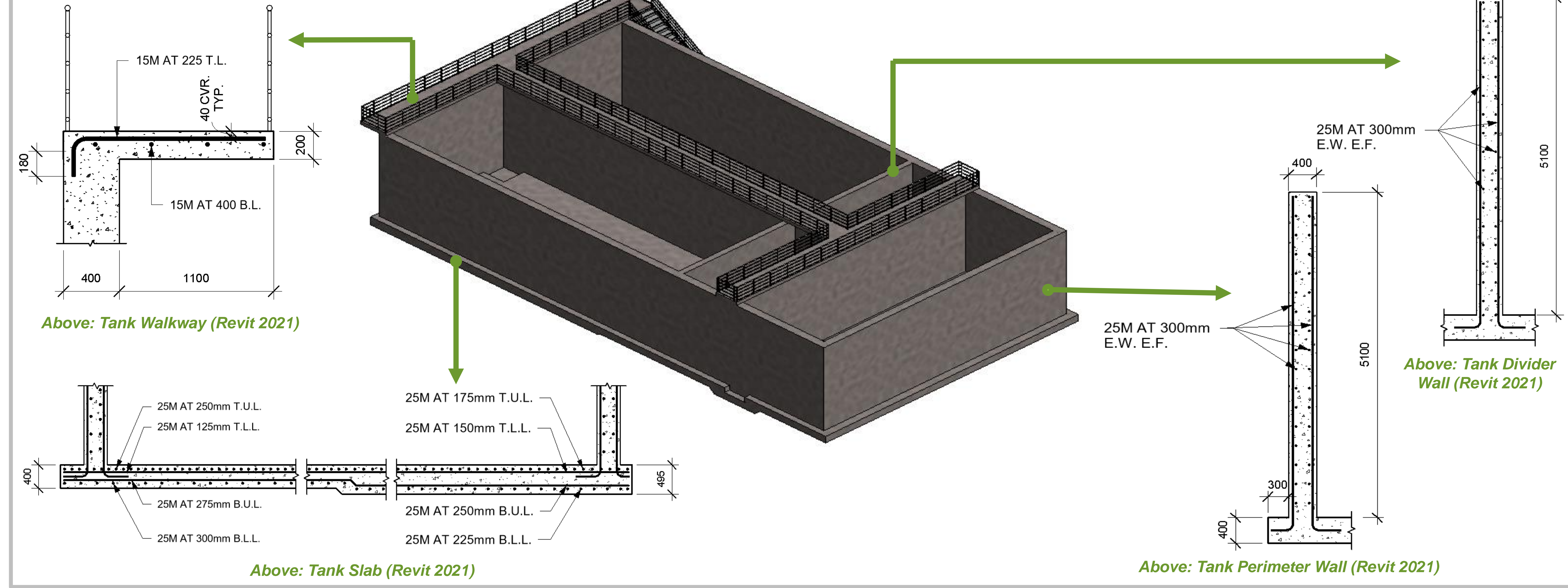
Design Process

- Options Analysis**
 - Determine project constraints
 - Research materials
- Load Analysis**
 - Develop gravity loads
 - Develop lateral loads
- Design**
 - Determine governing load cases
 - Attain required geometry
 - Conduct detailed design of components
- Present Results**
 - Design drawings of structures
 - Class B cost estimate

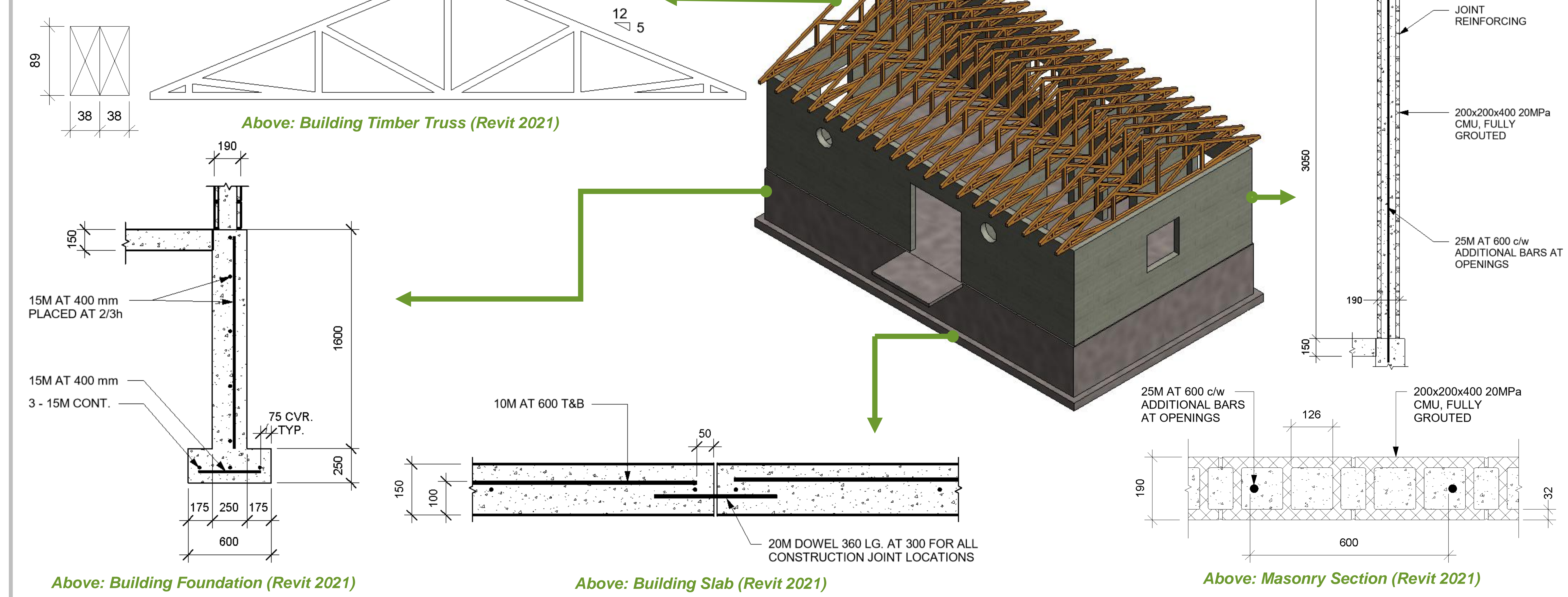
Key References

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 ACI. 2001. ACI 350-01 Code Requirements for Environmental Engineering Concrete Structures.
 ACI. 2010. ACI 360: Guide to Design of Slabs-on-Ground. ACI, 1-72.
 Munshi, J.A. (n.d.). PCA Rectangular Concrete Tanks. Fifth Edition. Portland Cement Association.
 NBCC. 2015. National Building Code of Canada. Canadian Commission on Building and Fire.

Tank Design



Building Design



Conclusion and Recommendations

The designs were completed by assuming a normal importance category, where typically a post disaster importance would be used for structures of this magnitude. The tank was designed for all possible loading cases during construction and operational phases while ensuring durability against chlorides, sulphates, and cracking. The control building was designed to resist the applied loading. Materials were selected by considering their structural, environmental and economical benefits. The tank is planned to be constructed using reinforced concrete complete with metal railings and epoxy coating. The building will be constructed using timber trusses, CMU block walls and reinforced concrete foundation.

Class 'B' Cost Estimate

Tank	\$904,264
Building	\$90,923
SUBTOTAL	\$995,187
Contingency (10%)	\$99,519
GROSS PROJECT COST	\$1,094,706