

Central Plant and Tunnel

Client: Te Whatu Ora Health New Zealand | Te Toka Tumai Auckland

Te Whatu Ora
Health New Zealand
Te Toka Tumai Auckland

Structural and Facades engineer: Aurecon



Contractor: McConnell Dowell



Project manager: RCP



Architect: Jasmax



Services and Fire Engineer: Beca



Acoustics: NDY



Central Plant and Tunnel

Te Toka Tumai

Main Building:

- 6-Level building housing critical plant + associated distribution infrastructure
- Building Importance Level: IL4
- Design Life : 100 years
- Seismic isolation utilised for damage avoidance design and improved re-occupancy.

Foundations

- Bored reinforced concrete piles with reinforced concrete pile caps and ground beams over.
- Slab on grade overlays over concrete beam grillage and forms floor crawl space.
- Lateral loads from base isolators anchors into plinth and pile caps.
- Seismic shear take out – combination of passive earth pressure and ground beams/ piles

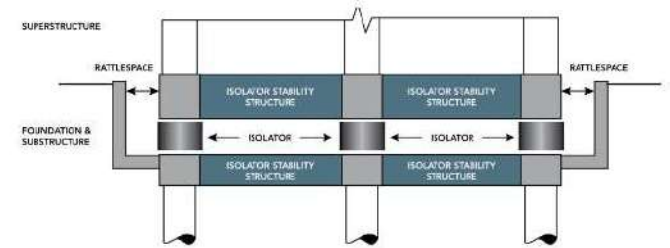
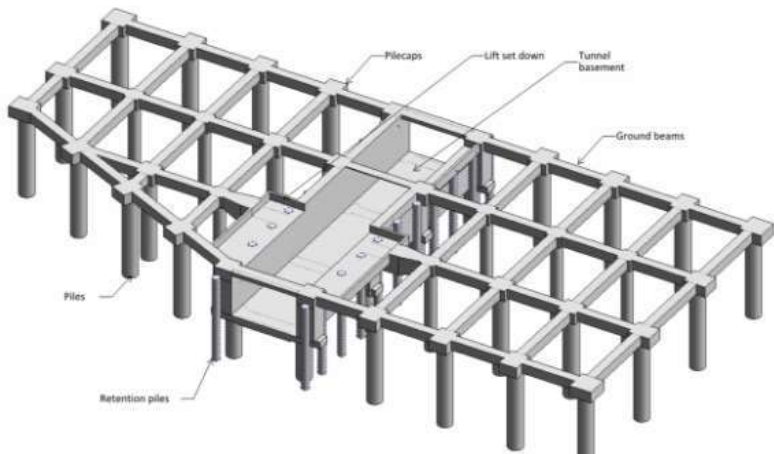


Figure 4-5: Components of seismically isolated building

Central Plant and Tunnel

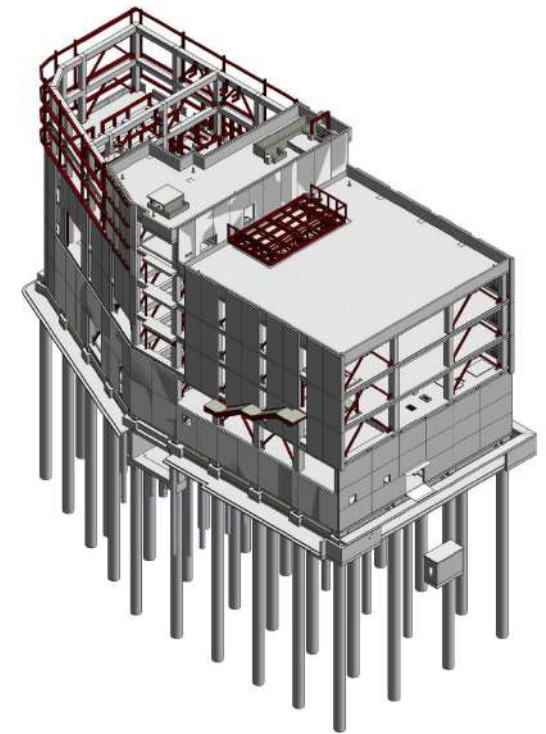
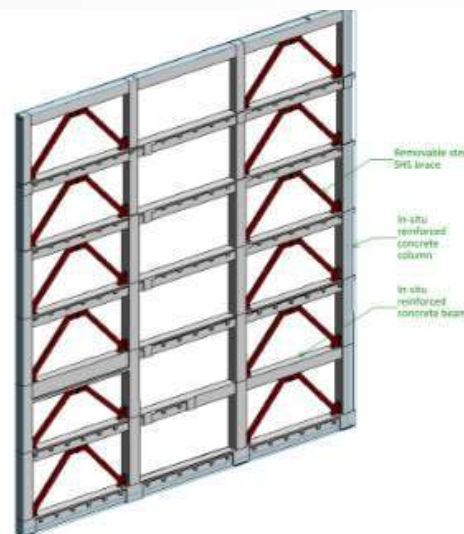
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Primary Lateral Load Systems

- Steel Concentrically Braced Frames for lateral stability above isolation level.
- Lateral System consists of 250SHS diagonal braces, reinforced concrete collector beams and reinforced concrete columns.

Primary Framing

- Reinforced concrete frame design consisting of precast half beams and reinforced concrete columns.
- Concrete used for the following benefits:
 - Durability – 100 year design life
 - Inherit Fire rating properties
 - Half beams = reduced construction time



A40 BUILDING - 3D VIEW 1

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Service Tunnel Structure

- New 4m wide x 3.5m high (clear dimensions) tunnel network linking existing A01 basement to new Central Plant Building (A40).
- Tunnel Length = 245m
- Temporary Structure = Retention Piles (600diameter) + Capping Beam for trench in tunnel construction, Shotcrete lagger or liner walls between piles, temporary steel struts to prop piles through excavation.
- Significant Support for Major In-ground existing Utilities.
- Permanent Retaining Walls (rigid wall assumption for seismic, crack width criteria = 0.3mm).

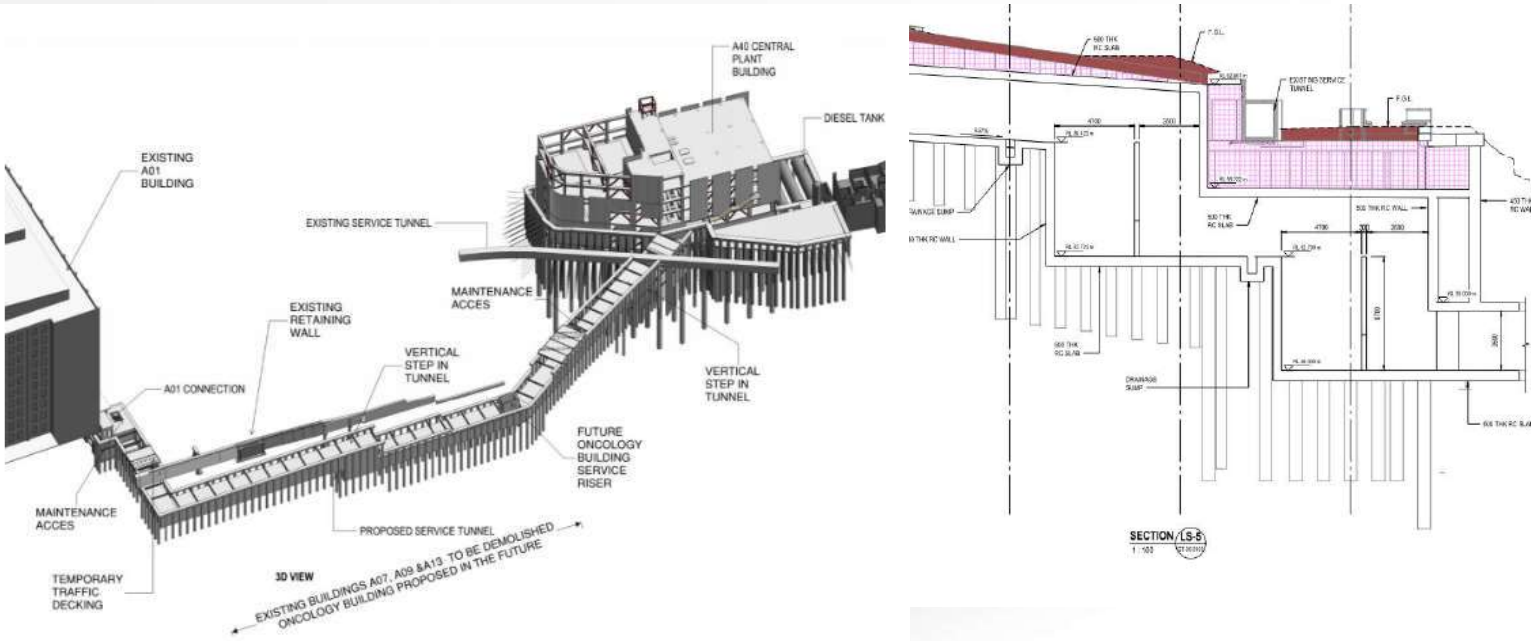


Figure 5: Plan of service tunnel

ZONE A SLAB ON GRADE POURED



ZONE B GROUND BEAMS AND FORMWORK BEING INSTALLED



ZONE A ISOLATORS INSTALLED, TUNNEL REO PROGRESSING



ZONE B SLAB ON GRADE PROGRESSING



ZONE B SLAB ON GRADE POURED



ZONE B ISOLATORS INSTALLED, TUNNEL REO/ STRUTS PROGRESSING

