



**Coonamble Shire Council Depot Fuel Upgrade
Development Application**

**53 Back Gular Road
Coonamble NSW 2829
Lot 1 on DP220172**

**Section Five
Statement of Environmental Effects**

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1. Introduction

This Statement of Environmental Effects (SEE) has been prepared in support of a Development Application for the upgrade of fuel storage and refuelling facilities at the Coonamble Shire Council Depot.

The proposal comprises:

- Installation of a new 55,000 L self-bunded diesel storage tank.
- Coonamble Shire Council Depot Fuel Upgrade Statement of Environmental Effects
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- Relocation of the existing 4,500 L self-bunded unleaded petroleum (ULP) tank.
- Relocation of the existing bitumen emulsion storage tank.
- Construction of a dedicated refuelling precinct, including reinforced concrete hardstand, drainage and spill containment infrastructure.
- Installation of fuel dispensing equipment and SmartFill fuel management systems.
- Associated electrical, safety and traffic management works.

The development is intended to improve fuel security, operational efficiency, environmental performance and workplace safety for Council's fleet operations. The proposal does not increase the overall operational footprint of the depot and is ancillary to the established use of the site as a Council works depot.

2. Site Description

The subject site is the Coonamble Shire Council Depot, an established operational facility used for the maintenance, servicing and deployment of Council vehicles, plant and equipment.

Existing site activities include:

- Vehicle and plant maintenance.
- Heavy vehicle parking and storage.
- Workshops and administration facilities.
- Fuel storage and refuelling activities.
- Storage of road maintenance materials and equipment.

The fuel upgrade is proposed on the eastern side of the depot within a dedicated fuel precinct separated from workshop operations and other depot activities. The location has been selected to improve vehicle circulation, facilitate fuel deliveries and provide opportunities for future operational expansion.

3. Proposed Development

The proposed development includes:

3.1 Fuel Storage

- One new 55,000 L self-bunded diesel storage tank.
- Relocation of the existing 4,500 L self-bunded ULP storage tank.
- Relocation of the existing bitumen emulsion storage tank.

3.2 Fuel Management

- SmartFill fuel management system.
- SmartDip fuel monitoring system.
- Automated fuel reconciliation and reporting.
- Vehicle and operator identification controls.

3.3 Civil Works

- Reinforced concrete fuel pad and hardstand.
- Spill collection infrastructure.
- Controlled drainage arrangements.
- Protective bollards and traffic controls.
- Access improvements for heavy and light vehicles.

3.4 Safety Infrastructure

- Emergency shutdown systems.
- Spill response equipment.
- Fire extinguishers.
- Hazardous chemical signage and placarding.
- Emergency eyewash facilities.
- Hazardous-area compliant electrical installations where required.

4. Planning Assessment

4.1 Coonamble Local Environmental Plan 2013

Zoning

The subject site is located within land zoned E4 General Industrial under the Coonamble Local Environmental Plan 2013, and the proposal supports the continued operation of an existing industrial depot facility.

The site is an established Council works depot containing workshops, plant storage areas, vehicle parking, maintenance facilities and fuel storage infrastructure. The proposed development comprises the upgrade and consolidation of existing fuel storage and refuelling facilities used in association with the ongoing operation of the depot. The development is consistent with the objectives of the zone and does not introduce a new land use.

The proposal includes:

- Installation of a new 55,000 L self-bunded diesel storage tank.
- Relocation of the existing 4,500 L self-bunded ULP tank.
- Relocation of the existing bitumen emulsion tank.
- Construction of a dedicated fuel storage and refuelling precinct.
- Associated civil, structural, electrical and safety infrastructure.

The proposal is ancillary to the established depot use and is consistent with the purpose and function of the existing facility.

Objectives of the E4 General Industrial Zone

The proposal is consistent with the objectives of the E4 General Industrial zone as it:

- Supports the continued operation of an existing industrial and infrastructure facility.
- Facilitates efficient operation of Council's maintenance, construction and asset management services.
- Improves operational efficiency and fuel security for Council's vehicle and plant fleet.
- Maintains the industrial character of the locality.
- Does not introduce land use conflict with surrounding industrial activities.
- Incorporates environmental protection and risk management measures appropriate to the storage and handling of fuels.

The development is therefore considered compatible with the objectives of the E4 General Industrial zone and the broader planning framework applicable to the site.

Built Form and Site Compatibility

The fuel storage upgrade is located within an existing operational depot and does not alter the overall character or function of the site.

The proposed fuel precinct:

- Utilises an area already associated with depot operations.
- Improves internal traffic circulation.
- Provides greater separation from workshop activities.
- Enhances operational safety.
- Improves environmental management outcomes when compared with the existing arrangement.

The proposal is therefore considered compatible with the existing and future industrial use of the site.

4.2 State Environmental Planning Policy (Resilience and Hazards) 2021

Chapter 3 – Hazardous and Offensive Development

The proposal has been assessed having regard to Chapter 3 of the State Environmental Planning Policy (Resilience and Hazards) 2021, which establishes the planning framework for hazardous and offensive industries and storage facilities. The SEPP requires consent authorities to consider potential off-site risks and relevant departmental guidelines when determining development applications involving hazardous substances and fuel storage.

Nature of the Development

The proposal involves the storage and handling of diesel fuel and unleaded petroleum products within a purpose-designed fuel storage precinct.

The development incorporates extensive risk management measures including:

- 55,000 L self-bunded diesel storage tank.
- Existing self-bunded ULP storage tank.
- Hydraulic overfill prevention system.
- High-level alarms.
- Spill collection systems.
- Emergency shutdown facilities.
- Hazardous-area compliant electrical installations.
- Fire protection equipment.
- Fuel management and monitoring systems.

Hazard Assessment

The supporting engineering assessment includes a detailed hazard review of:

- Fuel spills.
- Tank overfill.
- Vehicle impact.
- Equipment failure.
- Fire and explosion hazards.
- Stormwater contamination.
- Unauthorised access.

The assessment concludes that the identified risks can be effectively managed through the proposed engineering and operational controls and that residual risk levels are low and acceptable.

Land Use Compatibility

The proposal is located within an established industrial depot and is separated from sensitive land uses. Fuel storage activities already occur on the site and the proposal primarily consolidates and upgrades existing infrastructure.

The relocation of the fuel storage area to a dedicated fuel precinct improves:

- Separation from workshop activities.
- Traffic management.
- Emergency access.
- Spill management.
- Fire safety performance.

Conclusion

The development incorporates contemporary industry-standard environmental and safety controls and does not result in unacceptable off-site risk. The proposal is therefore consistent with the objectives and requirements of Chapter 3 of the State Environmental Planning Policy (Resilience and Hazards) 2021.

4.3 State Environmental Planning Policy (Resources and Energy) 2021

The State Environmental Planning Policy (Resources and Energy) 2021 establishes a planning framework for mining, extractive industries, petroleum production, electricity generation, transmission infrastructure and related resource and energy development.

The proposed development is not:

- A mining project.
- An extractive industry.
- Petroleum production infrastructure.
- An electricity generating work.
- State significant energy infrastructure.
- Gas transmission or processing infrastructure.

While the policy does not directly regulate the proposed depot fuel storage facility, consideration has been given to the broader objectives of supporting the efficient operation of essential infrastructure and ensuring that development incorporates appropriate environmental and safety measures.

The proposal will:

- Improve fuel security for Council operations.
- Reduce operational risks associated with existing fuel infrastructure.
- Increase diesel storage capacity and operational resilience.
- Improve fuel monitoring and accountability through the SmartFill system.
- Support delivery of essential local government services throughout the Coonamble local government area.

Accordingly, the proposal is considered consistent with the intent of the State Environmental Planning Policy (Resources and Energy) 2021 and raises no strategic planning issues under that policy.

4.4 Section 4.15 Environmental Planning and Assessment Act 1979

Pursuant to Section 4.15 of the Environmental Planning and Assessment Act 1979, the following matters have been considered.

Provisions of Environmental Planning Instruments

The proposal has been assessed against:

- Coonamble Local Environmental Plan 2013.
- State Environmental Planning Policy (Resilience and Hazards) 2021.
- State Environmental Planning Policy (Resources and Energy) 2021.

- Relevant Australian Standards, including AS 1940:2017.

The development is consistent with these instruments.

Likely Impacts of the Development

Environmental Impacts

Potential environmental impacts include:

- Fuel spills.
- Soil contamination.
- Groundwater contamination.
- Stormwater pollution.
- Construction-related disturbance.

Mitigation measures incorporated into the proposal include:

- Self-bunded fuel storage systems.
- Overfill protection.
- High-level alarms.
- Concrete refuelling pad.
- Spill collection systems.
- Controlled drainage.
- Spill response equipment.
- Fuel monitoring systems.

The proposal is expected to improve environmental performance when compared with the existing facility.

Traffic Impacts

The development will not significantly increase traffic generation.

The proposed fuel precinct improves:

- Vehicle circulation.
- Heavy vehicle access.
- Fuel delivery access.
- Traffic separation.
- Refuelling safety.

Safety Impacts

The proposal incorporates:

- Emergency shutdown systems.
- Hazardous-area compliant electrical systems.
- Fire extinguishers.
- Bollard protection.
- Emergency response procedures.
- Fuel access controls.

The residual operational risk is considered low.

Suitability of the Site

The site is an established Council depot currently utilised for vehicle maintenance, plant operations and fuel storage activities.

The site is suitable for the proposed development because:

- The proposal is ancillary to the existing use.
- Fuel storage already occurs on the site.
- Adequate separation distances can be achieved.
- The site provides suitable access for fuel delivery and refuelling operations.

- The development occurs within an industrial land use context.

Section 4.15 Conclusion

Having regard to the matters for consideration under Section 4.15 of the Environmental Planning and Assessment Act 1979, the proposed development is suitable for the site, will not result in significant adverse environmental impacts, is compatible with surrounding land uses and is in the public interest.

6. Environmental Assessment

6.1 Land Contamination

The proposal is located within an existing operational depot where fuel storage activities already occur.

The upgraded facility incorporates:

- Double-wall self-bunded tanks.
- Spill collection systems.
- Fuel inventory monitoring.
- Overfill prevention devices.
- Controlled refuelling infrastructure.

These measures significantly reduce the likelihood of soil contamination compared with the existing arrangement.

Assessment

Impacts on land contamination are considered negligible and acceptable.

6.2 Stormwater Management

The design incorporates:

- Graded concrete hardstand areas.
- Directed drainage to spill collection points.
- Separation from stormwater systems.
- Spill response equipment and procedures.

Potential spills occurring during refuelling or tanker deliveries will be contained within the fuel handling area and prevented from entering the stormwater system.

Assessment

No significant impact on stormwater quality is anticipated.

6.3 Groundwater Protection

Groundwater protection is provided through:

- Self-bunded storage systems.
- Secondary containment exceeding 110% of tank capacity.
- Concrete hardstand surfaces.
- Spill collection infrastructure.
- Routine inspection and maintenance requirements.

Assessment

The proposal provides a significant improvement in environmental protection over the existing facility.

6.4 Noise

Construction will result in temporary noise associated with excavation, concrete works, transport and installation activities.

These impacts will be:

- Temporary in nature.
- Limited to normal construction hours.
- Typical of works associated with industrial depot upgrades.

Operationally, the proposal will not significantly alter existing depot noise levels.

Assessment

Noise impacts are considered minor and acceptable.

6.5 Traffic and Access

The development has been specifically designed to improve traffic management within the depot by:

- Creating a dedicated refuelling precinct.
- Separating fuel operations from workshops.
- Providing defined entry and exit routes.
- Reducing reversing movements.
- Improving access for heavy vehicles and fuel tankers.

The proposal will not generate additional public-road traffic beyond normal depot operations.

Assessment

The proposal will improve on-site traffic safety and operational efficiency.

7. Hazard and Risk Assessment

A detailed hazard assessment identified potential risks including:

- Tank overfill.
- Fuel spills.
- Hose failure.
- Vehicle impacts.
- Electrical faults.
- Fire and explosion hazards.
- Unauthorised fuel access.

Risk mitigation measures incorporated into the design include:

- Hydraulic overfill prevention valves.
- High-level alarms.
- Self-bunded tank construction.
- Bollard protection.
- Emergency shutdown facilities.
- Hazardous-area compliant electrical equipment.
- Spill response equipment.
- SmartFill access controls.

Following mitigation, the residual risk level is assessed as low and acceptable.

8. Fire Safety

The proposal incorporates:

- Portable fire extinguishers.
- Emergency shutdown controls.
- Hazardous chemical placarding.
- No Smoking signage.
- Emergency vehicle access.
- Staff training and emergency procedures.

The fire risk assessment concludes that residual fire risk is low and As Low As Reasonably Practicable (ALARP).

9. Public Interest

The development is in the public interest because it:

- Improves Council operational efficiency.
- Increases fuel security for Council services.
- Enhances workplace safety.
- Reduces environmental risk.
- Consolidates existing fuel storage infrastructure.
- Supports ongoing delivery of Council services across the local government area.

10. Conclusion

The proposed fuel storage and refuelling facility upgrade at the Coonamble Shire Council Depot represents a necessary and appropriate enhancement of existing depot infrastructure that will improve operational efficiency, fuel security, workplace safety and environmental performance.

The development has been carefully designed to consolidate and modernise existing fuel storage operations through the installation of contemporary fuel management systems, upgraded containment measures and improved vehicle circulation arrangements. The proposal remains ancillary to the established use of the site as a Council works depot and does not involve the introduction of a new land use or expansion of the overall operational footprint of the facility.

The assessment contained within this Statement of Environmental Effects demonstrates that the proposal:

- Is permissible with consent and consistent with the objectives of the E4 General Industrial zone under the Coonamble Local Environmental Plan 2013.
- Is compatible with the existing and intended industrial character of the locality.
- Satisfies the relevant provisions of the State Environmental Planning Policy (Resilience and Hazards) 2021 and has incorporated appropriate hazard and risk management measures.
- Incorporates industry-standard environmental safeguards, including self-bunded fuel storage, spill containment systems, controlled drainage and fuel monitoring technology.
- Will improve environmental protection outcomes when compared with the existing fuel storage arrangements.
- Will not result in significant adverse impacts on surrounding land uses, traffic operations, public safety, soil, groundwater or stormwater quality.

- Supports the efficient delivery of essential local government services throughout the Coonamble local government area.

Having regard to the relevant environmental planning instruments, the matters for consideration under Section 4.15 of the Environmental Planning and Assessment Act 1979, and the findings of the environmental and hazard assessments, the proposal is considered to be in the public interest and suitable for the site.

Accordingly, it is concluded that the proposed development warrants approval and is recommended for development consent subject to appropriate conditions.



**COONAMBLE SHIRE COUNCIL DEPOT FUEL
UPGRADE**

DEVELOPMENT APPLICATION

53 BACK GULAR ROAD

COONAMBLE NSW 2829

LOT 1 ON DP220172

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Section One

Design Report Manthey Consulting Engineers



Coonamble Shire Council

Fuel Storage Upgrade

Client:	Coonamble Shire Council
Report No:	MCE_R100_004
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Prepared by:	B Manthey RPEQ 31180, NER

Executive Summary

Coonamble Shire Council is upgrading the fuel storage and refuelling facilities at the Council Depot to improve operational efficiency, increase diesel storage capacity, and ensure compliance with current regulatory requirements.

The project includes installation of a new 55,000 L self-bunded diesel tank, relocation of the existing ULP and bitumen emulsion tanks, integration of the SmartFill fuel management system and improvements to traffic flow, refuelling operations, and site safety.

The proposed design has been developed in accordance with AS 1940:2017 and relevant planning, environmental and safety requirements. The facility layout has been optimised to provide safe vehicle access, appropriate separation distances, spill containment measures and efficient fuel delivery operations.

The completed design provides Council with a compliant, safe and practical fuel facility that supports current and future operational requirements while reducing environmental and operational risk.

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Introduction

Existing Depot Arrangement

The Coonamble Shire Council Depot is a multi-purpose operational facility used for the maintenance, servicing and deployment of Council plant, vehicles and equipment. The depot contains workshops, storage sheds, parking areas, plant laydown areas and fuel storage facilities. Heavy vehicle parking is located to the western side of the site, while workshops and administration buildings are centrally located. Existing fuel storage and refuelling facilities are positioned adjacent to the workshop area, with a separate bitumen emulsion storage tank located nearby. A new fuel storage area has been identified on the eastern side of the depot to provide improved access, operational efficiency and future expansion capability.

Current Fuel Storage Facilities

The existing fuel storage infrastructure comprises:

- A 4,500 L self-bunded unleaded petroleum (ULP) storage tank and dispensing system located adjacent to the workshop building. The tank was manufactured in 2010 and is fitted with a pump, mechanical fuel meter and associated electrical connections.
- A heated bitumen emulsion storage tank equipped with circulation pumps, heating systems and dedicated electrical supply infrastructure.

The current fuel infrastructure has developed over time and is located within operational areas of the depot, resulting in constraints associated with traffic movements, refuelling operations and future upgrades.

Operational Requirements

The upgraded fuel facility is required to support Council's fleet of light vehicles, heavy vehicles, plant and road maintenance equipment operating from the depot. Key operational requirements include:

- Provision of a new 55,000 L self-bunded diesel storage tank with integrated dispensing facilities.
- Relocation of the existing 4,500 L ULP tank to a compliant location adjacent to the new diesel facility.
- Integration of the SmartFill Fuel Management System to provide secure fuel dispensing, automated transaction recording, vehicle identification and fuel usage reporting.
- Improved traffic circulation and safe access for both light and heavy vehicles during refuelling operations.
- Provision of compliant spill containment, overfill protection, emergency shutdown systems and fire safety measures in accordance with AS 1940.

- Relocation of the existing bitumen emulsion tank while maintaining its operational heating and pumping functionality.
- Provision for future maintenance, fuel delivery access and ongoing depot operations with minimal disruption.

The proposed upgrade will consolidate fuel storage activities within a dedicated fuel precinct, improving operational efficiency, safety and compliance while supporting the long-term needs of the Council depot.

Project Objectives

The primary objective of this project is to upgrade the existing fuel storage and refuelling facilities at the Coonamble Shire Council Depot to provide a safer, more efficient and compliant fuel management system that supports current and future operational requirements.

Specific project objectives include:

- Increase diesel storage capacity through the installation of a new 55,000 L self-bunded diesel tank, providing improved fuel security and reducing the frequency of fuel deliveries.
- Relocate the existing 4,500 L ULP storage tank to a new compliant location adjacent to the proposed diesel facility, creating a consolidated fuel storage and dispensing area.
- Improve traffic flow and vehicle access within the depot by establishing a dedicated refuelling area that accommodates both light vehicles and heavy plant while reducing congestion around existing workshop facilities.
- Integrate the SmartFill Fuel Management System to provide secure fuel dispensing, automated transaction recording, vehicle identification, fuel usage reporting and real-time fuel inventory management.
- Relocate the existing bitumen emulsion tank to facilitate the new fuel facility layout while maintaining operational functionality, including heating, circulation and product transfer systems.
- Improve safety and environmental performance through the incorporation of modern spill containment systems, overfill protection, emergency shutdown facilities, asset protection measures and controlled drainage arrangements.
- Achieve compliance with applicable legislation, Australian Standards and regulatory requirements, including AS 1940:2017 – Storage and Handling of Flammable and Combustible Liquids, SafeWork NSW requirements and relevant planning and environmental obligations.

The proposed upgrade will provide Council with a modern, compliant and efficient fuel storage facility capable of supporting ongoing depot operations while reducing operational, safety and environmental risks.

Scope of Works

Summary of Design Scope

Manthey Consulting Engineers was engaged to undertake the planning, design coordination and documentation for the upgrade of the fuel storage and refuelling facilities at the Coonamble Shire Council Depot.

The scope of works includes:

- Installation of a new 55,000 L self-bunded diesel storage tank and associated dispensing equipment.
- Relocation of the existing 4,500 L ULP storage tank and integration with the proposed fuel management system.
- Relocation of the existing bitumen emulsion tank and associated services.
- Development of the overall fuel facility layout, including tank locations, refuelling arrangements and operational access requirements.
- Design of vehicle circulation and traffic management arrangements for light vehicles, heavy vehicles and mobile plant.
- Integration of the SmartFill Fuel Management System and associated fuel monitoring infrastructure.
- Coordination of structural and electrical design inputs required for foundations, power supply, fuel management systems and associated infrastructure.
- Assessment of separation distances, spill containment requirements and operational safety provisions.
- Preparation of drawings and documentation suitable for Development Application, procurement and construction purposes.
- Review of fire safety and hazardous chemical storage requirements in accordance with applicable legislation and standards.

Exclusions

The following items are excluded from this design scope unless specifically noted otherwise:

- Geotechnical investigations.
- Detailed land survey and cadastral survey work.
- Construction, installation and commissioning activities.

- Procurement of tanks, equipment and contractors.
- Preparation of detailed electrical schematics by specialist electrical consultants.
- Environmental impact assessments beyond normal development application requirements.
- Ongoing maintenance, servicing and operational support following project completion.
- Supply of fuel, firefighting equipment, spill response equipment or ancillary site infrastructure.
- Council approvals, development consent fees and regulatory application fees.

Design Assumptions

The design has been developed based on the following assumptions:

- The proposed diesel storage system will comprise a 55,000 L self-bunded tank supplied in accordance with AS 1940 requirements.
- The existing 4,500 L ULP tank remains suitable for relocation and continued operation following inspection and refurbishment as required.
- Existing electrical infrastructure can be upgraded or extended to support the relocated ULP tank, diesel dispensing equipment, SmartFill system and bitumen tank relocation.
- Existing depot operations will continue during construction, requiring staged implementation of the works.
- Structural foundation design will be undertaken by a suitably qualified structural engineer based on confirmed tank loads and site conditions.
- Fuel delivery vehicles will maintain suitable access to the proposed fuel storage area.
- The bitumen emulsion tank will remain operational following relocation and reconnection of electrical and pumping services.
- Final fire protection requirements will be determined through detailed fire risk assessment and compliance review.
- The proposed facility will be designed in accordance with AS 1940:2017, relevant SafeWork NSW requirements and applicable Council planning requirements.

Design Basis

Applicable Standards

The proposed fuel storage and dispensing facility has been designed in accordance with the relevant Australian Standards, legislative requirements and industry best practice applicable to the storage and handling of flammable and combustible liquids.

AS 1940:2017 – The Storage and Handling of Flammable and Combustible Liquids

AS 1940:2017 is the primary design standard governing the facility. The standard establishes requirements for:

- Tank construction and installation.
- Spill containment and bunding.
- Separation distances.
- Venting systems.
- Overfill protection.
- Tank filling and dispensing arrangements.
- Fire protection requirements.
- Emergency management provisions.
- Inspection and maintenance requirements.

The proposed 55,000 L self-bunded diesel tank has been selected and located to comply with the requirements of AS 1940.

AS 2444 – Portable Fire Extinguishers and Fire Blankets – Selection and Location

Fire protection equipment associated with the fuel storage and dispensing area will be selected and located in accordance with AS 2444. The standard specifies requirements for:

- Fire extinguisher type selection.
- Minimum extinguisher ratings.
- Extinguisher locations.
- Accessibility requirements.
- Signage and identification.

Appropriate fire-fighting equipment will be provided to support emergency response activities associated with fuel storage and handling operations.

SafeWork NSW Requirements

The facility shall comply with the requirements of SafeWork NSW relating to hazardous chemicals and combustible liquids, including:

- Storage and handling of hazardous chemicals.
- Risk management and hazard identification.
- Emergency planning.
- Placarding and signage.
- Incident management.
- Worker health and safety obligations.

Existing depot fuel storage facilities are currently registered with SafeWork NSW for diesel and petrol storage.

Dangerous Goods Requirements

The design has been developed having regard to applicable dangerous goods legislation and associated regulations governing:

- Storage of combustible liquids.
- Storage of flammable liquids.
- Fuel transfer operations.
- Hazardous chemical notifications.
- Emergency response requirements.
- Environmental protection measures.

Appropriate controls will be incorporated to minimise risks associated with fuel storage and handling activities.

Relevant Electrical Standards

Electrical installations associated with fuel dispensing systems, pumps, fuel management equipment and tank monitoring systems shall comply with relevant Australian Standards, including:

- AS/NZS 3000 – Electrical Installations (Wiring Rules).
- AS/NZS 60079 series – Explosive Atmospheres.
- AS/NZS 3017 – Verification Guidelines for Electrical Installations.
- Relevant service and supply authority requirements.

Electrical equipment located within hazardous areas shall be appropriately rated and installed in accordance with hazardous area requirements. Existing documentation identifies that ULP tank electrical equipment must be intrinsically safe or flameproof.

Relevant Civil and Structural Standards

Civil and structural components of the facility shall be designed in accordance with relevant Australian Standards, including:

- AS 3600 – Concrete Structures.
- AS 4100 – Steel Structures.
- AS/NZS 1170 series – Structural Design Actions.
- AS 2159 – Piling Design and Installation (where applicable).
- Relevant geotechnical and foundation design requirements.

Tank foundations, hardstand areas, vehicle access pavements and protective barriers shall be designed to safely withstand operational loads, fuel delivery vehicle loads and environmental loading conditions. Foundation design shall be based on the tank manufacturer's certified requirements and site-specific conditions.

The above standards and requirements form the basis of the engineering design and compliance assessment undertaken for the proposed fuel facility upgrade.

Design Criteria

Fuel Storage Requirements

The upgraded fuel facility shall provide dedicated storage for diesel and ULP within a consolidated fuel storage area. The diesel storage system shall comprise a new 55,000 L class self-bunded tank, with a safe fill capacity of approximately 57,850 L, fitted with overfill protection, anti-syphon valves, high-level alarm and compliant fill/dispensing connections.

The existing 4,500 L ULP tank shall be relocated within the depot and connected to the upgraded fuel management system. The ULP tank is to be emptied, electrically disconnected, relocated, recommissioned and fitted with suitable flameproof/intrinsically safe dispensing equipment as required.

Refuelling Requirements

The refuelling arrangement shall support both low-volume and high-volume dispensing operations for Council vehicles, plant and mobile equipment. The diesel dispensing system is to include separate pump arrangements suitable for heavy vehicles, earthmoving equipment, trucks and light vehicles. The proposed diesel system includes 240 V pumps, digital pulse meters, high-mast hose reels, ZVA nozzles, breakaway fittings and 10 m fuel hoses.

The facility shall incorporate SmartFill fuel management to control fuel access, record transactions, assign fuel usage to approved vehicles or users, and provide reporting through the online portal.

Vehicle Access Requirements

The layout shall provide safe access for light vehicles, heavy vehicles, Council plant, fuel delivery tankers and maintenance personnel. Vehicle movements are to be arranged to minimise reversing, reduce congestion around the workshop area and provide adequate turning and approach clearances to the dispensing points. The proposed fuel storage location on the eastern side of the depot provides separation from the main workshop and parking areas and supports a more dedicated refuelling zone.

The layout shall also maintain suitable access for fuel delivery, tank maintenance, fire response and emergency egress.

Environmental Requirements

The facility shall be designed to reduce the risk of fuel release to ground, stormwater or adjoining operational areas. Environmental controls shall include self-bunded tank construction, overfill prevention, spill containment at fill and dispensing points, controlled drainage from refuelling areas, and provision for spill response equipment. The proposed diesel tank is self-bunded and includes hydraulic overfill protection and high-level alarm provisions.

Hardstand and drainage arrangements shall be designed to direct potential spills away from uncontrolled discharge points and allow containment, clean-up and recovery.

Fire Protection Requirements

Fire protection requirements shall be developed in accordance with AS 1940, AS 2444 and relevant SafeWork NSW requirements. The facility shall include appropriate fire extinguishers, emergency shutdown provisions, compliant signage, separation distances and access for emergency response.

The diesel system includes emergency stop technology and compliant electrical integration. The ULP system shall use appropriate flameproof or intrinsically safe equipment due to the flammable nature of petrol.

Final fire protection equipment quantities, types and locations shall be confirmed through the fire risk assessment and detailed design review.

Ancillary Safety and Protection Requirements

The upgraded fuel facility shall include ancillary safety equipment and physical protection measures suitable for a Council depot refuelling environment. These shall include, as a minimum, an emergency eyewash station located within practical access distance of the dispensing and fill points, spill response kit, impact protection bollards, compliant safety signage, emergency shutdown controls and suitable lighting for safe refuelling operations.

Impact protection shall be provided around the diesel tank, relocated ULP tank, dispensing equipment, pumps, pipework, electrical equipment, hose reels, fuel management hardware and other vulnerable infrastructure where exposed to vehicle, plant or tanker movements. Bollards shall be designed and positioned to protect equipment without obstructing refuelling access, tanker delivery, maintenance access, emergency egress or fire response access.

The facility shall also include provision for general operational safety items including tank labelling, product identification, no-smoking/no-ignition signage, emergency contact signage, first response spill equipment, suitable waste disposal for contaminated absorbents and clear delineation of the refuelling area.

FUEL FACILITY – SIGNAGE REQUIREMENTS

All signage shall be in accordance with AS 1319:1994 (Safety signs for the occupational environment) and AS 1940:2017.

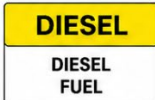
1. HAZARDOUS AREA SIGNAGE		2. GENERAL SAFETY SIGNAGE			
ZONE 1 SIGN  SIZE: 300mm (W) x 225mm (H) minimum MATERIAL: Metal or rigid durable material COLOUR: Red, black and white LOCATION: At all entrances to Zone 1 areas and clearly visible.	ZONE 2 SIGN  SIZE: 300mm (W) x 225mm (H) minimum MATERIAL: Metal or rigid durable material COLOUR: Red, black and white LOCATION: At all entrances to Zone 2 areas and clearly visible.	 SIZE: 300mm (W) x 225mm (H) MATERIAL: Metal COLOUR: Red, black and white LOCATION: At fill point, dispensers and tank areas.	 SIZE: 300mm (W) x 225mm (H) MATERIAL: Metal COLOUR: Red, black and white LOCATION: At fill point, dispensers and tank areas.	 SIZE: 300mm (W) x 225mm (H) MATERIAL: Metal COLOUR: Blue, black and white LOCATION: At fill point and dispensers.	 SIZE: 300mm (W) x 225mm (H) MATERIAL: Metal COLOUR: Blue, black and white LOCATION: At tanker bonding point.
3. TANKER BONDING SIGN		4. EMERGENCY STOP SIGN	5. FUEL TYPE IDENTIFICATION		
 SIZE: 400mm (W) x 250mm (H) minimum MATERIAL: Metal COLOUR: Blue and white LOCATION: Adjacent to tanker fill connection / bonding point.	 SIZE: 200mm (W) x 300mm (H) minimum MATERIAL: Metal COLOUR: Red and white LOCATION: Above or adjacent to E-Stop button (outside hazardous area where possible).	 SIZE: 300mm (W) x 150mm (H) minimum MATERIAL: Metal COLOUR: Green, black and white LOCATION: At ULP tank, dispenser and fill points.	 SIZE: 300mm (W) x 150mm (H) minimum MATERIAL: Metal COLOUR: Yellow, black and white LOCATION: At Diesel tank, dispenser and fill points.	 SIZE: 300mm (W) x 150mm (H) minimum MATERIAL: Metal COLOUR: Black and white LOCATION: At Bitumen tank and fill points.	
NOTES: - All signs shall be securely fixed, clearly visible and maintained in a legible condition. - Signs shall be constructed from durable materials suitable for outdoor environments. - Additional signage may be required to address site specific hazards and operational requirements. - No ignition sources permitted within hazardous areas unless certified for the applicable zone.					

Figure 1 - Signage Requirements

Existing Fuel Storage Facilities

The existing fuel storage infrastructure comprises:

- One 4,500 L self-bunded ULP storage tank and dispensing system.
- Existing diesel fuel storage facilities servicing Council plant and vehicles.
- One bitumen emulsion storage tank with associated heating and circulation equipment.
- Existing fuel dispensing equipment and associated electrical services.
- Existing hazardous chemical registrations and fuel storage notifications.

The existing ULP tank is fitted with a dispensing pump, flow meter and electrical connections and remains suitable for relocation and integration into the upgraded fuel management system.

Existing Services

Electrical

Electrical infrastructure currently exists at both the ULP tank and bitumen emulsion tank locations. Existing services include power supplies to fuel dispensing equipment, tank monitoring systems and bitumen tank heating equipment. Documentation indicates electrical connections are present at the ULP tank and dedicated power supplies are provided at the bitumen emulsion tank installation.

The proposed fuel facility will require relocation and extension of electrical services to support the new diesel tank, SmartFill fuel management system, fuel dispensing equipment, tank monitoring systems and relocated ULP tank.

Stormwater

The depot contains existing hardstand and drainage infrastructure associated with workshop and operational areas. Existing stormwater drainage systems will require consideration during detailed design to ensure fuel handling activities are separated from stormwater networks and that any potential spills can be appropriately contained and managed.

Detailed stormwater infrastructure investigations were outside the scope of this assessment and should be confirmed during detailed civil design.

Water

Potable and operational water services are available within the depot to support existing workshop and operational functions. Water services may be utilised for emergency response provisions, equipment cleaning and future fire protection requirements, subject to confirmation during detailed design.

Existing water infrastructure was not assessed in detail as part of this project and will require verification prior to construction.

Communications

The depot has access to communications infrastructure required to support operational activities. The proposed SmartFill Fuel Management System can communicate via 3G/4G, Wi-Fi or Ethernet connections and will require integration with available communications services to enable real-time fuel monitoring, transaction recording and reporting.

Site Constraints

Access Limitations

The existing fuel storage facilities are located within active operational areas of the depot, requiring fuel delivery vehicles, light vehicles, heavy vehicles and mobile plant to share common traffic routes. This arrangement creates potential congestion around the workshop area and increases interaction between refuelling activities and normal depot operations.

The design of the upgraded facility must maintain uninterrupted access to workshops, parking areas and operational zones during both construction and ongoing operation. Adequate turning areas and manoeuvring space must also be provided for fuel delivery tankers, service vehicles and Council plant.

Existing Infrastructure

Several existing assets and services influence the proposed layout, including:

- Existing workshop buildings and operational facilities.
- Existing ULP storage tank and dispensing equipment.
- Existing bitumen emulsion tank, associated heating systems and pumping infrastructure.
- Existing electrical services supplying the ULP tank and bitumen tank.
- Existing hardstand areas and vehicle circulation routes.
- Existing underground and above-ground services that may require relocation or protection during construction.

The relocation of the ULP tank and bitumen emulsion tank requires careful consideration of existing service connections to minimise disruption to depot operations and reduce modification costs.

Separation Distance Constraints

The design is required to comply with the separation distance requirements of AS 1940:2017 for the storage and handling of flammable and combustible liquids. Separation distances must be maintained between:

- Diesel and ULP storage tanks.
- Tank fill points and dispensing locations.
- Buildings and occupied structures.
- Property boundaries.
- Ignition sources and electrical equipment.
- Vehicle traffic areas and fuel storage infrastructure.

The proposed layout has been developed to position the new 55,000 L diesel tank and relocated ULP tank on a dedicated fuel pad while maintaining the required clearances and operational access. The location of fill points at opposite ends of the tanks and separation of dispensing activities from workshop operations were key considerations during the layout development.

Compliance with the final separation distances will be confirmed during detailed design and documented as part of the AS 1940 compliance assessment.

Proposed Facility Layout

General Arrangement

The proposed fuel facility has been developed to create a dedicated fuel storage and refuelling precinct on the eastern side of the Coonamble Shire Council Depot. The layout consolidates diesel and petrol storage within a single operational area while maintaining safe separation distances, efficient vehicle access and compliance with AS 1940:2017.

The facility comprises a new 55,000 L self-bunded diesel tank, the relocated 4,500 L ULP tank, SmartFill fuel management equipment, dispensing infrastructure and associated electrical services. The arrangement allows light vehicles, heavy vehicles and mobile plant to access the facility without conflicting with workshop operations or general depot traffic movements.

Diesel Tank Installation

55,000 L Self-Bunded Tank

The primary fuel storage facility will consist of a Grande 55 self-bunded diesel storage tank with a safe fill capacity of approximately 57,850 L. The tank is designed and certified in accordance with AS 1692, AS 1940, UL142 and ULC-S601 requirements.

Tank Specifications

Key tank features include:

- Safe fill capacity of approximately 57,850 L.
- Double-wall self-bunded construction.
- 6 mm primary and secondary tank walls.
- Hydraulic overfill prevention valve.
- Independent high-level alarm system.
- Dual suction lines fitted with anti-syphon valves.
- Integrated SmartDip automatic tank gauging.
- High-volume and low-volume dispensing systems.
- Full compliance certification and manufacturer documentation.

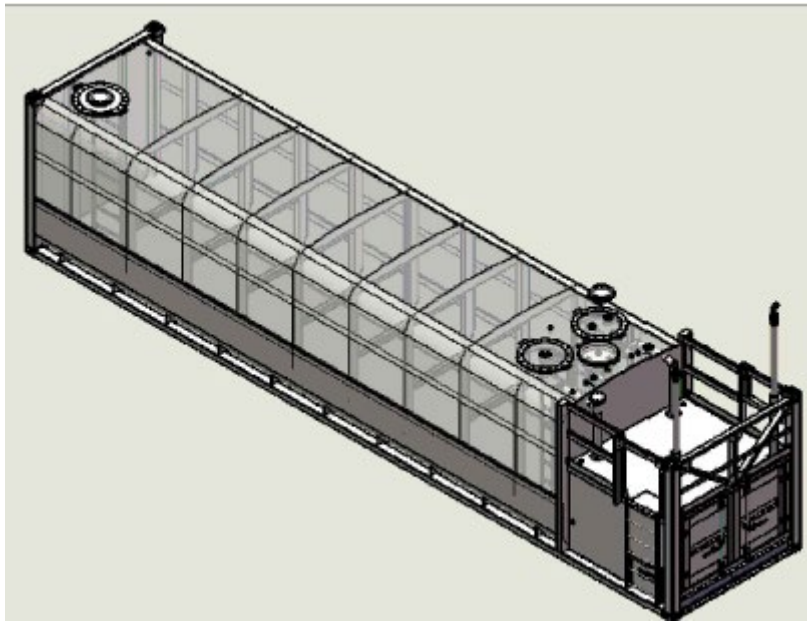


Figure 3 - Proposed Diesel Tank

Location Justification

The diesel tank has been positioned on the eastern side of the depot to:

- Provide a dedicated refuelling area separate from workshop activities.
- Improve access for fuel delivery tankers.
- Reduce vehicle congestion within the depot.
- Allow safe circulation of heavy vehicles and mobile plant.
- Facilitate compliance with AS 1940 separation distance requirements.
- Provide sufficient space for future maintenance and operational activities.
- Enable integration with the relocated ULP tank and SmartFill system.

ULP Tank Relocation

The existing 4,500 L self-bunded ULP tank will be relocated adjacent to the proposed diesel tank to create a consolidated fuel storage area. The tank will be positioned on a dedicated concrete pad while maintaining the separation distances required by AS 1940.



Figure 4 - Existing ULP Tank

Relocation works will include:

- Physical relocation of the tank to the new fuel precinct.
- Reconnection of electrical services.
- Integration with the SmartFill Fuel Management System.
- Installation of a pulse flow meter.
- Testing and recommissioning of the dispensing system.
- Verification of compliance with hazardous area requirements.

The relocated tank will allow petrol and diesel dispensing operations to occur from a common fuel facility while maintaining operational flexibility and safe access.

Bitumen Emulsion Tank Relocation

The existing bitumen emulsion tank will be relocated to accommodate the proposed fuel facility layout and improve overall site functionality.

The relocation will include:

- Relocation of the tank structure and support system.
- Reconnection of electrical power supplies.
- Reconnection of heating and circulation systems.
- Provision of suitable maintenance access.
- Retention of operational functionality following relocation.

The final location has been selected to minimise interference with fuel operations while maintaining accessibility for bitumen delivery and maintenance activities.



Figure 5 - Existing Bitumen Tank

Fuel Dispensing Arrangement

Hose Locations

The proposed layout incorporates dedicated diesel dispensing points located on the side of the fuel facility. Two independent dispensing systems are provided:

- High-flow diesel dispensing for heavy vehicles and plant.
- Lower-flow diesel dispensing for light vehicles and smaller equipment.

Dispensing hoses are mounted on high-mast hose supports to maximise reach and minimise hose wear and trip hazards.

Fill Points

The diesel and ULP fill points are located at opposite ends of the fuel facility to improve operational safety and facilitate tanker access during fuel deliveries. This arrangement reduces the potential for interaction between fuel deliveries and vehicle refuelling activities.

The diesel tank incorporates:

- AS 1940 compliant fill connection.
- Hydraulic overfill protection.
- High-level alarm.
- Tank gauging system.
- Vehicle Interface
- The facility has been designed to accommodate:
 - Light vehicles.
 - Heavy rigid vehicles.

Vehicle approach paths allow refuelling without reversing movements wherever practicable. Adequate clearance is provided around dispensing points to allow safe refuelling operations while maintaining access for other depot activities.

The SmartFill Fuel Management System will control fuel access through FOB identification, transaction recording and automated fuel reconciliation, providing improved accountability and operational control across the Council fleet.

Traffic and Operational Assessment

Existing Traffic Movements

The existing fuel storage facilities are located adjacent to the workshop area and are accessed via shared depot traffic routes. Light vehicles, heavy vehicles, mobile plant and fuel delivery vehicles currently operate within the same general area, resulting in interactions between refuelling activities, workshop operations and general depot movements.

The existing arrangement requires vehicles to enter operational areas surrounding the workshop to access fuel, creating potential congestion during peak operational periods and increasing the likelihood of vehicle conflicts within the depot.

Proposed Traffic Flow

The proposed fuel facility has been positioned on the eastern side of the depot to establish a dedicated refuelling precinct separate from workshop activities and general depot operations.

The proposed arrangement provides:

- Defined entry and exit movements for refuelling activities.
- Improved circulation around the fuel storage area.
- Reduced interaction between refuelling operations and workshop traffic.
- Improved access for fuel delivery tankers.
- Reduced congestion within central depot areas.
- Improved manoeuvring space for heavy vehicles and plant.

The layout has been developed to facilitate efficient vehicle movements while maintaining compliance with safety and separation distance requirements.

Heavy Vehicle Access

The fuel facility is required to accommodate a range of heavy vehicles including:

- Water trucks.
- Tippers.
- Prime movers.

- Road maintenance equipment.
- Loaders and other mobile plant.

Heavy vehicle access has been considered in the positioning of the diesel tank, hose dispensing locations and tanker fill points. The arrangement allows vehicles to approach the dispensing area directly and depart without complex manoeuvring requirements.

Adequate clearance is provided around the dispensing area to allow safe operation of large vehicles while maintaining access for other depot users. Fuel delivery tankers are also able to access the fill points without entering congested operational areas.

Light Vehicle Access

Light vehicles will utilise the same fuel precinct while operating within a clearly defined refuelling area. The lower-flow dispensing system allows safe and efficient refuelling of utilities, passenger vehicles and light commercial vehicles.

The proposed arrangement reduces the need for light vehicles to enter workshop operating zones and provides improved access to both diesel and ULP dispensing facilities. Vehicle circulation has been designed to minimise reversing movements and improve visibility during refuelling activities.

Vehicle Segregation Measures

The upgraded layout incorporates several measures to improve separation between vehicle classes and operational activities, including:

- Relocation of fuel storage away from workshop operations.
- Dedicated refuelling area for fuel-related activities.
- Separation of fuel delivery operations from vehicle refuelling activities.
- High-mast hose dispensing systems to reduce vehicle positioning constraints.
- Protective bollards around fuel infrastructure.
- Clearly defined traffic circulation routes.
- Improved visibility around the fuel facility.

These measures reduce the likelihood of vehicle conflicts and improve the overall safety of depot operations.

Refuelling Operations

The proposed fuel facility has been designed to support efficient refuelling of the Council fleet while maintaining operational control and accountability.

Refuelling operations will be undertaken using the SmartFill Fuel Management System, which provides:

- Vehicle and operator identification using FOB access.

- Automated recording of fuel transactions.
- Fuel usage reporting and reconciliation.
- Real-time monitoring of fuel inventory levels.
- Controlled access to diesel and ULP dispensing systems.

Diesel dispensing hoses are positioned on the eastern side of the facility and supported by high-mast hose systems to maximise reach and improve usability for both light and heavy vehicles. Fill points for fuel deliveries are located separately from vehicle dispensing locations, allowing tanker deliveries and vehicle refuelling activities to occur safely and efficiently.

The proposed arrangement provides a safer, more efficient and more controlled refuelling environment compared with the existing depot configuration.

Civil Design

Fuel Pad Design

The proposed refuelling facility comprises a shared reinforced concrete fuel pad supporting a 55,000 L self-bunded diesel tank and the relocated ULP tank. The fuel pad has been designed to provide safe vehicle access, accommodate refuelling operations and support the imposed tank and traffic loads. The layout incorporates separation distances, hose locations and traffic management requirements in accordance with AS1940:2017.

Drainage Design

Drainage has been incorporated into the fuel facility design to comply with AS1940:2017 requirements for spill containment and environmental protection. Surface runoff from the refuelling area is directed away from surrounding areas and towards designated spill containment collection points.

Spill Collection System

A spill collection system has been incorporated into the fuel pad design through the provision of a sloped concrete surface draining to a spill collection grate. The system is intended to capture minor fuel spills and prevent contamination of surrounding ground surfaces.

Surface Grades and Falls

The refuelling pad has been designed with appropriate surface falls to facilitate drainage towards the spill collection grate and prevent ponding. Grading has been configured to maintain operational safety while ensuring effective spill management.

Bollard Protection Design

Heavy-duty protective bollards are provided around critical infrastructure, including fuel dispensing equipment and vulnerable tank locations, to protect against accidental vehicle impact during refuelling operations.

Pavement Requirements

A trafficable reinforced concrete pavement is provided within the refuelling area to accommodate light vehicles, heavy vehicles and plant equipment accessing the fuel facility. Pavement design has been undertaken to suit anticipated depot traffic loading conditions.

Water Supply Provision

The dispensing station design incorporates a dedicated potable water supply to facilitate safe and efficient operation. A potable water supply line and manually operated isolation tap shall be provided adjacent to the dispensing area.

The buried water supply shall comprise PE100 high-density polyethylene (HDPE) pressure pipe manufactured in accordance with AS/NZS 4130, suitable for potable water service. Pipe joints shall be fusion welded or utilise approved mechanical fittings suitable for the operating pressure and service conditions.

The water supply pipeline shall be installed underground in accordance with AS/NZS 3500.1 – Plumbing and Drainage – Water Services. The pipeline shall be installed with a minimum cover of 750 mm below finished ground level or incorporate additional mechanical protection, such as a steel sleeve or concrete encasement, where required.

The pipeline shall be installed on suitable bedding material with appropriate backfill and a blue detectable warning tape installed above the pipeline in accordance with AS/NZS 3500.1 and site requirements.

Water Supply Tap Location Assessment

An assessment was undertaken to determine the suitability of locating the water supply isolation tap within the space between the two storage tanks. Positioning the tap in this location provides convenient access to the dispensing area while reducing exposed pipework and improving protection against accidental impact from mobile plant and equipment.

The proposed location is considered suitable provided that:

- Adequate clearance is maintained for safe operator access and routine maintenance.
- The tap can be safely operated without requiring awkward postures or entry into confined or restricted spaces.
- The installation does not interfere with inspection, maintenance or operation of either storage tank or associated pipework.
- The pipework and valve are adequately protected from mechanical damage.
- Emergency isolation of the water supply can be achieved quickly and without obstruction.

Subject to these requirements being incorporated into the final design, the proposed location of the water supply tap between the two tanks is considered acceptable from an operational, maintenance and safety perspective.

Structural Design

Design Criteria

Structural design has been undertaken in accordance with relevant Australian Standards and industry best practice. Design considerations include tank dead loads, fuel loads, vehicle loading, operational loading and site environmental conditions. The facility has been designed to support a 55 kL diesel tank, a relocated ULP tank and associated refuelling infrastructure

Foundation Design

Concrete foundations have been designed for the diesel tank, ULP tank and associated refuelling infrastructure. Foundation sizing and reinforcement have been developed to distribute loads to the supporting ground while maintaining allowable bearing pressures and serviceability requirements.

Tank Support System

The diesel and ULP tanks are supported on reinforced concrete footings designed to accommodate full operational loads. The self-bunded tank configuration provides integrated secondary containment, reducing the need for external bund walls while maintaining compliance with AS1940 requirements.

Structural Calculations Summary

Structural calculations considered:

- Tank operating and full fuel loads.
 - Vehicle loading on refuelling pavements.
 - Concrete slab bending and shear capacity.
 - Foundation bearing pressures.
 - Reinforcement requirements.
 - Serviceability performance under operational conditions.
- These calculations confirm the adequacy of the proposed concrete footings and hardstand areas for their intended use.

Design Certification

Structural design certification has been prepared by a suitably qualified structural engineer. The certification confirms that the proposed tank footings, hardstand pavements and bitumen emulsion storage area have been designed for the intended operational requirements.

Electrical Design

Existing Electrical Infrastructure

The depot currently contains electrical services capable of supporting site operations. Existing infrastructure will be assessed during installation to determine the most suitable connection point for the proposed fuel management system and associated equipment. Based on available information, mains power is available within the depot.

Power Supply Requirements

The fuel facility shall be supplied from the existing depot electrical infrastructure and include all electrical works necessary to provide a fully operational fuel storage, dispensing, monitoring and management system.

The electrical installation shall comprise:

- Connection of the new diesel fuel facility and relocated ULP facility to the existing depot low-voltage electrical network.
- A dedicated fuel facility distribution board located outside classified hazardous areas.
- Power supply to all diesel dispensing pumps, ULP dispensing pumps, SmartFill fuel management equipment, SmartDip tank gauging equipment, overfill alarms, high-level alarms and ancillary instrumentation.
- Communications infrastructure for SmartFill operation including Ethernet, WiFi or 4G connectivity as required by the selected SmartFill configuration.
- Power supply to all external lighting associated with the fuel storage and dispensing area.
- Emergency stop circuitry arranged to immediately isolate all fuel dispensing pumps and associated dispensing controls.

The electrical installation shall provide for:

- One SmartFill Fuel Management System controlling both diesel and ULP dispensing operations.
- SmartDip electronic tank gauging for the diesel storage tank and relocated ULP tank.
- High-level alarm monitoring from both tanks.
- Pulse meter integration from all dispensing pumps to SmartFill.
- Remote monitoring and reporting through the SmartFill online portal.

Electrical equipment associated with the relocated ULP tank shall:

- Be suitable for installation within or adjacent to classified hazardous areas.
- Utilise certified hazardous area equipment where located within classified zones.
- Include intrinsically safe barriers where required for instrumentation and tank gauging systems.

- Comply with the Hazardous Area Classification Drawing and hazardous area assessment prepared for the facility.

Electrical cabling shall:

- Be installed underground in heavy-duty conduit between the depot electrical supply, fuel facility distribution board, dispensers, SmartFill equipment and monitoring systems.
- Be routed outside hazardous areas wherever practicable.
- Utilise hazardous area certified cable glands, conduit systems and terminations where installation within classified areas is unavoidable.

The contractor shall verify the available capacity of the existing depot electrical supply and provide all upgrades necessary to support the fuel facility electrical loads.

The completed installation shall be tested, commissioned and certified in accordance with AS/NZS 3000, AS 1940, AS/NZS 60079 and the approved hazardous area documentation prior to practical completion.

Lighting Requirements

Lighting shall be provided to ensure the refuelling facility can be operated safely during periods of darkness and low ambient light. The lighting system shall provide adequate illumination for vehicle refuelling, tanker unloading, routine inspection, maintenance activities and emergency response.

The lighting system shall comprise four tank-mounted LED floodlights installed along the roadway-facing side of the diesel tank. The luminaires shall be mounted at approximately 2,591 mm above finished pavement level and equally distributed along the length of the tank to provide uniform illumination across the refuelling area.

The proposed lighting arrangement is summarised below.

Table 1 - Lighting Design

DESIGN PARAMETER	REQUIREMENT
LIGHTING ARRANGEMENT	Tank-mounted LED floodlights
NUMBER OF LUMINAIRES	4
MOUNTING HEIGHT	Approximately 2,591 mm above finished pavement level
MOUNTING LOCATION	Equally distributed along the roadway-facing side of the diesel tank
LUMINAIRE TYPE	Commercial LED floodlight with asymmetric optic
NOMINAL POWER	150 W per luminaire
MINIMUM LUMINOUS OUTPUT	21,000 lumens per luminaire
TOTAL INSTALLED LUMINOUS OUTPUT	84,000 lumens
COLOUR TEMPERATURE	4000 K preferred
OPTICAL DISTRIBUTION	Wide asymmetric
MINIMUM INGRESS PROTECTION	IP66
MINIMUM IMPACT RATING	IK08
MAINTENANCE FACTOR	0.80
GENERAL REFUELLING AREA	Minimum maintained average horizontal illuminance of 50 lux
DISPENSING, FILL AND TANKER UNLOADING POINTS	Minimum maintained illuminance of 100 lux
GENERAL UNIFORMITY TARGET	Minimum $E_{min}/E_{avg} = 0.25$
PRELIMINARY AIMING ANGLE	Approximately 20°–30° below horizontal
FINAL VERIFICATION	Photometric assessment using manufacturer-supplied IES or LDT files

A suitable light is the Integrated Power CF Series 150 W LED Floodlight (Model CF2150BL4KN01), or an approved equivalent meeting the above performance requirements. The luminaire provides a nominal luminous output of 21,000 lumens, an IP66 environmental rating, IK08 impact resistance and is supported by manufacturer-supplied photometric (IES) data suitable for lighting calculations.

A preliminary lumen assessment has been undertaken based on:

- Four 150 W LED floodlights.
- Total installed luminous output of 84,000 lumens.
- Maintenance factor of 0.80.
- Refuelling pavement approximately 12.8 m × 5.0 m.

The assessment indicates that only approximately 4.8% of the maintained luminous output is required to achieve an average horizontal illuminance of 50 lux, and approximately 9.5% is required to achieve 100 lux across the illuminated area. Accordingly, the proposed lighting arrangement provides sufficient installed lighting capacity to satisfy the design illumination requirements, subject to final photometric verification.

The final lighting design shall be confirmed by a photometric assessment using the selected luminaire manufacturer's IES or LDT files. The assessment shall verify:

- Minimum maintained average horizontal illuminance of 50 lux across the refuelling area.
- Minimum maintained illuminance of 100 lux at dispensing points, tank fill points and tanker unloading locations.
- Acceptable lighting uniformity with no significant dark zones.
- Adequate illumination of vehicle and pedestrian access routes.
- Minimal glare to vehicle operators and site personnel.
- Minimal shadowing from the tank, dispensing equipment and vehicles.

The final luminaire mounting locations, orientation and aiming angles shall be detailed on the construction drawings. Electrical installation shall comply with the applicable Australian Standards and the hazardous area classification applicable to the refuelling facility.

Fuel Management System Integration

The proposed fuel facility incorporates the SmartFill fuel management system. Electrical and communications infrastructure will be provided to support fuel transaction monitoring, vehicle identification, reporting and inventory management functions.

Earthing and Bonding

The fuel facility shall incorporate a permanent earthing and equipotential bonding system designed in accordance with AS 1940:2017, AS/NZS 3000 and all applicable electrical and hazardous area requirements.

The earthing and bonding installation shall comprise:

- Two copper-clad steel earth electrodes, minimum 14.2 mm diameter × 2.4 m length, installed not less than 3 m apart and interconnected.
- A minimum 35 mm² bare copper earth conductor forming the primary fuel facility earth grid.
- A minimum 16 mm² stranded copper earthing conductor connecting the fuel facility earth grid to the site main earth system.
- A minimum 6 mm² green/yellow insulated copper bonding conductor between all metallic fuel system components.
- A copper earth bar installed adjacent to the fuel management equipment for termination of all earthing and bonding conductors.

The following equipment shall be permanently bonded to the earthing system:

- Diesel storage tank.
- ULP storage tank.
- Fill points.
- Tank vents.
- Dispensing pumps.
- SmartFill fuel management equipment.
- Metallic fuel pipework.
- Hose reels
- Fuel dispensers.
- Structural steel supports.
- Access platforms and stairs.
- Protective bollards located within the hazardous area.
- Any other conductive item located within 3 m of dispensing or fuel transfer operations.

A dedicated tanker bonding station shall be installed adjacent to the tanker fill connection and shall include:

- Stainless steel bonding lug.
- Spring-loaded bonding clamp.
- Flexible bonding lead.
- Signage instructing connection prior to fuel transfer.

The earthing system shall achieve:

- Maximum earth grid resistance of 10 Ω under dry conditions.
- Maximum resistance of 1 Ω between any bonded item and the main earth bar.
- Continuous electrical continuity across all bonded metallic components.

All exposed earthing and bonding conductors shall be mechanically protected by heavy-duty conduit, cable tray or equivalent protection where subject to vehicle impact or maintenance activities.

Within hazardous areas associated with the ULP installation:

- All electrical equipment shall be certified for the applicable hazardous area classification.
- Earthing conductors shall be routed to avoid mechanical damage and ignition risk.
- Static dissipative hoses shall be provided for all fuel transfer operations.
- Dispensing nozzles shall be electrically continuous with the bonded dispensing system.

Testing and commissioning shall include:

- Earth resistance testing.
- Bond continuity testing.
- Verification of electrical continuity through dispensing hoses and nozzles.
- Verification of tanker bonding station operation.
- Inspection of all earth terminations.
- Provision of certified test reports and as-constructed drawings.

The earthing and bonding system shall be installed by a licensed electrical contractor and certified as compliant with AS 1940, AS/NZS 3000 and the hazardous area requirements applicable to the facility.

Hazardous Area Electrical Requirements

Electrical equipment associated with the fuel storage and dispensing facility shall be designed, selected and installed in accordance with AS 1940:2017, AS/NZS 60079 series, AS/NZS 3000 and applicable SafeWork NSW requirements.

The hazardous area classification for the facility has been established by the Hazardous Area Assessment and associated hazardous area drawings. All electrical equipment installed within classified hazardous areas shall be certified and suitable for the applicable zone classification identified on the approved hazardous area drawings.

As a minimum:

- Equipment located within Zone 1 areas shall be certified for Zone 1 service.
- Equipment located within Zone 2 areas shall be certified for Zone 2 service or higher.
- All dispensers, pumps, level instrumentation, switches, junction boxes, cabling systems, fuel management equipment and associated electrical components located within hazardous areas shall be appropriately certified for the applicable zone.
- Electrical equipment located outside classified hazardous areas shall be installed to AS/NZS 3000 requirements.
- Emergency stop stations shall be installed outside hazardous areas and arranged to isolate fuel dispensing equipment, transfer pumps and associated control systems.
- All metallic fuel system components shall be bonded to the facility earthing system.

- Hazardous area signage and equipment labelling shall be installed in accordance with AS 1319 and AS/NZS 60079.

Prior to commissioning, the hazardous area installation shall be inspected and verified by a competent hazardous area practitioner and a verification dossier shall be provided confirming compliance with the hazardous area classification and equipment certification requirements.

Safety and Risk Assessment

Hazard Identification

A hazard identification workshop was undertaken for the proposed fuel facility upgrade. The primary hazards identified are summarised in Table 7-1.

Table 2 - Hazard Identification

Hazard	Potential Consequence	Risk Controls
<i>Diesel tank overfill during delivery</i>	Fuel spill, environmental contamination	Overfill prevention valve, high-level alarm, trained operators
<i>Fuel hose failure during dispensing</i>	Fuel release, fire hazard	Scheduled inspection, breakaway couplings, emergency shutdown
<i>Tank leakage or structural failure</i>	Major fuel release	Self-bunded tank design, periodic inspection and maintenance
<i>Vehicle collision with tank</i>	Loss of containment, equipment damage	Concrete barriers and bollards, designated traffic routes
<i>Vehicle collision with dispensers</i>	Fuel release, injury	Bollard protection, separation from traffic paths
<i>Ignition of petrol vapours</i>	Fire or explosion	Flameproof equipment, hazardous area controls, emergency procedures
<i>Electrical fault at fuel facility</i>	Fire, equipment damage	AS/NZS 3000 compliant installation, RCD protection, routine testing
<i>Fuel spill entering stormwater system</i>	Environmental harm	Spill collection system, graded concrete pad, spill response equipment
<i>Unauthorised fuel access</i>	Fuel theft, operational loss	SmartFill access control system and FOB authentication
<i>Emergency vehicle access obstructed</i>	Delayed emergency response	Dedicated access routes and clear emergency zones

Following implementation of the proposed controls, all identified hazards are considered Low to Medium residual risk and acceptable for operation.

Fire Risk Assessment

The storage and dispensing of diesel and ULP present a potential fire risk due to the presence of combustible and flammable liquids. A fire risk assessment has been undertaken to identify ignition sources, potential fire scenarios and appropriate risk mitigation measures.

Fire Hazards

The primary fire hazards associated with the facility include:

- Ignition of petrol vapours during dispensing.
- Ignition of fuel released from damaged hoses or fittings.
- Vehicle fire occurring during refuelling.
- Static electricity discharge during fuel transfer.
- Electrical faults associated with pumps, controls or fuel management systems.
- Arson or unauthorised ignition sources.

Fire Risk Assessment

A fire risk assessment has been undertaken for the proposed self-bunded diesel and unleaded petroleum (ULP) fuel storage and dispensing facility. The assessment considered the principal fire hazards associated with fuel storage, vehicle refuelling, fuel delivery operations, electrical equipment and adjacent mobile plant.

The proposed installation incorporates engineered controls including self-bunded fuel storage tanks, hazardous area compliant electrical equipment, emergency shutdown facilities, spill containment, separation distances and portable firefighting equipment to minimise the likelihood and consequences of a fire event.

Table 3 - Fire Risk Assessment

Fire Scenario	Likelihood	Consequence	Initial Risk	Controls	Residual Risk
<i>ULP vapour ignition during dispensing</i>	Possible	Major	High	Hazardous area compliant equipment, emergency stop, operator controls	Medium
<i>Diesel spill fire</i>	Unlikely	Major	Medium	Self-bunded tank, spill containment, extinguishers	Low
<i>Fuel delivery incident</i>	Unlikely	Major	Medium	Controlled fill point, overfill protection, delivery procedures	Low
<i>Electrical fire</i>	Unlikely	Moderate	Medium	Certified electrical installation and testing	Low
<i>Vehicle fire adjacent to tank</i>	Rare	Major	Medium	Separation distances, emergency access, fire equipment	Low

Fire Protection Requirements

The following minimum fire protection measures shall be provided for the installation:

Table 4 - Fire Protection Requirements

ITEM	REQUIREMENT
PORTABLE FIRE EXTINGUISHERS	Minimum 2 × 9 kg ABE dry chemical extinguishers, located adjacent to the dispensing area and readily accessible during refuelling operations
EMERGENCY SHUTDOWN	Emergency stop station located adjacent to the fuel dispensers
HAZARD COMMUNICATION	Hazardous chemical placarding in accordance with the applicable Australian Standards and WHS legislation
WARNING SIGNAGE	"No Smoking" and "No Ignition Sources" signage
SPILL RESPONSE	Spill kit located adjacent to the dispensing area
EMERGENCY ACCESS	Unrestricted access for emergency response vehicles
EMERGENCY PROCEDURES	Site emergency response procedures and operator training

Fire Hose Reel Assessment

The requirement for a fire hose reel has been reviewed against the proposed installation and the applicable Australian Standards.

The proposed facility is a relatively small self-bunded fuel installation where the primary fire hazards are associated with Class B flammable liquid fires involving diesel and unleaded petroleum fuel.

Portable ABE dry chemical fire extinguishers provide the appropriate first-attack firefighting equipment for these hazards. Fire hose reels discharge water and are primarily intended for Class A combustible material fires. The application of water to burning flammable liquids may spread burning fuel and increase the extent of the fire.

AS 1940 requires appropriate fire protection to be provided for flammable liquid installations but does not specifically mandate the installation of fire hose reels for facilities of this type. The selection of firefighting equipment should be based on the installation risk assessment together with any additional requirements imposed by the relevant approval authority, building certifier, insurer or Fire and Rescue NSW.

Based on the proposed installation, the assessed fire hazards and the engineered controls incorporated into the design, the provision of:

- two 9 kg ABE dry chemical fire extinguishers.

- emergency shutdown facilities.
- spill containment.
- hazardous area compliant equipment.
- emergency signage.
- emergency response procedures.

is considered appropriate for the proposed installation.

Accordingly, a dedicated fire hose reel has not been included as part of the base design.

Should additional fire protection measures be required by the approval authority, building certifier, insurer or the facility owner during the detailed design or approval process, the provision of a fire hose reel system shall be reviewed and incorporated as required.

Residual Risk

Based on the proposed engineering design, fire protection measures and operational controls, the residual fire risk associated with the proposed fuel storage and dispensing facility is assessed as **Low** and As Low As Reasonably Practicable (ALARP).

This level of risk is considered acceptable for the proposed installation, subject to ongoing inspection, maintenance and operation in accordance with the manufacturer's requirements, applicable Australian Standards and the site's operational procedures.

Spill Risk Assessment

Potential spill events may occur during fuel deliveries, vehicle refuelling, equipment maintenance or component failure. Uncontrolled fuel releases may result in environmental contamination, fire hazards and operational disruption.

Credible Spill Scenarios

The following spill scenarios were assessed:

Table 5 - Spill Scenarios

Spill Event	Estimated Volume	Likelihood	Consequence
<i>Diesel nozzle left running</i>	<100 L	Possible	Minor
<i>Hose rupture during dispensing</i>	100–500 L	Unlikely	Moderate
<i>Tanker overfill event</i>	Up to several thousand litres	Rare	Major
<i>ULP tank leak</i>	Variable	Rare	Major
<i>Tank structural failure</i>	Full tank inventory	Very Rare	Severe

Spill Mitigation Measures

The proposed design incorporates:

- Self-bunded diesel storage tank.
- Overfill prevention valve.
- Independent high-level alarm.
- Concrete refuelling pad.
- Graded surface directing spills to collection point.
- Separation from stormwater drainage.
- Spill response equipment.
- Fuel management controls.
- Operator training and delivery procedures.

Spill Consequence Assessment

The greatest environmental risk is contamination of soil and stormwater from an uncontrolled fuel release. The proposed self-bunded diesel tank provides containment capacity exceeding 110% of the primary tank volume and significantly reduces the likelihood of environmental release. The dedicated concrete fuel pad and spill collection system provide secondary containment for dispensing activities.

Following implementation of the proposed controls, the residual environmental risk associated with fuel spills is assessed as **Low**.

Spill Risk Conclusion

The proposed fuel facility incorporates multiple layers of engineering protection, including bunding, overfill prevention, spill collection and operational controls. The likelihood of a significant environmental release is considered low and the facility is considered suitable for operation subject to implementation of the recommended controls and maintenance requirements.

Emergency Response Considerations

The facility layout has been developed to support safe emergency response in the event of a fuel spill, fire or equipment failure.

Emergency response considerations include:

- Unobstructed access for emergency vehicles.
- Clearly identifiable emergency shutdown systems.
- Suitable separation between fuel storage and surrounding infrastructure.
- Provision of emergency contact information and site signage.
- Availability of fire extinguishers and spill response equipment.
- Safe evacuation routes for depot personnel.

- Isolation of fuel dispensing systems during emergency events.

Emergency response procedures should be incorporated into Council's existing safety management system and communicated to all depot personnel.

Operational Safety Controls

A combination of engineering and administrative controls will be implemented to ensure the ongoing safe operation of the facility.

Operational safety controls include:

- SmartFill fuel management system with controlled user access.
- Vehicle identification and transaction recording.
- Scheduled inspection and maintenance of tanks, hoses and dispensing equipment.
- Routine testing of alarms and emergency shutdown systems.
- Operator training and competency requirements.
- Spill response training and equipment availability.
- Traffic management measures within the fuel precinct.
- Protective bollards around tanks and dispensing equipment.
- Compliance monitoring and periodic safety audits.

Implementation of these controls will ensure the fuel facility operates safely, efficiently and in accordance with applicable legislative and operational requirements.

Compliance Assessment

AS1940 Compliance Matrix

The proposed fuel facility has been assessed against the applicable requirements of AS 1940:2017 – *The Storage and Handling of Flammable and Combustible Liquids*. Table 8-1 provides a summary of compliance for the proposed installation.

Table 6 - Compliance Matrix

Requirement	AS 1940 Requirement	Proposed Design	Compliance
<i>Tank construction</i>	Approved tank design for combustible liquids	Self-bunded Grande 55 tank certified to AS1692 and AS1940 requirements	Complies
<i>Secondary containment</i>	Bundling or approved self-bunded tank	Self-bunded diesel tank	Complies
<i>Overfill protection</i>	Overfill prevention required	Hydraulic overfill prevention valve and high-level alarm	Complies
<i>Tank venting</i>	Venting in accordance with AS1940	Manufacturer supplied compliant venting system	Complies
<i>Spill containment</i>	Spill containment required at fuel handling areas	Concrete fuel pad with spill collection system	Complies
<i>Emergency isolation</i>	Emergency shutdown required	Emergency stop integrated with dispensing system	Complies
<i>Hazardous area equipment</i>	Suitable electrical equipment required	Flameproof/intrinsically safe equipment at ULP installation	Complies
<i>Vehicle protection</i>	Protection from vehicle impact	Bollards and traffic management measures	Complies
<i>Fire protection</i>	Fire equipment provided in accordance with risk assessment	Fire extinguishers and emergency controls proposed	Complies
<i>Signage and placarding</i>	Hazardous chemical signage required	Signage and placarding to be installed	Complies

Based on the available design information, the proposed facility satisfies the key requirements of AS 1940:2017. Detailed compliance verification should be completed following finalisation of structural, electrical and civil design documentation.

Separation Distance Assessment

A review of the proposed layout indicates that the fuel storage and dispensing infrastructure can be arranged to satisfy the separation distance requirements of AS 1940.

Key compliance measures include:

- Relocation of the fuel storage area away from workshop activities.
- Dedicated fuel storage precinct separated from occupied buildings.
- Separation between diesel and ULP storage systems.
- Separation between tank fill points and dispensing locations.
- Controlled vehicle access around fuel infrastructure.
- Location of fill points at opposite ends of the fuel storage area to minimise operational conflicts.

The proposed eastern-side depot location provides sufficient area to achieve the required clearances while maintaining operational access and emergency response capability.

Final separation distance measurements should be verified against surveyed site information and detailed design drawings before construction.

Assessment Outcome

Compliant.

Bunding Assessment

The proposed diesel storage system utilises a self-bunded tank which provides integrated secondary containment and eliminates the requirement for a separate external bund structure.

The selected Grande 55 diesel tank incorporates:

- Double-wall construction.
- Fully enclosed secondary containment.
- Overfill protection.
- High-level alarm system.
- Certified design for fuel storage applications.

The existing ULP tank is also a self-bunded installation and will retain its secondary containment capability following relocation.

The self-bunded arrangements provide containment of leaks, spills and tank failures within the tank structure and satisfy the intent of AS 1940 secondary containment requirements.

Assessment Outcome

Compliant.

Spill Containment Assessment

Fuel handling activities present the highest likelihood of spills during normal operation. The proposed design incorporates multiple layers of spill protection including:

- Self-bunded fuel storage tanks.
- Overfill prevention systems.
- High-level alarms.
- Dedicated concrete refuelling pad.
- Surface grading toward spill collection points.
- Isolation from stormwater systems.
- Spill response equipment and procedures.

Potential spill sources include:

- Fuel deliveries.
- Vehicle refuelling.
- Hose failures.
- Equipment maintenance activities.

The proposed concrete fuel pad and drainage arrangement will contain and direct spills toward a controlled collection point, preventing migration to surrounding operational areas and stormwater infrastructure.

Assessment Outcome

Compliant, subject to implementation of the proposed drainage and spill collection design.

Environmental Compliance

The design incorporates environmental controls intended to minimise the risk of soil, groundwater and stormwater contamination associated with fuel storage and handling activities.

Environmental protection measures include:

- Self-bunded fuel storage.
- Spill containment systems.
- Controlled drainage.
- Overfill prevention.
- High-level alarms.

- Fuel inventory monitoring through SmartFill and SmartDip systems.
- Emergency response procedures.
- Routine inspection and maintenance requirements.

The relocation of fuel infrastructure into a dedicated fuel precinct also reduces the potential for interactions with other depot operations and improves overall environmental management.

No significant environmental impacts are anticipated provided the facility is constructed, operated and maintained in accordance with the recommendations contained within this report.

Assessment Outcome

Compliant with the environmental management objectives of AS 1940 and applicable hazardous chemical storage requirements.

Compliance Conclusion

The proposed depot fuel facility upgrade has been assessed against the relevant requirements of AS 1940:2017, hazardous chemical storage obligations and recognised industry practice. The design incorporates compliant fuel storage systems, spill containment measures, fire protection provisions and environmental safeguards. Subject to detailed design verification and construction in accordance with the approved drawings, the facility is considered suitable to proceed to procurement and implementation.

Development Application Support

Project Description

Coonamble Shire Council proposes to upgrade the existing fuel storage and refuelling facilities at the Council Depot through the installation of a new 55,000 L self-bunded diesel storage tank, relocation of the existing 4,500 L ULP tank, relocation of the existing bitumen emulsion tank and integration of a SmartFill fuel management system.

The project includes construction of a dedicated fuel storage and dispensing precinct, incorporating fuel storage infrastructure, refuelling facilities, traffic management arrangements, spill containment systems, electrical services and associated safety controls.

The development is intended to improve fuel storage capacity, operational efficiency, safety and environmental performance while supporting the ongoing operation of Council's vehicle and plant fleet.

Regulatory Framework

The proposed development has been assessed against the relevant legislative and regulatory requirements applicable to fuel storage and handling facilities in New South Wales.

The project has been developed with consideration of:

- Environmental Planning and Assessment Act 1979 (NSW).
- Work Health and Safety Act 2011 (NSW).
- Work Health and Safety Regulation 2017 (NSW).
- SafeWork NSW requirements for hazardous chemicals.
- Dangerous Goods and hazardous chemical storage requirements.
- AS 1940:2017 – Storage and Handling of Flammable and Combustible Liquids.
- AS 2444 – Portable Fire Extinguishers and Fire Blankets.
- AS/NZS 3000 – Electrical Installations.
- Relevant Council planning controls and development requirements.

The facility has been designed to achieve compliance with applicable safety, environmental and operational standards associated with fuel storage and dispensing installations.

Environmental Considerations

The proposed development is located within an existing operational depot and does not alter the overall land use of the site.

Potential environmental impacts associated with the project include:

- Fuel spills during storage and handling.
- Stormwater contamination.
- Soil contamination from fuel releases.
- Construction-related disturbance.
- Noise associated with construction activities.

Environmental risks have been mitigated through the incorporation of:

- Self-bunded fuel storage systems.
- Overfill prevention devices.
- High-level tank alarms.
- Concrete refuelling hardstand.
- Spill collection and containment systems.
- Controlled site drainage.
- Fuel monitoring and inventory management systems.
- Operational spill response procedures.

The development is not expected to result in significant adverse environmental impacts and will improve environmental protection compared with the existing fuel storage arrangement.

Safety Considerations

The design incorporates a range of engineering and administrative controls to minimise risks associated with fuel storage and dispensing operations.

Key safety measures include:

- Self-bunded diesel and ULP storage systems.
- Compliance with AS 1940 separation distance requirements.
- Emergency shutdown systems.
- Hazardous area compliant electrical installations.
- Fuel access control through the SmartFill system.
- Protective bollards around fuel infrastructure.
- Fire extinguishers and emergency response equipment.
- Spill containment and environmental protection measures.

- Clearly defined vehicle circulation routes.
- Appropriate signage and hazardous chemical placarding.

The proposed development has been designed to achieve a low residual risk profile and provide a safer operational environment than the existing fuel storage arrangement.

Planning Assessment Summary

The proposed fuel facility upgrade represents an improvement to existing Council depot infrastructure and is consistent with the established use of the site for operational and maintenance activities.

The development:

- Supports the continued operation of Council's vehicle and plant fleet.
- Improves fuel storage capacity and fuel management capability.
- Enhances safety and environmental performance.
- Consolidates fuel storage activities within a dedicated fuel precinct.
- Reduces operational risks associated with existing infrastructure.
- Maintains compatibility with surrounding depot operations.
- Incorporates contemporary engineering and environmental controls.

Based on the assessments completed, the proposed development is considered appropriate for the site and is expected to provide operational, safety and environmental benefits to Coonamble Shire Council. Subject to detailed design verification and regulatory approval, the development is suitable to proceed to construction and implementation.

Construction Requirements

Construction Methodology Overview

The proposed fuel facility upgrade shall be constructed in a planned sequence to minimise disruption to depot operations and maintain safe access throughout the construction period.

The works are anticipated to include:

1. Site establishment and service identification.
2. Relocation of the bitumen emulsion tank and associated services.
3. Construction of the fuel pad, hardstand areas and drainage infrastructure.
4. Installation of underground conduits and electrical infrastructure.
5. Installation of the 55,000 L self-bunded diesel tank.
6. Relocation and reconnection of the existing ULP tank.
7. Installation of dispensing equipment, SmartFill fuel management system and tank monitoring systems.
8. Installation of bollards, signage and safety equipment.
9. Electrical testing and commissioning.
10. Fuel system commissioning and operator training.
11. Final inspections and handover.

Construction activities shall be undertaken in accordance with approved construction drawings, manufacturer requirements and applicable Australian Standards.

Staging Requirements

To maintain operational continuity, the works should be staged to ensure fuel supply remains available throughout construction wherever practicable.

Recommended staging includes:

Stage 1 – Site Preparation

- Establish construction area.
- Confirm service locations.
- Install temporary traffic controls.
- Complete earthworks and site preparation.

Stage 2 – Bitumen Tank Relocation

- Relocate bitumen emulsion tank.
- Reconnect electrical and operational services.
- Verify functionality.

Stage 3 – Civil Works

- Construct reinforced concrete fuel pad.
- Install drainage and spill collection infrastructure.
- Construct access pavements and hardstand areas.

Stage 4 – Tank Installation

- Deliver and install diesel tank.
- Relocate ULP tank.
- Complete mechanical installation works.

Stage 5 – Electrical and Fuel Management Installation

- Install power supply infrastructure.
- Install SmartFill and SmartDip systems.
- Connect dispensing equipment and controls.

Stage 6 – Commissioning and Handover

- Test all systems.
- Conduct operator training.
- Complete final inspections.
- Handover facility to Council.

Site Safety Requirements

Construction works shall be undertaken in accordance with the Work Health and Safety Act 2011 (NSW) and all applicable site safety procedures.

Key safety requirements include:

- Preparation and implementation of a Construction Environmental Management Plan (CEMP).
- Preparation of Safe Work Method Statements (SWMS) for high-risk activities.
- Isolation and removal of fuel from tanks prior to relocation works.
- Electrical isolation and lock-out/tag-out procedures.
- Management of excavation and underground service risks.

- Traffic management controls for plant and vehicle movements.
- Hot-work permit system for welding, grinding or cutting activities.
- Appropriate personal protective equipment (PPE).
- Emergency response and spill management equipment available on site.
- Daily pre-start meetings and toolbox talks.

All contractors shall comply with Council site induction requirements prior to commencing work.

Commissioning Requirements

Commissioning shall be undertaken to verify that all components operate safely and in accordance with the design intent.

Commissioning activities shall include:

Mechanical Systems

- Verification of tank installation.
- Inspection of dispensing systems.
- Pressure and leak testing.
- Verification of valves, hoses and fittings.

Electrical Systems

- Electrical inspection and testing.
- Verification of earthing systems.
- Functional testing of emergency stop systems.
- Verification of hazardous area equipment where applicable.

Fuel Management Systems

- SmartFill system configuration.
- Vehicle and user database setup.
- Communication testing.
- Transaction recording verification.
- SmartDip tank gauging calibration.

Operational Testing

- Fuel delivery simulation.
- Dispensing system testing.

- Alarm and emergency shutdown testing.
- Spill response verification.

All commissioning records shall be retained as part of the project quality documentation.

Handover Requirements

Following successful commissioning, the completed facility shall be formally handed over to Coonamble Shire Council.

The handover package shall include:

- As-constructed drawings.
- Equipment datasheets.
- Tank compliance certificates.
- Electrical certificates of compliance.
- Structural certification documentation.
- Commissioning reports.
- Inspection and test records.
- Operating and maintenance manuals.
- Emergency response procedures.
- Fuel management system user manuals.
- Training records.
- Warranty documentation.

A practical completion inspection shall be undertaken with Council representatives to confirm that all works have been completed in accordance with the approved design documentation and project requirements.

Upon acceptance of the works, the facility shall be released for normal operational use.

Conclusions and Recommendations

Design Summary

This report presents the proposed upgrade of the fuel storage and refuelling facilities at the Coonamble Shire Council Depot. The project includes the installation of a new 55,000 L self-bunded diesel storage tank, relocation of the existing ULP tank, relocation of the existing bitumen emulsion tank, integration of the SmartFill fuel management system and construction of associated civil, structural and electrical infrastructure.

The proposed facility has been designed to improve operational efficiency, increase fuel storage capacity, enhance safety and environmental performance, and provide a dedicated fuel precinct capable of supporting Council's current and future fleet requirements. The layout has been developed to improve vehicle circulation, simplify fuel delivery operations and reduce interactions between refuelling activities and other depot operations.

Compliance Statement

The proposed design has been developed in accordance with the requirements of AS 1940:2017 – *The Storage and Handling of Flammable and Combustible Liquids*, together with relevant SafeWork NSW requirements, hazardous chemical storage obligations and applicable Australian Standards for civil, structural and electrical infrastructure.

The assessment undertaken as part of this project indicates that the proposed facility:

- Satisfies the intent of AS 1940 requirements for fuel storage and handling.
- Incorporates compliant secondary containment through self-bunded fuel storage systems.
- Provides suitable spill containment and environmental protection measures.
- Includes appropriate fire protection and emergency response provisions.
- Achieves suitable separation distances between fuel storage infrastructure and surrounding assets.
- Provides safe vehicle access and operational controls for depot users.

Subject to completion of detailed design verification and construction in accordance with the approved documentation, the facility is considered suitable for approval and implementation.

Construction Recommendations

It is recommended that:

- Detailed structural design be completed for the fuel pad, foundations and associated infrastructure.

- Detailed electrical design be completed for power supply, earthing, hazardous area requirements and SmartFill integration.
- Existing underground services be positively identified prior to commencement of construction.
- Construction works be staged to minimise disruption to depot operations.
- All fuel storage and dispensing equipment be installed in accordance with manufacturer requirements.
- Civil works incorporate the proposed drainage and spill containment measures.
- A commissioning program be undertaken prior to operational handover.
- All required certifications, inspections and compliance documentation be obtained before the facility is placed into service.

Future Operational Recommendations

To ensure the ongoing safe and efficient operation of the facility, it is recommended that Council:

- Implement routine inspection and maintenance programs for tanks, pumps, hoses and dispensing equipment.
- Maintain the SmartFill fuel management system and regularly review fuel usage data.
- Conduct periodic testing of emergency shutdown systems, alarms and fire protection equipment.
- Maintain spill response equipment and ensure personnel remain trained in spill management procedures.
- Review hazardous chemical registers and emergency response plans periodically.
- Undertake regular compliance audits against AS 1940 and SafeWork NSW requirements.
- Maintain clear access around fuel storage infrastructure and emergency response equipment.
- Review future fuel storage requirements as fleet size and operational demands change.

Conclusion

The proposed fuel facility upgrade will provide Coonamble Shire Council with a modern, compliant and operationally efficient fuel storage and dispensing facility. The design incorporates contemporary safety, environmental and fuel management systems that will improve fuel security, operational control and regulatory compliance.

Subject to the recommendations outlined in this report, the proposed development is considered suitable to proceed to detailed design completion, procurement and construction.

Section Two

Appendix A – Design Drawings

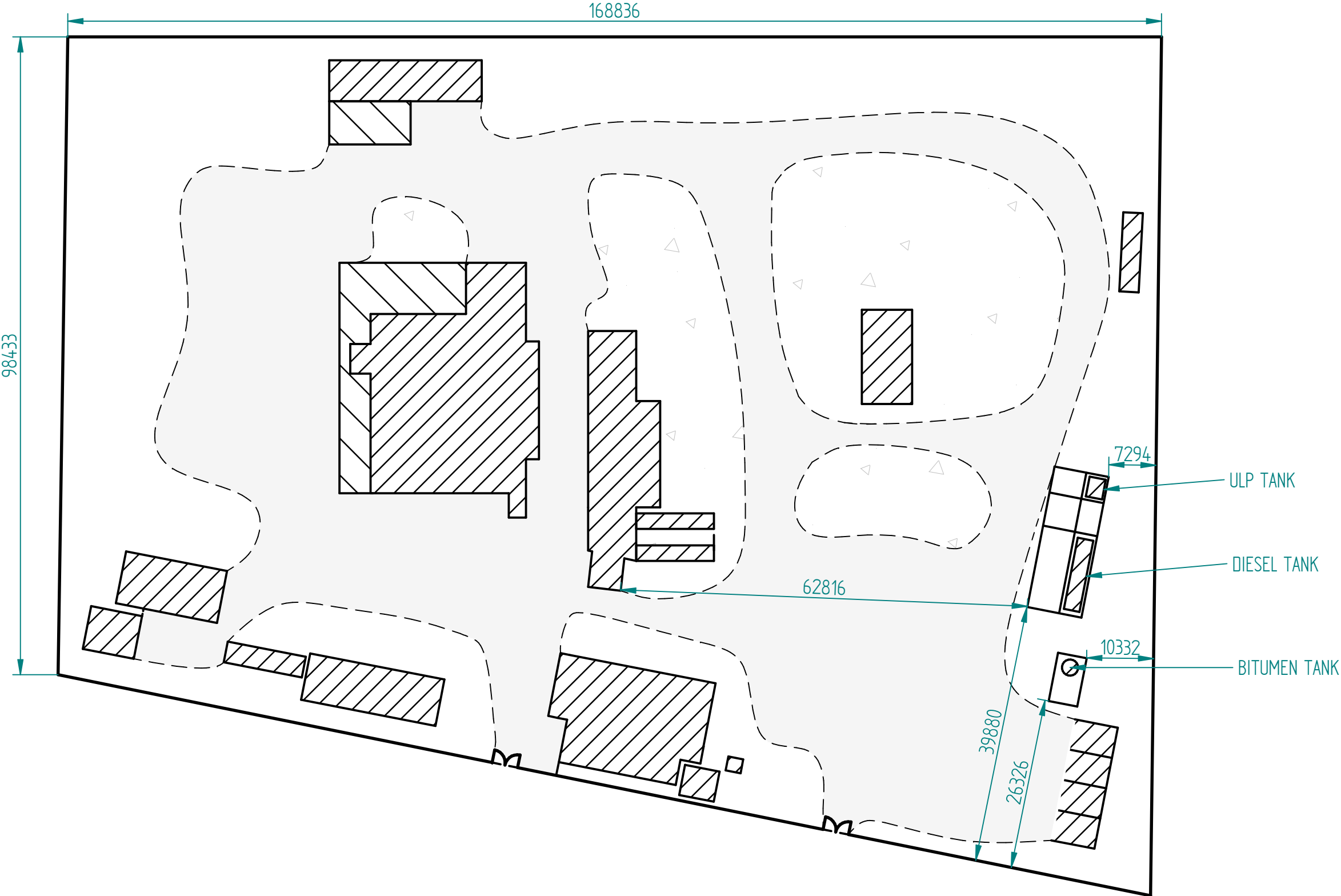
Appendix B – Structural Design Documentation
Welshaw Consulting

Appendix C – Equipment Datasheets and
Specifications

Appendices

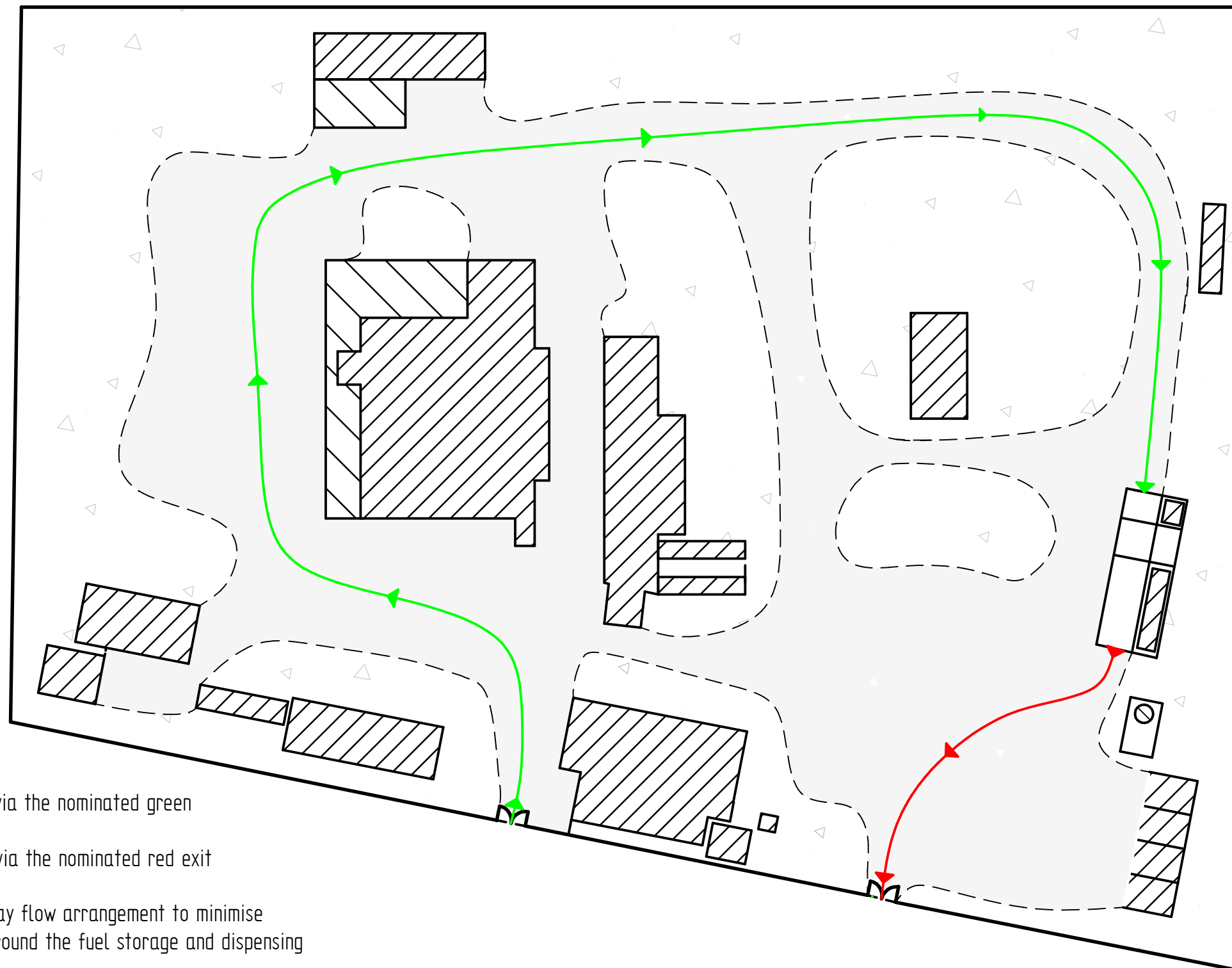
Appendix A – Design Drawings

SITE LAYOUT DIAGRAM



	NAME	DATE	MANTHEY CONSULTING ENGINEERS		
DRAWN	BM	22/07/2026			
CHECKED			TITLE COONAMBLE FUEL DEPOT UPGRADE		
ENG APPR					
MGR APPR			SIZE A3		
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS ANGLES ±1° 2 PL ±0.20 3 PL ±0.10					
			DWG NO MCE_CNB_002		REV 0.2
			SCALE:	WEIGHT:	SHEET 1 OF 4

TRAFFIC FLOW DIAGRAM

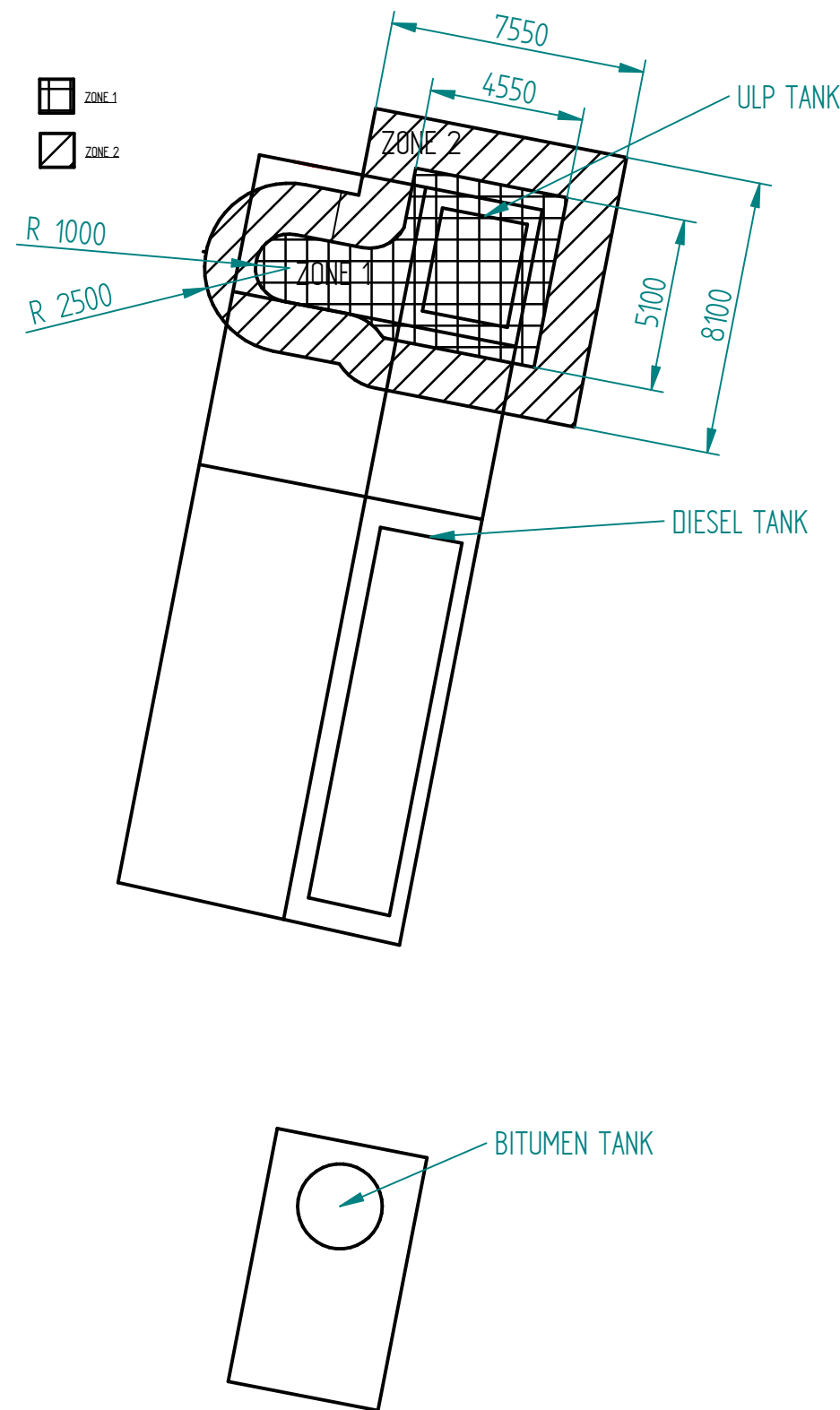


Traffic Flow Notes

1. Vehicle access to the fuel facility shall be via the nominated green entry route shown on this drawing.
2. Vehicle exit from the fuel facility shall be via the nominated red exit route shown on this drawing.
3. Refuelling traffic shall operate as a one-way flow arrangement to minimise reversing, congestion and vehicle conflict around the fuel storage and dispensing area.
4. The traffic flow arrangement shall accommodate light vehicles, heavy vehicles, Council plant, mobile equipment and fuel delivery tankers.
- 5 Drivers shall approach the dispensing area in the nominated direction of travel and exit without reversing where practicable.
6. The refuelling area shall remain clear of parked vehicles, stored materials and other obstructions that may restrict vehicle turning, tanker access or emergency egress.
7. Signage and pavement markings shall be installed to clearly identify entry direction, exit direction, refuelling approach path and no-parking zones.
8. Final traffic control signage, line marking and directional arrows shall be confirmed on site to suit the final equipment layout and available turning clearances.

	NAME	DATE		
DRAWN	BM	22/07/2026		
CHECKED				
ENG APPR				
MGR APPR			TITLE	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS ANGLES ±1° 2 PL ±0.20 3 PL ±0.10			COONAMBLE FUEL DEPOT UPGRADE	
			SIZE A3	DWG NO MCE_CNB_002 REV 0.2
			SCALE:	WEIGHT: SHEET 2 OF 4

HAZARDOUS AREA DIAGRAM



Hazardous Area Classification Notes

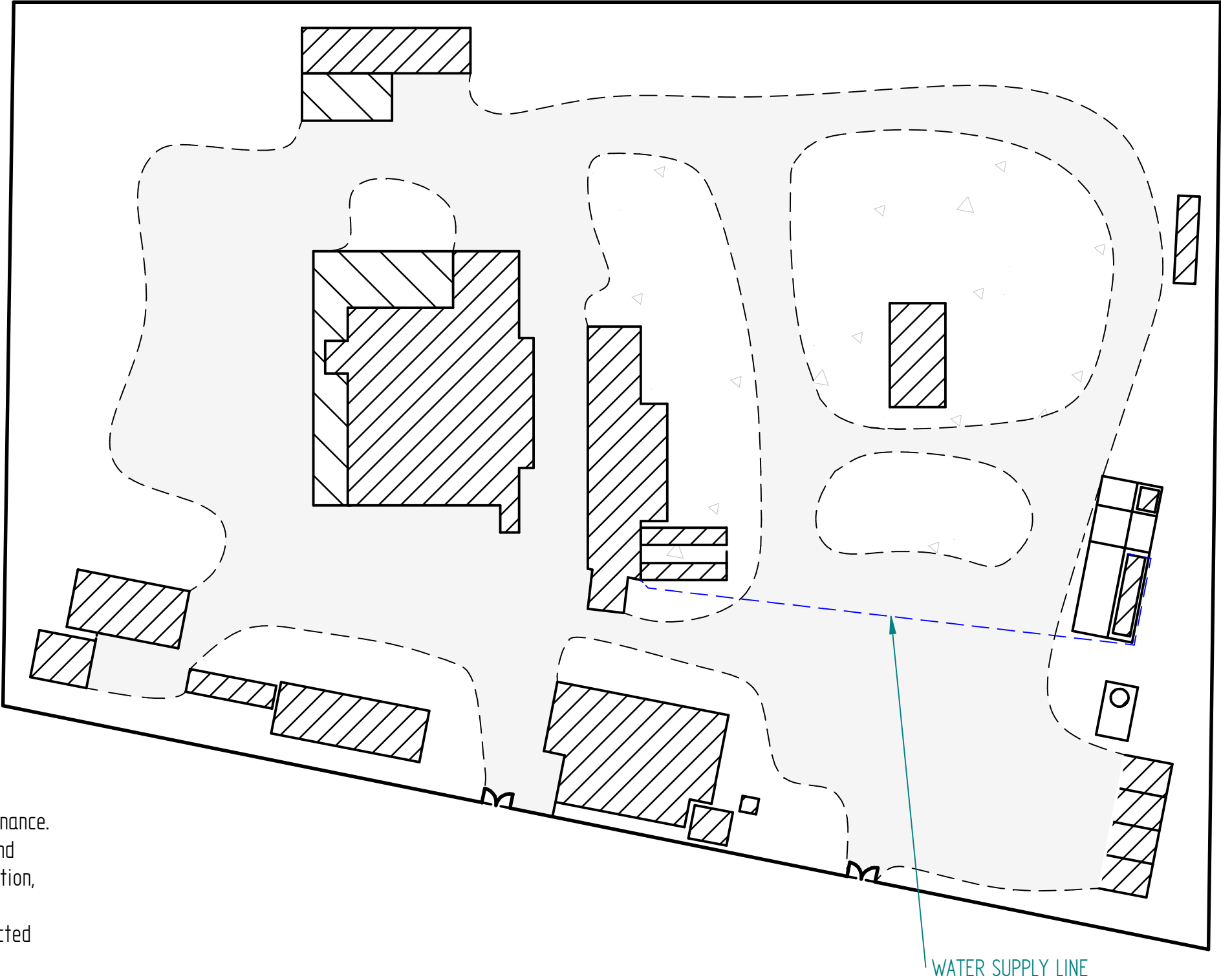
1. Hazardous area classification has been undertaken in accordance with AS 1940:2017 and AS/NZS 60079.10.1.
2. The hazardous area classification applies to the storage and dispensing of Unleaded Petroleum (ULP) only. Diesel storage and dispensing facilities are not classified as hazardous areas under normal operating conditions.
3. Zone 1 extends 1.0 m horizontally from the source of release associated with the ULP dispensing and filling equipment.
4. Zone 2 extends 2.5 m horizontally beyond the Zone 1 boundary and encompasses the area shown on this drawing.
5. The hazardous area classification is based on normal operating conditions with all equipment maintained in accordance with manufacturer requirements.
6. No ignition sources shall be installed or operated within classified hazardous areas unless certified for the applicable hazardous zone.
7. All electrical equipment located within Zone 1 shall be certified for Zone 1 service.
8. All electrical equipment located within Zone 2 shall be certified for Zone 2 service or a higher level of protection.
9. Electrical installations within classified hazardous areas shall comply with AS/NZS 60079 and AS/NZS 3000 requirements.
10. All metallic tanks, dispensing equipment, pipework and associated conductive infrastructure shall be bonded and earthed in accordance with the project earthing and bonding requirements.
11. Hot works, grinding, welding and other spark-producing activities shall not be undertaken within classified hazardous areas unless authorised under an approved permit-to-work system.
12. Mobile phones, non-certified portable electrical equipment and internal combustion engines shall not be used within classified hazardous areas unless specifically approved for the applicable hazardous zone.
13. Hazardous area signage shall be installed at all approaches to the classified area and shall identify the applicable hazardous zone and restrictions on ignition sources.
14. Any modification to the fuel storage system, dispensing equipment, venting arrangements or operating conditions shall require review of the hazardous area classification.
15. Hazardous area drawings shall be read in conjunction with the site layout drawings, electrical drawings and hazardous area assessment report.
16. All dimensions shown are in millimetres unless noted otherwise.

	NAME	DATE	MANTHEY CONSULTING ENGINEERS		
DRAWN	BM	22/07/2026			
CHECKED					
ENG APPR					
MGR APPR			TITLE COONAMBLE FUEL DEPOT UPGRADE		
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS ANGLES ±1° 2 PL ±0.20 3 PL ±0.10			SIZE A3	DWG NO MCE_CNB_002	REV 0.2
			SCALE:	WEIGHT:	SHEET 3 OF 4

WATER SUPPLY PIPELINE NOTES

1. Provide buried potable water supply pipeline to the dispensing area as shown on the drawings.
2. Pipeline shall comprise PE100 high-density polyethylene pressure pipe manufactured in accordance with AS/NZS 4130 and suitable for potable water service.
3. Pipework, fittings and valves shall be WaterMark certified and suitable for the nominated operating pressure.
4. Unless noted otherwise, provide 32 mm OD PE100 SDR11 PN16 HDPE pipe.
5. Pipe joints shall be butt-fusion welded, electrofusion welded or made using approved pressure-rated mechanical fittings.
6. Install the water service in accordance with AS/NZS 3500.1 and the manufacturer's installation requirements.
7. Provide a minimum cover of 750 mm from finished surface level to the top of the pipe in non-trafficable areas.
8. Where the pipeline passes beneath roads, driveways or areas subject to heavy vehicle loading, provide a minimum cover of 750 mm or additional engineered mechanical protection.
9. Provide suitable sand or fine granular bedding below and around the pipe. Bedding and backfill materials shall be free from sharp objects, large stones and other materials capable of damaging the pipeline.
10. Compact backfill in layers to suit the surrounding ground conditions and site requirements without damaging or deforming the pipeline.
11. Maintain a minimum clear separation of 100 mm from buried electrical services. A nominal horizontal separation of 300 mm shall be provided where practicable.
13. Where the water service crosses an electrical service, the services shall cross as close as practicable to 90 degrees and shall be provided with suitable mechanical separation and protection.
15. Provide a manually operated isolation valve and tap at the dispensing area. The final location shall permit safe access, operation, inspection and maintenance.
16. The tap may be located between the two tanks provided adequate access and clearance are maintained and the installation does not obstruct tank inspection, maintenance or associated pipework.
17. Above-ground pipework and valves shall be adequately supported and protected from accidental impact, vibration and mechanical damage.
19. Flush, pressure test and inspect the completed pipeline prior to commissioning. Testing shall be undertaken in accordance with AS/NZS 3500.1 and the pipe manufacturer's requirements.
20. Final pipeline routing, pipe size, operating pressure and connection point shall be verified on site prior to installation.
21. All work shall be completed by appropriately qualified and licensed personnel in accordance with applicable statutory, site and project requirements.

WATER SUPPLY DIAGRAM



	NAME	DATE	MANTHEY CONSULTING ENGINEERS		
DRAWN	BM	22/07/2026			
CHECKED					
ENG APPR					
MGR APPR			TITLE COONAMBLE FUEL DEPOT UPGRADE		
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS ANGLES ±1° 2 PL ±0.20 3 PL ±0.10			SIZE A3	DWG NO MCE_CNB_002	REV 0.2
			SCALE:	WEIGHT:	SHEET 4 OF 4

Appendix B – Structural Design Documentation

Wednesday, 22 July 2026

Project No. 001095

Telford Engineering Solutions
19 Herbert Street
Belmont NSW 2280

ATTENTION: Byron Manthey
byron@mantheyconsulting.com.au

EDS-001095-01_1: ENGINEERING DESIGN STATEMENT
COONAMBLE COUNCIL WORKS DEPOT REFUELING AND BITUMEN EMULSION FACILITY

Background

Welshaw Consulting, as a structural engineering consultancy within the meaning of the National Construction Code of Australia, have been engaged by Manthey Consulting Engineers to undertake the structural design of diesel/ULP tank footings, truck pavements and bunded bitumen emulsion tank footing and storage area at the Coonamble Council works depot.

It is understood the works will generally comprise the following as per Figure 1:

- Relocation of 4.5kL ULP tank to concrete footing.
- Installation of 55kL diesel tank to concrete footing.
- Provision of trafficable concrete pavement/hardstand area for refueling, and
- Replication of 22kL bitumen emulsion tank footing and bunded area to new location.

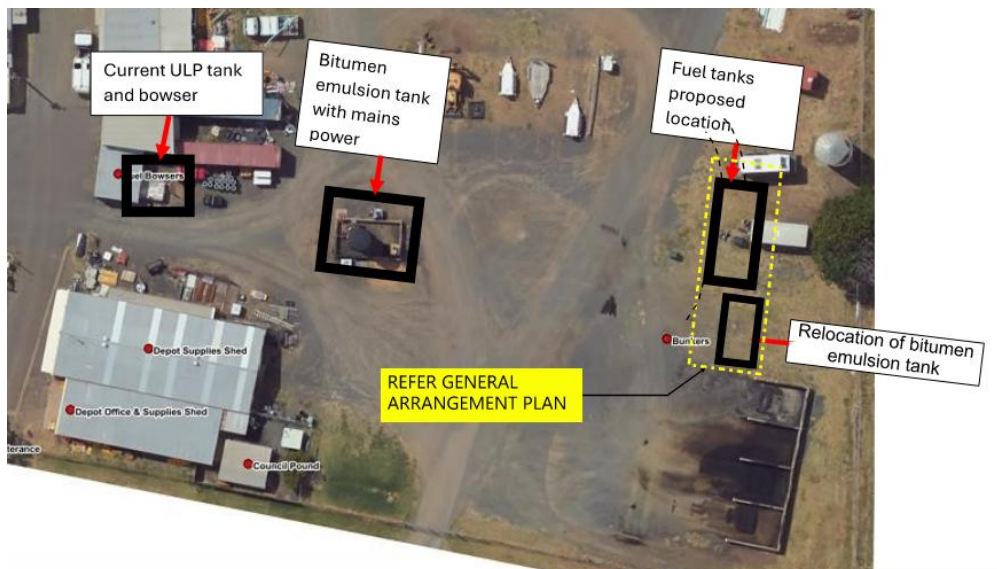


Figure 1. Proposed location of consolidated refueling area slab and bitumen emulsion tank.

The purpose of this report is to provide a summary of information and assumptions used in the footing and pavement design, certification of the structures for their intended use and limitations of the assessment scope.

Design Inputs

Australian Standards and Guidelines

Welshaw Consulting confirms the refueling and bitumen storage footing and pavement design has generally been undertaken in accordance with the relevant Australian Standards and industry guidelines including but not limited to the following:

- AS1170.0:2002 – Structural Design Actions Part 0: General Principles
- AS1170.1:2002 – Structural Design Actions Part 1: Permanent, Imposed and Other Actions
- AS1170.2:2021 – Structural Design Actions Part 2: Wind Actions
- AS1170.4:2007 – Structural Design Actions Part 4: Earthquake Actions
- AS1940:2017 – Storage and Handling of Flammable and Combustible Liquids
- AS3600:2018 – Concrete Structures
- AS3735:2001 – Concrete Structures for Retaining Liquids
- AS4100:2020 – Steel Structures
- CCAA T48 Guide to Industrial Floors and Pavements

Reference Information

Welshaw Consulting has received the following documents for the purposes of the design (enclosed in Appendix C for reference):

- Coonamble Shire Council indicative layout drawing for refuelling area,
- Bitumen Emulsion Tank Setup site photographs,
- ULS Tank Photos and Datasheet,
- FES Tanks Grande G55 Layout Drawing and Proposed Base General Notes, Plans and Details

Geotechnical Information

At this stage no geotechnical information is available to inform the pavement design. It has been assumed that ground conditions at the works depot generally comprises compacted pavement layers underlain by stiff to very stiff sandy or silty clay alluvium of low plasticity/reactivity (to be confirmed by the project geotechnical engineer). It is assumed surficial pavement layers will be removed for the installation of pavements/footings at required levels and therefore ground conditions will be as per the underlying alluvial subgrade. It is assumed that no groundwater will be present over the depth of excavation for pavements or for a depth equivalent to the tank footing width below founding level. It is assumed the proposed site has no pre-existing drainage issues. The following properties have been assumed to inform the pavement and footing design:

- Design Subgrade CBR = 4-5% minimum. Modulus of subgrade reaction assumed 20kPa/mm.
- Assumed minimum allowable bearing pressure = 150kPa.

In accordance with CCAA T48, the following subgrade properties have been adopted:

- Short Term Modulus E_{ss} = 25-30MPa, Long term Modulus E_{sl} = 15-20MPa
- Bedrock assumed >10m depth.

Material Assumptions

Design has been undertaken in accordance with the with the following material assumptions:

- Concrete: Trafficable pavement 40MPa 28-day compressive strength, loaded at 28 days. All other footings assumed 32MPa concrete, bollard infill 20MPa. Exposure classification for concrete cover to reinforcement adopted as follows:
 - Exposed: B1 (semi-industrial but temperate/semi-arid)
 - Cast Against Ground: A2 (non-aggressive soils)
- Reinforcement: All reinforcement assumed D500N.
- Dowels: All dowels assumed Grade 300 minimum.
- Bollards: Assumed Grade C350L0 CHS, platework Grade 350. All welds SP Category E49XX/W50X. Proprietary bollards may be proposed subject to review and approval. Anchor bolts assumed Grade 5.8 HDG.

Pavement Loading Assumptions

The following vehicle and other maintenance activity loads have been considered as part of the refuelling area slab design:

Wheel Loading

- Maximum truck wheel loading (for prime movers being filled or refuelling tankers) in accordance with NHR maximum axle group loads at General or Concessional Mass Limits i.e.:
 - Single-Axle: 6.5t single tyre, 9t dual tyre
 - Dual-axle: 14-14.5t single tyre, 16.5-17t dual tyre
 - Tri-axle: 15-15.5t single tyre, 20-21t dual tyre

On the basis of the above, a standalone design single axle load of 10 tonnes (100kN) has been adopted for the purposes of the assessment.

Distributed and Point Loading

- Assumed maximum 25kPa due to stacked or stored materials.
- Assumed maximum 5-tonne post loads at 2m minimum spacing on edge or interior of slab assumed for maintenance purposes (work stands or similar).

Fatigue and Design Life

- 15-year design life.
- Maximum 5 truck passes per day.
- On average assumed 3 critical laden axle groups per truck.
- On average assumed 2.5 axles per critical axle group (tandem or tri).
- Total cycles = $15 \times 365 \times 5 \times 3 \times 2.5 \sim 200,000$ axle loads
- Distributed or point loading assumed very low frequency (<10 repetitions per year).

Tank Loading Assumptions

Dead and Live Loading

- ULP Tank (4-4.5kL capacity): 2t empty, 4t fluid load, 6t full.
- Diesel Tank (55-60kL capacity): 13t empty, 55t fluid load (diesel), 68t full.
- Bitumen Emulsion Tank (22kL capacity): assumed 6 tonne empty, 24t fluid, 30t full
- Tank loading assumed to be supported at corners of tanks/containers typical.
- Assumed 5kPa maximum maintenance loading on tank footing slabs.

Wind Loading

In accordance with AS1170.2 as follows:

- Wind Region/Speed: A0
 - Service Wind Speed: 37m/s
 - Ultimate Wind Speed: 45m/s (1:500 event adopted)
- Structure Height: $z = 7\text{m}$ (top of bitumen emulsion tank)
- Terrain Category: TC2 $M_{z,cat} = 0.96$
- Directional, Shielding, Topographic, Climate Factors: $M_d = 1.0$, $M_s = 1.0$, $M_t = 1.0$, $M_c = 1.0$
- Dynamic Response Factor: $C_{dyn} = 1.0$ (assumed not dynamically sensitive)
- Design Wind Speeds and Base Pressures:
 - Service Limit State: $V_{des} = 36\text{m/s}$ (128kph), $P_{sls}/C_{fig} = 0.76\text{kPa}$
 - Ultimate Limit State: $V_{des} = 43\text{m/s}$ (156kph), $P_{uls}/C_{fig} = 1.12\text{kPa}$
- Drag Coefficients: $C_d = 1.2$ for cylindrical tank, 2.0 for rectangular ULS and diesel tanks. No shielding considered.

Earthquake Loading to AS1170.4

As provided in specification:

- Site Soil Classification: Ce (assumed)
- Site Hazard Factor: $Z = 0.09$
- Probability Factor: $k_p = 1.0$
- Design Category: EDC II ($h < 25\text{m}$, $0.08 < k_p Z < 0.12$)
- Structural performance/ductility factor: $S_p/\mu = 0.5$ (tanks on braced or unbraced legs)
- Live load combination factor: $\psi_E = 1.0$ for tank fluid loading
- Fundamental Modes: $T_1 = 1.25k_t h_n^{0.75} = 0.1-0.3$ seconds (3-10Hz), $C_h(T_1) = 3.5$ (approx.)
- Base Shear: $V = k_p Z C_h(T_1) S_p/\mu = 0.09 \times 3.5 \times 0.5 = 16\%$ W(seismic weight)

Earthquake Loading to AS3774

Note generally considered applicable to tanks containing fluid as opposed to bulk solids:

- Acceleration Coefficient $a = 0.09$ (from AS1170.4)
- Earthquake Coefficient: $C = 0.2-0.5$
- Site Factor: $S = 1.5$
- Importance Factor: $I = 1.0$
- Ductility factor: $R_f = 2.5$ (elevated structures designed for ductility)
- Base Shear: $V = ICS/R_f \sim 13-30\%$ W

Design value of $V = 20\%W$ adopted.

Other Loading

- Impact loading to bollards considered as follows:
 - Impact vehicle 30-tonne semi-trailer, 200mm crumple zone + 300mm bollard deflection gap (500mm total deceleration length), 5kph impact velocity.
 - Impact force = 60kN (equivalent to AS1170.2 medium traffic area 40kN load with 1.5 ULS factor). Assumed resultant applied at half-height of bollards (600mm).

Load Combinations

The following load combinations have been considered for the tank footing design with consideration to the combinations presented in AS1170.0 as follows:

- Service Limit State: $G+Q+W_s$
- Ultimate Limit State: $1.2G+1.5Q, G+Q+EQ, G+W_u, G+Q+W_u$
- Note: G =dead, Q = tank fluid, W_s/W_u = service/ultimate wind, EQ = ultimate earthquake

Safety in Design Considerations

It should be noted that structural requirements for footings for tanks for the storage and handling of flammable and combustible liquids contained within AS1940 are general in nature and have been considered in the review i.e.:

- Footing to be adequate to support without unacceptable settlement the direct load imposed by tank and product.
- To resist any possible overturning forces (e.g. wind with tank empty or seismic effects)
- Concrete footings to be designed to AS3600.

Other requirements for the refueling area including design and positioning of the tanks, assessment of hazard areas, containment etc. in accordance with AS1940, other relevant standards and legislation should be reviewed by others.

Design Assessment**Analysis Methods**

The slab design has been undertaken as follows:

- Pavement: slab thicknesses and jointing design determined via empirical methods presented in T48 for governing wheel, point and distributed loading conditions.
- Tank footing design undertaken by developing a numerical model as depicted in Figure 2:
 - Tank slabs modelled with plate elements on a compression-only elastic foundation.
 - Tanks modelled with connection elements at corner supports with multi-point links simulating tank masses, EQ and wind loads.
 - Flexural design actions extracted and capacities calculated to AS3600.

Calculations are presented in Appendix B for reference.

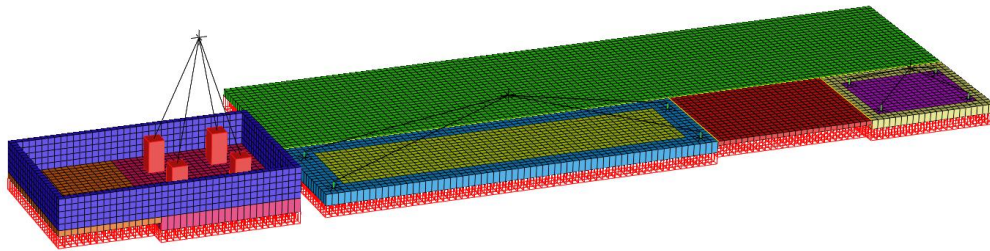


Figure 2. (a) FEA model of tank slab footings and pavements.

Certification, Limitations and Exclusions

Welshaw Consulting certifies the pavement and tank footing design presented in 001095-SK001 and SK002 has been undertaken in accordance with the relevant standards and guidelines based on the loading information and material assumptions contained in this report. It is subject to the following assumptions, limitations and exclusions:

- Design has been developed in the absence of geotechnical information for the site. It has been assumed that ground conditions will generally comprise competent, non-reactive subgrades for pavements and footings. It remains the responsibility of the contractor to confirm ground conditions are consistent with design assumptions or otherwise refer to Welshaw Consulting for review. Appropriate geotechnical supervision and inspection is to be provided to ensure sub-grade and sub-base preparation is consistent with design assumptions.
- Client to review and confirm acceptance of bollard design loading. Alternative proprietary bollards may be used subject to the review and approval.
- Concrete supply, curing and cylinder testing is to be undertaken in accordance with the relevant Australian Standards. Saw-cutting of pavement joints is to be undertaken as soon as practical after finishing operations. Pavement is not to be loaded until 28 days after casting (tank slabs may be loaded after 14 days subject to review and approval of cylinder results).
- Design is limited to structural design of pavements and footings only. Confirmation of all dimensions and levels, general arrangement and positioning of tanks and associated hazards assessments, routing of all services and management/containment of liquids to ensure facility functionality is fit-for-purpose remains the responsibility of others.

Please note that this letter does not relieve any party of their responsibility to comply with relevant documentation such as other project drawings, specifications and standards. Should you require any further advice or clarification of any of the above, please do not hesitate to contact us.

Yours faithfully,

WELSHAW CONSULTING PTY LTD

Sam Buttenshaw

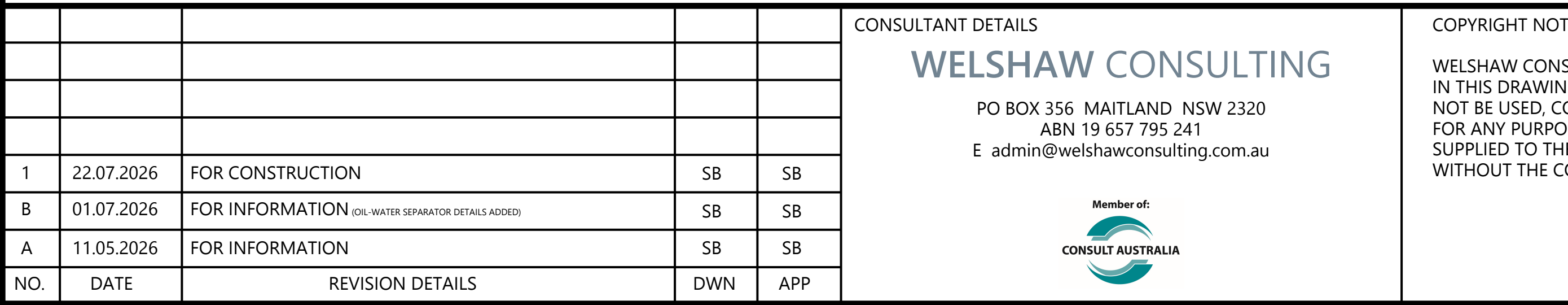
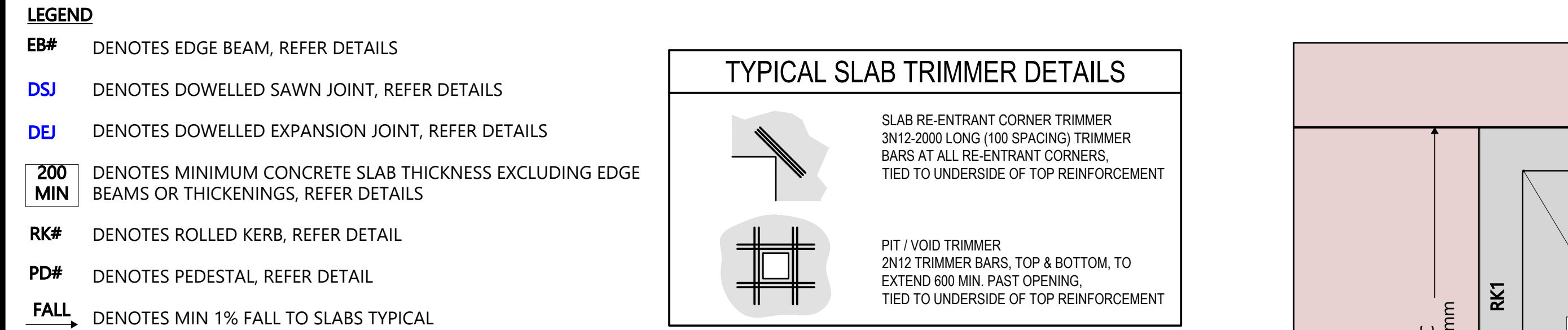
Principal Structural Engineer

BEng (Civil) Hons 1 MIEAust CPEng NER RPEQ

Appendix A

Design Sketches and Drawings

DRAWING 001095-SK001_1	DIESEL & ULP REFUELING AREA PLAN AND CONSTRUCTION NOTES
DRAWING 001095-SK002_1	DIESEL & ULP REFUELING AREA SECTIONS AND DETAILS

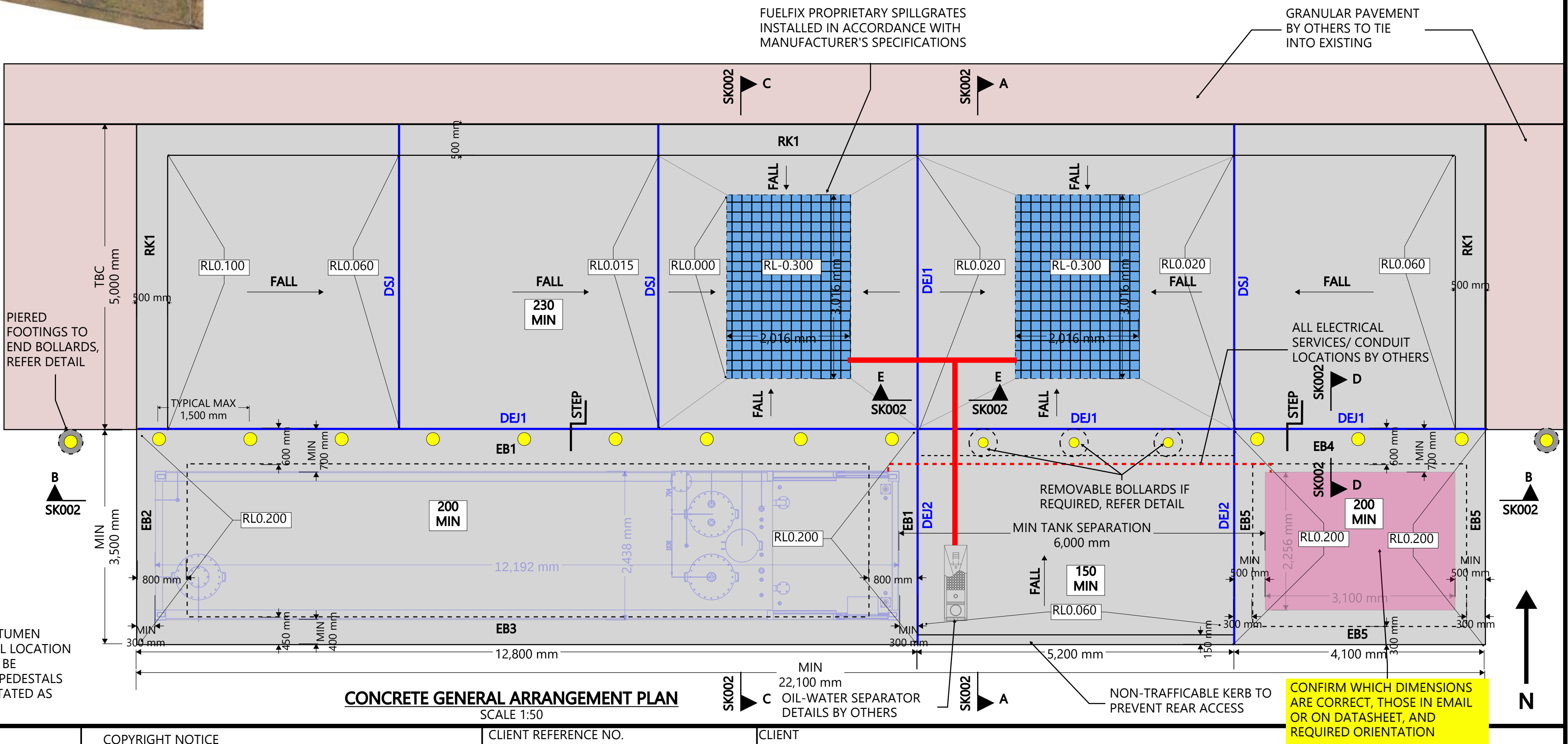


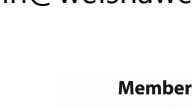
LOADING NOTES
ROADWAY PAVEMENT: SINGLE LANE NHVR AXLE LOAD LIMITS AT GML/CML OR 25kPa LAYDOWN AREA LOADING OR 5t WORK STAND
LOADING AT >2m SPACING (NOT CONCURRENT)
NON-TRAFFICABLE PAVEMENT: MAXIMUM 5t GVM LIGHT VEHICLES
TANK FOOTINGS: ULP = 6t FULL, DIESEL = 68t FULL, BITUMEN EMULSION: 30t FULL, 5kPa MAX DISTRIBUTED LOADING
BOLLARD IMPACT: 40kN
DESIGN LIFE: 15 YEARS

1. ALL TOPSOIL AND DELETRIOUS MATERIAL TO BE STRIPPED AND REMOVED PRIOR TO COMMENCEMENT OF EARTHWORKS. IDENTIFY ANY SOFT SPOTS AS REQUIRED WITH PROOF ROLL PASSES OF 10t ROLLER AND REPLACE WITH APPROVED COMPACTED SELECT MATERIAL.
2. FOUNDATION/SUBGRADE CONDITIONS TO BE CONFIRMED ON SITE. FOUNDATION REQUIREMENTS TO BE MINIMUM SUBGRADE CBR OF 5% AND MINIMUM ALLOWABLE BEARING PRESSURE FOR TANK FOOTINGS TO BE 150kPa. CONTRACTOR TO ALLOW FOR COST OF GEOTECHNICAL INSPECTIONS, SUPERVISION AND TESTING WHERE REQUIRED.
3. CONTRACTOR TO ENSURE GROUND DRAINS AWAY FROM TANK FOOTINGS AND PAVEMENTS AT THE COMPLETION OF WORKS

1. ALL CONCRETE SUPPLY, PLACEMENT, TESTING, CURING AND WORKMANSHIP TO BE UNDERTAKEN IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARDS (AS3600, AS1379, AS3610).
2. CONCRETE GRADES: N32 (TYPICAL UNO) AND N40 (TRAFFICABLE PAVEMENT), 20mm MAX AGGREGATE, 80mm SLUMP, 650 MICROSTRAIN 56-DAY DESIGN SHRINKAGE. PAVEMENTS TO BE UNLOADED FOR 30 DAYS AFTER CASTING, TANK FOOTINGS FOR MINIMUM 14 DAYS.
3. ALL REINFORCEMENT D500N, MIN LAPS AS FOLLOWS: HORIZONTAL BARS: (N12: 600mm, N16: 800mm, N20: 1000mm) VERTICAL BARS: (N12: 450mm, N16: 600mm, N20: 750mm), MESH: 3 CROSSWIRES MINIMUM. REINFORCEMENT TO BE INSTALLED SUCH THAT IT IS NOT DISPLACED DURING CONCRETE PLACEMENT.
4. EXPOSURE CLASSIFICATION B1 (EXPOSED) AND A2 (AGAINST GROUND): MINIMUM COVER TO REINFORCEMENT TO BE 40mm TOP, 50mm BTM/SIDE FACE (40mm IF PROTECTED WITH DAMP-PROOF MEMBRANE).
5. SURFACE FINISH TO CLIENT'S REQUIREMENTS (STEEL FLOAT/REPEATED POWER TROWEL AND LIGHT BROOM UNO). ALL KERB, WALL AND PEDESTAL EDGES TO HAVE 20mm FILLETS UNO.
6. CURING TO BE UNDERTAKEN IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARDS AND CONTINUOUSLY FOR A MINIMUM PERIOD OF 7 DAYS BY WET CURING (PONDING, WET HESSIAN COVERING) OR APPLICATION OF APPROVED CURING COMPOUNDS, BY DELAY OF SIDE FORMWORK REMOVAL OR VIA AN APPROVED EQUIVALENT METHOD).
7. CONCRETE SUPPLY AND TESTING TO BE UNDERTAKEN IN ACCORDANCE WITH RELEVANT STANDARDS, WITH A MINIMUM OF 2 x 7/28-DAY CYLINDERS TESTS TAKEN PER SLAB POUR. PROPOSED POUR SEQUENCE AS SHOWN.
8. NO HOLES OR CHASES PERMITTED FOR SERVICES UNLESS REVIEWED AND APPROVED.

1. ALL STEELWORK WORKMANSHIP TO RELEVANT STANDARDS (AS4100, AS1554, AS5131).
2. ALL PLATEWORK TO BE GRADE 350, HOLLOW SECTIONS TO BE C350L0.
3. ALL WELDING TO BE SP CATEGORY E49XX/W50X.
4. ALL ANCHOR BOLTS TO BE GRADE 5.8 HDG.
5. ALL CHEMICAL ANCHORING TO BE UNDERTAKEN IN ACCORDANCE WITH SUPPLIER'S SPECIFICATIONS (INCLUDING HOLE DRILLING DIAMETER AND CLEANOUT REQUIREMENTS).



					CONSULTANT DETAILS WELSHAW CONSULTING PO BOX 356 MAITLAND NSW 2320 ABN 19 657 795 241 E admin@welshawconsulting.com.au Member of: 	COPYRIGHT NOTICE WELSHAW CONSULTING PTY LTD MAINTAINS THE COPYRIGHT IN THIS DRAWING. THIS DRAWING (OR PARTS THEREOF) MUST NOT BE USED, COPIED, REPRODUCED OR COMMUNICATED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT WAS SUPPLIED TO THE CLIENT NOTED OR THEIR REPRESENTATIVES WITHOUT THE CONSENT OF WELSHAW CONSULTING PTY LTD.	CLIENT REFERENCE NO.	CLIENT MANTHEY CONSULTING ENGINEERS					
								PROJECT COONAMBLE WORKS DEPOT REFUELING AREA DIESEL & ULP REFUELING AREA PLAN AND CONSTRUCTION NOTES					
1	22.07.2026	FOR CONSTRUCTION	SB	SB					PROJECT NO. 001095		DRAWING NO. SK001	ISSUE 1	SIZE A1
B	01.07.2026	FOR INFORMATION (OIL-WATER SEPARATOR DETAILS ADDED)	SB	SB									
A	11.05.2026	FOR INFORMATION	SB	SB									
NO.	DATE	REVISION DETAILS	DWN	APP		APPROVED BEng (Hons 1) MIEAust							

Vehicle Templates

		SAST	SADT	DAST	DADT	TAST	TADT	Max
GML	tonnes	6.5	9	14	16.5	15	20	20
Axle	tonnes	6.5	9	7	8.25	5	6.7	9
	kN	63.7	88.2	68.6	80.85	49	65.33333	88.2
CML	tonnes	6.5	9	14.5	17	15.5	21	21
Axle	tonnes	6.5	9	7.25	8.5	5.17	7.0	9
	kN	63.7	88.2	71.05	83.3	50.63333	68.6	88.2

NHVR

National Heavy Vehicle Regulator

Common Heavy Freight Vehicle Configurations

Disclaimer: This chart shows some of the common heavy vehicle combinations used in Australia. In some circumstances, configurations and mass limits may be restricted. Heavy Vehicle Authorisations (Notices) describe these restrictions. Other heavy vehicle configurations may not be represented. Please visit www.nhvr.gov.au/gav for more information.

	Description	Maximum Length (metres)	Maximum Regulatory Mass under GML (tonnes)	Maximum Regulatory Mass under CML (tonnes)	Maximum Regulatory Mass under HML (tonnes)
1. COMMON RIGID TRUCKS - GENERAL ACCESS					
(a)	 2 Axle Rigid Truck	≤ 12.5	15.0	CML does not apply	-
(b)	 3 Axle Rigid Truck	≤ 12.5	22.5	23.0	-
(c)	 4 Axle Rigid Truck	≤ 12.5	26.0	27.0	-
(d)	 4 Axle Twinsteer Rigid Truck	≤ 12.5	26.5	27.0	-
(e)	 5 Axle Twinsteer Rigid Truck	≤ 12.5	30.0	31.0	-
2. COMMON SEMITRAILER COMBINATIONS - GENERAL ACCESS					
(a)	 3 Axle Semitrailer	≤ 19.0	24.0	-	-
(b)	 4 Axle Semitrailer	≤ 19.0	31.5	32.0	32.0
(c)	 5 Axle Semitrailer	≤ 19.0	35.0	36.0	37.5
(d)	 5 Axle Semitrailer	≤ 19.0	39.0	40.0	40.0
(e)	 6 Axle Semitrailer	≤ 19.0	42.5	43.5	45.5
3. COMMON RIGID TRUCK AND TRAILER COMBINATIONS (General access when complying with prescribed mass and dimension requirements)					
(a)	 2 Axle Truck and 2 Axle Dog Trailer	≤ 19.0	30.0	-	-
(b)	 2 Axle Truck and 2 Axle Pig Trailer	≤ 19.0	30.0	CML does not apply	-
(c)	 3 Axle Truck and 2 Axle Dog Trailer	≤ 19.0	40.5	41.0	-
(d)	 3 Axle Truck and 2 Axle Pig Trailer	≤ 19.0	37.5	CML does not apply	-
(e)	 3 Axle Truck and 3 Axle Dog Trailer	≤ 19.0	42.5	43.5	-
(f)	 3 Axle Truck and 3 Axle Pig Trailer	≤ 19.0	40.5	CML does not apply	-
(g)	 3 Axle Truck and 4 Axle Dog Trailer	≤ 19.0	42.5	43.5	-
(h)	 4 Axle Truck and 3 Axle Dog Trailer	≤ 19.0	42.5	43.5	-
(i)	 4 Axle Truck and 4 Axle Dog Trailer	≤ 19.0	42.5	43.5	-
4. COMMON B-DOUBLE COMBINATIONS - CLASS 2					
(a)	 7 Axle B-double	≤ 19.0	55.5	57.0	57.0
(b)	 8 Axle B-double	≤ 26.0	59.0	61.0	62.5
(c)	 8 Axle B-double	≤ 26.0	59.0	61.0	62.5
(d)	 9 Axle B-double	≤ 26.0	62.5	64.5	68.0

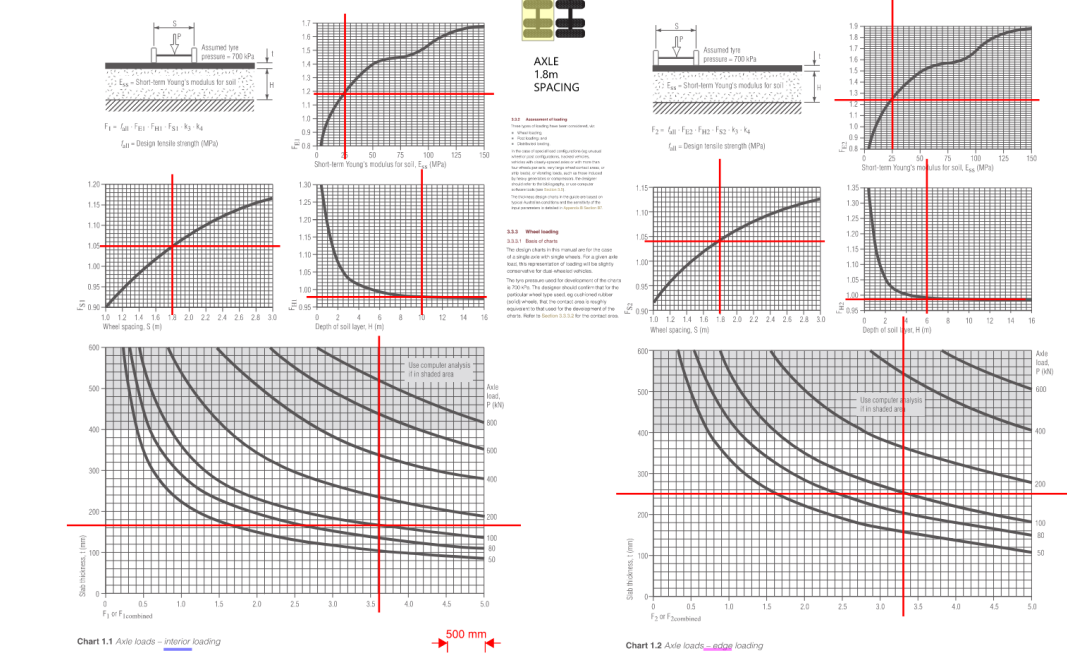
5. COMMON TYPE 1 ROAD TRAINS - CLASS 2					
(a)	 9 Axle A-double	≤ 36.5	72.0	74.0	74.0
(b)	 11 Axle A-double	≤ 36.5	79.0	81.0	85.0
(c)	 12 Axle A-double	≤ 36.5	82.5	84.5	90.5
(d)	 12 Axle Modular B-triple	≤ 35.0	82.5	84.5	90.5
(e)	 12 Axle B-triple	≤ 36.5	82.5	84.5	90.5
(f)	 14 Axle AB-triple	≤ 36.5	99.0	101.0	107.5
(g)	 15 Axle AB-triple	≤ 36.5	102.5	104.5	113.0
(h)	 11 Axle Rigid Truck and 2 Dog Trailers	≤ 36.5	88.5	90.5	91.0
6. COMMON TYPE 2 ROAD TRAINS - CLASS 2					
(a)	 16 Axle A-triple	≤ 53.5	115.5	117.5	124.5
(b)	 18 Axle A-triple	≤ 53.5	122.5	124.5	135.5
(c)	 15 Axle AB-triple	≤ 44.0 - Classified by the NHVR as Type 1 when L ≤ 36.5m	102.5	104.5	113.0
(d)	 13 Axle Rigid Truck and 2 Dog Trailers	≤ 47.5 - Classified by the NHVR as Type 1 when L ≤ 36.5m	95.5	97.5	102.0
(e)	 17 Axle BAB-Quad	≤ 53.5	119.0	121.0	130.0
(f)	 18 Axle BAB-Quad	≤ 53.5	122.5	124.5	135.5
(g)	 17 Axle ABB-Quad	≤ 53.5	119.0	121.0	130.0
(h)	 18 Axle ABB-Quad	≤ 53.5	122.5	124.5	135.5

*Add one tonne if twinsteer axle group is load sharing. *The mass of a dog trailer shall not exceed the mass of the towing vehicle under Schedule 1, Part 1, section 2(4) of the Heavy Vehicle (Mass, Dimension and Loading) National Regulation. Please note, additional limits are allowed for steer axles under Schedule 1, Part 2 of the Heavy Vehicle (Mass, Dimension and Loading) National Regulation. © Copyright National Heavy Vehicle Regulator 2019. creativecommons.org/licenses/by-sa/3.0/au

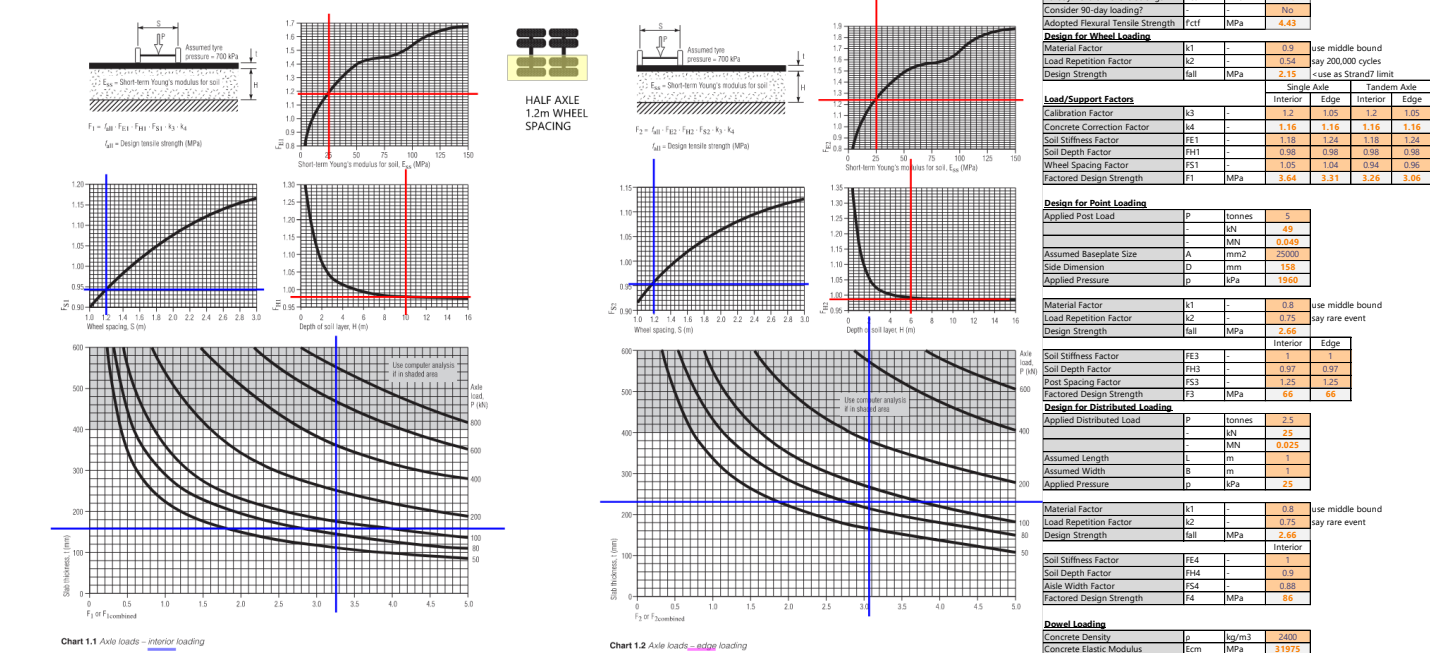
10-tonne single axle group (single or dual wheel) adopted as critical load.

T48 Calculations

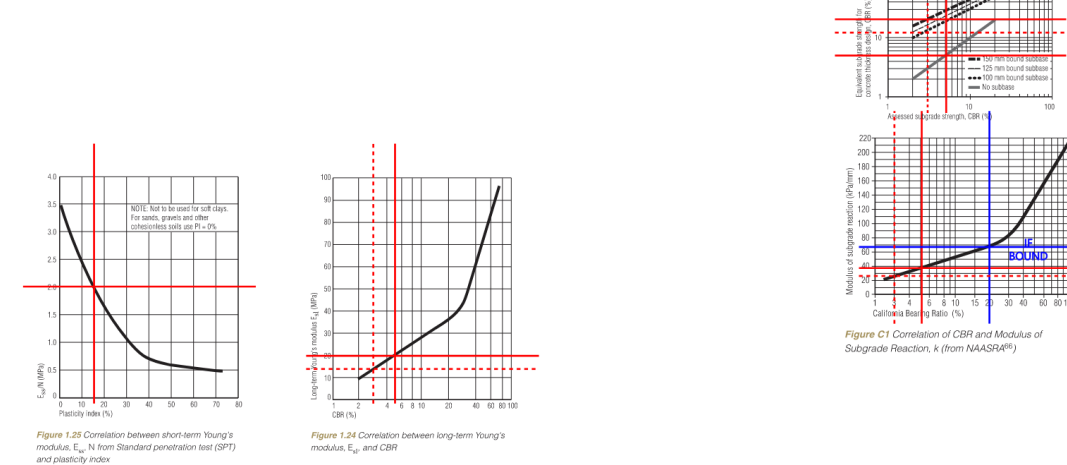
SINGLE AXLE (SAY 10 TONNE)



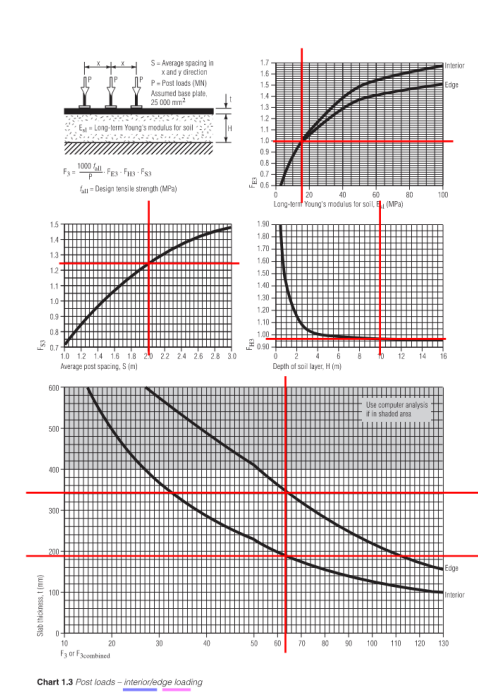
HALF TANDEM AXLE (SAY 1/2 OF 17 = 8.5 TONNE)



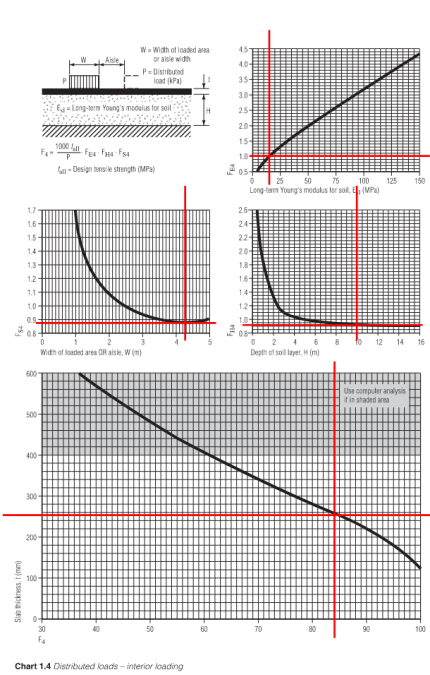
GEOTECH CORRELATIONS



POST LOADS (WORK STANDS)



DISTRIBUTED LOADING (STACKED MATERIALS STORAGE)



Strand7 Modelling and Results

Diesel Tank Slab

ULS Bending (Longitudinal and Transverse)

Plate Moment: XX (kN·m/m)

Max = 64.9

56.8
48.7
40.6
32.5
24.3
16.2
8.1

Min = 0.0

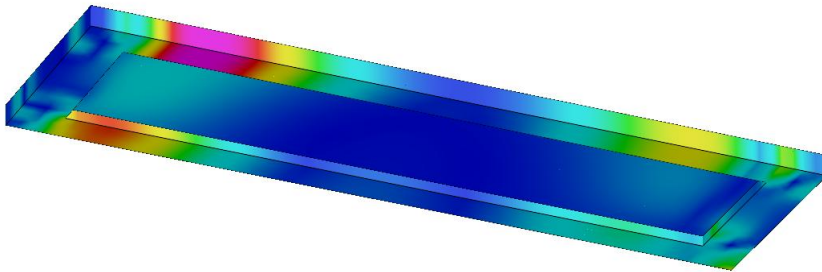
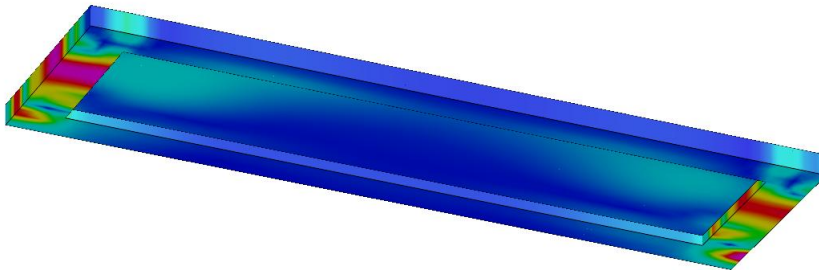


Plate Moment: ZZ (kN·m/m)

Max = 37.8

33.1
28.3
23.6
18.9
14.2
9.4
4.7

Min = 0.0



ULS Shear (Longitudinal and Transverse)

Plate Force: XY (kN/m)

Max = 203.2

177.8
152.4
127.0
101.6
76.2
50.8
25.4

Min = 0.0

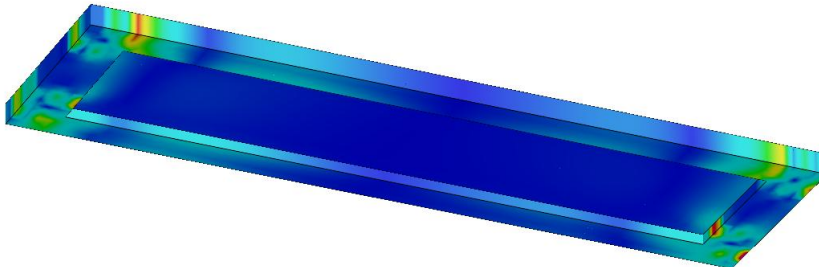
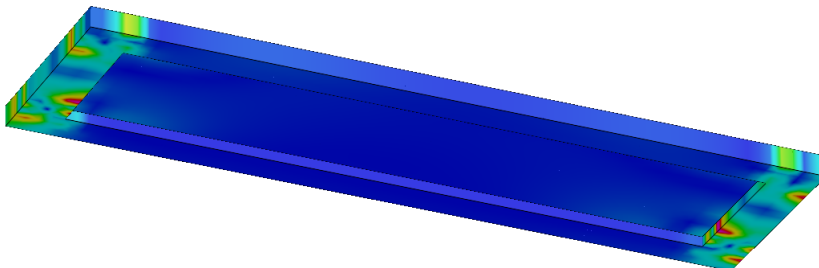


Plate Force: YZ (kN/m)

Max = 203.5

178.0
152.6
127.2
101.7
76.3
50.9
25.4

Min = 0.0



ULS Axial

Plate Force: XX (kN/m)
Max = 224.3

196.2
168.2
140.2
112.1
84.1
56.1
28.0
Min = 0.0

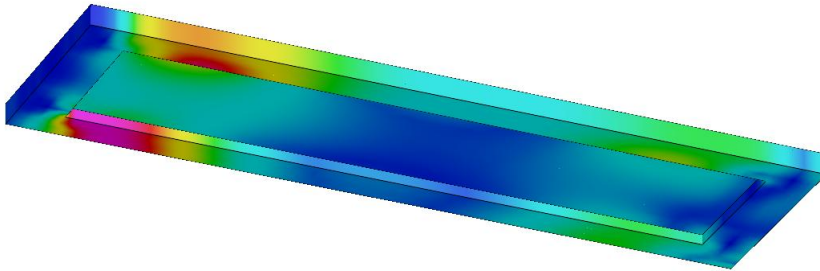
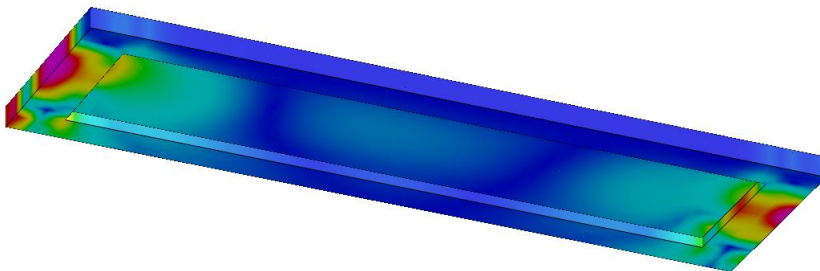


Plate Force: ZZ (kN/m)
Max = 119.2

104.3
89.4
74.5
59.6
44.7
29.8
14.9
Min = 0.0



SLS and ULS Bearing Pressures

Plate Stress: Support[Face] (kPa)
Max = 118.9

104.6
90.4
76.1
61.8
47.5
33.2
18.9
Min = 4.6

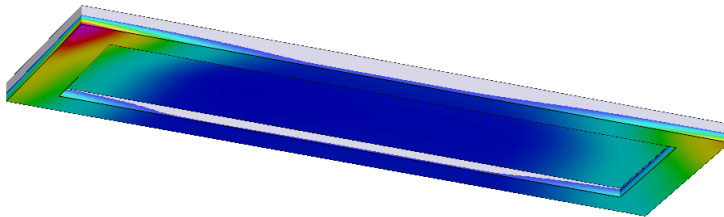
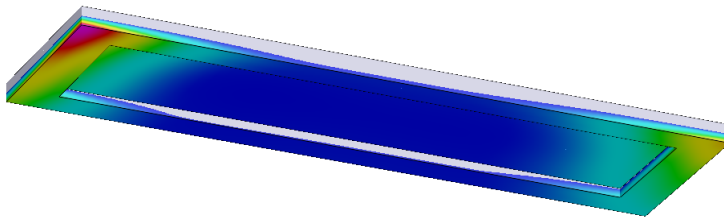


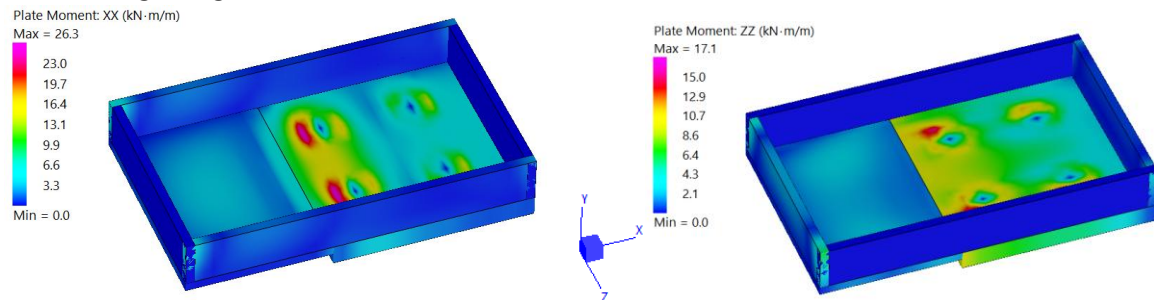
Plate Stress: Support[Face] (kPa)
Max = 157.8

138.6
119.5
100.4
81.2
62.1
42.9
23.8
Min = 4.7

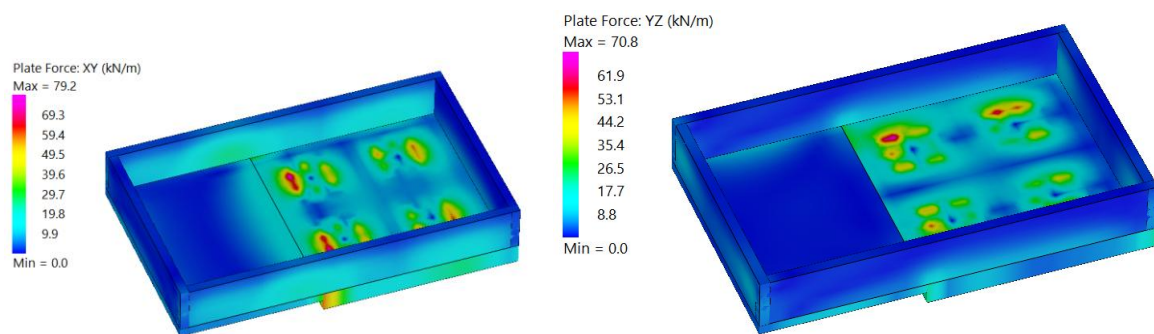


Bitumen Emulsion Slab and Walls

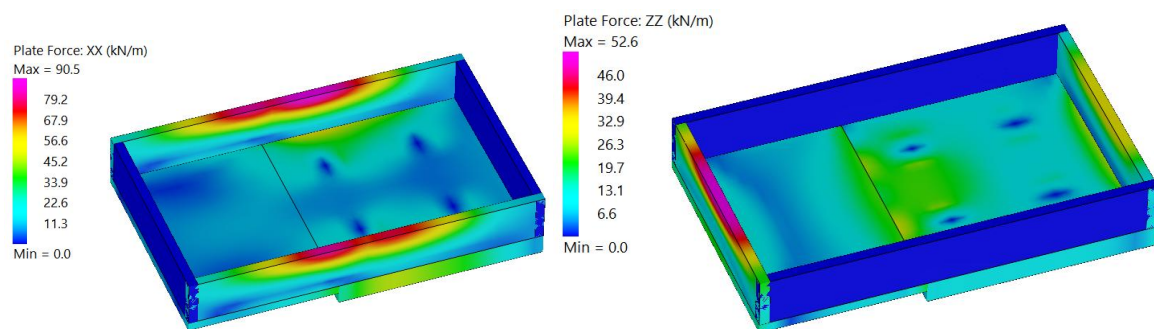
ULS Bending (Longitudinal and Transverse)



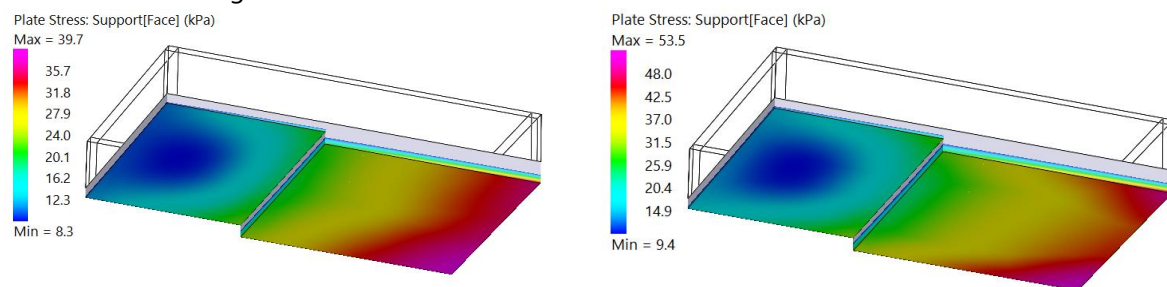
ULS Shear



ULS Axial

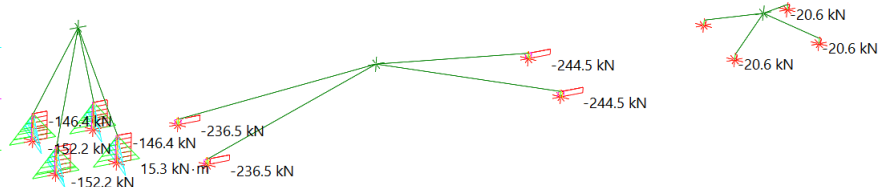


SLS and ULS Bearing Pressures



Tank Corner Actions

	MIN	MAX
SF1 (kN)	-33.9	33.9
	[Bm:6;Case:18]	[Bm:8;Case:14]
BM1 (kN·m)	-15.3	15.4
	[Bm:4;Case:14]	[Bm:2;Case:18]
SF2 (kN)	-33.3	33.3
	[Bm:5;Case:16]	[Bm:6;Case:12]
BM2 (kN·m)	-15.4	15.3
	[Bm:2;Case:12]	[Bm:4;Case:16]
AxForce (kN)	-244.5	13.0
	[Bm:6;Case:11]	[Bm:1;Case:29]



Check Pedestal

Bending			PD1
Beam Width	B	mm	600
Beam Depth	D	mm	600
Cover	c	mm	50
Bar Size	d _b	mm	12
Number of Bars	n	-	5
Shear Bar Size	d _{sv}	mm	10
Number of Legs	n _v	-	3
Spacing	s	mm	75
Compressive Strength	f _c	MPa	32
Tensile Steel Area	A _{st}	mm ²	565
Total Fitment Steel Area	A _{sf}	mm ²	236
Proportion Used for Shear	-	-	9%
Effective Depth	d	mm	534
	α2	-	0.802
	γ	-	0.89
	k _{uo}	-	0.039
	j _{uo}	-	0.983
	z = j _{ud}	mm	524.819
Max Moment	M*	kNm	20
Torsion			
Total Enclosed Area	A _{cp}	mm ²	360000
Outside Perimeter	u _c	mm	2400
Torsional Cracking Moment	φ _{tr}	kNm	70.56
Limit of Torsion	T* _{lim}	kNm	17.64
Max Shear	V*	kN	40
Max Torsion	T*	kNm	1
Max Axial (Tension +ve)	N*	kN	20
ULS Utilisation w/o Torsion R	-	-	1%
Equivalent Shear	V* _{eq}	kN	40
Larger Overall Dimension of F	y ₁	mm	490
Minimum Torsional Reinforce	A _{swmin}	mm ²	14.7
Area Provided	A _{sw}	mm ²	107
Width Enclosed by Fitments	x ₁	mm	490
Area Enclosed by Fitments	A _{oh}	mm ²	240100
Perimeter Enclosed by Fitmen	u _h	mm	1960
Steel Torsion Capacity	φ _{Tus}	kN	203.2
ULS Utilisation	-	-	0%
Shear			
Effective Shear Depth	d _v	mm	481
Aggregate Size	d _g	mm	20
	k _{dg}	-	1.00
Longitudinal Strain	ε _x	-	#####
Strut Angle	θ _v	deg	31.84
Shear Factor	k _v	-	0.22
Concrete Shear Capacity	φV _{uc}	kN	249
Min Shear Steel Area	A _{svmin}	mm ²	41
Shear Steel Area	A _{sv}	mm ²	22
Steel Shear Capacity	φV _{us}	kN	80
Shear Capacity	φV _u	kN	330
Max Capacity	φV _{umax}	kN	1592
ULS Utilisation - Direct Shear	-	-	12%
ULS Utilisation - Equivalent SF	-	-	12%
Additional Forces due to Torsion and Shear			
Longitudinal Tension Due to T	F _{td}	kN	3
Direct Tension	N*/2	kN	10
Tension from Bending	M*/z	kN	38
	T _{td}	kN	51
Capacity	φF _{td}	kN	240
Utilisation	-	-	21%
Governing - Torsion/Shear/Te	-	-	21%

Wind/EQ Calcs

Wind Loading					
Wind Region	-	-	A0		
Terrain Category	-	-	TC2		
Structure Height	z	m	10		
Regional Wind Speed	Vsls	m/s	37		
	Vult	m/s	45		
Factors	Mz,cat	-	0.96		
	Mt	-	1		
	Ms	-	1		
	Md	-	1		
	Mc	-	1		
Design Wind Speeds	vdcs-sl	m/s	35.5	kph	128
	vdcs-uls	m/s	43.2	kph	156
Base Pressures	PsIs/Cfig	kPa	0.76		
	Pult/Cfig	kPa	1.12		

EQ Loading			
Site Soil Class	-	-	De
Site Hazard Factor	Z	-	0.09
Probability Factor	kp	-	1
	kpZ	-	0.09
Design Category	-	-	EDCII
Structural Performance Factor	Sp	-	1
Ductility Factor	μ	-	2
Performance/Ductility Ratio	Sp/ μ	-	0.500

			Bitumen Tank	Diesel Tank	Adopted
	kt	-	0.11	0.05	
	hn	-	3.5	1.5	
Fundamental Period	T1	s	0.35	0.08	
Spectral Shape Factor	Ch(T1)	-	3.55	3.32	
Base Shear	V	%W	16.0%	14.9%	20.0%

AS3774 EQ coefficient	C	-	0.23	0.58
Site Factor	S	-	1.50	1.50
Importance Factor	I	-	1.00	1.00
Structural Response Factor	Rf	-	2.50	2.50
Base Shear	V	%W	13.5%	35.0%

Wind Transverse			ULP	Diesel	Bitumen
Length	L	m	3.1	12.2	2.5
Height	H	m	1.15	2.6	5.5
Drag Coefficient	Cd	-	2	2	1.2
Load for St7		kN	7.1	63.4	16.5
ULS Base Shear		kN	8.0	71.0	18.5

Wind Longitudinal			ULP	Diesel	Bitumen
Length	L	m	2.3	2.5	2.5
Height	H	m	1.15	2.6	5.5
Drag Coefficient	Cd	-	2	2	1.2
Load for St7		kN	5.3	13.0	16.5
ULS Base Shear		kN	5.9	14.6	18.5

Earthquake			ULP	Diesel	Bitumen
Empty Mass	me	t	2	13	6
Fluid Mass	mf	t	4	55	24
Total Mass	mt	t	6.0	68.0	30.0
ULS Base Shear		kN	11.8	133.3	58.8

Governing Base Shear		kN	11.8	133.3	58.8
Number of Supports	n	-	4	4	4
Support Shear		kN	2.9	33.3	14.7

Concrete Checks to AS3600

			Diesel Tank Footing EB1/2/3	Diesel Tank Slab Top	Diesel Tank Slab Btm	ULP Tank Footing EB4/5	ULP Tank Slab Top	Bitumen Tank Thick	Bitumen Tank Thin	Bitumen Tank Walls
Thickness/Depth	t	mm	375	200	200	300	200	425	200	200
Cover	c	mm	50	40	50	50	40	50	40	90
Effective Depth	d	mm	316	156	144	242	156	367	154	104
Bar Size	db	mm	18	9	12	16	9	16	12	12
Bar Spacing	s	mm	170	200	200	170	200	200	200	200
Steel Area	Ast	mm ² /m	1497	318	565	1183	318	1005	565	565
Min Steel Flexure	Astmin1	mm ² /m	574	332	358	480	332	635	335	496
Crack Requirement	-	-	Strong	Moderate	Moderate	Strong	Moderate	Strong	Strong	Strong
Min Steel Crack	Astmin2	mm ²	1125	350	350	900	350	1275	600	600
Min Steel Utilisation	-	-	75%	110%	63%	76%	110%	127%	106%	106%
Concrete Grade	fc	MPa	32	32	32	32	32	32	32	32
Bending Capacity	φMu0	kNm/m	181	19	31	109	19	144	34	22
Bending Moment	M*	kNm/m	80	10	10	10	10	30	10	10
Utilisation	-	-	44%	52%	32%	9%	52%	21%	30%	45%
Tensile Capacity	φN	kN/m	599	127	226	473	127	402	226	226
Total Tension	N*	kN/m	200	100	100	20	10	60	40	100
Utilisation w Tension	-	-	61%	91%	54%	11%	55%	28%	39%	67%
Shear Bar Size	db	mm	10	0	10	10	0	0	0	0
Grade	fsyf	mm	500	500	500	500	500	500	500	500
Lateral Spacing	slat	mm	200	200	200	200	200	200	200	200
Longitudinal Spacing	slong	mm	200	200	200	400	400	400	400	400
Shear Reo	Asv	mm ² /m	393	0	393	393	0	0	0	0
Min Shear Reo	Asvmin	mm ² /m	140	140	140	280	280	280	280	280
Concrete Shear Capacity	φVuc	kN/m	167	70	81	136	70	155	84	67
Steel Shear Capacity	φVus	kN/m	217	0	99	83	0	0	0	0
Combined Shear Capacity	φVuc	kN/m	384	70	180	219	70	155	84	67
Shear Force	V*	kN/m	200	30	30	20	10	80	30	30
Utilisation	-	-	52%	43%	17%	9%	14%	52%	36%	45%

* All moderate degree crack control under tank itself

Punching Shear Checks (T48 and AS3600)

Max Axial	N*uls	kN	250	250	250	30	30	200
Shear Depth	dom	mm	316	156	144	242	156	367
Load Length	Y	mm	200	200	200	200	200	500
Load Width	X	mm	200	200	200	200	200	500
Aspect	βh	-	1.00	1.00	1.00	1.00	1.00	1.00
Shear Strength	fcv	MPa	1.92	1.92	1.92	1.92	1.92	1.92
Shear Perimeter	u	mm	2064	1422	1376	1768	1422	3468
Punching Capacity w/o M	φVuo	kN	878	298	267	576	298	1714
Utilisation	-	-	28%	84%	94%	5%	10%	12%

Impact Loading

Barrier Load	F	kN	40.0
ULS Factor	-	-	1.5
ULS Barrier Load	F	kN	60
Resultant Height	H	m	0.6
Design Shear	V*	kN	60
Design Moment	M*	kNm	36

Gross mass of vehicle	m	t	30.0	1.5
		kg	30000	1500
Crumple Zone	$\Delta 1$	m	0.20	0.10
Barrier Gap	$\Delta 2$	m	0.30	0.30
Deceleration Length	Δt	m	0.50	0.40
Vehicle Speed	v	kph	5.00	20.00
		m/s	1.4	5.6
Impact Force	F	kN	58	58

HILTI PROFIS ENGINEERING Coonamble Refuelling Botard (Drafts) - Australia, AS 5216:2021 based, AS 5216:2021, ETA 20/0541

ANCHOR

Family: HIT-RE 500 V4 + HAS
Type: HIT-RE 500 V4 + HAS 5.8
Size: M24
View ETA

Insert item #
No standard item number available. Please contact Hilti to check feasibility of supply.

Mortar item #
2287553 HIT-RE 500 V4
Embedment depth h_{ef}
225 mm

LAYOUT

Rotation: 0°

INSTALLATION

☐ No hole clearance

SMART DESIGN

HIT-RE 500 V4 + HAS 5.8 M24 225...

Generate report

ANCHOR LOADS

Anchor	N (kN)	Vx (kN)	Vy (kN)
1	49.254	0	15
2	49.254	0	15
3	0	0	15
4	0	0	15

ANCHOR DESIGN

Tension

- Steel: 42%
- Concrete breakout: 80%
- Bond: 63%
- Splitting: 69%

Shear

- Steel: 18%
- Concrete: 77%

Design loads

Sustained loads

N°	Name	Type	Loads	Forces (kN)	Moments (kNm)	Utilisation				
				Vx	Vy	N	Mx	My	Mz	Total
1	Combination 1	Design		0	60	0	-32	0	0	80%
		Sustained				0	0	0	0	

ACTIONS

219.1 x 6.4 CHS DESIGN SUMMARY (AS 4100)

CATEGORY: Circular Hollow Section
TYPE: Austube Mills C350L0

LOAD CASE 01: Default [35.08%]

Nx*: 32.00 kNm
Vx*: 58.00 kN

SECTION PROPERTIES

CLASS:	CF	GRADE:	C350	MASS:	33.6 kg/m	d:	219.1 mm
t:	6.4 mm	f _y :	350 MPa	f _u :	430 MPa	Ag:	4277 mm ²
I:	2.4207E+7 mm ⁴	r:	75.2 mm	Z:	2.2093E+5 mm ³	S:	2.8963E+5 mm ³
J:	4.8413E+7 mm ⁴	I _w :	0 mm ⁴	C:	4.4193E+5 mm ³	AS:	COMPACT
Ze:	2.8963E+5 mm ³	kf:	1.000	ab:	-0.5	E:	200000 MPa

BENDING [35.08%]

$\phi_{Ms} = \phi \times f_y \times Z_e$
 $= 0.9 \times 350 \times 289632$
 $= 91.23 \text{ kNm [35.08%]}$

* Circular sections not susceptible to lateral buckling, such that $\phi_{Mb} = \phi_{Ms}$.

$\phi_{Mb} = 91.23 \text{ kNm [35.08%]}$

SHEAR [11.96%]

DOCUMENT

101.6 x 2.6 CHS - [FAIL]
 101.6 x 3.2 CHS - [FAIL]
 114.3 x 3.2 CHS - [FAIL]
 114.3 x 3.6 CHS - [FAIL]
 139.7 x 3.0 CHS - [FAIL]
 139.7 x 3.5 CHS - [FAIL]
 165.1 x 3.0 CHS - [FAIL]
 165.1 x 3.5 CHS - [117.35%]
 168.3 x 4.8 CHS - [79.15%]
 168.3 x 6.4 CHS - [60.53%]
 168.3 x 7.1 CHS - [55.03%]
 219.1 x 4.8 CHS - [48.30%]
219.1 x 6.4 CHS - [35.08%]
 219.1 x 8.2 CHS - [27.84%]
 26.9 x 2.0 CHS - [FAIL]
 26.9 x 2.3 CHS - [FAIL]
 273.1 x 12.7 CHS - [111.79%]
 273.1 x 4.8 CHS - [32.54%]
 273.1 x 6.4 CHS - [23.06%]

Bending [35.08%]
Shear [11.96%]
Bending & Shear [35.08%]

Appendix C – Equipment Datasheets

VERDEX – PRODUCT INFORMATION SHEET



Eyewash Stations

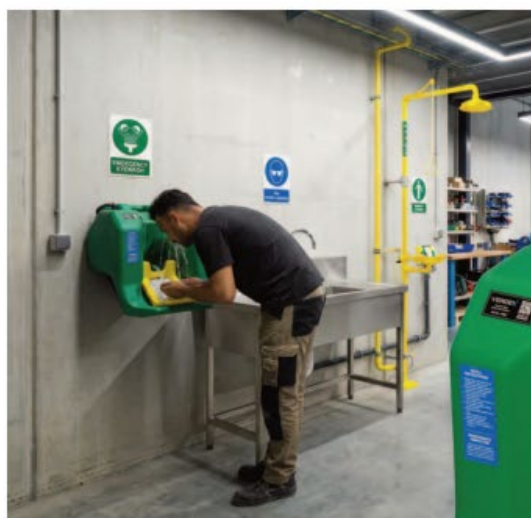
- Supports quick emergency response in the event of chemical exposure

V9655 Emergency Shower & Eyewash Combination Unit key features:

- Material: Stainless steel 304
- Finish: Epoxy Coating – Yellow
- Operating Pressure: 250 to 400kpa
- Eyewash Flow Rate : $\geq 11.4\text{L/min}$
- Shower Flow Rate: $\geq 75.7\text{L/min}$
- Hand or foot operated for easy use

V9660 Portable Eyewash Station 60L key features:

- Material: PE (Polyethylene)
- Rated Capacity: 60L
- Functional Capacity: 58L
- Water Flow Rate: $\geq 1.5\text{L/min}$ per nozzle
- Flushing Time / Duration: $\geq 15\text{min}$
- Pull handle for quick activation
- Dual aerated spray nozzles for even, gentle water flow
- Wall-mountable, free standing
- Complies with ANSI Z358.1, AS 4775, EN 15154, and OSHA 29 requirements



V9660

V9655

Code	Details	Unit Weight (kg)
V9660	Portable Eyewash Station (60L)	10
V9655	Emergency Shower & Eyewash Combination Unit	13.5

DATASHEET

Fuelfix & Tanks2Go Spill Grate

The versatile Spill Grate is a Fuelfix innovation introduced as a response to customers who require on-site containment of accidental spillages and safer hard stand areas, particularly at refuelling bays and truck unloading areas. The environmental impact of hydrocarbon incidents can be mitigated by appropriate placement of the Spill Grates.



Movable

The lifting points (eyelet on each corner) are designed to allow safe and easy handling. Each Spill Grate has 3 removable grating sections for easy cleaning access.

Modular

The modular design enables multiple units to be installed together to deliver a combined catchment area, with optional interconnection boots to provide a single integrated bund. Endlessly customisable, the use of Fuelfix's Spill Grates forms the basis of any environmentally conscious hydrocarbons site.

Stackable

The modular units are easy to stack, thus making them easier to store and transport.

Adaptable

Spill Grates can also be tailored to provide bunding for IBC containers, single skin tanks, pump modules, generator day tanks and filtration banks.

Weight (Approximate): 1,500kg	Height: 281 mm
Holding Capacity: 1,200L	Length: 3,016 mm
Rated to: 240T (Engineering certified)	Width: 2,016 mm

These specifications are subject to variation. Please contact the Fuelfix Sales team for more information.

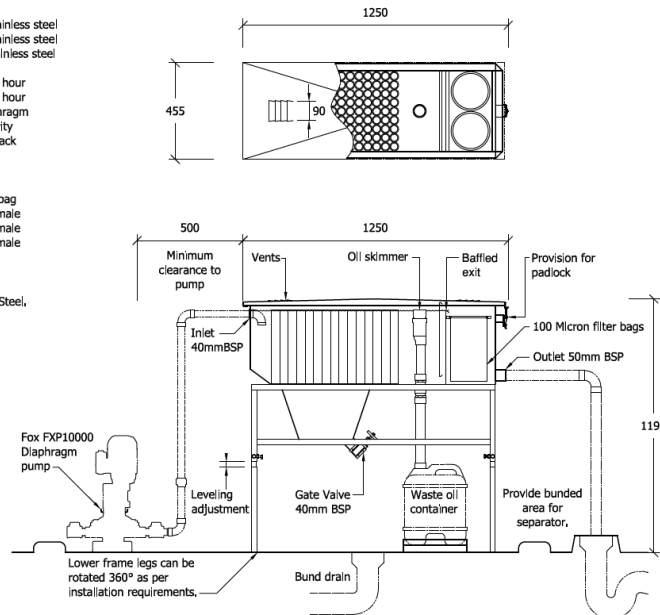


Specification FX1500SS-D Oil/Water Separator

SPECIFICATIONS

Material - Tank	1.6mm 304 stainless steel
Lid	1.2mm 304 stainless steel
Stand	25mm SHS stainless steel
Maximum flow rate	1500 litres per hour
Actual flow rate	1170 litres per hour
Pump type	FXP1500 Diaphragm
Separation process	Enhanced gravity
Coalescing medium	Vertical tube pack
Weight (empty)	56 kg
Weight (full)	220 kg
Volume	160 litres net
Polishing filter	2x100 micron bag
Inlet	40mm BSP Female
Outlet	50mm BSP Female
Gate Valve	40mm BSP Female

Note:
For marine applications Separator can be supplied in 316 or 445m Grade Stainless Steel.



VTC Filter pack Specification

Tube	42 mm Dia.
Block Size	378x630x350mm
Volume	0.08 m³
Surface Area	21 m²

Note:
This unit is designed for use with "Quick Break Detergents" only. Use of solvent based detergents will affect the efficiency of the unit and may void the warranty.



This is a schematic representation only. Site size and gradient to engineers details as arranged by customer. All plumbing and electrical connections to be installed by certified tradesmen in accordance with relative authorities requirements. Tradesmen to be engaged by the purchaser. System to be approved by relative Local Authorities before installation.

This Drawing and design is the Property of Fox Environmental Systems Pty Ltd. It must not be used for any other purpose than that for which it was issued.

Project
Fox FX1500SS-D Specification

Drawing Title
FX1500SS-D Oil/Water Separator

Drawn by:	JFS
Date:	01/11/2010
Scale:	1:20
Drawing No:	A4-SPEC-1021

FUEL FACILITY – SIGNAGE REQUIREMENTS

All signage shall be in accordance with AS 1319:1994 (Safety signs for the occupational environment) and AS 1940:2017.

1. HAZARDOUS AREA SIGNAGE

ZONE 1 SIGN



SIZE: 300mm (W) x 225mm (H) minimum
MATERIAL: Metal or rigid durable material
COLOUR: Red, black and white
LOCATION: At all entrances to Zone 1 areas and clearly visible.

ZONE 2 SIGN



SIZE: 300mm (W) x 225mm (H) minimum
MATERIAL: Metal or rigid durable material
COLOUR: Red, black and white
LOCATION: At all entrances to Zone 2 areas and clearly visible.

2. GENERAL SAFETY SIGNAGE



SIZE: 300mm (W) x 225mm (H)
MATERIAL: Metal
COLOUR: Red, black and white
LOCATION: At fill point, dispensers and tank areas.



SIZE: 300mm (W) x 225mm (H)
MATERIAL: Metal
COLOUR: Red, black and white
LOCATION: At fill point, dispensers and tank areas.



SIZE: 300mm (W) x 225mm (H)
MATERIAL: Metal
COLOUR: Blue, black and white
LOCATION: At fill point and dispensers.



SIZE: 300mm (W) x 225mm (H)
MATERIAL: Metal
COLOUR: Blue, black and white
LOCATION: At tanker bonding point.

3. TANKER BONDING SIGN



SIZE: 400mm (W) x 250mm (H) minimum
MATERIAL: Metal
COLOUR: Blue and white
LOCATION: Adjacent to tanker fill connection / bonding point.

4. EMERGENCY STOP SIGN



SIZE: 200mm (W) x 300mm (H) minimum
MATERIAL: Metal
COLOUR: Red and white
LOCATION: Above or adjacent to E-Stop button (outside hazardous area where possible).

5. FUEL TYPE IDENTIFICATION



SIZE: 300mm (W) x 150mm (H) minimum
MATERIAL: Metal
COLOUR: Green, black and white
LOCATION: At ULP tank, dispenser and fill points.



SIZE: 300mm (W) x 150mm (H) minimum
MATERIAL: Metal
COLOUR: Yellow, black and white
LOCATION: At Diesel tank, dispenser and fill points.



SIZE: 300mm (W) x 150mm (H) minimum
MATERIAL: Metal
COLOUR: Black and white
LOCATION: At Bitumen tank and fill points.

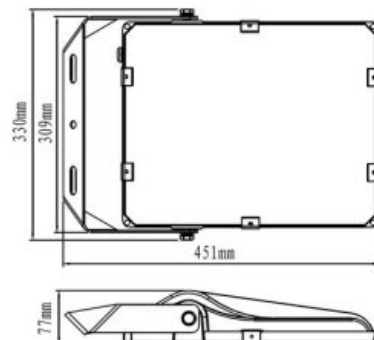
NOTES:

- All signs shall be securely fixed, clearly visible and maintained in a legible condition.
- Signs shall be constructed from durable materials suitable for outdoor environments.
- Additional signage may be required to address site specific hazards and operational requirements.
- No ignition sources permitted within hazardous areas unless certified for the applicable zone.



CF Series

COMMERICAL LED FLOODLIGHT - 150W



The CF series LED floodlight is a powerful yet compact commercial LED fitting. With high spec Philips LED chips and specialised secondary optics to minimise light spillage, the CF Series flood is the ultimate commercial LED floodlight.

Features

- Heavy duty construction
- Flicker free driver
- High Efficiency Lumiled Chips
- High efficiency Philips LED chips
- Specialised optics available
- Full range of motion on mounting bracket
- 1.5m cable with AU plug

Applications

- Sports lighting
- Hard stands
- Security lighting
- Signage



Scan for app



1300 551 942

sales@integratedpower.net.au

*For full warranty terms and conditions visit www.integratedpower.net.au

Standard Specifications

- Input Voltage: 220 - 240 Vac
- Rated input power: 150W
- Lumen Output: 21,000lm
- Colour Temperature: 5000K (4000K, 3000K optional)
- CRI Rating: CRI>80 (*CRI > 85 / GS)
- SDCM Rating: < 3
- IP Rating: IP66
- IK Rating: IK08
- Service Life: L70>50,000hrs
- Optics: Asymmetric Lens
- Weight: 4.5 kg
- Dimensions: 330 x 77 x 451mm

Option List

- 0-10V Dimming / 0-10V
- DALI Dimming / DALI
- Greenstar Specification* / GS

IES Files

IES CF2150BL4KN01 150W ASYM

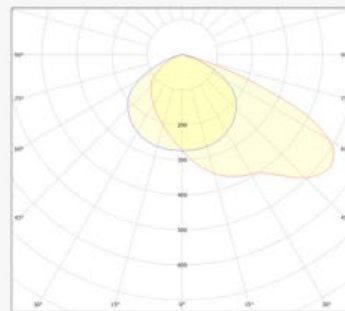
Models List

Black / 5000K	CF2150BL5KN01
Black / 4000K	CF2150BL4KN01

Accessories

Pole Bracket Adaptor - 60mm	CFADP60B
Pole Bracket Adaptor - 76mm	CFADP76B
Pole Clamp Bracket 40-150mm	CFCL150B
Protective Wire Mesh Cover	CF2150PWM01

Photometric Chart



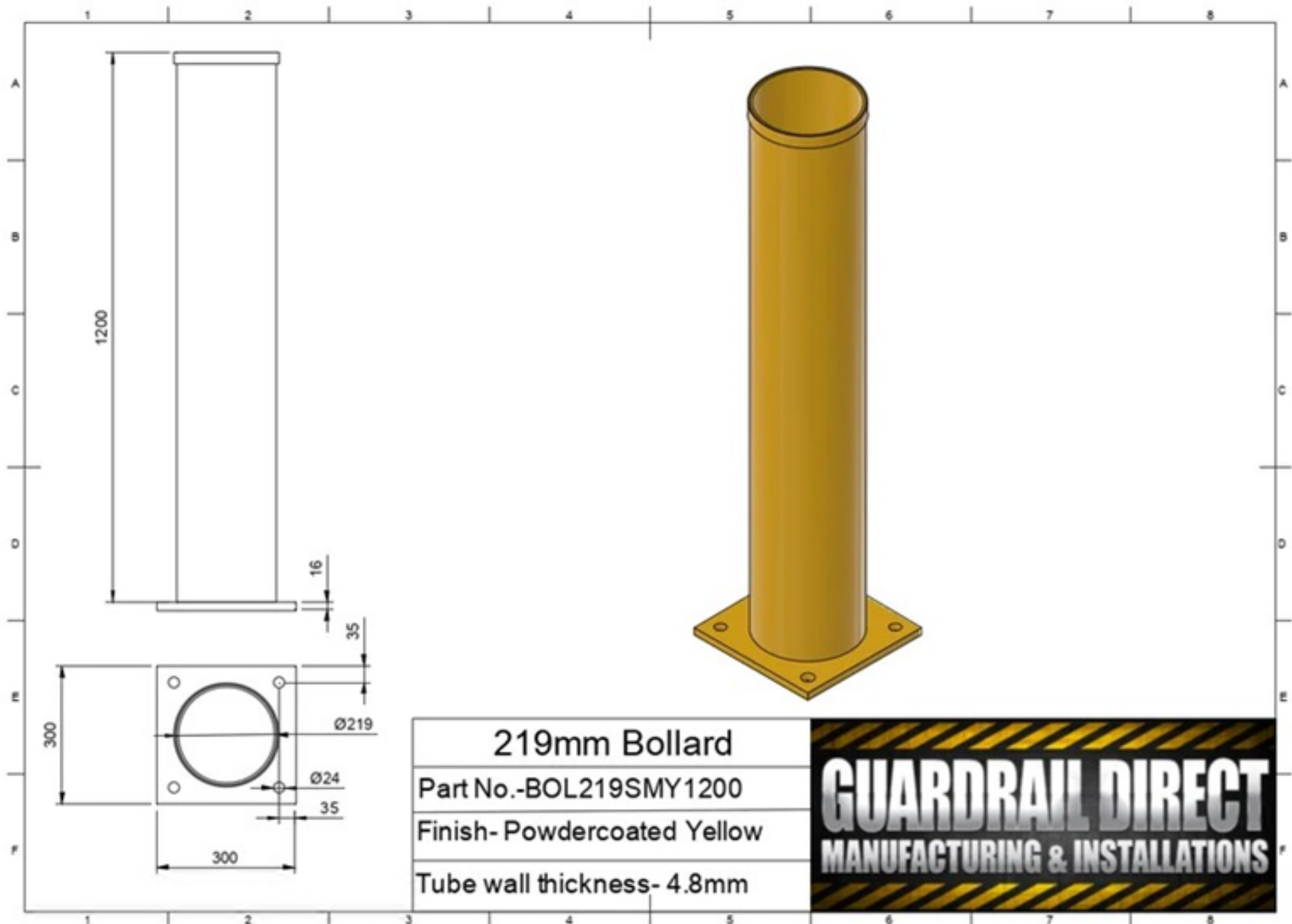
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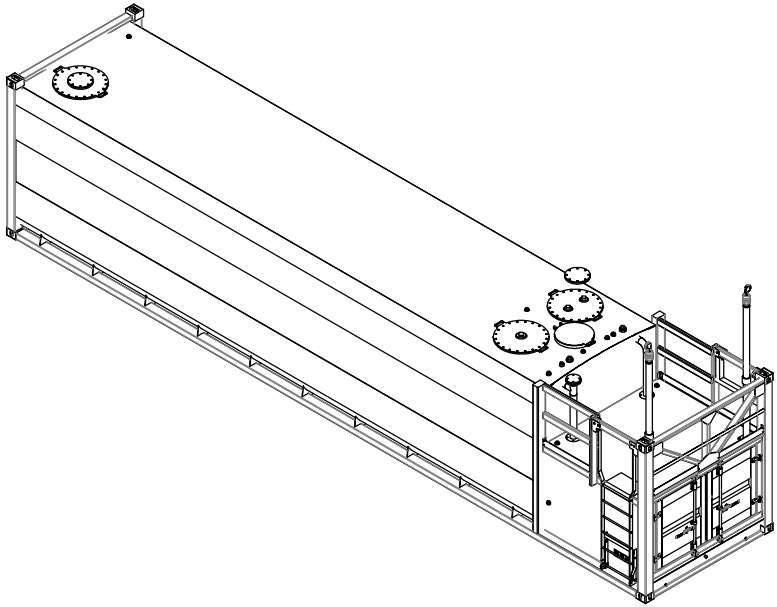
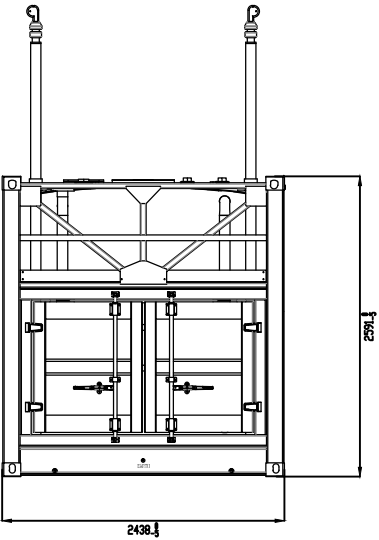


1300 551 942

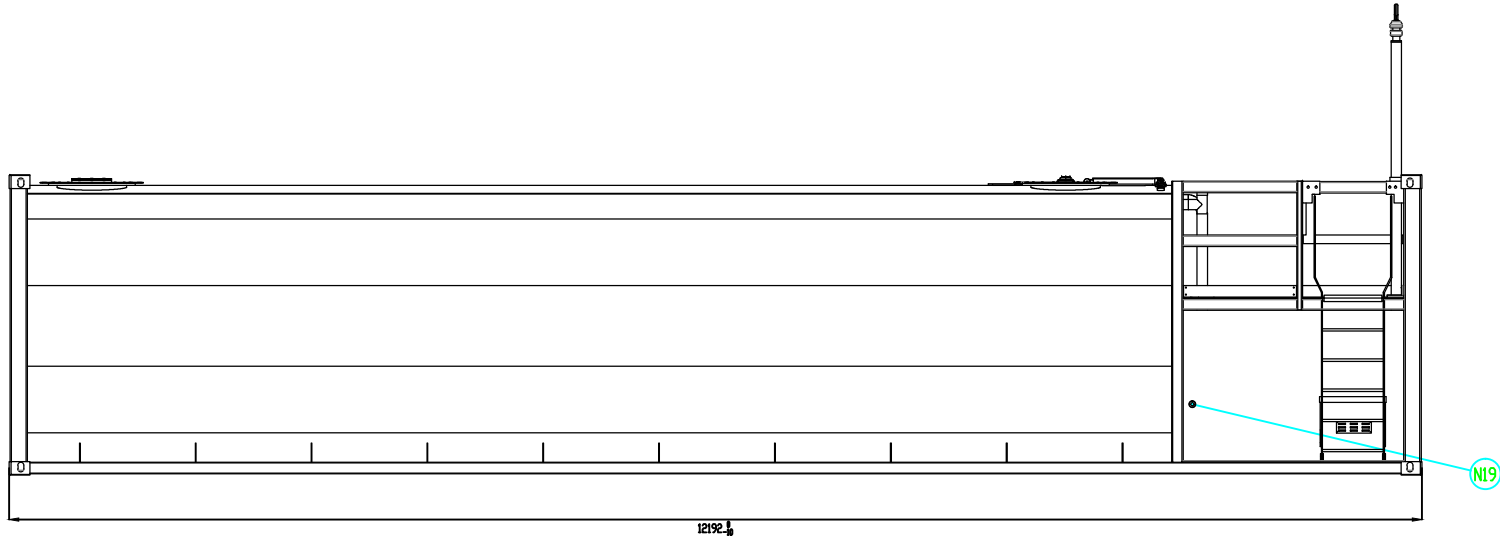
sales@integratedpower.net.au

*For full warranty terms and conditions visit www.integratedpower.net.au



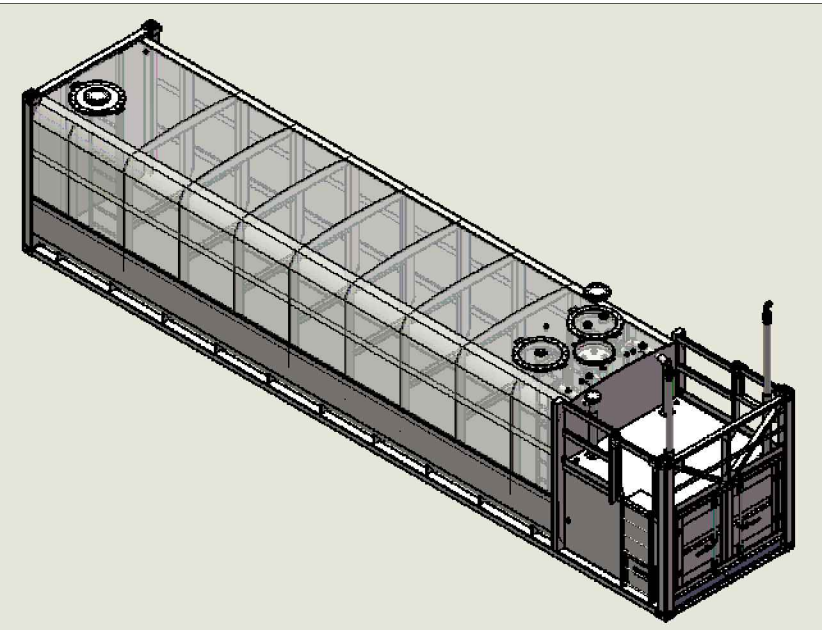
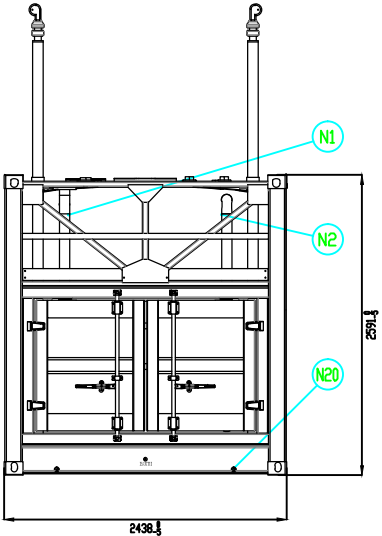
Autodesk

Autodesk

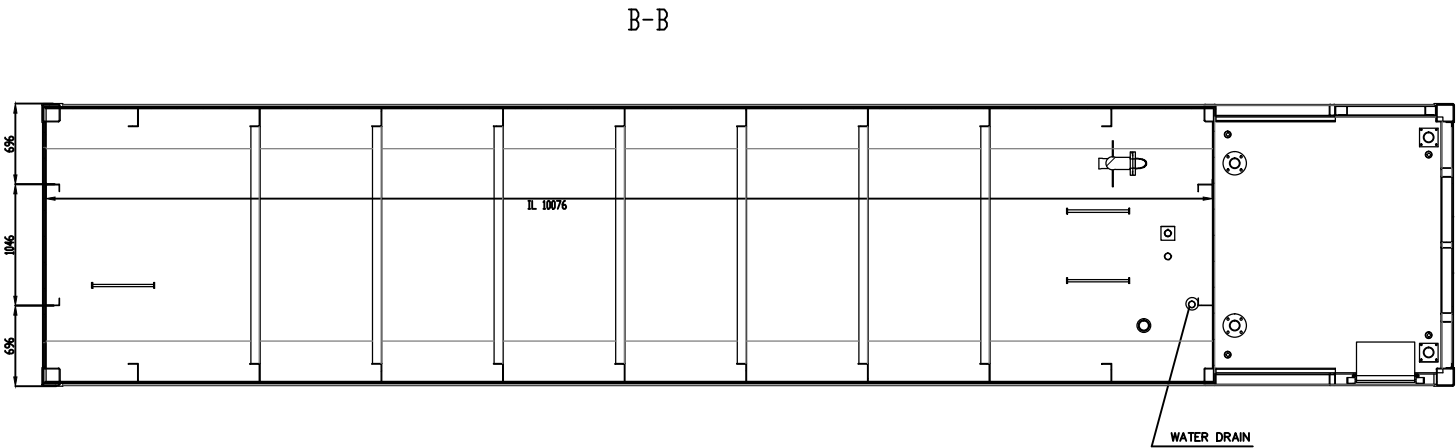
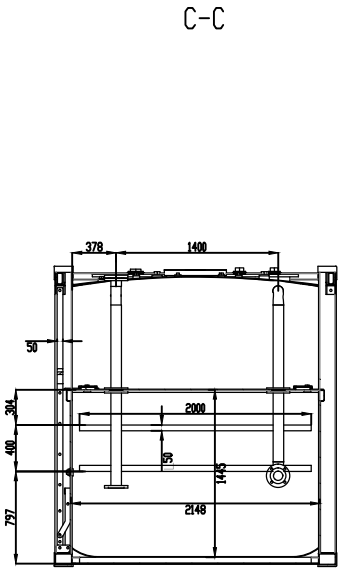
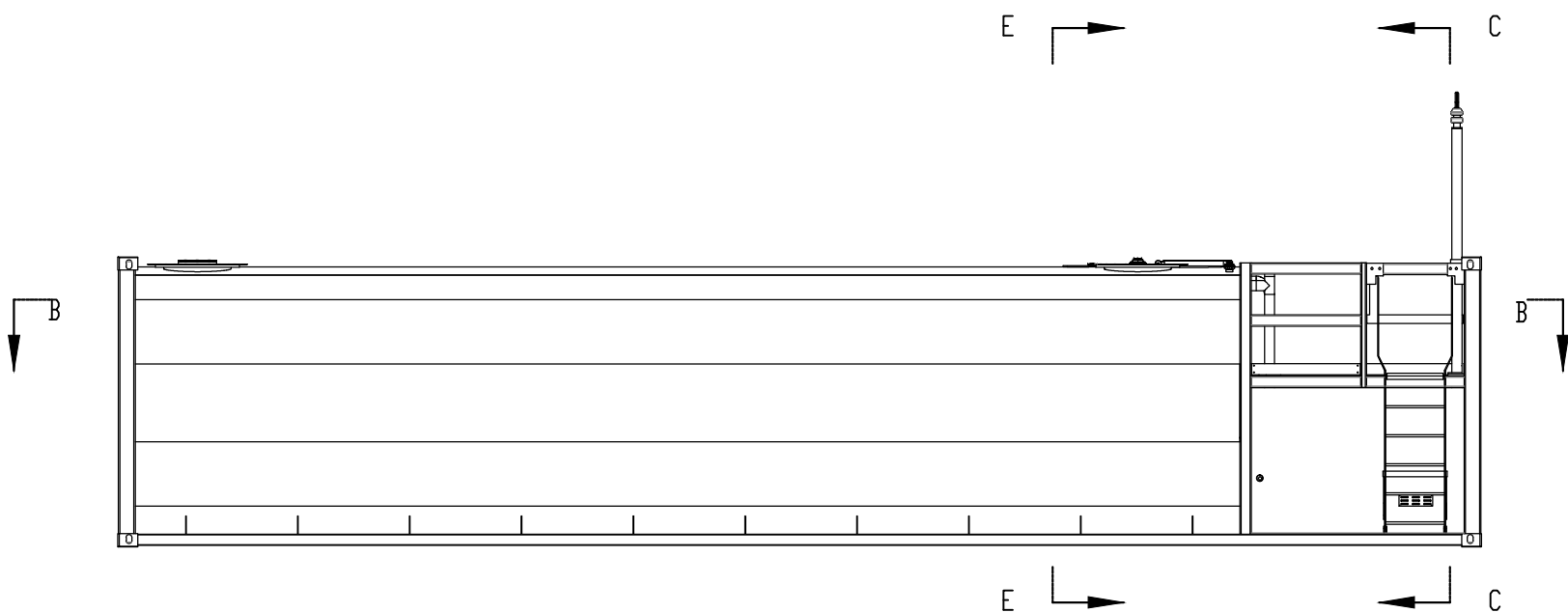


NOZZLE NO.	SIZE	CONNECTION TYPE	DESCRIPTION
N1	DN80	ANSI CLASS 150 FLANGE	SUCTION C/W DN80 PIPE 110mm FROM FLOOR & ANTI-SYPHON VALVE
N2	DN80	ANSI CLASS 150 FLANGE	FILL PIPE C/W DN80 PIPE W/ ELBOW 44mm FROM FLOOR & OVERFILL PROTECTION VALVE AND SPOOL
N3	600	MANWAY	600mm MANWAY C/W DN100 x 75 BSP-F SOCKET FOR SUB PUMP
N4	DN80	BSP-F x 75 LONG	SPARE / GAUGE / VENT
N5	DN50	BSP-F x 50 LONG	SPARE / GAUGE / VENT
N6	DN50	BSP-F x 50 LONG	OVERFILL WARNING ALARM
N7	DN50	BSP-M x 35 LONG	PRIMARY TANK DIP C/W DN50 PIPE 25mm HIGH OPENING FROM DIP STRIKE
N8	DN50	BSP-M x 35 LONG	INTERSTITIAL SPACE DIP
N9	DN50	BSP-M x 35 LONG	SPARE / GAUGE / VENT
N10	DN50	BSP-F x 50 LONG	SPARE / GAUGE
N11	DN50	BSP-F x 50 LONG	INTERSTITIAL SPACE EMERGENCY VENT
N12	DN80	BSP-F x 75 LONG	SPARE / GAUGE / VENT
N13	DN50	BSP-F x 50 LONG	SPARE / GAUGE
N14	DN50	BSP-F x 50 LONG	SPARE / GAUGE / VENT
N15	600	MANWAY	600mm MANWAY C/W DN150 x 75 BSP-F SOCKET FOR SUB PUMP
N16	DN50	BSP-F x 50 LONG	SPARE / GAUGE / VENT
N17	DN50	BSP-F x 50 LONG	SPARE / GAUGE / VENT
N18	DN50	BSP-F x 50 LONG	SPARE (INTO PUMP BAY) / EXTERNAL ELECTRICALS
N19	DN50	BSP-F x 50 LONG	SPARE (INTO PUMP BAY) / EXTERNAL ELECTRICALS
N20	DN50	BSP-F x 50 LONG	PUMP BUND DRAIN
N21	600	MANWAY	600mm MANWAY / DN200 PROMARY TANK EMERGENCY VENT
N21	DN200	ANSI CLASS 150 FLANGE	DN200 INTERSTITIAL SPACE EMERGENCY VENT

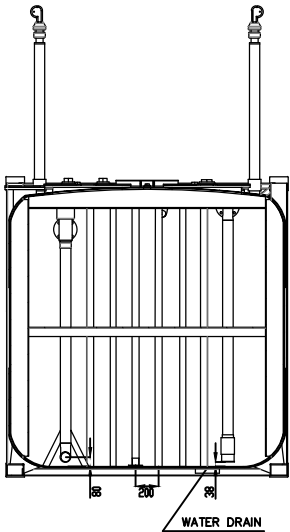
BSP-F: BSP FEMALE THREAD
BSP-M: BSP MALE THREAD



COPYRIGHT 2019 THE CONTENTS OF THIS DRAWING REMAINS THE PROPERTY OF FES CONTAINERS TANKS		TOLERANCES : ALL DIMENSIONS IN MM UNLESS STATED OTHERWISE, ALL TOLERANCES TO BE AS FOLLOWS: 0.00 : 0.00 : ANG :		FES TANKS FUELEQUIPMENTSPECIALISTS		TITLE : FES ABOVE GROUND TANKS	
DESIGN		SIGN	DATE	MATERIAL	WEIGHT	PART NO : G55 LAYOUT	
CHECKED		CHEN KAI	2019.1.25	Q235B	12,300 kgs	DWG. NO. FES-G55-DR002	
VERIFIED						SHEET : 2 TOTAL SHEET : 3 SCALE : NTS	
APPROVED							



E-E



COPYRIGHT 2019 THE CONTENTS OF THIS DRAWING REMAINS THE PROPERTY OF FES CONTAINERS TANKS			TOLERANCES : ALL DIMENSIONS IN MM UNLESS STATED OTHERWISE, ALL TOLERANCES TO BE AS FOLLOWS: 0.0 0.00 0.05						TITLE : FES ABOVE GROUND TANKS				
									PART NO : G55 LAYOUT				
							SIGN	DATE	MATERIAL	WEIGHT	DWG. NO. FES-G55-DR003		
						DESIGN CHECKED VERIFIED APPROVED	CHEN KAI	2019.1.25	Q235B	12,300 kgs			
				REVISION 01	SHEET : 3	TOTAL SHEET : 3	SCALE : NTS						

GENERAL NOTES

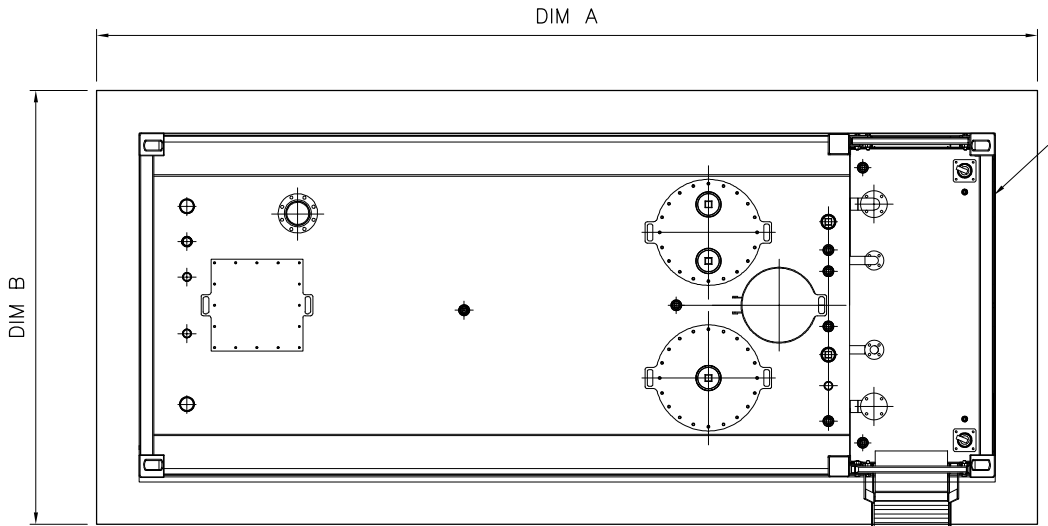
1. ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS NOTED OTHERWISE. ALL LEVELS ARE IN MILLIMETRES EXACT SETOUT & LOCATION TO BE CONFIRMED PRIOR TO EXCAVATION.

GROUND & BACKFILL CONDITIONS

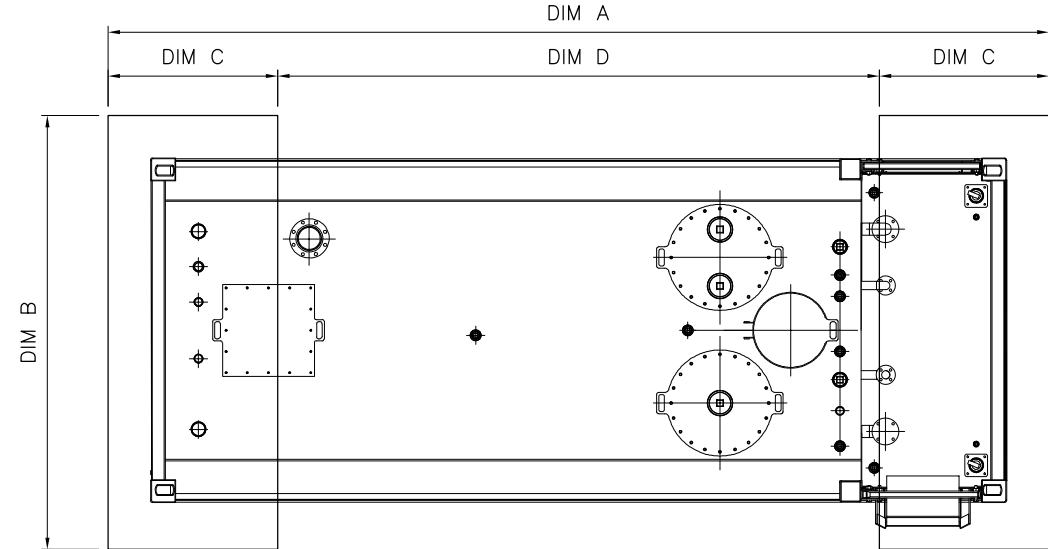
1. ALL TOPSOIL AND DELETERIOUS MATERIAL IS TO BE REMOVED PRIOR TO THE COMMENCEMENT OF EARTHWORKS.
2. FOUNDATION MATERIAL SHALL BE FIRM AND LEVEL. MACHINE PREPARATION MAY BE REQUIRED TO ACHIEVE THIS. NO VISIBLE DEFLECTION ALLOWED UNDER FOOTPRINT OF WORK AREA.
3. ANY IDENTIFIED SOFT SPOTS TO BE REMOVED AND COMPETENT MATERIAL PLACED & COMPACTED.
4. EXISTING GROUND CONDITIONS ASSUMED TO BE MINIMUM 100kPa BEARING CAPACITY.
5. POSITIVE DRAINAGE AWAY FROM TANK BASE TO BE ACHIEVED AT COMPLETION OF CONCRETE WORKS.

CONCRETE NOTES

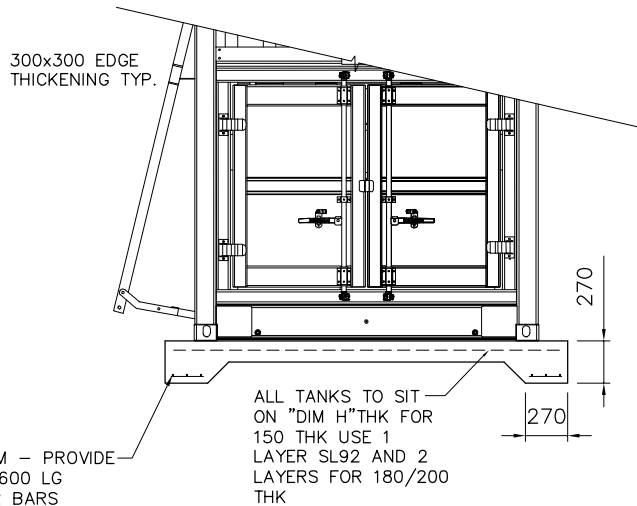
1. ALL CONCRETE WORK TO BE IN ACCORDANCE WITH AS 3600 WITH SPECIAL CONSIDERATION OF EXPOSURE CLASSIFICATION & COVER REQUIREMENTS.
2. CONCRETE CLASS TO BE N32, 20mm MAXIMUM AGGREGATE, 80mm SLUMP. USE OF CLIENT APPROVED ACCELERANTS TO BE USED THROUGH CONSULTATION WITH CONCRETE SUPPLIER.
3. MINIMUM COVER TO BE 60mm FOR FOOTINGS AGAINST GROUND, 40mm ELSEWHERE.
4. ALL CONCRETE FINISHES AS PER CLIENT'S REQUIREMENTS.
5. CURING TIME TO BE DETERMINED FROM CONCRETE CYLINDER STRENGTH RESULTS. SLAB TO ATTAIN A STRENGTH OF 28MPa OR 7 DAYS MINIMUM PRIOR TO USE.
6. CURING SHALL BE ACHIEVED BY THE APPLICATION OF WATER TO, OR THE RETENTION OF WATER IN, THE FRESHLY CAST CONCRETE AND SHALL COMMENCE AS SOON AS PRACTICABLE AFTER THE PLACEMENT.
7. ALL CONCRETE SHALL BE PROPERLY COMPACTED USING APPROVED METHODS.
8. FORMWORK SHALL BE DESIGNED, CONSTRUCTED AND STRIPPED IN ACCORDANCE WITH AS3610.
9. ALL REINFORCEMENT SHALL COMPLY WITH AS4671 & 3600.
10. ALL REINFORCEMENT TO BE INSTALLED SUCH THAT IT IS NOT DISPLACED DURING CONCRETE PLACEMENT.
11. NO HOLES, CHASES OR EMBEDMENT OF PIPES OTHER THAN THOSE SHOWN ON THESE DRAWINGS ARE ALLOWED AND CONSULTATION WITH THE ENGINEER IS REQUIRED SHOULD CHANGES BE REQUIRED.



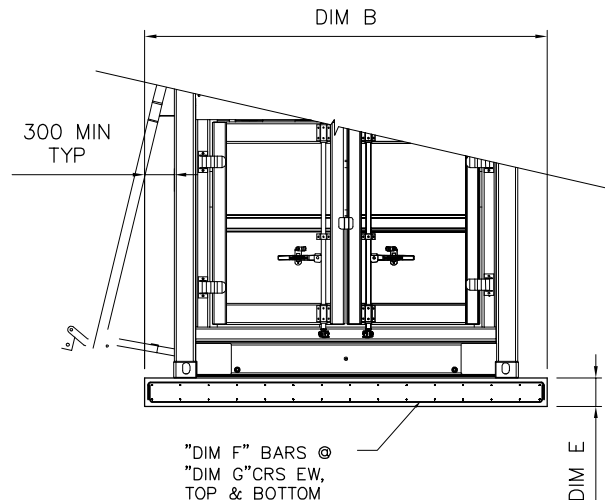
PLAN-CONCRETE BASE



PLAN-FOOTING BASE



ELEVATION-CONCRETE BASE



ELEVATION-FOOTING BASE

FES GRANDE TANK SPECIFICATIONS

MODEL	CAPACITY	SFL	TARE	LENGTH	WIDTH	HEIGHT	FOOTPRINT	DIM A	DIM B	DIM C	DIM D	DIM E	DIM F	DIM G	DIM H
	L	L	KG	mm	mm	mm	FT	mm	mm	mm	mm	mm	BARS	mm	mm
FES GRANDE 12/FES Grande 12 Aviation	11850L	11240L	4825	2991	2438	2896	10FT	3591	3100	900	1791	200	N12	200	150
FES GRANDE 20/FES Grande 20 Aviation	18185L	17275L	4730	2991	2438	2896	10FT	3591	3100	900	1791	200	N12	200	150
FES GRANDE 30/FES Grande 30 Aviation	30900L	29350L	7705	6058	2438	2896	20FT	6658	3100	1200	4258	250	N12	200	150
FES GRANDE 30 W AD BLU	21750L / 7016L	20620L / 6666L	8125	6058	2438	2896	20FT	6658	3100	1200	4258	250	N12	200	150
FES GRANDE 38/FES Grande 38 Aviation	37250L	35380L	7550	6058	2438	2896	20FT	6658	3100	1200	4258	250	N12	200	150
FES GRANDE 40/FES Grande 40 Aviation	40840L	38800L	10450	6058	2438	3200	20FT	6658	3100	1200	4258	250	N12	200	150
FES GRANDE 55/FES Grande 55 Aviation	60900L	57850L	12650	12192	2438	2591	40FT	12792	3100	1800	9192	300	N16	200	180
FES GRANDE 68/FES Grande 68 Aviation	69020L	65570L	13570	12192	2438	2896	40FT	12792	3100	1800	9192	300	N16	200	180
FES GRANDE 68 W AD BLU	59950L / 7016L	56952L / 6666L	14015	12192	2438	2896	40FT	12792	3100	1800	9192	300	N16	200	180
FES GRANDE 75/FES Grande 75 Aviation	75500L	71725L	13470	12192	2438	2896	40FT	12792	3100	1800	9192	300	N16	200	180
FES GRANDE 80/FES Grande 80 Aviation	82940L	78790L	16280	14630	2438	2896	48FT	15230	3100	2400	10430	350	N20	200	200
FES GRANDE 80 W AD BLU	73308L / 7310L	69308L / 6945L	16648	14630	2438	2896	48FT	15230	3100	2400	10430	350	N20	200	200
FES GRANDE 90/FES Grande 90 Aviation	90500L	85970L	16260	14630	2438	2896	48FT	15230	3100	2400	10430	350	N20	200	200
FES GRANDE 90 w Pump Bay	92450L	87820L	18050	14630	2438	3200	48FT	15230	3100	2400	10430	350	N20	200	200
FES GRANDE 100/FES Grande 100 Aviation	101000L	95900L	17190	14630	2438	3200	48FT	15230	3100	2400	10430	350	N20	200	200
FES GRANDE 100 w Pump Pay	102300L	97185L	18500	14630	2438	3550	48FT	15230	3100	2400	10430	350	N20	200	200
FES GRANDE 110/FES Grande 110 Aviation	112850L	107200L	18600	14630	2438	3550	48FT	15230	3100	2400	10430	350	N20	200	200
FES GRANDE 110 w Pump Bay/FES Grande 110 Aviation w Pump Bay	112850L	107200L	18600	15865	2438	3550	52FT	16465	3100	2800	10865	400	N20	200	250
FES GRANDE 110 W AD BLU	100062L /	95059L /	18893	14630	2438	3550	48FT	15230	3100	2400	10430	350	N20	200	200

IF IN DOUBT ASK
THIS DOCUMENT BECOMES
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CHECK THE REVISION IS CURRENT

REGISTERED PROFESSIONAL
ENGINEER QUEENSLAND

RPEQ NO: 16203
SIGNATURE: [Signature]
DATE: 22.03.21

ISSUED FOR CONSTRUCTION



REV	DESCRIPTION	BY	CHKD.	APP'VD	DATE	SCALE	(A1)	DATE
0	ISSUED FOR CONSTRUCTION				22.03.21	DRAWN	C.M.T.	22.03.21
						DRG. CHECKED	G.d.V.	22.03.21
						DESIGNED	S.M.T.	22.03.21
						APPROVED FOR CONST.	S.M.T.	22.03.21



info@patcol.com.au : www.patcol.com.au

FES GRANDE TANKS - PROPOSED BASE
GENERAL NOTES, PLANS & DETAILS

DRAWING No. 21-184/01

REV. 0

Section Three

Geotechnical Material Test Report Macquarie Geotech

Material Test Report

Report Number: D26074-2
Issue Number: 1
Date Issued: 21/07/2026
Client: Coonamble Shire Council

Contact: Darcie Holmes-Smith
Project Number: D26074
Project Name: Various Material Assessments
Project Location: Coonamble Shire LGA, NSW
Work Request: 7194
Sample Number: DBO-7194A
Date Sampled: 15/06/2026
Dates Tested: 16/06/2026 - 26/06/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: TS 02795.01 - Preparation of Samples for Testing (Soils)
Sample Location: Coonamble Council Depot
Lot No: Proposed Fuel Tank Relocation (refer plan)
Sub Lot No: TP1 0.00 - 0.50m
Material: Subgrade Material - Sample 1 of 5

MACQUARIE GEO TECH

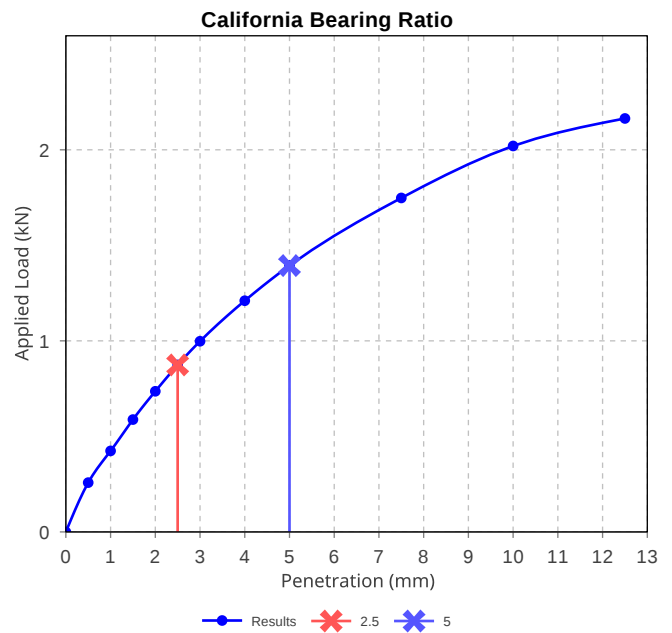
Macquarie Geotechnical Pty Ltd
 Dubbo Laboratory
 7 Energy Place Dubbo NSW 2830
 Phone: (02) 6332 2011
 Email: macgeo@macgeo.com.au



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: David Webb
 Laboratory Accreditation Number: 14874

California Bearing Ratio (TS 02795.11 & 02795.14)		Min	Max
CBR taken at	5 mm		
CBR %	7		
Method of Compactive Effort	Standard		
Method used to Determine MDD	TS 02795.06 & 02795.14		
Maximum Dry Density (t/m ³)	1.927		
Optimum Moisture Content (%)	11.0		
Target Laboratory Density Ratio (%)	98		
Laboratory Density Ratio (%)	98		
Target Laboratory Moisture Ratio (%)	100		
Laboratory Moisture Ratio (%)	102		
Dry Density after Soaking (t/m ³)	1.883		
Field Moisture Content (%)	11.1		
Moisture Content Top 30mm (%)	13.0		
Moisture Content Full Depth (%)	13.3		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Swell (%)	0.1		
Material Retained on 19 mm (%)	0		
Oversize Material Included	Excluded		



Material Test Report

Report Number: D26074-2
Issue Number: 1
Date Issued: 21/07/2026
Client: Coonamble Shire Council

Contact: Darcie Holmes-Smith
Project Number: D26074
Project Name: Various Material Assessments
Project Location: Coonamble Shire LGA, NSW
Work Request: 7194
Sample Number: DBO-7194B
Date Sampled: 15/06/2026
Dates Tested: 16/06/2026 - 26/06/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: TS 02795.01 - Preparation of Samples for Testing (Soils)
Sample Location: Coonamble Council Depot
Lot No: Proposed Fuel Tank Relocation (refer plan)
Sub Lot No: TP2 0.00 - 0.50m
Material: Subgrade Material - Sample 2 of 5

MACQUARIE GEO TECH

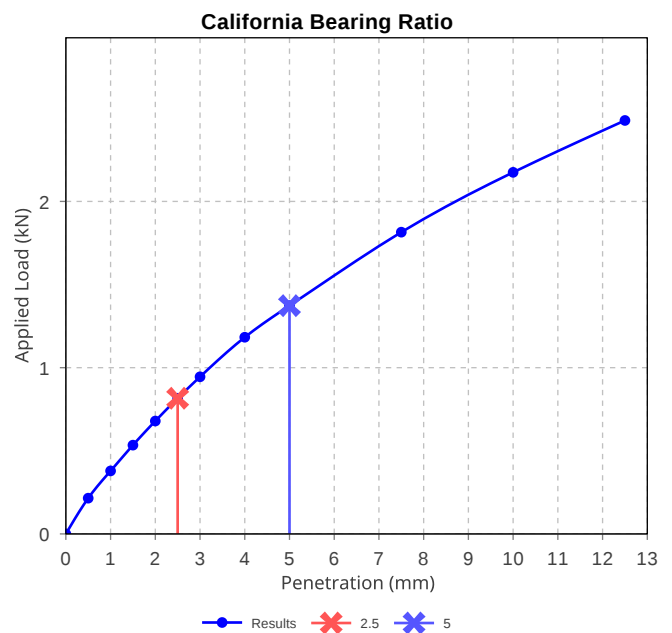
Macquarie Geotechnical Pty Ltd
 Dubbo Laboratory
 7 Energy Place Dubbo NSW 2830
 Phone: (02) 6332 2011
 Email: macgeo@macgeo.com.au



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: David Webb
 Laboratory Accreditation Number: 14874

California Bearing Ratio (TS 02795.11 & 02795.14)		Min	Max
CBR taken at	5 mm		
CBR %	7		
Method of Compactive Effort	Standard		
Method used to Determine MDD	TS 02795.06 & 02795.14		
Maximum Dry Density (t/m ³)	1.973		
Optimum Moisture Content (%)	9.9		
Target Laboratory Density Ratio (%)	98		
Laboratory Density Ratio (%)	98		
Target Laboratory Moisture Ratio (%)	100		
Laboratory Moisture Ratio (%)	100		
Dry Density after Soaking (t/m ³)	1.934		
Field Moisture Content (%)	11.0		
Moisture Content Top 30mm (%)	11.8		
Moisture Content Full Depth (%)	12.9		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Swell (%)	0.1		
Material Retained on 19 mm (%)	0		
Oversize Material Included	Excluded		



Material Test Report

Report Number: D26074-2
Issue Number: 1
Date Issued: 21/07/2026
Client: Coonamble Shire Council

Contact: Darcie Holmes-Smith
Project Number: D26074
Project Name: Various Material Assessments
Project Location: Coonamble Shire LGA, NSW
Work Request: 7194
Sample Number: DBO-7194C
Date Sampled: 15/06/2026
Dates Tested: 16/06/2026 - 30/06/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: TS 02795.01 - Preparation of Samples for Testing (Soils)
Sample Location: Coonamble Council Depot
Lot No: Proposed Fuel Tank Relocation (refer plan)
Sub Lot No: TP3 0.00 - 0.50m
Material: Subgrade Material - Sample 3 of 5

MACQUARIE GEO TECH

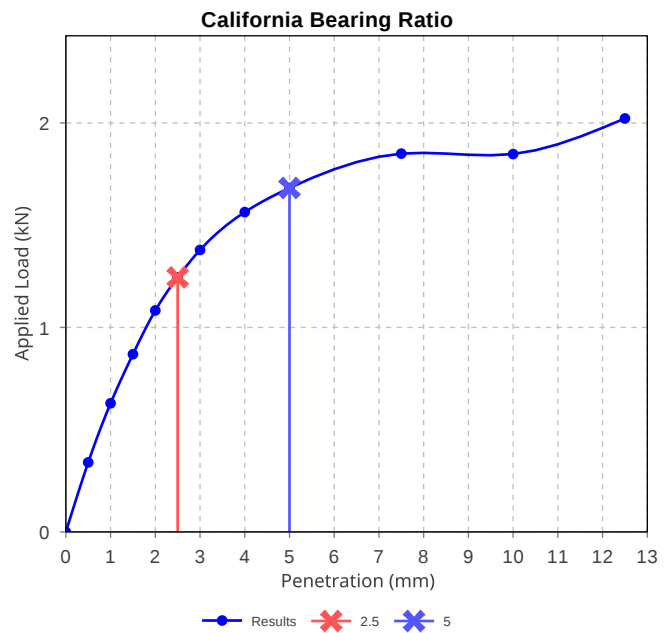
Macquarie Geotechnical Pty Ltd
 Dubbo Laboratory
 7 Energy Place Dubbo NSW 2830
 Phone: (02) 6332 2011
 Email: macgeo@macgeo.com.au



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: David Webb
 Laboratory Accreditation Number: 14874

California Bearing Ratio (TS 02795.11 & 02795.14)		Min	Max
CBR taken at	2.5 mm		
CBR %	9		
Method of Compactive Effort	Standard		
Method used to Determine MDD	TS 02795.06 & 02795.14		
Maximum Dry Density (t/m ³)	1.894		
Optimum Moisture Content (%)	11.6		
Target Laboratory Density Ratio (%)	98		
Laboratory Density Ratio (%)	98		
Target Laboratory Moisture Ratio (%)	100		
Laboratory Moisture Ratio (%)	99		
Dry Density after Soaking (t/m ³)	1.850		
Field Moisture Content (%)	17.2		
Moisture Content Top 30mm (%)	13.1		
Moisture Content Full Depth (%)	13.3		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Swell (%)	0.5		
Material Retained on 19 mm (%)	0		
Oversize Material Included	Excluded		



Material Test Report

Report Number: D26074-2
Issue Number: 1
Date Issued: 21/07/2026
Client: Coonamble Shire Council

Contact: Darcie Holmes-Smith
Project Number: D26074
Project Name: Various Material Assessments
Project Location: Coonamble Shire LGA, NSW
Work Request: 7194
Sample Number: DBO-7194D
Date Sampled: 15/06/2026
Dates Tested: 16/06/2026 - 26/06/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: TS 02795.01 - Preparation of Samples for Testing (Soils)
Sample Location: Coonamble Council Depot
Lot No: Proposed Fuel Tank Relocation (refer plan)
Sub Lot No: TP4 0.00 - 0.50m
Material: Subgrade Material - Sample 4 of 5

MACQUARIE GEO TECH

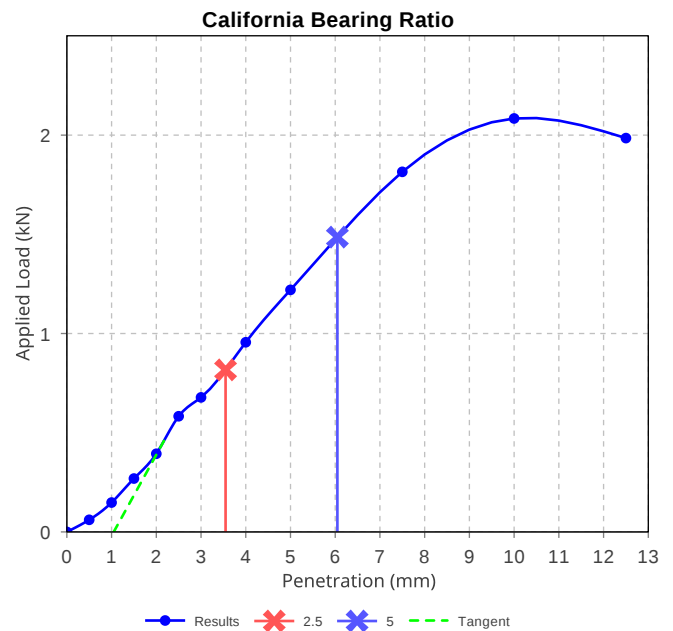
Macquarie Geotechnical Pty Ltd
 Dubbo Laboratory
 7 Energy Place Dubbo NSW 2830
 Phone: (02) 6332 2011
 Email: macgeo@macgeo.com.au



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: David Webb
 Laboratory Accreditation Number: 14874

California Bearing Ratio (TS 02795.11 & 02795.14)		Min	Max
CBR taken at	5 mm		
CBR %	8		
Method of Compactive Effort	Standard		
Method used to Determine MDD	TS 02795.06 & 02795.14		
Maximum Dry Density (t/m ³)	2.064		
Optimum Moisture Content (%)	9.1		
Target Laboratory Density Ratio (%)	98		
Laboratory Density Ratio (%)	98		
Target Laboratory Moisture Ratio (%)	100		
Laboratory Moisture Ratio (%)	100		
Dry Density after Soaking (t/m ³)	2.026		
Field Moisture Content (%)	8.0		
Moisture Content Top 30mm (%)	9.4		
Moisture Content Full Depth (%)	9.7		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Swell (%)	0.0		
Material Retained on 19 mm (%)	0		
Oversize Material Included	Excluded		



Material Test Report

Report Number: D26074-2
Issue Number: 1
Date Issued: 21/07/2026
Client: Coonamble Shire Council

Contact: Darcie Holmes-Smith
Project Number: D26074
Project Name: Various Material Assessments
Project Location: Coonamble Shire LGA, NSW
Work Request: 7194
Sample Number: DBO-7194E
Date Sampled: 15/06/2026
Dates Tested: 16/06/2026 - 26/06/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: TS 02795.01 - Preparation of Samples for Testing (Soils)
Sample Location: Coonamble Council Depot
Lot No: Proposed Fuel Tank Relocation (refer plan)
Sub Lot No: TP5 0.00 - 0.50m
Material: Subgrade Material - Sample 5 of 5

MACQUARIE GEO TECH

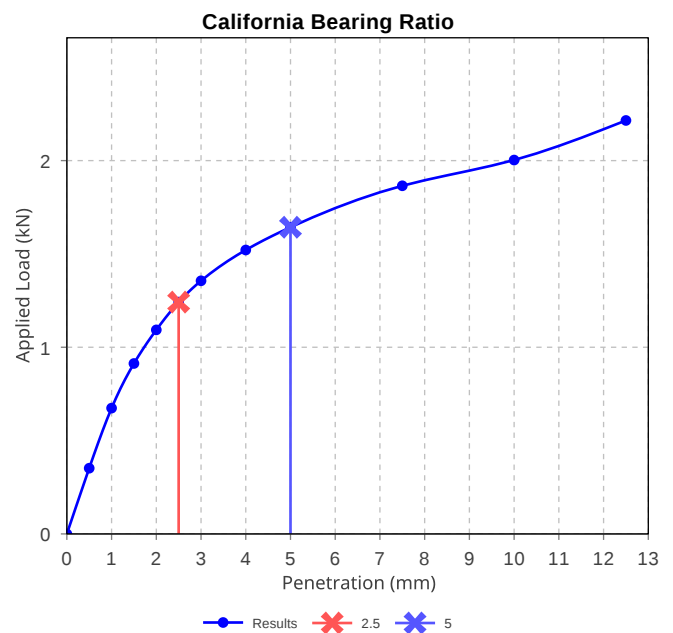
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Approved Signatory: David Webb
 Laboratory Accreditation Number: 14874

California Bearing Ratio (TS 02795.11 & 02795.14)		Min	Max
CBR taken at	2.5 mm		
CBR %	9		
Method of Compactive Effort	Standard		
Method used to Determine MDD	TS 02795.06 & 02795.14		
Maximum Dry Density (t/m ³)	1.931		
Optimum Moisture Content (%)	11.0		
Target Laboratory Density Ratio (%)	98		
Laboratory Density Ratio (%)	98		
Target Laboratory Moisture Ratio (%)	100		
Laboratory Moisture Ratio (%)	100		
Dry Density after Soaking (t/m ³)	1.886		
Field Moisture Content (%)	9.8		
Moisture Content Top 30mm (%)	12.4		
Moisture Content Full Depth (%)	13.1		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Swell (%)	0.5		
Material Retained on 19 mm (%)	0		
Oversize Material Included	Excluded		



Section Four

Project Cost Estimate

Project Cost Estimate

Item	Cost
55,000L Diesel Tank	\$67,975
240V Pump with FMS	\$39,320
Freight	\$6,520
On-site Commissioning	\$7,261
4,500L ULP Tank Relocation	\$6,437
Design Consultant Works	\$53,900
Macquarie Geotech Soil Testing	\$2,882
Electrical Contractor	\$55,000
Civil Contractor (Concreting)	\$85,000
Plumbing Contractor	\$15,000
Fuelfix Spill Grate	\$40,348
Oil Water Separator	\$6,710
Safety Bollards	\$4,445
LED Flood Lights	\$871
Eyewash Station	\$1,553
Safety Signage	\$2,000
Development Application Fees	\$1,213
Total	\$396,435

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