1.1 Provide a detailed description of the proposed action, including all proposed activities

The US Defence BFSF is to be located on Lot 5720 west of the Railway Terminal. Access to the BFSF is from the east via a proposed access road from Salloo Street.

The Jet Fuel Storage Facility functional requirements were identified as:

- Minimum storage of 300 ML Jet Fuel consisting of:
  - 700,000 barrels (111.3 ML) of F34 flammable jet fuel which is a military kerosene type aviation turbine fuel with Fuel System Icing Inhibitor (FSII) used by land based military gas turbine engine aircraft, and
  - 1,200,000 barrels (190.8 ML) F44 combustible jet fuel which is a military high flash point kerosene type aviation turbine fuel with FSII used by ship borne military gas turbine engine aircraft.
- Meet requirements of United States (US) Department of Defence (DoD)
- Designed to satisfy all relevant national and local safety, health and environmental requirements including:
  - Australian Standards
  - API Standards for tanks
  - ASME Codes for piping
  - AS1940 storage and handling of flammable and combustible liquids
  - API 1581 Specifications and Qualification Procedures for Aviation Jet Fuel Filter/Separators
  - Unified Facilities Criteria (UFC) as a guide for US DoD facilities
- Issue and receipt of fuel by road via a triple road tanker load/unload gantry with a capacity of 2,500 litres/minute per truck
- Connection to existing diesel pipeline at Port of Darwin for marine issue and receipt at a pump rate of:
  - Tanker – 1,400 m^3/hr
  - Barge – 320 m^3/hr
- Facilities shall be as required for bulk fuel operations including:
  - Office/control room
  - Warehouse storage/space
  - Additive tank area
  - Pump house
- US grant scheduled for 1 October 2021 with a 2-year schedule from award to operation.

Agreed Facility Layouts

The fuel will be pumped via existing pipeline to the East Arm Wharf where there will be an off-loading facility

The facility contains the following infrastructure:

- A series of flammable F34 jet fuel tanks compounds located on east side of Lot 5720.
  - Fixed or geodesic roof tanks.
  - Cooling water and foam injection to tanks required.
  - Cooling water – fixed piping on tanks with monitors on bund wall.
  - External fire hydrant system required.
- A series of combustible F44 jet fuel tanks compound located on west side of Lot 5720.
  - Fixed or geodesic roof tanks.
  - External fire hydrant system required.
- All storage compounds have concrete retaining walls based on compound storage volume being based on 110% of largest storage tank volume.
- All storage compounds have flooring designed to contain spills and to allow access for equipment.
- Unsealed paved areas around all storage compounds to allow emergency vehicles and crane access

- Common facilities located on Lot 5720
  - A tanker loading gantry allowing loading of both fuels.
  - Additional park-up area required for triple road tankers during peak periods.
  - Combined warehouse and administration building.
  - Firewater tanks/pumps. The fire water tanks design based on:
    - Water supply from water mains may not be a guaranteed inflow rate.
    - Fire water storage tanks sized to provide the specified flows as listed below:
      Cooling water – 1.5 hrs
      4 x hydrants – 4 hrs
      Foam – 20 mins
    - Fire booster valve assembly is required after the fire water tanks, before fire water pumps.
  - Oily water separation.
  - Storage requirements based on AS1940:2017 The storage and handling of flammable and combustible liquids

Filtering capability for tank-to-tank transfer in accordance with API-1581.

Ship unloading

Fuel ships are to be unloaded at Wharf 4 at Darwin's East Arm port facility.

Fuel will be delivered via ship onboard pumps to the storage facility from the wharf to the BFSF along the pre-existing pipeline rack and easement.

After the initial terminal fill, the expectation is that the terminal will receive about 120 ML/annum (4 ships).

All piping and valves used in the piping system are to be designed in accordance with the ASME B31.3 and B31.4 design codes (ASME B31.3 is commensurate to AS 2885). The piping is carbon steel and joints are flanged. The pipe will have a sealed surface with a curb to contain any spills that may occur during maintenance activities, to contain any product while a spill kit is employed to soak up any product before being disposed of.

Operating procedures typically ensure that the pipelines are visually inspected before each use to ensure no anomalies.

Ship Loading

The ship loading rate will be 1,400 m^3/hr from storage facility. Fuel will be delivered via shore pumps located at the storage facility.

Tank Truck On/Off-Loading Facility

The tank truck on/off-loading facility (TTOF) will be equipped with a safety overfill protection system capable of bottom loading all fuel shipped by truck. The TTOF has the necessary capacity to load two A-triple road trains at a rate of 36 kL per trailer per hour.

The loading arms are sized to deliver 2,500 L/min, equivalent to 150 kL/hr. The loading arms are capable of on and off-loading of road tankers.

The berth deck is to be designed to have a 200 mm high bund wall around the MLAs and manifold area. A topping slab is proposed to be installed with a 1:100 grade to an oily water drain. This then drains back to an underground 50 kL oily water tank, where it is then removed via road tanker.

The connectors are currently specified as the standard 100 mm API dry break coupler, designed for bottom loading applications.

Filtration

The terminal is to be capable of filtering all stored products during tank-to-tank transfers, when replacing dormant fuel in pipelines, or when repacking pipelines. The filtration system specified meets the requirements of the American Petroleum Institute (API) Publication 1581, “Specifications and Qualification Procedures – Aviation Jet Fuel Filter/Separator.”

Category M type S filter/separators are specified.

Tankage

The tank design is to incorporate API 650 and AS 1940 requirements. The tank is to have an external roof, with supported cone roof, internal columns, and rafters and no internal floating roof.

The proposed tanks are designed to achieve the required Working Volume (WV) between the tank Minimum Operating Level (MOL) and the tank Normal Operating Level (NOL).

Above the tank NOL an allowance has been made for the Maximum Fill Level (MFL).

A previous similar fuel farm project had allowed 7 minutes of inflow from NOL to High Level and a further 7 minutes from High Level (Alarm) to High-High Level, however AS1940:2017 requires the Normal Fill Level (NFL) to be not more than 95 % of the tank capacity which will exceed the 7 minutes plus 7 minutes criteria.

An allowance for 600 mm freeboard below the top of shell has been made to ensure the Maximum (overflow) level is below the internal roof framing.

Civil

Based on the geotechnical desktop study (Davies 2005) it is anticipated that relatively shallow rock occurs on the eastern portion of Lot 5720.

The west side of Lot 5720 consists of a tidal channel that was infilled with gravelly fill to connect the headland with a former island as part of the construction of the East Arm Wharf.

Access roads are designed in accordance with Austroads requirements and are suitable for A-triple road tankers. All internal roads are sealed asphalt roads.

All tank storage compound volumes are designed in accordance with AS 1940 to contain 110% of the largest tank volume. Storage compound walls are watertight sheet pile retaining walls and the floors designed to meet to permeability requirements.

Unsealed hardstand pavements are required around the external bund walls of the storage compounds to provide emergency vehicle and crane access. All surfaces are designed to allow stormwater runoff as sheet flow to external drains.

Security fencing is required around the perimeter of the required work site.

The finished earthworks design levels for the project area are all above the 100 ARI Storm Surge Level.

Electrical, Instrumentation and Communication

Power supply will be sourced from the adjacent grid. The exact tie in location will be selected once the layout has been confirmed.

A High Voltage (HV) ring main unit (RMU) will be used to distribute power to the Jet Fuel facility transformers, which will be placed adjacent to their respective pump skids.

The maximum demand has been calculated based on the Mechanical Equipment list (rev A) and has utilised the fuel loading strategy with highest rated pump power.

Motor Control Centres (MCC) and Variable Speed Drives (VSD) will be housed inside switch rooms and will be designed and specified as per Australian Standard. Transformers will be placed inside concrete bunds with 110% capacity as per AS 60076.

Electrical equipment inside Hazardous Areas and Dangerous Goods areas is designed as per AS-NZS 60079.