

**SEPP 33**

**RISK SCREENING DOCUMENTATION AND  
PRELIMINARY HAZARD ANALYSIS**

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October 2019**

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Last Saved	9th October 2019
Author	Alana Craven
Name of Organisation	Turnbull Planning International Pty Limited
Name of Project	Galen Property Pty Ltd Coolongolook
Document Version	Rev 6

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**RISK SCREENING and PRELIMINARY HAZARD ANALYSIS**  
**HIGHWAY SERVICE CENTRE**  
**37-41 Bengal Road**  
**COOLONGOLOOK NSW**

**PURPOSE AND SCOPE OF THIS DOCUMENT**

For dangerous goods installation designs where there is proposed storages above minor quantities, an investigation process must be followed in order to assess whether or not a proposal is suitable for a particular site or not. Such sites should be deemed "potentially hazardous" until a detailed risk assessment determines otherwise. The process flow chart is detailed in appendix 1.

NSW State Environmental Planning Policy 33<sup>1</sup>, (SEPP 33) is a document published by the NSW Department of Planning which provides guidelines for local government and developers for ensuring that the safety and pollution impacts of an industrial proposal are addressed at an early stage of the development application process. Through this document an assessment procedure is followed which links the permissibility of a proposal to its safety performance. SEPP 33 ensures that only those industrial proposals which are suitably located, and able to demonstrate that they can be built and operated with an adequate level of safety, can proceed<sup>2</sup>.

As detailed in SEPP 33 a "hazardous industry" is one which poses a significant risk when all locational, technical, operational and organizational safeguards are included.

A "potentially hazardous industry" is one which, when all safeguards are operating, imposes a risk level which is significantly lower.

SEPP 33 also incorporates a screening process which will determine whether or not a site is potentially hazardous. If deemed potentially hazardous, a preliminary hazard analysis is required.

Certain activities may involve handling, storing or processing a range of substances which in the absence of locational, technical or operational controls may create an off-site risk or offence to people, property or the environment. Such activities would be defined as potentially hazardous or potentially offensive. SEPP 33 also provides guidelines to assist councils and proponents to establish whether a development proposal would fit into such definitions and hence, come under the provisions of the policy.

The purpose of a PHA is to gain a better understanding of the risks and hazards associated with the site and to provide a reasonable basis for an informed judgment to be made on the acceptability of the site for the proposed development<sup>3</sup>. The PHA will outline in detail possible risks and hazards associated with this site. This will assist council in reaching an informed decision for the proposal.

It is important to note also that this investigation has been carried out by a suitably qualified person who understands the properties of the dangerous goods stored on site and the possible impact they may have on equipment and structures located on and off site. Under state legislation a system must be designed by a suitably qualified person who is experienced in this type of work<sup>4</sup>.

## **REFERENCE AND ASSISTANCE DOCUMENTS**

This document has been compiled with guidance from:

- Hazardous Industry Planning Advisory Paper No 4 'Risk Criteria for Land Use Safety Planning'
- Hazardous Industry Planning Advisory Paper No 6. 'Guidelines for Hazard Analysis''
- Hazardous and Offensive Development Application Guideline 'Applying SEPP 33'
- NSW Dept of Planning assessment guidelines "Multi Level Risk Assessment".

## **SITE DESCRIPTION**

### **LOCATION**

The site is a proposed Highway Service Centre to be located at 37-41 Bengal Road Coolongolook NSW. The site is on the western side of Bengal road (Pacific Highway) at the Nelson Street Bengal Road intersection. The site adjoins residential properties along the western and southern boundaries. Both the northern and eastern boundaries are street frontages.

### **PROPOSAL**

This site is a proposed Highway Service Centre which intends to supplying Motor Spirit and Combustible Liquids for automotive use to the general public. The site is approx. 6106 square meters in size with a proposed 270 square meter sales building. It is proposed to install two new double wall fuel tanks as per the list detailed to contain the motor spirit and combustible liquids which will supply both the truck canopy and car canopy.

### **HAZARDOUS MATERIALS**

This proposal incorporates a total of approximately 90 kl of flammable liquid, 80 kl of combustible liquid and 10kl of Ad Blue (Non Dangerous Good) in underground tanks. The flammable and combustible liquid storages covered by this assessment are the only bulk hazardous materials stored on site and are fully covered under the SEPP 33 screening process.

## **SEPP 33 RISK SCREENING**

### **FUEL STORAGE**

#### **Proposal**

<b>Product</b>	<b>Quantity</b>	<b>Tank/Compartment No.</b>	<b>Class and PG</b>
ULP	35,000 litres	1	3 PG II
E10 Petrol	30,000 litres	2	3 PG II
98 Petrol	25,000 litres	3	3 PG II
Diesel	80,000 litres	4	C1*
Ad Blue	10,000 litres	5	Non DG**

Notes: \* As the diesel (combustible C1) is stored on site together with the petrol (flammable liquid class 3), it will be considered as a flammable for the purposes of this report.

\*\* As the Ad blue is not a dangerous good and is a water based product it is not included in any calculations

#### **Calculations**

The screening method set out in Applying SEPP 33 (Department of Planning, 2011) provides the first step in the analysis. The screening method is based on broad estimates of the possible off-site effects or consequences from hazardous materials present on site, taking into account locational characteristics.

If the quantity/distance is less than the screening threshold, then no further analysis is necessary. The safety management regime in this case relies on observance of the requirements of engineering codes and standards.

If the quantities/distances exceed the screening threshold, further analysis is necessary.

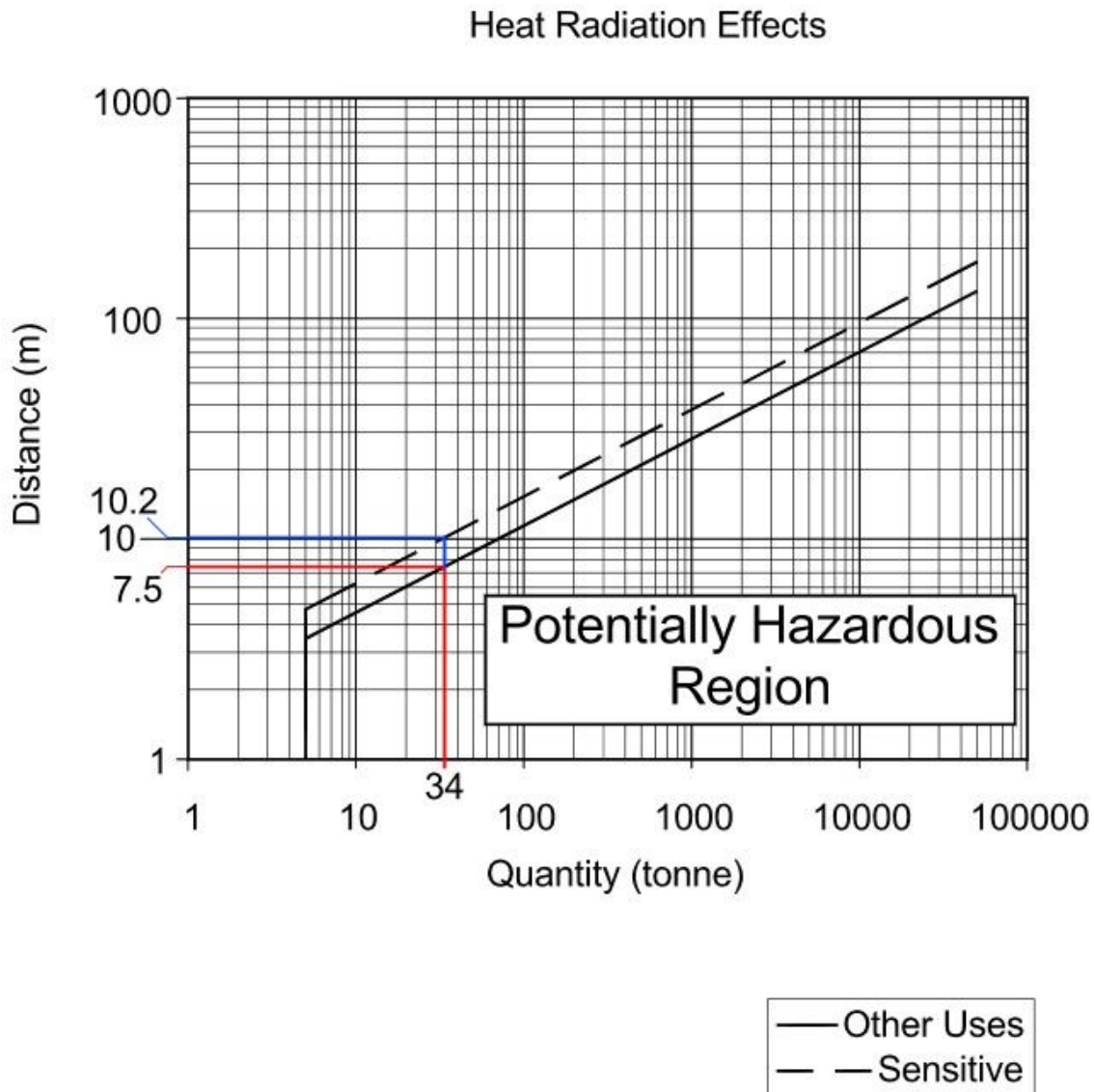
By utilising Figure 9 of SEPP 33 and measuring separation distances, it can be determined whether further analysis is required. The separation distances are measured from both the underground tank fill points and the fuel dispensers to the site boundaries. As only diesel and ad blue (a non dangerous good) will be dispensed within the truck filling canopy, only the separation distances from the car canopy dispensers will be measured.

<b>Boundary</b>	<b>Min Distance – Fill Points</b>	<b>Min Distance - Dispensers</b>
North	77.1	48.2
South	37.3	58.1
East	6.1	23.9
West	48.5	19.1

Total storage capacity is 170,000 litres.

So for this quantity, as it is stored underground, we can divide by a factor of five, as it is considered less invasive. So allowance is for 34,000 litre storage.

FIGURE 9, SEPP 33



From Figure 9 we can see that for 34,000 litres, the minimum setback distance from the remote fill and dispensing points is 7.5 metres to site property boundaries for other uses or 10.2 metres for sensitive uses (residential uses).

Since the set back distances are less than this to the eastern boundary from the fill points, further analysis will be required to ascertain whether the site is hazardous or not, and a PHA will be required. All other set back distances are met.

### **TRANSPORT SCREENING THRESHOLD**

SEPP 33 screening also requires a study of the transporting/delivery frequencies, for the site as outlined in table 2 (below). It is envisaged that deliveries to site, for fuels will be about 3 times a week, or 156 times per year. According to the "Transportation Screening Thresholds", up to 45 movements per week or 750 movements per year for fuel are acceptable prior to becoming potentially hazardous<sup>6</sup>.

In this case, as the number of expected deliveries for the fuel is well below the thresholds, there are no requirements to do further analysis in the form of a PHA based on the transport screening thresholds.

Table 2: Transportation Screen Threshold "Applying SEPP 33" (page 18)

**Table 2: Transportation Screening Thresholds**

Class	Vehicle Movements		Minimum quantity*	
	Cumulative	Peak	per load (tonne)	
	Annual	or Weekly	Bulk	Packages
1	see note	see note	see note	
2.1	>500	>30	2	5
2.3	>100	>6	1	2
3PGI	>500	>30	1	1
3PGII	>750	>45	3	10
3PGIII	>1000	>60	10	no limit
4.1	>200	>12	1	2
4.2	>100	>3	2	5
4.3	>200	>12	5	10
5	>500	>30	2	5
6.1	all	all	1	3
6.2	see note	see note	see note	
7	see note	see note	see note	
8	>500	>30	2	5
9	>1000	>60	no limit	

**Note:** Where proposals include materials of class 1, 6.2 or 7, the Department of Planning should be contacted for advice. Classes used are those referred to in the Dangerous Goods Code and are explained in Appendix 7.

\* If quantities are below this level, the potential risk is unlikely to be significant unless the number of traffic movements is high.

## **CONCLUSION**

It has been determined via assessment of this proposal under the NSW State Environmental Planning Policy 33 (SEPP 33) that the site is deemed "potentially hazardous". Whilst the transport screening thresholds are complied with, the proposed design does not achieve all setback distances as required under SEPP 33. As such the site and its current design require further analysis and a PHA is to be completed.



## **PRELIMINARY HAZARD ANALYSIS**

### **INTRODUCTION**

As previously detailed, SEPP 33 screening has deemed this proposal to be “Potentially Hazardous or Offensive” and hence a Preliminary Hazard Analysis (PHA) will be required to determine if this proposal is acceptable for this site.

This preliminary hazard analysis (PHA) covers the following subsections in accordance with established procedures and HIPAP No. 6:

- Hazard Identification
- Possible outcomes
- Estimation of likelihood of hazardous events/consequences\*
- Control measures

\* with respect to risk ranking method detailed in Appendix 2

The following types and quantities of materials are proposed to be stored on site.

<b>Product</b>	<b>Quantity</b>	<b>UN Number</b>	<b>DG Class</b>	<b>Packaging Group</b>	<b>Hazchem code</b>
ULP	35,000 litres	1203	3	II	3YE
E10 Petrol	30,000 litres	1203	3	II	3YE
98 Petrol	25,000 litres	1203	3	II	3YE
Diesel	80,000 litres	NA	C1	-	NA

This identification process has been examined and each possible event versus possible consequences and proposed safeguards to prevent or minimise these events.

A risk assessment has also been prepared as per NSW Department of Planning “Multi Level Risk Assessment” doc May 2011.

### **HAZARD IDENTIFICATION**

Note. The risk ranking referred to here is as per risk ranking method detailed in appendix 2.

#### **Flammable and Combustible Liquid**

The flammable and combustible system at this site has been designed with the intention of minimising all unnecessary risks associated with the storage and handling of these types of dangerous goods. It has been designed in full compliance with AS1940-2017 ‘The storage and handling of flammable and combustible liquids’. The tanks have been chosen to be located underground and are double walled fibreglass tanks. By installing tanks underground nearly all issues associated with storage are eliminated.

Risks and control measures associated with the Flammable and Combustible Liquid system:

- Overfill of tank
  - Risk: Yes
  - Possible Outcome: Spill
  - Ranking: D4
  - The flammable and combustible liquids tanks are located underground and are remote filled with a remote contents gauge located at the fill points. A spill kit and firefighting equipment are within close proximity to the delivery driver whilst filling the tanks.
  
- Hose trip hazard
  - Risk: Yes
  - Possible Outcome: Spill
  - Ranking: D5
  - The tanker parking area is adjacent to the fill points in a nominated tanker parking area. The hose used is a small diameter pressure hose and is generally able to lie flat on the ground. The tanker driver uses warning signage during deliveries.
  
- Fire at fill point
  - Risk: Yes
  - Possible Outcome: Spill/Fire
  - Ranking: D4
  - All delivery tankers carry at least a single powder type extinguisher which is available near the fill points during product delivery. As a Highway Service Centre additional fire protection equipment is available within a close proximity. The fill points are fitted with back check valves as well as manual valves to stop any outward flow. The tanker is fitted with an emergency stop system in order to cease pumping quickly.
  
- Fire on site
  - Risk: Yes
  - Possible Outcome: Spill/Fire
  - Ranking: D3
  - As a Highway Service Centre storing and dispensing flammable and combustible liquids, fire protection in the form of fire extinguishers are located on site in strategic places in full compliance with AS 1940. An emergency shut down system is installed onsite to enable the dispensing system to be shut down in an emergency.
  
- Leak in pipework
  - Risk: Yes
  - Possible Outcome: Spill
  - Ranking: D4
  - All pipework is located underground and is protected from impact. Regular pressure tests are performed to ensure tightness. Stock reconciliation is carried out weekly and would highlight any leaks immediately.

- Ruptured fill hose
  - Risk: Yes
  - Possible Outcome: Spill
  - Ranking: E4
  - Extremely unlikely event. The tank hoses are pressure tested and/or replaced regularly. The tanker is fitted with an emergency stop system. The tank standing area is specifically set up for containment of spills.
  
- Equipment wear and tear
  - Risk: Yes
  - Possible Outcome: Spill
  - Ranking: C4
  - Regular maintenance checks are carried out on the tank and its equipment to maintain that everything is in a safe and working condition. This occurs at least annually. Delivery drivers report anything that requires rectification.
  
- Vandalism of equipment
  - Risk: Yes
  - Possible Outcome: Spill/Fire
  - Ranking: D3
  - The tank is installed underground. All valves and fittings are located in an underground turret which is secured from tampering.
  
- Fire on adjoining property
  - Risk: Yes
  - Possible Outcome: Spill/Fire
  - Ranking: D3
  - Should a fire on an adjoining property impact the site, the dispensing system will be shut down ensuring that all product remains in the underground tanks.
  
- Customer overfill during dispensing
  - Risk: Yes
  - Possible Outcome: Spill/Fire
  - Ranking: C4
  - The dispensers installed at this site are equipped with a sensing device that shuts down the flow of product when it reaches the tip of the nozzle. Clean up materials are located within close proximity of the dispensing area.
  
- Customer drives off with nozzle inserted
  - Risk: Yes
  - Possible Outcome: Spill/Fire
  - Ranking: C5
  - Clean up materials are located within close proximity to the dispensing area.
  
- Collision between vehicle and dispenser
  - Risk: Yes
  - Possible Outcome: Spill/Fire
  - Ranking: C4
  - All dispensers on this site are protected from vehicular impact with the assistance of bollards.

- Use of mobile phone/transmitting devices  
 Risk: Yes  
 Possible Outcome: Spill/Fire  
 Ranking: D3  
 The site is fitted with warning signs advising customers of the risk of mobile phone and transmitting devices. The console is fitted with a public address system should the console operator be required to advise customers of the use of this type of equipment on a Highway Service Centre site.
  
- Spill of product onto customer  
 Risk: Yes  
 Possible Outcome: Spill/Fire  
 Ranking: D3  
 The console operator has been trained in how to administer first aid should a customer be injured by coming into contact with any flammable or dangerous goods on this site.
  
- Customer misuse of equipment  
 Risk: Yes  
 Possible Outcome: Spill/Fire  
 Ranking: D4  
 The site is fitted with instructions indicating procedures for safe use of the dispensing equipment. The console operator is in clear view of all dispensers on site and capable of shutting down any dispenser system that is not being used in a safe manner. The console operator also has access to a public address system should they need to verbally communicate with customers on the forecourt.

## CONCLUSIONS

As with any Preliminary Hazard Analysis, the main aims are:

1. Identify all potential hazards and accidental events that may lead to an accident
2. Rank the identified accidental events according to their severity
3. Identify required hazard controls and follow-up actions

In this case, there is nothing that leads to any conclusion other than the fact that this design is acceptable for this site.

## **MULTI-LEVEL RISK ASSESSMENT APPROACH**

This section highlights the key features of the multi-level risk assessment framework. There are three levels of assessment, depending on the outcome of preliminary analysis, which in this case are:

**level 1 - qualitative analysis**, primarily based on the hazard identification techniques

**level 2 - partially quantitative analysis**, using hazard identification and the focused quantification of key potential off-site risk contributors

**level 3 - quantitative risk analysis (QRA)**, based on the full and detailed quantification of risks, consistent with *HIPAP No. 6 - Hazard Analysis*.

The method nominated below is based on the *Manual for the classification and prioritisation of risks due to major accidents in the process and related industries* (IAEA, rev. ed. 1996). This method is risk-based and relies on broad estimations of consequences and likelihood of accidents. The outputs may be expressed in terms of individual and societal fatality risk which can be compared against criteria for determining the appropriate level of further assessment.

### **MULTI LEVEL RISK ASSESSMENT FRAMEWORK**

The calculations following here are a direct reference to this proposal using the working process detailed in this document.

The technique used is a modified version of the *Manual for the classification of risks due to major accidents in process and related industries* (IAEA, Rev. 1. 1996). It should be noted that the full IAEA method covers fixed installations and transport (including by waterways and pipeline).

For simplicity, only the part of the method dealing with fixed installations is covered here. The IAEA method was developed to produce a broad estimate of the risks due to major accidents from the manufacture, storage, handling and transport of hazardous materials. As published, the method covers only off-site risks arising from explosion, fire or release of toxic substances. The results are expressed in terms of societal risk, rather than individual risk. Societal risk of death is defined in the IAEA method as the relationship between the number of people killed in a single accident and the chance or likelihood that this number will be exceeded.

The method uses a number of simplifying assumptions, the most important being:

- Only the most important variables are used in assessing risk (such as population density, frequency of loading/unloading operations)
- Estimates of probability and consequences are rounded to the nearest order of magnitude.
- The entire inventory is initially assumed to be involved in any incident.
- For physical and toxic effects, 100 percent fatality is assumed within an area where 50-100 percent lethality would be expected; outside this range, no fatalities are assumed.

- No explosion overpressure or heat radiation calculations are carried out - the lethal radius is assumed to be the distance to the lower flammable limit (LFL) in the case of explosion and the actual fire area in the case of flammables.
- Only one weather pattern is used.
- Basic probabilities are generic but are modified later.

The boundaries of the site have been defined and maps and drawings prepared showing the site's location in relation to its locality, and the site layout itself. The area chosen is of sufficient size to encompass the consequence distance of the worst credible accident. The site layout is in sufficient detail to allow the locations of all storage and processing areas to be identified to a precision that will allow consequence distances to be clearly represented.

A plan of the area has been produced and estimates of the population in the area have been made. It should be noted that the surrounding area does include sensitive uses being residential properties.

## **FLAMMABLE LIQUIDS**

### **Calculations**

Firstly, IAEA Table II (page 39) provides us with reference number 6 for this type of storage being Flammable liquids in underground tanks.

From IAEA Table IV(a) (page 42), for flammable liquids storages such as this being in underground tanks we can apply Table IV(a) note which allows underground storage quantities to be divided by 5. For this underground storage of a total of 170,000L, applying a division of 5, we therefore assess as 34 tonnes (10-50 tonnes). Based on Table IV(a) classification of substance by effect category, we get for reference 6 as BII.

Using these classifications, in IAEA table V, (page 43) we obtain A for BII a maximum area of effect distance of 25-50 m's radius and an effect area of 0.4ha. (A=0.4)

As the storage of flammable liquids is located underground, the effect distance will be measured from the location of the fill points. Although the site is of a significant size, as the fill points are located near the site boundary, the maximum effect area will not be contained within the site and therefore population distribution around the site needs to be assessed.

The site itself takes up a portion of the Effect Area however some area also encroaches on neighbouring properties. The Population Density guidance of Table VI (page 44) will be utilised, with the ability to correct where deemed necessary. As a conservative figure, utilising the guidance provided by Table VI and knowledge of the area we estimate 20 persons per hectare. (d = 40)

### **Possible number of fatalities**

Considering the population correction factor  $f_A$  of Table VII (page 44) this can be utilised if only part of the Effect Area is populated. The effect area for BII is up to a 50m radius and therefore  $\pi \times r^2 = \pi \times 50^2 = 7857 \text{ m}^2$ . The site itself has an area of  $6106 \text{ m}^2$  and as such is calculated to take up approximately 78% ( $6106/7857 = 0.78$ ) of the Effect Area leaving

12% of offsite land. Based on Table VII a population fraction of 20% , can be applied as the closest figure without going under, and therefore a figure of 0.4 is determined. ( $f_A = 0.4$ )

Following on to the mitigation correction factors  $f_m$ , in this case as the substance is flammable and reference number 6, Table VIII (page 45) gives a value of 1.

So an estimate of external consequences for reference 6, given by the formula:

$$C_{a,s} = A \cdot d \cdot f_A \cdot f_m$$

or, in this case:

$$C_{a,s} = A \cdot d \cdot f_A \cdot f_m$$

$$C_{a,s} = 0.4 \times 20 \times 0.4 \times 1$$

$$C_{a,s} = \mathbf{3.2 \text{ fatalities}}$$

### Estimation of Probability of major accident

The method used for estimating probability is based on probability numbers related to the type of installation and substance involved, together with correction factors for:

- average probability of incident based on type of installation/storage
- the frequency of loading/unloading operations ( $n_l$ )
- safety systems associated with flammable substances ( $n_f$ )
- organisational and management safety ( $n_o$ )
- wind direction towards the populated area ( $n_p$ )

The probability number is given by the formula:

$$N_{i,s} = N_{i,s}^* \cdot n_l \cdot n_f \cdot n_o \cdot n_p$$

Where  $N_{i,s}$  is the average probability number for the installation and the substance.

Table IX states for reference 6 as a storage and not a plant  $N_{i,s}^* = 7$

Table X(a) states for the delivery frequency of approximately 3 deliveries per week/156 deliveries per year  $n_l = -1$

Table XI is applicable to flammable gas storages only  $n_f =$  Not applicable = 0

Table XII applies Correction Parameters for Organisational safety. This organisation maintains Average Industry practices therefore  $n_o = 0$

Table XIII applies correction Parameters for Wind direction towards populated areas in the affected Zone and specifically looks at where people are living within this zone. In this instance Residential properties are located within 20% of the Affected Area and therefore 20% coverage is applied and  $n_p = 0.5$

so,

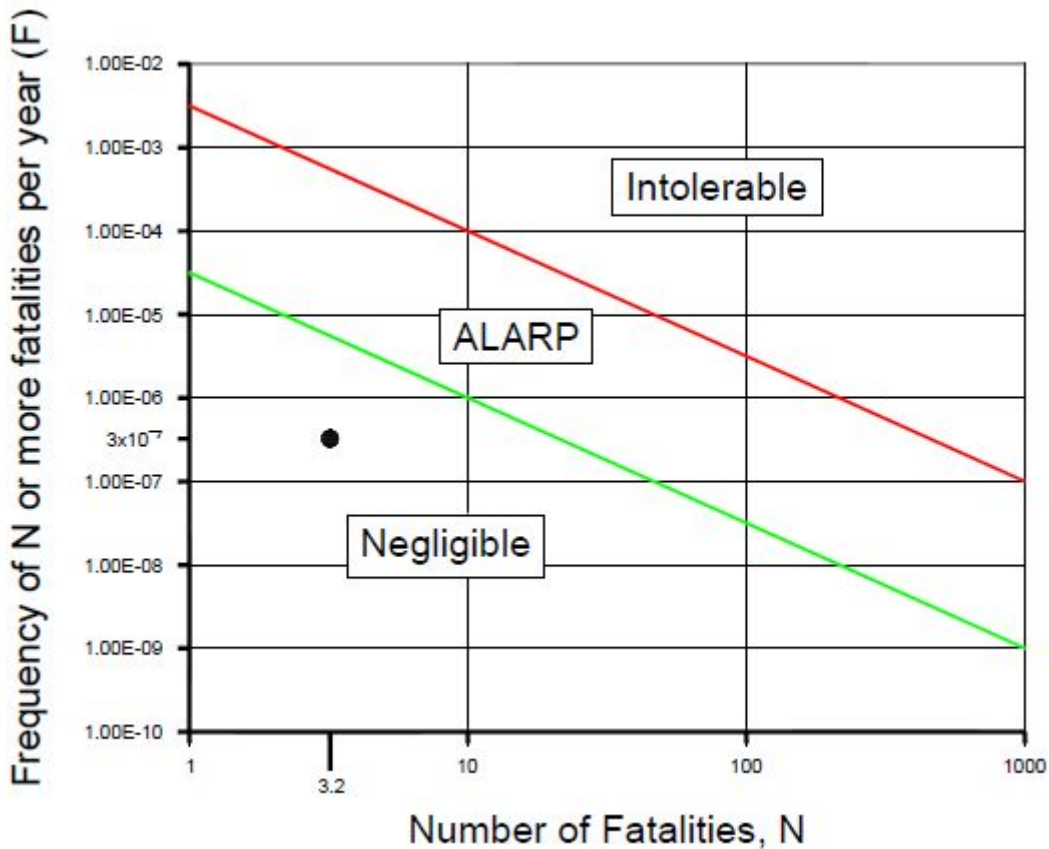
where

$$N_{i,s} = N_{i,s}^* \cdot n_l \cdot n_f \cdot n_o \cdot n_p$$

$$N_{i,s} = 7 + (-1) + 0 + 0 + 0.5 = 6.5$$

Converting probability into frequency, in table XIV, we get  $3 \times 10^{-7}$

This result can be plotted on the following graph:



By intersecting the frequency ( $P = 3 \times 10^{-7}$ ) with the consequences (**3.2** fatalities per accident) in the graph above, we can see that the risk to society from the proposed development falls within the negligible area below the green line.

All possible measures should still be taken to ensure that the level of risk is kept as low as possible.

## **CONCLUSION**

As can be seen through the application of SEPP 33 and the subsequent Preliminary Hazard Analysis (PHA) with the assistance of plotting the frequency against consequence, the societal risk is negligible. The level one qualitative Risk Analysis, referred to in Applying SEPP 33 as a Preliminary Hazard Analysis (PHA) is deemed sufficient for this proposal. All equipment must be installed to manufacturer's recommendations and must comply with all the relevant standards listed within. Specific safety features of the site are to be maintained and reviewed on a regular basis to ensure that they maintain, if not exceed industry standards.



## **DOCUMENT REFERENCES**

- <sup>1</sup> State Environmental Planning Policy 33, Hazardous & Offensive Development Application Guidelines. – Department of Planning NSW, January 2011.
- <sup>2</sup> State Environmental Planning Policy 33, Hazardous & Offensive Development Application Guidelines. – Department of Planning NSW. Page 1, 1.2 the policy, last para
- <sup>3</sup> State Environmental Planning Policy 33, Hazardous & Offensive Development Application Guidelines. – Department of Planning NSW. Page 9, 4.2
- <sup>4</sup> Protection of the Environment Operations (Underground Petroleum Storage Systems) regulation 2014 division 1, clause 5 and 6
- <sup>5</sup> Protection of the Environment Operations (Clean Air) regulation 2010
- <sup>6</sup> State Environmental Planning Policy 33, Hazardous & Offensive Development Application Guidelines. – Department of Planning NSW. Page 18, table 2

## **OTHER REFERENCES**

### **Australian Standards:**

AS 1940-2017	"The Storage & Handling of Flammable & Combustible Liquids"
AS 4897-2008	"The Design, Installation and Operation of Underground Petroleum Storage Tanks"
AS 3000-2007	"Electrical Wiring Rules"
AS/NZS 60079.10.1-2009	"Classification of Areas. Explosive gas atmospheres" Annex ZA "Examples of Hazardous Area Classification"
AS 2832.2-2003	"Cathodic Protection of Metals – Compact buried structures"
AS 2239-2003	"Galvanic (sacrificial) Anodes for Cathodic Protection"
AS/NZS 3788-2006	"Pressure Equipment – In-service inspection"
AS 4037-1999	"Pressure Equipment – Examination & testing"
AS/NZS 1841.5-2007	"Portable Fire Extinguishers"
AS 2444-2001	"Portable Fire Extinguishers and Fire Blankets". Select. & location.
AS 1692-2006	"Tanks for Flammable and Combustible liquids"

### **Codes of Practices:**

Australian Code for the Transportation of Dangerous Goods by Road and Rail, Seventh edition.  
 NSW Code of Practice 2005 for Storage & Handling of Dangerous Goods.  
 NSW Work Health and Safety Act 2011  
 NSW Work Health and Safety Regulation 2017

### **Planning NSW Guidelines:**

Hazardous and Offensive Development Application Guidelines - Applying SEPP 33  
 Hazardous and Offensive Development Application Guidelines - Multi-Level Risk Assessment  
 Hazardous Industry Planning Advisory Paper No. 4 - Risk Criteria for Land Use Safety Planning  
 Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis  
 Hazardous Industry Planning Advisory Paper No. 8 - Hazard and Operability Studies

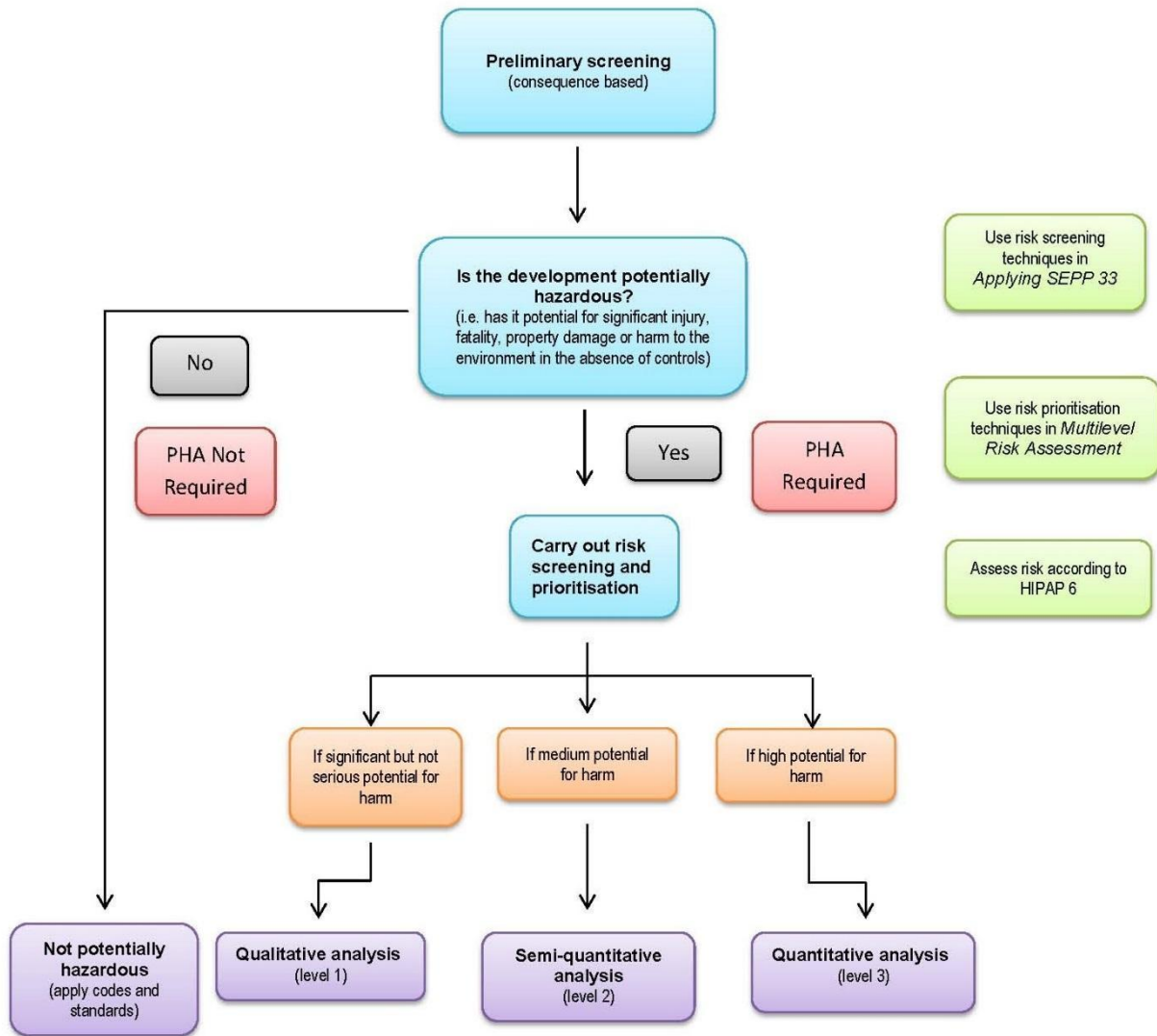
### **Other Documentation:**

Local Authorities requirements, NSW WorkCover and EPA Acts and Regulations.  
 Equipment Suppliers Specifications, Requirements and Instructions.  
 Fuel System Specifications and Drawings.  
 Site Specific drawings and suppliers specifications.

# **APPENDIX 1**

## **MULTI LEVEL RISK ASSESSMENT FLOW CHART**

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# **APPENDIX 2**

## **RISK RANK METHOD**

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## RISK RANKING METHOD

Risk is the combination of the likelihood of a specific unwanted event and the potential consequences if it should occur.

### Probabilities

- A - common or repeating occurrence
- B - known to occur, or "it has happened"
- C - could occur, or "I've heard of it happening"
- D - not likely to occur
- E - practically impossible

### Consequences

#### People

- 1 - fatality or permanent disability
- 2 - serious lost time injury or illness
- 3 - moderate lost time injury or illness
- 4 - minor lost time injury or illness
- 5 - no lost time

#### Equipment, assets or environment

- 1 - more than \$500K damage
- 2 - \$100K to \$500K damage
- 3 - \$50K to \$100K damage
- 4 - \$5k to \$50K damage
- 5 - less than \$5K damage

#### Production

- 1 - more than \$500K production delay
- 2 - \$100K to \$500K delay
- 3 - \$50K to \$100K delay
- 4 - \$5k to \$ 50K delay
- 5 - less than \$5K delay

### **Risk Ranking Method (above)**

For each event, the appropriate probability (a letter A to E) and consequence (a number 1 to 5) is selected. If an event affects more than one area of consequence (eg. Affects people and production), the highest rank number, i.e. 1, is always selected.

### **Risk Ranking Table (below)**

The consequences (loss outcomes) are combined with the probability (of those outcomes) in the risk ranking table to identify the risk rank of each loss event (eg a consequence 3 with a probability B yields a risk rank 9).

The table yields a risk rank from 1 to 25 for each set of probabilities and consequences. A rank of 1 is the highest magnitude of risk, i.e. a highly likely, very serious event.

A rank of 25 represents the lowest magnitude of risk, an almost impossible, very low consequence event.

Events represented on the risk ranking table by ranks between 16 and 25 inclusive are considered acceptable risks.

## RISK RANKING TABLE

PROBABILITY CONSEQUENCE	A	B	C	D	E
1	1	2	4	7	11
2	3	5	8	12	16
3	6	9	13	17	20
4	10	14	18	21	23
5	15	19	22	24	25

# APPENDIX 3

## HAZARD ANALYSIS

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# Hazard Analysis

**Project:**

Highway Service Centre at 37-41 Bengal Road Coolongook NSW  
Design Phase - Dangerous Goods Storage at Service Station

**Date:** 04.09.2019

**Description/Activity:**

## RISK RANKING METHOD SUMMARY (Refer Appendix 2 for full detail)

Probability	Consequences		
	People	Equipment, assets or environment	Production
A - Common or Repeating Occurrence	1 - fatality or permanent disability	1 - more than \$500k damage	delay
B - Known to occur, or "it has happened"	2 - serious lost time injury or illness	2 - \$100k to \$500k damage	2 - \$100k to \$500k delay
C - Could occur, or "I've heard of it happening"	3 - moderate lost time injury or illness	3 - \$50k to \$100k damage	3 - \$50k to \$100k delay
D - not likely to occur	4 - minor lost time injury or illness	4 - \$5k to \$50k damage	4 - \$5k to \$50k delay
E - practically impossible	5 - no lost time	5 - less than \$5k damage	5 - less than \$5k delay

Sheet 1 of 3

Certification against AS1940 for Flammable and Combustible Liquids Storage		Probability	Consequences	Action Required (Y/N)
No.	Hazard	A-E		
1	Overfill of tank	D	The flammable and combustible liquids tanks will be located underground and be remote filled with a remote contents gauge located at the fill points. A spill kit and fire fighting equipment will be within close proximity to the delivery driver whilst filling the tanks.	N
2	Leak in pipework	D	All pipework will be located underground and protected from impact. Regular pressure tests will be performed to ensure tightness. Stock reconciliation is to be carried out weekly and would highlight any leaks immediately.	N
3	Hose trip hazard	D	The tanker parking area is to be adjacent to the fill points in a nominated tanker parking area. The hose used will be a small diameter pressure hose and generally able to lie flat on the ground. The tanker driver will use warning signage during deliveries.	N
4	Ruptured fill hose	E	Extremely unlikely event. The tank hoses will be pressure tested and/or replaced regularly. The tanker will be fitted with an emergency stop system. The tanker standing area will be specifically set up for containment of spills.	N
5	Equipment wear and tear	D	Regular maintenance checks will be carried out on the tank and its equipment to maintain that everything is in a safe and working condition. This will occur at least annually. Delivery drivers will report anything that requires rectification.	N
6	Vandalism of equipment	D	The tank will be installed underground. All valves and fittings will be located in a underground turret which is to be kept secured from tampering.	N
7	Customer overfill during dispensing	D	The dispensers installed at this site will be equipped with a sensing device that's shuts down the flow of product when it reaches the tip of the nozzle. Clean up materials are to be located within close proximity of the dispensing area.	N
8	Customer drives off with nozzle inserted	D	Clean up materials are to be located within close proximity to the dispensing area.	N







# **APPENDIX 4**

## **PROPOSED SITE PLAN**

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SITE ANALYSIS	
TOTAL SITE AREA:	6,103m <sup>2</sup>
SALES BUILDING AREA:	320m <sup>2</sup>
FLOOR SPACE RATIO:	5.24%
SALES BUILDING ROOF AREA:	917m <sup>2</sup>
LIGHT VEHICLE CANOPY AREA:	298m <sup>2</sup>
HEAVY VEHICLE CANOPY AREA:	108m <sup>2</sup>
TOTAL PAVEMENT AREA:	4872m <sup>2</sup>
TOTAL SITE COVERAGE:	5757m <sup>2</sup>
SITE COVERAGE PERCENTAGE:	94%
TOTAL LANDSCAPED AREA:	346m <sup>2</sup>

PARKING ANALYSIS	
SECTION 5.2.2 OF THE RTA GUIDE TO TRAFFIC GENERATING DEVELOPMENTS (OCTOBER 2002)	
FOR CONVENIENCE STORES IN SERVICE STATIONS THE REQUIREMENT IS 6 SPACES PER 100 SQM OF GFA	
320 m <sup>2</sup> / 20 m <sup>2</sup> = 16	
16 PARKING SPACES REQUIRED	
(NO. OF SPACES)	
L/V PARKING SPACES	13 SPACES
CARAVAN PARKING SPACES	1 SPACES
H/V PARKING SPACES	2 SPACES
TOTAL PROVIDE 16 SPACES	

RELOCATED LIGHT POLE. FINAL LOCATION TO BE CONFIRMED BY LOCAL POWER AUTHORITY.

PROVIDE NEW CONCRETE CROSSOVER AND LAYBACK ALL TO LOCAL AUTHORITY REQUIREMENTS.

CONTINUE MARKINGS TO EDGE OF EXISTING TRAVEL LANE.

APPROX. LOCATION OF NEW 2 X 400LITRE OPERATIONAL TANKS; 1x100L (30046C/59K4LD/25H18)

EXISTING EDGE OF ROAD LINE MARKING.

PROVIDE NEW 1800 HIGH COLORBOND FENCE TO WESTERN AND NORTHERN BOUNDARY.

NEW HAND STAND PAVEMENT THROUGHOUT TO FUTURE ENGINEERING DETAILS.

150 H x 150 H CONCRETE KERBS LANDSCAPED AREAS.

RELOCATED LIGHT POLE. FINAL LOCATION TO BE CONFIRMED BY LOCAL POWER AUTHORITY.

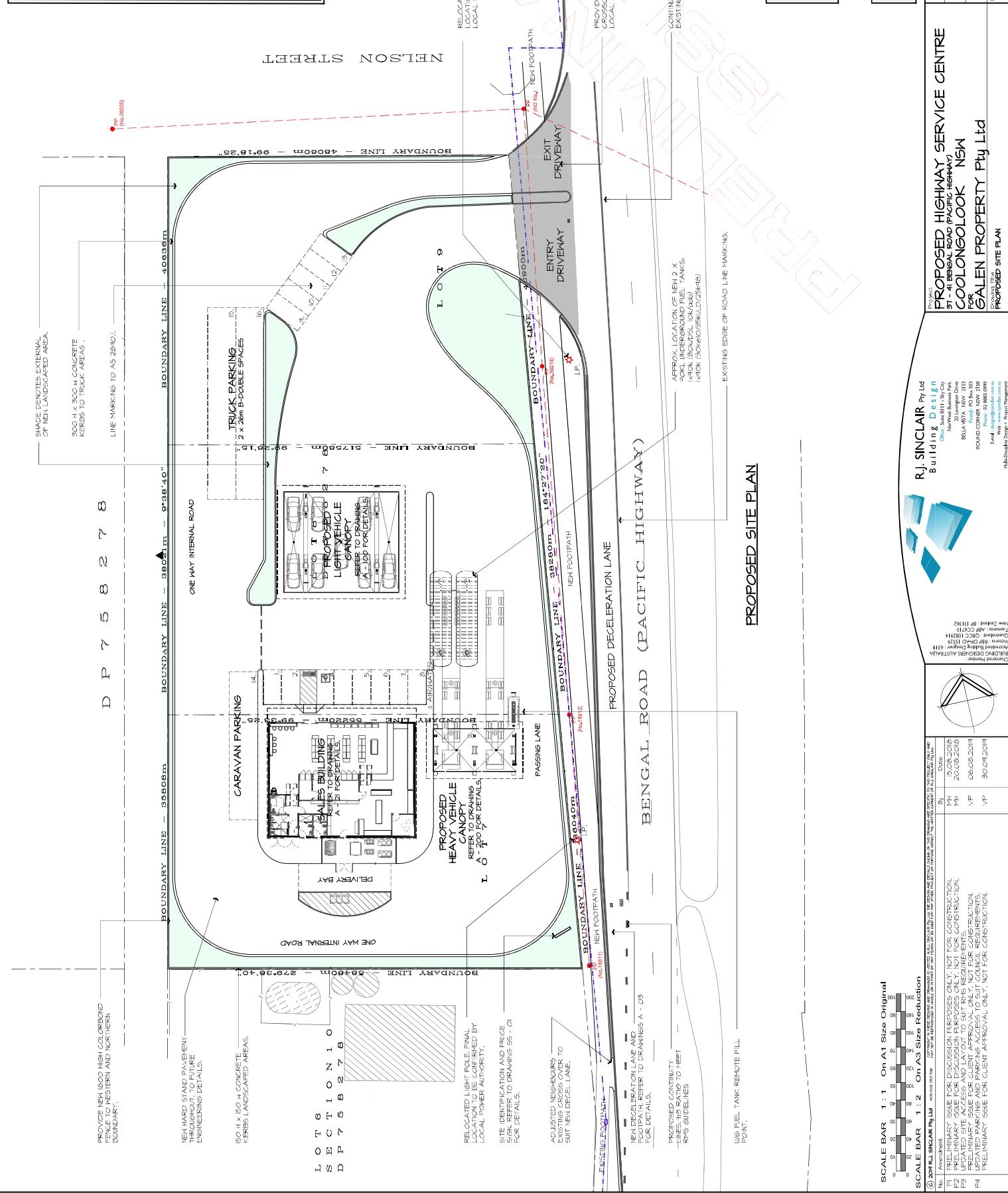
SITE IDENTIFICATION AND FENCE SIGN. REFER TO DRAWING 55 - 01 FOR DETAILS.

ADJUSTED NEIGHBOURS EXISTING CROSSOVER TO SUIT NEW DECEL LANE.

NEW DECELERATION LANE AND CROSSOVER. REFER TO DRAWING A - 03 FOR DETAILS.

PROPOSED CONTINUITY - LINES 185 X 100 TO 110ET R/S/S GUIDELINES

U/G FUEL TANK REMOTE FILL POINT.



**GENERAL NOTES:**

- DECLARATION FOOTPATH AND VERGE DESIGNS ARE PREPARED ONLY FOR DA APPROVAL. FINAL DESIGN TO BE PREPARED SUBJECT TO DA APPROVAL AND TO IN ACCORDANCE WITH ALL APPLICABLE REGULATORY REQUIREMENTS AND DESIGN STANDARDS.

**ISSUED FOR APPROVAL**  
**NOT FOR CONSTRUCTION**

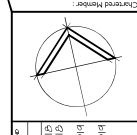
Approved	Designed
Date	Drawn
Scale	Checked
Project No.	Drawn No.
1:250 @ A1	1:500 @ A3
18 - 04B	A - 02
	P4

**PROPOSED HIGHWAY SERVICE CENTRE**  
**31 - 41 BENGAL ROAD (PACIFIC HIGHWAY)**  
**COOLONGLOOK NSW**  
**FOR**  
**GALEN PROPERTY Pty Ltd**

**R.J. SINCLAIR Pty Ltd**  
**Building Design**  
 10/111-113 Stirling Street  
 New West Business Park  
 BELMONT NSW 2171  
 Phone: 02 958 593  
 ROUND CORNER ROOM 209  
 Email: [raj@rjsinclair.com.au](mailto:raj@rjsinclair.com.au)  
 Website: [www.rjsinclair.com.au](http://www.rjsinclair.com.au)  
 1/16/2018 - 31/03/2018

Project No. 18-04B  
 Drawing No. A-02  
 P4

No.	Author/Rev	Date	Description
P1	VP	15.02.2018	PRELIMINARY ISSUE FOR DISCUSSION PURPOSES ONLY. NOT FOR CONSTRUCTION.
P2	MH	20.03.2018	UPDATED SITE ACCESS AND LAYOUT TO SUIT REGISTRATION CONSTRUCTION.
P3	VP	06.02.2019	PRELIMINARY ISSUE FOR CLIENT APPROVAL ONLY. NOT FOR CONSTRUCTION.
P4	VP	30.04.2018	PRELIMINARY ISSUE FOR CLIENT APPROVAL ONLY. NOT FOR CONSTRUCTION.



SCALE BAR 1 : 1 On A1 Size Original  
 SCALE BAR 1 : 2 On A3 Size Reduction

**PROPOSED SITE PLAN**