HAZKEM

DANGEROUS GOODS CONSULTING

SEPP 33

RISK SCREENING DOCUMENTATION AND PRELIMINARY HAZARD ANALYSIS

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RISK SCREENING and PRELIMINARY HAZARD ANALYSIS
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940 Pittwater Road
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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[1], (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[2].

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[3]. The PHA will outline in detail possible risks and hazards associated with this site. This will assist the 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[4].

State legislation requires a site such as this to incorporate stage 1 vapour recovery, such that during discharge by a road tanker, all vapours from the storage tank that would normally be discharged to atmosphere are collected by the tanker (VR1). In addition to VR1, stage 2 vapour recovery is also required such that when a vehicle is refueled, vapours that would normally be discharged to atmosphere are collected at the nozzle and returned to the underground tank (VR2)[5].

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 re tank of an existing 7 eleven service station located at 940 Pittwater Road, Dee Why NSW. The site is on the north east corner of the Pittwater Road and Hawkesbury Road intersection. There are residential properties to the north and the east of site with Hawkesbury Road running along the southern frontage and Pittwater Road along the Western frontage. There are commercial and residential properties located over Pittwater Road with the Dee Why RSL and Northern Beaches Veterans club located across Hawkesbury Road.

PROPOSAL

This site is an existing service station supplying Motor Spirit, Combustible Liquids and LPG for automotive use to the general public. The site is approx. 1860 square meters in size with an existing 185 square meter sales building. It is proposed to remove all existing tanks except the LPG vessel and replace them with new double wall tanks as per the list detailed below. The existing LPG vessel will remain.

HAZARDOUS MATERIALS

There is an existing maximum, 17kl of LP Gas in bulk stored on site at any one time in an underground vessel, together with a proposed total of 150 kl of flammable liquid and 30 kl of combustible liquid in underground tanks. The LP Gas as well as 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

Product	Quantity	Tank/Compartment No.	Class and PG
ULP	60,000 litres	1	3 PG II
E10 Petrol	30,000 litres	2	3 PG II
95 Petrol	30,000 litres	3	3 PG II
98 Petrol	30,000 litres	4	3 PG II
Diesel	30,000 litres	5	C1*

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.

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.

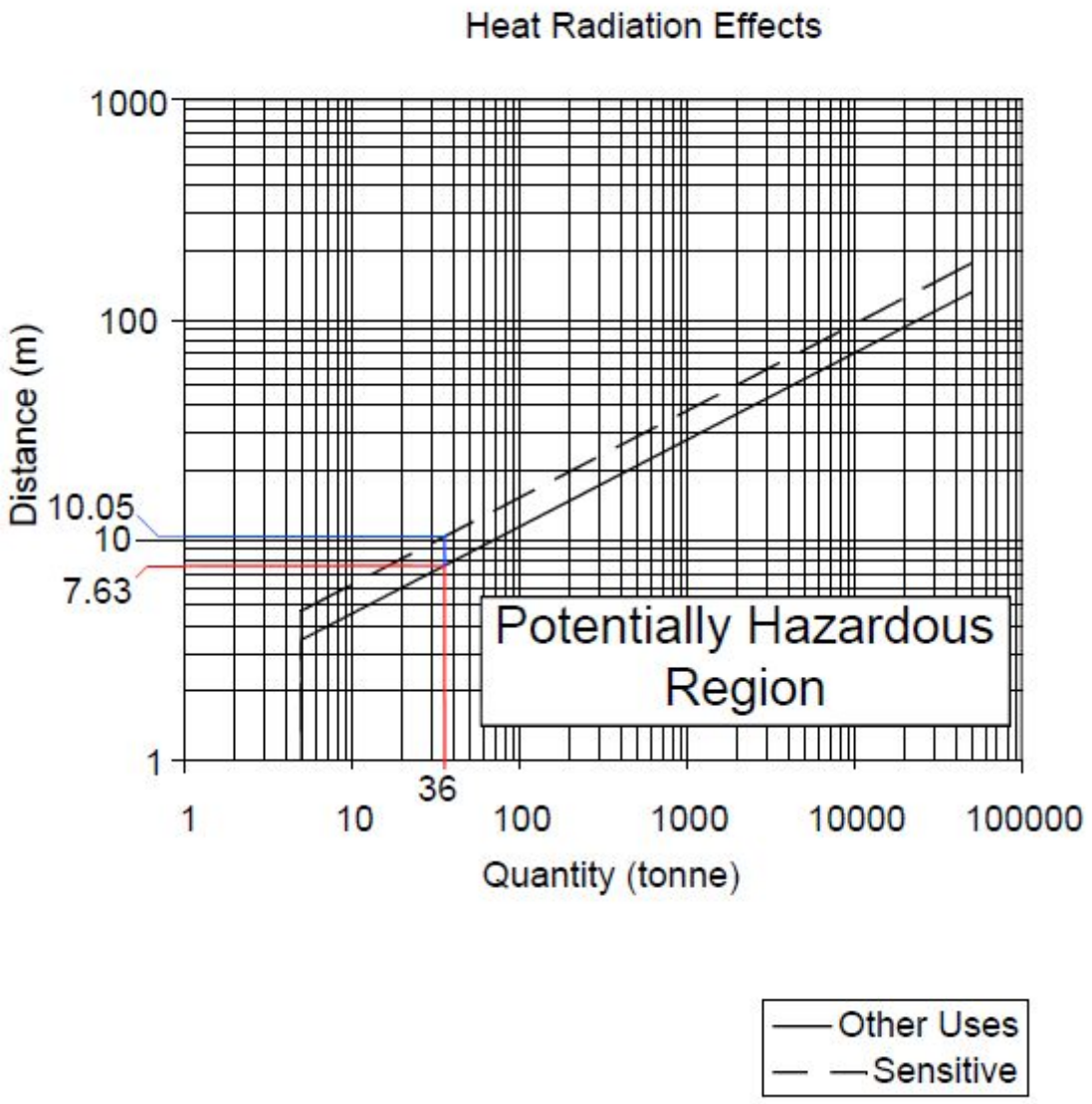
By utilising Figure 9 of SEPP 33 and measuring separation distances, it can be determined whether further analysis is required. The separation distances are measured from both the underground tank fill points and the fuel dispensers to the site boundaries.

Boundary	Min Distance – Fill Points	Min Distance - Dispensers
North	46.2	13.6
South	6.9	23.3
East	15.7	17.4
West	8.5	6.7

Total storage capacity is 180,000 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 36,000 litre storage.

FIGURE 9, SEPP 33



From Figure 9 we can see that for 36,000 litres, the minimum setback distance from the remote fill and dispensing points is 7.63 metres to site property boundaries for other uses or 10.05 metres for sensitive uses (residential uses).

Since the set back distances are less than this to the southern and western boundaries from the fill points as well as to the western boundary for the dispenser, 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.

LPG STORAGE

Proposal

Product	Quantity	Tank/Compartment No.	Class
LPG	17,000 litres	6	2.1

Calculations

For LPG there is a screening process, which includes a simple chart (Table 1 page 17). This table indicates the screening method to be used. In this instance, being underground storage proposed, table 1 references table 3 (page 37) as the screening threshold quantity for LPG. Table 3 outlines the threshold for underground storage as 40 tonne or 64m^3

With respect to the LPG vessel, as we are not exceeding the threshold of 64m^3, in this instance the existing tank stores 17m^3, no further analysis will be required with regards to the LPG storage as it is deemed non hazardous, and therefore a PHA will not be required for the LPG storage.

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[6]. For the LP Gas storage delivers to the site will be about 2 a week or 104 times a year which is well below the allowable 30 movements per week or 500 movements per year.

In this case, as the numbers of expected deliveries for both the fuel and LPG are well below the thresholds, there are no requirement 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

	Vehicle Movements		Minimum quantity* per load (tonne)	
	Cumulative	Peak		
Class	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 as well as the screen thresholds for LP Gas, the proposed design does not achieve all setback distances as required under SEPP 33 for the flammable and combustible liquids storage. As such the site and its current design of the flammable and combustible liquids system 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.

Product	Quantity	UN Number	DG Class	Packaging Group	Hazchem code
ULP	60,000 litres	1203	3	II	3YE
E10 Petrol	30,000 litres	1203	3	II	3YE
95 Petrol	30,000 litres	1203	3	II	3YE
98 Petrol	30,000 litres	1203	3	II	3YE
Diesel	30,000 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 Service Station site 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 service station 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 service station 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 180,000L, applying a division of 5, we therefore assess as 36 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. The site is not of a significant enough size to contain the maximum effect areas 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 50 persons per hectare. (d = 50)

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 $\pi \times r^2 = \pi \times 50^2 = 7857\ m^2$. The site itself has an area of $1860m^2$ and as such is calculated to take up approximately 20% (1860/7857 = 0.24) of the Effect Area leaving 76% of offsite land. Based on Table VII a population fraction of 100% , needs to be

applied as the closest figure without going under, and therefore a figure of 1 is determined. (f_A = 1)

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:
$C_{a,s} = A \bullet d \bullet f_A \bullet f_m$
or, in this case:

$C_{a,s} = A \bullet d \bullet f_A \bullet f_m$
$C_{a,s} = 0.4x50x1x1$
$C_{a,s}$ = ***20 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 (*nl*)
- safety systems associated with flammable substances (*nf*)
- organisational and management safety (*no*))
- wind direction towards the populated area (*np*)

The probability number is given by the formula:

$N_{i,s} = N^*_{i,s} \bullet n_l \bullet n_f \bullet n_o \bullet n_p$

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 $n_o = 0$

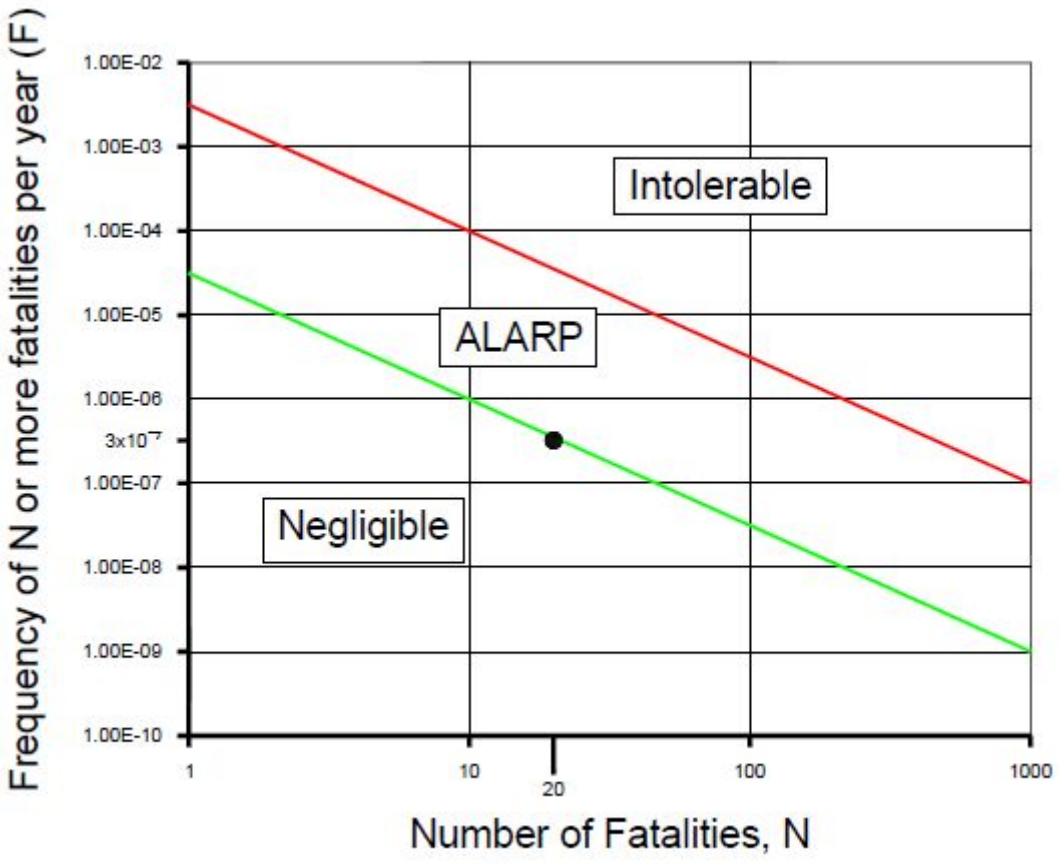
Table XIII applies correction Parameters for Wind direction towards populated areas in the affected Zone and specifically looks at where people are living within this zone. In this instance Residential properties are located within 20-50% of the Affected Area and therefore 50% coverage is applied and $n_p = 0.5$

so,

where
$N_{i,s} = N^*_{i,s} \bullet n_l \bullet n_f \bullet n_o \bullet n_p$
$N_{i,s} = 7 + (-1) + 0 + 0 + 0.5 = 6.5$

Converting probability into frequency, in table XIV, we 3×10^{-7}

This result can be plotted on the following graph:



By intersecting the frequency ($P = 3 \times 10^{-7}$) with the consequences (**20** 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

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

OTHER REFERENCES

Australian Standards:

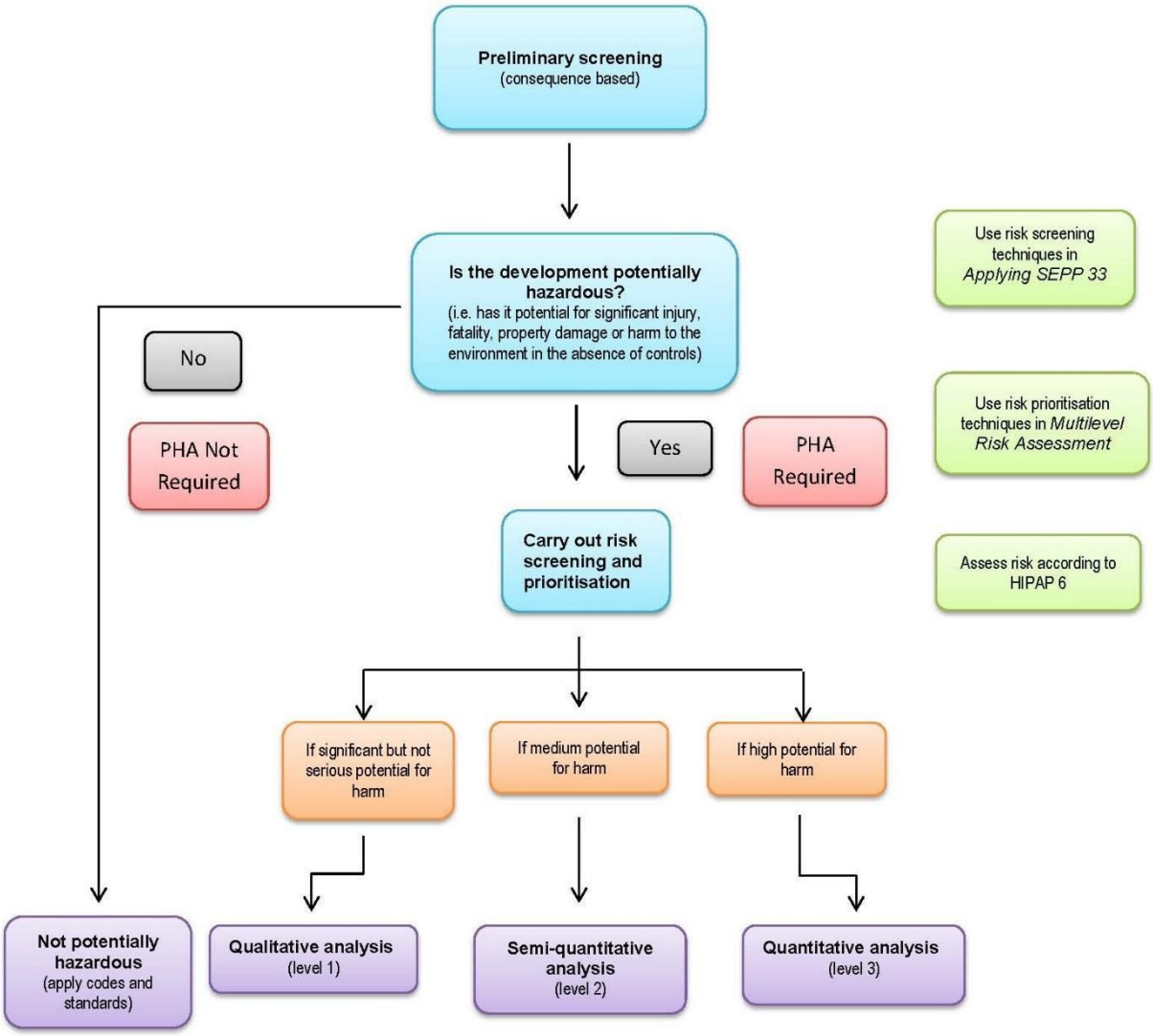
AS 1940-2017	"The Storage & Handling of Flammable & Combustible Liquids"
AS/NZS 1596-2014	"Storage and Handling of LPG Gas"
AS 4897-2008	"The Design, Installation and Operation of Underground Petroleum Storage Tanks"
AS 3000-2007	"Electrical Wiring Rules".
AS/NZS 60079.10.1-2009	"Classification of Areas. 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


Preliminary screening
(consequence based)
Is the development potentially hazardous?
(i.e. has it potential for significant injury, fatality, property damage or harm to the environment in the absence of controls)
Use risk screening techniques in Applying SEPP 33
No
PHA Not Required
Yes
PHA Required
Use risk prioritisation techniques in Multilevel Risk Assessment
Carry out risk screening and prioritisation
Assess risk according to HIPAP 6
If significant but not serious potential for harm
If medium potential for harm
If high potential for harm
Not potentially hazardous
(apply codes and standards)
Qualitative analysis
(level 1)
Semi-quantitative analysis
(level 2)
Quantitative analysis
(level 3)

APPENDIX 2
RISK RANK METHOD

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	A	B	C	D	E
CONSEQUENCE					
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

Hazard Analysis

Project: 7-Eleven Service Station at 940 Pittwater Road Dee Why **Date:** 20.02.2020
Description/Activity: Design Phase - Dangerous Goods Storage at Service Station

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	1 - more than $500k production 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, "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

	Certification against AS1940 for Flammable and Combustible Liquids Storage		Probability	Consequences	
No.	Hazard		A-E	1-5	Action Required
1	Overfill of tank	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.	D	4	N
2	Leak in pipework	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.	D	4	N
3	Hose trip hazard	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.	D	5	N
4	Ruptured fill hose	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.	E	4	N

5	Equipment wear and tear	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.	D	4	N
6	Vandalism of equipment	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.	D	4	N
7	Customer overfill during dispensing	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.	D	4	N
8	Customer drives off with nozzle inserted	Clean up materials are to be located within close proximity to the dispensing area.	D	4	N
9	Collision between vehicle and dispenser	All dispensers on this site are to be protected from vehicular impact by with the assistance of bollards.	D	3	N
10	Use of mobile phone/transmitting devices	The site is to be fitted with warning signs advising customers of the risk of mobile phone and transmitting devices. The console is to be 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 service station site.	D	4	N
11	Spill of product onto customer	The console operator will be trained in how to administer first aid should a customer be injured by coming into contact with any dangerous goods on this site.	D	4	N
12	Customer misuse of equipment	The site will be fitted with instructions indicating procedures for safe use of the dispensing equipment. The console operator will be 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 will also has access to a public address system should they need to verbally communicate with customers on the forecourt.	D	4	N
13	Fire at fill point	All delivery tankers will carry at least a single powder type extinguisher which will be available near the fill points during product delivery. As a Service Station site additional fire protection equipment will be available within a close proximity. The fill points will be 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.	D	4	N
14	Fire on site	As a service station storing and dispensing flammable and combustible liquids fire protection in the form of fire extinguishers will be located on site in strategic places in full compliance with AS 1940. An emergency shut down system will be installed onsite to enable the dispensing system to be shut down in an emergency.	D	3	N
15	Fire on adjoining property	Should a fire on an adjoining property impact the site the dispensing system will be able to be shut down ensuring the all product remains in the underground tanks.	D	3	N

	Certification against AS/NZS1596 for Flammable Gas Storage				
No.	Hazard				
1	Overfill of tank	Tank installation is located outdoors in a well ventilated area. The tank is direct filled with a contents gauge readily accessible for the delivery driver. Fire fighting equipment is within close proximity to the delivery driver whilst filling the tank.	D	4	N
2	Hose trip hazard	As a direct filled underground tank, the tanker will park adjacent to the fill point 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.	D	4	N
3	Fire at fill point	At least a single powder type extinguisher is available near the fill points during product delivery (normally carried by the tanker) and at least a tap and hose in the vicinity of the tank storage area. The fill point is fitted with a manual shutoff valve and a back check fill valve to stop any outward flow. The tanker is fitted with an emergency stop system in order to cease pumping quickly. The driver is in attendance at all times.	D	3	N
4	Fire on site	As a service station storing and dispensing flammable gas fire protection in the form of a minimum of a tap and hose and fire extinguishers are located on site in strategic places in full compliance with AS/NZS 1596. An emergency shut down system is installed on site to enable the LP Gas installation and dispensing system to be shut down in an emergency.	D	3	N
5	Leak/rupture in pipework	All pipework is located underground and are protected from impact. Regular pressure tests are performed to ensure tightness. Stock reconciliation is carried out weekly and would highlight any leaks immediately. The pipework run through the site is a continuous copper or polypropylene line.	D	3	N
6	Ruptured fill hose	Extremely unlikely event. The tank hoses are pressure tested and/or replaced regularly. The tanker is fitted with an emergency stop system.	D	4	N
7	Equipment wear and tear	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.	D	3	N
8	Vandalism of equipment	As an underground installation all fitting are located within the tank pit and is secured from unauthorised access and tampering. Regular maintenance checks are carried out on all equipment.	D	4	N
9	Fire on adjoining property	Should a fire on an adjoining property impact the site the dispensing system will be shut down ensuring the all product remain in the tanks.	D	4	N
10	Customer overfill during dispensing	The site is fitted with Style A type dispenser in compliance with AS/NZS 1596 which automatically shuts off when the tank reaches capacity.	D	4	N
11	Customer drives off with nozzle inserted	The dispenser is fitted with a break-away coupling which will detach and prevent any significant damage to the dispenser.	D	3	N
12	Collision between vehicle and dispenser	All dispensers on this site are protected from vehicular impact by with the assistance of bollards.	D	3	N

13	Use of mobile phone/transmitting devices	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 service station site.	D	4	N
14	Spill of product onto customer	The console operator has been trained in how to administer first aid should a customer be injured by coming into contact with any flammable gas on this site.	D	4	N
15	Customer misuse of equipment	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.	D	4	N
16	Leaking valve	Experience shows that this is a rare occurrence. Any leaking valve can be shut down manually.	D	4	N

Hazard Analysis Summary

Project/Site: 7-Eleven Service Station at 940 Pittwater Road Dee Why **Date:** 20.02.2020
Description/Activity: Design Phase - Dangerous Goods Storage at Service Station Last Updated:

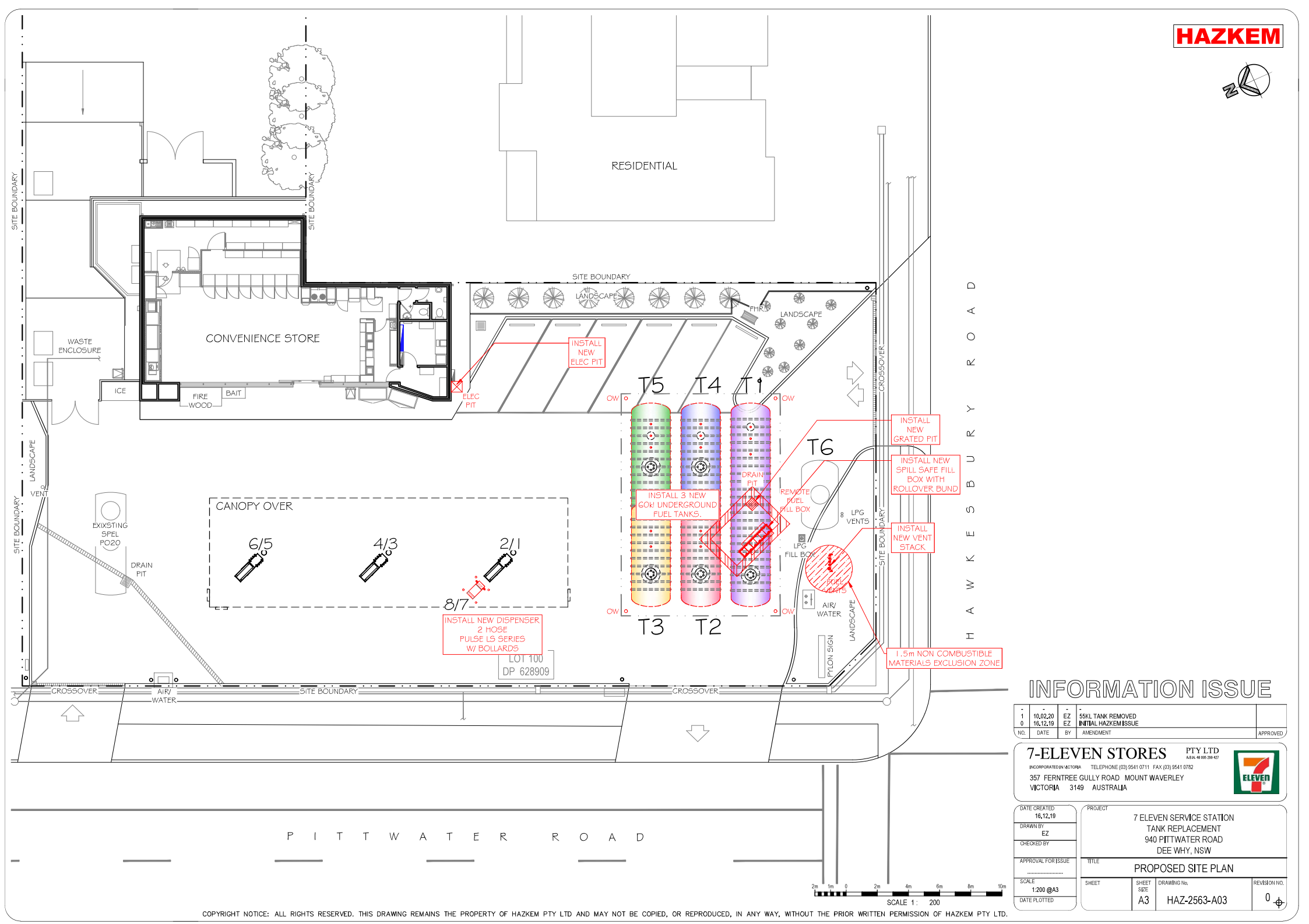
Note: This section of the hazard analysis is for the design of site only and does not take into account any site issues which must be looked at regarding alternate storage locations

CONTROL MEASURES		IMPLEMENTATION		MONITOR & REVIEW	
Item Ref	**Possible Control Measures**	**Responsibility and Action Required**	**Control Implemented Sign-off & Date**	**Planned Review Date**	**Review Sign-off & Date**
	NA	NA			

CONCLUSION/COMMENTS:

POST IMPLEMENTATION CHECKLIST REVIEW:

APPENDIX 4
PROPOSED SITE PLAN



INFORMATION ISSUE

NO.	DATE	BY	AMENDMENT	APPROVED
-	-	-	-	
1	10.02.20	EZ	55KL TANK REMOVED	
0	16.12.19	EZ	INITIAL HAZKEM ISSUE	

7-ELEVEN STORES PTY LTD
A.B.N. 46 005 289 427
INCORPORATED IN VICTORIA TELEPHONE (03) 9541 0711 FAX (03) 9541 0782
357 FERNTREE GULLY ROAD MOUNT WAVERLEY
VICTORIA 3149 AUSTRALIA

DATE CREATED	16.12.19
DRAWN BY	EZ
CHECKED BY	
APPROVAL FOR ISSUE	.....
SCALE	1:200 @A3
DATE PLOTTED	

PROJECT
7 ELEVEN SERVICE STATION
TANK REPLACEMENT
940 PITTWATER ROAD
DEE WHY, NSW

TITLE
PROPOSED SITE PLAN

SHEET	SHEET SIZE	DRAWING No.	REVISION NO.
	A3	HAZ-2563-A03	0