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PARCEL PROPERTY
BALDIVIS ROAD DEVELOPMENT

APA GROUP
PARMELIA GAS PIPELINE
AS2885 SAFETY MANAGEMENT
STUDY
WORKSHOP REPORT

Document No: R-PF-1073						
Rev	Date	Description	Prepared	Checked	Approved	Licensee
A	28/12/2017	Issued for Client Review	B Collins	R Thornton	R Thornton	
			Project Engineer	Snr Pipeline Integrity Engineer	Snr Pipeline Integrity Engineer	



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WORKSHOP REPORT**

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1.0 TABLE OF ABBREVIATIONS AND DEFINITIONS

Abbreviation / Term	Description
ALARP	The term “As Low as Reasonably Practicable” means the cost of further risk reduction measures is grossly disproportionate to the benefit gained from the reduced risk that would result. (AS2885.1 Section 1.6 & Appendix G)
KP	Kilometre Point
MAE	A Major Accident Event (MAE) is defined as “an event connected with a pipeline operation, including a natural event, having the potential to cause multiple fatalities of persons engaged in the operation or other protected persons”. (AS2885.3 Appendix E2)
MAOP	Maximum Allowable Operating Pressure
Non-Credible Threat	A threat for which the frequency of occurrence is so low that it does not exist for any practical purpose at that location. (AS2885.1 Section 1.6)
PGP	Parmelia Gas Pipeline
SMS	Safety Management Study
TOR	Terms of Reference

Table 1: Abbreviations and Definitions used in the Report

2.0 REFERENCES

Document Number	Title
AS2885.1	Pipelines Gas and Liquid Petroleum, Part 1 – Design and Construction
AS2885.3	Pipelines Gas and Liquid Petroleum, Part 3 – Operation & Maintenance
TOR-PF-1051	Terms of Reference Baldvis Road Development
N/A	Parmelia Gas Pipeline System 2012 AS2885 SMS Workshop Report
N/A	APA AS2885 Risk Assessment Matrix
R-PI-453	SMS Guide Words
Drawings	
3407-35-01 (Dated 24/8/2017)	Concept Plan Lots 1006, 1007 & 1272 Baldvis Road & Lot 1 Serpentine Road, Baldvis
99596-DE-001 Rev B	LOTS 1006, 1007, & 1262 BALDIVIS ROAD, BALDIVIS DETAIL SURVEY
N/A	Map of Lots, Baldvis Rd (Pipeline Aerial Overview / Pipeline DOC's / Pipeline Measurement Lengths / Pipeline Service Crossings)
101-D-L-56_3	Alignment Sheet – Baldvis Rd

Table 2: Reference Documents

3.0 EXECUTIVE SUMMARY

The AS2885 Safety Management Study for the proposed development at Baldivis Road, Baldivis has been successfully completed in accordance with the Terms of Reference Document No: TOR-PF-1051 and AS2885.1.

All identified threats to and from the Parmelia Gas Pipeline from the proposed development were assessed to ensure the on-going safe operation of the Pipeline.

A total of 21 Actions were raised in the workshop.

As a result of the additional controls specified during the workshop, there were no items identified which required an ALARP Justification.

Upon completion of these Actions all threats to and from the Pipeline from the proposed development are considered to be adequately controlled and managed as per the requirements of AS2885.1.

The AS2885 Safety Management Study Workshop was conducted at the APA Office, Eastpoint Plaza, Perth on the 31st October 2017 and contained all parties required for the successful completion of the Safety Management Study Workshop.

As part of the Safety Management Study a Location Classification Review was also performed in accordance with AS2885.1.

4.0 INTRODUCTION

Pipeline Integrity Pty Ltd was engaged by Parcel Property to perform an AS2885 Safety Management Study and Location Classification Review Workshop for the Parmelia Gas Pipeline in the location of the proposed development at Baldivis Road, Baldivis.

This document forms the Workshop Report and outlines the Safety Management Study and Location Classification Review Workshop details, results and actions raised.

5.0 PIPELINE OVERVIEW

An overview of the Pipeline for the relevant section is outlined below.

Item	Parmelia Pipeline
Pipeline License No	1, 2, 3
Location of Pipeline Affected by Proposed Works	Baldivis Rd to Sixty Eight Rd
Product	Natural Gas
Design Code	AS 2885
Diameter	DN350
MAOP	5.61 MPa
Pipe Type	API 5L X52
Wall Thickness	5.56 mm
Coating Type	Yellow Jacket
Measurement Length (4.7kW/m ² Radiation Contour)	279 m (160 m to 12.6 kW/m ²)
Current Location Class (Prior to Development)	R1 (As per 2012 SMS for Section 27: Baldivis – Pinjarra, KP381 – 413.05)
Depth of Cover	Minimum of 750 mm (DOC Readings Range from 850 – 1700 mm)
Above Ground Facilities	Nil
DMP Licenced Asset	Yes
Easement	12.192 m (40')

Table 3: Pipeline Overview

For further details refer to the drawings and documentation listed in Section 2.0.

6.0 DEVELOPMENT OVERVIEW

Parcel Property are proposing to develop the following Lots at Baldvis Road:

- Lots 1006, 1007 & 1272 Baldvis Road
- Lots 1 Serpentine Road

The Proposed Works are within the vicinity of the Parmelia Gas Pipeline which is operated by APA Group.

The proposed development consists of the following:

- Total Lot Area is approximately 33 ha
- Residential lots
 - Size range from 150m² to 450m²
 - Low density Lots
 - High density Lots (Terrace Type, Typically 150m² lots and two stories, No Apartments)
 - Compact Lots
 - Cottage Lots
- Public Open Space
- Additional Road and Services
- *Note: The above areas are approximated only and subject to Final Survey.*
- **Existing Road Crossings** (across the PGP)
 - Baldvis Road (*No works to Baldvis Road Required. No upgrade to Services along Baldvis Road as part of the Development Project*)
 - Sixty Eight Road (*will be re-built, lifted up 2m and services crossings installed*)
- **New Road Crossings** (across the PGP)
 - X1 Minor Road Crossings (Lifted 1m and service crossings installed)
 - Road Crossings will include services (Power, Communication, Gas, Water, Drainage and Sewage)
- Street Lights
- Public Open Space (with Potential Sewer Crossing PGP. Likely to have playgrounds installed)
- Fencing along some Boundaries
- Drainage Basins nearby to PGP
- Pedestrian Paths
- Power Transformers throughout development (approx. 5 to 6)

The development is encumbered by an Easement for the Parmelia Gas Pipeline (PGP). This corridor extends in West to South-East direction through the centre of the development area.

Details of the proposed development are as per the Concept Plan 3407-35-01 dated on the 24th of August 2017, which is included as part of the Terms of Reference attached in Appendix D.

6.1 Construction Details

Details of the proposed Construction Activities in the vicinity of the Parmelia Gas Pipeline are as outlined below:

- Site establishment including establishment of site facilities and mobilisation of plant and personnel (including site office and lay down area)
- Surveying and Marking
- Earth Works
 - Clear and Grade
 - Clear and Removal of Large Trees
 - Import and Fill (Road Reserve / Development)
 - Compaction (Road Reserve / Development)
- Construction activities for:
 - Roadworks
 - Building Demolition
 - Concrete footpaths
 - Landscaping
 - Hardscaping
 - Fencing
- Installation of Services (Trenching, Backfill, Compaction) to lots and associated development:
 - Electrical/Power
 - Communications
 - Gas
 - Water
 - Drainage
 - Sewer (including dewatering)
 - Irrigation for Landscaping

Note: The majority of the above activities will be performed around and on the Parmelia Gas Pipeline Easement.

7.0 SCOPE OF WORKSHOP

The Workshop Scope undertaken was to perform an AS2885 Safety Management Study (SMS) Workshop and document the process for the proposed development at Baldivis Rd, Baldivis.

This assessment was required to take into account the relevant section of the following existing operating Pipeline:

- Parmelia Gas Pipeline (Operated by APA Group)

As part of the SMS Workshop assessment, the following is required:

1. Review of the Location Classification for the above Pipeline taking into account the Proposed Works
2. Safety Management Study for the above Pipeline for the section in which the pipeline measurement length encompasses the Proposed Works (Location Specific and Non-Location Specific Threats)

The Safety Management Study is required to assess:

1. Threats to the Pipeline from proposed Construction activities
2. Any new threats which may exist from the proposed works (during Operations)
3. If current controls to existing threats are sufficient taking into account the proposed works and any Location Class changes which may arise (Loc Specific and Non-Loc Specific Threats)

The above is a License and AS2285 requirement for the Parmelia Gas Pipeline.

The purpose of the Safety Management Study is to ensure the continued safe operation of the pipeline and safety of those in the surrounding area from the pipeline.

7.1 Excluded from Scope

The following items are excluded from the Scope:

- Construction HAZID
- ALARP Justification (Performed Post Workshop as Required)
- Assessment of the any other gas pipelines

8.0 METHODOLOGY

The Location Classification Review was performed by assessing each section and utilising local knowledge of relevant personnel within the workshop to establish the land use for each section. Location Class was assigned in accordance with AS2885.1.

The Safety Management Study Workshop was performed in accordance with AS2885.1 and the process outlined in the Terms of Reference Document No: TOR-PF-1051. The Terms of Reference document is attached in Appendix D and should be referred to where further information is required.

Documentation utilised during the workshop included the reference documentation as listed in Section 2.0.

8.1 Assumptions

All information supplied is a true and accurate representation of the relevant pipeline details and proposed development works.

9.0 WORKSHOP SCHEDULE

The Safety Management Study was conducted in the APA Group Perth Office located at Eastpoint Plaza, Adelaide Tce Perth WA per the details below.

Date	Detail	Start	Finish
31/10/2017	SMS Workshop	9:00 am	3:30 pm

Table 4: Workshop Schedule

10.0 ATTENDEES

The attendees for the workshop are listed in the table below.

Prior to commencement of the workshop, the group confirmed that all required parties were present to allow the Safety Management Study to be performed.

Name	Initials	Position	Company
Developer's Consultant – Pritchard Francis			
Ryan Brook	RB	Civil Engineer	Pritchard Francis
Mark Riddell	MR	Project Director	Pritchard Francis
Developer – Parcel Property			
Steve Claudio	SC	Development Manager	Parcel Property
Owner & Operator – APA			
Bill Ivory	BI	Corridor Protection Lead WA & NT	APA Group
Warren Guthrie	WG	Team Leader - Perth	APA Group
Gerry Connell	GC	Corridor Technical Officer	APA Group
Adam Crichton	AC	Risk Engineer	APA Group
Facilitator - Pipeline Integrity			
Rob Thornton	RT	Independent Facilitator & Scribe	Pipeline Integrity

Table 5: Workshop Attendees

A copy of the Attendance Sign on Sheet is attached in Appendix C.

11.0 LOCATION CLASSIFICATION REVIEW

A Location Classification Review was performed for the relevant section of the Parmelia Gas Pipeline as part of the SMS Workshop. The Location Classification Review was performed in accordance with AS2885.1.

A copy of the Location Classification Review is attached in Appendix A.

The Results of the Location Classification Review are summarised below.

Section	Pipeline	Kilometre Post (kilometre)		Current Location Classification		Revised Location Classification	
		Start	Finish	Primary	Secondary	Primary	Secondary
1	PGP	279m U/S of Baldivis Rd	279m D/S of Sixty Eight Rd	R1 (Note - there is T1 to the Northern area from the Development from the other side of Baldivis Rd)	-	T1	-

Table 6: Location Classification Review

12.0 RESULTS

The results of the Safety Management Study Workshop were recorded using a spread sheet based logging tool and included assessment of the following:

- Construction Activities and Threats to Pipeline
- New Location Specific Threats (from Proposed Works during Operations)
- Location Specific Threats (Existing which needs to be assessed based on a Location Class Change)
- Non Location Specific Threats (During Operations which could result in a Failure Event. Assessed based on changes to Location Class which could potentially affect consequences and risk analysis)

A copy of the results is attached in Appendix B.

12.1 Major Accident Events

Major Accident Events (MAE) describes those hazards which could result in multiple fatalities. There were Three Major Accident Events identified during the Safety Management Study and are summarised below.

Job Step ID	Loc. Description	Kilometre Point	Threat Description	Additional Controls / Actions	Residual Risk (with additional threat control)
Construction Activities and Threats to Pipeline					
C – 10	Baldivis Road to Sixty Eight Road	Baldivis Road to Sixty Eight Road	Open Trenching	Refer actions 12, 13 and 14 in Table 9	Failure Not Possible
C – 11	Baldivis Road to Sixty Eight Road	Baldivis Road to Sixty Eight Road	HDD	Refer actions 15 and 16 in Table 9	Negligible
Location Specific Threats (During Operations)					
LS - 5	Baldivis Road to Sixty Eight Road	Baldivis Road	Excavation and Maintenance of services at Road Crossings (above and below pipe) (20T Exc)	21. Install slabs over service crossings at time of Baldivis Road upgrade (scheduled for approx. 2018)	Failure Not Possible

Table 7: MAE Summary

12.2 ALARP Justifications

ALARP Justifications are required for the following threats:

- Major Accident Events
- Threats with Risk Levels of Intermediate or higher

Prior to additional controls being specified, Item's ID C-10 (Open Trenching), C-11 (HDD) and LS-5 (Excavation and Maintenance of services at Road Crossings (above and below pipe) (20T Exc)) were identified as Major Accident Events and a Risk Level of Intermediate or Higher.

With the additional controls that were specified:

- Failure was considered no longer possible for C-10 and LS-5, hence no longer a Major Accident Event and ALARP Justification was not required.
- The Risk Level for C-11 was reduced to Negligible, no longer a Major Accident Event and ALARP Justification was not required.

While no ALARP Justifications are required, a summary of the above items are provided below.

Job Step ID	Loc. Description	Kilometre Point	Threat Description	Additional Controls / Actions	Residual Risk (with additional threat control)
Construction Activities and Threats to Pipeline					
C – 10	Baldivis Road to Sixty Eight Road	Baldivis Road to Sixty Eight Road	Open Trenching	Refer actions 12, 13 and 14 in Table 9	Failure Not Possible
C – 11	Baldivis Road to Sixty Eight Road	Baldivis Road to Sixty Eight Road	HDD	Refer actions 15 and 16 in Table 9	Negligible
Location Specific Threats (During Operations)					
LS - 5	Baldivis Road to Sixty Eight Road	Baldivis Road	Excavation and Maintenance of services at Road Crossings (above and below pipe) (20T Exc)	21. Install slabs over service crossings at time of Baldivis Road upgrade (scheduled for approx. 2018)	Failure Not Possible

Table 8: ALARP Summary

12.3 Actions

The Actions from the Safety Management Study and Location Classification Review Workshop were also recorded using a spread sheet based logging tool.

21 Actions were raised during the Safety Management Study and Location Classification Review Workshop. A summary is outlined in the table below.

Item ID	Location	Pipeline	Feature Description	Threat Description	Action / Control Measure	Actionee	Date Required
Construction Activities and Threats to Pipeline							
C-1	Baldivis Road to Sixty Eight Road	PGP	General	Road Legal Vehicles crossing the Gas Pipeline	1. Ensure designated vehicle & equipment crossing points are installed across the gas pipeline and build up cover to 1200mm at this location	Parcel / PF	Prior to Works
C-2	Baldivis Road to Sixty Eight Road	PGP	General	Non - Road Legal Vehicles / Equipment crossing the Gas Pipeline	2. Details of all Non Road Legal Vehicles and equipment to cross the gas pipeline easement are to be submitted to APA Group for assessment prior to commencing works	Parcel / PF	Prior to Works
C-3	Baldivis Road to Sixty Eight Road	PGP	Installation of Offices and Set Up of Lay Down Areas	Equipment / Building loads over the Pipeline	3. No Equipment / Offices or Laydown areas to be established on the Pipeline Easement	Parcel / PF	Prior to Works
C-4	Baldivis Road to Sixty Eight Road	PGP	Survey and Marking	Installation of Survey Pegs (including Marking of Pipeline Easement)	4. Survey of the PGP (incl. potholing) to be performed by Approved Contractor under APA PTW	Parcel / PF	Prior to Design
					5. The PGP corridor is be surveyed and pegged out with Hi Viz Rope Flagged Fence prior to any site clearing/ earthworks commencing	Parcel / PF	Prior to Works

Item ID	Location	Pipeline	Feature Description	Threat Description	Action / Control Measure	Actionee	Date Required
					6. All works on Pipeline Easement to be under APA PTW System and all works adjacent to Pipeline Easement to be under Third Party Works Authorisation	Parcel / PF	At time of Works
					7. APA to confirm marker sign spacing is in accordance with required Location Class Requirements and rectify as required	APA - GFC	At time of Works
C - 5	Baldivis Road to Sixty Eight Road	PGP	Clearing and Grubbing (minor vegetation and bushes)	Entangled vegetation roots around pipeline	8. Any trees to be removed on Pipeline Easement to be removed under APA PTW requirements	Parcel / PF	At time of Works
C - 6	Baldivis Road to Sixty Eight Road	PGP	Earthworks	Excavation / Removal of Cover (Clear and Grade, Strip Top Soil, Landscaping Works, Establishing Site Levels)	9. APA to advise Road Crossing and Drain requirements	APA - GFC	Prior to Works
C - 9	Baldivis Road to Sixty Eight Road	PGP	Earthworks - Compaction Activities (Development and at Road Crossings)	Compaction / Vibrations from Equipment	10. There must be no vibrating compaction used within 10 metres of the Gas Pipeline and only static rollers or light walk behind plate compactors (600mm x 600mm maximum plate size) are to be utilised within 10 metres either side of the Gas Pipeline	Parcel / PF	At time of Works

Item ID	Location	Pipeline	Feature Description	Threat Description	Action / Control Measure	Actionee	Date Required
					11. Parcel Property to provide proposed vibratory equipment for approval for works within 10m of gas pipeline	Parcel / PF	Prior to Works
C – 10	Baldivis Road to Sixty Eight Road	PGP	Buried Service Installation: Lighting cables Power Water Gas Communication Drainage Sewer	Open Trenching	12. Excavator Size limited to 10 Tonne and GP Teeth Only	Parcel / PF	At time of Works
					13. Install Concrete Slabs under road and HDPE Slabs in road reserve prior to additional services going in. Also install HDPE slabs at all other service crossings outside road easements.	Parcel / PF	Prior to Works
					14. APA to provide details of slabbing requirements	APA - GFC	At time of Works
C – 11	Baldivis Road to Sixty Eight Road	PGP	Service Installation: Lighting cables Power Water Gas Communication Drainage Sewer	HDD	15. Works to be performed under APA Supervision and in accordance with APA Procedures for HDD (including calibration hole)	Parcel / PF	At time of Works
					16. Ensure competent and reputable Contractor engaged to perform works	Parcel / PF	At time of Works
C-12	Baldivis Road to Sixty Eight Road	PGP	Construction Activities for: Roadworks Concrete footpaths Landscaping Hardscaping (Retaining Walls etc)	No additional threats identified Threats from these activities covered under threat assessments above (eg. Excavation, Compaction, Vehicle Loads)	17. Excavation, Inspection and Recoating of Pipeline required at new road crossing location	Parcel / PF	Prior to Works

Item ID	Location	Pipeline	Feature Description	Threat Description	Action / Control Measure	Actionee	Date Required
New Location Specific Threats							
New LS-14	Baldivis Road to Sixty Eight Road	PGP	Sewer and Drain Crossing	Excavation and Maintenance	18. Developer to provide Drainage Crossing details to APA for assessment	Parcel / PF / APA	At Design
New LS – 17	Baldivis Road to Sixty Eight Road	PGP	Access along Pipeline by APA Group	Access restricted	19. 3m Vehicle Access gates required along the pipeline easement where fences / bollards are installed	Parcel / PF	At Design
New LS-18	Baldivis Road to Sixty Eight Road	PGP	Electrical Transformers and Equipment	Refer to action	20. Details of Electrical Equipment and Transformers to be submitted to APA for assessment to confirm compliance with AS4853	Parcel / PF	At Design
Location Specific Threats							
LS-5	Baldivis Road to Sixty Eight Road	PGP	Buried Services at Road Crossing - Baldivis Road	Excavation and Maintenance of services at Road Crossings (above and below pipe) (20T Exc)	21. Install slabs over service crossings at time of Baldivis Road upgrade (scheduled for approx. 2018)	APA	Prior to road upgrade

Table 9: Action Item Summary

For further details of the actions raised, please refer to Appendix B.

The Actions were assigned only to persons in the Safety Management Study Workshop with a view that they could be re-assigned to a relevant team member following consultation with the person concerned.

An estimated target date has been assigned during the workshop. This may be updated following review and approval of the action plan developed.



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The above will allow the Safety Management Study to be closed out and the actions to be performed as a separate item.

13.0 CONCLUSION

The AS2885 Safety Management Study and Location Classification Review Workshop for the Parmelia Gas Pipeline in the location of the proposed development at Baldivis Rd, Baldivis has been successfully completed in accordance with the Terms of Reference Document No: TOR-PF-1051 and AS2885.1.

All identified threats to and from the Parmelia Gas Pipeline from the proposed development were assessed with 21 Actions raised to ensure the on-going safe operation of the Pipeline.

As a result of the additional controls specified during the workshop, there were no items identified which required an ALARP Justification.

Upon completion of these actions, all threats to and from the Pipeline from the proposed development are considered to be adequately controlled and managed as per the requirements of the Terms of Reference and AS2885.1.



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APPENDIX A: LOCATION CLASSIFICATION REVIEW RESULTS

Document No: LCR-PF-1053

BALDIVIS ROAD DEVELOPMENT AS2885 LOCATION CLASSIFICATION REVIEW

Doc No: LCR-PF-1053 Rev: A



Section	Pipeline	Kilometre Post (kilometre)		Alignment Sheet Drawing No:	MAOP	Measurement Length @ MAOP (4.7kW/m ² Radiation Contour) (See Note 2)	Current Location Classification (See Note 1)		Development / Encroachment within Measurement Length	Location Class Change	Revised Location Classification		Note	Action
		Start	Finish				Primary	Secondary			Primary	Secondary		
1	Parmelia Gas Pipeline	279m U/S of Baldivis Rd (KP - TBA)	279m D/S of Sixty Eight Rd (KP - TBA)	101-D-L-56_3	5.61	279m	Rural (R1) (Note - there is T1 to the Northern area from the Development from the other side of Baldivis Rd)	-	Yes Baldivis Road Residential Development Lots 1006, 1007 & 1272 Baldivis Road & Lot 1 Serpentine Road (Lot sizes 150m2 to 450m2)	Yes	Residential (T1)	-	Refer Developer's proposed Concept Plan Drawing for details of proposed development. (Dwg: 3407-35-01, Dated 24/8/2017)	-

Note 1: Current Location Class for PGP is as per Parmelia Gas Pipeline System 2012 LCR and AS2885 SMS Workshop Report (Section 27: Baldivis – Pinjarra, KP381 – 413.05)

Note 2: Radiation Contour as advised by Pipeline Operator



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APPENDIX B: AS2885 SAFETY MANAGEMENT STUDY RESULTS

Document No: RA-PF-1054

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Item ID	Location				Threat Identification				Existing Threat Control				Risk Analysis											Additional Threat Control						Residual Risk Analysis											Additional Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
	Location Description	Pipeline	Kilometre Point	Location Classification	Feature Description	Threat Description	Is Threat Credible?	Threat Credibility Justification	Ext. Int Threat?	Required Controls for EI Threats (Physical / Sign Spacing / Rupture / Energy Release)	Physical Controls	Procedural Controls	Failure Possible / AS2885 Non-Compliance	Failure Event	Frequency	Consequence Severity					Risk Level					Is this a Major Accident Event?	Is Risk Acceptable or ALARP?	Is ALARP consideration required?	Action / Control Measure	Actionee	Priority (2885.1 Table F)	Date Required	Action Comments	Failure Possible / AS2885 Non-Compliance	Failure Event	Frequency	Consequence Severity					Risk Level					Is this a Major Accident Event?	Is Risk Acceptable or ALARP?	Is ALARP consideration required?																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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New LS - 1	Baldvis Road to Sixty Eight Road	PGP	Baldvis Road to Sixty Eight Road	T1	Fencing / Bollards	Installation / Maintenance activities impacting pipeline	Yes		Yes	2 Phys / 2 Proc / 100m / No Rupture / 10 GJ's	Burial Wall Thickness	Marking Patroling DBYD Liaison	No																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

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BALDIVIS ROAD DEVELOPMENT
APA GROUP PGP
AS2885 SMS
WORKSHOP REPORT**

APPENDIX C: SIGN ON SHEET

APA GROUP

PARMELIA GAS PIPELINE

PARCEL PROPERTY








BALDIVIS ROAD DEVELOPMENT

AS2885 SAFETY MANAGEMENT STUDY WORKSHOP

SIGN ON SHEET

APA GROUP OFFICE, EASTPOINT PLAZA, PERTH WA

31st October 2017

Name	Position	Company	Signature	Full Time / Part Time
Adam Crichton	Risk Eng	APA		FT
Steve Clardis	Dev Manager	Parcel		FT
Mark Riddell	Project Director	Pritchard Francis		FT.
Ryan Brook	Civil Engineer	Pritchard Francis		FT
Warren Guthrie	Team Leader - Path.	APA		F.T.
Bill Ivory	Corridor Protection Lead	APA		F.T.
GERRY CONNELL	" TECH. OFFICER	APA		F.T.



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AS2885 SMS
WORKSHOP REPORT**

APPENDIX D: REFERENCE DOCUMENTS

- Terms of Reference Document (Doc No: TOR-PF-1051)
- SMS Guide Words



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APA GROUP

PARMELIA GAS PIPELINE

AS2885 SAFETY MANAGEMENT
STUDY WORKSHOP

TERMS OF REFERENCE

Document No: ToR-PF-1051						
Rev	Date	Description	Prepared	Checked	Approved	Licensee
0	25/10/2017	Issued for Use	R Thornton	B Collins	R Thornton	
			Snr Pipeline Engineer	Project Engineer	Snr Pipeline Engineer	



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TERMS OF REFERENCE**

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- 2. Whilst the information contained in this document has been presented with all due care, Pipeline Integrity Pty Ltd does not warrant or represent that the information is free from errors or omission.*



**PARCEL PROPERTY
BALDIVIS ROAD
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AS2885 SMS WORKSHOP
TERMS OF REFERENCE**

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1.0 TABLE OF ABBREVIATIONS AND DEFINITIONS

Abbreviation	Description
ALARP	The term “As Low As Reasonably Practicable” means the cost of further risk reduction measures is grossly disproportionate to the benefit gained from the reduced risk that would result. (AS2885.1 Section 1.6 & Appendix G)
KP	Kilometre Point
MAE	A Major Accident Event (MAE) is defined as “an event connected with a pipeline operation, including a natural event, having the potential to cause multiple fatalities of persons engaged in the operation or other protected persons”. (AS2885.3 Appendix E2)
MAOP	Maximum Allowable Operating Pressure
Non-Credible Threat	A threat for which the frequency of occurrence is so low that it does not exist for any practical purpose at that location. (AS2885.1 Section 1.6)
PGP	Parmelia Gas Pipeline
SMS	Safety Management Study
TOR	Terms of Reference

Table 1: Abbreviations and Definitions used in the body of the Report

2.0 REFERENCES

Document Number	Title
AS2885.1	Pipelines Gas and Liquid Petroleum, Part 1 – Design and Construction
AS2885.3	Pipelines Gas and Liquid Petroleum, Part 3 – Operation & Maintenance
N/A	Parmelia Gas Pipeline System 2012 AS2885 SMS Workshop Report
N/A	APA AS2885 Risk Assessment Matrix
R-PI-453	SMS Guide Words
Drawings	
3407-35-01 (Dated 24/8/2017)	Concept Plan Lots 1006, 1007 & 1272 Baldivis Road & Lot 1 Serpentine Road Baldivis
N/A	Map of lots, Baldivis Rd – Pipeline Aerial Overview
N/A	Map of lots, Baldivis Rd – Pipeline DOC's
N/A	Map of lots, Baldivis Rd – Pipeline Measurement Lengths
N/A	Map of lots, Baldivis Rd – Pipeline Service Crossings
101-D-L-56_3	Alignment Sheet – Baldivis Rd

Table 2: Reference Documents

3.0 SCOPE

The Scope of this Terms of Reference document is to outline the requirements for an AS2885 Safety Management Study (SMS) Workshop and document the process for the proposed Residential Subdivision Property Development Project on Baldivis Road.

This SMS Workshop is required to take into account the relevant section of the following existing operating pipeline:

- Parmelia Gas Pipeline (Operated by APA Group)

As part of the SMS Workshop assessment, the following is required:

1. Review of the Location Classification for the above pipeline taking into account the Proposed Works
2. Safety Management Study for the above Pipelines for the section in which the pipeline measurement length encompasses the Proposed Works (Location Specific and Non-Location Specific Threats)

The Safety Management Study is required to assess:

1. Threats to the pipeline from proposed construction activities
2. Any new threats which may exist from the proposed works (during Operations)
3. If current controls to existing threats are sufficient taking into account the proposed works and any Location Class changes which may arise

The above is a License and AS2885 requirement for the Parmelia Gas Pipeline.

The purpose of the Safety Management Study is to ensure the continued safe operation of the pipeline and safety of those in the surrounding area from the pipeline.

3.1 Excluded from Scope

The following items are excluded from the Scope:

- Construction HAZID
- ALARP Justification (Performed Post Workshop as Required)
- Assessment of any other Gas Pipelines

4.0 PIPELINE OVERVIEW

An overview of the Pipeline and relevant section which is to be assessed as part of the above Scope is outlined below.

Item	Parmelia Pipeline
Pipeline License No	1, 2, 3
Location of Pipeline Affected by Proposed Works	Baldivis Road to Sixty Eight Road
Product	Natural Gas
Design Code	AS 2885
Diameter	DN350
MAOP	5.61 MPa
Pipe Type	API 5L X52
Wall Thickness	5.56 mm
Coating Type	Yellow Jacket
Measurement Length (4.7kW/m ² Radiation Contour)	279 m (160 m to 12.6 kW/m ²)
Current Location Class	R1 (as per 2012 SMS for Section 27: Baldivis – Pinjarra, KP381 – 413.05)
Depth of Cover	Minimum of 750 mm (DOC Survey readings range from 850 – 1700 mm)
Above Ground Facilities	Nil
DMP Licenced Asset	Yes

Table 3: Pipeline Overview

For further details refer to the drawings and documentation listed in Section 2.0.

5.0 PROPOSED DEVELOPMENT OVERVIEW

Parcel Property are proposing to develop the following lots at Baldivis Road:

- Lots 1006, 1007 & 1272 Baldivis Road
- Lot 1 Serpentine Road

The Proposed Works are within the vicinity of the Parmelia Gas Pipeline which is operated by APA Group.

The proposed development consists of the following:

- Total Site Area is approximately 33 ha
- Residential lots which include:
 - Low density lots
 - High density lots
 - Compact lots, and
 - Cottage lots
- Public Open Space
- Additional Roads and Services

Note:

The above areas are approximated only and subject to Final Survey.

The definition of low, high, compact and cottage lots is required to be defined at the time of the Workshop.

The development is encumbered by an Easement for the Parmelia Gas Pipeline (PGP). This corridor extends in a West to South-East direction through the centre of the development area.

Details of the proposed works are as per the following documents which are attached in Appendix B:

Document Number	Title
3407-35-01 (Dated 24/8/2017)	Concept Plan Lots 1006, 1007 & 1272 Baldivis Road & Lot 1 Serpentine Road Baldivis

Table 4: Proposed Works Drawings

5.1 Proposed Construction Activities

Details of the proposed Construction Activities in the vicinity of the Parmelia Gas Pipeline are as outlined below:

- Surveying and Marking
- Earth Works
 - Clear and Grade
 - Clear and Removal of Large Trees
 - Import and fill
 - Compaction
- Construction activities for:
 - Roadworks
 - Buildings including foundations (TBC)
 - Concrete footpaths
 - Landscaping
 - Hardscaping
 - Fencing
- Installation of Services:
 - Electrical/Power
 - Communications
 - Gas
 - Water
 - Drainage
 - Sewer

Note: The majority of the above activities will be performed on the Parmelia Gas Pipeline Easement.

6.0 ATTENDEES, VENUE & WORKSHOP SCHEDULE

The Safety Management Study is scheduled to be conducted at the APA Group Office at Eastpoint Plaza, Adelaide Tce Perth, WA per the details below.

Date	Detail	Start	Finish	Report Submission
31/10/2017	SMS Workshop	8:30 am	2:30 pm	Draft - 1 week Final – 1 week from receiving Draft comments

Table 5: Workshop Schedule

The proposed attendees for the workshop are listed below:

Name	Position	Company
Developer's Consultant – Pritchard Francis		
Ryan Brook	Civil Engineer	Pritchard Francis
Mark Riddell	Project Manager	Pritchard Francis
Developer - Parcel Property		
Steve Claudio	Developer	Parcel Property
Owner & Operator – APA		
Gerry Connell	Corridor Technical Officer	APA Group
Bill Ivory	Corridor Protection Lead WA & NT	APA Group
Warren Guthrie	Team Leader - Perth	APA Group
Adam Crichton	Risk Engineer	APA Group
Facilitator – Pipeline Integrity		
Rob Thornton	Independent Facilitator & Scribe	Pipeline Integrity

Table 6: Proposed Workshop Attendees

7.0 TERMS OF REFERENCE

7.1 Safety Management Study Facilitator

The Facilitator provides a key role and shall:

- Be given the necessary support and authority to objectively, systematically and impartially execute the requirements of these TOR
- Provide requirements to the Workshop Sponsor that are necessary to ensure that the requirements of these TOR are met, with regard to the conduct of the workshop, preparation and issuance of the necessary documents
- Have suitable equipment for recording minutes of the workshop
- Be experienced in facilitating similar style workshops and have suitable personal attributes in order to foster the active participation of all attendees and maintain effective time and resources management
- Possess adequate and relevant technical knowledge and experience to understand and control discussion and / or facilitate resolution of issues
- Liaise with the Workshop Sponsor and / or other relevant parties to plan the Workshop
- Ensure the adequacy, currency and validity of all documentations, data and information prior to use in the AS2885 SMS Workshop
- Lead and conduct the SMS Workshop
- Ensure the workshop team comprises representation by all required stakeholders, together with a broad spectrum of experiences relevant to the design & operation of pipeline systems
- Record, review, approve and distribute the workshop meeting minutes, including a record of all decisions
- Produce a record of all threats (inclusive of both credible and non-credible hazards) considered and Corrective Recommendations (based on the assessed risks) identified
- Prepare, approve and distribute the Workshop Report outlining and demonstrating how the purpose and requirements of these TOR are met
- Have a good knowledge of AS2885

7.2 Process

The following sections outline the SMS process and requirements for each stage of the SMS.

7.3 Preparation

As preparation for the workshop the following shall be performed:

- Populate the SMS logging tool with all relevant Features, Crossings, Location Classification and KP points required to perform the SMS.
- Collate all necessary reference documentation consisting of:
 - Design Basis Manual or relevant Pipeline details
 - Drawings (including Facility General Arrangements, Route Drawing/Alignment Sheets where applicable)
 - Previous SMS / Location Classification Review (where relevant)
 - Pipeline Easement Reference Documentation (Patrol reports, Photographs, Encroachments, Proposed Crossings as applicable)
 - Calculations:
 - Penetration resistance calculations (including Critical Defect Length)
 - 4.7KW/m² Radiation Contour (Measurement Length)
 - Details of any Proposed Works or Developments near the Pipeline
- Prepare a summary of the following pipeline details:
 - MAOP
 - Design Code
 - Nominal Diameter
 - Wall Thickness
 - Pipe Grade
 - Pipe Coating
 - Minimum Depth of Cover

7.4 Workshop

The workshop will be conducted as per the requirements of AS2885.1-2012. The SMS process will be as outlined in the table below (taken from AS2885.1 section 2.3.1).

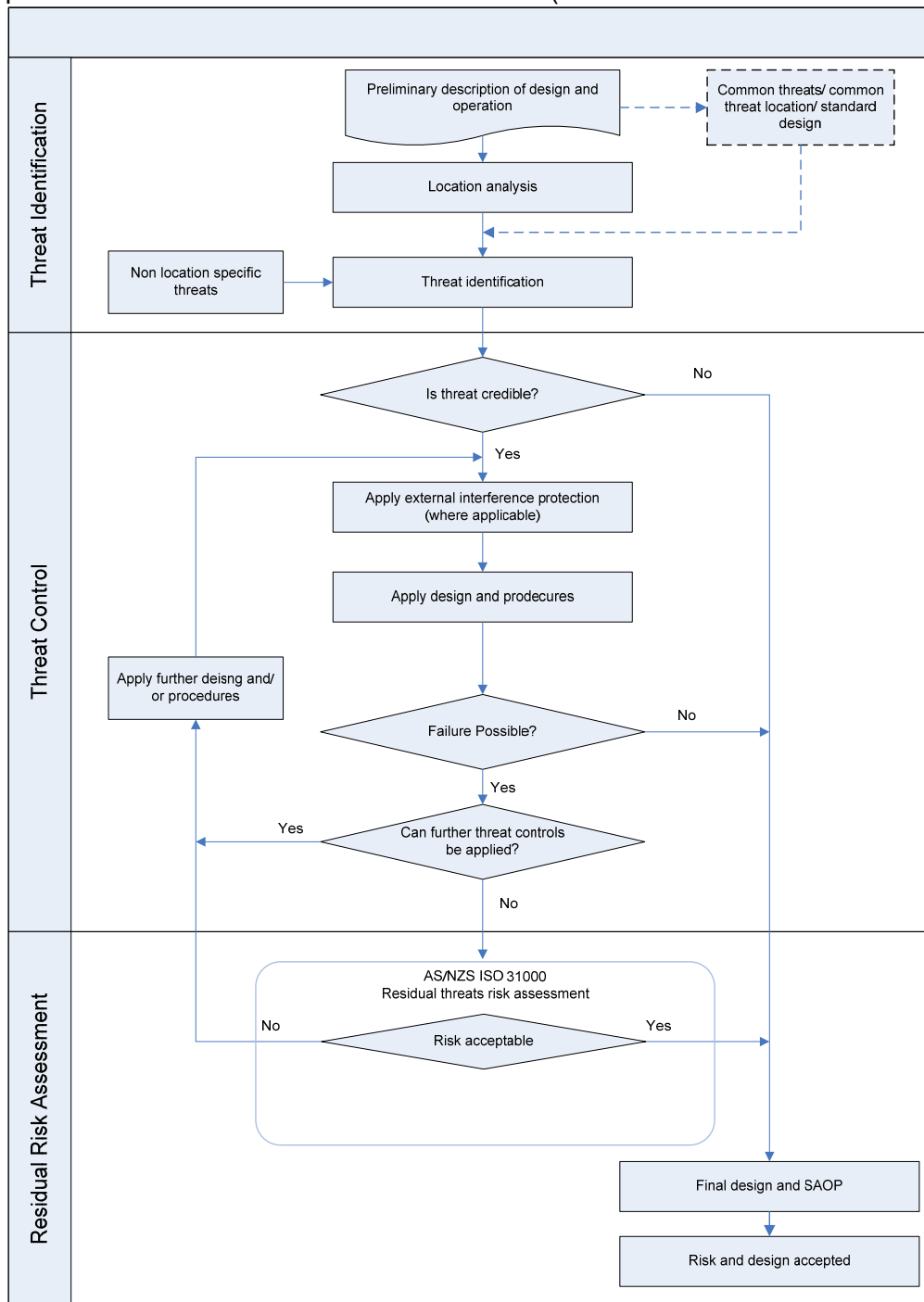


Figure 1: SMS Workshop Process

Essentially the process will be as follows:

- Present the pipeline details
- Conduct Location Classification Review
- “Walk” the line section via aerial photographs or similar (e.g. Photos of identified features) and refer to the location classes as defined by the Location Classification Review
- Employ AS2885.1 with regard to location sub-classes, signage requirements and minimum number of protection measures (physical and procedural)
- Select first section and review landowners and activities
- Review / log non-location threats that are general to that section including parallel threats. If the threat is credible, log external interference protection measures and other prevention measures as necessary
- If necessary, proceed to risk assessment using the risk matrix from AS2885.1– attached in Appendix A
- Select “Location Specific Threats” and review / log threats and external interference protection measures and other prevention measures as necessary, and proceed to risk matrix assessment as necessary
- Log recommendations where required. Assign to appropriate personnel in attendance at workshop and provide estimated target date for completion.
- Where the Risk is deemed not acceptable or not “As Low as Reasonably Practical (ALARP)” apply further control measures and re-assess until residual risk is acceptable
- Identify Major Accident Events (events which could cause multiple fatalities)
- Identify threats requiring an ALARP Justification (includes MAE Events and Threats with Risk Levels of Intermediate or higher)
- Note: Where required ALARP Justification will be done as a separate Scope of Work and is outside this Terms of Reference (in the case it cannot be resolved in the Workshop)
- Repeat steps above for subsequent sections

NOTE 1: Typical threats will be risk assessed the first time they are encountered and then referenced (or copied) where they apply for subsequent typical threats

NOTE 2: Non-Location Threats include non-process threats to Pipeline including corrosion, intentional damage etc.

7.5 Reporting

The documentation to be submitted upon completion of the SMS Workshop consists of a Report containing:

- A populated register of the threats identified in the workshop and their assessment
- A list of actions generated during the workshop
- A copy of or reference to the Logging Tool Worksheet used in the SMS
- The Location Class Review Results
- A list of any Major Accident Events identified
- An outline of the Methodology and Reference to the Terms of Reference

The Reporting Schedule is as outlined in Section 6.0.

7.6 Management of Actions

Upon completion of the final report, the Client will perform a review and prepare a proposed action plan. This will be submitted to the Pipeline Licensee in a timely manner along with the SMS report prepared in order to facilitate the management of the required actions.

Actions raised from the SMS will be implemented in the Client's relevant Action Management System.

This will close out the SMS Project and allow management of the required actions to be taken as a separate project.



APPENDIX A: RISK MATRIX

- APA AS2885 Risk Matrix

			Severity Class				
CONSEQUENCES	Dimension		Catastrophic 5	Major 4	Severe 2	Minor 1	Trivial 0.75
	People		Multiple fatalities result	Few Fatalities, several people with life-threatening injuries	Injury or illness requiring hospital treatment	Injuries requiring first aid treatment	Minimal impact on health & safety
	Commercial / Supply		Long term interruption of supply	Prolonged interruption; long term restriction of supply	Short term interruption; prolonged restriction of supply	Short term interruption; restriction of supply but shortfall met from other sources	No impact; no restriction of supply
	Environment (see note)		Effects widespread; viability of ecosystems or species affected; permanent major changes	Major off-site impact; long term severe effects or rectification difficult	Localised (<1 ha) & short term (<2 yr) effects, easily rectified	Effect very localised (<0.1 ha) and very short term (weeks), minimal rectification	No effect; minor on-site effects rectified immediately with negligible residual effect
	Reputation or Regulatory		Continuous national and / or international coverage, major regulatory restrictions imposed possible loss of licence	National press coverage, regulatory investigation	Regional / state coverage, regulator wants formal explanation & remedial action plans	Managed locally, some publicity in local press, general regulatory query	Issue resolved in day to day management. Small local publicity. No regulatory involvement
	Business Continuity		The survival and / or continued profitability of the company is in doubt	Business disruption such that the business will return to a level somewhere less than previous, growth indefinitely shelved	Delivery times causing financial loss and / or breach of contract, growth delayed for over six months, business return after several days	Delays in delivery cause problems to either internal or external customers, growth options put off for months, business as usual achieved after several hours	Temporary delay in service delivery with little effect, business would return to normal immediately
	Assets or Profitability		Risk may exceed \$50 million	Maximum risk less than \$50 million	Maximum risk less than \$5 million	Maximum risk less than \$500,000	Maximum risk less than \$5,000
FREQUENCY	Frequent 5	Expected to occur once per year or more	Extreme 25	Extreme 20	High 10	Intermediate 5	Low 3.75
	Occasional 4	May occur occasionally in the life of the pipeline	Extreme 20	High 16	Intermediate 8	Low 4	Low 3
	Unlikely 3	Unlikely to occur within the life of the pipeline, but possible	High 15	High 12	Intermediate 6	Low 3	Negligible 2.25
	Remote 2	Not anticipated for this pipeline at this location	High 10	Intermediate 8	Low 4	Negligible 2	Negligible 1.5
	Hypothetical 1	Theoretically possible, but has never occurred on a similar pipeline	Intermediate 5	Low 4	Negligible 2	Negligible 1	Negligible 0.75

Note: Significant environment consequences may occur in locations that are relatively small and isolated

RISK LEVEL	RISK MANAGEMENT ACTIONS
EXTREME	Modify the threat, the frequency or the consequences so that the risk rank is reduced to 'intermediate' or lower. For an in-service pipeline the risk shall be reduced immediately
HIGH	Modify the threat, the frequency or the consequences so that the risk rank is reduced to Intermediate or lower. For an in-service pipeline the risk shall be reduced as soon as possible, typically within a timescale of not more than a few weeks.
INTERMEDIATE	Repeat threat identification and risk evaluation processes to verify and, where possible, quantify the risk estimation; determine the accuracy and uncertainty of the estimation. Where the risk rank is confirmed to be 'intermediate', if possible modify the threat, the frequency or the consequence to reduce the risk rank to 'low' or 'negligible'. Where the risk rank can not be reduced to 'low' or 'negligible', action shall be taken to: (a) remove threats, reduce frequencies and/or reduce severity of consequences to the extent practicable; and (b) demonstrate ALARP For an in-service pipeline, the reduction to 'low' or 'negligible' or demonstration of ALARP shall be completed as soon as possible; typically within a timescale of not more than a few months
LOW	Determine the management plan for the threat to prevent occurrence and to monitor changes that could affect the classification
NEGIGIBLE	Review at the next review interval



**PARCEL PROPERTY
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AS2885 SMS WORKSHOP
TERMS OF REFERENCE**

APPENDIX B: PROPOSED DEVELOPMENT DRAWINGS

Drawings	
3407-35-01 (Dated 24/8/2017)	Concept Plan Lots 1006, 1007 & 1272 Baldivis Road & Lot 1 Serpentine Road Baldivis

This plan has been prepared for general information purposes only and uses potentially uncontrolled data from external sources. CLE does not guarantee the accuracy of this plan and it should not be used for any detailed site design. This plan remains the property of CLE.





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GUIDE WORDS FOR AS2885 SAFETY MANAGEMENT STUDY WORKSHOP – THREAT IDENTIFICATION

Document No: R-PI-453						
Rev	Date	Description	Prepared	Checked	Approved	Licensee
0	03/07/2015	Issued for Use	R Thornton		R Thornton	
			Snr Pipeline Integrity Engineer		Snr Pipeline Integrity Engineer	

External Interference	Natural Events
Blasting	Cyclone*
Bogged Vehicles*	Earthquake*
Cable Installation - Plough	Erosion Of Cover Or Support
Deep Ripping To 900mm	Floods* (Erosion Or Impact Damage)
Deep Ploughing To 600mm	Ground Movement*
Ploughing To 300mm	Inundation Leading To Floatation
Excavation – Drainage / Ditch Maintenance	Lightning*
Excavation Rail Maintenance	Wind*
Excavation Road Maintenance	Fire*
Excavation Installation Of New Services	Other
Horizontal Boring / Drilling	Electrical Effects
Marine Anchors	Fault Voltages (From Nearby Electricity Towers)
Post Driving – Fence Construction / Maintenance	Induced Voltages (From Parallel Power Lines)
Vertical Boring - Posthole Augers	Operational And Maintenance Activities
Trench Excavation - Other Services	Bypass Control System Logic*
Other	Exceeding MAOP*
Grading	Inaccurate Test Equipment* (Leading To Incorrect Control And Safety Equipment Settings)
Pipeline Maintenance Activities	Inadequate Servicing Of Equipment*
Vehicle Loads	Inadequate / Incomplete Maintenance Procedures*
Vehicle Impact (Road, Rail, Aircraft)	Incorrect Operation Of Control And Protective Equipment*
Excessive Backfill (External Load)	Incorrect Pigging Operation*
Corrosion	Incorrect Valve Operating Sequence*
Bacterial Corrosion	Maintenance Actions Contrary To Procedures*
Environmental SCC	Fatigue From Pressure Cycling
External Corrosion	Construction Defects
Internal Corrosion	Undetected Or Unreported Damage To The Pipe, Coating Or Equipment*
Stray Current Corrosion	Undetected Or Unreported Critical Weld Defects*
Stress Corrosion Cracking	Failure To Install The Specified Materials Or Equipment*
Internal Erosion	Failure To Install Equipment Using The Correct Procedures Or Materials*
Other	Failure To Install Equipment In Accordance With Specified Design*
	Failure To Install Pipeline In Specified Location Or In A Specified Manner*
	Inadequate Testing Of Materials To Ensure Defects Have Been Detected Prior To Hand Over*

* Most likely will be non-locational threats

Design Defects	Material Defects
External Loads – Rail	Incorrectly Identified Components*
External Loads – Vehicle	Manufacturing Defect*
Temperature Exceeds Design*	Under Strength Pipe*
Temperature Less Than Design*	Insufficient Inspection And Testing To Confirm Acceptability Of Material And Equipment
Specify Incorrect Test Procedures*	Incorrect Specification, Supply, Handling, Storage Or Installation Which Allows Faults To Remain Undetected Or Damages The Item
Stresses Exceed Allowable*	Other
Inadequate ITP Plan To Confirm Acceptability Of Material*	Intentional Damage
Failure To Specify Required Material Characteristics*	Malicious Damage*
Incorrect Material Specified*	Sabotage*
Incorrect Diameter*	Terrorism*
Design Pressure Incorrect*	Other
Failure To Define Correct Range Of Operating Conditions*	Other Threats
Other	Mine Subsidence
	Seismic Surveys*

* Most likely will be non-locational threats



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APPENDIX E: RISK ASSESSMENT MATRIX

- APA AS2885 Risk Assessment Matrix

			Severity Class				
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INTERMEDIATE	Repeat threat identification and risk evaluation processes to verify and, where possible, quantify the risk estimation; determine the accuracy and uncertainty of the estimation. Where the risk rank is confirmed to be 'intermediate', if possible modify the threat, the frequency or the consequence to reduce the risk rank to 'low' or 'negligible'. Where the risk rank can not be reduced to 'low' or 'negligible', action shall be taken to: (a) remove threats, reduce frequencies and/or reduce severity of consequences to the extent practicable; and (b) demonstrate ALARP For an in-service pipeline, the reduction to 'low' or 'negligible' or demonstration of ALARP shall be completed as soon as possible; typically within a timescale of not more than a few months
LOW	Determine the management plan for the threat to prevent occurrence and to monitor changes that could affect the classification
NEGLECTIBLE	Review at the next review interval