



Document Cover Sheet

 Wasco (Australia) Pty Ltd 60 Commercial Drive, Shailer Park QLD 4128	Supplier PO/Contract No:	4100359348
	Supplier Item Description:	
	Equipment/Tag No:	

Project Name:	Kembla Grange Metering Station		
Supplier Document Title:	HAZID Report		
Supplier Document No:	2211-HSS-REP-001	Supplier Rev No:	B
Jemena Document No:	GAS-599-RP-RM-002	Jemena Rev No:	B
		Total No of Pages: (including cover sheet)	20

Document Revision History:

Rev	Issue Date	Key Reason for Issue (as above table)	Approved By/ Signature	Company Name	Notes (if not applicable N/A)
A	20/02/2023	Issued for Review	Andrew Freeman	Wasco	
B	10/03/2023	Issued for Review	Andrew Freeman	Wasco	

Key Reason for Issue:

IFR- Issued for Review	IFI- Issued for Information	IFU- Issued for Use
IFP- Issued for Purchase	IFC- Issued for Construction	AB- As Built



RISK WORKSHOP/ HAZID JEMENA KGMS CSMPEI Project

OBJECTIVE:

The objective of the HAZID (Risk Workshop) is to perform a risk assessment on the main jobs associated with the construction and pre-commissioning of the Kembla Grange Metering Station (KGMS).

Scope:

The site is located at Wylie Road, Kembla Grange NSW 2526. The new facility functions as an end of pipeline gas receiving flow control and metering facility with connection to the existing EGP system.

Scope of Works for KGMS project includes the following site works:

- Earthworks
- Retaining wall and drainage
- Foundations and support bases
- Two (2) Meter Runs
- Pig Receiver
- Gas chromatograph
- Structural supports and platform
- Balance of Plant (BOP) piping, electrical, instrumentation, equipment and structures
- Permanent fencing
- Site control hut
- Site communications

METHODOLOGY:

The methodology involves the following steps -

- 1) Identify all the jobs associated with each Functional Area
- 2) Identify all hazards associated with each of these jobs.
- 3) Risk assess each job.
- 4) Prioritise controls using the Hierarchy of Controls and according to level of risk to achieve controls that are AS LOW AS REASONABLY PRACTICABLE.
- 5) Develop a list of recommended SWMS/JSEA's/SWP/SOP's for high risk and medium risk jobs

OUTCOME: Session 1 - Site Establishment, General Site works, Earthworks/Piling, Concrete Works, Structural, Mechanical, Piping
Session 2 - Electrical & Instrumentation

The outcome of the HAZID is a list of recommended controls (SWMS/JSEA's/SWP/SOP's) for High and Medium Risk jobs associated with the construction and pre-commissioning of the Kembla Grange Metering Station in relation to Project Marlin.

Future: Session 3 - Electrical & Instrumentation, Pre-commissioning

A further HAZID Session will be held at a later date when the Pre-commissioning contractors are fully engaged and incorporated into the project team, suitable for holding a HAZID review. These works are planned for Q4 2023 and will not begin until the HAZID Pre-commissioning workshop is complete and resultant actions closed.

RISK RATING SHALL BE IN ACCORDANCE WITH THE WASCO RISK MATRIX

Wasco Risk Matrix

Consequence Rating		Health, Safety and Security Consequences	Environmental Consequences	Community, Stakeholder and Reputation	Business/ Financial	Law / Compliance /Regulatory
5	Catastrophic	Fatality incident, total and permanent disability (TPD), major irreversible health effect / disease	Incident resulting in catastrophic regional environmental impact causing long term environmental harm. Major long-term remediation required (greater than 12 months / over multiple years). Major litigation or prosecution resulting in long term interruption to operations.	Wasco's reputation is damaged so significantly that it is unlikely it would be able to work in some areas. National adverse media or public criticism	>\$3,000,000	Material litigation, criminal investigation or proceedings involving officers, or directors, significant fines
4	Major	Lost time incident (LTI), partial permanent disability (PPD), major irreversible health effects	Incident resulting in major onsite/offsite environmental impact causing medium / long term environmental harm. Significant remediation required (typically less than 12 months) Significant legal issues, non-compliance and breaches of regulations that result in prosecution or citation or fine. Litigation issues involving many weeks of senior management time.	Will impact significantly on Wasco's reputation and impact future business; requires significant intervention to recover Wasco's reputation. Regional media or public concern, local criticism	\$1,000,000-\$3,000,000	Significant violation of law with material fines, penalties, or costs, serious dispute, major litigation
3	Moderate	Medical treatment injury (MTI), disabling reversible impairment, restricted work case (RWC)	Incident resulting in reversible onsite, and or offsite impact causing short term effect. Moderate remediation required (typically one month) Noncompliance and breaches of regulations that may result in prosecution or citation or punitive fine. Requirement or obligation to report to the regulators.	Will impact on Wasco's current project for its duration and will need remediation and management intervention to recover. Local media, public concern	\$100,000-\$1,000,000	Violation of law, regulation, permit or policy with moderate fines or penalties. Moderate litigation
2	Minor	First aid treatment (FAT), slightly injured, minimal health effects	Minor reversible environment impact, minor remediation (typically <5 days). Noncompliance and breaches of regulation that may result in a citation. May result in reporting to the regulators.	Short term impact (less than a month) on Wasco's reputation but will not impact its overall standing.	\$10,000-\$100,000	Reoccurring or systematic small violations of law, regulation, permits or policy, minimal fines, penalties or costs
1	Low	Near miss, no health effects	Negligible or reversible environmental impact. Nil or minor remediation (typically a shift). No breach of regulations or requirements to report to regulators.	Minor issue resolved immediately with no ongoing consequences, no public concern	<\$10,000	Minor, one off violations of law, regulation, permit or policy, no fines or penalties

Likelihood		
A	Almost Certain	Almost inevitable. Possible to occur and the team have knowledge of a similar event. Likely to occur repeatedly during the operational life of the facility / project. Is expected to occur in most circumstances and/or more than once a year.
B	Likely	Not certain to happen but an additional factor may result in occurrence. More than average i.e. the team do not have direct knowledge but suspect that an event has occurred and represents a credible scenario. Likely to occur from time to time.
C	Possible	Could happen when additional factors are present, but otherwise unlikely. Average i.e. easy to postulate a scenario for the occurrence but considered doubtful. Likely to occur once during the operational life of the facility / project. Might occur at some time.
D	Unlikely	A rare combination of factors would be required for an occurrence. Conceivable but would require multiple failures of systems and controls. Unlikely to occur during the operational life of the facility / project. Could occur at some time and/or Happened before.
E	Rare	A freak combination of factors would be required for an occurrence. Not credible i.e. the teams have never heard of the event occurring in the industry. Very unlikely to occur during the operational life of the facility / project. May occur only in exceptional circumstance.

		Consequence				
		Insignificant [1]	Minor [2]	Moderate [3]	Major [4]	Catastrophic [5]
Likelihood	Almost Certain [A]	Moderate	Moderate	High	Extreme	Extreme
	Likely [B]	Low	Moderate	High	High	Extreme
	Possible [C]	Low	Moderate	High	High	Extreme
	Unlikely [D]	Low	Low	Moderate	Moderate	High
	Rare [E]	Low	Low	Low	Moderate	Moderate

Residual Risk		Controls
Extreme	This level of risk is unacceptable. The Task / operation shall not commence until risk reduction measures are implemented or the risk eliminated	Approval to commence by Wasco President
High	Determine if the risk can be eliminated. If the risk cannot be eliminated, then the task / operation shall not commence until effective risk reduction measures are identified and implemented to reduce the risk to ALARP. If the risk cannot be reduced to an acceptable level, then an alternate way of conducting the operation shall be found	Approval to commence by General Manager
Moderate	Consideration shall be given to implement additional effective controls if risk reduction to ALARP can be achieved	Approval to commence by Project Manager / Head of Department
Low	Implement agreed risk mitigation controls before proceeding	This level of risk is controlled through JHA, SWMS, procedures, supervision, etc



CONSTRUCTION RISK REGISTER

Functional Area:

2211 - Marlin KGMS Facilities Project

Item Number	Activity / Product / Task / Process	Task/Risk/ Hazard	Major Effect	Impact / Consequence	Risk			Control measures	Residual Risk				Additional Controls	Residual Risk				Comments	
					L	C	R		L	C	RR	ALARP		L	C	RR	ALARP		
1	Site Establishment General Site Work	Driving	Health & Safety	Motor vehicle accident resulting in personal and or property damage	C	4	H	- 2211-HSS-PLN-005 A Travel Management Plan to be implemented. - Only use registered, roadworthy and correctly maintained vehicles. - Licenced drivers with suitable class of drivers licence. - Use of small buses to transport the bulk of the workforce to site to minimise the number of drivers and vehicles on the road. - Project fatigue management procedure to be followed (includes 0 Breath alcohol limit). - Travel management procedure to be followed. - Drive to the conditions. - Drivers and passengers are to be courteous at all times to fellow road users and pedestrians. Project penalties to be applied for poor driver/passenger behaviour (including loss of driver privileges or other penalties up to and not excluding removal from the project as determined after suitable investigation and then deliberation of the facts by the WASCO project manager).	D	4	M	Yes					0		
2	Site Establishment General Site Work	Driving	Community, Stakeholder and Reputation	Community complaints poor reflection on the project	B	3	H	- Speed limits to be adhered to. - Only use registered, roadworthy and correctly maintained vehicles. - Licenced drivers with suitable class of drivers licence. - Use of small buses to transport the bulk of the workforce to site to minimise the number of drivers and vehicles on the road. - Only project nominated drivers to drive project vehicles. - Project fatigue management and fitness for work procedures to be followed. - Drivers and passengers are to be courteous at all times to fellow road users and pedestrians. - Project penalties to be applied for poor driver/passenger behaviour (including loss of driver privileges or other penalties up to and not excluding removal from the project as determined after suitable investigation and then deliberation of the facts by the WASCO project manager).	D	3	M	Yes					0		Add slide into induction for driving NOTE: Communicate with cemetery processions to give them right of way when needed
3	Site Establishment General Site Work	Driving	Business, Financial	Motor vehicle accident resulting in personal and or property damage	C	4	H	- 2211-HSS-PLN-005 A Travel Management Plan to be implemented. - Speed limits to be adhered to. - Only use registered, roadworthy and correctly maintained vehicles. - Licenced drivers with suitable class of drivers licence. - Use of small buses to transport the bulk of the workforce to site to minimise the number of drivers and vehicles on the road. - Only project nominated drivers to drive project vehicles. - Project fatigue management and fitness for work procedures to be followed. Drivers and passengers are to be courteous at all times to fellow road users and pedestrians. - Project penalties to be applied for poor driver/passenger behaviour (including loss of driver privileges or other penalties up to and not excluding removal from the project as determined after suitable investigation and then deliberation of the facts by the WASCO project manager). - Drive to conditions	D	2	L	Yes					0		

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					L	C	R		L	C	RR	ALARP		L	C	RR	ALARP		
4	Site Establishment General Site Work	Unloading/Loading plant, equipment or materials from trucks/transport HRCW (High Risk Construction Work due to "Work in an area with movement of powered plant")	Health & Safety	Personal Injury - struck by, caught by moving plant. Rushing, Complacency, unplanned movement, eyes not on task, loss of balance/traction/grip, unsuitable ground conditions resulting in injury or death to personnel	C	4	H	- Maintain a dedicated area for loading / unloading wherever practicable. - Trucks to be switched off during task, - Transport loading and unloading of equipment and materials use a Take 5 to identify hazards and control risks. - Craneage SWMS to be used if using craneage. - Checking load shift had not occurred during transit - check with driver who will assess and release load binders. - Trained, competent and VOC'd operators / dogman only used. Deny access to unauthorised personnel. - Consolidate deliveries if possible to reduce number of deliveries, - Flagging, spotters, - Regular delivery operators to site to be site inducted. - Irregular delivery drivers to have a visitor induction and be under direct supervision of a fully inducted person - Delivery instructions - Receivers to be trained and understand the Chain of Responsibility process - LUEZ - exclusion zones - All delivery to go to laydown area	D	4	M	Yes	- No standing on the back of the truck - SWMS to be followed for unloading/loading trucks - Flagging of the existing driveway - Assess ground conditions. Ensure suitable for each type and size of vehicle					0	NOTE: Deliveries to KGMS not KGMLV
5	Site Establishment General Site Work	Unloading/Loading plant, equipment or materials from trucks/transport	Environmental	Introduction of weeds and/or weed seeds and disease	C	3	H	- Procurement to ensure this is made clear to delivery contractors prior to ordering / organising transport. - Deliveries to be consolidated where practicable to reduce number of deliveries to site. - Maintain a dedicated area for loading / unloading wherever practicable. - Include Government advise on Agricultural diseases - Weed and Seed declaration for plant and equipment arriving on site	D	2	L	Yes					0		
6	Site Establishment General Site Work	Faulty Plant HRCW (High Risk Construction Work due to "Work in an area with movement of powered plant")	Health & Safety	Personal injury caused by faulty plant	C	4	H	- All plant to be maintained as per the OEM or equivalent. - All plant to have a daily pre start check done by the operator each shift and recorded. - Copies of the weekly pre start check must be submitted at the completion of each week to the HSE advisor. - All faulty plant to be tagged out of service and the fault reported to the supervisor for rectification before the plant can be operated. - Faults that do not affect the safe operation of the plant must be reported to the supervisor and the supervisor must accept or refuse the use of the plant pending the repair of the non safe operation related fault (e.g. small crack in windscreen not in the line of site of the operator, etc.) - Plant must be fit for purpose and will be recorded onto a Plant Register - Risk Assessments no more than 2 years old	D	4	M	Yes					0		
7	Site Establishment General Site Work	Interaction with venomous snakes	Health & Safety	Snake bite	C	3	H	- First aid trained personnel on site. - Snake bite kits at the site office. - Personnel not to attempt to interact with snakes and are to report all sightings to supervisor and/or HSE advisor. - If required a trained snake handler will be utilised to remove any snakes. - First aiders will be identified at pre start, and on notice board, - AED to be available in Wasco site office - PIO are all First Aid trained	D	3	M	Yes					0		
8	Site Establishment General Site Work	Interaction with fauna	Environmental	Damage to fauna	C	2	M	- Personnel not to attempt to interact with all fauna and are to report all sightings to supervisor and/or HSE advisor. - If required a trained handler will be utilised to remove all fauna. - All injured fauna are to be reported to the HSE advisor/Jemena representative	D	2	L	Yes					0	NOTE: Feral Deer in area	
9	Site Establishment General Site Work	Climate exposure/overexposure	Health & Safety	Heat illness ranging from insignificant to life threatening	B	4	H	- Adequate fresh cool water available at all times for the work site. - Suitable first aid facilities. - Shade shelters as required. - WASCO management/supervision to ensure that adequate resources are available to allow rotation of tasks etc if required. - Airconditioned crib room - facilities - Heat stress training for site staff - Toolbox talks to be completed - Electrolytes to be available on site	D	4	M	Yes	- Frost in the morning, adequate clothing - Sunscreen to be available					0	

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					L	C	R		L	C	RR	ALARP		L	C	RR	ALARP		
10	Site Establishment General Site Work	Interaction with Landholder	Community, Stakeholder and Reputation	Poor communication/interaction with affected landholder	C	4	H	- Only authorised personnel to interact with the landholder/s. - If approached all unauthorised personnel must be courteous and polite and direct all enquiries to Jemena site representatives. - Jemena contractor and community landholder document	D	2	L	Yes				0			
11	Site Establishment General Site Work	Fitness for work	Health & Safety	Personnel unable to safely undertake their work duties resulting in possible damage to the affected person or third parties	B	4	H	- Ensure WASCO Fit For Work policy is followed. - 100% alcohol testing of the work force prior to starting work each day. 0 alcohol level required for work. - Random drug testing and targeted drug testing if required. 10% drug testing (every 3 months) average over the term of the project. - Personnel to be adequately rested prior to start each day. - Mates in construction connector to be available for mental support if required. - WASCO has an EAP available for employee wellness through the services of "Workplace Wellness" (Contact number is office (07) 35351239 or EAP service line 1300 326 350) - Construction Manager, Project Engineer and HSE Advisor will be responsible for ensuring all personnel are fit for duty. Construction Manager, Project Engineer and HSE Advisor will be trained and competent in performing breath alcohol testing daily. - Toolbox discussions and site inductions to discuss fitness for work. - RAT Tests to be available - provided by Jemena	D	4	M	Yes				0			
12	Site Establishment General Site Work	Fatigue On site work in excess of 21 days	Health & Safety	Personnel unable to safely undertake their work duties resulting in possible damage to the affected person or third parties	C	4	H	- Ensure compliance with the WASCO Fatigue Management Plan (WAPL-HSS-PLN-003) - Ensure workers are adequately rested both mentally and physically. - Schedule work to account for the fatigue of the workforce. - Consult with the workforce to ensure the work schedule is realistic and fatigue is being managed adequately. - Workforce to be adequately rested prior to mobilising - Contractors to comply with Wasco fatigue management process - Risk assessment to be completed and approved by management for any worker working in excess of 21 days - Risk assessment to be completed and approved by management for any worker working in excess of a 12 hour day	D	4	M	Yes				0			
13	Site Establishment General Site Work	Poor Communication	Environmental	Instructions/direction not clear resulting in a diversion from the Construction Environment management Plan and a possible environmental incident	C	3	H	- Ensure all work/task Instructions/directions are clear and concise. - Ensure communication between all work crews is maintained (SIMOPS). - Ensure planning takes into account work crew interactions and suitable meetings/directions are given and understood before starting tasks. - Ensure all environmental controls are installed and maintained as per the Jemena/WASCO CEMP. - Onboarding inductions to include environmental information	D	3	M	Yes				0			
14	Site Establishment General Site Work	Poor Communication	Community, Stakeholder and Reputation	Instructions/direction not clear resulting in an incident involving project personnel and a member of the public	C	3	H	- All project personnel are to be courteous and polite to any land holder or member of the public. - All questions or concerns are to be directed to the Jemena site representative for their attention. - Onboarding inductions to include community information - All personnel to conduct themselves in appropriate manner outside of working hours including interaction with locals, suppliers etc.	D	3	M	Yes	- Inductions to include permitted access areas between greenfield/brownfield				0		

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					L	C	R		L	C	RR	ALARP		L	C	RR	ALARP	
15	Site Establishment General Site Work	Interaction with plant/other personnel HRCW (High Risk Construction Work due to "Work in an area with movement of powered plant")	Health & Safety	Plant/Plant or Plant/Personnel interaction resulting in personal or plant damage	C	4	H	- Restricted access work areas to be set up/defined around working plant. - Breach of a restricted access work area shall result in disciplinary action as determined by the WASCO project manager. - The direction of work flow is to be determined by the supervisor and clearly communicated to the plant operators prior to the start of any new task or if there is a change of conditions including new personnel to the task. - Reversing beeper on vehicles and plant. - Spotter if required. - Speed limit, allocated parking for light vehicles, Two way radios, Light beacons on mobile plant while working on the site. - Delineation between brownfields and Greenfields works - Tool box topic to be conducted at beginning of project - SWMS	D	4	M	Yes				0		
16	Site Establishment General Site Work	Interaction with plant/other personnel	Community, Stakeholder and Reputation	Plant/private vehicle/machinery or Plant/Personnel interaction resulting in personal or private vehicle/plant damage to a third party	C	3	H	- Ensure that site is secured from the public and any unauthorised entry. - Should any unauthorised entry occur stop work until the unauthorised person, plant or vehicle is removed to a position of safety. - TMP - Spotters for all plant movement - Signage to site office	D	3	M	Yes				0		
17	Site Establishment General Site Work	Interaction with existing gas/electrical/telecommunications/water infrastructure HRCW (High Risk Construction Work due to "Work on or near energised electrical installations or services and/or work on or near pressurised gas mains or piping")	Health & Safety	Damage to existing infrastructure resulting in personal damage to personnel	C	5	E	- Dial before you dig and site inspection reveals that there is no existing infrastructure within the greenfield construction site. - Survey to clearly mark all known services - All underground services to be located using NDD - Jemena permit to work in be in place - To be in accordance with Jemena excavation procedure - Signage to be put in place for overhead powerlines	E	5	M	Yes				0		NOTE: Check highest delivery in relations to overhead powerlines
18	Site Establishment General Site Work	Interaction with existing gas/electrical/telecommunications/water infrastructure	Community, Stakeholder and Reputation	Damage to existing infrastructure resulting in inconvenience to the affected asset holder and the community serviced by the infrastructure	C	4	H	- Dial before you dig and site inspection reveals that there is no existing infrastructure within the greenfield construction site. - Survey to clearly mark all known services - All underground services to be located using NDD	D	3	M	Yes	- Keep drainage operational				0	
19	Site Establishment General Site Work	Interaction with existing gas/electrical/telecommunications/water infrastructure	Business, Financial	Damage to existing infrastructure resulting in economic loss to the affected asset holder and possible legal action.	C	3	H	- Dial before you dig and site inspection reveals that there is no existing infrastructure within the greenfield construction site. - Survey to clearly mark all known services - All underground services to be located using NDD	D	3	M	Yes				0		

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					L	C	R		L	C	RR	ALARP		L	C	RR	ALARP		
20	Site Establishment General Site Work	Working at heights (Including EWP and fall arrest and fall restraint systems and machinery platforms and edge protection along with scaffolding installation and removal) HRCW (High Risk Construction Work due to "Risk of a person falling more than 2 metres")	Health & Safety	Possible fall from height resulting in permanent injury or death	C	5	E	<ul style="list-style-type: none"> - Plant and machinery to have suitable edge protection in place to access the plant/machine for operation or service/maintenance. Where practicable scaffolding or other suitable platform with edge protection should be used when personnel are required to work at height. - No work off of ladders other than platform ladders with appropriate safety rail at the back of the ladder. - Personnel required to wear harnesses must have proof of training for work at heights. - Fall restraint systems are to be used in preference to fall arrest systems. - All fall restraint/fall arrest equipment must be tested and tagged every three months in accordance with the RuGBY system. - No person is to work alone if working in a harness. - A rescue plan must be developed and communicated to and understood by the work crew involved with the use of harnesses, fall restraint, fall arrest systems. - EWPs are preferred to the use of fall arrest or fall restraint systems where practicable. - When working below 6m fall restraint system to be used. - All operators and the ground person (Spotter/stand by rescue person) must be high risk licenced. - EWP ground controls trialled each shift to prove ability to rescue. - All work at height tasks incorporating fall arrest or fall restraint systems or the use of EWPs must be risk assessed and a SWMS developed for the task. - All personnel involved must be signed on and understand the requirements of the SWMS. Controls are to be monitored to ensure ALARP - Training matrix to capture competencies, high risk licences, proof of training etc. - Permit to Work System - Exclusion zones to be set up - Verification of competencies for working with machinery 	D	3	M	Yes				0			
21	Site Establishment General Site Work	Work requiring Permit to Work HRCW (High Risk Construction Work due to various high risk tasks as defined in the legislation)	Health & Safety	No Permit in Place Work not in accordance with Wasco/Jemena PTW Procedure	C	4	H	<ul style="list-style-type: none"> - All works within Jemena operation site (brownfields) under a Jemena permit to work system - Wasco permit to work system for all Greenfields works - Fire ban days may need further controls and consultation with the local CFA 	D	4	M	Yes				0	NOTE: Follow up critical lifts to ensure permit officer is adequate		
22	Site Establishment General Site Work	Slips/trips and falls	Health & Safety	Possible serious injury	C	3	H	<ul style="list-style-type: none"> - Ensure walkways are clear and stable. - Ensure good housekeeping. - Don't walk across batters or on loose sloping surfaces. - Wear correct footwear in good condition. - Three points of contact when accessing plant or machinery. - Dry off wet access points to plant if required. - Remove mud build up on plant access points as required. - Set up and site conditions in good condition - Site inspections to be conducted 	C	2	M	Yes				0			
23	Site Establishment General Site Work	Dirty/dusty or muddy work conditions	Health & Safety	Personnel working in muddy, dirty conditions being impacted by loose dirt/dust (Exposure to silica) or mud	C	2	M	<ul style="list-style-type: none"> - Dust suppression to be implemented e.g. Use of water cart to suppress dust. Machinery with controlled environment cabins to be used where practicable. - Supervisor to assess safety of work in muddy conditions by personnel on foot. - Machinery/materials to be utilised to remediate muddy areas to make safe for workers on the ground. - Ground conditions to be assessed prior to working machinery in wet conditions. - Jemena consultation with client site personnel regarding access to site in a wet weather event. - SWMS to introduce the PPE required for dust - Follow process of CEMP for unidentified waste 	D	2	L	Yes				0			
24	Site Establishment General Site Work	Uncontrolled construction waste disposal	Community, Stakeholder and Reputation	Rubbish being poorly managed on site resulting in neighbouring landholder complaints from "escaped rubbish/packaging/left over materials".	C	2	M	<ul style="list-style-type: none"> - WASCO to ensure that adequate waste bins are available at all times on site. - Change out of full bins as required. - Covers (shade cloth or the like) for windy conditions if required on light general waste bins. - Any rubbish not contained in a suitable receptacle to be picked up and placed into the relevant waste bin. - Waste is to be recycled wherever practicable. - Approved waste disposal compiles to be utilised - Site inspections - Smoking areas to have adequate butt receptacles 	D	2	L	Yes				0			

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					L	C	R		L	C	RR	ALARP		L	C	RR	ALARP		
25	Site Establishment General Site Work	Poor construction site security and construction site open to public	Community, Stakeholder and Reputation	Possible injury to member of the public by construction activities.	C	3	H	- Ensure that site is secured from the public. Should any unauthorised entry occur stop work until the unauthorised person is removed to a position of safety.	E	3	L	Yes					0	NOTE: Evolution - Safety barrier around excavation and road	
26	Site Establishment General Site Work	Crush injuries HRCW (High Risk Construction Work due to "Work in an area with movement of powered plant")	Health & Safety	Possible serious injury or death	C	5	E	- No person to be under a suspended load. - No person to be in the operational range of operating plant. - Exclusion zones to be installed for lifting tasks to ensure other work crews are not in the firing line. - Don't place body parts in the firing line. ensure pinch points/crush zones of plant are clearly identified and marked as per plant risk assessment - Do not remove or modify any guarding - All plant and equipment to be risk assessed prior to operation - Spotter to be in place for operating mobile plant	E	5	M	Yes					0		
27	Site Establishment General Site Work	Poor manual handling	Health & Safety	Possible serious injury or long term chronic injury	C	4	H	- Use mechanical aids wherever practicable. - Use correct lifting techniques. - Personnel only lift weight that is comfortable to lift for that individual. - Use team lifts where required. - Ensure clear path of travel when moving an item from point to point. - Plan any manual tasks to ensure adequate resources and rotation of tasks if required. - Inductions to include this	D	4	M	Yes					0		
28	Site Establishment General Site Work	Equipment damage	Business, Financial	Possible delays to the project, expensive equipment repairs	C	3	H	- Only approved plant and equipment to be allowed to operate on site. - Only approved competent and suitably trained, high risk licenced (where required) personnel to operate plant or equipment on site. - Daily pre start checks to be conducted on plant and equipment before the start of each shift. - Use spotters where there is congested, restricted access/operating area. - A risk assessment must be conducted for all work involving plant (SWMS) - A take 5 is to be conducted when required. - Current Insurances for all plant equipment in place - Report all damage to existing Jemena process equipment no matter how minor immediately to your supervisor.	D	2	L	Yes					0		
29	Site Establishment General Site Work	Equipment damage HRCW (High Risk Construction Work due to "Work in an area with movement of powered plant")	Health & Safety	Damage causing failure of Equipment and resulting in injury to personnel	C	4	H	- Only approved plant and equipment to be allowed to operate on site. - Only approved competent and suitably trained, high risk licenced (where required) personnel to operate plant or equipment on site. - Daily pre start checks to be conducted on plant and equipment before the start of each shift. - Use spotters where there is congested, restricted access/operating area. - A risk assessment must be conducted for all work involving plant (SWMS) A take 5 is to be conducted when required. - All plant equipment in good condition and registered. - Report all damage to existing Jemena process equipment no matter how minor immediately to your supervisor.	D	2	L	Yes					0		
30	Site Establishment General Site Work	Use of electrically powered equipment/power tools	Health & Safety	Possible injury or death from faulty equipment causing electric shock or electrocution	C	5	E	- All electrical equipment must be tested and tagged (RuGBY System) and in good order. - All electrical equipment must be visually inspected before use each shift to ensure it is in good repair with no damage. - All damaged or out of test date electrical equipment must not be used and must be tagged out of service and removed from the job site as soon as practicable for repair by a qualified/certified repair person (Licenced electrician) before returning to the work area or condemned and replaced. - Electrical circuits must be protected by RCD and tested before the first use daily. - Use electrical equipment with the correct IP rating for the environment in which it is being used - Battery operation equipment used wherever possible - Use of insulated hook for suspension of power leads - Correct equipment for the job/task - Equipment maintained on a Plant & Equipment register	E	5	M	Yes	- All personnel to have a gas detector					0	

Item Number	Activity / Product / Task / Process	Task/Risk/ Hazard	Major Effect	Impact / Consequence	Risk			Control measures	Residual Risk				Additional Controls	Residual Risk				Comments
					L	C	R		L	C	RR	ALARP		L	C	RR	ALARP	
31	Site Establishment General Site Work	Failure of emergency response	Health & Safety	Lack of Emergency preparedness. Lack of Emergency resources / equipment. Untrained personnel. Poor or inadequate communications. Insufficient first aid equipment, emergency response Procedures. Complacency. Untested protocols in the event of an Emergency. unable to suitably deploy sufficient resources in the event of an Emergency situation. Inability to contact local emergency services. long response times	C	4	H	- Follow Wasco project Emergency response plan and Jemena ERP plan. - Regularly review site first aid kits (6 monthly). - Maintain Fire extinguisher register (6 monthly test and tag period) - UHF radios issued for site supervisors and one radio issued and monitored for ER in office. - Phone reception booster unit to be procured if insufficient telephone reception on site. - Muster point identified at induction. - Meet with local emergency services and advise them of our location and access route. - Key personnel trained in emergency response procedure - Emergency drill must be conducted within 28 days of mobilisation to site	D	3	M	Yes				0		
32	Site Establishment General Site Work	Handling Dangerous Goods or Hazardous Substances	Health & Safety	Personal injury - inhalation, ingestion, skin contact, splash to eyes	C	3	H	- Storage of DG and hazardous substances as per relevant standards and codes of Practice. SDS register. - Hazardous Goods container on site. - Hazardous Gases stored as per standard. - All DG and hazardous substances to be risk assessed. - Provide work crews with the correct PPE inline with SDS requirements. - Provide Appropriate First aid equipment, Emergency response and Spill response equipment available as required and as recommended by SDS. - Personnel to read SDS and incorporate controls into SWMS or Take 5. - Prior to mobilisation register of DG's and quantities	D	3	M	Yes				0		
33	Site Establishment General Site Work	Handling Dangerous Goods or Hazardous Substances	Environmental	Environmental leaks, poor disposal of substances	C	4	H	- Storage of DG and hazardous substances as per relevant standards and codes of Practice. SDS register. - Hazardous Goods container on site. Hazardous Gases stored as per standard. Emergency response and Spill response equipment available as required and as recommended by SDS. - All disposals in accordance with statutory requirements and in full compliance with the CEMP. - Dedicated refuelling station and spill kit - All personnel to be trained in relation to refuelling - Reporting of any spills to Jemena representative	D	2	L	Yes				0		
34	Site Establishment General Site Work	Use of Compressed air (Compressors) and air tools	Health & Safety	Air injection, personal damage from whipping hose and fittings. Noise/hearing damage	C	3	H	- All air compressors to be serviced and maintained in accordance with the OEM. - All hoses and attachments to be in good working order. - Safety clips and whip checks to be in place on all air hoses and air tools when in use. - No person to direct compressed air at themselves or another person. - No person to blow off clothing. - There must be someone else working in the vicinity or a spotter capable of shutting down the compressor should there be an emergency. A daily prestart must be conducted on all compressors before use each shift. - Appropriate hearing protection to be available.	D	3	M	Yes				0		
35	Earthworks / Piling	Impact with existing infrastructure/services	Community, Stakeholder and Reputation	Damage to existing infrastructure/services through/within the construction site.	C	3	H	- Dial before you dig and site inspection reveals that there is no existing infrastructure within the greenfield construction site. - Survey to clearly mark all known services - All underground services to be located using NDD	E	1	L	Yes	- Use caution for works near existing retaining wall to not impact earth structure			0		
36	Earthworks / Piling	Disturbance/work outside of defined work area (co-ords)	Environmental	Breach of environmental Approval	C	3	H	- Ensure that boundary survey is complete and boundaries are clearly marked before commencing on site ground disturbance. - Permanent and temporary easement areas will be identified and marked	E	2	L	Yes				0		

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					L	C	R		L	C	RR	ALARP		L	C	RR	ALARP	
37	Earthworks / Piling	Interaction of plant or equipment with third party property or personnel. HRCW (High Risk Construction Work due to "Work in an area with movement of powered plant")	Health & Safety	Possible damage to plant or personnel	C	4	H	- Restricted access work areas to be set up/defined around working plant. - Breach of a restricted access work area shall result in disciplinary action as determined by the WASCO project manager. - The direction of work flow is to be determined by the supervisor and clearly communicated to the plant operators prior to the start of any new task or if there is a change of conditions including new personnel to the task. - Reversing beeper on vehicles and plant. - Spotter if required. - Speed limit, allocated parking for light vehicles, Two way radios, Light beacons on mobile plant while working on the site. - Delineation between brownfields and Greenfields works - Tool box topic to be conducted at beginning of project	D	4	M	Yes				0		
38	Earthworks / Piling	Interaction of plant or equipment with third party property or personnel.	Community, Stakeholder and Reputation	Possible damage to plant or personnel	C	3	H	- Ensure that site is secured from the public. Should any unauthorised entry occur stop work until the unauthorised person or animal is removed to a position of safety. - Protection or repair of the road surface and driveways to be included in dilapidation reports	E	3	L	Yes				0		
39	Earthworks / Piling	Interaction of plant or equipment with third party infrastructure or personnel.	Business, Financial	Possible damage to plant or personnel	C	3	H	- Ensure that site is secured from the public. Should any unauthorised entry occur stop work until the unauthorised person or animal is removed to a position of safety.	E	2	L	Yes				0		
40	Earthworks / Piling	Plant and personnel interaction HRCW (High Risk Construction Work due to "Work in an area with movement of powered plant")	Health & Safety	Possible plant strike on personnel	C	4	H	- Maintain a dedicated area for loading/unloading wherever practicable. - Trucks to be switched off during task, - Transport loading and unloading of equipment and materials use a Take 5 to identify hazards and control risks. - Craneage SWMS to be used if using craneage. - Checking load shift had not occurred during transit - check with driver who will assess and release load binders. - Trained, competent and VOC'd operators/dogman only used. Deny access to unauthorised personnel. - Consolidate deliveries if possible to reduce number of deliveries, - Flagging, spotters - Regular delivery operators to site to be site inducted. - Irregular delivery drivers to have a visitor induction and be under direct supervision of a fully inducted person - Delivery instructions - Receivers to be trained and understand the Chain of Responsibility process	D	4	M	Yes				0	NOTE: SIMOPs for pipeline contractor to have separate risk assessment for works in KGMS	
41	Earthworks / Piling	Excavation, trenching and drilling HRCW (High Risk Construction Work due to "Work in or near a shaft or trench deeper than 1.5m or a tunnel")	Health & Safety	Possible trench collapse and engulfment, equipment roll over, unsuitable access points, trenches not correctly protected, adverse weather conditions affecting the integrity of the trench/excavation. Falling into excavation	C	4	H	- When any personnel creating an excavation over 1.5 metre deep it must be benched, battered or shored and all conditions imposed. - No vehicles or plant/equipment are to be placed in the zone of influence of the trench. - No person to enter an excavation while working alone. - Worksafe notification for any excavation over 1.5 metres - Safe means for access entering or exiting - Emergency response and rescue plan - SWMS in place	D	4	M	Yes	- Ensure any boreholes are covered				0	ACTION: Leon - Consult with Jodi Woods about cut-off for landfill area around eastern side of site. Possibility of previous landfill contaminants/gas etc. Geotech has found no contaminants/gas.
42	Earthworks / Piling	Excavation and trenching	Business, Financial	Earthworks not meeting the Quality requirements for the project	C	3	H	- Ensure all earthworks Quality checks are completed and recorded. - Ensure an ITP in place to control the earthworks. Ensure all testing requirements are complied with and records are kept as part of Q.A.	D	2	L	Yes				0		
43	Earthworks / Piling	Excavation and trenching	Environmental	Fauna trapped or injured in an open excavation/trench	C	2	M	- Open trenches/excavations to be protected/identified as required with either an earth bund or bunting or other suitable method (e.g. A cover over a penetration / flagging). - Suitable access/egress point/s available to allow escape of trapped fauna where practicable. Sediment and erosion controls to be installed in accordance with the CEMP.	D	2	L	Yes						

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					L	C	R		L	C	RR	ALARP		L	C	RR	ALARP	
44	Earthworks / Piling	Craneage/lifting HRCW (High Risk Construction Work due to "Work in an area with movement of powered plant")	Health & Safety	Possible crush injuries, dropped loads, pinch points, overturned cranes (Plant used in crane mode), unstable crane pad, underground services, overhead structures/services, crane failure	C	4	H	- A SWMS to be developed in conjunction and consultation with the workforce involved for general site craneage. - Only high risk licenced operators and dogman/riggers to be used to operate a crane and select rigging and direct the crane operator. Plant used in crane mode must be operated by personnel with appropriate proof of training and competence. - All heavy lifts will be performed with a Lift plan/Lift study commensurate with the weight of the load and the potential risk. - Tested and tagged lifting equipment. - Mobile crane operations must be within the lift charts of the machine with adequate derating for any slope etc. - Spotters to be used as/if required. - Lifting near or over live asset - Anti burst valve to be fitted to excavator performing any lifting activities - If using excavator for lifting, VOC requirements to include operator has received specific training and instruction in the use of equipment for crane work, which can include competency, access to a load chart, understanding of hand signals etc.	D	4	M	Yes					0	
45	Earthworks / Piling	Noise Control	Environmental	Excessive noise and out of hours works from plant & equipment	C	2	M	- Reference the EPA guidelines	D	2	L	Yes						NOTE: Potential Driven piles - time of day notification of locals
46	Earthworks / Piling	Management of excavation material	Environmental	Possible spreading of weeds, uncontrolled movement of sediment or breach of environmental Permit, contaminated waste	C	2	M	- All plant to be free of weed seeds prior to entry to site (Weed and Seed declaration to be with all plant and vehicles). - All spoil to be placed into the designated stockpile area. - Ensure that erosion controls are properly installed, as necessary to prevent sediment flow into watercourse and other sensitive areas - Separate piles for top soils and excavated material. - Regular assessment of waterflow to ensure proper watercourse - Contaminated waste to be properly removed	D	2	L	Yes						
47	Concrete works	Slips/trips and falls	Health & Safety	Possible injury including sprains, strains or broken bones	C	2	M	- Ensure walkways are clear and stable. - Ensure good housekeeping. - Don't walk across batters or on loose sloping surfaces. - Wear correct footwear in good condition. - Three points of contact when accessing plant or machinery. - Dry off wet access points to plant if required. Remove mud build up on plant access points as required. - Set up and site conditions in good condition - Site inspections to be conducted	D	2	L	Yes	- Ensure proper access when working at heights and down into drain				0	
48	Concrete works	Concrete slurry contact with eyes/skin	Health & Safety	Possible eye injury or skin irritation or dermatitis	C	2	M	- Use appropriate PPE (Glasses) and gloves. Ensure an adequate supply of eye wash is on site from mobilisation onwards. - If contact occurs use eyewash to irrigate the affected eye and wash other affected body part with clean running water. - Any eye injury requires a medical investigation to ensure no damage to the eye. - Medical investigation as a precaution only and NOT a medically treated injury unless there is a need for further medical treatment. - SDS onsite	D	2	L	Yes					0	ACTION: Check for definitions of MTI compared to first aid treatment in HS plan
49	Concrete works	Release of stored energy HRCW (High Risk Construction Work due to "Work in an area with movement of powered plant")	Health & Safety	Damage to personnel by escaped high pressure hydraulic oil/compressed air and possible oil/air injection injury. Crush injury from raised implements/ suspended loads	C	4	H	- Ensure that all plant is maintained in accordance with the OEM or equivalent. - Operators to conduct daily pre start checks on all plant and written record of this is to be given to the Supervisor to check the machine is OK to operate. - All safety related faults must be repaired before the plant may be used on site. - The daily plant pre start records are to then be given to the Safety Advisor by the supervisor for recording compliance. - No attachments are to be left raised when a machine is left unattended. - No personnel to pass or be under a suspended load or implement. Bleed out compressed air when compressor is left unattended. - Concrete Trucks to be cleared of malfunction/faults	D	4	M	Yes					0	

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					L	C	R		L	C	RR	ALARP		L	C	RR	ALARP		
50	Concrete Works	Use of concrete pumps/trucks HRCW (High Risk Construction Work due to "Work in an area with movement of powered plant")	Health & Safety	Collapse of concrete pump, line blockage resulting in possible plant property and personal damage	C	4	H	- All concrete pumps to be maintained in accordance with the OEM. - Concrete pump log book to be available at all times the pump is on site. - The log book must be current and up to date. Only suitably qualified and trained personnel (High Risk Licensed as required) to operate concrete pumps and concrete trucks. - Concrete pumps to be set up on the plant hard stand (Known bearing capacity of the hard stand) in accordance with the operators manual. Ensure no person in the line of fire when cleaning the pump lines or where there is a blockage.	D	4	M	Yes	- Brownfields works under permit				0	NOTE: Pours inside brownfields will have plans and layout for exclusion zones	
51	Concrete Works	Concrete truck/pump wash out	Environmental	Contamination of area with uncontrolled wash out of concrete trucks/pumps	B	2	M	-Wasco to install and maintain a designated wash out area for the concrete delivery trucks and concrete pumps. - Controls to prevent run offs	E	2	L	Yes					0		
52	Concrete Works	Craneage/lifting HRCW (High Risk Construction Work due to "Work in an area with movement of powered plant")	Health & Safety	Possible crush injuries, dropped loads, pinch points, overturned cranes (Plant used in crane mode), unstable crane pad, underground services, overhead structures/services, crane failure	C	4	H	- A SWMS to be developed in conjunction and consultation with the workforce involved for general site craneage. - Only high risk licenced operators and dogman/riggers to be used to operate a crane and select rigging and direct the crane operator. Plant used in crane mode must be operated by personnel with appropriate proof of training and competence. - All heavy lifts will be performed with a Lift plan/Lift study commensurate with the weight of the load and the potential risk. - Tested and tagged lifting equipment. - Mobile crane operations must be within the lift charts of the machine with adequate derating for any slope etc. - Spotters to be used as/if required. - Lifting near or over live asset - Anti burst valve to be fitted to excavator performing any lifting activities - If using excavator for lifting, VOC requirements to include operator has received specific training and instruction in the use of equipment for crane work, which can include competency, access to a load chart, understanding of hand signals etc.	D	4	M	Yes	- Any lifts over live assets classified as critical lift. Jemena Permit to be implemented					0	
53	Concrete Works	Impact to underground services	Business, Financial	Possible strike of installed services causing rework, added costs and possible delays to programme	D	3	M	- Ensure that survey clearly identify services "as built" and they are marked up on the drawings. Clearly mark where services are located where there is a need to return to that location for future excavation work or operate machinery in close proximity. - Ensure "as built" drawings are referenced before any excavation in an area where services have been installed. - Use spotters when operating close to installed services. - NDD to be utilised to positively identify services for excavation work undertaken in the close proximity of an installed service. - DBYD to be conducted	E	3	L	Yes	- Jemena PTW for brownfield works					0	NOTE: Nathan to ensure KGMLV underground as built are transmitted to Wasco
54	Concrete Works	Debris left on hard stand and not cleaned up/placed into appropriate skip bins	Community, Stakeholder and Reputation	Reputation, environmental regulations regarding clean ups	C	2	M	- Wasco to ensure that adequate waste bins are available at all times on site. - Change out of full bins as required. - Covers (shade cloth or the like) for windy conditions if required on light general waste bins. Any rubbish not contained in a suitable receptacle to be picked up and placed into the relevant waste bin. - Different types of waste are to be kept separate and recycled wherever practicable.	D	2	L	Yes					0		
55	Concrete Works	Debris left on hard stand and not cleaned up/placed into appropriate skip bins	Business, Financial	Reputation, environmental regulations regarding clean ups, Paying for disposal of waste when it may be removed at no cost/ reduced cost for recycling.	C	2	M	- Wasco to ensure that adequate waste bins are available at all times on site. - Change out of full bins as required. - Covers (shade cloth or the like) for windy conditions if required on light general waste bins. Any rubbish not contained in a suitable receptacle to be picked up and placed into the relevant waste bin. - Different types of waste are to be kept separate and recycled wherever practicable.	D	2	L	Yes					0		

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					L	C	R		L	C	RR	ALARP		L	C	RR	ALARP	
56	Concrete Works	Use of cutting tools (Grinder, oxy set, cut off saw, etc.)	Health & Safety	Personal Damage (Including burns, trauma from shattered discs, physical damage/cuts/abrasions etc from uncontrolled movement of grinder, failure of oxy set/hoses)	C	4	H	<ul style="list-style-type: none"> - Use flash back arrestors on both gauge and hand piece ends of oxy set - Guarding to be in place with grinders/cut off saws, - Handle to be in place on grinder in accordance with OEM, - Experienced trades people and trades assistants to use tools of trade. - All tools to be inspected prior to use each shift. Any damaged tools to be tagged out of service and repaired or replaced before use on site. - Hazards and controls to form a part of the relevant SWMS for the tasks involving these tools. - Jemena/Wasco permit to work to be in place - Double eye protection to be worn - Appropriate PPE to be worn - Grinding discs to meet grinder requirements - Annual inspections of flashback arrestors - Awareness of others while in line of fire - Assessment of screens to be conducted prior to starting - Assessment of Fire blankets/extinguisher to be conducted prior to starting 	D	4	M	Yes	- No use of 9" grinder				0	
57	Concrete Works	Entanglement in rotating equipment HRCW (High Risk Construction Work due to "Work in an area with movement of powered plant")	Health & Safety	Personal damage including possible degloving etc.	C	4	H	<ul style="list-style-type: none"> - Ensure no loose clothing worn when working on or near rotating equipment. - Gloves not required where there is an increased possibility for the glove to be caught in the rotating equipment. - All long hair etc. to be covered/restrained to prevent entanglement. - Ensure all guarding is in place as part of prestart 	D	4	M	Yes	- Exclusion zones when boring/drilling - Plant to be fitted with emergency stop				0	
58	Concrete Works	Working with electricity (electrical tools, gen sets, etc.)	Health & Safety	Possible electric shock or electrocution	C	5	E	<ul style="list-style-type: none"> - Where practicable use low voltage (Battery powered hand tools), - On gensets ensure RCDs fitted and test and tagged (RuGBY system) and checked before each shift (trip button test). - Ensure all equipment/leads/tools are visually checked before use each shift. - All damaged or incorrectly tagged items to be removed from the work area and tagged out of service until it can be tested and tagged or repaired or replaced as appropriate. - Insulated hooks to be used for leads off the ground - All gear to be checked after a rain event 	D	3	M	Yes				0		
59	Concrete Works	Concrete cutting/scabbling/grouting	Health & Safety	Exposure to silica, respiratory illness	C	3	H	<ul style="list-style-type: none"> - Dust suppression to be implemented e.g. Wet cutting. - SWMS to introduce the PPE required for dust - Follow SDS requirements 	E	3	L	Yes				0		
60	Structural, Mechanical and Piping	Use of cutting tools (Grinder, oxy set, cut off saw, etc.)	Health & Safety	Personal Damage (Including burns, trauma from shattered discs, physical damage/cuts/abrasions etc from uncontrolled movement of grinder, failure of oxy set/hoses)	C	4	H	<ul style="list-style-type: none"> - Use flash back arrestors on both gauge and hand piece ends of oxy set - Guarding to be in place with grinders/cut off saws - Handle to be in place on grinder in accordance with OEM, - Experienced trades people and trades assistants to use tools of trade. - All tools to be inspected prior to use each shift. Any damaged tools to be tagged out of service and repaired or replaced before use on site. - Hazards and controls to form a part of the relevant SWMS for the tasks involving these tools. - Jemena/Wasco permit to work to be in place - Double eye protection to be worn - Appropriate PPE to be worn - Grinding discs to meet grinder requirements - Annual inspections of flashback arrestors - Awareness of others while in line of fire - Assessment of screens to be conducted prior to starting - Assessment of Fire blankets/extinguishers to be conducted prior to starting 	D	4	M	Yes	- Containment of sparks/flammable materials				0	
61	Structural, Mechanical and Piping	Painting/protective coating	Health & Safety	Personal damage to personnel due to hazardous nature of required coatings	C	2	M	<ul style="list-style-type: none"> - Only experienced personnel to be used to apply protective coatings. - All applications and preparation of the surface to be protected to be in accordance with the product technical data information. - Suitably qualified personnel to ensure compliance with project specifications. - SDS measure to be put in place as per the manufacturers recommendations. - Appropriate PPE to be worn - Ensure blast pot is certified 	D	2	L	Yes				0		

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					L	C	R		L	C	RR	ALARP		L	C	RR	ALARP		
62	Structural, Mechanical and Piping	Painting/protective coating Abrasive Blasting - Compressed Air - Personal Injury	Health & Safety	Air injection, personal damage from whipping hose and fittings. Noise/hearing damage	C	3	H	- Only suitable trained personnel to utilise the equipment. - Blasting garnet material is appropriately contained as such to not coat surroundings - Use bristle gun where possible - Appropriate PPE to be worn - SWMS to be in place - No person to direct abrasive material at themselves or another person. - There must be someone else working in the vicinity or a spotter capable of shutting down the compressor should there be an emergency. A daily prestart must be conducted on all compressors before use each shift. - Appropriate hearing protection to be available.	D	3	M	Yes				0			
63	Structural, Mechanical and Piping	Painting/protective coating	Business, Financial	Use of incorrect products, work not done to standard, work not done in accordance with the specifications, QA not captured (Incorrectly or not certified personnel/inspectors) resulting in rework and possible delays to programme	C	2	M	- Only experienced personnel to be used to apply protective coatings. - All applications and preparation of the surface to be protected to be in accordance with the product technical data information. - Suitably qualified personnel to ensure compliance with project specifications. - QA to be recorded/completed as the task progresses. - Correct preparation and DEW point etc to be achieved before application of coating/s. - NACE Painting Inspector to be present - Consider weather/protection of coated surfaces during drying period	E	2	L	Yes				0			
64	Structural, Mechanical and Piping	Painting/protective coating	Environmental	Incorrect disposal of hazardous substances. Escape of hazardous substances to the environment	C	2	M	- Ensure all hazardous products are stored correctly (i.e. Haz Substances Container) and all empty/used containers are disposed of in accordance with the SDS and the Project CEMP. Any spills to be contained, reported, investigated and cleaned up in accordance with the EMP. - Removed coating to be disposed of by professional disposal company - Asbestos to be removed in accordance with the EPA requirements	D	2	L	Yes				0			
65	Structural, Mechanical and Piping	NDT testing	Health & Safety	Potential for radiation exposure to work crew and others in the work area.	C	4	H	- Exclusion zones during onsite testing - Trained and experienced/qualified testing crew. Testing times scheduled to eliminate excess workers on site: i.e. at lunch breaks, out of normal hours, etc. - A specific SWMS for all NDT - A specific SWMS for radiography and other forms of NDT. - SWMS must be developed in conjunction with the work crew. - Clear communication with all other personnel who are to remain working on the construction site during any of the NDT processes. - Formal notification to all work parties to be distributed - Radiation management plan to be implemented	E	4	M	Yes				0		ACTION: Leon to discuss with Jodi Wood about exclusion zones NDT/Hydro that exceed fence line. Is there need for council/road limited access	
66	Structural, Mechanical and Piping	Failure to ensure structural items secured correctly HRCW (High Risk Construction Work due to "Work in an area with movement of powered plant")	Health & Safety	Potential for collapse and injury to personnel	C	4	H	- All structural work to be conducted in accordance with the SWMS. - Ensure structural items are secured in accordance with the design drawings. - Ensure all bolts are positively identified when tightened to specification. - Use only high risk licenced crane operator and rigger/dogmen. - Dogman/rigger to ensure that the structural items are correctly secured before removing the rigging from the load (Positive communication with the personnel securing the structural members). - Exclusions zones to be implied - Correct bolts are correctly identified as per design	D	4	M	Yes				0		NOTE: Ensure when Wilson modifying poles are following procedure/checked by Wasco	
67	Structural, Mechanical and Piping	Welding flash/burns etc	Health & Safety	Potential eye injuries, burns etc.	C	3	H	- Use correct PPE for the task, (Welding masks, welding gloves, etc.) - Use welding screens and/or welding huts appropriate for the specific task. - Restrict unnecessary personnel from entry into the welding work area. - SWMS to show controls. - Take 5 as required. - Only experienced and suitably qualified welders and TA's to be used. - All welding plant and consumables to be in good working order. - Welding inspector to oversee the works - Welding blankets/extinguisher to be in the area	D	3	M	Yes	- Jemena PTW to be in place for any Brownfield welding - Preference for working area to be outside any hazardous areas				0		

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					L	C	R		L	C	RR	ALARP		L	C	RR	ALARP	
68	Structural, Mechanical and Piping	Hydro testing	Health & Safety	Potential for personal damage to work crew and others in the work area through the sudden/unsuspected release of stored energy	C	5	E	<ul style="list-style-type: none"> - Exclusion zones during onsite testing - Trained and experienced/qualified hydro testing crew. - Testing times scheduled to eliminate excess workers on site: i.e. at lunch breaks, out of normal hours, etc. - A specific SWMS for all hydro testing. - SWMS must be developed in conjunction with the work crew. - Clear communication with all other personnel who are to remain working on the processing construction site, during any of the hydro testing processes, near the exclusion zone. - The majority of the Hydro testing will be conducted off site at the fabrication point wherever practicable. - The majority of the onsite hydro will be conducted in the lay down area away from the facility footprint allowing for a suitable exclusion zone without interfering with other work crews. - All equipment calibrated - Safety valve on the line to prevent over pressurisation - WHIP protectors and rated hoses/fittings to be used - Correct studs and gaskets to be used - Hydro procedure to be approved - Test packs to be developed and approved prior to testing - Where required, water tested so Chloride PPM is met - All threaded fittings to be suited for hydro 	D	3	M	Yes					0	
69	Structural, Mechanical and Piping	Hydro testing	Environmental	Potential for contaminated water to be released to the environment	C	2	M	<ul style="list-style-type: none"> - All hydro water to be captured and where possible reused. - All hydro water to be released or used in another way as to meet the environmental requirements (Tested) or removed off site for disposal. - Work with the EPA requirements 	D	2	L	Yes					0	
70	Structural, Mechanical and Piping	Plant/personnel interactions HRCW (High Risk Construction Work due to "Work in an area with movement of powered plant")	Health & Safety	Possible plant strike on personnel	C	4	H	<ul style="list-style-type: none"> - No personnel to work inside the work zone of plant where practicable. - A hard barrier to be installed between plant and personnel where practicable. - Delineation of the work zone is the minimum required with no go areas clearly signposted for exclusion of personnel not directly involved with the task. - Pedestrian access pathways to be defined for workers not involved in the task to access their work areas if they have to pass near other active work areas which involve the use of plant or machinery with the potential to cause harm to those passing work crews. - SIMOPS to be discussed and advised at morning prestart. - Communication between work crews to ensure risks are controlled. - Supervisor or other senior personnel to determine which task has priority if SIMOPS can not be safely achieved. - Use of spotter required for all equipment movement on site - Permit to work and SWMS to be put in place - Positive communication with operator prior to entering work zone 	D	4	M	Yes	- Brownfields Jemena PTW to be in place				0	
71	Structural, Mechanical and Piping	Damage to installed building, pipe, pipe racks, infrastructure HRCW (High Risk Construction Work due to "Work in an area with movement of powered plant")	Health & Safety	Plant, machine, Crane or lifted load strikes infrastructure causing damage to infrastructure or load and possible damage to crew working in vicinity	C	3	H	<ul style="list-style-type: none"> - Use spotters when working close to above ground assets (Dogman Rigger and other as required.) - Only those personnel required for the task to be in the work area. - Exclusion zones delineated as required. - No personnel under a suspended load. - Use tag lines to eliminate personnel in the line of fire. - Ensure adequate escape path for dogman/rigger or other worker involved in the task. - Use only experienced and where required high risk licenced personnel to undertake the task. - Ensure good communication within the work crew and especially between the dogman/rigger and the crane operator. - Ensure slew cranes are set up correctly in accordance with the crane OEM with adequate crane pads and on known bearing capacity hard stand. 	D	3	M	Yes	- Jemena PTW in Brownfields - Jemena Critical lift PTW as required				0	

Item Number	Activity / Product / Task / Process	Task/Risk/ Hazard	Major Effect	Impact / Consequence	Risk			Control measures	Residual Risk				Additional Controls	Residual Risk				Comments	
					L	C	R		L	C	RR	ALARP		L	C	RR	ALARP		
72	Structural, Mechanical and Piping	Install Pipework / flanges/ Flange management HRCW (High Risk Construction Work due to "Work in an area with movement of powered plant")	Health & Safety	Congestion within the work area, rushing, complacency, hand Injuries. Pipe rolling on stands or supports. Manual handling. Torque multiplier/tensioner manual handling injury	C	4	H	<ul style="list-style-type: none"> - Only those personnel required for the task to be in the work area to reduce congestion. Determine the movement limitations of any crane and the load, lift plan if considered to be a difficult lift due to congestion restrictions. - Involve crane operator, dogman and other relevant persons when planning - SWMS for general craneage Competent (High Risk Licensed) Operators - Tested and tagged lifting equipment. - Rigger Gloves, chock/wedges to be placed - stands to be rated for the pipe that they are supporting, no modifications to construction pipe stands. Level hard ground. - VOC for Torque multiplier / tensioner unit. - Calibrated equipment. - Correct capacity pipe stands. - No alterations to propriety pipe stands without engineered design sign off. - Ensure pipe stability before removing any rigging. Ensure all pipe fitters and those undertaking flange management are trained and deemed competent. - Use mechanical aids wherever practicable. - Use correct lifting techniques. - Personnel only lift weight that is comfortable to lift for that individual. - Use team lifts where required. - Ensure clear path of travel when moving an item from point to point. - Plan any manual tasks to ensure adequate resources and rotation of tasks if required. 	D	4	M	Yes	<ul style="list-style-type: none"> - Pipe on pipe stands adequately supported/tied down - Flange management tags properly filled out 					0	
73	Electrical and instrumentation	Electrical Stripping, Glanding and termination (Strip cables, crimp cables Install cables into switchboard) and instrumentation cabinets	Health & Safety	Hand injuries, Crushes/Pinch points Slips, trips, Manual handling. Plant shutdown Metal shavings	C	3	H	<ul style="list-style-type: none"> - Appropriate tools and equipment available and relevant to task - Ensure all personnel are fit for work - Site access approval and relevant inductions completed - Trained and competent personnel to complete scope of works - Licensed electrician performing work - File burrs - Awareness of surroundings - Maintain good housekeeping - Maintain good posture, avoid twisting, use additional persons for larger cables - Take 5 to be conducted prior to using other stripping methods e.g. spring retractable knife - Ensure cable stripping tool as primary tool where possible, wear gloves where required - Keep hands clear of crimping jaw, positive communications - Awareness of energised equipment - SWMS to be developed for tasks - Press holes rather than drill where practicable 	D	3	M	Yes					0	Note: Metal shavings potential to cause shorting	
74	Electrical and instrumentation	Electrical Installation of cableways and conduits Use of Ladder Cutting cable tray and brackets Installing brackets and saddles onto concrete Installing cable tray and conduit onto brackets Installation of conduit into trench	Health & Safety	Falling, Unserviceable or not fit for purpose equipment, Cuts and abrasions, Uncontrolled movement, Work area access, Unprotected edges, Noise, Hot work, Strains and Sprains, poisoning from glue. Pinch points and unstable ground	C	4	H	<ul style="list-style-type: none"> - Use all terrain EWP as first option where practicable - platform type ladder - Maintain 3 points of contact - Ensure Ladder is on secure level ground - Establish a drop/Exclusion Zone around area and use a spotter if required - Visual inspection and function test prior to use of equipment - Ensure equipment is tested and in date - Correct Hand and Eye protection and Site-specific PPE - Maintain safe body position at all times - Use adequate hearing protection - Double eye protection when grinding - File burrs after cutting - Gloves to be worn while cutting - Practice safe lifting techniques / 2 person lift if required - Follow manufactures recommendations and SDS, PPE requirements - SDS to be checked prior to any activity were solvents, cutting compounds etc are to be used - Ensure stable ground prior to conduit installation - Correct PPE to be worn. 	D	4	M	Yes					0		

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					L	C	R		L	C	RR	ALARP		L	C	RR	ALARP	
75	Electrical and instrumentation	Electrical Installation of cable Setup cable onto cable stands, Installing cables on cable tray, Cable tie cables in place, electrical testing of cables as per relevant standards	Health & Safety	Slips, trips, pinch points, manual handling, cable drum falling, Restricted access, Damage to cables	C	3	H	- Practise safe lifting technique - Check for sharp edges along cable route, use cable rollers where required - Maintain good posture, additional personnel required during pull, Use of winch where required cut cable ties flush, Housekeeping - Avoid overreaching - Trained and competent personnel to be present on both ends of cable being tested. - Awareness of surroundings, Positive communication	D	3	M	Yes					0	
76	Electrical and instrumentation	Electrical Equipment installation Mounting of electrical equipment	Health & Safety	Injury from items dropped from height Pinch point injuries, crushing injuries Hand injuries Sprains and strains Trips and slips	C	3	H	- Ensure all persons conducting activity are trained, competent correctly licensed to perform task. Wear appropriate PPE to perform task - Ensure all lifting equipment is in good order and not damaged or unfit for assigned task - Be aware of surroundings - Ensure good housekeeping round work area - Positive communication between activity team members to Ensure everyone knows what is happening - Provide an exclusion / drop zone around the area when conducting lifts (ensure specific equipment is considered for radius) - Two man lifts or mechanical aids for heavy or awkward equipment lifts - Use correct tools for task being conducted	D	3	M	Yes					0	
77	Electrical and instrumentation	Instrument tubing and instrument panels laying instrument tubing, Cutting of tubing, attachment of tubing to devices	Health & Safety	Crushing injuries from tube bending, Incorrect installation of tubing into device causing pressure release, hand injuries from sharp edges, exposure to energy sources	C	3	H	- Ensure all persons conducting activity are trained, competent correctly licensed to perform task. - Wear appropriate PPE to perform task - Be aware of surroundings - Ensure good housekeeping round work area - Positive communication between activity team members to ensure everyone knows what is happening - Mark tube to ensure visual check is possible after termination of tube into device - Use correct tools for task being conducted - Swagelok trained personnel to be used for all tubing works - All burs to be removed from tubing - Compressed air to be blown through the tube prior to installation - Ensure PTW where energy sources release potential - Consider line of fire risk from air when blasting air through tube	D	3	M	Yes					0	
78	Electrical and instrumentation	Electrical & Instrumentation Cable Testing Use of Meters, hand tools, ladder, radios, PPE, EWP	Health & Safety	Faulty power tools, faulty drawings, working at heights/falls from height, energised sources, LOTO not in place	C	4	H	- Fit for purpose tools, correct test and tag and in good condition. - Ensure test equipment is calibrated - LV Rescue Kit, - PTW / LOTO - SWMS - Battery operated tools as first option - RCDs - Extension leads are not to be joined to increase length - Exclusion zone and signage - SIMOPS discussed at prestart - Testing to be conducted prior to energisation where practicable - Licenced and competent workers	D	4	M	Yes					0	
79	Electrical and instrumentation	Connect Earthing Grid	Health & Safety	Equipment not fit for purpose / suitably maintained, sharp edges, incorrect drawings/installations, manual handling, other activities (CAD welding), vehicle movements, faulty power tools, faulty drawings, Hot surfaces completion of task. Connection to existing grid	C	4	H	- Correct PPE, site supervision within work area, control of access to work area/signage, access good housekeeping, compacted surface, toolbox meeting, audible alarms, level work surface, correct/suitable edge protection, separation of vehicles and pedestrians, fit for purpose tools, correct test and tag and in good condition. - CAD welding to have SWMS and control measures in place - Personnel to be trained - PTW	D	4	M	Yes					0	Note: Connection to existing grid impact & additional control Follow up by Jemena
C 80	Electrical and instrumentation	Live work on LV Boards	Health & Safety	Brown fields or greenfields energised boards Electric shock, electrocution, fire	C	5	H	- PTW / LOTO (test for dead) - No work on energise boards without further risk assessment workshop - Competent and licenced workers - LV rescue kits and process - Defib and first aid trained personnel - SWMS - 24 VDC works allowed only - no 240V works allowed - Double lock process connected to metring panel prior to live testing	D	4	M	Yes						Action - Jemena to review cathodic protection scope with pipeline team

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					L	C	R		L	C	RR	ALARP		L	C	RR	ALARP	
81	Pre commissioning Commissioning	Operating on live infrastructure. Failure of isolation HRCW- High Risk Construction Work	Health & Safety	Personal injury, electric shock, electrocution, explosion, exposure to gasses (Nitrogen etc.)	C	5	High					No				0		A SEPARATE RISK WORKSHOP. (Location and date to be determined) SHALL BE CONDUCTED BEFORE ANY PRE COMMISSIONING OR COMMISSIONING ACTIVITIES ARE UNDERTAKEN ON SITE.

Issue Date	Jemena Doc No.	Wasco Doc No.	Revision No.	Description of Issue	Prepared by	Approved by Project Manager / Site Construction Superintendent / General Manager
17/02/2023	GAS-599-RG-RM-003	2211-HSE-REG-001	A	Issued for Review	Craig Ostler	Andrew Freeman
10/03/2023	GAS-599-RG-RM-003	2211-HSE-REG-001	B	Issued for Review	Craig Ostler	Andrew Freeman

Line No	Action Register	Comments	Closed Out
41	ACTION: Leon - Consult with Jodi Woods about cut-off for landfill area around eastern side of site. Possibility of previous landfill contaminants/gas etc. Geotech has found no contaminants/gas.	No information from the landholder. Understanding is that the whole site is made from a slag heap so assumption is that the slag heap extends to the bottom of the batters. The combined Geotech reports will provide the most detail.	Closed
48	ACTION: Check for definitions of MTI compared to first aid treatment in HS plan	Added to CSMP	Closed
65	ACTION: Leon to discuss with Jodi Wood about exclusion zones NDT/Hydro that exceed fence line. Is there need for council/road limited access	If the exclusion zones extend outside the temp construction area into Landwide property, we'd need to let the landholder know. We wouldn't necessarily need to barricade them, will depend in the activity. For the road, if there was any exclusion zones, Wasco would need to contact council for a road permit and traffic control.	Closed