

Operation Soil and Water Management Plan for Ammonium Nitrate Emulsion Production Facility

Orica, Richmond Vale

Operation Soil and Water Management Plan for Ammonium Nitrate Emulsion Production Facility

Orica, Richmond Vale

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Quality Information

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Emulsion Production Facility

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Prepared by Alison O'Neill

Reviewed by Gabriel Wardenburg

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Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
A	29-Sep-2017	DRAFT	Craig Grant Project Manager	
1	08-Nov-2017	FINAL	Craig Grant Project Manager	
2	14-Nov-2017	FINAL	Craig Grant Project Manager	
3	07-Feb-2020	Document review and update	Dylan Turnbull Principal Environmental Scientist	
4	28-Feb-2020	Final	Dylan Turnbull Principal Environmental Scientist	
5	11-Jun-2020	Final - revised	Dylan Turnbull Principal Environmental Scientist	

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1.0 Introduction

This Operation Soil and Water Management Plan (OSWMP) has been reviewed and updated for Orica Australia Pty Limited (Orica) by AECOM Australia Pty Ltd (AECOM), to address the soil and water management requirements of the operation phase of the Ammonium Nitrate Emulsion Production Facility (ANE Production Facility).

The requirement to develop a construction soil and water management plan was defined in Schedule 3, Condition 23 of Project Approval 09_0090 (see Table 1). This condition was met prior to the commencement of construction of the project (approved on 7 October 2010). The Construction Soil and Water Management Plan (CSWMP) included a commitment to develop an operational management plan for soil and water, including a Stormwater Management Plan and Erosion and Sediment Control Plan as defined in Schedule 3, Condition 23 of Project Approval 09_0090. This OSWMP forms part of the overarching Environmental Management Strategy – Operations (EMS-O) developed by Orica to collectively outline the management measures proposed to mitigate the potential environmental impacts that may occur during operations.

The OSWMP was prepared and submitted to the Department of Planning and Environment, now the Department of Planning, Industry and Environment (DPIE) for approval prior to the commencement of operations associated with the ANE Production Facility.

2.0 Project Approval

The requirement of an OSWMP was not included as part of the project approval conditions, however was a commitment made by Orica within the CSWMP. The features of the OSWMP have come directly from the project approval conditions for the CSWMP, detailed in Table 1.

Table 1 Project Approval Requirements Relevant to the Operation Soil and Water Management Plan

Project Approval Condition	Condition Requirement	Where addressed in this OSWMP
Schedule 3, Condition 23	<i>The Proponent shall prepare and implement a Soil and Water Management Plan for the project to the satisfaction of the Director-General. This plan must:</i> <i>a. be submitted to the Director-General for approval prior to construction;</i> <i>b. be prepared by a suitably qualified and experienced expert; and</i> <i>c. include, where relevant:</i> <i>- a Stormwater Management Plan; and</i> <i>- an Erosion and Sediment Control Plan.</i>	Note that a construction SWMP was prepared and approved – this document covers the operational soil and water management aspects of the ANE facility. Section 6.0 Section 5.0
Schedule 3, Condition 24	<i>The Stormwater Management Plan must:</i> <i>a. include detailed plans of the stormwater management system for the site, including any rainwater harvesting infrastructure;</i> <i>b. be consistent with the guidelines Managing Urban Stormwater: Harvesting and Reuse (DEC);</i> <i>c. demonstrate that post development flows will not exceed predevelopment flows for a range of ARI from 1 year up to and including the 100 year ARI;</i> <i>d. describe the procedures for the installation, inspection and maintenance of the stormwater system; and</i> <i>e. include a stormwater quality monitoring program for including procedures to be undertaken if any noncompliance is detected.</i>	Section 6.0
Schedule 3, Condition 25	<i>The Erosion and Sediment Control Plan shall be prepared in accordance with Landcom's 2004 Managing Urban Stormwater: Soils and Construction.</i>	Section 5.0

3.0 Objective

The objective of the OSWMP is to:

- Provide employees and contractors with a clear and concise description of their responsibilities in relation to stormwater, soil and water control during the operation of the ANE Production Facility;
- Describe the location, function, capacity, maintenance and, where appropriate, decommission of erosion and sediment control structures installed during the construction phase of the ANE Production Facility;
- Detail the stormwater management system, including rainfall harvesting infrastructure, installed onsite to prevent stormwater discharge above peak pre-construction discharge flows;
- Describe the procedures for the installation, inspection and maintenance of the stormwater system;
- Detail a stormwater water quality monitoring program and procedures to be undertaken in the case of non-compliance; and
- Address the relevant commitments made within the environmental assessment; and address the conditions of project approval 09_0090, as committed in the CSWMP.

4.0 Legislative Requirements

In addition to Orica's legislative requirements detailed in Section 2.0 of the EMS-O, Orica will undertake stormwater, erosion and sediment management in accordance with:

- Project Approval (09_0090);
- Environmental Protection Licence 4121;
- *Protection of the Environment Operations Act 1997* (POEO Act);
- *Environmental Planning and Assessment Act 1979* (EP&A Act);
- *Water Management Act 2000*;
- Operation phase commitments of the CSWMP;
- Managing Urban Stormwater: Soils and Construction (the Blue Book) Volume 1 (Landcom, 2004); and
- Managing Urban Stormwater: Harvesting and Reuse (DEC, 2006).

5.0 Erosion and Sediment Control Plan

As no future disturbance is proposed as part of the operation phase of the ANE Production Facility, the soil and water management requirements focus on the maintenance and, where appropriate, decommissioning of erosion and sediment controls installed during the construction phase.

5.1 Existing Controls

As identified in the CSWMP, sources of erosion and sediment control during the construction of the ANE Production Facility included:

- Alteration of pre-construction surface drainage flows;
- Land clearing;
- Topsoil and bulk materials placement; and
- Vehicle and equipment movements.

As such, a range of control measures were identified to minimise impacts on surrounding catchments. Standard erosion and sediment control techniques were utilised in accordance with the Blue Book and Managing Urban Stormwater Volume 2C: Unsealed Roads and 2D: Main Road Construction (DECC, 2008).

A summary of the general controls implemented during the construction phase, including operation phase requirements, is provided in Table 2. As defined in the EMS-O, the implementation and maintenance of erosion and sediment controls will be the responsibility of the Safety, Health and Environment team (or person with the responsibilities of the Environmental Manager), and monthly inspections of the site will be undertaken by the Site Manager.

Table 2 Operation Erosion and Sediment Controls Requirements for the ANE Production Facility

Measure/Control as Identified in the CSWMP	Operation Phase Requirements
Installation of erosion and sediment control measures prior to land disturbance. Note: selective clearing/land disturbance may be required to install the erosion and sediment control measures.	As no further land disturbance is proposed as part of the operation phase, this measure is no longer relevant.
Minimise all disturbance areas and stabilisation by progressive clearing and rehabilitation/stabilisation as soon as practicable.	Stabilise any remaining exposed areas as soon as practicable. Stabilisation measures may include: • Revegetation with turf; • Use of commercial stabilisation products; and • Installation of hardstand, gravel or concrete material.
Clearly identifying and delineating areas required to be disturbed and ensuring that disturbance is limited to those areas.	Maintain perimeter fencing and signage to ensure no access is permitted to areas outside the approved limits of disturbance, defined by the project Environmental Assessment.
Construction of diversion banks upslope of areas to be disturbed to direct clean water runoff away from disturbed areas where practicable. The diversion banks will be designed to ensure effective segregation of sediment laden runoff and allow clean surface water to return to natural water courses.	Maintain existing upslope diversion bunds. Maintain concentrated water channels adjacent to diversion bunds to prevent erosion and down slope sedimentation.
Construction of catch drains to capture runoff from disturbed areas and direct runoff to sediment control structures.	Maintain any remaining catch drains to manage erosion. Stabilise retained catch drains with vegetation or by engineering means.
Construction of other erosion and sediment control measures such as sediment fences as required.	Maintain erosion and sediment control measures until remaining exposed surface are stabilised.
Construction of drainage controls such as table drains at roadsides and on hardstand areas and toe drains on stockpiles.	Maintain drainage controls throughout operation, including inspections for and repair of erosion, and removal of accumulated sediment. Stabilise any drainage controls with vegetation or by engineering means.
Removal of any material which is tracked onto pavement surfaces at the end of each working day through methods such as placement of hardstand material or installation of rumble grids at exit points to minimise the tracking of soil onto pavement surfaces and off site.	All high traffic areas should be stabilised as part of construction activities. Should it be identified that additional facilities are required within the approved project footprint for parking or vehicle movement, these areas will be stabilised as part of their construction.
Construction of graded banks, where required, over the final reshaped landform to minimise erosion and re-direct runoff to catch drains and water disposal areas.	Landform shaping was completed as part of the construction phase, and no further action is required.
Locate stockpiles away from watercourses.	All stockpiles have been decommissioned as part of the construction phase, and no further action is required.

Measure/Control as Identified in the CSWMP	Operation Phase Requirements
Select level or gently sloping areas for stockpile sites to minimise erosion and potential soil loss where possible.	All stockpiles have been decommissioned as part of the construction phase, and no further action is required.
Install appropriate sediment controls upslope of stockpiles to divert water around the stockpile and down slope of stockpiles to prevent material loss.	All stockpiles have been decommissioned as part of the construction phase, and no further action is required.
Place stockpiles to a height generally less than three metres and setting out topsoil stockpiles where necessary in windrows to maximise seed growth from the soil seed bank and maintain biological activity.	All stockpiles have been decommissioned as part of the construction phase, and no further action is required.
Soil stockpiles will be vegetated if they will be undisturbed for a period longer than three months.	All stockpiles have been decommissioned as part of the construction phase, and no further action is required.
Revegetation of final landforms and disturbed areas as soon as practicable.	Stabilise any remaining exposed areas as soon as practicable. Stabilisation measures may include: • Revegetation; • Use of commercial products; and • Installation of hardstand, gravel or concrete material.
Immediate repair or redesign of erosion and sediment controls that are not performing adequately, as identified during field inspections.	Maintain erosion and sediment control measures until such time as they can be removed.
Placement of geotextile liners and rock check dams in drains as required to reduce water velocities and prevent scouring in drainage lines, flow paths and culverts.	Maintain all drainage line control structures including geotextile fabrics and rock check dams throughout the operation of the facility.
Sediment fences, sediment traps, rock checks and other erosion and sediment control measures are to be designed and installed in accordance with the 'Blue Book' and installed in advance of, or in conjunction with, earthworks to prevent sediment laden water leaving the site or entering the clean water system.	Maintain all erosion and sediment controls until such time that they can be removed.
Sediment fences and other controls where appropriate are intended to be used until a final stable landform is established.	Maintain all erosion and sediment controls until such time that they can be removed. To facilitate the stabilisation of the final landform, utilise revegetation or install hardstand materials as soon as possible, and maintain these areas as required.
Where appropriate, sediment fences or other controls are to be installed immediately downstream of the areas to be disturbed.	Maintain all erosion and sediment controls until such time that they can be removed.
Sediment fences are to be installed along contours if practicable. Sediment	As no further land disturbance is proposed as part of the operation phase,

Measure/Control as Identified in the CSWMP	Operation Phase Requirements
fences are to be constructed using geotextile filter fabric with structural posts to be spaced no more than 1.5 metres apart.	this measure is no longer relevant.
Sediment fences should not be installed in high flow areas where the effectiveness of fences may be impaired.	As no further land disturbance is proposed as part of the operation phase, this measure is no longer relevant.
Catchment areas of sediment fences and other temporary controls where practicable, are to be limited by constructing the fences or other controls with small returns at 20 metre intervals to create smaller contributing sub catchments so as to prevent failure in larger storm events.	As no further land disturbance is proposed as part of the operation phase, this measure is no longer relevant.
Sediment fences and other such temporary controls should be designed to ensure a maximum of 50 L/s passes through the sediment fence during a storm event.	As no further land disturbance is proposed as part of the operation phase, this measure is no longer relevant.
Clean water diversions will be constructed to convey clean water runoff away from the disturbed areas and prevent water from entering active areas and the dirty water management system, this clean water runoff will be diverted into nearby watercourses.	Existing clean water drains which are to remain in place throughout the ANE operation phase are to be maintained.
All diversions are to be designed in accordance with the Blue Book to cater for a minimum 20 year Average Recurrence Interval (ARI) storm event.	As no further land disturbance is proposed as part of the operation phase, this measure is no longer relevant.
Catch drains will be established to convey runoff from the disturbed areas to appropriate discharge structures.	Existing catch drains which are to remain in place throughout the ANE operation phase are to be maintained.
All catch drains will be designed to convey peak discharges from a minimum critical duration 20 year ARI storm event.	As no further land disturbance is proposed as part of the operation phase, this measure is no longer relevant.

5.2 Decommissioning of Controls

As per Blue Book standards, the decommissioning of controls should not be undertaken prior to the catchment of that control being stabilised at equal to or greater than 75 per cent. Once the catchment of each control can be verified as being effectively stabilised across 75 per cent or greater of the area, the control is permitted to be removed. However, should stabilisation subsequently fail, consideration should be given to replacing the control if other erosion and sediment controls should not be considered suitable.

Verification of catchment stabilisation should be undertaken by the Safety, Health and Environment team (or person with the responsibilities of the Environmental Manager).

5.3 Inspections and Maintenance

While erosion and sediment controls are in place, the inspection and maintenance regime detailed in Table 3 should be implemented. As defined in the EMS-O, the implementation of maintenance of stormwater controls will be the responsibility of the Safety, Health and Environment team (or person with the responsibilities of the Environmental Manager), and monthly inspections of the site will be undertaken by the Site Manager.

Table 3 Operation Erosion and Sediment Control Inspection and Maintenance Regime

Control Measure	Frequency
Regular maintenance of all controls.	As required
Material accumulated by erosion and sediment control structures is to be removed before the efficiency of the sediment storage zone is reduced by more than 50 per cent of its designed capacity.	As required
The sediment levels in the structures and the need for de-silting will be determined through a visual assessment.	Monthly
If the inspections identify that the type, location or condition of the control structures are ineffective, the control structure will be modified, repaired or replaced.	As required
If any ineffective erosion and sediment control structures cannot be addressed immediately, the timeframe for the modification, repair or replacement of the structures will be based on an assessment of the risk to the surrounding environment.	As required

6.0 Stormwater Management Plan

6.1 Stormwater Management System

The stormwater management system for the operational phase of the ANE Production Facility is comprised of a series of pipes, pits and spoon drains as shown on the construction plans, No.0516-C-1054 and 0516-C-1077 attached (see Appendix A) and described below (Table 4). As defined in the EMS-O, the implementation and maintenance of stormwater controls will be the responsibility of the Site Manager, and monthly inspections of the site will be undertaken by the Site Manager.

Table 4 Stormwater Management Measures

Stormwater Management Measures	Maintenance Requirements
Clean Water Diversion	
Diversion drains have been established to convey clean runoff from upslope areas to the east of the site away from the footprint of the proposed ANE Production Facility. The first diversion drain will direct runoff around the southern portion of the proposed ANE Production Facility footprint before directing flows to a geo-fabric lined rock channel where it will overflow into existing natural downstream drainage systems. The second diversion drain diverts runoff northwards under the access road via a culvert into a geo-fabric lined rock channel where it overflows into existing natural downstream drainage systems.	Inspection of clean water diversions monthly and following rainfall events. Carry out repairs as required, to ensure they remain in good working condition.
Runoff from Unbundled Areas	
Where appropriate, plant areas have been covered with a roof to minimise the generation of potentially contaminated stormwater within the process areas.	Maintain roof over plant areas as required. Ensure no blockages of downpipes and guttering of roof infrastructure on Monthly basis.
The site access roads and unbundled plant hardstand areas are permanently sealed with one-way cross-fall across the site towards the west.	Maintain, seal and repair as required.
Runoff from building roofs and hardstand areas is directed to a hydrocarbon and sediment trap (SPEL Stormceptor™), via the stormwater pipe and pit system for the removal of potential contaminants. Water in the SPEL Stormceptor™ will be harvested for re-use and stored in three recycled water tanks that have a combined capacity of approximately 93,000 L. Runoff in excess of the storage capacity of the recycled water tanks will flow through the SPEL Stormceptor™ to separate sediment and oils from the stormwater to ensure a water quality similar to the receiving waters and discharged to downstream drainage lines via a geofabric lined rock channel to reduce velocity.	The installation of a commercial stormwater treatment device, the SPEL Stormceptor™, has been undertaken according to the manufacturer's specifications. Maintain the trap in accordance with manufacturer's specifications.

Stormwater Management Measures	Maintenance Requirements
The SPEL Stormceptor™ includes instrumentation to detect the level of hydrocarbons and sediment collected. A binary controller will alert operators to the presence of oil. Sediment measurements will be routinely monitored by the operations personnel. Operations personnel will arrange for the removal of the collected waste material by a licensed waste disposal firm.	Maintain trap in accordance with manufacturer's specifications. Ensure collected waste is removed as required.
Oil, fuel or chemical spills on the hardstand areas will be managed in accordance with relevant requirements for the respective chemicals. Spill kits will be strategically placed on site according to the risk and the nature of the hazard in accordance with current site operational practice for the Technology Centre.	Ensure spill kits are placed and maintained as part of routine inspections of the ANE Production Facility
Bunded Areas	
Chemicals and storage tanks are contained within a fully bunded, covered area to limit the ingress of stormwater. In the event that water enters the processing plant bunded area it will be directed to the recycled water tanks.	Daily and after each rainfall event, ensure there is no blockage of pipes or pits for the stormwater containment system. Maintain all bunds around processing area.
Liquid chemical storage areas such as acetic acid and caustic soda will be bunded and will collect stormwater during rainfall events.	Inspect and maintain all bunds around processing area on a daily basis.
All stormwater runoff captured in within designated chemical bunded areas will be tested for pH. If the testing shows the water to be of suitable quality then it will be sent to the recycled water tanks for re-use in the process water for the ANE Production Facility. If contaminant levels are excessive then it will be removed from site by a licensed waste contractor.	Ensure real time stormwater sump monitoring systems are functional on a daily basis. In the event of an overflow to the bund, ensure water is tested and reused or removed by a licensed waste contractor as soon as practical.
The ANE manufacturing area is under a roofed area, with concrete floor sloped to a central sump with level monitoring.	
All oil, fuel or chemical spills that occur in designated bunds or low points in unloading bays will be contained and tested as required for cross contamination. Where possible chemical spills which are not contaminated will be recovered for re-use. Cross contaminated spills that are unable to be re-used in the process will be disposed of through a licensed waste treatment facility.	Ensure bunds are appropriately sized to contain all material within the bunded area. Maintain all bunds around processing area.
Double walled (self-bunded) tanks will be utilised for hydrocarbon storage.	Ensure all tanks are regularly inspected and replaced should deterioration be observed.
The hydrocarbon tank loading and storage area is bounded by a roll over bund that drains to a collection sump. When unloading is not occurring rainwater within the collection sump will be pumped to the hydrocarbon and sediment trap for treatment. When unloading is occurring no pumping from the collection sump will occur. The bunded hydrocarbon area has been designed to contain the full content of a hydrocarbon tanker compartment in the event of a loss of containment. A spill	On a daily basis, ensure prompt and full removal of any material which has collected in the sump, to maintain sump capacity.
	Maintain and inspect the condition of the bund, daily. Ensure it is appropriately sized for the material contained in the bunded area. Ensure sump is appropriately sized to store all material which has potential to

Stormwater Management Measures	Maintenance Requirements
kit will be located within the vicinity of the unloading area to enable small spillages of hydrocarbon materials to be managed. In the event of a significant loss of containment during the unloading operation, a licensed waste disposal company will be utilised to recover the product from the bunded area.	be spilled within the bunded area. Ensure spill kit is appropriately located and adequately supplied to manage small spillages.
All chemicals and additives will be stored, transferred and managed in accordance with the <i>Dangerous Goods Act 2003</i> and relevant Australian Standards.	Ensure all activities are undertaken in accordance with the relevant legislation.
Access Road	
The road has been designed and constructed with a one-way cross-fall draining from east to west.	No maintenance actions required.
Grass lined swale drains have been constructed upslope of the access road to direct flows from upstream undisturbed catchments under the access road through culverts. Runoff is then directed to levels spreaders where it overflows into existing natural downstream drainage lines.	Monitor vegetation in grass lined swales to ensure no erosion is occurring. Ensure no blockages of pipes or pits carrying runoff and remove accumulated materials if blockages occur. Monitor geo-fabric lined rock channels to ensure no erosion is occurring, and remove any deposited materials (e.g. sedimentation).
Grassed buffer strips have been constructed along the down slope length of the proposed access road.	Monitor vegetation to ensure no erosion is occurring.
Scour protection has been installed at the outlets of all access road culverts.	Monitor scour protection to ensure it is adequate for the erosion potential of the water. If damage is occurring, extend or improve existing scour protection area. Remove any accumulated material from within the scour protection area.
Stormwater Attenuation	
Regular inspection of the downstream overland flow paths, following discharge events, to ensure that discharged stormwater does not increase the erosion and scouring of surface material.	If areas of significant scouring are identified, appropriate remediation measures will be implemented.
Regular inspection of rock lined level spreaders at the stormwater discharge points.	Inspect on a monthly basis and following rainfall events to assess condition and clear sediment as required.

6.2 Stormwater Attenuation

The stormwater management system constructed at the ANE Production Facility includes kerb and guttering, pits and pipes that convey stormwater generated by the development area to two discharge points. The pipe and pit system has been designed to convey the stormwater generated by the 2 year Average Recurrence Interval (ARI) critical duration event. The design of the car park and bunded area provides for some minor flow retention as a result of surface ponding when the conveyance capacity of the drainage system is exceeded (i.e. for storm events greater than the 2 year design event).

The two discharge points include scour protection and level spreaders that reduce the velocity of the discharged stormwater and spread the area into which the stormwater flows into. These measures reduce the likelihood of scouring new channels into the downslope area.

The attenuation of stormwater generated by the site is provided by a combination of both the broad overland flow paths downstream of the ANE Production Facility, and by some minor surface storage within the carpark and bunded areas of the facility during larger rainfall events.

A comparison of the modelled peak discharges from the ANE Production Facility (and immediate surrounds) is summarised in Table 5. The peak flows included in this table are those modelled at the downstream boundary of the Orica site. As shown in Table 5, the modelled peak discharges from the ANE Production Facility are attenuated to be generally reduced compared to the pre-development discharges.

Table 5 Summary of Pre- and Post- Development Peak Discharge in the Vicinity of the ANE Facility

Design Storm Event (ARI) (2 hour duration)	Peak Flow (m ³ /s)	
	Pre-ANE Development	Post-ANE Development
1 year	0.07	0.05 (- 30%)
10 year	0.13	0.12 (- 8%)
20 year	0.20	0.15 (-25%)
50 year	0.25	0.23 (- 8%)
100 year	0.29	0.27 (- 7%)

In order to maintain the peak flow attenuation capabilities of the site, ongoing maintenance and monitoring measures are required. These include:

- Monthly inspection of the downstream overland flow paths, and following discharge events, to ensure that the discharged stormwater does not increase the erosion and scouring of surface material. If areas of scouring are identified, appropriate remediation measures will need to be undertaken; and
- Monthly inspection of rock lined level spreaders at the stormwater discharge points to ensure they remain functional and free from sediment.

6.3 Stormwater Quality Monitoring

Rainfall is monitored on a daily basis using a rain gauge at the site weather station in accordance with EPL 4121.

Orica has committed to the Environment Protection Authority (EPA) that during any event where stormwater is not contained on site, monitoring of storm water discharging from the outfall will occur. Monitoring will be undertaken with the objective to prevent harm to the environment, in compliance with any other directive received from the EPA.

Monitoring will be undertaken as per EPL 4121 (refer Table 6) and results will be stored on site. An Annual Performance Report on the stormwater discharge quality monitoring is submitted to the EPA with each Annual Return, as required by Condition E1 of EPL 4121. The Annual Performance Report includes the results of all discharge monitoring data required to be collected from the Stormceptre and an assessment of the data against historical results and relevant environmental guideline values. Pollution incidents must be reported to the EPA in accordance with the POEO Act.

Table 6 EPL 4121 Stormwater Monitoring Requirements

Pollutant	Units of measure	Frequency	Sampling Method
Ammonia	milligrams per litre	Daily during any discharge	Grab sample
Conductivity	micro siemens per centimetre		
Nitrogen (total)	milligrams per litre		
Oil and Grease	milligrams per litre		
pH	pH		
Total dissolved solids	milligrams per litre		
Total suspended solids	milligrams per litre		

7.0 Corrective Actions

All non-conformances, corrective and preventative actions with regards to this OSWMP will be managed in accordance with Section 4.0 of the EMS-O.

8.0 References

AECOM Australia Pty Ltd, November 2019, Environmental Management Strategy – Operations: Orica, Richmond Vale Ammonium Nitrate Emulsion Plant.

Department of Conservation (DEC, 2006). Managing Urban Stormwater: Harvesting and Reuse.

Department of Environment and Climate Change (DECC), 2008. Managing Urban Stormwater – Soils and Construction, 2C – Unsealed Roads.

Department of Environment and Climate Change (DECC), 2008. Managing Urban Stormwater – Soils and Construction, 2D – Main Road Construction.

Environment Protection Licence 4121 – Licence version date 2-Oct-2019.

Landcom, 2004. Managing Urban Stormwater – Soils and Construction, Volume 1, 4th Edition.

Project Approval 09_0090 (in accordance with Section 75J of the Environmental Planning and Assessment Act, 1979), issued 26 July 2010 by the Minister for Planning.

Project Approval 09_0090 MOD 1 (in accordance with Section 75W of the Environmental Planning and Assessment Act, 1979), issued 9 November 2012 by the delegate of the Minister for Planning.

Project Approval 09_0090 MOD 2 (in accordance with Section 75W of the Environmental Planning and Assessment Act, 1979), issued 4 July 2016 by the delegate of the Minister for Planning.

Umwelt, 2010. Environmental Management Strategy for the Construction of Orica's Ammonium Nitrate Emulsion (ANE) Production Facility, Richmond Vale, NSW.

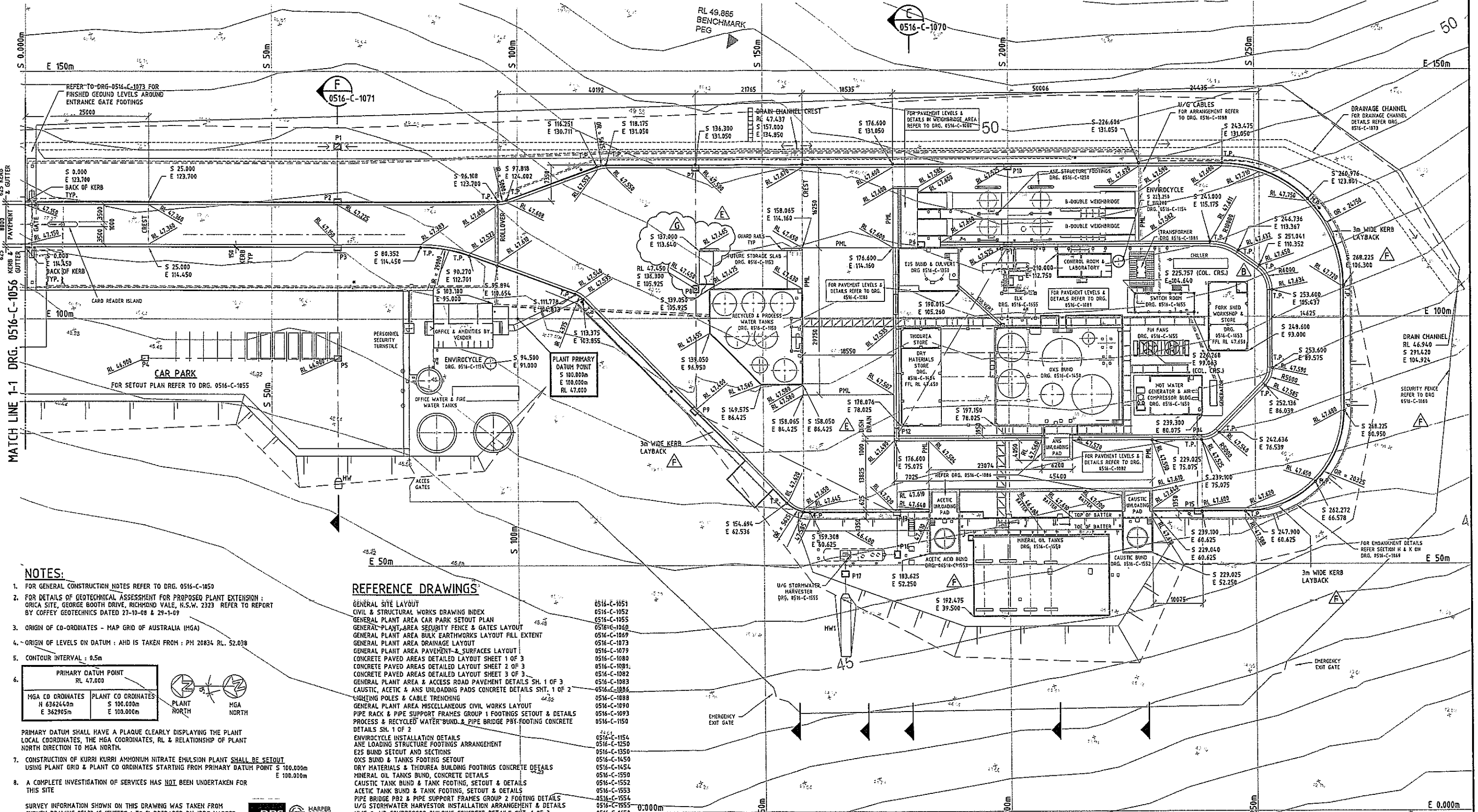
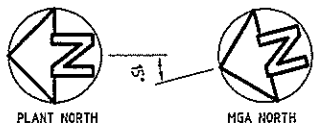
Umwelt (Australia) Pty Limited, October 2012, Section 75W Modification application, MOD 1
Environmental Assessment - Orica Australia Pty Limited, Ammonium Nitrate Emulsion Production Facility, Richmond Vale.

Umwelt (Australia) Pty Limited, April 2016, Section 75W Modification application, MOD 2
Environmental Assessment - Orica Australia Pty Limited, Ammonium Nitrate Emulsion Production Facility, Richmond Vale.

Appendix A

ANE Construction Plans

Appendix A ANE Construction Plans



- NOTES:**
- FOR GENERAL CONSTRUCTION NOTES REFER TO DRG. 0516-C-1050
 - FOR DETAILS OF GEOTECHNICAL ASSESSMENT FOR PROPOSED PLANT EXTENSION: ORICA SITE, GEORGE BOOTH DRIVE, RICHMOND VALE, N.S.W. 2323 REFER TO REPORT BY COFFEY GEOTECHNICS DATED 27-10-08 & 29-1-09
 - ORIGIN OF CO-ORDINATES - MAP GRID OF AUSTRALIA (MGA)
 - ORIGIN OF LEVELS ON DATUM: AHD IS TAKEN FROM: PH 20834 RL 52.038
 - CONTOUR INTERVAL: 0.5m
 - | PRIMARY DATUM POINT | |
|--------------------------|--------------------------|
| RL 47.000 | |
| MGA CO-ORDINATES | PLANT CO-ORDINATES |
| N 636244.0m
E 362905m | S 100.000m
E 100.000m |

PLANT NORTH MGA NORTH
 - PRIMARY DATUM SHALL HAVE A PLAQUE CLEARLY DISPLAYING THE PLANT LOCAL COORDINATES, THE MGA COORDINATES, RL & RELATIONSHIP OF PLANT NORTH DIRECTION TO MGA NORTH.
 - CONSTRUCTION OF KURRI KURRI AMMONIUM NITRATE EMULSION PLANT SHALL BE SETOUT USING PLANT GRID & PLANT CO-ORDINATES STARTING FROM PRIMARY DATUM POINT S 100.000m E 100.000m
 - A COMPLETE INVESTIGATION OF SERVICES HAS NOT BEEN UNDERTAKEN FOR THIS SITE
 - SURVEY INFORMATION SHOWN ON THIS DRAWING WAS TAKEN FROM SURVEY DRAWING 25433-1C (SHEETS 1 TO 5) PREPARED BY RPS-HARPER SOMERS O'SULLIVAN OF 241 DENISON STREET BROADMEADOW N.S.W. 2303
 - PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON THE SITE, ALL AUTHORITIES SHALL BE CONTACTED FOR POSSIBLE LOCATION OF FURTHER UNDERGROUND SERVICES AND DETAILED LOCATIONS OF ALL SERVICES.

REFERENCE DRAWINGS:

- GENERAL SITE LAYOUT
CIVIL & STRUCTURAL WORKS DRAWING INDEX
GENERAL PLANT AREA CAR PARK SETOUT PLAN
GENERAL PLANT AREA SECURITY FENCE & GATES LAYOUT
GENERAL PLANT AREA BULK EARTHWORKS LAYOUT FILL EXTENT
GENERAL PLANT AREA DRAINAGE LAYOUT
GENERAL PLANT AREA PAVEMENT & SURFACES LAYOUT
CONCRETE PAVED AREAS DETAILED LAYOUT SHEET 1 OF 3
CONCRETE PAVED AREAS DETAILED LAYOUT SHEET 2 OF 3
CONCRETE PAVED AREAS DETAILED LAYOUT SHEET 3 OF 3
GENERAL PLANT AREA & ACCESS ROAD PAVEMENT DETAILS SH. 1 OF 3
CAUSTIC, ACETIC & ANS UNLOADING PADS CONCRETE DETAILS SH. 1 OF 2
LIGHTING POLES & CABLE TRENCHING
GENERAL PLANT AREA MISCELLANEOUS CIVIL WORKS LAYOUT
PIPE RACK & PIPE SUPPORT FRAMES GROUP 1 FOOTINGS SETOUT & DETAILS
PROCESS & RECYCLED WATER BUND & PIPE BRIDGE PBT-FOOTING CONCRETE DETAILS SH. 1 OF 2
ENVIROCYCLE INSTALLATION DETAILS
ANS UNLOADING STRUCTURE FOOTINGS ARRANGEMENT
E2S BUND SETOUT AND SECTIONS
OXES BUND & TANKS FOOTING SETOUT
DRY MATERIALS & THIUREA BUILDING FOOTINGS CONCRETE DETAILS
MINERAL OIL TANKS BUND, CONCRETE DETAILS
CAUSTIC TANK BUND & TANK FOOTING, SETOUT & DETAILS
ACETIC TANK BUND & TANK FOOTING, SETOUT & DETAILS
PIPE BRIDGE PB2 & PIPE SUPPORT FRAMES GROUP 2 FOOTING DETAILS
U/G STORMWATER HARVESTER INSTALLATION ARRANGEMENT & DETAILS
HWG & AIR-COMPRESSOR-BUILDING-CONCRETE-DETAILS-SHT-1-OF-3
FORK SHED WORKSHOP & STORE FOOTINGS CONCRETE DETAILS
FIN FAN, SWITCHROOM & ELK FOOTING SETOUT & DETAILS

- 0516-C-1051
0516-C-1052
0516-C-1055
0516-C-1060
0516-C-1069
0516-C-1073
0516-C-1079
0516-C-1080
0516-C-1081
0516-C-1082
0516-C-1083
0516-C-1086
0516-C-1088
0516-C-1090
0516-C-1093
0516-C-1094
0516-C-1154
0516-C-1250
0516-C-1350
0516-C-1450
0516-C-1454
0516-C-1500
0516-C-1552
0516-C-1553
0516-C-1554
0516-C-1555
0516-C-1650
0516-C-1653
0516-C-1655

PLAN
SCALE 1:375

FOR COMPLETE SETOUT DETAILS OF INDIVIDUAL FACILITIES REFER TO REFERENCE DRAWINGS

REFER TO DRG. 0516-C-1090 FOR SETOUT OF THE FOLLOWING ANCILLARY ITEMS WITHIN THE GENERAL PLANT AREA - GENERATOR, CHILLER, CONTROL ROOM, PATHWAYS, CONCRETE STAIR, TURNSTILE, ENTRANCE GATE FOOTINGS, FIRE TANK & ISLANDS (INCLUDING CARD READER) AT ENTRY & EAST EMBANKMENT STAIR

FOR DRAINAGE PITS SETOUT REFER TO DRG. 0516-C-1073

FOR PIPE BRIDGES, SUPPORTS & RACKS FOOTING DETAILS REFER TO DRG.s 0516-C-1093, 1159 & 1554

FOR CONSTRUCTION

* REV A INCLUDES NEW WEIGH BRIDGE DIMENSIONS. REFER TO THE MINUTES OF MEETING ON 22/07/2010 ITEM 7.

3m WIDE KERB LAYBACK ADDED IN THREE LOCATIONS. LOCATIONS ARE INDICATIVE AND DRAWN TO REFLECT WHAT WAS BUILT ON SITE.

#	DATE	DESCRIPTION	DRAWN	CHECKED	ENGINEER	RELEASED
G	19.04.11	RAMP ADDED	BB	SH	DS	MW
F	22.03.11	KERB LAYBACKS ADDED & SECURITY FENCE REVISED	SH	BB	DS	MW
E	06.01.10	FUTURE STORAGE SLAB ADDED	BB	SH	DS	MW
D	22.12.10	SURFACE LEVEL AT RECYCLED BUND CNR REVISED	SH	DS	DS	MW
C	14.12.10	PAVEMENT RLs REVISED (GENERAL REVISION)	SH	DS	DS	MW
B	31.08.10	SWITCH ROOM RELOCATED	SV	SH	DS	MW
A	18.08.10	ISSUED FOR CONSTRUCTION	BB	SH	CK	MW
2	15.03.10	ISSUED FOR TENDER	SH	JDB	CK	MW
1	18.01.10	ISSUED FOR COMMENTS	SV	JDB	CK	MW
REV	DATE	DESCRIPTION	DRAWN	CHECKED	ENGINEER	RELEASED

DEVELOPMENT CONSENT NUMBER

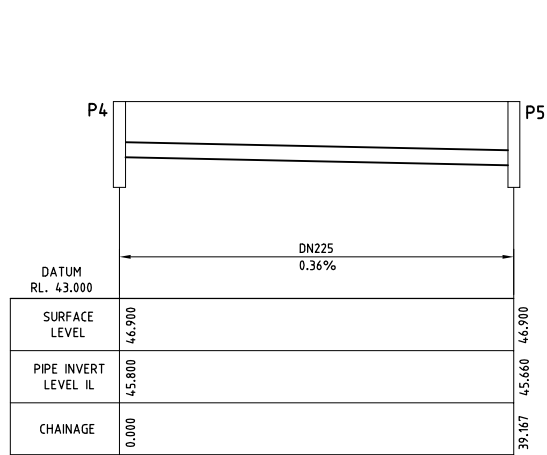
I.C.D. (Asia Pacific) Pty Ltd
188 Bungee Road, Pendle Hill, NSW 2145.
Phone No: (02) 9636-8777 Fax No: (02) 9636-4124
E-Mail Address: icdeng@icdasiapacific.com.au

CLIENT: ORICA MINING SERVICES

TITLE: KURRI KURRI AMMONIUM NITRATE EMULSION PLANT
GENERAL PLANT AREA
CIVIL WORKS
SETOUT PLAN

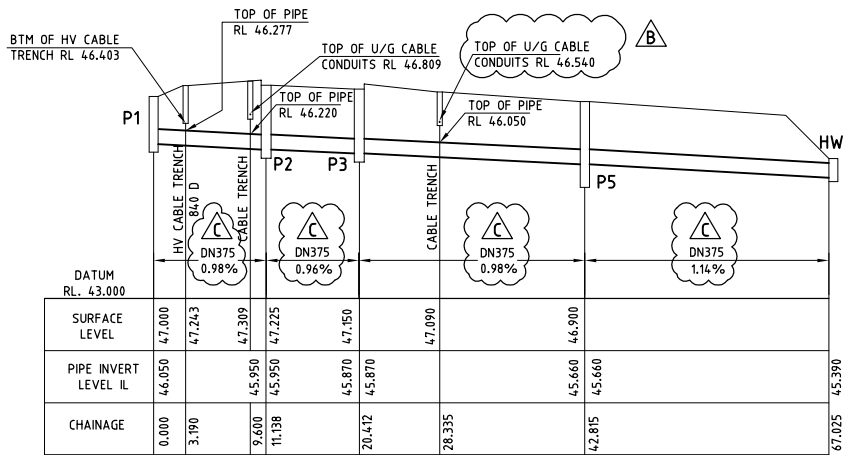
ICD JOB No. 0516 ICD CAD FILE No: 0516-C-1054

SCALE: 1:375 A1 DRG. No: 0516-C-1054 REV: G



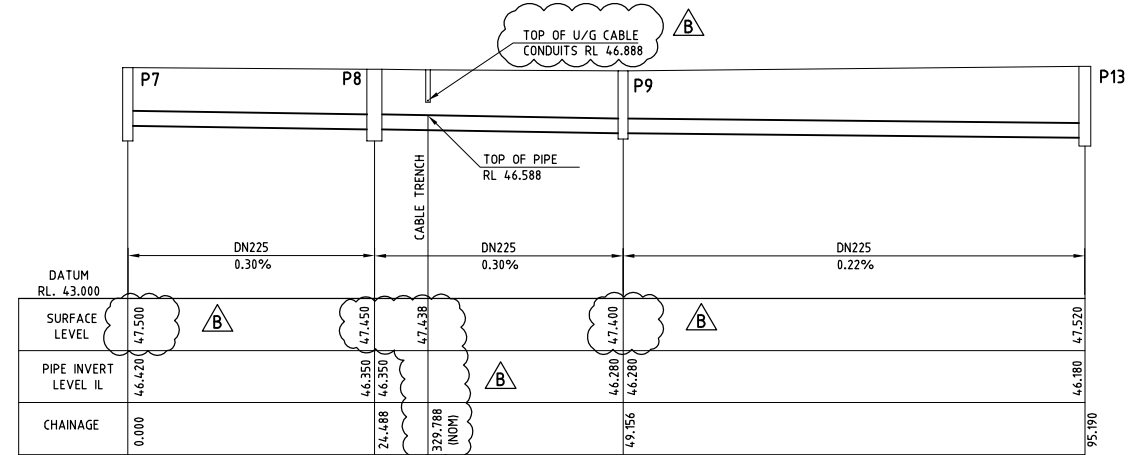
LINE 'A' LONGITUDINAL SECTION

SCALE : HORIZONTAL 1:375
VERTICAL 1:75



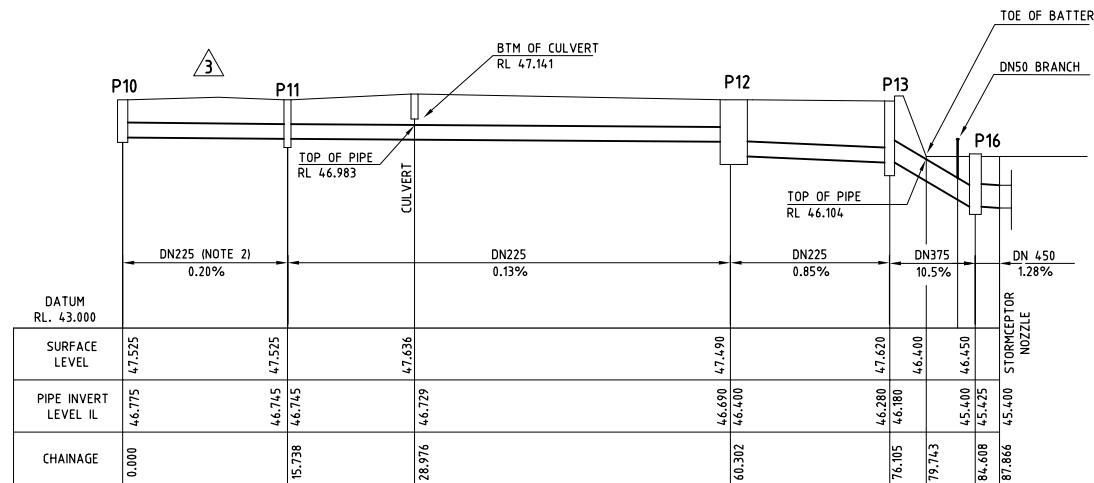
LINE 'B' LONGITUDINAL SECTION

SCALE : HORIZONTAL 1:375
VERTICAL 1:75



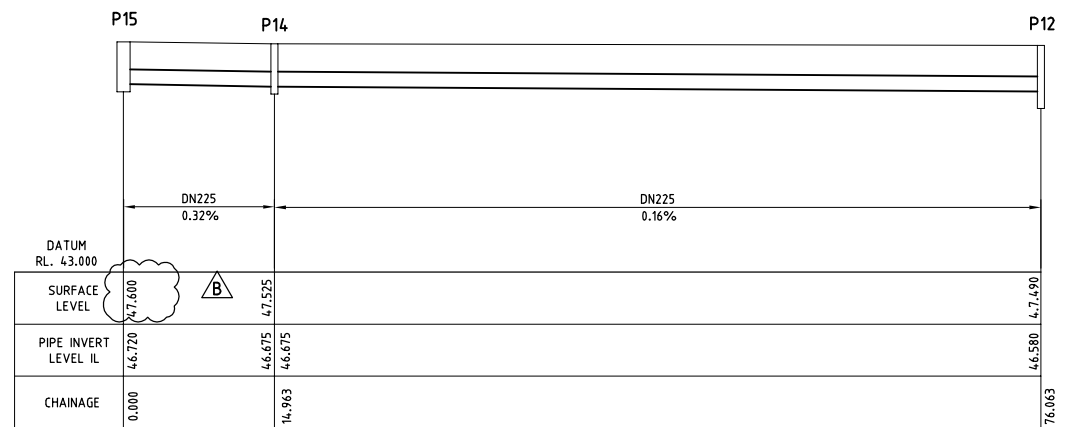
LINE 'C' LONGITUDINAL SECTION

SCALE : HORIZONTAL 1:375
VERTICAL 1:75



LINE 'D' LONGITUDINAL SECTION

SCALE : HORIZONTAL 1:375
VERTICAL 1:75



LINE 'E' LONGITUDINAL SECTION

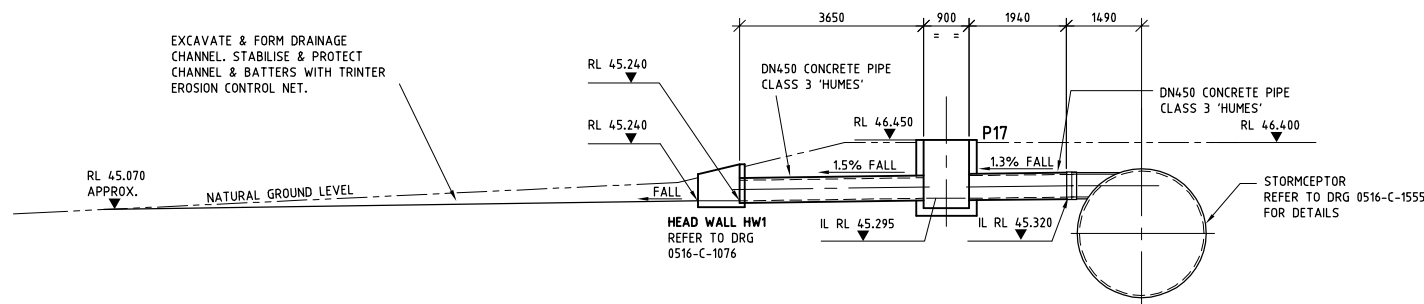
SCALE : HORIZONTAL 1:375
VERTICAL 1:75

NOTES

- FOR GENERAL CONSTRUCTION NOTES REFER TO DWG. 0516-C-1050
- CONCRETE DRAIN PIPES TO BE 'HUMES' CLASS 3 IN THE FOLLOWING SIZES:
-DN225 (279 OD)
-DN375 (445 OD)
-DN450 (534 OD)
EXCEPT BETWEEN PIT P10 & P11, WHERE PIPE SHALL BE DN225 (279 OD) CLASS 4
- NOTE: ALL CHAINAGES ARE IN METRES

REFERENCE DRAWINGS

GENERAL CONSTRUCTION NOTES	0516-C-1050
GENERAL PLANT AREA CIVIL WORKS SETOUT PLAN	0516-C-1054
GENERAL PLANT AREA DRAINAGE LAYOUT	0516-C-1073
DRAINAGE DETAILS SHEET 1 OF 5	0516-C-1074
DRAINAGE DETAILS SHEET 2 OF 5	0516-C-1075
DRAINAGE DETAILS SHEET 3 OF 5	0516-C-1076
DRAINAGE DETAILS SHEET 5 OF 5	0516-C-1078
GENERAL PLANT AREA LIGHT POLES & CABLE TRENCHING CIVIL DETAILS	0516-C-1098



SECTION A
SCALE 1:75 0516-C-1073

FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRAWN	CHECKED	ENGINEER	RELEASED
C	10/01/12	PIPE SIZE WAS 225	RCH	SH	DS	DH
B	22.12.10	SURFACE LEVELS & CABLE TRENCH POSITION REVISED	SH	RCH	DS	MW
A	19.08.10	ISSUED FOR CONSTRUCTION	BB	SH	DS	MW
3	15.4.10	REFERENCE TO DN100 IN LINE D DELETED	SH			
2	15.03.10	ISSUED FOR TENDER	RIB	SV	DS	MW
1	2.03.2010	ISSUED FOR COMMENTS	RIB	SV		

DEVELOPMENT CONSENT NUMBER	
I.C.D. (Asia Pacific) Pty Ltd 152 Bungaroo Road, Pendle Hill, NSW 2145. Phone No.: (02) 9636-3777 Fax No.: (02) 9688-4124 E-Mail Address: icdeng@icdasiapacific.com.au	
CLIENT: ORICA MINING SERVICES	
TITLE: KURRI KURRI AMMONIUM NITRATE EMULSION PLANT	
DRAINAGE DETAILS SHEET 4 OF 5	
ICD JOB No. 0516	ICD CAD FILE No: 0516-C-1077
SCALE: AS SHOWN	A1
DRG. No: 0516-C-1077	REV: C