299 Trahairs Road, Wagga Wagga

Response to Submissions – 07_0146 Mod 1

Integrated Oilseed Processing Plant

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We have prepared this report for the sole purposes of ROBE Pty Ltd ("**Client**") for the specific purpose of the provision of an environmental assessment / response to submissions under Section 75H for an application seeking project Approval under Section 75W of Part 3A of the Environmental Planning and Assessment Act 1979 ("**Purpose**"). This report is strictly limited to the Purpose and the facts and matters stated in it and does not apply directly or indirectly and will not be used for any other application, purpose, use or matter.

In preparing this report we have made certain assumptions. We have assumed that all information and documents provided to us by the Client or as a result of a specific request or enquiry were complete, accurate and up-to-date. Where we have obtained information from a government register or database, we have assumed that the information is accurate. Where an assumption has been made, we have not made any independent investigations with respect to the matters the subject of that assumption. We are not aware of any reason why any of the assumptions are incorrect.

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Overview

As a result of the exhibition process and post exhibition consultation process, the main issues that required further clarification and assessment included visual impact, ridgeline policy, water balance and irrigation concerns.

This document provides information which provides either further assessment, further information and/ or commitments by the developer on the following issues:

- Justification and further information on the bulk and scale of buildings within the development. (page 41)
- Information about the post exhibition community consultation meeting. Issues and outcomes minuted. (Attachment H)
- Waste water irrigation has been abandoned due to operational and climatic issues as well as community concern. Instead a reverse osmosis technology for recycling of water is being proposed (information provided for new process – page 49)
- Visual impact – further field survey and montages created from various vantage points in the area provided with comment. The footprint of proposed development is more compact compared to the currently approved development and actually achieves an improvement of visual impact from some vantage points as some buildings shield and obstruct views through to others and the breadth of the development reduces from some vantage points. (page 34)
- Colour scheme proposed to reflect the landscape for a large part of the year (sandbank) and other non reflective materials.
- Lighting - developer proposes lighting to Australian standards for car park and pathway areas. Developer prepared to apply awnings to the façades of the Solvent Extraction plant due to partial cladding and light escape. (see page 41, and revised Statement of Commitments Attachment G)
- It is considered that this document and the information contained within it, along with the amended Statement of Commitments made by the developer adequately responds to the submissions of the department and agencies and gives confidence to the community about the visual impact of the proposal and developers commitments to mitigate negative impact where required. We trust that a conditional consent may now be granted to ROBE to commence the post approval process in order to construct the facility.

1 Introduction

1.1 Overview of Approved Development

The approved development involved the construction and operation of an Integrated Oilseed Processing and Biodiesel Plant (IOPBP), which included the processing of oilseeds for the production of biodiesel and co-products including vegetable protein meal, refined edible vegetable oil and refined glycerine. The proposed development would have had a manufacturing capacity of 75 million litres (ML) of biodiesel. The development would also generate co-products through the integrated oilseed crushing plant in the volumes 109,500t of meal, 30,000t of refined vegetable oil and 8,460 t of crude glycerine. Manufacturing would have occurred via the PJ Project Engineers Private Limited of Bangalore India – PJPE Process.

The production of these products would occur in the following components which collectively comprised the IOPBP.

- Oilseed crushing plant
- Solvent extraction plant
- Meal Blending Shed
- Vegetable Oil Refinery
- Glycerine refining unit
- Biodiesel plant and
- Storage and Handling facilities

Operation of the IOPBP would have resulted in the generation of wastewater which was to be treated on site and irrigated on adjoining effluent irrigation areas to the north and east of the IOPBP footprint.

The approved IOPBP would operate 24 hours per day, 7 days per week and would provide employment for approximately 79 people.

The project would have required a construction period of up to 60 weeks, which would include site establishment, delivery of raw construction materials and plant and equipment, earthworks and grading, installation of amenities and services and construction of the IOPBP and ancillary structures.

During the peak construction period, up to 300 construction personnel may have been on site. Construction works would have been undertaken between the hours of 7.00 am and 6.00 pm Monday to Friday, and 7.00 am to 4.00 pm Saturday. No construction work would be carried out on Sundays or Public Holidays.

1.2 Overview of Proposed Modified Development

The proposed modified project involves the construction and operation of an Integrated Oilseed Processing Plant (IOPP), which includes the processing of oilseeds for the production of vegetable protein meal and edible vegetable oil.

The project involves the construction and operation of a number of components which collectively comprise the IOPP, including:

- Oilseed crushing plant;
- Solvent extraction plant;
- Meal blending shed;
- Vegetable oil refinery; and
- Storage and handling facilities.

The proposed development would have a yearly manufacturing capacity through the integrated oilseed crushing plant of approximately 90,000 Tonne of vegetable protein meal, 66,000 Tonne of refined edible vegetable oil. Manufacturing will occur utilising the DESMET BALLESTRA process.

Operation of the IOPP as propose in this modification request was to result in the generation of wastewater to be treated on site and irrigated on adjoining effluent irrigation areas located on adjacent land owned by RIVCO Group Pty Ltd to the south east of the site. An agreement had been reached between ROBE and RIVCO Group Pty Ltd which states that RIVCO Group Pty Ltd will accept the treated wastewater for use as irrigation water on their land. However, in view of the unprecedented wet weather, concerns of the nearby community, the NSW Office of Water and the real possibility that continued rain events in subsequent years post operations may result in a plant shut down due to the inability to irrigate treated effluent, ROBE proposes to add additional equipment to recycle a significant portion of the waste water and utilise the proposed effluent storage pond as an evaporative pond to dispose of the effluent that cannot not be recycled. This added modification removes the need to irrigate treated effluent entirely.

The proposed modified IOPP will operate 24 hours per day, 7 days per week, and is anticipated to provide employment for up to 70 people.

The project will require a construction period of up to 60 weeks, which would include site establishment, delivery of raw construction materials, plant and equipment, earthworks and grading, installation of amenities and services and construction of the IOPBP and ancillary structures. During the peak construction period, up to 150 construction personnel may be on site.

1.3 Overview of Environmental Impact Assessment Process

The project requires approval under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and, as such, the Minister for Planning is the approval authority. The proposal is deemed a 'major project' under the EP&A Act. Section 75(F) of the Act requires that, for a major project, a Project Application must be accompanied by an EA prepared by or on behalf of the applicant.

An EA is part of a larger assessment process in which the proponent of a project:

- Identifies a need
- Considers alternatives and identifies a preferred option
- Assesses the likely environmental impacts and identifies mitigation measures; and
- Presents the EA to the Department of Planning (DoP) for public exhibition.

The DoP then;

- exhibits the EA and notifies stakeholders in accordance with statutory requirements;
- seeks comments from other government agencies;
- considers public comments on the EA and prepares an assessment report
- recommending one of the following:
  - support for the proposal in the EA;
  - rejection of the proposal in the EA;
  - support for the proposal, with modifications

In this case, the DoP considered the modifications proposed of the original approved development not to be consistent with the Minister's approval and therefore required a modification to the approval under section 75W of the Environmental Planning and Assessment Act 1979.

Under Section 75H of the EP&A Act, it was determined by DoP that the revised EA would be required to be publicly exhibited for a minimum of 21 days for public review. The submissions received during this period are taken into consideration in the assessment of the proposal.

Section 75H allows the proponent of the project the opportunity to respond to the submissions received and to address the issues raised through existing or new information on the project, or through the modification.

This report represents the following:

- ROBE's response to the submissions raised during the exhibition of the modification to the approved project
- a preferred project report that outlines any proposed changes to the project
- a revised statement of commitments

1.4 Site Location and Footprint of Development

The proposed project site is unchanged and is located approximately 10 kilometres (km) north east of the City of Wagga Wagga, on the corner of Trahairs and Byrnes Roads. The site is known as Lot 1 DP 1000675, 299 Trahairs Road, and has an area of approximately 16.5 hectares (ha), approximately 10.3 ha would comprise the footprint of the IOPP including the area for the evaporative storage pond. Previously the footprint of the development and storage dam covered 16 hectares.

Development Footprint Comparison – Land utilisation		
	November 2008 Approval	Modified proposal
Captive drained area within the site development	135,771m2	103,125m2
Water Storage Pond requirement	25,000m2	Included above
Treated Effluent Irrigation area	250,000m2	Not Applicable
Total	410,771m2	103,125m2

The site has historically been utilised for irrigated crop land using treated wastewater from the adjoining Wool Combing Facility. The area surrounding the proposed site is dominated by rural and rural industrial land uses.

1.5 The Proponent

The proponent for the proposal remains Riverina Oils and Bio Energy Pty Ltd (ROBE).

1.6 Structure of Submissions Report

This Submissions Report has been structured in a manner which clearly sets out the issues raised in each of the submissions on the EA and addresses each issue.

Section 1 Introduction and background to the project and the proposed modifications

Section 2 Summary of the issues raised during the public exhibition of the EA and response addressing each of the key issues. This section includes consideration of recommended conditions of approval for the project.

Section 3 Additional Information

(I) as required by NSW Office of Water

(II) Additional view sheds and comparison of elevation views.

Section 4 Post Exhibition Consultation

Section 5 Conclusion

2 Summary of submissions

2.1 Response to Issues

A total of ten submissions were received comprising one private submission, one submission from a community group and eight responses from government organisations. Each of the issues raised during the public exhibition of the modified EA has been summarised and set out in the table below. It is noted that the author of the private submission is also a member of the community group.

Table 1 follows

Table 1: Summary of Submissions and Response to Issues and Comments

Submission	Comment or Issues	Response
NSW Office of Water	1) The hydro-geological technical report submitted is dated March 2008 and has not been updated to account for the new wastewater storage pond or changes in climatic conditions during 2008 to 2010. The use of average annual groundwater levels and quality data is not adequate to determine seasonal variability of levels and quality within the shallow perched and deeper aquifer; to assess connectivity between these two aquifers; linkage to rainfall; and to establish trigger level criteria. There are a number of NOW monitoring bores within the area which could have been accessed for comprehensive groundwater contours and flow directions to be determined.	**ROBE has abandoned the irrigation of treated effluent in favour of recycling. A new lot layout including waste water treatment plant and reverse osmosis building is included in Attachment A** Mark Mitchell of NOW advised ROBE 1/12/2010 that NOW do not have monitoring bores, or data available that would be relevant for the development site. The access and use of the neighbouring RIVCO property monitoring bore network was considered relevant to the development site. Irrigation Assessment is no longer relevant to the proposal. Technical report – Appendix E - Ground Water Review May 2008 of the original EA, completed by ENSR, is proceeded by the information contained in Section 9.3 Groundwater Attachment B
	2) The establishment of impact assessment criteria section of the EA (Section 6.3) has only used guideline levels for Primary Industries (Irrigation) and given no indication for the level of protection these values represent. Due to salinity being an issue in the Murrumbidgee River Catchment, the ANZECC guidelines for freshwater ecosystems needs to be referred to. The EA states that where trigger levels are not provided, an assessment of variation between years was undertaken. This assessment has not been presented in the EA and there is no indication of the number of samples used and from what locations these samples have been collected and when the samples were taken.	Irrigation assessment is no longer relevant to the development proposal.

Submission	*Comment or Issues*	Response
NSW Office of Water	Using a trigger level for rise in groundwater levels to 3 m or an average 20cm per year over 5 years is inadequate due to the lack of knowledge in the variation of groundwater levels seasonally and connectivity with the perched aquifer which the EA states is located at a depth of approximately 2 metres.	Section 9 to the EA is revised and now forms Attachment B
	3) The site water balance detailing water sources, water consumption, water recycling, and the quantity and quality of waste water streams was not addressed in the EA. The EA did provide information on the stormwater collection, rainfall, holding capacity of the waste water storage dam, and the water requirements for the crops to be irrigated with the waste water. However, there has been no information on the volumes or source of water required for operating the processing facility, estimations of stormwater runoff and a model of this data to provide the information detailing the amount of water in and out of the processing plant for the site balance.	Section 9 to the EA is revised and now forms Attachment B
	4) The monitoring proposed in the Groundwater Management Plan (GMP) for leakage from the wastewater dam on an annual basis is inadequate to detect any impacts to the groundwater from any potential leakage from the dam. **Recommendations** To adequately assess the EA, NOW requires the following documents to be updated for review.	GMP is listed as a management plan as part of the pos approval process and shall be developed in consultation with the NSW Office of Water, DECCW, Wagga Wagga City Council and the Community Liaison Group and then forwarded to the DoP for approval.

Submission	*Comment or Issues*	Response
NSW Office of Water	1) Hydrogeology Technical Report The technical report needs to be updated to include current data from 2008 to 2010 with the following areas to be addressed: a) A map showing the proposed monitoring bores in relation to the wastewater dam including information on bore depths and screen levels, b) Updated hydrographs using raw data not average annual data to show seasonal variability and responses to rainfall to be presented as line graphs not bar graphs, c) Daily rainfall presented to enable comparison with groundwater level d) Graphs showing changes in water quality over the baseline period to show any seasonal and local variations e) Provide groundwater trigger level criteria for all variables based upon guidelines and baseline data, and f) If this data is not available baseline data is to be collected for a period of 2 years for groundwater levels (daily measurements) and quality (monthly and after storm events), to establish variability of groundwater levels and to establish trigger level criteria.	Revised technical information is included in section 9 Attachment B Map is provided Section 9, Page 15 - Attachment B Information is provided as requested. Section 9, page 16 – Attachment B Information is provided as requested. Section 9, page 16 – Attachment B Water quality history is presented based on the monitoring network of RIVCO. Section 9, page 18 – Attachment B Ground water triggers levels to be developed in consultation with NOW and the DECCW. Detection of any pond leakage to result in liner maintenance. Historical data of the surrounding area downstream of the surface and aquifer contours is available. New monitoring bores have been established that will provide to a minimum 60 weeks of additional baseline ground water data prior to effluent entering the evaporative pond of the approved project. Had this been a condition precedent at the November 2008 Development Approval this data would now be available.

Submission	Comment or Issues	Response
NSW Office of Water	2) Site Water balance needs to be determined for all water in and out of the site including the amount and source of processing water. In addition, the Groundwater Management Plan needs amending for the proposed monitoring of the wastewater storage pond for leakage detection. The proposed monitoring on an annual basis needs to be changed to monthly monitoring, to ensure minimum impacts to the groundwater due to leakage are detected. Mitigation and contingency.	Summary of the process water balance follows, • Process Water Required - 590Kl/day • Water lost within the process 240kl/day Effluent for treatment 350kl/day • Effective recycling 300kl/day • Evaporation Pond 50kl/day over 22,000m2 • Make Up Water – 290kl/day Riverina Water County Council Full water balance provided in Attachment C and also provided within Section 9, page 5 Attachment B Ground Water Management Plan, shall be part of the SWMP, which will include leak detection systems beneath the poly liner and above the compacted clay subsurface to provide early warning liner compromise. Bore monitoring leak detection from the proposed waste water dam shall be conducted as required by any conditions of permit and to those procedures agreed in the SWMP. Storm water scheme has been developed in consultation with Christopher Burton of DECCW Albury, designed by MJM Solutions of Wagga Wagga. (Attachment D) Black Water scheme has been developed in consultation with Christopher Burton of DECCW and shall be designed and implemented in accordance with the BCA and Council requirements.
Country Energy	No comment in support or otherwise to the application	Noted
Department	Have "reviewed the modified EA and determined that we able to support	Response to individual conditions in Table 2

of Environment and Climate	the proposal subject to a number of conditions. (Table 2) The conditions relate to the proposed development and should any	
Submission	**Issue**	**Response**
Change and Water DECCW	part of the development be modified either by the applicant prior to the granting of consent or as a result of the conditions proposed to be attached to the consent, DECCW request to be consulted about the changes prior to consent being issued. Environmental Protection License 13097 was granted to the proponent for Stage 1 of the development. The proponent will need to make a separate application to DECCW to vary their license to allow further development.	Water recycling by reverse osmosis technology has been discussed with Christopher Burton of the DECCW leading to favourable outcomes in regard to sustainable operating conditions. Accepted
NSW Rural Fire Service	The NSW Rural Fire Service has no Bush Fire concerns with the proposed Oilseed Processing Plant we would however recommend that appropriate industrial fire fighting equipment be provided at the site to prevent a fire from spreading to adjacent lands.	Accepted recommendation
RTA	The RTA has reviewed the revised development proposal and notes that the current proposal represents changes to the original proposal through the deletion of several components of the original proposal. From the information supplied this modified proposal does not represent any significant traffic related impacts when compared with the original proposal The RTA has assessed the development application and the supporting information supplied and notes the recommendations of the Traffic & Transport section and the Statement of commitments of the Environmental Assessment report, dated August 2010, prepared by Lennon Salvestro Planning and would raise no objection to the development as proposed subject to the following comments being considered in the assessment of the development proposal for road safety reasons: (Detailed in Table 2)	Noted Received and detailed responses in Table 2

Submission	Comment or Issues	Response
Riverina Water and County Council	To assist Riverina Water to determine potential impacts to our water supply system and to determine the headworks' contributions, is it possible to ascertain the following water supply information from ROBE's modified development proposal, i.e. excluding the biodiesel component.	A meeting between ROBE and RWCC occurred on 19th November 2010 where RWCC confirmed the supply of water to the IOPP in the quantities illustrated did not impact the operations of RWCC.
RWCC	• Peak day's water demand (i.e. kilolitres per day) • Peak instantaneous water demand (i.e. litres per second) • Daily patterns of use (i.e. 24 hour operation, 7 day operation etc.) Annual water demand (i.e. mega litre per year)	See EA amended Section 9 (Attachment B)
NSW Industry and Investment	I&I NSW support the nominated monitoring program as a means of early detection of trends thereby allowing some technical assessment of existing management practices. The proposal not to apply effluent to pasture/grazing situations but rather to cropping areas is also highly supported.	Noted
Eunony Valley Resident **Mathew Howard**	1. There is a significant local environmental impact difference between the initial road submission and the current R.O.B.E submission. The most significant of these is noise, pollution and visual impact. In the initial documentation there was to be one 27metre high silo. There will now be in excess of seven buildings that are more than 27 metres high. This represents a significant visual impact for a massive area of north Wagga. These buildings will be able to be seen far and wide. There is not enough detail in the planning submission to document how this visual impact is to be mitigated.	Findings of the Heggies noise report Appendix E of amended EA: • Results of noise predictions, for operation of the Project Site, indicate that compliance with the noise criteria set in accordance with the INP is likely for calm and adverse weather conditions. • Noise from construction of the plant is predicted to comply with the DECCW construction guidelines. • Traffic generated by the operation is predicted to meet the requirements of the Environmental criteria for road traffic noise. (ECRTN) Section 3.1 gives more detail of Proposed Site elevations for comparison of the approved development and revised development clearly indicating the changes to the development, and view sheds north east west and south are also included for comparisons

Submission	Comment or Issues	Response
Eunony Valley Resident	2. Further to the last point, there is a significant change in activity in regards to the plant. At first Biodiesel was to be produced. Now oilseed is to be crushed. With this change, pollution will increase.	The activities of the IOPP are very similar to the original project, other than the removal of a Trans Etherification Unit and a Methanol Storage and Rectification Plant deleted with Bio-Fuels production. It is noted that the proposal now introduces a reverse osmosis waster water treatment facility.
Mathew Howard	3. Whilst environmental studies have been undertaken to assess noise and noxious odour impact, the weather station that these calculations have been based on is at a locality known as Forest Hill. Forest Hill is between these two localities. The topography is completely different. Therefore weather figures from Forest Hill cannot be extrapolated to Bomen. Therefore any estimation from the R.O.B.E. submission regarding these issues is false.	The findings of the Heggies report, a consultant accepted by DoP within the odour report (Appendix D to original EA) follow: "No identified receptors were predicted to experience odour above 1.0 OU/m3, indicating that odour impacts at the surrounding residential properties are predicted to be lower than the relevant DECCW odour assessment criterion" As required by the current EPL license a weather station approved by DECCW has been installed at the site to monitor any impacting conditions during any approved construction, and those conditions post construction of the proposed plant It is noted that during construction activities of Stage 1 works "Earthworks and Site Prep" that no community complaints were received in regard to any environmental impacts for noise, dust or traffic management.
	4. Water is a significant issue in this development. The resubmission suggests that water usage will exceed 174 mega litres a year. There will be construction for a 40 mega litre dam only. Therefore the shortfall will have to be made out of local water supplies. Until we had recent, decent rain the water table level in Wagga had fallen to catastrophic levels. Further west of Wagga, towns are importing water. I do not think that water usage of this scale is sustainable without provisions for further water salvage	ROBE have recognised the community preference for recycled water and lack of support with an irrigation of treated effluent scheme and have included a recycling plant capable of recovering 300ml per day. It is now anticipated that 95.7Ml of process water will be purchased from Riverina Water County Council (RWCC) per annum to maintain process water balance. RWWC consider the supply of water to ROBE in the quantities and flow rates suggested in the proposal will not affect the capacity of the agency to supply water to current and future users of the area.

Submission	Comment or Issues	Response
Mathew Howard	These issues are serious. If you are remotely interested in environmental impact then this company must be made to provide more water storage. It must be made to mitigate the effects of ridge line development. It must be made to mitigate pollutants, odour and noise.	
Eunony Valley Association Incorporated (EVA)	Key points of the objections and concerns raised by Mr Bill Schulz representing the Eunony Valley Association Incorporated are inserted to the comments and issues register. The complete document is provided as Attachment E **"**The WWCC LEP states there will be no development on ridgelines"	Reference to "no development on ridgelines" is not found within the Wagga Wagga LEP 2010. **From LEP Land Use Table** **The site is Zoned IN1 General Industrial** **From LEP 2010** ***4.3 Height of buildings*** **The objectives of this clause are as follows:** **to enhance the vitality of Wagga Wagga city centre by facilitating medium and high density residential, commercial and retail development in a co-ordinated and cohesive manner,** **to ensure the height of buildings complements the streetscape and character of the area in which the buildings are located,** **to encourage mixed use development with residential components that have high residential amenity and active street frontages,** **to ensure the height of buildings preserves the amenity of neighbouring properties in terms of visual bulk, access to sunlight and privacy and permits adequate sunlight to key areas of the public domain.** **The height of a building on any land is not to exceed the maximum height shown for the land on the height of buildings map.** This clause is clearly applicable to the city centre and to medium density residential and commercially zoned sites throughout the city. There is no reference to industrial land within the sub clauses and no maps restricting heights of buildings within this zone.

		The Draft Wagga Wagga Bomen Development Control Plan (Urban Release Area) 2010 seeks to protect ridgelines as visual aspects of Bomen. The ridgeline is depicted on the western side of the railway line adjacent to the site but for all intent and purpose the site is located on or nearby the ridge. For further comment regarding the DCP see View shed paragraphs below. A detention pond is to be used for the retention and treatment of contaminated stormwater and to ensure that the rural runoff rate is maintained for this property by calculated detention. Water to be used in the process is to be sourced directly from Riverina Water and a water recycling process will be implemented. The calculations used to determine the capacity of the proposed storage dam has been prepared by MJM solutions (Attachment D)

Submission	Comment or Issues	Response
Eunony Valley Association Incorporated (EVA)	"The first proposal stated that ROBE would use 175 mega litres (ML) of water, there is no mention of using less in the DA, however it now says it will only use 125ML with no mention of how or why the reduction. The 40ML storage dam will hold 1/4 to 1/3 of the annual usage levels. There is no calculation of the hard surface run-off and how that is going to be dealt with."	In response to the unusual climatic conditions of 2010 and EVA concerns it has been considered prudent to abandon the irrigation component of the proposal due to the risks of having to close the plant down where irrigation cannot be carried out and water storage capacities exceeded. For more detail refer to the redrafted section 9 (Attachment B)
	The irrigation requirements are not calculated accurately. Considering Wagga's winter rainfall pattern and reliability there is no economic benefit to irrigate between May and October, irrigating in winter would actually create immediate run-off most years. This leaves a 6 month window of opportunity to irrigate.	Irrigation assessment is no longer relevant to the proposal.
	"There is 25 hectares proposed to be irrigated. This is on sloping land that will create runoff.	Irrigation assessment is no longer relevant to the proposal.
	"The site is in the extreme SE corner of land owned by RIVCO (who is leasing the area to ROBE). Any run-off will go into the neighbour's property as there is no catchment plan for excess run-off. It is a requirement that all water tailings (run-off from irrigation) has to be controlled, collected and recycled; there is no plan of this"	Irrigation assessment is no longer relevant to the proposal.
	"The 25 hectares set aside for irrigation is not large enough."	Irrigation assessment is no longer relevant to the proposal.
Eunony Valley Association Incorporated	"The social impact statements in regard to the community are minimalistic and flawed. Firstly the Receptor locations do not cover the 360 degrees affected by this project. I am a landholder within 3km of the site and yet	Accepted that a number of receptors are not included in the study area. Many receptors have been deemed beyond the study area for Noise

(EVA)	my property is not marked on the various maps covering Odour, Noise, Dust or Lighting. There are several other properties that have not been identified or recognized in this report either. See attached maps showing the residences that we are aware of within 6km of the proposed site.	Odour and Dust as they would not be impacted. The technical reports (Appendixed in the original EA and the amended EA concur with this assessment). Lighting shall be installed to all relevant Australian Standards for maintaining a Safe working Environment and for generally illuminating carriageways, walkways and parking areas. The Fittings shall be selected to ensure the most effective management of this energy by minimising light shed past the area required to be illuminated. The Solvent Extraction Plant is partly fixed wall and partly open to allow for adequate ventilation. There will be some light leaving this building for this reason and it will be operating 24 hours per day. To mitigate light intrusion in the direction of sensitive receptors to the east and north of the development the proponent is prepared to hood the eastern façade openings to direct light to the ground. Additional view sheds of the development are included as part of the view shed section 3 within this report. The proponent will undertake an evaluation of landscaping options for those receptors where site screening may have minimal effect. This will occur in consultation with the affected land holders. It is suggested that a condition of consent be applied that seeks landscape plans to be approved by the DOP and then landscape works constructed within 3 months of the project approval. This will ensure that mitigation works are completed well before construction has become visually prominent. Such landscaping will also prove beneficial when further development occurs in the Bomen precinct.
WAGGA WAGGA CITY COUNCIL	"Since the NSW Department of Planning issued the Initial Consent to the subject development on 7th November 2008, three significant strategic land use planning and development plans designed to	

WAGGA WAGGA CITY COUNCIL WWCC	achieve appropriate land use outcomes and economic development require consideration, namely; • The Bomen Strategic Master Plan adopted on 14th December 2009 provides the strategic framework for industrial development at the Bomen Business Park over the next 30 Years • The Wagga Wagga Local Environmental Plan 2010, made on 16th July 2010 identifies the subject land as an Urban Release Area and zones the subject land IN1 Industrial. A development control plan is a pre-requisite to issuing development approval The Council exhibited the draft Wagga Wagga Bomen Development Control Plan on 6th September to 4th October 2010. All submissions received are currently being assessed. The land to be developed for the processing facility is affected by the draft plan. Draft controls refer to the need to protect the adjacent rural landscape and existing residential amenity attached • It is intended to prepare a report to the December Council Meeting seeking the adoption of the plan. Once adopted, it will become a chapter in the Wagga Wagga Development Control Plan."	Accepted that the Bomen Strategic Master Plan was adopted post the original Project Approval. Accepted that the Wagga Wagga LEP 2010 was made post the original Project Approval. **From the Wagga Wagga LEP 2010,** **Part 6, Clause 6.3(2)** ***"Development Consent must not be granted for the development on land in an urban release area unless the development control plan that provides for the matters in subclause (3) has been prepared for the land.*** A Draft Wagga Wagga Bomen Development Control Plan has been prepared and was referred to Council to be adopted / in December 2010, however the Council decided to defer the DCP and continue consultation. In general the purpose of the DCP is to: [Clause 1.8 Purpose of DCP, dot point 4] "To provide for sustainable staged development which respects and responds to availability of services, landscapes and heritage management objectives and appropriate stormwater management. "

Submission	Comment or Issues	Response
WAGGA WAGGA CITY COUNCIL WWCC		1.9 Guiding Principles, "GP3 – *1.* Design for compatibility with landform, stormwater catchment and management, services, heritage and archaeology, subdivisions and transport services" Comment/response: The site is compatible with the landform as there is very little cut and fill required due to the relatively flat nature of the site. Some forming of the eastern section of the site will occur to construct the detention basin which will assist in storm water control and the evaporative storage pond for the disposal of treated effluent. In relation to visual amenity the draft DCP seeks to: 3.1 Site Topography and Landscape Character **Objectives** O1 - To require new development to respond to site features including topography, important features, vegetation and creek lines O2 - To avoid adverse impact upon land with development limitations **Controls** C1 – Retain existing vegetation along the Olympic Highway and along creek lines and all other treed locations indicated on the Site Topography and Landscape Character diagrams C2 – Protect ridgelines as visual features of Bomen C3 – Roads and pathways should run predominantly along the contours of the land. Comment / response: Existing vegetation strips along the boundaries of the site are being maintained and enhanced.

		The above control C2 was only inserted into the draft DCP after public consultation period. The draft DCP remains in consultation with this condition uncertain. It is considered a threat to the industrial park to have this clause implemented as the ridgeline exists adjacent to the railway line and on flat land which are both crucial to the viability and functionality of the industrial park. No further public roads are proposed and internal roads will be appropriately sealed and drained to assist in dust suppression and storm water management. It is accepted that some buildings have increased in height and at the same time the size of the seed storage silos has decreased. See View Shed paragraphs below for further detail. As a result of a more condensed development footprint, the layout of buildings and infrastructure of the modified proposal has minimised affected views of the proposed development viewed from the east or west. View of relative infrastructure from the north and south of the development site has been altered; however, affected views have changed little from the approved development. (See elevation comparisons in section 3 below). In relation to sewerage and stormwater management the DCP seeks to: 4.2 Sewage and Effluent Disposal **Objectives** O1 – To ensure that all new development is connected to reticulated mains sewer in advance of development occurring to the land

Submission	Comment or Issues	Response
WAGGA WAGGA CITY COUNCIL **WWCC**		**Controls** C1 – The developer shall be responsible for providing reticulated mains sewer to the allotments, including associated pumping stations to the satisfaction of Council. C2 – Sewerage and Drainage provision should be installed in accordance with appendix A, of part 2 "Service Areas" of the city of Wagga Wagga Development Services Plan for Sewerage 2007 where this plan is applicable, and the map appendix A included in part 2 Service Area of the City of Wagga Wagga Development Servicing Plan (DSP) for sewerage covers the Bomen Urban Release area C3 – The map in appendix C included in Part 2 Area of Land to which the policy applies of the City of Wagga Wagga Development Servicing Plan (DSP) for drainage covers the Bomen Urban Release area Comment /response: controls noted and will likely be carried across into development consent conditions and then complied with by the developer. Currently ROBE intend to maintain the overland stormwater to the rural runoff rate, later providing infrastructure to connect storm waters exiting the site to future storm water systems of the Bomen Industrial Estate. ROBE are going to install a packaged black water treatment plant on site with provision to bypass this unit once reticulated sewer mains are installed to the Bomen site. The developer understands that future contributions may be required to facilitate the community stormwater and sewer

schemes.

In relation to Industrial Development the plan seeks to:

9.0 Industrial Development

"Development for industrial uses will form the majority of new development within Bomen. This section gives details about specific design and layout aspects that describe Bomen"

9.1 Industrial Development Design Principles

P1 – Development is to be suited to its site in terms of the nature of the use, the relationship to adjoining uses and the availability of land for industrial development

P2 – Development should be consistent with the principles of industrial ecology.

Submission	Issue	Response
WAGGA WAGGA CITY COUNCIL **WWCC**		**9.13 – Development adjacent to Rural Zones** Industrial sites that are close to rural areas need to take special care to avoid impacts on rural land use and outlooks. These controls apply to sites that adjoin or are opposite to rural land zones. Comment/ response: It is considered that this development is a direct extension of and in keeping with the other industrial developments existing to the south (e.g. Woolcombers, Renewed Metal Technologies, Buckman Chemical Laboratories)., Environmental impacts are being kept to a minimum and the recent introduction of water recycling into the proposal is directly in keeping with ESD principles. The site is not directly adjoining rural lands; however it can be viewed by rural lifestyle properties particularly from the north west and north east / east. The developer is committed to reducing outlook impacts as much as possible by implementing landscape treatments both on and off site.
	More specific matter in relation to the application that are considered to be of particular relevance or concern are *1.* The increased height of a number of buildings that may have significant impact on the landscape and should be carefully considered. Whilst a greater height minimises the likely odour impacts there are also visual and amenity issues to consider, particularly with regard to the location of the buildings on existing elevated land as it may have a negative impact on the existing natural and physical landscape and visual amenity.	1. For more detail on height of buildings response read View Shed section 3 below.

	2. Odour from the plant has the potential to adversely impact on neighbouring properties. In this circumstance, Council will rely on the application of controls by the DECCW ensuring all necessary standards are adhered to the plant commencing works and during operations. 3. Lighting of the plant may introduce a significant and adverse change to the rural environment. Measures should be considered to that minimise light spillage towards rural properties. Consideration should be given to the height to which light is allowed to be placed on taller buildings. 4 The extensive construction period has the ability to impact on surrounding properties. Consideration should be given to the development of Environmental and Construction Management Plans to ensure that such impacts, especially noise are minimised.	2. Comment is noted 3. Lighting shall be installed to all relevant Australian Standards for maintaining a Safe working Environment and for generally illuminating carriageways, walkways and parking areas. Fittings shall be selected to ensure the most effective management of this energy by minimising light shed past the area required to be illuminated. 4. Comment is noted – construction noise in particular has been covered in the technical report and impacts are considered minimal. Council and the DOP and DECCW will have the opportunity to comment on the Environmental Management Plans as they are prepared. The Industrial Noise Policy and associated safeguards will apply to this development in terms of monitoring and accountability for noise control and amenity.
NSW Rural Fire Service	The NSW Rural Fire Service has no Bush Fire concerns with the proposed Oilseed Processing Plant we would however recommend that appropriate industrial fire fighting equipment be provided at the site to prevent a fire from spreading to adjacent lands.	Accepted recommendation
RTA	The RTA has reviewed the revised development proposal and notes that the current proposal represents changes to the original proposal through the deletion of several components of the original proposal. From the information supplied this modified proposal does not represent any significant traffic related	Noted

	impacts when compared with the original proposal The RTA has assessed the development application and the supporting information supplied and notes the recommendations of the Traffic & Transport section and the Statement of commitments of the Environmental Assessment report, dated August 2010, prepared by Lennon Salvestro Planning and would raise no objection to the development as proposed subject to the following comments being considered in the assessment of the development proposal for road safety reasons: (Detailed in Table 2)	Received and detailed responses in Table 2
Riverina Water and County Council **RWCC**	To assist Riverina Water to determine potential impacts to our water supply system and to determine the headworks contributions, is it possible to ascertain the following water supply information from ROBE's modified development proposal i.e. excluding the biodiesel component: • Peak day's water demand (i.e. kilolitres per day) • Peak instantaneous water demand (i.e. litres per second) • Daily patterns of use (i.e. 24 hour operation, 7 day operation etc.) • Annual water demand (i.e. mega litre per year)	A meeting between ROBE and RWCC occurred on 19th November 2010 where RWCC confirmed the supply of water to the IOPP in the quantities illustrated did not impact the operations of RWCC See redrafted Section 9 (Attachment B)
NSW Industry and Investment	I &I NSW support the nominated monitoring program as a means of early detection of trends thereby allowing some technical assessment of existing management practices. The proposal not to apply effluent to pasture/grazing situations but rather to cropping areas is also highly supported.	Noted

2.2 Response to recommended Conditions

A number of the submissions made by government agencies contained recommended conditions for the construction and operation of the IOPP, the result of the modifications. The following table summarises these recommended conditions and provides for comments where appropriate.

Table 2 follows

Agency	Recommended Condition	Response
Department of Environment, Climate Change and Water DECCW	Condition A1 – Information supplied to the EPA	Agreed
	Condition L1.1 – Pollution of Waters	Agreed
	Condition L5.1 – Waste	Agreed
	Condition L5.2 – Waste	Agreed
	Condition L6.1 – Noise Limits	Agreed
	Condition L6.2 – Noise Limits	Agreed
	Condition L6.3 – Noise Limits	Agreed
	Condition L6.4 – Hours of Operation	Agreed
	Condition L6.5 – Noise Compliance Monitoring	Agreed
	Condition L6.7 – Construction Noise Management Protocol	Agreed
	Condition L6.8 – Compliance Assessment – Noise	Agreed
	Condition 6.10 – Compliance Assessment Air	Agreed
	Condition 6.11 – Compliance Assessment –Odour	Agreed
	Condition 6.12 – Compliance Assessment –Air	Agreed
	Condition O1 – Odour Emissions	Agreed
	Condition O2.1 – Dust	Agreed
	Condition O3.1 – Stormwater/sediment control – Construction Phase	Agreed
	Condition O4.1 – Stormwater/sediment control – Operation Phase	Agreed
	Condition O5 – Emergency Response	Agreed
	Condition O6.1 – Effluent application to land	Agreed
	Condition O6.2 – Effluent application to land	Agreed
	Condition O6.3 – Effluent application to land	Agreed
	Condition M1.1 – Monitoring records	Agreed
	Condition M1.2 – Monitoring records	Agreed

	Condition M1.3 – Monitoring records	Agreed
Department of Environment, Climate Change and Water DECCW	Condition M2 – Requirement to monitor concentration of pollutants discharged	Agreed
	Testing Methods – Concentration limits	Agreed
	R1.1 Reporting Conditions	Agreed
	Mandatory Conditions for all EPA licenses	Agreed
RTA	The intersection of Byrnes Road and Trahairs Road shall be designed and constructed to provide for a sealed Channelised Right Turn (CHR) and Auxiliary Left Turn (AUL) treatment in accordance with the Austroads Guide to Traffic Engineering Practice – Part 5; Intersections at Grade for the prevailing speed limit and to cater for largest size vehicle likely to access the subject site. The pavement standards are to be in accordance with the RTA requirements for the proposed turning traffic	Agreed
	As the development is proposed to be operated 24 hours per day the intersection of Byrnes Road and Trahairs Road is to be illuminated in accordance with AS1158 - Lighting for roads and public spaces and the Austroads Guide to Road Design series.	Agreed
	The proposed emergency access to Byrnes Road is to be located so as to comply with the required Safe Intersection Sight Distance (SISD) in either direction in accordance with the RTA's Road Design Guide and/or relevant Australian Standards for the prevailing speed limit (currently 100 Km/H). Compliance with this requirement is to be certified by an appropriately qualified person prior to construction of the vehicular access.	Agreed
	Any gates located at the access driveways to the site from Trahairs Road and Byrnes Road are to be located a minimum of 30m into the site from the road reserve. This is to allow for storage of long vehicles off the road reserve if the access gates are closed.	Agreed

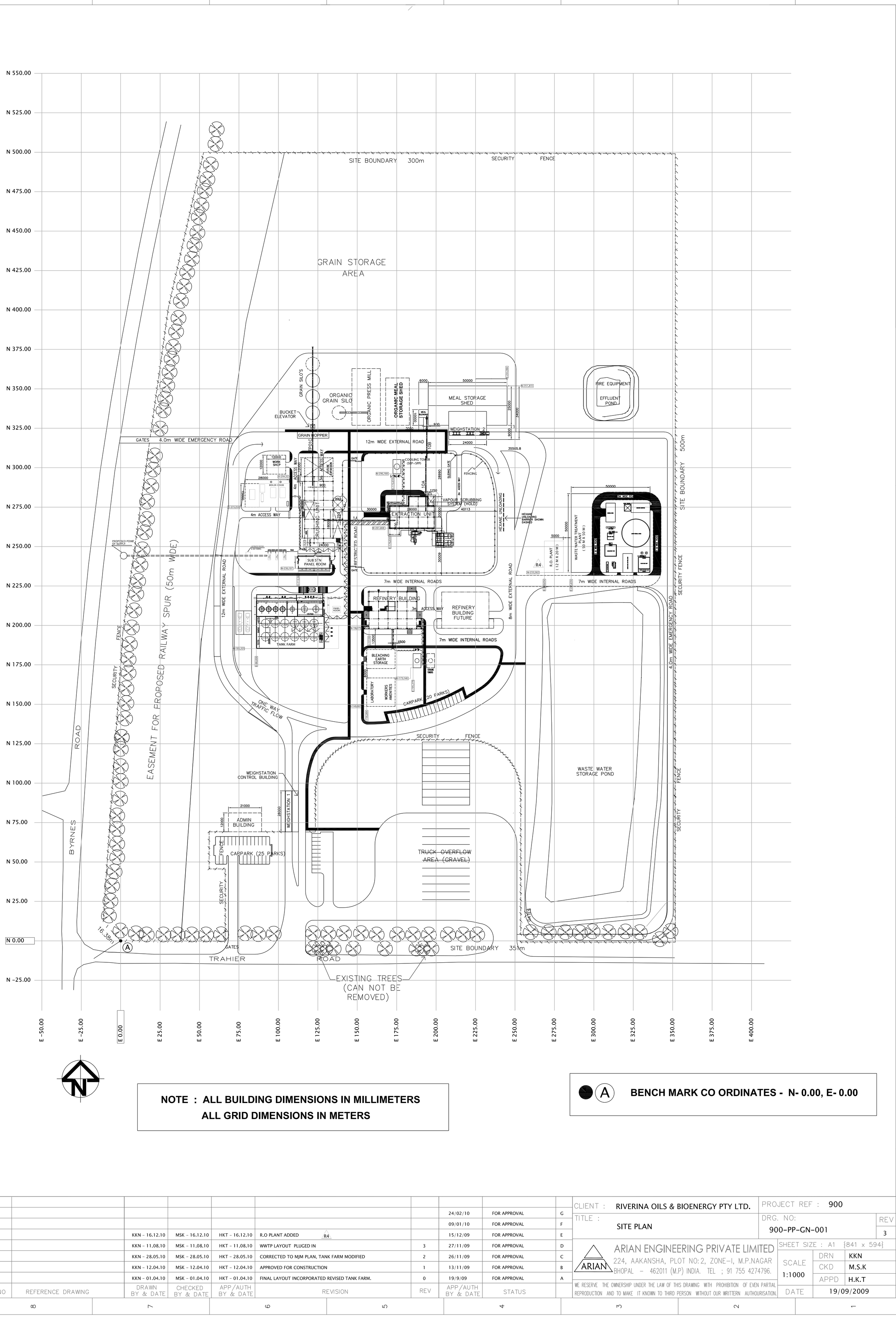
Agency	Recommended Condition	Response
RTA	Any driveway shall be sealed from the edge of seal of the carriageway to the entry gate or the property boundary whichever is the greater. This is required to prevent deterioration of the road shoulder and the tracking of gravel onto the roadway. The remainder of the driveway access should be constructed using an all weather surface to address maintenance and dust concerns.	Agreed
	Any access driveway is to be designed and constructed to prevent water from proceeding onto the carriageway of the adjoining road reserve	Agreed
	Stormwater run-off from the subject site onto the adjoining road reserve as a result of the proposed development is not to exceed the existing level of run-off from the subject site. Suitable provision should be made to retard any increased storm water run-off from the site.	Agreed
	The provision of on-site car parking spaces associated with subject development is to be in accordance with Council requirements. All car parking spaces required by the development are to be provided on site and not to be compensated by the on-road parking in the vicinity.	Agreed
	The internal layout for vehicular movement and parking including driveway design and location, internal aisle widths, parking bay dimensions and loading bays are to be in accordance with AS 2890.1-2004 "Off-street car parking" and AS 2890.2-2002 "Off-street commercial vehicle facilities "to a width and standard to accommodate the largest size vehicle likely to access the subject site.	Agreed
	The swept path of the largest vehicles entering and exiting the subject site and manoeuvrability through the site is to be in accordance with AS 2890.2-2002 "Off-street commercial vehicle facilities" and to Councils satisfaction and in a manner to allow all vehicles to be able to enter and exit the subject site in a forward direction	Agreed

Agency	Recommended Condition	Response
RTA	Appropriate directional signage and line marking is to be strategically located and maintained throughout the site to assist in directing vehicles around and through the facility.	Agreed
	A construction management plan, to address construction activity access and parking, is to be prepared to ensure that suitable provision is available on site for all vehicles associated with the construction of the development to alleviate any need to park within, or load/unload from, the surrounding public road network. Access to the site for construction purposes is to be from Trahairs Road only. Appropriate signage and fencing is to be installed and maintained to effect this requirement.	Agreed
	Any works associated with the proposed development shall be at no cost to the RTA.	Agreed

3 ADDITIONAL INFORMATION

3.1 View shed and further Visual Impact Assessment

With the deletion of the irrigation component and introduction of the reverse osmosis recycling facility, these new components of the development have been considered in terms of visual impact. (Refer to Attachment A). The size of building required to house the osmosis equipment (12 m x 20 m x 4.5 m height). Due to the relative size and placement of this building on the site between the waste water treatment plant and the extraction plant, its visual impact is considered to be negligible. The photo montages remain unmodified to include the osmosis building for this reason.



NOTE : ALL BUILDING DIMENSIONS IN MILLIMETERS
ALL GRID DIMENSIONS IN METERS

A — BENCH MARK CO ORDINATES - N- 0.00, E- 0.00

NO	REFERENCE DRAWING	DRAWN BY & DATE	CHECKED BY & DATE	APP/AUTH BY & DATE	REVISION	REV	APP/AUTH BY & DATE	STATUS	
							24/02/10	FOR APPROVAL	G
							09/01/10	FOR APPROVAL	F
		KKN - 16.12.10	MSK - 16.12.10	HKT - 16.12.10	R.O PLANT ADDED R4		15/12/09	FOR APPROVAL	E
		KKN - 11.08.10	MSK - 11.08.10	HKT - 11.08.10	WWTP LAYOUT PLUGED IN	3	27/11/09	FOR APPROVAL	D
		KKN - 28.05.10	MSK - 28.05.10	HKT - 28.05.10	CORRECTED TO MJM PLAN, TANK FARM MODIFIED	2	26/11/09	FOR APPROVAL	C
		KKN - 12.04.10	MSK - 12.04.10	HKT - 12.04.10	APPROVED FOR CONSTRUCTION	1	13/11/09	FOR APPROVAL	B
		KKN - 01.04.10	MSK - 01.04.10	HKT - 01.04.10	FINAL LAYOUT INCORPORATED REVISED TANK FARM.	0	19/9/09	FOR APPROVAL	A

CLIENT : RIVERINA OILS & BIOENERGY PTY LTD.

PROJECT REF : 900

TITLE : SITE PLAN

DRG. NO: 900-PP-GN-001

REV 3

ARIAN ENGINEERING PRIVATE LIMITED
224, AAKANSHA, PLOT NO: 2, ZONE-I, M.P.NAGAR
BHOPAL - 462011 (M.P) INDIA. TEL ; 91 755 4274796.

SHEET SIZE : A1 {841 x 594}

SCALE 1:1000

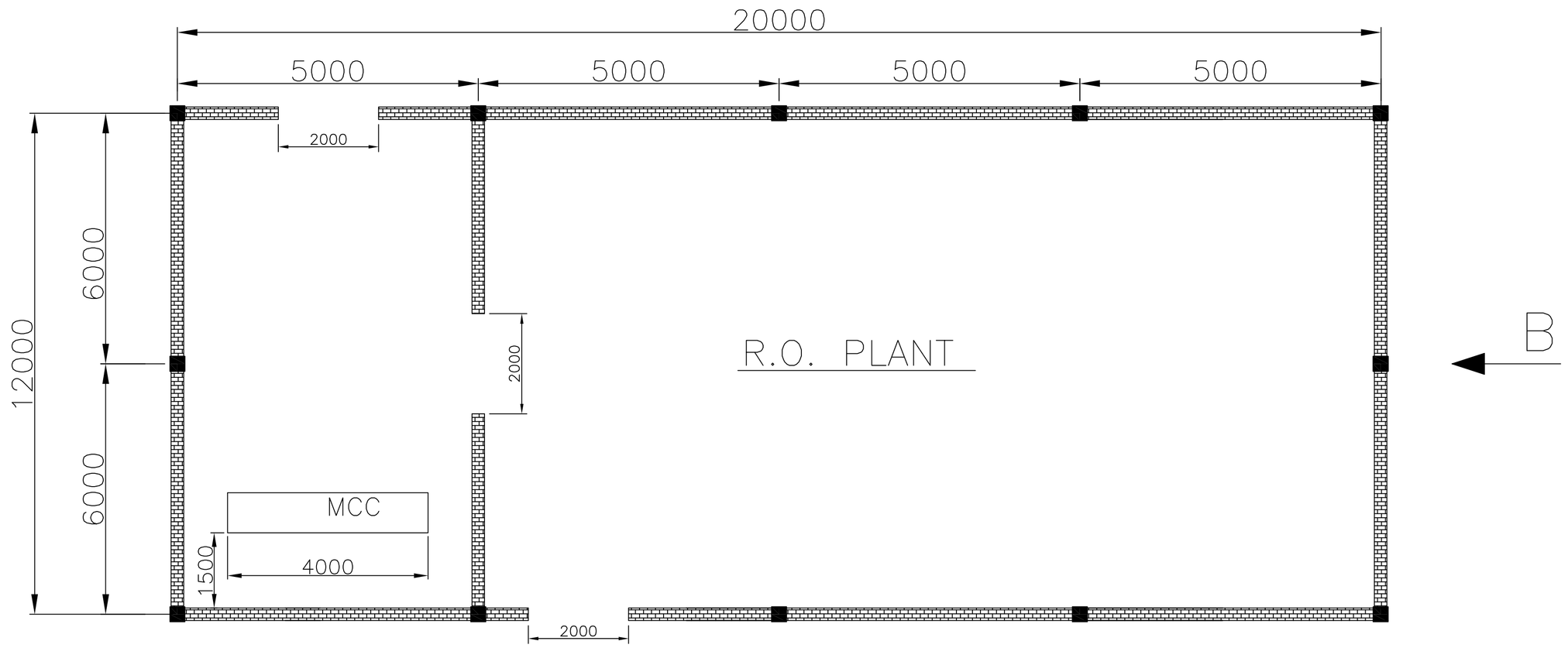
DRN KKN

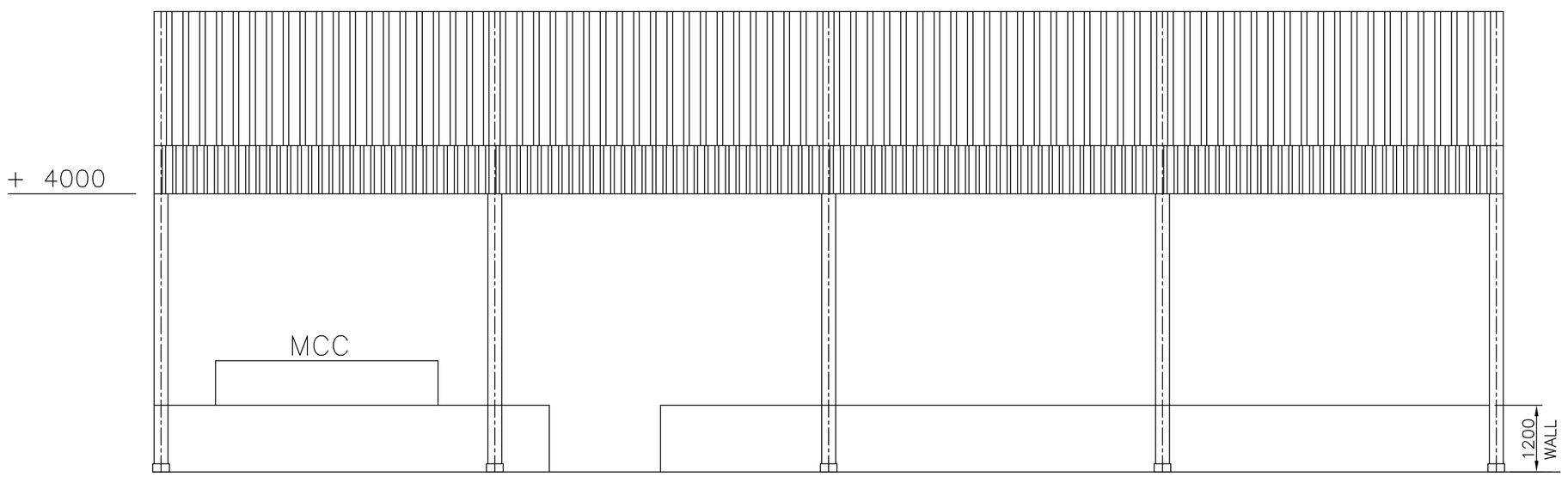
CKD M.S.K

APPD H.K.T

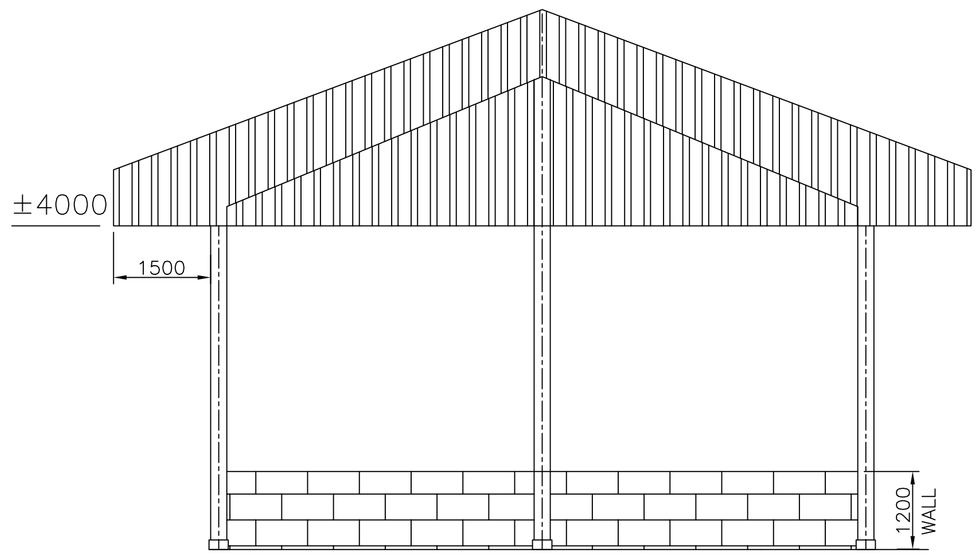
DATE 19/09/2009

PLAN





VIEW – "A"



VIEW – "B"

NO	REFERENCE DRAWING	DRAWN BY & DATE	CHECKED BY & DATE	APP/AUTH BY & DATE	REVISION	REV	DRAWN BY & DATE	CHECKED BY & DATE	APP/AUTH BY & DATE	REVISION	REV	APP/AUTH BY & DATE	STATUS
							KKN/16 12 2010	M.S.K/16 12 2010	H.K.T/16 12 2010	FOR EXECUTION	RO	H.K.T/16 12 2010	FOR APPROVAL
													A

CLIENT : RIVERINA OILS & BIOENERGY PTY LTD.

PROJECT REF : 900

TITLE : REVERSE OSMOSIS PLANT LAYOUT.

DRG. NO: 900 – L – UT – 005

REV 0

SHEET SIZE : A1 {841 x 594}

ARIAN ENGINEERING PRIVATE LIMITED

224, AAKANSHA, PLOT NO:2, ZONE–I, M.P.NAGAR
BHOPAL – 462011 (M.P) INDIA. TEL ; 91 755 4274796.

SCALE	DRN	KKN
NTS	CKD	M.S.K
	APPD	H.K.T
DATE	16/12/2010	

Three submissions raised concerns about the scale of the development and the impact that this development will have on visual amenity and the natural landscape. The submissions were from a land holder whose property and home will have direct views from distance across the landscape to the site, another is from the Eunony Valley Association (local community group of which the land holder above is a member) and the local Council. The issues raised in the submissions included:

3.2.1 The question as to whether the application satisfied the Council's standards in terms of buildings on the ridgeline.

3.2.2 Increase in number of structures above 27 metres in height.

3.2.3 Lack of detail in the proposal to document how the visual impact would be mitigated.

3.2.4 Whether buildings could be rationalised for height and bulk.

3.2.5 The question was raised as to the methodology behind the sites that were visited and assessed in the visual impact assessment vs. the number of receptors that exist in the locality.

ROBE's response to the above is detailed below:

3.1.1 Councils Standards

While there is no statutory reference within the Council's LEP to development on ridgelines, under the heading of "Site topography and landscape character" the Draft Wagga Wagga Bomen Development Control Plan (Urban Release Area) 2010 does state the following:

Objectives

O1 To require new development to respond to site features including topography, important aspects, vegetation and creek lines.

O2 To avoid adverse impact upon land with development limitations.

Controls

C1 Retain existing vegetation along the Olympic Highway and along creek lines and all other treed locations indicated on the Site Topography and Landscape Character diagrams.

C2 Protect ridgelines as visual features of Bomen.

C3 Roads and pathways should run predominantly along the contours of the land.

This DCP was due to be made in December 2010, however, at time of writing the Council had decided at its December 2010 meeting to defer the DCP and continue with consultation on the document.

In relation to the DCP, there are a number of points that can be made in response to the ridgeline and specifically this development:

- ROBE had achieved an approval on this site already under at 3A of the EP&A Act 1979 (November 2008) and while approval of the modified development may represent an increase in the number of structures, some with increased dimensions, the overall grouping of buildings and structures is more compact than the original proposal. The clustering of buildings on the site has

allowed for a smaller development footprint and the outcome will be building elements that somewhat screen each other from full view. Comparisons in the landscape of elevations of the proposal can be viewed on the following pages and in 3.2.5 below. The locations that these pictures were taken can be seen in MAP 1 on page 47.

Figure 1: Above: Montage of Approved Development. View from the rear yard of Mr Schulz "Waterview" – Receptor "G" property towards the site.

Figure 2: Above: Montage of the Proposed Development. View from the rear yard of Mr Schulz "Waterview" – Receptor "G" property towards the site. *Image 55*

Comment: Figure 1 and Figure 2. Impact of the approved development comparable to that which is proposed. Landscaping to the perimeter of the development site as well as paddock plantings at the receptor will further reduce impact of the proposed plus future industrial developments in the precinct.

Figure 3: Montage of the Approved Development. View to the development site from the north – Howard's "Bindalee" Residence (elevation 289 metres). Receptor D precinct. *Image 68*

Figure 4: Montage of the Proposed Development. View to the development site from the north – Howard's "Bindalee" Residence (elevation 289 metres). Receptor D precinct. *Image 68*

Comment Figure 3 and 4 – Impact of approved and proposed developments similar. Planting at the receptor site could screen view towards the development and other future developments.

- Previous strategic planning work (WISDOM) had nominated key visual landscape points along the ridgelines surrounding Bomen which are higher than the subject site. The subject site and surrounds were not nominated as key to visual amenity. As this subject site is central to the new Industrial zoning, adjacent to both Byrnes and Trahairs Road, similar elevation to the existing Sydney, Melbourne Railway opposite Byrnes Road where it has been mooted that an intermodal terminal could be developed and indeed containing the railway line easement to the western part of the property for future developments. If local and state government and the broader community seriously consider the development of the industrial estate then this site and land in the immediate vicinity shall be developed.
- Where residences themselves have located on ridgelines (i.e. Howard homestead) the expectation that views can be maintained for 360 Degrees is considered unreasonable. The Howard site is over 5 km away from the subject site where the view to the skyline will not be interrupted at any point about the development. View to the development site and the industrial area in general is from the southern part of the homestead.
- ROBE intends to consult with and negotiate landscape works on private properties where visual impact cannot be adequately mitigated by landscape works on the subject site. This could be conditioned within the consent to ensure that it occurs in a timely manner and that landscape works are in place well prior to the finalisation of construction works on the site. As stated earlier ROBE is attempting to begin this process in the near future by establishment of a community liaison group.

3.1.2 Height Number and Locations of Buildings and Structures

The submission by Howard states that the original project only had one element above 27 metres. It then went on to state that the new project proposed in excess of 7 buildings that will now be over 27 metres tall. This is not a correct statement.

The approved project had 6 storage silos, 2 each at 27.6 metres in height, 2 at 25 metres in height and two day bins at 14 metres in height. Gravity chutes for these silos stood at 33.6 metres in height. These were situated to the south of the subject site and would have been directly viewed from both the east and west. The original project proposed an unspecified number of tanks ranging in height from 4.8 to 10.5 metres and spread throughout the site.

The modified project proposes 2 buildings in excess of 27 metres (oil seed crushing plant 29 metres and Vegetable oil refinery 27 metres). Both of these buildings are located more central to the site and are partially obscured from some viewpoints due to the clustering of buildings on the site. The current project proposes a decrease in number and height of silos (4 at 20 metres) and the gravity chute for silos is 27 metres. The tank farm is consolidated in the proposed project and consists of 19 tanks at 15 metres high. These tanks are totally visible from the south (note: no receptors located directly south), and partially obscured due to the clustering of buildings from the other viewpoints.

The comparison of the views to the original approved development and the proposed development site from north, south east and west can be viewed in the following montages.

3.1.3 Mitigation Measures – Lack of Detail

The proponent has indicated by plan where existing and proposed landscaping works will be enhanced

and planted on the site. This landscape plan will be developed in more detail post development approval to the satisfaction of the DOP. The proponent has indicated a willingness to undertake offsite landscape works to private properties where on site works will either be insufficient or will not mitigate effectively in the short to medium term. The developer is liaising with the EVA committee about the possibility of setting up a community liaison group immediately to begin exploring landscaping options for individuals, as well as keeping communication lines open for discussion and exchanging information about other aspects of the development and any issues that may arise.

Wagga Wagga City Council continues to negotiate the development control plan for the Bomen Industrial Estate and is also committed to the vegetation of Council reserves to assist wit the integration of the industrial park into the Eunony Valley.

Similar to other consents for major projects, it is suggested that conditional approval requires the proponent to consult with the receptors and develop individual solutions to suit individual properties and property owners' needs. For example, landscape works may be established in house gardens to mitigate views through to the site from dwellings or areas where outdoor entertaining could take place. Another option would be to establish tree lines along the edge of paddocks to mitigate views through to the site. Paddock-plantings are usually associated with mitigating views from:

- the entrance driveways to the property, or
- outdoor entertainment areas, by strategic plantings at a distance from the dwelling that will result in a shorter term erasing of view, and

Although some building dimensions have increased with the modified proposal, the fact that the development footprint has contracted compared to the original approved proposal has reduced the visual impact from being as prominent as it may have been.

In terms of lighting, the developer will provide awnings to all the wall openings of Solvent Extraction Plant building to provide weather protection and to reduce light escaping the building and directing any other light towards the ground. Other site lighting shall be to the car park areas and pathways and will be lit to Australian standards.

3.1.4 Ability to Reduce Building Heights and Bulk

The process buildings that dominate the development are functional units to house equipment. It is not possible to reduce the building size or the footprint or height and continue to house the process equipment and facilitate the technology required to be operated to achieve maximum environmental efficiencies and sustainable operating conditions.

The following information is offered to demonstrate the reasons for why sizes of the building have changed compared to the original design.

1. ROBE having completed further investigation post approval regarding the best available technologies available technologies in this industry, came to the conclusion that DESMET BALLESTRA (DB) is the leading technology provider of complete integrated solutions for the oilseed crushing & refining industry. DB is the worldwide leader in this industry. Their state-of-the-art technology translates to efficient processes, with lower energy consumption, high quality of equipment, proven plant safety, and full reliability. DB have experience in supplying similar equipment in Australia according to local standards and codes. DB has been awarded this Contract on these arguments and in addition offered the most optimised solutions to the actual requirements of ROBE. The footprint of the buildings have increased, however it is important to note that this increase in footprint is only due to additional equipment resulting in lower emissions and lower energy consumption.

The height of the buildings increased for the following reasons:

- though the plant is foreseen with a most efficient scrubbing system to improve the quality of the air emissions it has been concluded after several studies that a higher release to the atmosphere results in increased dispersion and hence reduces the likelihood of possible odour nuisances.
- especially in the SPP/SEP, the process utilises gravity flows of the product where ever possible in the filtering and heating and cooling phases to reduce energy consumption. This process method determines the height requirement for the structures.
- referring to the architectural views of the buildings, they are not oversized for the 'volume'/'amount' of equipment to be installed in this development.
- the actual buildings have not been enlarged to allow for further expansion. ROBE in consultation with DB, the BCA and the consulting fire engineer has made a clear choice to foresee sufficient access inside the plant for egress and that regular maintenance is possible in a sage work environment.

2. ROBE has decided to invest in the long term with optional technological solutions reducing substantially energy consumption and effluents described below:

- the material to be extracted entrains into the extraction unit a proportional volume of air that must be vented from the extractor and released to the atmosphere. In leaving the extractor via its vent line, this air entrains a certain amount of solvent vapours. This plant will be using an absorption unit with a mineral oil of special quality circulating in a closed circuit and will drastically reduce the amount of solvent in the air before it is released to the atmosphere. The anticipated discharge levels are well within the current environmental conditions require in NSW and will meet limits even where future emission targets are further reduced.

- The DB, Dimax DTDC shall further improve the meal quality while reducing solvent losses, steam and power consumption.

- for the Refinery building : in conventional vacuum systems, vapours are condensed in direct contact condensers by means of barometric water. The barometric water flows in a loop: the heated effluent water coming out of the vacuum system is reused to feed the condensers, after cooling to a suitable temperature. The barometric water is conventionally cooled in an open dirty cooling tower. This plant is however fitted with a closed loop system where the barometric water is cooled by means of clean cooling water in heat exchangers. Handling of the effluent water of the vacuum equipment becomes easier with this system. Moreover the odours coming from the barometric water passing through an open dirty cooling tower are eliminated.

- state of the art scrubbing systems for the SPP & SEP building - DB is implementing this system in cooperation with Beke Environmental Technologies (BETE). BETE has over 20 years of experience in designing gas scrubbers for a multitude of industrial applications.

Three dimensional plans of the main component buildings are included to demonstrate the fit-out of equipment within the buildings' full utilisation.

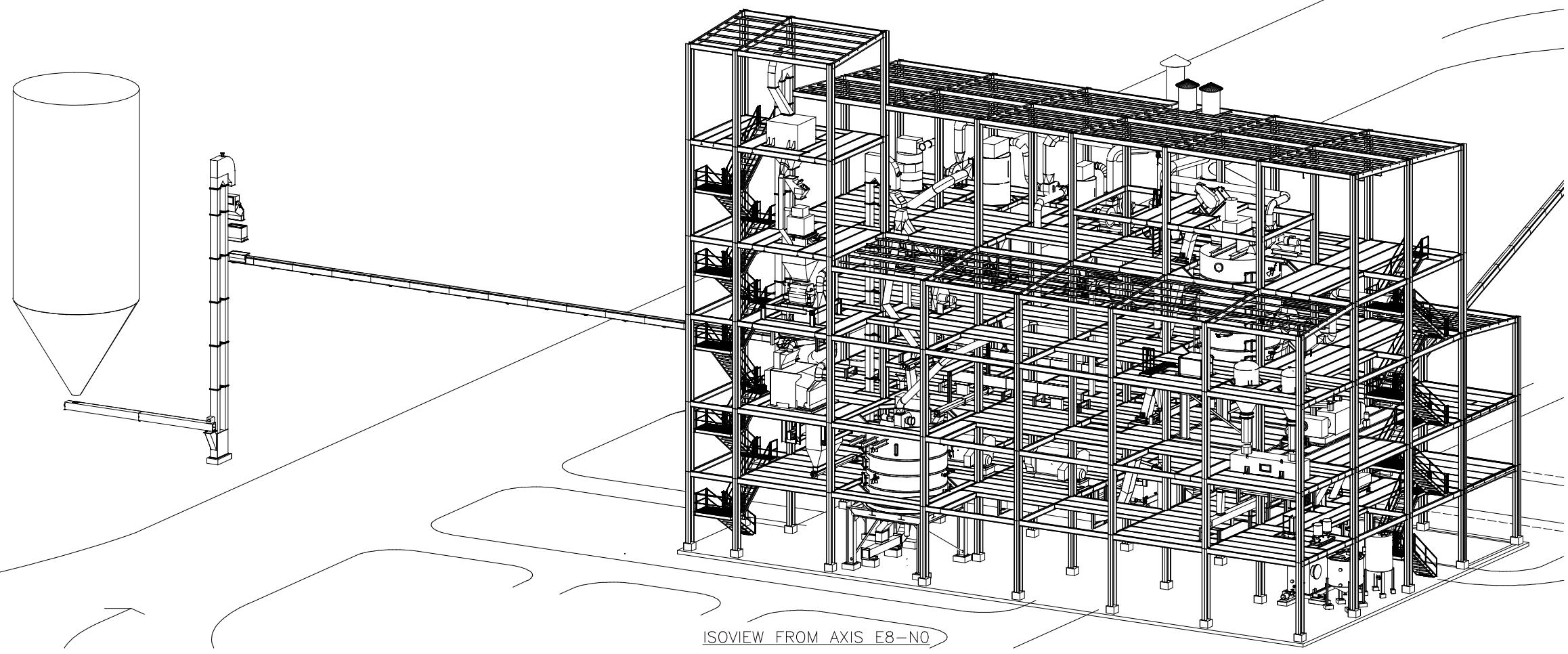
SEED PREPARATION PLANT (SPP)

As a condition of the original project approval, the project is required to meet a number of environmental conditions, and to prove to the DoP that this can occur at various stages of the development.

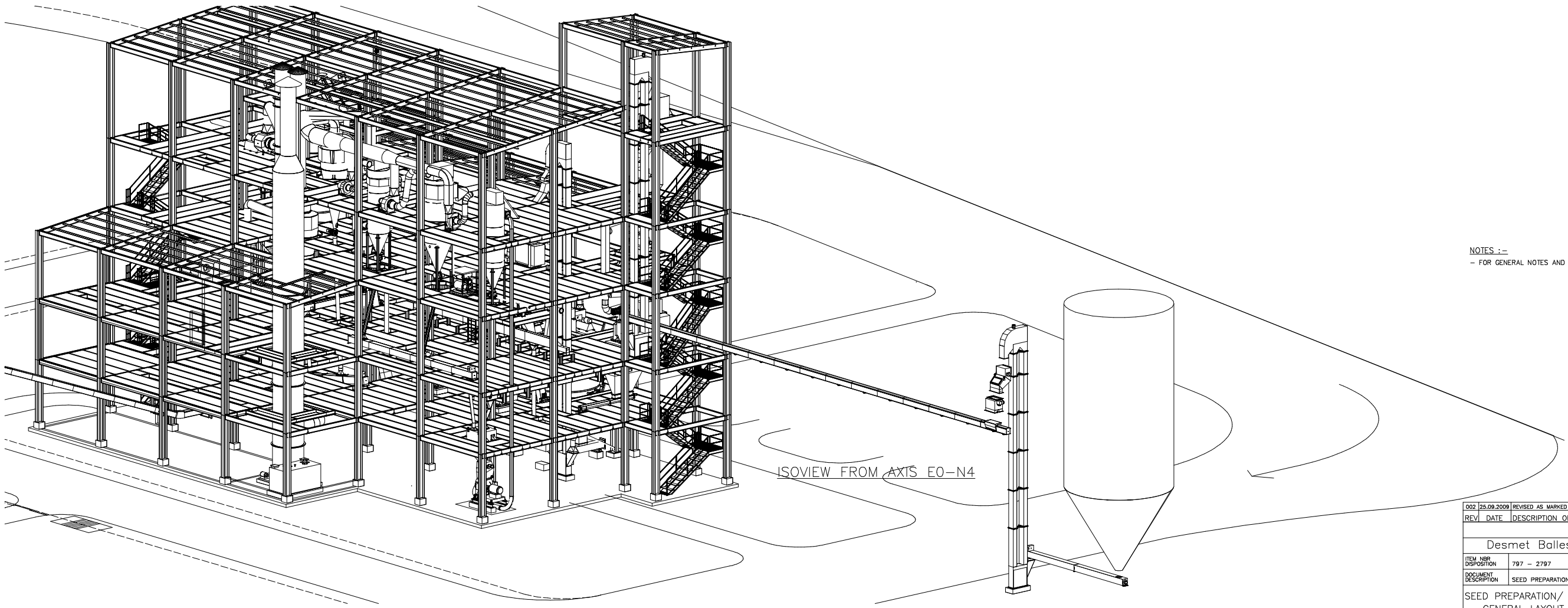
One such condition is to comply with the Clean Air Regulation 2002 (2010). The stringent standards and controls has required that ROBE include a Counter Current Gas Scrubbing Unit (CCGSU) within the Seed Preparation Building. Intimate contact is necessary in this process requiring that the CCGSU has a particular surface area, and for efficient scrubbing the length to diameter ratio must be maintained. To achieve a sufficient retention time the design warrants a tall scrubbing system which has accordingly increased the overall height of the building to accommodate it.

Please see below.

IF IN DOUBT, ASK – DO NOT SCALE !



ISOVIEW FROM AXIS E8–N0



ISOVIEW FROM AXIS E0–N4

NOTES :–

– FOR GENERAL NOTES AND EQUIPMENT LIST REFER DRG. No: IN057852

REV	DATE	DESCRIPTION OF MODIFICATION	NBR OF MOD	BY
002	25.09.2009	REVISED AS MARKED 002	–	KSS/RAB

Desmet Ballestra Group			PROJECT ID NBR	200924	
			PROJECT DESCRIPT	ROBEA	
ITEM NBR DISPOSITION	797 – 2797	DOCUMENT TYPE: LAYOUTS	SECD: PROC.E	KSS: MPS	SCALE: 1:100 / FORMAT: A0
DOCUMENT DESCRIPTION	SEED PREPARATION/ PRESSING PLANT		PROJ.M: DOM	RM/SPV: PRA	AUTHOR: KSS
SEED PREPARATION/ PRESSING PLANT GENERAL LAYOUT – ISOMETRIC			DATE: 21.07.2009	DRAWING NUMBER: IN057856	REVISION: 002

IF IN DOUBT, ASK DO NOT SCALE !

CAD DRWG. DO NOT MODIFY

A0 (841 x 1189)

SOLVENT EXTRACTION PLANT (SEP)

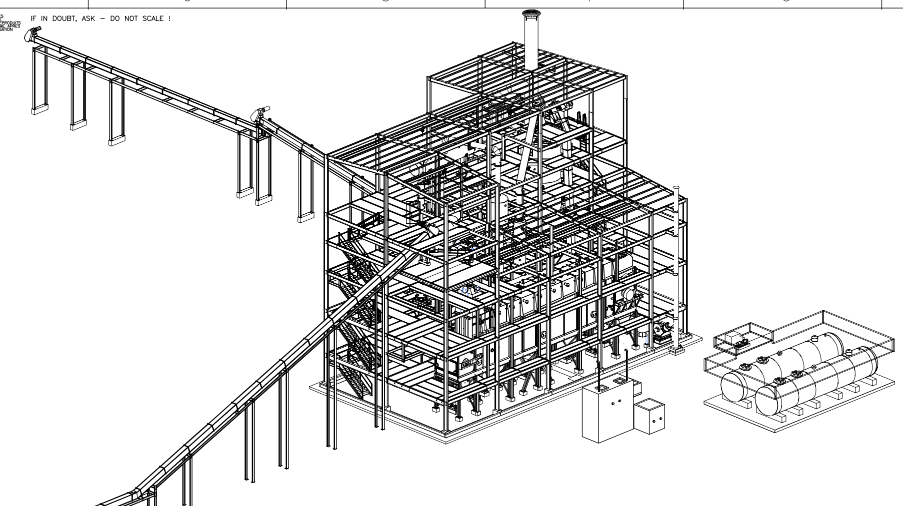
The solvent extraction plant proposed of the revised development represents a significant increase in the ability to manufacture and maintain "fit for consumption" meal products, as this component no longer represents a by-product of the operation, and is elevated to a product of "required sales revenue".

To achieve a competitive advantage, meal for the cattle and poultry industry require that the toasted quality of the meal is improved, enhancing the protein values. The installation of the proposed Desolventiser Toaster improves the stripping steam density per square meter area of the Desolventiser Trays, reducing operation temperatures while maintaining process efficiency. This has resulted in a taller desolventiser installation and a subsequent increase in building height at the Desolventiser Toaster section.

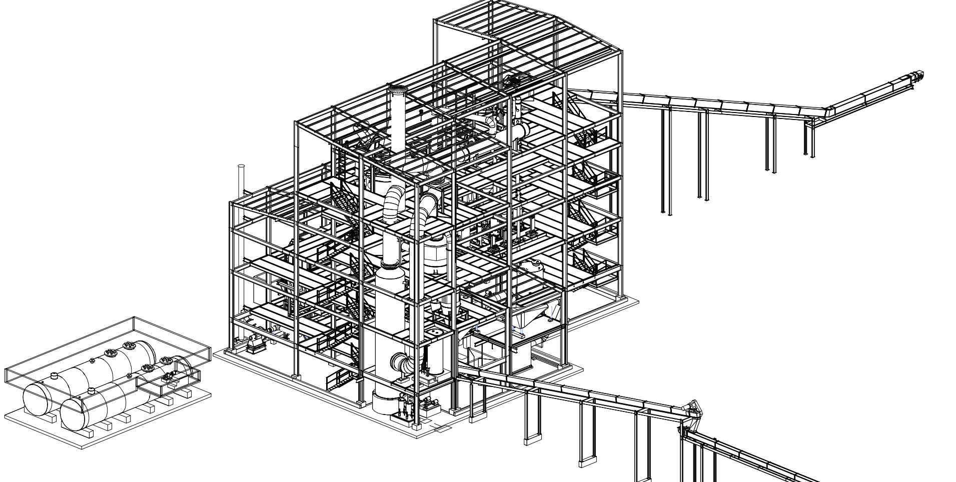
Similarly to the SPP, a Common Gas Scrubbing System (CGSS) is to be accommodated within the Solvent Extraction Plant to ensure that all gas streams exiting the plant shall conform to the requirements of the Clean Air Regulation 2002 (2010). The required CGSS provide sufficient intimate contact with the scrubbing fluid of the Solvent Extraction Plant is 20meters in height in order to maintain length / diameter ratio. The building above the CGSS accommodates this equipment.

Please see below.

IF IN DOUBT, ASK – DO NOT SCALE !



ISO VIEW FROM AXIS N0–E0



ISO VIEW FROM AXIS N3–E5

NOTES :–

– FOR EQUIPMENT LIST, GENERAL NOTES & OTHER DETAILS REFER DRG.No.:IN057333

REV	DATE	DESCRIPTION OF MODIFICATION	NBR OF MOD	BY
005	02.08.2010	REVISED AS MARKED REV.:005	–	SPM
004	09.02.2010	SCRUBBER SCHEME REVISED & UPDATED	–	KSS
003	11.12.2009	REVISED AS MARKED REV.:003	–	SHT
002	11.11.2009	REVISED AS MARKED 002	–	KSS

Desmet Ballestra Group

PROJECT ID NBR	200924
PROJECT DESCRIPT	ROBEA
ITEM NBR DISPOSITION	97
DOCUMENT TYPE	LAYOUT
DOCUMENT DESCRIPTION	EXTRACTION LAYOUT
SECD	KSS
PROC.E	MPS/SLA
PROJ.M	RM/SPV
DOM	PRA
SCALE	1:100
FORMAT	A0
AUTHOR	AMB
DATE	21.07.2009
DRAWING NUMBER	IN057336
REVISION	005

EXTRACTION PLANT GENERAL LAYOUT
ISO VIEWS

IF IN DOUBT, ASK
DO NOT SCALE !

CAD DRWG.
DO NOT MODIFY

A0(841 x 1189)

REFINERY BUILDING (REF)

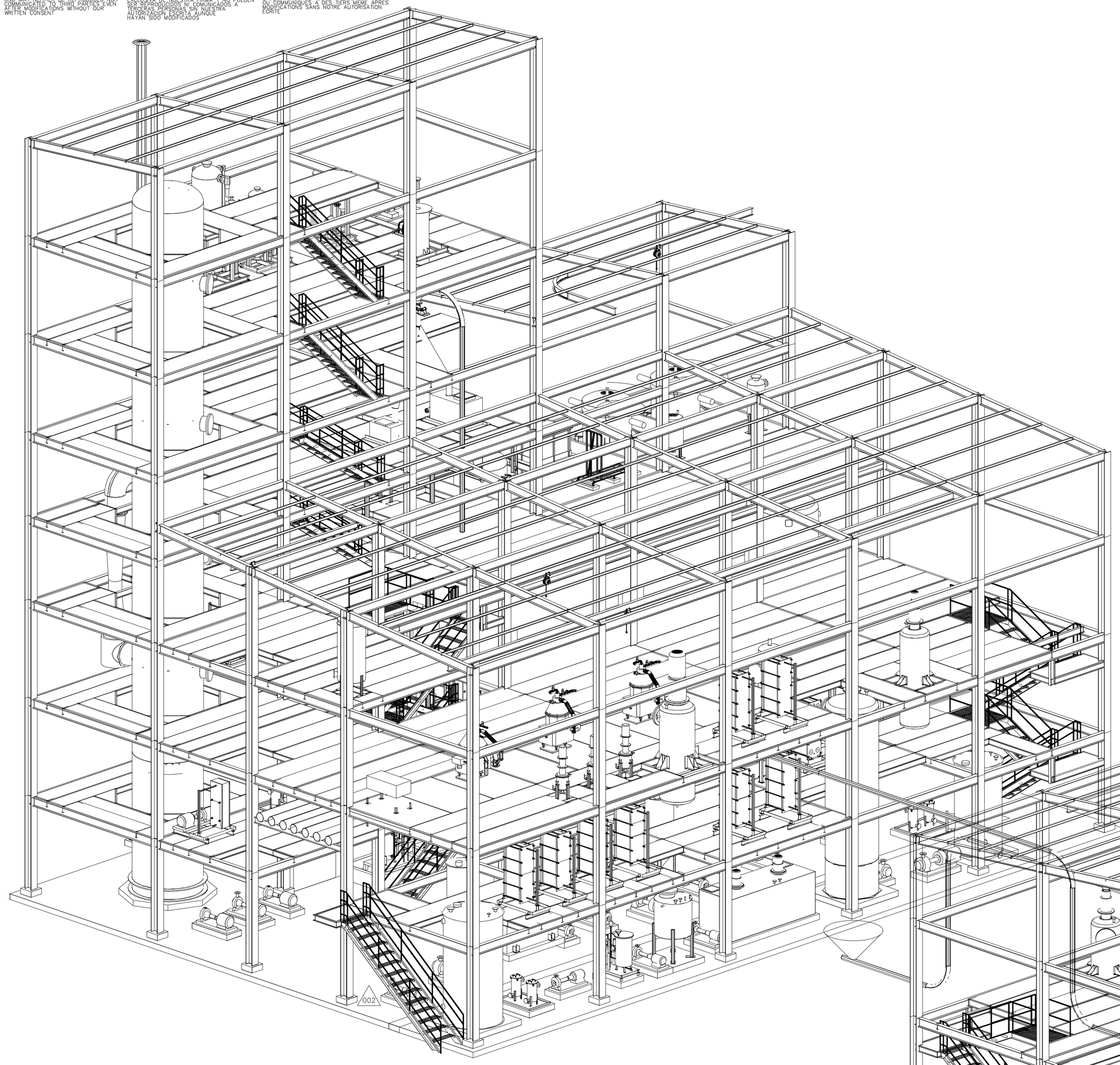
The Refinery plant of the modified proposal has the capability to achieve a refined product by both a physical and chemical process. The original proposal was to provide for a chemical process only.

The physical process considerably reduces the volume of effluent produced, which in turns reduces overall water and energy consumptions. Fewer chemicals are to be stored, consumed, and or recovered in the physical process.

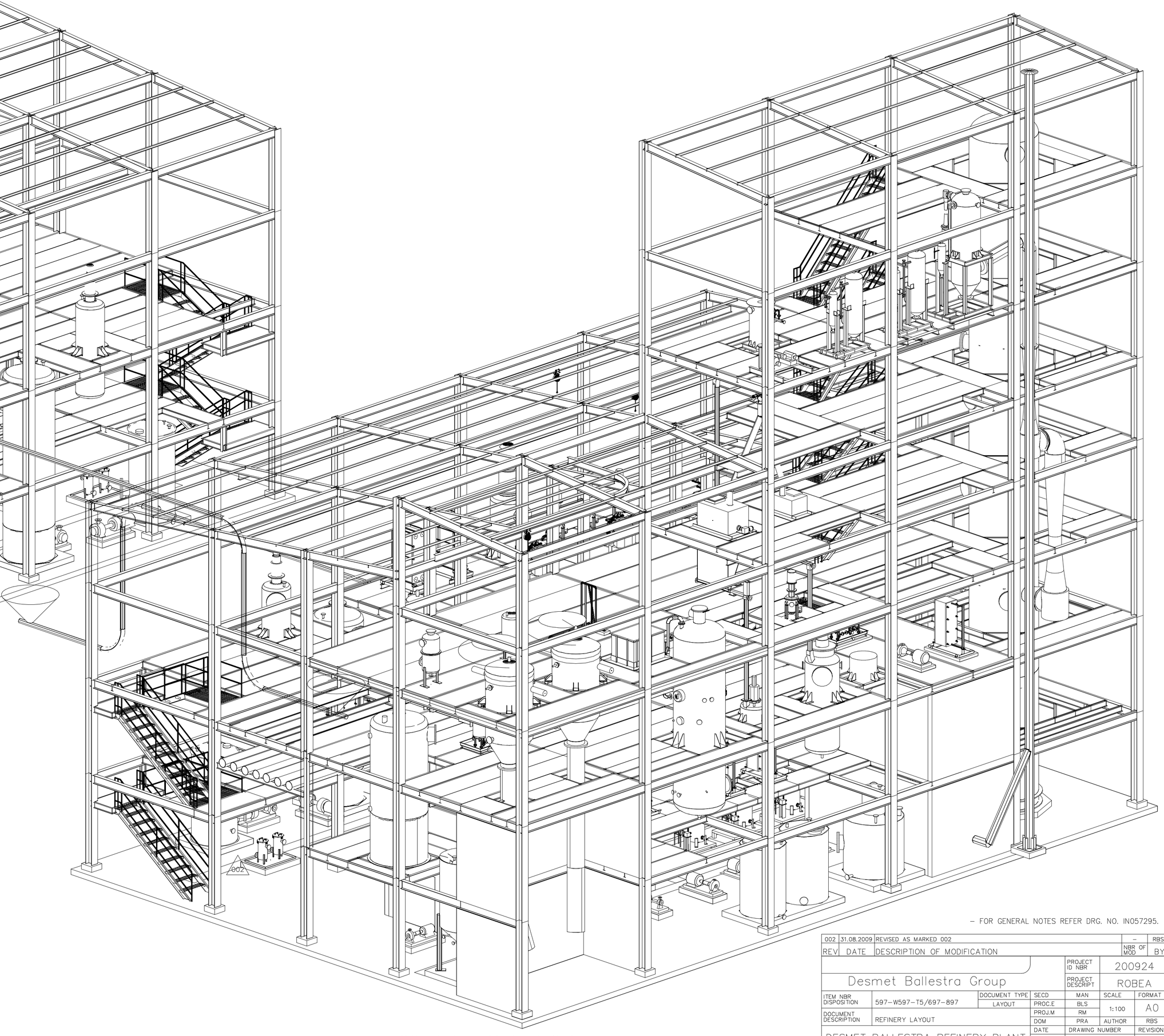
Physical Refining Process envisages de-acidification and de-odorisation in a single piece of equipment. The de-odoriser recommended by Desmet Ballestra to achieve an efficient process has a number of vertical trays which dictate the overall height of the equipment and the building to accommodate it.

Please see below.

IF IN DOUBT, ASK – DO NOT SCALE !



ISO VIEW FROM AXIS E0–N0



ISO VIEW FROM AXIS N4–E5

– FOR GENERAL NOTES REFER DRG. NO. IN057295.

REV.	DATE	DESCRIPTION OF MODIFICATION	NBR OF MOD.	BY
002	31.08.2009	REVISED AS MARKED 002	–	RBS

Desmet Ballestra Group			PROJECT ID NBR	200924		
			PROJECT DESCRIPT	ROBEA		
ITEM NBR DISPOSITION	597–W597–T5/697–897	DOCUMENT TYPE: LAYOUT	SECD	MAN	SCALE	FORMAT
			PROC.E	BLS	1:100	A0
DOCUMENT DESCRIPTION	REFINERY LAYOUT		PROJ.M	RM		
			DOM	PRA	AUTHOR	RBS
DESMET BALLESTRA REFINERY PLANT GENERAL LAYOUT – ISOVIEWS			DATE	DRAWING NUMBER		REVISION
			21.07.2009	IN057298		002

AO(841 x 1189)

IF IN DOUBT, ASK DO NOT SCALE !

CAD DRWG. DO NOT MODIFY

ANCILLARIES

The oilseed handling and storage systems, solvent storage, oil dispatch, and the meal storage systems are all unaltered in physical appearance when comparing the original and the proposed development. However, they may have been relocated within the site to improve operational efficiencies.

The oilseed storage systems and tank farms area have been rationalised to maximise efficiencies and are reduced in individual sizes and increased in numbers to minimise the mass of elevated structures.

WASTE WATER TREATMENT

ROBE has engaged Advent Envirocare Technology to design and supply the effluent treatment plant to produce effluent of sufficient quality, in order to enable irrigation to crop and pasture.

With the strategic change to abandon irrigation of treated effluent in favour of a zero effluent discharge, Advent has been requested to supply the additional infrastructure to achieve the recycling targets suggested by Advent.

The developed area of the proposed treatment plant within the modified EA shall be enlarged by approximately 12 meters x 20 meters. The extension will be a single level development to house additional storage tanks and a covered area for the reverse osmosis units.

The reverse osmosis units will be powered by electrically driven vertical pumps, fitted with soft starters to enable a quiet operation.

The proposed effluent storage pond shall be utilised as an evaporative storage pond with greater than twice the holding capacity required to accommodate a 95%ile wet year.

Further information about the water balance and process modifications are included in Section 9 Attachment B.

FUTURE BIO-FUEL PRODUCTION

No equipment or building specified in the revision to the development approval limits the addition of a Trans-esterification Unit ad and Methonal Storage and Rectification Plant at any stage in the future to produce bio-fuels.

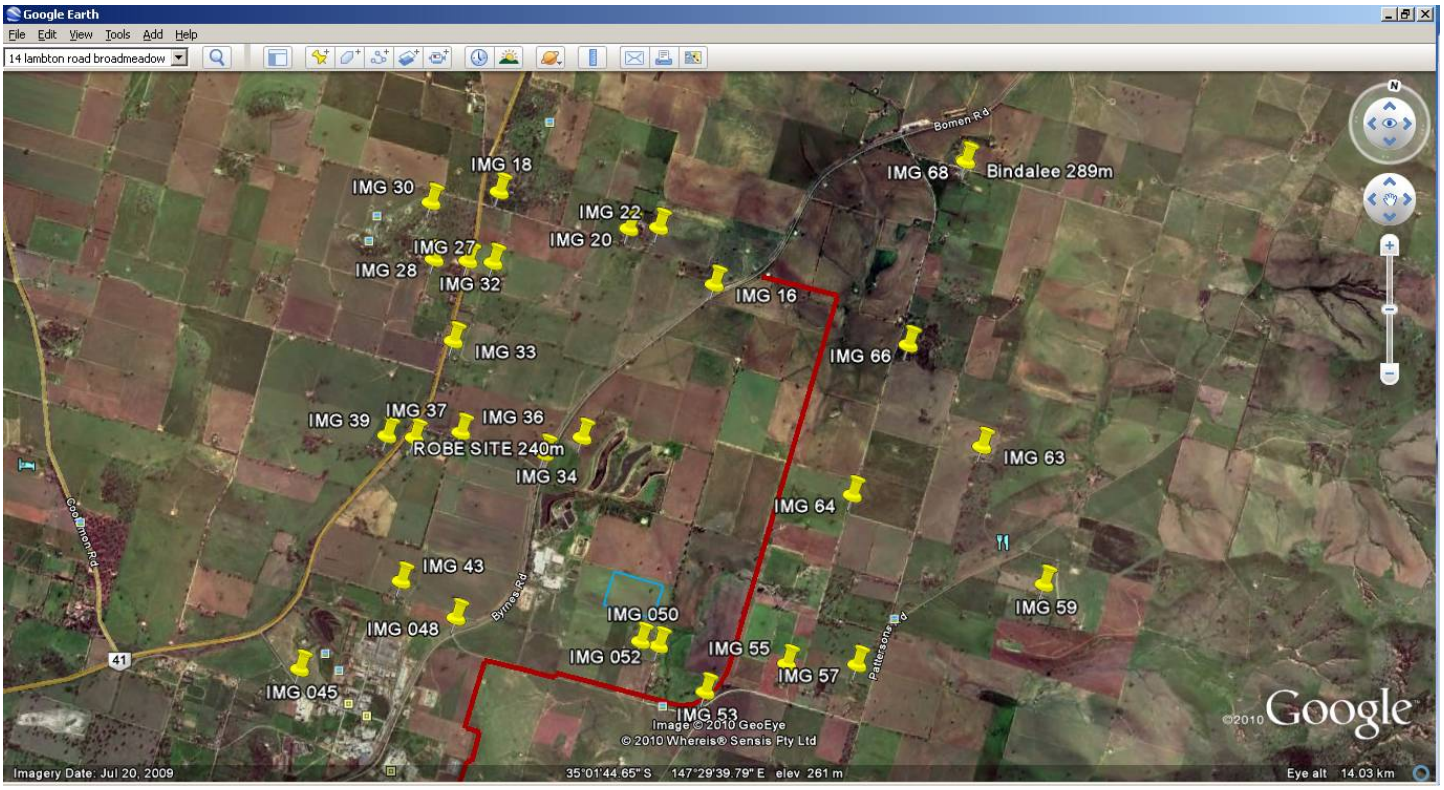
ROBE is aware that any changes and modification to the process shall require approval by the regulatory agencies.

3.1.5 Methodology used when Assessing Visual Impact

The Eunony Valley association queried the methodology used to decide which receptors would be assessed. The association presented a map that showed all the dwellings in the vicinity of the site.

The original method of assessment included the following:

- Review of the previous visual impact assessment carried out for the original proposal and the receptors selected for that assessment.
- Field survey using line of site from various vantage points to the subject land. Where views from receptors were clear through to the site, these were considered more closely.
- The potential visual impact was considered to be more serious where the development could be clearly viewed either directly from a dwelling or from its private open space areas, where, for example, entertaining could take place.
- Since receipt of submissions a crane was erected on the site at ROBE's expense on the 18th of November – 8am to 1pm. The crane was positioned just west of the proposed SPP building location. The field survey was carried out again and the Eunony Valley Association was notified so that interested parties could also view the site and crane. This method was more successful at determining views to the development as the crane was set at a height of 38 metres with a flag height of 30 metres, which approximately reflected the highest proposed building. This method helped facilitate partial views of the development where the actual site could not be seen but, due to the height of development, the positioning of the crane assisted with determining where partial views of the development would occur.
- Pictures and montages have been created using pictures taken from the second field survey with the use of the crane. Some montages have been created for both the original and the proposed development to give a comparison; others are taken from various vantage points in the locality to assist with the interpretation of the context of the future development in the existing environment.



Map 1: Locations of photographs used for further visual impact assessment.

Figure 5: View from south looking north towards the site from the corner of East Bomen Road and Byrnes Road (modified development). *Image 48*

Figure 6: View from south looking north towards the site from the corner of East Bomen Road and Byrnes Road (approved development). *Image 48*

Comment: Figure 5 and Figure 6

This view is taken from within the industrial precinct and is not from a sensitive receptor. The view is in keeping with what one would expect in a rural industrial area.

Figure 7: View from the north looking south towards the site from Byrnes Road. (Modified Development) *Image 16*

Figure 8: (Receptor Precinct A) Elevated View from west looking east towards the site from 7 Brucedale Drive – front porch (modified development) *Image 30*

Comment: Figure 7 View of development from this location along Byrnes road is well shielded by existing vegetation.

Comment Figure 8: View from Brucedale locality. There will be direct and indirect views from the properties located on the eastern side of the Brucedale precinct towards the site; however, it is anticipated that the horizon will not be broken by the built form from any view observed from the receptor dwellings.

Figure 9: View from the west looking east. 4 Trahairs Road – rear pool area (modified development) Distance to site: Approximately 1.8 km. *Image 37*

Figure 10: View from the west looking east. 4 Trahairs Road – rear pool area (approved development) *Image 37 –*

Comment: Figure 9 and 10 - this land has been recently re-zoned for industrial purposes, although currently rural residential in land use.

Figure 11: (Receptor F) View from east towards the west from Langrigg Hall (Obst. residence). Modified Development. Distance to site: Approximately 4.5 km. *Image 63*

Figure 12: (Receptor F) View from east towards the west from Langrigg Hall (Obst. residence). Approved Development. *Image 63*

Comment: Figure 11 and Figure 12
The two views of the approved and proposed are quite comparable. The more compact proposed scenario is potentially easier to landscape screen which the developer is offering to do on the receptor's site.

Figure 13: View from 4 Mary Gilmore Road, (driveway to residence) towards the south east (Modified Development) Distance to site: Approximately 3km. *Image 22*

Figure 14: View from 4 Mary Gilmore Road, (driveway to residence) towards the south east (Approved Development). *Image 22*

Comment: Figure 13 and 14 Development sits well into the landscape with partial screening from middle ground tree canopy. Proposed and approved developments comparable.

Figure 15: View towards the north-west from the Rosehill Residence (Gray Family). Modified Development. Distance to site: Approximately 1.5 km. *Image 50*

Figure 16: View from the driveway of Rosehill residence (Gray Family) towards the site. Modified development. *Image 52*

Comment: Figure 15 and 16. Views could be further mitigated by increasing existing paddock plantings in the mid ground in both pictures.

Figure 17: View from north east towards the site from Receptor Precinct E. Distance to site: Approximately 4.5km. *Image 66*

Figure 18: View through to the site from the western end of Mary Gilmore Road. (Modified Development). *Image 18*

Comment:
Figure 17- view from the street to site significant and interrupting skyline. The dwellings in the precinct are largely shielded from view via mature plantings on their sites and therefore the impact is still considered low. Figure 18 View to the site significant but comparable and consistent with existing industry building to the right of picture.

Figure 19: View to the site from Bomen Road. *Image 45*

Figure 19: view to the site from 224 Trahairs Road – front yard. *Image 36*

Figure 20: View from Olympic Highway Wilks Residence. *Image 33.m NB: this land is within the industrial*

Comment: Figure 18 and 19 and 20. Views from industrial zoned areas through to the site considered to be comparable with perceptions of amenity and expectations of community.

Figure 21: View from intersection of East Bomen Road and Windmill Lane. *Image 53*

Comment Figure 21: This view is from a public road and not a receptor. Development partially shielded by existing vegetation that exists in vicinity of the development site. Considered to be consistent with expectations of views from public areas through and over industrial lands.

Post Exhibition Community Consultation

3.2 Eunony Valley Committee Consultation Meeting

A meeting was held on Thursday November 11 for the benefit of the Eunony Valley Association Committee. Members were met initially outside the site, and a tour was commenced to receptors properties to view the sites and discuss issues. Concerns were also raised by the committee about the fragile nature of the catchment, recently flooded Schillers creek, and swamp areas. The presentation given by the project manager and full minutes and action items from that meeting has been provided in Attachment E.

As a direct result of that meeting it was decided to erect a crane on the site to undertake further visual assessment and allow the community to view the crane from their own residences.

In addition the meeting raised some valid points about the Water Balance and irrigation. These concerns added to the concern expressed by the NSW Office of Water and the unusually wet 2010 year, led the developer to abandon the proposed waste water treatment via irrigation to a recycling method.

Letters of support

A number of letters of support have been forthcoming from members of the community since the inception of the project and these are provided in Attachment F. It is expected that another dozen or so will be received in the prior to or post Christmas period, and can be provided if required.

Preferred Development and Commitments

3.3 Preferred Development

One modification to the development has occurred post exhibition, and environmental assessment concerning this change is outlined below:

Reverse Osmosis Waste Water Recycling

This process provides for a better outcome environmentally, as there is no reliance on climatic conditions or land availability for irrigation, and no requirement to store large amounts of waste water on the site. Effluent produced at the site shall now be contained on the existing site with no contingent agreements required of other land owners to accept irrigated waters.

The recycling process has been discussed with Mr Christopher Burton of the DECCW (23 November 2010) and reverse osmosis was their preferred option to avoid irrigation.

The proposed technology this project now offers to recycle treated effluent exceeds the minimum standards that DECCW would expect and ROBE will quite possibly set the benchmark for this type of treatment in the district.

3.4 Revised Statement of Commitments

To reflect the changes and the actions that ROBE will now carry out to satisfy community concerns, the statement of commitments has been amended and now forms Attachment G.

Conclusion

The consultation process has been successful in identifying the issues raised by both agencies and the community. The main issues that ROBE has reconsidered as part of the response to the submissions includes:

- Irrigation component and the decision to proceed with water recycling instead of irrigation. While this has considerable cost implications for the development, the environmental benefits and assurance of limiting plant shut downs outweighs the costs.

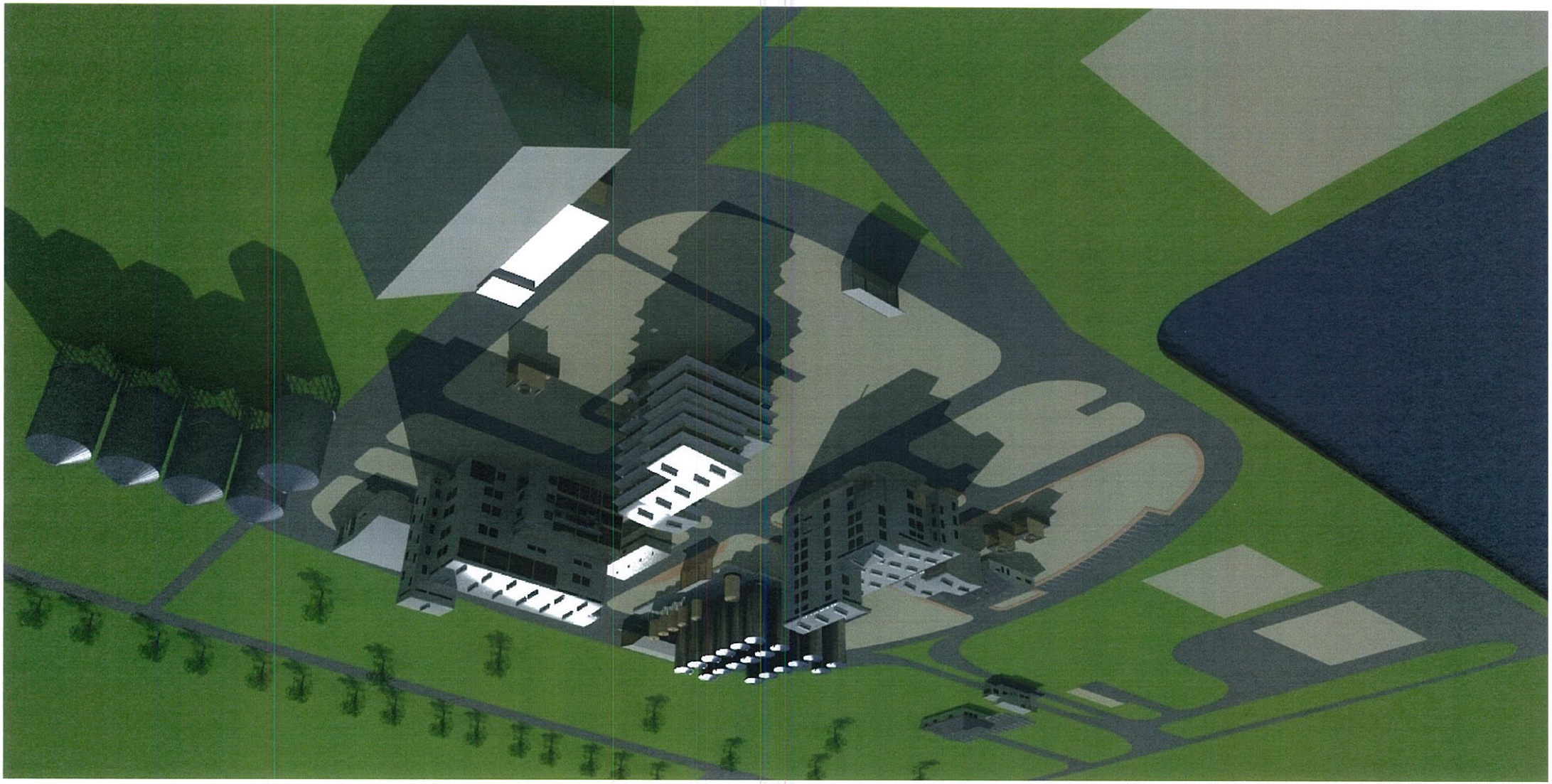
- Further assessment of the visual context of the site and zoning considerations and further consideration of the visual impact of the proposal by improving the methodology and providing more visual comparisons provided between the approved and modified proposal.

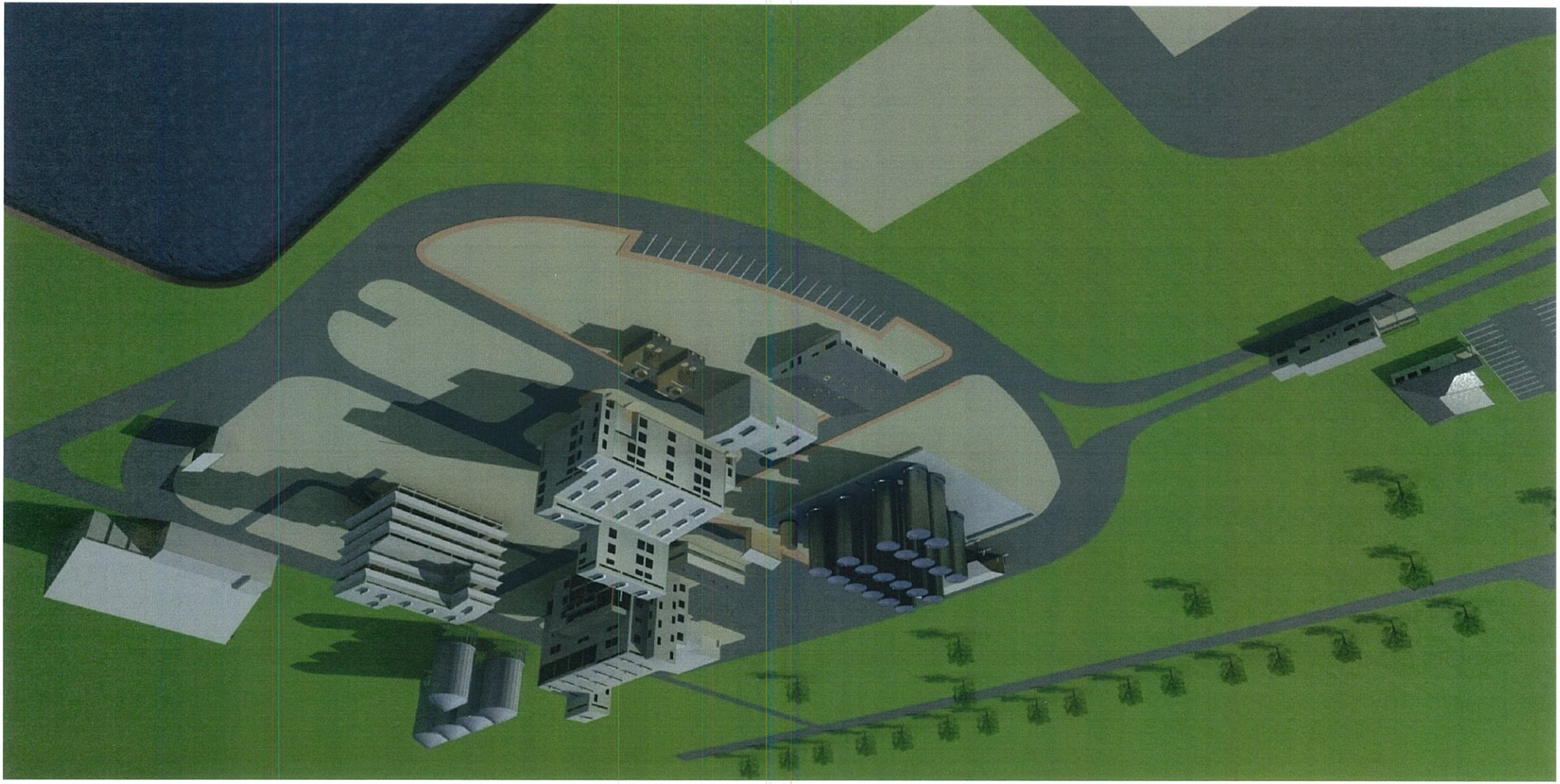
ROBE is committed to continuing a positive relationship with the community and agencies and has suggested the establishment of a community liaison group. This group would provide a forum where ongoing consultation can occur with the community to pass on information about the status of the project, elements of the project or elements of future management plans that would benefit from community input and awareness. It would also provide a conduit for the community to input into the project with any concerns or comments that may arise through the construction and operations phase of the development.

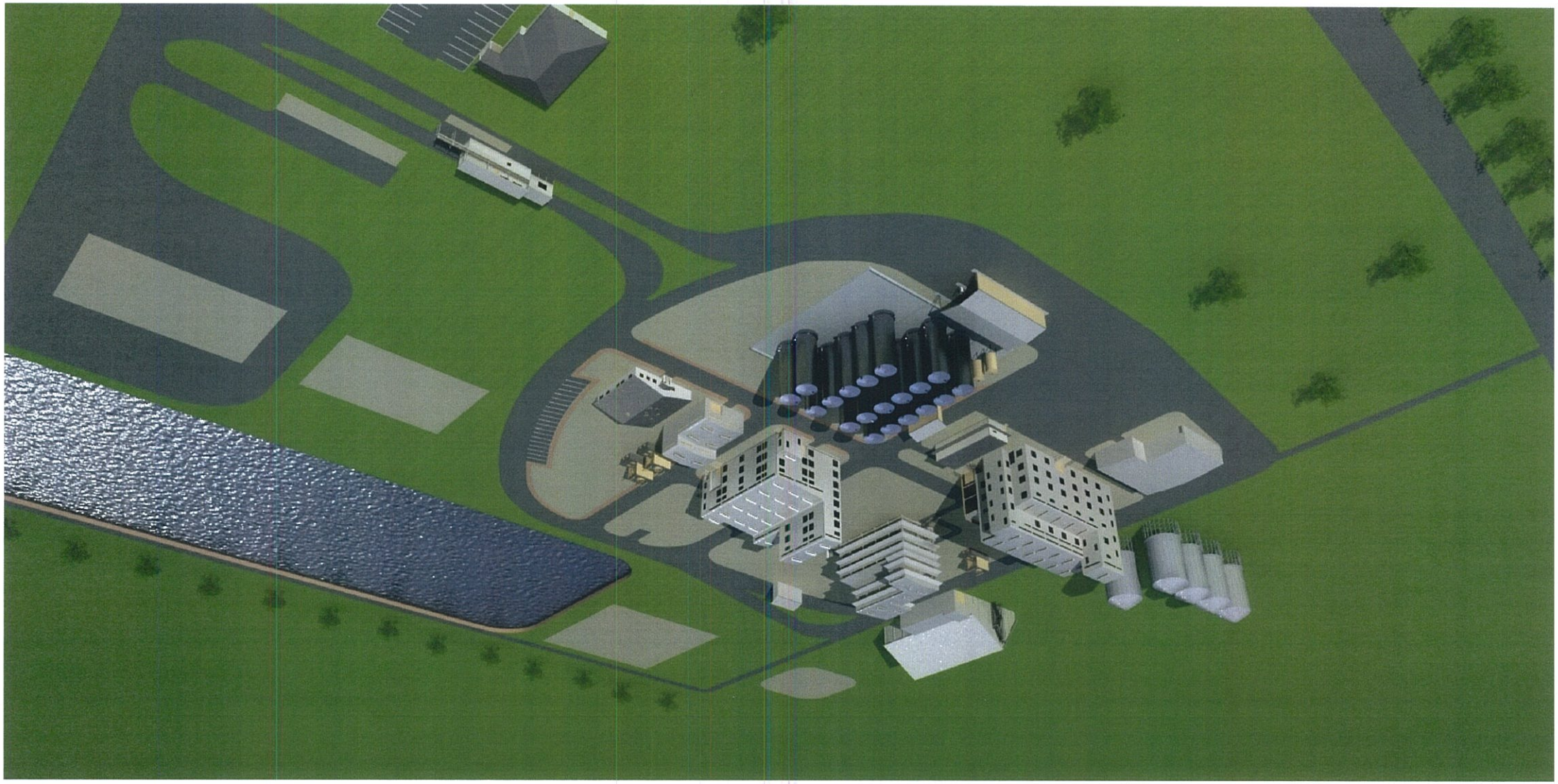
We trust that the response and other documentation provided to the Department are satisfactory to issue a conditional consent to the proposal.

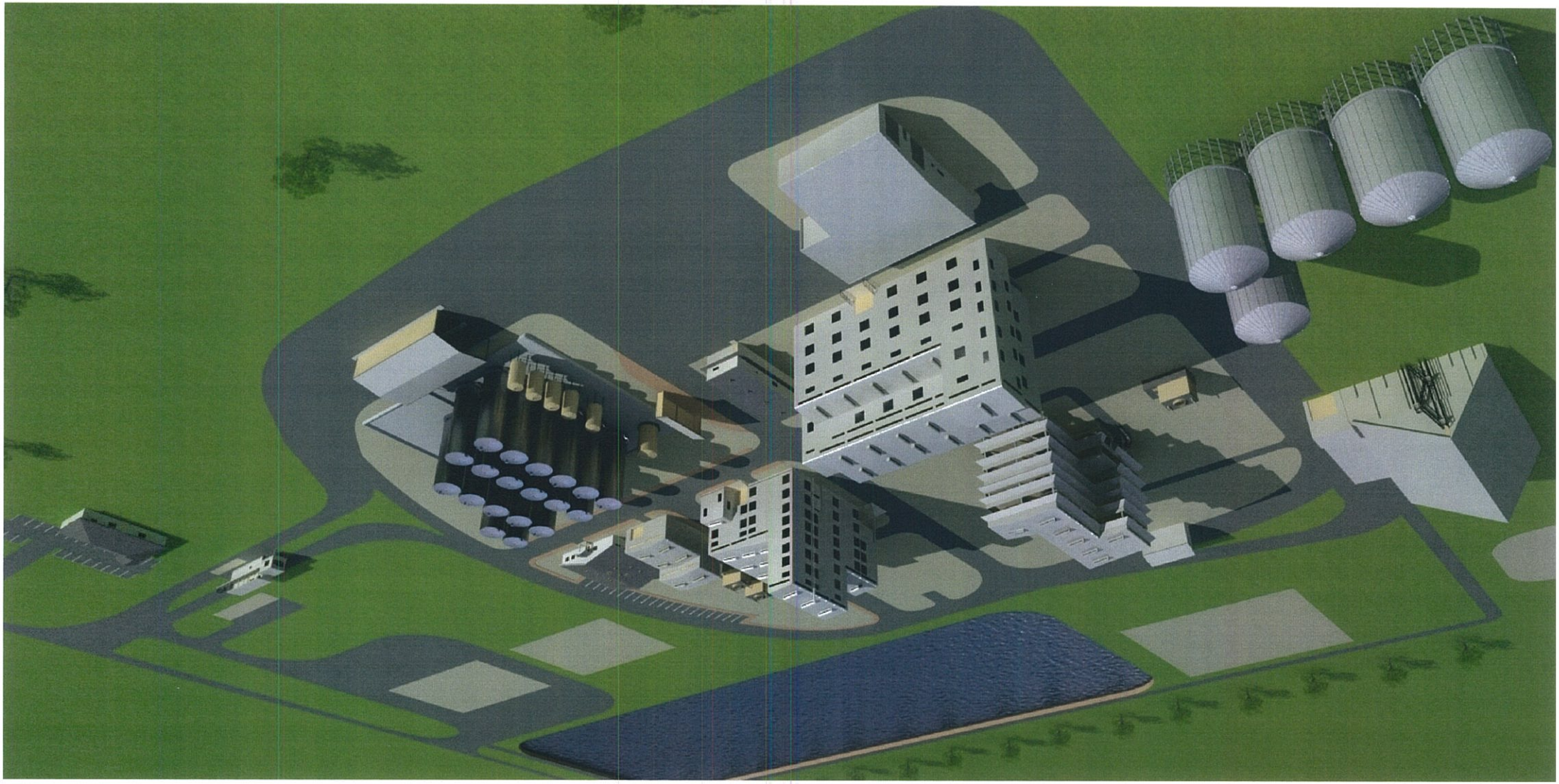
Attachment A

Robe 3D









Attachment B

EA Amended Section 9

9 WATER

NB. The following material (chapter 9.1) was produced by ENSR/AECOM in 2008 when the initial application was made, it has been altered by Lennon Salvestro Planning to reflect the new direction that the project will take and newly introduced legislation.

In recognition of the community concerns of the proposed irrigation of treated effluent following the modification public display, subsequent community meetings, and the unprecedented rainfall events of 2010, ROBE, in consultation with the DECCW now proposed to recycle the majority of process effluent with the inclusion of reverse osmosis, membrane technology. The proposed effluent storage pond shall now be utilised as an evaporative pond to dispose of approximately 49m3 of water daily.

Irrigation of treated effluent is no longer considered or requested as part of the project approval.

9.1 Process Water

9.1.1 General Description

The process will require 590kilolitres (kl) of water per day. Source water shall be supplied by Riverina Water County Council. The process is estimated to consumer 240kl lost in products, the preparation and recovery of steam and general escape due to wash down and evaporation. 350kl per day is sent to the effluent treatment plant for recycling. Each day the ETP shall recycle 300kl of water for the process with the remaining reject water sent to the evaporative pond. The pond has an approximate design capacity of 47ml and a surface area of 22,000m2.

Make up water of 290kl is to be supplied by Riverina Water County Council.

9.1.2 Water Supply

On the approval of the modification ROBE in consultation, ROBE intend to execute a negotiated position with Riverina Water County Council (RWCC) for the, installation of associated infrastructure to supply process water to the site. The current discussions with RWCC involve,

- Average daily usage of 300 kl
- Peak demand at 11litres per second (l/s)

RWCC advise that water volumes are available to ROBE and that a commercial supply agreement shall be established in accordance with the rates tables and policies of the RWCC.

RWWC shall at its own discretion make provision for future infrastructure requirements of the recently rezoned East Bomen Industrial Estate.

9.1.3 Effluent Treatment Plant (ETP)

The ETP is designed for an input flow of 349 kl per day.

Influent Streams

Streams are separated in order of need for treatment which reduces the energy required and the capacity of the plant. It is noted that black waters associated with human waste (black water) is not to be treated in the process water effluent treatment plant.

The wastewater influent to the ETP enters as three distinct streams, with following principal characteristics (max. levels), **table a**:

Table a: Input untreated effluent characteristics

Sr.	Parameter	Unit	Stream – 1	Stream – 2	Stream – 3
01	Source	-	SEP & Prep	Refinery	Utilities
02	Daily Flow	m3/day	106	123	120
03	Peak Flow	m3/hr	6.63	7.69	7.5
04	pH	-	4 – 7	3 – 11	7 – 11
05	TSS	mg/L	900	Nil	10
06	TDS	mg/L	1500	1500	1080

07	COD	mg/L	9736	20920	Nil
08	BOD-3 (20ºC)	mg/L	5842	12552	Nil
09	Total Oil & Grease	mg/L	1000	7058	Nil
10	Total N	mg/L	900	Nil	Nil
11	Temperature	ºC	35 – 65	Ambient	Ambient

A vendor supplied flow sheet is provided as **Attachment AA** and should be read in conjunction with the worded descriptions.

Primary Treatment

The process streams # 1 & 2, from Solvent Extraction Plant (SEP) / Seed Preparation Plant (SPP) and Refinery respectively, shall be first subjected to removal of free oil and floating matters in gravity oil separators designed on lines of API separators. The oil separator shall be a long channel with horizontal velocity of less than 0.12 m/min and vertical velocity of less than 0.5 m/hour to achieve detention and separation times. Each channel shall have two mechanical belt-type oil skimmers, which will operate periodically based on set time interval and duration. The oily water collected in the adjoining sump shall be hauled out periodically and containerised for suitable disposal. Both streams, after oil removal, shall be collected under gravity into an Equalisation (EQ) Tank. The EQ Tank will be employed to attain uniformity in terms of flow and quality of the effluent prior to subsequent treatment. Contents within the EQ tank shall be mixed using diffused aeration system in the form of coarse bubble grid. The equalised effluent shall be pumped to primary physicochemical treatment using an automatic flow control arrangement set at constant flow over 24- hour period based on incoming load.

The equalised effluent shall be neutralized in an on-line neutralisation tank. An automated pH control system shall be used to add either caustic or sulphuric acid, depending on whether the incoming liquid, is acidic or alkaline. The neutralised effluent shall be subjected to dosing of alum and polyelectrolyte to de-emulsify the emulsified oil and to promote formation of floccules. The floatation oil / scum and settleable solids will be removed in a Dissolved Air Floatation System (DAF). The DAF will employ a micro-bubble floatation system wherein recycled effluent will be mixed with compressed air under about 4 – 5 bar pressure and released in the DAF basin. The resultant micro-bubbles will induce floatation of smaller oil droplets, resulting in high oil removal efficiency compared to gravity separators. The settled sludge will be mixed with floating scum and sent for dewatering, while the clarified effluent will be let into the biological (secondary) treatment system.

Secondary Treatment

The primary treated process effluent is estimated to exert about 8383 mg/L COD and 6707 mg/L BOD while containing about 415 mg/L nitrogen. For efficient removal of organics as well as nitrogen, an advanced biological treatment system employing nitrification/denitrification combination based on activated sludge process is proposed. This system will ensure near-complete removal of biodegradable organics while optimizing on power consumption and alkalinity make-up. The excess biomass from the bioreactor shall be pumped out to sludge dewatering system at operator controlled frequency and duration based on biomass level (MLVSS) in the basin and influent BOD and Nitrogen load.

Tertiary Treatment

The bio-treated effluent will be collected in a Tertiary Equalization Tank and blended with utility effluent stream # 3. The mixed effluent will be subjected to polishing treatment using Pressure Sand Filter (PSF) and Activated Carbon Filter (ACF). These units will remove suspended solids while carbon will adsorb escaping organics to provide further reduction in levels of COD, BOD and Oil & Grease before entering the treated effluent sump. The PSF and ACF will be periodically backwashed at operator-controlled frequency and duration. The backwash water will flow to the Primary Equalization Tank. Activated Carbon performance can be monitored in this process by testing the absorbsion rate of iodine of the carbon, and shall be replaced once the iodine number is reduced to 425 mg/g.

Sludge Dewatering

Sludge from both primary and secondary treatment operations shall be combined and dewatered in a common system. Primary sludge from DAF unit and excess biomass from AIS will be pumped out by operator to the Sludge Thickener, which shall be a circular tank having sloped bottom and a scrapper mechanism. The thickened sludge exiting the bottom of the thickener shall be pumped out to a

Decanter Centrifuge for dewatering. Conditioning polymer shall be dosed in-line prior to the decanter to promote formation of floccules to achieve higher solid content in the wet cake. The wet cake shall be stored on concrete covered hardstands and shall be hauled out in trucks to landfill by a licensed waste cartage contractor. The centrate liquor from decanter will contain some solids and will be channeled back to the Primary Equalization Tank.

Recovery Section

A block diagram of the proposed recovery, recycling component of the ETP is included as Attachment DD.

349 kl/day of treated water at the treated effluent sump shall be pumped to the recovery section. The recovery section shall utilise Reverse Osmosis technology to reclaim for re-use 300 kl/day of process water.

Effluent enters the Primary Reverse Osmosis (RO) unit after exiting the inlet filter protecting RO membranes. The primary RO unit shall produce approximately 226kl/day as water suitable for the process which shall be pumped to an intermediate holding tank. Reject waters of the primary RO unit shall be pumped to a secondary RO plant.

The secondary RO plant shall produce approximately 74kl/day of water suitable for the process which shall also be pumped to the intermediate holding tank. Reject of the secondary RO will be of high TDS and shall be pumped to the Evaporative pond for disposal by evaporation.

The Evaporative pond is to be constructed utilising the natural contours of the site as shown in figure XX , harvesting the existing impermeable clay for the construction of the base and retaining walls. To ensure that the possibilities of the high strength effluent breaching the impermeable clay layer are reduced, a fully welded 2.5mm thick poly liner shall be placed. The construction and placement of the liner shall include for a “tell all” sample point to establish any faults with the poly liner.

The evaporative pond shall be constructed so that in months of high evaporation in the course of an average rainfall year (January and February) that it is possible to completely dry one half of the pond. This will for maintenance of the evaporative pond and the continued operations of the

Table b: Treated effluent characteristics thru flow chart

Sr.	Parameter	Units	Plant Effluent	After Primary	After Biological	Final Effluent	Recovery Reject
01	Daily Flow	m3/day	229	229	229	349	49
02	Peak Flow	m3/hour	14.4	9.6	9.6	15	2.25
03	pH	-	3-11	6-8	6-8	6-8.5	8.5-9.5
04	Temperature	° C	20-65	<35	<38	< 36	<40
05	Total O & G (incl FM)	mg / L	9521	1904	~25	< 5	<5
06	TSS	mg / L	415	75	75	< 30	1500
07	TDS (Inorganic)	mg / L	<500	<500	<500	< 700	4300
08	COD	mg / L	15743	6300	~150	< 90	180
09	BOD	mg / L	9446	3780	~50	< 30	150
10	Total Nitrogen	mg / L	415	150	~50	< 50	500
11	Phosphorus	mg/L	29	29	< 15	< 10	1500

The recovery reject will be classified as high strength effluent under the DEC guidelines and as such must be contained to site.

The generation storage and disposal of sludge, and the disposal of solids from the evaporative pond shall be in accordance with DEC's Environmental Guidelines for the Assessment, Classification and Management of Liquid and Non-Liquid Waste (EPA 1999a)

Table 1: DEC Classification of effluent based on average concentration

Constituent	Low mg/L	Medium mg/L	High mg/L
BOD	<50	40-1,500	>1,500
Total Nitrogen	<50	50-100	>100
Total Phosphorus	<10	10-20	>20
Total Dissolved Solids	<600	600-1,000	>1,000-2,500

9.1.3 Potential Impacts

The potential harmful impacts associated with the generation and treatment of effluent, and the storage for evaporation of the reject waters is,

- Added pressure to the water resources distributed by RWCC.
- The release of chemicals used in the effluent treatment process,
- Odours generated at the ETP and from the evaporative pond.
- Noise generated of the ETP.
- The escape of untreated effluent to the environment,
- The escape of reject water within the evaporative pond to the ground and associated ground water

9.1.4 Environmental Safeguards

The IOPP is designed for commercial reasons to ensure that all consumable items including water usage is reduced in a quest for efficiency.

All chemicals handled and stored on site in the operation of the ETP, and in fact the IOPP, shall be done so in accordance with the relevant Australian Standards, the material safety data sheets (MSDS) and recognised industry best practice. All areas where chemicals are stored shall be bunded to ensure any release shall be captured to drainage pits, or sent directly by means of one of the effluent streams to the ETP. Operational procedures shall be established to measure the performance and effectiveness of the storage and handling systems.

The effluent of the evaporative pond is concentrated yet unchanged in composition to that assessed by Heggies in the Air quality and Odour Assessment of the modified EA, which concluded that stored process plant effluent was not likely to negatively impact the receptors of the study area. The removal of irrigation scheme from the proposal further reduces any likelihood of exposure to nuisance odours.

The removal of the irrigation scheme reduces the need for a large electrically driven irrigation pump. It is recognised that the treatment plant will be operating 24 hour per day. Reverse Osmosis units have been known to create some noises on start up and after maintenance due to the inclusion of air to the system. Otherwise the ETP is a series of tanks and pumps and a pair of endless belts that might generate operational noise. Removal of sludge will occur only within daylight hours as in operating wheeled loaders as per the existing permit conditions The inclusion of the ETP and recycling scheme is not expected to have any further negative impacts to the local receptors.

Effluent is generated at various components of the IOPP and transferred by gravity to the ETP. All effluent pipes other than various capture pits are designed with fall by gravity in order to be to fully discharge on zero flow status reducing the risk of leakage to the environment. All effluent lines shall be tested on installation prior to plant commissioning, and routine testing shall be incorporated to operational and management plans to ensure the integrity of the effluent drainage system.

The integrated nature of the plant will see that the ETP must be operational to maintain production of the IOPP. In the event of an ETP failure the IOPP must be shut until the ETP functionality is restored. The ETP is designed to receive 350kl of effluent of the quality predicted per day. All components of the ETP shall have a default overflow to the following component of the treatment systems. This is to ensure that untreated effluent cannot be discharged to the environment the result of mechanical equipment failure. The area about the ETP is to be bunded where any wash down water or effluent escaping from failed equipment shall be contained and returned to the system for treatment. In the event of total power failure, effluent entering the ETP shall force downstream effluent to discharge small quantities direct to the evaporative pond.

The evaporative pond has the following design criteria,

- two captive chambers with a total design surface area of 21,922 m2,
- to receive 49m3 of effluent per day for 351 days per year,
- a programmed shut of the IOPP each year for 14 days during August,
- to be suitably sized to ensure that maintenance can be completed on one half of the evaporative pond during February in average rainfall years.
- Be suitably sized that successful operation of the pond can continue for many years without maintenance.
- be sufficiently sized so that the holding capacity in a 95%ile wet year shall be incorporate 100% redundant capacity after prolonged periods of no maintenance.
- Shall be constructed with an impervious clay liner with the added security of a fully welded plastic liner
- Shall have a tell all system included to check the integrity of the poly liner
- Additional monitoring bores shall be placed in consultation with NSW Office of Water to monitor incoming and outgoing ground water of the site to ensure that ground water is not adversely affected by the use of the evaporative pond.

The following table summarises the capability of the evaporative pond. Detail calculations of the various scenarios are included as Attachment BB (water balance)

EVAPORATVIE POND TOTAL STORAGE 47ML					
	Effluent	**Rainfall**	**Evaporation**	**Net Change**	**Max Holding Capacity required**
Mean rainfall	49m3	475mm	1712mm	-13,009m3	5,945m3
90%ile Year	49m3	1105mm	1712mm	8,635m3	15,714m3
95% ile year	49m3	1346mm	1712mm	13,616m3	19,290m3
2010**	49m3	1056mm	1712mm	2,852m3	11,504m3
Wettest recorded	49m3	2024mm	1712mm	24,077m3	25,085m3

9.1.5 Residual Impacts

Given the successful implementation of the environmental safeguards, the potential for uncontrolled release of contaminated water is limited. There are considered no residual impacts from the establishment of the process water recycle scheme.

9.2 Surface Water

The site lies within the Murrumbidgee Catchment Management Area of which the Murrumbidgee River is the main stream. The source of the Murrumbidgee River is in the Fiery Ranges of the Snowy Mountains. From here it flows 1,600 km westward to its confluence with the Murray River near Balranald. The Murrumbidgee River passes through Wagga Wagga, approximately 10 km south of the site. The Murrumbidgee River is a regulated system with a number of large dams and weirs having been constructed along its length. It is the water source for a number of uses including irrigation, aquaculture, industry, domestic and environmental flows.

The Wagga Wagga catchment area is predominantly situated on a large drainage basin comprising heavy clay soils, with only a small catchment discharge point (Wagga Wagga and Urban Salinity, n.d.).

Surface water quality has been affected by extensive clearing and other land management practices in the catchment, leading to increased turbidity, nutrient levels, bacterial pollution and pesticide levels (EPA, 1995).

The site is situated on a high section of land, where originally the eastern section of the block drained naturally to the Byrnes Road Reserve, the southern section of the site to the Trahairs road reserve, the north and eastern to the neighboring property, where surface waters are diverted about evaporative ponds on this property to eventually meet with storm waters of Trahairs Road which enters Schillers Creek. There are no streams running through or bordering the site.

Trahairs Road, up to the main entrance of the proposed IOPP will continue to drain to Byrnes Road reserve, while past the proposed IOPP development main entrance drains directly to RIVCO Group Pty Ltd land at control points along the length of Trahairs Road.

MJM Solutions have designed the storm water system in consultation with DECCW in order to ensure that peak discharge from the developed site will not exceed peak discharge of the undeveloped site. The MJM calculations are attached as **Attachment CC.**

9.2.1 Present Users

The Murrumbidgee River is the major water supply for a number of different uses including:

- Major population's centres, such as Wagga Wagga;
- Large irrigated agricultural and irrigated pastoral developments;
- Aquaculture; and
- Industry.

The Murrumbidgee River is a regulated system and water delivery to users is the responsibility of the State Water Corporation. The allocations include water for environmental flows.

9.2.2 Wetlands

The EPBC Protected Matters Search Tool identified one Ramsar Wetland, the Fivebough and Tuckerbil Swamps, in the same catchment as the site. The wetland is in the Murrumbidgee catchment; however, it is located over 135 km from the site. There are no wetlands of national significance located in the vicinity of the site.

9.2.3 Droughts and Flooding

The Murrumbidgee River has flooded a number of times since European occupation affecting areas of the northern and southern floodplains. The development site is situated at AHD 240m on gently sloping land, well above the underlying valley where temporary floodwaters draining Schillers Creek are regularly recorded at AHD 200m.

The proposed 47 megalitre evaporative pond has a dam wall at the AHD237m level. The Murrumbidgee River South of Byrnes Road intersection with Gundagai Road has a normal running level at approximately 185m level, therefore no threat to direct cross contamination of the river by flooding exists.

The development site has remained accessible throughout the 2010 year regardless of the storm events indicating that site drainage remains adequate and that environmental risks associated with flooding the site due to rainfall or natural floodwaters are minimal.

Droughts have also been a feature of the region, particularly in recent years. In October 2007, the Wagga Wagga area was identified as an area suffering drought conditions (Department of Primary Industries, 2007). As the Murrumbidgee River is a regulated system, water is allocated according to availability. Domestic and basic rights supplies are given first priority, followed by core environmental needs and then irrigation and industry. Such conditions are expected to result in a reduction in water quality if drought conditions continue (Department of Primary Industries,
2007a).

9.2.4 Potential Impacts

There is no natural surface water bodies located on the site and as such, potential impacts would be associated with runoff or sediment leaving the site and affecting the surface water bodies in the vicinity of the site.

Potential impacts during construction are associated with earthworks and stockpiling of soils. These activities may cause:

- Increased turbidity of surface waters resulting from erosion and sediment laden runoff as a result of earthworks and construction traffic;
- Increased turbidity of surface waters as a result of water and wind erosion of stockpiles and access roads; and

- Contamination of surface waters as a result of accidental spillage of fuel from drilling Rigs, support vehicles and passenger vehicles. Potential impacts during operation may include:

- Contamination of surface water caused by offsite release of wastewater, runoff or overflow from proposed storage dam; and

- Contamination of surface waters as a result of accidental spillage of fuel from rigs, Support vehicles and passenger vehicles.

9.2.5 Environmental Safeguards

Potential impacts to surface water would be minimised by design measures incorporated into the construction, and approved plant operational procedures. The following measures would be implemented during the construction phase:

- Sediment and erosion control measures, such as sediment fences, are to be installed between the construction area and surface water bodies where the drainage is towards the surface water body;
- Erosion and sediment control measures are to be detailed in a Construction Environmental Management Plan;
- All stockpiles are to remain covered, where possible; and
- Spill kits are to be made available to construction vehicles so that accidental leaks and spills can be readily cleaned.

The facility is designed so that water resources are utilised in the most efficient process commercially available.

The storm water scheme has been prepared in consultation with DECCW.

Process effluent and wash down waters are prevented from entering the storm water systems.

A storm water first flush retention /detention pond is proposed to ensure peak storm water discharge from the developed site remains within the pre-developed storm water discharge volumes from the site in a 1 in 100 ARI storm.

The detention pond will retain a minimum 170m3 freeboard capacity, capable of being contained to the pond by closing the discharge valve in the event of a site fire to ensure contaminated waters are not discharged to the environment the result of fire fighting activities.

Areas containing storage tanks are bunded to contain spilt products and retain fires, and contaminated waters expended to fight fires should the contents of the storage tanks escape and be ignited.

The solvent delivery system is designed to reduce the chance of leaks however the designated area is bunded and an effluent trap is provided to contain any potential leaks during or after the delivery process.

The oil dispatching and chemical unloading bay is covered and bunded to ensure any spilt products are contained and delivered to the ETP via the gravity waste water scheme.

9.2.6 Residual Impacts

Given the successful implementation of the environmental safeguards, the potential for uncontrolled release of contaminated water is limited. Furthermore, the distance of surface water bodies from the Site makes it unlikely that contaminated water from the proposed facility would affect them.

9.3 Groundwater

9.3.1 Introduction

The proposed IOPP includes the construction of an evaporative pond for the disposal of reject process

waters. The design specifications of the evaporative pond include a two basin construction with a combined surface area of 22,000m2 and a total capacity of 47megalitres.

Storm water is to be discharged within the natural contours of the site in accordance with the Storm Water Design as described in 9.2 and Attachment AA.

The EA includes a groundwater review from data listed below.

- Aitken Rowe Testing Laboratories Pty Ltd Geotechnical Investigation 2007.
- Charles Sturt University (CSU, 2006) Annual Environmental Report 2006, Riverina Wool Combing Pty Ltd.
- Charles Sturt University (CSU, 2005) Annual Environmental Report 2005, Riverina Wool Combing Pty Ltd.
- Johnstone Centre (2005) Annual Environmental Report 2004, Riverina Wool Combing Pty Ltd. Report No. 114. March 2005.
- HLA ENSR (2008) Irrigation Assessment, Wagga Wagga. 27 February 2008.
- HLA ENSR (2007) Soil Suitability Assessment, Use of Effluent by Irrigation – Riverina Oils and Bio Energy. 12 December 2007.

Subsequent information has been accessed from the data list;

- Groundwater Review –McMahon December 2010
- HLA ENSR (2008) Groundwater Review, Riverina Oils and Bio Energy. 19 March 2008.
- Monthly groundwater depth data 28 October 2009 to 16 November 2010 provided by Rivco Pty Ltd, current owners of the Riverina Wool Combing site.
- Weekly groundwater depth data 1 January 2007 to 6 May 2009 provided by Charles Sturt University Wagga Wagga, contracted samplers.
- Water quality analysis undertaken 2 December 2008, Charles Sturt University, Wagga Wagga.
- Water quality analysis undertaken 17 November 2010, ROBE

The review of groundwater in the EA utilised data collected from the years 2004 to 2006 using an existing network of monitoring bores established during the Riverina Wool Combing operation on and adjacent to the proposed ROBE site. The reports provided average groundwater depths for the year and average groundwater quality across all existing bores for the year.

9.3.2 Background Geology and Hydrogeology

Geology

Regional Geology

The geology of the Wagga Wagga region is summarised as extensive folded Ordovician meta sediments and large intruded Silurian granite masses as well as minor Devonian sandstones occupying hilly areas

Up to 10 m of Cainozoic alluvial, slope-wash and windblown clay has been deposited in the valley alluvial plains of all drainage systems.

Local Geology

The geology underlying the site is dominated by the Silurian granites, predominantly Wantabadgery Grandiorite and Collingullie Granite (Adamson and Loudon, *Wagga Wagga* 1:250,000 Geological Series Sheet S1-55-15, 1st ed. 1966). Thick clay sequences are present overlying the granite, with significant Aeolian clay in drainage depressions. During previous investigations in the locality of the subject site (CSIRO, 1990; Coffey Partners, 1992), soils comprising surface sandy loams over plastic silty to sandy clays were encountered to depths of approximately 6 metres. Fine gravels consistent with weathered granitic bedrock (saprolite) were encountered in clay materials from approximately 3 metres below ground surface. Variably weathered bedrock could occur to depths of approximately 40 metres below grade

Soils

The *Soil Landscapes of the Wagga Wagga 1:100,000 Sheet* (DLWC, 1997) describes the soils in the vicinity of the site as being part of the East Bomen soil landscape group, comprising shallow to moderately deep (40-150cm) Eutrophic Red Dermosols on crests and ridges; deep (80-200cm)

Eutrophic Red Dermosols on slopes; and moderately deep (80-150cm) Eutrophic Brown Dermosols in drainage lines.

Surface Water, Topography and Drainage

The topography in the vicinity of the site is generally flat with an elevation of approximately 245 metres (*Wagga Wagga* 8327-1-N 1:25,000 Topographic Map, 2nd ed. NSW Department of Lands 1991).

The site is located within the Wagga Wagga catchment area, located along the Murrumbidgee River. The proposed location for the bio-diesel plant is approximately 7 km north of the Murrumbidgee River. A number of minor tributaries and drainage lines are located in the vicinity of the site and suggest a southerly drainage direction in the event of storm events.

Hydrogeology

Regional Hydrogeology

The Wagga Wagga catchment area is predominantly situated on a large drainage basin comprising heavy clay soils, with only a small catchment discharge point. The combination of geographical and geological features prevents groundwater from easily migrating away from the area, resulting in water logging and increased salinity, affecting both urban and agricultural environments (Wagga Wagga City Council, 2007).

There are three regional hydro geological units of the Wagga Wagga area, including the Ordovician meta sediments, the Silurian granites and Tertiary and Quaternary alluvium (CSIRO, 2001). Groundwater yields within the meta sediments typically range between 0.3 and 0.5 litres per second (L/s), with higher yields experienced where well-fractured zones are intersected. Bores constructed within granites have typically been unsuccessful, although yields of up to 0.2 L/s have been recorded. Yields from alluvium production bores are up to 200 L/s. The depth of the water table in the Wagga Wagga area varies, but has been recorded at less than 2 m in areas where salinity has affected urban infrastructure and vegetation (CSIRO, 2001).

Local Hydrology

Historical reports have identified the presence of two aquifers beneath the site including:

- A shallow, or perched aquifer is present at approximately 2 metres depth; and
- A deeper aquifer is present between 4 and 13 metres below the surface.

Little data is available regarding shallow groundwater flow directions prior to excavation and use of the evaporation ponds of the RIVCO site, however groundwater is expected to have flowed in an easterly direction from recharge areas on the elevated ground towards lower ground along the water courses.

Falling head permeability tests reported in previous annual reports indicate lateral infiltration rates of approximately 0.15 m/d in sandy clay and 0.0012 m/d to 0.0018 m/d in clay with minor sand content in the vicinity of the subject site

In addition to groundwater within the weathered granite zone, groundwater is likely to flow through fractures within the underlying granite bedrock, with variable flow rates depending on the local interconnectivity of fractures.

9.3.3 Background Surface Water, Topography and Drainage

The topography in the vicinity of the site is generally flat with an elevation of approximately 245 metres (*Wagga Wagga* 8327-1-N 1:25,000 Topographic Map, 2nd ed. NSW Department of Lands 1991).

The site is located within the Wagga Wagga catchment area, located along the Murrumbidgee River. The proposed location for the processing plant is approximately 7 km north of the Murrumbidgee River. A number of minor tributaries and drainage lines are located in the vicinity of the site and suggest a southerly drainage direction in the event of storms or spills.

9.3.4 Summary of the Groundwater Review in the EA

The EA identified from historical reports two aquifers beneath the site including:

- A shallow, or perched aquifer is present at approximately 2 metres depth; and
- A deeper aquifer is present between 4 and 13 metres below the surface.

Groundwater level monitoring results and trends within the two aquifers present at the site indicate there is little connectivity between aquifers, with differences in water levels from paired wells of up to 7 metres and annual trends differing between the two aquifers in some locations.

Groundwater is expected to have flowed in an east to south easterly direction from recharge areas on the elevated ground towards lower ground along the water courses.

An overall decline in groundwater levels was experienced from 1997 to 2006. Historical results indicated limited correlation between rainfall and groundwater levels in the shallow (perched) aquifer prior to these wells going dry. The average annual standing water levels reported for the shallow wells were more erratic, indicating the shallow aquifer may be influenced more by surface activities such as irrigation and the intermittent use of the evaporation ponds on the Riverina Wool Combing site. The evaporation ponds have not been used since 2006 nor has any irrigation taken place since this time.

Aitken Rowe Testing Laboratories completed a geotechnical evaluation of the development site in December 2007. The evaluation determined that the permeability of clays (compacted to 95% standard maximum dry density) underlying the site were in the order of 1.0x10-9 m/sec. The report also stated,

"*Based on the test results, visual inspection of the material and subsurface profile as discussed above, the underlying clays are considered impermeable*".

Bores used for irrigation and stock watering are located more than two kilometers from the site and are therefore unlikely to be affected by changes in groundwater levels or water quality. Historical data have indicated that changes to deep aquifer water levels in the vicinity of the evaporation ponds were not found to affect the surrounding area. Monitoring of groundwater quality and standing water levels would identify any potential for off-site impacts.

Should significant unseasonal increases in groundwater levels be recorded or changes in ground water quality to groundwater quality during routine monitoring, the lining of the pond should be inspected and repaired accordingly

9.3.5 Local Ground Water Conditions

In liaison with Mark Mitchell, local Hydro geologist with NSW Office of Water (NOW), a review of the existing bores on the Riverina Wool Combing site was undertaken to ascertain groundwater height and quality. NOW bores which are located within the region are too far away from the site to provide meaningful data. There are 39 bores on the RWC site and at each existing bore site (except 13) the bores are nested with a shallow bore and deeper bore. The shallow bores are designed to monitor any shallow sub surface water in slope wash soil layers whilst the deeper bores monitor the groundwater that generally flows along the drainages on top of bedrock or impermeable clay. The general direction of the groundwater flow follows the topography of the land and the major drainages

in the locale. The deeper aquifer as described by Mark Mitchell within the area is post 30m deep below rock substructure and is not considered to be affected by this development.

Following is a table of the existing bores on site their drilled depths from ground level, measured height (AHD) and their characteristics. It is interesting to note that of the 17 existing bores consistently monitored, only three have always water present since 2007, two have had water sporadically present and the remaining 12 are dry. All shallow bores have been dry since 2007 indicating their unresponsiveness to rainfall. Monitoring bore network is illustrated in Figure A:

Bore ID	Drilled Depth m	AHD	Characteristic
1A	1.8	227.85	Dry
1B	11.0	227.85	Wet
2A	1.8	228.17	Dry
2B	6.9	228.17	Dry
3A	1.85	228.16	Dry
3B	4.9	228.16	Dry
4A	1.7	228.52	Dry
4B	11.05	228.52	Sporadically wet
5A	1.8	222.27	Dry
5B	4.4	222.27	Wet
6A	1.8	222.58	Dry
6B	5.4	222.58	Wet
13	4.4	223.81	Wet
14A	6.45	226.84	Dry
14B	10.5	226.84	Dry
15A	6.3	228.15	Dry
15B	10.6	228.15	Sporadically wet

Figure A: Monitoring Bore Network

The depth of the groundwater has been measured monthly from 28 October 2009 to 16 November 2010. Weekly groundwater depth was measured from 1 January 2007 to 6 May 2009. There are a further 5 sets of paired bores on the Riverina Wool Combing site that were referred to in the EA, (16, 17, 18, 19 and 20) but these bores have remained dry since 2007 and/or are located away from the study area.

The depth of groundwater indicates that the shallow aquifer has not had any water present since 2007 and that only four of the bores on site have water in them regularly. As follows is a hydrograph showing the groundwater heights of the bores in relation to rainfall from 2007 to November 2010. Since the request of NOW, daily monitoring has commenced for ground water levels and samples shall be collected monthly after storm events for quality testing. Those bores that provide regular data are included to the chapters following.

Average monitored ground water levels are included in Table C:

Bore No.	Well Depth (m from ground surface)	Standpipe Height (m)	AHD (m at ground Surface)	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
P1a	1.8	0.49	227.85	dry	227.00	226.35	226.33	226.19	226.11	225.53	dry	226.10	224.88	dry			
P1b	11	0.44	227.88	222.65	222.95	221.98	222.26	221.72	221.23	220.95	220.64	221.03	219.93	219.20	220.35	220.15	220.39
P2a	1.8	0.52	228.17	dry	227.42	226.54	226.55	226.44	226.33	dry	dry	dry	dry	dry			
P2b	6.9	0.43	228.17	dry	dry	221.25	222.10	dry	dry	dry	dry	221.41	dry	dry			
P3a	1.85	0.30	228.16	dry	dry	226.10	226.23	dry	dry	dry	dry	226.24	dry	dry			
P3b	4.9	0.37	228.16	dry	dry	dry	224.16	dry	dry	dry	dry	dry	dry	dry			
P4a	1.7	0.31	228.52	dry	dry	dry	219.18	dry	dry	dry	dry	dry	dry	dry			
P4b	11.05	0.33	228.52	222.12	221.72	219.41	218.27	217.80	217.27	dry	dry	219.42	217.54	214.06			
P5a	1.8	0.11	222.27	221.15	221.05	220.51	220.84	220.74	220.23	dry	dry	220.22	dry	dry			
P5b	4.4	0.31	222.27	221.28	222.08	220.68	220.85	220.81	220.20	219.61	218.94	218.91	217.70	219.63	217.53	216.92	219.61
P6a	1.8	0.42	222.58	222.43	221.93	221.05	220.91	220.98	220.81	dry	dry	220.68	dry	dry			
P6b	5.4	0.42	222.58	221.33	221.03	220.50	220.66	220.63	219.93	219.28	218.67	218.49	217.13	215.93	217.74	217.34	220.03
P7a	1.8	0.41	222.47	221.97	221.67	220.82	220.75	220.61	dry	dry	dry	220.6	dry	dry			
P7b	4.9	0.39	222.47	dry	dry	dry	dry	217.94	dry	dry	dry	dry	dry	dry			
P8a	1.8	0.36	218.03	dry	dry	216.22	dry	dry	dry	dry	dry	dry	dry	dry			
P8b	5.5	0.33	218.03	217.33	215.73	212.47	213.59	dry	dry	dry	215.92	dry	dry	dry			
P9a	1.8	0.38	218.31	217.41	217.31	216.73	216.48	216.38	216.37	dry	dry	216.15	dry	dry			
P9b	3.8	0.41	218.31	217.41	217.21	216.67	216.65	216.43	215.99	215.62	214.94	214.77	213.52	213.09			
P10a	1.8	0.44	218.28	dry	dry	216.52	216.68	dry	dry	dry	dry	216.52	dry	dry			
P10b	8.35	0.47	218.28	214.08	213.68	212.31	211.58	211.76	210.66	210.87	dry	210.73	dry	dry			
P11a	1.7	0.21	228.79	dry	dry	dry	226.71	dry	dry	dry	dry	dry	dry	dry			
P11b	11.05	0.32	228.79	dry	dry	dry	dry	dry	dry	dry	217.25	dry	dry	dry			
P12a	1.9	0.61	222.67	221.87	222.07	221.09	221.07	221.19	220.76	dry	dry	dry	dry	dry			
P12b	12.95	0.73	222.67	211.57	212.27	210.99	211.73	212.56	213.09	212.84	210.48	209.37	dry	dry			
P13	4.4	0.58	223.81	223.41	223.21	222.61	222.78	222.49	222.48	220.66	222.18	222.33	219.92	215.59	220.95	220.01	221.33

P14a	6.45	0.44	226.84	dry	dry	dry	220.68	dry	dry	dry	dry	221.26	219.85	dry			
Bore No.	**Well Depth (m from ground surface)**	**Standpipe Height (m)**	**AHD (m at ground Surface)**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
P14b	10.5	0.53	226.84	dry	dry	216.70	221.69	dry	dry	dry	dry	dry	dry	dry			
P15a	10.6	0.50	228.15	dry	dry	217.93	dry	dry	dry	dry	dry	dry	216.95	dry			
P15b	6.3	0.51	228.15	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry			
P16a	6.6	0.42	235.33	dry	dry	dry	230.52	229.23	dry	dry	dry	229.80	dry	dry			
P16b	10.7	0.44	235.33	dry	dry	224.87	225.03	dry	dry	dry	225.13	dry	dry	dry			
P17a	2.3	0.49	234.01	dry	233.36	dry	232.07	dry	dry	dry	dry	232.16	dry	dry			
P17b		0.51	234.01	dry	231.83	227.06	dry	dry	dry	228.20	dry	226.98	225.79	dry			
P18a	2.1	0.55	239.04	dry	dry	dry	237.91	dry	dry	dry	dry	dry	dry	dry			
P18b	7.6	0.81	239.04	dry	dry	dry	235.18	dry	dry	dry	dry	dry	dry	dry			
P19a	3.15	0.52	224.46									221.90	220.81	220.80			
P19b	8.26	0.50	224.53									217.00	215.79	215.46			
P20a	3.2	0.55	225.08									222.50	221.37	221.40			
P20b	10.95	0.50	225.13									215.06	213.75	214.56			

Table C: Average Monitored Ground Water Levels

9.3.6 Site Rainfall

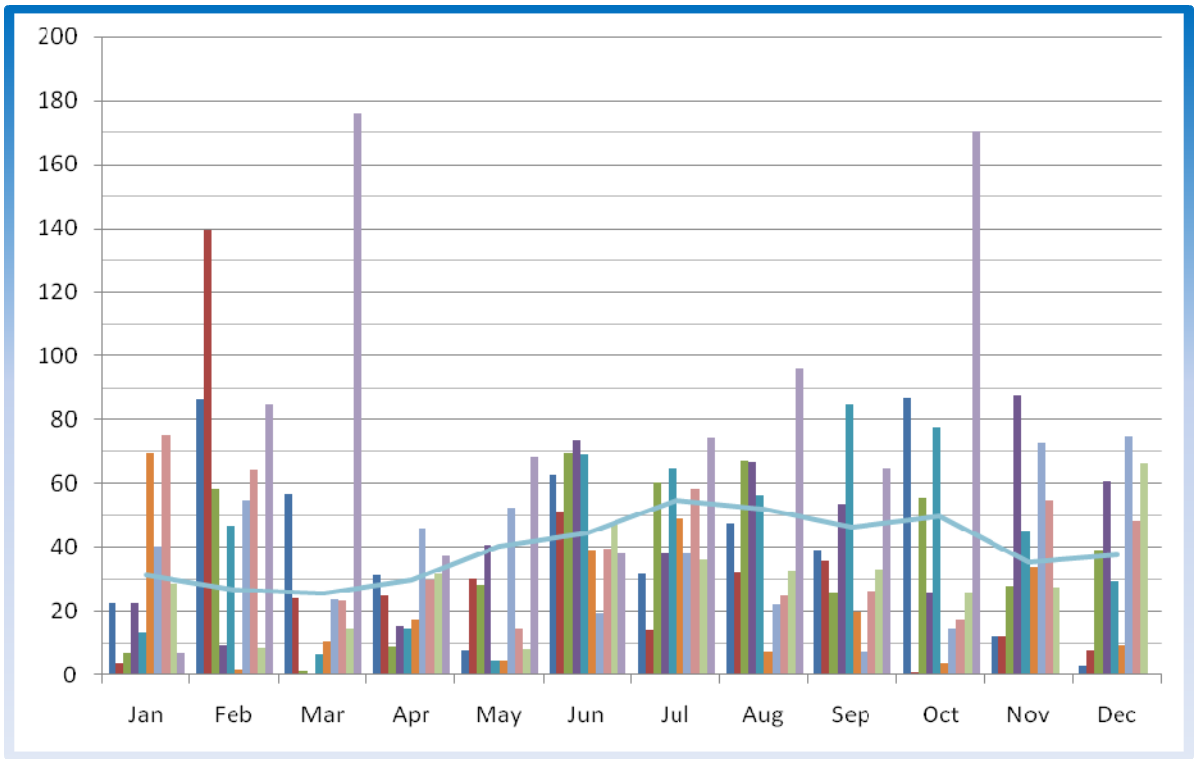
Wagga Wagga has an average annual rainfall of 572 mm, normally distributed equally over the full 12 months of the year
Maximum temperatures in summer are warm, averaging between 29°C and 32°C. The winters are cool to cold with overnight minimums averaging 3°C and daily maximums climbing to only 12°C to 14°C on average.

Average monthly rainfall over the period 2001 to current is presented in **Table D** below

Table D: Monthly Rainfall – Wagga Wagga (Weather Station 072150)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2001	22.8	86.4	56.6	31.2	8	62.8	31.6	47.6	39.2	86.8	12	3.2	488.2
2002	3.6	139.8	24	25	30.2	50.8	14.4	32.4	36	0.6	12.2	7.8	376.8
2003	7	58.6	1.6	9.2	28.4	69.4	60.2	67.2	26	55.4	28	39.2	450.2
2004	22.8	9.4	0	15.4	40.8	73.4	38	66.8	53.6	26	87.6	60.6	494.4
2005	13.2	46.8	6.6	14.6	4.6	69	65	56.4	85	77.6	44.8	29.4	513
2006	69.4	1.8	10.6	17.4	4.6	39.4	49.2	7.6	20	3.8	34	9.4	267.2
2007	40.2	54.6	23.8	46	52.4	19.4	38.2	22.2	7.4	14.6	73	74.6	466.4
2008	75.2	64.4	23.4	29.8	14.8	39.6	58.4	24.8	26.6	17.4	54.6	48.4	477.4
2009	28.8	8.6	14.8	31.8	8.2	47.4	36.2	33	33.2	25.8	27.4	66.4	361.6
2010	7	85	*176*	*37.4*	*68.2*	*38*	*74.4*	*96.4*	*65*	*170.2*	*88.2*		817.6
Median	31.4	26.8	25.6	29.8	40.4	44.5	54.8	52.2	46.5	49.9	35.5	37.9	561
90th %ile	83.8	85.1	105.5	87.1	103.2	87	94.5	89.3	82.6	113.5	83.4	90.2	722.6
95th %ile	99.7	107.7	138.9	100.5	148.7	97.1	101.1	94	99.7	145.8	98.1	115.4	777.8
Highest	174.4	157.5	249.2	216.9	190.3	138.8	130	101.4	128	181.7	142.4	213.4	926.8

Graphical Representation of Monthly Rainfalls in mm 2001, Overlaid with Median rainfall median for 60 year history (Source Weather Station 072150)



9.3.7 Ground Water Monitoring

A graphical representation of historical data is provided at the request of NOW as figure xx. The daily rainfall data is an interpolated dataset for the site (-35.05 147.45, Decimal Degrees) and was obtained using the SILO DataDrill, QDNRM 2010. The interpolated dataset provides daily observations from 1880 to present.

From the 1st December rainfall data shall be obtained from the independently certified and calibrated weather station approved (DECCW) located on the proposed development site.

The data shows that bore 13 is relatively responsive to rainfall events and recharge with fluctuations of up to 3.8 metres in depth ranging from 1 meter depth to 4.8 metres depth. The groundwater in bore 13 appears to be at its highest in the winter and spring months and at its lowest over summer. This is a cyclic trend indicating that recharge of the groundwater at bore 13 is occurring after the winter months where rainfall exceeds evaporation. Bore 13 is located in a diversion drainage line between 2 dams which would be the single biggest contributing factor to the constant presence of water and responsiveness to winter rainfall and subsequent recharge. See **figure d** showing the location of the dams and the drainages lines in relation to bore 13.

Bores 1B and 6B have remained comparatively steady since 2007 with some increases in levels in 2010 which coincided with above average rainfall experienced in the months of February, March, May, July, August, September and October 2010.

Bore 15 had water present for the first time in November 2010 and was able to be sampled.

Bore 5B has indicated uncharacteristic recharge with the abnormal weather events of 2010 and shall be monitored daily to plot the receding ground water progress. A replacement monitoring bore may be required to ensure that the monitoring bore for deeper waters is not compromised.

Additional monitoring bores have been established in consultation with NOW A,B,C as paired sets to further enhance the ground water monitoring network and is described in figure e. Location of the monitoring bores is illustrated below. Information is recorded from the expanded bore network commencing 1st December 2010.

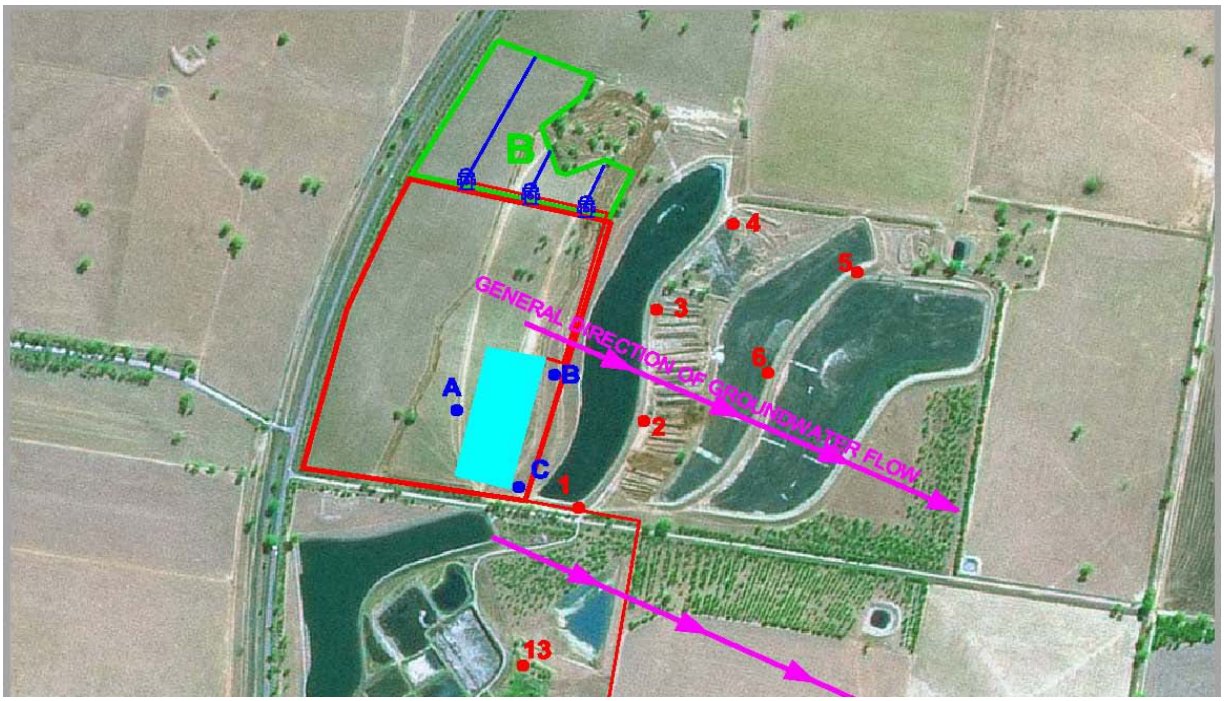
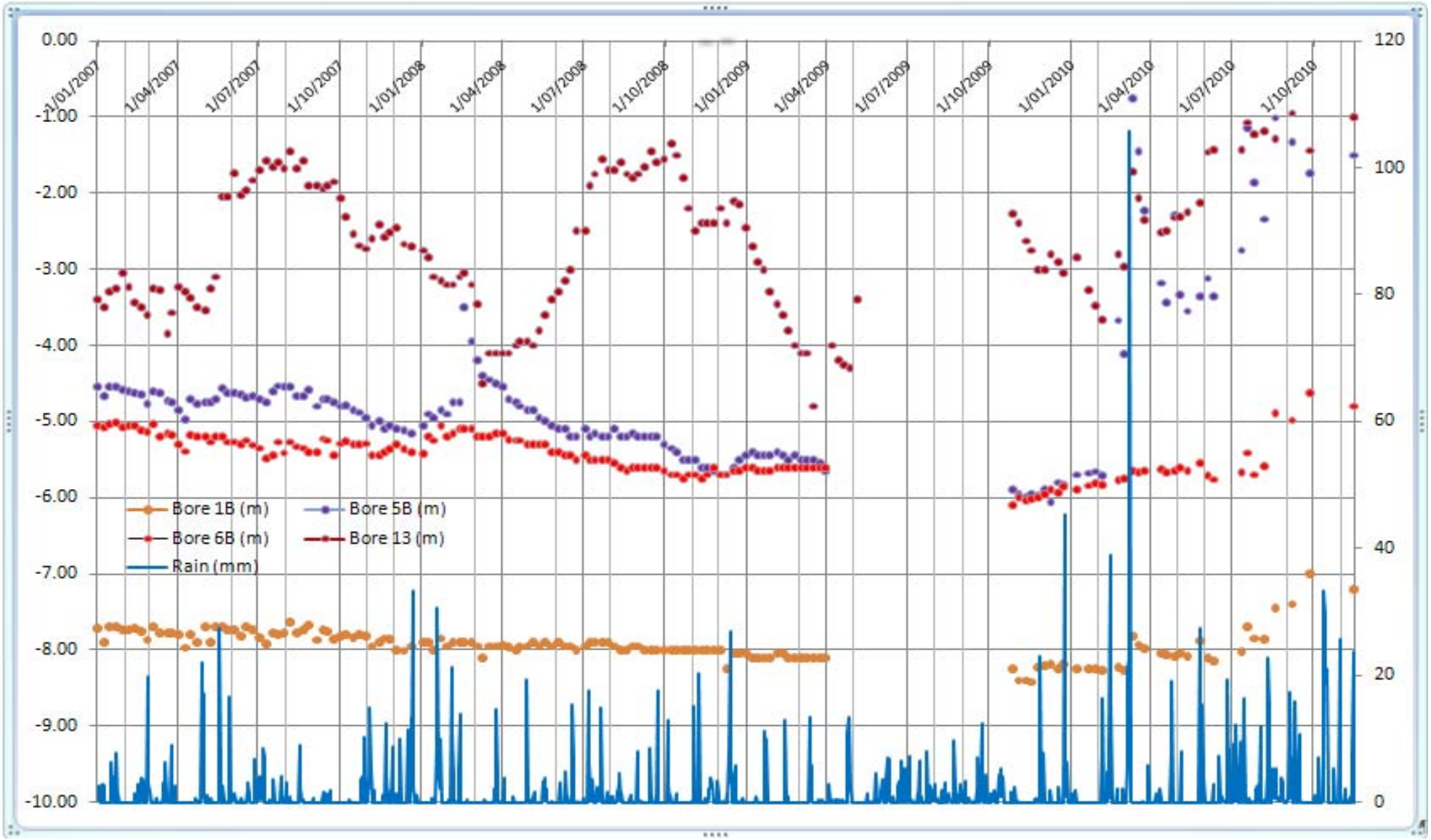


Figure d: Location of Dams and Drainage Lines in Vicinity of Site


0.00
-1.00
-2.00
-3.00
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-5.00
-6.00
-7.00
-8.00
-9.00
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100
80
60
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1/01/2007
1/04/2007
1/07/2007
1/10/2007
1/01/2008
1/04/2008
1/07/2008
1/10/2008
1/01/2009
1/04/2009
1/07/2009
1/10/2009
1/01/2010
1/04/2010
1/07/2010
1/10/2010
Bore 1B (m)
Bore 5B (m)
Bore 6B (m)
Bore 13 (m)
Rain (mm)

Figure e

The new monitoring bores were located based on the following methodology:

- One shallow and deep monitoring bores located up-hydraulic gradient of the evaporative storage pond; marked A and
- Two shallow and deep monitoring bores located down-hydraulic gradient of the wastewater storage marked B and C respectively.

The existing bores 1B, 2, 3, 4B, 5B, 6B will be monitored to assess any adverse impacts of the site and evaporative storage pond.

Bores A, B and C were installed on the 26 November 2010 to depths of 8 metres, 9 metres and 6.5 metres respectively for the deeper monitoring bores. All holes experienced rock and subsequent refusal of the drilling rig and the bores were installed accordingly. Bores A and B have 6 metres of screen on the bottom of the well for water entry whilst bore C has 3 metres of screen. All bores were observed dry and no free groundwater was encountered during the drilling process. Bores A, B and C also has shallow bores installed alongside the deeper bores to a depth of 2 metres. 1 metre of screen was used for water entry for the shallow bores.

Bores and were constructed by reference to figure C1 "Monitoring bore with bentonite seal and backfill to surface" page 87 Minimum Construction Requirements for Water Bores in Australia, Edition 2, Revised September 2003, National Minimum Bore Specification Committee, **figure f**

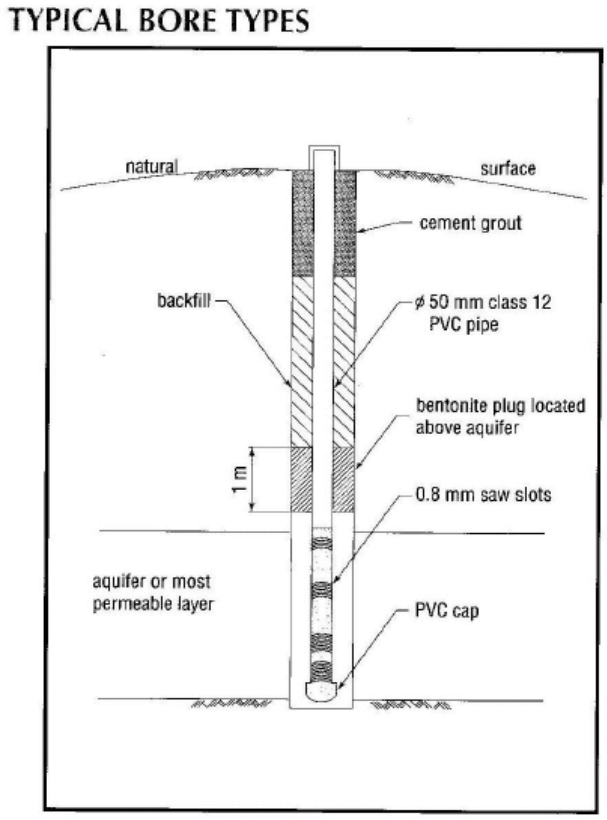


Figure f: Typical Bore Types

The quality of the groundwater data in the existing bores has been analysed quarterly since 2003. However the data is limited owing to the averaging of the quality across all the bores in data supplied in EA from 2003 to 2006. Sampling and analysis continued quarterly when water was present from 2006 to 2009. Sampling was undertaken by ROBE on the 17th November 2010.

The available laboratory analysis from December 2006 is presented in the following tables.

Table 2: Bore 1B analysis

Test	Units	12/12/06	14/3/07	13/06/07	02/12/08	03/12/09	17/11/10
Alkalinity, Bicarbonate as CaCO3	mg/L	392	-	380	397	381	357
Calcium (dissolved)	mg/L	106	-	87	99.7	95.4	63.4
Chloride	mg/L	197	-	200	200	1010	205
Chemical Oxygen Demand	mg/L	31	-	24	26	21	-
Conductivity	µS/cm	1350	1350	1370	1380	1370	1290
Magnesium (dissolved)	mg/L	41.7	-	37	38.8	38.8	39.0
Nitrogen (Total)	mg/L	10.4	10	5	10	32	-
Oil & Grease	mg/L	9	-	2	4	4	-
Phenolics (Total)	mg/L	0.088	-	0.008	0.05	0.2	-
pH	pH units	7.4	7.3	7.6	7.3	7.4	7.1
Potassium (dissolved)	mg/L	2.8	-	3	3.7	2.7	2.9
Sodium (dissolved)	mg/L	123	117	114	123	120	92.0

Table 3: Bore 5B analysis

Test	Units	12/12/06	14/3/07	13/06/07	02/12/08	03/12/09	17/11/10
Alkalinity, Bicarbonate as CaCO3	mg/L	350	-	341	357	346	282
Calcium (dissolved)	mg/L	71.4	-	59	74.3	79	34.3
Chloride	mg/L	59.4	-	46.6	36.6	188	54.0
Chemical Oxygen Demand	mg/L	46	-	29	14	10	-
Conductivity	µS/cm	944	963	947	1000	964	686
Magnesium (dissolved)	mg/L	37.4	-	33	39.5	37.3	25.6
Nitrogen (Total)	mg/L	28.2	29	30	30	137	-
Oil & Grease	mg/L	8	-	2	2	4	-
Phenolics (Total)	mg/L	0.056	-	0.001	0.05	0.4	-
pH	pH units	7.6	7.4	7.7	7.6	7.5	7.0
Potassium (dissolved)	mg/L	1.6	-	1.2	1.7	1.5	2.1
Sodium (dissolved)	mg/L	75.7	73.2	71.9	85.2	77.7	44.5

Table 4: Bore 6B analysis

Test	Units	12/12/06	14/3/07	13/06/07	02/12/08	03/12/09	17/11/10
Alkalinity, Bicarbonate as CaCO3	mg/L	359	-	352	303	357	381
Calcium (dissolved)	mg/L	82.8	-	69.9	76.4	80	65.9
Chloride	mg/L	235	-	247	226	1170	296
Chemical Oxygen Demand	mg/L	91	-	88	25	24	-
Conductivity	µS/cm	1330	1350	1350	1360	1390	1530
Magnesium (dissolved)	mg/L	52.6	-	47.8	49.1	51.7	70.0
Nitrogen (Total)	mg/L	6.6	2	5		9	-
Oil & Grease	mg/L	5	-	2	2	17	-
Phenolics (Total)	mg/L	0.016	-	0.001	0.05	0.4	-
pH	pH units	7.8	7.5	7.6	7.7	7.6	7.2
Potassium (dissolved)	mg/L	5.6	5.2	4.6	5.1	6.3	5.5
Sodium (dissolved)	mg/L	120	109	109	113	123	81.5

Table 5: Bore 13 analysis

Test	Units	12/12/06	14/3/07	13/06/07	02/12/08	03/12/09	17/11/10
Alkalinity, Bicarbonate as CaCO3	mg/L	210	-	88	220	220	130
Calcium (dissolved)	mg/L	12.3	-	6.4	14.3	11.8	4.3
Chloride	mg/L	78	-	59.9	53.2	203	30.5
Chemical Oxygen Demand	mg/L	126	-	34	34	618	-
Conductivity	µS/cm	727	853	613	716	653	473
Magnesium (dissolved)	mg/L	8.4	-	6.2	10.2	8.6	6.4
Nitrogen (Total)	mg/L	3.3	2	14	2	8	-
Oil & Grease	mg/L	6	-	2	2	13	-
Phenolics (Total)	mg/L	0.097	-	0.001	0.05	4	-
pH	pH units	7.4	7.5	7.1	7.3	7.3	6.8
Potassium (dissolved)	mg/L	4.1	5.3	3.7	3.4	6.1	6.7
Sodium (dissolved)	mg/L	150	147	95.1	112	127	61.0

Table 6: Bore 15B analysis

Test	Units	12/12/06	14/3/07	13/06/07	02/12/08	03/12/09	17/11/10
Alkalinity, Bicarbonate as CaCO3	mg/L	Dry	Dry	Dry	Dry	Dry	394
Calcium (dissolved)	mg/L	Dry	Dry	Dry	Dry	Dry	12.7
Chloride	mg/L	Dry	Dry	Dry	Dry	Dry	28.8
Chemical Oxygen Demand	mg/L	Dry	Dry	Dry	Dry	Dry	-
Conductivity	µS/cm	Dry	Dry	Dry	Dry	Dry	881
Magnesium (dissolved)	mg/L	Dry	Dry	Dry	Dry	Dry	11.4
Nitrogen (Total)	mg/L	Dry	Dry	Dry	Dry	Dry	-
Oil & Grease	mg/L	Dry	Dry	Dry	Dry	Dry	-
Phenolics (Total)	mg/L	Dry	Dry	Dry	Dry	Dry	-
pH	pH units	Dry	Dry	Dry	Dry	Dry	7.6
Potassium (dissolved)	mg/L	Dry	Dry	Dry	Dry	Dry	7.2
Sodium (dissolved)	mg/L	Dry	Dry	Dry	Dry	Dry	124

Chemical Oxygen Demand ranges from 10 top 84 mg/L across the bores with substantial variation within bores between sampling events.

Alkalinity ranges from 88 to 397 mg/L across the bores with readings being relatively stable within single bores pH is mostly even ranging from 6.8 to 7.8.

Chloride and Conductivity are quite variable across the site ranging from 37 to 1170 mg/L and 473 to 1530 µS/cm respectively. Bore 13 has the lowest chloride and conductivity indicating its responsiveness to rainfall being situated in a drainage line and in between 2 dams.

9.3.8 Potential Impacts

Ground water has the potential to be impacted by any concentration of storm water exiting the site, the mounding of groundwater about the detention pond and by the contamination of groundwater with the failing of the construction of evaporative pond clay and poly liner.

The reject water to be evaporated in the pond is classified as high strength effluent with the potential to cause environmental harm and therefore must be contained within the evaporative pond.

9.3.9 Environmental Safeguards

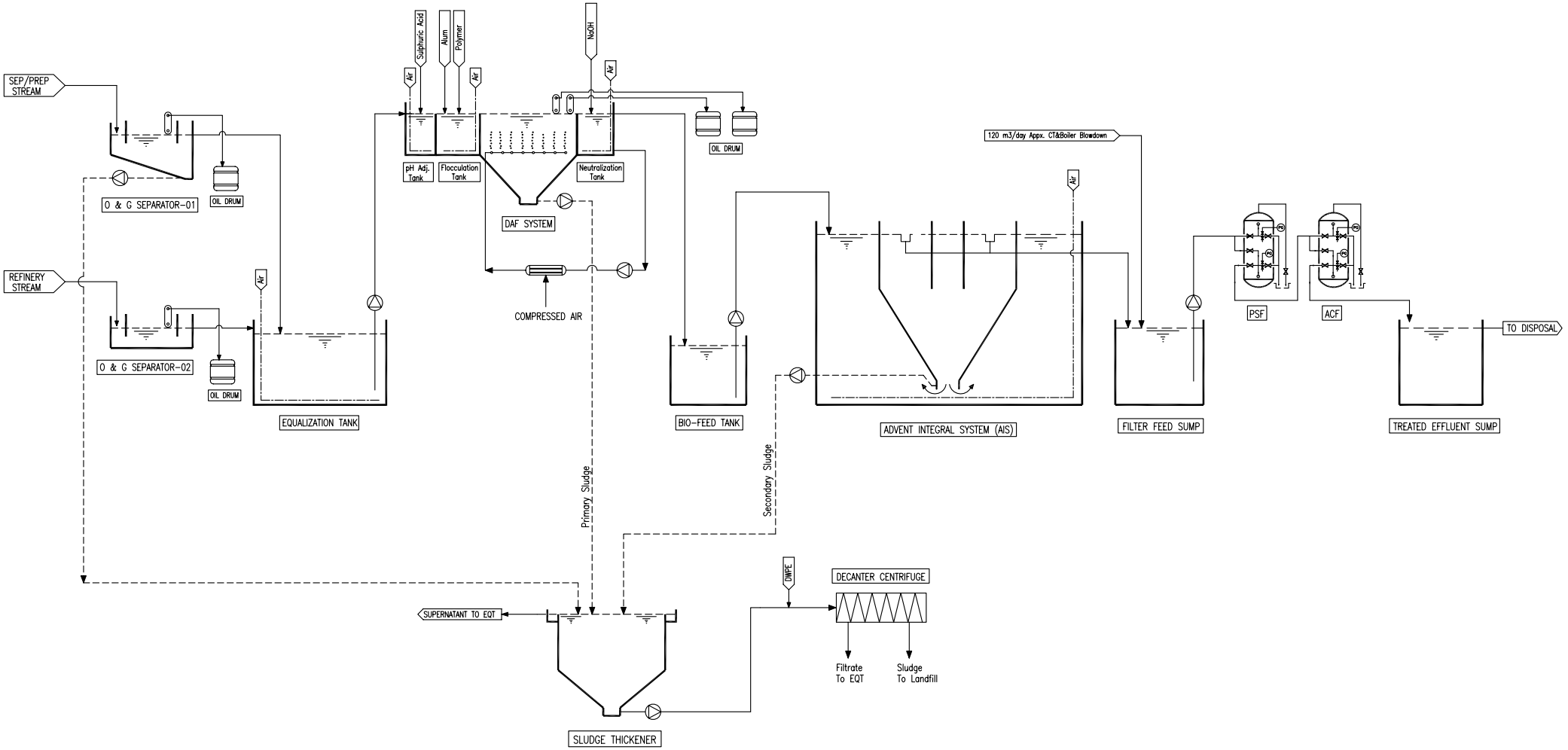
As identified and discussed in section 9.1 Process Water, and in the EA in order to minimise the impact on groundwater the evaporative storage pond will be constructed using:

- be sufficiently sized so that the holding capacity in a 95%ile wet year shall be incorporate 100% redundant capacity after prolonged periods of no maintenance.
- Shall be constructed with an impervious clay liner with the added security of a fully welded plastic liner
- Shall have a tell all system included to check the integrity of the poly liner
- Additional monitoring bores shall be placed in consultation with NSW Office of Water to monitor incoming and outgoing ground water of the site to ensure that ground water is not adversely affected by the use of the evaporative pond.

All solid waste storage areas shall have impermeable pads, and shall be located in controlled drainage areas within the developed site.

Attachment AA

Flow Sheet



REV.	DESCRIPTION	DATE	SIGN
R3	–	25/06/10	SPM
R2	–	21/06/10	SPM
R1	–	01/06/10	SPM
R0	–	27/04/10	ROMIL

NOTE:–

CLIENT	ARIAN ENGINEERING PVT. LTD.
PROJECT	EFFLUENT TREATMENT PLANT FOR AUSTRALIA
	ADVENT ENVIROCARE TECHNOLOGY PVT. LTD. (AHMEDABAD)
TITLE	PROCESS FLOW DIAGRAM

Attachment BB

Water Balance Table

Water Balance for Evaporative Pond
Mean Rainfall

Description	Qty	Units	Notes
Area of basin (18)	21,922	m2	From MJM catchment Plan
Effluent Inflow	49	m3/Per Day	

Mean mm / Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Mean Rain Fall	31.4	26.8	25.6	29.8	40.4	44.5	54.8	52.2	46.5	49.9	35.5	37.9	BOM
Evaporation	285.2	226.8	198.4	117	58.9	42	37.2	55.8	84	136.4	198	272.8	D.M. McMahon Report

Inflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
RainFall Volume	688	588	561	653	886	976	1,201	1,144	1,019	1,094	778	831	Area x C x mm/1000
Effluent Volume	1,519	1,421	1,519	1,470	1,519	1,470	1,519	833	1,470	1,519	1,470	1,519	Area x C x mm/1000
Total	**2,207**	**2,009**	**2,080**	**2,123**	**2,405**	**2,446**	**2,720**	**1,977**	**2,489**	**2,613**	**2,248**	**2,350**	Total

Outflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Evap Volume	6,252	4,972	4,349	2,565	1,291	921	815	1,223	1,841	2,990	4,341	5,980	Dam Area x Evap mm/1000
Total	**6,252**	**4,972**	**7,484**	**2,565**	**1,291**	**921**	**815**	**1,223**	**1,841**	**2,990**	**4,341**	**5,980**	Total

Summary - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Inflow Volume	2,207	2,009	2,080	2,123	2,405	2,446	2,720	1,977	2,489	2,613	2,248	2,350	Calculated Inflow
Outflow Volume	6,252	4,972	7,484	2,565	1,291	921	815	1,223	1,841	2,990	4,341	5,980	Calculated Outflow
Total Volume	**-4,045**	**-2,963**	**-5,404**	**-442**	**1,113**	**1,525**	**1,905**	**754**	**648**	**-377**	**-2,092**	**-3,630**	Diffrence

Water Balance for Evaporative Pond
Decile 9 rainfall

Description	Qty	Units	Notes
Area of basin (18)	21,922	m2	From MJM catchment Pl
Effluent Inflow	49	m3/Per Day	
		0	

Mean mm / Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Decile 9 Rain Fall	83.8	85.1	105.5	87.1	103.2	87	94.5	89.3	82.6	113.5	83.4	90.2	BOM
Evaporation	285.2	226.8	198.4	117	58.9	42	37.2	55.8	84	136.4	198	272.8	

Inflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
RainFall Volume	1,837	1,866	2,313	1,909	2,262	1,907	2,072	1,958	1,811	2,488	1,828	1,977	Area x C x mm/1000
Effluent Volume	1,519	1,421	1,519	1,470	1,519	1,470	1,519	833	1,470	1,519	1,470	1,519	Area x C x mm/1000
Total	**3,356**	**3,287**	**3,832**	**3,379**	**3,781**	**3,377**	**3,591**	**2,791**	**3,281**	**4,007**	**3,298**	**3,496**	Total

Outflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Evap Volume	5,939	4,474	3,696	2,052	903	506	449	796	1,381	2,541	4,124	5,980	Dam Area x Evap mm/1000
Total	**5,939**	**4,474**	**3,696**	**2,052**	**903**	**506**	**449**	**796**	**1,381**	**2,541**	**4,124**	**5,980**	Total

Summary - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Inflow Volume	3,356	3,287	3,832	3,379	3,781	3,377	3,591	2,791	3,281	4,007	3,298	3,496	Calculated Inflow
Outflow Volume	5,939	4,474	3,696	2,052	903	506	449	796	1,381	2,541	4,124	5,980	Calculated Outflow
Total Volume	**-2,583**	**-1,188**	**136**	**1,328**	**2,878**	**2,871**	**3,141**	**1,995**	**1,900**	**1,466**	**-825**	**-2,484**	Diffrence
			TOTAL STORAGE VOLUME REQUIRED									15,714	

Balance Gain	8,635	m3

Water Balance for Evaporative Pond
2010

Description	Qty	Units	Notes
Area of basin (18)	21,922	m2	From MJM catchment Pl
Effluent Inflow	49	m3/Per Day	
		0	

Mean mm / Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
2010	7	85	176	37.4	68.2	38	74.4	96.4	65	170.2	88.2	150.0	Bom / site station
Evaporation	285.2	226.8	198.4	117	58.9	42	37.2	55.8	84	136.4	198	272.8	

Inflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
RainFall Volume	153	1,863	3,858	820	1,495	833	1,631	2,113	1,425	3,731	1,934	3,288	Area x C x mm/1000
Effluent Volume	1,519	1,421	1,519	1,470	1,519	1,470	1,519	833	1,470	1,519	1,470	1,519	Area x C x mm/1000
Total	**1,672**	**3,284**	**5,377**	**2,290**	**3,014**	**2,303**	**3,150**	**2,946**	**2,895**	**5,250**	**3,404**	**4,807**	Total

Outflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Evap Volume	6,252	4,972	4,349	2,565	1,291	921	815	1,223	1,841	2,990	4,341	5,980	Dam Area x Evap mm/1000
Total	**6,252**	**4,972**	**4,349**	**2,565**	**1,291**	**921**	**815**	**1,223**	**1,841**	**2,990**	**4,341**	**5,980**	Total

Summary - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Inflow Volume	1,672	3,284	5,377	2,290	3,014	2,303	3,150	2,946	2,895	5,250	3,404	4,807	Calculated Inflow
Outflow Volume	6,252	4,972	4,349	2,565	1,291	921	815	1,223	1,841	2,990	4,341	5,980	Calculated Outflow
Total Volume	**-4,580**	**-1,688**	**1,028**	**-275**	**1,723**	**1,382**	**2,334**	**1,723**	**1,053**	**2,260**	**-937**	**-1,173**	Diffrence
			TOTAL STORAGE VOLUME REQUIRED									11,504	

Balance Gain	2,852	m3

Water Balance for Evaporative Pond
95%ile Year

Description	Qty	Units	Notes
Area of basin (18)	21,922	m2	From MJM catchment Pl
Effluent Inflow	49	m3/Per Day	
		0	

Mean mm / Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Decile 95 Rain Fall	99.7	107.7	138.9	100.5	148.7	97.1	101.1	94	99.7	145.8	98.1	115.4	BOM
Evaporation	285.2	226.8	198.4	117	58.9	42	37.2	55.8	84	136.4	198	272.8	

Inflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
RainFall Volume	2,186	2,361	3,045	2,203	3,260	2,129	2,216	2,061	2,186	3,196	2,151	2,530	Area x C x mm/1000
Effluent Volume	1,519	1,421	1,519	1,470	1,519	1,470	1,519	833	1,470	1,519	1,470	1,519	Area x C x mm/1000
Total	**3,705**	**3,782**	**4,564**	**3,673**	**4,779**	**3,599**	**3,735**	**2,894**	**3,656**	**4,715**	**3,621**	**4,049**	Total

Outflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Evap Volume	6,252	4,474	3,696	2,052	903	506	449	796	1,381	2,541	4,124	5,980	Dam Area x Evap mm/1000
Total	**6,252**	**4,474**	**3,696**	**2,052**	**903**	**506**	**449**	**796**	**1,381**	**2,541**	**4,124**	**5,980**	Total

Summary - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Inflow Volume	3,705	3,782	4,564	3,673	4,779	3,599	3,735	2,894	3,656	4,715	3,621	4,049	Calculated Inflow
Outflow Volume	6,252	4,474	3,696	2,052	903	506	449	796	1,381	2,541	4,124	5,980	Calculated Outflow
Total Volume	**-2,548**	**-692**	**868**	**1,621**	**3,876**	**3,092**	**3,286**	**2,098**	**2,275**	**2,174**	**-503**	**-1,932**	Diffrence
			TOTAL STORAGE VOLUME REQUIRED									19,290	

Balance Gain	13,616	m3

Water Balance for Evaporative Pond
Wettest year

Description	Qty	Units	Notes
Area of basin (18)	21,922	m2	From MJM Solutions
Effluent Inflow	49	m3/Per Day	
		0	

Mean mm / Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Wettest Recorded	174.4	157.5	249.2	216.9	190.3	138.8	130	101.4	128	181.7	142.4	213.4	Bom
Evaporation	285.2	226.8	198.4	117	58.9	42	37.2	55.8	84	136.4	198	272.8	

Inflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
RainFall Volume	3,823	3,453	5,463	4,755	4,172	3,043	2,850	2,223	2,806	3,983	3,122	4,678	Area x C x mm/1000
Effluent Volume	1,519	1,421	1,519	1,470	1,519	1,470	1,519	833	1,470	1,519	1,470	1,519	Area x C x mm/1000
Total	**5,342**	**4,874**	**6,982**	**6,225**	**5,691**	**4,513**	**4,369**	**3,056**	**4,276**	**5,502**	**4,592**	**6,197**	Total

Outflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Evap Volume	6,252	4,972	4,349	2,565	1,291	921	815	1,223	1,841	2,990	4,341	5,980	Dam Area x Evap mm/1000
Total	**6,252**	**4,972**	**4,349**	**2,565**	**1,291**	**921**	**815**	**1,223**	**1,841**	**2,990**	**4,341**	**5,980**	Total

Summary - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Inflow Volume	5,342	4,874	6,982	6,225	5,691	4,513	4,369	3,056	4,276	5,502	4,592	6,197	Calculated Inflow
Outflow Volume	6,252	4,972	4,349	2,565	1,291	921	815	1,223	1,841	2,990	4,341	5,980	Calculated Outflow
Total Volume	**-910**	**-98**	**2,633**	**3,660**	**4,400**	**3,592**	**3,553**	**1,833**	**2,435**	**2,512**	**251**	**217**	Diffrence
			TOTAL STORAGE VOLUME REQUIRED									25,085	

Balance Gain for cycle	24,077	m3

Attachment CC

MJM Storm Water Design

MJM

CONSULTING ENGINEERS

STRUCTURAL • CIVIL • BUILDING DESIGN

Stormwater Drainage

A Report on Hydraulics and Internal Drainage

at the

Riverina Oilseed Bio Energy Site

Client : Dern Pease

Our Ref: 090141

MJM Solutions
Level 1, 25 Tompson Street
Wagga Wagga NSW 2650

Phone (02) 6921 8333
Fax (02) 6921 8179
Email admin@mjm-solutions.com

1. INTRODUCTION

This report has been prepared in order to provide supplementary information on the fundamental principles of the stormwater design for the ROBE site. The report also includes a summary of the calculations used in the design of the retention basin.

2. METHODOLOGY

The following process was used in the design of the stormwater retention basin:

- Total pre-development flow was established for a 1 in 100 year (ARI) storm.
- The necessary size for the retention basin was determined for the 1 in 100 year (ARI) storm using the following assumptions:
    - Maximum outflow from basin is no greater than the pre-developed flow for a 1 in 100 year event.
    - The Rational Method is used to estimate a peak flow from an average rainfall intensity, (Q = C.I.A/360). C = 0.9
    - Triangular inflow and outflow hydrographs are assumed. (Refer equation 7.43 Australian Rainfall and Run-off).
    - Minimum storm duration is twice the time of concentration (t_c) as peak flow occurs at t_c by definition.

3. SUMMARY OF CALCULATIONS

a) Pre-developed outflow for 1:100 year storm = 0.765 m^3/s

This was determined as follows:

Design storm		1 in 100 year
Time of concentration	Tc =	18.7 min (see Appendix 1)
Intensity	I =	103.1 mm/hr
Run off coefficient	C =	0.6
Area	A =	4.45 ha
Undeveloped flow	=	C.A.I/360
	Q =	(0.6x4.45x103.1)/360
	=	0.765m^3/s

b) Developed outflow for 1:100 year storm = 1.66 m^3/s

This was determined as follows:

Design storm	1 in 100 year		
Time of concentration	Tc	=	8.7 (see Appendix 1)
Intensity	I	=	149.7 mm/hr
Run off coefficient	C	=	0.9
Area in Ha	A	=	4.45ha
Developed flow		=	C.A.I/360
	Q	=	(0.9x4.45x149.7)/360
		=	1.66 m^3/s

c) Outlet control calculations:

Single cell existing 525mm dia pipe will control the outlet.

Head	= 0.775 m
Diameter	= 0.525 m
Length	= 20 m
Area	= 0.216 m^2

Max out flow from 525 dia pipe for 1:100 year storm = 0.76m^3/s

d) Retention basin size = 467 m^3

This was calculated as follows using the triangular hydrograph formula:

$Q_{out}=Q_{in}(1-Vol_{store}/Vol_{in})$ Q_{out}=Peak out flow in m^3/s
$Vol_{store}= Vol_{in}(1- Q_{out}/Q_{in})$ Q_{in}= Peak In flow in m^3/s
$Vol_{in}=T_c x60xQ_{in}$ Vol_{in}=Total Inflow volume in m^3
$Vol_{store}= T_c x60xQ_{in}(1- Q_{out}/Q_{in})$ Vol_{store}= Total storage required in m^3

Hence volume required is:

Q_{out}	= Max Outflow	= 0.765 m^3/s
Q_{in}	= Developed Outflow	= 1.66 m^3/s
Vol_{store}	= $T_c x60xQ_{in}(1- Q_{out}/Q_{in})$	
	= 8.7x60x1.66(1-0.765/1.66)	
	= 467m^3	

e) Detention capacity of pipes and basin:

Storage in the 600 diameter pipes = 130m x π x 0.3^2 = 36.75 m^3

Basin capacity = 690 m^3

APPENDIX 1

Developed Tc Calcs using Kinematic wave

Enter Return Interval 1,2,5,10,20,50, 100

TIME OF CONCENTRATION FOR OVERLAND FLOWS

INPUT NUMBER OF OVERLAND FLOW SEGMENTS: 2

----------Roughness For Segment----------

Concrete or Asphalt	0.010 - 0.013	Bare Sand	0.010 - 0.016
Graveled Surface	0.012 - 0.030	Bare Clay-Loam Soil	0.012 - 0.033
Sparse Vegetation	0.053 - 0.130	Short Grass Prairie	0.100 - 0.200
Lawns	0.170 - 0.480	n* from AR&R vol 1 Page 300	

LENGTH (m), SLOPE % AND ROUGHNESS FOR SEGMENT 15,2,0.01

LENGTH (m), SLOPE % AND ROUGHNESS FOR SEGMENT 170,.2,0.011

INTERATION INTENSITY ESTIMATED AND CALCULATED TIMES

No.	(mm/h)	(min)	(min)
1	189.3	5.00	7.94
2	155.6	7.94	8.55
3	150.6	8.55	8.65
4	149.8	8.65	8.67
5	149.7	8.67	8.67

TIME IS 8.7 MINUTES FOR INTENSITY 149.7 mm/h

Undeveloped Tc Calcs using Kinematic wave

Enter Return Interval 1,2,5,10,20,50, 100

TIME OF CONCENTRATION FOR OVERLAND FLOWS

INPUT NUMBER OF OVERLAND FLOW SEGMENTS: 1

----------Roughness For Segment----------

Concrete or Asphalt	0.010 - 0.013	Bare Sand	0.010 - 0.016
Graveled Surface	0.012 - 0.030	Bare Clay-Loam Soil	0.012 - 0.033
Sparse Vegetation	0.053 - 0.130	Short Grass Prairie	0.100 - 0.200
Lawns	0.170 - 0.480	n* from AR&R vol 1 Page 300	

LENGTH (m), SLOPE % AND ROUGHNESS FOR SEGMENT 190,3,0.1

INTERATION INTENSITY ESTIMATED AND CALCULATED TIMES

No.	(mm/h)	(min)	(min)
1	189.3	5.00	14.78
2	116.4	14.78	17.84
3	105.7	17.84	18.52
4	103.6	18.52	18.67
5	103.2	18.67	18.70
6	103.1	18.70	18.70

TIME IS 18.7 MINUTES FOR INTENSITY 103.1 mm/h

APPENDIX 2

NETWORK DISCHARGE FLOW RATES

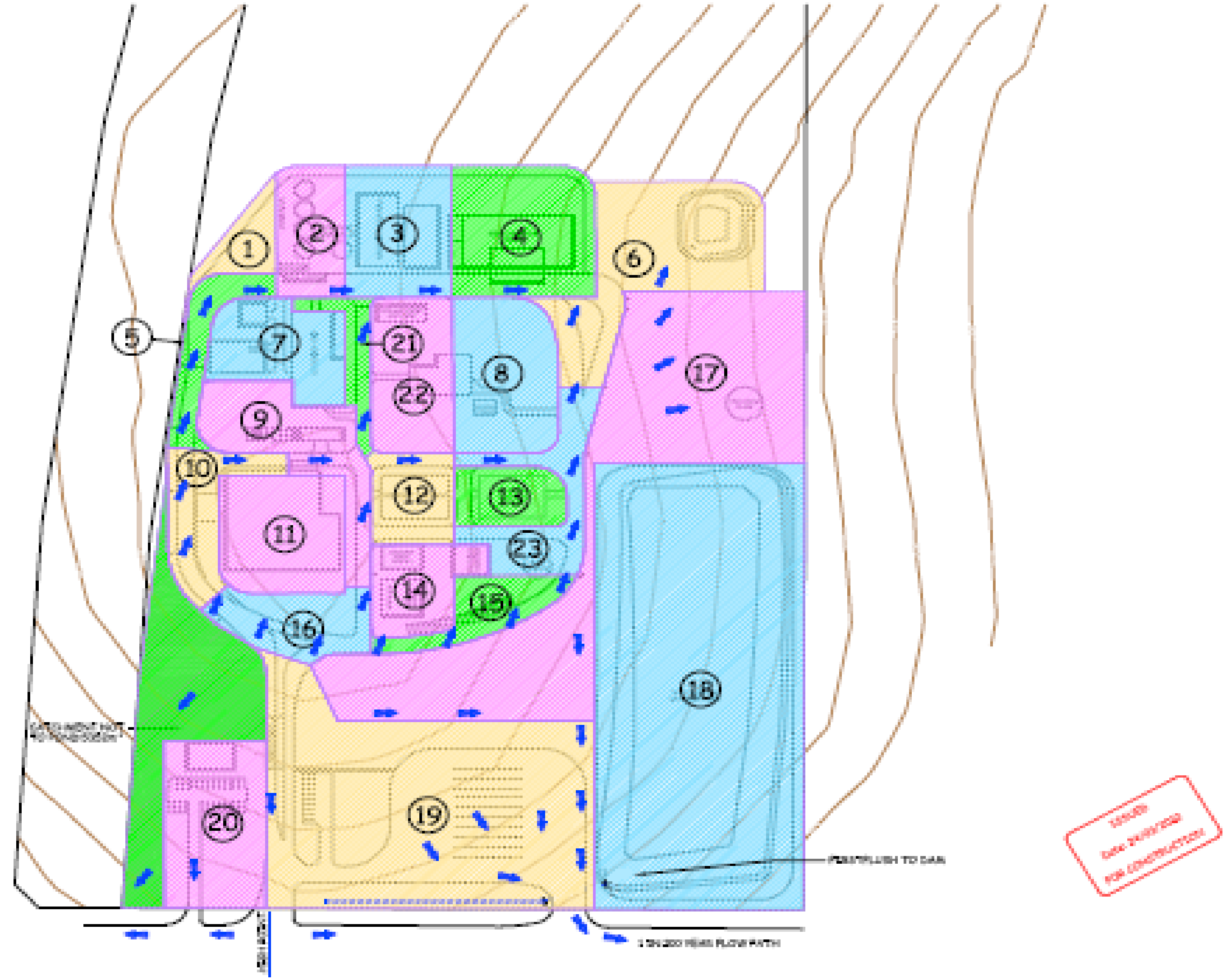
Line	Q (m^3/sec)
1	1.201
2	0.519
3	0.039
4	0.099

CATCHMENT AREA TABLE

No.	AREA
1	[illegible]
2	[illegible]
3	[illegible]
4	[illegible]
5	[illegible]
6	[illegible]
7	[illegible]
8	[illegible]
9	[illegible]
10	[illegible]
11	[illegible]
12	[illegible]
13	[illegible]
14	[illegible]
15	[illegible]
16	[illegible]
17	[illegible]
18	[illegible]
19	[illegible]
20	[illegible]
21	[illegible]
22	[illegible]
23	[illegible]

TOTAL [illegible]

- OVERLAND FLOW PATH



MJM Solutions

LEVEL 1, 25 TOMPSON STREET
WAGGA WAGGA NSW 2650

PROJECT
INTERNAL ROAD DESIGN
RIVERINA OILSEED
CRUSHING PLANT

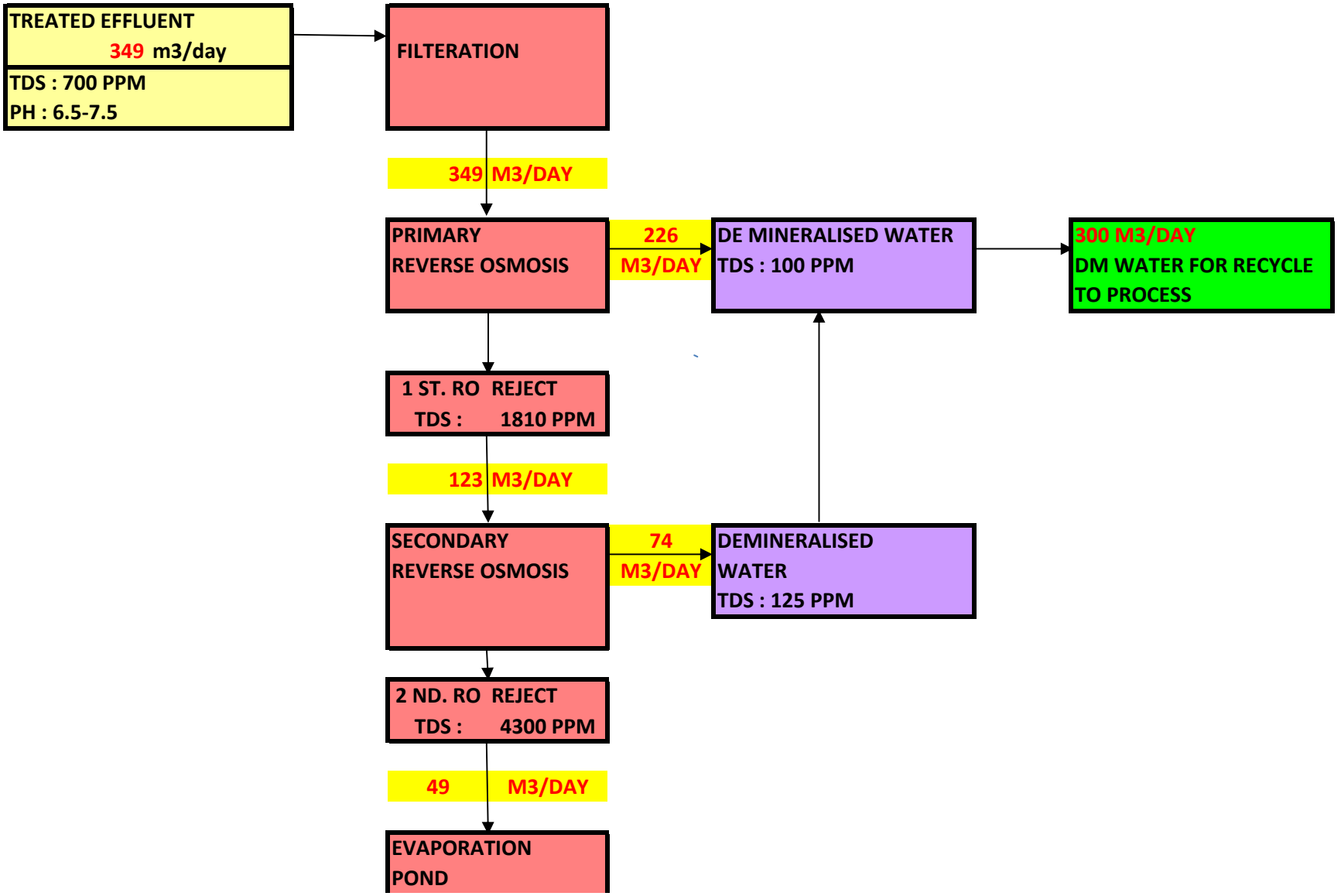
SHEET SUBJECT
CATCHMENT PLAN

DRAWN C. Burt
DATE Oct 2009
ISSUE B
DRAWING NO. 090141
SHEET NO. C1

Attachment DD

Recycling Block Diagram

TREATED EFFLUENT WATER RECYCLE SYSTEM



Attachment C

Water Balance Table

Water Balance for Evaporative Pond
Mean Rainfall

Description	Qty	Units	Notes
Area of basin (18)	21,922	m2	From MJM catchment Plan
Effluent Inflow	49	m3/Per Day	

Mean mm / Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Mean Rain Fall	31.4	26.8	25.6	29.8	40.4	44.5	54.8	52.2	46.5	49.9	35.5	37.9	BOM
Evaporation	285.2	226.8	198.4	117	58.9	42	37.2	55.8	84	136.4	198	272.8	D.M. McMahon Report

Inflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
RainFall Volume	688	588	561	653	886	976	1,201	1,144	1,019	1,094	778	831	Area x C x mm/1000
Effluent Volume	1,519	1,421	1,519	1,470	1,519	1,470	1,519	833	1,470	1,519	1,470	1,519	Area x C x mm/1000
Total	**2,207**	**2,009**	**2,080**	**2,123**	**2,405**	**2,446**	**2,720**	**1,977**	**2,489**	**2,613**	**2,248**	**2,350**	Total

Outflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Evap Volume	6,252	4,972	4,349	2,565	1,291	921	815	1,223	1,841	2,990	4,341	5,980	Dam Area x Evap mm/1000
Total	**6,252**	**4,972**	**7,484**	**2,565**	**1,291**	**921**	**815**	**1,223**	**1,841**	**2,990**	**4,341**	**5,980**	Total

Summary - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Inflow Volume	2,207	2,009	2,080	2,123	2,405	2,446	2,720	1,977	2,489	2,613	2,248	2,350	Calculated Inflow
Outflow Volume	6,252	4,972	7,484	2,565	1,291	921	815	1,223	1,841	2,990	4,341	5,980	Calculated Outflow
Total Volume	**-4,045**	**-2,963**	**-5,404**	**-442**	**1,113**	**1,525**	**1,905**	**754**	**648**	**-377**	**-2,092**	**-3,630**	Diffrence

Water Balance for Evaporative Pond
Decile 9 rainfall

Description	Qty	Units	Notes
Area of basin (18)	21,922	m2	From MJM catchment Pl
Effluent Inflow	49	m3/Per Day	
		0	

Mean mm / Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Decile 9 Rain Fall	83.8	85.1	105.5	87.1	103.2	87	94.5	89.3	82.6	113.5	83.4	90.2	BOM
Evaporation	285.2	226.8	198.4	117	58.9	42	37.2	55.8	84	136.4	198	272.8	

Inflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
RainFall Volume	1,837	1,866	2,313	1,909	2,262	1,907	2,072	1,958	1,811	2,488	1,828	1,977	Area x C x mm/1000
Effluent Volume	1,519	1,421	1,519	1,470	1,519	1,470	1,519	833	1,470	1,519	1,470	1,519	Area x C x mm/1000
Total	**3,356**	**3,287**	**3,832**	**3,379**	**3,781**	**3,377**	**3,591**	**2,791**	**3,281**	**4,007**	**3,298**	**3,496**	Total

Outflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Evap Volume	5,939	4,474	3,696	2,052	903	506	449	796	1,381	2,541	4,124	5,980	Dam Area x Evap mm/1000
Total	**5,939**	**4,474**	**3,696**	**2,052**	**903**	**506**	**449**	**796**	**1,381**	**2,541**	**4,124**	**5,980**	Total

Summary - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Inflow Volume	3,356	3,287	3,832	3,379	3,781	3,377	3,591	2,791	3,281	4,007	3,298	3,496	Calculated Inflow
Outflow Volume	5,939	4,474	3,696	2,052	903	506	449	796	1,381	2,541	4,124	5,980	Calculated Outflow
Total Volume	**-2,583**	**-1,188**	**136**	**1,328**	**2,878**	**2,871**	**3,141**	**1,995**	**1,900**	**1,466**	**-825**	**-2,484**	Diffrence
			TOTAL STORAGE VOLUME REQUIRED									15,714	

Balance Gain	8,635	m3

Water Balance for Evaporative Pond
2010

Description	Qty	Units	Notes
Area of basin (18)	21,922	m2	From MJM catchment Pl
Effluent Inflow	49	m3/Per Day	
		0	

Mean mm / Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
2010	7	85	176	37.4	68.2	38	74.4	96.4	65	170.2	88.2	150.0	Bom / site station
Evaporation	285.2	226.8	198.4	117	58.9	42	37.2	55.8	84	136.4	198	272.8	

Inflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
RainFall Volume	153	1,863	3,858	820	1,495	833	1,631	2,113	1,425	3,731	1,934	3,288	Area x C x mm/1000
Effluent Volume	1,519	1,421	1,519	1,470	1,519	1,470	1,519	833	1,470	1,519	1,470	1,519	Area x C x mm/1000
Total	**1,672**	**3,284**	**5,377**	**2,290**	**3,014**	**2,303**	**3,150**	**2,946**	**2,895**	**5,250**	**3,404**	**4,807**	Total

Outflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Evap Volume	6,252	4,972	4,349	2,565	1,291	921	815	1,223	1,841	2,990	4,341	5,980	Dam Area x Evap mm/1000
Total	**6,252**	**4,972**	**4,349**	**2,565**	**1,291**	**921**	**815**	**1,223**	**1,841**	**2,990**	**4,341**	**5,980**	Total

Summary - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Inflow Volume	1,672	3,284	5,377	2,290	3,014	2,303	3,150	2,946	2,895	5,250	3,404	4,807	Calculated Inflow
Outflow Volume	6,252	4,972	4,349	2,565	1,291	921	815	1,223	1,841	2,990	4,341	5,980	Calculated Outflow
Total Volume	**-4,580**	**-1,688**	**1,028**	**-275**	**1,723**	**1,382**	**2,334**	**1,723**	**1,053**	**2,260**	**-937**	**-1,173**	Diffrence
			TOTAL STORAGE VOLUME REQUIRED									11,504	

Balance Gain	2,852	m3

Water Balance for Evaporative Pond
95%ile Year

Description	Qty	Units	Notes
Area of basin (18)	21,922	m2	From MJM catchment Pl
Effluent Inflow	49	m3/Per Day	
		0	

Mean mm / Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Decile 95 Rain Fall	99.7	107.7	138.9	100.5	148.7	97.1	101.1	94	99.7	145.8	98.1	115.4	BOM
Evaporation	285.2	226.8	198.4	117	58.9	42	37.2	55.8	84	136.4	198	272.8	

Inflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
RainFall Volume	2,186	2,361	3,045	2,203	3,260	2,129	2,216	2,061	2,186	3,196	2,151	2,530	Area x C x mm/1000
Effluent Volume	1,519	1,421	1,519	1,470	1,519	1,470	1,519	833	1,470	1,519	1,470	1,519	Area x C x mm/1000
Total	**3,705**	**3,782**	**4,564**	**3,673**	**4,779**	**3,599**	**3,735**	**2,894**	**3,656**	**4,715**	**3,621**	**4,049**	Total

Outflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Evap Volume	6,252	4,474	3,696	2,052	903	506	449	796	1,381	2,541	4,124	5,980	Dam Area x Evap mm/1000
Total	**6,252**	**4,474**	**3,696**	**2,052**	**903**	**506**	**449**	**796**	**1,381**	**2,541**	**4,124**	**5,980**	Total

Summary - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Inflow Volume	3,705	3,782	4,564	3,673	4,779	3,599	3,735	2,894	3,656	4,715	3,621	4,049	Calculated Inflow
Outflow Volume	6,252	4,474	3,696	2,052	903	506	449	796	1,381	2,541	4,124	5,980	Calculated Outflow
Total Volume	**-2,548**	**-692**	**868**	**1,621**	**3,876**	**3,092**	**3,286**	**2,098**	**2,275**	**2,174**	**-503**	**-1,932**	Diffrence
			TOTAL STORAGE VOLUME REQUIRED									19,290	

Balance Gain	13,616	m3

Water Balance for Evaporative Pond
Wettest year

Description	Qty	Units	Notes
Area of basin (18)	21,922	m2	From MJM Solutions
Effluent Inflow	49	m3/Per Day	
		0	

Mean mm / Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Wettest Recorded	174.4	157.5	249.2	216.9	190.3	138.8	130	101.4	128	181.7	142.4	213.4	Bom
Evaporation	285.2	226.8	198.4	117	58.9	42	37.2	55.8	84	136.4	198	272.8	

Inflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
RainFall Volume	3,823	3,453	5,463	4,755	4,172	3,043	2,850	2,223	2,806	3,983	3,122	4,678	Area x C x mm/1000
Effluent Volume	1,519	1,421	1,519	1,470	1,519	1,470	1,519	833	1,470	1,519	1,470	1,519	Area x C x mm/1000
Total	**5,342**	**4,874**	**6,982**	**6,225**	**5,691**	**4,513**	**4,369**	**3,056**	**4,276**	**5,502**	**4,592**	**6,197**	Total

Outflow Calcs - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Evap Volume	6,252	4,972	4,349	2,565	1,291	921	815	1,223	1,841	2,990	4,341	5,980	Dam Area x Evap mm/1000
Total	**6,252**	**4,972**	**4,349**	**2,565**	**1,291**	**921**	**815**	**1,223**	**1,841**	**2,990**	**4,341**	**5,980**	Total

Summary - m3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Inflow Volume	5,342	4,874	6,982	6,225	5,691	4,513	4,369	3,056	4,276	5,502	4,592	6,197	Calculated Inflow
Outflow Volume	6,252	4,972	4,349	2,565	1,291	921	815	1,223	1,841	2,990	4,341	5,980	Calculated Outflow
Total Volume	**-910**	**-98**	**2,633**	**3,660**	**4,400**	**3,592**	**3,553**	**1,833**	**2,435**	**2,512**	**251**	**217**	Diffrence
			TOTAL STORAGE VOLUME REQUIRED									25,085	

Balance Gain for cycle	24,077	m3

Attachment D

MJM Storm Water Management Design

MJM

CONSULTING ENGINEERS

STRUCTURAL • CIVIL • BUILDING DESIGN

Stormwater Drainage

A Report on Hydraulics and Internal Drainage

at the

Riverina Oilseed Bio Energy Site

Client : Dern Pease

Our Ref: 090141

MJM Solutions
Level 1, 25 Tompson Street
Wagga Wagga NSW 2650

Phone (02) 6921 8333
Fax (02) 6921 8179
Email admin@mjm-solutions.com

1. INTRODUCTION

This report has been prepared in order to provide supplementary information on the fundamental principles of the stormwater design for the ROBE site. The report also includes a summary of the calculations used in the design of the retention basin.

2. METHODOLOGY

The following process was used in the design of the stormwater retention basin:

- Total pre-development flow was established for a 1 in 100 year (ARI) storm.
- The necessary size for the retention basin was determined for the 1 in 100 year (ARI) storm using the following assumptions:
    - Maximum outflow from basin is no greater than the pre-developed flow for a 1 in 100 year event.
    - The Rational Method is used to estimate a peak flow from an average rainfall intensity, (Q = C.I.A/360). C = 0.9
    - Triangular inflow and outflow hydrographs are assumed. (Refer equation 7.43 Australian Rainfall and Run-off).
    - Minimum storm duration is twice the time of concentration (t_c) as peak flow occurs at t_c by definition.

3. SUMMARY OF CALCULATIONS

a) Pre-developed outflow for 1:100 year storm = 0.765 m^3/s

This was determined as follows:

Design storm		1 in 100 year
Time of concentration	Tc =	18.7 min (see Appendix 1)
Intensity	I =	103.1 mm/hr
Run off coefficient	C =	0.6
Area	A =	4.45 ha
Undeveloped flow	=	C.A.I/360
	Q =	(0.6x4.45x103.1)/360
	=	0.765m^3/s

b) Developed outflow for 1:100 year storm = 1.66 m^3/s

This was determined as follows:

Design storm	1 in 100 year		
Time of concentration	Tc	=	8.7 (see Appendix 1)
Intensity	I	=	149.7 mm/hr
Run off coefficient	C	=	0.9
Area in Ha	A	=	4.45ha
Developed flow		=	C.A.I/360
	Q	=	(0.9x4.45x149.7)/360
		=	1.66 m^3/s

c) Outlet control calculations:

Single cell existing 525mm dia pipe will control the outlet.

Head	= 0.775 m
Diameter	= 0.525 m
Length	= 20 m
Area	= 0.216 m^2

Max out flow from 525 dia pipe for 1:100 year storm = 0.76m^3/s

d) Retention basin size = 467 m^3

This was calculated as follows using the triangular hydrograph formula:

$Q_{out}=Q_{in}(1-Vol_{store}/Vol_{in})$ Q_{out}=Peak out flow in m^3/s
$Vol_{store}= Vol_{in}(1- Q_{out}/Q_{in})$ Q_{in}= Peak In flow in m^3/s
$Vol_{in}=T_c x60xQ_{in}$ Vol_{in}=Total Inflow volume in m^3
$Vol_{store}= T_c x60xQ_{in}(1- Q_{out}/Q_{in})$ Vol_{store}= Total storage required in m^3

Hence volume required is:

Q_{out}	= Max Outflow	= 0.765 m^3/s
Q_{in}	= Developed Outflow	= 1.66 m^3/s
Vol_{store}	= $T_c x60xQ_{in}(1- Q_{out}/Q_{in})$	
	= 8.7x60x1.66(1-0.765/1.66)	
	= 467m^3	

e) Detention capacity of pipes and basin:

Storage in the 600 diameter pipes = 130m x π x 0.3^2 = 36.75 m^3

Basin capacity = 690 m^3

APPENDIX 1

Developed Tc Calcs using Kinematic wave

Enter Return Interval 1,2,5,10,20,50, 100

TIME OF CONCENTRATION FOR OVERLAND FLOWS

INPUT NUMBER OF OVERLAND FLOW SEGMENTS: 2

----------Roughness For Segment----------

Concrete or Asphalt	0.010 - 0.013	Bare Sand	0.010 - 0.016
Graveled Surface	0.012 - 0.030	Bare Clay-Loam Soil	0.012 - 0.033
Sparse Vegetation	0.053 - 0.130	Short Grass Prairie	0.100 - 0.200
Lawns	0.170 - 0.480	n* from AR&R vol 1 Page 300	

LENGTH (m), SLOPE % AND ROUGHNESS FOR SEGMENT 15,2,0.01

LENGTH (m), SLOPE % AND ROUGHNESS FOR SEGMENT 170,.2,0.011

INTERATION INTENSITY ESTIMATED AND CALCULATED TIMES

No.	(mm/h)	(min)	(min)
1	189.3	5.00	7.94
2	155.6	7.94	8.55
3	150.6	8.55	8.65
4	149.8	8.65	8.67
5	149.7	8.67	8.67

TIME IS 8.7 MINUTES FOR INTENSITY 149.7 mm/h

Undeveloped Tc Calcs using Kinematic wave

Enter Return Interval 1,2,5,10,20,50, 100

TIME OF CONCENTRATION FOR OVERLAND FLOWS

INPUT NUMBER OF OVERLAND FLOW SEGMENTS: 1

----------Roughness For Segment----------

Concrete or Asphalt	0.010 - 0.013	Bare Sand	0.010 - 0.016
Graveled Surface	0.012 - 0.030	Bare Clay-Loam Soil	0.012 - 0.033
Sparse Vegetation	0.053 - 0.130	Short Grass Prairie	0.100 - 0.200
Lawns	0.170 - 0.480	n* from AR&R vol 1 Page 300	

LENGTH (m), SLOPE % AND ROUGHNESS FOR SEGMENT 190,3,0.1

INTERATION INTENSITY ESTIMATED AND CALCULATED TIMES

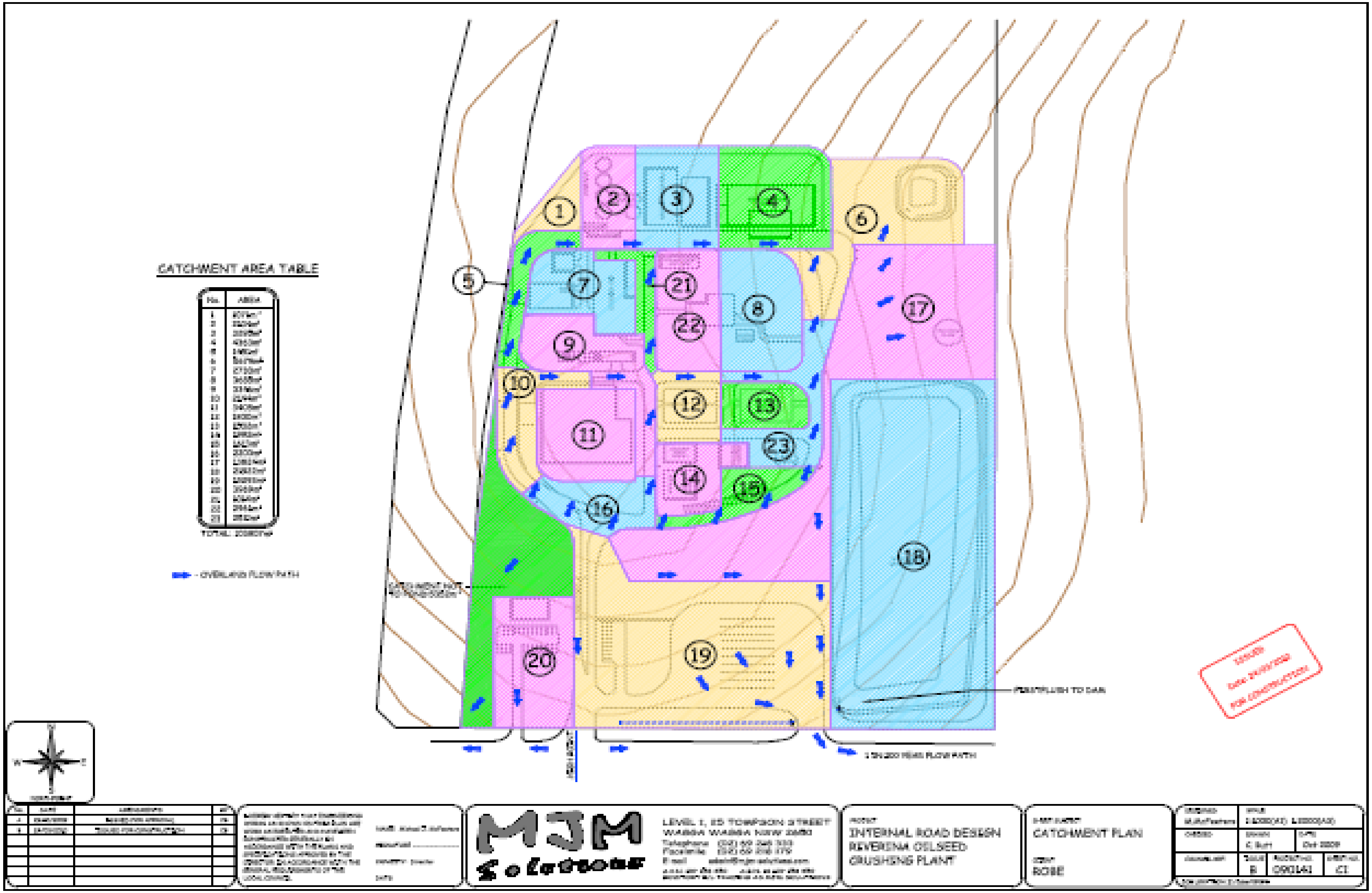
No.	(mm/h)	(min)	(min)
1	189.3	5.00	14.78
2	116.4	14.78	17.84
3	105.7	17.84	18.52
4	103.6	18.52	18.67
5	103.2	18.67	18.70
6	103.1	18.70	18.70

TIME IS 18.7 MINUTES FOR INTENSITY 103.1 mm/h

APPENDIX 2

NETWORK DISCHARGE FLOW RATES

Line	Q (m^3/sec)
1	1.201
2	0.519
3	0.039
4	0.099


CATCHMENT AREA TABLE
No.
AREA
TOTAL
- OVERLAND FLOW PATH
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
FIRST FLUSH TO DAM
LEVEL 1, 25 TOMPSON STREET
WAGGA WAGGA NSW 2650
MJM Solutions
INTERNAL ROAD DESIGN
RIVERINA OILSEED
CRUSHING PLANT
CATCHMENT PLAN
CATCHMENT PLAN
Oct 2009
090141
C1

Attachment E

EVA Submission

1st October 2010

Waterview
86 Dunns Road
PO Box 440
Wagga Wagga
NSW 2650

Dear Sir / Madam,

Riverina Oils and BioEnergy - Wagga Wagga

This is a submission regarding the above Development Application amendment.

This response is written on behalf of myself and the Eunony Valley Association Incorporated (EVA). EVA is an organisation that has 100 members that have united to a single voice to present our concerns over social and environmental issues that effect our community.

We object to the above amendment on 2 core base points. Firstly the lack of recognition of the Wagga Wagga City Council's own Local Environment Plan and secondly inaccuracy of data and failure to calculate full operating issues.

The WWCC L.E.P. states that there is to be no development on ridge lines – why is this site being considered for this project at all and in particular that it is now asking for buildings to be as high as 29metres above the ridge line. The proposed site overlooks the Eunony Valley to the east. This is an area of mixed farming and 40hectare lifestyle properties that will have their skyline damaged permanently by this proposal.

* There is ample land elsewhere zoned industrial that will bring it below visual damage levels that the ridgeline magnifies.

The inaccuracies or assumptions that are very concerning include the following points.

Water use, recycling, run-off and irrigation management.

The first proposal stated that ROBE would use 175megalitres (ML) of water, there is no mention of using less in the DA, however it now says it will only use 125ML with no mention of how or why the reduction. The 40ML storage dam will hold 1/4 to 1/3 of the annual usage levels. There is no calculation of the hard surface run-off and how that is going to be dealt with. Based on Wagga's annual average rainfall of 566.1mm the 7 hectares of developed area (could be as high as 16 hectares depending on how the balance of the site is managed) would create run-off as calculated below.

The area multiplied by the annual rainfall of 566.1mm would create 39,620,000litres or 39ML of run-off. In February 2010 Wagga received 170mm in 1 day, this alone would have created 11.9ML run-off from the site. The proposed dam size actually only manages the on site catchment not the excess water from the plant. We strongly believe that storage the dam needs to cater for 100% of 6 months of wastewater plus the annual rainfall equivalent in on site run-off plus there needs to be buffer for the 1 in 100 year rain event i.e. this would equate to a 200ML storage dam. This would allow for rain events that eliminate the need for irrigation such as February this year.

The irrigation requirements are not calculated accurately. Considering Wagga's winter rainfall pattern and reliability there is no economic benefit to irrigate between May and October, irrigating in winter would actually create immediate run-off most years. This leaves a 6 month window of opportunity to irrigate.

There is 25 hectares proposed to be irrigated. This is on sloping land that will create run-off. The site is in the extreme SE corner of land owned by RIVCO (who is leasing the area to ROBE). Any run-off will go into the neighbour's property as there is no catchment plan for excess run-off. It is a requirement that all water tailings (run-off from irrigation) has to be controlled, collected and recycled; there is no plan of this.

This run-off and any overflow from the storage dam will run into Schiller's Creek and onto the wetlands area known as Kurrajong Plain. In the event of flooding this water course flows into the Murrumbidgee River – are you comfortable that there will be no contamination risk? The Kurrajong Plain is also a natural point for recharging the artesian aquifer from which Wagga draws its domestic supply.

The current year to date rainfall for Wagga is 655mm (annual average is YTD 477mm). That rain has fallen from February to September and the irrigation requirements over that period have minimal if any. The owners of RIVCO (who are to operate the irrigation area) have been bogged at least twice this year in their adjoining farming land due to the wetter (normal) season. On the 2010 weather there needs to be storage of 46ML (from run-off) plus 80ML of waste water from the ROBE processing. These figures do not account for the other 11hectares of land on the ROBE site and water management from this or any other run-off nor excessive use through the plant.

** This demonstrates how flawed the modeling is for the storage dam alone.*

Wagga Wagga Long-term Averages

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Mean Max. (°C)	31.6	30.8	27.7	22.4	17.3	13.8	12.6	14.5	17.6	21.4	25.6	29.4	***22.1***
Mean Min. (°C)	16.2	16.3	13.3	9.1	5.9	3.7	2.7	3.6	5.1	7.7	10.7	13.7	***9.0***
Mean Rain (mm)	40.6	39.5	40.2	41.6	51.5	49.7	55.3	51.4	49.8	58.2	44.0	44.4	***566.1***
Mean Rain Days	5.2	5.2	5.3	6.7	9.4	11.4	13.6	13.1	10.8	9.7	7.6	6.2	***104.3***

Wagga Wagga Daily Records

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
High Max. (°C)	44.8	44.6	39.5	35.4	27.4	23.2	23.2	26.6	31.8	36.3	42.8	43.2	***44.8***
Low Max. (°C)	15.2	13.4	14.1	9.7	6.6	5.6	3.4	7.3	8.8	10.2	11.6	13.6	***3.4***
High Min. (°C)	29.5	28.6	24.5	21.7	17.8	13.8	14.8	14.4	16.5	21.9	27.6	29.8	***29.8***
Low Min. (°C)	3.4	2.3	2.6	-2.1	-4.4	-5.2	-6.3	-5.4	-3.8	-2.0	-0.2	3.4	***-6.3***
High Rain (mm)	91.8	69.1	104.1	78.0	91.2	50.2	46.0	44.4	49.8	55.8	51.6	65.2	***104.1***

Wagga Wagga Monthly Records

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
High. Max. (°C)	36.0	35.2	31.2	27.3	20.1	17.5	15.1	19.0	21.6	26.4	30.8	32.7	***36.0***
Low. Max. (°C)	27.5	27.4	23.6	19.3	13.9	11.8	10.8	12.4	14.2	17.8	21.0	25.8	***10.8***
High. Min. (°C)	20.0	20.5	16.5	12.5	9.6	8.0	5.1	5.9	7.6	10.5	14.7	17.6	***20.5***
Low. Min. (°C)	12.2	13.0	9.4	5.4	1.7	1.1	-1.7	1.0	2.6	5.3	5.9	9.3	***-1.7***
High Rain (mm)	174.4	157.5	249.2	216.9	190.3	138.8	130.0	101.4	128.0	181.7	142.4	213.4	***249.2***
Low Rain (mm)	0.0	0.0	0.0	0.5	4.6	0.8	1.8	6.4	4.1	0.6	0.0	0.5	***0.0***

Wagga Wagga Average Number of Days With Temperatures

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
≥ 40°C	1.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	***2.1***
≥ 35°C	7.5	4.9	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.5	4.2	***19.6***
≥ 30°C	19.5	16.4	8.7	0.6	0.0	0.0	0.0	0.0	0.0	1.3	5.9	14.2	***66.9***
≤ 2°C	0.0	0.0	0.0	1.0	6.0	10.7	14.0	11.1	7.1	2.3	0.3	0.0	***52.4***
≤ 0°C	0.0	0.0	0.0	0.1	2.1	5.0	7.6	5.3	2.1	0.3	0.0	0.0	***22.4***

WAGGA WAGGA AMO
35.1583°S 147.4573°E 212m AMSL
Commenced 1941
Rainfall records: 67.5 years between 1941 and 2009
Min. temperature records: 67.1 years between 1942 and 2009
Max. temperature records: 67.1 years between 1942 and 2009

The irrigation system, crop selection and water use efficiency are also inaccurate.

The irrigation area I believe needs to be owned by ROBE so that there is absolute security of agreement to irrigate. What happens if RIVCO terminate the lease or sell the land and the in-coming owner does not want the responsibility and obligation?

The 25 hectares set aside for irrigation is not large enough for responsible use of this precious commodity. As demonstrated early in this document if the dam is full at the end of winter and there is 0.3ML being added per day from the plant plus the on-going annual rainfall, there is an absolute minimum of 200ML that needs to be used over summer. On 25 hectares that would be an average of 8ML per hectare. Rice is one of Australia's thirstiest crops and that uses 8ML per hectare. The crops nominated require 2 – 4 ML per hectare for economic production levels.

** The area nominated for irrigation is a major flaw, highlighting the lack of integrity in the document as well as the blatant misuse of this precious resource.*

The irrigation system is stated to have a capacity of 0.9ML per day. With the dam full at the start of the irrigation season (and being topped up by 0.3ML per day from the plant) the irrigation system needs to be able to empty the dam by April each year, so there needs to be 2.5ML per day irrigated (for all of Summer) not the 0.9ML as stated.

- *Another glaring over sight that cannot be signed off on.*

The concept of having food producing irrigation land in the middle of a land bank zoned industrial has to be hypocritical when it comes food safety. The irrigation land is on the low side of contour and any run-off from other sites above will impact on the proposed irrigation site. Once again, a major fault in this submission.

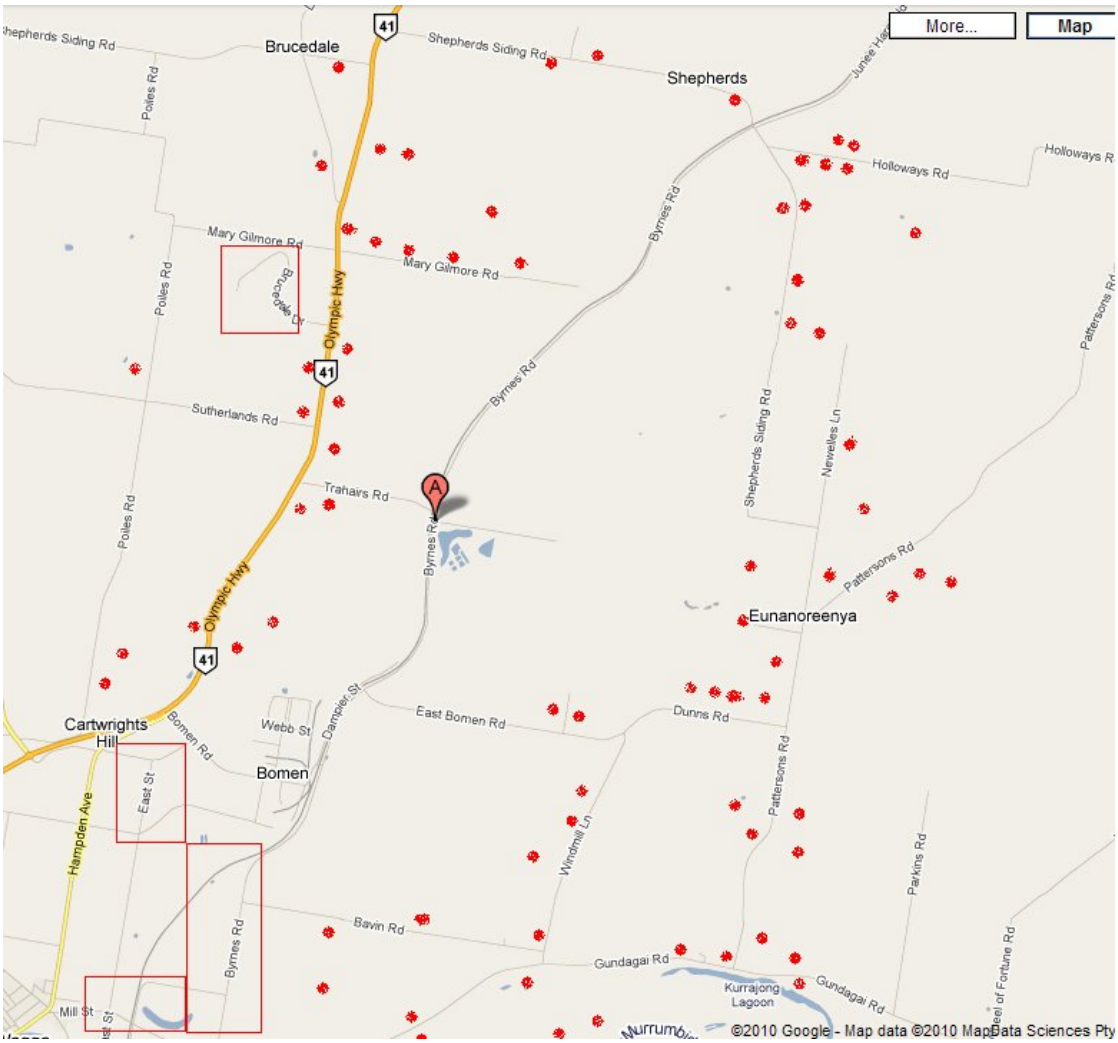
Water is a precious resource and no more so than in the Murray Darling Basin in which this proposal is situated. The Murray – Darling Basin report due out 8/10/10 appears to be reducing irrigators entitlements by 27% – 37%. If this is so, surely ROBE must show "state of the art" systems that minimize water use through the plant and maximize production through the irrigation area. To use the water at all is questionable however to abuse the water is deplorable.

The social impact statements in regard to the community are minimalistic and flawed. Firstly the Receptor locations do not cover the 360degrees affected by this project. I am a landholder within 3km of the site and yet my property is not marked on the various maps covering Odour, Noise, Dust or Lighting. There are several other properties that have not been identified or recognized in this report either. See attached maps showing the residences that we are aware of within 6km of the proposed site.

The DA shows photographs taken from a number of our properties, however no-one from Lennon Salvestro (author of the document) has spoken to any of these owners as to why they where on the property and what their plans are.

Map of community directly impacted by ROBE DA

Red dots refer to individual residences, the lined blocks are suburbs. The "A" is the proposed site and is the highest point in the immediate district.



Solvents are mentioned in 6.4.2 and fire risk, yet as adjoining landholders on the prevailing wind side there is no fire prevention plan.

Following a call to the Bureau of Meteorology at Wagga, it has been confirmed that the prevailing winds come from the North East to North to West to South Westerly direction. The maps supplied in the DA do not show this. The predominate winds will blow noise, dust and pollutants towards many homes and these issues will not stop at a 4.5km point.

Of the crops anticipated to be processed by ROBE only Canola is grown to a significant commercial level within 500km of Wagga. What carbon footprint would be created by transporting the other crops to this site? *Palm Oil to Wagga?*

Why is there not a major vegetation plan enforced to screen this ugly bulky mess (regardless of site location).

Why does the site need to operate 24 hours a day / 7 days a week?

I request to see a thorough working model showing that 79 people will be permanently employed, with technology enhancements and mechanisation I do not believe that 79 people are required nor would be it be economically viable to employ this many.

Is the NSW State Planning Department aware RIVCO (the irrigation partner) owns land adjoining ROBE that is severely contaminated with heavy metals and toxic waste from previous wool scouring operations? It is the same company that owns the site previously operated by Laminex (3km south of the ROBE site) that one of the Directors informed us has "thousands of tonnes of sanderdust that has similar health concerns as Asbestos Fibre, but no-one has made us do anything with it."

Surely a responsible Government would expect a developer to have an environmentally sound operation prior to being granted additional approval for questionable activities.

The initial proposal was based on Bio-Diesel, as the demand for that has diminished so has the plan changed. Can you and I be assured that this won't become a white elephant that will scar our sky-line for years to come?

Summary:

I hold a Graduate Diploma in Agribusiness, have an agronomic background and licensed Stock & Station Agent, and have been a past member of the Wagga Wagga City Council Economic Development Committee. This proposal breaches the local planning act and has quite blatantly submitted data that is both thin on detail and limited in accuracy.

For the New South Wales government to support this application it would negligent in its obligations to the tax payers of this State as well as the rate payers of Wagga.

I look forward to further discussion of this matter. I can be contacted on 0407 932 124.

Regards

Bill Schulz

On behalf of myself and the Eunony Valley Association Inc.

Attachment F

Letters of Support

RIVCO GROUP PTY LTD

16 December 2010

Department of Planning, NSW

Dear Sir / Madam,

Re: Letter of support for the development of ROBE's oilseed crushing facility located in Bomen's Industrial Precinct

I write to lend my full support to the establishment of ROBE's oilseed crushing facility. Recently, Sate Planning endorsed a new LEP for the entire Wagga Wagga district. The previous LEP, some 25 years earlier, in 1985 was so outdated that all plans for land use lacked certainty, until now. ROBE is central to the Industrial Precinct. Surely, if an agribusiness, the nature of ROBE can not exist in Bomen then one would have to question if any agricultural value adding will be ever be permitted.

The worthiness of value adding agricultural products locally and proximate to source is so logical and only to be further encouraged. For too long, our primary production sector has had a "bulk' mentality whereby vast quantities of food have been grown in our region only to be transported away with marginal gains and no value adding. The logic of separating meal from oil and returning the meal to other local industries, namely feedlots, is undeniable. Exporting whole seed from the region leads to a discount in the meal, higher freight costs, higher carbon foot print, lower values, less jobs and far less efficiencies.

The "knock on" effect for all local business sectors is profound. Farmers, contractors, local employment and eventually the production of home grown bio-fuel, all meet triple bottom-line objectives that are prerequisites to the establishment of any business today.

Production and processing are cornerstones in any economy. The city of Wagga Wagga is so fortunate to have such an opportunity by having a company that is choosing to establish a processing facility here. Sooner or later, in every vibrant community, consumption has to be off-set with production and processing. If every precinct around Wagga Wagga is geared only to consumption then the region will eventually suffer. Similarly, if all processing is encouraged only in the northern hemisphere, then this too will lead to an ailing local economy.

PO Box 2393
101 Byrnes Road, Bomen Industrial Estate
WAGGA WAGGA NSW 2650
Telephone: (02) 6921 8881 • Facsimile: (02) 6921 8919

Food security is looming as the next big global concern. Here, in one of Australia's most productive food basins, our local community has a real chance to get the supply chain right. If the ROBE project is overruled at this late stage, my greater concern is where does this leave Australian Agribusiness going forward? Wagga Wagga was originally an Agricultural town. Are we saying now it is not? Integrating our agricultural sector to the world could arguably be Wagga Wagga's greatest point of differentiation in the near future.

Yours truly,

Richard Reid
Director
Rivco Group Pty Ltd
PO BOX 2393
Wagga Wagga NSW 2650
Ph 02 6921 8881
Fax 02 6921 8919
Mob 0417 677 742
www.rivcogroup.com.au

Attachment G

Statement of Commitments

Table 58: Amended Statement of Commitments

Issue	Commitment
General	The proponent shall prepare and implement the following management plans for the project: • A Construction Environmental Management Plan (CEMP) and Operational Environmental Management Plan, which incorporate an Erosion and Sediment Control Plan; • A Traffic Management Plan (TMP) shall be prepared prior to site establishment and construction. The TMP shall incorporate a Transport Code of Conduct, which would outline and manage the transportation routes to the site for heavy vehicles and B-doubles. The TMP would also include: o Heavy vehicle access to the site; o Deliveries and dispatch of products; o Heavy vehicle parking; o Internal speed limits; and o Use of truck turnaround areas. • Landscape Management Plan detailing requirements for roadside landscaping and planting to minimise distant views and enhance near views from Byrnes Road and Trahairs Roads, including monitoring and maintenance of landscaping; • An Energy Savings Action Plan in accordance with the requirements of DECCW and the *Guidelines for Energy Savings Action Plans* (DEUS 2005). The Energy Savings Action Plan would include details of greenhouse gas abatement measures and energy efficiency measures for the operation of the proposed IOPP; • A Procurement Plan for palm oil shall be implemented prior to commencement of operation which must: o Identify environmentally and socially responsible feedstock materials; o Include procedures for the sourcing of such feedstock; o Include evidence of legal sourcing of feedstock; and

Issue	Commitment
	o Contain procedures for regular review of suppliers.
Additional general	Proponent will facilitate the establishment of a community liaison group to keep communication open between the proponent and the public regarding issues that may arise during construction and operation of the plant, and assist with the implementation of appropriate landscaping off site to the satisfaction of community and DOP.
Odour and Air Quality	The proponent shall ensure the design and operation of the IOPP minimises the potential release of fugitive odour emissions
	The proponent shall take all practicable measures to ensure that air emissions during the construction and operation of the project are within relevant air quality and odour criteria and guidelines
	The proponent shall ensure that the CEMP includes an Erosion and Sediment Control Plan to minimise dust generation from the site
	The proponent shall prepare and implement an Energy Savings Action Plan for the project, which would be prepared in accordance with the requirements of DECCW and the *Guidelines for Energy Savings Action Plans* (DEUS 2005) in order to maximise energy efficiency associated with the IOPP. The Energy Savings Action Plan would include details of greenhouse gas abatement measures and energy efficiency measures for the operation of the proposed IOPP.
Hazard and Risk	The proponent shall develop a plant operating procedure documenting procedures for the shut down of operations and removal of flammable liquids in the event that nitrogen generation equipment at the plant fails
	The proponent shall ensure that corrosive materials spill kits are installed throughout areas of the IOPP where corrosive materials are stored, handled and used at the site
	The proponent shall engage an appropriately qualified consultant to undertake a fire safety study to determine locations at the site where fire water cooling would be required to minimise the potential for a fire incident, and implement recommendations of the report
	The proponent shall ensure that fire hoses on the site are fitted with a foam generation attachment at each plant area where flammable and combustible liquids are stored and handled. A storage of at least 20 L of foam concentrate shall be maintained at locations where a foam generating attachment is held
	The proponent shall implement all practicable measures to contain firewater on the site and ensure that the water management system maintains a minimum freeboard capacity of 162 m3. The first flush retention pond shall contain all stormwater from plant areas, roadways and open yard areas
Surface Water Quality	The proponent shall implement all practicable measures to minimise soil erosion and discharge of sediments from the site. The Erosion and Sediment Control Plan prepared as part of the CEMP shall ensure: • Sediment and erosion control measures, such as sediment fences, are installed and maintained, with particular attention where the drainage is towards a surface water body; • Stockpiles are stabilised and remain covered and appropriate sediment and erosion control measures are installed down slope of all stockpiles; and • Spill kits are made available to construction vehicles so that accidental leaks and spills can be controlled.

	Areas containing storage tanks shall be fully bunded to contain accidental spills
Soil Suitability	Deleted
Groundwater	A Groundwater Monitoring Plan (GMP) will be developed and

Issue	Commitment
	implemented prior to the operation of the proposed development. The GMP will include: • Recommendations for the installation of additional monitoring wells including construction details; • Development of a groundwater monitoring schedule including sampling methodology and timetable; and • Preparation of a consolidated Groundwater Management Plan to be implemented during operation of the proposed development.
Waste Management	The proponent shall implement all practicable measures to minimise the generation of waste from the proposed IOPP
	Wastes requiring removal from the site shall be collected and disposed of by an appropriately licensed waste contractor
	Wastewater to be reused following treatment shall be stored in the 40 ML effluent storage dam, which shall be refurbished to the requirements of DECCW. This would include constructing the dam with a PVC liner.
	Deleted
	Deleted
	Deleted
Traffic and Transport	The proponent shall ensure that construction and operational traffic is managed in accordance with the TMP
	The proponent shall consult with the relevant traffic authority to obtain a s138 permit under the Roads Act 1993 to undertake an upgrade of the intersection at Byrnes Road and Trahairs Road, and to widen and seal Trahairs Road in accordance with relevant standards and guidelines
Visual	The proponent shall prepare a Landscape Management Plan, which would consider local endemic species and accommodate future land uses and receptors in the area
	The proponent shall ensure that landscaping is undertaken in accordance with the Landscape Management Plan
	Exterior lighting would be designed to minimise light spill, and would be generally in accordance with Australian Standard 4282-1997 Control of the Obtrusive Effects of Outdoor Lighting, notwithstanding functional and safety requirements
Additional visual	Light spill from the extraction plant building will be minimized by hooding of eastern and northern façade openings to direct light downwards.
Noise	Regular noise monitoring, including attended monitoring, will be undertaken during operations at surrounding receivers to determine noise levels generated by the project. If exceedances are detected during monitoring, amelioration measures will be investigated by ROBE to ensure that noise criteria are met

Heritage	The proponent shall ensure that in the event that Aboriginal objects are identified during works on site, works in the vicinity of the find would cease and the IOPP Environmental Representative would notify a heritage professional to obtain advice on how to proceed. Works would not recommence until heritage requirements identified through this process have been met

Issue	Commitment
	Should suspected skeletal material be uncovered during the course of any site works or through subsidence landscape modification, all works must cease and the DECCW, the NSW Police and the NSW Coroners office contacted immediately, regardless of any existing environmental approvals
	Contractors shall be made aware of the above recommendations, and advised of their responsibilities in relation to the protection of Aboriginal objects and sites under state legislation
Flora and Fauna	The proponent shall ensure that all practicable measures are implemented to minimise the potential impacts on flora and fauna, including: • Felled trees shall remain in situ for at least 24 hours to allow fauna species to relocate; • Qualified personnel shall be on hand to check trees hollows for wildlife and assist with relocation, if required; and • Should wildlife be inadvertently injured, an accredited veterinarian (and through them possibly a wildlife care group) shall be contacted.
	The proponent shall undertake weed monitoring during construction and operation to control weed infestations and apply appropriate control measures, if required. Measures to control Patterson's Curse shall be implemented in accordance with the Class 4 Noxious Weed Control Management Plan 2006 – 2011
	The Landscape Management Plan shall incorporate species endemic to the area
	Deleted

Attachment H

Community Consultation

12/11/2010

ROBE REFERENCE
050-130-20

RE: MINUTES OF PUBLIC MEETING BETWEEN ROBE AND EUNONY VALLEY ASSOCIATION

MEETING DATE 11/11/2010

ATTENDEES:
John Gray - "*Rosehill" Oura Road Wagga*, Craig Alexander -*50 Shepherds Siding Road Wagga Wagga*, Tony Dunn -*"Kurrajong" Patterson Rd Wagga Wagga (PO BOX 418)*, Graeme Obst - *"Langrigg Hall" 100 Newelles Lane Harefield*, Bill Schulz -*"Waterview" 86 Dunns Road PO Box 440 Wagga Wagga*, Mathew Howard *"Bindalee" 393 Holloways Rd Wagga Wagga,* Nicole Lennon - *RPS GROUP*, Dern Pease - *ROBE Project Manager,* Joe Fealey – *ROBE Procurement and Sales*

APOLOGIES:
DD Saxena – *ROBE Managing Director*

4.45 pm meeting outside of site and tour of affected properties and water courses.

Attendee list, less Graeme Obst and Mathew Howard met at the Trahairs Road entry to the construction site for introductions and general discussions.

Attendees informed that their attendance as a committee represents approximately 100 members of the Eunony Valley Association (EVA)

It is noted by request of the EVA to document the EVA committee disappointment that the Attendees were not permitted access to the construction site

Attendees proceeded on a tour of the Eunony Valley

Bindalee 289m

Mathew Howards Residence
35° 0'42.83"S
147°28'29.66"E
Elevation 289M
Distance From Site 5.24km
View to Site - Bearing 227 Degrees

- The dwelling is constructed on the ridgeline on a property with expansive view over the valley to the south west.
- The dwelling is constructed with a NW- SW aspect at an offset of approximately 40deg from north.
- The proposed development site could be viewed from the property in the distance with some difficulty but it was agreed that when completed the development will be visible and will near if not top the ridgeline behind.
- From observations it is expected that any completed IOPP, and in fact any development in the underlying valley recently rezoned Industrial, shall be within view from the property and also from the south western rooms of the dwelling.

Please note that all co-ordinates and elevations are sourced from GOOGLE EARTH

Langrigg Hall 259m

Graham Obst Residence
35° 2'23.66"S
147°28'51.84"E
Elevation 259m
Distance From Site 4.41km
View to Site - Bearing 264.25 Degrees

- Graham Obst joined the meeting group at this point
- The dwelling is constructed on the western side of an elevated knoll near the highest elevation on the knoll.
- The dwelling is constructed with a NW- SW aspect at an offset of approximately 40deg from north.
- The proposed development site could be viewed from the property in the distance with some difficulty but it was agreed that when completed the full western side view of the development will be clearly visible.
- From observations it is expected that any completed IOPP, and in fact any development in the underlying valley recently rezoned “Industrial” shall be within view from the property and that some existing trees at the property will provide some shield of views of the IOPP from within the dwelling

Schillers Creek

Observation Point where creek overspills in flood events
35° 3'24.75"S
147°28'23.32"E
Elevation 215m

EVA raised concern over

- the introduction of treated effluent applied to the catchment,
- The quality and quantitative monitoring of the effluent discharged to the proposed land for irrigation
- The protection of water quality in this creek as the development site and all future developments of east Bomen all exist in this catchment.

No photo taken from this point

Waterview 216m

Bill Shultz Residence
35° 3'51.96"S
147°27'39.77"E
Elevation 216m
Distance from Site 3.44km
View to site bearing 311.4 deg

- The attendees were driven to the rear of the dwelling clear of the existing screening trees that exist about the dwelling to witness a clear view to the west.
- The dwelling is constructed with a N-S aspect.
- The development site could be viewed from the property and it was agreed that when completed a full western side view of the development will be clearly visible from this vantage point.
- Screening trees that exist limit the visibility to the west from within the dwelling, to which Mr Shultz made comment that, “he lives on his 400 acres not just inside the residence”.

Kurrjong 216m

Tony Dunn's residence
35° 4'22.78"S
147°27'46.12"E
Elevation 203m
Distance from Site 4.19km
View to Site Bearing 319.82 deg

- The attendees were driven to the north west of the property to a vantage point some 300m NW of the dwelling to witness a spectacular view of the Kurrajong Plain, the intermittent wetlands to the north of Murrumbidgee River currently holding water post the recent rainfall events.
- The EVA committee expresses concerns of the potential water quality and possible harmful effects of run off from the irrigation site, or of a catastrophic effect in the event of a treated effluent dam failure.
- The development site could be viewed from the location and it was agreed that when completed a significant portion of the IOPP development could be viewed from this vantage point.
- Screening trees that exist limit the visibility from the dwelling as it was not clear of the exact location of the dwelling structure from the vantage point.

No photo taken or provided from this residence. The development will not be in view from the residence.

Meeting 6.45 pm Lawson Hotel

Mathew Howard “Bindalee” 393 Holloways Rd Wagga Wagga joins the attendees.

- ROBE (Dern) introduced the project by power point slides, accompanied by handout of the slides, provide some project history, the current status of development and design, and directly addressed concerns raised by the Eunony Valley Group in their submission. (see attached power point presentation)

The following notes reflect the discussion topics, and agreed actions resulting of the discussions.

WATER BALANCE and IRRIGATION

- EVA (Bill Shultz) raised concern that water balance data relied on average rain fall and average evaporation where in his opinion the operating plant will encounter years of extreme weather events. EVA wished to see a contingency plan to manage for this event.

- EVA (Bill Shultz) questioned why the irrigation plan was not provided with the submission.

- EVA (all) expressed concern on previous environmental discharges within the catchment that caused significant harmful affects to crops.

- EVA (John Gray) is particularly concerned his property is directly downstream of the proposed site on the RIVCO land to receive treated effluent.

ACTIONS AND RESPONSES

1. ROBE (Dern) directed group to DECCW submission in response to the EA, freely available on the internet which stipulates the environmental parameters the project must maintain during construction and subsequent operations

2. For information, ROBE provides extract from the staged Environmental Protection License 13097 as an attachment to this

document issued November 2009. This document details timelines for management plans and the approval processes thereof. http://www.environment.nsw.gov.au/prpoeo/licences/L13097.pdf

3. ROBE (Dern) commits that ROBE shall engage the community, EVA and in particular John Gray in relation to the development of an irrigation strategy

4. ROBE (Dern) commit to further investigate the water balance calculations and in particular the likelihood of uncontrolled discharge during extreme weather events.

5. ROBE (Dern) commits to openly discuss operational contingency plans for both short term and long term extreme weather events.

6. ROBE (Dern) agree to provide the water balance spreadsheet for crops to EVA (Bill Shultz) for further scrutiny of the calculations for meaningful discussion in spirit of co-operation as it is in ROBE's interest to maximise plant availability. (spread sheet attached)

VISUAL IMPACT ASSESSMENT (VIA)

- EVA committee generally expressed concern that the planning consultant did not notify residents of intention to enter property to prepare the VIA.

- EVA Committee (Bill Shultz) concerned that the proposal did not consider or adhere to Councils draft DCP controls for visual amenity.

- EVA Committee (Mathew Howard) indicates that the blue painted mechanical equipment currently at storage on site is visible in its prone position and expresses concern that this equipment raised to its vertical position shall be most visible.

- EVA Committee (Mathew Howard) enquired had the project considered a programmed tree planting exercise to assist with shielding any potential.

- EVA Committee (Tony Dunn) expressed concern of the lighting required to illuminate the proposed facility during 24hr operations and that the view to the stars will be affected in the area.

ACTIONS AND RESPONSES

7. Nicole (RPS Group) offers business cards to the committee and advises that should any interested resident of the area wish to make contact, she is available to make planned site visits to discuss individual concerns, view the site from their property and discuss potential mitigation measures.

8. Nicole (RPS Group) informed the meeting that the comment on the developments compliance with the Council DCP shall be measured and formalised to be included in the response to submissions presented to the DoP.

9. ROBE (Dern) informs the meeting that the size and shape of the buildings is essentially dictated by the equipment that is contained within the structure. The blue processing equipment supplied by the technology provider, Desmet Ballestra would be placed within the buildings, and the building themselves will be clad in colourbond materials of neutral colours to minimise any harm to visual amenity.

10. ROBE (Joe Fealy) informs the committee that Australian Standards will apply to the light levels required of any facility that operates 24 hours. The level of lighting required is dependent on the activities undertaken at any particular part of the plant where the process areas where employees are required to perform night duties requiring the highest illumination

11. ROBE (Dern) further offered that it is in the best interests of ROBE to minimise light energy and shall commit to making the lighting plan available EVA on its development.

NOISE ASSESSMENT (VIA)

- EVA committee expressed concern that the consultants report within the EA did not include residents to the east in the noise modeling.

- EVA committee expressed concern of the noise levels emitted of the Uranquinty Power Station and the ability of the DECCW, DoP and local councils to regulate and enforce environmental conditions

ACTIONS AND RESPONSES

12. ROBE (Dern) accesses the Heggies Report and provides the following information
    a. Rosehill is clearly considered in the Heggies Report as Receptor R8 and is located east of the proposed development.
    b. The noise modeling conducted by Heggies indicates that the sound pressures in any event, inversion affected or otherwise to the east of the proposed facility past a radius of approximately 1.5km from the source of the noise shall experience sound pressures below 30dB. The nearest residence on the east side of the source is “ROSEHILL” approximately 2.3km from the proposed equipment.

13. ROBE (Dern) enquired of the committee, “had any members of the EVA commented on being disturbed by construction activities of Stage 1 bulk earthworks and deliveries?”.
    Tony Dunn had advised that he had heard some activity but did not comment on its nature
    Bill Shultz made comment that no activity had taken place and if it had the community was not overly concerned with temporary nuisance construction noise
    (comment post meeting)

Approximately 50,000m3 of cut and 30,000m3 of fill has occurred at the site over the previous four months utilizing scrapers dozers excavators and dump trucks. A further 3000m3 of road sub base has been imported to the site and compacted to form road structures and hardstands suitable for further development.

14. ROBE (Dern) committed that background noise data will be collected in accordance with Australian Standards for both daytime and for night time by agreement prior to any commissioning of the proposed plant should it be approved for those immediately concerned residents.

15. ROBE (Dern) committed to contacting Heggies to consider residents outside of the modeled area for affect.

GENERAL DISCUSSION

- EVA, (Mathew Howard) expressed concerns over the capability of Byrnes Road, and in particular the capacity of the Byrnes Road, Shepherds Siding Road intersection to accommodate any additional heavy vehicles the result of the development and the possibility that ROBE may utilize the
    - Shepherds Siding storage facility to receive products by road and forward progressively to the proposed IOPP.
    - Junee Rail Siding facility to receive products by rail and transport to either Shepherds Siding or the proposed IOPP.

ACTIONS AND RESPONSES

16. ROBE (Dern) advised that traffic management plans were included for the approval of any new development as part of the EA.

17. ROBE (Dern) advised that it was considering applying to the WWCC traffic committee to have BDOUBLE access to the Shepherds Siding Road facility which would require additional studies to be completed.

18. ROBE (Dern) advised that it is not yet confirmed of the utilization of the Shepherds Siding Facility within the ROBE operational plans.

19. Nicole (RPS Group) advised that EVA may wish to approach WWCC traffic committee direct to present the issues and concerns regarding the intersection in question.

MEETING CLOSED -9.15pm

Minutes recorded by Dern Pease

"O7.1 An operational environmental management plan must be developed for the facility prior to operations commencing.
As part of the OEMP for the development, the licensee shall prepare and implement the following Management Plans:
*a) an **Odour Management Plan** Prior the plant operation. The Plan shall include, but not necessarily be limited to:*
i) identification of all point and diffuse sources of odour associated with the operation;
ii) a detailed description of the odour mitigation methods and management practices that will be used throughout the operation to ensure offensive odour impacts do not occur off site;
iii) details of the implementation of industry best practice management measures to ensure potential odour impacts are managed;
iv) a detailed description of the methods used for monitoring the effectiveness of the odour mitigation methods and management practices for all point and diffuse sources of odour associated with the operation;
v) details of proposed contingency measures should odour impacts occur;
vi) details of the proposed maintenance procedures for the overall project to ensure potential odour impacts are managed; and
vii) a procedure for handling potential odour complaints that includes recording, investigating, reporting and actioning.
*b) an **Effluent Irrigation and Wastewater Management Plan** to outline measures to manage waste (including liquid effluent and solid wastes) associated with the project. The Plan shall be prepared in consultation with the EPA, and include but not necessarily be limited to:*
i) description of the proposed irrigation system and associated infrastructure, location of utilisation areas etc.;
ii) measures to manage and/or mitigate the risk of soil degradation, erosion and the accumulation of nutrients & salts in the utilisation areas;
iii) details of the crop cycling and management in the utilisation areas;
iv) specification of standards and performance measures for each of the relevant components of the irrigation system and effluent treatment system;
v) details of a suitable soil moisture monitoring system to ensure that effluent is not irrigated during periods when soil is at or near field capacity to minimise the risk of deep drainage of nutrients;
vi) details of the frequency of analysis of wastewater, groundwater, soil and dry matter produce in order to ensure that adequate information is available each year to determine an annual nutrient and salt balance for the site and details of the trigger levels for nitrogen and phosphorus in the soil;
vii) demonstration of consistency with the DEC's Environmental Guidelines Use of Effluent by Irrigation;
viii) description of what measures would be implemented to ensure that the proposed system complies with the specified criteria during operations;
ix) a detailed description of what contingency measures would be implemented for irrigation practices on site and the treatment of effluent, such as the impacts of adverse weather conditions or the failure of the effluent treatment ponds to maintain biological conditions;
x) description of how the effectiveness of actions and measures would be monitored over time; and
xi) if any non-compliance is detected what procedures would be followed to ensure compliance.
*c) a **Groundwater Management Plan** to detail measures to manage and minimise the impact of the proposal on groundwater. The Plan must be prepared in consultation with the EPA and is to include, but not necessarily be limited to:*
i) details of baseline groundwater quality, as present prior to the commencement of construction of the development;

ii) identification of activities associated with the development that have the potential to impact on groundwater quality, and how these materials and activities are to be managed to prevent those impacts;
iii) monitoring of groundwater quality, including parameters to be monitored and frequency of monitoring;
iv) details of how any groundwater level rises or salinity increases in nearby properties will be monitored and managed;
v) details of contingency measures and management options should monitoring of groundwater quality indicate that the development has had, or is having, an adverse effect on groundwater quality;
vi) details of specific levels for standing water levels, nitrogen, phosphorus and potassium that trigger the nominated contingency measures and management options, should monitoring of groundwater quality indicate that the development has exceeded this criteria. These levels and contingency and management options must be developed to the satisfaction of the EPA.

Note: The EPA will not require any part of the above plans (a, b or c) to be approved or reviewed by the EPA. The licensee must ensure that each plan is sufficient to meet all the requirements of the conditions of this licence."