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10 June 2015

Statement of Expert Evidence

Re: Central Victorian Livestock Exchange:
Ballarat Planning Scheme Amendment C185:
EPA Works Approval Application Service Order Reference: 1001580

Name and Address

Charles Mellish,
Level 21, 28 Freshwater Place,
Southbank 3006,
Melbourne Victoria

Qualifications and Experience

B.Sc (Engineering), M. Sc (Engineering)
Chartered Professional Engineer (IPENZ PE International)

I have 30 years' experience in wastewater treatment process design specialising in natural pond treatment systems and activated sludge nutrient removal process design. I am recognised as a specialist in the field of domestic and industrial wastewater treatment. A statement of qualifications and experience is included in Appendix A.

Instructions

This statement has been prepared on the instruction of Central Highlands Water. I was instructed to:

1. Review the exhibited materials and submissions;
2. Prepare a peer review of the exhibited materials as they relate to my discipline;
3. Prepare a statement of expert evidence and appear at the planning panel proposed for the week beginning 22 June 2015.

Information used and relied upon

These documents relate to the works approval application WA1001580: RLX Operating Company Pty Ltd to relocate and re-establish the Central Victoria Livestock Exchange (CVLX, saleyard) from its existing site in central Ballarat to (Part) 22 – 76 Victoria Street, Miners Rest. I have considered them in preparation of my evidence.

1) Geolyse (2014) Water cycle management, Report prepared for Regional Livestock Exchange (RXL) Investment Company Pty Ltd, August 2014
2) Spiire (2014) DRAFT Environmental Improvement Plan, Prepared for Regional Livestock Exchange (RXL) Investment Company Pty Ltd, August 2014

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3) Geolyse (2015) Letter of response to Central Highlands Water, dated 3rd June 2015

The review also considers the requirements outlined in the following documents.

1) EPA Victoria (2003) Guidelines for Environmental Management: Use of reclaimed water, Publication 464.2, ISBN 0 7306 7622 6

The following are assumptions made during the review of the presented documents.

1) The proposed consultation with the EPA to affect the identified improvements in wastewater management will be effective and appropriate;
2) The physical works that are to be approved by through the EPA Works Approval Application will achieve the assumed empirical designs report, namely:
   a) First order decay rates for BOD removal;
   b) Reed (1985) for Total Suspended Solids Removal in wetlands;
   c) First order decay rates for pathogen reduction;
3) The hydraulic design of the treatment ponds avoids short-circuiting, upon which the empirical design is based.

Peer Review Outcomes

My assessment of the wastewater treatment system presented in the Geolyse Report (August 2014) review is listed below:

4.2.3 EFFLUENT QUALITY

- The influent design assumptions presented in the documents defining the treatment of sales stockyard runoff are a reasonable assessment of the expected flows and organic loads;
- The proposed use of facultative aerated ponds must ensure that sufficient mixing energy is provided while oxygen is transferred mechanically into the pond to achieve the reduction in BOD;
- The organic loads treated in the Facultative Aerated Ponds effluent are treated entirely using mechanical aeration. The transfer efficiency and expected effluent quality needs to be presented in the Works Approval application. The details of the expected treated water quality must be provided in the Works Approval Application and will be reviewed at that time by Central Highlands Water to:
  - Consider odour emission risk at the proposed organic loads;
  - Consider organic load on the Aerobic pond to limit loading during cold winter periods when reaction rates for empirical designs decline;
- The reduction of pathogens is reported to be 21 coliform units that is proposed to be achieved across the Facultative Aerated and Aerobic Ponds;
  - Any increase in pathogen counts in the influent can result in elevated pathogens in the effluent above that predicted in the design;

- The Environmental Improvement Plan (EIP) developed in consultation with EPA Victoria must address the pathogen targets after Facultative Aerated Pond treatment and Aerobic Pond treatment respectively;
- Mitigation of these seasonal occurrences may be achieved in the upper soil profile where predation of e coli occurs; and
- EPA Victoria must be satisfied that the Class C water quality is achieved in the Aerobic Pond Effluent and not the Holding Pond.

4.2.4 COMMISSIONING

A response to the Central Highlands Water review of the plant Commissioning was detailed in a letter from Geolyse, dated 3 June 2015. The commissioning activity is proposed to occur over 18 months.

The following comments are made to these responses:

- It was stated that staff will be trained to operate the treatment facility as the "system is simple, robust and stable biological system". While this may be the case once the system is fully commissioned, the expected 18-month commissioning process will require the input from Geolyse that is stated in the letter, otherwise the successful commissioning may be compromised;
- Development of the EIP with EPA Victoria monitoring of performance is essential to the success of the proposed treatment process;
- Regular sampling will be required to measure performance against the Licence requirements especially during commissioning;
- During commissioning, land drainage collected by the wetland system may not be compliant with the expected disposal quality. This flow can gravitate off-site. Mitigation of this occurrence must be considered by disposing low quality treated wastewater to the Central Highlands Water sewerage network.

Conclusions

It is concluded that the review of the proposed wastewater treatment process is adequate to achieve the intended however further review of the design is required to consider the additional design criteria that will documented as part of the final Works Approval application. This will provide Central Highlands Water with an opportunity to confirm that the proposed system design is appropriate and applicable for this application.

Assumptions and limitations

The following are assumptions were made during the peer review.

- The physical design of the treatment process achieves the assumptions made in the empirical design criteria;

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- Any anomalies or trends towards an inability of the treatment process can be mitigated by changes made to the operation of the facultative aerated lagoon and Aerobic Pond to meet the EPA Victoria licence requirements.

Declaration

In preparing this document I have considered all the assumptions made that are applicable to the design of wastewater from the activities proposed for this site.

While the detailed Works Approval Application will provide detailed design assumptions for review in the future, there are no matters of the proposed treatment system omitted that are required to achieve the EPA guidelines for management of wastewater on this site.

Yours sincerely

Charles Mellish
MWH Australia Pty Ltd

MWH Australia Pty Ltd
Suite 406
147 Pirie Street
Adelaide, SA 5000

TEL +61 8 8223 2214
www.mwhglobal.com

ABN: 17 007 820 322ABN: 17 007 820 322

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Appendix A

Charles Mellish

PRINCIPAL PROCESS ENGINEER

charles.mellish@nz.mwhglobal.com *Ph: +61 487 316 566*

Charles is a wastewater treatment engineer for MWH and has 28 years' experience specialising in wastewater treatment processes.

Charles has extensive expertise in wastewater treatment including personal involvement in the process design of numerous wastewater treatment plants, treating both domestic and industrial wastewater. Charles has experience in sludge thickening and dewatering of biological sludges. He has been selected as the technical lead to manage delivery of multi-disciplinary projects and providing guidance and technical review.

Charles has a Masters degree from the University of Cape Town. He is also a member of the Water Environment Federation (WEF), meaning he has access to a range of publications and colleagues, which help to further his expertise in the area. Charles' practical experience extends internationally, with work also undertaken in New Delhi and South Africa. Charles' skills are thus readily transferable, to either large infrastructure planning or a small community environment.

Charles delivered a paper on wastewater treatment process at the 2008 INGENIUM conference and also a member of the South African water institute.

SPECIALISATIONS

- Wastewater treatment process
- Feasibility and design engineering
- Water treatment

CAREER SUMMARY

- Wastewater Treatment Engineer, MWH, 2002 to Present
- Director, KV3 Engineers, 1998 to 2002 (KV3 joined the WorleyParsons organisation in 2010)
- Associate, KV3 Engineers, 1995 to 1997
- Engineer, KV3 Engineers, 1990 to 1994
- Engineer, Meiring & Barnard, 1984 to 1989

QUALIFICATIONS AND MEMBERSHIPS

- BS/BSc, Engineering
- MS/MSc, Engineering
- Water Institute of Southern Africa, Member
- Institute of Professional Engineers - New Zealand (IPENZ), Member
- Water Environment Federation (WEF), Member

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Charles Mellish

A SELECTION OF PROJECT SUCCESSES

Upgrade of Regional Lagoon Systems in Queensland, Queensland Urban Utilities, 2010 to Present

Charles is the process designer for the preliminary design to upgrade Regional Lagoon Systems in the Lockyer valley and Scenic Rim Regions. The six lagoon systems were upgraded using aerated lagoons with filtration and tertiary treatment to meet the suspended solids concentration limits in the effluent.

Pines II WWTP Upgrade, Selwyn District Council, 2010 to 2011

Charles is the technical lead for process design and reviewer of the plant hydraulics and process mechanical equipment for a 30,000 ep plant upgrade. The plant comprises fine screens, grit removal, biological nutrient removal, clarifiers, UV disinfection, gravity thickening, aerobic digestion, mechanical dewatering and solar drying.

Whangarei Headworks, Whangarei District Council, 2008 to 2010

Charles specified the process requirements for the screening and grit removal equipment and the solids handling processes to wash and dewater the screenings and grit for a 25MLd plant. Charles developed the hydraulic model to accommodate the storm flows and provide side stream flow balancing of diurnal flows.

Te Maunga sludge dewatering, Tauranga City Council, 2008 to 2010

Charles is developing a strategy to dewater short sludge age waste activated sludge to achieve 20% dry solids for disposal to a landfill. The project will then require a planned development of drying processes to reduce the water content further.

Whangarei Tertiary Filter upgrade, Whangarei District Council, 2008 to 2010

The secondary treated wastewater required a tertiary filtration process to meet the consent limits of the discharge consent for a 25MLd plant. Charles provided process design for a tertiary filter process that was tendered as a design-build project.

Palmerston North City Council Waste Water 2006, Palmerston North City Council, 2003 to 2005

As Process Engineer, Charles was responsible for the hydraulic modeling of a UV disinfection system into the Manawatu River. This project required modeling of hydrologic structures such as the UV channel, wetland control structures and the river diffuser under varying flow conditions.

Whangarei WWTP Upgrade, Whangarei District Council, 2003 to 2006

As Process Engineer, Charles was responsible for the development of a long term master plan to define the asset upgrade for a 20 year life. The project included the assessment of all process units. Charles' work contribution improved the planning of the capacity of the process trains and developed a cash flow for upgrade planning.

Feilding WWTP Upgrade, Manawatu District Council, 2008 to 2009

Co-ordinate and undertake the review of the treatment conventional domestic and industrial wastewater treatment processes, plant upgrade requirements, and future planning to develop the plant for the future flows and loads for a 25 year design horizon.

Lyttelton Coal Stockpile Stormwater Treatment, Lyttelton Port Company, 2007 to 2010

As Process Design Engineer, Charles was responsible for designing a water treatment process using chemical dosing and a lamellae clarifier to improve the treatment process and sludge handling for the Lyttelton Coal Stockpile, for a new stockpile configuration. This project was particularly difficult given the varying flow rates generated by the stormwater runoff on the site. The plant has been commissioned after a design-build procurement process and has been successfully commissioned. The plant survived the February 2011 earthquake with minor damage and continues to perform well.

Yamuna Action Plan Phase II, Delhi Jal (Water) Board, 2006 to 2009

As the lead process engineer, Charles was responsible for implementing two wastewater treatment plant upgrades, which incorporated three sewer pipeline rehabilitation projects. The treatment plants treated flows of 55MLd and 350MLd respectively. Charles achieved compliance with permits for increased nutrient removal and disinfection limits achieving the client's requirements and deadlines, and brought international expertise to the project.

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Tauranga Solids Reduction at Te Maunga WWTP, Tauranga City Council, 2007 to 2009

As Project Engineer, Charles coordinated process design and multi-disciplinary input for the development of a solids reduction process in preparation for the construction of the Te Maunga waste water treatment plant upgrade. The project involved the use of innovative technology which had a large impact on biosolids operating costs. It was also unique as it integrated waste water treatment and biosolids.

Te Maunga WWTP Development Plan, Tauranga City Council, 2007 to 2008

As senior wastewater engineer Charles was involved in the development of the investigation of the flow and load investigation, unit process upgrade planning to meet the demand and provided guidance for the development of the cost estimate to predict capital development planning.

Reefton WWTP - Project Management, Buller District Council, 2004 to 2007

As Project Manager and Design Engineer, Charles was responsible for designing and supervising the construction of a new natural treatment system incorporating screening, an aerated lagoon and baffled maturation pond wastewater treatment processes. The combined sewer system had to treat wastewater using very high flow variations. Charles managed these variations using a natural treatment process with very positive results.

Te Maunga Stage 3 Design Statement, Tauranga City Council, 2006 to 2007

As Process Design Engineer, Charles was responsible for the design of screening and grit removal processes. A conventional upgrade was challenging as it was difficult to integrate new equipment into the existing structure. Charles approached the challenge by using a phased upgrade to integrate the new equipment.

Russell Wastewater Treatment Plant Upgrade, Far North District Council, 2003 to 2005

As Process Engineer, Charles was responsible for assessing the IDAL treatment process and making subsequent improvements. This included designing an upgrade to meet resource consent requirements. He improved the aerobic treatment process, UV disinfection and automated process control system all of which helped to significantly enhance the plant's efficiency.

WDC Waikuku Beach and Woodend WWTP Upgrade, Waimakariri District Council, 2004 to 2005

As Project Manager, Charles was responsible for designing and supervising the upgrade of oxidation ponds to aerated facultative ponds with treatment wetlands for the Woodend and Waikuku Beach wastewater treatment plants. Charles met the challenges involved in managing a natural treatment process and constructing a 2.5ha constructed wetland.

Gwaing Petro Process Review, MTH Consultants, 2003

As a sub-consultant, Charles reviewed the process design for a Petro wastewater treatment plant. He provided expert advice to improve the process for the plant which has been incorrectly designed. This was a particularly innovative and interesting project as Petro plants are not common.

Sosucam: Cameroon Sugar Mill Wastewater Treatment, Sosucam, 2002 to 2003

As Process Engineer, Charles was responsible for optimising the pre-treatment process to remove sugarcane plant material and grit. He undertook a detailed plant inspection and gave recommendations for utilising process water to improve water demand management in the production process.

Ardmore and Huia - Design, Watercare Services Ltd, 2002 to 2003

As Process Design Engineer, Charles was responsible for developing the filter process instrumentation and process flow diagrams including user requirement specifications. He defined filtration systems to achieve New Zealand drinking water standards and improved an automation system.

Chapel St Inlet Screen Invest, Tauranga City Council, 2002 to 2003

As Design Engineer, Charles was responsible for improving screening performance. This involved upgrading to fine screens and the use of related equipment. The project successfully achieved a decrease in the amount of solids handled.

Bellville Inlet Works Upgrade, City of Cape Town, 1999 to 2002

Process design and project management of fine screening, grit removal and removal of hydraulic constraints of pipe-work and distribution of piping for 60 ML/d Bellville WWTP.

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