Submission for:

MBA – EXCELLENCE IN OCCUPATIONAL HEALTH & SAFETY - PRACTICES - 2011

NORTH WESTON PONDS & MOLONGLO INFRASTRUCTURE, STAGE 1A

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Project Description

North Weston Ponds & Molonglo Infrastructure Stage 1A

Principal:	Roads ACT
Superintendent:	Cardno Young
Head contractor:	Hewatt Earthworks Pty Ltd
Contract Value:	$39 million +
Commenced:	December 2009
Completion Date:	To Be Determined

The site is located adjacent to the intersection of the Cotter Road and Streeton Drive in Weston Creek, ACT and is bound by the ACT Forestry HQ, the RSPCA and Orana School**.**

Works consist of environmental protection measures; temporary traffic management; earthworks, removal of contaminants, bridgework, structural concrete work, precast concrete, relocation of services, stormwater drainage, protection of sewer infrastructure, quality assurance testing and reporting; ancillary works including coordination, commissioning and liaison with asset owners.

Hewatt Earthworks' involvement

- Construction of the North Weston Pond for stormwater management, recreational uses and visual amenity. Ponds include the installation of Geosynthetic Clay Liners (GCL) to encapsulate the contamination from the former Weston Creek Sewerage Treatment Plant (WCSTP).
- Construction of Gross Pollutants traps on Weston Creek, Duffy Creek and the future inflows from subdivisions east of the ponds.
- Remediation earthworks of Part Sec 1210, WCSTP, and Part Sec 1204.
- Construction of controlled fill platforms for the future subdivision works.
- Landscaping of public parkland with waterside promenades, picnic areas, playgrounds and cycle path connections.
- Construction of the first stage, approximately 980m, along the North South Arterial (NSA) alignment from the intersection of Cotter Road and Streeton Drive to the new connection back to Cotter Road South of the suburbs of Wright and Coombs. Removal of Environmental Incident Limit (EIL) material from Part Sect 121 and WCSTP and placement in the embankment of the road with 1m of capping providing that it is asbestos free.
- A new signalised intersection to provide access to the proposed suburbs of Wright and Coombs.
- Twin bridges over Weston Creek incorporating a pedestrian underpass.
- Pedestrian bridge over the Ponds.
- Arch bridge over Weston Creek and pond embankment to provide access to Coombs.
- Primary outfall arch for outfall to ponds.

- Relocation of services within Cotter Road and open space for ponds including HP Gas, Communications, over head power and 300 dia water mains.
- Aside from the many and varying engineering challenges for the project the following key Safety Issues are being managed on a daily basis.

Project High Risk Areas Identified by Hewatt Earthworks:

1. **Site Contamination**
   The project as tendered included the provision for a small quantity of asbestos contaminated material in the order of 100's of cubic metres among other small amounts of contamination on the site.

   The site Remedial Action Plan (RAP) prepared by SMEC allowed for remediation of the site based on clearing "Hot Spots" that had been identified as part of a Phase 2 investigation in the design phase. Approx 350 test pits were excavated across the site.

   Based on Hewatt Earthworks' experience - training in the identification and safe handling of asbestos - in other recent projects such as Commonwealth New Building Project, Hewatt Earthworks assessed the risk to our employees to be too great to continue with the project without expert involvement from an Occupational Hygienist. From December 2009 to February 2010 Hewatt Earthworks insisted that the client engage an expert in asbestos (not initially part of the clients consultant team).

   Finally in March 2010, and prior to Hewatt Earthworks agreeing to commence works on the site, an Occupational Hygienist was engaged. This inspection confirmed Hewatt Earthworks' own observations that asbestos was on the surface and was wide spread across the site. The expert concluded that

   > "Based on the distribution of ACM observed across the site it must be presumed until proven otherwise via excavation that all areas in the proposed pond site are impacted by ACM." (Robson March 2010)
   >
   > "Several types of ACM debris were located, including pipe sections, flat sheeting, tilux sheeting, corrugated sheeting, valve housing packing and woven asbestos material." (Robson March 2010)

   Due to the confirmation of a high frequency of asbestos on the site the entire approach to the project and the notion of clearing "hot spots" was abandoned. The entire portion of the project within the Area of Environmental Concern (AEC) was then correctly managed under asbestos protocols and the RAP was amended accordingly.

   Correctly, the project now was undertaken by excavating on a face where the exposed face could be managed and the material sorted and classified systematically. The expert observations were subsequently ratified with 100,000's of tonnes of impacted material excavated to date with further material still yet to be classified.

   The insistence by Hewatt Earthworks to not just accept the client's original direction, to commence works and proceed with the original RAP, is well and truly justified as evidenced by the substantial quantum and level of contaminated material processed so far.

2. Disposal Aspects

Prior to the development of projects such as Harman, the Commonwealth New Building Project and the Molonglo Development, all bulk disposal of asbestos contaminated soil from the ACT was disposed of in NSW. Only small quantities of double wrapped asbestos were accepted at the Mugga Lane facility. This facility does not have the capacity for bulk deliveries of the magnitude generated by the above projects. Substantial lobbying and negotiations were undertaken by Hewatt Earthworks in order to reactivate the West Belconnen Resource Management Centre (WBRMC).

As the WBRMC had effectively been "mothballed" by ACT NoWaste in 2003, Hewatt Earthworks was required to re-establish and operate the facility. This was undertaken under a memorandum of understanding between Hewatt Earthworks and the ACT Government. Hewatt Earthworks' operation at the Belconnen resource centre included:

- Establishment of Safe Work Method Statements (SWMS), a Safety Plan and protocols with negotiations held with the EPU, Workcover, the Client, the CFMEU, etc, as previous protocols requiring the double wrapping of contaminated material in plastic were not practicable for the large quantities associated with this project.
- Training of all personnel associated with the works including truck drivers and plant operators. To date Hewatt Earthworks has trained in excess of 80 personnel in the nationally accredited course (Identification and Safe Handling of Asbestos 80803ACT)
- Maintenance of access and all weather access roads to the disposal site
- Establishment of a containment area
- Dust suppression
- Provision of plant and equipment to compact, place and seal with capping material
- Protection of all on site personnel to tarp and untarp and clean trucks
- Air monitoring
- Survey control to maintain records of disposal locations by source sites within the disposal area

(Refer to the Plan of the WBRMC at Attachment 2.1)

3. Traffic Arrangements for the Cotter Road

In the Tender stage of the project Hewatt Earthworks assessed that the Concept Traffic Management Plan for the construction of Cotter Road was unrealistic, unsafe and impractical.

The concept plan required traffic to traverse the batters on each side of the new road alignment (1:2 northern and 1:4 southern) with a 3m to 5m deep cut to the new road surface immediately adjacent on each side of the existing carriageway. Also the concept did not make any provision for the existing cycle path that would be totally disrupted as part of the works. (refer to the Concept Plan at attachment 3.1)

Further in order to undertake the excavation for the new road the existing services in Cotter Road needed to be relocated first. The new services are in a standard verge alignment with the new road and at a standard depth to the new road of 1 to 1.5m. However, as the new road is 5m below the existing road this would mean trench excavations of 6 to 7m deep directly adjacent trafficable lanes, of roads supporting substantial heavy vehicle movements for the Enlarged Cotter Dam (ECD) and new suburbs of Wright and Coombs.

Hewatt Earthworks could not rationally accept the documented concept of constructing the works with traffic running through a 5m excavation. Hewatt Earthworks therefore undertook the design of a 570m side track to divert all traffic to the south of the existing alignment and the 5m deep earthworks. (refer to the Side Track Detail Design at Attachment 3.2)

The side track achieved the following outcomes:

- Design speed of traffic of 70km/hr, including all heavy vehicles for the ECD works, which will have B-Double movements for 20hrs within each 24hr period for a duration of at least 6 months.
- Provided a 350m diversion for the cyclepath.
- Maximum vertical grade of 7.175% (concept 27%, 2:1 batters).
- All weather sealed pavement with standard road furniture, reflective road markings and RPM's (not practical with temporary gravel pavements proposed with concept). (refer to the TTM at attachment 3.3)
- Safety of construction workers, motorists and cyclists maximised with complete separation of traffic from the work area.
- Safety of construction workers undertaking services relocation maximised as the excavation to the new surface in the area of the new service alignment could be undertaken before the existing services needed to be disconnected. Workers now able to construct the new services (300 dia water, HP gas, electrical, comms) in standard 1m to 1.5m deep trenches instead of the concept proposal of 6m to 7m deep.
- Side track achieved the first objective in the hierarchy of control of risk by eliminating the risk to workers and the public from the project.

The cost of construction of the 570m side track (cost totally met by Hewatt Earthworks) was considered worthwhile as the potential safety risk of not using the side track was considered too high.

4. MVIS Protection Works

The MVIS is the 1950 dia ACTEW sewer main that carries 80% of the total volume of waste water from Canberra to the lower Molonglo STP. As the existing MVIS was to be flooded by the new ponds, a section of 240m of the main required protection with a concrete slab. Due to the age of the MVIS and the degradation of the pipe, the protection slab was required to be constructed approx 1m above the obvert of the main to relieve ground pressure on the main. As the MVIS is at an existing depth in excess of 12m through this section of the site, the excavation to construct the slab was 8m to 10m deep, which was 5m to 7m below Weston Creek. (refer to diagram at Attachment 4.1)

The design for the protection slab required the total length of the works to be fully excavated and then precast slabs to be site measured, detailed and then fabricated. The changing rock levels would require detailing of the precast slabs individually and they could therefore not be prefabricated ahead of excavation.

At the Tender stage Hewatt Earthworks identified that the design proposed presented several concerns. With a production rate of the precast slabs of only 2 per day the excavation would need to be kept open for at least 10 weeks. The flows of Weston

Creek of Q1 37.2 m3/sec and Q5 56.5 m3/sec would provide expectation that the excavation would be inundated at least once in that time as the excavation was 5m to 7m below Weston Creek. The potential of inundation was an unacceptable risk to ACTEW due to the potential of failure of the MVIS under the water load and then piping of stormwater to the Molonglo STP. This storm flow would breach the plant capacity and potentially cause discharge of untreated effluent to the Molonglo River.

Hewatt Earthworks also researched the original construction of the MVIS and determined that extensive explosive blasting had been used to excavate the area. The piped section of the MVIS was in fact a gallery area that was over excavated to provide a staging area for the MVIS heading south that was constructed as a tunnel. Due to the over excavation for the original MVIS construction, the proposed excavation for the protection slab would be into uncontrolled fill. The stability of the batters would be unknown and most likely would not be safe at the design slope of 1H:2V as per the provided design.

Hewatt Earthworks, along with our Subcontractor Bridge and Marine, proposed an alternative design that would allow insitu construction of the protection slab. The large excavation to install the slab would still be required. However, the excavation could be progressively undertaken in coordination with the slab construction to match the rock profile and minimise the time that each section of the MVIS and batters were exposed. The progressive form of construction would also allow flexibility in construction by allowing the site staff to keep one eye on the weather and start each section when favourable conditions were expected. A summary of the fully proofed alternative protection slab design is attached (refer Attachment 4.2).

Subsequent to Hewatt Earthworks initiating further discussion in relation to the protection works and identifying the risks and issues, the Client then directed that the entire concept of the protection works be revisited.

Hewatt Earthworks, under direction from the design consultant, undertook pot holing of the MVIS and confirmed that the uncontrolled fill was of very poor quality, largely uncompacted, saturated with water table and groundwater inflows and pot holes even at 3m deep could only be kept open for less than an hour before fully collapsing. The option of Jet Grout Injection was then explored as a mechanism of providing structural support over the MVIS without the need to undertake any open excavation. This proposal was developed to the sketch plan stage, when works on the site were suspended in November 2010.

As part of the redesign of the project and the reshaping of the ponds, the storage of water over the MVIS is being deleted. This will now alleviate the risks identified by Hewatt Earthworks and remove the need to construct the protection slabs.

This is a positive outcome for the project as unnecessary high risk work has now been designed out of the project without compromising the final objective. The redesign is fully supported by Hewatt Earthworks and the savings will allow critical funds to be diverted to other areas of the project.

5. Work in Weston Creek and High Velocity Water Flow

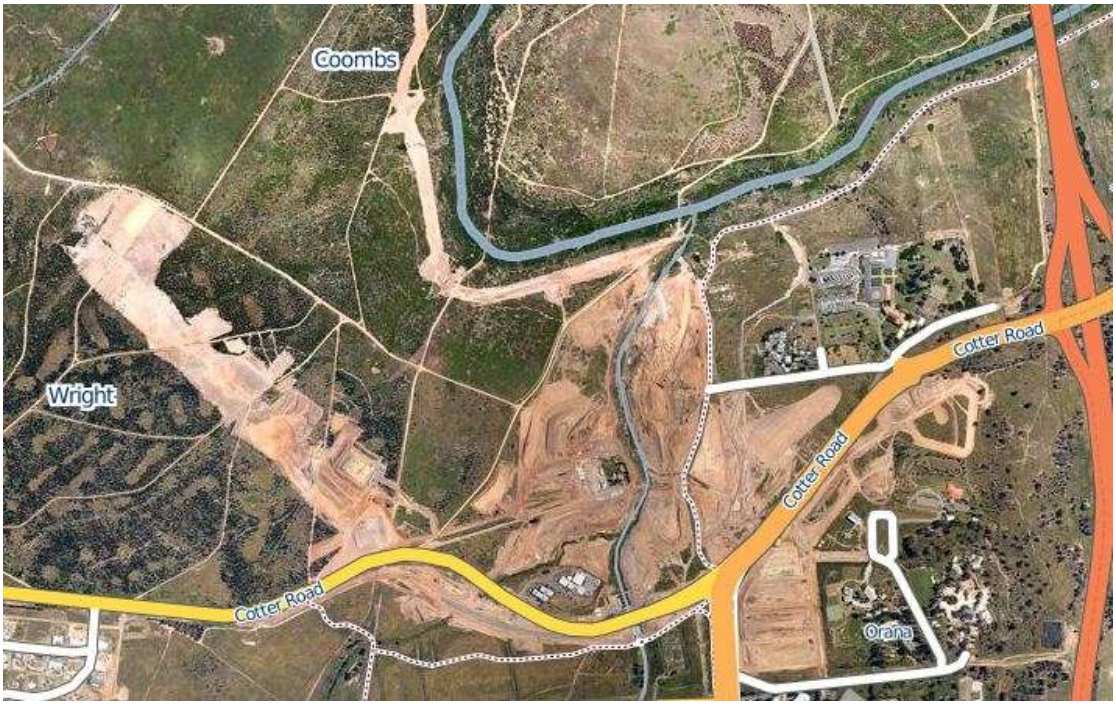
The catchment to the south of the site that contributes to Weston Creek is extensive and largely developed with well established residential areas and impervious surfaces. The catchment extends as far as the suburbs of Chapman and Fisher, with direct connection to the fully lined floodway.

The attached marked up plan (Attachment 5.1) shows the design flows expected through the site in term of Q1 and Q5. Due to the piped and hard lined floodway system, the times of concentration of the flows from the catchment is less than 15minutes. It was quite possible, and it has been experienced, that flows in the channel could appear without any obvious signs over the site.

Pictures below show some examples of the type of flow experienced on the site due to even moderate rainfall events during the project.

At project establishment stage the issue of how to safely undertake construction works in the active stormwater system was planned in great detail. In accordance with the Hierarchy of Control the interaction between the works and the active water flow was eliminated if possible. Where elimination was not possible, then further controls were needed. The following provides example of how these were achieved.

- At GPT 1 and the Twin Bridges work in the floodway was unavoidable with coffer dams and pumps unable to cope with significant flows. Prior to commencing these, works diversion (low flow) pipes were installed and the channels blocked with a series of 1 tonne sand bags. The trickle flow was then diverted around the work site through the low flow pipes (375 dia) to maintain a dry slip free surface for construction. The 1 tonne sandbags also provided initial buffer protection to any flash flood events that could be generated upstream without warning. The buffer protection would provide sufficient time for workers to evacuate the work site should an event occur. This protection was utilised on 28 July 2010 when unrelated works upstream caused the rupture of a 300 dia ACTEW water main in Rivett. Within 12 min of the rupture on a fully sunny day the floodway was flowing 0.5m deep and 2m wide.
- GPT 2 has been constructed off line to the Duffy Creek flow by constructing a 50m long 6m wide diversion channel that has been fully lined with geotextile fabric to mitigate erosion control considerations.
- The main pond works will require the effective removal of the existing Weston and Duffy Creeks through the site and diversion of the creeks into the newly created ponds. Due to the significant foundation works required for the pond embankment construction, the only practical option was to divert the full flow of the existing system. Hewatt Earthworks designed and has commenced construction on a 640m diversion that will take the flow of both Weston and Duffy Creeks. Design for the diversion is attached. (refer to Attachment 5.2)



November 2010

Conclusion

This project has necessitated the development of many and varied new processes and practices to overcome and mitigate the risks to workers.

Portions of the works, particularly in relation to the contamination, have required the implementation of completely non standard work practices and have required the training of the complete workforce.

Hewatt Earthworks has been instrumental in identifying the risks before these posed a safety concern to workers and in eliminating or reducing these risks.

Referees

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