POL System – Clean and Make Safe,
Upper Heyford, Oxfordshire

De-commissioning Method Statement

August 2011

On behalf of:

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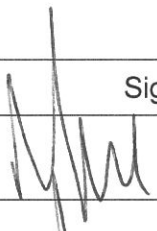
Michael Longman		11/8/11

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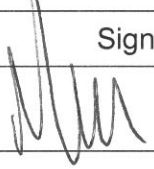
Michael Longman		11/8/11

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Issue: 0	Initial for internal review / approval	
Issue: 1	Internal comments received	
Issue: 2	Issued to external parties	

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Appendix A **Drawings**

Appendix B **Batching Plant Details**

1.0 Introduction

1.1 VertaseFLI Limited (Vertase) has been awarded the contract to undertake de-commissioning works at the former RAF / USAF base at Upper Heyford, Oxfordshire on behalf of Upper Heyford LP (client). The client will appoint Waterman Energy, Environmental & Design Limited (Waterman) as overseeing environmental consultant for the works. This document provides a detailed overview of the works and how they will be completed. Additional documents shall also be prepared and disseminated to appropriate parties including Site Waste Management Plan, Construction Phase Health & Safety Plan, emergency plans and task specific health & safety risk assessments and method statements.

1.2 The area and site boundary of the works is as shown on our drawing 2862_04 enclosed in appendix A. This drawing also shows the general site layout and POL information as we currently understand. POL is the collective term for all tanks, pipework and associated infrastructure. All tanks are prefixed by POL and then a unique reference number whether they are an above ground storage tank (AST) or underground fuel storage tank (UST). The very large circular tanks which rise above surrounding ground level and are surrounded by an earth blast mound are referred to as Type 1 tanks.

1.3 This method statement will be submitted to Waterman for internal approval. Vertase shall submit be responsible for obtaining approval for their works from the regulators, the planning authority and any other interested parties as required.

1.4 The aforementioned approvals also include obtaining an authorisation from the Environment Agency (EA) for discharge of treated tank water. To this end, they shall need to approve this document and site investigation data confirming the absence of any ground or water contamination where treated tank water is to be discharged. Waterman has undertaken some groundwater monitoring to date. Vertase shall undertake additional groundwater and surface water monitoring and soil sampling prior to any discharge works. Further detail on monitoring and sampling is provided later in this document.

1.5 No demolition works are proposed. Some above ground infrastructure will be utilised to obtain access to various parts of the POL system. Only one AST forms part of these works and will be exported from site following decommissioning.

2.0 Summary of Works

2.1 The main works can be summarised as follows:

(i) Prepare and obtain approval for this de-commissioning method statement, all necessary requirements for compliance with the CDM Regulations, prepare Site Waste Management Plan (SWMP), obtain authorisation for discharge of treated tank water, approval to remove above ground fuel storage tank at POL15, undertake design mix trials for the tank fill and prepare all other documents as required by the contract,

(ii) Conduct survey of POL system,

(iii) Remove, treat and store / use / dispose of water from POL system,

(iv) Clean and de-gas where necessary, POL system,

(v) Render tanks safe (fill, part fill and/or vent),

(vi) Environmental monitoring & reporting.

More detail is provided on these activities throughout this document.

3.0 Information of Specific Activities

3.1 Pre Start Activities

3.1.1 This decommissioning method statement shall be approved by the client, Waterman, EA, local authority & English Heritage before works commence.

3.1.2 A Construction Phase Health & Safety Plan will be prepared and approved by the CDMC. This will include location for welfare, batching plant and a traffic management plan. The water treatment plant will move around the site as the works progress.

3.1.3 Vertase shall submit all the necessary data required to obtain an authorisation from the EA to discharge treated tank water across the airfield. This to include the groundwater monitoring already undertaken by Waterman. The EA has confirmed that subject to approving this method statement, water can be discharged to the airfield and local water courses as long as the receiving land is free from contamination.

3.1.4 The site will be registered as a hazardous waste producer.

3.1.5 We will undertake design mix trials for the tank fill in our own workshop / laboratory prior to works commencing. Further detail is provided in 3.4.7.

3.2 POL Survey & Baseline Condition Monitoring

3.2.1 Vertase shall assess the site investigations undertaken by Waterman. These shall be supplemented by additional trial pits and groundwater monitoring as necessary to establish baseline conditions before discharge of any water. Soils and water will be analysed for Total Petroleum Hydrocarbons which include the range C_6 – C_{40}. This work will only be undertaken in areas where discharge is proposed although groundwater and surface water monitoring will be undertaken over a wider area. A plan shall be produced and maintained throughout the works showing where water monitoring and soil sampling has been undertaken, and where water has been discharged. This will also form part of the contract completion report.

3.2.2 Soil samples taken from the upper 0.5 m will be analysed for total petroleum hydrocarbons (TPH). This will confirm the absence of TPH and also provide pre start condition data.

3.2.3 Deeper ground water samples shall be obtained from existing boreholes. Any water contained in existing water courses destined for subsequent use for discharge of water will also be sampled. Analysis will be for TPH.

3.2.4 Further inspection of tank contents will be made and recorded. This will include an estimate of water quantity and samples to confirm presence / absence of LNAPL and concentrations of dissolved phase TPH.

3.2.5 There is currently extensive data available on the size and location of the POL system. However, it is proposed to undertake a further survey of the site to confirm the validity of the existing survey data and gain appropriate information on any anomalies. Changes can then be incorporated into the works and a final decommissioned condition report.

3.2.6 The POL survey will consist of passive and intrusive surveys of the existing tanks and all associated pipework. The passive survey will entail a walkover survey, photographic survey and a topographical land survey and pipe tracing using Cable Avoidance Tool and Generator (Cat & Genny). Intrusive will include gaining access into pump houses, pipes and tanks. It will also include inspection of above ground structures and existing pits and sumps and some hand excavation and trial pitting. Due to the nature of the proposed works, some surveying will be undertaken during the main works for health & safety reasons i.e. confirmatory survey of the large Type 1 tanks. We will also look to spend some additional time in the data room (a room at the main airbase containing extensive information and drawings on the design, construction and layout of the POL infrastructure). The survey will continue to be revised and updated during the de-commissioning works to produce a definitive record on completion of the works.

3.2.7 We do not believe asbestos containing material (ACM) will be present in significant quantities or in an 'unsafe' condition. Possible presence may be as fuses in some of the switch gear within some of electrical panels within the pump rooms, possibly as seals around doors / hatches and possibly but unlikely, as gaskets between pipe connectors. We shall employ an independent asbestos surveyor to carry out an appropriate survey and subsequent removal, of any ACM's. Records of all works involving asbestos will be contained in the final completion report.

3.3 Site Establishment

3.3.1 The main welfare compound and batching plant will be established on existing concrete hardstandings to the north west of POL23A. However, small localised welfare facilities may also be established closer to works as they progress. The water treatment plant will be relocated a number of times to facilitate the safe and efficient treatment of tank water (further detail is provided on this later).

3.3.2 Temporary concrete bunkers with removable covers will be constructed adjacent to the batching plant for the storage of conditioned Pulverised Fuel Ash (PFA). Ordinary Portland Cement (OPC) for the batching plant will be stored in purpose made silos.

3.3.3 A detailed traffic management plan will be prepared and incorporated into the Health & Safety Plan.

3.4 Access into Tanks & Pipeline

3.4.1 We will gain access into all tanks via existing manlids. These will typically be adequate for manned access including tank cleaning apparatus. These access points currently have a metal cover bolted into place. These bolts shall either be taken off using appropriate powered wrenches or if necessary, the bolts will be cut off by shearing / cold cutting. All tank access points will be re-instated on completion of the works.

3.4.2 There are two main pipeline systems on site; the most recently used and a previously abandoned network. These works will encompass both pipeline systems. This will include a length of pipeline present to the south of Camp Road.

3.4.3 Access into the pipe work will be via existing flanges within inspection / roding pits. We will also gain access by localised excavation down onto the pipe and fixing a saddle with a tapping arrangement. This will allow us access to lengths of pipework possibly not accessible via the aforementioned means. In any event, during all initial entry works into the pipework, full emergency and contingency arrangements will be in place to deal with localised spillages and / or immediately re-seal the pipe. Arrangements may include any combination of the following although emergency measures will always be in place:

(i) The saddle and tapping arrangement will allow water to be drained and collected very safely for immediate collection into a vacuum tanker,

(ii) An appropriate sized receptacle to catch water as it drains from the pipe and which can then be immediately pumped to nearby storage or transport to the treatment plant,

(iii) A suitable impermeable liner placed beneath the flange / pipe to catch small spillages,

(iv) No initial entry into the pipework system will be undertaken adjacent to sensitive receptors i.e. surface water, foil water drainage systems, etc.

(v) Ensuring adequate emergency equipment is always adjacent such as plugs & cap ends, secondary pumps, temporary storage, pads, booms and other absorbents.

3.4.4 It is an objective of the works to render all pipework safe and fully decommissioned. This will entail removing some apparatus, small lengths of pipe and above ground pipework and apparatus. These 'breaks' facilitate safe and efficient access points into the buried pipework and form an integral part of making the pipeline safe and will not be re-connected.

3.5 Tank Water Removal, Treatment and Reuse / Disposal

3.5.1 Our approach to each tank will be dependent on the presence and character of any free product. In all cases, a thorough assessment of the tank, the product and the atmosphere in the tank will be made and appropriate safety measures and equipment utilised (e.g. ATEX compliant equipment).

3.5.2 If LNAPL is present, it will be skimmed from the top of the water using suitable skimmers and pneumatic pump arrangement. The pump and skimmer will be ATEX compliant. The product will be pumped directly to a bunded storage tank. The compressed air source and control will remain outside of any potentially hazardous area.

3.5.3 Any product recovered from any of the works will be stored in suitable double bunded storage tanks or drums within drip trays prior to offsite disposal to a suitably licensed facility. Copies of consignment notes will be included in the final completion report.

3.5.4 Tanks will be dewatered by means of an electrical submersible pump which will initially be suspended above the base of the tank. The pump will be level controlled and remain submerged with suitable, safe level controls in place to prevent exposure of the pump. As appropriate, pneumatic pumps will ensure that any remaining internal sumps or deep spots will be dewatered. Whilst we shall primarily pump water from tanks using pumps and associated pipe work, we shall also utilise tractor and bowsers and vacuum tankers throughout the works i.e. to empty distant / smaller UST tanks.

3.5.5 Water being pumped to the water treatment plant will be monitored at all times for evidence of gross contamination. Sludges will not be pumped to the water treatment plant; the pumps proposed for pumping water from the tanks are not physically able to actually pump sludge. Sludge, if present, is covered later in this document.

3.5.6 The water treatment plant which is designed, manufactured and maintained by Vertase, will be flexible and mobile. It will consist of several treatment lanes consisting of oil / water separators with associated booster pumps and aqueous phase granulated activated carbon filters. All vessels treating contaminated water will be situated on concrete and in a bunded area. The hosing for pumping waters out of the tanks and within the treatment plant, will be an abrasion and suitably chemical resistant delivery hose rated well in excess of the maximum pressure that can be developed by the submersible pumps. The hose carrying the clean water discharge from the treatment system will be lay-flat hose. The hose carrying product from the skimmers in the tanks will be wire-reinforced PVC and earthed at both ends to avoid the build up of static electricity. The system will be leak tested prior to each use. The treatment plant capacity can be easily increased / decreased as the needs of the project dictate. The plant will be fitted with flow metres and will be sampled regularly as detailed later in this document. The plant will be thoroughly inspected prior to use every day. A schematic of the treatment plant is shown on drawing 2862_02 enclosed in appendix A.

3.5.7 Clean water leaving the treatment plant will be sampled and analysed for TPH daily for the first week. Thereafter and the plant is confirmed as operating correctly, sampling will be undertaken weekly. All tank water will be sampled and analysed for TPH prior to pumping to the treatment plant. With these known concentrations, by monitoring plant throughput and knowing the absorptive capacity of the activated carbon (the primary means for stripping TPH from the water), we can accurately predict when the carbon will be exhausted. We shall build in a factor of safety to ensure the carbon is changed at 90% absorption. Spare carbon pods and fresh carbon will be maintained at all times.

3.5.8 Following treatment, water will be handled in any combination of the following.

(i) Pumped to primary storage within one of the existing POL tanks that has already been cleaned.

(ii) Pumped / transported to the batching plant for reuse in the manufacture of the tank fill.

(iii) Pumped / transported to the existing surface water drainage system.

(iv) Sprayed to land upon the existing soft areas using either tractor towed bowsers, agricultural oscillating rain guns or discharged to open grassland via temporary, perforated land drains laid across the grass areas.

3.5.9 During all discharge works, strict environmental monitoring shall be maintained. This will include:

(i) Daily inspections for visual or olfactory evidence of TPH on areas where discharge is occurring and in any adjacent surface waters,

(ii) Continuous monitoring via visual inspection of ground conditions where discharge is occurring for ground saturation. Discharge will be suspended in any area where the ground is becoming or showing signs of becoming, saturated. Saturated is defined as ponding water 2 hours after discharge.

(iii) Continuous monitoring via visual inspection to ensure immediate run off is not occurring and that is causing suspended solids or erosion of the existing grassland.

(iv) Weekly sampling and analysis for TPH from existing boreholes and any surface waters adjacent to areas of discharge.

(v) Discharge to land will not be undertaken during or immediately following periods of heavy rain.

(vi) Discharge will not be undertaken on steep slopes.

(vii) Daily records of discharged quantities and general locations will be maintained.

(viii) On completion of water discharge activities, a final round of water sampling and analysis for TPH will be undertaken. An additional round of soil samples which will be analysed for TPH will also be obtained from the top 0.5 m in all areas where water has been discharged.

(ix) Discharge will not be undertaken on any areas identified as unsuitable in the constraints plan or ecology reports.

(x) The client will ensure that areas of grass used to discharge water will be kept regularly mown throughout our works.

(xi) Discharge will not be undertaken onto frozen ground.

(xii) Discharge shall only be undertaken during working hours.

3.5.10 As described earlier in this document, it is proposed to undertake soil sampling and water monitoring in areas proposed for discharge. No discharge will be undertaken until a plan showing the locations for proposed discharge together with locations of sampling, and results of soil sampling and water monitoring have been submitted and agreed by the EA.

3.5.11 As explained later in this document, we are proposing to fill and part fill the tanks with a PFA / OPC fill. It is proposed to utilise the existing tank water, after cleaning, to manufacture the tank fill. We believe there is circa 9,500 m^3 of contaminated water contained within the tanks. Our solution will reuse between 3,000 m^3 - 4,000 m^3 of the water for the manufacture of the tank fill representing a particularly sustainable approach to the works.

3.5.12 We estimate that the period that water will be discharged will be between 12 – 16 weeks.

3.6 Tank & Pipe Cleaning

3.6.1 Following removal of any product and water from within all the tanks, personnel access will be undertaken for final cleaning. Fully qualified personnel with breathing apparatus will enter the tanks to undertake the following tasks as required:

(i) Remove residual water, product, and sludge from the bottom of the tank. This will entail sweeping to an appropriate collection point and then sucking up this residue. Where possible, product and water will be kept separate from any sludges. Suction of sludges will be by way of a specialist vacuum tanker. Sludges will be exported from site to a suitably licensed recycling / disposal facility. Consignment notes will be included in the final completion reports.

(ii) Clean the tank as necessary of residual fuel. This could entail use of absorbent cloths or power washing. Contaminated washings will be sent to the water treatment plant whilst contaminated absorbent materials will be exported from site to a suitably licensed disposal facility. Consignment notes will be included in the final completion reports.

(iii) Undertake final inspection of tank ensuring any outlets are properly sealed, and confirm gas free status.

3.6.2 Full confined space entry controls will be adopted when entering tanks including gas monitor operating at all times, void purging as necessary, no lone working, winch and safety harness and free flowing breathing apparatus. Task specific risk assessments and method statements will be prepared before all tank entry / cleaning works. A permit to work / entry system will be adopted.

3.6.3 We shall inspect all pipe work for the presence of water / product. It is worthy of note that the system was properly emptied by the vacating RAF / USAF personnel so there is only a very small chance of any significant product being discovered. Where such liquors are present, they will be removed prior to decommissioning of the pipework which will be achieved by filling with proprietary specialist inert foam. Liquors within pipework will be recovered as follows:

(i) Access into the pipe will be via existing flanges.

(ii) Pipe will be connected to a vacuum tanker and the pipe contents sucked out.

(iii) Emergency arrangements as described in 3.4.3 will be maintained during all such operations.

3.6.4 Following removal of any water / liquors from the pipe, the pipework will be filled by a specialist contractor who will pump an inert resin foam under pressure through the pipework. This will be carried out typically on 150 m lengths or less of pipeline at a time. The foam is installed under pressure so in the unlikely event of any blockage, this will be apparent to the operators of the specialised foam filling tanker. Pipe will be considered full when it protrudes from the opposite end of that being injected. The foam will set within the pipe and will also extend into any spurs that may not have been discovered by the survey. Please see 3.7.2 for further detail.

3.7 Tank & Pipework Fill

3.7.1 To facilitate access to the pipework and to ensure it does not become a future pathway for contamination, the pipework will be regularly severed and capped.

3.7.2 We are proposing to fill the existing pipework with expanding resin foam (such as Benefil 2200 or similar). Filling the pipework this way has a number of advantages:

(i) The introduction of this low density fill is safe and quick.

(ii) This method will expel any residual waters from the pipe for subsequent collection.

(iii) In the event that there is a minor break anywhere in the pipework, this filling would seal such a break.

3.7.3 It is possible some of the UST's may already have been filled with concrete. No further works are proposed for these tanks other than confirming such during the survey.

3.7.4 For the purposes of filling, tanks can be separated into two categories; Type 1 and all other. We are proposing to part fill the Type 1 tanks where it is deemed necessary, and fully fill all other tanks. Our rationale can be explained as follows:

(i) The Type 1 tanks are located partly below and partly above existing ground levels (excluding of course the earth mound). The main receptor is the underlying aquifer and in particular, shallow groundwater. The objective is to fill tanks only where they are in direct continuity with the shallow groundwater. This prevents any residual transfer of potential contaminants into or out of the tanks. This will also alleviate any on-going risks associated with heave caused by fluctuating shallow groundwater levels. Please see drawing 2862_03 in appendix A for further detail.

(ii) We are not proposing to fill the Type 1 tanks fully because we have broken the potential source–pathway-receptor linkage and the cost and environmental impact does not justify the limited benefit gained in fully filling these very large tanks (single largest tank is 4,800 m^3).

(iii) Considering the same rationale regarding source-pathway-receptor as described above, all other tanks are fully located within the drift material and potentially the shallow groundwater. Therefore, in order to break the potential source-pathway-receptor linkage and risk associated with heave, we will completely fill all of the individual underground tanks. Please see drawing 2862_03 in appendix A for further detail.

3.7.5 We are proposing to fill the tanks (part fill some of the Type 1 tanks) with Pulverised Fuel Ash (PFA) / Ordinary Portland Cement (OPC) mix. This too represents a particularly sustainable approach which can be summarised as follows:

(i) The PFA will be sourced from Didcot power station located less than 30 miles away. We have held extensive discussions with RWE (the plant operators) who has provided invaluable support and technical advice on the suitability and use of their PFA.

(ii) Conditioned and bound PFA (as will be the case on this project) now complies with the requirements of the WRAP Quality Protocol for Bound and Grouts Applications and is no longer considered a waste.

(iii) This particular source of PFA is relatively close and will bring obvious environmental benefits and reduction in carbon usage. It also brings a significant amount of what is normally a surplus product, back into beneficial use.

(iv) We are proposing to reuse the tank water after cleaning in the manufacture of the PFA / OPC tank fill. This brings significant environmental benefits by negating the need to use fresh water supplies and avoids additional costs and time associated with disposing of this water.

(v) The PFA / OPC will initially be added to the tanks as slurry so will quickly and fully fill the tanks without risk of voids forming.

(vi) The PFA / OPC will seal the tanks completely removing any risk of backflow of contamination into the tanks.

(vii) The PFA / OPC tank fill is safe, has low risk of environmental impact during installation and zero risk to the environment after installation.

(viii) The weight (density) of the tank fill will be sufficient to provide structural strength / support to the tank without risking the integrity of the tank.

(xiii) This type of tank fill meets all of the objectives of the project including ensuring that in the event that the tanks are fully de-commissioned in the future, there will be no exceptional costs associated with breaking out or disposing of the tank contents. In fact, the tank contents will become a valuable commodity as they will be suitable for reuse in filling tank voids.

3.7.6 Considering the aforementioned rationale, we have assessed the groundwater data provided by Waterman and compared this to the base of the Type 1 tanks. We shall fill any Type 1 tank to an internal 1 m above shallow groundwater levels where shallow groundwater level has been recorded as being within 1 m or less of the tank base. Table 1 provides detail of relationship of tank bases with shallow groundwater levels. This shows that the bases of only two of the nine Type 1 tanks are within 1 m of the recorded groundwater levels and therefore require fill; POL23A and POL25B. Please also see drawing 2862_03 in appendix A for further detail.

Table 1: CALCULATION OF TANK BASE LEVELS AND BASE HEIGHT ABOVE GROUND WATER LEVELS

A	B	C	D	E	F	G	H	I	J	K	L	
Type 1 Tank Number	Vol of tank (m3)	External ground level adj. to tank	Tank dip point mAOD	Height of tank above ground including dip point	Dip depth of tank	Base of tank (mAOD)	Groundwater in nearest boreholes mAoD	Boreholes		Depth of tank below GW	Depth of tank below GW plus 1m	
	DATA	DATA	DATA	**CALC = D-C**	DATA	**CALC = D-F**	DATA	INFORMATION	INFORMATION	CALC = H-G		
POL 21A	736	125.38	133.71	8.32	10.59	123.12	121.248	BH223, BH224	Highest GW level used	-1.87	-0.87	
POL 21B	736	125.38	133.71	8.32	10.58	123.13	121.248	BH223, BH224	Highest GW level used	-1.88	-0.88	
POL 21C	1453	125.38	133.71	8.32	10.62	123.09	121.248	BH223, BH224	Highest GW level used	-1.84	-0.84	
POL 22	1457	136.10	144.22	8.12	10.60	133.62	130.050	BH104, BH114	Highest GW level used	-3.57	-2.57	
POL 23A	4440	133.10	140.47	7.38	10.39	130.08	130.029	BH102, BH113, BH305	Highest GW level used	-0.05	**0.95**	below (GW + 1m)
POL 23B	1947	134.12	141.70	7.58	10.35	131.35	130.029	BH102, BH113, BH305	Highest GW level used	-1.32	-0.32	
POL 24	4754	123.17	131.31	8.14	10.50	120.81	111.833	BH202, BH203	Highest GW level used	-8.97	-7.97	
POL 25A	4508	124.99	134.30	9.31	10.46	123.84	121.619	BH218	Highest GW level used	-2.22	-1.22	
POL 25B	4503	123.80	132.91	9.11	10.46	122.45	121.619	BH218	Highest GW level used	-0.83	**0.17**	below (GW + 1m)
DATA SOURCE	DATA SUPPLIED BY WORKS INFO.	Tank Base levels 26 April 2011 Average	DATA SUPPLIED BY WORKS INFO.			DATA SUPPLIED BY WORKS INFO.	Highest water level in nearest group of BHs at 15 June 11	DATA SUPPLIED BY WORKS INFO.				

3.7.7 To ensure we manufacture an appropriate fill material, we will undertake design mix trials in our own workshops / laboratories. These bench trials will look to identify the optimum design mix of PFA, OPC and water and ensure the slurry cures (sets) within an appropriate period of time. It is not necessary to produce a fill with any given strength but one that will eventually become fully stable i.e. no longer a slurry. It should be noted that we shall look to expedite curing during the bench trials but due to the likely mix and conditions within enclosed tank voids, curing times within the tanks could be months rather than weeks.

3.7.8 During filling of each tank, a representative sample of PFA / OPC fill shall be taken and set aside in a mould replicating curing conditions within the tank (an open topped water proof container loosely (not air tight) covered with plastic / polythene. These samples will be used to demonstrate that fill contained within each tank as cured satisfactorily. These samples will be maintained on site and available for inspection at any time. They will be submitted to Waterman for final inspection.

3.7.9 Following filling of the tanks, it is possible that some water will 'weep' and collect on top of the fill within the tanks. This is perfectly normal and will normally evaporate over time or be re-absorbed into the PFA / OPC mix. In the event that excessive water does collect and does not reduce in time, it can be easily collected and disposed of. This water will not be disposed of on the site but will be taken away by vacuum tanker to a suitably licensed waste water treatment facility.

3.7.10 We are proposing to use a small mobile batching plant. Further detail on the plant is shown in appendix B. The PFA / OPC may be pumped from the batching plant to the tanks through steel pipes but primarily transported using mixer trucks. It will be necessary to use an independent concrete pump to pump the fill up the sides of the Type 1 tanks. This will be achieved either through a static concrete pump and reinforced hoses or a mobile concrete pump with telescopic boom.

3.7.11 OPC will be stored in silos. PFA will be stored in temporary holding bunkers which will be sheeted between deliveries and collection for batching to prevent dust. It is worthy of note that the PFA will arrive on site with a typical moisture content of 25% which will of course help to minimise dust.

3.8 Tank Venting

3.8.1 Passive ventilation is commonly adopted to prevent accumulation of a range of vapours and gases in or below buildings. This includes VOC's that are likely to be the main source of concern within the fuel tanks. The fuel tanks will be cleaned out and therefore the source of vapour and thus the volumes that can occur within the tanks will be small. This will be reduced further by filling or partial filling of the tanks. Such low volumes of vapour can be adequately diluted by passive ventilation. The precise details depend on various factors but the passive venting capacity can be varied to suit each tank by choice of venting arrangements. In many ways passive venting is more robust than mechanical venting as it is not so dependent on regular maintenance. It is also more efficient and reduces carbon emissions as there are no ongoing energy requirements. To this end, we will assess existing passive venting arrangements on all tanks and repair / enhance where necessary. This would entail properly designing the venting capacity required considering the remaining volume of the tanks, different weather conditions and flow calculations through the venting apparatus. Remembering the Type 1 tanks would have been cleaned twice after these works, the venting can be considered precautionary only. In respect of all other tanks which are being filled completely, we would only need to ensure that existing venting arrangements are still operable. Allowing these tanks to vent will assist the curing of the tank fill (through evaporation of small quantities of water which will collect on top).

4 Health & Safety, and Environmental Control

4.1 Fencing / Security

4.1.1 The site currently benefits from very secure perimeter fencing and security. Therefore, our temporary fencing will be restricted to fencing around working areas to prevent unauthorised and accidental access such as the batching plant, water treatment plant and where any tanks have openings. Fencing will also include suitable warning signs where necessary.

4.2 Health & Safety

4.2.1 The works will require comprehensive controls and management to mitigate potential impacts. Vertase operates an Integrated Management System in accordance with BS EN ISO9001 and 14001. The procedures and records contained therein ensure all works are carried out in a manner that minimises risks to health and safety and impact on the environment, and generates adequate and accurate records to demonstrate works have been carried out to the required standard and in accordance with all applicable legislation. All such records are collated on contract completion (or sooner as required) and included within the contract completion report. Appropriate progress reports will be provided in a format and at a frequency as agreed with the client.

4.2.2 Works will be supervised by a suitably qualified and experienced site based manager at all times. We shall have specific technically qualified and operationally qualified personnel on site at all times. This includes direct and full supervision of any sub-contractors (asbestos and tank cleaning) who will be employed. Vertase shall act as Principal Contractor and be responsible for complying with the CDM Regulations 2007.

4.2.3 Vertase employs its own fully qualified Health & Safety Manager and who will make regular and random visits to site. He will undertake a thorough safety audit and complete an inspection sheet including details of any actions required.

4.2.4 All staff and sub-contractors will be fully inducted including ensuring training certificates etc. are up to date and relevant. Regular tool box talks and site safety meetings will be held. Health & safety risk assessments and method statements will be produced for all necessary activities and disseminated to all appropriate personnel.

4.2.5 A Construction Phase (Health & Safety) Plan shall be prepared and reviewed throughout the project and will include a list of specific emergency plans. Any accidents, incidents or near-misses will be recorded, reported and investigated as appropriate including actions to prevent re-occurrence.

4.2.6 A traffic management plant will be prepared and reviewed throughout the project.

4.2.7 A permit to work system will be in place especially for entering tanks.

4.3 Environmental Controls

4.3.1 The works will not generate noise above normal levels associated with projects of this nature. The highest noise level will be that generated by lorry movements.

4.3.2 Whilst the PFA will have a relatively high retained moisture content, the delivery and batching of PFA / OPC has the potential to generate dust. The site manager shall assess dust and its impact upon neighbours throughout the working day and ensure the following mitigation measures are being utilised to control dust:

(i) delivery of products are in tankers (OPC) or fully sheeted lorries (PFA),
(ii) enforcing speed limits of site traffic and only using roads and hardstandings,
(iii) dust suppression via water applied by towed bowser,
(iv) suspending certain works in certain weather conditions,
(v) covering PFA storage bunkers that may be contributing to dust,
(vi) the batching plant is a closed and sealed system which will help prevent dust during the actual batching activity.

4.3.3 Dust monitoring points shall be established at suitable locations around the batching plant. These shall consist of Frisbee sticky pads and or hand held dust monitor.

4.3.4 We believe only the Type 1 tanks (or others if they are found to be empty or part filled) have the potential to generate odours. Even then, we believe such odours will be minimal and dissipate quickly and are unlikely to be perceptible beyond the wider site boundary. We shall place temporary covers over any tank openings or suspend works on particular tanks until the prevailing weather conditions become more favourable, in the event that any particular tank is causing fugitive odours.

4.3.5 In the event that a complaint is made regarding noise, odour or dust from nearby residents, the site manager shall respond by attending the complainant's property if appropriate, to assess the nature of the complaint. This may include monitoring at that location. Mitigation measures as appropriate shall then be enforced including if necessary, suspension of offending works until the prevailing weather conditions become more favourable. A full report will be prepared.

4.3.6 An environmental engineer will undertake all environmental monitoring. This will include the groundwater and soil sampling mentioned previously together with monitoring the quality of treated tank water. Full records shall be maintained and will be available for inspection at any time.

4.3.7 A comprehensive emergency plan shall be prepared. This will look to cover such eventualities as discovery of UXB, fire / explosion, emergency access into tanks, and spillage of fuel, contaminated water or PFA / OPC.

4.4 Unexploded Ordnance

4.4.1 There is a very small risk that both spent and unexploded ordnance (UXO) may be encountered during certain elements of the works. The client has previously commissioned a very comprehensive investigation and report and which make s some recommendations. Vertase will encompass those recommendations in task specific risk assessments and method statements for any works that may encounter UXO. In reality this will only relate to survey and de-commissioning of buried pipe work and soil conditioning surveys before and after the works.

4.5 Ecology

4.5.1 The client has previously commissioned a very comprehensive ecology surveys and reports. Amongst other recommendations, a constraints plan has been produced. Only a small element of the proposed works have the potential to impact upon ecology and such impact together with any recommendations / conditions relating to ecology, will be considered and managed in compliance with the ecology reports, constraints plan and all applicable legislation. Such works include; survey and de-commissioning of buried pipe work, soil conditioning surveys before and after the works and discharge of treated water across areas of grassland.

5 Completion Report

5.1 On completion of the works, a comprehensive completion report shall be prepared. This will include all the information as required by the contract specification including a full description of the works completed. Records contained therein will include but not be limited to the following:

(i) Drawing showing location and size of all known tanks and pipework.

(ii) A record of volumes of water removed from tanks and where water was reused or disposed of.

(iii) Asbestos survey and details of asbestos removal works where applicable.

(iv) Records of exact fill type and volumes in tanks and pipes.

(v) Locations of pipe breaks / caps.

(vi) Details of residual hazards / services as discovered by the survey and works.

(vii) All records relating to imports and exports from site.

(viii) Final construction phase health & safety plan.

(ix) Site Waste Management Plan.

(x) All records relating to compliance with the discharge consent including surface water, groundwater monitoring and soil sampling.

(xi) Photographs.

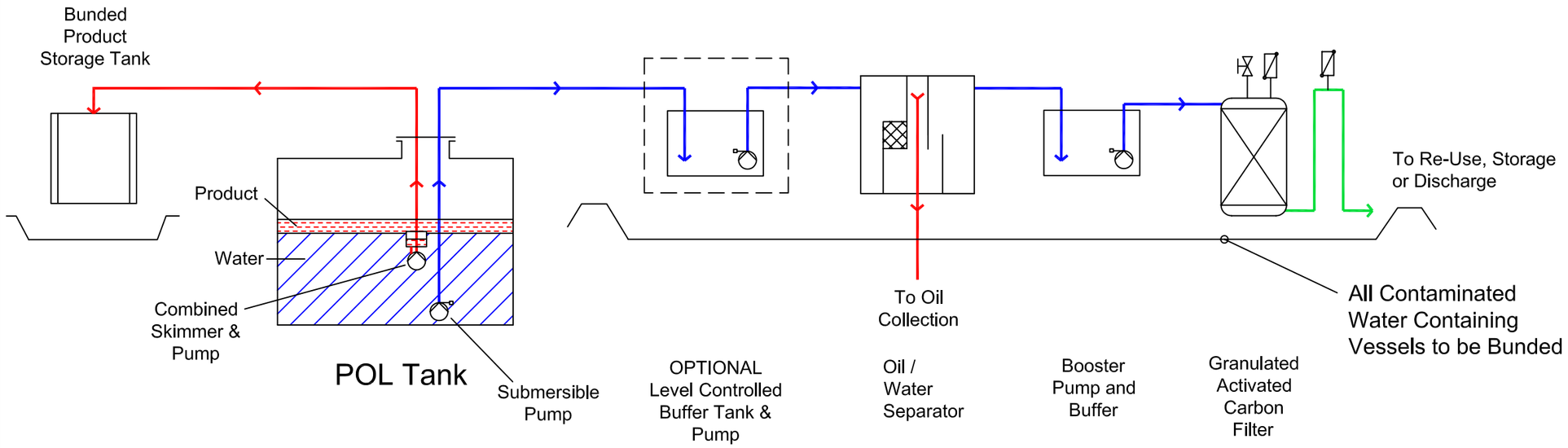
This list is not exhaustive and all other data as required by the contract requirements will also be included.

Appendix A

Drawings

A3

Indicative Schematic - Single Treatment Lane



Legend

- Contaminated
- Oil
- Clean

Note:
A number of treatment lanes can be established. Works are likely to entail 2-3 lanes at any one time

Rev.	Description	Revised By	Date
	FIRST ISSUE		02-02-11

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- Manchester Office: Tel: 01614 372708 Fax: 01614 376300

email: info@vertasefli.co.uk
www.vertasefli.com

Rev:

Site Address:

Upper Heyford

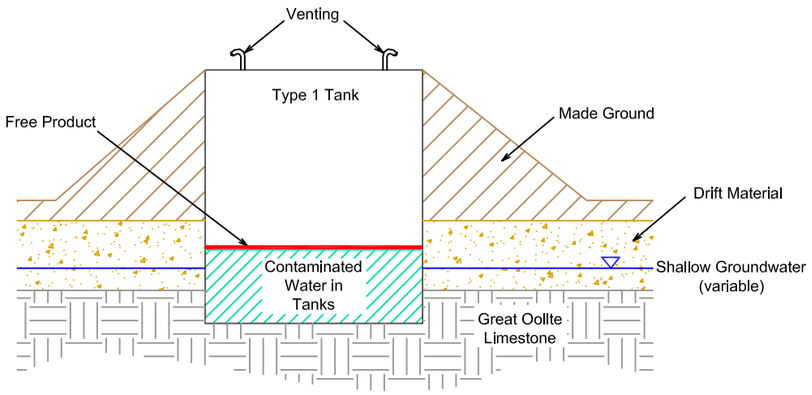
Title: Indicative De-Watering & Treatment Set-Up

Client: Upper Heyford LP

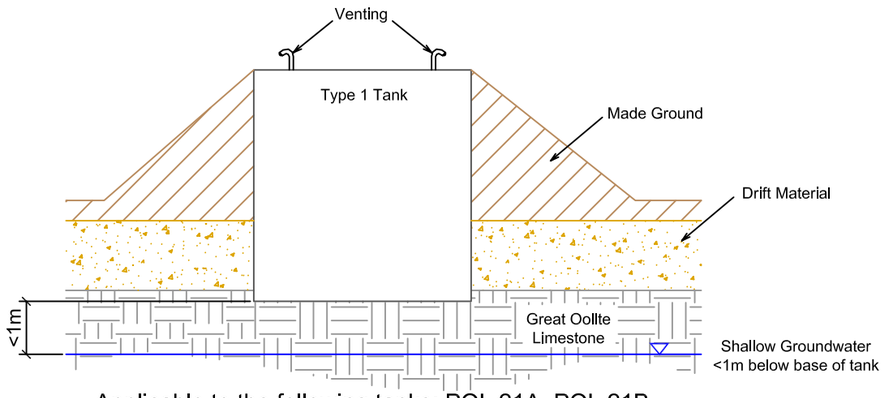
Drawn: MRG	Checked: JL	Approved: ML
Dwg: 2862_02	Contract: 2862	Scale: NTS

A3

Type 1 Tanks Pre Works

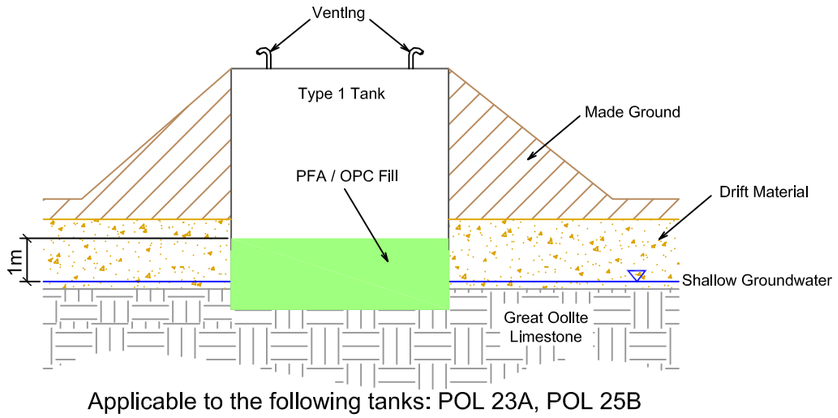


Shallow Groundwater more than 1m below base of Tanks - No Fill



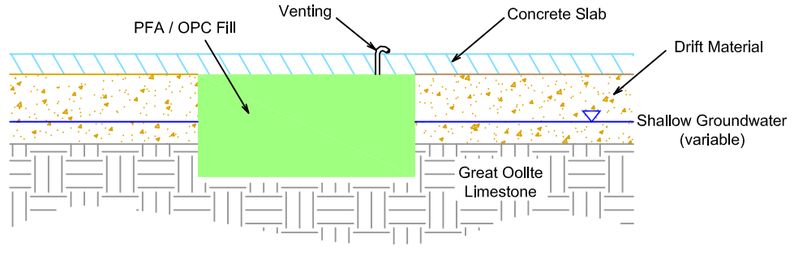
Applicable to the following tanks: POL 21A, POL 21B, POL 21C POL22, POL 23B, POL 24, POL 25A

Shallow groundwater within 1m or above base of tank - 1m of fill above groundwater level



Applicable to the following tanks: POL 23A, POL 25B

Other USTs Post Works



Legend

- Tank
- Made Ground
- Concrete Slab
- Drift Material
- Groundwater Level
- Great Oolite Limestone
- PFA/OPC Fill

Note : Depth and thickness shown are approximate and variable

Rev.	Description	Revised By	Date
A	Various amendments	JWH	29-07-11
	FIRST ISSUE		03-02-11

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Site Address:

Upper Heyford

Rev: A

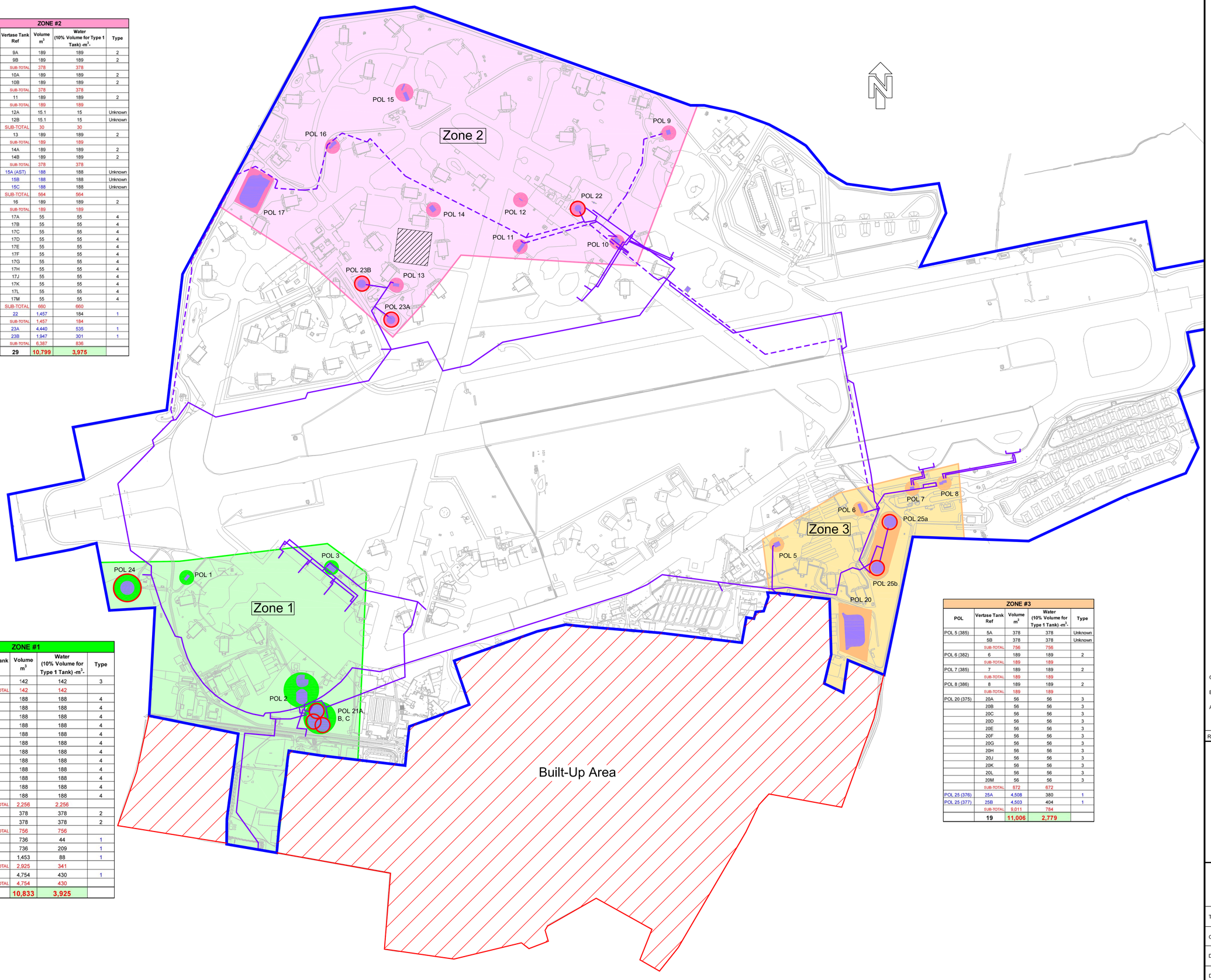
Title: Conceptual Model

Client: Upper Heyford LP

Drawn: JWH	Checked: MSL	Approved: MSL
Dwg: D2862_03	Contract: 2862	Scale: NTS

A1

ZONE #2				
POL	Vertase Tank Ref	Volume m^3	Water (10% Volume for Type 1 Tank) -m^3-	Type
POL 9 (215)	9A	189	189	2
	9B	189	189	2
	SUB-TOTAL	378	378	
POL 10 (219)	10A	189	189	2
	10B	189	189	2
	SUB-TOTAL	378	378	
POL 11 (229)	11	189	189	2
	SUB-TOTAL	189	189	
POL 12	12A	15.1	15	Unknown
	12B	15.1	15	Unknown
	SUB-TOTAL	30	30	
POL 13 (283)	13	189	189	2
	SUB-TOTAL	189	189	
POL14 (284)	14A	189	189	2
	14B	189	189	2
	SUB-TOTAL	378	378	
POL 15	15A (AST)	188	188	Unknown
	15B	188	188	Unknown
	15C	188	188	Unknown
	SUB-TOTAL	564	564	
POL 16 (242)	16	189	189	2
	SUB-TOTAL	189	189	
POL 17 (245)	17A	55	55	4
	17B	55	55	4
	17C	55	55	4
	17D	55	55	4
	17E	55	55	4
	17F	55	55	4
	17G	55	55	4
	17H	55	55	4
	17J	55	55	4
	17K	55	55	4
	17L	55	55	4
	17M	55	55	4
	SUB-TOTAL	660	660	
POL 22 (395)	22	1,457	184	1
	SUB-TOTAL	1,457	184	
POL 23 (285)	23A	4,440	535	1
POL 23 (269)	23B	1,947	301	1
	SUB-TOTAL	6,387	836	
	29	**10,799**	**3,975**	



ZONE #1				
POL	Vertase Tank Ref	Volume m^3	Water (10% Volume for Type 1 Tank) -m^3-	Type
POL 1 (270)	1	142	142	3
	SUB-TOTAL	142	142	
POL 2 (254)	2A	188	188	4
	2B	188	188	4
	2C	188	188	4
	2D	188	188	4
	2E	188	188	4
	2F	188	188	4
	2G	188	188	4
	2H	188	188	4
	2I	188	188	4
	2J	188	188	4
	2K	188	188	4
	2L	188	188	4
	SUB-TOTAL	2,256	2,256	
POL 3 (275)	3A	378	378	2
	3B	378	378	2
	SUB-TOTAL	756	756	
POL 21 (392)	21A	736	44	1
POL 21 (394)	21B	736	209	1
POL 21 (392)	21C	1,453	88	1
	SUB-TOTAL	2,925	341	
POL 24 (269)	24	4,754	430	1
	SUB-TOTAL	4,754	430	
	19	**10,833**	**3,925**	

ZONE #3				
POL	Vertase Tank Ref	Volume m^3	Water (10% Volume for Type 1 Tank) -m^3-	Type
POL 5 (385)	5A	378	378	Unknown
	5B	378	378	Unknown
	SUB-TOTAL	756	756	
POL 6 (382)	6	189	189	2
	SUB-TOTAL	189	189	
POL 7 (385)	7	189	189	2
	SUB-TOTAL	189	189	
POL 8 (386)	8	189	189	2
	SUB-TOTAL	189	189	
POL 20 (375)	20A	56	56	3
	20B	56	56	3
	20C	56	56	3
	20D	56	56	3
	20E	56	56	3
	20F	56	56	3
	20G	56	56	3
	20H	56	56	3
	20J	56	56	3
	20K	56	56	3
	20L	56	56	3
	20M	56	56	3
	SUB-TOTAL	672	672	
POL 25 (376)	25A	4,508	380	1
POL 25 (377)	25B	4,503	404	1
	SUB-TOTAL	9,011	784	
	19	**11,006**	**2,779**	

Legend

- Zone 1 POL
- Zone 2 POL
- Zone 3 POL
- Type 1 Tanks
- Works Area
- Underground Pipeline
- Abandoned Pipeline
- POL Locations
- Approximate Location of Compound & Batching Plant

Rev.	Description	Revised By	Date
C	Phase2 boundary modified & compound area added	MRG	10-08-11
B	6-Tanks added to Zone #1 chart	MRG	08-08-11
A	Charts now: Water (10% Vol for Type 1 Tank) -m3-	MRG	01-08-11
	FIRST ISSUE		03-02-11

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Site Address: Upper Heyford

Rev: C

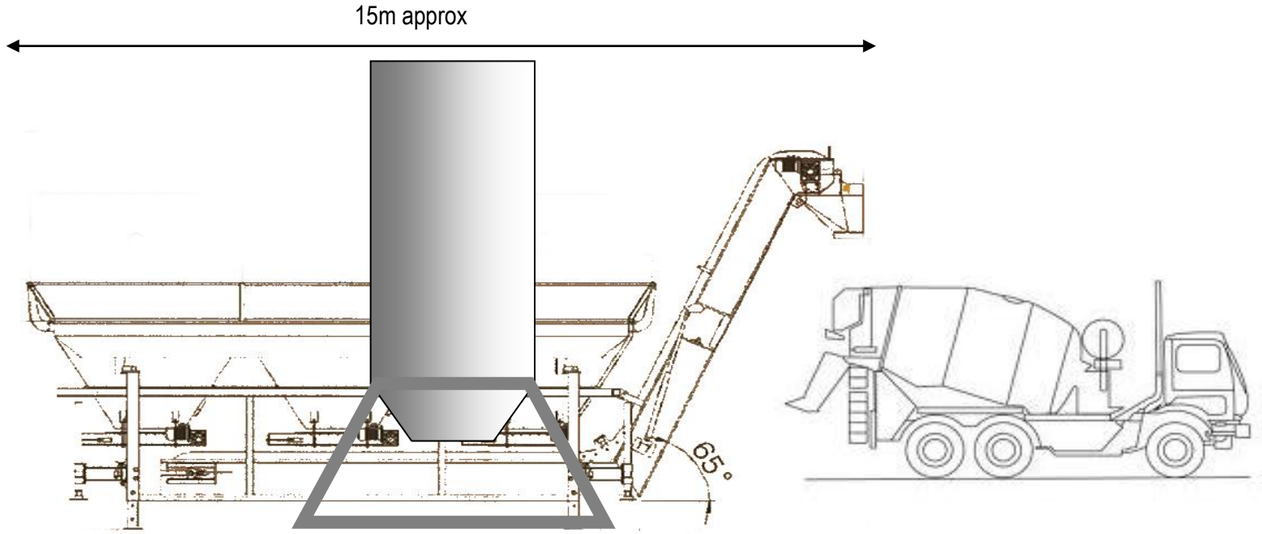
Title: Indicative POL and Underground Pipe Locations

Client: Upper Heyford LP

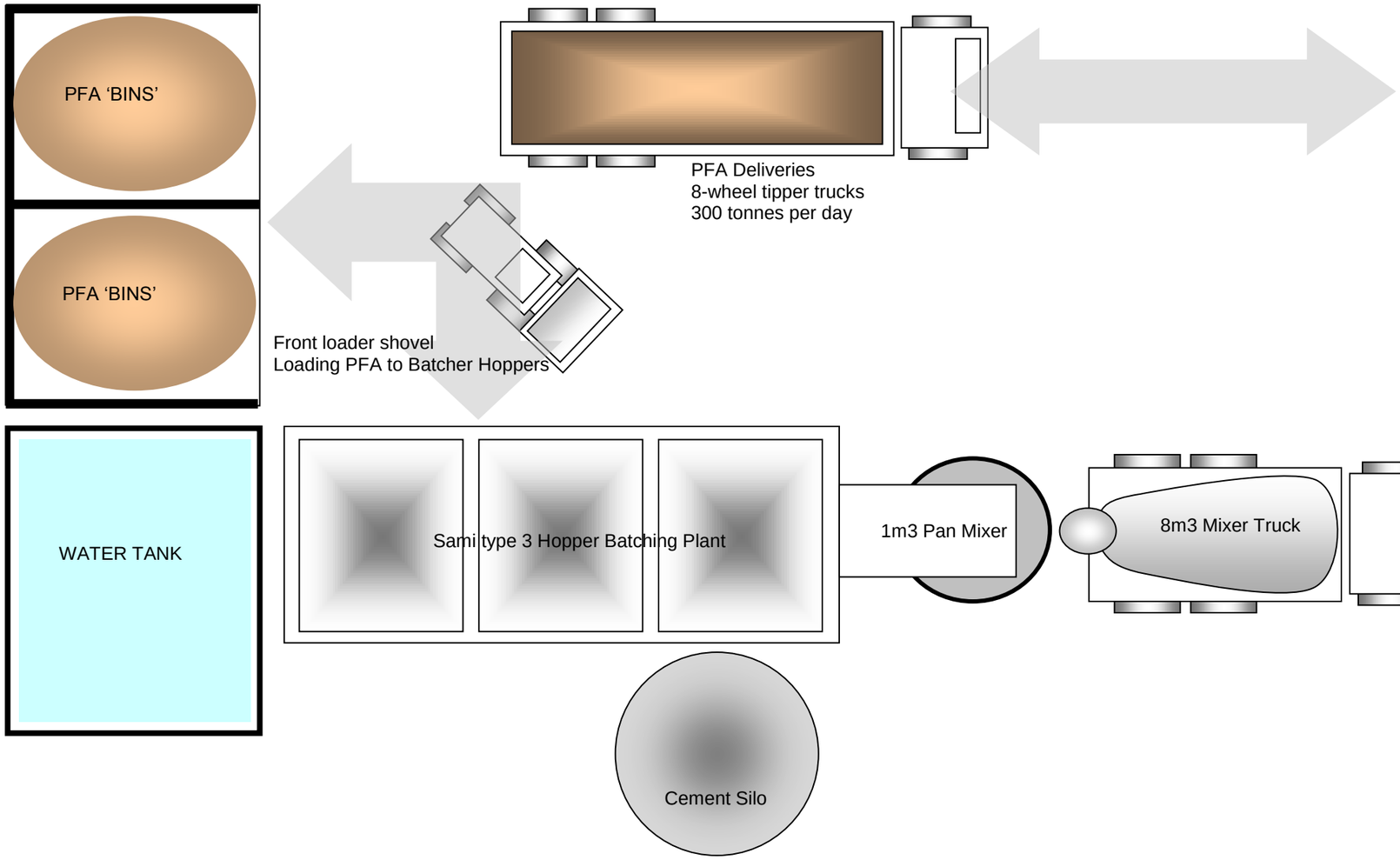
Drawn: JWH	Checked: MSL	Approved: MSL
Dwg: 2862_04	Contract: 2862	Scale: 1:5000

Appendix B

Batching Plant



NOTE:
Area of batching plant compound is approximately 30m x 25m = 750m²



A3

Rev.	Description	Revised By	Date
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Site Address:
Heyford Park, Upper Heyford

Rev:

Title: PFA Batching Plant Indicative Schematic

Client: Upper Heyford LP

Drawn:	Checked:	Approved:
AJT		

Dwg:	Contract:	Scale:
No.2862/Sk01	1198ALP	NTS