ENVIRONMENTAL EARTH SCIENCES
THE KNOW AND THE HOW

REPORT NO. 113093

SITE CONTAMINATION AUDIT REPORT FOR 506 PEEL STREET, TAMWORTH, NEW SOUTH WALES

ENVIRONMENTAL EARTH SCIENCES NSW
REPORT TO GEORGE WESTON FOODS
7 FEBRUARY 2014
VERSION 1

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EXECUTIVE SUMMARY

This site audit report has been prepared in response to a request from George Weston Foods as part of the divestment of 506 Peel Street, Tamworth, New South Wales.

The audit was conducted to provide an independent review of whether the land is considered suitable for a specified use. Based on the information provided, including substantial analysis, the Auditor considers the site is suitable for commercial/ industrial land use. That is to say, it is not that contamination may not exist locally but that the site as a whole is suitable for the designated use.

A summary of the environmental audit is provided below.

TABLE 1 AUDIT SUMMARY TABLE

Site Details	Description
Name of Auditor	Mr Philip Mulvey
Date of appointment	10 December 2013
Date NSW EPA notified of commencement of audit	-
NSW EPA audit reference	-
Name of person requesting audit	Kevin Speak (George Weston Foods)
Site Owner	George Weston Foods
Reason for audit	To determine land use suitability as part of land sale.
Site Address	506 Peel Street, Tamworth, New South Wales
Current certificates of title	Certificates of title are presented in Appendix A and include: Lot 10 DP873830 Lot 11 DP873830 Lot 81 DP531080 Lot 1 DP455288
Zoning	Commercial/ industrial
Past use / Site history	Former feedstock production mill
Surrounding land use	Commercial, parkland, residential
Outcome of audit	Commercial/ industrial
Nature and extent of continuing risk	

This summary must be read in conjunction with the full site audit report and site audit statement that has been issued for this site. The site audit report provides more data and discussions that are not in the above summary table for reasons of space and clarity. All owners of the site and those made responsible for the management of the site should be provided with a copy of this site audit report and site audit statement.

This site audit report and site audit statement has been issued based upon conditions at the time of issue. The Auditor cannot control future activities that may result in further contamination of the site or unidentified issues between sampling points.

NSW EPA Accredited Site Auditor 9806
Philip Mulvey

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AUDIT STATEMENT

NSW EPA Site Contamination Audit System Audit Statement: Attached

SUMMARY OF FINDINGS

- The soil investigation at the site identified two locations with elevated BaP concentrations in fill material which exceed ecological screening levels for commercial/ industrial land use (NEPM, 2013).
- The groundwater investigation at the site indicates that there are elevated levels of copper and zinc which exceed ecosystem criteria (ANZECC, 2000).
- Following review of all documents provided by the Consultant, the Auditor determines that the investigation carried out was in general accordance with relevant guidelines, and was appropriate and accurate. Data presented in the reports is considered to be representative of the site conditions and reliable.
- The Auditor has determined that the site is suitable for the proposed commercial/ industrial land use, based on the information provided by the Consultant and subject to the restrictions, limitations and assumptions included within this Audit report.

SPECIFIC DETERMINATION OF SITE CONTAMINATION AUDIT

For the purposes of this Audit the site has been assessed in general accordance with the relevant guidelines and is suitable for commercial/ industrial use.

DOCUMENT CONTROL

Document	Status	Recipients
Site contamination audit report for 506 Peel Street, Tamworth, NSW **7 February 2014** **113093 SAR**	Issued	George Weston Foods
		Site Auditor – Phil Mulvey

1 INTRODUCTION

This site audit report has been prepared in response to a request from George Weston Foods, as part of a sale for 506 Peel Street, Tamworth, NSW.

TABLE 2 AUDIT DETAILS

Item	Details
Auditor	Mr Philip Mulvey
Accreditation number	9608
Date NSW EPA notified of commencement of audit	-
Date of appointment	10 December 2013
Audit completion	7 February 2014
Audit reference	113093 SAR

1.1 Background

On 10 December 2013, Kevin Speak commissioned NSW EPA accredited Site Contamination Auditor Philip Mulvey to undertake a non-statutory audit of 506 Peel Street, Tamworth, NSW (hereafter referred to as “the site”).

Prior to Mr Mulvey’s involvement as the Auditor the following work was undertaken at the site:

- UST Investigation; and
- Environmental Site Assessment.

It is noted that the Auditor was engaged following completion of the above works at the request of the purchaser as a condition in the contract of sale and therefore this Audit is based on information provided in the Consultants reports and any information which was able to be verified during a visit to the site by the Auditor on the 5 February 2014.

1.1.1 Contamination identified

The soil investigation at the site identified two locations with elevated BaP concentrations in fill material which exceed ecological screening levels for commercial/ industrial land use (NEPM, 2013).

The groundwater investigation at the site indicates that there are elevated levels of copper and zinc which exceed ecosystem criteria (ANZECC, 2000).

1.1.2 Proposed development

Currently the site is unoccupied and former site infrastructure has been demolished. The site is proposed to be developed for commercial purposes (shopping centre).

2 AUDIT INFORMATION

2.1 Purpose of audit

The Audit was requested by George Weston Foods for the sale of the site. This Audit is a non-statutory audit.

The purpose of this Audit is to determine the land use suitability for commercial/ industrial use.

This Audit report is set out in accordance with NSW EPA (2006) *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd edition)* and presents the findings of the Audit.

The Audit details are included in Table 2, site details are included in Table 3 and the site boundaries and features are indicated on Figures 1 and 2. Specific title details are included in Appendix A.

Specifically the objective of this Audit is to provide the client (George Weston Foods) with a conclusion on the contamination at the site and subsequently the suitability of the site to be used for commercial/ industrial purposes.

2.2 Audit team

The Audit team consisted of the following people:

- Philip Mulvey – NSW Accredited Auditor; and
- Tamara Ashford – Auditors assistant.

The Auditor is sufficiently experienced in soil and groundwater contamination, investigation, remediation and validation that other members of this specialist team were not called upon to be part of this Audit.

The Audit company is Environmental Earth Sciences International.

2.3 Audited and related documentation

The following reports were reviewed as part of this Audit; copies of the reports are included in Appendix B.

- Environmental Strategies 2013, *Tank Pit Investigation – 506 Peel Street, Tamworth, NSW.* Reference 13021RP01.
- Environmental Strategies 2014, *Environmental Site Assessment – 506 Peel Street, Tamworth, NSW.* Reference 13104aRP01_ESA (Ref4) FINAL.

The following correspondence was also used in compiling this report (Appendix C):

- Environmental Earth Sciences 2013, 113093 REVIEW 01.
- Environmental Strategies 2014, Response to Auditor's Information Request No1.
- Environmental Earth Sciences 2014, 113093 REVIEW 02.

- Environmental Strategies 2014, Response to Auditor's Information Request No2.
- Email correspondence.

2.4 Audit compliance

To the best of the Auditors knowledge:

- There has not been an Audit (statutory or non-statutory) undertaken previously at this site.
- The site is not the subject of a declaration, order, agreement, proposal or notice under the Contaminated Land Management Act 1997 nor the Environmentally Hazardous Chemicals Act 1985.

This audit report relies on documents prepared by Environmental Strategies and presents the Auditors independent opinion on the suitability of the site for the intended use.

This Audit has been undertaken using guidance contained in NSW EPA published documents, in particular the *Contamination Sites: Guidelines for the NSW Site Auditor Scheme (2nd edition)* published in 2006.

In addition, all information was compared to other relevant published guidance for an investigation of this nature, including but not limited to:

- National Environment Protection Council, National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013;
- ANZECC and Agricultural and Resource Management Council of Australia and New Zealand (ARMCANZ) 2000, *Australian and New Zealand guidelines for fresh and marine water quality. National Water Quality Management Strategy;*
- NHRMC 2011, *Australian drinking water guidelines. National Water Quality Management Strategy;*
- NHRMC 2008, *Australian drinking water guidelines. National Water Quality Management Strategy;* and
- NSW DECCW 2009, *Waste Classification Guidelines. Part 1: Classifying waste.*

This Audit report presents the independent view of the NSW EPA Accredited Site Auditor Mr Philip Mulvey and is in compliance with all relevant legislation, regulations and guidelines issued by the NSW EPA and its subsidiaries.

The Auditor has arrived at all conclusions independently of others and has not been unduly influenced by the views and actions of others during the course of undertaking this Audit.

2.5 Site identification

TABLE 3 SITE IDENTIFICATION

Item	Details
Site Owner	George Weston Foods
Site address	206 Peel Street, Tamworth, NSW

Certificate of title deeds	Certificates of title are presented in Appendix A and include: Lot 10 DP873830 Lot 11 DP873830 Lot 81 DP531080 Lot 1 DP455288
Site area	6,873 m^2
Locality map	Figure 1
Site plan	Figure 2
Local government authority	Tamworth Regional Council
Current council zoning	Commercial Core (B3)
Proposed council zoning	Commercial Core (B3)

2.6 Surrounding land use

The site is located in a commercial area with a number of nearby land uses. Surrounding land uses are as follows:

- North east: the site is bound by Byrnes Avenue. The opposite side of the street is zoned commercial core and currently occupied by a mix of commercial and residential uses including a bitumen area currently used as a car park and a fancy dress shop.
- South east: the site is bound by Murray Street with 'mixed use' zoning on the other side of the street. This is currently occupied by a mixture of commercial and residential properties, including a medical centre, chiropractic centre and solicitors.
- South: directly south of the site, on the corner of Murray Street and Peel Street is currently occupied by a Red Rooster fast food restaurant (commercial).
- South west: the site is bound by Peel Street with public recreation zoning on the opposite side of the street. This is currently occupied by Prince of Wales Park which includes a veledrome. The Peel River is on the other side of the park.
- North west: the site is bound by Jaycees Park and is currently zoned 'commercial core'.

2.7 Sensitive local receptors

The following sensitive receptors have been identified by the Auditor as being local to the site:

- current and future site users;
- site workers;
- members of the public outside the site boundary at nearby commercial, residential and recreational areas;
- groundwater; and
- local surface water receptors including the Peel River.

4 AUDIT CRITERIA

4.1 Soil criteria

4.1.1 Health investigation levels

The Auditor refers to the National Environment Protection Council (2013) *National Environment Protection (Assessment of Site Contamination) Amendment Measure (NEPM).* These investigation levels are derived from the toxicity of substances and estimated exposure of humans to the soil. Given the proposed use of the site is commercial/ industrial, the Auditor considers that the exposure setting HILD - Commercial/ industrial is the most appropriate.

Health screening levels (HSLs) are also referred to for organic compounds including total recoverable hydrocarbons (TRH), benzene, toluene, ethyl-benzene, xylene (BTEX) and polycyclic aromatic hydrocarbons (PAHs). The HSLs are for vapour intrusion based on soil concentrations. They are dependent on the soil texture, the depth of contamination and land use (further discussion is provided in Section 3.2.2 below). Management limits are also considered for heavy fractions where vapour is not a concern (>C_{16}).

4.1.2 Ecological investigation levels

As per Appendix I of NSW EPA (2006) the Auditor considers the ecological investigation levels (EILs) presented in the NEPM appropriate for the site.

The NEPM (NEPC, 2013) provides a methodology for determining ecological investigation levels (EILs) for selected metals and organic substances that are applicable for assessing the risk to terrestrial ecosystems. The EILs depend on the physiochemical properties of the soil and specific land use scenarios and generally apply to the upper two metres of soil. The framework for ecological risk assessment has been considered for this site investigation, while the methodology described in Schedule B5b (NEPM 2013) has been used to derive EILs for selected metals.

The Auditor considers that the EILs calculated by the Consultant to be appropriate, however notes that the CEC adopted to calculate the added contaminant limits (ACL) are an overestimate of what is expected. This does not change the outcome of the assessment findings.

Environmental screening levels (ESLs) are also referred to for selected organic compounds including TRH, BTEX and BaP. These are based on the soil texture (coarse/ fine) and the proposed land use (commercial/ industrial).

4.2 Groundwater criteria

In principle, groundwater is required to be of sufficient quality that it does not affect receiving waters nor degrade aquifers. Given this, the waters encountered are of concern only in their potential to impact an off-site discharge zone and the receptors there (such as ecosystems or humans abstracting water).

4.2.1 Drinking water guidelines

The Australian Drinking Water Guidelines (NHMRC (2011) *Australian drinking water guidelines. National Water Quality Management Strategy)* are considered.

4.2.2 Health screening levels

The Auditor refers to the NEPM (2013) for HSLs for organic compounds, including TPH, BTEX and PAHs. For petroleum hydrocarbons, NEPM (2013) recommends the analysis of total recoverable hydrocarbons (TRH) compounds in soil which represent biogenic and petrogenic compounds in soil and water. The inclusion of non-petroleum compounds in groundwater and organic soil (such as topsoil or peaty soils) can be significant and in these cases a silica-gel cleanup to remove biogenic components prior to analyses using eluted gases is undertaken.

Fraction ranges of hydrocarbons together with soil texture classes used in the NEPM (2013) are presented in Table 4. Fractions F3 ($>C_{16}$-C_{34}) and F4 ($>C_{34}$-C_{40}) are non-volatile and are not of concern for vapour intrusion, however, exposure to human receptors can occur via direct pathways such as dermal contact, and to ecological receptors by migration through interface water. There are scenarios where the application of HSLs is limited and alternative assessment approaches should be considered, if required.

TABLE 4 HSL FRACTIONS AND CORRESPONDING EQUIVALENT CARBON RANGE

Fraction Number	Equivalent carbon number range
F1	$C_6 – C_{10}$
F2	$>C_{10} – C_{16}$
F3	$>C_{16} – C_{34}$
F4	$>C_{34} – C_{40}$
HSL soil classification	AS 1726 Equivalent
Sand	Coarse-grained soil
Silt	Fine-grained soil - silts and clays (liquid limit <50%)
Clay	Fine-grained soil - silts and clays (liquid limit >50%)

4.2.3 Protection of aquatic ecosystems

The Auditor considers the groundwater investigation levels (GILs) presented in NEPM 2013 which are based on the Australian and New Zealand Environment and Conservation Council (ANZECC) (2000) *Australian water quality guidelines for fresh and marine ecosystems* to be the relevant criteria for this investigation.

The guidelines take into account trigger values for fresh and marine waters, and present varying values for the protection of varying percentages of species (99%, 95%, 90% and 80%) for specific analytes.

For protection of aquatic ecosystems the Auditor considers that the 95% protection level is appropriate. It is noted however that as these criteria relate to discharging waters (Section 4.2) they are considered to be conservative when used in assessing groundwater at a site. Factors such as dilution, dispersion, and attenuation effects could reduce contaminant levels substantially by the time the waters have moved through the aquifer and discharged to the surface or to such a point where they are abstracted.

5 SUMMARY OF SITE HISTORY

A detailed account of the site history is provided in Environmental Strategies (2014) Environmental Site Assessment. The Auditor has reviewed and where possible verified the historic information provided and has summarised the site history below.

5.1 Site history

The historical aerial photos indicate that the site was grazing land with residential dwellings until between 1953 and 1965 when commercial sheds/ buildings are evident. Between 1965 and 1976 the site appears to have been developed for use as a stock feed storage and destitution facility with a similar site layout to that present prior to demolition in 2013.

Historical titles for the site suggest that the site was used for grazing/ farming practices until the 1960's. From the 1960's the majority of the site was likely used for storage and distribution of farm produce, followed by the use of the site for grain storage. George Weston Foods purchased this part of the site in 1986. Lot 10 was owned from the early 1960's by a panel beater and then a service station proprietor until George Weston Foods purchased the remainder of the site in 1997. Based on the review of aerial photographs, the Consultant determined that it is unlikely that a service station operated on the site. It is possible a waste oil tank or oil water separator may remain on site, though the auditor find no evidence of a UST infrastructure during the site inspection..

A site walkover was undertaken by Environmental Strategies in February 2013 prior to demolition of the site. At the time of the site inspection the site comprised the following buildings and structures:

- A storage warehouse;
- Office buildings;
- A weighbridge;
- A storage container;
- Several large silos for storage of grain products; and
- An underground storage tank (UST).

The site structures were demolished in October 2013 leaving the majority of the site sealed with concrete and a grassed area at the south western end of the site.

5.2 Potentially contaminating activities

Fill material was encountered at varying depths across the majority of the site, underlying the concrete hardstand. Two tanks were previously present on site. One above ground storage tank (AST) formerly used for the storage of tallow (animal fat) and one UST with an associated bowser used for diesel storage. No additional tanks were identified in the Dangerous Goods search conducted for the site and nothing was noted as being on Lot 10.

Environmental Strategies identified the contaminants of potential concern as total petroleum hydrocarbons (TPH C_6-C_{36}), BTEX, PAHs, organochlorine pesticides (OCPs), volatile halogenated compounds (VHCs), heavy metals and asbestos.

5.3 Auditors conclusion on adequacy of historical review

The Auditor considers that the Consultants review of site history and identification of contaminants of potential concern to be adequate. From the historical assessment, contamination appears confined to surface soil and fill material with the exception of one UST.

6 SITE CONDITION

6.1 Topography and hydrology

The site is regionally located in a generally flat area next to the Peel River with a mountain range to the north/ north-east of the site which reaches an elevation of approximately 800 mAHD.

The site slopes towards the west/ south west, with Lot 10 (eastern corner) being the highest point of the property at approximately 392 mAHD. The western end of the grassed area is the lowest point at approximately 388 mAHD. Lot 10 is level with the street on Byrnes Avenue and steps down to Lots 11 and 81 with a brick retaining wall. Lot 1 steps down again from Lot 81 with a concrete retaining wall.

Surface water run-off from the site is expected to run off to the south west of the site and into the Peel River, approximately 100 m away.

6.2 Geology and soils

The Tamworth 1:1,250,000 Geological Series Sheet indicates that the site is on alluvial sediments consisting of clay, silt, sand and gravel, underlain by the Baldwin Formation comprising of argillite and greywacke.

Conditions encountered at the site by the Consultants during site work were generally consistent with this. Based on a review of the Consultants borelogs, it appears that alluvial sediments were encountered in the south west of the site closer to the river and the weathered residual mudstone (Baldwin Formation) was encountered on the remainder of the site.

Fill material encountered on site consisted of a silty or sandy clay with minor gravel, sand, brick fragments, glass, roadbase, ash, blue metal and crushed concrete.

6.3 Hydrogeology

Groundwater encountered at the site is likely to be either in the Peel Valley Alluvium, which is highly connected to the Peel River or in the Peel Valley fractured rock (NSW Office of Water, 2011).

Based on a review of the Consultants borelogs and measured water levels, it appears that the aquifer encountered in the south west end of the site (MW2) is in the alluvial gravels, which is likely to have a high connectivity with the Peel River and therefore respond quickly to changes in surface water level. Bores on the rest of the site are installed in clay or clay gravels which is considered to be formed from the residual mudstone underlying the site.

The groundwater in this area of the site responds much slower to changes in water levels due to lower permeability and is likely to be recharged from surface infiltration.

A groundwater assessment undertaken by Environmental Strategies (2013) identified that groundwater underneath the site was likely to flow in a westerly direction towards the Peel River located approximately 100 m south west of the site.

Key observations from the groundwater monitoring conducted are summarised below:

- The SWL ranged between 1.67 and 8.99 metres below top of casing;
- phase separated hydrocarbons were not detected in any of the monitoring wells sampled;
- no odours or sheens were observed in any of the purged water;
- groundwater was described as slightly cloudy and turbid in MW2, MW5, MW6 and MW7 and clear in MW1, MW3 and MW4;
- groundwater field parameters recorded were:
    - pH range of 6.6 to 8.0 indicating slightly acidic to alkaline conditions;
    - electrical conductivity ranged from 1,616 to 4,620 µS/cm indicating saline conditions;
    - dissolved oxygen ranged from 0.72 to 6.91 ppm; and
    - redox ranged from 366 to 382 mV.

6.4 Auditor site observations

The Site Auditor visited the site on 5 February 2014. The following observations were made by the Auditor. Photographs taken during the site inspection are held on file.

- The site is covered in concrete hardstand with the exception of a grassed area at the south western end.
- The site is levelled with hardstand covering all of the site, with the exception of some infilled areas of removed infrastructure, including the former weighbridge.
- The highest point is Lot 10 and the concrete hardstand steps down with retaining walls, to approximately 6 m at the bottom of Murray Street.
- Lot 10 appears to be the original slab with no indication of concrete cuts and the presence of underground infrastructure such as triple interceptor trap or tanks.
- The concrete in the forecourt and in the street of Lot 10 appears to be new and there is a new water hydrant present. There is no evidence of any UST infrastructure.
- There appears to be an old (infilled) drainage line that runs along the north western boundary of the property, parallel to Murray Street, towards the Peel River.

7 ASSESSMENT REVIEW

TABLE 5 DOCUMENTS INCLUDED IN REVIEW

Document	Consultant	Figures included in SAR
Tank Pit Investigation – 506 Peel Street, Tamworth, NSW	Environmental Strategies	-
Environmental Site Assessment – 506 Peel Street, Tamworth, NSW	Environmental Strategies	Figures 1 – 4

7.1 Tank pit investigation

The Consultant was initially engaged to undertake an investigation at the site to identify potential soil and groundwater impacts associated with an underground storage tank. It is noted that the Auditor had not been engaged at the time of this investigation, therefore a full review of this work was not conducted.

The scope of work conducted includes the following:

- a site walkover (14/03/2013);
- drilling of four boreholes for soil sampling followed by the installation of groundwater bores (14/03/2013);
- soil logging and sampling of boreholes and laboratory analysis of selected samples for a range of contaminants of potential concern (14/03/2013);
- groundwater gauging, sampling and laboratory analysis of a range of contaminants of potential concern (22/03/2013); and
- preparation of a report detailing the findings of the investigation (10/04/2013).

The findings of the investigation are summarised below.

- Soil encountered was described to be brown/ orange/ red sandy to silty clay with argillite gravels, no odour was noted, however some black staining was observed at MW3 0.4-0.5 m.
- nine soil samples were analysed for metals, BPH, BTEX and PAHs and all results were below the adopted criteria.
- Four groundwater samples were collected (MW1 – MW4) and analysed for TPH, BTEX, PAHs and metals. All organic analysis results were below the laboratory detection limit. Elevated levels of copper and zinc were detected and it was concluded that the concentrations are unlikely to pose a risk to human health and the environment.

7.2 Environmental site assessment

Following the tank pit investigation, the Consultant was engaged to complete an investigation across the entire site prior to sale of the site. A formal review of the report was undertaken

by the Auditor after it was completed, however the Auditor was not involved throughout the planning of the assessment.

The scope of work conducted includes the following:

- supervision and drilling of 13 boreholes to approximately 2 m below ground level (11/11/2013);
- three of the boreholes were extended and installed as groundwater bores (11/11/2013);
- soil logging and sampling of boreholes and laboratory analysis of selected samples for a range of contaminants of potential concern (11/11/2013);
- groundwater gauging, sampling and laboratory analysis for a range of contaminants of potential concern (three new bores only) (19/11/2013); and
- preparation of a draft report detailing the findings of the investigation (06/12/2013); and
- issue of a final report following Auditor review and response to Auditor comments (24/01/2014).

The findings of the investigation are summarised below.

- Soil encountered was described to be brown/ orange/ red sandy to silty clay with argillite gravels, no odour was noted, ash/ coke/ slag were observed at BH103 0.7 m and BH104 0.2 m.
- Twenty-three soil samples were analysed for metals, BPH, BTEX and PAHs and all results were below the adopted criteria with the exception of BaP at two locations, BH104 0.3 m and MW3 0.4-0.5 with (12 mg/kg and 3.2 mg/kg respectively) which exceed the environmental screening level. These levels of BaP were attributed to ash and coke observed in fill material which are noted to be relatively immobile and unavailable, therefore unlikely to pose a risk.
- Three soil samples were also analysed for OCPs and results were below the limit of reporting.
- Thirteen soil samples were tested for asbestos and was not detected.
- Four groundwater samples were collected (MW5 – MW7) and analysed for TPH, BTEX, PAHs and metals.
- All organic analysis results were below the laboratory detection limit. Elevated levels of zinc were detected and it was concluded that they may be background or due to upgradient sources and the concentrations encountered are unlikely to pose a risk to human health and the environment.

7.3 Auditors professional opinion on assessment

The Auditor considers that sampling densities and the analytical schedule is appropriate and comprehensive; and screening criteria used for validation samples and samples for offsite disposal were appropriate and considered to be in general accordance with published guidance.

Borelogs of the works were and are in general correlation with the Consultants observations. Based on the borelogs provided, the Auditor further notes that the geology encountered at the site varies across the site (as discussed in Section 5.2). Based on the geology and depth of groundwater across the site, the Auditor also notes that groundwater at MW2 is in the

gravel/ alluvial aquifer, closely connected with the river, while the other bores are installed in residual weathered geological units or isolated paleo-stream channel.

The results are generally representative of the site conditions, and the Auditor is satisfied that the assessment works carried out is sufficient to characterise the site.

The Auditor is also satisfied that even though groundwater at the site has metal concentrations (copper and zinc) which exceed guideline values, these values are potentially an overestimate of the dissolved metal concentrations present as it is possible that field filtering techniques used may have allowed soil colloids to pass through/ around the filter and being dissolved during field preservation. The Auditor is of the opinion that it is unlikely that the groundwater poses a risk to human health or the environment in its condition at the time of assessment.

8 DATA QUALITY EVALUATION

8.1 Background

This section of the Audit report presents a review of the quality control and quality assurance procedures (QAQC) documented by the Consultant in the reports provided for review. This review is based only on the information provided and that, if any, which was able to be verified by the Auditor during a site visit on 5 February 2014.

In carrying out this review the Auditor refers to the following published guidance:

- National Environment Protection Council National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013;
- DEC NSW (2006) *Contaminated Sites: Guidelines for the NSW Site Auditor scheme*; and;
- Australian Standard 4482.1 *Guide to the sampling and investigation of potentially contaminated soil - Part 1: Non-volatile and semi-volatile compounds*.

The Auditor has used the following measurement data quality indicators (MDQIs) in the review of the Consultants reports (Table 6). It should be noted that Standards Australia (AS4482.1) specify that typical MDQIs for precision should be ≤ 50% RPD, however also acknowledge that low concentrations and organic compounds in particular can be acceptably outside this range. The standard suggests that ≤ 50% RPD be used as a 'trigger' and values above this level of repeatability should be noted and explained.

The Auditors adopted MDQI's for precision acknowledge the intrinsic heterogeneity of metal and semivolatile chemical concentrations in disturbed soil that may potentially cause large variations in results between laboratory subsamples. Similarly, large variations in volatile chemical concentrations between duplicates may be unavoidable even when using best practice sampling methodology, especially as sampling methods seek to minimise the disturbance to the sample while splitting it which means a high degree of inherent heterogeneity is expected.

As such, the adopted RPD criteria are considered to be a suitable measure for the reproducibility of results in a naturally heterogeneous media such as soil.

TABLE 6 MEASUREMENT DATA QUALITY INDICATORS (MDQIS)

Parameter	Procedure	Minimum Frequency	Criteria	
			(5 to 10x LOR4)	>10x LOR
Precision	Field Duplicates	1 in 20 - metals	<80 RPD	<50 RPD
		1 in 20 - semi-volatiles	<100 RPD	<80 RPD
		1 in 20 - volatiles	<150 RPD	<130 RPD
	Lab Replicate*	1 in 20	<50 RPD	<30 RPD
Accuracy*	Reference Material	1 in 10	60% to 140%R	80% to 120%R
	Matrix spikes			
	Surrogate spikes			
Representativeness	Reagent Blanks	1 per batch	No detection	
	Holding Times*	Every sample	-	
Blanks	Trip Blank	1 per batch	No detection	
	Rinsate Blanks			
Sensitivity	Limit of Reporting	Every sample	LOR < ½ site criteria	

8.2 Data quality objectives

The Data Quality Objectives (DQOs) process is a systematic approach used to define the type, quantity and quality of data supporting decisions which relate to the environmental condition of a site. Undertaking DQOs for site assessment and remediation is a requirement of the Department of Environment and Conservation NSW (2006), *Contaminated sites: Guidelines for NSW Site Auditors Scheme (2nd edition)*. The DQO process was formulated by the US EPA and provides sound guidance for a consistent approach to understanding site assessment and remediation.

The review of the DQOs and information used to assess them included the following:

- Sampling density and laboratory scope;
- field methodology, sampling procedures, calibration of equipment used, decontamination methods used;
- laboratory and field data verification;
- sample handling integrity; and
- quality control sample regime, including duplicate samples, split samples, trip spikes and blanks, and a review of the laboratory program.

8.3 Sampling density and laboratory scope

8.3.1 Groundwater sampling

Seven groundwater bores were installed across the site over two stages. The Auditor considers that the groundwater in the uppermost aquifer has been appropriately targeted, however also notes that the groundwater encountered in MW2 is likely to be from the gravel/ alluvial aquifer, closely connected with the river, while the other bores are installed in residual weathered geological units.

8.3.2 Soil sampling

A total of 17 boreholes were advanced across the site, which complies with the minimum densities outlined in the Australian Standards AS4482.1 (2005) for a site of this size (6,873 m^2). The Auditor considers the sampling density to be sufficient to characterise the site.

8.4 Sample collection and integrity

Soil samples were collected directly from the push tube liner or the auger with a stainless steel trowel. To maintain sample integrity, new nitrile gloves were used to collect each sample. The methodology employed by the Consultant for all samples collected from the site was appropriate, consistent with guidelines and unlikely to introduce error.

Field QA/QC consisted of following correct decontamination procedures during collection of samples, and appropriate storage and handling of samples following collection and during storage and transport to the laboratory. Samples were placed in laboratory supplied containers and stored on ice in “esky” containers prior to transport to the laboratory under chain of custody documentation.

8.5 Analytical schedule and completeness

The Auditor considers that the analytical schedule includes all the contaminants of concern identified by the Consultant and is considered sufficiently comprehensive to characterise and soil and groundwater at the site.

8.6 Field quality control sampling

Duplicate samples were collected and analysed at both the primary laboratory and a secondary laboratory, as detailed in Section 8 of the Consultants ESA report. Samples were collected at a rate of 5% or better and these duplicate rates are considered adequate by the Auditor.

A review of the duplicate samples collected during the investigation stage indicates that the relative percentage differences (RPDs) were generally within the acceptable limits. The Auditor agrees with this conclusion, and in addition notes that the samples were collected from the fill material, some variation in the metals concentrations in the fill material is to be expected given it is likely to be heterogeneous in nature.

One rinsate sample (groundwater) and two trip blank samples were prepared and analysed. This does not meet the frequency recommended by industry guidelines, however, the sampling methods employed by the Consultants and the nature of the contamination (non-volatile) encountered suggests that the dataset is unlikely to be compromised as a result.

The rinsate and trip blank samples collected returned results below the limit of reporting suggesting that cross contamination did not occur.

8.7 Laboratory quality assurance and quality control

The Consultant submitted primary samples to Envirolab and secondary samples to Eurofins. Completed chain of custody documentation was included by the Consultant as appendices to the reports. Laboratory quality control and assurance reports were also appended to the Consultants reports.

Soil and groundwater samples were analysed within laboratory holding times with the exception of:

- one sample for TPH and BTEX (Tank investigation); and
- three samples for OCPs.

The Consultant noted that the integrity of the results is unlikely to have been compromised due to all other TPH and BTEX results being below the detection limit, and in the case of OCPs, these are persistent chemicals, unlikely to be impacted by an excedence of holding times. Overall the Auditor is satisfied with the integrity of results.

The internal QAQC performed by the laboratories included analysis of internal duplicates, method blanks and surrogate and spike samples. No issues were noted by the primary or the secondary laboratory and the analytical data is stated by the Consultant to be acceptable for the purposes of the investigation.

Based on the analysis of the field and laboratory QA/ QC methods the Auditor considers that the data set is precise and accurate.

8.8 Auditors professional opinion on data quality

In the Auditor's opinion:

- the quantity of blind and split duplicate analysis is considered acceptable;
- the RPDs for field duplicate samples were within the acceptable range or not outside logical explanation;
- results adhered to chemical laws or were not outside the range of logical explanation. Chemical results were within the range expected for natural ground that has not been adversely impacted by contamination. Elevated PAHs in soil are confined to the fill layer;
- the field observations and measurements generally correlate with the laboratory data;
- elevated copper and zinc found in groundwater on site are consistent with the dissolution of soil colloids during field filtering;
- chemical analysis was consistent with the findings of the desk top review; and
- Internal laboratory quality assurance was within acceptable ranges.

Based on the information provided, the Auditor concurs with the consultant that the samples collected and analysed during the assessment are representative of the conditions at the site. The Auditor therefore considers that the data can be relied upon for the purposes intended.

9 AUDITOR OPINIONS AND RISK ASSESSMENT

9.1 Final site conditions

9.1.1 Soil

The soil at the site has been assessed and compared to criteria for commercial/ industrial land use. The Auditor has reviewed all available reports, carried out a site inspection and undertaken a critical review of the information provided and concludes the following regarding the final condition of the site:

- Soil contamination at the site has been adequately assessed;
- Low levels of benzo(a)pyrene associated with ash/ coke material in the fill material remain on site and is confined to two locations. The levels reported are well within the relevant human health criteria for the site and is considered to be immobile and not leachable; and
- the site has been confirmed to be suitable for commercial/ industrial land use.

The Auditor considers that the soil at the site is suitable for the proposed ongoing commercial/ industrial land use, based on the information provided by the Consultant.

9.1.2 Groundwater

Groundwater at the site was monitored in seven bores over two rounds of monitoring. The groundwater was found to contain elevated copper and zinc concentrations which are potentially due to the field filtering techniques used. Furthermore, the site does not appear to be contributing to site contamination of groundwater. No organic contaminants were detected in any samples analysed.

The Auditor has reviewed all available reports supplied by the Consultants pertaining to groundwater, has undertaken a critical review of the information provided and concludes that the site is considered suitable for the proposed commercial/ industrial use.

9.1.3 Surface water and vapour

Surface water and vapour were not addressed within the scope of this investigation as there are no surface water bodies on site and there is not considered to be a risk of vapour given the nature of the identified groundwater and soil contamination.

9.2 Potential for offsite migration

9.2.1 Soil

The Auditor has considered the information provided in making an assessment of the presence and/ or potential for offsite migration of contamination both from the site and onto the site from other sites. The following conclusions have been drawn regarding offsite migration of soil contamination:

- the extent of elevated BaP levels in fill material appears to be confined to two locations and within the site boundaries; and
- the levels of BaP identified in the fill were associated with ash/ coke, which is unlikely to be leachable or mobile due to the matrix in which they are bound.

The Auditor concludes that the presence and potential for offsite migration of contamination for soil is considered low.

The surrounding areas of the site were not included as part of this investigation therefore a definitive statement of offsite contamination migrating onto site cannot be made, however the Auditor considers it unlikely as ash and coke were confined to fill material associated with levelling and filling the site specifically for its use.

9.2.2 Groundwater

Elevated copper and zinc concentrations in groundwater were found to be consistent with the local regional groundwater quality and the site is not contributing to the contamination of groundwater. Therefore the potential for on or offsite migration is not considered to pose a significant contamination risk.

9.3 Auditor risk assessment

The Auditor considers that the actual or potential risk to human health, groundwater, surface waters or the environment from soil contamination at the site to be low to negligible based on the final site conditions at the time of the site audit. Soil at the site has been assessed as being suitable for the proposed ongoing commercial/ industrial land use, based on a lack of any significant exceedences of HILs, with no location exceeding 250% of investigation levels,.

Groundwater does not have the characteristics of contamination from site.. There are not considered to be any current or likely future beneficial uses of the groundwater which would impact human health via groundwater contaminants from site. The proposed end use does not include any potential exposure pathways which would allow exposure to contaminated groundwater.

Risks posed to human health, groundwater, surface waters or the environment by groundwater are considered to be low to negligible

The final site conditions are not considered to pose a risk to structures at the site based on the information provided and on the conditions of the site at the time of the audit.

As the whole site is currently covered by pavement, the risk of offsite migration of any other substances from the site such as odour, sediment runoff, or issues which may affect air quality is considered to be negligible. Even if the pavement is removed there is no significant exceedences of investigation levels and thus risk to health from soil contaminants are within levels considered acceptable.

10 AUDIT OUTCOMES AND DETERMINATIONS

The following reports and correspondence have been reviewed as part of this Audit:

- Environmental Strategies 2013, *Tank Pit Investigation – 506 Peel Street, Tamworth, NSW.* Reference 13021RP01.
- Environmental Strategies 2014, *Environmental Site Assessment – 506 Peel Street, Tamworth, NSW.* Reference 13104aRP01_ESA (Ref4) FINAL.

- Environmental Earth Sciences 2013, 113093 REVIEW 01.
- Environmental Strategies 2014, Response to Auditor's Information Request No1.
- Environmental Earth Sciences 2014, 113093 REVIEW 02.
- Environmental Strategies 2014, Response to Auditor's Information Request No2.
- Email correspondence.

Following review of all documents provided by the Consultant the Auditor determines that the work carried out was generally in accordance with relevant guidelines, and was appropriate and accurate. Data presented is considered to be representative of the site conditions, accurate and reliable.

As defined in Part 4 of the *Contaminated Land Management Act 1997* the purpose of this audit was to determine any one or more of the following matters:

- the nature and extent of any contamination of the land;
- the nature and extent of any management or actual or possible contamination of the land;
- whether the land is suitable for any specified use or range of uses;
- what management remains necessary before land is suitable for any specified use or range of uses; and
- the suitability and appropriateness of a plan of management, a long-term management plan or a voluntary management proposal.

Following a review of the abovementioned documents and a site visit for verification, the Auditor concludes that the site is **suitable for the commercial/ industrial use** based on the following conclusions:

- two isolated locations of elevated BaP exceeding ecological criteria were identified in fill material, however as this has been associated with ash/ coke material in fill it is considered to be immobile and unlikely to leach to groundwater. Based on this assessment, soil at the site is not considered to pose a risk to either human health or ecosystems; and
- groundwater at the site is not considered to pose a risk to either human health or ecosystems given that the levels of metals identified are low and likely to be sorbed by the clay matrix of the aquifer. It is considered likely that the elevated zinc concentrations are a result of the filtering and preservation techniques used in the field.

11 AUDITOR LIMITATIONS

1. Although the Auditor has reviewed all reports and undertaken a site visit the Auditor is not responsible for any information which may be found to be false or misleading at a later date.
2. This Audit report implies that the risk posed by any contamination which may or may not remain is unlikely to cause a risk to future site occupants.
3. As the site has been investigated and remediated on a targeted and systematic system the Auditor cannot make a definitive statement as to the condition of the site in areas

which have not been sampled, only that the site as a whole is statistically considered suitable for the proposed use. The Auditor notes that based on the history there is a small possibility of buried infrastructure particularly associated with Lot 10. The site inspection by the auditor found no evidence supporting this small possibility but notes presence of this infrastructure if found does not affect the suitability of the site as a whole as being suitable for commercial use, but if found should be removed.

4. This Audit in no way makes any statement as to the geotechnical suitability of the site. The Auditor is not responsible for any change to the site conditions which may arise following the date of this site Audit, nor compliance by the site owners, developers and/or occupiers to any laws and regulations relating to demolition, construction, waste disposal or groundwater abstraction.
5. This Audit is based only on information provided by the Consultant engaged to undertake the assessment works at the site, and site inspection by the Auditor.

12 AUDIT CONDITIONS

The auditor does not impose any conditions on the site.

13 AUDITOR SIGNATURE AND DECLARATIONS

Signed by

Mr Philip Mulvey (Accreditation number 9806)
Site Contamination Auditor
Accredited pursuant to Section 51 of Part 4 of the *Contaminated Land Management Act 1997*

Date 7 February 2014

14 REFERENCES

ANZECC and Agricultural and Resource Management Council of Australia and New Zealand (ARMCANZ) 2000, *Australian and New Zealand guidelines for fresh and marine water quality,* National Water Quality Management Strategy.

Australian Standard 4482.1 2005, *Guide to the sampling and investigation of potentially contaminated soil - Part 1: Non-volatile and semi-volatile compounds*.

Environmental Strategies 2013, *Tank Pit Investigation – 506 Peel Street, Tamworth, NSW.* Reference 13021RP01.

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National Environment Protection Council 2013, *National Environment Protection (Assessment of Site Contamination) Amendment Measure*.

NHRMC 2008, *Australian drinking water guidelines*, National Water Quality Management Strategy.

NHRMC 2011, *Australian drinking water guidelines*, National Water Quality Management Strategy.

NSW DEC 2006, *Contamination Sites: Guidelines for the NSW Site Auditor Scheme (2nd edition)*.

NSW DECCW 2009, *Waste Classification Guidelines. Part 1: Classifying waste*.

NSW Office of Water 2011, *Water resources and management overview – Namoi catchment*, Sydney.

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ENVIRONMENTAL EARTH SCIENCES GENERAL LIMITATIONS

Scope of services

The work presented in this report is Environmental Earth Sciences response to the specific scope of works requested by, planned with and approved by the client. It cannot be relied on by any other third party for any purpose except with our prior written consent. Client may distribute this report to other parties and in doing so warrants that the report is suitable for the purpose it was intended for. However, any party wishing to rely on this report should contact us to determine the suitability of this report for their specific purpose.

Data should not be separated from the report

A report is provided inclusive of all documentation sections, limitations, tables, figures and appendices and should not be provided or copied in part without all supporting documentation for any reason, because misinterpretation may occur.

Subsurface conditions change

Understanding an environmental study will reduce exposure to the risk of the presence of contaminated soil and or groundwater. However, contaminants may be present in areas that were not investigated, or may migrate to other areas. Analysis cannot cover every type of contaminant that could possibly be present. When combined with field observations, field measurements and professional judgement, this approach increases the probability of identifying contaminated soil and or groundwater. Under no circumstances can it be considered that these findings represent the actual condition of the site at all points.

Environmental studies identify actual sub-surface conditions only at those points where samples are taken, when they are taken. Actual conditions between sampling locations differ from those inferred because no professional, no matter how qualified, and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden below the ground surface. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from that predicted. Nothing can be done to prevent the unanticipated. However, steps can be taken to help minimize the impact. For this reason, site owners should retain our services.

Problems with interpretation by others

Advice and interpretation is provided on the basis that subsequent work will be undertaken by Environmental Earth Sciences NSW. This will identify variances, maintain consistency in how data is interpreted, conduct additional tests that may be necessary and recommend solutions to problems encountered on site. Other parties may misinterpret our work and we cannot be responsible for how the information in this report is used. If further data is collected or comes to light we reserve the right to alter their conclusions.

Obtain regulatory approval

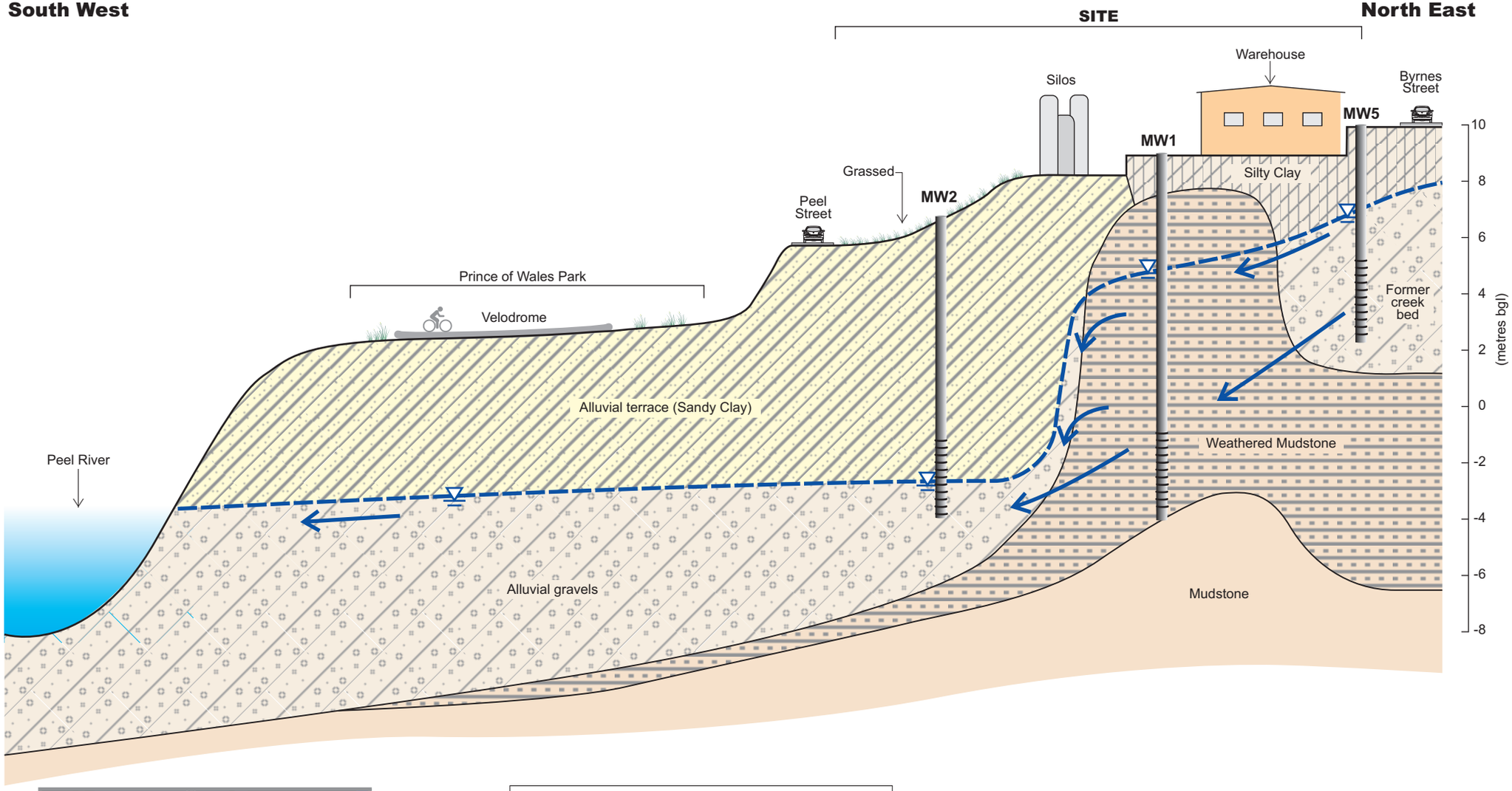
The investigation and remediation of contaminated sites is a field in which legislation and interpretation of legislation is changing rapidly. Our interpretation of the investigation findings should not be taken to be that of any other party. When approval from a statutory authority is required for a project, that approval should be directly sought by the client.

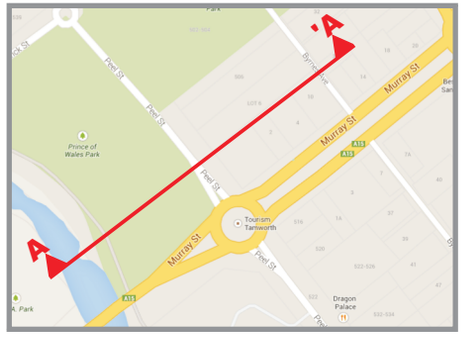
Limit of liability

This study has been carried out to a particular scope of works at a specified site and should not be used for any other purpose. This report is provided on the condition that Environmental Earth Sciences NSW disclaims all liability to any person or entity other than the client in respect of anything done or omitted to be done and of the consequence of anything done or omitted to be done by any such person in reliance, whether in whole or in part, on the contents of this report. Furthermore, Environmental Earth Sciences NSW disclaims all liability in respect of anything done or omitted to be done and of the consequence of anything done or omitted to be done by the client, or any such person in reliance, whether in whole or any part of the contents of this report of all matters not stated in the brief outlined in Environmental Earth Sciences NSW's proposal number and according to Environmental Earth Sciences general terms and conditions and special terms and conditions for contaminated sites.

To the maximum extent permitted by law, we exclude all liability of whatever nature, whether in contract, tort or otherwise, for the acts, omissions or default, whether negligent or otherwise for any loss or damage whatsoever that may arise in any way in connection with the supply of services. Under circumstances where liability cannot be excluded, such liability is limited to the value of the purchased service.

FIGURES





LEGEND:

Inferred groundwater flow

Inferred water table

ENVIRONMENTAL EARTH SCIENCES
THE KNOW AND THE HOW

Title: **Site Conceptual Model**

Location: **506 Peel Street, Tamworth, NSW**

Client: **George Weston Foods**

Job No: **113093**

Project Man: **PM**

Scale: **As Shown**

Drawn By: **LB**

Date: **February 2014**

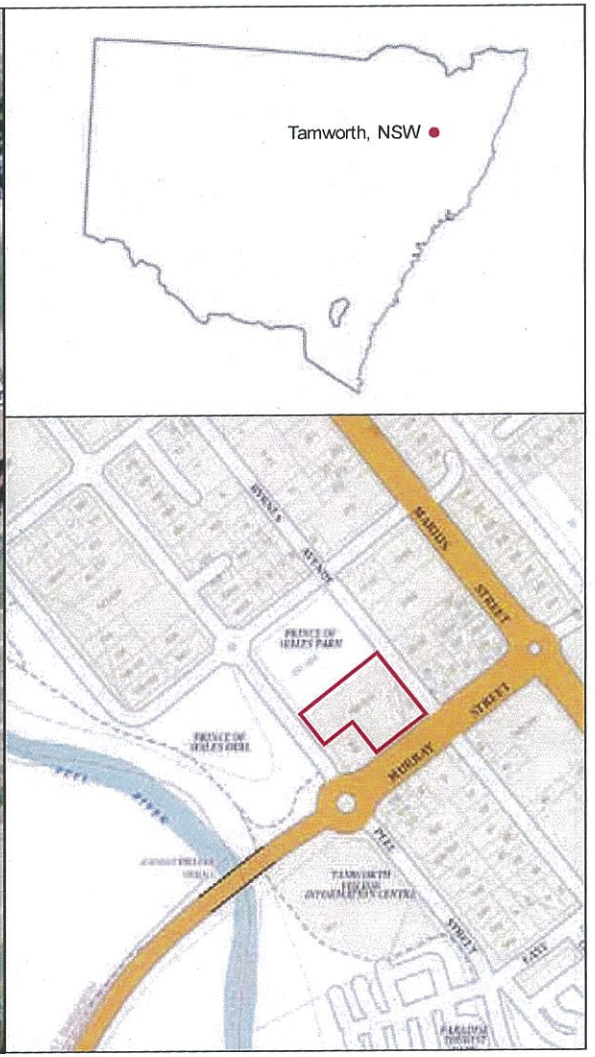
Figure **1**

Environmental Strategies
PROVIDING BENEFITS

Site Location

Environmenatl Site Assessment
506 Peel Street, Tamworth, NSW

FIGURE 1



Base maps sourced from six.maps.nsw.gov.au (accessed 23 October 2013)

KEY

- Site location
- Site boundary

N

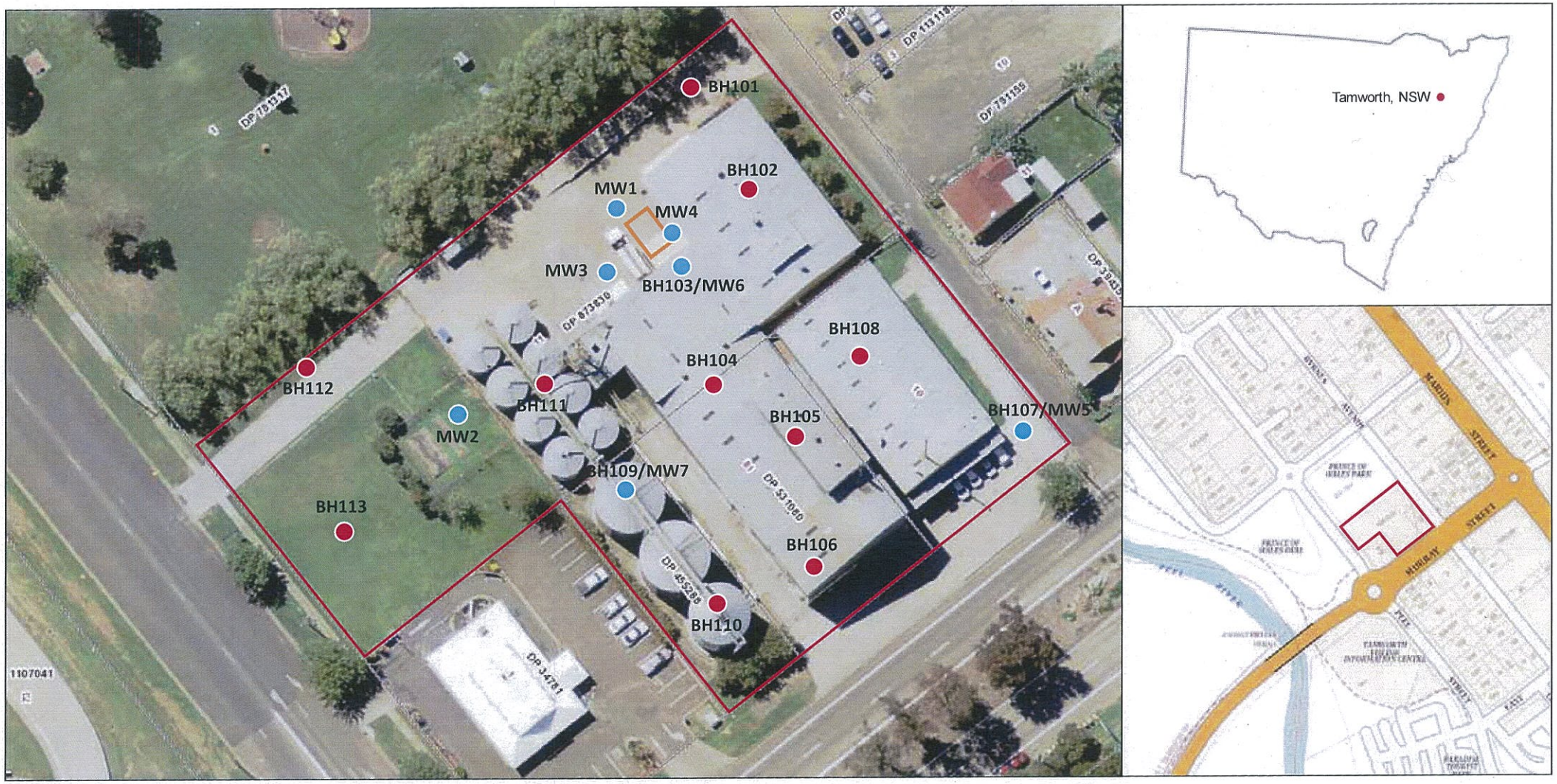
Approximate Scale
0 25
Metres

EnvironmentalStrategies
PROVIDING BENEFITS

Sample Locations

Environmental Site Assessment
506 Peel Street, Tamworth, NSW

FIGURE 2



KEY

- Site location
- Site boundary
- UST pit location (approximate)
- Monitoring Well Location
- Borehole Location

N

Approximate Scale
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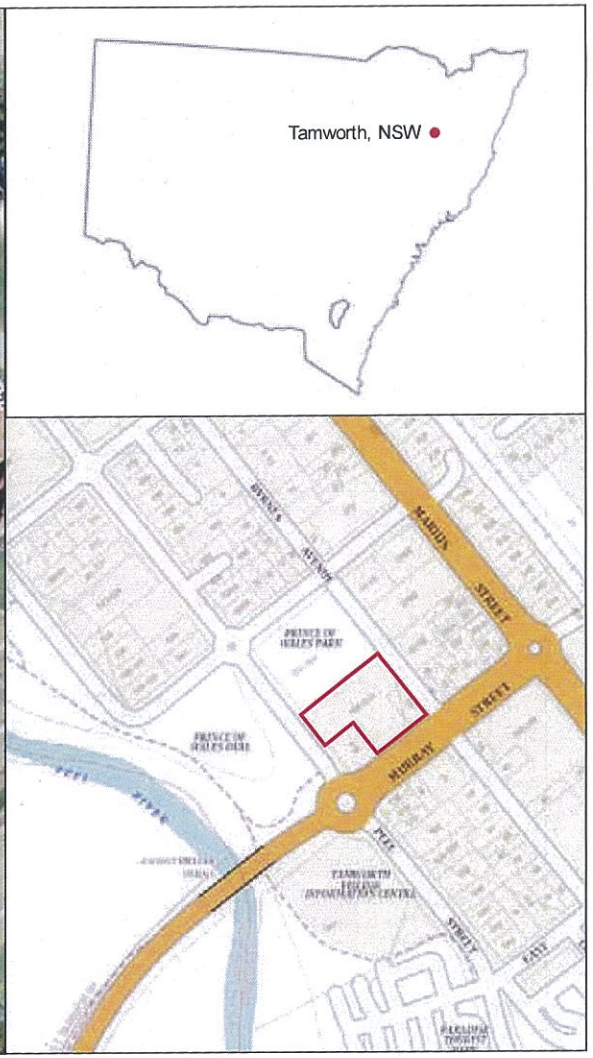
Metres

Environmental Strategies
PROVIDING BENEFITS

Groundwater Flow Contours

Environmental Site Assessment
506 Peel Street, Tamworth, NSW

FIGURE 3



KEY

- Site location
- Site boundary
- UST pit location (approximate)
- Monitoring Well Location
- Borehole Location
- 6.8 Groundwater Contour

N

Approximate Scale
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Metres