Potential Source	Potential Receptor	Potential Pathway to Receptors	Associated Hazard	Scale of Impact	Potential Consequence of Source-Receptor Linkage	Potential Likelihood for Significant Source-Receptor Linkage	Risk Classification
Current and historic ASTs (Elevated TPH concentrations and visual and olfactory evidence of hydrocarbon contamination)	Site end users	Exposure to potential hydrocarbon contamination through ingestion, inhalation and dermal contact	Risk to human health	Local	Medium	**Likely:** Given the number of current and historic ASTs at the site, the recorded elevated TPH concentrations and the visual and olfactory evidence of hydrocarbon contamination on site, the potential significant risk to this receptor is considered to be likely.	**Moderate Risk**
	Construction workers				Mild to medium	**Low Likelihood:** Although hydrocarbon contamination has been identified on site, the potential for significant risk to this identified receptor is considered largely to represent a chronic risk, provided appropriate health and safety procedures are observed.	**Low to Moderate Risk**
	Controlled waters	Infiltration of water through the unsaturated zone resulting in leaching of hydrocarbons and potential vertical and horizontal migration of hydrocarbons to and within perched water overlying the low permeability alluvial deposits	Risk to minor aquifer and river quality	Local to regional	Medium to severe	**Likely to High Likelihood**: Given the presence of a minor aquifer underlying the site, the close proximity of the River Usk, the presence of high groundwater and soils classified as having a high leaching potential, the presence of the recorded elevated TPH concentrations together with the visual and olfactory evidence of hydrocarbon contamination within the groundwater, the ASTs are considered likely to represent a significant risk to controlled waters.	**High Risk**
Potential ground gas generation associated with general made ground, natural strata	Site end users and structures	Migration, ingress and accumulation / inhalation of ground gasses	Risk to human health	Local	Medium to Severe	**Low Likelihood to Likely:** Slightly elevated carbon dioxide and methane concentrations have been recorded at the site. Potential sources of ground gas (e.g. superficial deposits and made ground) have been identified to underlie the site. No radon protection measures are reported as being necessary for dwellings constructed on the site.	**Moderate to High Risk**

Potential Source	Potential Receptor	Potential Pathway to Receptors	Associated Hazard	Scale of Impact	Potential Consequence of Source-Receptor Linkage	Potential Likelihood for Significant Source-Receptor Linkage	Risk Classification
Adjacent potentially contaminative land uses	Controlled waters	Horizontal migration of potential contaminants on to the site from possible off-site contaminative sources	Risk to controlled waters	Local to regional	Medium	**Low Likelihood to Likely:** Given the potentially contaminative current and historic land uses in the close proximity to the site, the potential for the migration of contaminants on to the site at concentrations that may pose a significant risk to controlled waters cannot be discounted.	**Moderate Risk**

10 GROUND ENGINEERING

10.1 Proposed Development

Full details of the proposed development have not been finalised, but it is understood that the proposed development may comprise the construction of an up to 13 storey structure at the site.

10.2 Site Preparation

10.2.1 At the time of the ground investigation works, no demolition works had been undertaken. The site is known to be former paint works comprising a number of derelict buildings, comprising brick, corrugated iron and prefabricated board construction. The site was enclosed by security fencing comprising corrugated metal sheets with barbed wire and pallisade fencing and was mainly laid to concrete and tarmacadam. An area of soft landscaping is located along the eastern boundary of the site.

10.2.2 There is evidence of numerous above ground storage tanks located across the site both outside and within the derelict buildings. Concrete mounts for at least four above ground storage tanks (ASTs) were observed around the site area. Within the derelict buildings evidence of further ASTs were observed including a large tank constructed on a brick base, located in the building located in the southernmost corner of the site. Consideration should be given to these structures when planning the demolition works. Furthermore, it is considered that no significant below ground obstructions would be present at the site.

10.2.3 A pipe was observed to run along the northern boundary of the site from the building located in the north-eastern section of the site. The pipe traverses the northern part of the site and aligns vertically at the building located in the north-western section of the site. It is presumed this feature is a venting pipe. Consideration to this feature should also be given when the demolition of the site is planned.

10.2.4 Some areas of potential hydrocarbon contamination has been identified at the site, which will require appropriate remedial works. These works may include the removal or treatment of significant volumes of impacted soils. As a result, any conventional foundation design will need to take into account of potentially significant thickness of fill materials.

10.2.5 Evidence of Asbestos Containing Materials (ACM) was observed on site and concrete bound asbestos roofing sheets were observed stored within one of the derelict buildings. The disposal of ACM should be considered when preparing the site fro development.

10.3 Ground Conditions

10.3.1 Geotechnical test results are discussed below. Geotechnical laboratory test certificates are provided in Appendix H with in-situ tests being presented on the exploratory hole logs in Appendix F of this report.

Made Ground

10.3.2 Made ground was encountered across the site at all trial pit and borehole locations to a maximum depth of 4.6m below ground level (bgl) within BH2.

10.3.3 An upper layer of made ground was encountered generally comprising tarmacadam (within areas of hardstanding) overlying made ground materials that varied across the site. These encountered variations are discussed below.

10.3.4 Within TP4, was undertaken in vicinity of a historic AST in the southern section of the site. Dark brown to black sandy gravel of brick, concrete, clinker and plastic was observed to 0.2m depth. In addition, cardboard and textiles were observed within these materials. Underlying the initial surface layer, light brown to cream-brown slightly gravelly to gravelly clay was observed to 0.65m depth. The gravel encountered comprised medium to coarse sized fragments of moderately weak to strong chalk with occasional to rare flint. Between 0.65m and 1.5m depth, gravel to cobbles of red-brown and orange-brown black stained sandstone was observed.

10.3.5 TP6 (in the vicinity of another historic AST), within the northern section the site encountered a thickness (0.15m) of black ashy sandy gravel with a strong odour overlying a veneer of lean mix concrete/cement. Beneath this light grey-brown to brown slightly clayey very gravelly sand was observed. The gravel comprised mixed lithologies, predominantly fine to coarse flint and sandstone with rare brick and clinker also observed.

10.3.6 A lower layer of made ground was encountered within all the exploratory holes beneath the 'upper' made ground. The materials were typically encountered as loose to medium dense (based on visual inspections only) orange-brown sands, slightly clayey sands, and sandy flint gravels along with soft to firm sandy clays. These materials were encountered to a maximum depth of 4.6m (BH2). Bands of green-brown to brown colouration were also observed.

10.3.7 Visual and olfactory evidence of hydrocarbon contamination was observed within TP4 in the materials recovered between 3.9m and 4.40m depth.

10.3.8 Laboratory analysis was conducted on four samples of the possible made ground/natural ground. The results of these analyses are presented in Table 10.1 below.

Table 10.1: Summary of Laboratory Test Results – Made Ground (Lower Layer)

Test	Number of Tests	Range of Results
Plasticity Index (%)	4	16 -23
Moisture Content (%)	4	17 - 31
% passing 425µm sieve	4	7 - 42
pH Value	3	7.2 – 7.5
SO_4 (g/l in soil)	3	<0.02 – 0.06
In Situ SPT ‚N' Value'	1	8

10.3.9 The results of the classification tests undertaken on samples of the cohesive strata indicate a low to intermediate plasticity with a corresponding modified plasticity index ranging between 1.6% to 11.3% relating to low to medium

volume change potential, as defined in NHBC Standards (2007). The majority of the results indicated cohesive materials with a low modified plasticity.

10.3.10 A single in situ Standard Penetration Test (SPT) was undertaken at 3.0m depth (BH2). The returned 'N' value of 8 indicated the cohesive materials encountered at this depth to be of soft consistency.

10.3.11 Water Soluble Sulphate and pH testing was undertaken as part of the geo-chemical testing of the upper layer of made ground. The results of these tests showed the topsoil/made ground material to fall into Class DS1 in accordance with BRE Special Digest 1.

10.3.12 The results of the water soluble sulphate content tests carried out on the samples of the lower made ground layer also showed these materials to fall into Class DS1 in accordance with BRE Special Digest 1.

Natural Strata

Alluvium

10.3.13 Laboratory analysis was conducted on 5 samples of the alluvial deposits encountered on site which was typically encountered as soft, locally firm green-brown to grey clay with pockets of fine to medium sand . The results of these analyses are presented in Table 10.2 below.

Table 10.2: Summary of Laboratory Test Results - Alluvium

Test	Number of Tests	Range of Results
Plasticity Index (%)	4	25 - 38
Moisture Content (%)	4	33 - 48
% passing 425µm sieve	4	0
pH Value	3	8.0 - 8.4
SO_4 (g/l in soil)	3	<0.02 - 0.24
In Situ SPT 'N' Value	3	6 - 8

10.3.14 The results of the classification tests undertaken on samples of the cohesive alluvial strata indicate high plasticity with a corresponding modified plasticity index ranging between 25% to 38% relating to medium volume change potential, as defined in NHBC Standards (2007).

10.3.15 Based upon standard correlations, eg Stroud & Butler (1975), and assuming a Plasticity Index of >30%, the SPT results indicate the alluvial clays to be soft and very soft. The results of the water soluble sulphate content tests carried out on the samples of the natural clays showed the material to fall into Class DS1 in accordance with BRE Special Digest 1.

10.3.16 In addition, using standard correlations with the SPT data, eg Stroud & Butler (1975), consolidation parameters may be estimated for the cohesive alluvial deposits. It is estimated that these clays would have a coefficient of compressibility in excess of 0.3 m^2/MN.

Alluvial Gravel (Basal Layer of Alluvium)

10.3.17 Visual observations and the in situ SPT undertaken at 14.0m depth ('N' value of >50) within the underlying alluvial gravels indicated gravels and cobbles attained a density of 'very dense'.

St Maughans Formation

10.3.18 Laboratory analysis was conducted on 2 samples of the St Maughans Formation encountered on site which was typically encountered as red-brown to brown blue-grey speckled slightly weathered to weathered mudstone. The materials were recovered as soft to firm red-brown lithorelict clays with strong gravel sized fragments of mudstone. It is assumed that the water flush used during boring by the drilling contractors may have deteriorated the samples. The results of the analyses are presented in Table 10.3 below.

Table 10.3: Summary of Laboratory Test Results – St Maughans Formation

Test	Number of Tests	Range of Results
Plasticity Index (%)	2	25 - 38
Moisture Content (%)	2	33 – 48
% passing 425µm sieve	2	0
pH Value	3	8.9 – 9.2
SO_4 (g/l in soil)	2	<0.02

10.3.19 The results of the classification tests undertaken on samples of the St Maughans Formation indicate low plasticity with a corresponding modified plasticity index ranging between 2.9% to 7.0% relating to low volume change potential, as defined in NHBC Standards (2007).

10.3.20 The results of the water soluble sulphate content tests carried out on the samples of the natural clays showed the material to fall into Class DS1 in accordance with BRE Special Digest 1.

10.4 Foundations

Ground Conditions

10.4.1 The ground conditions encountered during the ground investigation generally comprised a thickness of made ground potentially underlain possible river terrace gravels overlying alluvium, over alluvial gravels underlain by St Maughans Formation.

10.4.2 Made ground was encountered across the site in two distinct layers. The maximum total thickness recorded being 4.6m depth (BH2). The composition of the upper layer of made ground varied across the site and the lower layer was encountered from an average depth of 0.8m depth and comprised loose to medium dense (based on visual observations only) orange-brown sands slightly clayey sands, and sandy flint gravels along with soft to firm sandy.

10.4.3 Alluvium was recorded beneath this stratum to a maximum depth of 19.0m depth. The alluvial deposits were typically encountered as soft, locally firm green-brown to grey clay with pockets of fine to medium sand. A thickness (4.4m, BH2) of alluvial gravels was encountered beneath the cohesive alluvial deposits within both of the boreholes progressed on site, comprising very dense very clayey sandy gravel and cobbles of sub-angular to rounded red-brown, brown and purple brown angular to sub-angular sandstone and mudstone. These granular alluvial deposits were underlain by the St Maughans Formation at depths ranging between 18.2m depth (BH2) and 19.0m depth (BH1). The St Maughans Formation was encountered as red-brown to brown blue-grey speckled slightly weathered to weathered mudstone.

Preliminary Foundation Design Recommendations

10.4.4 On the basis of the ground and groundwater conditions identified in the exploratory holes, conventional foundations are not considered appropriate for the proposed structure and it is suggested that bored piles or augered piles may be appropriate either bearing on the very dense alluvial gravels encountered at depths between 13.8m and 16.3m depth. However, the proximity of adjacent structures will need to be carefully considered when choosing the most appropriate pile type and it is suggested that a specialist piling contractor should be consulted regarding the piling options and detailed design of most appropriate option.

10.4.5 However, at this initial stage, using a Factor of Safety of 3 and ignoring shaft resistance derived from the soft alluvial clays, preliminary safe working loads for a single 600mm diameter driven pile constructed to the top of the dense alluvial gravels is estimated to be approximately 1800kN for a settlement of less than 25mm. Whereas a preliminary safe working load for a 900mm diameter pile constructed to the same depth, is estimated to be approximately 4150kN.

10.4.6 It should be noted that where pile load tests are undertaken a lower factor of safety may be adopted in the design which would result in a more economic founding solution.

10.4.7 Should piles be founded within the alluvial gravels, it suggested that further intrusive works are undertaken in order to determine the thickness of these superficial deposits and to ensure that the underlying St Maughans Formation does not contain zones of softened, more weathered material.

10.5 Ground Floor Slabs

10.5.1 As a result of the presence of a significant thickness of made ground over the entire site, it is recommended that a suspended floor are incorporated into the design. Should a suspended concrete in situ ground floor be used, it is recommended that a minimum void of 100mm is allowed for in the design.

10.6 Excavations

10.6.1 Excavation of the soils beneath the site should be readily achievable using conventional excavation plant. Consideration should be given to groundwater ingress to excavations taking into account the tidal nature of the River Usk.

10.7 Protection of Buried Concrete

10.7.1 The results of the water soluble sulphate content tests showed the made ground, the alluvium (cohesive and granular) and the St Maughans Formation to fall into Class DS1 in accordance with BRE Special Digest 1 (with the maximum recorded value of the water soluble sulphate being <0.24g/l (BH1 7.5m). These results yield an Aggressive Chemical Environment for Concrete (ACEC) designation of AC1.

11 CONCLUSIONS & RECOMMENDATIONS

11.1 Conclusions

11.1.1 Tweedie Evans Consulting Ltd (TEC) has been appointed by Supporta Bay Associates on behalf of Messrs Webber & Hill Family to undertake a preliminary geo-environmental and geotechnical assessment of a site off Coverack Road, Newport. All works were undertaken in accordance with our proposal letter dated 25th March 2008 and referenced 0803007.001(rev1).

11.1.2 The site is a former industrial site, previously used as a paint mill and an electrical storage depot, comprising a number of derelict buildings, above ground storage tanks with areas of both soft and hard landscaping.

11.1.3 The proposed development is understood to comprise residential dwellings up to 13 storeys in height potentially with associated communal gardens, car parking and soft landscaping. However, it should be noted that at the time of writing no plans of the proposed development layout were available.

11.1.4 The site is considered to be of moderate environmental sensitivity due primarily the close proximity of the tidal River Usk, the presence of current and historic ASTs on site, the historic use of the site as a paint mill/depot and the sensitivity of the site end users.

11.1.5 Potential sources of contamination have been identified on and adjacent to the site. These include:

- Made Ground - Elevated concentrations of inorganic contaminants (arsenic, zinc and lead) and organic contaminants (PAH and monohydric phenols) have been identified within the made ground across the site with the organic contamination be present particularly in the areas of TP2, TP4 and TP6 (areas of historic and current ASTs).

- Made Ground - Elevated leachable arsenic, zinc, monohydric phenols and benzo(a)pyrene have been recorded within the sampled made ground posing a potential significant risk to controlled waters.

- ASTs - Given the number of current and historic ASTs at the site, the recorded elevated TPH concentrations and the visual and olfactory evidence of hydrocarbon contamination within the both ground materials and groundwater on site, the potential significant risk to human health and controlled waters is considered likely.

- Ground gas - Slightly elevated carbon dioxide and methane concentrations have been recorded on site. In addition, potential sources of ground gas (e.g. superficial deposits and made ground) have been identified to underlie the site.

- Asbestos - Concrete bound asbestos roofing sheets and numerous sheets were observed on site. However, short term exposure to the ACM is not considered likely to cause significant harm to construction workers, provided that appropriate health and safety procedures are in place. No ACM was observed within the encountered ground materials on site.

- Potential contaminative off-site sources. Potential sources include e.g. an electricity sub-station, historic chemical works, tanks, oil works and electricity board stores depot located in close proximity to the site.

11.1.6 The BRE indicate that radon protection measures are not required at the site.

11.1.7 On the basis of a single complete monitoring visit undertaken by TEC, the site would be characterised, in accordance with current guidance (CIRIA C665 (2007), as having a Gas Screening Value of 0.15l/hr for carbon dioxide and 0.05l/hr for methane. The Gas Screening Values recorded place the site into Characteristic Situation 2 (low risk), based on CIRIA C665 (2007). On the basis of our conceptual understanding of the site, gas protection measures are likely to be required. Notwithstanding this, only a single complete round of gas monitoring has been undertaken to date. In accordance with current guidance, further monitoring would be required to confirm the gas regime for the site and the requirement for gas protection measures within the proposed future site development.

11.1.8 Based upon our current conceptual understanding of the site and the proposed end use, the main potential Significant Pollutant Linkages identified are summarised below:

- A potential significant hazard is considered to be posed to site end users and construction workers though the ingestion, inhalation and dermal contact of elevated inorganic (arsenic, lead) and organic contaminants (PAH and phenol) identified within made ground across the site and possible made ground/natural ground in the area of TP4.

- A potential significant hazard is considered to be posed to site end users and construction workers though the ingestion, inhalation and dermal contact of hydrocarbon contaminated ground materials (made ground and potential made ground/natural ground) in the area of the current/historic ASTs on site. In addition, a potential significant hazard is considered to be posed to controlled waters through vertical and horizontal migration of hydrocarbons.

- A potential significant hazard is considered to be posed to controlled waters (the tidal River Usk) through vertical and horizontal migration of leachable arsenic, zinc, phenol and B(a)P. In addition, visual and olfactory of hydrocarbon contamination was observed within the groundwater encountered in TP4 during the intrusive investigation works.

- A potential significant hazard is considered to be posed to site end users through migration, ingress and inhalation of carbon dioxide and methane.

- A potential significant hazard is considered to be posed to construction workers through inhalation of identified ACM on site. However, this risk is considered to be low provided that appropriate health and safety procedures are in place.

11.2 Geo-Environmental Risk Evaluation

11.2.1 Based upon the information contained within this report, it is the opinion of TEC that the site represents a moderate to high risk of geo-environmental liability. This largely reflects the presence of potential Significant Pollutant Linkages associated with the significantly elevated contaminant concentrations likely to be associated with the historic use of the site, the slightly elevated ground gas concentrations recorded on site, the presence of ASTs, the presence of potential preferential contaminant pathways and identified environmental receptors.

11.3 Geo-Environmental Risk Management Recommendations

Identification of Feasible Remediation Options

11.3.1 Significant risks identified within the conceptual model can be mitigated through the breaking of the significant pollution linkage by the removal of at least the source, receptor or pathway. Within reference to the site's conceptual models the following preliminary remediation approach has been prepared. This preliminary remediation approach will need to be presented in more detail within a Remediation Strategy, the content of which will require agreement in writing of the Regulatory Authorities prior to commencing any remediation on site.

Human Health

11.3.2 A significant hazard is considered to be posed to human health through the ingestion, dermal contact and dust inhalation of soil materials associated with identified elevated levels of inorganic (arsenic, zinc and lead) and organic (phenols and PAH) recorded within the made ground across the site. In addition, elevated TPH concentrations together with olfactory and visual evidence of hydrocarbon contamination have been recorded within the made ground and possible made ground/natural ground at TP4. Olfactory evidence of hydrocarbon contamination was also recorded within the shallow made ground encountered at TP1, TP5 and TP6.

11.3.3 Where soft landscaping is proposed, it is recommended that a suitable geo-textile/geo-membrane is placed above the made ground followed by a suitable thickness of clean cover to mitigate against the potential significant risk posed to human health by the recorded inorganic and organic contamination across the site.

11.3.4 An area of hydrocarbon contamination is considered to exist in the western part of the site (TP4), where elevated PAH and TPH concentrations indicate a significant risk through ingestion and dermal contact.

11.3.5 Although the hydrocarbons encountered were within the heavier, less volatile ranges, significant olfactory (TP4 only) evidence was recorded during investigations and, as such, the potential risk from vapours cannot be discounted. While further investigation would be required to determine the extent of the hydrocarbon contamination at this location and to better quantify the risk posed, consideration should be given at this stage to the inclusion within the design of a suitable vapour barrier. Further assessment would be required in order to determine the risk posed to human health from the identified hydrocarbon contamination.

11.3.6 It should be noted that olfactory evidence of hydrocarbon contamination was also observed within the shallow made ground encountered at TP1, TP5

and TP6 (areas of historic ASTs), but no TPH analysis was undertaken to confirm the presence of hydrocarbons at these locations. Therefore, it is recommended that further intrusive works are undertaken at these locations in order to assess the extent of such potential contamination.

11.3.7 It should be noted that access restrictions (the presence of buildings) during the intrusive site works prevented full investigation of the all the areas surrounding the ASTs. Therefore, it cannot be discounted that unidentified hydrocarbon contamination may be present (i.e. within building footprints) and it is recommended that further intrusive works are undertaken in order to assess the extent of such potential contamination after demolition works have been undertaken.

11.3.8 The identified contaminant concentrations are considered largely to represent a chronic risk to human health and therefore any risk to construction workers on site, e.g. the presence of ACM on site, will be adequately mitigated against by the adoption of good brownfield site working practises.

Ground Gas

11.3.9 On the basis of a single complete monitoring visit undertaken to date, the site would be characterised, in accordance with current guidance (CIRIA C665, 2007), as having a maximum Gas Screening Value of 0.15l/h for carbon dioxide and 0.05l/h for methane, placing the site into Characteristic Situation 2 (Low Risk). Therefore, appropriate gas protection measures are likely to be required in all new structures at the site.

11.3.10 Notwithstanding this, further gas monitoring is recommended to be undertaken in order to determine the ground gas regime for the site in accordance with current guidance.

Controlled Waters

11.3.11 Elevated leachable concentrations of arsenic, zinc, phenol and B(a)P were detected within the analysed made ground. In addition, visual and olfactory evidence of hydrocarbon contamination was noted within the ground materials (TP1, TP4, TP5 and TP6) and groundwater encountered in TP4.

11.3.12 It is recommended that groundwater samples are obtained from the perched water overlying the alluvium and risk assessment is undertaken, in order to establish the potential harm to controlled waters from the identified contamination on site.

11.4 Ground Engineering

Preliminary Foundation Design Recommendations

11.4.1 On the basis of the ground and groundwater conditions identified in the exploratory holes it is suggested that bored piles or augered piles may be appropriate either bearing on the very dense alluvial gravels encountered at depths between 13.8m and 16.3m depth. However, the proximity of adjacent structures will need to be carefully considered when choosing the most appropriate pile type and it is suggested that a specialist piling contractor should be consulted regarding the piling options and detailed design of most appropriate option.

11.4.2 At this initial stage, using a Factor of Safety of 3, but using an appropriate depth factor, and ignoring shaft resistance derived from the soft alluvial clays, preliminary safe working loads for a single 600mm diameter driven pile constructed to the top of the dense alluvial gravels is estimated to be approximately 1800kN for a settlement of less than 25mm. Whereas a preliminary safe working load for a 900mm diameter pile constructed to the same depth, is estimated to be approximately 4150kN.

Ground Floor Slabs

11.4.3 A significant thickness of made ground was recorded over the entire site, it is recommended that a suspended floor are incorporated into the design. Should a suspended concrete in situ ground floor be used, it is recommended that a minimum void of 100mm is allowed for in the design.

11.5 Recommended Further Works

Geo-environmental Considerations

11.5.1 Given the assessment presented within this report, additional works would be recommended to fully define the geo-environmental risks associated with the site:

- Additional intrusive investigation to allow for:
  - Further investigation of the areas of identified and potential hydrocarbon contamination;
  - Investigation of the areas currently occupied by buildings after the demolition works;
  - Further gas monitoring; and
  - Groundwater sampling and analysis.
- Quantitative Risk Assessment may be required to be undertaken based on the findings of the additional investigation works.
- The preliminary remediation approach presented above will need to be updated after the additional intrusive works and presented in more detail within a Remediation Strategy, the content of which is considered likely to require agreement in writing of the Regulatory Authorities prior to commencing any remediation on site.
- Waste Acceptance Criteria testing to characterise site materials in relation to possible future off site disposal.

Geotechnical Considerations

11.5.2 If a piled solution is favoured, founding within the very dense alluvial gravels, it suggested that further intrusive works are undertaken in order to further quantify the thickness of the alluvial gravels and to ensure that the underlying St Maughans Formation does not contain zones of softened, more weathered material.

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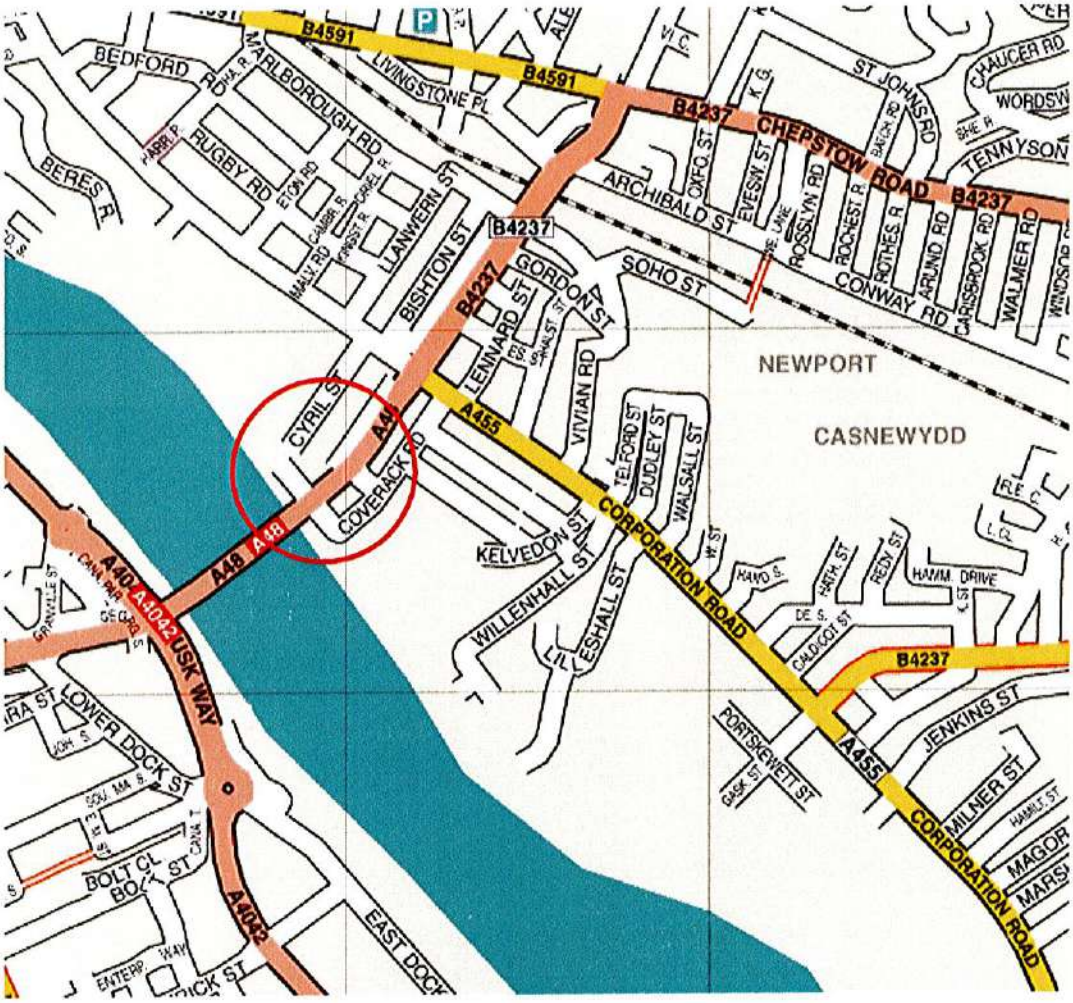
FIGURES



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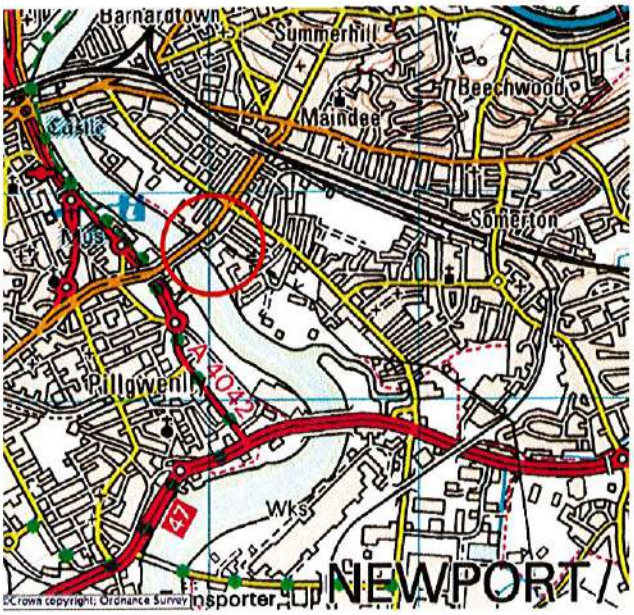


Key

Site Location

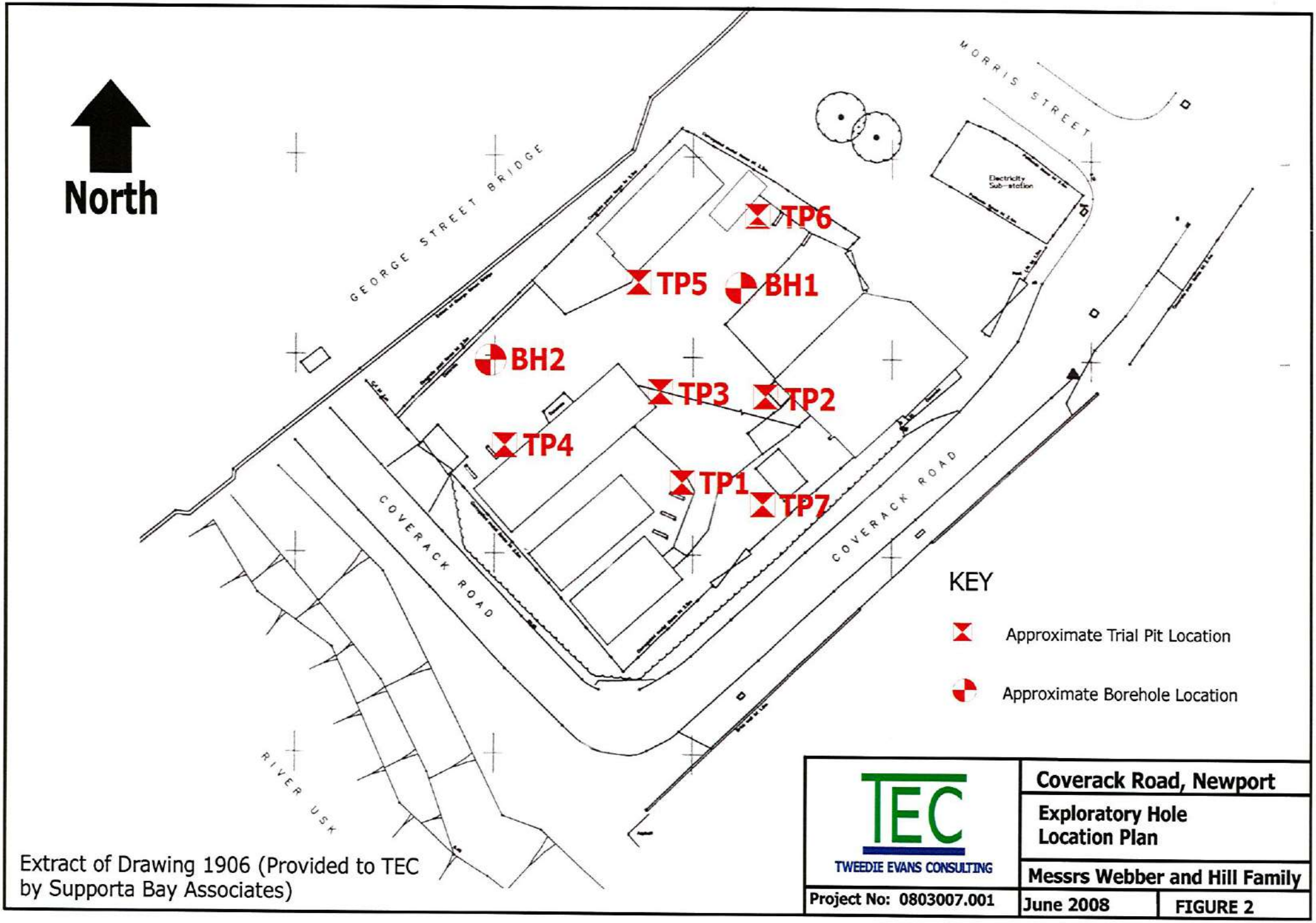
TWEEDIE EVANS CONSULTING

Coverack Road, Newport

Site Location Plan

Messrs Webber & Hill Family

Project No: 0803007.001 | June 2008 | Figure 1



Extract of Drawing 1906 (Provided to TEC by Supporta Bay Associates)

TWEEDIE EVANS CONSULTING

Coverack Road, Newport

Exploratory Hole Location Plan

Messrs Webber and Hill Family

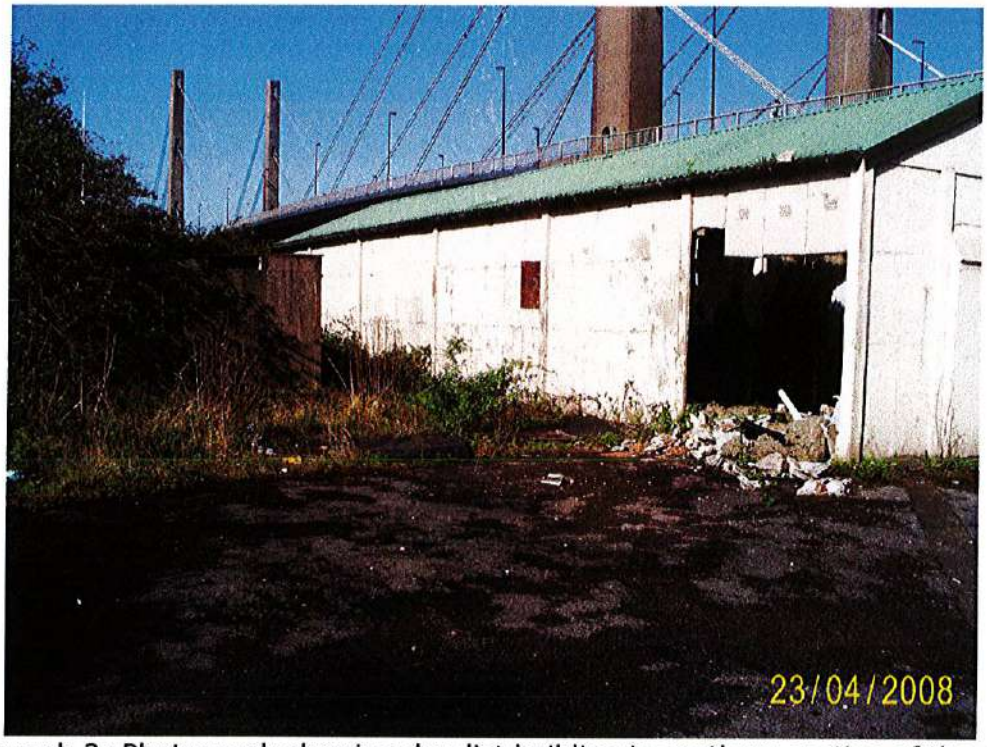
Project No: 0803007.001	June 2008	FIGURE 2

APPENDIX A

Site Photographs

Photograph 1: Photograph of derelict building located in the north-eastern section of the site, taken from Coverack Road. Photograph shows signage indicating historic land use (Paint & Putty Works).

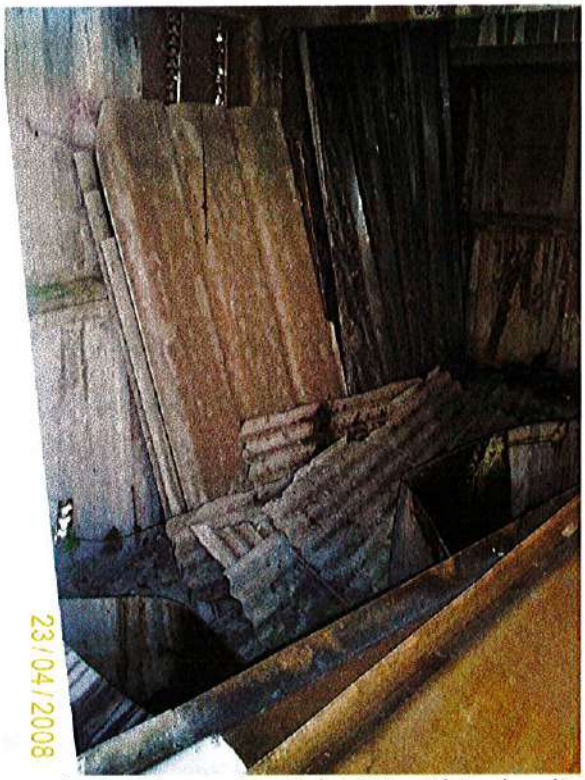
Photograph 2: Photograph showing site access taken from bank of River Usk (facing north-eastwards).



Photograph 3: Photograph showing derelict building in southern section of the site. George Street Bridge visible in background.

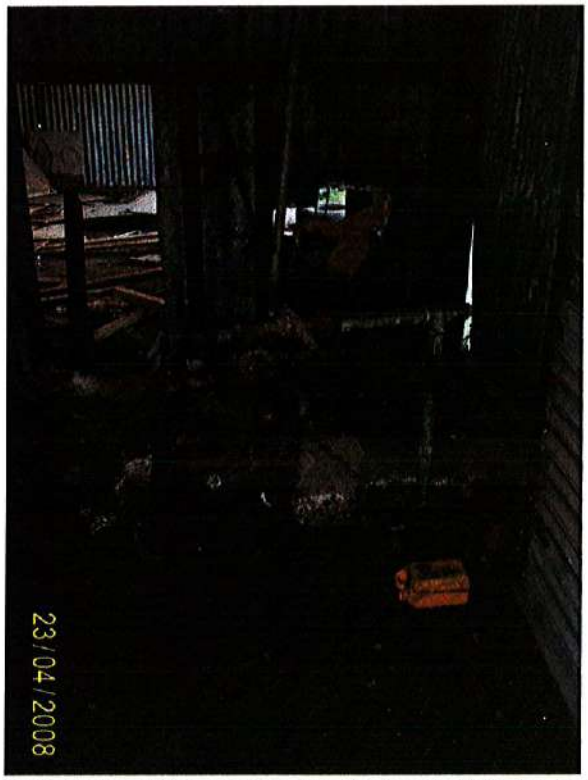
Photograph 4: Photograph showing derelict building in south-eastern section of the site. Concrete tank supports (location of TP1) visible within overgrown vegetation in right of photograph.

Photograph 5: Photograph showing tank on brick base located within derelict building located within south-eastern section the site.



Photograph 6: Photograph showing potential ACM within derelict building in southern section of the site.

Photograph 7: Photograph showing derelict building within north-eastern section of the site.



Photograph 8: Photograph showing pipework and possible base for AST within the derelict building located in the north-eastern section of site. Staining of concrete clearly visible.

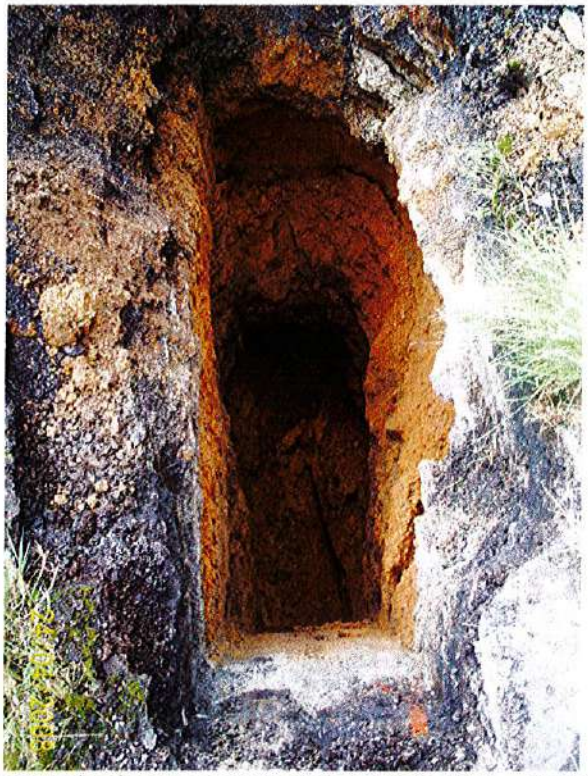
Photograph 9: Photograph showing location of TP2, at location of historic AST.

Photograph 10: Photograph showing a potential venting pipe located on building in north-western section of the site.

Photograph 11: Photograph showing location of TP4, within southern section of the site. Blackened near surface materials visible in foreground and concrete supports for AST visible in background.

Photograph 12: Photograph showing arisings from TP4, materials with hydrocarbon sheen visible on top of spoil heap.

Photograph 13: Photograph showing materials within TP2.



Photograph 14: Photograph showing materials within TP5. Darkened made ground materials visible at near surface.

Photograph 15: Photograph showing recovery of alluvium from auger at BH1.

APPENDIX B

Historical Mapping