

ACBA4001: Fundamentals in Construction Technology**Swansea Foreshore Ice-Cream Parlour**

1. *Undertake a preliminary desk top study of the site and record and complete a walk-over inspection. Then write up your preliminary observations*

1.1 Introduction

This project is planned to develop a new restaurant, ice-cream parlour and manager's apartment on the Swansea foreshore. It is a joint scheme between Swansea Council and the Marriott Hotel Chain.

This preliminary investigation desk top study will help us in gaining a wider understanding of our site as well as a broader background of understanding to help identify any risks. It also includes detail and scope for problems that may occur during the subsequent phases of the project and aid in the mitigation of any underlying problems.

This desktop study includes a general site description, access points, and a review of the sites history, planning background, current usage, adjacent sites, potential contaminations as well as a general overview of any ecological, geological, hydrological and hydrogeological information that is known at present or previously studied. It will also include data from a site walkover.

1.2 Site Description

The site chosen for the project highlighted in red on Image 1.1 is located between the Swansea Marriott Hotel and the Swansea Civic Centre. The site includes two car parks (one belonging to the Swansea Civic and the other the Marriott Hotel), Public footways/cycle paths a vehicle access point and some Greenland comprised of trees and made-up land. The carparks can be easily accessed via Dunvant Place just off the A4067 Oystermouth Road, to which an agreement would need to be made for the use and partial closure of one/both carparks. It should be noted that these areas are heavily used by members of the public, staff and visitors to both the Swansea Marriott and Swansea Civic Centre. Image 1.2 shows the access points leading to the site.

The proposed building will have a total Gross Internal Area (GIA) of 300m² on the ground level. The ground floor will contain a restaurant, ice cream parlour, café bar, kitchen, food stores etc. The first and second floor will subsequently both have a GIA of 150m² and will

contain staff welfare facilities on one level and also a self-contained manager's complex on the other.

Image 1.1



Image 1.1 – Site Location between the Marriott Hotel & Swansea Civic Centre buildings and car parks.

Image 1.2

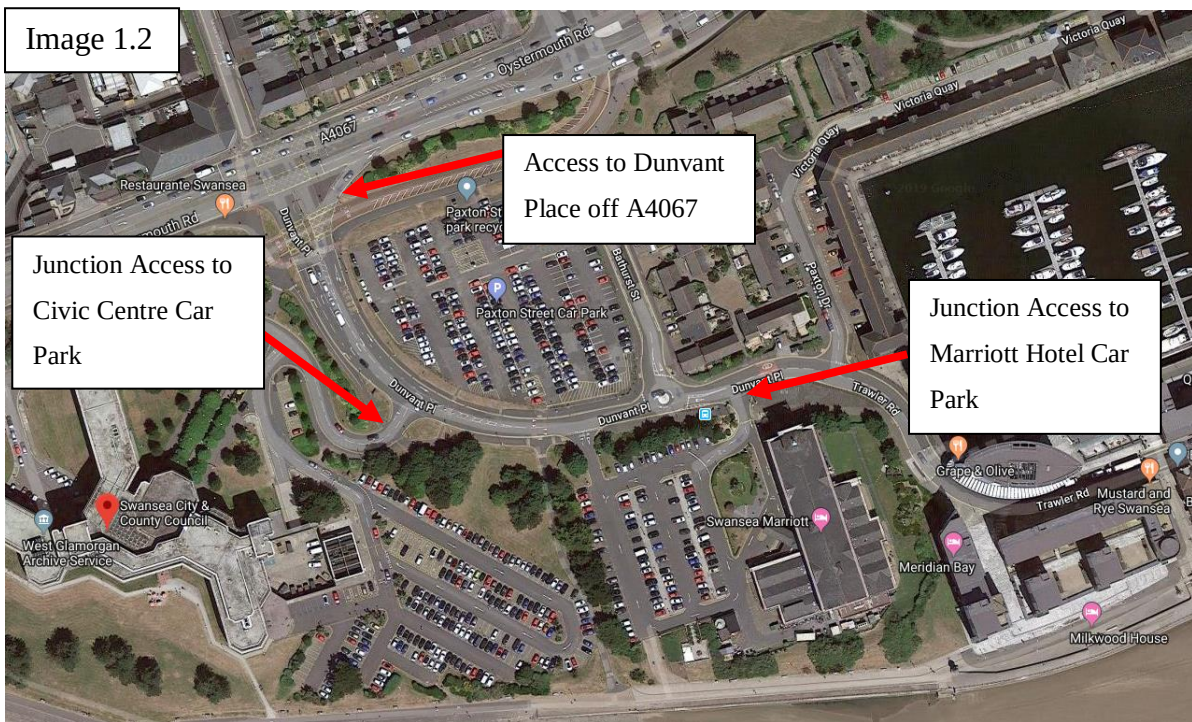


Image 1.2 – Access Points off the A4067 Oystermouth Road onto Dunvant Place and the two car parks within the Marriott Hotel & Swansea Civic Centre.

1.3 Review of Site History

Table 1 below highlights the development of the site from 1879 up until 2017 through the use of historical maps and aerial photography. The Table gives dates and the onsite and nearby implications of development in relation to the site

OS Map Edition		On Site Features	Nearby Implications
Date	Scale		
1879	1:1250	> Sites appears to be open green space with a railway line running through the site	> Timber/Saw Mill towards West of site. > Housing to the North > Hospital and Lime Kilns to the West
1899	1:2500	> Site now appears to have a timber yard contained on the North side of the boundary with boundaries contained within site > Site Also still has railway line running through middle of site.	> Large Engine Shed appears to the west of site > Houses and Saw mill still to north and east > Hospital and kilns gone
1916-1919	1:2500	> Timber Yard now has transitioned into a canister works > Railway Line still running through centre of site	> Engine Shed still to west of site appears to have a large number of railway tracks surrounding shed > Houses and Saw mill still to north and east
1948-1949 (Image 1.3)	1:1250	> Railway line through centre of site > Wagon Repair Works appear on southern boundary of site > Canister works still on north of site	> Large Engine Shed still to west of site > Timber yard to East > Houses to North
1972-1977	1:1250	> Railway line has been dismantled > Warehouses have replaced Canister Works >Wagon Repair works demolished	> Large engine shed demolished > Saw mill still to east of site > Promenade built to south west of site > Houses to North of site

Aerial Photos			
2000	1:2500	> Historic Areas all but gone (Railway line, warehouses, saw mill replaced) > 2 car parks exist on site (1 for Marriott Hotel, 1 for Swansea Civic Centre) > Access point from hotel carpark onto promenade	> Marriott Hotel to East > Swansea Civic Centre to West > Road Access to site now developed > Houses to North East > Large Carpark to North of Site > Small green areas surrounding Carparks
2006	1:2500	> Viewing platform from Marriott Hotel carpark now also exists in site > No Other changes from year 2000	> No other changes from year 2000
2014	1:1250	> Cycle track/path now contained between the two car parks > No other changes from year 2006	> Surrounding site to East changed slightly, Restaurant/Flats (Grape and Olive developed to beyond marriott hotel) > No other changes since year 2000
2017 (Image 1.4)	1:1250	> No changes since 2014	> No Changes since 2014

Table 1 – Historic & Aerial data through history at development site. Please refer to Image 1.3 & 1.4. All data from (Old-maps.co.uk, 2019)

There is evidence through the years of industry on site and in nearby locations that may have led to potential contamination of the site. There is evidence of this due to the presence of Gas Canister Works, Wagon Repair Station (Image 1.3), Railway lines running through the site. In close surrounding proximity to the site there has also been evidence of large engine sheds, timber and saw mills and lime kilns. All of these may cause land contamination in some form and therefore this will need to be investigated further.

The current day aerial photography gives a good indication as to what should be expected on site. Contained within are two car parks, a car access point to promenade, cycle/footway, some green areas and a viewpoint (Vista) on the hotel carpark grounds. (Image 1.4)

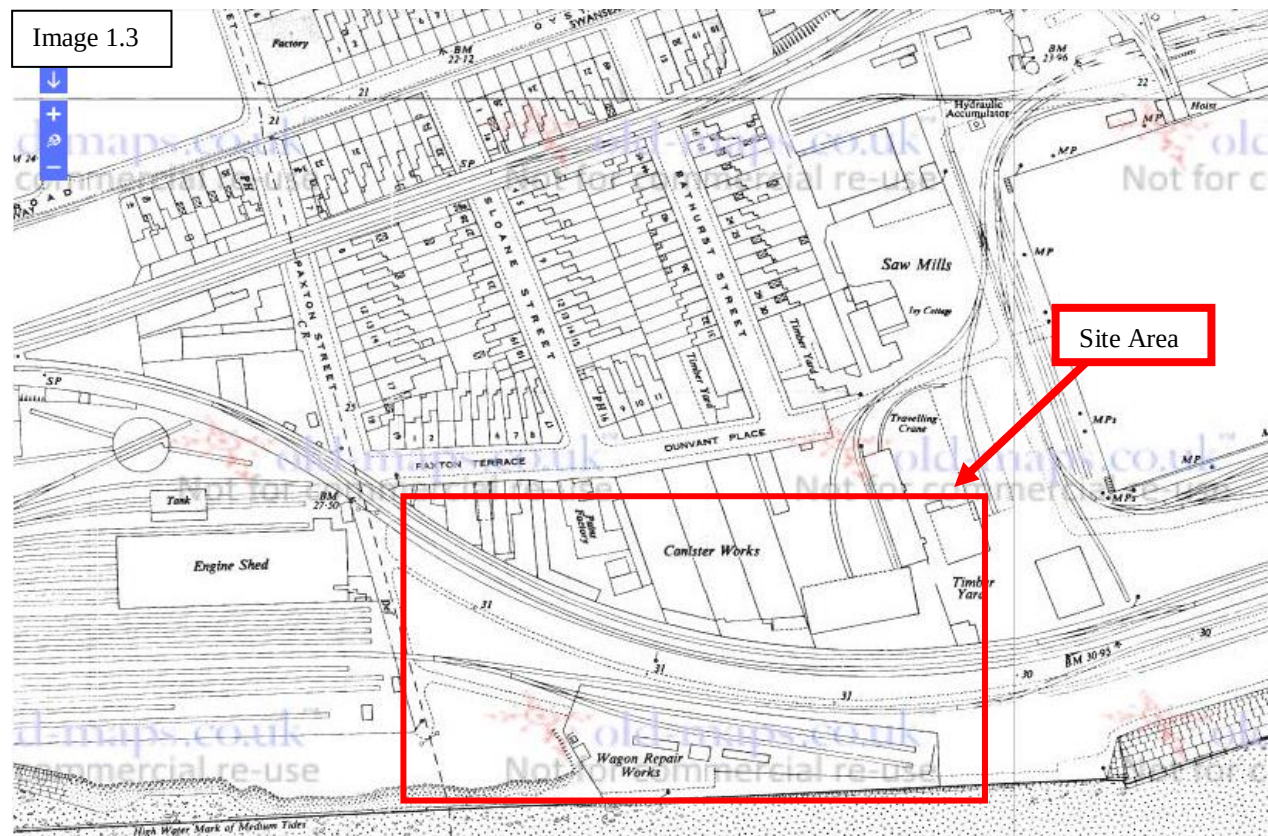


Image 1.3 – Historic Map from 1948-1949 showing the Canister Works & Wagon Repair Works contained within the site as well as an Engine Shed to West & Timber Yard to East (Old-maps.co.uk, 2019)



Image 1.4 – Aerial Photo from 2017 showing the current in-situ buildings, car parks and footways contained within the site and surrounding (Old-maps.co.uk, 2019)

1.4 Site Walkover

A Site walkover was undertaken on the 3rd of January 2019. The following photographs and their descriptions allow for confirmation of the information contained within the aerial photographs and any extra data that may provide useful in the planning stage.

The main points from the inspection were as follows:

- The site is generally flat with vegetation containing trees (relatively sparse but large) and some shrubbery between particularly on the sea front between car parks and promenade with some built up verges. (Image 1.12 & 1.9)
- Easy access points off the A Road onto Dunvant place leading to both car parks. (Images 1.5 & 1.6)
- Vehicle Access point from Marriott car park onto promenade with barrier that can be lifted. (Image 1.7)
- Large car park to north of site (Image 1.8)
- Viewing platform built up in Marriott car park
- Cycle path running from Dunvant place onto promenade between both car parks (Image 1.9)
- Pathway between cycle path and Marriott car park with a plaque put in by West Glamorgan County Council as a 'Private Right of Way' under the Highways Act of 1980. (Image 1.11)
- Large promenade along southern boundary of site (Image 1.10)
- Lighting columns along promenade & amongst car parks in verges (Image 1.12)
- Storage container on the corner of Marriott car park (Image 1.13)

Image 1.5



Image 1.5: Access point from Dunvant Place into Marriott Hotel Carpark

Image 1.6



Image 1.6: Access point from Dunvant Place into Swansea Civic Centre Carpark

Image 1.7



Image 1.7: Vehicle access point with barrier at back of Marriot Hotel Car Park

Image 1.8



Image 1.5: Large car park just to north of site

Image 1.9



Image 1.9: Cycle/footway between both car parks

Image 1.10



Image 1.10: Large promenade at southern boundary of site

Image 1.11



Image 1.11: Private Right of Way footpath implemented by West Glamorgan County Council under the Private right of way Act 1980

Image 1.12



Image 1.12: Verges and Civic Centre car park with lighting columns within

Image 1.13



Image 1.13: Storage Container at the corner of Marriott Hotel Car park.

The walkover provided a wide variety of information that was unknown previously. The general topography of the land is flat with some built up verges. There is also good access and link roads to the site particularly through the Marriott Hotel car park with vehicle access onto the promenade possibly used by emergency vehicles, the hotel itself and the local council.

There is also public access through a cycle/footpath of which contains a private right of way. If this access point is to be altered we would need to apply for permission through Swansea Council. This right of way can either be diverted if in the best interest of the public or extinguished completely which is a rare and difficult process, the right of way may also be subject to temporary closure and can last up to six months under council authority and may be extended subject to approval by the Welsh Government (Swansea.gov.uk, 2019). Private rights of way can also be removed under the Town and Country Planning Act 1990 which states "A competent authority may by order authorize the stopping up or diversion of any footpath if they are satisfied it is necessary to do so in order to enable development" (Legislation.gov.uk, 1990). Once the specific area for development within the site is chosen it may be best to temporarily close the right of way or provide a temporary diversion as altering this right of way is a long and difficult process so should be taken into high consideration before development begins. Flora and Fauna would need to be accounted for by an outside consultant to determine if there are any species that are protected before work begins.

1.5 Geology

The British Geological Survey (BGS) provides a variety of data regarding both superficial deposits and bedrock situated within our site area. These deposits provide an insight into the makeup of the ground beneath the area of anticipated development and will aid in the implications for the type of foundations needed for the property.

The superficial deposits indicated in Image 1.13 show our site to be contained within as 'Blown Sand' they are typically Aeolian deposits comprising of medium to fine grained materials that form as lenses, beds and dunes (Mapapps.bgs.ac.uk, 2019) This blown-sand deposits typically consist of gravel, silt, clay and sand and usually thin and discontinuous and lie on top of bedrock (Bgs.ac.uk, 2019)



Image 1.13: Indicates a map of the superficial geology in relation to site location (Mapapps.bgs.ac.uk, 2019)

The bedrock on site as seen in image 1.14 is indicated as from the BGS website (Mapapps.bgs.ac.uk, 2019) as the 'South Wales Middle Coal Measures' formation and comprises of a variety of a variety of Mudstone, sandstone and Siltstone. These are the main mass of rock beneath our site.

It should be noted that these maps are subjective and are not indicative of what is actually beneath our site. Therefore further study through consultations may be useful to get a fully accurate representation of what is beneath the surface of the site.

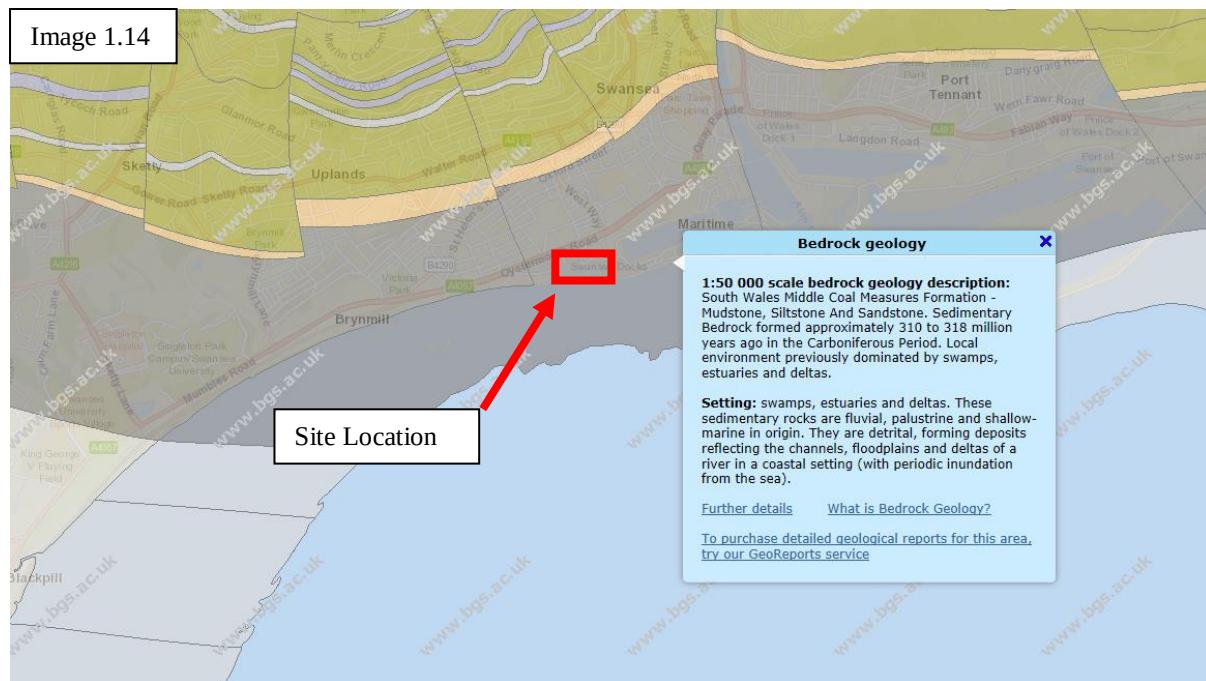


Image 1.14: Indicates a map of the bedrock geology in relation to site location
(Mapapps.bgs.ac.uk, 2019)

1.6 Mining Records

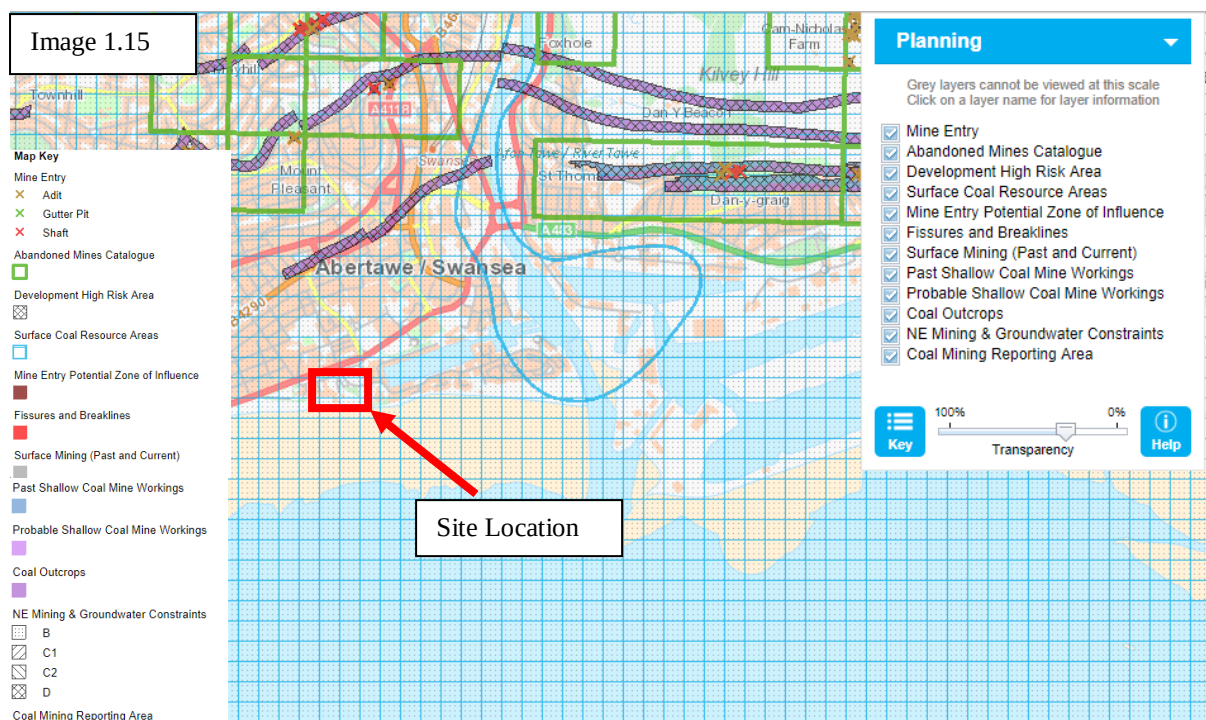


Image 1.15 – Taken from the Coal Authority mapping tool website indicating mining
activity within the Swansea Area of which our site is contained within. (Coal Authority,
2019)

The Coal Authority provide a wide variety of data concerning areas of mining activity through this we can see that our site is contained within a Surface Coal Resource Area as well as a Coal Mining Report Area. Consulting the Coal Authority regarding any evidence is needed as they may implicate mining activity within our site. It should be noted with regards to historical map evidence mining activity seemed unlikely to take place on site.

The Coal Authority (2019) states that “the impact of mining on any development can be costly if not properly factored in and can have major impacts on the potential of development sites” therefore is recommended to liaise with such departments to ensure the site is clear of mining activity. After determining the area is within a coal field, the Coal Authority recommends a mining report.

1.7 Borehole Report

The British Geological survey also has borehole information contained within our site at the centre of the southern boundary (Image 1.16) this can provide useful information for depths up to 22m of nearby geological information, however due to the fact rock type can change over a few metres other boreholes will also be needed.



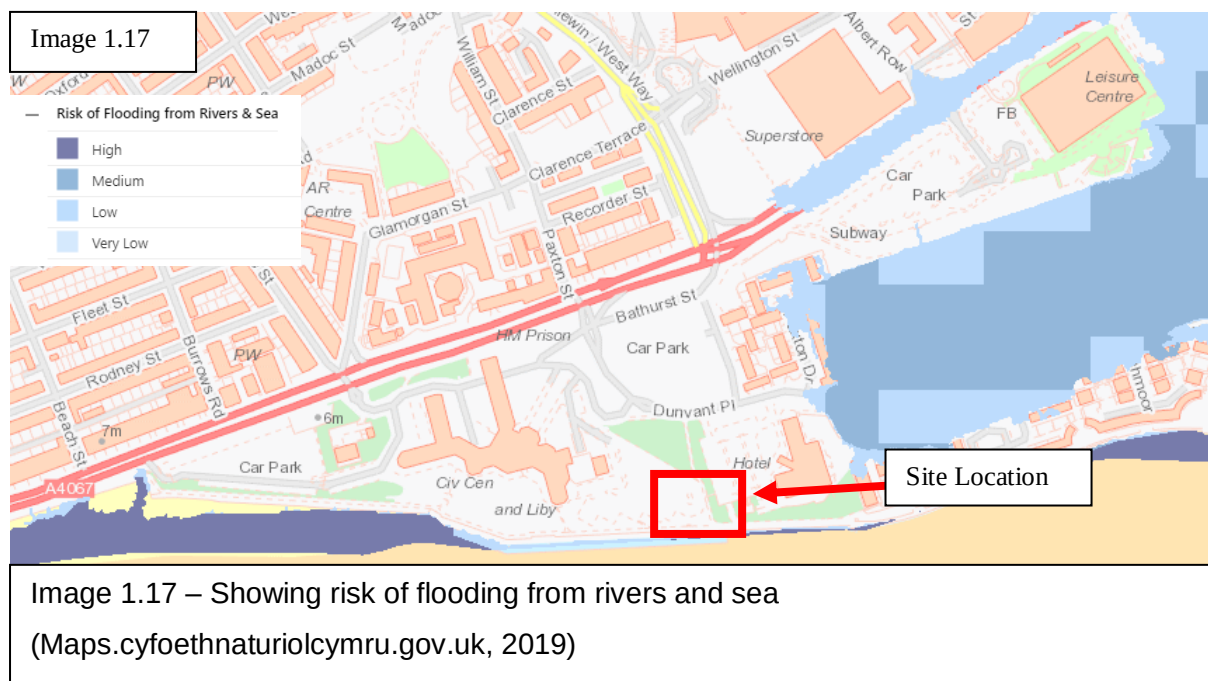
Image 1.16 – Taken from the BGS mapping tool website indicating borehole information within the site area. (Mapapps.bgs.ac.uk, 2019)

This borehole 'SS69E345' was commissioned during the construction of the proposed construction of the currently built Swansea County Hall. This borehole reaches depths of 22m and gives a good indication of what should be expected in the surrounding ground. It contained made ground of up to 5m deep and continued into the various strata ranging from gravel, boulder clay, sandy clay to the base of the log consisting of grey mudstone (Refer to

Appendix 8, 9 & 10 for core log information). Clay is subject to shrinking and expanding and can cause ground movement and potentially cause movement of buildings in these areas and subsequent damage therefore it needs to be managed. There is also evidence of a high-water table. Short Bored Pile Foundations may be suitable for this type of subsurface.

1.8 Hydrology

Hydrological information is important in determining the potential flood risk on our site. This information was found via the NRW website, two searches were conducted to determine flood risk from rivers and seas as there are nearby flood implications from the marina to the east and sea to the south, Image 1.17 shows this first search.



The area of our site appears to be as of current at no risk from flooding via rivers and sea.



Image 1.18 – Showing risk of flooding surface water (Maps.cyfoethnaturiolcymru.gov.uk, 2019)

The search in Image 1.18 indicates surface water flooding potential implications. The map provided by NRW shows that the west of our site has a medium maximum risk for surface water flooding. This data provided means that we would need to contain and prepare for any flooding using sustainable drainage systems (SuDS) or storm drains to minimize risk of flooding from this area of our site.

1.9 Radon

Determining the amount of radon contained within the vicinity of our site is important as higher radon levels lead to higher exposures and once inhaled and absorbed by our lungs can cause cancer (Ukradon.org, 2019). Radon comes from all natural and man-made sources, using the Radon Interactive map, we can determine the levels of radon of which are between 1-3% however may be elevated within some areas (Ukradon.org, 2019). A more in depth study of radon levels carried out by consultants may be required to ensure levels of radon are at normal levels on a local scale.

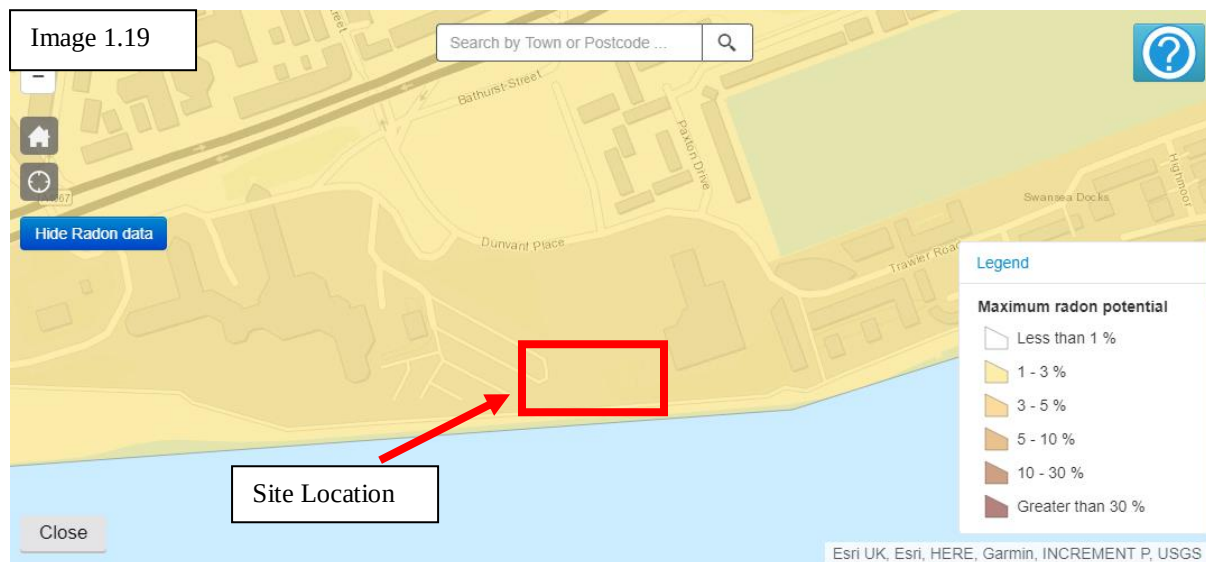


Image 1.18 – Showing radon levels at Swansea Site (Ukradon.org, 2019).

1.10 Desktop Study Conclusions

This desktop study has enabled us to find a variety of key information that can be used to enable us to choose a suitable location for the building however, there are several further elements that needs to be addressed and investigated at a greater depth before the development is to be undertaken they are listed below:

- Biodiversity Report
- Further Flood Risk Assessment
- Consulting from Coal Authority
- Expansion on specifics of Radon data contained on site
- Contamination report from historical industry
- Service/Utility Information
- Pre-Planning consultations from Swansea Council
- Lab testing of Soil & Rock samples
- In Situ Site Testing to provide suitable foundations (Boreholes, Loading Tests, Penetration Tests, Soundings, Driven Piles)
- GIS Mapping for logistics
- Access agreed for the use of both car park
- Confirmation of acceptable location for new building

- 2 *Describe with the aid of neat annotated, proportional sketches the recommendations that you would make for a more detailed site investigation that will be undertaken by others*

In order to gain more insight into the specifics that cannot be determined simply by a desk top study a more detailed site investigation is required through the use of consultations with external agencies, In-Situ testing that is carried out by contractors and lab testing to determine the specifics of the rock and soil types beneath our site. This once completed will give enough detail to help determine any further hazards that have not been accounted for and potentially how to mitigate and prevent any problems in the construction phase.

2.1 Biodiversity

A biodiversity report is essential in determining what flora and fauna is contained within the sites boundary. Our new development will have an affect onto the local biodiversity either through the loss or reduction of habitats and some protected species rely on these in order to survive. Before the planning application process is to begin we will need to ascertain a report from a consultant to submit to the local authority where they can determine whether the new development will cause an impact on any protected wildlife.

Following British Standards specifically the one published in 2013 addresses how protected species and habitats are to be protected when planning to build. This British Standard used is the '42020:2013: Biodiversity. Code of practice for planning and development' (British Standards Institution, 2013). The British Standards Institution (2013) gives guidance to ecological consultants, planning applicants and planning authorities to ensure considerations are made for biodiversity in the planning stage and once carried out gives guidance on any raised issues so that they can be managed effectively.

Any issues raised by the consultant ecologist will need to be addressed and agreed before the planning application is to be submitted to the local authority. In this case we will be using Arbtech that provide fast and effective reports within 1-5 days and can give us details through a preliminary ecological appraisal and a walkover survey (Arbtech, 2019).

2.2 Flood Risk Assessments (FRA)

After carrying out a search during the desktop study using the NRW flood risk tool it was determined that there are potential surface water flooding risks on the western area of the site as 'medium risk' (Image 1.18). A flood risk assessment will be needed to outline the main hazards and the potential impact our new development will have on the surrounding area. It may also provide details on how to reduce and redirect flooding problems appropriately.

The UK Government (Gov.uk, 2019), states that when reviewing flood risk assessments, we should look at four specific factors that will be needed to determine factors on our site:

1. How flood risk will affect the proposed development
2. Is the development type appropriate for the proposed location
3. Is the site's flood risk too large for the development that is to take place
4. Is the proposed development going to increase flood risk elsewhere

The Syntega group provides a suitable flood risk assessment that can provide us with information on flood risk, drainage strategies, response plans and SuDS designs (Syntega Energy Consulting Ltd, 2019).

2.3 Coal Authority Mining Report

The Coal Authority (CA) can produce an accurate and in-depth report within the constraints of our site. Due to our site location contained within the South-Wales Coal Field we shall be carrying out an 'Enviro All-in-One' report that is recommended by the CA (Groundstability.com, 2019), that not only includes details on mining but property specific information linked to contaminated land as well as subsidence hazard, this report typically has a turnaround time of 48 hours.

This coal mining report will provide information on, mine entries within 20 meters of a property, gas emissions, other coal mining hazards in the area and any future mining that is set to occur nearby (GOV.UK, 2019).

2.4 Contaminated Land Report

Historical maps were able to give an insight into the previous industrial activity that were situated in and around our site's location. These industries ranged from canister works, railway lines, saw/timber mills, wagon repair works, and an engine shed. Due to these findings we have contacted NRW and a Petroleum officer (due to the potential of fuel storage on site) that will be able to provide site specific information.

Through these enquires we will be able to gain a 'risk of harm assessment' that is based on the likelihood, frequency and seriousness of consequences and may include threats to human health, damage to flora and fauna, contamination of ground water, damage to foundations, settlement, subsidence and migration of contaminants from surrounding land (Designingbuildings.co.uk, 2019). Due to the history of bombing during the world war there is

also a requirement for an UXO Survey to be undertaken to determine if there are any unexploded bombs etc. within the boundaries of our site.

Once the site-specific boundaries of the building are determined (section 2.6), more in-depth analysis through in-situ testing (section 2.7) and laboratory testing (section 2.8) to determine potential contamination.

The website 'designingbuildings.co.uk' (2019) states three main clean-up techniques that have the potential to be used depending on site specific conditions, the first being excavation and removal of contaminated soil to be disposed of site, to limit the spread of contamination and finally using a treatment to destroy or remove detoxify contaminants. At our site we will be using that of the first method to excavate and remove contaminated soil and bring in clean soil and rocks.

2.5 Utility Services

Utility companies for water, electric, gas, sewerage and internet such as Welsh Water, Western Power Distribution (WPD), Wales & West Utilities (WWU) and Virgin Media have all been contacted under the PUSWA (Public Utilities and Street Works Act), of 1950 from the British Standards Institution (1950), for them to provide the current extent of utilities within our site. This information provided by the companies are to be assumed and not 100% accurate and the actual positions of these pipes are to be determined on site.

These utility companies stated above have been notified well in advance of construction as these connections will need to be implemented and agreed in order so that the site can function and that there are no delays.

2.6 Site Location Chosen

The site location for the proposed building is to be situated on the south-west corner of the overall site. It has been determined as the best position due to having good accessibility from the link roads as well as having large areas that can be used and shut off within the civic centre car park for plant to be stored and accessed during the construction phase.

This location also does not interfere with the private right of way to the east of the chosen site or that of the cycle/footpath. There is also the potential of use if needed to access the promenade at the front of the building through the Marriott Hotel car park. Closing this access point also will not interfere with the ability for emergency vehicles as well as council maintenance vehicles to access the sea front.

Image 2.1 shows an annotated sketch of a block plan where the assumed exact location to the building is to be constructed in relation to the rest of the site.

Image 2.3 Shows the proposed building elevations of the building

2.7 In Situ Testing

Image 2.2 shows a plan containing the locations where the in-situ tests are to be carried out on site provided to external contractors. These tests are essential to determine the exact ground makeup beneath our site. These investigatory tests are key in being pro-active in construction as this can lead to cost saving as it will allow us to determine potentially encountered problems and how to prepare for them instead of being reactive. These tests will consist of ground soundings via standard penetration tests, plate bearing test, boreholes, trial pits and load tests on piles

Standard Penetration Tests & Soundings

This test will enable us to determine inferred resistance to the penetration of the subsurface under static or dynamic loading these are to be used as approximate overall ground conditions and not fully relied upon. It will help show the different soil profiles at different depths as well as give some indication of the strength and other soil properties at the site. Soil samples gained from this test will also be used in the lab testing. It should be noted, Yusof and Zabidi (2018) discussed the reliability of the SPT and stated that samples can be disturbed and are not considered appropriate to determine the overall strength, soil structure and consolidation. Due to this we are going to carry out ground borehole tests to determine the full structure of underlying lithologies.

Trial Pits (Shoring up/Visual)

Trial Pits are to be used first during this investigation as a cheap and inexpensive tool that will be used determine the shallow ground conditions on site. They will aid by showing any underlying contamination on site as suspected previously, as well as any other structures that were previously not detectable such as old foundations or exact location of utilities. The trial pits are to be dug down at 4m, if the underlying surface is of poor-quality then boreholes are to be used to gain insight at a much further depth. These trial pits are also to be used nearby with boreholes to help correlate surrounding subsurface.

Loading Tests (Plate Bearing Test)

The Plate Bearing test will also be used to help us determine the bearing capacity of the ground and the likely settlement of our surface under a specific given load. This test is to be carried out at ground level as it will give the most accurate comparison and a truer representation for what foundations and plant are potentially suitable. Where most of the site investigations used at our site are at depth determining the strength at the surface level is relevant at the designing and working phase, therefore will need to be carried out.

Boreholes

If the substructure of the ground determined from the previous tests is presumed to be poor and relatively unstable and that this evidence can be backed up from the nearby borehole found in the preliminary investigation, then we are also set to carry out 4 borehole tests at the proposed locations highlighted in image 2.2. Although lithology varies over a few metres using the previous borehole we are also going to use a percussion borehole of depths assumed up to around 15m through weaker soils and rock, we will then proceed with the use of a rotary boreholes until we reach solid dense rock/gravel suitable for pile foundations.

Borehole data will also be subject to lab testing, soil samples will be sorted by classification, quality, permeability, shear strength, compressibility and rock samples into bedrock types their strength, durability and any chemical or petrographic information these are outlined in section 2.8.

Lab Testing

Lab testing our soils and rocks is key in determining the foundations that will be suitable for our building. We will do this by testing the permeability, shear strength, classification, compressibility and quality of soils and any chemicals within. The classification of our soils will help us determine what sort of properties the soils contain, these can be linked very closely to that of particle size distribution (Chudley & Greeno, 2013) and therefore will play a significant role for us as the designer of the foundations. We will also carry out a bulk density test to determine water moisture content, Shear strength for our bearing capacity, all of which are important tests aiding in the potential for different foundations within our structure.

Dynamic Load Testing

Pile foundations are likely to be used due to the composition of the underlying geology determined thus far we therefore need to test their loading capacity. A 'dynamic load test' is to be used on site which shall determine the bearing capacity of piles. It will test the ground and compare the resistance in N/mm to determine the potential load that can be imposed on these piles. ASTM International (2017) provides a procedure that is the standard test method for piles regardless of their installation method and should be followed as so. These results will allow for the determination of the strength and integrity when implementing foundations.

We are to test one pile as a 'trial' near but does not form any part of the foundations that are to be used in our building. This pile is set to be overloaded by approximately 50% of its working load and held for 24 hours, this will provide an ultimate bearing capacity

(Designingbuildings.co.uk, 2019). We are using this type of testing as piles are to be used in our foundations.

3. With the aid of sketches describe a suitable foundation and sub-structure details for the building, based on your preliminary observations.

The preliminary observations outlined several factors that has determined which foundations appear to be the most suitable for the ground conditions at our site. The function of our foundation is to successfully transmit the load of the building onto the ground without causing any movement that will cause stability issues or damage to the building (Chudley & Greeno, 2013).

The site walkover enabled us to determine that there were several trees within the site and minor vegetation within our building location. These trees can cause structural damage up to 30m away from the foundation that can lead to shrinkage and heave typically within clay subsoils.

Using the Borehole that was carried out within our site from the BGS, allowed interpretation in the ground makeup within our site along to help determine suitable foundations. It showed 8m of alternating sand, clay and silt followed by 3m of stiff gravelly boulder clay, 7m of boulder clay and 4m to base of hole of mudstone. As well as a high-water table

These factors determined that foundations such as strip, trench fill, pad, raft and short-bored piles were all unsuitable as they did not provide enough depth to withstand to the surrounding trees and underlying amounts of soft subsoil (8m in depth). The ground can shrink combined with a high-water table can cause movements in the upper surface resulting in moving foundations. Therefore, friction pile foundations would be most suited as they are applicable to the surrounding ground, provide suitable loading for the type of building and are more economical.

Piled Foundations are suitable for our site as the ground has a low bearing capacity of subsoil, there is a high-water table as indicated from boreholes, the subsoils are subject to movement (Clay, Sand) and these layers appear to be highly compressible and not consolidated into rock or harder strata.

Diagram 3.1 – Shows a diagram indicating the concept of Friction Piles.

The Piles within our site are to be Rotary bored, consisting of 300mm suitable for light loads, they are to go 15 metres deep and should be able to withstand the load of the building. The completed pile is to be placed in-situ concrete that will be consolidated by gravitational force and have reinforcement throughout the pile. The concrete is tamped down by a rapid compaction from a hammer as a steel tube is withdrawn.

The Foundations are capped by a concrete ring beam that acts as a cap to the piles and links them together spanning around the top of all the piles to support the load.

Diagram 3.2 indicates the Ring-Beam on the friction piles.

Diagram 3.3. Indications the Friction Pile foundations and how they interact with the floor and sub-base of the building

4. Select and produce **neatly drawn, proportionate and suitably annotated sections and sketches** that illustrate your suggested choice of materials and methods for the detailing of the following building elements and construction inter-faces:

- (i) *The external wall. External wall, window and door intersections to the ice-cream parlour*

Diagram 4.1 – Shows the Junctions between walls and windows (Cross Sections)

Diagram 4.2 Shows the Door Threshold with the walls (Cross Sections)

- (ii) *The roof weathering and structure of the restaurant and kitchen areas*

Diagram 4.3 – Roof Eaves Cross Section

Diagram 4.4 – Ridge Detail Cross Section

Diagram 4.5 – Trussed Rafter Timber Section

- (iii) *The ground floor. Construction, detailing and junctions with external walls*

Diagram 4.6 – Ground Floor Cross Section

Diagram 4.7 – Shows the Ground Floor Block Plan Layout

- (iv) *Describe the site set up and plant that might typically be required to expedite the work in a safe manner*

Diagram 4.8 – Shows the site layout

The site here has a variety of considerations that have been made to maximise the production and efficient running of the works. There are two entrances for access to the site the first of which at the north side that will act as the main entrance to the site, where all plant, visitors and workers will enter through. The second entrance is to act as an emergency access for entrance or exit if required.

The site is to be surrounded by Hoarding around all four of the sides of the site to not only protect the workers but pedestrians and to deal with any vandalism or breaking in. This will be combined with a footway/cycle path diversion for pedestrians to get around and onto the promenade, that is to be surrounded by heras fencing to protect the users from traffic moving within the adjacent car park.

The main site entrance is to be in very close vicinity for site visitors for them to have easy access to the site office. The mess room and toilet block are in close vicinity also allowing an ease of access between all three. There is a separate area for plant/vehicles that will be kept separate and enclosed from people. The site office will have a designated health and safety area within. The toilets are to supply a mix of hot and cold water.

There are also a variety of storage locations around the site designated for materials, scaffold, cement and aggregate along with a general site storage location with power points. There are also to be temporary water supply points and the toilet areas are to have temporary connections to trains. There will also be a readily supply available for PPE.

There will be a variety of different plant used on site that range from a small crane, mechanical excavators/loaders, small power tools, forklifts, mixers, dumpers, concrete trucks etc. This variety of plant will allow for faster, efficient working, lower construction costs and eliminate the need for large amounts of manual work. Plant such as skips will also be present on site for the efficient cleanup of materials. Concrete pumps may also be needed on site.

Bibliography

Arbtech. (2019). *Ecological Consultants & Arboriculturists* | Arbtech. [online] Available at: <https://arbtech.co.uk/> [Accessed 8 Jan. 2019].

ASTM International (2017). *ASTM D4945-17, Standard Test Method for High-Strain Dynamic Testing of Deep Foundations*. PA.

British Standards Institution (2013) BS 42020:2013: *Biodiversity. Code of practice for planning and development*. London, England: BSI [Accessed 6 Jan. 2019].

British Standards Institution (1950): *Public Utilities and Street Works Act c.39.1950*. London, England: BSI [Accessed 10 Jan. 2019].

Chudley, R. and Greeno, R. (2017). *Building Construction Handbook*. 11th ed. Routledge

Coal Authority. (2019). *Planning and technical advice - Coal Authority*. [online] Available at: <https://www2.groundstability.com/services/pre-planning-permitting-advice/> [Accessed 4 Jan. 2019].

Designingbuildings.co.uk. (2019). *Contaminated land for construction - Designing Buildings Wiki*. [online] Available at: https://www.designingbuildings.co.uk/wiki/Contaminated_land_for_construction [Accessed 4 Jan. 2019].

Designingbuildings.co.uk. (2019). *Testing pile foundations - Designing Buildings Wiki*. [online] Available at: https://www.designingbuildings.co.uk/wiki/Testing_pile_foundations [Accessed 5 Jan. 2019].

GOV.UK. (2019). *Find out if a property is affected by coal mining*. [online] Available at: <https://www.gov.uk/check-if-property-is-affected-by-coal-mining> [Accessed 10 Jan. 2019].

GOV.UK. (2019). *Flood risk assessment for planning applications*. [online] Available at: <https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications> [Accessed 7 Jan. 2019].

Maps.cyfoethnaturiolcymru.gov.uk. (2019). [online] Available at: https://maps.cyfoethnaturiolcymru.gov.uk/Html5Viewer/Index.html?configBase=https://maps.cyfoethnaturiolcymru.gov.uk/Geocortex/Essentials/REST/sites/Flood_Risk/viewers/Flood_Risk/virtualdirectory/Resources/Config/Default&layerTheme=1 [Accessed 4 Jan. 2019].

Mapapps.bgs.ac.uk. (2019). *Geology of Britain viewer* | *British Geological Survey (BGS)*. [online] Available at: <http://mapapps.bgs.ac.uk/geologyofbritain/home.html> [Accessed 3 Jan. 2019].

Mapapps2.bgs.ac.uk. (2019). *Interactive Map Viewer | Coal Authority*. [online] Available at: <http://mapapps2.bgs.ac.uk/coalauthority/home.html> [Accessed 4 Jan. 2019].

Naturalresources.wales. (2019). *Natural Resources Wales / Long term flood risk maps*. [online] Available at: <https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en> [Accessed 4 Jan. 2019].

Old-maps.co.uk. (2019). *Old-Maps - the online repository of historic maps - home page*. [online] Available at: <https://www.old-maps.co.uk/#/> [Accessed 4 Jan. 2019].

Swansea.gov.uk. (2019). *Swansea - Changes to the path network*. [online] Available at: <https://www.swansea.gov.uk/proworders> [Accessed 1 Jan. 2019].

Syntegra Energy Consulting Ltd. (2019). *SUDS DESIGN FOR PLANNING | Syntegra Energy Consulting Ltd*. [online] Available at: <https://syntegragroup.com/2014/03/suds-design-for-planning/> [Accessed 8 Jan. 2019].

Town and Country Planning Act 1990 c.8. Available at: <http://www.legislation.gov.uk/ukpga/1990/8/section/257/2004-10-01> [Accessed 1 Jan. 2019].

Ukradon.org. (2019). *UKradon - What is radon?*. [online] Available at: <https://www.ukradon.org/information/whatisradon> [Accessed 4 Jan. 2019].

Yusof, N. and Zabidi, H. (2018). Reliability of Using Standard Penetration Test (SPT) in Predicting Properties of Soil. *Journal of Physics: Conference Series*, 1082, p.012094.t