

PHASE 1 PRELIMINARY DESK STUDY

Project: Proposed Five-Storey Hotel, Bar, Restaurant, and Conference Centre

Location: Former Tesco Supermarket and Car Park, Swansea

Commissioned by Ross Montanari

Assignment For Fundamentals of Construction

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Executive summary

This Phase 1 preliminary study examines the new development by Jarvis Hotels to determine its suitability for a new 5 storey hotel. The study analysed environmental, geological, and infrastructural factors and compliance with local regulations. Findings indicate favourable soil conditions, existing infrastructure constraints, environmental sensitivity. Recommendations include further soil testing, borehole logs and stakeholder consultations.

Introduction

This report was commissioned by Jarvis Hotels to evaluate the suitability of the Tesco supermarket and carpark for the new 5 storey hotel development. This study considers factors such as existing infrastructure, environmental conditions, and regulatory compliance. Limitations include the exclusion of intrusive testing and seasonal variations.

This phase 1 report outlines the background of this site with its previous uses. The report also proposes a framework for a detailed site investigation and offers the recommendations for the most suitable foundation type for the build. The findings are based on research from archivable material, Geotechnical assumptions derived from the site's context, and adherence to relevant building regs and codes of practice. Social and environmental considerations are also integrated to ensure compliance with sustainable and considerate construction plans.

Site Description

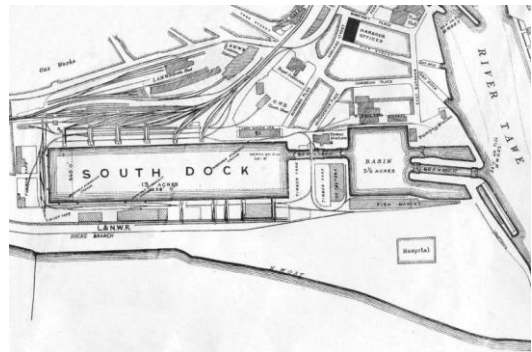
The site, currently home to the supermarket giants Tesco and its oversized car park, sits at the heart of Swansea city centre, directly opposite the LC2 leisure centre along with Swansea's latest development Swansea arena. It's a great location, full of potential and surrounded by many retail shops, homes and entertainment venues. This area is thriving with activity and now with the Swansea Arena it's the perfect opportunity for a new hotel to be built in the city.

Redeveloping this site offers an exciting opportunity to contribute to Swansea's ongoing transformation. With the Quadrant shopping centre and the waterfront being around corner, this redevelopment could seamlessly weave into the city's broader regeneration efforts, adding new energy and purpose to an already thriving urban landscape.

Historical Use of the Site

The Tesco Superstore in Swansea Marina is situated on a site with a rich industrial heritage. Historically, this location was home to the Swansea Gas Works, a facility integral to the city's energy production in the 19th and early 20th centuries. The gas works, located on Oystermouth Road, produced town gas from coal, which was then stored in large gas holders, or gasometers, before distribution. These prominent structures were key features of Swansea's industrial heritage.

As the demand for town gas declined and natural gas became the standard, the gas works were decommissioned and the site underwent significant redevelopment. The transformation of this industrial area into the modern Swansea Marina, including the construction of the Tesco Superstore, reflects the city's shift from its industrial roots to a focus on residential and commercial development, aiming to revitalise the urban landscape and economy. (Ariadne-infrastructure.eu, 2025)



Gasometers where Tesco is now - in 1989 Map of the South Dock 1908

(Image: South Wales Evening Post archives)

[Swansea Docks-Maps](#)

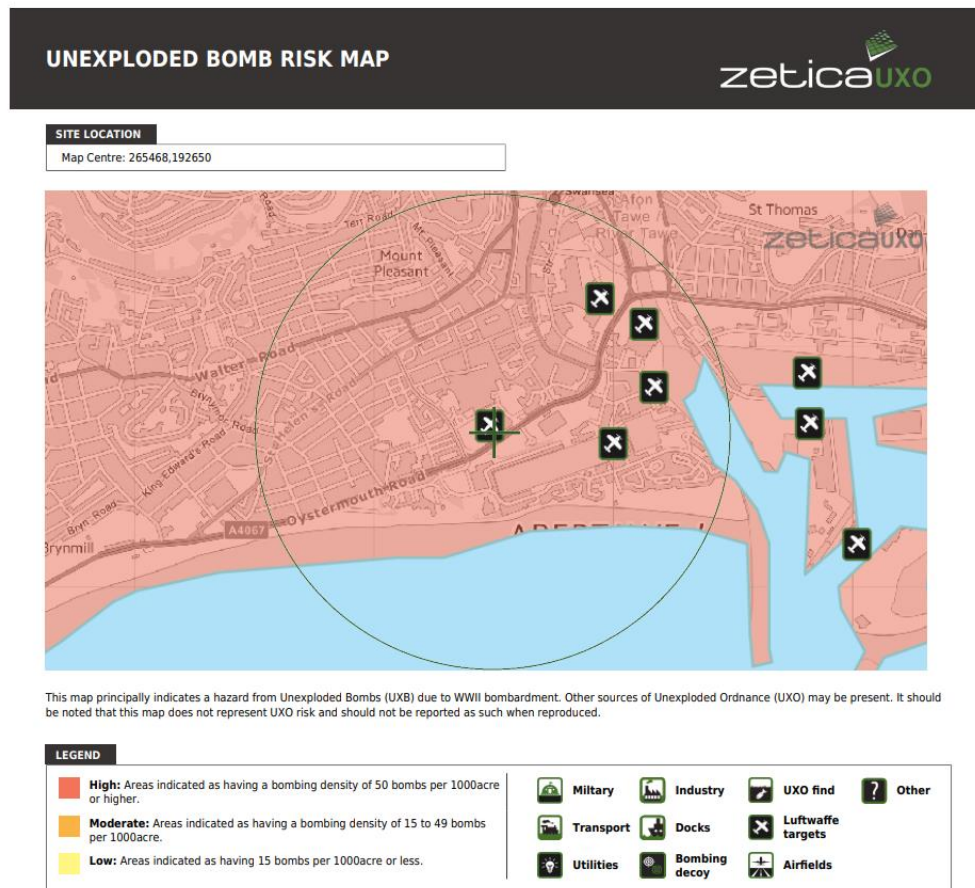
The South Docks was also known for its famous railway to transport coal from the Swansea valleys to the city. The railway was heavily used during the copper opilis as Swansea produced 90% of the worlds copper. (Swansea copperworks: Industry was 'Google of its day', 2020)



(The Story of Mumbles, 2023)

The railway was also one of the first passenger carrying railway lines, which allowed pedestrians to travel to and from Mumbles. Given the historical use of the site as a railway line, it is likely that potential ground contamination may be present, due to activities such as fuel and oil spills, the use of creosote-treated sleepers and possible deposition of heavy metals and other pollutants associated with rail operations over time. (www.swanseamuseum.co.uk, n.d.)

Unexploded Ordnance (UXO) Risk



The Zetica UXO map shows that the site is in an area with a *low to moderate risk* of unexploded bombs. This is because Swansea was heavily bombed during World War II as part of the Blitz, particularly during three nights in February 1941 known as the Swansea Blitz, which caused widespread destruction to the city's docks and industrial areas. (Swansea, n.d.)

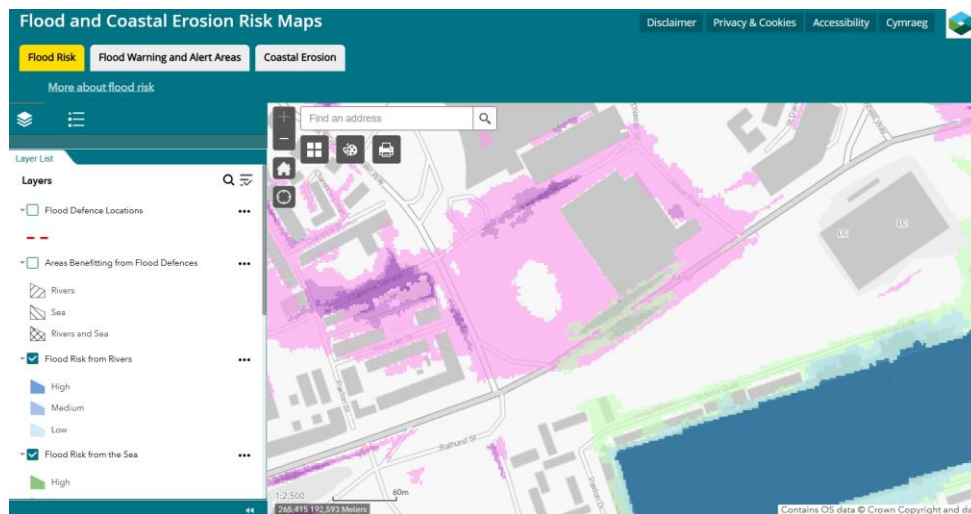
As a result, there is a chance that unexploded bombs could still be buried on the site, so care should be taken during any digging or construction. A more detailed UXO check may be needed before starting groundworks. (Zetica UXO, 2024)

Site Specific Risks

The site is in an area with a *low to moderate risk* of unexploded ordnance (UXO), as shown by Zetica's UXO risk map. This is because Swansea's docks and industries were heavily bombed during the Swansea Blitz in 1941. Although this risk does not stop development, it needs to be managed carefully. A detailed UXO risk assessment and if needed, a non intrusive UXO survey should be carried out before any groundworks begin. It is also advised to have a UXO watching brief during excavation and piling to keep workers safe.

In the past, the site was part of the Swansea Gas Works and included railway sidings serving the South Dock. Both uses likely caused ground contamination. Railway activity often leaves behind fuel and oil residues, tar (PAHs), heavy metals from ash and slag, and chemicals from treated timbers. Gasworks sites are known to leave tar, oil, PAHs, cyanides, ammonia, sulphates, and asbestos in the ground. These contaminants can remain in the soil and groundwater. A targeted site investigation with soil and water tests is therefore recommended to check for these contaminants, especially in areas where former structures stood.

According to Environment Agency flood maps, the site is partly in Flood Zone 2, meaning there is a medium chance of flooding from tidal or surface water. A Flood Risk Assessment (FRA) should be carried out to confirm the exact risk and suggest measures like raising floor levels or improving drainage if needed.



(Natural Resources Wales, 2020)

The Coal Authority also classifies the site as a *High Risk Area* for mining, due to Swansea's history of coal mining. There could be shallow mine workings underground, which might lead to ground movement or settlement. It is recommended to include rotary boreholes with probes in the site investigation to check for voids or weak ground. If found, these areas may need to be filled or strengthened before construction.

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		WHITE YOUNG GREEN ENVIRONMENTAL Ground Technologies and Investigation Yeoman House, 63 Croydon Road, London SE20 7TB Tel. 0181 850 9959 Fax. 0181 676 9958		Borehole Number BH302 Sheet 1 of 1 1:50				
Project Oystermouth Road, Swansea			Client Tesco Stores Ltd					
Method Cable Percussive			Ground Level					
			Start Date 27/01/99 Finish Date 27/01/99					
Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Level (m)	Installation / Backfill	Sample Test	Notes
HARDWARE (MADE GROUND) (Driller's description)			5.35					
Dark brown and beige mottled clayey SAND with abundant gravel, brick fragments and occasional cobble (MADE GROUND).								
... below 1.0 mbgl, becoming dark grey and very gravelly.								
Dark brown GRAVEL, and SAND with occasional cobble and shell fragments (MADE GROUND)			7.00					
Soft brown grayish green sandy SILT with much organic debris and rootlets (ALLUVIUM)			3.50					
Spongy brown fibrous PEAT (ALLUVIUM)			4.00					
... at 5.0 mbgl, becoming slightly clayey.								
Soft to firm greenish grey SILT with occasional organic debris (ALLUVIUM)			7.00	7.00	200mm			
... below 7.5 mbgl, becoming silty and grey.								
Borehole completed at 8.00mbgl			8.00					
Remarks: Chiselling: See Notes column for details Installation / Backfill: 50 mm dia. HDPE standpipe installed. Slotted with gravel filter from 4.0 to 8.0 mbgl. Bentonite seal from 3.0 to 4.0 mbgl. Backfilled with arisings from G.L. to 3.0 mbgl. Cover and gas tap fitted. Groundwater: Sampled at 1.5 mbgl and 7.3 mbgl. Other Observations: Heavy rain inspection pit to 1.2 m (34 ft).		JOB NUMBER E0074 Logged By BS Checked By FIG. NO.						

Recommended Foundation Type

Bored piles are recommended as the most suitable foundation type based on the borehole log (BGS No. 370488). The log shows that competent bearing strata are met at roughly 7–10 metres depth, consisting of stiff clay with gravel and cobbles. The upper layers, down to around 7 metres, comprise made ground, soft alluvium and peat, which are not suitable for strip or raft foundations due to their low strength and compressibility. Based on this data, the proposed bored piles would extend through these weak soils and terminate in the stiff clay layer at a depth of 12–15 metres, ensuring proper bearing capacity and minimising settlement. (Pile Design and Construction Practice, Fifth Edition, 2007)

Bored piles are appropriate here as they minimise vibration and noise during installation. A key consideration given the site's busy city centre location with nearby sensitive areas and pedestrian traffic. Also bored piles will allow inspection and cleaning of the pile base during construction, ensuring quality control and reliable load transfer. (Pile Design and Construction Practice, Fifth Edition, 2007)

Pile foundations have several benefits. They limit the amount of excavation needed, which helps avoid disturbing contaminated soils, and they reduce the risk of uneven settlement by providing uniform support. They also work well even when groundwater is high and are suitable for challenging ground conditions. Their quiet, low-vibration installation makes them ideal for busy urban areas.

On this site, bored piles are preferred over driven or displacement piles because they create less noise and vibration. It is important in a city centre with nearby homes and businesses. They can also reach stable ground at depth, passing through weak or variable soils. Because bored piles can be inspected and cleaned during construction, they offer good quality control and reduce the risk of spreading contamination. Overall, they are a stable, quiet, and reliable foundation choice for this development.

Conclusion

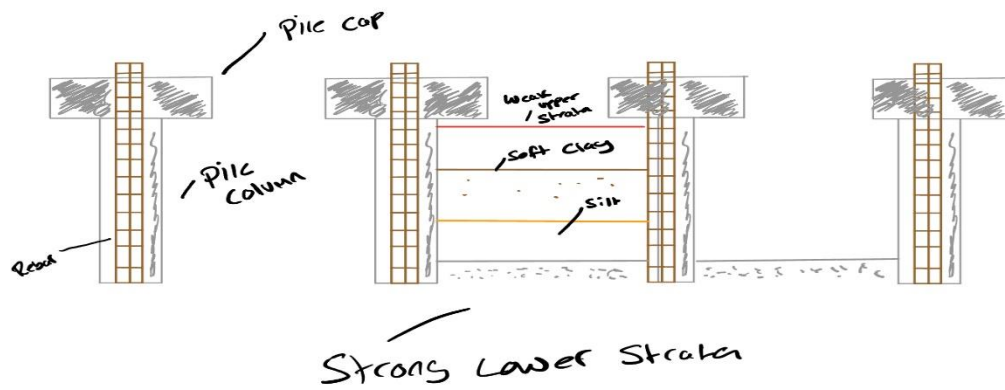
Transforming the old Tesco site into a hotel and conference centre is a major opportunity for regenerating Swansea's urban landscape. The project is expected to boost the local economy by attracting visitors, creating jobs, and bringing new life to the area. However, before construction begins, it's essential to carefully assess the current site conditions.

A detailed Phase 1 study has outlined the need for geotechnical and environmental investigations to ensure the ground is suitable for building. This includes checking the soil and groundwater for any contamination, especially given the site's industrial history, which may have left long term impacts. These tests are particularly important due to the site's location near sensitive areas and existing infrastructure. The results will help determine which types of foundations are most appropriate.

Given the likely presence of weak or uneven soil, the study suggests using driven or bored pile foundations. These deep foundations offer better stability and help prevent future issues like uneven settling, which is especially important for a large, multi-storey building like a hotel and conference centre.

Success will also depend on taking both environmental and social factors into account. The Phase 1 report recommends involving residents, businesses and authorities early on to address potential disruptions, such as traffic and noise during construction. This collaborative approach will help ensure the redevelopment benefits Swansea as a whole while respecting the community and the environment.

Drawing of Pile Foundation



Here is a brief drawing of the chosen pile foundations.

References

Borehole log : <https://api.bgs.ac.uk/sobi-scans/v1/borehole/scans/items/370488>

General Geotechnical and Site Investigation Standards: British Standards Institution (BSI). [BS 10175:2011+A2:2017](#)

Swansea gas works <https://portal.ariadne-infrastructure.eu/resource/b5b9142bbb62cd279fd49deedcf85676afe8a21992511cd5588812bd6de5d96a>.

Image of the gas holder: Wales online

Image of the south docks: <http://swanseadocks.co.uk/oldsite/Maps.htm>

Foundation choice : Tomlinson, M., & Woodward, J. (2008). *Pile Design and Construction Practice* (5th ed.). CRC Press.
ISBN: 978-0415385824

Ariadne-infrastructure.eu. (2025). *Ariadne portal*. [online] Available at: <https://portal.ariadne-infrastructure.eu/resource/b5b9142bbb62cd279fd49deedcf85676afe8a21992511cd5588812bd6de5d96a> [Accessed 6 Feb. 2025].

Natural Resources Wales (2020). *Story Map Series*. [online] flood-risk-maps.naturalresources.wales. Available at: <https://flood-risk-maps.naturalresources.wales/?locale=en>.

Pile Design and Construction Practice, Fifth Edition. (2007). Crc Press.

Swansea. (n.d.). *Three Nights' Blitz*. [online] Available at: <https://www.swansea.gov.uk/threenightsblitz>.

The Story of Mumbles. (2023). *The Swansea & Mumbles Railway near Norton Road*. [online] Available at: https://www.storyofmumbles.org.uk/catalogue_item/mumbles-railway-swansea-bay [Accessed 14 Jul. 2025].

Swansea copperworks: Industry was 'Google of its day'. (2020). *BBC News*. [online] 2 Feb. Available at: <https://www.bbc.co.uk/news/uk-wales-51310056> [Accessed 6 Feb. 2025].

www.swanseamuseum.co.uk. (n.d.). *Mumbles Train*. [online] Available at: <http://www.swanseamuseum.co.uk/swansea-a-brief-history/mumbles-train> [Accessed 6 Feb. 2025].

Zetica UXO (2024). *Risk Maps | Zetica UXO*. [online] Zetica UXO. Available at: <https://zeticauxo.com/guidance/risk-maps> [Accessed 14 Jul. 2025].

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