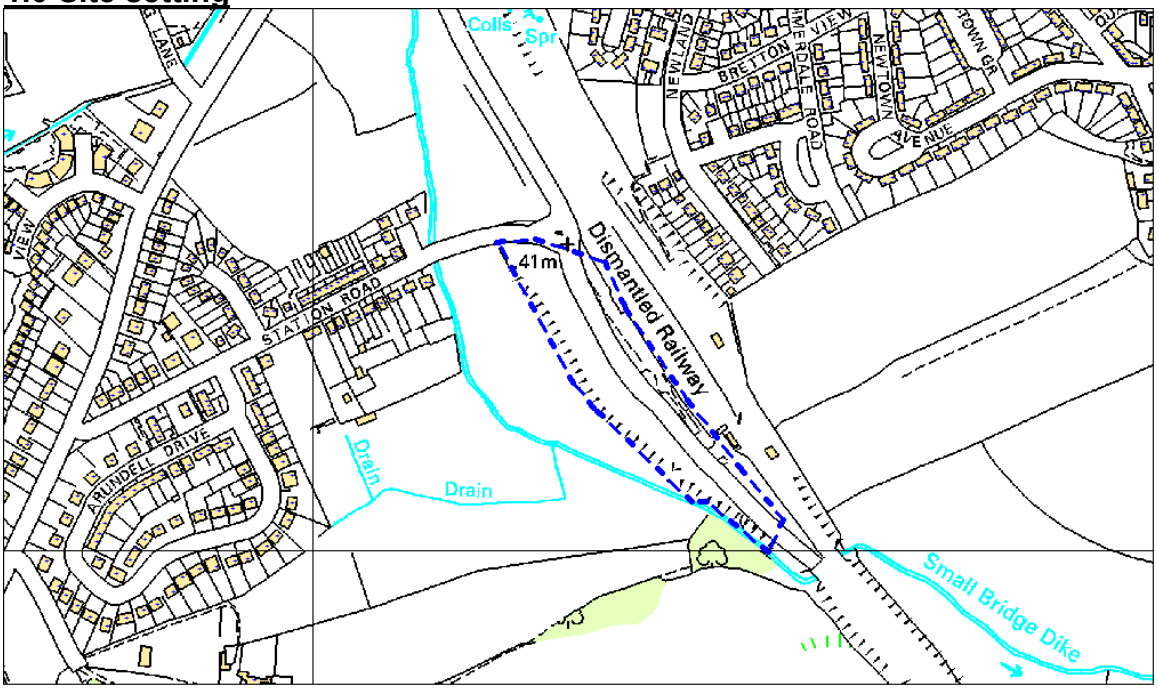
P2-410-i24 Phase I

Landfill 167, Station Rd, Cudworth

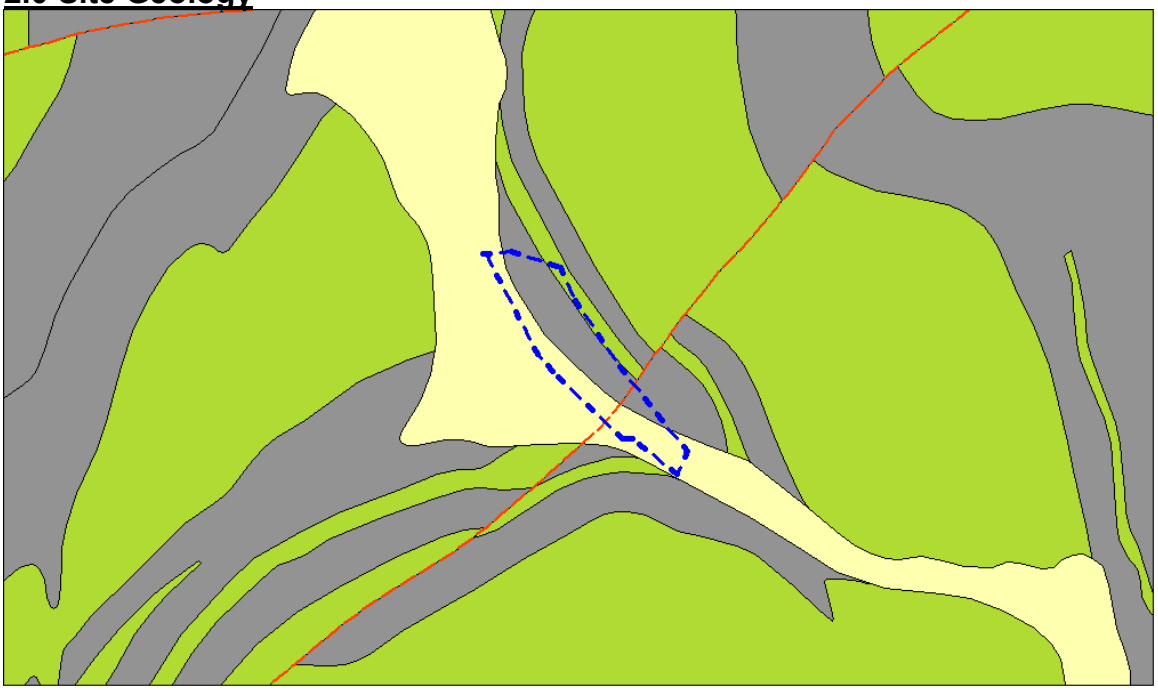
Active Layer: Landfill 167

1.0 Site setting



The site occupies former railway sidings to the west of the village of Cudworth in the north of the Borough. The dismantled railway runs along the eastern boundary of the site and several buildings are present here, although it is unclear whether they are still occupied. There are open fields of unknown purpose to the north, south, west and southeast and relatively modern residential housing estates to the northwest and northeast. It is unclear whether the site has any current fixed use, but the most recent definite use is as a landfill site where it accepted around 9900m3 of construction waste (it was licensed to accept up to 80000m3) in 1994. This is classed as a category 4 landfill site.

2.0 Site Geology



This area lies upon the Middle Coal Measures formation (MCM) which dominates much of the underlying geology in this part of the Borough. The site lies mainly upon a band of undivided Cyclic Sedimentary Rock, i.e. mudstone and shale (indicated in grey). The surrounding rocks are mainly MCM-Sandstones (indicated in green), with a large band of Ackton Rock Sandstone to the west. Part of the site is overlain by alluvial deposits associated with Small Bridge Dike (indicated in yellow). A major fault dissects the site

3.0 Surface hydrology

There are no surface hydrology features on the site itself. However, Small Bridge Dike runs adjacent to the southern and western edges.

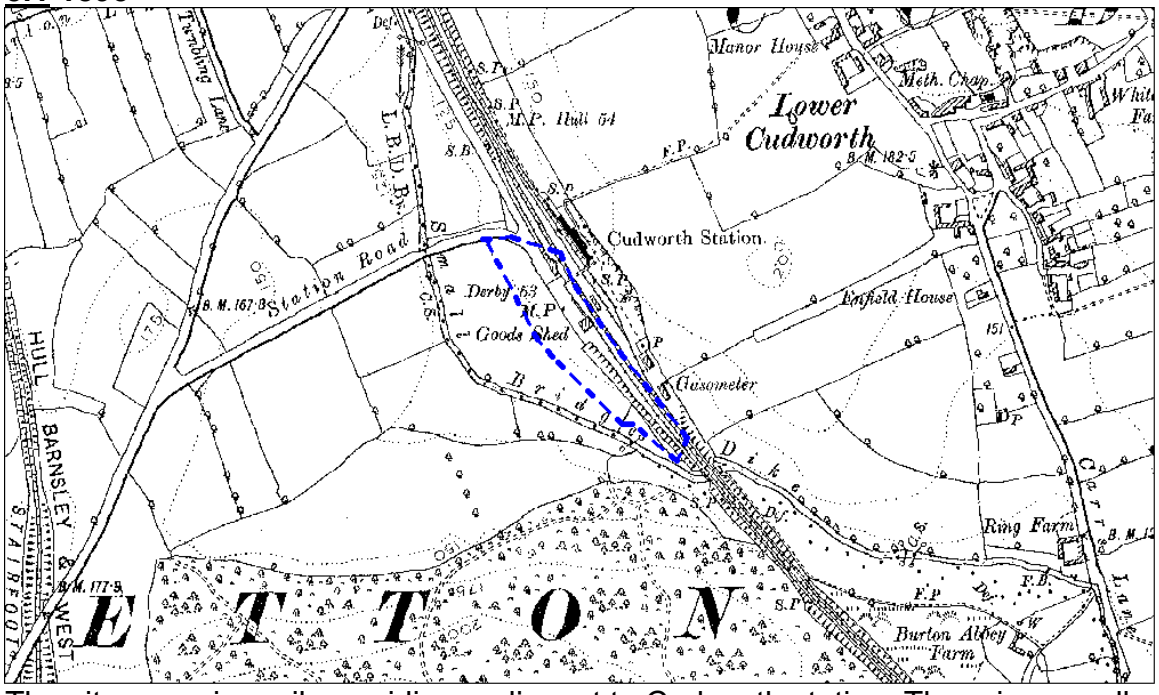
4.0 Site Hydrogeology

WATER ENVIRONMENT		GROUNDWATER SENSITIVITY[1]		
		NON AQUIFER	MINOR AQUIFER	MAJOR AQUIFER
DISTANCE TO NEAREST SURFACE WATER[2]	>200m	Low Risk	Low Risk	Medium Risk
	50 – 200m	Low Risk	Medium Risk	High Risk
	<50m	Medium Risk	High Risk	High Risk

The site lies upon a minor aquifer of high vulnerability. This means that while there is a significant possibility of contaminants migrating to the stored groundwater, the aquifer is of little hydrological value outside of the immediate area. This, combined with the adjacent controlled waters means that the overall risk to the water environment from potential contamination at this site is High

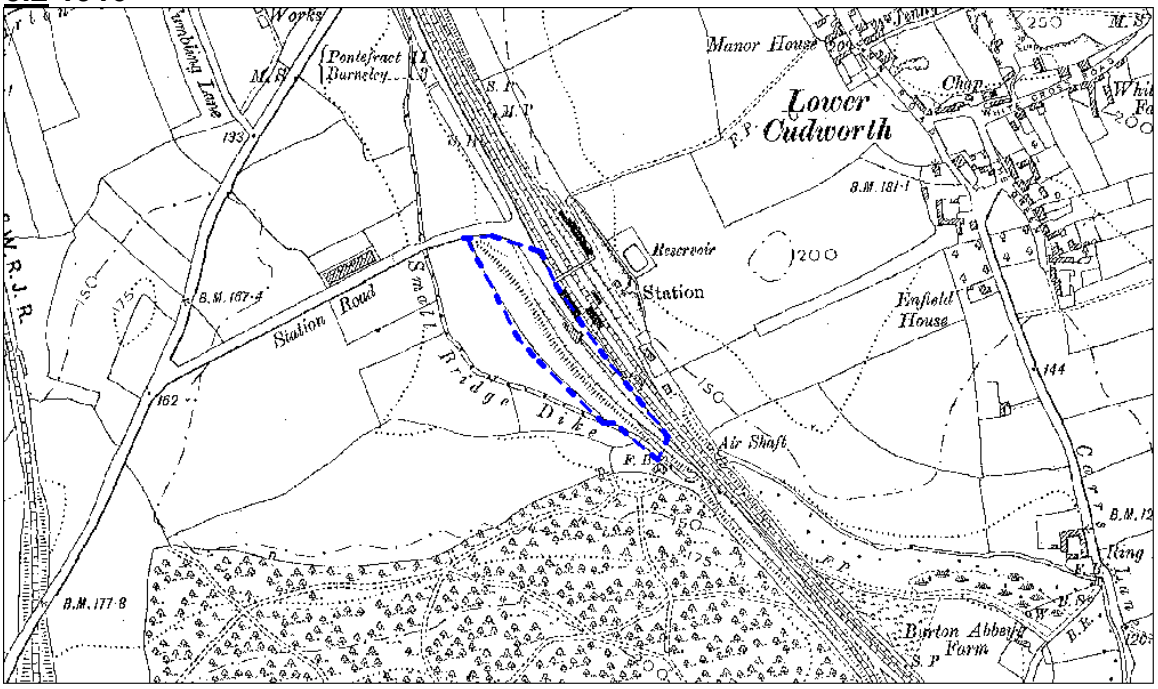
5.0 Site History

5.1 1895



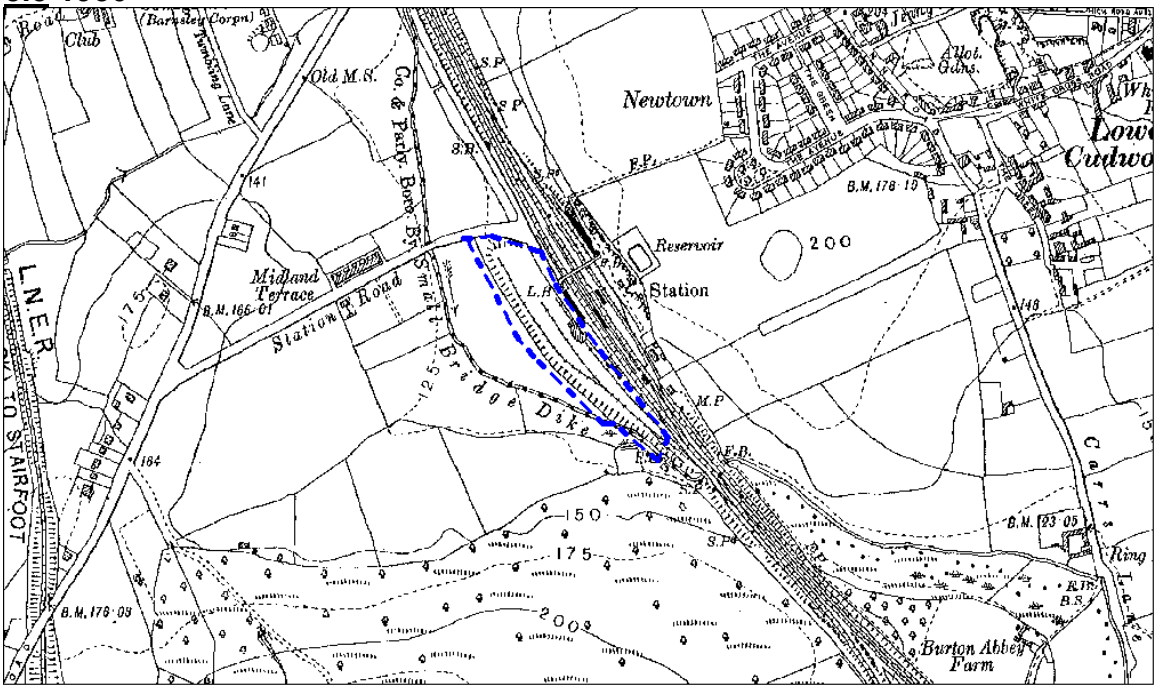
The site occupies railway sidings adjacent to Cudworth station. There is a small building marked ‘Goods Shed’ in the centre of the site and a gasometer marked adjacent to the eastern edge. The area to the south is covered in woodland

5.2 1910



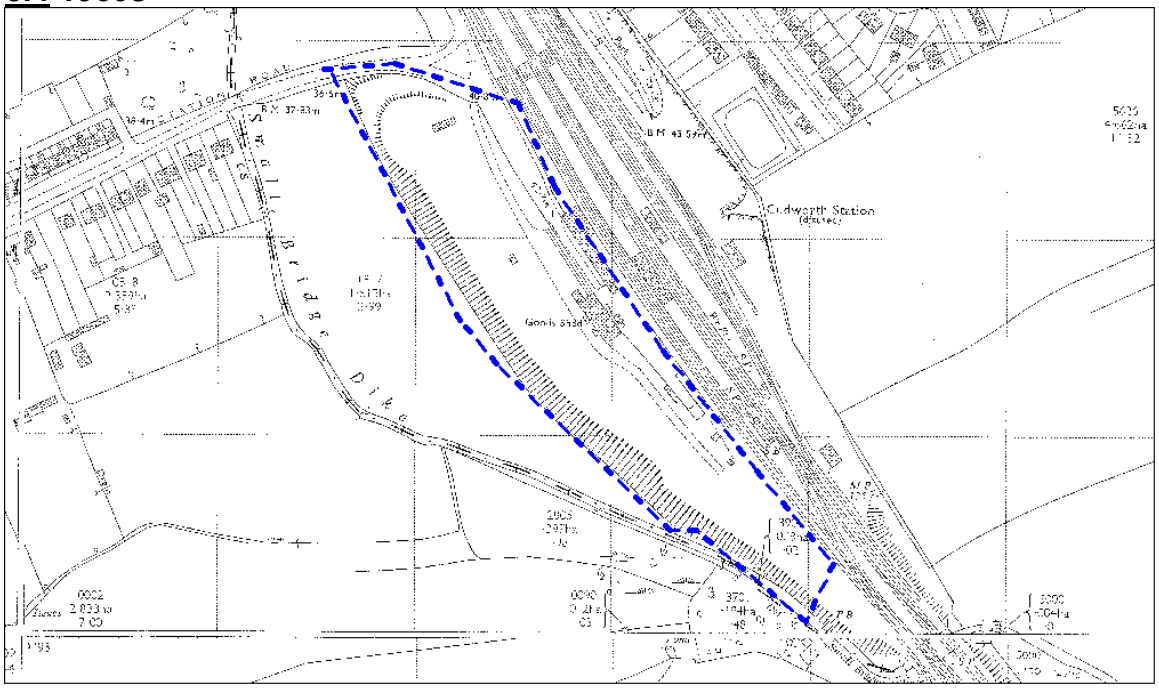
Several more buildings have been constructed on the sidings and a reservoir now lies to the rear of the station building. There is an air shaft just to the southeast indicating the presence of mine workings beneath the site.

5.3 1930



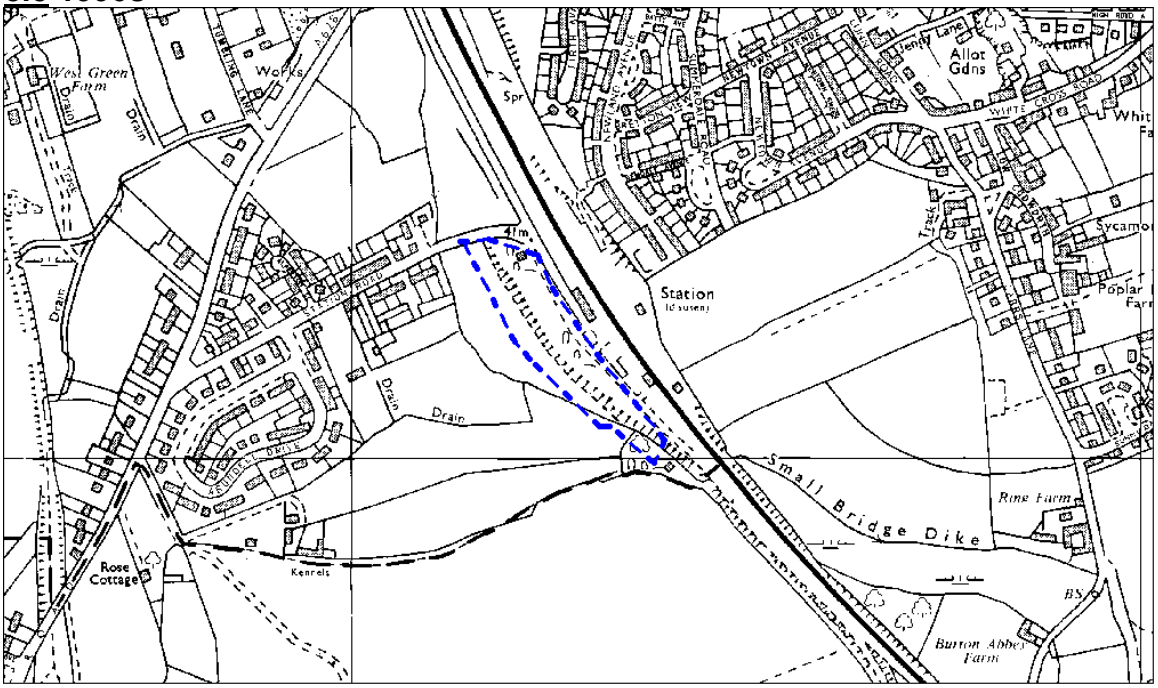
There appears to have been little change to the site itself, but the area to the south appears to have suffered some deforestation and residential housing has been built to the northeast

5.4 1960s



The station is now disused, but the goods sheds and sidings appear to still be in use. Further residential buildings have been constructed to the northeast and northwest

5.5 1990s



The sidings have been dismantled but the mainline of the railway still remains. Some of the goods sheds remain but it is unclear whether they are still in use

Summary

There have been several potentially contaminative processes on this site prior to the landfill. The railway sidings themselves have associated contaminants and the adjacent gasometer and nearby mine-workings may provide additional sources. There is no obvious current land use and it is likely that this land has no fixed purpose. Due to its proximity to the railway line it is unlikely that it will be developed for residential purposes

6.0 Conceptual Model

Sources

The initial source of potential contamination to affect this site will have been from the railway sidings. The tracks are likely to have been bedded on furnace or foundry clinker and this can degrade to release metals such as aluminium and chromium and PAHs such as benzo(a)pyrene. These metals and SVOCs may also be present from coal spilt from either engines or railway containers and may also migrate from coal tars stored or generated at the gasometer which lies adjacent to the site. The presence of these sources may also lead to more volatile organics such as BTEX compounds being present.

The presence of an air shaft near the site indicates that there may be mine-workings below and this means that the site may also be affected by mines-

gas, i.e. methane and carbon dioxide. CH_4 and CO_2 may also affect the site from the landfill. While Landfill 167 is known to contain only construction and demolition waste and was not gassing when last monitored, there is a second landfill nearby containing unknown material. If this were gassing, methane and CO_2 could migrate through the subsoil to affect the site

Pathways
The pathways that must be considered for this site include ingestion, dermal contact, direct contact, inhalation, asphyxiation and explosion. All pathways may be preceded by migration to a receptor

Receptors
The receptors that must be considered for this site include site users, adjacent site residents and controlled waters

Linkages

Source	Receptor	Pathway	Risk	Comments
Mines Gas	Site users	Inhalation, Asphyxiation, Explosion	**LOW**	While the air shaft adjacent to the site indicates that there are almost certainly mine-workings underneath the site and a preferential pathway for gas in the major fault, a linkage would be difficult to prove as there appear to be no permanent structures on the site and so no linkage could be proven
Landfill gas from the decay of buried organic matter	Site users	Inhalation, Asphyxiation, Explosion	**LOW**	The materials which are known to have been deposited in the landfill itself are innate and so it is unlikely that significant amounts of gas are generated on this site. There is no linkage obvious for migrating gas as there are no permanent inhabitants or users of the site
Metals and Semi-volatile organics	Site users, Adjacent site residents, Controlled waters	Ingestion, Dermal contact, Direct contact	**LOW**	Because of the apparent irregular use of the site is unlikely that a linkage could be proven to site users. There is nothing to suggest that nearby residents are at risk and GQA data for the dike does not indicate any issues with the migration of contaminants to adjacent sites
Volatile organics		Ingestion, Dermal contact, Direct contact, Inhalation	**LOW**	Again, GQA data does not indicate that organics are migrating to the controlled waters and so it is unlikely that they are migrating to adjacent residential areas. There have been no reports of hydrocarbon odours in adjacent areas

7.0 Conclusion

Part IIA of the Environment Act 1990 defines contaminated land as being;

“any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that-

(a) significant harm is being caused or there is a significant possibility of such harm being caused; or
(b) pollution of controlled waters is being, or is likely to be, caused”

It is unlikely, given the current land use and ground cover, that this statement could be applied to this site. While there are undoubtedly potentially contaminative materials present on this site, a pollutant linkage would be very difficult to prove as there are no obvious receptors on the site. There is a potential risk to controlled waters but no evidence to suggest pollutants are migrating to the adjacent dike. However, the site shall be further investigated to determine the exact nature of the site use