Environmental Statement Volume II:

Appendices Part 3

Nant Llesg Surface Mine

Incorporating Land Remediation






miller argent

Environmental Statement: Volume II: Appendices

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LANDMAP

Appendix MA/NL/ES/A16/001 Landscape & Visual Impact Assessment: LANDMAP

1.1 LANDMAP[1] is "the national information system, devised by the Countryside Council for Wales (CCW – now Natural Resources Wales, NRW), for taking landscape into account in decision-making". It allows "information about landscape to be gathered, organised and evaluated into a nationally consistent data set … in a structured and rigorous way that aims to be as objective as possible". The information database contains "both relatively objective information - such as rock type and historical information - and more subjective information, such as sensory responses and cultural interpretation". Individual studies of topics, or "aspects" of the landscape are carried out: Geological Landscape (GL), Landscape Habitats (LH), Historic Landscape (HL), Cultural Landscape (CL), and Visual and Sensory Aspect (VS) Aspect Areas are evaluated, according to the following criteria:

Evaluation	Criteria
Outstanding	of international or national importance
High	of regional or county importance
Moderate	of local importance
Low	of little or no importance
Unknown	insufficient information exists to evaluate
NB: Where the Evaluation refers to 'importance' it is in terms of that particular Aspect only	

1.2 The LANDMAP information for the landscape context study area has been published on the CCW website. The relevant aspect area information is summarised in the following tables, from the Level 3 or 4 classifications, descriptive text, overall evaluations, and justifications for the overall evaluations, provided in the LANDMAP database[2]. The following aspect areas occur within site:

Table 1 Geological Landscape Aspect Areas

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
Cynon GL007 Uppermost Rhymney valley	Classified at Level 3 as Glacial Mountain Valley. Broad, moderately steep-sided valley controlled by S-dipping mud-dominated Coal Measures (Upper Carboniferous), opening northwards into gentle S-facing dip slope formed by Namurian Basal Grit conglomerates (Upper Carboniferous). Extensive boulder clay cover with loose gritstone blocks (clitter). Numerous colliery waste tips & partially reclaimed opencast workings. Lower House stream section (Blean Rhymney) SSSI.	Outstanding	Partly open countryside but with significant urban/industrial development in valley - includes nationally important Lower House stream section (Blaen Rhymney) SSSI (Namurian (Upper Carboniferous) stratigraphy).

[1] Natural Resources Wales website, http://landmap.ccw.gov.uk/ and http://landmap.ccw.gov.uk/methodology/
[2] Note: the text is selected and transcribed from the database without alteration.

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
Cynon GL008 Upper Rhymney and Bargoed Rhymney valley	Classified at Level 3 as Glacial Mountain Valley. Steep-sided valleys trending NW-SE cut into South Wales Pennant Formation sandstones (Upper Carboniferous), separated by ridge representing remnant of high-level plateau. Valley floor contains alluvium & glacial sand/gravel; boulder clay in the form of hummocky moraine, and head on higher ground. Numerous derelict mine workings, shafts & adits.	Moderate	Upper valleys dissected in widespread outcrop of Pennant sandstones - some quarries present.
MRTHR GL018 Craig Penddeu-gae	Classified at Level 3 as Glacial Mountain Valley. Steep western slopes of U-shaped Cwm Bargoed, with large landslip area, dissected into S-dipping high-level sandstone plateau of South Wales Pennant Formation, and cut by several major NW-SE faults. Line of cliffs at Craig Penddergae above large landslip between Penddergae Fawr and Bryn Caerau. Lower slopes in Productive Coal Formation with closed coal mine shafts and adits, disused quarries and waste tips. Boulder clay cover in Nant y Fedw, and in northern parts of Bargoed Taf valleys.	Moderate	Upland plateau and W slopes of U-shaped valley; Pennant stratigraphy, landslip, coal workings and quarries.
MRTHR GL019 Gelligaer Common	Classified at Level 3 as Glacial Mountain Valley. Steep eastern slopes of U-shaped Bargoed Taf valley, dissected by three prominent tributary valleys, cut through high-level sandstone plateau of gently S-dipping South Wales Pennant Formation and Productive Coal Formation. NW-SE faults cut the slopes, and regional E-W syncline and anticline affects the general S-dip. Boulder clay cover on lower slopes and in tributary valleys. Closed coal mine shafts and adits, disused coal waste tips.	Moderate	E slopes of U-shaped valley; Productive Coal - S Wales Pennant fms stratigraphy, coal workings

Table 2 Landscape Habitat Aspect Areas

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
Cynon LH109	Classified at Level 3 as Improved Grassland. A uniform improved grassland resulting from reclamation of former mine workings.	Low	Low ecological value with no key species.
Cynon LH112	Classified at Level 3 as Mosaic. Unenclosed uplands comprised of unimproved acid grassland, wet dwarf shrub heath, wet heath/ acid grassland mosaic flushes, open water, bracken, ephemeral/short perennials on spoil. BAP habitats present: Purple Moor Grass & Rush Pastures, Upland Heathland	High	A number of Priority habitats and area does have potential to support key species.
Cynon LH113	Classified at Level 3 as River Corridors. Urbanised river corridor with a ribbon of riparian trees.	Low	Man made habitat built up habitat with no key species records.

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
Cynon LH116	Classified at Level 3 as Mosaic. Bracken and dry heath with wet heath/acid grassland mosaic and patches of broadleaved woodland. BAP habitats present: Upland Oakwood, Wet Woodland, Upland Heathland	High	Area has three different Priority habitats and does have potential for key species.
MRTHR LH007	Classified at Level 3 as Acid Grassland. Large area based on Gelligaer, Merthyr and Mynydd y Capel Commons. BAP habitats present: Ancient and/or Species Rich Hedgerows, Upland Calcareous Grassland, Upland Heathland, Purple Moor Grass & Rush Pastures, Reedbeds, Limestone Pavements	High	BAP habitats and other semi-natural habitats; extensive areas of established revegetated and reclaimed spoil spoil and tips; quarries containing nesting peregrine, and small ponds containing great crested newt; BAP birds present, including lapwing and linnet.

Table 3 Historic Landscape Aspect Areas[3]

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
Cynon HL633	**Note: the LANDMAP information for this area is incorrect** *Classified at Level 3 as Woodland.* *Area of forestry created in the 2nd and 3rd quarters of the 20th century by the afforestation of what was previously mainly open moorland, though it did include some areas of ancient woodland on Craig Rhiwglyn and Daren y Dimbath.*	*Low*	*The extensive modern forestry plantation established in this area (formerly open moorland) has significantly reduced the value of the archaeological resource in this area.*
Cynon HL701	Classified at Level 3 as Other Settlement. The longest transport and communication corridor within the region... The aspect area is characterised by heavy industrial activity and urban growth along the length of the valley, from Rhymney in the extreme north to Machen on the Gwent border to the south... The Rhymney Valley exhibits occupation evidence from the Neolithic through into the present and represents an important and historically significant aspect area... ... The Rhymney Valley is now characterised by modern manufacturing instillations, relict and derelict railways; modern roads now replace the railways as the main communication medium...	High	Although the coherence of the aspect area has been significantly impacted by modern housing and industrial development, the Rhymney Valley remains a diverse, historically important communications corridor with evidence of human activity dating back to the Neolithic period.
Cynon HL831	Classified at Level 3 as Marginal Land. The landscape area of Gelli-gaer Common (HLW [MGl] 4) represents an increasingly rare survival in Southeast Wales of an area of high upland moor rich in a diverse	Outstanding	Gelligaer Common is a landscape of national importance, representing an extensive area of high upland moor with an exceptionally

3 The extensive descriptions in the LANDMAP database have been summarised here

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
	archaeological resource; extending from the pivotal ancient settlement of Gelligaer in the southeast to the summits of Pen Garnbugail and Mynydd Fochriw in the northwest. The landscape is diverse both in its form and in its archaeological and historical content, displaying a remarkable continuity of occupation; prehistoric activity well-represented by Bronze Age burial and ritual sites and by hut sites and settlements of the succeeding Iron Age; preserved remains of at least four Roman earthworks about 2kms to the north of the Roman fort at Gelligaer (probably small military practice-camps); occupation in the post-Roman period attested by the church of Capel Gwladys and its associated earthworks; deserted rural medieval settlement as groups of platform houses: on the east side of the Common, the largest group of such sites in South East Wales, and on the western flanks of Pen Garnbugail; extensive field systems associated with medieval and early post-medieval exploitation of the Common.		rich and diverse archaeological heritage, with significant evidence of prehistoric and medieval occupation.
Cynon HL602 Nant Bargod Rhymni	Classified at Level 3 as Irregular Fieldscapes. Large rural aspect area characterised by an extensive irregular fieldscape, ancient and semi-natural woodland, modern forestry, a small lake and three settlement areas including Fochriw. The post-medieval fieldscape and farmstead distribution is the defining feature covering the larger part of the aspect, representing settlement continuity from the medieval period through into the post-medieval, accentuated by the survival of Ridge and Furrow earthworks in the fields south of Bryn-côch. Aspect area bounded by Gelligaer Common to the south and west with Cefn Brithdir, the Rhymni Valley and Bargoed defining the aspects northern and eastern limits respectively … Prehistoric activity in the area is unusually absent possibly due to intense and prolonged agricultural activity, from the medieval period to the present; Roman activity represented by practice works located to the extreme south of the aspect area on the border with Gelligaer Common; until demolition in 1960, the medieval chapel of Capel-y-Brithdir stood alongside the Cefn Brithdir Ridgeway, during demolition a cross-incised slab of probable10th century date was recovered. Extraction on a fairly intensive level: large quarrys and Levels along the entire length of the Cwm Ysgwydd-gwyn. An exceptionally rare timber footbridge, opened in 1868 and crossing the former Brecon and Merthyr Railway Bargoed Line, later the Cilhaul Branch Railway, survives. The line and followed the Cwm Ysgwydd-gwyn from Bargoed to Fochriw through this aspect area.	High	This area has been assessed overall as 'high' based on the fact that it represents an extensive, well-preserved irregular enclosed upland landscape, dominated by significant remains of medieval/post-medieval agricultural settlement and later 19th-20th century industrial extractive activity.
CynonHL866	Classified at Level 3 as Other Fieldscapes A predominantly enclosed agricultural landscape, now heavily industrialised, with a number of large reservoirs at Blaen Rhymni and Blaencarno … The landscape seen today is heavily drained, feeding the combined reservoirs found within this aspect... Heavy industrial activity has potentially removed any trace of pre-post-medieval archaeology; however the remnants of a small a doughnut shaped cairn, situated on Blaencarno Common, does indicate the existence of occupation in the Bronze Age... The aspect was heavily industrialised during the post-	Moderate	This enclosed agricultural landscape has been heavily impacted by 19th-20th century industrial activity, which has resulted in a moderate loss of coherence...

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
	medieval period with the creation of a complex drainage system, feeding three reservoirs, numerous coal Levels and tips that now overlie earlier agricultural field systems... The Merthyr, Tredegar and Abergavenny Railway is represented by a line of concrete posts delineating the northern extent of the railway; much of this route has since been infilled by later coal tips... A large and impressive tunnel and embankment to carry the line of the Railway was constructed over the Afon Rhymni, as were several smaller bridges along its length... The 20th century saw the construction of a series of four allotment gardens dating from the Second World War "Dig for Victory" campaign and originally belonging to the occupants of seven cottages, shown on tithe map of 1842 and OS map of 1880, which stood adjacent to Blaencarno Farm, now destroyed...		
MRTHR HL026 Cwm Golau and Cwm Bargod West	Classified at Level 3 as Irregular Fieldscapes. The area is characterised by enclosed pastureland, which had formerly been open upland common, and small loosely dispersed agricultural settlement. The field boundaries are of the clawdd type, though chronological progression to large dry-stone walling in the northern part of the area is discernible; diverse and fragmented area of: narrow areas of open common, enclosed fields, non-nucleated agricultural settlement, and extractive features, reflecting piecemeal encroachment on the surrounding common land from the late medieval/early post-medieval period. Evidence of prehistoric activity includes Bronze Age features; medieval period, when the enclosed lands had reached close to their present extent, strongly represented by platform houses probably occupied only in summer, some indications of all-year-round settlement; fields mostly enclosed by well-built dry-stone walls; some further enclosure of the Common in post-medieval period, and more intensive use of the Taff Bargoed valley; 19th century industrial extraction relatively small scale, comprising coal levels and quarries on the unenclosed common.	High	The high value assigned to this area reflects the intact condition of the irregular fieldscape and dispersed settlement pattern in this area and the multi-period character of the archaeological resource, dominated by extensive remains of 19th century industrial extractive activity and associated water-management and transport features.
MRTHR HL008	Classified at Level 3 as Extractive An important and increasingly rare example of a relict industrial landscape associated with the Iron Industry, characterised by surviving extractive, and related water management, industrial and public rail and tramroad features, interspersed with surviving earlier landscape features; an extensively industrially altered part of the Merthyr Common, which elsewhere remains essentially marginal upland characterised by upland agricultural features and prehistoric funerary monuments; aspect area characterised by extensive extraction of the mineral outcrop and approximately a third of the area has been subject to reclamation; little evidence of intensive activity until the onset of industrialisation the Dowlais ironworks at the north end of the area in 1759, the biggest ironworks in the world during the early to mid 19th century, shifting to steel production in 1865, finally closing in 1987; the innovative Dowlais Free Drainage System, which collected groundwater from a catchment area on the hills to the east of Merthyr and conveyed it to the ironworks through a complex system of open leats, culverts and aqueducts. The east part of this area, around Trecatti, has been extensively remodelled in the recent past, with reworking of coal tips and subsequent opencasting, now partially reinstated.	Outstanding	This area has been assigned an overall value of outstanding, which reflects its national importance as an industrial landscape created by an upsurge in coal and ironstone extraction from the latter half of 18th century. Surviving features include the remains of extensive coal and ironstone workings and a well-preserved complex of water-management features associated with the Dowlais Free Drainage System, as well as the remains of a late 18th- early 19th century deserted ironworkers' settlement at Ffos-y-fran.

Table 4 Cultural Landscape Aspect Areas

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
Cynon CL056 Designated Landscape Areas	Classified at Level 3 as Institutions and at Level 4 as Other Institutions. Large expanses of (mostly) upland and moorland landscape throughout the Study Area; variously designated statutorily as Sites of Special Scientific Interest or locally as Special Landscape Areas, Sites of Interest for Nature Conservation or as part of the Coalfield Plateaux; a reflection of 20th/21st century perceptions of the value of protecting both natural habitats and of rural areas of lesser importance though with aesthetic and sensory value; containing historic and contemporary evidence of human occupation and exploitation in the form of prehistoric monuments, redundant industrial workings and transport systems and forestry; a commodity for leisure enjoyment; very extensive "green lungs" to supplement those in urban landscapes that they surround.	High	Examples of policy determination to protect the natural and visual attributes of large areas of landscape from being overrun by development, and for the benefit of both people and wildlife.
Cynon CL045 Rhymney Sirhowy Ebbw Valleys	Classified at Level 3 as Urban and at Level 4 as Urban Settlement. Separated by ridges, these three valleys contain strings of settlements with colourful, varied and resonant histories, but they are combined into one Aspect Area because of the similarity of their contemporary cultural essence, predominantly regeneration activity: new-build housing, business and industrial parks, designated green spaces, creation of country parks from derelict land as local leisure amenities, and improvements to roads and traffic systems. The latter are especially injurious to the landscape, but help to reinforce the all-pervasive culture of regeneration.	High	Determined efforts to regenerate and for rich historical associations.
MRTHR CL015 Merthyr Common	Classified at Level 3 as Rural. Mixed landscape use; industrial remains in N; moorland with prehistoric remains; field systems and forestry in S	High	Good example of a multi-period, multi-layered landscape whose cultural essence is mostly intact.

Table 5 Visual & Sensory Aspect Areas

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
Cynon VS193 Rhymney	Classified at level 3 as Village	Low	Little to distinguish village in upland valley setting apart from moderate sop (75% criteria's low)
Cynon VS361 Rhoslas	Classified at Level 3 as Upland Grazing. An upland area lying at approximately 400mAOD of rough grassland, but strong underlying feel of industrial past. Industrial remnants include old railway sidings/earthworks. Views dominated by adjacent upland areas. Overhead	Moderate	Partially degraded upland landscape with industrial debris and other visual detractors. Potential to regenerate to natural type.

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
	pylons are visual detractors, and A465 noise/movement impact. Overall a discordant area with slightly unsettling air.		High scenic quality, low integrity, moderate character, moderate rarity
Cynon VS209 West of Rhymney	Classified at Level 3 as Hillside & Scarp Slopes Mosaic. Upper valley sides with strong upland feel, both from the strong visual link that exists and the rough grazed grassland with some small coniferous elements. Dominant character is that of an upland area but borders on settlement of Rhymney. Visual detractors include pylons on skyline to south and Capital Valley and the Heads of the Valleys industrial estates. Some noise and movement from the A465 to the north.	Moderate	Open generally unspoilt valley side, but detractive elements e.g. urban edge, pylons traffic noise. Scenic quality, integrity, character and rarity all moderate
Cynon VS785 Parc Cwm Darran	Classified at Level 3 as Open/Wooded Mosaic Upland Valleys. Upland valleys ranging from approximately 200m to 350mAOD, with a complex mix of broadleaf/conifer/mixed woodland, with open areas of bracken and rough grassland with isolated settlement and some relicts of industrial /mining past and disused railway. The relatively narrow landform and mosaic pattern contribute to sense of enclosure.	Moderate	Upland valley with mix of vegetation cover and past industrial remains, of local importance. Scenic quality, integrity, character and rarity all moderate
MRTHR VS506 Upper Taff Bargoed Valley	Classified at Level 3 as Open Upland Valleys. Several small mountain streams join the Bargod Taf at Cwm-Bargoed to flow in a steep-sided valley southwards. The slopes are generally more steep and open on the east side. The area is defined by its remnant field pattern, which contrasts with the adjacent open commons and also with the more wooded and enclosed valley to the south. It is a very remote area at the head of the valley with very limited road access - a minor road/track from the upland to the north. There are a few isolated farmsteads There is also an awareness of past industrial activity on a small-scale through disrupted ground levels and rusting machinery/containers. The agriculture of the area is marginal and this is reflected in the land cover. There is a distinctive mosaic of unmanaged hedges to fields fading up slope to wire fences and then to open moorland. The mineral railway runs through the area to the massive and bleak coal washery at the head of the valley. This is an unexpected feature and forms an abrupt end to the remote and undisturbed quality of the landscape.	Moderate	The area is remote and of consistent character and sense of place with pleasant views down the valley and to some of the surrounding uplands. However, the area shows signs of decline in field pattern and presence of rusting machinery. Scenic quality, integrity, and character all moderate, rarity low
MRTHR VS452 Merthyr Common	Classified at Level 3 as Upland Moorland. The area is one of rounded summits above broad sweeps of grassland across the ridgelines which separate the U-shaped valleys below. The vegetation is sparse - very well grazed areas of grass with soft rush in wetter patches. There are many groups of ponies and sheep some of which appear to be in poor condition. There is no settlement on the Common as farms are situated on the enclosed land below the ridges. The enclosures along the edge of the Common are generally dry stone walls with some post and wire fences. A few narrow roads and tracks cross the area and all have undefined and ragged edges. Fly tipping is apparent in parts as is the clutter of old fences and signs which have not been cleared away. The northern end of the Common contrasts with the narrow	Low	The area allows panoramic views of the coalfield plateau. However, it suffers from tipping, derelict structures and the presence of urban areas nearby. Management of the area is therefore difficult. The coal washery is a detractor. Scenic quality, integrity, and rarity all low, character moderate

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
	ridgeline to the south. It is more remote from existing settlement at the same time as showing greater evidence of past activity in the form of man made ponds, tramways, etc. In addition the Cwm Bargoed coal washery is a *[end of sentence missing from LANDMAP data]*.		

Landscape context

1.3 The following additional aspect areas occur within the 5 kilometres context study area:

Table 6 Geological Landscape Aspect Areas

Aspect Area	Level 1 Classification	Level 2 Classification	Level 3 Classification	Overall Evaluation	Justification
BLNGW GL001 Trefil	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley	High	Key exposures of Carboniferous Dowlais Limestone with stratigraphic importance, also karstic features and potential RIGS site
BLNGW GL002 Dros y Llyn	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley	High	Includes potential RIGS site for Millstone Grit stratigraphy, including Basal Grit karstic features
BLNGW GL003 Tynewyd	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley	Moderate	Lower Coal Measures Group dip slopes with boulder clay cover - no significant exposures of widespread deposits.
BLNGW GL004 Rassau	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley	Moderate	Lower, sandstone dominated part (Garw Sandstone) of Productive Coal Fm (Upper Carboniferous) with dip slopes covered with boulder clay - widespread deposits with little notable exposure.
BLNGW GL005 Nant y Bwch	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley	Moderate	Productive Coal Fmoutcrop with many disused mines, tips, and large areas of worked out opencast and made ground - although with no significant remaining exposures of widespread deposit.
BLNGW GL006 Bedwellte	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley	Moderate	Pennant Sandstone succession typical of region, mine tips, quarries present but no notable exposures recorded.

Aspect Area	Level 1 Classification	Level 2 Classification	Level 3 Classification	Overall Evaluation	Justification
BLNGW GL007 Cefn Golau	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley	Moderate	Outcrop of widespread Pennant succession - coal mines, landslips, present but no notable exposures.
BLNGW GL008 Sirhowy Valley	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley	Low	River and floodplain in part altered by industrial and urban development.
BLNGW GL009 Coed y Rhyd	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley	Moderate	Outcrop of widespread Pennant succession, also coal tips, quarries, landslips, etc., but no recorded notable localities
BLNGW GL010 Ebbw Vale	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley	Moderate	Productive Coal Fm outcrop of North Crop - many mines, waste tips, large area of worked out and reclaimed land, large landslips, etc., but no recorded localities of significant geological/ geomorphological significance, although some may have historical significance.
BRCKN GL372 Mynydd Llangynidr - Mynydd Llangatwg	Karst	Karst	Doline or sink field, pavements, dry valleys, etc	Outstanding	Carboniferous Limestone karstic geomorphology; Mynydd Llangatwg (Mynydd Llangattock) 3190156 214581 SSSI - karst and caves (+GCR Llangatwg, Llangynidr and Draenen) , Siambre Ddu SSSI
BRCKN GL785 Dyffryn Crawnon	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley (Level 4 Glacial U-shaped valley)	Outstanding	SSSI Brecon Beacons 302500 219760;- Quaternary geomorphology, Palaeozoic palaeobotany, ORS stratigraphy
BRCKN GL811 Waun Rydd	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley	Outstanding	SSSI Abercriban Quarries 306365 212663 - Non-marine Devonian (ORS); ORS stratigraphy; escarpment with U-shaped Taf fechan valley
Cynon GL003 Upper Sirhowy valley	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley	Moderate	Widespread Pennant sandstone succession in upper part of valley with some disused quarries
MRTHR GL001 AvonTaf	Mountain and upland valley	Upland and mountain river and stream	Active upland river or stream channel system	Low	Alluvial valley floor in glacial U-shaped valley
MRTHR GL005	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley	High	Rotational periglacial landslip, eroded cirque;

Aspect Area	Level 1 Classification	Level 2 Classification	Level 3 Classification	Overall Evaluation	Justification
Aberfan					Pennant stratigraphy
MRTHR GL006 Merthyr Vale	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley	High	Rotational periglacial landslip; Pennant stratigraphy, coal and sandstone workings
MRTHR GL007 Gellideg	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley	Moderate	Mudstone dominated Middle Shale - Producitve Coal fms of valley slopes, coal and ironstone workings
MRTHR GL008 Dowlais Top	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley	Moderate	Productive Coal Formation, many old coal and iron workings, large areas of made and reclaimed land
MRTHR GL009 Pen-y-darren	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley	Moderate	Dip slopes in Namurian Middle Shales - L Westphalian Farewell Rock Fm; areas of made ground
MRTHR GL010 Bryniau	Mountain and upland valley	Undulating upland terrain and dissected plateau	Upland valley slope	High	Karstic dip slope in Millstone Grit Basal Grit Fm
MRTHR GL011 Cwm Taf Fechan	Karst	Karst	Doline or sink field, pavements, dry valleys, etc	Outstanding	SSSI Nant Glais Caves (303960 210675); Karstic dip slope, incised valleys with caves, tufa, working and disused limestone quarries; Potential RIGS
MRTHR GL012 Garn Ddu	Mountain and upland valley	Undulating upland terrain and dissected plateau	Upland valley slope	Moderate	ORS stratigraphy; sandstone dip slopes; upper glacial valleys
MRTHR GL017 Cwm Bargoed	Mountain and upland valley	Glaciated mountain terrain	Glacial mountain valley	Moderate	Fluvial and fluvioglacial sediments of glacial U-shaped valley floor

Table 7 Landscape Habitat Aspect Areas

Aspect Area	Level 1 Classification	Level 2 Classification	Level 3 Classification	Overall Evaluation	Justification
BLNGW LH001	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Marsh/Marshy Grassland	High	**Note:** None provided in LANDMAP database for the majority of LH aspect areas
BLNGW LH002	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Calcareous Grassland	Moderate	

Aspect Area	Level 1 Classification	Level 2 Classification	Level 3 Classification	Overall Evaluation	Justification
BLNGW LH003	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Improved Grassland	Moderate	
BLNGW LH004	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Improved Grassland	Moderate	
BLNGW LH006	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Improved Grassland	Moderate	
BLNGW LH007	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Acid Grassland	Moderate	
BLNGW LH008	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Neutral Grassland	High	
BLNGW LH011	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Improved Grassland	High	
BLNGW LH014	Dry (Relatively) Terrestrial Habitats	Woodland & Scrub	Mixed Woodland	Moderate	
BLNGW LH015	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Acid Grassland	High	
BLNGW LH019	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Acid Grassland	Moderate	
BLNGW LH020	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Acid Grassland	Moderate	
BLNGW LH021	Dry (Relatively) Terrestrial Habitats	Tall Herb & Fern	Bracken	High	
BLNGW LH022	Dry (Relatively) Terrestrial Habitats	Tall Herb & Fern	Bracken	Moderate	
BLNGW LH023	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Improved Grassland	Moderate	
BLNGW LH024	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Neutral Grassland	High	
BLNGW LH025	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Acid Grassland	High	
BLNGW LH026	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Improved Grassland	Low	
BLNGW LH027	Dry (Relatively) Terrestrial	Woodland & Scrub	Coniferous Woodland	Moderate	

Aspect Area	Level 1 Classification	Level 2 Classification	Level 3 Classification	Overall Evaluation	Justification
	Habitats				
BLNGW LH028	Dry (Relatively) Terrestrial Habitats	Heathland	Dwarf Shrub Heath	High	
BLNGW LH029	Dry (Relatively) Terrestrial Habitats	Built Up Areas	Residential/ Green Space	Low	
BLNGW LH097	Dry (Relatively) Terrestrial Habitats	Built Up Areas	Residential/ Green Space	Low	
BRCKN LH153 Pontsticill	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Acid Grassland	Moderate	Largely semi-improved habitat of local value to wildlife.
BRCKN LH265 Mynydd Llangynidr	Dry (Relatively) Terrestrial Habitats	Heathland	Dwarf Shrub Heath	High	Extensive area of heathland vegetation of high nature conservation interest.
BRCKN LH807 Byniau Gleision - Waun y Gwair	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Marsh/Marshy Grassland	High	Semi-natural habitat of high nature conservation value.
BRCKN LH912 Brecon Beacon Reservoirs	Wet Terrestrial Habitats	Open Water	Reservoirs & Lakes & Margins	High	Reservoirs of local nature conservation interest with the exception of species such as Violet Crystalwort where they are probably of regional to national interest.
Cynon LH107	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Marsh/Marshy Grassland	High	Valuable habitat that has potential to support key species.
Cynon LH108	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Acid Grassland	High	A good variety of valuable habitats.
Cynon LH110	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Improved Grassland	Moderate	
Cynon LH111	Dry (Relatively) Terrestrial Habitats	Cultivated/ Disturbed Land		Low	Low ecological value habitat with no key species.
Cynon LH112	Costal & Marine Habitats	Mosaic	Mosaic	High	A number of Priority habitats and area does have potential to support key species.
Cynon LH113	Wet Terrestrial Habitats	Open Water	River Corridors	Low	Man made habitat built up habitat with no key species records.

Aspect Area	Level 1 Classification	Level 2 Classification	Level 3 Classification	Overall Evaluation	Justification
Cynon LH114	Costal & Marine Habitats	Mosaic	Mosaic	High	Some valuable grassland habitats that have potential to support key species.
Cynon LH115	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Acid Grassland	High	Valuable unimproved habitat with potential to support key species.
Cynon LH117	Dry (Relatively) Terrestrial Habitats	Woodland & Scrub	Mixed Woodland	Moderate	Some high value habitat and also some lower value habitat.
Cynon LH118	Costal & Marine Habitats	Mosaic	Mosaic	High	High value habitat, some of which is Priority that has potential to support key species.
Cynon LH119	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Improved Grassland	Moderate	Generally low value but some more value habitat fragments are present.
Cynon LH120	Coastal & Marine Habitats	Mosaic	Mosaic	High	Valuable habitats supporting a number of key species.
Cynon LH121	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Improved Grassland	Moderate	Generally quite low but dry heath and semi-improved grassland areas add value.
Cynon LH122	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh		High	Valuable habitat some of which is Priority habitat.
Cynon LH123	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Improved Grassland	Moderate	Generally low vlaue improved grassland, but more valuable grasslands are present which support breeding Lapwings.
Cynon LH124	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Improved Grassland	Low	Low ecological value habitat with no records of key species.
Cynon LH128	Dry (Relatively) Terrestrial Habitats	Mosaic	Mosaic	Moderate	A contrast in high value areas supporting key species and low value areas.
MRTHR LH001	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Marsh/Marshy Grassland	High	
MRTHR LH003	Dry (Relatively) Terrestrial Habitats	Woodland & Scrub	Coniferous Woodland	Low	
MRTHR LH004	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Improved Grassland	Moderate	
MRTHR LH005	Dry (Relatively) Terrestrial Habitats	Woodland & Scrub	Broadleaved Woodland	Outstanding	
MRTHR LH006	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Calcareous Grassland	High	

Aspect Area	Level 1 Classification	Level 2 Classification	Level 3 Classification	Overall Evaluation	Justification
MRTHR LH008	Dry (Relatively) Terrestrial Habitats	Heathland	Dwarf Shrub Heath	High	
MRTHR LH009	Dry (Relatively) Terrestrial Habitats	Built Up Areas	Residential/Green Space	Low	
MRTHR LH010	Dry (Relatively) Terrestrial Habitats	Woodland & Scrub	Coniferous Woodland	Low	
MRTHR LH011	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Acid Grassland	Moderate	
MRTHR LH012	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Improved Grassland	Moderate	
MRTHR LH013	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Improved Grassland	High	
MRTHR LH014	Dry (Relatively) Terrestrial Habitats	Woodland & Scrub	Coniferous Woodland	Low	
MRTHR LH015	Dry (Relatively) Terrestrial Habitats	Grassland & Marsh	Improved Grassland	Moderate	

Table 8 Historic Landscape Aspect Areas

Aspect Area	Level 1 Classification	Level 2 Classification	Level 3 Classification	Overall Evaluation	Justification
BLNGW HL001 HAA 1 Trefil Ddu	Rural environment	Non agricultural	Marginal Land	High	An extensive, largely well-preserved area of open moorland; evidence of occupation ranging from the Bronze Age period to 20thC; 18th-19thC industrial remains a significant component, including the important Trefil Railroad, established in 1793.
BLNGW HL002 HAA 2 Nant Trefil Quarry	Built environment	Industrial	Extractive	High	A coherent extractive landscape comprising limestone quarry workings and associated settlement, with a series of field enclosures delineated by boundaries of traditional boulder dyke construction to the S; the quarries in use since the late 18th century and still operational; also

Aspect Area	Level 1 Classification	Level 2 Classification	Level 3 Classification	Overall Evaluation	Justification
					remains of the associated tramroad system; part of the heritage trail network established by Blaenau Gwent CBC and thus of recognised amenity value.
BLNGW HL003 HAA 4 Rassau Industrial Estate	Built environment	Industrial	Processing/ Manufacturing	Low	A modern development occupying an area with no significant evidence of earlier activity, with the exception of a local tramway network, which crosses the southern part of the area.
BLNGW HL004 HAA 5 Carno Plantation	Rural environment	Non agricultural	Woodland	Moderate	The construction of the Carno reservoir and extensive later 20th century forestry plantation have significantly impacted on the archaeological resource in this area, obscuring earlier patterns of landscape and settlement, although recent work following the draining of the reservoir identified evidence of post-medieval field boundaries associated with Carno Farm.
BLNGW HL006 HAA 6 Ebbw Vale	Built environment	Settlement	Nucleated Settlement	High	One of the major industrial settlements within the Blaenau Gwent area throughout the 19th and 20th centuries, with substantial extant evidence of 19th century workers' housing, industrial communications features and notable public buildings, including Christ Church and the Ironworks General Office
BLNGW HL013 HAA 13 Waundeg Industrial Estate	Built environment	Industrial	Processing/ Manufacturing	Moderate	Largely a small modern industrial estate of typical late 20th century design and construction; appears to have been built on land reclaimed from former quarry workings; 19th century quarry workers' settlement at Tafarnaubach survives in the southern part of the area.
BLNGW HL014 HAA 14 Tredegar Patch	Rural environment	Non agricultural	Reclaimed land	Low	Reflecting the impact of modern land reclamation and landscaping activity associated with the creation of Parc Bryn Bach, which has detracted from the value of the area in archaeological and historical terms, obscuring evidence of what was formerly a busy industrial extractive

Aspect Area	Level 1 Classification	Level 2 Classification	Level 3 Classification	Overall Evaluation	Justification
					landscape, as shown on earlier OS maps
BLNGW HL016 HAA 16 Tredegar	Built environment	Settlement	Nucleated Settlement	High	Area retains much of its 19th century street plan intact, with its focal point represented by the distinctive cast iron clock tower of 1858, and the survival of the historically important, scheduled remains of the late 18th-19th century Sirhowy Ironworks.
BLNGW HL017 HAA 17 Bryn Serth	Rural environment	Non agricultural	Reclaimed land	Low	Paucity of the archaeological resource as a result of modern land reclamation and redevelopment, which has largely removed evidence of the industrial extractive landscape shown on the OS 1st edition map
BLNGW HL018 HAA 18 Waun y Pound Woods	Rural environment	Non agricultural	Woodland	Low	The impact of modern land reclamation and forestry plantation have significantly obscured evidence of the earlier 19th-20th century industrial extractive activity that previously dominated this landscape
BLNGW HL019 HAA 19 Ebbw Vale Fieldscape	Rural environment	Agricultural	Regular Fieldscapes	Moderate	The fieldscape has been impacted by extractive activity and intrusive development in the form of a small garden suburb.
BLNGW HL026 HAA 26 Rhymney Hill	Rural environment	Non agricultural	Marginal Land	High	Reflects the largely intact survival of this bleak, open landscape of unenclosed upland moorland and the presence of the scheduled site of the early 19th century cholera cemetery at Cefn Golau, an extremely rare survival of considerable historic importance
BLNGW HL027 HAA 27 Bedwellte Fieldscape	Rural environment	Agricultural	Irregular Fieldscapes	High	Reflects the well-preserved character of this upland fieldscape and the reasonably diverse scope of the archaeological resource, with evidence of pre-industrial settlement, extensive industrial extractive activity and a post-medieval cemetery site.
BLNGW HL028 HAA 28	Rural environment	Non agricultural	Woodland	Moderate	The modern coniferous plantation has largely obscured evidence of the earlier mixed fieldscape

Aspect Area	Level 1 Classification	Level 2 Classification	Level 3 Classification	Overall Evaluation	Justification
Coed y Rhyd					shown on the OS 1st edition map, incorporating elements of landscape of open moor and enclosed fields, as well as evidence of late 19th-early 20th century industrial extractive activity.
BLNGW HL029 HAA 29 Cefn Manmoel	Rural environment	Non agricultural	Marginal Land	High	A multi-period upland landscape containing evidence of prehistoric, early medieval, post-medieval and modern activity; cross ridge dyke feature extending into the southern part of the area, one of a number of such linear earthworks in southeast Wales, date and function uncertain, perhaps early medieval means of controlling access along natural routeways.
BLNGW HL036 HAA 36 Mynydd Bedwellte	Rural environment	Non agricultural	Marginal Land	High	Well-preserved character of this extensive tract of open moorland and the multi-period range of the archaeological resource, with possible traces of prehistoric funerary activity and considerable evidence of 19th-20th century industrial exploitation (represented by the Bedwellty Pits and associated features).
BLNGW HL310 HAA 48 Bedwellty Park	Built environment	Other built environment	Designed (Level 4 Urban Park/Public Space)	Outstanding	An exceptionally well-preserved example of an early 19th century urban landscape park, with strong historic associations with the Homfrays of Merthyr and retaining much of its original built features and landscaping intact, including the Regency mansion of Bedwellty House and a remarkable icehouse/chapel building of 1818.
BRCKN HL133 Mynydd Llangynidr	Rural environment	Non agricultural	Marginal Land	Outstanding	Extensive area of marginal land dominated by prehistoric settlement and burial archaeology and post medieval farming remains; area scoring highly in all criteria.
BRCKN HL750 Abercriban Quarry	Built environment	Industrial	Extractive	Moderate	Area of disused quarries and relict industrial landscape, now reverting to agriculture.

Aspect Area	Level 1 Classification	Level 2 Classification	Level 3 Classification	Overall Evaluation	Justification
BRCKN HL864 Taf Fechan	Rural environment	Non agricultural	Woodland	Outstanding	Complex reservoir system lying within afforested valley. Overlying evidence of prehistoric activity.
Cynon HL483 Rhymney Hill	Rural environment	Non agricultural	Marginal Land	Moderate	This aspect area comprises two distinct landscape elements: the large expanse of unenclosed open moor occupying the central and southern parts of Rhymney Hill and the extensive, long-established industrial extractive landscape (including large tracts of recently reclaimed opencast mining) within the northern and western parts. The moderate value assigned to this are reflects the impact of opencast mining and subsequent land reclamation on the coherence of the landscape and the survival of the archaeological resource
Cynon HL696 Mynydd Bedwellte and Cefn Manmoel	Rural environment	Non agricultural	Marginal Land	Moderate	The coherence of this aspect area has been moderately impacted by 20th century industrial extractive activity; however, the survival of the cross ridge dyke feature on Cefn Manmoel provides evidence of earlier, possibly medieval occupation. Overall, however, the assessment of this area has been given as 'moderate', based on the limited coherence of the landscape and the modest nature of the archaeological resource
Cynon HL706 Pen March	Rural environment	Non agricultural	Marginal Land	Moderate	An extensive area of unenclosed open moorland, forming the easternmost outlier of Merthyr Common, which has remained largely unchanged since the late 19th century... The moderate value assigned to this area reflects the limited nature of the archaeological resource identified in this area
Cynon HL885 Bedwellte	Rural environment	Agricultural	Irregular Fieldscapes	Moderate	An extensive, reasonably well preserved irregular rural fieldscape of post-medieval date with limited evidence of 19th-20th century industrial exploitation and modern afforestation; the moderate value assigned to this area reflects the limited nature of

Aspect Area	Level 1 Classification	Level 2 Classification	Level 3 Classification	Overall Evaluation	Justification
					the available archaeological record
MRTHR HL002 Garn Ddu	Rural environment	Non agricultural	Marginal Land	Outstanding	Represents an extensive, unspoiled area of largely unenclosed upland common, containing an exceptionally large and well-preserved series of cairns, hut circles and field/settlement enclosures and house platforms constituting a remarkable concentration of agricultural, funerary and settlement features ranging in date from the Bronze Age through to the medieval period.
MRTHR HL003 Taff Fechan valley	Rural environment	Agricultural	Irregular Fieldscapes	High	High reflecting the largely intact nature of the fieldscape and settlement pattern and its historic associations as a long-established communications route since the Roman period, distinguished by substantial remains of mid to late 19th century communications features, including the Morlais Tunnel and Pontsarn railway viaduct
MRTH HL004 Morlais	Rural environment	Non agricultural	Marginal Land	Outstanding	A relict, multi-period landscape which has been described as being of 'national importance' (Roberts, 2003), with extensive evidence of prehistoric, medieval and post-medieval field patterns and settlement features, dominated by the remains of Morlais Castle, a defensive site of high antiquity
MRTHR HL005 Merthyr Tydfil Core	Built environment	Settlement	Nucleated Settlement	Outstanding	A nationally important industrial centre during the 18th and 19th centuries. Merthyr Tydfil rapidly expanded from a modest village in the 1750s to become the largest town in Wales by 1801, its rapid growth fuelled by its association with the great expansion of the ironworking industry in this area from the mid 18th century onwards. Despite impacts from extensive recent land reclamation and the expansion of 20th century

Aspect Area	Level 1 Classification	Level 2 Classification	Level 3 Classification	Overall Evaluation	Justification
					social housing, the town and its environs, together with the extant remains of the ironworks at Cyfarthfa, Dowlais and Ynysfach, constitute what has been characterised as 'a potent example of an internationally renowned industrial landscape of the 18th and 19th centuries.
MRTHR HL006 Cwm-glo and Bryn-y-Badell	Built environment	Industrial	Extractive	Outstanding	A complex, historically significant industrial/extractive landscape with extensive, reasonably well-preserved remains of 18th-20th century coal and ironstone workings and related features, which has been characterised as being of 'national and international importance'
MRTHR HL009 Pen March	Rural environment	Non agricultural	Marginal Land	High	Survival of extensive remains of the Dowlais Free Drainage System and other water-management features and quarries associated with the Dowlais Ironworks, which together represent a significant concentration of 19th century industrial water-management features of considerable historical importance
MRTHR HL010 Graweth	Rural environment	Agricultural	Irregular Fieldscapes	Moderate	Fragmented condition of the irregular fieldscape surrounding the ruined farmsteads of Graweth and Pen-y-lan and the fact that modern reclamation activity has removed many of the 19th century ironstone and coal workings and associated features in the central and northern parts of the aspect area
MRTHR HL011 Mynydd Merthyr and Mynydd Gethin	Rural environment	Non agricultural	Marginal Land	High	Survival of the pre-industrial character of the landscape, characterised by largely unenclosed, marginal upland pasture and the presence of a prehistoric ritual/funerary landscape on the western edge of the aspect area
MRTHR HL012 Taff valley corridor	Built environment	Settlement	Nucleated Settlement	High	Historic importance of the Taff Valley as a key industrial transport corridor, evidenced by the survival of extensive remains of industrial communication features

Aspect Area	Level 1 Classification	Level 2 Classification	Level 3 Classification	Overall Evaluation	Justification
					(canals, disused tramroads and railway lines) and well-preserved 19th century industrial settlements at Abercanaid, Llwyn-yr-Eos and Pentrebach. The decision to rate this area as high rather than outstanding reflects the extent to which the remains of communication features have been impacted by modern infrastructure work and land reclamation activity
MRTHR HL014 Cefn-y-Fan	Rural environment	Non agricultural	Marginal Land	Outstanding	An extensive, well-preserved area of marginal upland common pasture, with significant evidence of Bronze Age burial, ritual and field clearance activity, represented by the substantial groupings of cairns at Mynydd Cilfach-yr-encil and, in particular, Cefn Merthyr.
MRTHR HL015 Gelligaer Common (west)	Rural environment	Non agricultural	Marginal Land	Outstanding	Remarkably intact character of this upland landscape and the exceptionally rich, multi-period quality of the archaeological resource, attesting to a remarkable continuity of occupation since the prehistoric era.
MRTHR HL016 Cwm Bargod East	Rural environment	Agricultural	Irregular Fieldscapes	High	Reasonably well-preserved character of the fieldscape and settlement pattern in this area, in spite of limited encroachment by industrial extractive activity, and the multi-period nature of the archaeological resource, with evidence of prehistoric and medieval settlement and ritual activity
MRTHR HL018 Cyfarthfa Castle	Built environment	Other built environment	Designed (Level 4 Designed Parkland/ Garden)	Outstanding	An important, extremely rare and well-preserved example of an ironmaster's residence and estate, with strong historic associations as the seat of the Crawshay family. Registered park and garden. A nationally important group of interrelated listed buildings centred upon a Grade I listed castellated mansion...
MRTHR HL019 Twynau Gwynion	Built environment	Industrial	Extractive	High	Constitutes a well-defined, defined area of 19th -early 20th century limestone quarrying (now disused), with important historic links to the

Aspect Area	Level 1 Classification	Level 2 Classification	Level 3 Classification	Overall Evaluation	Justification
					Dowlais and Rhymney Ironworks with reasonably well-preserved remains of associated railways and tramroads. The decision to rate Twynau Gwynion as high rather than outstanding is based on two counts: 1/ it represents one of three well-preserved quarry sites linked with major ironworking complexes within the Merthyr historic landscape (consequently reducing its rarity value) and 2/ the quarry complex at Cwm-Glo and Bryn y Badell contains a much greater density of surviving features (hence the evaluation of HL006 as outstanding)
MRTHR HL021 Morlais Quarries	Built environment	Industrial	Extractive	High	A visually striking and historically important extractive landscape of late 18th-19th century date, with substantial extant remains of the transport network linking the quarries with the Dowlais and Penydarren Ironworks. The decision to rate Morlais as high rather than outstanding reflects the fact that it represents one of three well-preserved quarry sites linked with major ironworking complexes within the Merthyr historic landscape (consequently reducing its rarity value) and that Cwm-Glo and Bryn y Badell contains a much greater density of surviving features (hence the evaluation of HL006 as outstanding).
MRTHR HL022 Bargod Taf and Bedlinog corridor	Built environment	Other built environment	Communications	High	Important as an industrial communication corridor through the Cwm Bargod valley and the survival of key components in a relatively intact condition, including the line of the Great Western and Rhymney Valley Railway (partially in use as a mineral railway) and mid-late 19th century coalmining settlements established on the slopes of Cwm Bargod at Bedlinog and Cwmfelin containing well-preserved examples of workers' terraced housing

Aspect Area	Level 1 Classification	Level 2 Classification	Level 3 Classification	Overall Evaluation	Justification
MRTHR HL024 Mid Taff enclosed valleyside	Built environment	Industrial	Extractive	High	Reasonably intact condition of the upland pastoral fieldscape and the presence of substantial extant remains of mid 19th century extractive activity specifically associated with the 'steam coal' industry, now obscured by extensive late 20th century forestry plantations which have detracted from the coherence of this landscape.

Table 9 Cultural Landscape Aspect Areas

Aspect Area	Level 1 Classifi-cation	Level 2 Classifi-cation	Level 3 Classifi-cation	Level 4 Classifi-cation	Overall Evaluation	Justification
BLNGW CL149 Ebbw Vale	Influences	Material expressions	Urban	Urban Settlement	Outstanding	Highly significant former major industrial settlement along the Heads of the Valleys
BLNGW CL221 Industrial Islands	Influences	Material expressions	Rural	Rural Settlement	Moderate	Because they exist as clearly identified landscape elements with very strong historic origins
BLNGW CL228 Special Landscape Areas	Associations	Notional Expressions	Institutions	Other Institutions (specify)	Outstanding	As a defined area of landscape with specific designation
BLNGW CL365 Tredegar	Associations	Notional Expressions	Institutions	Politics	Outstanding	Although the Aspect Area is currently experiencing economic problems its significance as a 19th century "valleys" town with its planned layout and the associations is outstanding
BLNGW CL578 Bedwellty Park & Town Clock	Associations	Notional Expressions	Places	Sense of Place	Outstanding	As very important examples and manifestations of 19th century creativity. They are iconic manifestations that represent the cultural focus and character of Tredegar town and its communities

Aspect Area	Level 1 Classifi-cation	Level 2 Classifi-cation	Level 3 Classifi-cation	Level 4 Classifi-cation	Overall Evaluation	Justification
BLNGW CL678 Country Parks	Influences	Material expressions	Infrastructure	Tourism	High	High at the moment but likely to become "outstanding" as the individual Country Parks become significant to wider audiences
BLNGW CL843 General upland Areas, inc. pre-industrial	Influences	Material expressions	Rural	Other Rural (specify)	Outstanding	The classification is given in this instance because of the physical representation of culture in the form of the remaining farms, small holdings, field boundaries and agricultural practices. The condition and trend valuations should only treated as generalisations as there are instances of both good and poor quality
BLNGW CL937 Trefil	Associations	Notional Expressions	Places	Sense of Place	High	Strong sense of place, of community and compactness
BLNGW CL971 "Limestone" landscapes	Associations	Notional Expressions	Places	Sense of Place	Outstanding	As an area of land that has great historic evidence and a visually important part of the Heads of the Valleys. Also potential for increasing cultural usage including recreation
BLNGW CL980 Industrial Estates & Business Parks	Influences	Material expressions	Urban	Light Industry & Technology	Outstanding	Exemplification of the change in economic dependence from monolithic heavy industries to inward investment and individual entrepreneurial activity
BRCKN CL839 The Beacons	Associations	Notional Expressions	Places	Other Places (specify)	Outstanding	Outstanding as an image and a concept deeply embedded in people’s perception
BRCKN CL935 Reservoirs	Associations	Notional Expressions	Customs	Leisure/ Recreation	Moderate	Culturally they are judged to be moderate because of their abundance in the landscape, despite their increasing use as leisure destinations

Aspect Area	Level 1 Classifi-cation	Level 2 Classifi-cation	Level 3 Classifi-cation	Level 4 Classifi-cation	Overall Evaluation	Justification
Cynon CL047 Country Parks	Associations	Notional Expressions	Customs	Leisure/ Recreation	High	High for their deliberate contribution to the improvement of the environment and to leisure and social engineering
Cynon CL051 Gelligaer Common	Associations	Notional Expressions	Institutions	Other Institutions (specify)	Outstanding	Outstanding as a relict evolved landscape of Special Historic Interest in Wales
MRTHR CL001 A470(T)	Influences	Material expressions	Infrastructure		Outstanding	Both as principal route N-S in Wales and as key feeder road for Merthyr, the Aspect Area is judged as outstanding overall
MRTHR CL002 A465	Influences	Material expressions	Infrastructure		Outstanding	In addition to the A465's socio-economic importance, some of the bridge designs in the study area have won design awards
MRTHR CL003 National Cycle Network: Celtic Trail/Taf	Influences	Material expressions	Infrastructure		High	High, as a response to increased leisure time, contribution to encouraging a healthy lifestyle, re-use of redundant industrial route ways
MRTHR CL004 Llywyn-On and Pontsticyll Reservoirs	Influences	Material expressions	Infrastructure		Outstanding	Outstanding as examples of man-made features created for social and industrial purposes while presenting landscapes of great aesthetic appeal
MRTHR CL005 Garn Ddu Uplands	Influences	Material expressions	Rural		High	High, as a surviving upland relict landscape with evidence of evolved use
MRTHR CL006 Vaynor (inc. Pontsticyll, Pontsarn, Fiel	Influences	Material expressions	Rural		Outstanding	Outstanding as an area containing varied historic features, now returning to its former position as a leisure and recreation area
MRTHR CL007 Morlais Castle and	Influences	Material expressions	Infrastructure		Outstanding	Relict landscape illustrating sequential land use, but dominated by two distinctly separate

Aspect Area	Level 1 Classifi-cation	Level 2 Classifi-cation	Level 3 Classifi-cation	Level 4 Classifi-cation	Overall Evaluation	Justification
Quarries						periods and uses - mediaeval fortification and 19th century quarrying
MRTHR CL009 Pantyscalliog	Influences	Material expressions	Urban		High	Example of endeavours to recover from economic and social depression and deprivation
MRTHR CL010 Dowlais Superstore Estate	Influences	Material expressions	Urban		Outstanding	Outstanding as an example of 20th/21st century out-of-town retail centre entirely dependent on the use of motor transport
MRTHR CL011 Cefn Coed y Cymmer and cemetry	Influences	Material expressions	Urban		High	Historical connections with Cyfarthfa Ironworks and results of unhealthy living conditions in form of cholera cemetery
MRTHR CL012 Gurnos and Galon Uchaf Estates and Hospital	Influences	Material expressions	Urban		Outstanding	Outstanding as a strong cultural expression whose essence will, paradoxically, be eroded by the commendable and energetic efforts to improve the Aspect Area's society, well-being and economy
MRTHR CL013 Penydarren and Park	Influences	Material expressions	Urban		High	High as an apparent example of a determination to establish and maintain a settle middle-class enclave
MRTHR CL014 Dowlais, Dowlais Top, Dowlais Great Tip	Influences	Material expressions	Urban		Outstanding	Outstanding because of the Aspect Area's central place in the history of Merthyr as one of the most significant industrial settlements, and associations with ironmasters, politics and industrial innovation
MRTHR CL016 Cynfarthfa Castle, Park, Furnaces and Po	Associations	Notional Expressions	Places	Sense of Place	Outstanding	One of the finest surviving examples of an ironmaster's house and park coupled with adjacent Furnaces; very high profile as an historically important place central to

Aspect Area	Level 1 Classifi-cation	Level 2 Classifi-cation	Level 3 Classifi-cation	Level 4 Classifi-cation	Overall Evaluation	Justification
						Merthyr's past
MRTHR CL017 Gellideg, Heolgerrig, Mynydd Aberdar	Influences	Material expressions	Urban		Moderate	Moderate because of creeping change and dilution of what was once a clearer cultural identity
MRTHR CL018 Williamstown , The Quar, Georgetown, Morg	Influences	Material expressions	Urban	Urban Settlement	Moderate	Moderate, though (paradoxically, perhaps) the Aspect Area may be said to be an outstanding example of visual, social and cultural anonymity and mediocrity
MRTHR CL019 Mynydd Merthyr	Influences	Material expressions	Rural		Moderate	Moderate because one over-riding cultural essence is not discernible
MRTHR CL020 Merthyr Tydfil Industrial Estates, Pentr	Influences	Material expressions	Urban	Light Industry & Technology	High	High as an expression of landscape re-use for economic regeneration; reduced from 'Outstanding' because of general loss of historic evidence of an evolved economic landscape
MRTHR CL021 Troedyrhiw and Mount Pleasant	Associations	Notional Expressions	Institutions		Moderate	Moderately strong cultural essence as decline in congregations will lead to neglect of built fabric and religiosity in the community
MRTHR CL022 Aberfan and Merthyr Vale	Associations	Recorded Expressions	Media		Outstanding	Outstanding as a community whose very name is synonymous with a preventable disaster in which 116 children tragically died beneath a mountain of coal slurry
MRTHR CL024 Millenium Park and Climbing Centre, Cwm	Influences	Material expressions	Infrastructure	Tourism	Outstanding	Outstanding because, by virtue of its name, it symbolises optimism for a vibrant future in this Millennium; and as a fine example of regenerating redundant industrial

Aspect Area	Level 1 Classifi-cation	Level 2 Classifi-cation	Level 3 Classifi-cation	Level 4 Classifi-cation	Overall Evaluation	Justification
						landscape
MRTHR CL027 Cwmfelin and Bedlinog	Influences	Material expressions	Rural	Rural Settlement	High	High for architectural merit of schools and places of worship set in an essentially prehistoric and agricultural landscape
MRTHR CL028 Cwm Bargoed Mineral Railway	Influences	Material expressions	Infrastructure		High	High as an example of High Victorian engineering skill in overcoming topographical obstacles
MRTHR CL029	Influences	Material expressions	Infrastructure		Moderate	Outstanding as examples of man-made features created for social and industrial purposes while presenting landscapes of great aesthetic appeal

Table 10 Visual & Sensory Aspect Areas

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
BLNGW VS143 A465	Classified at Level 3 as Road Corridor. Major dual-carriageway passing through northern part of Blaenau Gwent. The western half of road is currently being rebuilt with large-scale intrusion of earthworks, noise and associated temporary structures causing much disruption. Eastern half of route is generally well-integrated without wide-scale views to it, but providing varied and interesting views from road.	Moderate	Not too ugly except where reconstruction
BLNGW VS214 Nant Trefil	Classified at Level 3 as Upland Grazing. Shallow valley linking Trefil with Heads of Valleys forming headwaters of Sirhowy River. Mainly consists of farmland and some scattered houses. Variety of field boundaries generally in poor condition with run-down character. The green of the semi-improved grasslands contrast with the adjacent open moor. Central reservoir is not conspicuous. From A465 there is a good view of small valley with stone viaduct which gives clear sense of place to the central part of the area. The edges of the area are defined by the extent of the enclosed fields to the north and by development to the south.	Moderate	Generally not strong character

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
BLNGW VS242 H. of V. ind. ests	Classified at Level 3 as Urban Grids of modern industrial buildings located uncomfortably in vast bleak open landscape. Buildings consist mainly of large pale-coloured sheds, few with taller chimneys, etc. often seen against skyline. Geometric shapes contrast harshly with flowing natural lines of Brecon Beacons. Belts of woodland planting within and around the estates are not mature enough effectively soften or integrate the buildings yet from wider landscape. Viewed widely from towns and main road, mainly unscreened or softened by planting although future trees will improve the mitigation. They bring intrusive noise, movement and night-time light into the adjacent countryside.	Low	Unattractive buildings, out of keeping in overall exposed landscape. Generally unsightly.
BLNGW VS246 Tredegar post-ind.	Classified at Level 3 as Amenity Land Series of linear areas restricted to valley bottoms showing clear evidence of relatively recent industrial disturbance. Occur throughout all the valleys, interlinked with the main towns and other settlements. Great mixture of post-industrial uses and neglect gives un-coordinated appearance to parts but having the continuity of disturbed land. Large-scale horizontal and geometric shapes relating to reclamation, sports and industrial buildings dominate in parts. Other parts are naturalised and unrestored. Rivers often hidden or overpowered by development. Highly visible from valley sides above and from main routes along valleys and therefore important to 'image' of valleys.	Moderate	Clear landform but compromised by muddle of development. Some good elements within disjointed areas. Strong topography
BLNGW VS334 Scotch Peter	Classified at Level 3 as Wooded Upland & Plateaux Lower gentle west-facing slopes of ridge mainly covered with coniferous forestry with fields in south. Northern edge adjacent to road has poor quality, with neglected, felled but unplanted parts and unused reservoir. Focal point is reservoir on lip of valley with fine views westward, popular for recreation. Other parts are not so accessible. Forestry does not appear discordant in most places, and much of area hidden from view from within valley. Southern fields are remote and not seen except from a distance across valley.	Moderate	Pleasant area of forestry. Accessibility means that forestry is more valued than otherwise
BLNGW VS352 Trefil	Classified at Level 3 as Excavation Set in shallow valley and surrounded by open moorland this quarry and village form the only major feature within Brecon Beacons part of Blaenau Gwent. Working quarry adds intrusive noise, dust and lorries but is not particularly prominent. The loosely-structured village merges with the disturbed land of past workings which are now generally softened with sheep-grazed grassland. Small-scale fields with stone walls, paddocks, allotments integrated with scattered houses and few trees contrast with large-scale open surrounds and gives special sense of place. Village feels run-down with areas of neglect. The northern part of the quarry area is becoming naturalised.	High	Attractive and interesting feature degraded rather by workings. Unique to county
BLNGW VS399 Mynydd Llangynidr	Classified at Level 3 as Upland Moorland This area forms all of the northern edge of Blaenau Gwent and consists generally of expansive south-facing gently undulating slopes of Brecon Beacons. Mainly open grassy moorland with patches of heather, rock outcrops, pools and one or two larger areas of water, but few trees or prominent features. Vast, uninviting, bleak, exposed and unpeopled	High	Large scale of open moorland - attractive and clear sense of place

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
	contrasting abruptly with 'busy' Heads of Valleys areas. Wide views to empty horizons especially northward giving expansive sense of place. Few signs of extractive industry include tramways, small quarries, and the 'patches'. Away from the immediate vicinity of the A465 and edges of towns it is very quiet, with little access and no settlements. Some tipping, burnt-out cars, etc. adjacent to roads detracts generally.		
BLNGW VS431 Rassau open	Classified at Level 3 as Informal Open Space Strip of semi-rural land between industry and residential and A465. Mix of woodland, small fields and buildings with no clear sense of place or purpose. General air of disturbed land and neglect. Only the central part, around the stream, is more enclosed and intimate. The area is not much viewed except at close quarters.	Low	Generally degraded. Bit of a non-area
BLNGW VS436 Brynbach Park	Classified at Level 3 as Mosaic Upland & Plateaux Gentle north-facing slopes of Heads of the Valleys in western part of county on edge of Tredegar. Wooded and grassy country park on reclaimed land centred around lake which forms focal feature, plus visitor centre. Generally tame and unspectacular around popular centre. Still not mature and will improve with age as trees grow giving more variety of enclosure. Busy with visitors in limited area but quiet beyond with no other settlement or development. Open views to nearby ridge and to nearby road construction and large industry.	Moderate	Undramatic
BLNGW VS673 Cwm Tyswg	Classified at Level 3 as Upland Grazing Shallow south-west facing valley sides defined by field pattern, forming eastern half of small side valley connecting to Rhymney Valley. Only part of Blaenau Gwent where visual links to Rhymney Valley. Hidden from areas to east. Peaceful undisturbed character with continuity of farming - fields, scattered trees, contrasting with busy Rhymney Valley and open exposed ridges. Mix of hedges, fences, stone walls. One or two scattered small farms and other buildings.	Moderate	Unspoilt but undistinguished
BLNGW VS688 Mynydd Bedwellte	Classified at Level 3 as Upland Moorland Series of north-south high open rounded ridges forming 'backbones' of Blaenau Gwent. Open, with mainly grass/heather moorland, with sheep, and no settlement. A few remnants of quarrying and tipping and associated disturbance in past. Provide sweeping skylines to both sides of most settled valleys, giving great contrast. Uncluttered, wild, unpeopled character contrast with valleys giving strong sense of place. 360° long-distance views from tops, with valleys totally hidden, gives very important remote quality. None of the ridges have any road access apart from sections of minor, little-used roads along edges of the areas, well away from the highest points. Some fly-tipping, etc. near roads.	High	Large areas of unspoilt open countryside, in close proximity to densely populated areas so great contrasts. Clear 'backbones' to valley character.
BLNGW VS713 Sirhowy Valley	Classified at Level 3 as Open/Wooded Mosaic Upland Valleys Most of both sides of the three main south-flowing valleys of Sirhowy, Ebbw and Ebbw fach. Steep, wild hillsides form major backdrop and enclosing elements of all settlements and therefore very important visually. Strong contrasts of	High	Distinctive valley formations, however landscape poor in places

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
	dark and light throughout day/year. Industrial scars, including quarries, tips, inclines, mines add interest throughout, in addition to semi-natural woodland, rocky outcrops, small fields and scattered small settlements with distinctive long-row patterns mainly associated with the quarries and mines. Edges around settlements tend to have unsightly neglect and abuse such as fly-tipping. Few large-scale detractors, but well hidden from most parts, also recent landslip/reclamation at Nantyglo. Various tracks and minor roads give access with interesting good views, but much of the area is not very accessible, adding to sensory appeal.		
BLNGW VS861 Waun-y-pound	Classified at Level 3 as Mosaic Upland & Plateaux Heads of Valley undulating plateau between settlements of Tredegar and Ebbw Vale. Largely disturbed land with reclamation and with mosaic of post-industrial uses and non-uses including industry and recreation, new roads and retail parks, interspersed with remnants of farmland. More farmed and wooded in south part. Panoramic views along and across valleys and to Brecon Beacons from high points and lips of valleys. Aneuron Bevan memorial on the highest point. General incoherence and state of change including run-down urban fringe. Extensive planted woodland in south-west part overlooking Tredegar and forming a backdrop to the town.	Low	No important attractive qualities
BLNGW VS958 Tredegar town	Classified at Level 3 as Urban Three separate towns of Tredegar, Ebbw Vale and Brynmawr, located in shallow Heads of Valleys basin. Core areas with some distinct buildings forming landmarks/focal points, mainly relating to past prosperity. These include church towers/spires and clock tower at Tredegar and provide an important part of individual identity of towns. Cores are a mix of restored and redeveloped urban land, with run-down parts. Outskirts tending to sprawl up valley sides, with 'anywhere' housing. The main routes by-pass the town centres and expose some unsightly back areas. Many fine views to adjacent high ridges, to Brecon Beacons and down main valleys help to provide sense of place and orientation. The areas are interlinked with the valley bottom post-industrial areas	Moderate	Distinctive but rather ugly town centres and some outer areas
BRCKN VS372 Mynydd Llangynidr and Mynydd Llangattock	Classified at Level 3 as Upland Moorland Exposed upland moorland on undulating plateau top dominated by unimproved poor grassland. Some wet flushes occur with patches of heath vegetation which create subtle patterns and welcome relief from the otherwise consistent vegetation cover. Rock exposures [limestone] including scree and cliffs occur in places, particularly on the northern slopes facing the Usk valley. Evidence of small quarries and borrow pits with their associated waste tips which have been colonised with vegetation. These create further interest. One road crosses the area from north to south. Evidence of the deprived nature of the valleys settlements to the south is provided by burnt out cars which are a detractor. The laybys appear to be poorly managed and rather abused by vehicles	High	The area affords panoramic views particularly on its northern fringes. The consistent expansive open character of the landscape maintains its integrity and is relatively unspoilt. The area provides an important refuge from the urban character of the valleys to the south. It has a strong sense of place with its simple horizons and vegetation cover which are highly influenced by weather and sky.
BRCKN VS443	Classified at Level 3 as Lake A tranquil, enclosed and linear stretch of water fringed by	Outstanding	The reservoir facilitates superb views of Beacons emphasising the drama of

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
Ponsticill and Pentwyn Reservoirs	conifer and deciduous woodland which runs close to its edge in places. This provides a frame for long views up the valley to the Beacons. Two low key car parks are located by the lake (one in Merthyr Tydfil to the south) which form popular tourist/visitor destinations to the Beacons, including easy walking, cycling along the valley (including the Taf Trail). The mountain railway terminates adjacent which is another popular destination. The dam is stone clad with Victorian/Edwardian robust detailing. Boating is allowed on the southern lake with low key facilities provided. Fishing is also carried out. These activities do not detract from the areas tranquillity. Tree clearance is apparent in places (Pentwyn Reservoir).		the topography through reflection and contrast. The area provides outstanding scenic quality which is reinforced by the Brecon Mountain Railway Station and car parks adjacent, which are popular tourist destinations for those seeking to enjoy the Beacons - there is therefore consensus on the value of the area. The reservoir is well managed and has consistent character/management of its edges and structures including the dam. The accessibility of the reservoir and views provided are rare in Wales although available in the study area in other locations
Cynon VS144 Pentrapeod	Classified at Level 3 as Hillside & Scarp Slopes Mosaic A rolling, hilly landform that lies between 200m and 400m AOD, the upland feel increasing with elevation as views out increase in quality and the influence of the urban edge and associated visual clutter decreases. Upland area characterised by rough grassland with scattered woodland , hedgerows and narrow lanes	Moderate	No single quality of note overall, but scenic quality and integrity both are high in parts of this aspect area, where detractors are not present. All criteria are moderate
CYNON VS308 N. of Bargoed	Classified at Level 3 as Hillside & Scarp Slopes Grazing Upper valley sides and tops. Mainly rough grazing with bracken and scattered clumps of woodland. rock outcrops impart a strong upland character tempered by urban presence to south of area. Views similarly polarised into upland and urban. scattered farmsteads with steep drives/access tracks up sloping landform	Moderate	No single defining feature of regional importance to justify more than local importance... scenic quality and integrity both reduced by the presence of urban areas. All criteria are moderate
CYNON VS352 Bryn-oer Patch	Classified at Level 3 as Upland Grazing Upland landscape of rough grazed grassland with rock outcrops lying between approximately 300m and 400mAOD. Wind noise is a dominant aesthetic factor which evokes particular experience of exposure and wildness. Attractive upland views within and across Rhymney valley	Moderate	Some attractive upland views and area is quite unspoilt, adjacent visual detractors reduce value to moderate however. 75% of criteria are moderate
CYNON VS404 Gelligaer Common	Classified at Level 3 as Upland Grazing Landscape of rough grazed grassland. Wind noise is a dominant factor which evokes exposure and wildness. An exposed open landscape of rough grazing & bracken. Dramatic views all around. Noise & movement - more noticeable within generally quiet landscape. Sheep & horses grazing. Frequent traffic on main road through area	High	Both high and moderate criteria, area is quite open and wild with some attractive views
CYNON VS605 Cefn Y Brithdir	Classified at Level 3 as Upland Grazing Landscape of rough grazed grassland and Bracken and heath along the eastern edge of the Rhymney Valley. Wind noise can be a dominant aesthetic factor. Views down Rhymney valley, directly down on to the settlement of New Tredegar and further south down the valley, some views to	High	Attractive largely unspoilt upland area with strong sop and good views. Criteria mostly high

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
	uplands from the top of Cefn Brithdir. Some pylons on valley sides but not too intrusive.		
CYNON VS716 East of Rhymney	Classified at Level 3 as Hillside & Scarp Slopes Grazing Valley slopes ranging generally at about 300m rising to 470m north of A465. Mixture of rough grazing, bracken with scattered clumps of woodland. A strong upland character is created by views across valley and the areas within the aspect area particularly to the north. This is tempered by urban edge presence at base of valley side and the A465. Views similarly polarised into upland and urban.	Moderate	No single defining feature of regional importance to justify more than local importance. Scenic quality and integrity both reduced by the presence of urban areas and A465. All criteria moderate
CYNON VS785 Parc cwm darran	Classified at Level 3 as Open/Wooded Mosaic Upland Valleys Upland valleys with a complex mix of broadleaf/ conifer/ mixed woodland, with open areas of bracken and rough grassland with isolated settlement and some relicts of industrial /mining past and disused railway. The relatively narrow landform and mosaic pattern contribute to sense of enclosure	Moderate	Upland valley with mix of vegetation cover and past industrial remains, of local importance. All criteria moderate
CYNON VS864 New Tredegar	Classified at Level 3 as Village Urban area in valley setting of mainly housing along the A4069. Views up and down the Rhymney Valley. Distinctive terraced housing along valley slopes dominates	Low	Urban area with few positive visual and sensory qualities and several negative ones including traffic noise from A4069 and unattractive views of built form and development. Mostly low criteria.
MRTHR VS101 Lower Taff Bargoed Valley	Classified at Level 3 as Open/Wooded Mosaic Upland Valleys Dramatic narrow steep sided valley in which a diversity of landcover creates a pleasing whole. Substantial proportion of tree and scrub cover within a mosaic of enclosed farmland and bracken. Considerable areas of deciduous woodland on the valley sides. The blocks of small scale hedged field pattern are generally on the lower and less steep slopes with woodland or open grassland/bracken cover on the steeper sides. The valley has a backwater quality but evidence of much recent activity particularly aligned to the valley floor. The main road follows the east side of the valley as does a mineral railway line. There are a few individual dwellings/ farms in the valley and the village of Bedlinog towards the north. Tranquillity increases to the north. Some revegetated tip sites within the area, forming stark features in the landscape. Much of the valley floor has been recently reclaimed with distinctive reed beds and lakes as part of the Millennium Park. This gives a positive ambience within the backwater of the now relatively quiet post industrial valley.	Moderate	The area is an attractive landscape with some detractors and developing landscapes in the valley floor. Pleasant views are possible across the valley. The valley side is fairly typical of the south Wales valleys.
MRTHR VS119 Gelligaer Farmlands	Classified at Level 3 as Upland Grazing The area essentially consists of an upland enclosed field pattern on the shoulder of land above the Taf Bargod valley but below the ridgeline of Gelligaer Common to the east. Stone wall field boundaries with a particularly distinctive coping. Exposed with very few trees which tend to be limited to adjacent to the isolated and scattered farmsteads or to field boundaries. A small stone quarry to the north, which makes a minor scar on the landscape. The stone walls give this area a uniformity and well kept quality which	Moderate	The area has a consistent character with distinctive stone wallls enclosing fields. The area has been unaffected by industrial activity and attractive views across the coalfield plateau are possible. The area is in decline due to the marginal nature of pastoral

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
	is often lacking in adjacent areas which are enclosed with hedges. The hedges are often deteriorating and form less strong boundary features.		agriculture which is exhibited in deteriorating walls in places
MRTHR VS122 Merthyr Tydfil	Classified at Level 3 as Urban This urban area includes Merthyr Tydfil itself and a series of linked village communities and housing estates, which surround the town centre. All sit within a broad basin around the confluence of the Taf Fawr and the Taf Fechan and also the Nant Morlais. The main road pattern defines the funnel shape of this basin. The pattern of development has historically been controlled by the exploitation of local minerals and related industrial development. The area can be divided into older settlement cores and the matrix of areas in between which comprise newer housing developments, industrial and commercial sites, open spaces and apparently unused and reclaimed land. The town centre has been substantially redeveloped and lacks coherence. The open spaces between built up areas are in varying condition. Planting and vegetation is, over time, integrating and softening these formerly visually harsh but distinctive landscapes; however they often suffer from dumping and litter. The A470 along the west side of the town runs parallel but set back form the river corridor which has been canalised through the town centre. North and south of this stretch it is still an attractive but underused element of the townscape. However the quality of this landscape is very variable and many areas appear to be undervalued at present.	Low	The town has a very complex form with no discernible pattern and coherence. Some areas are in poor condition and there are numerous detractors. New development and reclamation have obscured the important heritage of the area in parts. Though there is a significant story to tell about Merthyr this is not apparent.
MRTHR VS198 Vaynor Farmlands	Classified at Level 3 as Upland Grazing This sloping farmed landscape lies between open uplands and town. It has a distinctive and attractive small-scale field pattern around Vaynor and Pontsticill - a mix of distinctive stone walls and hedgebanks. This is an intimate undulating landscape which contrasts in scale with the adjacent reservoir, moorland, forestry and quarries. The area south of Taf Fechan has larger fields, a mosaic of woodlands and rough ground and is less remote. Access is possible from Merthyr to the south and the area is visible from, and visually affected by, the adjacent A465. It still fulfils a vital role providing a connection between the upland landscapes to the north with industrialised Merthyr.	Moderate	The area is a pleasant pastoral human scale landscape with views to adjacent uplands and valley. It has a consistent character with distinctive stone walls and small scale field pattern.
MRTHR VS288 Taff Fechan	Classified at Level 3 as Wooded Upland Valleys An enclosed wooded gorge linking the remote upland of Vaynor to the north with Merthyr Tydfil to the south. At the southern end, the river flows under the A465 and the presence of the trunk road high above the gorge is a clear reminder of the proximity of development. The mature woodland is deciduous and there are many attractive intimate spaces within the gorge. The water course is small scale with many large boulders and rock platforms. There are a number of routes through the gorge including lanes, a dismantled railway now used for the Taff cycle trail and the Brecon Mountain Railway. Focal points include the Pontsarn Viaduct and other smaller scale bridges. The woodland is interspersed with more open slopes clothed in grassland and/or scrub. Disused quarries above the gorge add to the strong sense of place. Settlement is scattered and sparse with a cluster at Pontsticill. Recreational use includes walking, cycling and climbing.	High	The valley is a superb wooded gorge with interesting features such as a viaduct and stone bridges and adjacent derelict quarries, all of which give a particular and distinctive scenic quality. The area has a clear sense of place and unity.

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
MRTHR VS313 Merthyr North Flank	Classified at Level 3 as Mosaic Upland & Plateaux The area is of exposed upland character with moorland rising to 530m. Generally bleak and open with long views. It is a complex area in which the variety of land uses over time have fragmented the appearance and changed the otherwise large scale upland. The north eastern corner of this area feels remote from development but much of the remaining area is clearly influenced by the proximity to the town. Settlement is present on the north side of the A465 and abuts the area - terraced housing, large scale industry and retail parks. The retail park in particular is very exposed and sits uncomfortably on the edge of the upland moorland. There are many signs of past and current extractive activity including the active Vaynor Quarry, disused quarries and Pitwellt Pond. Morlais Hill and Castle form an important landmark. The adjacent golf course is not particularly visually distinct in long views. The power lines are detractors in this landscape.	Moderate	The mosaic of post industrial and prehistoric features combined with moorland create a landscape of distinctive character with dramatic characteristics in places.
MRTHR VS317 Mid Taff Valley	Classified at Level 3 as Open Upland Valleys This area is primarily defined by its valley form with distinct valley floor and steep sides. It is distinct from the lower Taf Valley because of its openness and rugged character. It lies just below the ridgelines on both sides of the valley and has dramatic crags in places. The valley sides are largely unenclosed although remnant field patterns can be distinguished in places and the vegetation cover is mainly upland pasture including grassland and extensive bracken. Settlement is confined to the valley floor due to the steepness of the slopes. Post industrial sites include the tips east of Pentrebach and at Aberfan, small disused quarries, tramroads and levels. The area is cut through by the A470 on the eastern slopes, which allows good views. The valley floor is open reclaimed pasture with the canalised River Taf, roads and Taff trail. This area forms a very important semi-rural break between the valley floor settlements which would other wise coalesce.	Low	The area has some dramatic features such as crags and steep valley sides and attractive areas such as oak woodland. However, the area is in decline and invasion of bracken indicates under use over time. There are tips which still look raw in the landscape.
MRTHR VS355 Merthyr Upper East Flank	Classified at Level 3 as Derelict/Waste GroundThis area is apparently unused and forms a large-scale 'moonscape'. Mounds of tipped material have been colonised by vegetation in parts on the western flank. The mosaic of colonising vegetation and the tipped landforms form prominent features in the landscape giving some visual interest. These areas are often raw and exposed but have more diversity and sense of place than the extensive reclaimed plateaux to the north and west. There are remnants of industrial features such as railway lines and water troughs which give further interest to the area. The area is used for tipping and abandoning cars plus motorcycle scrambling.	Low	The area is a highly distinctive post industrial tipped landscape which has been left for a long time to revegetate. It is used by marginal unregulated uses such as car dumping and scrambling. While it is a degraded landscape it also has some rich visual interest which is not without value.
MRTHR VS359 Ponsticill Reservoir	Classified at Level 3 as Lake The reservoir forms an extensive and calm element in the landscape - a horizontal plane in an otherwise hilly terrain. It reflects the surrounding hillsides and the beauty of the Brecon Beacons. Coniferous plantations on adjacent slopes add to the sheltered quality without being oppressive as the open hilltops are visible above and there are clearings within the woodland. The early 20th century structure has fine stone and metal work associated with it including a 'fairy-tale' turret in the reservoir close to the	Outstanding	The reservoir is a highly attractive landscape of outstanding scenic quality and enhancing views of the surrounding Brecon Beacons. It is well managed generally with a consistent character and has a strong sense of place. It is a popular visitor attraction

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
	dam. This dam cuts across the valley in views from the south and is obviously artificial. The south face is grassed which reduces its prominence although it is still very visible against surrounding woodland. The built forms associated with the reservoir have a confident and substantial quality. Access is via a single track B road along the western edge of the reservoir with a number of laybys/picnic areas and views across to the railway		which is indicative of consensus as to its value
MRTHR VS377 Craig Fargoed	Classified at Level 3 as Open Upland Valleys The area is very open and is dominated by bracken because of its particularly steep slopes, which are unsuitable for farming. The slopes are west facing. This simple land cover makes this area distinct from surrounding mosaics. The slopes are broken up to an extent by the tributary valleys of Nant y Garth and Nant Ddu.	Moderate	The area has a consistent character with good views in and out along the valley with little inharmonious development. The groundcover of bracken dominates the steep valley side leading to limited diversity and visual interest.
MRTHR VS387 Vaynor Uplands	Classified at Level 3 as Upland Moorland Big open unenclosed landscape forming a large block of upland between the Taf Fawr and Taf Fechan and looms high above the basin in which Merthyr Tydfil is located. The vast scale contrasts with the more fragmented and/or linear character areas elsewhere. The area is exposed, bleak and empty of settlement with almost no access. It includes V-shaped stream valleys draining to east/west/south. The vegetation cover is predominantly upland grassland with large areas of poorly drained moorland. The distinctive craggy outcrops on Cefn Cilsanws along the southern edge are a focal point with scrub vegetation and grey scree slopes below. This hillside forms a focal point on the main road north into the Brecon Beacons.	High	The area has high scenic quality with panoramic views. It has consistent and unspoilt character throughout and a strong sense of place through rock outcrops and moorland character. The area forms part of the Brecon Beacons upland area
MRTHR VS429 Bedlinog	Classified at Level 3 as Urban The town of Bedlinog lies on the steep valley sides of the Taf Bargod valley. It is a typical valleys settlement associated with coal extraction in the past. It has long linear terraces of render and stone with mainly slate roofs. It is split into two parts- one linear part lies on the valley floor and includes a square in front of a public house. The larger part of the town lies up the slope built around the main street with its hairpin bends. A mineral railway line runs along the contours through the settlement. There are many remnants of previous industrial activity around what is now a quiet settlement which shows signs of decline	Low	The town has a distinctive character although with many similarities to other valleys towns. It sprawls untidily up the slopes of the valley and while some areas are well kept the settlement shows signs of decline. Poorly built 20th century houses intersperse the traditional terraces. The settlement has harsh egdes in places which do not complement the valley landscape.
MRTHR VS460 A470 Corridor	Classified at Level 2 as Developed Unbuilt Land (no Level 3 classification provided) Busy dual carriageway with an attractive sinuous alignment on the western side of the Taf valley. The road has been built in two stages. The southern stretch was implemented first and vegetation cover is beginning to be established and is integrating the road into the landscape. Structures are crisp and well detailed especially retaining walls although concrete is used extensively and little concession is made to local materials. The northern section is more recent, with immature planting and more use of pennant stone and lighting with frequent junctions.	Low	The road is intrinsically noisy and a detractor in the valley landscape with night time noise pollution. However, the vegetation cover and hard materials are well maintained and are in good condition and will, in time, help to integrate the road into the landscape.

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
MRTHR VS487 Gethin Woodlands	Classified at Level 3 as Wooded Upland Valleys The character of this upland landscape is dominated by the blanket cover and large expanse of coniferous woodland on the upper slopes of the valley. This continues over the ridgeline into the Cynon valley. Includes the coniferous woodland area only of Gethin Woodland Park. Parts are open to recreation through rides and walks. The woodland absorbs this recreation giving the area a feeling of remoteness. The forestry has a major positive visual presence on the side of the valley.	Moderate	The area is well managed and has consistent character throughout but lacks diversity of vegetation cover and visual interest. Pleasant views are possible and the woodland is an important setting for Merthyr and the valley.
MRTHR VS557 Aberfan and Merthyr Vale	Classified at Level 3 as Urban Aberfan and Merthyr Vale are located at the point where the Taf valley begins to widen out to the north. They are aligned to a series of route corridors including the A470, the A4054, the railway and the canal, all of which follow the north-south alignment of the valley. Aberfan is less well defined as a linear settlement than Merthyr Vale. The settlements consist primarily of terraces, aligned either along the contour or at right angles to the river and punctuated by occasional larger buildings. Merthyr Vale is visible from the A470. The settlements once clustered around a colliery which is now a reclaimed amenity site. The cemetery and Garden of Remembrance on the slopes above Aberfan and below a reclaimed tip are visible reminders of the 1966 disaster. Both settlements are undistinguished in visual terms and their character relies heavily on the quality of the fine valley setting. The river corridor appears to be little used.	Low	The settlements are distinctive south Wales ex-mining villages with distinctive long terraces and a reclaimed area on the valley floor. They have common characteristics and a sense of place. However, they have a number of detractors, the housing is poor condition in places and the settlements are poorly integrated into the valley.
MRTHR VS588 Cyfarthfa Park	Classified at Level 3 as Amenity Land Cyfarthfa Park is the largest open space in the Merthyr Tydfil conurbation, representing a mature designed landscape, graded as II*. The house (a Grade I Listed Building), designed as a mock castle, overlooks grounds dropping to the southwest and the Cyfarthfa Ironworks, on the far side of the River Taf. It is therefore prominent in the landscape. The areas behind the house, to the east and north, have developed as mixed woodland. The large attractive lake in the west of the park supplied water to the Cyfarthfa Ironworks via a trough on the Pont y Cafnau Bridge. Following the sale of the park to Merthyr Tydfil council in 1910, a bowling green, tennis courts, flower beds and a fountain were added. More recently, the east part of the park has been converted to school playing fields.	High	Cyfarthfa Park acts as an important setting to the castle and is prominent in views form the A470 and other parts of Merthyr. It has a strong visual relationship with the related furnaces across the valley which is a rare feature. The park is very attractive with mature trees and well maintained grounds
MRTHR VS706 Lower Taff Valley	Classified at Level 3 as Wooded Upland Valleys The narrow valley has a dramatic enclosed character which is emphasised by the substantial areas of woodland, mainly conifers, on upper valley sides and deciduous trees along the river side. The enclosed nature of the valley contrasts with the more open U-shaped valley to the north. There are disused mines, quarries, tips and reclaimed areas on the valley sides. The A470 [T] is on the western side with the old road to the east. The railway lies lower in valley, as does the Taff Trail which follows an old tramroad. Settlement is limited to a few isolated farmsteads and dwellings. The woodland cover dies away on the west side of valley towards the south and above the trunk road with a deteriorating field pattern and areas of reclaimed ground. Clear signs of past activity and development include	Moderate	There are attractive views of the area from both sides of the valley with its wooded character and pleasant river corridor. Though there are post industrial remnants, these add to the richness of the area visually. The area has a sense of place although there are similarities to other south Wales valleys.

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
	quarried rock faces, masts and small reservoirs. This more open hillside is a welcome contrast to the otherwise wooded valley and the strong landform generally absorbs the past development.		
MRTHR VS762 A465 Corridor	Classified at Level 2 as Developed Unbuilt Land (no Level 3 classification provided) A busy three lane road running across the grain of the valleys along the northern edge of Merthyr Tydfil at a high elevation. It is a tight corridor with generally restricted junctions. There is some highway vegetation but this is fairly restricted due to climate and space. There are some views to the Brecon Beacons but often views are of industrial areas, derelict land or housing in Merthyr. Detailing on the road is basic using concrete and standard highway fencing	Low	The road is intrinsically of little scenic merit and is a detractor. It is also busy and therefore noisy which also detracts from its environs.
MRTHR VS852 Upper Taff Fechan	Classified at Level 3 as Wooded Upland Valleys The dramatic east facing and steep sloping upland valley side is dissected by a tributary valley, the Nant Car Fach, but this is masked by the almost complete cover of the conifers of the Taf Fechan Forest. Minor road runs close to the base of the slopes with land adjacent to the Pontsticill Reservoir to the west and the Taff Trail passes through the forestry. Glimpsed views are possible across the water body from the road and the area is used for recreation with picnic areas and other low key facilities in clearings along the water's edge. The views over the reservoir are of a forested edge to the water body, the Brecon Mountain Railway and the open hilltops beyond. Sheltered and peaceful and feels rather remote with only a couple of dwellings. Views out to the reservoir and more open landscape reduce the strong sense of enclosure created by the conifers. The simple blocks of water, woodland and upland moorland in adjacent aspect areas create a calming scene	Moderate	The area acts as a pleasant setting for the reservoir to the east, framing views. The coniferous woodland has consistent character and is well managed.
MRTHR VS858 Gelligaer Common	Classified at Level 3 as Upland Moorland Bleak and open character very similar to Merthyr Common to the west. The area is one of rounded summits above broad sweeps of grassland across the ridgelines which separate the U-shaped valleys below. The vegetation is sparse - very well grazed areas of grass with soft rush in wetter patches. There is no settlement on the Common as farms are situated on the enclosed land below the ridges. The enclosures along the edge of the Common are generally dry stone walls with some post and wire fences. A few narrow roads and tracks cross the area and all have undefined and ragged edges. Fly tipping is apparent in parts as is the clutter of old fences and signs which have not been cleared away. There is a quarry at the south end but this is not generally visible in long views into the area. Long views out across the Coalfield plateau contrast with the enclosed nature of the adjacent valleys. There is some recreational use including walking, riding, paragliding and picnics. The common is remote and exposed with a simple ground cover which contrasts with the more diverse vegetation in the valleys themselves	High	The area has attractive panoramic views across the coalfield plateau and has limited development- only one small quarry. It has consistent character throughout and a landcover of heather in places. The area does show signs on decline through poor wall condition and limited sward diversity in places plus tipping. The common is similar to other commons on plateau tops in the south Wales valleys.
MRTHR VS876	Classified at Level 3 as Derelict/Waste Ground The area is primarily defined by the degree of disturbance	Low	The area is still a raw landscape, prominent on the valley sides above

Aspect area	Classification & Characteristics	Overall Evaluation	Justification
Merthyr East Flank	of the landform and the lack of diversity in vegetation cover. Almost all the area has clearly been disturbed and is apparently currently unused or reclaimed. The slopes form a stark and unattractive backdrop to this side of the town. Large areas of reclaimed land are open with pasture for sheep grazing with some fencing against the road edge. These form a bleak and apparently sterile landscape. There are also examples of reclamation which much more successfully create new landscapes which add to the visual quality of the area. Some opencast is being carried out and also landfill which is just visible on the exposed ridge. To the south, upland pastures mix with the disturbed landscape to form a more intimate mosaic which is more akin to areas on the western flank.		Merthyr. While some areas are establishing a landscape infrastructure there are extensive areas which are open and lacking diversity of texture and cover. There remain a few detractors.
MRTHR VS917 Merthyr West Flank	Classified at Level 3 as Open/Wooded Mosaic Upland Valleys A complex mosaic of tips, transport features and mine sites intermingled with an upland pasture field pattern. Areas of woodland and substantial natural regeneration. Large number of disused sites with majority becoming well integrated within the mosaic. In the northern end there are more tips and less woodland or evidence of field pattern. The landscape here is exposed and raw. Further south the balance is in favour of the remnant field pattern and small blocks of woodland. The A470 cuts through this landscape and reveals at close hand the mix of industrial heritage, field pattern and woodland on this edge of Merthyr. It is also seen as the backdrop to the town in long views from the east and the A4060. At both viewing distances the diversity and pattern of this landscape are distinctive and of high value.	Moderate	The area has a distinctive sense of place, especially around Cwm Glo with a mix of vegetation and industrial heritage features and patterns with a particular richness. The area provides a positive backcloth to the town of Merthyr and dominates its views west. However, there are detractors such as Heolgerrig Brickworks.

Nant Llesg Surface Mine

Incorporating Land Remediation

Appendix MA/NL/A16/002

Viewpoint Details

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Appendix MA/NL/ES/A16/002 Landscape & Visual Impact Assessment: Viewpoint Details

Contents

Introduction

1.1 Viewpoints in the nearby communities, on rights of way and access land, on roads through the area, and in the national park were examined in the course of the visual impact assessment:

1.2 The tables below contain:

- Details of the viewpoints locations
- A description of the existing view, with the viewers likely to be affected identified ("receptors") and their relative sensitivity to the project proposals assessed
- A description of how the view will change with the development and the magnitude of the change experienced
- An assessment of the visual effects, for each set of viewers or receptors at each viewpoint.

1.3 The following abbreviations are used:

BBNP: Brecon Beacons National Park
FLRS: Ffos-y-fran Land Reclamation Scheme
LANDMAP VS: Visual and Sensory aspect
LDFP: Long Distance Footpath
LOHI: Landscape of Outstanding Historic Interest
LSHI: Landscape of Special Historic Interest
NCR: National Cycle Route
OBM: overburden mound
SLA: Special Landscape Area.
VILL: Visually Important Local Landscape.

Table A16/003/ 1 Details of Viewpoint Locations

VP ref	Location	Receptors/Reasons for selection	Easting	Northing	Elevation mAOD	Distance from site boundary (m)	Direction of view
1A, 1B	Fochriw (photomontage, 1A)	Settlement: residents	310729	206040	355	74 165	North-west
2	Bryn Carno, Rhymney (photomontage)	Settlement: residents	311338	208524	318	750	South-west
3A, 3B	Rhymney Conservation Area (photomontage, both)	Settlement: residents Conservation area and listed buildings	311102	208077	287	495 550	West
4	Carn-y-Tyle Terrace, Abertysswg	Settlement: residents	312371	206014	267	1,182	North-west
5	Pontlottyn	Settlement: residents	311241	206181	325	218	North-west
6	Rhymney Valley Ridgeway Footpath (RVRF) (Cefn Brithdir) (photomontage)	Users of long distance footpath Users of common land, access land Visually Important Local Landscape LANDMAP VS evaluation: High	311340	205315	405	894	North-west
7	Pentwyn, south of Fochriw	Settlement: residents Requested by CCBC	310420	204548	407	559	North
8	Fochriw Road between Disposal Point and A465	Travellers on road Requested by CCBC	308920	207193	427	6	East
9	National Cycle Route 468, Abertysswg	Users of NCR Visually Important Local Landscape	313390	205108	241	2,531	North-west
10	Bridleway, Mynydd Fochriw (photomontage)	Users of long distance footpath Users of common land, access land Landscape of Special Historic Interest Visually Important Local Landscape LANDMAP VS evaluation: High	309783	205208	404	490	North
11	Rhymney to Tredegar Road	Ridgeline within Special Landscape Area Travellers between Rhymney and Tredegar Requested by CCBC	312865	207022	350	1,586	West
12	National Cycle Route 46, Parc Brynbach	Users of NCR Visitors to country park Special Landscape Area	311703	209824	380	1,656	South-west

VP ref	Location	Receptors/Reasons for selection	Easting	Northing	Elevation mAOD	Distance from site boundary (m)	Direction of view
13	Bute Town Pond National Cycle Route 46	Visitors to pond area Users of NCR	310301	209198	327	438	South
14	Minor road giving access to dwellings at Ras Bryn Oer (photomontage)	Residents at nearby houses Users of public rights of way along the road Special Landscape Area LANDMAP VS evaluation: High to Moderate	311653	209080	361	1,178	South
15	Waundeg	Settlement: residents Industrial estate	312825	210649	357	3,068	South-west
16	Merthyr Common	Users of access land Landscape of Outstanding Historic Interest Scheduled Monument	307842	204599	380	1,693	North-east
17	Bryniau/Morlais Castle Golf Club	Users of access land Next to golf course Landscape of Outstanding Historic Interest	305664	208985	345	3,513	South-east
18	Twynau Gwynion, BBNP (photomontage)	Users of access land Viewers from Brecon Beacons National Park (BBNP) LANDMAP VS evaluation: High	307543	212235	552	3,362	South-east
19A, 19B	Sirhowey Valley Walk	Users of long distance footpath LANDMAP VS evaluation: High	316566	207174	487	5,113 5,272	West
20	Garn Fawr, Chartist Cave	Users of access land Viewers from BBNP LANDMAP VS evaluation: High Requested by CCW	312348	215130	551	6,704	South-west
21	Garn Ddu	Users of bridleway, access land Viewers from BBNP LANDMAP VS evaluation: High Requested by CCW	302703	212071	421	7,500	South-east
22	Princetown	Residents	311143	209878	359	1,354	South-west

VP ref	Location	Receptors/Reasons for selection	Easting	Northing	Elevation mAOD	Distance from site boundary (m)	Direction of view
23	Heads of Valleys Industrial Estate	Viewers from the Industrial Estate Users of bridleways on the Estate access road	310583	208254	302	600	West

Table A16/003/ 2 Existing View Descriptions

VP ref	Location	Landscape context	View towards study area	Receptors represented	Sensitivity
1A	Fochriw	Located on minor but busy local road within open upland of level to undulating landform extending over the site to the north, with rolling hills and ridges to north-east, east, south and west; land cover is upland grassland for grazing; evidence of former mining and associated industrial uses as tips to the west and south (the latter to be remediated to prevent further erosion); traditional-style stone walling forming a gateway to the common at the viewpoint. The village of Fochriw extends to the south, properties with views oriented to the west towards the tips south of South Tunnel Road; the character of the village very strongly influenced by its upland location (unusual in this area); sense of wildness and openness, and wide ranging panoramic views. At the viewpoint the contrast between settlement and open upland is marked.	The viewpoint is close to the site boundary and the site occupies almost all the fore and middle ground of the view – a very near and uninterrupted view; seen against the more distant hills rising to the north to the Brecon Beacons national park. (Pen y Fan itself is not visible.) The view is framed to the left by Ffos-y-Fran overburden mounds, formed and grassed so they appear similar to other hills in the area. To the right, the land falls to the edge of the Rhymney, which is out of view.	Residents: some direct views and some oblique	High to Moderate
				Travellers along the road: direct but passing views	Moderate
				Users of the access land, a regionally important recreational facility	High
				Users of public rights of way, open views and the landscape and views are the attractant	High

VP ref	Location	Landscape context	View towards study area	Receptors represented	Sensitivity
2	Bryn Carno, Rhymney	Quiet residential area, in parking area in public open space, overlooked by houses both sides; terraced open space on the distinct slopes of the valley side. The characteristic landscape pattern of the South Wales Valleys can be seen on the valley side opposite: settlement generally in the valley bottom or on lower slopes, enclosed fields above with hedgerow boundaries and frequent woodlands giving way to stone walls or fences on the higher slopes, and open moorland on the ridge tops – here interrupted by features of former mine working and tipping. Sense of enclosure and small scale; house roofs in varying orientation on lower slopes giving texture and building materials and finishes and garden plants giving colour; pleasant and tranquil, the valley side location and orientation of the open space providing open views, which are elsewhere confined by buildings or framed along east-west streets.	The land falls steeply from the viewpoint to the houses on the lower valley side, providing an open view towards the site, partly framed by the houses descending the slope to left and right. The ridge on which the site is located extends through the near backdrop of the view. The enclosed fields on the restored former opencast land in the north of the site can be seen in the right of the view, the fresh green of restored open grazing rising to the left towards the ridge top, and above them on the skyline the tall pylons of the 400kv power line that crosses to the north-west of the site. To the left, the Bent Iron can be seen on the high point of the site, above the scarp, former levels and tips on the ridge side extending to the left. The timber poles of the power line crossing the southern part of the site can be seen on the skyline to the left. In the background. The industrial units of the Heads of the Valleys Industrial Estate can be seen in the centre of the view, on a steep sided plateau at the foot of the ridge. Mynydd Fochriw rises to the extreme left, the eastern overburden mounds of Ffos-y-Fran are in the centre background of the view and the industrial buildings at Pengarnddu can be seen to the extreme right.	Residents: some direct views and some oblique	High to Moderate
				Users of the open space, a locally important recreational facility	Moderate
3	Rhymney Conservation Area	Two views are illustrated, from within the central built up area, and conservation area, of Rhymney, on the lower valley side; set amongst streets at different angles with houses of varying form and period, mainly terraced, and near the boundary of the grounds St David's Church, which is enclosed by a stone wall and mature trees; mature trees also along Queen Street. Unlike other parts of the town, the street pattern does not follow the contours with linking streets crossing the contours, but is irregular/informal, so that views towards the site	In VP3A, the street/road junction slopes down from the view point to groups of houses at the lower level, the gap between them providing a view towards the ridge and eastern slopes of the site. The middle ground is occupied by houses in varying styles and orientations and garden vegetation. Beyond, the valley side rises, with an industrial estate set upon a terrace (a reclaimed mine or tip site) with woodland enclosing it on the left. The view from VP3B is across the playing field in the foreground, to house amongst trees in the	Residents: some direct views and some oblique	High to Moderate
				Town centre visitors	Moderate
				Views from a conservation area	High

VP ref	Location	Landscape context	View towards study area	Receptors represented	Sensitivity
		from houses and streets are intermittent. The lower elevation and more tightly-knit urban grain give a sense of intimacy and small scale; building materials give colour; there is diversity in the urban form and character; pleasant and moderately tranquil, with moderate intrusion of traffic and urban busyness. Views out generally confined or intermittent, the form of the road junction in VP3A and the public open space in VP3B provide a more open view.	middle ground, beyond and above which the ridge side rises, within the site. In both views, the ridge on which the site is located extends through the background, interrupted by nearer individual trees or rooftops. In the extreme right of VP3A, the ridge rises from the enclosed fields on the north of the site, the tops of some 400kV pylons visible on the skyline towards the centre of the view. The land rises to the high point of the site, marked by the Bent Iron, clearly visible. The scarp and former levels on the eastern slopes are prominently visible below this. In the left, the ridge, the power line on timber poles is a characteristic skyline feature of the southern part of the site. In VP3B, the northern part of the site is out of view, but the scarp and valley with former levels is prominently visible.		
4	Carn-y-Tyle Terrace, Abertysswg	The viewpoint is at the junction with Pen-y-Cwm, where there is a small sitting area; overlooking the narrow valley strongly enclosed by ridges. Carn-y-Tyle is a linear residential settlement along a local but important connecting road, the traffic causing low to moderate intrusion on tranquillity. In the valley bottom to the west is Rhymney Comprehensive School, amenity open space and playing fields as well as agricultural fields with hedgerow boundaries and industrial estates; Pontlottyn extends along the far valley side. From this edge-of-settlement there is an attractive view along and across the valley; views are more confined from other parts.	The foreground is dominated by the road and road junction, with the small grass area and seat. The land falls steeply from the far side of the road, marked by an intermittent trimmed hedgerow; through gaps, Pontlottyn and woodlands can be seen on the far valley side and the school and other building in the valley bottom. The middle ground is largely screened by the nearer vegetation. The ridge on which the site is located extends through the near backdrop towards the right of the view, and beyond, the land rises towards the uplands of the Brecon Beacons national park, framed on the extreme right by nearby houses. In the centre of the view the high point of the site forms a distinct scarp, the ridge top undulating towards the left, with the powerline on double timber poles in the southern part of the site distinctly visible on the skyline.	Residents: oblique views	Moderate
				Users of sitting area, a local amenity	Moderate
				Travellers along the road	Low
5	Pontlottyn	Because of the density of the urban grain, the varying orientations of the buildings, and the landform, views of the site are largely screened	The illustrated view is from its extreme northern edge along the eastern ridge side slopes.	Residents: oblique views	Moderate

VP ref	Location	Landscape context	View towards study area	Receptors represented	Sensitivity
		from within the settlement.			
6	Rhymney Valley Ridgeway Footpath (Cefn Brithdir)	The viewpoint is at the crossing point of the RVRF and an access track along the ridge; an upland landscape; a distinct ridge, the land falling rapidly to the north and to the more level/undulating land within the site; located between the two villages: Fochriw to the west and Pontlottyn to the east, the urban area of Rhymney extending through the view. The land is in upland grassland with conifer plantations; broadleaf and conifer tree cover concentrated in the valley and within settlements, contrasting with the open uplands uninterrupted except by old tips.	The land falls steeply from the viewpoint, giving views into and over the site, which occupies most of the middle ground. To the left and centre, the land rises towards the background to enclosing ridges, and further ridges into the distance define the backdrop. Pontlottyn and Rhymney occupy the valley in the right of the view, extending towards the back of the middle ground, the large scale and bright colours of the industrial units near the site's eastern boundary in strong contrast with the finer grain of the various housing estates that comprise most of the settlements. Fochriw can be seen in the left near middle ground, unusual in its elevated location. South Tunnel Road to its north marks the southernmost boundary of the operational site, with the line of the disused railway that bisects the site and marks the eastern edge of the "lapwing area" and the embankment of the southern dam of Rhaslas Pond clearly visible. The overburden mounds of Ffos y Fran are seen in the left and centre against the backdrop of higher land beyond. The view extends into the distance to the north, to the Brecon Beacons, their distinctive forms on the distant skyline.	A promoted route, where the view of the landscape is an important attractant; within the VILL	High
7	Pentwyn, south of Fochriw	This is a very small settlement, the houses within it set on either side of the road descending away from the site, with no view of the site. At the northern end, the Mount Pleasant Inn faces north and there is a bus-stop. The location on a hillside overlooking other ridges and hills, near the junction with the busy road over the mountain to Bedlinog; open upland moorland and sheep-grazing on the	The profile of the rising land encloses the view to the left, directing the view towards the right over the lower ridges, where the site s located. The foreground extends a short distance in fenced pasture, with the road in the left of the view, both disappearing out of view with the break in landform. Lamp standards along the road break the skyline and there is the ruin of a building on the slopes descending out of view.	Users of local community facilities, their attention locally focussed	Moderate

VP ref	Location	Landscape context	View towards study area	Receptors represented	Sensitivity
		surrounding land and blocks of coniferous forestry; the character of the area dominated by the open upland with little enclosure; scale is large, the upland grassland giving a smooth appearance; the predominantly simple arrangement of upland ridges interrupted only by small settlements and minor roads; a strong sense of wildness and remoteness and tranquillity except localised traffic intrusion; distant dramatic views to the north.	The view is framed on the right by Rhiw Cantorion, where a block of conifer forestry descends the slope. In the centre on a lower ride, the village of Fochriw and South Tunnel Road help locate the site in the view: the major part extending north in to the back of the middle ground. Part of the "lapwing area" can be seen to the right of the building ruin, largely screened by the nearer landform. Beyond the site, the land rises in overlapping ridges to the uplands of the national park, the industrial estate at Tafarnau Bach visible on the loser slopes.	Travellers on the roads	Moderate to Low
8	Fochriw Road between Disposal Point and A465	On minor but busy connecting route between Heads of Valleys and communities to south; Classic open uninterrupted upland of the South Wales; undulating upland near viewpoint, rolling hills in wider landscape; land cover is upland grassland for sheep grazing; to the east is Ffos y Fran LRS, Trecatti Landfill to the north-west and Cwmbargoed Disposal Point to the south; no settlement near the viewpoint, but Fochriw, an upland community to the south; 400kV overhead power line crosses the landscape to the north on large pylons, lower voltage line on wood poles within site, parallel with road. Dominated by large scale, open to exposed character, interrupted only by the road, Rhaslas Pond and Fochriw; an attractive landscape but with detractors e.g. condition of the land, intrusion of traffic on busy road and reversing alarms of vehicles in Trecatti. Distant, panoramic, attractive views.	The site occupies almost all the fore- to middle ground to the east, the level to undulating land extending from the viewpoint to a middle ground horizon beyond which it falls steeply into Rhymney Valley, which is out of view, and falling gently to the right towards Rhaslas Pond and Fochriw. The near backdrop is the ridge enclosing Rhymney Valley to the east, also open upland, with conifer plantations and old quarries on the valley side to the right. Mynydd Fochriw rises steeply to the right from Fochriw at its foot, closing the view, with conifer plantations on its western flank above Cwm Darran. More distant ridges and hills extend into the distance.	Travellers on the road, whose view is not focussed on the landscape but with open views over the open upland	Low to moderate
9	National Cycle Route 468, Abertysswg	The viewpoint is within a broad valley enclosed by surrounding ridges, set amongst rolling engineered landforms of the reclaimed former McClaren Colliery site, providing a locally	To the left, the land rises gently in a grassed mound with small blocks of young broadleaf planting. A framed view towards the site is available through a gap between the plantings.	Users of a promoted Cycle Route	High

VP ref	Location	Landscape context	View towards study area	Receptors represented	Sensitivity
		important recreation resource. Roads and settlement follow the valley sides, on which the traffic is both visible and audible. Other features of the area are typical of reclaimed colliery landscapes; regraded and grassed or planted tips, occasionally eroded by recreation vehicle use, concrete lined drainage channels; open level areas and wide stoned tracks. The cycle route passes along one of these tracks, linking Abertysswg, visible to the north, with Phillipstown and New Tredegar to the south. Views are confined within the valley and along the valley to more distant landscape. The viewpoint is a short distance from the cycle route, on a nearby track giving access across the open space and valley floor.	Beyond the grassed mound, the land descends from view into the valley, with Abertysswg on the slopes rising to the right, seen above the valley vegetation. To the left and in the centre, the land rises to the ridge on which the site is located, the farm buildings and vegetation around the playing fields to the south-east of the site visible on the mid-slopes. On the lower slopes in the centre of the view, the old quarry and recent planting can be seen. The power line on double timber poles crosses the skyline of the southern part of the site in the left of the background, the ridge extending in the centre background, with the Bent Iron on the high point, before descending to the right and out of view.	Users of the amenity open space and recreation facilities	Moderate
10	Bridleway, Mynydd Fochriw	The viewpoint is in an upland location, set amongst other ridges, above the farmed valley of Bryn-Caerau, beyond which is the western overburden mound of Ffos-y-Fran LRS site and the Cwmbargoed Disposal Point (CDP). The land nearby is upland grassland and moorland in sheep grazing, the fields in the farmland below with boundaries of hedges and woodlands, contrasting with the industrial uses to the north, a disturbed by interesting landscape. The area is also crossed by roads and power lines, the mineral railway serving the CDP. A diverse, medium-large scale landscape; pleasant but with detractors, visual and audible; tranquil away from roads and industrial sites; moderate sense of wildness and remoteness; dramatic views to more distance higher hills to the north. Views of varying openness are available from along the route of the bridleway and track giving access from Fochriw Road and used by paragliders who fly from the hilltop. The illustrated viewpoint is located on the bridleway, close to the track, near the reservoir.	The view is framed by the land rising to the right to Mynydd Fochriw and the overburden mounds of Ffos-y-Fran to the left. The land descends to the left providing a view over the near moorland to the mineral railway and the farmed lowland landscape at Bryn Caerau, beyond which the features of the Ffos-y-Fran site rise. At the foot of the southern overburden mound, still being formed, the features of cultural heritage and ecological interest can be distinguished. Between this overburden mound the two northern mounds, the workshop area of the Ffos-y-Fran site can be seen. Over these, the distant high hills of the national park can be seen, with Pen-y-Fan to their right in the centre background. In the centre and to the right, Fochriw Road and South Tunnel Road locate the site on the ridge extending through the middle ground towards the background, with further ridges extending into the distance. The settlements at Fochriw or in the Rhymney Valley can not be seen.	Users of bridleway and access land, likely to be there for the landscape setting	High
				Paragliders and other active recreation users, whose reason for being there is partly for the landscape setting	Moderate to Low

VP ref	Location	Landscape context	View towards study area	Receptors represented	Sensitivity
11	Rhymney to Tredegar Road, by entrance to Golf Club	The road rises from the valley to cross over the upland moorland ridge of Twyn Abertysswg, a busy minor road. The land is largely used for sheep-grazing, with the golf course to the south. Settlements are concentrated within the valleys and scattered farms in the surrounding areas. A large scale, open, uninterrupted (except for the golf course) landscape, strong sense of exposure, wildness and remoteness; very pleasant and tranquil, except for moderate traffic intrusion; open, mid-distance view to near hills.	The elevation with the land falling gently from the viewpoint provides a view towards the site. The land rises gently to left and right, cutting off wider views and descends out of view in the foreground. Beyond this near horizon, woodlands and the upper part of the settlement of Pontlottyn on the far side of the Rhymney valley can be seen on the lower slopes and Fochriw on the higher slopes to the left. The ridge on which the site is located extends through the middle to back-ground, the elevation of the viewpoint allowing views across to Fochriw Road to the west of the site. The tips, old quarry and levels, and scarp features along the eastern slopes of the site can be distinguished across the middle ground. The background is closed by the overburden mounds at Ffos-y-Fran, the 400kV power line that crosses that site and skirts the north-west of Nant Llesg distinctly visible on the skyline in the centre and to the right. The distinctive profile of Mynydd Fochriw rises to enclose the background to the left.	West-bound travellers on the road	Moderate to Low
				Users of golf course and clubhouse, likely to be more focussed on the recreational use than on the landscape	Moderate
				Users of the access land	High
12	National Cycle Route 46, Parc Brynbach	Views from the main part of Park Bryn Bach around the lake screened by the nearer landform; to the north of this is a golf course and driving range with car park from where this track continues north to provide a foot and cycle route connecting with other public rights of way and NCR46. The landscape is rising from valley to upland, with rounded hills overlooking confined valleys; the land in ecological and amenity uses and grazing for sheep, reflecting its history as restored surface coal and other mining. Beyond the golf facility, mostly open grassland with conifer and mixed plantations, including new planting south of the	The track continues westward, with woodland plantation on the rights hand side framing the view and grassland; young tree planting to the left; on land falling to a small valley before rising in a hill with conifer plantations, framing the view. In the near middle ground, the land falls to the edge of the Rhymney Valley, which is out of view. The western valley side can be seen, with its scarp edges, incising valleys, old quarry, woodland plantings and levels and tips, rising to the ridge on which the main part of the site is located. It extends through the back of the middle ground, falling gently to the left beyond which Mynydd Fochriw and other ridges	Visitors to the Country Park	High
				Users of the footpath and cycleway	High
				Views from a valued landscape	High

VP ref	Location	Landscape context	View towards study area	Receptors represented	Sensitivity
		track (future screening along part of the route); no settlement nearby, but traffic on A465 audible. The gateway on the track is defined with traditional-style stone walls; sense of enclosure at the viewpoint, opening up to the west; very pleasant although with moderate to low intrusion from background sounds of traffic; at the point of leaving the designed landscape of the country park and entering more open countryside with views of uplands.	form the backdrop, with Merthyr Common seen above the site landform towards the centre of the view. The features of Ffos y Fran are not visible; the wood poles of the overhead power line that crosses the site from south-east to north west can be seen along the ridge top.	Users of a recreational amenity where the setting contributes to the amenity but is not the focus of the view	Moderate
13	Bute Town Pond	Bute Town Pond is elevated from the surrounding landform by the containing embankments. It is located to the south of the A465 and to the west of Bute Town (a conservation area with listed buildings). A footway follows the top of the embankment on the eastern and southern sides, which can be seen in the left foreground, affording open views towards the northern parts of the site. There is a strong sense of openness, and the pond is a relatively large and dominant feature in the local context. The elevation provides distant panoramic views of the surrounding uplands and an overview of Rhymney in the left of the view and down the Rhymney valley to the south. Busy roads in the immediate surroundings intrude on the potential tranquillity of the pond and its local context. It is a popular local recreation amenity.	The pond and surrounding embankment dominate the foreground of the view. The northern fields of the site and the land rising to the highpoint of the site occupy most of the middle-ground of the view. The 400kV power line along the north-west edge of the site dominates the skyline to the right, and the view extends further to the right to the industrial buildings at Pengarnddu on the skyline. To the left the land falls to the Rhymney Valley and the view overlooks the town with the light-coloured roofs of the industrial estate along the valley-side on its western edge contrasting with the valley vegetation. Further south, the ridge enclosing the eastern side of the Darran Valley closes the view. On the skyline in the centre of the view, the “Bent Iron” can be clearly distinguished, and parts of the overhead power line on timber poles in the east of the site.	Users of cycleway NCR 46 to the north and the public footpath on the embankment	High
14	Minor road giving access to dwellings at Ras Bryn Oer	The originally proposed viewpoint was on a bridleway on Rhymney Hill, but after public consultation responses, the location was moved close to these residential properties, as sensitive receptors. The properties are	The land descends towards the Rhymney valley in the foreground, interrupted by woodland planting. Beyond the break in slope, the rooftops of the upper part of Rhymney are visible. Over these, the enclosed fields in the	Residents of Ras Bryn Oer, going to and from their properties, but not directly from their properties	High to Moderate

VP ref	Location	Landscape context	View towards study area	Receptors represented	Sensitivity
		oriented away from the site, but open views towards the site are available for the road which is also used as a bridleway and community route. It is on land rising from the valley to the upland, a rolling ridge landform, overlooking other ridges and valleys. Outside of the settlement, the land is in pasture with woodlands, and is partly also the restored former Bryn Oer surface coal site. The A465 is apparent to the north, marked by pale coloured lighting columns and the movement of traffic. This is a medium scale landscape set within a large scale; varying degrees of enclosure to openness, moderately diverse; pleasant with high-moderate tranquillity, and moderate-low intrusion of traffic and lighting at night from A465 and Rhymney; fine open views to the uplands of the national park (available from the dwellings).	north can be seen on the far valley side, rising from right to left, to the open land of the ridge on which the main parts of the site are located. The tips and other disturbed land in the north-east of the site can be seen and the brighter green of restored former opencast land. Across the background the pylons of the 400kV line skirting the north-west of the site and crossing Ffos-y-Fran are prominent on the skyline. Overburden mounds of Ffos-y-Fran are partly visible above the Nant Llesg ridge, with the distinctive profile of Mynydd Fochriw rising to the left.	Users of the public rights of way along the road, likely to be there for the landscape setting	High
15	Waundeg	On land rising from valley to upland; a landscape of rounded ridges and broad valleys (heads of valleys broadening as they meet the upland); edge of settlement, with residential, industrial, highway and pastoral land uses; corresponding mix of vegetation: garden ornamentals, agricultural grassland, belts of forestry and amenity woodland edging the settlements; dominated by the A465, busy with traffic its urban character emphasised by large retaining structures and lamp-posts in a light colour, increasing their prominence; settlement generally concentrated in valleys, but nearby settlements rising onto edge of upland, which provides containment. Sense of enclosure within settlement opening to west ; variety within the view and colour within settlement, especially industrial buildings, contrasting with muted greens of countryside; medium to high intrusion of audible traffic and visible features of A465; more tranquil within residential areas;	From the viewpoint, the cycleway descends steeply between the A465 and Waundeg industrial estate; a steep bank on the left down to the A465, which is enclosed between grass banks and large angular retaining walls to the west. The road curves out of view in the middle ground, enclosed in tree planted banks. Beyond the retaining wall on the south side of the road, houses at Bryn Rhosyn in the north of Tredegar can be seen, with a conifer plantation enclosing them and separating them from the open hillside rising above them on the left side of the view. The land rises to the right also beyond Waundeg with industrial buildings and large pylons on the skyline. Spurs and woodland combine in the centre middle ground to close the view and screen visibility of the site.	Walkers and cyclists on cycleway	High
				Residents on south-eastern edge of Waundeg with open views, mainly oblique towards the site	Moderate
				Views from Industrial Estate	Low
				Not travellers on A465, as the road is enclosed in cutting and retaining structures	N/A

VP ref	Location	Landscape context	View towards study area	Receptors represented	Sensitivity
		attractive mid-distance views from cycleway to west and south-west and more distant to south..			
16	Merthyr Common	The viewpoint is on a high point between the summit of Merthyr Common and a “pillow mound” feature, set amongst rolling upland hills and ridges enclosing narrow valleys, with the Ffos-y-Fran landform features prominent to the north. The land is accessed by a stone track that continues to the summit and is used for sheep, pony and cattle grazing; overlooking the farmland of Bryn Caerau to the east. This ridge and Mynydd Fochriw to the east is popular with paragliders. Nearby, several cairns are marked on the map and there is a small pond close to the track. The landscape is large scale, open with local enclosure from higher land; generally simple, but Ffos-y-Fran features add diversity; disturbed by present and former industrial land uses, and detractors such as frequent fly-tipping. Near views available towards higher ridges, and attractive panoramic mid-distance to distant views to east and west.	The land falls gently at first then steeply from a break in slope in the direction of the site, to a col, and to the right to Bryn Caerau, and rises to the far right to enclose the view. To the left, the overburden mound of Ffos-y-Fran presents a dark and uneven appearance (although surface preparations are in progress to allow it to be grass seeded) and interrupts the view to the more distant uplands extending to the national park. Beyond Bryn Caerau, Mynydd Fochriw encloses the view to the right in the background, the ridgeline descending to the left to the lower ridge on which the site is located and traffic can be seen on Fochriw Road. The view toward the site is framed by Ffos-y-Fran to the left and Mynydd Fochriw to the right. In the middle ground at the foot of the Ffos-y-Fran site, are the industrial structures and buildings of the Cwmbargoed Disposal Point. These nearer features mask or interrupt visibility of the ground level of the site. The wind turbine at the Rassau Industrial Estate to the north of Ebbw Vale can be distinguished on the land rising to the distant background uplands.	Users of access land, although most people observed were using the track further east	High
				Paragliders, whose reason for being there is likely to be partly for the landscape setting	Moderate to Low
17	Bryniau/Morlais Castle Golf Club	This is a small area of access land bordering Pant Industrial Estate to the north of Merthyr Tydfil and A465, popularly used for informal recreation and easily accessible from the	The land falls a little from the viewpoint to open views of Pant, with a housing area visible to the left in a valley and the industrial estate and a recreation ground enclosed in conifers to the	Users of access land, an important amenity	High

VP ref	Location	Landscape context	View towards study area	Receptors represented	Sensitivity
		nearby residential areas and the roads that border it. The land rises from the valleys, a locally undulating landform set amongst rolling ridges; an amenity open space with a golf course to the west and north. The vegetation is heathland with developing scrub and there is a small pond nearby. This is a piece of "wild" land within an urban or sub-urban context, with lit streets nearby; small-medium scale, enclose on the lower levels but more open on the few highpoints within it; strongly textured by the heath and scrub vegetation and landform variations; moderately diverse and pleasant; sense of local tranquillity but moderate to high traffic intrusion and urban sounds; open distant, panoramic views available from higher points; but views are near to confined on lower levels, in which buildings and vegetation of the industrial estate and urban area screen or enclose views to the south.	right. The elevation at the viewpoint provides a view over these to Ffos-y-Fran, the void visible to the right, the overburden mounds in the centre. To the left of Ffos-y-Fran the Trecatti landfill can be seen on the slopes to the north of Ffos-y-Fran: the void being filled, the buildings above on the ridge skyline. To the left of these, Dowlais Top, the Asda and Pengarnddu Industrial Area is visible above Pant but below the skyline, which is formed by the top of the Nant Llesg ridge, a low ridge enclosing the view in the back of the middle ground and extending left to Cefn Cilsanws. To the right, ridges defining the Taff Valley extend into the distance and rise further to the right to form the backdrop.	Users of the neighbouring golf course, whose attention is likely to be only partly focussed on the landscape in the view	Moderate to Low
18	Twynau Gwynion, BBNP	Located within the open upland of the southern BBNP, almost due north of the site: undulating landform of limestone features and low hills ("twynau") rising from the ridges; land cover is heather-bilberry heath and upland grassland in use for sheep grazing; unenclosed open upland, overlooking valleys where settlement is concentrated amongst tree vegetation and enclosed farmland. Sense of openness or exposure, remoteness and wildness; large scale; muted colours contrasting with silver of limestone features; very attractive; tranquil, low level of intrusion from sounds of traffic, settlements, planes, Brecon Railway; moderate visual intrusion from Trecatti landfill, Ffos-y-Fran LRS, Dowlais Top industrial/retail buildings. Distant wide ranging views, panoramic from high points, interrupted locally by landform variation.	The land falls gently from the elevated viewpoint south towards the south and west, rising in a low hill to the north, which frames the left side of the view. The nearer slopes mask much of the middle ground of the view. Through the back of the middle ground, Merthyr Tydfil and Dowlais can be seen on the lower land; the overburden mounds and part of the excavation void of Ffos-y-Fran LRS and Trecatti landfill on higher land to the left. The backdrop is ranges of ridges in which the distinct valleys of the Taff and Darran are seen as notches in the skyline. The site is identified by the reflective surface of Rhaslas Pond seen against the darker Mynydd Fochriw rising beyond, a small and relatively unimportant element in this wide panorama.	Users of the access land, an important recreation resource, within the BBNP, a nationally valued landscape	High

VP ref	Location	Landscape context	View towards study area	Receptors represented	Sensitivity
19B	Sirhowy Valley Walk	The long distance footpath follows the eastern flank of the ridge between Ebbw Vale and Tredegar, but does not cross the high points along the way. The viewpoint is on a low hill rising from the ridge, overlooking the Sirhowy Valley Walk but within open access land: Darran Fawr. This is an open view; variations of the view described are available from the footpath, framed – and interrupted – by nearer vegetation and landform. Darran Fawr is an open ridge-top with remnants of World War 11 emplacements, set amongst heath and grassland grazed by sheep. It overlooks Ebbw Vale to the east and the slopes of Mynydd Bedwellte to the west. The scale is large, with a strong sense of openness and exposure; very pleasant and very tranquil away from the eastern edge of the ridge where settlement, industry, and traffic intrude moderately; there is a sense of wildness but potential remoteness is mitigated by nearness of settlement and the road across the common; fine views over surrounding uplands to the north-west and north to the Brecon Beacons and other uplands to east, south and west.	The ridge-side falls to the track followed by the long distance footpath, Manmoel Road, beyond which is Ton-y-Fedw Farm, located on the land rising from the valley to the upland common. Beyond that, the rolling ridge landform extends further to the ridge enclosing the western side of the Sirhowy valley, with further ridges extending in overlapping layers forming a near horizon and enclosing the valley settlement, which can be seen to the right on the land rising from the valley onto the ridge-side, set amongst tress and woodland. In the back of the middle ground the ridge top on which Nant Llesg is located can be distinguished amongst these ridges, the scarp, valleyside quarry and planting features distinguishable. Rhaslas pond is just discernible as a narrow grey band, beyond which are the three overburden mounds of Ffos-y-Fran and the Trecatti Landfill Site, and the pylons of the 400kV powerline crossing to the north-west of the site. The CDP is just identifiable by the light colour of the structures. Because of the elevation, the more distant upland ridges can be seen above the Ffos-y-Fran features, with Dowlais Top/Pengarnddu buildings in the right of the view as the land rising to the Brecon Beacons.	Users of upland access land	High
				Users of Sirhowy Valley Walk, promoted long distance footpath	High
				Residents of upland farm	High
20	Garn Fawr, Chartist Cave	Located within the open upland of the southern BBNP, to the north-east of the site: landform of low rolling hills and valleys; land cover of upland heath and upland grassland for sheep grazing with conifer plantations and limestone quarries; the quarries are connected by a minor/private road over the hills (followed by a bridleway), from Trefil to the south to Cwar yr Hendre to the west; frequent limestone features, boulders and cairns; Chartist Cave about 1km to east: heritage interest Sense of remoteness and wildness, openness and exposure; large to vast scale; very	The land extends more or less level from the viewpoint, the foreground defined by the near ridge landform, beyond which the land falls away to east, south and west; the settlement of Rhymney and Fochriw are out of view, screened by the nearer landform. In the back of the middle ground, the overburden mounds of Ffos-y-Fran LRS are seen against the backdrop of more distant ridges and hills. They are not prominent features, blending with other landform features. The site is identified by the reflective surface of Rhaslas Pond to the left of Ffos-y-Fran. The road over Mynydd Fochriw	Users of access land within BBNP, a nationally valued landscape, with open views towards the site and added attraction of heritage interest of nearby Chartist Cave	High

VP ref	Location	Landscape context	View towards study area	Receptors represented	Sensitivity
		attractive; very tranquil, little intrusion except occasional reversing alarms in quarries, which blend visually with the limestone features of the wider landscape. Distant panoramic views through 360^0, including Brecon Beacons prominent on the skyline to the north-west; the distinctive directional valleys and ridges of The South Wales Valleys clearly appreciable to the south-east.	can be distinguished further to the left and part of the settlement of Abertysswg rising up the lower valley side further left again, with the radio mast on Cefn y Brithdir on the skyline above it. The site is a small but moderately important element in the view. From lower elevations, the nearer landforms mask the view of the site.		
21	Garn Ddu	Located within the open upland of the southern BBNP, to the north-west of the site: landform of rolling hills overlooking valleys where settlement is located amongst enclosed farmland with trees; land cover is upland grassland with rushy areas in use for sheep grazing; old quarries and scattered trees on side slopes of lower hills; settlement, scattered farms on lower land and valleys amongst hedgerows with trees and woods; conifer plantations on hills; larger settlement within the view include Merthyr Tydfil, Dowlais. Open upland of large to medium scale, moderate enclosure from surrounding landform at bridleway, more open at top of hill; attractive, tranquil with low or no intrusion; moderate sense of remoteness. From bridleway: near to mid-distance pleasant views; clear unobstructed view in the direction of the site. From the top of the hill: view north to the Brecon Beacons; wind farms visible in the distance at Maesgwyn, Taff-Ely and the ridge on which Pen-y-Cymoedd wind farm is to be built.	The land falls rapidly to a basin-like valley which extends to the more defined valley of Nant y Glais in the right-hand middle ground, with hedgerow-bound fields and trees contrasting with the open landscape in the foreground. Disused quarries provide cliff features on the valley side to the left above which Trecatti Landfill and the overburden mounds and part of the extraction void of Ffos-y-Fran LRS and can be seen on a more distant ridge, with settlements on the lower land: Pontsticill to the left, Dowlais and Merthyr Tydfil in the centre and to the right. Further more distant ridges form the backdrop. The site is difficult to distinguish at this distance; it can be located in the view by reference to the overburden mounds of Ffos-y-Fran LRS, the Trecatti Landfill site and the 400kV power line that skirts the north-western boundary of the site.	Users of access land within BBNP, a nationally valued landscape, especially from higher elevations with open views towards the site	High
				Users of the bridleway a locally important recreation resource within BBNP, a nationally valued landscape, with open view towards the site from part of its length	High to moderate
22	Princetown	This is a small settlement north of the A465 to the north-east of the site, with open relatively elevated views towards the site. At the western end of the village, new houses have been built	The view is to the south-west over low trimmed field hedges, the landform and vegetation masking the lower land and the A465 corridor in the near middle ground, evidenced by the	Residents with direct open views towards the site	High

VP ref	Location	Landscape context	View towards study area	Receptors represented	Sensitivity
		and orientated to take advantage of the views to the south and south-west, which include the site. Nearby is a public house. The village is on the land rising to the uplands, set amongst enclosed farmland with open upland above. The older houses are located along the road through the village, oriented away from the site, and the road continues south-west on a bridge over the A465 to Llechryd and Rhymney. Similar but lower level views are available from Llechryd.	tops of lighting columns and the sound of the traffic. Beyond, the land rises, the fields in the north of the site forming a characteristic pattern on the lower slopes. Butetown Pond to the north of the site can be seen amongst the valley vegetation. Above the fields and extending to the left is the ridge on which the major part of the site is located, the scarp, valley and old levels features clearly visible on the ridge-side and the Bent Iron and power line on timber poles on the skyline. Further to the right, the Ffos-y-Fran overburden mounds are background features, and the 400kV pylons crossing between them and extending down the slope to the right of the site. In the extreme left of the background the land rises in the distinctive profile of Mynydd Fochriw, the fine weather on the day of the survey attracting paragliders seen in the sky by the ridge.	Residents with oblique views, and views when travelling to and from the village	High to Moderate
				Travellers on the minor road generally	Low
23	Heads of Valleys Industrial Estate	The illustrated photograph location was a little west of the Estate access road, which marks the application site boundary, by the factory building. The context is edge of settlement, dominated to the east by the industrial area and to the west by woodland plantations on steeply rising slopes, with occasional gaps allowing views through the pastureland rising to the skyline. The industrial estate is also well vegetated with woodland and tree plantations. The slopes rising steely to the west cut off views of the wider landscape and create a strong sense of enclosure and mystery. Scale is medium and composition simple. Industrial processes are a source of low sound intrusion. Views are generally confined to the immediate context, with occasional glimpses through to the hills and ridges in the wider landscape context or to the urban area of Rhymney.	The Estate access road and immediate grassed slope between tree plantations occupies the foreground through the view, above which the land rises, first in fenced fields of pasture and then in open upland pastureland. The plantations to left and right frame the view and screen wider views, although in winter, there would be filtered views through to the ridge-top further south, to the left. The operational site boundary is at or close to the top of the slope visible in this view.	Viewers from the Industrial Estate	Low
				Users of bridleways on the Estate access road	High

Table A16/003/ 3 View with Development & Magnitude of Change

VP ref	Location	View with development	Magnitude of change
1	Fochriw	In the initial phase, the view would be interrupted by the fencing of the operational area, although the fenceline would be set back from the edge of the road. The construction of built facilities would be apparent in the mid distance on the west side of the site, and on the nearer land, formation of a large water treatment area in the right of the view. In the left of the view towards the back of the middle ground, the remedial works to the southern tips would be apparent as low-key engineering operations, followed by re-establishment of grass cover. The principal change would arise from formation of the main overburden mound during the first phases of excavation, continuing from year 1 for about 5 years, when it would have reached its ultimate size. Formation of the mound would proceed in layers, the outer face of each layer formed first and grass-seeded as soon as practicable. This method would screen views of moving vehicles and the filling operations of the remainder of the layer, becoming apparent again in forming the outer edge of the succeeding layer. Once maximum void had been reached, no further material would be added to the overburden mound and there would be no further change in the view. As the grass became established it would become a settled, although large, element of the view, and would interrupt the open views currently available to the north. During restoration backfilling in years 11-14, activity and change would resume in the view as the overburden was removed in layers to backfill the final extraction void. As in the process of forming the mound, the outer edge of each layer would be retained to provide screening of the removal operations and vehicle movement in the rest of the layer. That would be followed by removal of water treatment areas and site facilities. The view north would be restored towards the end of year 14. From year 15, after soils were respread, a short period of agricultural and horticultural operations would restore the land cover of grassland and heathland in the near view, which would become established gradually over the 5-year aftercare period.	Initial operations, year 1: This would be a short period of small to medium change in the view. Operations, years 1-6: A period of large change and intermittent activity in this close range view, the main period of formation of the overburden mound. Operations, years 6-9.5: No further change, but the mound would continue to be a large element of the view, interrupting the open views currently available to the north. Operations, years 9.5-14: A further period of large change and intermittent activity as the mound was removed, followed by the water treatment area and site facilities. At that point, the open view north would be restored, a large change in the view. Aftercare, years 15-19: This would a short to medium term period of gradual incremental change as land cover was restored.
2	Bryn Carno, Rhymney	During initial operations, the fencing of the operational area would be just discernible near the top of the slope in the view, and the formation of a water treatment area, on the mid to upper slopes in the left of centre of the view, would be more prominent as the sloping land would be engineered to form the lagoons. A second water treatment area would be formed on the lower slopes in the right of the view, where enclosed fields are partly visible above	Initial operations, year 1: This would be a short period of small to medium change in the view, in particular due to formation of water treatments areas. Operations, years 1-6: A period of large change and activity in this relatively close range view, during formation of the overburden and screening mounds. Operations, years 6-9.5: No further change until final void, the upper slopes

VP ref	Location	View with development	Magnitude of change
		the roof tops and trees in the near middle ground. During years 1-2, remedial works would also be taking place on the side slopes of the ridge, minor localised engineering works to the old mine hazards, and hedgerow and woodland planting, although these are unlikely to be noticeable in this view until about year 5. The main changes in this view would occur once excavations commenced, although they would be out of view beyond the ridgetop. The overburden excavated from the void would be stored in a large mound and in a long mound along the upper slopes in the centre and right of the view and on the ridge top in the left of the view. This would be medium term period of activity and change. As noted for VP1, the mounds would be formed in layers, an outer bund formed first to each layer which would screen the filling activity behind while the rest of the layer was formed. The outer slopes would be grassed at the earliest opportunity, which would help merge the mounds with the ridge landform and they would become settled elements in the view. The bund in the centre and right of the view would screen the excavations from this view until final void when the topmost cutting would be just discernible above the left hand end of the bund. There would be no further change in the view, except growth of the new planting, until overburden material began to be removed for use in backfilling the final void, in about year 9.5, which would be another medium term period of activity and change. By this time the planting on the lower slopes of the ridge would be well established and providing a strong landscape pattern on the ridge side. Once the final void was backfilled, the water treatment area would be removed and the final features of the restoration landscape established. In this view, the stone walls on the upper slopes would be visible. The Bent Iron would be reinstated on the high point above the ridgeside in the right of the view, the stone faced terrace feature in which it is to be placed, giving it emphasis from this elevated viewpoint. The fieldscape in the right of the view would be restored with new planting of hedgerows and woodland bands rising up the slope. After restoration, the ridge side landscape pattern would be fully appreciable, as the planting carried out in years 1-2 would be established, the stone walls on the higher levels and other features would be instantly apparent after construction, providing the transition to the open ridge top of upland grassland.	of which would be a further small change in the view. Operations, years 9.5-14: A period of large change and activity as the overburden mounds were removed, followed by the water treatment areas, etc. Throughout these phases, the planting on the side slopes would be growing and becoming noticeable feature of the ridge side landscape, incremental medium-scale change. Aftercare, years 15-19: This would a short to medium term period of small changes as land cover of the upper slopes and ridge top was restored, and the stone walls and Bent Iron feature constructed, to become a landmark in the view.
3	Rhymney Conservation Area	During initial operations, the fencing of the operational area would be just discernible near the top of the slope in these views, and the formation of a water treatment area, on the mid to upper slopes in the left of centre (3A) or centre (3B) of the view, would be more prominent as the sloping land would	Initial operations, year 1: This would be a short period of small to medium change in the view, in particular due to formation of water treatment area. Operations, years 1-6: A period of large change and activity in these relatively close range views, during formation of the overburden and

VP ref	Location	View with development	Magnitude of change
		be engineered to form the lagoons. . During years 1-2, remedial works would also be taking place on the side slopes of the ridge, minor localised engineering works to the old mine hazards, and hedgerow and woodland planting, although these are unlikely to be noticeable in these views until about year 5. The main changes in these views would occur once excavations commenced, which would be out of view beyond the ridgetop throughout the operations. The overburden excavated from the void would be stored in a large mound and in a long mound along the upper slopes in the centre and right of the view and on the ridge top in the left of the view. This would be medium term period of activity and change. As noted for VP1, the mounds would be formed in layers, an outer bund formed first to each layer which would screen the filling activity behind while the rest of the layer was formed. The outer slopes would be grassed at the earliest opportunity, which would help merge the mounds with the ridge landform and they would become settled elements in the view. The mound in the centre and right of the view would screen the excavations from view. There would be no further change in the view, except growth of the new planting, until overburden material began to be removed for use in backfilling the final void, between about year 9.5 and year 14, which would be another medium term period of activity and change. By this time the planting on the lower slopes would be well established and providing a strong landscape pattern on the ridge side, especially form VP3A. Once the final void was backfilled, the water treatment area would be removed and the final features of the restoration landscape established. In these views, the stone walls on the upper slopes would be visible. The Bent Iron would be reinstated on the high point above the ridgeside in the right of the view, the stone faced terrace feature in which it is to be placed, giving it a degree of emphasis especially in VP3A. The fieldscape in the right of view 3A would be restored with new planting of hedgerows and woodland bands rising up the slope. After restoration, the ridge side landscape pattern would be fully appreciable, especially in VP3A, as the planting carried out in years 1-2 would be established, the stone walls on the higher levels and other features would be instantly apparent after construction, providing the transition to the open ridge top of upland grassland.	screening mounds. Operations, years 6-9.5: No further change except growth of the planting carried out in years 1-2 on the ridge side, but the mounds would continue to be moderately large elements of the view. Operations, years 9.5-14: A further period of large change and activity as the mounds were removed, followed by the water treatment area, etc. Throughout these phases, the planting on the side slopes would be growing and becoming a noticeable feature of the ridge side landscape, incremental medium-scale change. Aftercare, years 15-19: This would a short to medium term period of small changes as land cover of the upper slopes and ridge top was restored, and the stone walls and Bent Iron feature constructed, to become a landmark in the view.
4	Carn-y-Tyle Terrace, Abertysswg	The main changes in this view would occur during formation in years 1-6 and later removal in years 9.5-14, of the main overburden mound, on the skyline in the centre-left of the view. The formation and removal of the screening mound would be discernible on the more distant ridgeline in the background of the centre of the view.	Initial operations, year 1: No discernible change Operations, years 1-6: The activity in forming the main overburden mound would be a medium to large change in the view; the forming of the screening mound a small change.

VP ref	Location	View with development	Magnitude of change
			Operations, years 6-9.5: No further change, but the overburden mound would continue to be noticeable element on the skyline. Operations, years 9.5-14: The activity in removing the main overburden mound would be a medium to large change in the view; the removal of the screening mound a small change over a short period towards the end of these operations. Aftercare, years 15-19: No discernible change
5	Pontlottyn	The initial operations to fence the operational site, construct water treatment areas, are likely to be discernible, especially construction of the south-eastern water treatment area, as this elevated viewpoint looks down on its location. But the main changes in this view would occur during formation in years 1-6 and later removal in years 9.5-14, of the main overburden mound, on the open ridge top in the centre of the middle ground. The formation and removal of the screening mound would be discernible on the more distant ridgeline in the background of the centre of the view.	Initial operations, year 1: Little discernible change Operations, years 1-6: The activity in forming the main overburden mound would be a large change in this close view; the forming of the screening mound a small change. Operations, years 6-9.5: No further change, but the overburden mound would continue to be prominent element on the skyline. Operations, years 9.5-14: The activity in removing the main overburden mound would be a large change in the view; the removal of the screening mound a small change over a short period towards the end of these operations. Aftercare, years 15-19: No discernible change
6	Rhymney Valley Ridgeway Footpath (Cefn Brithdir)	The initial operations to fence the operational site and remedial works to old mine hazards, are likely to be discernible, especially construction of the south-eastern water treatment area, as the view from this elevation is over its location in the middle ground. The main changes in this view, however, would occur during formation in years 1-6 and later removal in years 9.5-14, of the main overburden mound, in the centre middle ground. The method of formation in layers, constructing an outer bund first and filling behind, would partly reduce the prominence of this operation, and would be more effective for the top layer. The formation and removal of the screening mound would be discernible on the ridge side beyond that to the right. Because of the elevation of the viewpoint, the overburden mound would not interrupt the distant view of the Brecon Beacons on the skyline. There would be no further change in the view, the mound screening the excavation area from view, until removal of the overburden mounds and the water treatment area in years 9.5-14, followed by restoration aftercare. From year 15, after soils were respread, a short period of agricultural and horticultural operations would restore the land cover of grassland and heathland in the near view, which would become established gradually over the 5-year aftercare period	Initial operations, year 1: Small changes as the water treatment area is established. Operations, years 1-6: The activity in forming the main overburden mound would be a large change in this elevated view; the forming of the screening mound a small change. Operations, years 6-9.5: No further change, but the overburden mound would continue to be a noticeable element on the ridge top. Operations, years 9.5-14: The activity in removing the main overburden mound would be a large change in the view; the removal of the screening mound, over a short period towards the end of these operations, and water treatment area, a small change. Aftercare, years 15-19: This would a short to medium term period of gradual incremental change as land cover was restored.
7	Pentwyn, south of	The initial operations to fence the operational site and remedial works to old	Initial operations, year 1: Negligible change.

VP ref	Location	View with development	Magnitude of change
	Fochriw	mine hazards, are likely to be barely discernible in this elevated but partial view of the site. The main change would occur during formation in years 1-6 and later removal in years 9.5-14, of the main overburden mound, in the centre and back of the middle ground. The method of formation in layers, constructing an outer bund first and filling behind, would partly reduce the prominence of this operation, and would be more effective for the top layer. The mound would be seen against higher land in the background. There would be no further change in the view, the mound screening the excavation area from view, until removal of the overburden mound etc. in years 9.5-14. From year 15, after soils were respread, the restored upland grassland and heathland would become established gradually over the 5-year aftercare period	Operations, years 1-6: The activity in forming the main overburden mound would be a medium to large change in this elevated view. Operations, years 6-9.5: No further change, but the overburden mound would continue to be a noticeable element on the ridge top. Operations, years 9.5-14: The activity in removing the main overburden mound would be a medium to large change in the view. Aftercare, years 15-19: This would a short to medium term period of gradual incremental change as land cover was restored.
8	Fochriw Road between Disposal Point and A465	In the initial phase, the view would be interrupted by the fencing of the operational area, although the fenceline would be set back from the edge of the road, and a margin along the left side of the road would remain unchanged. The power line along the eastern side of the site would be relocated to run alongside the existing overhead line on poles in the foreground of the view. The construction of built facilities would be would be visible, although the rolling landform in the foreground would provide a degree of screening. The main changes in the view would arise from formation of the overburden mound during the first phases of excavation (which would not be visible from this viewpoint) from year 1 until it reached its ultimate size in year 6. Formation of the mound would proceed in layers, the outer face of each layer formed first and grass-seeded as soon as practicable. Once maximum void had been reached, no further material would be added to the overburden mound and there would be no further change in the view. As the grass became established it would become a settled, although large, element of the view, and would interrupt the open views currently available to the north. The mound would provide a background and containing element to the built facilities and coal processing area, also partly screened by the foreground landform, throughout the coal extraction period (years 2-11). Then, during restoration backfilling in years 9.5-14, there would be further activity and change in the view as the overburden was removed in layers to backfill the final extraction void. That would be followed by removal of the site facilities in the middle ground. The open view south to the Rhymney Valley would be restored towards the end of year 14. From year 15, after soils were respread, a short period of agricultural and horticultural operations would restore the land cover of upland grassland in	Initial operations, year 1: This would be a short period of medium change in the view, as the site facilities and overhead powerline diversion were constructed. Operations, years 1-6: A period of large change and activity in this close range view, the main period of formation of the overburden mound, and activity around the site facilities and coal processing area. Operations, years 6-9.5: The mound would continue to be a large element of the view, interrupting the open views currently available to the south, and there would be continued activity around the site facilities and coal processing area. Operations, years 9.5-14: A further period of large change and activity as the mound was removed, followed by site facilities. At that point, the open view south would be restored, a large change in the view. Aftercare, years 15-19: This would a short to medium term period of gradual incremental change as land cover was restored.

VP ref	Location	View with development	Magnitude of change
		the middle ground, which would become established gradually over the 5-year aftercare period. The proposed features at Rhaslas Pond would be screened by the foreground landform.	
9	National Cycle Route 468, Abertysswg	The main changes in this view would occur during formation in years 1-6 and later removal in years 9.5-14, of the main overburden mound, on the skyline in the centre background of the view. The formation and removal of the screening mound would be just discernible on the more distant ridgeline in the background of the centre of the view.	Initial operations, year 1: No discernible change Operations, years 1-6: The activity in forming the main overburden mound would be a medium change in the view; the forming of the screening mound a negligible change. Operations, years 6-9.5: No further change, but the overburden mound would continue as a discernible element on the skyline. Operations, years 9.5-14: The activity in removing the main overburden mound would be a medium change in the view; the removal of the screening mound a negligible change over a short period towards the end of these operations. Aftercare, years 15-19: No discernible change
10	Bridleway, Mynydd Fochriw	The initial operations of fencing the operational area, relocating the power line from the eastern side of the site to run along the west side, the construction of the south-western water treatment area and of built facilities would be visible, from this relatively elevated viewpoint. The main changes in the view would arise from formation of the overburden mound during the first phases of excavation, which would not be visible from this viewpoint, until it reached its ultimate size in year 6. As described above, formation of the mound would proceed in layers, the outer face of each layer formed first and grass-seeded as soon as practicable, while filling proceeded behind. Once maximum void had been reached, year 6, no further material would be added to the overburden mound and there would be no further change in the view. As the grass became established it would become a settled, although large, element of the view, and would interrupt the open views currently available to the north-east although barely breaking the skyline. During the excavation operations, the movement of vehicles transporting coal to the CDP, visible in the left of the view in the middle ground, would be discernible. During restoration backfilling in years 9.5-14, there would be further activity and change in the view as the overburden was removed in layers to backfill the final extraction void. That would be followed by removal of the site facilities in the back of the middle ground. The open view north-east to the uplands of the national park would be restored towards the end of this period. From year 15, after soils were respread, a short period of agricultural and horticultural operations would restore the land cover of upland grassland in	Initial operations, year 1: This would be a short period of medium change in the view, as the site facilities, the water treatment areas in the south of the site, and overhead powerline diversion were constructed. Operations, years 1-6: A period of large change and activity in this relatively close range and relatively elevated view as the overburden mound was formed. Activity around the site facilities and coal processing area within the site and movement of vehicles transporting coal to the CDP would represent small changes in the view. Operations, years 6-9.5: The mound would continue to be a large element of the view, interrupting the open views currently available to the north-east. There would be continued activity around the site facilities and coal processing area and movement of vehicles transporting coal to the CDP, small changes in the view. Operations, years 9.5-14: A further period of large change and activity as the mound was removed, followed by removal of site facilities, water treatment areas, etc. During this period, the open view north-east would be restored, a large change in the view. Aftercare, years 15-19: This would a short to medium term period of gradual incremental change as land cover was restored.

VP ref	Location	View with development	Magnitude of change
		the middle ground, which would become established gradually over the 5-year aftercare period.	
11	Rhymney to Tredegar Road, by entrance to Golf Club	The main changes in this view would occur during formation in years 1-6 and later removal in years 9.5-14, of the main overburden mound, on the skyline in the centre-right of the view. The formation and removal of the eastern screening mound would be discernible on the more ridge side in the background to the right of the view. Because of the elevation of the viewpoint, the western edge of the excavation void would be discernible, through all phases partly screened by the overburden bund on the eastern edge of the operational area.	Initial operations, year 1: No discernible change Operations, years 1-6: The activity in forming the main overburden mound would be a medium change in the view; the forming of the screening mound, a small change. Operations, years 6-9.5: No further change, but the overburden mound would continue to be noticeable element on the skyline; the screening mound and the excavation void a small to negligible change. Operations, years 9.5-14: The activity in removing the main overburden mound would be a medium to large change in the view; the removal of the screening mound a small change over a short period towards the end of these operations . Aftercare, years 15-19: No discernible change
12	National Cycle Route 46, Parc Brynbach	The main changes in this view would occur during formation in years 1-6 and later removal in years 9.5-14, of the main overburden mound, on the skyline in the centre background of the view. The formation and removal of the part of the screening mound would be just discernible on the ridge side below and to the right of the main overburden mound. In years 1-2, the remediation and planting on the ridge side would be just discernible. After restoration, the ridge side landscape pattern would be just appreciable, as the planting carried out in years 1-2 would be established, the stone walls on the higher levels and other features would be apparent providing the transition to the open ridge top of upland grassland.	Initial operations, year 1: No discernible change Operations, years 1-6: The activity in forming the main overburden mound would be a medium to small change in the view; the forming of the screening mound and the remediation works would be negligible changes. Operations, years 6-9.5: No further change, but the overburden mound would continue as a discernible element on the skyline. Operations, years 9.5-14: The activity in removing the main overburden mound would be a medium change in the view; the removal of the screening mound a negligible change. Aftercare, years 15-19: Negligible change.
13	Bute Town Pond	During initial operations, the formation of soil storage mounds, water treatment area, etc in the northern fields would be clearly visible in the near middle ground. Further changes would occur once excavations commenced and overburden excavated from the void would be stored in a long mound along the upper slopes in the centre and right of the view, formed during the first 4 months of excavations, and in a mound along the ridge top in the left of the view, formed over the course of years 1-6. As noted for VP1, the mounds would be formed in layers, an outer bund formed first to each layer which would screen the filling activity behind while the rest of the layer was formed. The outer slopes would be grassed at the earliest opportunity, which would help merge the mounds with the ridge landform and they would become settled elements in the view. There would be no further change in the view until the final void was backfilled and the overburden and screening mounds would be removed,	Initial operations, year 1: This would be a short period of large change in the view, in particular, the formation of water treatments area and the soil storage mounds. Operations, years 1-6: An initial short period of large change during formation of the overburden and screening mounds, and continuing moderate change as the more distant overburden mound was formed. Operations, years 6-9.5: No further change. Operations, years 9.5-14: A further period of large change and activity as the mounds were removed, the screening mound over a short period towards the end of these operations, followed by the water treatment areas, and soil storage mounds. Throughout these phases, the planting on the side slopes would be growing and becoming distinguishable on the ridge side, incremental small scale

VP ref	Location	View with development	Magnitude of change
		although the developing woodland on the eastern slopes in the mid-distance would be discernible as it developed. Removal of the overburden mound would be through years 9.5-14, a gradual change in the background of the view, and the screen mound removal a short period of rapid change towards the end of the period. The water treatment area and soil storage mounds in the northern fields would then be removed and the final features of the restoration landscape established. The fieldscape extending through the middle ground of the view would be restored, with new planting of hedgerows and woodland bands rising up the slope and stone walls on the upper slopes. The Bent Iron would be reinstated on the high point above the ridgeside in the left of centre of the view above a stone faced terrace feature.	change in the view. Aftercare, years 15-19: This would a short to medium term period of small changes as land cover of the upper slopes was restored, and the stone walls and Bent Iron feature constructed.
14	Minor road giving access to dwellings at Ras Bryn Oer	During initial operations, the formation of a water treatment area on the mid to upper slopes in the centre of the view would be noticeable as the sloping land would be engineered to form the lagoons, as would the formation of a second water treatment area on the lower slopes in the right of the view, in the enclosed fields in the right of the near background, with storage mounds for the soils stripped from the initial working areas on the far slopes beyond the water treatment area. During years 1-2, remedial works including hedgerow and woodland planting taking place on the side slopes of the ridge are unlikely to be noticeable in this view until about year 5. The main changes in this view would occur once excavations commenced, and overburden excavated from the void would be stored in a long mound along the upper slopes in the centre and right of the view, formed during the first 4 months of excavations, and in a mound along the ridge top in the left of the view. This would be medium term period of activity and change. As noted for VP1, the mounds would be formed in layers, an outer bund formed first to each layer which would screen the filling activity behind while the rest of the layer was formed. The outer slopes would be grassed at the earliest opportunity, which would help merge the mounds with the ridge landform and they would become settled elements in the view. The upper edge of the excavation void would be visible from box cut until final void, at this elevation, only partly screened by the overburden bund. Further incremental changes in the view would occur as earlier phases of extraction were backfilled from the current phase and more noticeable changes when overburden material began to be removed for use in backfilling the final void, in about year 9.5. By this time the planting on the lower slopes would be well established and providing a strong landscape pattern on the ridge side. Once the final void was backfilled, the water	Initial operations, year 1: This would be a short period of medium change in the view, in particular, the formation of water treatments areas. Operations, years 1-6: A period of large change and activity during formation of the overburden and screening mounds. Operations, years 6-9.5: Medium changes in the view from progression of the excavation across the ridge Operations, years 9.5-14: A further period of large change and activity as the mounds were removed, followed by the water treatment areas, etc. Throughout these phases, the planting on the side slopes would be growing and becoming noticeable feature of the ridge side landscape, incremental medium-scale change. Aftercare, years 15-19: This would a short to medium term period of small changes as land cover of the upper slopes and ridge top was restored, and the stone walls and Bent Iron feature constructed.

VP ref	Location	View with development	Magnitude of change
		treatment areas would be removed and the final features of the restoration landscape established. In this view, the stone walls on the upper slopes would be visible. The Bent Iron would be reinstated on the high point above the ridgeside in the right of the view, the stone faced terrace feature in which it is to be placed, giving it emphasis from this elevated viewpoint. The fieldscape in the right of the view would be restored with new planting of hedgerows and woodland bands rising up the slope. After restoration, the ridge side landscape pattern would be appreciable, as the planting carried out in years 1-2 would be established, the stone walls on the higher levels and other features would be apparent, providing the transition to the open ridge top of upland grassland.	
15	Waundeg	Although originally predicted to be visible from here, subsequent modification of the development design now means that no part of the development would be visible from this viewpoint;	None at any stage
16	Merthyr Common	Until final void, year 11, the existing overburden mounds at FLRS would screen most of the site from this view, although formation of the Nant Llesg overburden mound would be a noticeable activity and change in the view. Once formed, the mound would be a noticeable element of the view. During the period to final void, the overburden mounds at FLRS would be removed, opening up the view to the features of the Nant Llesg site. The overburden mound would be the main feature seen, a moderately important mid-distance element in the view, against the backdrop of the more distant rising land. Activity and change associated with removal of the mound to backfill the final void would be noticeable in this view, but once completed, further change would be difficult to discern.	Initial operations, year 1:Change would be Negligible Operations, years 1-6: Medium to small change Operations, years 6-9.5: Medium to small change Operations, years 9.5-14: Medium change Aftercare, years 15-19: Negligible change.
17	Bryniau/Morlais Castle Golf Club	Although originally predicted to be visible from here, subsequent modification of the development design now means that no part of the development would be visible from this viewpoint;	None at any stage
18	Twynau Gwynion, BBNP	At this distance, it is unlikely that initial operations to establish site facilities, water treatment areas, etc. would be easily distinguishable. Because of the elevation of the viewpoint, the main overburden mound and excavation void would be visible at all stages at a lower level than the viewer. However, at this distance they would be relatively small elements in the wide panoramic view, the larger existing features of FLRS and Trecatti Landfill sites a guide to the likely impact of the Nant Llesg features. Early and progressive restoration of the excavation area as operations progress from west to east would reduce the scale of the void further in the view. The activity to remove the overburden to backfill the final void would be similarly noticeable and restoration aftercare would quickly re-establish the upland grassland, at	Initial operations, year 1: Small to negligible change, or localised where built facilities might be discernible Operations, years 1-6: Small progressive change as void excavation commences and the overburden mound constructed Operations, years 6-9.5: Small progressive change, as the void excavation progressed across the ridge in front of the overburden mound followed by progressive backfilling Operations, years 9.5-14: Small changes as the overburden mound is removed and final void filled Aftercare, years 15-19: Negligible change; none once grassland is

VP ref	Location	View with development	Magnitude of change
		which point the site would be indistinguishable in the view.	established.
19	Sirhowey Valley Walk	In this distant, elevated view, the current visibility of the FLRS overburden mounds provide an indication of the likely importance of the proposed Nant Llesg features in the wide-ranging panoramic views available from the route of the Walk itself and from the higher access land to the east. It is unlikely that initial operations would be discernible, but initial excavation of the void and construction of the main overburden mound in years 1-6 are likely to be just noticeable. The elevation of the viewpoints would allow the excavation void to be visible at all stages, but it would be a very small element in the view. The activity and change during restoration backfilling would be noticeable, in the same way as the earlier construction of the mound. During restoration after care, there would be no discernible change in the view.	Initial operations, year 1: Negligible change Operations, years 1-6: Small progressive change as void excavation commences and the overburden mound constructed Operations, years 6-9.5: Small to negligible progressive change, as the void excavation progressed across the ridge Operations, years 9.5-14: Small changes as the overburden mound is removed and final void filled Aftercare, years 15-19: Negligible change; none once grassland is established.
20	Garn Fawr, Chartist Cave	In this distant, elevated view, the current visibility of the FLRS overburden mounds provide an indication of the likely importance of the proposed Nant Llesg features in the wide-ranging panoramic views available from these uplands. It is unlikely that initial operations would be discernible and the ridge landform in the foreground would screen the excavation void area. Construction of the main overburden mound in years 1-6 is likely to be just noticeable, the process of change drawing the attention, and it would be a small element in the view once constructed. The activity and change during restoration backfilling would be noticeable, in the same way as the earlier construction of the mound. During restoration after care, there would be no discernible change in the view.	Initial operations, year 1: Negligible change Operations, years 1-6: Small progressive change as the overburden mound is constructed Operations, years 6-9.5: Negligible change Operations, years 9.5-14: Small changes as the overburden mound is removed Aftercare, years 15-19: Negligible change; none once grassland is established.
21	Garn Ddu	Although originally predicted to be visible from here, subsequent modification of the development design now mean that no part of the development would be visible from this viewpoint;	None at any stage
22	Princetown	During initial operations, the formation of a water treatment area on the lower slopes in the enclosed fields in the right of the near background, with storage mounds for the soils stripped from the initial working areas on the far slopes beyond the water treatment area. During years 1-2, remedial works including hedgerow and woodland planting taking place on the side slopes of the ridge are unlikely to be noticeable in this view until about year 5. The main changes in this view would occur once excavations commenced. The overburden excavated from the void would be stored in a large mound in a long mound along the upper slopes in the centre and right of the view and on the ridge top in the left of the view. This would be medium term	Initial operations, year 1: This would be a short period of medium change in the view, in particular, the formation of water treatments areas. Operations, years 1-6: A period of large change and activity during formation of the overburden and screening mounds. Operations, years 6-9.5: Medium changes in the view from progression of the excavation across the ridge Operations, years 9.5-14: A further period of large change and activity as the mounds were removed, the screen mound over a short period towards the end of these operations, followed by the water treatment areas, etc. Throughout these phases, the planting on the side slopes would be growing

VP ref	Location	View with development	Magnitude of change
		period of activity and change. As noted for VP1, the mounds would be formed in layers, an outer bund formed first to each layer which would screen the filling activity behind while the rest of the layer was formed. The outer slopes would be grassed at the earliest opportunity, which would help merge the mounds with the ridge landform and they would become settled elements in the view. The elevation of the view means that the excavation void would be visible from box cut until final void, only partly screened by the overburden bund at final void. Further incremental changes in the view would occur as earlier phases of extraction were backfilled from the current phase and more noticeable changes when overburden material began to be removed for use in backfilling the final void, in about year 9.5 and the screening mound towards the end of this period. By this time the planting on the lower slopes would be well established and providing a strong landscape pattern on the ridge side. Once the final void was backfilled, the water treatment areas would be removed and the final features of the restoration landscape established. In this view, the stone walls on the upper slopes would be visible. The Bent Iron would be reinstated on the high point above the ridgeside in the right of the view, the stone faced terrace feature in which it is to be placed, giving it emphasis from this elevated viewpoint. The fieldscape in the right of the view would be restored with new planting of hedgerows and woodland bands rising up the slope. After restoration, the ridge side landscape pattern would be appreciable, as the planting carried out in years 1-2 would be established, the stone walls on the higher levels and other features would be apparent, providing the transition to the open ridge top of upland grassland.	and becoming noticeable feature of the ridge side landscape, incremental medium-scale change. Aftercare, years 15-19: This would a short to medium term period of small changes as land cover of the upper slopes and ridge top was restored, and the stone walls and Bent Iron feature constructed.
23	Heads of Valleys Industrial Estate	During initial operations, there would be localised activity where old mine hazards were located and remediated and woodland planting on the mid to upper slope and other ecological features were established. Once excavations commenced, overburden excavated from the void would be stored in a long mound along the upper slopes in the centre and right of the view, formed during the first 4 months of excavations. The main overburden mound would be on the ridge top to the left, screened in summer by the woodland plantation, with the possibility of filtered views during winter. As noted, the mounds would be formed in layers, an outer bund formed first to each layer which would screen the filling activity behind while the rest of the layer was formed. The outer slopes would be grassed at the earliest opportunity, which would help merge the mounds with the ridge landform and they would become settled elements in the view. There would be no further change in the view until the screening mound was	Initial operations, year 1: Localised small changes in the view, in particular from mine hazard remediation. Operations, years 1-6: A short period of large change and activity during formation of the screening mounds. Operations, years 6-9.5: No further change in the view, except small change as the woodland planting established Operations, years 9.5-14: During this period, a further short period of large change and activity as the screen mound was removed towards the end of these operations. Throughout these phases, the planting on the side slopes would be growing and becoming a noticeable feature of the ridge side landscape, incremental medium-scale change. Aftercare, years 15-19: This would a short to medium term period of small

VP ref	Location	View with development	Magnitude of change
		removed to backfill the final void in about year 14, except that the woodland planting on the mid- to upper slopes would become more noticeable as it developed.	changes as woodland on the mid- to upper slopes matured and added to the predominantly wooded character of the landscape in the view.

Table A16/003/ 4 Assessment of Visual Effects

		Assessment: Preliminary operations Remedial operations	Assessment: Phases 1-2 Box Cut to Maximum Void	Assessment: Phases 3-4 Maximum Void to End of Coaling including progressive restoration of Phases 1-3	Assessment: Phases 4-5 Restoration Backfilling & progressive restoration of Phases 3-4	Assessment: Aftercare
VP ref	**Receptors & Sensitivity**	**Year 1, Year 1-2** **Short Term**	**Years 1-6** **Medium Term**	**Years 6-11** **Medium Term**	**Years 12-14** **Medium Term**	**Year 15-19** **Medium Term**
1B	Residents: some direct views and some oblique: High to Moderate	Minor to Moderate, adverse	Major, adverse	No further change; presence of OBM: Moderate, adverse	Major, adverse	Minor, and restored landscape not noticeably different from the present
1A, 1B	Travellers along the road: direct but passing views: Moderate	Minor or Negligible, adverse	Moderate, adverse	No further change; presence of OBM: Moderate to Minor, adverse	Moderate, adverse	Negligible
1A, 1B	Users of the access land, an important recreational facility, within VILL: High	Minor to Moderate, adverse	Major, adverse	No further change; presence of OBM: Moderate, adverse	Major, adverse	Minor, and restored landscape not noticeably different from the present
1A, 1B	Users of public rights of way, open views and the landscape and views are the attractant, within VILL: High	Minor to Moderate, adverse	Major, adverse	No further change; presence of OBM: Moderate, adverse	Major, adverse	Minor, and restored landscape not noticeably different from the present

		Assessment: Preliminary operations **Remedial operations**	**Assessment: Phases 1-2 Box Cut to Maximum Void**	**Assessment: Phases 3-4 Maximum Void to End of Coaling including progressive restoration of Phases 1-3**	**Assessment: Phases 4-5 Restoration Backfilling & progressive restoration of Phases 3-4**	**Assessment: Aftercare**
VP ref	**Receptors & Sensitivity**	**Year 1, Year 1-2** **Short Term**	**Years 1-6** **Medium Term**	**Years 6-11** **Medium Term**	**Years 12-14** **Medium Term**	**Year 15-19** **Medium Term**
2	Residents: some direct views and some oblique: High to Moderate	Moderate, adverse	Major, adverse Remedial works: Minor	Moderate, adverse Remedial works: Moderate, beneficial	Major, adverse Remedial works: Moderate, beneficial	Moderate, beneficial, over the baseline condition in the long term
2	Users of the open space, a locally important recreational facility: Moderate	Minor, adverse	Moderate to Major, adverse	Minor, adverse	Moderate to Major, adverse	Minor, beneficial to Negligible
3A, 3B	Residents: some direct views and some oblique: High to Moderate	Moderate to Minor	Major, adverse Remedial works: Minor	Moderate, adverse Remedial works: Moderate, beneficial	Major, adverse Remedial works: Moderate, beneficial	Moderate, beneficial, over the baseline condition in the long term
3A, 3B	Town centre visitors: Moderate	Minor	Moderate, adverse Remedial works: Minor	Minor, adverse Remedial works: Minor, beneficial	Moderate, adverse Remedial works: Minor, beneficial	Minor to Moderate, beneficial, over the baseline condition in the long term
3A, 3B	Views from a conservation area: Moderate to High	Moderate to Minor	Major, adverse Remedial works: Minor	Moderate, adverse Remedial works: Moderate, beneficial	Major, adverse Remedial works: Moderate, beneficial	Moderate, beneficial, over the baseline condition in the long term
4	Residents: some direct views and some oblique: High	None	Moderate to Major, adverse	Moderate, adverse	Moderate to Major, adverse	None
4	Users of sitting area, a local amenity: Moderate	None	Moderate, adverse	Moderate to Minor, adverse	Moderate, adverse	None
4	Travellers along the road: direct but passing views: Low	None	Minor, adverse	Minor, adverse	Minor, adverse	None

		Assessment: Preliminary operations Remedial operations	Assessment: Phases 1-2 Box Cut to Maximum Void	Assessment: Phases 3-4 Maximum Void to End of Coaling including progressive restoration of Phases 1-3	Assessment: Phases 4-5 Restoration Backfilling & progressive restoration of Phases 3-4	Assessment: Aftercare
VP ref	Receptors & Sensitivity	Year 1, Year 1-2 Short Term	Years 1-6 Medium Term	Years 6-11 Medium Term	Years 12-14 Medium Term	Year 15-19 Medium Term
5	Residents: some direct views and some oblique: High to Moderate	None	Major, adverse	Moderate, adverse	Major, adverse	None
6	A promoted route, where the view of the landscape is an important attractant; within the VILL; VS evaluation High: High	Minor to Negligible	Moderate to Major, adverse	Moderate, adverse	Moderate to Major, adverse	Negligible
7	Users of local community facilities, their attention locally focussed: Moderate	None	Moderate, adverse	Minor, adverse	Moderate, adverse	Negligible
7	Travellers on the roads: Moderate to Low	None	Minor, adverse	Minor to Negligible	Minor, adverse	Negligible
8	Travellers on the road, whose view is not focussed on the landscape but with open views over the open upland: Moderate	Moderate to Minor, adverse	Moderate to Major, adverse	Moderate to Major, adverse	Moderate to Major, adverse	Negligible
9	Users of a promoted Cycle Route; within VILL: High	None	Moderate to Minor, adverse	Moderate to Minor, adverse	Moderate to Minor, adverse	none
9	Users of the amenity open space and recreation facilities: Moderate	None	Minor, adverse	Minor, adverse	Minor, adverse	None

		Assessment: **Preliminary operations** **Remedial operations**	**Assessment:** **Phases 1-2** **Box Cut to Maximum Void**	**Assessment:** **Phases 3-4** **Maximum Void to End of Coaling including progressive restoration of Phases 1-3**	**Assessment:** **Phases 4-5** **Restoration Backfilling & progressive restoration of Phases 3-4**	**Assessment:** **Aftercare**
VP ref	**Receptors & Sensitivity**	**Year 1, Year 1-2** **Short Term**	**Years 1-6** **Medium Term**	**Years 6-11** **Medium Term**	**Years 12-14** **Medium Term**	**Year 15-19** **Medium Term**
10	Users of bridleway and access land, likely to be there for the landscape setting; within LSHI, VILL; VS evaluation High: High	Moderate to Minor, adverse	Major, adverse	Major to Moderate, adverse	Major, adverse	Negligible
10	Paragliders and other active recreation users, whose reason for being there is partly for the landscape setting: Moderate to High	Minor, adverse	Moderate, adverse	Moderate, adverse	Moderate, adverse	Minor, beneficial
11	West-bound travellers on the road; within SLA: Moderate to Low	None	Moderate to Minor, adverse	Minor to Moderate, adverse	Moderate to Minor, adverse	None
11	Users of golf course and clubhouse, likely to be more focussed on the recreational use than on the landscape: Moderate	None	Moderate to Minor, adverse	Minor to Moderate, adverse	Moderate to Minor, adverse	None
11	Users of the access land; within SLA: High	None	Moderate, adverse	Moderate to Minor, adverse	Moderate, adverse	None
12	Visitors to the Country Park; within SLA: High	None	Moderate, adverse	Moderate to Minor, adverse	Moderate, adverse	None
12	Users of the footpath and cycleway; within SLA: High to Moderate	None	Moderate, adverse	Moderate to Minor, adverse	Moderate, adverse	None
12	Views from a valued landscape, SLA: High	None	Moderate, adverse	Moderate to Minor, adverse	Moderate, adverse	None

		Assessment: Preliminary operations Remedial operations	Assessment: Phases 1-2 Box Cut to Maximum Void	Assessment: Phases 3-4 Maximum Void to End of Coaling including progressive restoration of Phases 1-3	Assessment: Phases 4-5 Restoration Backfilling & progressive restoration of Phases 3-4	Assessment: Aftercare
VP ref	**Receptors & Sensitivity**	**Year 1, Year 1-2** **Short Term**	**Years 1-6** **Medium Term**	**Years 6-11** **Medium Term**	**Years 12-14** **Medium Term**	**Year 15-19** **Medium Term**
12	Users of a recreational amenity where the setting contributes to the amenity but is not the focus of the view: Moderate to Low	None	Minor, adverse	Minor, adverse	Minor, adverse	None
13	Users of National Cycle Route and public footpath: High	Major, adverse	Major to Moderate, adverse Remediation: Negligible	No further change from operations Remediation: Negligible	Major, adverse Remediation: Minor, beneficial	Moderate, beneficial, generally Remediation: Minor, beneficial
14	Residents of Ras Bryn Oer, going to and from their properties, but not directly from their properties; within SLA: High to Moderate	Moderate, adverse	Major, adverse Remediation: Negligible	Moderate, adverse Remediation: Moderate, beneficial	Moderate, adverse Remediation: Moderate, beneficial	Minor, beneficial, generally Remediation: Moderate, beneficial
14	Users of the public rights of way along the road, likely to be there for the landscape setting; within SLA: High	Moderate, adverse	Major, adverse Remediation: Negligible	Moderate, adverse Remediation: Moderate, beneficial	Moderate, adverse Remediation: Moderate, beneficial	Minor, beneficial, generally Remediation: Moderate, beneficial
15	Walkers and cyclists on cycleway: High to Moderate	None	None	None	None	None
15	Residents on south-eastern edge of Waundeg with open views, mainly oblique towards the site	None	None	None	None	None

		Assessment: Preliminary operations Remedial operations	**Assessment: Phases 1-2 Box Cut to Maximum Void**	**Assessment: Phases 3-4 Maximum Void to End of Coaling including progressive restoration of Phases 1-3**	**Assessment: Phases 4-5 Restoration Backfilling & progressive restoration of Phases 3-4**	**Assessment: Aftercare**
VP ref	**Receptors & Sensitivity**	**Year 1, Year 1-2 Short Term**	**Years 1-6 Medium Term**	**Years 6-11 Medium Term**	**Years 12-14 Medium Term**	**Year 15-19 Medium Term**
15	Views from Industrial Estate	None	None	None	None	None
16	Users of access land, within LOHI (although most people observed were using the track further east); within LOHI: Moderate to High	Negligible	Moderate, adverse	Minor, adverse	Moderate, adverse	Negligible
16	Paragliders, whose reason for being there is likely to be partly for the landscape setting: Moderate to Low	Negligible to None	Minor, adverse	Minor, adverse	Minor, adverse	Negligible or None
17	Users of access land, an important local amenity; within: High	None	None	None	None	None
17	Users of the neighbouring golf course, whose attention is likely to be only partly focussed on the landscape in the view: Moderate	None	None	None	None	None
18	Users of the access land, an important recreation resource, within the BBNP, a nationally valued landscape; VS evaluation High: High	Minor, adverse to Negligible	Minor, adverse	Minor, adverse	Minor, adverse	Minor, adverse to Negligible

		Assessment: Preliminary operations Remedial operations	**Assessment: Phases 1-2 Box Cut to Maximum Void**	**Assessment: Phases 3-4 Maximum Void to End of Coaling including progressive restoration of Phases 1-3**	**Assessment: Phases 4-5 Restoration Backfilling & progressive restoration of Phases 3-4**	**Assessment: Aftercare**
VP ref	**Receptors & Sensitivity**	**Year 1, Year 1-2 Short Term**	**Years 1-6 Medium Term**	**Years 6-11 Medium Term**	**Years 12-14 Medium Term**	**Year 15-19 Medium Term**
19A	Users of upland access land; VS evaluation High: High	Negligible	Minor, adverse	Minor, adverse	Minor, adverse	Negligible to None
19B	Users of Sirhowy Valley Walk, promoted long distance footpath; VS evaluation High: High	Negligible	Minor, adverse	Minor, adverse	Minor, adverse	Negligible to None
19B	Residents of upland farm: High	Negligible	Minor, adverse	Minor, adverse	Minor, adverse	Negligible to None
20	Users of access land within BBNP, a nationally valued landscape, with open views towards the site and added attraction of heritage interest of nearby Chartist Cave; VS evaluation High: High	Negligible	Minor, adverse	Negligible	Minor, adverse	Negligible to None
21	Users of access land within BBNP, a nationally valued landscape, especially from higher elevations with open views towards the site; VS evaluation High : High	None	None	None	None	None

		Assessment: Preliminary operations Remedial operations	**Assessment: Phases 1-2 Box Cut to Maximum Void**	**Assessment: Phases 3-4 Maximum Void to End of Coaling including progressive restoration of Phases 1-3**	**Assessment: Phases 4-5 Restoration Backfilling & progressive restoration of Phases 3-4**	**Assessment: Aftercare**
VP ref	**Receptors & Sensitivity**	**Year 1, Year 1-2 Short Term**	**Years 1-6 Medium Term**	**Years 6-11 Medium Term**	**Years 12-14 Medium Term**	**Year 15-19 Medium Term**
21	Users of the bridleway a locally important recreation resource within BBNP, a nationally valued landscape, with open view towards the site from part of its length; VS evaluation High: High to moderate	None	None	None	None	None
22	Residents with direct open views towards the site: High	Moderate, adverse	Major, adverse Remediation: Negligible	Moderate, adverse Remediation: Moderate, beneficial	Major, adverse Remediation: Moderate, beneficial	Minor, beneficial Remediation: Moderate, beneficial
22	Residents with oblique views, and views when travelling to and from the village: High to Moderate	Moderate to Minor, adverse	Moderate, adverse Remediation: Negligible	Moderate, adverse Remediation: Minor, beneficial	Major, adverse Remediation: Minor, beneficial	Minor, beneficial Remediation: Minor, beneficial
22	Travellers on the minor road generally: Low	Minor, adverse	Minor to Moderate, adverse Remediation: Negligible	Minor, adverse Remediation: Minor, beneficial	Minor to Moderate, adverse Remediation: Minor, beneficial	Minor, beneficial Remediation: Minor, beneficial
23	Heads of Valleys Industrial Estate	Negligible	Short term, Moderate, adverse, during formation of the screening mound Remediation: Negligible	No further change from operations Remediation: Negligible	Short term, Moderate, adverse, during removal of the screening mound Remediation: Minor, beneficial	Negligible Remediation: Moderate, beneficial

Nant Llesg Surface Mine

Incorporating Land Remediation

Appendix MA/NL/A16/003

Planning Policies for the Landscape and Landscape Designations

Appendix MA/NL/ES/A16/003 Landscape & Visual Impact Assessment: Planning Policies for the Landscape & Landscape Designations

Minerals Planning Policy Wales 2000 (MPPW)

1.1 MPPW provides for working of mineral resources while protecting areas of importance to the natural and built heritage. In particular, its seeks that minerals development "adjacent or close to a National Park or AONB that might affect the setting of these areas should be assessed carefully to determine whether the environmental and amenity impact is acceptable or not, or whether suitable, satisfactory conditions can be imposed to mitigate the impact". Effects on historic buildings, landscapes, parks and gardens, conservation areas, and ancient monuments and their settings must also be considered.

1.2 New mineral extraction must "provide satisfactory and suitable restoration" which should "at least maintain, and preferably enhance, the long-term quality of land and landscapes taken for mineral extraction … to the benefit of local communities". MPPW also states that "it is essential that progressive restoration is introduced at the earliest opportunity where appropriate and practicable".

Minerals Technical Advice Note 2: Coal 2009 (MTAN2)

1.3 MTAN2 provides guidance on best practice in carrying out landscape and visual impact assessment in Appendix N and on assessing cumulative impact within the EIA in Appendix G.

<u>Appendix N Best practice for landscape and visual impact assessment</u>

1.4 Section N1 recommends reference to GLVIA[1] and advises that visual impact assessment should be undertaken from various viewpoints including main settlements, major traffic routes, bridleways and footpaths, both close to the site and from greater distances, to reflect its landscape setting, and viewing corridors and visual characters should be identified. Study area extents are recommended:

- for the landscape impact assessment, normally all areas within 500m of the site boundary
- for visual impact assessment, up to the visual envelope, based on intervisibility studies which must be shown on a scaled plan.

1.5 Material advised to support the LVIA includes annotated illustrative materials such as computer-generated photomontages, oblique aerial photographs and other photographs. The assessment should identify potential sources of impact on landscape and visual amenity, taking into account the magnitude and degree of effect, and descriptive text should provide a concise and reasoned argument. MTAN2 also suggest computer based techniques to support the assessment process.

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1 <u>Guidelines for Landscape and Visual Impact Assessment, 2nd Edition</u>, Landscape Institute and Institute of Environmental Management and Assessment, Spon 2002

1.6 Section N2 advises that approaches to mitigation should aim to avoid or reduce adverse effects or remedying unavoidable effects, whether on landscape or on views. Approaches may be based on “Primary Measures” built into the design of the development or “Secondary Measures” to address residual effects, so that the proposal would be integrated into the local surroundings, making maximum use of existing landscape features such as woodlands, shelter-belts and hedges, trees and shrubs of appropriate native species, to screen elements of the development, and planting “well in advance of development” to establish effective screens.

Appendix G Best Practice for assessing cumulative impact within the EIA

1.7 Section G1 advises that the environmental sensitivity of geographical areas likely to be affected by development must be considered, having regard, in particular, to:

- the existing land use and the relative abundance, quality and regenerative capacity of natural resources in the area
- the absorption capacity of the natural environment and areas in which the environmental quality standards have already been exceeded
- sensitive receptors and stress factors, densely populated areas, and landscapes of historical, cultural or archaeological significance.

1.8 The appropriate spatial boundaries for the study area should be defined in relation to the distance the environmental effects travel (G3). The assessment of cumulative impacts should be based on available data (and further survey work if needed) and should focus on the most important environmental aspects (G4, G5). Having established the baseline, the assessment should identify past and future projects and their environmental effects and assess interactions between them and the project (G5). The assessment should consider, of relevance to LVIA (G6):

- the source of environmental change, the type and magnitude of effect
- additive and non-additive effects, whether beneficial or adverse, duration, reversibility, indication of uncertainty
- historic and projected trends
- effects which would not be significant for each scheme individually but would be significant in combination and effects which would be significant for each scheme individually but would not be significant in combination.

Caerphilly County Borough Local Development Plan up to 2021 (adopted November 2010)

1.9 The aims of the LDP include:

- To protect the environment as a whole whilst balancing the need for development with the need to conserve valuable resources
- To underpin all development with the principle of good design, that meets a diversity of needs; which uses resources efficiently

1.10 The relevant Key Objectives of the LDP include:

- 2. Ensure that the County Borough is well served by accessible public open space and accessible natural green space.
- 4. Ensure that the environmental impact of all new development is minimised.
- 7. Encourage the re-use and/or reclamation of appropriate brownfield and contaminated land and prevent the incidence of further contamination and dereliction.

- 11. Identify, protect and, where appropriate, enhance valuable landscapes and landscape features and protect them from unacceptable development.
- 13. Create appropriate new landscape and ecological features and habitats as an integral part of new development wherever appropriate.
- 24. Protect and enhance the overall quality of the historic natural and built environment of the County Borough.

Section A: The Development Strategy

1.11 The LDP proposes a Development Strategy based on three broad geographic areas. The site is located within the Heads of the Valleys Regeneration Area. It is stated that “a large part of the area has been shown to be highly valued and sensitive environmentally and as a consequence 67% of the surrounding countryside is subject to environmental protection”.

1.12 The Development Strategy seeks to reduce the impact of development upon the countryside. The LDP seeks to “take into account the impact of proposals for the extraction of minerals on the amenity of residents and its implications for the safeguarding or enhancement of the natural environment to facilitate the future tourism development potential of the area”. The countryside is viewed as “a positive asset that can strengthen regeneration strategies and maximise tourism opportunities that provide an enhanced quality of life for all” and the LDP seeks to “develop opportunities for the County Borough to contribute to the Valleys Regional Park – a network of countryside recreation areas linked by strategic footpaths and cycleways”.

1.13 Policy SP10 Conservation of Natural Heritage seeks to “protect, conserve, enhance and manage the natural heritage of the County Borough in the consideration of all development proposals within both the rural and built environment”. Natural Heritage is defined as the “geology, geomorphology, biodiversity, landscape and amenity value of the County Borough”.

1.14 Policy SP11 Countryside Recreation states that “access to opportunities for enjoyment of the County Borough will be promoted and encouraged where the proposals are sustainable in terms of its impact on the natural heritage, the local community and the rural environment within which they are located”.

1.15 Policy SP18 Protection of Strategic Leisure Network seeks to “protect important networks of public open space, natural green space and recreational facilities from inappropriate development”.

Section B: Countywide Policies

1.16 Policy CW2 Amenity states that all development proposals “must have regard for all relevant material planning considerations”, and requires that “there is no unacceptable impact on the amenity of adjacent properties or land” (A).

1.17 Policy CW4 Natural Heritage Protection states that development proposals “that affect locally designated natural heritage features, will only be permitted (A) where they conserve and, where appropriate, enhance the distinctive or characteristic features of the Special Landscape Area (SLA) or Visually Important Local Landscape (VILL)”.

1.18 Policy CW6 Trees, Woodland and Hedgerow Protection would only permit development with appropriate tree surveys, mitigation, management and protection schemes, or, “where trees, woodlands or hedgerows are removed, suitable replacements are provided where appropriate”.

1.19 Policy CW23 Mineral Site Buffer Zones states that development proposals for “minerals development will not be permitted within the mineral site buffer zones identified on the proposals map” in order to reduce the conflict between mineral working and other sensitive land uses. A 500m Buffer Zone has been defined to the existing Ffos-y-Fran site (Area Specific Policy MN1). No buffer zone is shown in respect of the Nant Llesg site.

Section C: Area Specific Policies

1.20 Section C includes policies specific to Strategy Area 1 Heads of the Valleys Regeneration Area within which the majority of the site is located. The LDP recognises that the Upper Rhymney Valley offers the greatest potential in terms of energy production due in part to the coal resources at Nant Llesg and "seeks to balance the safeguarding and potential development of minerals in this area against the objective of safeguarding the landscape from further degradation and, where possible, securing landscape enhancement". Development proposals should "secure effective landscape rehabilitation and enhancement as an integral part of the scheme" and be consistent with the wider regeneration strategy and enhanced recreational and tourism role envisaged for the area.

1.21 Policy SI1 Green Wedges seeks to protect open spaces between and within urban areas and settlements to prevent coalescence; development proposals within Green Wedges will be resisted. A Green Wedge is identified between Fochriw and Pontlottyn 125m to the south of the site.

1.22 Policy NH1 identifies Special Landscape Areas (SLAs) which "seek to protect areas that exhibit distinctive landscape, historical, cultural, biodiversity and geological features and characteristics within the County Borough". Applicants will "need to demonstrate that any development proposal will not have an unacceptable impact on the specific distinctive features or characteristics associated with the SLA". The SLAs have been identified using CCW LANDMAP datasets and SLA designation methodology. Special Landscape Areas are identified at

- Upper Rhymney Valley (NH1.1), "one of the most open upland areas within the County Borough" and "forms the Northern edge of the coalfield"
- Gelligaer Common (NH1.2) an "important and increasingly rare upland landscape within South East Wales exhibiting continuity of land use over many centuries".

1.23 The site is not within either Special Landscape Area. The Upper Rhymney Valley SLA includes the area to the north of Rhymney east of the A469 and, at its nearest, the site is located c.60m from the SLA boundary. Land within the County Borough, north of the A465 is also within the SLA, approximately 500m north of the site. The Gelligaer Common SLA is located beyond Pentwyn to the south of the site, c.325m from the site boundary.

1.24 Policy NH2 identifies Visually Important Local Landscapes (VILLs) which "seek to protect the distinctive features or characteristics of the visual and sensory landscape of the County Borough and how we perceive and respond to the landscape around us". The VILLs have been identified using the Visual and Sensory Aspect layer of LANDMAP. Development "will only be permitted where it conserves and, where appropriate, enhances the distinctive visual and sensory landscape features or characteristics of the VILL" and "should demonstrate that these features of the visual and sensory LANDMAP aspect layer are conserved and, where appropriate enhanced for the benefit of the visual landscape." Visually Important Local Landscapes are identified at:

- Northern Rhymney Valley (NH2.1), a "predominantly upland and open area". Long term aims include managing development at settlement edges to prevent further loss of visual quality and character, retaining the open feel of the area, encouraging reduced grazing, and preventing the spread of bracken and conifer plantation. Medium term objectives include restricting visual detractors such as pylons, industrial debris and turbines, and the reclamation of post-industrial and mining sites. In the short term, stone walls are to be promoted as the primary boundary treatment in the area with stockproof fencing where appropriate, and to restore the natural landscape by maximising natural vegetation and removing debris.
- Manmoel (NH2.2), "predominantly an upland landscape with a strong sense of openness", with a distinctive field pattern, beech hedging and stonewalls.

1.25 The Northern Rhymney Valley VILL includes the area of the site to the south of South Tunnel Road excluding the CDP area, but excludes the area of the site to the north of South Tunnel Road. . This VILL also includes Parc Cwm Darran, Cefn y Brithdir, the Rhymney River between Pontlottyn and New Tredegar, and Twyn Abertyswg. The Manmoel VILL is located some 4.8km to the east of the site.

1.26 Policy NH3 identifies Sites of Importance for Nature Conservation (SINCs). Development proposals will "normally be permitted where it would not cause unacceptable harm to the particular features of the SINC" and if harm is unavoidable effective mitigation measures should be employed to "ensure that there is no reduction in the overall nature conservation value of the area or feature". If this is not possible "compensation measures designed to conserve, enhance and manage locally distinctive natural habitats and species should be provided, including for example details of restoration and reclamation schemes". Approximately two-thirds of the site is designated as a SINC, excluding the northern slopes, the CDP and a small area to the west of Fochriw.

1.27 Policy LE3 seeks to protect Country Parks from inappropriate development. Country Parks are designated at Parc Bryn Bach (500m north-east of the site) and Parc Cwm Darran (1km south of the site).

1.28 Policy TR1 seeks to safeguard land to facilitate improvements to the cycle route network, including:

- TR1.1 Rhymney Valley Linear Cycle Route - Heads of the Valleys to Bedwas / Caerphilly, HOV
- TR1.2 Completion and Extension of Cycle Route NCN46
- TR1.6 Link from Fochriw to NCN 46 via Rhaslas Pond.

1.29 Indicative route alignments are shown on the Proposals Map. TR1.1 passes within 60m of the site boundary at its nearest point if it were to follow the indicative alignment along the eastern side of the A469. The indicative alignment of TR1.6 follows the Fochriw Road north with a detour along the alignment of the disused railway to include Rhaslas Pond before rejoining Fochriw Road[2].

Merthyr Tydfil County Borough Council, Local Development Plan 2006-21, (adopted 25 May 2011)

1.30 The application site lies entirely outside Merthyr Tydfil County Borough, but the CDP is immediately adjacent to its eastern boundary. Some MTCBC policies may be relevant to consideration of the landscape and/or visual effects of the Nant Llesg proposal.

<u>Borough-Wide Strategic Policy</u>

1.31 Policy BW5 Natural Heritage seeks to "protect and support the enhancement of the County Borough's distinctive natural heritage" and that proposals will only be permitted where "they maintain, enhance or do not cause harm to:

- The landscape character of the countryside
- Trees, woodlands and hedgerows that have natural heritage value or contribute to the character and amenity of an area"

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[2] Although the LDP provides this indicative route for a cycle way, it would be over common land, which would have to be taken out of common in order to allow the proposal to proceed.

1.32 Policy BW7 Sustainable design and place making requires development proposals to:

- Not result in unacceptable impact on local amenity in terms of visual impact
- Incorporate a good standard of landscape design
- Take account of natural heritage and the historic environment on site and in terms of potential impact on neighbouring areas of importance
- Contribute to the provision of usable open space, ensuring its accessibility and connectivity to other green infrastructure, footpaths and cycleways

1.33 Policy BW11 Transport, cycling and pedestrian proposals states that proposals "will be favourably considered where they improve access to the countryside" and "ensure an increased amount of attractive, safe and easy-to-use routes".

1.34 Policy BW16 Protecting / enhancing the network of leisure facilities seeks to "protect and support the enhancement of leisure facilities including … public rights of way in order to ensure their continued use for recreation and amenity" and that proposals which "result in the loss of an existing facility will not normally be permitted unless "alternative provision of at least equivalent value to the local community can be provided nearby".

1.35 Policy BW17 seeks to secure community infrastructure benefits through planning obligations which may relate to "pedestrian and cycling facilities".

<u>Area Specific Policies</u>

1.36 Policy AS4 Historic Landscape states "there will be a presumption in favour of the protection, conservation and enhancement of Gelligaer Common and the main settlement of Merthyr Tydfil in accord with their status of Landscapes of Historic Interest in Wales". The Merthyr Tydfil LDP does not identify any other local landscape designations.

<u>Topic Based Policies</u>

1.37 Policy TB8 is concerned with proposals for Mineral extraction and associated development which "will only be allowed where:

- they would not result in unacceptable environmental impacts
- they would not conflict with transportation considerations including access, … and enjoyment of public rights of way
- they include acceptable proposals for progressive and final restoration, aftercare and beneficial after-use"

1.38 Policy TB9 deals with Mineral buffer zones which have been established between permitted, active and inactive mineral operations. A 500m buffer has been applied to coal sites within which new development will only be allowed where it would not unacceptably affect operations within the coal site and would not be unacceptably affected by operations within the coal site. A 500m buffer has been established around the Ffos-y-Fran Land Reclamation Scheme.

Brecon Beacons National Park

1.39 No part of the application site lies within the National Park, but the landscape context and visual study areas extend into its southern margins. Some Brecon Beacons National Park policies may therefore be relevant to consideration of the landscape and/or visual effects of the Nant Llesg proposal.

Brecon Beacons National Park Unitary Development Plan (approved March 2007)

1.40 The UDP provides policies to enable the special qualities of the National Park to be protected and for "careful control" of development that "straddles the Park boundary or is conspicuous from within the Park". Part 1 Policy 1: The Special Qualities of the National Park states that:

- "In considering all proposals for development the NPA will give great weight to conserving and enhancing the Park's special qualities and its natural beauty, wildlife and cultural heritage which the designation is intended to protect".

Brecon Beacons National Park Deposit Local Development Plan (November 2010)

1.41 The Brecon Beacons Deposit LDP was published in November 2010 and a composite plan including Proposed Focussed Changes was published in October 2011. The LDP will supersede the UDP on adoption.

1.42 Policy SP1 of the Deposit LDP is to be used by the NPA when commenting on proposals that impact the National Park, which seeks to enable:

- "Development that conserves or enhances the natural beauty, wildlife and cultural heritage of the National Park
- Development that provides for, or supports, the understanding and enjoyment of the special qualities of the National Park in a way that does not harm those qualities
- Development which fulfils the two purposes above and that assists the economic and social well-being of local communities".

Blaenau Gwent County Borough Council Unitary Development Plan (adopted July 2006)

1.43 No part of the application site lies within Blaenau Gwent, but the landscape context and visual study areas extend into County Borough, and some policies may therefore be relevant to consideration of the landscape and/or visual effects of the Nant Llesg proposal.

1.44 The Blaenau Gwent Unitary Development Plan will be replaced by the Blaenau Gwent Local Development Plan when that is adopted.

General Policies

1.45 Policy G2 states that "development proposals will be considered against … the impact of development on landscape quality".

1.46 Policy EN1 The Natural Environment states that “development proposals should safeguard the natural beauty of land”.

1.47 Policy EN2 The Built Environment seeks to protect “the natural setting and important existing built form in the vicinity of the proposal”.

1.48 Policy M1 Minerals states that minerals development will be permitted providing “there is no adverse impact on the environment including landscape” or “designated sites of landscape importance”.

Environment Policies

1.49 Policy EN18 concerns Special Landscape Areas and states that “proposals detrimental to the features or qualities of SLAs will not be permitted”. SLAs within Blaenau Gwent include the area north of the A465 excluding the settlement and industrial estates; the area from Rhymney Hill south to Mynydd Bedwellte; and the uplands between Tredegar and Ebbw Vale.

Mineral Policies

1.50 Policy M5 is concerned with the visual impact of minerals development. It states that “All plant, buildings and stockpile areas will:

- where practicable, be grouped together to prevent the creation of an unsightly sprawl of development and to facilitate their screening;
- be kept as low as practicable to minimise visual intrusions;
- be of appropriate colour, cladding or suitably treated to reduce their visual impact;
- be satisfactorily maintained to preserve their external appearance;
- be removed upon cessation of extraction and the site restored”.

1.51 Policy M6 advocates Screening of Workings and for the method of working and phasing to be designed to “cause least visual intrusion”.

Designations

National Landscape Designations

National Park

1.52 The Brecon Beacons National Park (BBNP) is located to the north of the site, approximately 2.7km from the site boundary at the closest point. The two statutory purposes of the National Park Authorities, as defined in the 1995 UK Environment Act, are to:

- conserve and enhance the natural beauty, wildlife and cultural heritage of the park
- promote opportunities for the enjoyment and understanding of its special qualities.

1.53 The act also gives the National Park Authorities a duty to "seek to foster the economic and social well being" of their local communities". The BBNP Authority has defined 11 "special qualities", of relevance to the proposal:

- A National Park offering peace and tranquillity with opportunities for quiet enjoyment, inspiration, relaxation and spiritual renewal.
- A feeling of vitality and healthfulness that comes from enjoying the Park's fresh air, clean water, rural setting, open land and locally produced foods.
- A sense of place and cultural identity …
- The Park's sweeping grandeur and outstanding natural beauty observed across a variety of harmoniously connected landscapes … with extensive views in all directions.
- A working, living "patchwork" of contrasting patterns, colours, and textures …
- Extensive and widespread access to the Park's diversity of wildlife and richness of semi-natural habitats … including those of international and national importance.
- In the context of the UK, geographically rugged, remote and challenging landscapes.
- Enjoyable and accessible countryside with extensive, widespread and varied opportunities to pursue … sustainable recreation or relaxation.

Registered Historic Landscapes

1.54 The Merthyr Tydfil Landscape of Outstanding Historic Interest intersects the western boundary of the CDP. The area is described as "a natural basin situated at the head of the Taff valley, containing an internationally renowned iron and coal industrial landscape of the 18th and 19th centuries. The area includes large ironworks, associated coal mining industry, waste tips, power and transportation systems, terraced industrial housing, Cyfarthfa Castle Ironmasters' house and gardens, and important related, historical religious, literary and political associations".

1.55 To the west of Fochriw, the southern tip of the site is included within the Gelli-Gaer Common Landscape of Special Historic Interest. The area "represents a rich and increasingly rare upland landscape in South East Wales, having numerous distinct foci of settlement representing continuity of land use and activity from the prehistoric period to the recent past. The area includes: Bronze Age funerary and ritual monuments; Iron Age hut settlements; a Roman fort and associated features including a Roman road and military practice camps; a medieval earthwork castle and a significant concentration of medieval platform houses which include some of the first examples of the type to be archaeologically excavated in Wales".

1.56 There are two Registered Historic Parks and Gardens within 5km of the site. Bedwellty Park, Tredegar, located 3.5km to the east of the site, is a Grade II early nineteenth-century urban landscape park, with interesting contemporary features, including rockwork and an unusual and very well preserved ice-house. Cyfarthfa Castle is a Grade II* "Victorian park, which was converted from a private to a public park with formal gardens", and is located 4km to the west of the site. A significant view is identified from the castle but in a south-westerly direction away from the site.

Scheduled Monuments

1.57 There are a total of 36 Scheduled Monuments located within 5km of the site boundary, of which 3 are within a distance of 1km. Sarn Howell Pond and Watercourses (GM94) is part of the Dowlais Free Drainage System and is located immediately to the west of the CDP boundary and is the closest Scheduled Monument to the site. Rhymney Upper Furnace (GM403) is located east of the B4257, 600m to the north-east of the site. Gelligaer Common Roman Road (GM556) is found 800m to the south of the site boundary.

1.58 In addition, the southern embankment of Rhaslas Pond, within the site, is of cultural heritage interest and is being considered for scheduling by Cadw. It is treated for the purposes of the LVIA as if it is scheduled.

Listed Buildings

1.59 There are a total of 244 Listed Buildings within 5km of the site, of which 26 are within a distance of 1km (all of which are within the community of Rhymney to the east of the site). These include the following (all within 400-700m of the site and Grade II unless stated otherwise):

- Grade II* Church of St David
- Grade II* Penuel Baptist Church
- Ebenezer Calvanistic Methodist Chapel
- Church of St Tyfaelog
- St David's (Masonic Hall)
- Boundary wall and railings at St David's Churchyard
- The Vicarage
- Ysgol Lawnt
- War Memorial
- Railway viaduct
- Rhymney House Hotel
- Former Pay Office Noddfa Buildings
- Old Furnace Farmhouse
- 1-14 Collins Row, 14-28 Lower Row, 1-13 Middle Row and Windsor Arms Public House, 2-8 The Terrace, 1-4 Susannah Houses, 1-2 The Lawn

Conservation Areas

1.60 A number of conservation areas are located within 5km of the site. The two closest to the site are Rhymney Town Conservation Area, 400m east of the site and including 16 Listed Buildings, and Bute Town Conservation Area, 350m north-east of the site, a planned village built in 1825-30 containing 3 rows of listed terraces (Middle Row, Collins Row and Lower Row). Other Conservation Areas within 5km of the site are:

- Dowlais (1.8km west of the site)
- Bedwellty House and Park (3.4km east of the site)
- Thomastown (3.5km west of the site)
- Morgantown (3.5km west of the site)
- Merthyr Tydfil Town Centre (3.8km west of the site)
- Cyfarthfa (4km west of the site)

Other Designations and Sites

Country Parks

1.61 Country Parks within the vicinity of the site are Parc Bryn Bach (within Caerphilly County Borough and Blaenau Gwent County Borough) and Parc Cwm Darran (within Caerphilly County Borough). The boundary of Parc Bryn Bach is located 550m to the north-east of the site. The park covers an area of 340 acres of woodland, grassland and a lake, with a visitor centre and caravan and campsite. Leisure activities include canoeing, cycling, golf, and fishing. Parc Cwm Darran is located 900m south of the site. Its central feature is Ogilvie Lake and there are way-marked trails and provision for leisure activities including walking, cycling, and fishing. There is also a local nature reserve.

Valleys Regional Park

1.62 The site is located within the Valleys Regional Park (VRP). The aim of the VRP is to create a high quality, sustainable network of green space and complements the activities and programmes of the Heads of the Valleys and Western Valleys Regeneration Areas. VRP is a partnership of over 40 organisations “working together to deliver environmental, heritage and tourism activities in a more effective, collaborative approach, both cross-sector and cross-boundary, towards a regional vision”[3]. Current VRP projects within the vicinity of the site include enhancements to Parc Cwm Darran and improvements to access trails in the Sirhowy Valley.

1.63 There are no areas of Ancient and Semi-natural Woodland or Plantation on Ancient Woodland Site within the site boundary or adjacent to it.

1.64 There are four Sites of Special Scientific Interest within 5km of the site, at Cefn y Brithdir (2.7km south-east of the site), Cwm Taf Fechan Woodlands (3.8km west of the site), Cwm Glo a Glyndyrys (4.1 km west of the site), and Baltic and Tyle'r-Bont Quarries (4.1km north-west of the site).

1.65 There are four areas designated as Local Nature Reserves within 5km of the site: Cwmllwydrew Meadows (1km south of the site), Parc Bryn Bach (2km north-east of the site), Sirhowy Hill Woodlands and Cardiff Pond (4.1km east of the site), and Cwm Taf Fechan Woodlands (4.7km west of the site).

Routes and areas designated for public access

1.66 Public rights of way and open access land designated under the CROW Act[4] are shown on Drawing MA/NL/ES/16/006. The site includes large areas of Registered Common Land (approximately 70% of the site area) and a small area designated as Open Country adjacent to the A469 by the Capital Valley Industrial Park, which are both designated open access land, and the site is crossed by a number of PROWs.

Access Land

1.67 There are large areas of open access land within the 5km study area, which include:

- Gelligaer Common and Cefn y Brithdir to the south of the site
- Merthyr Common to the west and north of the site, and neighbouring land north of the A465
- Rhymney Hill and Mynydd Bedwellte to the east

Bridleways

1.68 Four bridleways cross the site:

- Bridleway 89 commences along the A469 near the football ground north of Pontlottyn then heads north crossing into the site before following the Heads of the Valleys Industrial Estate access road as far north as the Nant Llesg watercourse.

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[3] Valleys Regional Park website: http://www.thevalleys.org.uk/

[4] Countryside and Rights Way Act, 2000, which defined areas of open land for public access

- From this point Bridleway 92 runs north along the Heads of the Valleys Industrial Estate access road to a junction with Footpath 91 crossing back into the site to a junction with Bridleway 93 at the north-east corner of the site, just south of the Nant Carno.
- Bridleway 93 runs east-west along the northern boundary of the site to the south of the Nant Carno to a junction with Footpath 96 then continues westward exiting the site before heading south to a junction with Footpath 95.
- From this point Bridleway 99 heads eastward back into the site for a distance of 100m.

Public footpaths

1.69 The site is crossed by 11 public footpaths:

- In the south-east of the site Footpaths 85 and 86 run east-west from the A469/Bridleway 89 to the crossing point of the disused railway and South Tunnel Road
- The north of the site is served by a network of Footpaths 90, 91, 95, 96, 97, 98 and 100 with Bridleways 92, 93 and 99.
- Footpath 151 connects Gelligaer Common with Merthyr Common, heading north from the Lapwing area and skirting the west shore of Rhaslas Pond, before heading westward to a junction with Footpath 150. From here both footpaths head west out of the site crossing Fochriw Road.

Long Distance paths

1.70 The east of the site is crossed by the Rhymney Valley Ridgeway Walk long distance footpath. Within the study area, the long distance footpath heads northwards along the ridgeline of Cefn y Brithdir to Fochriw. The route crosses into the site from a point within Gelligaer Common to the north of Fochriw, heading northwards across the common to disused mine workings and tips, then heads north out of the common along the lower slopes to the west of the Heads of the Valleys Industrial Estate. The route exits at the north-eastern corner of the site to follow the A469 north to the end of the route at Bute Town.

1.71 The Taff Trail long distance footpath follows the Afon Taf north from Cardiff to Brecon. Within the 5km study area the Taff Trail follows the river from Troedyrhiw to Merthyr Tydfil and then north to Pontsticill; it is 3.6km form the site at its closest point. The Coed Morgannwg Way links to the Taff Trail near Abercanaid, some 4.5km form the site.

1.72 The Rhymney Riverside Walk is a walking route promoted by the Valleys Regional Park which commences at either Bute Town or Parc Bryn Bach then follows the Afon Rhymni south through Rhymney, Pontlottyn, New Tredegar and southwards to Caerphilly and Cardiff. The route passes within 250m of the eastern boundary of the site where the Afon Rhymni is crossed by the B4257 Carno Street road bridge, and is immediately adjacent to the site where it passes the Capital Valley Industrial Park.

1.73 There are a number of interconnected cycle routes within the study area:

- National Cycle Route (NCR) 468 connects Bargoed with the NCR46 to the north, passing through Abertysswg and Rhymney. It follows the A469 northward from the roundabout with the B4257 passing within 100m of the site and connects to NCR46 near the junction of the A469 and A465.
- NCR46 Merthyr Tydfil to Brynmawr follows approximately the line of the A465, passing within 450m of the northern site boundary, to Dowlais and connects with NCR8 The Taff Trail north of Merthyr Tydfil. NCR8 largely follows the route of the Taff Trail long distance footpath and is 3.7km from the site at its closest point.
- NCR477 Taith Trevithick Trail links to NCR8 at Merthyr Tydfil and runs southward on the opposite side of the valley to NCR8; it is 3.2km from the site at its closest point.
- 800m south of the site, NCR469 follows a dismantled railway line from Parc Cwm Darran south to Bargoed.

- NCR467 Ebbw Vale to Tredegar follows the Sirhowy River and connects to NCR46 at Parc Bryn Bach 2.4km from the site.

Nant Llesg Surface Mine

Incorporating Land Remediation

A17

Waste

Nant Llesg Surface Mine

Incorporating Land Remediation

Appendix MA/NL/A17/001

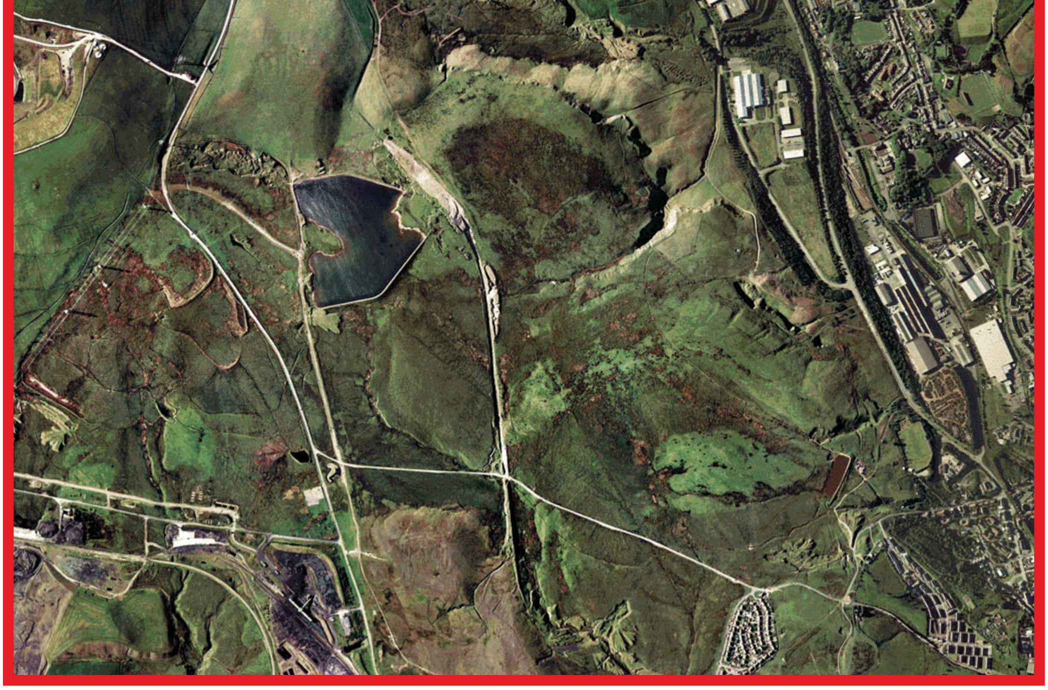
2012 Quantum Ground Investigation

miller argent

NANT LLESG LAND RECLAMATION - MIS LANDFILL GROUND INVESTIGATION

FACTUAL REPORT

Report No. G132/FGI



NANT LLESG LAND RECLAMATION – MIS LANDFILL GROUND INVESTIGATION

FACTUAL REPORT

Report No. G132/FGI

September 2012

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Miller Argent

Cwmbargoed Disposal Point
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CONTENTS

0.0 FOREWORD

The following Conditions and Notes on Site Investigation Procedures should be read in conjunction with this report.

0.1.0 Ground Investigation

0.1.1. General

Recommendations made and opinions expressed in the report are based on the strata observed in the excavations, together with the results of site and laboratory tests. No responsibility can be held for conditions which have not been revealed by the Exploratory Holes or which occur between Exploratory Holes. Whilst the report may suggest the likely configuration of strata, both between Exploratory Holes and below the maximum depth of investigation, this is only indicative and liability cannot be accepted for its accuracy.

Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction below or close to the site.

0.1.2. Investigation Procedures

Rotary open-hole drilling, Dynamic Sampling and Trial Pitting techniques for ground investigation have been employed within the project. All Exploratory Hole operations, sampling and logging of soils, rocks and in-situ testing complies with the recommendations of the British Code of Practice BS 5930 (1999) +A2:2010, 'Site Investigations' as superseded in part by BS EN ISO 14688-1 (2002) and 14688-2 (2004), British Code of Practice BS 10175 (2001) 'Investigation of Potentially Contaminated Sites' and BS 1377: 1990, 'Methods of Test for Soils for Engineering Purposes'.

0.1.3. Routine Sampling

Representative bulk, disturbed and environmental samples of the different strata are taken during excavation. These samples are sealed and labelled in clear plastic bags, 2kg plastic tubs and 1litre amber jars. Soil samples obtained for environmental testing are sampled and sealed in borosilicate amber jars or in specialist vessels where required. All geotechnical samples are returned from site to QGL's laboratory for controlled storage within 24 hours of sampling to await test scheduling/requirements. Environmental samples are sent to the nominated testing laboratories for controlled storage until testing schedules are received.

0.1.4. In-Situ Testing

In-situ testing comprised:

- Hand shear vane testing

0.1.5. Groundwater

Where possible, the depth of entry of any influx of groundwater is recorded during the course of excavation or boring operations. The rate of inflow into the excavation or borehole is monitored during the course of the excavation or during boring procedures. Upon encountering any water strikes, work is temporarily halted and the water levels monitored for a standard twenty minute period recording the change in water level at the end of the twenty minutes.

Groundwater conditions observed in the excavations are those appertaining to the period of investigation. It should be noted, however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions or other causes.

0.1.6. Retention of Samples

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material is discarded. Further to notifying the Engineer/ Client with one week's notice all soil and/or rock samples will be discarded 28 days after submission of the approved final report.

1.0. INTRODUCTION

1.1 General

Upon the instructions of Mott MacDonald (Engineers), on behalf of Miller Argent Limited (Client), Quantum Geotechnical Limited (QGL) has been commissioned to undertake a ground investigation at the site of a former inert landfill

Development of the surrounding 400 hectare site, owned by the Client, is proposed for open cast mining. The former inert landfill, located along approximately 700m of an historic railway cutting, is located towards the centre adjacent to Rhaslas Reservoir.

The purpose of this investigation is to determine ground and groundwater conditions and primarily the potential sources of contamination within the landfill. This report presents a factual account of the fieldwork carried out, the strata encountered, groundwater observations and details subsequent laboratory testing of samples obtained from the investigation.

Other available sources of information that have been consulted include the published geological maps for the area.

General notes on the techniques employed by QGL are described in the Foreword together with the limitations inherent in carrying out site investigation work.

2.0. SITE DETAIL

2.1. Site Description

The ground investigation was undertaken across the former landfill site as directed by the Engineers. The site is located adjacent to Rhaslas Reservoir, 2km north of Fochriw and 4km east of Merthyr Tydfil town centre. The site is a disused inert landfill which was filled into the cutting of the old Brecon & Merthyr Railway since the 1990s until fairly recently. The site is linear in shape, approximately 700m long, comprising a gravel track along the former railway leading to the landfill and continuing north beyond Rhaslas Reservoir.

The site is centred on approximate National Grid reference 309700, 207370 as shown on the site location plan presented as Figure 1, Appendix I.

2.2. Statutory Service Information

All service information was held by the Engineer with the relevant plans and information made available to QGL prior to commencement of the intrusive works. Standard QGL procedures for breaking ground were followed and all areas were CAT scanned for presence of buried services. No onsite services were deemed at risk during the investigation procedures.

3.0. GEOLOGY & ENVIRONMENTAL SETTING

3.1. Published Geology

Details of the superficial geology of the site are provided by the British Geological Survey (BGS) Sheet 232 'Abergavenny' at 1:50,000 scale (drift edition).

3.1.1. Superficial Geology

The geological sheet indicates Devensian Till to underlie the site comprising.

3.1.2. Solid Geology

The solid geology beneath the site is Carboniferous South Wales Middle Coal Measures comprising mudstones, siltstone and sandstones.

Extracts from Geological Maps are included as Figure 2, Appendix I.

4.0. FIELDWORK

4.1. General

The fieldwork was undertaken between the 20th and 23rd August 2012. Full time onsite supervision and attendance by an Engineering Geologist from QGL was undertaken on all aspects of the site works.

4.2. Su*mmary of Fieldworks*

The fieldworks comprised;

- 3 No. Rotary Boreholes with standpipe installations for gas and groundwater monitoring,
- 14 No. Machine Excavated Trial Pits

4.3. Exploratory Hole Locations

The exploratory holes were positioned across the landfill site and locations agreed with the Engineer. Following completion of the fieldwork, accurate co-ordinates and elevations of the locations were surveyed by QGL. An Exploratory Hole Location Plan is presented as Figure 3 in Appendix I.

4.4. Rotary Dynamic Sampling and Open-hole boreholes

Three (3 No.) 115mm diameter boreholes (numbered BH01 to BH03) were sunk using dynamic sampling and open-hole ODEX (casing) drilling techniques with a Hands England lorry mounted rig to depths detailed on Table 1 below.

Table 1: *Rotary borehole final depths:*

Borehole ID	Final Depth (mbgl)
BH01	6.0
BH02	6.0
BH03	7.0

Dynamic Sampling is a technique whereby a hydraulically driven percussive hammer attached to the head of the drill rig mast is used to drive a 1.0m length, 101mm diameter, steel sampling tube through the soils to obtain undisturbed samples within 87mm core liner. These samples are then sealed, labelled and stored safely within wooden boxes for transport.

Upon encountering obstructions or difficult ground conditions whereby the dynamic sampling techniques could no longer progress, rotary open-hole methods using the ODEX drill system were employed to progress the hole to final depths or to bedrock.

The drilling equipment on this contract utilised air as the flushing medium. The strata descriptions are the geologist's estimate based on sediment returns from the flush. The rate of penetration is used as an indicator of density of material being drilled.

Upon completion, the Boreholes were installed with 50mm internal diameter HDPE combined gas and groundwater monitoring standpipes at depths specified by the Engineer. The installations were completed with a lockable raised barrel covers. Details of the installations are shown in Table 2 below and on the complete set of Engineering Geologist's Borehole Logs in Appendix II.

Table 2: *Gas and Groundwater Monitoring Standpipe Installation Details:*

Borehole ID	Installation Depth (mbgl)	Response Zone (mbgl)
BH01	3.8	0.5-3.8
BH02	3.8	0.5-3.8
BH03	4.5	0.5-4.5

4.5. Machine Excavated Trial Pits

Fourteen (14 No.) Trial Pits were excavated onsite using a JCB 3CX. The trial pitting method of investigation allows direct sampling of the near surface deposits for identification and laboratory testing purposes, as well as assessment of any Made Ground or disturbed ground, or naturally occurring superficial deposits. The trial pits were logged in accordance with BS5930: 1999 +A2:2012; BS EN ISO 14688-1:2002 and BS EN ISO 14688-2:2005, by QGL's Engineering Geologist. Geotechnical soil samples were taken at suitable depths during excavation. In addition, environmental samples were taken at depths specified by the Engineer for contamination analysis. The trial pits were backfilled in compacted layers of arisings upon completion.

A complete set of Engineering Geologist's logs for Machine Excavated Trial Pits are presented in Appendix III.

4.6. In-Situ Testing

4.6.1. Hand Shear Vane Tests

Hand Shear Vane tests were undertaken in suitable strata using a Pilcon Direct Hand Shear Vane. Three tests were carried out at each depth and an average calculated. The average results are included on the

Engineer logs.

4.7. Sampling

Sampling of soils and waters were undertaken in accordance with the Specification for the Works as specified by the Engineers. Bulk, disturbed, undisturbed and environmental samples were taken within the superficial deposits for strata identification and laboratory testing purposes. Water samples were recovered from borehole installations during post fieldwork groundwater monitoring as instructed by the Engineers. All environmental samples are sent to the laboratory whilst geotechnical samples are returned from site to QGL's laboratory for controlled storage to await test scheduling/requirements.

Sample type and sample depth are all recorded on the Engineering Geologist's Exploratory Hole Logs found within the appropriate Appendix.

4.8. Groundwater/Gas Monitoring

Groundwater and gas monitoring visits were scheduled to be undertaken at weekly intervals as specified by the Engineer following completion of the site works. The results of monitoring visits undertaken to date of issue of this report are presented within Appendix IV. Any remaining monitoring visit records shall be issued as Addendum.

5.0. LABORATORY TESTING

5.1. General

The laboratory testing was scheduled by the Engineers and comprised a number of contamination tests on selected soil samples recovered from the investigation. No Geotechnical Testing was scheduled by the Engineer.

5.2. Contamination Testing

Geo-Environmental testing was carried out on selected soil samples gained from the ground investigation. Tables 3 and 4 below display the geo-environmental tests undertaken on soil and leachate samples.

Table 3: *Geo-Environmental Laboratory soil testing undertaken:*

Soils Maxi Suite:	As, B, Ba, Be, Cd, Cr, Cu, Fe, Mo, Ni, Zn, Pb, Hg, Sb, Se, Total Cyanide, Free Cyanide, Total Sulphate, Suphide, Total Sulphur, pH, Speciated PAH (USEPA 16) by GCMS, Phenols, VOCs (incl. BTEX), PCBs (7 Congeners).
Asbestos Screen	
EPH (C5-C35) Aliphatic / Aromatic Split with CWG banding.	Ali - >5-6, >6-8, >8-10, >10-12, >12-16, >16-21, >21-35. Aro - >5-7, >7-8, >8-10, >10-12, >12-16, >16-21, >21-35.
Total Organic Carbon	
WAC Testing:	2 batch eluate suite + total waste suite

Table 4: *Geo-Environmental Laboratory Soil Leachate testing undertaken:*

Leachate Preparation	BSEN12457 Method
Leachate Maxi Suite:	As, B, Ba, Be, Cd, Cr, Cu, Fe, Mo, Ni, Zn, Pb, Hg, Sb, Se, Total Cyanide, Free Cyanide, Soluble Sulphate, Suphide, Free Sulphur, Ammoniacal Nitrogen, Chloride, pH, Speciated PAH (USEPA 16) by GCMS, Phenols, VOCs, PCBs (Screen).
Dissolved Organic Carbon	
TPH	GRO/EPH

Full sets of Geo-Environmental Laboratory Test Certificates are provided within Appendix V.

6.0. GROUND CONDITIONS ENCOUNTERED

6.1. Ground Conditions – General

The sequence of deposits encountered during the investigation is detailed within the Engineering Geologist's logs presented within Appendix II and III. The logs highlight the nature of the soils encountered and provide detailed descriptions of the strata revealed at the site. This section gives a summary of the ground conditions encountered across the site.

6.1.1. Made Ground

Made Ground was encountered in each of the exploratory holes undertaken from ground level to depths of between 0.2m and 4.7m bgl and comprised a granular material with varying content and type of inert landfill waste.

The Made Ground was generally described as either grey, brown and/or black silty very sandy gravel with angular to subrounded cobbles and locally boulders of siltstone, sandstone and mudstone. Gravel mainly comprised angular to subrounded fine to coarse of siltstone, sandstone, mudstone and a variety of inert landfill material including, but not limited to; wood, metal, brick, concrete, glass, bitumen, clinker, tile, pottery, plastic, wire, large plastic drums (empty), textiles, carpet, steel cable, tins, glass, rubber, general refuse etc. Black and grey ash was found locally in some exploratory holes.

The most frequent and varied landfill materials were found in Trial Pits TP01 – TP05, TP07, TP08 and TP10 and Boreholes BH01 and BH02.

6.1.2. Alluvium

Strata interpreted to be Alluvium was encountered in exploratory holes TP02, TP07 – TP09, TP11 – TP14 and BH01 – BH03. This comprised orangish brown and/or grey sandy gravelly Silts and Clays, locally with pockets of sand, encountered below the made ground at depths of between 1.70m and 4.70m bgl.

A layer of Peat, between 0.1m and 0.3m thick, was encountered above the cohesive silts and clays in Trial pits TP07, TP08 and TP11 – TP14 at depths of between 1.50m and 3.40m bgl. The Peat was mostly brown, dark brown and/or black pseudo-fibrous, locally fibrous, with strong organic odours.

6.1.3. *Middle Coal Measures*

Strata interpreted to be the Carboniferous Middle Coal Measures was encountered in Trial Pits TP07, TP08 and TP09. The strata comprising Weathered Sandstone bedrock was encountered at depths of between 0.2m and 2.0mbgl and was recovered as orangish brown and grey silty sandy Gravel with high cobble content, locally with some boulders, of fine to medium grained sandstone.

6.2. Groundwater Encountered

Groundwater incursions were noted when encountered within the Boreholes and Trial Pits. The depth and nature of each groundwater strike was recorded either by the Engineering Geologist and/or Driller and, in the boreholes, were monitored over a standard twenty-minute period noting any change in groundwater levels. Details of all groundwater strikes encountered during the Ground Investigation works are recorded on the relevant Engineering Geologist's Exploratory Hole Logs within the Appendices. Depths at which groundwater was encountered on site are detailed in Table 5. No groundwater was encountered in the remaining exploratory holes.

Table 5: Summary of Groundwater Encountered on site

Exploratory Hole Number	Depth Encountered (mbgl)	Depth Following 20min Observation Period (mbgl)	Remarks
TP08	2.50	-	Slow seepage at base of pit.
TP11	1.50	-	Fast flow rate from pit sides
BH01	1.60	1.45	Slow flow rate
BH02	1.60	1.45	Slow flow rate

Please note: The groundwater conditions observed in these exploratory holes are those appertaining to the period of the investigation. However, it should be noted that groundwater levels are subject to diurnal, seasonal and climatic conditions or may vary due to other causes.

6.3. Visual & Olfactory Evidence of Soil Contamination

Visual and Olfactory evidence of soil contamination encountered during the site investigation are summarised in Table 6.

Table 6: Visual and Olfactory evidence of soil contamination encountered

Exploratory Hole Number	Details
TP01 – TP05	Strong hydrocarbon odour throughout. Oil sheen locally on gravel surfaces.
TP10	Strong sulphur odour between 0.20m and 0.70mbgl

7.0. REFERENCES

Specialist Publications;-

- British Code of Practice BS 5930: (1999) *'Code of Practice for Site Investigations'*
- British Code of Practice BS 1377: (1990) *'Methods of test for soils for civil engineering purposes'.*
- *British Code of Practice BS EN ISO 14688-1 (2002)*
- *British Code of Practice BS EN ISO 14688-2 (2004)*
- *Health and Safety Executive Guidance Note EH40/90*

For and on behalf of **Quantum Geotechnical**

Written by:

B. Tucker, B.Sc. (Hons), F.G.S. — Date

Engineering Geologist

Checked by:

R. McDERMOTT, B.Sc. (Hons), M.Sc., C.Geol., F.G.S. — Date

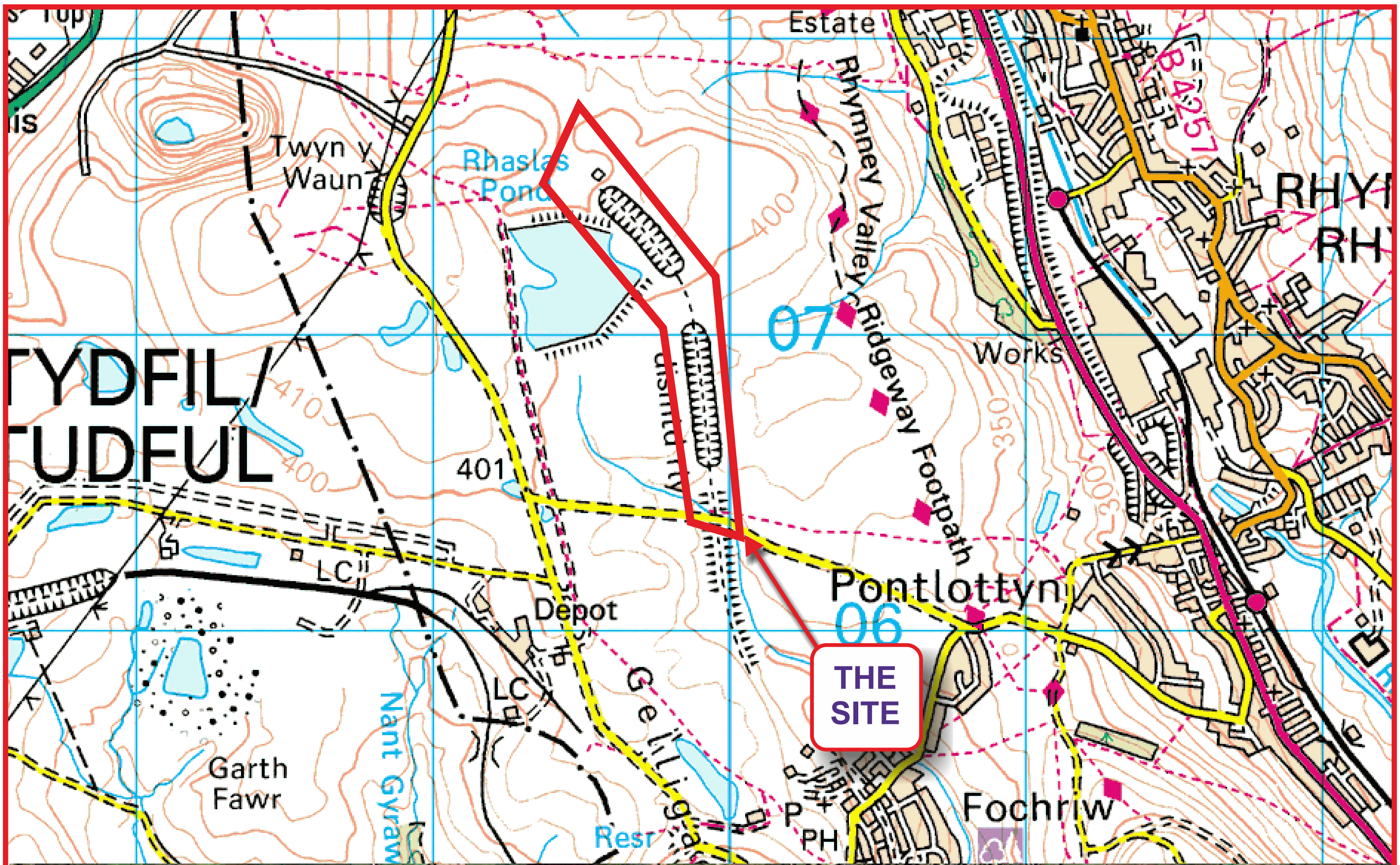
Senior Engineering Geologist

Approved by:

J.E. Stark, B.Sc. (Hons), C.Geol., F.G.S. — Date

Technical Director

APPENDIX I – SITE PLANS



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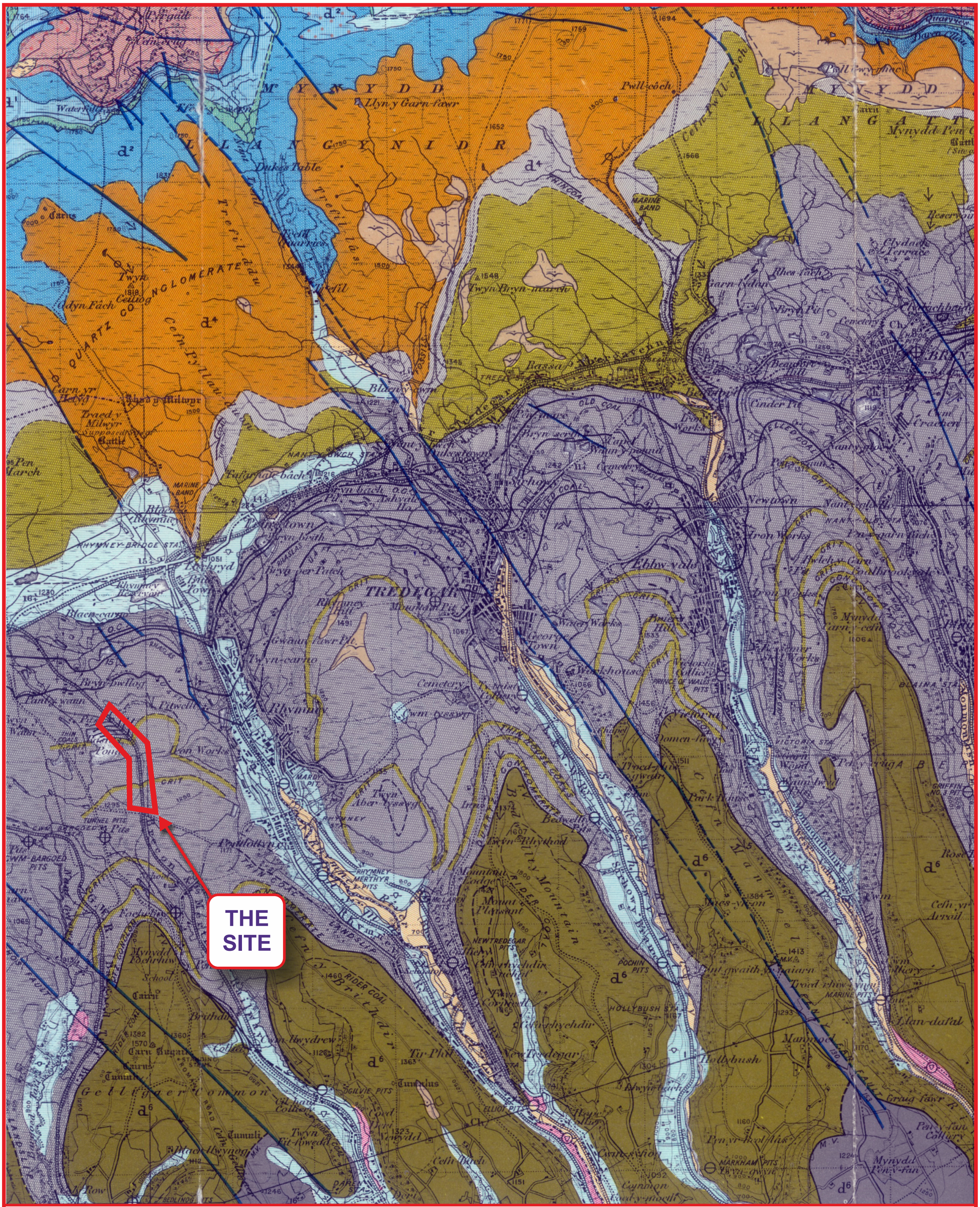
NANT LLESG LAND RECLAMATION

SITE LOCATION PLAN

FIGURE 1

SCALE: 1 : 25000

JOB No. G132



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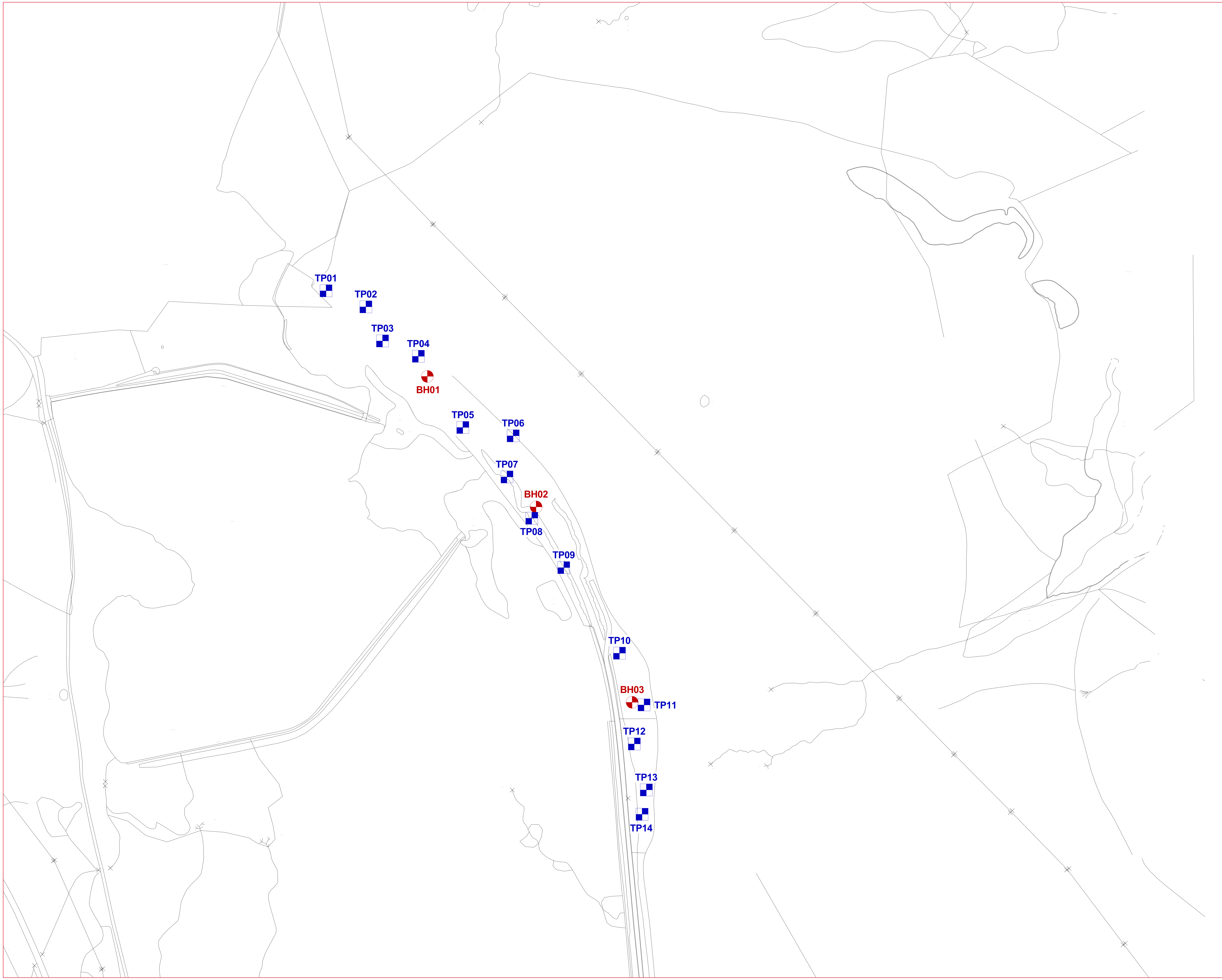
NANT LLESG LAND RECLAMATION

GEOLOGICAL MAP EXTRACT SHEET 232 DRIFT EDITION

FIGURE 2

SCALE: 1 : 63360

JOB No. G132



NOTES:

DATE:

KEY

Borehole	Trial Pit
Window Sample	Dynamic Probe
Monitoring Point	In Situ Test Point
Window Sample & Dynamic Probe	

PROJECT
NANT LLESG LAND RECLAMATION

DRAWING TITLE:
EXPLORATORY HOLE LOCATION PLAN

DATE	JOB NO.	FIGURE NO.	SCALE
18/09/12	G132	2	1:2000

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APPENDIX II – ENGINEERING GEOLOGIST'S ROTARY BOREHOLE LOGS

KEY TO BOREHOLE AND TRIAL PIT LOGS

SAMPLE AND TEST TYPES

U	Undisturbed driven tube sample - 102mm diameter, 450mm long.
P	Undisturbed pushed piston sample - 102mm diameter, 1000mm long.
TW	Undisturbed thin walled push in sample - 100mm diameter, 750mm long.
B	Bulk disturbed sample.
BLK	Block Sample
CBR	Heavy duty undisturbed sample - 154 mm diameter (CBR mould).
D	Small disturbed sample.
LB	Large Bulk disturbed sample (for earthworks testing)
C	Core sample
W	Water sample
G	Gas sample
j	Jar sample
t	Tub sample
p	Pot sample
s	Small sample
v	Vial sample

S	Standard Penetration Test using split spoon sampler. (See Note).
C	Standard Penetration Test using a solid 60 degree cone. (See Note).

NOTE: Where a single value is quoted this is the N value for 300 mm penetration following a seating drive of 150 mm. Where this full penetration is not achieved the number of blows is quoted for the penetration below the seating drive eg. 63/160 mm.
Where total penetration is less than the seating drive this is indicated by a + and the number of blows for total penetration is quoted eg. +50/75 mm.

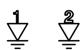
HV	Hand Vane Test. Vane undrained shear strength, c_u, quoted in kPa.
V	Borehole Vane Test. Vane undrained shear strength, c_u, quoted in kPa.
FHT/RHT	Falling / Rising Head Permeability Test.

CORE RUN DETAILS

TCR	Total Core Recovery, %
SCR	Solid Core Recovery, %
RQD	Rock Quality Designation, %
FI	Fracture Index. NI - Non intact where > 25 No. per metre length.

WATER COLUMN SYMBOLS

 First water strike, second water strike etc.

 Standing water level after first strike, second strike etc.

 Seepage.

QUANTUM

NOTE:
Legend symbols in accordance with BS 5930 (1999)

KEY TO BOREHOLE AND TRIAL PIT LOGS

MATERIAL LEGENDS

Made Ground	Topsoil	Clay
Gravel	Sand	Silt
Peat	Boulders	Cobbles
Chalk	Conglomerate	Volcaniclastic
Asphalt	Void	Mudstone
Siltstone	Sandstone	Limestone
Ironstone	Mudstone / Siltstone	Breccia
Coal	Coral	Bedrock
Shale	Gypsum	Igneous (Coarse Grained)
Igneous (Fine Grained)	Igneous (Medium Grained)	Metamorphic (Coarse Grained)
Metamorphic (Fine Grained)	Metamorphic (Medium Grained)	

INSTALLATION / BACKFILL DETAILS

Arisings	Concrete	Bentonite cement grout
Bentonite seal	Filter	Pea Gravel
Plain pipe	Slotted pipe	Piezometer / Standpipe tip

QUANTUM

NOTE:
Legend symbols in accordance with BS 5930 (1999)

Contract : Nant Llesg Land Reclamation

Client : Miller Argent

Borehole No. BH01

Dates : 21/08/12 - 21/08/12

Location :

Job Number : G132

Engineer : Mott MacDonald

Ground Level : 410.49 m A.O.D. *Level to Ordnance Datum*

Coordinates: 309688.28 E 207392.42 N *Co-ordinates to National Grid*

Core Run	TCR	SCR	RQD	FI	Test Depth	Test Results	Sample Depth	Type-No.	Depth (Thickness)	Description	Legend	Red. Level A.O.D.	Water	Install/ Backfill
1.00	0						0.00 - 1.00	D1						
2							0.00 - 0.10	ES1a						
								ES1b						
							0.50	ES1c						
								ES1a						
							1.00 - 2.00	ES2b						
								ES2c						
							1.00	WINDOW2						
								ES3a						
								ES3b						
								ES3c						
							2.00 - 3.00	D3	(4.00)	Recovered as dark greyish brown silty sandy gravel. Gravel is angular to subangular, occasionally subrounded, fine to coarse of mixed lithologies. Some fragments of brick, concrete, wood, glass, tile, metal and plastic. Occasional pockets of black ash. [MADE GROUND].			1	
							3.00 - 4.00	D4						
							4.00 - 5.00	D5	4.00 (2.00)	Firm to stiff brown and grey locally orangish brown slightly sandy slightly gravelly SILT. Gravel is subangular to subrounded fine to coarse siltstone and sandstone.		406.49		
									6.00			404.49		

Drilling Progress and Water Observations

Date / Time		Depth	Casing	Case Dia.	Water
21/08/2012	09:00	6.00	6.00	115	1.45

Groundwater

Struck	Sealed	Flow Rate Remarks
1.60		Slow water seepage.

Flush

Depth	Type	Returns
0 - 6	Air	50

Remarks: Lorry mounted drilling rig. Borehole positioned by Mott MacDonald and CAT scanned prior to excavation. Borehole terminated at 6.0m depth on instruction from Mott MacDonald.

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Operator: K Osborn | Logged By. BT | Sheet No. 1 Of 1 | m Per Page 10 | All measurements in metres unless otherwise stated | AGS

Contract : Nant Llesg Land Reclamation

Client : Miller Argent

Borehole No. BH02

Dates : 22/08/12 - 22/08/12	Job Number : G132	Ground Level :	408.84 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Mott MacDonald	Coordinates:	309813.42 E 207242.10 N *Co-ordinates to National Grid*

Core Run	TCR	SCR	RQD	FI	Depth	Test Results	Sample Depth	Type-No.	Depth (Thickness)	Description	Legend	Red. Level A.O.D.	Water	Install/ Backfill
							0.00 - 1.00	D1		Recovered as dark greyish brown silty sandy gravel. Gravel is angular to subangular, occasionally subrounded, fine to coarse of mixed lithologies. Some fragments of brick, concrete, wood, glass, tile and plastic. Occasional pockets of black ash. [MADE GROUND].				
							0.00 - 0.10	ES1a						
								ES1b						
							0.50	ES1c						
								ES2a						
							1.00 - 2.00	ES2b						
							1.00	ES2c						
								D2						
								ES3a						
								ES3b						
								ES3c						
							2.00 - 3.00	D3	(4.00)					
							3.00 - 4.00	D4						
							4.00 - 6.00	D5	4.00 (2.00)	Firm to stiff brown and grey locally orangish brown slightly sandy slightly gravelly SILT. Gravel is subangular to subrounded fine to coarse siltstone and sandstone.		404.84		
									6.00			402.84		

Depth scale: 1, 2, 3, 4, 5, 6

Drilling Progress and Water Observations

Date / Time	Depth	Casing	Case Dia.	Water	Groundwater Struck	Sealed	Flow Rate Remarks	Flush Depth	Type	Returns
22/08/2012 00:00	6.00	6.00	115	1.45	1.60		Slow water seepage.	0 - 6	Air	50

Remarks: Lorry mounted drilling rig. Borehole positioned by Mott MacDonald and CAT scanned prior to excavation. Borehole terminated at 6.0m depth on instruction from Mott MacDonald.

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Operator:	Logged By.	Sheet No.	m Per Page	
K Osborn	BT	1 Of 1	10	All measurements in metres unless otherwise stated

AGS

Contract : Nant Llesg Land Reclamation

Client : Miller Argent

Borehole No. BH03

Dates : 22/08/12 - 22/08/12	Job Number : G132
Location :	Engineer : Mott MacDonald

Ground Level : 395.11 m A.O.D. *Level to Ordnance Datum*

Coordinates: 309924.00 E 207017.11 N *Co-ordinates to National Grid*

Run Details

Core Run	TCR	SCR	RQD	FI
4.00 - 4.8	50			

Samples

Depth	Type-No.
0.00 - 1.00	D1
0.00 - 0.10	ES1a
	ES1b
0.50	ES1c
	ES2a
	ES2b
1.00 - 2.00	ES2c
1.00	WINDOW2
	D3
	ES3a
	ES3b
2.00 - 3.00	ES3c
	D4
3.00 - 4.00	D5
4.00 - 6.00	WINDOW6
5.00 - 7.00	D7

STRATA

Depth (Thickness)	Description	Red. Level A.O.D.
(4.70)	Recovered as dark greyish brown silty sandy gravel. Gravel is angular to subangular, occasionally subrounded, fine to coarse of mixed lithologies. Some fragments of brick, concrete, wood and plastic. [MADE GROUND].	
4.70 (2.30)	Firm to stiff brown and grey locally orangish brown slightly sandy slightly gravelly SILT. Gravel is subangular to subrounded fine to coarse siltstone and sandstone.	390.41
7.00		388.11

Drilling Progress and Water Observations

Date / Time		Depth	Casing	Case Dia.	Water
22/08/2012	00:00	7.00	7.00	115	Dry

Groundwater

Struck	Sealed	Flow Rate Remarks
		No ground water encountered.

Flush

Depth	Type	Returns
0 - 7	Air	50

Remarks: Lorry mounted drilling rig. Borehole positioned by Mott MacDonald and CAT scanned prior to excavation. Borehole terminated at 7.0m depth on instruction from Mott MacDonald.

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Operator:	Logged By.	Sheet No.	m Per Page	
K Osborn	BT	1 Of 1	10	All measurements in metres unless otherwise stated

AGS

APPENDIX III – ENGINEERING GEOLOGIST'S TRIAL PIT LOGS

Contract : Nant Llesg Land Reclamation

Client : Miller Argent

Trial Pit No. TP01

Dates : 23/08/12 - 23/08/12

Location :

Job Number : G132

Engineer : Mott MacDonald

Ground Level : 400.02 m A.O.D. *Level to Ordnance Datum*

Coordinates: 309571.60 E 207490.98 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Type No.	Tests Depth	Test Results	Depth (Thickness)	STRATA DESCRIPTION	Legend	Red. Level A.O.D.	Water
	0.10 -	D				Grass over greyish dark brown silty very sandy gravel with medium cobble content. Gravel (fine to coarse) and cobbles are angular to subrounded of mudstone, siltstone and sandstone. Sand is fine to coarse grained. Many fragments of wood, metal, brick, concrete, bitumen, clinker, tile, pottery, plastic, wire, fuse box, large plastic drums (empty), textiles, steel cable, tins, glass, and general refuse. Sand is fine to coarse grained. Local pockets of ash. Gravel surfaces locally covered by oily sheen. Strong hydrocarbon odour.			
	0.50 - 3.50	B							
	0.50 -	D							
1	1.00 -	D							
2	2.00 -	D							
3	3.00 -	D							
					3.50			396.52	

PLAN

3.7

0.8 A B C D

Groundwater:

Stability: Unstable

Shoring: None

Remarks : Trial Pit area CAT scanned prior to excavation. On completion the Trial Pit was backfilled in compacted layers of arisings.

Equipment Used: JCB 3CX

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated
	BT	1 Of 3	5	

Contract : **Nant Llesg Land Reclamation**

Client : **Miller Argent**

Trial Pit No. **TP01**

Dates : 23/08/12 - 23/08/12	Job Number : G132	Ground Level : 400.02 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Mott MacDonald	Coordinates: 309571.60 E 207490.98 N *Co-ordinates to National Grid*

Above:- TP01 spoil

Right:-
TP01 pit

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated
	BT	2 Of 3		

Contract : Nant Llesg Land Reclamation
Client : Miller Argent

Trial Pit No.
TP01

Dates : 23/08/12 - 23/08/12	Job Number : G132	Ground Level : 400.02 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Mott MacDonald	Coordinates: 309571.60 E 207490.98 N *Co-ordinates to National Grid*

Above:-

Right:-
TP01 pit

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated	AGS
	BT	3 Of 3			

Contract : **Nant Llesg Land Reclamation**

Client : **Miller Argent**

Trial Pit No. **TP02**

Dates : 22/08/12 - 22/08/12

Location :

Job Number : G132

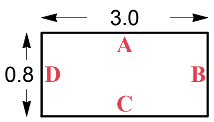
Engineer : Mott MacDonald

Ground Level : 405.29 m A.O.D. *Level to Ordnance Datum*

Coordinates: 309617.51 E 207472.51 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Tests Test Results	STRATA Depth (Thickness)	STRATA DESCRIPTION	Legend	Red. Level A.O.D.	Water
	0.10 -	D				Grass over greyish dark brown silty very sandy gravel with low to medium cobble content. Gravel (fine to coarse) and cobbles are angular to subrounded of mudstone, siltstone and sandstone. Sand is fine to coarse grained. Many fragments of wood, metal, brick, concrete, bitumen, clinker, tile, pottery, plastic, wire, textiles, steel cable, tins, glass, and general refuse. Sand is fine to coarse grained. Local pockets of ash. Gravel surfaces locally covered by oily sheen. Strong hydrocarbon odour.			
	0.50 - 1.50	B							
	0.50 -	D							
1	1.00 -	D							
					1.90	Soft to firm orangish brown mottled grey slightly gravelly sandy SILT. Gravel is angular to subangular fine to coarse sandstone and siltstone. Sand is fine to coarse grained.		403.39	
2	2.00 - 2.50	B							
	2.00 -	D							
					2.80	Weathered Sandstone Bedrock		402.49	

PLAN



Groundwater: Slow seepage

Stability: Slightly Unstable

Shoring: None

Remarks : Trial Pit area CAT scanned prior to excavation. Trial pit terminated at 2.80m on weathered bedrock. On completion the Trial Pit was backfilled in compacted layers of arisings.

Equipment Used: JCB 3CX

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated	AGS
	BT	1 Of 3	5		

Contract : Nant Llesg Land Reclamation

Client : Miller Argent

Trial Pit No. TP02

Dates : 22/08/12 - 22/08/12	Job Number : G132	Ground Level : 405.29 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Mott MacDonald	Coordinates: 309617.51 E 207472.51 N *Co-ordinates to National Grid*

Above:- TP02 spoil

Right:- TP02 pit

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated	AGS
	BT	2 Of 3			

Contract : **Nant Llesg Land Reclamation** **Client :** **Miller Argent**	**Trial Pit No.** **TP02**

Dates : 22/08/12 - 22/08/12 Location :	Job Number : G132 Engineer : Mott MacDonald	Ground Level : 405.29 m A.O.D. *Level to Ordnance Datum* Coordinates: 309617.51 E 207472.51 N *Co-ordinates to National Grid*

Above:-

Right:-
TP02 pit

Quantum Geotechnical Ty Berwig, Bynea Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator:	Logged By. BT	Sheet No. 3 Of 3	m Per Page	All measurements in metres unless otherwise stated	AGS

Contract : Nant Llesg Land Reclamation

Client : Miller Argent

Trial Pit No. TP03

Dates : 22/08/12 - 22/08/12

Location :

Job Number : G132

Engineer : Mott MacDonald

Ground Level : 407.60 m A.O.D. *Level to Ordnance Datum*

Coordinates: 309636.62 E 207433.24 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Test Results	Depth (Thickness)	DESCRIPTION	Legend	Red. Level A.O.D.	Water
	0.10 -	D				Dark greyish brown silty very sandy gravel with medium cobble content. Gravel (fine to coarse) and cobbles are angular to subangular of mixed lithologies. Many fragments of wood, metal, brick, concrete, bitumen, clinker, tile, pottery, plastic, wire, textiles, steel cable, tins, glass, and general refuse. Sand is fine to coarse grained. Local pockets of ash. Gravel surfaces locally covered by oily sheen. Strong hydrocarbon odour.			
	0.50 - 2.50	B							
	0.50 -	D							
1	1.00 -	D							
2	2.00 -	D							
					2.70			404.90	

PLAN

2.9 × 0.8 (A, B, C, D)

Groundwater:

Stability: Slightly Unstable

Shoring: None

Remarks : Trial Pit area CAT scanned prior to excavation. Trial pit terminated at 2.70m due to large impenetrable metal and wood object. On completion the Trial Pit was backfilled in compacted layers of arisings.

Equipment Used: JCB 3CX

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Operator:	Logged By.	Sheet No.	m Per Page	
	BT	1 Of 3	5	All measurements in metres unless otherwise stated

AGS

Contract : Nant Llesg Land Reclamation	**Trial Pit No.**
Client : Miller Argent	**TP03**

Dates : 22/08/12 - 22/08/12	Job Number : G132	Ground Level :	407.60 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Mott MacDonald	Coordinates:	309636.62 E 207433.24 N *Co-ordinates to National Grid*

Above:- TP03 spoil

Right:- TP03 pit

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Contract : Nant Llesg Land Reclamation	Trial Pit No.
Client : Miller Argent	TP03

Dates : 22/08/12 - 22/08/12	Job Number : G132	Ground Level : 407.60 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Mott MacDonald	Coordinates: 309636.62 E 207433.24 N *Co-ordinates to National Grid*

Above:-

Right:-
TP03 pit

Contract : Nant Llesg Land Reclamation

Client : Miller Argent

Trial Pit No. TP04

Dates : 22/08/12 - 22/08/12

Location :

Job Number : G132

Engineer : Mott MacDonald

Ground Level : 409.44 m A.O.D. *Level to Ordnance Datum*

Coordinates: 309677.86 E 207415.57 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Type No.	Tests Depth	Test Results	Depth (Thickness)	DESCRIPTION	Legend	Red. Level A.O.D.	Water
	0.00 - 3.00	B				Dark greyish brown silty very sandy gravel with medium cobble content. Gravel (fine to coarse) and cobbles are angular to subangular sandstone with many fragments of metal, brick, concrete, bitumen, clinker, tile, pottery, plastic, asbestos, wire, textiles, wood, 100mm diamater blue plastic water pipe, carpet, steel cable, tins, glass bottles, plyboard and general refuse. Sand is fine to coarse grained. Gravel surfaces locally covered by oily sheen. Strong hydrocarbon odour.			
	0.10 -	D							
	0.50 -	D							
1	1.00 -	D							
2	2.00 -	D							
3	3.00 -	D							
					3.50			405.94	

PLAN

3.1

0.8 D A B C

Groundwater:

Stability: Slightly Unstable

Shoring: None

Remarks : Trial Pit area CAT scanned prior to excavation. On completion the Trial Pit was backfilled in compacted layers of arisings.

Equipment Used: JCB 3CX

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Operator:	Logged By.	Sheet No.	m Per Page	
	BT	1 Of 3	5	All measurements in metres unless otherwise stated

AGS

Contract : Nant Llesg Land Reclamation			Trial Pit No.
Client : Miller Argent			TP04
Dates : 22/08/12 - 22/08/12	Job Number : G132	Ground Level : 409.44 m A.O.D. *Level to Ordnance Datum*	
Location :	Engineer : Mott MacDonald	Coordinates: 309677.86 E 207415.57 N *Co-ordinates to National Grid*	

Above:- TP04 spoil

Right:-
TP04 pit

	Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated
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AGS

Contract : **Nant Llesg Land Reclamation**

Client : **Miller Argent**

Trial Pit No. **TP04**

Dates : 22/08/12 - 22/08/12	Job Number : G132	Ground Level : 409.44 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Mott MacDonald	Coordinates: 309677.86 E 207415.57 N *Co-ordinates to National Grid*

Above:-

Right:-
TP04 pit

Contract : Nant Llesg Land Reclamation

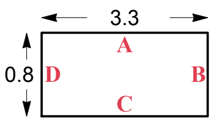
Client : Miller Argent

Trial Pit No. TP05

Dates : 22/08/12 - 22/08/12	Job Number : G132	Ground Level : 411.82 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Mott MacDonald	Coordinates: 309729.06 E 207333.58 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Test Results	Depth (Thickness)	STRATA DESCRIPTION	Legend	Red. Level A.O.D.	Water
	0.10 -	D				Grass over brown silty very sandy gravel. Gravel is angular to subangular fine to coarse of mudstone siltstone and sandstone. Occasional fragments of brick, wood, plastic pipe, plastic and metal.	▨		
	0.50 -	D			0.50	Blackish brown silty very sandy gravel with medium cobble content. Gravel (fine to coarse) and cobbles are angular to subrounded mudstone and sandstone with many fragments of metal, brick, concrete, bitumen, clinker, tile, pottery, plastic, asbestos, wire, textiles, wood, 100mm diamater blue plastic water pipe, carpet, steel cable, tins, glass bottles, plyboard and general refuse. Sand is fine to coarse grained. Local pockets of ash. Gravel surfaces locally covered by oily sheen. Strong hydrocarbon odour.	▨	411.32	
1	1.00 - 3.00	B							
	1.00 -	D							
2	2.00 -	D							
3	3.00 -	D							
					3.50			408.32	

PLAN



Groundwater:

Stability: Slightly Unstable

Shoring: None

Remarks : Trial Pit area CAT scanned prior to excavation. On completion the Trial Pit was backfilled in compacted layers of arisings.

Equipment Used: JCB 3CX

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Operator:	Logged By.	Sheet No.	m Per Page	
	BT	1 Of 3	5	All measurements in metres unless otherwise stated

Contract : Nant Llesg Land Reclamation			Trial Pit No.
Client : Miller Argent			TP05
Dates : 22/08/12 - 22/08/12	Job Number : G132	Ground Level : 411.82 m A.O.D. *Level to Ordnance Datum*	
Location :	Engineer : Mott MacDonald	Coordinates: 309729.06 E 207333.58 N *Co-ordinates to National Grid*	

Above:- TP05 spoil

Right:-
TP05 pit

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated
	BT	2 Of 3		

Contract : Nant Llesg Land Reclamation			Trial Pit No.
Client : Miller Argent			TP05
Dates : 22/08/12 - 22/08/12	Job Number : G132	Ground Level : 411.82 m A.O.D. *Level to Ordnance Datum*	
Location :	Engineer : Mott MacDonald	Coordinates: 309729.06 E 207333.58 N *Co-ordinates to National Grid*	

Above:-

Right:-
TP05 pit

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	BT	3 Of 3			

Contract : Nant Llesg Land Reclamation

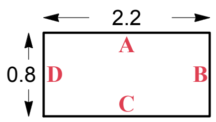
Client : Miller Argent

Trial Pit No. **TP06**

Dates : 22/08/12 - 22/08/12	Job Number : G132	Ground Level : 410.67 m A.O.D. *Level to Ordnance Datum*	
Location :	Engineer : Mott MacDonald	Coordinates: 309786.96 E 207323.99 N *Co-ordinates to National Grid*	

Samples Depth	Samples Type No.	Tests Depth	Test Results	Depth (Thick-ness)	STRATA DESCRIPTION	Legend	Red. Level A.O.D.	Water
0.00 - 0.20	B				Grass over brown silty very sandy gravel. Gravel is angular to subangular fine to coarse of mudstone siltstone and sandstone. Occasional fragments of brick, wood, plastic pipe, plastic and metal.			
0.10 -	D							
0.20 - 0.80	B			0.20	Orangish brown mottled grey silty very sandy gravel with high cobble content. Gravel (fine to coarse) and cobbles are angular to subangular of fine to medium grained sandstone.		410.47	
0.50 -	D							
				0.85	Weathered Sandstone Bedrock		409.82	

PLAN



Groundwater:

Stability: Stable

Shoring: None

Remarks : Trial Pit area CAT scanned prior to excavation. Trial pit terminated at 0.85m on weathered bedrock. On completion the Trial Pit was backfilled in compacted layers of arisings.

Equipment Used: JCB 3CX

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Operator:	Logged By.	Sheet No.	m Per Page	
	BT	1 Of 3	5	All measurements in metres unless otherwise stated

Contract : Nant Llesg Land Reclamation Client : Miller Argent		Trial Pit No. TP06
Dates : 22/08/12 - 22/08/12 Location :	Job Number : G132 Engineer : Mott MacDonald	Ground Level : 410.67 m A.O.D. *Level to Ordnance Datum* Coordinates: 309786.96 E 207323.99 N *Co-ordinates to National Grid*

Above:- TP06 spoil

Right:- TP06 pit

Contract : **Nant Llesg Land Reclamation**			Trial Pit No.
Client : **Miller Argent**			**TP06**
Dates : 22/08/12 - 22/08/12	Job Number : G132	Ground Level : 410.67 m A.O.D. *Level to Ordnance Datum*	
Location :	Engineer : Mott MacDonald	Coordinates: 309786.96 E 207323.99 N *Co-ordinates to National Grid*	

Above:-

Right:-
TP06 pit

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	BT	3 Of 3		

Contract : Nant Llesg Land Reclamation	Trial Pit No.
Client : Miller Argent	TP07

Dates : 21/08/12 - 21/08/12	Job Number : G132	Ground Level : 411.06 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Mott MacDonald	Coordinates: 309779.89 E 207276.64 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Tests Test Results	Depth (Thick-ness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water
	0.00 - 1.50	B				Grass over brownish black silty very sandy gravel. Gravel is angular to subangular fine to coarse of mixed lithologies including mudstone siltstone and sandstone. Many fragments of metal, brick, concrete, bitumen, tile, pottery, plastic, asbestos, wire, textiles, wood, 100mm diamater blue plastic water pipe, carpet, steel cable, plyboard and general refuse.			
	0.10 -	D							
	0.50 -	D							
1	1.00 -	D							
					1.50	Brownish black firm pseudo-fibrous and amorphous PEAT with organic odour.		409.56	
	1.60 -	D							
	1.70 - 2.00	B			1.70	Very soft to soft orangish brown mottled grey slightly gravelly sandy SILT. Gravel is angualr to subrounded fine to coarse sandstone. Occasional pockets of fine to medium grained sand.		409.36	
2	2.00 - 2.30	B			2.00	Orangish brown and grey silty very sandy GRAVEL and COBBLES of angular to subangular fine to medium grey sandstone.		409.06	
	2.00 -	D							
					2.30	Weathered Sandstone Bedrock		408.76	

PLAN		
3.0 / 0.8 — sides A, B, C, D	Groundwater: Stability: Stable Shoring: None	Remarks : Trial Pit area CAT scanned prior to excavation. Trial pit terminated at 2.30m on weathered bedrock. On completion the Trial Pit was backfilled in compacted layers of arisings.

Equipment Used: JCB 3CX

Quantum Geotechnical — Ty Berwig, Bynea Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator:	Logged By. BT	Sheet No. 1 Of 3	m Per Page 5	All measurements in metres unless otherwise stated	AGS

Contract : Nant Llesg Land Reclamation Client : Miller Argent			Trial Pit No. TP07
Dates : 21/08/12 - 21/08/12 Location :	Job Number : G132 Engineer : Mott MacDonald	Ground Level : 411.06 m A.O.D. *Level to Ordnance Datum*	Coordinates: 309779.89 E 207276.64 N *Co-ordinates to National Grid*

Above:- TP07 spoil

Right:-
TP07 pit

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated	AGS
	BT	2 Of 3			

Contract : **Nant Llesg Land Reclamation** **Client :** **Miller Argent**	**Trial Pit No.** **TP07**

Dates : 21/08/12 - 21/08/12 Location :	Job Number : G132 Engineer : Mott MacDonald	Ground Level : 411.06 m A.O.D. *Level to Ordnance Datum* Coordinates: 309779.89 E 207276.64 N *Co-ordinates to National Grid*

Above:-

Right:-
TP07 pit

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Contract : Nant Llesg Land Reclamation

Client : Miller Argent

Trial Pit No. TP08

Dates : 21/08/12 - 21/08/12

Location :

Job Number : G132

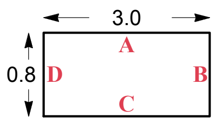
Engineer : Mott MacDonald

Ground Level : 408.83 m A.O.D. *Level to Ordnance Datum*

Coordinates: 309808.41 E 207229.09 N *Co-ordinates to National Grid*

Samples Depth	Samples Type No.	Tests Depth	Test Results	Depth (Thickness)	STRATA DESCRIPTION	Red. Level A.O.D.	Water
0.10 -	D				Dark brownsilty very sandy gravel with medium cobble content. Gravel (fine to coarse) and cobbles are angular to subangular of various lithologies including mudstone, siltstone and sandstone. Some fragments of metal (strips and pipes), brick, concrete, tile, pottery, plastic, asbestos, wire, textiles, wood, 100mm diamater blue plastic water pipe, steel cable, plyboard and general refuse.		
0.50 - 2.00	B						
0.50 -	D						
1.00 -	D						
2.00 -	D						
				2.30	Very soft dark brown firm pseudo-fibrous PEAT with organic odour.	406.53	
				2.40	Orangish brown and grey silty sandy gravel with high cobble content. Gravel (fine to coarse) and cobbles are angular to subangular of dark grey fine to medium grained sandstone.	406.43	
2.50 - 3.50	B						
3.00 -	D						
				3.30	Weathered Sandstone Bedrock	405.53	

PLAN



Groundwater: Slow seepage at base of pit.

Stability: Slightly Unstable

Shoring: None

Remarks : Trial Pit area CAT scanned prior to excavation. Trial pit terminated at 3.30m on weathered bedrock. On completion the Trial Pit was backfilled in compacted layers of arisings.

Equipment Used: JCB 3CX

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	BT	1 Of 3	5	All measurements in metres unless otherwise stated

AGS

Contract : Nant Llesg Land Reclamation	Trial Pit No.
Client : Miller Argent	TP08

Dates : 21/08/12 - 21/08/12	Job Number : G132	Ground Level : 408.83 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Mott MacDonald	Coordinates: 309808.41 E 207229.09 N *Co-ordinates to National Grid*

Above:- TP08 spoil

Right:- TP08 pit

Contract : Nant Llesg Land Reclamation	Trial Pit No.
Client : Miller Argent	TP08

Dates : 21/08/12 - 21/08/12	Job Number : G132	Ground Level : 408.83 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Mott MacDonald	Coordinates: 309808.41 E 207229.09 N *Co-ordinates to National Grid*

Above:-

Right:-
TP08 pit

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Contract : Nant Llesg Land Reclamation

Client : Miller Argent

Trial Pit No. TP09

Dates : 21/08/12 - 21/08/12	Job Number : G132	Ground Level :	401.90 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Mott MacDonald	Coordinates:	309845.27 E 207172.20 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Test Results	STRATA Depth (Thickness)	DESCRIPTION	Legend	Red. Level A.O.D.	Water
	0.10 -	D							
	0.20 - 1.00	B			0.20	Grass over soft to firm dark brown sandy gravelly silt with low cobble content. Gravel (fine to coarse) and cobbles are angular to subangular of mudstone siltstone and sandstone, with occasional bricks. Occasional fragments of brick, rubber, plastic, tile and pottery.		401.70	
	0.50 -	D							
1					1.10	Soft to firm orangish brown mottled grey sandy silty gravel with high cobble content and medium boulder content. Gravel (fine to coarse) and cobbles are angular to subangular sandstone. Boulders are subangular of sandstone.		400.80	
						Weathered Sandstone Bedrock			

PLAN

2.5

0.8 A B C D

Groundwater:

Stability: Slightly Unstable

Shoring: None

Remarks : Trial Pit area CAT scanned prior to excavation. Trial pit terminated at 1.10m on weathered bedrock. On completion the Trial Pit was backfilled in compacted layers of arisings.

Equipment Used: JCB 3CX

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Operator:	Logged By.	Sheet No.	m Per Page	
	BT	1 Of 3	5	All measurements in metres unless otherwise stated

AGS

Contract : Nant Llesg Land Reclamation Client : Miller Argent			Trial Pit No. TP09
Dates : 21/08/12 - 21/08/12 Location :	Job Number : G132 Engineer : Mott MacDonald	Ground Level : 401.90 m A.O.D. *Level to Ordnance Datum*	
		Coordinates: 309845.27 E 207172.20 N *Co-ordinates to National Grid*	

Above:- TP09 spoil

Right:-
TP09 pit

Contract : Nant Llesg Land Reclamation			**Trial Pit No.**
Client : Miller Argent			**TP09**
Dates : 21/08/12 - 21/08/12	Job Number : G132	Ground Level : 401.90 m A.O.D. *Level to Ordnance Datum*	
Location :	Engineer : Mott MacDonald	Coordinates: 309845.27 E 207172.20 N *Co-ordinates to National Grid*	

Above:-

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Contract : Nant Llesg Land Reclamation

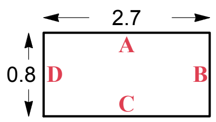
Client : Miller Argent

Trial Pit No. TP10

Dates : 21/08/12 - 21/08/12	Job Number : G132	Ground Level : 396.22 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Mott MacDonald	Coordinates: 309909.39 E 207073.66 N *Co-ordinates to National Grid*

Samples Depth	Samples Type No.	Tests Depth	Tests Test Results	Strata Depth (Thickness)	DESCRIPTION	Legend	Red. Level A.O.D.	Water
0.10 -	D				Brown silty very sandy gravel. Gravel is angular to subangular of various lithologies including mudstone, siltstone and sandstone. Many fragments of wood, plastic, metal, asbestos, glass, pottery, bitumen, tarmacadam, brick, tiles, electrical cable and rubber.			
0.20 - 0.50	B			0.20			396.02	
0.50 -	D				Black silty sand and gravel with low cobble content. Gravel is angular to subangular fine to course of of various lithologies including mudstone, siltstone and sandstone. Cobbles are angular to subangular mudstone. Occasional fragments of plastic, wood, glass, tile, brick and bitumen. Very strong sulphur odour.			
				0.70			395.52	
1.00 - 2.50	B				Brown silty very sandy gravel with medium cobble content. Gravel (fine to coarse) and cobbles are angular to subangular of sandstone and siltstone. Occasional fragments of plastic, glass, tile, metal and brick.			
1.00 -	D							
2.00 -	D							
				2.50			393.72	

PLAN



Groundwater:

Stability: Unstable - Pit Collapse

Shoring: None

Remarks : Trial Pit area CAT scanned prior to excavation. Trial Pit terminated at 2.50m due to instability. On completion the Trial Pit was backfilled in compacted layers of arisings.

Equipment Used: JCB 3CX

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AGS

Contract : Nant Llesg Land Reclamation	**Trial Pit No.**
Client : Miller Argent	**TP10**

Dates : 21/08/12 - 21/08/12	Job Number : G132	Ground Level : 396.22 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Mott MacDonald	Coordinates: 309909.39 E 207073.66 N *Co-ordinates to National Grid*

Above:- TP10 spoil

Right:-
TP10 pit

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Contract : Nant Llesg Land Reclamation			Trial Pit No.
Client : Miller Argent			TP10
Dates : 21/08/12 - 21/08/12	Job Number : G132	Ground Level : 396.22 m A.O.D. *Level to Ordnance Datum*	
Location :	Engineer : Mott MacDonald	Coordinates: 309909.39 E 207073.66 N *Co-ordinates to National Grid*	

Above:-

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Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated
	BT	3 Of 3		

Contract : Nant Llesg Land Reclamation

Client : Miller Argent

Trial Pit No. TP11

Dates : 23/08/12 - 23/08/12

Location :

Job Number : G132

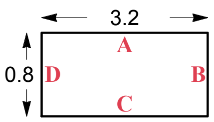
Engineer : Mott MacDonald

Ground Level : 392.37 m A.O.D. *Level to Ordnance Datum*

Coordinates: 309937.67 E 207014.09 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Tests Test Results	Depth (Thickness)	STRATA DESCRIPTION	Legend	Red. Level A.O.D.	Water
	0.00 - 1.50	B				Compact brown silty very sandy gravel with high cobble content and medium boulder content. Gravel (fine to coarse) and cobbles are angular to subangular of siltstone and sandstone. Boulders are subangular of sandstone. Occasional fragments of black mineral, brick, plastic , wire, tiles and cement blocks.			
	0.10 -	D							
	0.50 -	D							
1	1.00 -	D							
	1.70 - 2.00	B			1.70	Very soft Dark brownish black firm pseudo-fibrous, locally fibrous, PEAT with some intact wood fragments and branches. Strong organic odour,		390.67	
2	2.00 - 2.50	B			2.00	Very soft to firm grey mottled orangish brown slightly sandy slightly gravelly SILT. Localised pockets of brown fine to medium grained sand. Gravel is angular to subrounded of siltstone and sandstone with some ironstone.		390.37	
	2.00 -	D							
					2.50			389.87	

PLAN



Groundwater: Fast

Stability: Unstable

Shoring: None

Remarks : Trial Pit area CAT scanned prior to excavation. Trial Pit terminated at 2.50m due to high inflow of water. On completion the Trial Pit was backfilled in compacted layers of arisings.

Equipment Used: JCB 3CX

Quantum Geotechnical

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Operator:	Logged By.	Sheet No.	m Per Page	
	BT	1 Of 3	5	All measurements in metres unless otherwise stated

AGS

Contract : Nant Llesg Land Reclamation			Trial Pit No.
Client : Miller Argent			TP11

Dates : 23/08/12 - 23/08/12	Job Number : G132	Ground Level :	392.37 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Mott MacDonald	Coordinates:	309937.67 E 207014.09 N *Co-ordinates to National Grid*

Above:- TP11 spoil

Right:-
TP11 pit

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Contract : Nant Llesg Land Reclamation Client : Miller Argent			Trial Pit No. TP11
Dates : 23/08/12 - 23/08/12 Location :	Job Number : G132 Engineer : Mott MacDonald	Ground Level : 392.37 m A.O.D. *Level to Ordnance Datum* Coordinates: 309937.67 E 207014.09 N *Co-ordinates to National Grid*	

Above:-

Right:-
TP11 pit

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Contract : Nant Llesg Land Reclamation

Client : Miller Argent

Trial Pit No. TP12

Dates : 20/08/12 - 20/08/12

Location :

Job Number : G132

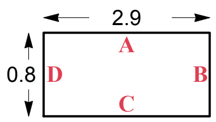
Engineer : Mott MacDonald

Ground Level : 394.72 m A.O.D. *Level to Ordnance Datum*

Coordinates: 309926.48 E 206969.16 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Type No.	Tests Depth	Test Results	Depth (Thickness)	DESCRIPTION	Legend	Red. Level A.O.D.	Water
	0.00 - 1.00	B				Grass over brown very silty very sandy gravel with medium cobble content and low boulder content. Gravel (fine to coarse) and cobbles are angular to subrounded of mudstone, siltstone and sandstone. Boulders are subangular of mudstone. Occasional gravel sized fragments of plastic, red brick, textile, rubber and wood.			
	0.10 -	D							
	0.50 -	D							
1	1.00 -	D							
					1.40	Dark grey silty very sandy gravel with medium cobble content and low boulder content. Gravel (fine to coarse) and cobbles are angular to subrounded of mudstone, siltstone and sandstone. Boulders are subangular of mudstone. Occasional gravel sized fragments of brick and plastic.		393.32	
	1.50 - 3.00	B							
2	2.00 -	D							
3	3.00 -	D							
					3.20	Very soft dark blackish brown firm and spongy pseudo-fibrous PEAT with organic odour.		391.52	
	3.25 -	D							
					3.30	Very soft to soft grey locally orangish brown slightly sandy CLAY. Sand is fine to coarse grained.		391.42	
	3.50 -	B			3.50			391.22	

PLAN



Groundwater:

Stability: Slightly Unstable

Shoring: None

Remarks : Trial Pit area CAT scanned prior to excavation. On completion the Trial Pit was backfilled in compacted layers of arisings.

Equipment Used: JCB 3CX

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Contract : **Nant Llesg Land Reclamation**

Client : **Miller Argent**

Trial Pit No. **TP12**

Dates : 20/08/12 - 20/08/12	Job Number : G132	Ground Level : 394.72 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Mott MacDonald	Coordinates: 309926.48 E 206969.16 N *Co-ordinates to National Grid*

Above:- TP12 spoil

Right:-
TP12 pit

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	BT	2 Of 3		

Contract : Nant Llesg Land Reclamation Client : Miller Argent		Trial Pit No. TP12
Dates : 20/08/12 - 20/08/12 Location :	Job Number : G132 Engineer : Mott MacDonald	Ground Level : 394.72 m A.O.D. *Level to Ordnance Datum* Coordinates: 309926.48 E 206969.16 N *Co-ordinates to National Grid*

Above:-

Right:-
TP12 pit

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Contract : Nant Llesg Land Reclamation

Client : Miller Argent

Trial Pit No. TP13

Dates : 20/08/12 - 20/08/12

Location :

Job Number : G132

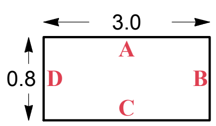
Engineer : Mott MacDonald

Ground Level : 394.25 m A.O.D. *Level to Ordnance Datum*

Coordinates: 309940.30 E 206916.19 N *Co-ordinates to National Grid*

m B.G.L.	Samples Depth	Samples Type No.	Tests Depth	Test Results	Depth (Thickness)	STRATA DESCRIPTION	Legend	Red. Level A.O.D.	Water
	0.10 -	D				Grass over brown very silty very sandy gravel with medium cobble content. Gravel (fine to coarse) and cobbles are angular to subrounded of mudstone, siltstone and sandstone. Occasional gravel sized fragments of brick, hard and soft plastic, wood, rubber hose, textile and metals.			
	0.50 -	D							
1	1.00 -	D							
	1.50 - 2.50	B			1.50	grey very silty sandy gravel with medium cobble content. Gravel (fine to coarse) and cobbles are angular to subrounded of mudstone, siltstone and sandstone. Occasional fragments of textile and clay pipe.		392.75	
2	2.00 -	D							
					2.60	Very soft blackish dark brown firm pseudo-fibrous PEAT with organic odour.		391.65	
	2.70 -	D			2.75	very soft to soft orangish brown and grey slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of mudstone and ironstone.		391.50	
3	3.00 -	D							
					3.50			390.75	

PLAN



Groundwater:

Stability: Slightly Unstable

Shoring: None

Remarks : Trial Pit area CAT scanned prior to excavation. On completion the Trial Pit was backfilled in compacted layers of arisings.

Equipment Used: JCB 3CX

Quantum Geotechnical

Ty Berwig, Bynea
Llanelli, Carmarthenshire SA14 9ST
Tel: 01554 744880
Fax: 01554 776150
email: enquiries@quantum-geotech.co.uk

Operator:	Logged By.	Sheet No.	m Per Page	
	BT	1 Of 3	5	All measurements in metres unless otherwise stated

Contract : Nant Llesg Land Reclamation			Trial Pit No.
Client : Miller Argent			TP13
Dates : 20/08/12 - 20/08/12	Job Number : G132	Ground Level : 394.25 m A.O.D. *Level to Ordnance Datum*	
Location :	Engineer : Mott MacDonald	Coordinates: 309940.30 E 206916.19 N *Co-ordinates to National Grid*	

Above:- TP13 spoil

Right:- TP13 pit

Quantum Geotechnical	Ty Berwig, Bynea Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator:	Logged By. BT	Sheet No. 2 Of 3	m Per Page	All measurements in metres unless otherwise stated	AGS

Contract : Nant Llesg Land Reclamation **Client : Miller Argent**	**Trial Pit No.** **TP13**

Dates : 20/08/12 - 20/08/12 Location :	Job Number : G132 Engineer : Mott MacDonald	Ground Level :	394.25 m A.O.D. *Level to Ordnance Datum*
		Coordinates:	309940.30 E 206916.19 N *Co-ordinates to National Grid*

Above:-

Quantum Geotechnical

Ty Berwig, Bynea
Llanelli, Carmarthenshire SA14 9ST
Tel: 01554 744880
Fax: 01554 776150
email: enquiries@quantum-geotech.co.uk

Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated
	BT	3 Of 3		

Contract : Nant Llesg Land Reclamation

Client : Miller Argent

Trial Pit No. TP14

Dates : 20/08/12 - 20/08/12	Job Number : G132	Ground Level : 394.68 m A.O.D. *Level to Ordnance Datum*
Location :	Engineer : Mott MacDonald	Coordinates: 309935.40 E 206888.18 N *Co-ordinates to National Grid*

Samples Depth	Samples Type No.	Tests Depth	Test Results	Depth (Thickness)	DESCRIPTION	Legend	Red. Level A.O.D.	Water
0.00 - 1.00	B				Grass over brown very silty sandy gravel with medium cobble and boulder content. Gravel (fine to coarse) and cobbles are angular to subrounded mudstone, sandstone and siltstone. Boulders are angular to subrounded of concrete. Occasional gravel sized fragments of black bitumen and red brick.			
0.10 -	D							
0.50 -	D							
1.00 -	D							
				1.20	Grey very silty sandy gravek with medium cobble content and low boulder content. Gravel (fine to coarse) and cobbles are angular to subrounded of mudstone siltstone and sandstone. Boulders are subangular of mudstone and siltstone.		393.48	
1.50 - 3.00	B							
2.00 -	D							
3.00 -	D							
				3.40	Very soft to soft dark brownish black firm and spongy pseudo-fibrous PEAT with strong organic odour.		391.28	
3.50 -	B			3.50			391.18	

m B.G.L.: 1, 2, 3

PLAN

2.8 × 0.8 (sides A, B, C, D)

Groundwater:

Stability: Stable

Shoring: None

Remarks : Trial Pit area CAT scanned prior to excavation. On completion the Trial Pit was backfilled in compacted layers of arisings.

Equipment Used: JCB 3CX

Quantum Geotechnical
Ty Berwig, Bynea
Llanelli, Carmarthenshire SA14 9ST
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email: enquiries@quantum-geotech.co.uk

Operator:	Logged By.	Sheet No.	m Per Page	
	BT	1 Of 3	5	All measurements in metres unless otherwise stated

AGS

Contract : Nant Llesg Land Reclamation Client : Miller Argent			Trial Pit No. **TP14**
Dates : 20/08/12 - 20/08/12 Location :	Job Number : G132 Engineer : Mott MacDonald	Ground Level : 394.68 m A.O.D. *Level to Ordnance Datum* Coordinates: 309935.40 E 206888.18 N *Co-ordinates to National Grid*	

Above:- TP14 spoil

Right:- TP14 pit

Contract : Nant Llesg Land Reclamation Client : Miller Argent			Trial Pit No. TP14
Dates : 20/08/12 - 20/08/12 Location :	Job Number : G132 Engineer : Mott MacDonald	Ground Level : 394.68 m A.O.D. *Level to Ordnance Datum* Coordinates: 309935.40 E 206888.18 N *Co-ordinates to National Grid*	

Above:-

Right:-
TP14 pit

Quantum Geotechnical	Ty Berwig, Bynea Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator:	Logged By. BT	Sheet No. 3 Of 3	m Per Page	All measurements in metres unless otherwise stated	AGS

APPENDIX IV – GROUNDWATER AND LAND GAS MONITORING RECORDS

MONITORING RECORD SHEET

Project Name:	**Nant Llesg**
Project No.:	**G132**
Instruments Used:	**Water Dip Meter and Gas Monitor (GA2000)**
Monitoring Engineer:	**SP**
Date Sampled/Monitored:	**26/09/2012**

QUANTUM GEOTECHNICAL

Site Readings

Exploratory Hole I.D.	Ground Level mOD	CH_4 %	CO_2 %	O_2 %	H_2S ppm	Atmos Pressure m bar	Flow l/hr	Water Level mbgl	Water Level mOD	Response Zone (slotted pipe) mbgl	Remarks
BH01		0.0	3.0	16.3	0.0	947.0	0.0	3.32	-3.32	0.20 - 4.0	50mm standpipe
BH02		0.0	1.0	20.0	0.0	947.0	0.0	2.98	-2.98	0.20 - 4.0	50mm standpipe
BH03		0.0	3.5	15.9	0.0	947.0	0.0	3.50	-3.50	0.20 - 4.0	50mm standpipe
BH01A		0.0	0.0	0.0	0.0	0.0	0.0	0.05	-0.05		Along track - Flooded
BH01B		0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00		Along track - Locked
BH01C		0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00		Locked
BH01D		0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00		Bung jammed
BH01E		0.0	6.2	8.7	0.0	947	0.0	12.74	-12.74		50mm standpipe

Background Gas Levels

	CH_4	CO_2	O_2	Atmos
	%	%	%	mbar
Before Monitoring	0.00	0.00	20.70	947
After Monitoring	0.00	0.00	20.80	947

APPENDIX V – GEO-ENVIRONMENTAL LABORATORY TEST CERTIFICATES

Scientific Analysis Laboratories is a
limited company registered in England and
Wales (No 2514788) whose address is at
Hadfield House, Hadfield Street, Manchester M16 9FE

Scientific Analysis Laboratories Ltd

Certificate of Analysis

Hadfield House
Hadfield Street
Cornbrook
Manchester
M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2468

Report Number: 296264-1

Date of Report: 04-Oct-2012

Customer: Quantum Geotechnical
Ty Berwig
Heol y Bwlch
Bynea
Llanelli
Carmarthenshire
SA14 9ST

Customer Contact: Mr Arwel Jones

Customer Job Reference: G132
Customer Purchase Order: G132/53242
Customer Site Reference: Nant Llesg
Date Job Received at SAL: 23-Aug-2012
Date Analysis Started: 20-Sep-2012
Date Analysis Completed: 04-Oct-2012

The results reported relate to samples received in the laboratory
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with SAL SOPs

UKAS TESTING
1549

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Report checked
and authorised by :
Caroline Haworth
Assistant Customer Service
Manager

Issued by :
Caroline Haworth
Assistant Customer Service
Manager

SAL Reference: 296264
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
MCERTS Preparation

				SAL Reference	296264 001	296264 002	296264 003
				Customer Sample Reference	BH01 ES 0.1 293783-62	BH01 ES 0.5 293783-63	BH3 ES1 293783-67
				Bottom Depth	0.1	0.5	
				Date Sampled	22-SEP-2012	22-SEP-2012	22-SEP-2012
				Type	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Moisture	T277	AR	0.1	%	**13**	**21**	**12**
Moisture @ 105 C	T162	AR	0.1	%	**8.8**	**14**	**16**

SAL Reference: 296264
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
Miscellaneous

				SAL Reference	296264 001	296264 002	296264 003
				Customer Sample Reference	BH01 ES 0.1 293783-62	BH01 ES 0.5 293783-63	BH3 ES1 293783-67
				Bottom Depth	0.1	0.5	
				Date Sampled	22-SEP-2012	22-SEP-2012	22-SEP-2012
				Type	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Asbestos ID	T27	AR			Chrysotile Detected -	Chrysotile Detected -	Chrysotile Detected -
Total Organic Carbon	T21	AR	0.1	%	**5.6**	**5.7**	**7.1**

SAL Reference: 296264
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
Soil Suite

				SAL Reference	296264 001	296264 002	296264 003
				Customer Sample Reference	BH01 ES 0.1 293783-62	BH01 ES 0.5 293783-63	BH3 ES1 293783-67
				Bottom Depth	0.1	0.5	
				Date Sampled	22-SEP-2012	22-SEP-2012	22-SEP-2012
				Type	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Antimony	T6	M40	1	mg/kg	**18**	**15**	**2**
Arsenic	T6	M40	2	mg/kg	**16**	**16**	**11**
Barium	T6	M40	1	mg/kg	**500**	**410**	**450**
Beryllium	T6	M40	2	mg/kg	<2	**2**	<2
Boron (water-soluble)	T6	AR	1	mg/kg	<1	<1	<1
Cadmium	T6	M40	1	mg/kg	**1**	**2**	<1
Cadmium	T65	M40	0.2	mg/kg	**1.5**	**2.1**	<0.2
Chromium	T6	M40	1	mg/kg	**170**	**150**	**21**
Copper	T6	M40	1	mg/kg	**170**	**170**	**34**
Cyanide(Total)	T546	AR	1	mg/kg	<1	<1	<1
Cyanide(free)	T546	AR	1	mg/kg	<1	<1	<1
Iron	T6	M40	1	mg/kg	**57000**	**50000**	**25000**
Lead	T6	M40	1	mg/kg	**510**	**600**	**170**
Mercury	T65	M40	0.1	mg/kg	**0.6**	**0.7**	**0.1**
Mercury	T6	M40	1	mg/kg	<1	<1	<1
Molybdenum	T6	M40	1	mg/kg	**6**	**6**	**3**
Nickel	T6	M40	1	mg/kg	**57**	**46**	**26**
pH	T7	AR			**9.8**	**9.2**	**8.2**
Selenium	T6	M40	3	mg/kg	<3	<3	<3
SO4(Total)	T6	M40	0.01	%	**0.96**	**3.1**	**0.52**
Sulphide	T546	AR	1	mg/kg	<1	<1	<1
Sulphur (total)	T6	M40	0.01	%	**0.32**	**1.0**	**0.17**
Zinc	T6	M40	1	mg/kg	**1600**	**1500**	**120**

SAL Reference: 296264
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
TPH (CWG)

				SAL Reference	296264 001	296264 002	296264 003
				Customer Sample Reference	BH01 ES 0.1 293783-62	BH01 ES 0.5 293783-63	BH3 ES1 293783-67
				Bottom Depth	0.1	0.5	
				Date Sampled	22-SEP-2012	22-SEP-2012	22-SEP-2012
				Type	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
TPH (C5-C6 aliphatic)	T209	M105	0.100	mg/kg	<0.100	<0.100	(2) <0.200
TPH (C6-C8 aliphatic)	T209	M105	0.10	mg/kg	**0.43**	<0.10	(2) <0.20
TPH (C8-C10 aliphatic)	T209	M105	0.100	mg/kg	<0.100	**0.116**	(2) <0.200
TPH (C10-C12 aliphatic)	T206	M105	1	mg/kg	(9) <10	**2**	(9) <10
TPH (C12-C16 aliphatic)	T206	M105	2	mg/kg	(9) <10	<2	(9) <10
TPH (C16-C21 aliphatic)	T206	M105	1	mg/kg	**40**	**17**	**22**
TPH (C21-C35 aliphatic)	T206	M105	4	mg/kg	**120**	**76**	**350**
TPH (C6-C7 aromatic)	T209	M105	0.100	mg/kg	<0.100	<0.100	(2) <0.200
TPH (C7-C8 aromatic)	T209	M105	0.100	mg/kg	<0.100	<0.100	(2) <0.200
TPH (C8-C10 aromatic)	T209	M105	0.100	mg/kg	<0.100	<0.100	(2) <0.200
TPH (C10-C12 aromatic)	T206	M105	1	mg/kg	(9) <10	<1	(9) <10
TPH (C12-C16 aromatic)	T206	M105	1	mg/kg	(9) <10	**2**	(9) <10
TPH (C16-C21 aromatic)	T206	M105	1	mg/kg	**65**	**21**	**84**
TPH (C21-C35 aromatic)	T206	M105	1	mg/kg	**46**	**49**	**570**

SAL Reference: 296264
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil

PAH US EPA 16 (B and K split)

				SAL Reference	296264 001	296264 002	296264 003
				Customer Sample Reference	BH01 ES 0.1 293783-62	BH01 ES 0.5 293783-63	BH3 ES1 293783-67
				Bottom Depth	0.1	0.5	
				Date Sampled	22-SEP-2012	22-SEP-2012	22-SEP-2012
				Type	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Naphthalene	T207	M105	0.1	mg/kg	**0.3**	**0.1**	**0.3**
Acenaphthylene	T207	M105	0.1	mg/kg	**1.9**	<0.1	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	**0.3**	**0.4**	**1.0**
Fluorene	T207	M105	0.1	mg/kg	**0.5**	**0.5**	**1.4**
Phenanthrene	T207	M105	0.1	mg/kg	**1.5**	**1.5**	**7.2**
Anthracene	T207	M105	0.1	mg/kg	**0.5**	**0.5**	**2.8**
Fluoranthene	T207	M105	0.1	mg/kg	**1.6**	**1.7**	**16**
Pyrene	T207	M105	0.1	mg/kg	**1.2**	**1.2**	**11**
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	**1.3**	**0.7**	**6.0**
Chrysene	T207	M105	0.1	mg/kg	**1.2**	**1.0**	**8.4**
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	**0.5**	**0.5**	**5.1**
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	**1.0**	**1.0**	**6.7**
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	**0.6**	**0.6**	**4.8**
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	**0.3**	**0.3**	**2.5**
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	**0.2**	**0.1**	**1.3**
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	**0.4**	**0.4**	**3.5**
PAH(total)	T207	M105	0.1	mg/kg	**13**	**11**	**78**

SAL Reference: 296264
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil

Phenols (Speciated)

				SAL Reference	296264 001	296264 002	296264 003
				Customer Sample Reference	BH01 ES 0.1 293783-62	BH01 ES 0.5 293783-63	BH3 ES1 293783-67
				Bottom Depth	0.1	0.5	
				Date Sampled	22-SEP-2012	22-SEP-2012	22-SEP-2012
				Type	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Cresols	T16	AR	0.01	mg/kg	**0.16**	**0.16**	**2.0**
Phenol	T149	AR	0.01	mg/kg	**14**	**1.5**	**0.39**
Xylenols	T16	AR	0.01	mg/kg	**0.09**	**0.08**	**2.4**

SAL Reference: 296264
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
Volatile Organic Compounds (USEPA 624) (MCERTS)

				SAL Reference	296264 001	296264 002	296264 003
				Customer Sample Reference	BH01 ES 0.1 293783-62	BH01 ES 0.5 293783-63	BH3 ES1 293783-67
				Bottom Depth	0.1	0.5	
				Date Sampled	22-SEP-2012	22-SEP-2012	22-SEP-2012
				Type	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
1,1,1,2-Tetrachloroethane	T209	M105	50	µg/kg	<50	<50	(2) <100
1,1,1-Trichloroethane	T209	M105	50	µg/kg	<50	<50	(2) <100
1,1,2,2-Tetrachloroethane	T209	M105	50	µg/kg	<50	<50	(2) <100
1,1,2-Trichloroethane	T209	M105	50	µg/kg	<50	<50	(2) <100
1,1-Dichloroethane	T209	M105	50	µg/kg	<50	<50	(2) <100
1,1-Dichloroethylene	T209	M105	50	µg/kg	<50	<50	(2) <100
1,1-Dichloropropene	T209	M105	50	µg/kg	<50	<50	(2) <100
1,2,3-Trichloropropane	T209	M105	50	µg/kg	<50	<50	(2) <100
1,2,4-Trimethylbenzene	T209	M105	50	µg/kg	<50	<50	(2) <100
1,2-dibromoethane	T209	M105	50	µg/kg	<50	<50	(2) <100
1,2-Dichlorobenzene	T209	M105	50	µg/kg	<50	<50	(2) <100
1,2-Dichloroethane	T209	M105	50	µg/kg	<50	<50	(2) <100
1,2-Dichloropropane	T209	M105	50	µg/kg	<50	<50	(2) <100
1,3,5-Trimethylbenzene	T209	M105	50	µg/kg	<50	<50	(2) <100
1,3-Dichlorobenzene	T209	M105	50	µg/kg	<50	<50	(2) <100
1,3-Dichloropropane	T209	M105	50	µg/kg	<50	<50	(2) <100
1,4-Dichlorobenzene	T209	M105	50	µg/kg	<50	<50	(2) <100
2,2-Dichloropropane	T209	M105	50	µg/kg	<50	<50	(2) <100
2-Chlorotoluene	T209	M105	50	µg/kg	<50	<50	(2) <100
4-Chlorotoluene	T209	M105	50	µg/kg	<50	<50	(2) <100
Benzene	T209	M105	10	µg/kg	<10	<10	(2) <20
Bromobenzene	T209	M105	50	µg/kg	<50	<50	(2) <100
Bromochloromethane	T209	M105	50	µg/kg	<50	<50	(2) <100
Bromodichloromethane	T209	M105	50	µg/kg	<50	<50	(2) <100
Bromoform	T209	M105	50	µg/kg	<50	<50	(2) <100
Bromomethane	T209	M105	50	µg/kg	<50	<50	(2) <100
Carbon tetrachloride	T209	M105	50	µg/kg	<50	<50	(2) <100
Chlorobenzene	T209	M105	50	µg/kg	<50	<50	(2) <100
Chlorodibromomethane	T209	M105	50	µg/kg	<50	<50	(2) <100
Chloroethane	T209	M105	50	µg/kg	<50	<50	(2) <100
Chloroform	T209	M105	50	µg/kg	<50	<50	(2) <100
Chloromethane	T209	M105	50	µg/kg	<50	<50	(2) <100
Cis-1,2-Dichloroethylene	T209	M105	50	µg/kg	<50	<50	(2) <100
Cis-1,3-Dichloropropene	T209	M105	50	µg/kg	<50	<50	(2) <100
Dibromomethane	T209	M105	50	µg/kg	<50	<50	(2) <100
Dichlorodifluoromethane	T209	M105	50	µg/kg	<50	<50	(2) <100
Dichloromethane	T209	M105	50	µg/kg	<50	<50	(2) <100
EthylBenzene	T209	M105	10	µg/kg	<10	<10	(2) <20
Isopropyl benzene	T209	M105	50	µg/kg	<50	<50	(2) <100
M/P Xylene	T209	M105	10	µg/kg	<10	<10	(2) <20
n-Propylbenzene	T209	M105	50	µg/kg	<50	<50	(2) <100
O Xylene	T209	M105	10	µg/kg	<10	<10	(2) <20
p-Isopropyltoluene	T209	M105	50	µg/kg	<50	<50	(2) <100
S-Butylbenzene	T209	M105	50	µg/kg	<50	<50	(2) <100
Styrene	T209	M105	50	µg/kg	<50	<50	(2) <100
T-Butylbenzene	T209	M105	50	µg/kg	<50	<50	(2) <100
Tetrachloroethene	T209	M105	50	µg/kg	<50	<50	(2) <100
Toluene	T209	M105	10	µg/kg	<10	<10	(2) <20
Trans-1,2-Dichloroethene	T209	M105	50	µg/kg	<50	<50	(2) <100
Trans-1,3-Dichloropropene	T209	M105	50	µg/kg	<50	<50	(2) <100
Trichloroethene	T209	M105	50	µg/kg	<50	<50	(2) <100
Trichlorofluoromethane	T209	M105	50	µg/kg	<50	<50	(2) <100
Vinyl chloride	T209	M105	50	µg/kg	<50	<50	(2) <100

SAL Reference: 296264
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
PCB EC7

				SAL Reference	296264 001	296264 002	296264 003
				Customer Sample Reference	BH01 ES 0.1 293783-62	BH01 ES 0.5 293783-63	BH3 ES1 293783-67
				Bottom Depth	0.1	0.5	
				Date Sampled	22-SEP-2012	22-SEP-2012	22-SEP-2012
				Type	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
PCB BZ#28	T1	M105	0.05	µg/kg	**3800**	**1800**	**1.5**
PCB BZ#52	T1	M105	0.05	µg/kg	**1200**	**590**	**0.63**
PCB BZ#101	T1	M105	0.05	µg/kg	**230**	**100**	(9) <0.50
PCB BZ#118	T1	M105	0.05	µg/kg	**180**	**79**	(9) <0.50
PCB BZ#153	T1	M105	0.05	µg/kg	**57**	**27**	(9) <0.50
PCB BZ#138	T1	M105	0.05	µg/kg	**78**	**38**	(9) <0.50
PCB BZ#180	T1	M105	0.05	µg/kg	**32**	**13**	(9) <0.50

SAL Reference: 296264
Project Site: Nant Llesg
Customer Reference: G132

Leachate to BS EN 12457-2 (10:1) Analysed as Water
Leachate Suite

				SAL Reference	296264 001	296264 002	296264 003
				Customer Sample Reference	BH01 ES 0.1 293783-62	BH01 ES 0.5 293783-63	BH3 ES1 293783-67
				Bottom Depth	0.1	0.5	
				Date Sampled	22-SEP-2012	22-SEP-2012	22-SEP-2012
				Type	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Ammoniacal nitrogen	T4	10:1	0.05	mg/l	**0.96**	**0.27**	**0.91**
Sb (Dissolved)	T281	10:1	1	µg/l	**16**	**24**	**2**
As (Dissolved)	T281	10:1	0.2	µg/l	**4.4**	**8.7**	**3.5**
Ba (Dissolved)	T281	10:1	1	µg/l	**40**	**72**	**56**
Be (Dissolved)	T281	10:1	0.05	µg/l	**0.13**	**0.12**	**0.16**
Boron	T6	10:1	0.01	mg/l	**0.09**	**0.17**	**0.06**
Cd (Dissolved)	T281	10:1	0.02	µg/l	**0.17**	**0.26**	**0.15**
Chloride	T686	10:1	0.5	mg/l	**30**	**66**	**3.5**
Cr (Dissolved)	T281	10:1	1	µg/l	**7**	**5**	**4**
Cu (Dissolved)	T281	10:1	0.5	µg/l	**99**	**69**	**4.3**
Cyanide(Total)	T4	10:1	0.05	mg/l	<0.05	<0.05	<0.05
Cyanide(free)	T4	10:1	0.05	mg/l	<0.05	<0.05	<0.05
Iron	T6	10:1	0.01	mg/l	<0.01	<0.01	<0.01
Pb (Dissolved)	T281	10:1	0.3	µg/l	**0.5**	**0.5**	**0.4**
Hg (Dissolved)	T281	10:1	0.05	µg/l	**0.39**	**0.50**	**0.31**
Mo (Dissolved)	T281	10:1	1	µg/l	**32**	**73**	**12**
Ni (Dissolved)	T281	10:1	1	µg/l	**21**	**30**	**3**
pH	T7	10:1			**11.2**	**10.3**	**8.9**
Se (Dissolved)	T281	10:1	0.5	µg/l	**2.1**	**4.9**	**1.9**
Sulphate	T686	10:1	0.1	mg/l	**190**	**1500**	**190**
Sulphide	T4	10:1	0.05	mg/l	<0.05	<0.05	<0.05
Sulphur(Free)	T2	10:1	10	mg/l	<10	<10	<10
Zn (Dissolved)	T281	10:1	2	µg/l	**4**	**8**	**5**

SAL Reference: 296264
Project Site: Nant Llesg
Customer Reference: G132

Leachate to BS EN 12457-2 (10:1) Analysed as Water
Miscellaneous

				SAL Reference	296264 001	296264 002	296264 003
				Customer Sample Reference	BH01 ES 0.1 293783-62	BH01 ES 0.5 293783-63	BH3 ES1 293783-67
				Bottom Depth	0.1	0.5	
				Date Sampled	22-SEP-2012	22-SEP-2012	22-SEP-2012
				Type	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Dissolved Organic Carbon	T21	10:1	1	mg/l	**43**	**10**	**6**
Gasoline Range Organics	T215	10:1	10	µg/l	<10	<10	<10
TPH (C10-C35)	T81	10:1	0.01	mg/l	**0.56**	**0.08**	**0.08**

SAL Reference: 296264
Project Site: Nant Llesg
Customer Reference: G132

Leachate to BS EN 12457-2 (10:1) Analysed as Water
PAH US EPA 16 (B and K split) and Phenol

				SAL Reference	296264 001	296264 002	296264 003
				Customer Sample Reference	BH01 ES 0.1 293783-62	BH01 ES 0.5 293783-63	BH3 ES1 293783-67
				Bottom Depth	0.1	0.5	
				Date Sampled	22-SEP-2012	22-SEP-2012	22-SEP-2012
				Type	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Naphthalene	T149	10:1	0.01	µg/l	**0.22**	**1.9**	**2.7**
Acenaphthylene	T149	10:1	0.01	µg/l	**0.02**	**0.05**	**0.38**
Acenaphthene	T149	10:1	0.01	µg/l	**0.07**	**0.30**	**1.6**
Fluorene	T149	10:1	0.01	µg/l	**0.07**	**0.41**	**2.0**
Phenanthrene	T149	10:1	0.01	µg/l	**0.24**	**1.7**	**10**
Anthracene	T149	10:1	0.01	µg/l	**0.07**	**0.51**	**4.9**
Fluoranthene	T149	10:1	0.01	µg/l	**0.24**	**2.1**	**30**
Pyrene	T149	10:1	0.01	µg/l	**0.19**	**1.6**	**23**
Benzo(a)Anthracene	T149	10:1	0.01	µg/l	**0.22**	**1.5**	**19**
Chrysene	T149	10:1	0.01	µg/l	**0.22**	**1.4**	**16**
Benzo(b)fluoranthene	T149	10:1	0.01	µg/l	**0.22**	**1.5**	**51**
Benzo(k)fluoranthene	T149	10:1	0.01	µg/l	**0.14**	**1.1**	**25**
Benzo(a)Pyrene	T149	10:1	0.01	µg/l	**0.12**	**1.2**	**16**
Indeno(123-cd)Pyrene	T149	10:1	0.01	µg/l	**0.08**	**0.58**	**5.5**
Dibenzo(ah)Anthracene	T149	10:1	0.01	µg/l	**0.06**	**0.35**	**3.3**
Benzo(ghi)Perylene	T149	10:1	0.01	µg/l	**0.10**	**0.52**	**5.5**
PAH(total)	T149	10:1	0.01	µg/l	**2.3**	**17**	**220**
Phenol	T149	10:1	0.5	µg/l	**0.6**	**1.6**	**3.7**

SAL Reference: 296264
Project Site: Nant Llesg
Customer Reference: G132

Leachate to BS EN 12457-2 (10:1) Analysed as Water
PCBs EC7 congeners(28,52,101,118,138,153,180)

				SAL Reference	296264 001	296264 002	296264 003
				Customer Sample Reference	BH01 ES 0.1 293783-62	BH01 ES 0.5 293783-63	BH3 ES1 293783-67
				Bottom Depth	0.1	0.5	
				Date Sampled	22-SEP-2012	22-SEP-2012	22-SEP-2012
				Type	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
PCB BZ#28	T1	10:1	0.005	µg/l	**0.85**	**0.16**	<0.005
PCB BZ#52	T1	10:1	0.005	µg/l	**0.27**	**0.035**	<0.005
PCB BZ#101	T1	10:1	0.005	µg/l	**0.069**	**0.009**	<0.005
PCB BZ#118	T16	10:1	0.005	µg/l	**0.071**	**0.009**	<0.005
PCB BZ#153	T1	10:1	0.005	µg/l	**0.032**	<0.005	<0.005
PCB BZ#138	T1	10:1	0.005	µg/l	**0.048**	**0.006**	<0.005
PCB BZ#180	T1	10:1	0.005	µg/l	**0.015**	<0.005	<0.005

SAL Reference: 296264
Project Site: Nant Llesg
Customer Reference: G132

Leachate to BS EN 12457-2 (10:1) Analysed as Water
Volatile Organic Compounds (USEPA 624)

				SAL Reference	296264 001	296264 002	296264 003
				Customer Sample Reference	BH01 ES 0.1 293783-62	BH01 ES 0.5 293783-63	BH3 ES1 293783-67
				Bottom Depth	0.1	0.5	
				Date Sampled	22-SEP-2012	22-SEP-2012	22-SEP-2012
				Type	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
1,1,1,2-Tetrachloroethane	T54	10:1	1	µg/l	<1	<1	<1
1,1,1-Trichloroethane	T54	10:1	1	µg/l	<1	<1	<1
1,1,2,2-Tetrachloroethane	T54	10:1	1	µg/l	<1	<1	<1
1,1,2-Trichloroethane	T54	10:1	1	µg/l	<1	<1	<1
1,1,2-Trichloroethylene	T54	10:1	1	µg/l	<1	<1	<1
1,1-Dichloroethane	T54	10:1	1	µg/l	<1	<1	<1
1,1-Dichloroethylene	T54	10:1	1	µg/l	<1	<1	<1
1,1-Dichloropropene	T54	10:1	1	µg/l	<1	<1	<1
1,2,3-Trichloropropane	T54	10:1	1	µg/l	<1	<1	<1
1,2,4-Trimethylbenzene	T54	10:1	1	µg/l	<1	<1	<1
1,2-dibromoethane	T54	10:1	1	µg/l	<1	<1	<1
1,2-Dichlorobenzene	T54	10:1	1	µg/l	<1	<1	<1
1,2-Dichloroethane	T54	10:1	1	µg/l	<1	<1	<1
1,2-Dichloropropane	T54	10:1	1	µg/l	<1	<1	<1
1,3,5-Trimethylbenzene	T54	10:1	1	µg/l	<1	<1	<1
1,3-Dichlorobenzene	T54	10:1	1	µg/l	<1	<1	<1
1,3-Dichloropropane	T54	10:1	1	µg/l	<1	<1	<1
1,4-Dichlorobenzene	T54	10:1	1	µg/l	<1	<1	<1
2,2-Dichloropropane	T54	10:1	1	µg/l	<1	<1	<1
2-Chlorotoluene	T54	10:1	1	µg/l	<1	<1	<1
4-Chlorotoluene	T54	10:1	1	µg/l	<1	<1	<1
Benzene	T54	10:1	1	µg/l	(13) <1	(13) <1	(13) <1
Bromobenzene	T54	10:1	1	µg/l	<1	<1	<1
Bromochloromethane	T54	10:1	1	µg/l	<1	<1	<1
Bromodichloromethane	T54	10:1	1	µg/l	<1	<1	<1
Bromoform	T54	10:1	1	µg/l	<1	<1	<1
Bromomethane	T54	10:1	1	µg/l	<1	<1	<1
Carbon tetrachloride	T54	10:1	1	µg/l	<1	<1	<1
Chlorobenzene	T54	10:1	1	µg/l	<1	<1	<1
Chlorodibromomethane	T54	10:1	1	µg/l	<1	<1	<1
Chloroethane	T54	10:1	1	µg/l	<1	<1	<1
Chloroform	T54	10:1	1	µg/l	<1	<1	<1
Chloromethane	T54	10:1	1	µg/l	<1	<1	<1
Cis-1,2-Dichloroethylene	T54	10:1	1	µg/l	<1	<1	<1
Cis-1,3-Dichloropropene	T54	10:1	1	µg/l	<1	<1	<1
Dibromomethane	T54	10:1	1	µg/l	<1	<1	<1
Dichlorodifluoromethane	T54	10:1	1	µg/l	<1	<1	<1
Dichloromethane	T54	10:1	50	µg/l	<50	<50	<50
EthylBenzene	T54	10:1	1	µg/l	<1	<1	<1
Isopropyl benzene	T54	10:1	1	µg/l	<1	<1	<1
M/P Xylene	T54	10:1	1	µg/l	<1	<1	<1
n-Propylbenzene	T54	10:1	1	µg/l	<1	<1	<1
O Xylene	T54	10:1	1	µg/l	<1	<1	<1
p-Isopropyltoluene	T54	10:1	1	µg/l	<1	<1	<1
S-Butylbenzene	T54	10:1	1	µg/l	<1	<1	<1
Styrene	T54	10:1	1	µg/l	<1	<1	<1
T-Butylbenzene	T54	10:1	1	µg/l	<1	<1	<1
Tetrachloroethene	T54	10:1	1	µg/l	<1	<1	<1
Toluene	T54	10:1	1	µg/l	<1	<1	<1
Trans-1,2-Dichloroethene	T54	10:1	1	µg/l	<1	<1	<1
Trans-1,3-Dichloropropene	T54	10:1	1	µg/l	<1	<1	<1
Trichlorofluoromethane	T54	10:1	1	µg/l	<1	<1	<1
Vinyl chloride	T54	10:1	1	µg/l	<1	<1	<1

Index to symbols used in 296264-1

Value	Description
M105	Analysis conducted on an "as received" aliquot. Results are reported on a dry weight basis where moisture content was determined by assisted drying of sample at 105C
M40	Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis.
10:1	Leachate to BS EN 12457-2 (10:1)
AR	As Received
13	Results have been blank corrected.
9	LOD raised due to dilution of sample
2	LOD Raised Due to Matrix Interference
S	Analysis was subcontracted
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

ACMs identified in samples 001 and 002 are present in cement

Method Index

Value	Description
T27	PLM
T162	Grav (1 Dec) (105 C)
T65	ICP/OES (Preconc.)
T206	GC/FID (MCERTS)
T6	ICP/OES
T7	Probe
T281	ICP/MS (Filtered)
T54	GC/MS (Headspace)
T207	GC/MS(MCERTS)
T149	GC/MS (SIR)
T215	GC/MS (Headspace)(LV)
T686	Discrete Analyser
T546	Colorimetry (CF)
T16	GC/MS
T277	Grav (1 Dec) (40 C)
T209	GC/MS(Head Space)(MCERTS)
T21	OX/IR
T81	GC/FID (LV)
T4	Colorimetry
T2	Grav
T1	GC/MS (HR)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
1,1,1,2-Tetrachloroethane	T209	M105	50	µg/kg	M	001-003
1,1,1-Trichloroethane	T209	M105	50	µg/kg	M	001-003
1,1,2,2-Tetrachloroethane	T209	M105	50	µg/kg	U	001-003
1,1,2-Trichloroethane	T209	M105	50	µg/kg	M	001-003
1,1-Dichloroethane	T209	M105	50	µg/kg	M	001-003
1,1-Dichloroethylene	T209	M105	50	µg/kg	M	001-003
1,1-Dichloropropene	T209	M105	50	µg/kg	M	001-003
1,2,3-Trichloropropane	T209	M105	50	µg/kg	U	001-003
1,2,4-Trimethylbenzene	T209	M105	50	µg/kg	M	001-003
1,2-dibromoethane	T209	M105	50	µg/kg	M	001-003
1,2-Dichlorobenzene	T209	M105	50	µg/kg	M	001-003
1,2-Dichloroethane	T209	M105	50	µg/kg	M	001-003
1,2-Dichloropropane	T209	M105	50	µg/kg	M	001-003
1,3,5-Trimethylbenzene	T209	M105	50	µg/kg	M	001-003
1,3-Dichlorobenzene	T209	M105	50	µg/kg	M	001-003
1,3-Dichloropropane	T209	M105	50	µg/kg	M	001-003
1,4-Dichlorobenzene	T209	M105	50	µg/kg	M	001-003

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
2,2-Dichloropropane	T209	M105	50	µg/kg	U	001-003
2-Chlorotoluene	T209	M105	50	µg/kg	U	001-003
4-Chlorotoluene	T209	M105	50	µg/kg	U	001-003
Benzene	T209	M105	10	µg/kg	M	001-003
Bromobenzene	T209	M105	50	µg/kg	M	001-003
Bromochloromethane	T209	M105	50	µg/kg	M	001-003
Bromodichloromethane	T209	M105	50	µg/kg	M	001-003
Bromoform	T209	M105	50	µg/kg	M	001-003
Bromomethane	T209	M105	50	µg/kg	U	001-003
Carbon tetrachloride	T209	M105	50	µg/kg	M	001-003
Chlorobenzene	T209	M105	50	µg/kg	M	001-003
Chlorodibromomethane	T209	M105	50	µg/kg	M	001-003
Chloroethane	T209	M105	50	µg/kg	M	001-003
Chloroform	T209	M105	50	µg/kg	M	001-003
Chloromethane	T209	M105	50	µg/kg	U	001-003
Cis-1,2-Dichloroethylene	T209	M105	50	µg/kg	M	001-003
Cis-1,3-Dichloropropene	T209	M105	50	µg/kg	M	001-003
Dibromomethane	T209	M105	50	µg/kg	M	001-003
Dichlorodifluoromethane	T209	M105	50	µg/kg	M	001-003
Dichloromethane	T209	M105	50	µg/kg	U	001-003
EthylBenzene	T209	M105	10	µg/kg	M	001-003
Isopropyl benzene	T209	M105	50	µg/kg	M	001-003
M/P Xylene	T209	M105	10	µg/kg	M	001-003
n-Propylbenzene	T209	M105	50	µg/kg	M	001-003
O Xylene	T209	M105	10	µg/kg	M	001-003
p-Isopropyltoluene	T209	M105	50	µg/kg	M	001-003
S-Butylbenzene	T209	M105	50	µg/kg	M	001-003
Styrene	T209	M105	50	µg/kg	U	001-003
T-Butylbenzene	T209	M105	50	µg/kg	M	001-003
Tetrachloroethene	T209	M105	50	µg/kg	M	001-003
Toluene	T209	M105	10	µg/kg	M	001-003
Trans-1,2-Dichloroethene	T209	M105	50	µg/kg	M	001-003
Trans-1,3-Dichloropropene	T209	M105	50	µg/kg	M	001-003
Trichloroethene	T209	M105	50	µg/kg	M	001-003
Trichlorofluoromethane	T209	M105	50	µg/kg	M	001-003
Vinyl chloride	T209	M105	50	µg/kg	M	001-003
1,1,1,2-Tetrachloroethane	T54	10:1	1	µg/l	U	001-003
1,1,1-Trichloroethane	T54	10:1	1	µg/l	U	001-003
1,1,2,2-Tetrachloroethane	T54	10:1	1	µg/l	U	001-003
1,1,2-Trichloroethane	T54	10:1	1	µg/l	U	001-003
1,1,2-Trichloroethylene	T54	10:1	1	µg/l	U	001-003
1,1-Dichloroethane	T54	10:1	1	µg/l	U	001-003
1,1-Dichloroethylene	T54	10:1	1	µg/l	U	001-003
1,1-Dichloropropene	T54	10:1	1	µg/l	U	001-003
1,2,3-Trichloropropane	T54	10:1	1	µg/l	U	001-003
1,2,4-Trimethylbenzene	T54	10:1	1	µg/l	U	001-003
1,2-dibromoethane	T54	10:1	1	µg/l	U	001-003
1,2-Dichlorobenzene	T54	10:1	1	µg/l	U	001-003
1,2-Dichloroethane	T54	10:1	1	µg/l	U	001-003
1,2-Dichloropropane	T54	10:1	1	µg/l	U	001-003
1,3,5-Trimethylbenzene	T54	10:1	1	µg/l	U	001-003
1,3-Dichlorobenzene	T54	10:1	1	µg/l	U	001-003
1,3-Dichloropropane	T54	10:1	1	µg/l	U	001-003
1,4-Dichlorobenzene	T54	10:1	1	µg/l	U	001-003
2,2-Dichloropropane	T54	10:1	1	µg/l	U	001-003
2-Chlorotoluene	T54	10:1	1	µg/l	U	001-003
4-Chlorotoluene	T54	10:1	1	µg/l	U	001-003
Benzene	T54	10:1	1	µg/l	U	001-003
Bromobenzene	T54	10:1	1	µg/l	U	001-003
Bromochloromethane	T54	10:1	1	µg/l	U	001-003
Bromodichloromethane	T54	10:1	1	µg/l	U	001-003
Bromoform	T54	10:1	1	µg/l	U	001-003
Bromomethane	T54	10:1	1	µg/l	U	001-003
Carbon tetrachloride	T54	10:1	1	µg/l	U	001-003
Chlorobenzene	T54	10:1	1	µg/l	U	001-003
Chlorodibromomethane	T54	10:1	1	µg/l	U	001-003
Chloroethane	T54	10:1	1	µg/l	U	001-003
Chloroform	T54	10:1	1	µg/l	U	001-003
Chloromethane	T54	10:1	1	µg/l	U	001-003
Cis-1,2-Dichloroethylene	T54	10:1	1	µg/l	U	001-003

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Cis-1,3-Dichloropropene	T54	10:1	1	µg/l	U	001-003
Dibromomethane	T54	10:1	1	µg/l	U	001-003
Dichlorodifluoromethane	T54	10:1	1	µg/l	U	001-003
Dichloromethane	T54	10:1	50	µg/l	N	001-003
EthylBenzene	T54	10:1	1	µg/l	U	001-003
Isopropyl benzene	T54	10:1	1	µg/l	U	001-003
M/P Xylene	T54	10:1	1	µg/l	U	001-003
n-Propylbenzene	T54	10:1	1	µg/l	U	001-003
O Xylene	T54	10:1	1	µg/l	U	001-003
p-Isopropyltoluene	T54	10:1	1	µg/l	U	001-003
S-Butylbenzene	T54	10:1	1	µg/l	U	001-003
Styrene	T54	10:1	1	µg/l	U	001-003
T-Butylbenzene	T54	10:1	1	µg/l	U	001-003
Tetrachloroethene	T54	10:1	1	µg/l	U	001-003
Toluene	T54	10:1	1	µg/l	U	001-003
Trans-1,2-Dichloroethene	T54	10:1	1	µg/l	U	001-003
Trans-1,3-Dichloropropene	T54	10:1	1	µg/l	U	001-003
Trichlorofluoromethane	T54	10:1	1	µg/l	U	001-003
Vinyl chloride	T54	10:1	1	µg/l	U	001-003
Cresols	T16	AR	0.01	mg/kg	U	001-003
Phenol	T149	AR	0.01	mg/kg	U	001-003
Xylenols	T16	AR	0.01	mg/kg	U	001-003
Naphthalene	T149	10:1	0.01	µg/l	U	001-003
Acenaphthylene	T149	10:1	0.01	µg/l	U	001-003
Acenaphthene	T149	10:1	0.01	µg/l	U	001-003
Fluorene	T149	10:1	0.01	µg/l	U	001-003
Phenanthrene	T149	10:1	0.01	µg/l	U	001-003
Anthracene	T149	10:1	0.01	µg/l	U	001-003
Fluoranthene	T149	10:1	0.01	µg/l	U	001-003
Pyrene	T149	10:1	0.01	µg/l	U	001-003
Benzo(a)Anthracene	T149	10:1	0.01	µg/l	U	001-003
Chrysene	T149	10:1	0.01	µg/l	U	001-003
Benzo(b)fluoranthene	T149	10:1	0.01	µg/l	U	001-003
Benzo(k)fluoranthene	T149	10:1	0.01	µg/l	U	001-003
Benzo(a)Pyrene	T149	10:1	0.01	µg/l	U	001-003
Indeno(123-cd)Pyrene	T149	10:1	0.01	µg/l	U	001-003
Dibenzo(ah)Anthracene	T149	10:1	0.01	µg/l	U	001-003
Benzo(ghi)Perylene	T149	10:1	0.01	µg/l	U	001-003
PAH(total)	T149	10:1	0.01	µg/l	U	001-003
Phenol	T149	10:1	0.5	µg/l	U	001-003
Antimony	T6	M40	1	mg/kg	U	001-003
Arsenic	T6	M40	2	mg/kg	M	001-003
Barium	T6	M40	1	mg/kg	U	001-003
Beryllium	T6	M40	2	mg/kg	M	001-003
Boron (water-soluble)	T6	AR	1	mg/kg	N	001-003
Cadmium	T6	M40	1	mg/kg	M	001-003
Cadmium	T65	M40	0.2	mg/kg	N	001-003
Chromium	T6	M40	1	mg/kg	M	001-003
Copper	T6	M40	1	mg/kg	M	001-003
Cyanide(Total)	T546	AR	1	mg/kg	M	001-003
Cyanide(free)	T546	AR	1	mg/kg	M	001-003
Iron	T6	M40	1	mg/kg	U	001-003
Lead	T6	M40	1	mg/kg	M	001-003
Mercury	T65	M40	0.1	mg/kg	N	001-003
Mercury	T6	M40	1	mg/kg	M	001-003
Molybdenum	T6	M40	1	mg/kg	M	001-003
Nickel	T6	M40	1	mg/kg	M	001-003
pH	T7	AR			M	001-003
Selenium	T6	M40	3	mg/kg	M	001-003
SO4(Total)	T6	M40	0.01	%	N	001-003
Sulphide	T546	AR	1	mg/kg	N	001-003
Sulphur (total)	T6	M40	0.01	%	N	001-003
Zinc	T6	M40	1	mg/kg	M	001-003
Ammoniacal nitrogen	T4	10:1	0.05	mg/l	U	001-003
Sb (Dissolved)	T281	10:1	1	µg/l	U	001-003
As (Dissolved)	T281	10:1	0.2	µg/l	U	001-003
Ba (Dissolved)	T281	10:1	1	µg/l	U	001-003
Be (Dissolved)	T281	10:1	0.05	µg/l	U	001-003
Boron	T6	10:1	0.01	mg/l	N	001-003
Cd (Dissolved)	T281	10:1	0.02	µg/l	U	001-003

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Chloride	T686	10:1	0.5	mg/l	N	001-003
Cr (Dissolved)	T281	10:1	1	µg/l	U	001-003
Cu (Dissolved)	T281	10:1	0.5	µg/l	U	001-003
Cyanide(Total)	T4	10:1	0.05	mg/l	U	001-003
Cyanide(free)	T4	10:1	0.05	mg/l	U	001-003
Iron	T6	10:1	0.01	mg/l	U	001-003
Pb (Dissolved)	T281	10:1	0.3	µg/l	U	001-003
Hg (Dissolved)	T281	10:1	0.05	µg/l	U	001-003
Mo (Dissolved)	T281	10:1	1	µg/l	N	001-003
Ni (Dissolved)	T281	10:1	1	µg/l	U	001-003
pH	T7	10:1			U	001-003
Se (Dissolved)	T281	10:1	0.5	µg/l	U	001-003
Sulphate	T686	10:1	0.1	mg/l	N	001-003
Sulphide	T4	10:1	0.05	mg/l	N	001-003
Sulphur(Free)	T2	10:1	10	mg/l	N	001-003
Zn (Dissolved)	T281	10:1	2	µg/l	U	001-003
Asbestos ID	T27	AR			SU	001-003
Total Organic Carbon	T21	AR	0.1	%	N	001-003
PCB BZ#28	T1	10:1	0.005	µg/l	U	001-003
PCB BZ#52	T1	10:1	0.005	µg/l	U	001-003
PCB BZ#101	T1	10:1	0.005	µg/l	U	001-003
PCB BZ#118	T16	10:1	0.005	µg/l	U	001-003
PCB BZ#153	T1	10:1	0.005	µg/l	U	001-003
PCB BZ#138	T1	10:1	0.005	µg/l	U	001-003
PCB BZ#180	T1	10:1	0.005	µg/l	U	001-003
PCB BZ#28	T1	M105	0.05	µg/kg	M	001-003
PCB BZ#52	T1	M105	0.05	µg/kg	M	001-003
PCB BZ#101	T1	M105	0.05	µg/kg	M	001-003
PCB BZ#118	T1	M105	0.05	µg/kg	M	001-003
PCB BZ#153	T1	M105	0.05	µg/kg	M	001-003
PCB BZ#138	T1	M105	0.05	µg/kg	M	001-003
PCB BZ#180	T1	M105	0.05	µg/kg	M	001-003
Dissolved Organic Carbon	T21	10:1	1	mg/l	N	001-003
Gasoline Range Organics	T215	10:1	10	µg/l	N	001-003
TPH (C10-C35)	T81	10:1	0.01	mg/l	U	001-003
TPH (C5-C6 aliphatic)	T209	M105	0.100	mg/kg	N	001-003
TPH (C6-C8 aliphatic)	T209	M105	0.10	mg/kg	N	001-003
TPH (C8-C10 aliphatic)	T209	M105	0.100	mg/kg	N	001-003
TPH (C10-C12 aliphatic)	T206	M105	1	mg/kg	M	001-003
TPH (C12-C16 aliphatic)	T206	M105	2	mg/kg	M	001-003
TPH (C16-C21 aliphatic)	T206	M105	1	mg/kg	M	001-003
TPH (C21-C35 aliphatic)	T206	M105	4	mg/kg	M	001-003
TPH (C6-C7 aromatic)	T209	M105	0.100	mg/kg	N	001-003
TPH (C7-C8 aromatic)	T209	M105	0.100	mg/kg	N	001-003
TPH (C8-C10 aromatic)	T209	M105	0.100	mg/kg	N	001-003
TPH (C10-C12 aromatic)	T206	M105	1	mg/kg	M	001-003
TPH (C12-C16 aromatic)	T206	M105	1	mg/kg	M	001-003
TPH (C16-C21 aromatic)	T206	M105	1	mg/kg	M	001-003
TPH (C21-C35 aromatic)	T206	M105	1	mg/kg	M	001-003
Naphthalene	T207	M105	0.1	mg/kg	M	001-003
Acenaphthylene	T207	M105	0.1	mg/kg	U	001-003
Acenaphthene	T207	M105	0.1	mg/kg	M	001-003
Fluorene	T207	M105	0.1	mg/kg	M	001-003
Phenanthrene	T207	M105	0.1	mg/kg	M	001-003
Anthracene	T207	M105	0.1	mg/kg	U	001-003
Fluoranthene	T207	M105	0.1	mg/kg	M	001-003
Pyrene	T207	M105	0.1	mg/kg	M	001-003
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	M	001-003
Chrysene	T207	M105	0.1	mg/kg	M	001-003
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	M	001-003
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	M	001-003
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	M	001-003
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	M	001-003
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	M	001-003
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	M	001-003
PAH(total)	T207	M105	0.1	mg/kg	U	001-003
Moisture	T277	AR	0.1	%	N	001-003
Moisture @ 105 C	T162	AR	0.1	%	N	001-003

Scientific Analysis Laboratories Ltd

Certificate of Analysis

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Report Number: 293916-1

Date of Report: 18-Sep-2012

Customer: Quantum Geotechnical
Ty Berwig
Heol y Bwlch
Bynea
Llanelli
Carmarthenshire
SA14 9ST

Customer Contact: Mr Arwel Jones

Customer Job Reference: G132
Customer Purchase Order: G132/53242
Customer Site Reference: Nant Llesg
Date Job Received at SAL: 23-Aug-2012
Date Analysis Started: 04-Sep-2012
Date Analysis Completed: 18-Sep-2012

The results reported relate to samples received in the laboratory
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with SAL SOPs

UKAS TESTING
1549

Report checked
and authorised by :
Caroline Haworth
Assistant Customer Service
Manager

Issued by :
Caroline Haworth
Assistant Customer Service
Manager

Waste Acceptance Criteria

Customer Sample Reference : TP01 0.5
SAL Sample Reference : 293916 001
SAL Reference : 293916
Project Site : Nant Llesg
Customer Reference : G132
Bottom Depth : 0.5
Date Sampled : 22-AUG-2012
Test Portion Mass (g) : 175
Type : Sandy Soil

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Acid Neutralising Capacity (pH 4)	Titration	2.0	Mol/kg	N	<2.0			
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS	0.1	mg/kg	N	<0.1			
Loss on Ignition	Grav	0.1	%	N	17			**10.0**
Moisture	Grav	0.1	%	N	18			
PAH (Sum)	Calc	1.6	mg/kg	N	1.9	100.0		
PCB EC7 (Sum)	Calc	0.00035	mg/kg	U	0.0055	1.0		
pH	Probe	0.0		M	7.4		>6.0	
Phenol	GC/MS(MCERTS)	0.1	mg/kg	M	<0.1			
Total Organic Carbon	OX/IR	0.1	%	N	4.6	**3.0**	5.0	6.0
TPH C10-C40 (sum)	Calc	1	mg/kg	N	210	500.0		

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.021	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.010	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.50	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.00074	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	5.0	mg/kg	N	27	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.76	**0.5**	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.025	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	120	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	4.8	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	<0.0030	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	0.0023	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.18	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.055	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.0076	0.1	0.5	7.0
Sulphate	Calc / Discrete Analyser	1.0	mg/kg	N	1200	**1000.0**	20000.0	50000.0
Total Dissolved Solids	Calc / Grav	1000	mg/kg	N	3200	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.084	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference :	TP01 3.00
SAL Sample Reference :	293916 002
SAL Reference :	293916
Project Site :	Nant Llesg
Customer Reference :	G132
Date Sampled :	22-AUG-2012
Bottom Depth :	3.00
Test Portion Mass (g) :	175
Type :	Sandy Soil

Soil Summary					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Acid Neutralising Capacity (pH 4)	Titration	2.0	Mol/kg	N	<2.0			
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS	0.1	mg/kg	N	<0.1			
Loss on Ignition	Grav	0.1	%	N	12			**10.0**
Moisture	Grav	0.1	%	N	18			
PAH (Sum)	Calc	1.6	mg/kg	N	5.2	100.0		
PCB EC7 (Sum)	Calc	0.00035	mg/kg	U	0.055	1.0		
pH	Probe	0.0		M	8.0		>6.0	
Phenol	GC/MS(MCERTS)	0.1	mg/kg	M	<0.1			
Total Organic Carbon	OX/IR	0.1	%	N	7.6	3.0	5.0	**6.0**
TPH C10-C40 (sum)	Calc	1	mg/kg	N	510	**500.0**		

10:1 Leachate					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.15	**0.06**	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.041	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.53	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.00070	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	5.0	mg/kg	N	12	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.17	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.056	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	71	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	5.7	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.0049	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	0.0065	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.15	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.029	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.012	0.1	0.5	7.0
Sulphate	Calc / Discrete Analyser	1.0	mg/kg	N	1900	**1000.0**	20000.0	50000.0
Total Dissolved Solids	Calc / Grav	1000	mg/kg	N	3000	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.084	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : TP02 1.00
SAL Sample Reference : 293916 003
SAL Reference : 293916
Project Site : Nant Llesg
Customer Reference : G132
Test Portion Mass (g) : 175
Bottom Depth : 1.00
Date Sampled : 22-AUG-2012
Type : Clay

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Acid Neutralising Capacity (pH 4)	Titration	2.0	Mol/kg	N	<2.0			
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS	0.1	mg/kg	N	<0.1			
Loss on Ignition	Grav	0.1	%	N	11			**10.0**
Moisture	Grav	0.1	%	N	21			
PAH (Sum)	Calc	1.6	mg/kg	N	6.5	100.0		
PCB EC7 (Sum)	Calc	0.00035	mg/kg	U	0.018	1.0		
pH	Probe	0.0		M	8.0		>6.0	
Phenol	GC/MS(MCERTS)	0.1	mg/kg	M	<0.1			
Total Organic Carbon	OX/IR	0.1	%	N	6.8	3.0	5.0	**6.0**
TPH C10-C40 (sum)	Calc	1	mg/kg	N	75	500.0		

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.057	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.037	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.44	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.0011	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	5.0	mg/kg	N	10	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.057	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.035	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	80	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	10	**10.0**	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	<0.0030	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	0.0013	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.34	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.012	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.023	0.1	0.5	7.0
Sulphate	Calc / Discrete Analyser	1.0	mg/kg	N	320	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc / Grav	1000	mg/kg	N	1500	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.050	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : TP03 0.50
SAL Sample Reference : 293916 004
SAL Reference : 293916
Project Site : Nant Llesg
Customer Reference : G132
Bottom Depth : 0.50
Date Sampled : 22-AUG-2012
Test Portion Mass (g) : 175
Type : Sandy Soil

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Acid Neutralising Capacity (pH 4)	Titration	2.0	Mol/kg	N	<2.0			
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
BTEX (Sum)	Calc	0.040	mg/kg	U	0.23	6.0		
Coronene	GC/MS	0.1	mg/kg	N	0.7			
Loss on Ignition	Grav	0.1	%	N	13			**10.0**
Moisture	Grav	0.1	%	N	11			
PAH (Sum)	Calc	1.6	mg/kg	N	42	100.0		
PCB EC7 (Sum)	Calc	0.00035	mg/kg	U	0.055	1.0		
pH	Probe	0.0		M	8.2		>6.0	
Phenol	GC/MS(MCERTS)	0.1	mg/kg	M	0.3			
Total Organic Carbon	OX/IR	0.1	%	N	8.1	3.0	5.0	**6.0**
TPH C10-C40 (sum)	Calc	1	mg/kg	N	280	500.0		

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.33	**0.06**	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.024	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.77	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.0012	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	5.0	mg/kg	N	15	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.020	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.085	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	120	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	7.5	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.0064	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	0.0019	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.34	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.055	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.011	0.1	0.5	7.0
Sulphate	Calc / Discrete Analyser	1.0	mg/kg	N	2600	**1000.0**	20000.0	50000.0
Total Dissolved Solids	Calc / Grav	1000	mg/kg	N	3600	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.070	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : TP04 1.00
SAL Sample Reference : 293916 005
SAL Reference : 293916
Project Site : Nant Llesg
Customer Reference : G132
Test Portion Mass (g) : 175
Date Sampled : 22-AUG-2012
Bottom Depth : 1.00
Type : Sandy Soil

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Acid Neutralising Capacity (pH 4)	Titration	2.0	Mol/kg	N	<2.0			
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS	0.1	mg/kg	N	0.2			
Loss on Ignition	Grav	0.1	%	N	13			**10.0**
Moisture	Grav	0.1	%	N	2.9			
PAH (Sum)	Calc	1.6	mg/kg	N	6.6	100.0		
PCB EC7 (Sum)	Calc	0.00035	mg/kg	U	0.0054	1.0		
pH	Probe	0.0		M	8.5		>6.0	
Phenol	GC/MS(MCERTS)	0.1	mg/kg	M	0.4			
Total Organic Carbon	OX/IR	0.1	%	N	10	3.0	5.0	**6.0**
TPH C10-C40 (sum)	Calc	1	mg/kg	N	110	500.0		

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.10	**0.06**	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.096	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.24	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.00082	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	5.0	mg/kg	N	29	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.12	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	170	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	3.7	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.016	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	0.00057	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.10	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.058	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.024	0.1	0.5	7.0
Sulphate	Calc / Discrete Analyser	1.0	mg/kg	N	430	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc / Grav	1000	mg/kg	N	1500	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.057	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : TP04 3.00
SAL Sample Reference : 293916 006
SAL Reference : 293916
Project Site : Nant Llesg
Customer Reference : G132
Test Portion Mass (g) : 175
Date Sampled : 22-AUG-2012
Bottom Depth : 3.00
Type : Sandy Soil

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Acid Neutralising Capacity (pH 4)	Titration	2.0	Mol/kg	N	<2.0			
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS	0.1	mg/kg	N	0.2			
Loss on Ignition	Grav	0.1	%	N	12			**10.0**
Moisture	Grav	0.1	%	N	17			
PAH (Sum)	Calc	1.6	mg/kg	N	9.7	100.0		
PCB EC7 (Sum)	Calc	0.00035	mg/kg	U	0.10	1.0		
pH	Probe	0.0		M	8.8		>6.0	
Phenol	GC/MS(MCERTS)	0.1	mg/kg	M	0.1			
Total Organic Carbon	OX/IR	0.1	%	N	6.2	3.0	5.0	**6.0**
TPH C10-C40 (sum)	Calc	1	mg/kg	N	700	**500.0**		

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.29	**0.06**	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.098	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.41	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.0020	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	5.0	mg/kg	N	89	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.057	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.12	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	140	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	15	**10.0**	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.0072	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	0.0045	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.43	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.050	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.032	0.1	0.5	7.0
Sulphate	Calc / Discrete Analyser	1.0	mg/kg	N	2500	**1000.0**	20000.0	50000.0
Total Dissolved Solids	Calc / Grav	1000	mg/kg	N	4700	**4000.0**	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.070	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : TP05 2.00
SAL Sample Reference : 293916 007
SAL Reference : 293916
Project Site : Nant Llesg
Customer Reference : G132
Test Portion Mass (g) : 175
Date Sampled : 22-AUG-2012
Bottom Depth : 2.00
Type : Sandy Soil - Asbestos Detected

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Acid Neutralising Capacity (pH 4)	Titration	2.0	Mol/kg	N	<2.0			
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS	0.1	mg/kg	N	0.3			
Loss on Ignition	Grav	0.1	%	N	13			**10.0**
Moisture	Grav	0.1	%	N	5.0			
PAH (Sum)	Calc	1.6	mg/kg	N	11	100.0		
PCB EC7 (Sum)	Calc	0.00035	mg/kg	U	0.12	1.0		
pH	Probe	0.0		U	8.2		>6.0	
Phenol	GC/MS(MCERTS)	0.1	mg/kg	U	0.3			
Total Organic Carbon	OX/IR	0.1	%	N	5.7	3.0	**5.0**	6.0
TPH C10-C40 (sum)	Calc	1	mg/kg	N	1600	**500.0**		

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.31	**0.06**	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.076	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.45	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.0015	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	5.0	mg/kg	N	48	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.020	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.17	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	240	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	5.2	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.012	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	0.0035	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.42	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.090	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.022	0.1	0.5	7.0
Sulphate	Calc / Discrete Analyser	1.0	mg/kg	N	1200	**1000.0**	20000.0	50000.0
Total Dissolved Solids	Calc / Grav	1000	mg/kg	N	2500	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.10	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Note:- Sample failed to produce sufficient eluate within the specified time after vacuum filtration for 1 hour and centrifugation for 30 minutes. Therefore, the exact application of the two-step leaching test is precluded on technical grounds. (ref: Section 5.2.4 BS EN 12457-3:2002) Results are derived from a single step leaching at L/S 10/1 as prescribed by the EA guidance. (Ref Section C4.1.1 Guidance on Sampling and Testing of Wastes to meet Landfill Waste Acceptance Procedures Version 1 April 2005, Environment Agency)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : TP07 0.50
SAL Sample Reference : 293916 008
SAL Reference : 293916
Project Site : Nant Llesg
Customer Reference : G132
Date Sampled : 22-AUG-2012
Test Portion Mass (g) : 175
Bottom Depth : 0.50
Type : Sandy Soil

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Acid Neutralising Capacity (pH 4)	Titration	2.0	Mol/kg	N	<2.0			
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS	0.1	mg/kg	N	0.2			
Loss on Ignition	Grav	0.1	%	N	14			**10.0**
Moisture	Grav	0.1	%	N	11			
PAH (Sum)	Calc	1.6	mg/kg	N	6.5	100.0		
PCB EC7 (Sum)	Calc	0.00035	mg/kg	U	0.012	1.0		
pH	Probe	0.0		M	7.4		>6.0	
Phenol	GC/MS(MCERTS)	0.1	mg/kg	M	<0.1			
Total Organic Carbon	OX/IR	0.1	%	N	8.5	3.0	5.0	**6.0**
TPH C10-C40 (sum)	Calc	1	mg/kg	N	650	**500.0**		

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.014	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.014	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.45	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.00087	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	5.0	mg/kg	N	23	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.029	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.051	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	160	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	1.1	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	<0.0030	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	0.013	**0.01**	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.055	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.062	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.011	0.1	0.5	7.0
Sulphate	Calc / Discrete Analyser	1.0	mg/kg	N	3200	**1000.0**	20000.0	50000.0
Total Dissolved Solids	Calc / Grav	1000	mg/kg	N	5000	**4000.0**	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.066	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : TP07 1.00
SAL Sample Reference : 293916 009
SAL Reference : 293916
Project Site : Nant Llesg
Customer Reference : G132
Date Sampled : 22-AUG-2012
Bottom Depth : 1.00
Test Portion Mass (g) : 175
Type : Sandy Soil

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Acid Neutralising Capacity (pH 4)	Titration	2.0	Mol/kg	N	<2.0			
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS	0.1	mg/kg	N	<0.1			
Loss on Ignition	Grav	0.1	%	N	21			**10.0**
Moisture	Grav	0.1	%	N	35			
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
PCB EC7 (Sum)	Calc	0.00035	mg/kg	U	0.0018	1.0		
pH	Probe	0.0		M	7.3		>6.0	
Phenol	GC/MS(MCERTS)	0.1	mg/kg	M	<0.1			
Total Organic Carbon	OX/IR	0.1	%	N	8.4	3.0	5.0	**6.0**
TPH C10-C40 (sum)	Calc	1	mg/kg	N	260	500.0		

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.021	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.52	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.00052	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	5.0	mg/kg	N	20	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.030	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	190	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	<0.50	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.0032	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.030	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.065	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.014	0.1	0.5	7.0
Sulphate	Calc / Discrete Analyser	1.0	mg/kg	N	3800	**1000.0**	20000.0	50000.0
Total Dissolved Solids	Calc / Grav	1000	mg/kg	N	5800	**4000.0**	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.076	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : TP08 0.50
SAL Sample Reference : 293916 010
SAL Reference : 293916
Project Site : Nant Llesg
Customer Reference : G132
Test Portion Mass (g) : 175
Bottom Depth : 0.50
Date Sampled : 22-AUG-2012
Type : Clay

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Acid Neutralising Capacity (pH 4)	Titration	2.0	Mol/kg	N	<2.0			
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS	0.1	mg/kg	N	0.2			
Loss on Ignition	Grav	0.1	%	N	13			**10.0**
Moisture	Grav	0.1	%	N	19			
PAH (Sum)	Calc	1.6	mg/kg	N	5.0	100.0		
PCB EC7 (Sum)	Calc	0.00035	mg/kg	U	0.0040	1.0		
pH	Probe	0.0		M	7.8		>6.0	
Phenol	GC/MS(MCERTS)	0.1	mg/kg	M	<0.1			
Total Organic Carbon	OX/IR	0.1	%	N	7.8	3.0	5.0	**6.0**
TPH C10-C40 (sum)	Calc	1	mg/kg	N	16	500.0		

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.063	**0.06**	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.022	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.36	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.00055	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	5.0	mg/kg	N	16	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.022	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.040	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	79	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	5.8	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.0066	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.074	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.017	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.0066	0.1	0.5	7.0
Sulphate	Calc / Discrete Analyser	1.0	mg/kg	N	520	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc / Grav	1000	mg/kg	N	1500	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.065	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : TP08 2.00
SAL Sample Reference : 293916 011
SAL Reference : 293916
Project Site : Nant Llesg
Customer Reference : G132
Test Portion Mass (g) : 175
Date Sampled : 22-AUG-2012
Bottom Depth : 2.00
Type : Clay

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Acid Neutralising Capacity (pH 4)	Titration	2.0	Mol/kg	N	<2.0			
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS	0.1	mg/kg	N	0.1			
Loss on Ignition	Grav	0.1	%	N	11			**10.0**
Moisture	Grav	0.1	%	N	23			
PAH (Sum)	Calc	1.6	mg/kg	N	9.3	100.0		
PCB EC7 (Sum)	Calc	0.00035	mg/kg	U	(9) <0.0035	1.0		
pH	Probe	0.0		M	7.5		>6.0	
Phenol	GC/MS(MCERTS)	0.1	mg/kg	M	<0.1			
Total Organic Carbon	OX/IR	0.1	%	N	8.3	3.0	5.0	**6.0**
TPH C10-C40 (sum)	Calc	1	mg/kg	N	3	500.0		

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.063	**0.06**	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.021	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.44	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.00075	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	5.0	mg/kg	N	16	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.022	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.037	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	98	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	4.5	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.0040	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.13	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.023	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.011	0.1	0.5	7.0
Sulphate	Calc / Discrete Analyser	1.0	mg/kg	N	1100	**1000.0**	20000.0	50000.0
Total Dissolved Solids	Calc / Grav	1000	mg/kg	N	2200	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.088	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : TP09 0.10
SAL Sample Reference : 293916 012
SAL Reference : 293916
Project Site : Nant Llesg
Customer Reference : G132
Bottom Depth : 0.10
Test Portion Mass (g) : 175
Date Sampled : 22-AUG-2012
Type : Topsoil

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Acid Neutralising Capacity (pH 4)	Titration	2.0	Mol/kg	N	<2.0			
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS	0.1	mg/kg	N	0.5			
Loss on Ignition	Grav	0.1	%	N	14			**10.0**
Moisture	Grav	0.1	%	N	41			
PAH (Sum)	Calc	1.6	mg/kg	N	27	100.0		
PCB EC7 (Sum)	Calc	0.00035	mg/kg	U	0.00087	1.0		
pH	Probe	0.0		M	7.6		>6.0	
Phenol	GC/MS(MCERTS)	0.1	mg/kg	M	<0.1			
Total Organic Carbon	OX/IR	0.1	%	N	7.3	3.0	5.0	**6.0**
TPH C10-C40 (sum)	Calc	1	mg/kg	N	88	500.0		

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.020	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.030	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.30	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.00080	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	5.0	mg/kg	N	23	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.013	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.076	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	360	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	1.5	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.0041	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.020	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.023	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.011	0.1	0.5	7.0
Sulphate	Calc / Discrete Analyser	1.0	mg/kg	N	<1.0	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc / Grav	1000	mg/kg	N	1700	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.079	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Note:- Sample failed to produce sufficient eluate within the specified time after vacuum filtration for 1 hour and centrifugation for 30 minutes. Therefore, the exact application of the two-step leaching test is precluded on technical grounds. (ref: Section 5.2.4 BS EN 12457-3:2002) Results are derived from a single step leaching at L/S 10/1 as prescribed by the EA guidance. (Ref Section C4.1.1 Guidance on Sampling and Testing of Wastes to meet Landfill Waste Acceptance Procedures Version 1 April 2005, Environment Agency)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : TP10 0.50
SAL Sample Reference : 293916 013
SAL Reference : 293916
Project Site : Nant Llesg
Customer Reference : G132
Date Sampled : 22-AUG-2012
Test Portion Mass (g) : 175
Bottom Depth : 0.50
Type : Sandy Soil

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Acid Neutralising Capacity (pH 4)	Titration	2.0	Mol/kg	N	<2.0			
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS	0.1	mg/kg	N	5.6			
Loss on Ignition	Grav	0.1	%	N	11			**10.0**
Moisture	Grav	0.1	%	N	2.1			
PAH (Sum)	Calc	1.6	mg/kg	N	190	**100.0**		
PCB EC7 (Sum)	Calc	0.00035	mg/kg	U	(9) <0.0035	1.0		
pH	Probe	0.0		M	7.2		>6.0	
Phenol	GC/MS(MCERTS)	0.1	mg/kg	M	<0.1			
Total Organic Carbon	OX/IR	0.1	%	N	7.6	3.0	5.0	**6.0**
TPH C10-C40 (sum)	Calc	1	mg/kg	N	710	**500.0**		

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.016	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.68	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.00056	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	5.0	mg/kg	N	160	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.0096	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	72	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	2.5	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	<0.0030	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.11	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.14	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.0092	0.1	0.5	7.0
Sulphate	Calc / Discrete Analyser	1.0	mg/kg	N	9900	**1000.0**	20000.0	50000.0
Total Dissolved Solids	Calc / Grav	1000	mg/kg	N	11000	**4000.0**	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.095	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

Waste Acceptance Criteria

Customer Sample Reference : TP12 0.50
SAL Sample Reference : 293916 014
SAL Reference : 293916
Project Site : Nant Llesg
Customer Reference : G132
Test Portion Mass (g) : 175
Date Sampled : 22-AUG-2012
Bottom Depth : 0.50
Type : Topsoil

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Acid Neutralising Capacity (pH 4)	Titration	2.0	Mol/kg	N	<2.0			
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS	0.1	mg/kg	N	0.2			
Loss on Ignition	Grav	0.1	%	N	7.7			10.0
Moisture	Grav	0.1	%	N	15			
PAH (Sum)	Calc	1.6	mg/kg	N	5.0	100.0		
PCB EC7 (Sum)	Calc	0.00035	mg/kg	U	<0.00035	1.0		
pH	Probe	0.0		M	7.6		>6.0	
Phenol	GC/MS(MCERTS)	0.1	mg/kg	M	<0.1			
Total Organic Carbon	OX/IR	0.1	%	N	5.1	3.0	**5.0**	6.0
TPH C10-C40 (sum)	Calc	1	mg/kg	N	36	500.0		

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.0070	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.32	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00020	mg/kg	N	0.00030	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	5.0	mg/kg	N	10	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.014	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.030	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	270	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	1.5	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.0031	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.010	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry	1.0	mg/kg	N	<1.0	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
Sulphate	Calc / Discrete Analyser	1.0	mg/kg	N	47	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc / Grav	1000	mg/kg	N	<1000	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.054	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Note:- Sample failed to produce sufficient eluate within the specified time after vacuum filtration for 1 hour and centrifugation for 30 minutes. Therefore, the exact application of the two-step leaching test is precluded on technical grounds. (ref: Section 5.2.4 BS EN 12457-3:2002) Results are derived from a single step leaching at L/S 10/1 as prescribed by the EA guidance. (Ref Section C4.1.1 Guidance on Sampling and Testing of Wastes to meet Landfill Waste Acceptance Procedures Version 1 April 2005, Environment Agency)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

SAL Reference: 293916
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
MCERTS Preparation

				SAL Reference	293916 001	293916 002	293916 003	293916 004	293916 005	293916 006	293916 007
				Customer Sample Reference	TP01 0.5	TP01 3.00	TP02 1.00	TP03 0.50	TP04 1.00	TP04 3.00	TP05 2.00
				Test Sample	AR	AR	AR	AR	AR	AR	AR
				Bottom Depth	0.5	3.00	1.00	0.50	1.00	3.00	2.00
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Type	Sandy Soil	Sandy Soil	Clay	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil - Asbestos Detected
Determinand	**Method**	**LOD**	**Units**	**Symbol**							
Moisture	Grav (1 Dec) (40 C)	0.1	%	N	**28**	**13**	**18**	**18**	**9.3**	**21**	**9.7**
Moisture @ 105 C	Grav (1 Dec) (105 C)	0.1	%	N	**18**	**18**	**21**	**11**	**2.9**	**17**	**5.0**

SAL Reference: 293916
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
MCERTS Preparation

				SAL Reference	293916 008	293916 009	293916 010	293916 011	293916 012	293916 013	293916 014
				Customer Sample Reference	TP07 0.50	TP07 1.00	TP08 0.50	TP08 2.00	TP09 0.10	TP10 0.50	TP12 0.50
				Test Sample	AR	AR	AR	AR	AR	AR	AR
				Bottom Depth	0.50	1.00	0.50	2.00	0.10	0.50	0.50
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Type	Sandy Soil	Sandy Soil	Clay	Clay	Topsoil	Sandy Soil	Topsoil
Determinand	**Method**	**LOD**	**Units**	**Symbol**							
Moisture	Grav (1 Dec) (40 C)	0.1	%	N	**15**	**55**	**22**	**13**	**19**	**12**	**11**
Moisture @ 105 C	Grav (1 Dec) (105 C)	0.1	%	N	**11**	**35**	**19**	**23**	**41**	**2.1**	**15**

SAL Reference: 293916
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
BTEX

				SAL Reference	293916 001	293916 002	293916 003	293916 004	293916 005	293916 006	293916 007
				Customer Sample Reference	TP01 0.5	TP01 3.00	TP02 1.00	TP03 0.50	TP04 1.00	TP04 3.00	TP05 2.00
				Test Sample	M105	M105	M105	M105	M105	M105	M105
				Bottom Depth	0.5	3.00	1.00	0.50	1.00	3.00	2.00
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Type	Sandy Soil	Sandy Soil	Clay	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil - Asbestos Detected
Determinand	**Method**	**LOD**	**Units**	**Symbol**							
Benzene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10	<10	-
Benzene	GC/MS(Head Space)(MCERTS)	10	µg/kg	U	-	-	-	-	-	-	<10
Toluene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10	<10	-
Toluene	GC/MS(Head Space)(MCERTS)	10	µg/kg	U	-	-	-	-	-	-	<10
EthylBenzene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	**39**	<10	<10	-
EthylBenzene	GC/MS(Head Space)(MCERTS)	10	µg/kg	U	-	-	-	-	-	-	<10
Meta/Para-Xylene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	**150**	<10	<10	-
Meta/Para-Xylene	GC/MS(Head Space)(MCERTS)	10	µg/kg	U	-	-	-	-	-	-	<10
Ortho-Xylene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	**39**	<10	<10	-
Ortho-Xylene	GC/MS(Head Space)(MCERTS)	10	µg/kg	U	-	-	-	-	-	-	<10

SAL Reference: 293916
Project Site: Nant Llesg
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Soil Analysed as Soil
BTEX

				SAL Reference	293916 008	293916 009	293916 010	293916 011	293916 012	293916 013	293916 014
				Customer Sample Reference	TP07 0.50	TP07 1.00	TP08 0.50	TP08 2.00	TP09 0.10	TP10 0.50	TP12 0.50
				Test Sample	M105	M105	M105	M105	M105	M105	M105
				Bottom Depth	0.50	1.00	0.50	2.00	0.10	0.50	0.50
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Type	Sandy Soil	Sandy Soil	Clay	Clay	Topsoil	Sandy Soil	Topsoil
Determinand	**Method**	**LOD**	**Units**	**Symbol**							
Benzene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10	<10	<10
Benzene	GC/MS(Head Space)(MCERTS)	10	µg/kg	U	-	-	-	-	-	-	-
Toluene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10	<10	<10
Toluene	GC/MS(Head Space)(MCERTS)	10	µg/kg	U	-	-	-	-	-	-	-
EthylBenzene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10	<10	<10
EthylBenzene	GC/MS(Head Space)(MCERTS)	10	µg/kg	U	-	-	-	-	-	-	-
Meta/Para-Xylene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10	<10	<10
Meta/Para-Xylene	GC/MS(Head Space)(MCERTS)	10	µg/kg	U	-	-	-	-	-	-	-
Ortho-Xylene	GC/MS(Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10	<10	<10
Ortho-Xylene	GC/MS(Head Space)(MCERTS)	10	µg/kg	U	-	-	-	-	-	-	-

SAL Reference: 293916
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
TPH

				SAL Reference	293916 001	293916 002	293916 003	293916 004	293916 005	293916 006	293916 007
				Customer Sample Reference	TP01 0.5	TP01 3.00	TP02 1.00	TP03 0.50	TP04 1.00	TP04 3.00	TP05 2.00
				Test Sample	M105	M105	M105	M105	M105	M105	M105
				Bottom Depth	0.5	3.00	1.00	0.50	1.00	3.00	2.00
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Type	Sandy Soil	Sandy Soil	Clay	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil - Asbestos Detected
Determinand	**Method**	**LOD**	**Units**	**Symbol**							
Total Petroleum Hydrocarbons	GC/FID	1	mg/kg	M	**160**	**350**	**58**	**240**	**90**	**580**	-
Total Petroleum Hydrocarbons	GC/FID	1.0	mg/kg	U	-	-	-	-	-	-	**1200**
Total Petroleum Hydrocarbons (C35-C40)	GC/FID	1	mg/kg	N	**54**	**160**	**17**	**41**	**20**	**120**	**380**

SAL Reference: 293916
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
TPH

				SAL Reference	293916 008	293916 009	293916 010	293916 011	293916 012	293916 013	293916 014
				Customer Sample Reference	TP07 0.50	TP07 1.00	TP08 0.50	TP08 2.00	TP09 0.10	TP10 0.50	TP12 0.50
				Test Sample	M105	M105	M105	M105	M105	M105	M105
				Bottom Depth	0.50	1.00	0.50	2.00	0.10	0.50	0.50
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Type	Sandy Soil	Sandy Soil	Clay	Clay	Topsoil	Sandy Soil	Topsoil
Determinand	**Method**	**LOD**	**Units**	**Symbol**							
Total Petroleum Hydrocarbons	GC/FID	1	mg/kg	M	**420**	**200**	**11**	**3**	**68**	**520**	**29**
Total Petroleum Hydrocarbons	GC/FID	1.0	mg/kg	U	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C35-C40)	GC/FID	1	mg/kg	N	**230**	**56**	**5**	<1	**20**	**190**	**7**

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Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
Total and Speciated USEPA16 PAH

				SAL Reference	293916 001	293916 002	293916 003	293916 004	293916 005	293916 006	293916 007
				Customer Sample Reference	TP01 0.5	TP01 3.00	TP02 1.00	TP03 0.50	TP04 1.00	TP04 3.00	TP05 2.00
				Test Sample	M105	M105	M105	M105	M105	M105	M105
				Bottom Depth	0.5	3.00	1.00	0.50	1.00	3.00	2.00
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Type	Sandy Soil	Sandy Soil	Clay	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil - Asbestos Detected
Determinand	**Method**	**LOD**	**Units**	**Symbol**							
Naphthalene	GC/MS(MCERTS)	0.1	mg/kg	M	<0.1	**0.2**	**0.3**	**0.4**	**0.2**	**0.6**	-
Naphthalene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	**0.3**
Acenaphthylene	GC/MS(MCERTS)	0.1	mg/kg	U	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	GC/MS(MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	**0.7**	<0.1	<0.1	-
Acenaphthene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	**0.2**
Fluorene	GC/MS(MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	**0.8**	**0.1**	**0.1**	-
Fluorene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	**0.2**
Phenanthrene	GC/MS(MCERTS)	0.1	mg/kg	M	**0.2**	**0.7**	**1.0**	**4.6**	**0.8**	**1.0**	-
Phenanthrene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	**1.5**
Anthracene	GC/MS(MCERTS)	0.1	mg/kg	U	<0.1	**0.1**	**0.2**	**1.4**	**0.2**	**0.3**	**0.3**
Fluoranthene	GC/MS(MCERTS)	0.1	mg/kg	M	**0.5**	**1.2**	**1.6**	**6.8**	**1.1**	**2.0**	-
Fluoranthene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	**2.3**
Pyrene	GC/MS(MCERTS)	0.1	mg/kg	M	**0.4**	**0.9**	**1.2**	**5.1**	**0.9**	**1.9**	-
Pyrene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	**1.7**
Benzo(a)Anthracene	GC/MS(MCERTS)	0.1	mg/kg	M	**0.1**	**0.2**	**0.3**	**3.0**	**0.4**	**0.4**	-
Benzo(a)Anthracene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	**0.5**
Chrysene	GC/MS(MCERTS)	0.1	mg/kg	M	**0.2**	**0.4**	**0.4**	**3.6**	**0.4**	**0.6**	-
Chrysene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	**0.4**
Benzo(b/k)Fluoranthene	GC/MS(MCERTS)	0.1	mg/kg	M	**0.4**	**1.0**	**0.9**	**8.0**	**1.1**	**1.4**	-
Benzo(b/k)Fluoranthene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	**1.8**
Benzo(a)Pyrene	GC/MS(MCERTS)	0.1	mg/kg	M	**0.1**	**0.4**	**0.3**	**2.9**	**0.4**	**0.5**	-
Benzo(a)Pyrene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	**0.6**
Indeno(123-cd)Pyrene	GC/MS(MCERTS)	0.1	mg/kg	M	<0.1	**0.1**	**0.1**	**1.4**	**0.2**	**0.2**	-
Indeno(123-cd)Pyrene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	**0.3**
Dibenzo(ah)Anthracene	GC/MS(MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	**0.9**	<0.1	**0.1**	-
Dibenzo(ah)Anthracene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	**0.1**
Benzo(ghi)Perylene	GC/MS(MCERTS)	0.1	mg/kg	M	<0.1	<0.1	**0.2**	**1.4**	**0.2**	**0.3**	-
Benzo(ghi)Perylene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	**0.4**
Polyaromatic Hydrocarbons (Total)	GC/MS(MCERTS)	0.1	mg/kg	U	**1.9**	**5.2**	**6.5**	**41**	**6.4**	**9.5**	**11**

SAL Reference: 293916
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
Total and Speciated USEPA16 PAH

				SAL Reference	**293916 008**	**293916 009**	**293916 010**	**293916 011**	**293916 012**	**293916 013**	**293916 014**
				Customer Sample Reference	**TP07 0.50**	**TP07 1.00**	**TP08 0.50**	**TP08 2.00**	**TP09 0.10**	**TP10 0.50**	**TP12 0.50**
				Test Sample	**M105**	**M105**	**M105**	**M105**	**M105**	**M105**	**M105**
				Bottom Depth	**0.50**	**1.00**	**0.50**	**2.00**	**0.10**	**0.50**	**0.50**
				Date Sampled	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**
				Type	**Sandy Soil**	**Sandy Soil**	**Clay**	**Clay**	**Topsoil**	**Sandy Soil**	**Topsoil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**							
Naphthalene	GC/MS(MCERTS)	0.1	mg/kg	M	**0.1**	<0.1	**0.2**	**0.3**	**0.6**	**0.5**	<0.1
Naphthalene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	-
Acenaphthylene	GC/MS(MCERTS)	0.1	mg/kg	U	<0.1	<0.1	<0.1	<0.1	<0.1	**0.1**	<0.1
Acenaphthene	GC/MS(MCERTS)	0.1	mg/kg	M	**0.1**	<0.1	<0.1	**0.4**	**0.2**	**1.6**	<0.1
Acenaphthene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	-
Fluorene	GC/MS(MCERTS)	0.1	mg/kg	M	**0.1**	<0.1	<0.1	**0.3**	**0.2**	**1.7**	<0.1
Fluorene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	-
Phenanthrene	GC/MS(MCERTS)	0.1	mg/kg	M	**0.7**	**0.2**	**0.6**	**2.0**	**2.6**	**9.7**	**0.4**
Phenanthrene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	-
Anthracene	GC/MS(MCERTS)	0.1	mg/kg	U	**0.2**	<0.1	**0.1**	**0.6**	**1.1**	**5.0**	**0.1**
Fluoranthene	GC/MS(MCERTS)	0.1	mg/kg	M	**1.3**	**0.3**	**0.9**	**1.7**	**5.3**	**27**	**1.0**
Fluoranthene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	-
Pyrene	GC/MS(MCERTS)	0.1	mg/kg	M	**0.9**	**0.2**	**0.7**	**1.2**	**4.0**	**21**	**0.7**
Pyrene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	-
Benzo(a)Anthracene	GC/MS(MCERTS)	0.1	mg/kg	M	**0.3**	**0.1**	**0.3**	**0.3**	**1.8**	**18**	**0.3**
Benzo(a)Anthracene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	-
Chrysene	GC/MS(MCERTS)	0.1	mg/kg	M	**0.5**	**0.2**	**0.3**	**0.4**	**1.9**	**20**	**0.4**
Chrysene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	-
Benzo(b/k)Fluoranthene	GC/MS(MCERTS)	0.1	mg/kg	M	**1.3**	**0.4**	**0.9**	**1.1**	**4.7**	**44**	**1.1**
Benzo(b/k)Fluoranthene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	-
Benzo(a)Pyrene	GC/MS(MCERTS)	0.1	mg/kg	M	**0.4**	**0.1**	**0.3**	**0.4**	**1.7**	**15**	**0.4**
Benzo(a)Pyrene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	-
Indeno(123-cd)Pyrene	GC/MS(MCERTS)	0.1	mg/kg	M	**0.2**	<0.1	**0.2**	**0.2**	**0.8**	**7.6**	**0.2**
Indeno(123-cd)Pyrene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	-
Dibenzo(ah)Anthracene	GC/MS(MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	<0.1	**0.4**	**4.0**	<0.1
Dibenzo(ah)Anthracene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	-
Benzo(ghi)Perylene	GC/MS(MCERTS)	0.1	mg/kg	M	**0.2**	<0.1	**0.3**	**0.3**	**1.0**	**8.2**	**0.2**
Benzo(ghi)Perylene	GC/MS(MCERTS)	0.1	mg/kg	U	-	-	-	-	-	-	-
Polyaromatic Hydrocarbons (Total)	GC/MS(MCERTS)	0.1	mg/kg	U	**6.3**	**1.5**	**4.8**	**9.2**	**26**	**180**	**4.8**

SAL Reference: 293916
Project Site: Nant Llesg
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Soil Analysed as Soil
PCB EC7

				SAL Reference	293916 001	293916 002	293916 003	293916 004	293916 005	293916 006	293916 007
				Customer Sample Reference	TP01 0.5	TP01 3.00	TP02 1.00	TP03 0.50	TP04 1.00	TP04 3.00	TP05 2.00
				Test Sample	M105	M105	M105	M105	M105	M105	M105
				Bottom Depth	0.5	3.00	1.00	0.50	1.00	3.00	2.00
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Type	Sandy Soil	Sandy Soil	Clay	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil - Asbestos Detected
Determinand	**Method**	**LOD**	**Units**	**Symbol**							
Polychlorinated biphenyl BZ#28	GC/MS (HR)	0.05	µg/kg	M	**0.73**	**3.0**	**2.3**	**10**	**1.3**	**12**	-
Polychlorinated biphenyl BZ#28	GC/MS (HR)	0.05	µg/kg	U	-	-	-	-	-	-	**11**
Polychlorinated biphenyl BZ#52	GC/MS (HR)	0.05	µg/kg	M	**0.87**	**7.2**	**3.7**	**11**	**1.1**	**19**	-
Polychlorinated biphenyl BZ#52	GC/MS (HR)	0.05	µg/kg	U	-	-	-	-	-	-	**15**
Polychlorinated biphenyl BZ#101	GC/MS (HR)	0.05	µg/kg	M	**0.85**	**7.8**	**3.3**	**8.5**	**0.91**	**23**	-
Polychlorinated biphenyl BZ#101	GC/MS (HR)	0.05	µg/kg	U	-	-	-	-	-	-	**17**
Polychlorinated biphenyl BZ#118	GC/MS (HR)	0.05	µg/kg	M	**0.55**	**5.4**	**1.8**	**5.1**	**0.63**	**14**	-
Polychlorinated biphenyl BZ#118	GC/MS (HR)	0.05	µg/kg	U	-	-	-	-	-	-	**20**
Polychlorinated biphenyl BZ#153	GC/MS (HR)	0.05	µg/kg	M	**1.0**	**9.4**	**2.5**	**7.3**	**0.55**	**13**	-
Polychlorinated biphenyl BZ#153	GC/MS (HR)	0.05	µg/kg	U	-	-	-	-	-	-	**19**
Polychlorinated biphenyl BZ#138	GC/MS (HR)	0.05	µg/kg	M	**1.1**	**12**	**2.9**	**8.4**	**0.73**	**17**	-
Polychlorinated biphenyl BZ#138	GC/MS (HR)	0.05	µg/kg	U	-	-	-	-	-	-	**28**
Polychlorinated biphenyl BZ#180	GC/MS (HR)	0.05	µg/kg	M	**0.39**	**11**	**1.0**	**4.9**	**0.22**	**4.3**	-
Polychlorinated biphenyl BZ#180	GC/MS (HR)	0.05	µg/kg	U	-	-	-	-	-	-	**5.5**

SAL Reference: 293916
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
PCB EC7

				SAL Reference	293916 008	293916 009	293916 010	293916 011	293916 012	293916 013	293916 014
				Customer Sample Reference	TP07 0.50	TP07 1.00	TP08 0.50	TP08 2.00	TP09 0.10	TP10 0.50	TP12 0.50
				Test Sample	M105	M105	M105	M105	M105	M105	M105
				Bottom Depth	0.50	1.00	0.50	2.00	0.10	0.50	0.50
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Type	Sandy Soil	Sandy Soil	Clay	Clay	Topsoil	Sandy Soil	Topsoil
Determinand	**Method**	**LOD**	**Units**	**Symbol**							
Polychlorinated biphenyl BZ#28	GC/MS (HR)	0.05	µg/kg	M	**1.5**	**0.22**	**0.50**	(9) <0.50	**0.10**	**0.80**	<0.05
Polychlorinated biphenyl BZ#28	GC/MS (HR)	0.05	µg/kg	U	-	-	-	-	-	-	-
Polychlorinated biphenyl BZ#52	GC/MS (HR)	0.05	µg/kg	M	**3.9**	**0.40**	**0.57**	(9) <0.50	<0.05	**0.60**	<0.05
Polychlorinated biphenyl BZ#52	GC/MS (HR)	0.05	µg/kg	U	-	-	-	-	-	-	-
Polychlorinated biphenyl BZ#101	GC/MS (HR)	0.05	µg/kg	M	**2.1**	**0.29**	**0.54**	(9) <0.50	**0.11**	(9) <0.50	<0.05
Polychlorinated biphenyl BZ#101	GC/MS (HR)	0.05	µg/kg	U	-	-	-	-	-	-	-
Polychlorinated biphenyl BZ#118	GC/MS (HR)	0.05	µg/kg	M	**1.3**	**0.20**	**0.28**	(9) <0.50	<0.05	(9) <0.50	<0.05
Polychlorinated biphenyl BZ#118	GC/MS (HR)	0.05	µg/kg	U	-	-	-	-	-	-	-
Polychlorinated biphenyl BZ#153	GC/MS (HR)	0.05	µg/kg	M	**1.0**	**0.26**	**0.74**	(9) <0.50	**0.22**	(9) <0.50	<0.05
Polychlorinated biphenyl BZ#153	GC/MS (HR)	0.05	µg/kg	U	-	-	-	-	-	-	-
Polychlorinated biphenyl BZ#138	GC/MS (HR)	0.05	µg/kg	M	**1.3**	**0.31**	**0.71**	(9) <0.50	**0.22**	(9) <0.50	<0.05
Polychlorinated biphenyl BZ#138	GC/MS (HR)	0.05	µg/kg	U	-	-	-	-	-	-	-
Polychlorinated biphenyl BZ#180	GC/MS (HR)	0.05	µg/kg	M	**0.60**	**0.17**	**0.70**	(9) <0.50	**0.22**	(9) <0.50	<0.05
Polychlorinated biphenyl BZ#180	GC/MS (HR)	0.05	µg/kg	U	-	-	-	-	-	-	-

Index to symbols used in 293916-1

Value	Description
M40	Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis.
M105	Analysis conducted on an "as received" aliquot. Results are reported on a dry weight basis where moisture content was determined by assisted drying of sample at 105C

AR	As Received
2:1	Leachate to BS EN 12457-3 (2:1)
8:1	Leachate to BS EN 12457-3 (8:1)
9	LOD raised due to dilution of sample
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Scientific Analysis Laboratories is a
limited company registered in England and
Wales (No 2514788) whose address is at
Hadfield House, Hadfield Street, Manchester M16 9FE

Scientific Analysis Laboratories Ltd

Certificate of Analysis

Hadfield House
Hadfield Street
Cornbrook
Manchester
M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2468

Report Number: 293783-1

Date of Report: 17-Sep-2012

Customer: Quantum Geotechnical
Ty Berwig
Heol y Bwlch
Bynea
Llanelli
Carmarthenshire
SA14 9ST

Customer Contact: Mr Arwel Jones

Customer Job Reference: G132
Customer Purchase Order: G132/53242
Customer Site Reference: Nant Llesg
Date Job Received at SAL: 23-Aug-2012
Date Analysis Started: 04-Sep-2012
Date Analysis Completed: 14-Sep-2012

The results reported relate to samples received in the laboratory
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with SAL SOPs

UKAS TESTING
1549

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Report checked
and authorised by :
Caroline Haworth
Assistant Customer Service
Manager

Issued by :
Caroline Haworth
Assistant Customer Service
Manager

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
MCERTS Preparation

				SAL Reference	293783 002	293783 005	293783 006	293783 008	293783 011	293783 013	293783 015	293783 017
				Customer Sample Reference	TP01 0.5	TP01 3.0	TP02 0.1	TP02 1.0	TP03 0.5	TP03 2.0	TP04 0.1	TP04 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.5	3.0	0.1	1.0	0.5	2.0	0.1	1.0
				Type	Sandy Soil	Sandy Soil	Topsoil	Clay	Sandy Soil	Sandy Soil	Clay	Sandy Soil
Determinand	Method	Test Sample	LOD	Units								
Moisture	T277	AR	0.1	%	18	15	13	21	17	13	15	8.0
Moisture @ 105 C	T162	AR	0.1	%	24	21	16	19	19	21	21	1.5

SAL Reference: 293783
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Soil Analysed as Soil
MCERTS Preparation

				SAL Reference	293783 019	293783 020	293783 023	293783 025	293783 028	293783 029	293783 032	293783 034
				Customer Sample Reference	TP04 3.0	TP05 0.1	TP05 2.0	TP06 0.1	TP07 0.5	TP07 1.0	TP08 0.5	TP08 2.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	3.0	0.1	2.0	0.1	0.5	1.0	0.5	2.0
				Type	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Clay
Determinand	Method	Test Sample	LOD	Units								
Moisture	T277	AR	0.1	%	14	12	15	16	14	13	15	21
Moisture @ 105 C	T162	AR	0.1	%	23	14	8.5	8.6	3.5	14	16	19

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
MCERTS Preparation

				SAL Reference	293783 036	293783 038	293783 039	293783 041	293783 043	293783 045	293783 047	293783 053
				Customer Sample Reference	TP09 0.1	TP10 0.1	TP10 0.5	TP10 2.0	TP11 0.5	TP11 2.0	TP12 0.5	TP13 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.1	0.1	0.5	2.0	0.5	2.0	0.5	1.0
				Type	Topsoil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Topsoil	Clay
Determinand	Method	Test Sample	LOD	Units								
Moisture	T277	AR	0.1	%	21	18	13	13	4.4	16	16	19
Moisture @ 105 C	T162	AR	0.1	%	26	10	11	7.5	8.2	19	11	19

SAL Reference: 293783
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Soil Analysed as Soil
MCERTS Preparation

				SAL Reference	293783 057
				Customer Sample Reference	TP14 0.5
				Date Sampled	22-AUG-2012
				Bottom Depth	0.5
				Type	Topsoil
Determinand	Method	Test Sample	LOD	Units	
Moisture	T277	AR	0.1	%	6.8
Moisture @ 105 C	T162	AR	0.1	%	6.3

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
Miscellaneous

				SAL Reference	293783 002	293783 005	293783 006	293783 008	293783 011	293783 013	293783 015	293783 017
				Customer Sample Reference	TP01 0.5	TP01 3.0	TP02 0.1	TP02 1.0	TP03 0.5	TP03 2.0	TP04 0.1	TP04 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.5	3.0	0.1	1.0	0.5	2.0	0.1	1.0
				Type	Sandy Soil	Sandy Soil	Topsoil	Clay	Sandy Soil	Sandy Soil	Clay	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Asbestos ID	T27	AR			Chrysotile Detected -	Chrysotile Detected -	N.D.	Chrysotile Detected -	Chrysotile Detected -	N.D.	Chrysotile Detected -	Chrysotile Detected -
Total Organic Carbon	T21	M40	0.1	%	**2.9**	**7.0**	**7.2**	**5.5**	**6.6**	**6.1**	**5.5**	**10**

SAL Reference: 293783
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Soil Analysed as Soil
Miscellaneous

				SAL Reference	293783 019	293783 020	293783 023	293783 025	293783 028	293783 029	293783 032	293783 034
				Customer Sample Reference	TP04 3.0	TP05 0.1	TP05 2.0	TP06 0.1	TP07 0.5	TP07 1.0	TP08 0.5	TP08 2.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	3.0	0.1	2.0	0.1	0.5	1.0	0.5	2.0
				Type	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Clay
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Asbestos ID	T27	AR			Amosite Detected -	Chrysotile Detected -	Chrysotile Detected -	N.D.	N.D.	Chrysotile Detected - Amosite Detected -	N.D.	N.D.
Total Organic Carbon	T21	M40	0.1	%	**6.6**	**7.3**	**6.9**	**6.4**	**6.3**	**5.0**	**7.2**	**8.2**

SAL Reference: 293783
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Soil Analysed as Soil
Miscellaneous

				SAL Reference	293783 036	293783 038	293783 039	293783 041	293783 043	293783 045	293783 047	293783 053
				Customer Sample Reference	TP09 0.1	TP10 0.1	TP10 0.5	TP10 2.0	TP11 0.5	TP11 2.0	TP12 0.5	TP13 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.1	0.1	0.5	2.0	0.5	2.0	0.5	1.0
				Type	Topsoil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Topsoil	Clay
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Asbestos ID	T27	AR			N.D.	Chrysotile Detected -	N.D.	Chrysotile Detected -	Chrysotile Detected -	N.D.	N.D.	N.D.
Total Organic Carbon	T21	M40	0.1	%	**3.7**	**5.2**	**6.8**	**6.4**	**6.9**	**1.7**	**4.2**	**3.7**

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
Miscellaneous

				SAL Reference	293783 057	293783 061
				Customer Sample Reference	TP14 0.5	SP01 0.1
				Date Sampled	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.5	0.1
				Type	Topsoil	
Determinand	**Method**	**Test Sample**	**LOD**	**Units**		
Asbestos ID	T27	AR			N.D.	Chrysotile Detected -
Total Organic Carbon	T21	M40	0.1	%	**3.6**	-

SAL Reference: 293783
Project Site: Nant Llesg
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Soil Analysed as Soil
Soil Suite

				SAL Reference	293783 002	293783 005	293783 006	293783 008	293783 011	293783 013	293783 015	293783 017
				Customer Sample Reference	TP01 0.5	TP01 3.0	TP02 0.1	TP02 1.0	TP03 0.5	TP03 2.0	TP04 0.1	TP04 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.5	3.0	0.1	1.0	0.5	2.0	0.1	1.0
				Type	Sandy Soil	Sandy Soil	Topsoil	Clay	Sandy Soil	Sandy Soil	Clay	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Antimony	T6	M40	1	mg/kg	**11**	**15**	**17**	**14**	**14**	**37**	**16**	**3**
Arsenic	T6	M40	2	mg/kg	**23**	**30**	**18**	**63**	**19**	**29**	**21**	**15**
Barium	T6	M40	1	mg/kg	**390**	**720**	**490**	**590**	**470**	**750**	**500**	**360**
Beryllium	T6	M40	2	mg/kg	<2	<2	<2	**4**	<2	<2	<2	<2
Boron (water-soluble)	T6	AR	1	mg/kg	<1	<1	<1	<1	**2**	**1**	**1**	<1
Cadmium	T6	M40	1	mg/kg	<1	**3**	**4**	<1	**3**	**12**	<1	<1
Cadmium	T65	M40	0.2	mg/kg	<0.2	**3.1**	**4.1**	**0.8**	**2.9**	**12**	**0.5**	<0.2
Chromium	T6	M40	1	mg/kg	**65**	**170**	**290**	**140**	**120**	**420**	**290**	**26**
Copper	T6	M40	1	mg/kg	**150**	**300**	**350**	**220**	**300**	**480**	**280**	**46**
Cyanide(Total)	T546	AR	1	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1
Cyanide(free)	T546	AR	1	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1
Iron	T6	M40	1	mg/kg	**10000**	**60000**	**80000**	**81000**	**58000**	**120000**	**110000**	**33000**
Lead	T6	M40	1	mg/kg	**190**	**870**	**820**	**290**	**420**	**4400**	**840**	**110**
Mercury	T65	M40	0.1	mg/kg	**0.2**	**0.5**	**0.8**	**0.2**	**0.2**	**1.2**	**0.3**	**0.2**
Mercury	T6	M40	1	mg/kg	<1	<1	<1	<1	<1	**1**	<1	<1
Molybdenum	T6	M40	1	mg/kg	**6**	**7**	**11**	**9**	**8**	**15**	**8**	<1
Nickel	T6	M40	1	mg/kg	**43**	**69**	**110**	**81**	**53**	**110**	**73**	**28**
pH	T7	AR			**7.3**	**7.8**	**8.2**	**8.0**	**8.6**	**9.5**	**8.3**	**8.8**
Selenium	T6	M40	3	mg/kg	<3	<3	<3	<3	<3	<3	<3	<3
SO4(Total)	T6	M40	0.01	%	**0.43**	**0.55**	**0.39**	**0.34**	**0.99**	**1.2**	**0.31**	**0.43**
Sulphide	T546	AR	1	mg/kg	**2**	**7**	**7**	**2**	**9**	**9**	**7**	**4**
Sulphur (total)	T6	M40	0.01	%	**0.13**	**0.17**	**0.13**	**0.10**	**0.33**	**0.40**	**0.10**	**0.14**
Zinc	T6	M40	1	mg/kg	**680**	**1800**	**2900**	**1200**	**1600**	**7200**	**1800**	**320**

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
Soil Suite

				SAL Reference	293783 019	293783 020	293783 023	293783 025	293783 028	293783 029	293783 032	293783 034
				Customer Sample Reference	TP04 3.0	TP05 0.1	TP05 2.0	TP06 0.1	TP07 0.5	TP07 1.0	TP08 0.5	TP08 2.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	3.0	0.1	2.0	0.1	0.5	1.0	0.5	2.0
				Type	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Clay
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Antimony	T6	M40	1	mg/kg	**14**	**6**	**70**	**8**	**4**	**9**	**5**	**4**
Arsenic	T6	M40	2	mg/kg	**26**	**17**	**18**	**13**	**12**	**14**	**16**	**18**
Barium	T6	M40	1	mg/kg	**520**	**180**	**600**	**240**	**190**	**260**	**370**	**350**
Beryllium	T6	M40	2	mg/kg	<2	<2	<2	<2	<2	<2	<2	<2
Boron (water-soluble)	T6	AR	1	mg/kg	<1	<1	**1**	<1	<1	<1	<1	<1
Cadmium	T6	M40	1	mg/kg	**3**	<1	**9**	**1**	<1	<1	<1	<1
Cadmium	T65	M40	0.2	mg/kg	**2.6**	<0.2	**9.0**	**1.2**	<0.2	<0.2	<0.2	<0.2
Chromium	T6	M40	1	mg/kg	**170**	**87**	**240**	**110**	**50**	**62**	**23**	**29**
Copper	T6	M40	1	mg/kg	**270**	**99**	**290**	**140**	**67**	**92**	**56**	**57**
Cyanide(Total)	T546	AR	1	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1
Cyanide(free)	T546	AR	1	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1
Iron	T6	M40	1	mg/kg	**74000**	**52000**	**73000**	**37000**	**30000**	**40000**	**24000**	**22000**
Lead	T6	M40	1	mg/kg	**430**	**180**	**1000**	**370**	**170**	**160**	**190**	**180**
Mercury	T65	M40	0.1	mg/kg	**0.6**	**0.1**	**0.6**	**0.5**	<0.1	**0.5**	**0.2**	<0.1
Mercury	T6	M40	1	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1
Molybdenum	T6	M40	1	mg/kg	**9**	**4**	**8**	**4**	**6**	**4**	**4**	**2**
Nickel	T6	M40	1	mg/kg	**76**	**47**	**85**	**39**	**65**	**53**	**22**	**26**
pH	T7	AR			**9.0**	**8.5**	**8.4**	**8.2**	**7.7**	**7.7**	**7.9**	**7.7**
Selenium	T6	M40	3	mg/kg	<3	<3	<3	<3	<3	<3	<3	<3
SO4(Total)	T6	M40	0.01	%	**0.66**	**0.16**	**0.61**	**0.22**	**0.40**	**0.58**	**0.28**	**0.41**
Sulphide	T546	AR	1	mg/kg	**6**	**9**	**4**	**1**	**6**	**3**	<1	**6**
Sulphur (total)	T6	M40	0.01	%	**0.23**	**0.05**	**0.20**	**0.07**	**0.13**	**0.19**	**0.09**	**0.14**
Zinc	T6	M40	1	mg/kg	**1100**	**510**	**2700**	**1100**	**390**	**600**	**290**	**280**

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
Soil Suite

				SAL Reference	293783 036	293783 038	293783 039	293783 041	293783 043	293783 045	293783 047	293783 053
				Customer Sample Reference	TP09 0.1	TP10 0.1	TP10 0.5	TP10 2.0	TP11 0.5	TP11 2.0	TP12 0.5	TP13 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.1	0.1	0.5	2.0	0.5	2.0	0.5	1.0
				Type	Topsoil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Topsoil	Clay
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Antimony	T6	M40	1	mg/kg	**2**	**4**	**4**	**4**	**2**	<1	**2**	**2**
Arsenic	T6	M40	2	mg/kg	**22**	**12**	**13**	**20**	**15**	**3**	**11**	**11**
Barium	T6	M40	1	mg/kg	**47**	**240**	**330**	**110**	**120**	**27**	**120**	**140**
Beryllium	T6	M40	2	mg/kg	<2	<2	<2	<2	<2	<2	<2	<2
Boron (water-soluble)	T6	AR	1	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	T6	M40	1	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	T65	M40	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	T6	M40	1	mg/kg	**9**	**17**	**17**	**17**	**14**	**9**	**17**	**16**
Copper	T6	M40	1	mg/kg	**18**	**39**	**41**	**44**	**35**	**9**	**33**	**24**
Cyanide(Total)	T546	AR	1	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1
Cyanide(free)	T546	AR	1	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1
Iron	T6	M40	1	mg/kg	**17000**	**19000**	**23000**	**41000**	**39000**	**4500**	**30000**	**27000**
Lead	T6	M40	1	mg/kg	**49**	**140**	**180**	**81**	**44**	**16**	**76**	**59**
Mercury	T65	M40	0.1	mg/kg	<0.1	**0.2**	**0.3**	<0.1	<0.1	<0.1	**0.3**	**0.2**
Mercury	T6	M40	1	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1
Molybdenum	T6	M40	1	mg/kg	<1	**1**	<1	<1	<1	<1	<1	<1
Nickel	T6	M40	1	mg/kg	**5**	**20**	**19**	**34**	**39**	**11**	**26**	**18**
pH	T7	AR			**7.2**	**7.1**	**7.2**	**6.6**	**7.1**	**4.6**	**6.9**	**7.8**
Selenium	T6	M40	3	mg/kg	<3	<3	<3	<3	<3	<3	<3	<3
SO4(Total)	T6	M40	0.01	%	**0.12**	**3.7**	**2.1**	**0.51**	**0.18**	**0.11**	**0.11**	**0.10**
Sulphide	T546	AR	1	mg/kg	**5**	**8**	**10**	<1	<1	<1	**3**	**6**
Sulphur (total)	T6	M40	0.01	%	**0.04**	**1.3**	**0.70**	**0.17**	**0.06**	**0.04**	**0.04**	**0.03**
Zinc	T6	M40	1	mg/kg	**36**	**330**	**170**	**120**	**94**	**43**	**140**	**110**

SAL Reference:	293783
Project Site:	Nant Llesg
Customer Reference:	G132
Soil	Analysed as Soil
Soil Suite	

				SAL Reference	**293783 057**
				Customer Sample Reference	**TP14 0.5**
				Date Sampled	**22-AUG-2012**
				Bottom Depth	**0.5**
				Type	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
Antimony	T6	M40	1	mg/kg	**2**
Arsenic	T6	M40	2	mg/kg	**12**
Barium	T6	M40	1	mg/kg	**120**
Beryllium	T6	M40	2	mg/kg	<2
Boron (water-soluble)	T6	AR	1	mg/kg	<1
Cadmium	T6	M40	1	mg/kg	<1
Cadmium	T65	M40	0.2	mg/kg	<0.2
Chromium	T6	M40	1	mg/kg	**17**
Copper	T6	M40	1	mg/kg	**25**
Cyanide(Total)	T546	AR	1	mg/kg	<1
Cyanide(free)	T546	AR	1	mg/kg	<1
Iron	T6	M40	1	mg/kg	**26000**
Lead	T6	M40	1	mg/kg	**63**
Mercury	T65	M40	0.1	mg/kg	**0.3**
Mercury	T6	M40	1	mg/kg	<1
Molybdenum	T6	M40	1	mg/kg	<1
Nickel	T6	M40	1	mg/kg	**20**
pH	T7	AR			**7.7**
Selenium	T6	M40	3	mg/kg	<3
SO4(Total)	T6	M40	0.01	%	**0.06**
Sulphide	T546	AR	1	mg/kg	**6**
Sulphur (total)	T6	M40	0.01	%	**0.02**
Zinc	T6	M40	1	mg/kg	**110**

SAL Reference:	293783
Project Site:	Nant Llesg
Customer Reference:	G132
Soil	Analysed as Soil
TPH (CWG)	

				SAL Reference	**293783 002**	**293783 005**	**293783 006**	**293783 008**	**293783 011**	**293783 013**	**293783 015**	**293783 017**
				Customer Sample Reference	**TP01 0.5**	**TP01 3.0**	**TP02 0.1**	**TP02 1.0**	**TP03 0.5**	**TP03 2.0**	**TP04 0.1**	**TP04 1.0**
				Date Sampled	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**
				Bottom Depth	**0.5**	**3.0**	**0.1**	**1.0**	**0.5**	**2.0**	**0.1**	**1.0**
				Type	**Sandy Soil**	**Sandy Soil**	**Topsoil**	**Clay**	**Sandy Soil**	**Sandy Soil**	**Clay**	**Sandy Soil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
TPH (C5-C6 aliphatic)	T209	M105	0.100	mg/kg	(2) <0.200	(2) <0.200	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
TPH (C6-C8 aliphatic)	T209	M105	0.10	mg/kg	(2) <0.20	(2) <0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
TPH (C8-C10 aliphatic)	T209	M105	0.100	mg/kg	(2) <0.200	(2) <0.200	<0.100	<0.100	**0.367**	**0.235**	<0.100	<0.100
TPH (C10-C12 aliphatic)	T206	M105	1	mg/kg	(9) <10	(9) <10	(9) <10	<1	<1	(9) <10	(9) <10	<1
TPH (C12-C16 aliphatic)	T206	M105	2	mg/kg	(9) <10	(9) <10	(9) <10	<2	**6**	**16**	(9) <10	<2
TPH (C16-C21 aliphatic)	T206	M105	1	mg/kg	(9) <10	**13**	**23**	**15**	**33**	**130**	**25**	**7**
TPH (C21-C35 aliphatic)	T206	M105	4	mg/kg	**24**	**33**	**80**	**48**	**98**	**520**	**100**	**17**
TPH (C6-C7 aromatic)	T209	M105	0.100	mg/kg	(2) <0.200	(2) <0.200	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
TPH (C7-C8 aromatic)	T209	M105	0.100	mg/kg	(2) <0.200	(2) <0.200	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
TPH (C8-C10 aromatic)	T209	M105	0.100	mg/kg	(2) <0.200	(2) <0.200	<0.100	<0.100	**0.715**	**0.313**	<0.100	<0.100
TPH (C10-C12 aromatic)	T206	M105	1	mg/kg	(9) <10	(9) <10	(9) <10	<1	<1	(9) <10	(9) <10	<1
TPH (C12-C16 aromatic)	T206	M105	1	mg/kg	(9) <10	(9) <10	(9) <10	**1**	**2**	(9) <10	(9) <10	**2**
TPH (C16-C21 aromatic)	T206	M105	1	mg/kg	(9) <10	**28**	**19**	**7**	**14**	**37**	<10	**11**
TPH (C21-C35 aromatic)	T206	M105	1	mg/kg	(9) <10	**42**	**37**	**18**	**22**	**71**	**31**	**24**

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
TPH (CWG)

				SAL Reference	293783 019	293783 020	293783 023	293783 025	293783 028	293783 029	293783 032	293783 034
				Customer Sample Reference	TP04 3.0	TP05 0.1	TP05 2.0	TP06 0.1	TP07 0.5	TP07 1.0	TP08 0.5	TP08 2.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	3.0	0.1	2.0	0.1	0.5	1.0	0.5	2.0
				Type	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Clay
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
TPH (C5-C6 aliphatic)	T209	M105	0.100	mg/kg	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
TPH (C6-C8 aliphatic)	T209	M105	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
TPH (C8-C10 aliphatic)	T209	M105	0.100	mg/kg	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
TPH (C10-C12 aliphatic)	T206	M105	1	mg/kg	<1	<1	(9) <10	(9) <10	(9) <10	(9) <10	(9) <10	(9) <10
TPH (C12-C16 aliphatic)	T206	M105	2	mg/kg	**4**	<2	(9) <10	(9) <10	(9) <10	(9) <10	(9) <10	(9) <10
TPH (C16-C21 aliphatic)	T206	M105	1	mg/kg	**42**	**3**	**24**	(9) <10	**13**	**14**	(9) <10	(9) <10
TPH (C21-C35 aliphatic)	T206	M105	4	mg/kg	**150**	**13**	**110**	**41**	**48**	**25**	**14**	(9) <10
TPH (C6-C7 aromatic)	T209	M105	0.100	mg/kg	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
TPH (C7-C8 aromatic)	T209	M105	0.100	mg/kg	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
TPH (C8-C10 aromatic)	T209	M105	0.100	mg/kg	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
TPH (C10-C12 aromatic)	T206	M105	1	mg/kg	<1	<1	(9) <10	(9) <10	(9) <10	(9) <10	(9) <10	(9) <10
TPH (C12-C16 aromatic)	T206	M105	1	mg/kg	**1**	<1	(9) <10	(9) <10	(9) <10	(9) <10	(9) <10	(9) <10
TPH (C16-C21 aromatic)	T206	M105	1	mg/kg	**9**	**1**	**17**	(9) <10	**22**	**19**	(9) <10	(9) <10
TPH (C21-C35 aromatic)	T206	M105	1	mg/kg	**21**	**9**	**53**	**16**	**85**	**42**	**15**	**12**

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
TPH (CWG)

				SAL Reference	293783 036	293783 038	293783 039	293783 041	293783 043	293783 045	293783 047	293783 053
				Customer Sample Reference	TP09 0.1	TP10 0.1	TP10 0.5	TP10 2.0	TP11 0.5	TP11 2.0	TP12 0.5	TP13 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.1	0.1	0.5	2.0	0.5	2.0	0.5	1.0
				Type	Topsoil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Topsoil	Clay
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
TPH (C5-C6 aliphatic)	T209	M105	0.100	mg/kg	<0.100	<0.100	<0.100	<0.100	(2) <0.200	<0.100	<0.100	<0.100
TPH (C6-C8 aliphatic)	T209	M105	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	(2) <0.20	<0.10	<0.10	<0.10
TPH (C8-C10 aliphatic)	T209	M105	0.100	mg/kg	<0.100	<0.100	<0.100	<0.100	(2) <0.200	<0.100	<0.100	<0.100
TPH (C10-C12 aliphatic)	T206	M105	1	mg/kg	<1	(9) <10	(9) <10	(9) <10	<1	<1	<1	<1
TPH (C12-C16 aliphatic)	T206	M105	2	mg/kg	<2	(9) <10	(9) <10	**11**	<2	<2	<2	<2
TPH (C16-C21 aliphatic)	T206	M105	1	mg/kg	<1	**22**	**25**	(9) <10	**1**	<1	<1	<1
TPH (C21-C35 aliphatic)	T206	M105	4	mg/kg	<4	**67**	**89**	(9) <10	**9**	<4	<4	<4
TPH (C6-C7 aromatic)	T209	M105	0.100	mg/kg	<0.100	<0.100	<0.100	<0.100	(2) <0.200	<0.100	<0.100	<0.100
TPH (C7-C8 aromatic)	T209	M105	0.100	mg/kg	<0.100	<0.100	<0.100	<0.100	(2) <0.200	<0.100	<0.100	<0.100
TPH (C8-C10 aromatic)	T209	M105	0.100	mg/kg	<0.100	<0.100	<0.100	<0.100	(2) <0.200	<0.100	<0.100	<0.100
TPH (C10-C12 aromatic)	T206	M105	1	mg/kg	<1	(9) <10	(9) <10	(9) <10	<1	<1	<1	<1
TPH (C12-C16 aromatic)	T206	M105	1	mg/kg	<1	(9) <10	(9) <10	**170**	**2**	<1	<1	<1
TPH (C16-C21 aromatic)	T206	M105	1	mg/kg	<1	**17**	**59**	**450**	**4**	<1	**4**	**1**
TPH (C21-C35 aromatic)	T206	M105	1	mg/kg	**2**	**44**	**170**	**560**	**8**	<1	**13**	**3**

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
TPH (CWG)

				SAL Reference	293783 057
				Customer Sample Reference	TP14 0.5
				Date Sampled	22-AUG-2012
				Bottom Depth	0.5
				Type	Topsoil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
TPH (C5-C6 aliphatic)	T209	M105	0.100	mg/kg	<0.100
TPH (C6-C8 aliphatic)	T209	M105	0.10	mg/kg	<0.10
TPH (C8-C10 aliphatic)	T209	M105	0.100	mg/kg	<0.100
TPH (C10-C12 aliphatic)	T206	M105	1	mg/kg	<1
TPH (C12-C16 aliphatic)	T206	M105	2	mg/kg	<2
TPH (C16-C21 aliphatic)	T206	M105	1	mg/kg	<1
TPH (C21-C35 aliphatic)	T206	M105	4	mg/kg	<4
TPH (C6-C7 aromatic)	T209	M105	0.100	mg/kg	<0.100
TPH (C7-C8 aromatic)	T209	M105	0.100	mg/kg	<0.100
TPH (C8-C10 aromatic)	T209	M105	0.100	mg/kg	<0.100
TPH (C10-C12 aromatic)	T206	M105	1	mg/kg	<1
TPH (C12-C16 aromatic)	T206	M105	1	mg/kg	<1
TPH (C16-C21 aromatic)	T206	M105	1	mg/kg	**3**
TPH (C21-C35 aromatic)	T206	M105	1	mg/kg	**11**

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
PAH US EPA 16 (B and K split)

				SAL Reference	293783 002	293783 005	293783 006	293783 008	293783 011	293783 013	293783 015	293783 017
				Customer Sample Reference	TP01 0.5	TP01 3.0	TP02 0.1	TP02 1.0	TP03 0.5	TP03 2.0	TP04 0.1	TP04 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.5	3.0	0.1	1.0	0.5	2.0	0.1	1.0
				Type	Sandy Soil	Sandy Soil	Topsoil	Clay	Sandy Soil	Sandy Soil	Clay	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Naphthalene	T207	M105	0.1	mg/kg	<0.1	**0.3**	**0.5**	**0.1**	**0.3**	**1.1**	**0.4**	**0.2**
Acenaphthylene	T207	M105	0.1	mg/kg	<0.1	**0.1**	<0.1	<0.1	<0.1	<0.1	**0.6**	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	<0.1	**1.0**	<0.1	<0.1	**0.2**	**0.5**	**0.5**	<0.1
Fluorene	T207	M105	0.1	mg/kg	<0.1	**1.0**	**0.1**	<0.1	**0.2**	**0.5**	**0.8**	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	**2.6**	**7.1**	**1.7**	**0.5**	**1.4**	**2.4**	**7.7**	**0.6**
Anthracene	T207	M105	0.1	mg/kg	**0.8**	**2.6**	**0.6**	**0.1**	**0.5**	**0.7**	**3.8**	**0.2**
Fluoranthene	T207	M105	0.1	mg/kg	**4.6**	**8.6**	**6.7**	**1.0**	**2.6**	**4.0**	**15**	**1.3**
Pyrene	T207	M105	0.1	mg/kg	**3.4**	**8.0**	**5.9**	**0.8**	**2.0**	**3.9**	**14**	**1.1**
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	**1.2**	**3.5**	**1.8**	**0.3**	**2.8**	**1.0**	**3.2**	**0.5**
Chrysene	T207	M105	0.1	mg/kg	**1.2**	**3.9**	**2.6**	**0.4**	**3.7**	**1.5**	**4.4**	**0.7**
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	**0.8**	**2.7**	**1.6**	**0.2**	**1.1**	**1.0**	**2.7**	**0.5**
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	**0.6**	**1.9**	**1.6**	**0.3**	**1.0**	**1.0**	**2.7**	**0.4**
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	**0.7**	**2.4**	**1.3**	**0.2**	**0.8**	**0.8**	**2.4**	**0.4**
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	**0.3**	**1.0**	**0.6**	<0.1	**0.3**	**0.3**	**0.8**	**0.1**
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	**0.1**	**0.5**	**0.4**	<0.1	**0.2**	**0.2**	**0.4**	<0.1
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	**0.3**	**1.0**	**0.6**	<0.1	**0.3**	**0.4**	**0.9**	**0.2**
PAH(total)	T207	M105	0.1	mg/kg	**17**	**46**	**26**	**3.9**	**17**	**19**	**60**	**6.2**

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
PAH US EPA 16 (B and K split)

				SAL Reference	293783 019	293783 020	293783 023	293783 025	293783 028	293783 029	293783 032	293783 034
				Customer Sample Reference	TP04 3.0	TP05 0.1	TP05 2.0	TP06 0.1	TP07 0.5	TP07 1.0	TP08 0.5	TP08 2.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	3.0	0.1	2.0	0.1	0.5	1.0	0.5	2.0
				Type	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Clay
Determinand	Method	Test Sample	LOD	Units								
Naphthalene	T207	M105	0.1	mg/kg	0.3	<0.1	5.1	0.2	0.6	0.3	0.2	0.3
Acenaphthylene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	<0.1	<0.1	0.3	<0.1	0.3	0.1	<0.1	<0.1
Fluorene	T207	M105	0.1	mg/kg	<0.1	<0.1	0.3	<0.1	0.3	0.2	<0.1	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	0.6	0.6	4.1	0.4	1.8	1.2	0.7	0.3
Anthracene	T207	M105	0.1	mg/kg	0.2	<0.1	1.1	0.1	0.5	0.3	0.2	0.1
Fluoranthene	T207	M105	0.1	mg/kg	1.4	0.8	6.1	0.9	3.7	3.2	1.7	1.0
Pyrene	T207	M105	0.1	mg/kg	1.2	0.7	4.9	0.8	3.0	2.6	1.4	0.9
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	0.4	0.2	3.8	0.3	1.0	1.1	0.5	0.3
Chrysene	T207	M105	0.1	mg/kg	0.7	0.3	4.1	0.4	1.5	1.7	0.7	0.7
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	0.4	0.2	3.5	0.3	1.3	1.5	0.4	0.5
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	0.4	0.2	3.5	0.3	1.1	1.3	0.4	0.5
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	0.3	0.2	2.3	0.2	0.8	1.2	0.4	0.4
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	0.1	<0.1	0.9	<0.1	0.3	0.4	0.1	0.2
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	<0.1	<0.1	0.5	<0.1	0.2	0.2	<0.1	<0.1
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	0.1	<0.1	0.9	<0.1	0.4	0.5	0.1	0.2
PAH(total)	T207	M105	0.1	mg/kg	6.1	3.2	41	3.9	17	16	6.8	5.4

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
PAH US EPA 16 (B and K split)

				SAL Reference	293783 036	293783 038	293783 039	293783 041	293783 043	293783 045	293783 047	293783 053
				Customer Sample Reference	TP09 0.1	TP10 0.1	TP10 0.5	TP10 2.0	TP11 0.5	TP11 2.0	TP12 0.5	TP13 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.1	0.1	0.5	2.0	0.5	2.0	0.5	1.0
				Type	Topsoil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Topsoil	Clay
Determinand	Method	Test Sample	LOD	Units								
Naphthalene	T207	M105	0.1	mg/kg	<0.1	0.3	0.7	<0.1	<0.1	<0.1	0.1	<0.1
Acenaphthylene	T207	M105	0.1	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1	0.5	<0.1	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	<0.1	0.2	0.9	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	T207	M105	0.1	mg/kg	<0.1	0.3	1.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	0.1	2.4	5.0	0.1	0.2	<0.1	6.9	0.4
Anthracene	T207	M105	0.1	mg/kg	<0.1	0.7	2.1	<0.1	<0.1	<0.1	2.9	0.2
Fluoranthene	T207	M105	0.1	mg/kg	0.3	5.3	13	0.3	0.4	<0.1	8.2	1.5
Pyrene	T207	M105	0.1	mg/kg	0.2	4.2	9.9	0.2	0.3	<0.1	7.1	1.2
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	<0.1	2.1	5.1	0.2	0.2	<0.1	3.6	0.6
Chrysene	T207	M105	0.1	mg/kg	0.2	3.1	6.2	0.2	0.3	<0.1	4.3	0.9
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	0.1	2.2	4.8	0.2	0.2	<0.1	3.0	0.7
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	<0.1	2.1	4.1	0.2	0.3	<0.1	3.0	0.7
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	<0.1	1.9	3.6	0.1	0.2	<0.1	2.4	0.6
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	<0.1	0.5	1.2	<0.1	<0.1	<0.1	1.1	0.2
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	<0.1	0.3	0.8	<0.1	<0.1	<0.1	0.2	<0.1
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	<0.1	0.5	1.4	<0.1	<0.1	<0.1	0.2	<0.1
PAH(total)	T207	M105	0.1	mg/kg	0.9	26	60	1.5	2.1	0.5	43	7.0

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
PAH US EPA 16 (B and K split)

				SAL Reference	293783 057
				Customer Sample Reference	TP14 0.5
				Date Sampled	22-AUG-2012
				Bottom Depth	0.5
				Type	Topsoil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
Naphthalene	T207	M105	0.1	mg/kg	<0.1
Acenaphthylene	T207	M105	0.1	mg/kg	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	<0.1
Fluorene	T207	M105	0.1	mg/kg	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	**0.5**
Anthracene	T207	M105	0.1	mg/kg	**0.2**
Fluoranthene	T207	M105	0.1	mg/kg	**1.7**
Pyrene	T207	M105	0.1	mg/kg	**1.3**
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	**0.5**
Chrysene	T207	M105	0.1	mg/kg	**0.8**
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	**0.6**
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	**0.6**
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	**0.5**
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	**0.2**
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	<0.1
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	<0.1
PAH(total)	T207	M105	0.1	mg/kg	**6.9**

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
Phenols (Speciated)

				SAL Reference	293783 002	293783 005	293783 006	293783 008	293783 011	293783 013	293783 015	293783 017
				Customer Sample Reference	TP01 0.5	TP01 3.0	TP02 0.1	TP02 1.0	TP03 0.5	TP03 2.0	TP04 0.1	TP04 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.5	3.0	0.1	1.0	0.5	2.0	0.1	1.0
				Type	Sandy Soil	Sandy Soil	Topsoil	Clay	Sandy Soil	Sandy Soil	Clay	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Cresols	T16	AR	0.01	mg/kg	<0.01	**0.02**	<0.01	**0.02**	**0.14**	**0.37**	<0.01	**0.55**
Phenol	T149	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	**0.20**	**0.16**	<0.01	**0.18**
Xylenols	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
Phenols (Speciated)

				SAL Reference	293783 019	293783 020	293783 023	293783 025	293783 028	293783 029	293783 032	293783 034
				Customer Sample Reference	TP04 3.0	TP05 0.1	TP05 2.0	TP06 0.1	TP07 0.5	TP07 1.0	TP08 0.5	TP08 2.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	3.0	0.1	2.0	0.1	0.5	1.0	0.5	2.0
				Type	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Clay
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Cresols	T16	AR	0.01	mg/kg	**0.09**	<0.01	**0.61**	**0.06**	<0.01	<0.01	**0.02**	<0.01
Phenol	T149	AR	0.01	mg/kg	<0.01	<0.01	**0.29**	<0.01	**1.7**	<0.01	<0.01	<0.01
Xylenols	T16	AR	0.01	mg/kg	**0.02**	<0.01	**0.12**	<0.01	<0.01	<0.01	<0.01	<0.01

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
Phenols (Speciated)

				SAL Reference	293783 036	293783 038	293783 039	293783 041	293783 043	293783 045	293783 047	293783 053
				Customer Sample Reference	TP09 0.1	TP10 0.1	TP10 0.5	TP10 2.0	TP11 0.5	TP11 2.0	TP12 0.5	TP13 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.1	0.1	0.5	2.0	0.5	2.0	0.5	1.0
				Type	Topsoil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Topsoil	Clay
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Cresols	T16	AR	0.01	mg/kg	<0.01	**0.48**	<0.01	<0.01	<0.01	<0.01	**0.06**	**0.06**
Phenol	T149	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenols	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
Phenols (Speciated)

				SAL Reference	293783 057
				Customer Sample Reference	TP14 0.5
				Date Sampled	22-AUG-2012
				Bottom Depth	0.5
				Type	Topsoil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
Cresols	T16	AR	0.01	mg/kg	**0.10**
Phenol	T149	AR	0.01	mg/kg	<0.01
Xylenols	T16	AR	0.01	mg/kg	<0.01

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
PCB EC7

				SAL Reference	293783 002	293783 005	293783 006	293783 008	293783 011	293783 013	293783 015	293783 017
				Customer Sample Reference	TP01 0.5	TP01 3.0	TP02 0.1	TP02 1.0	TP03 0.5	TP03 2.0	TP04 0.1	TP04 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.5	3.0	0.1	1.0	0.5	2.0	0.1	1.0
				Type	Sandy Soil	Sandy Soil	Topsoil	Clay	Sandy Soil	Sandy Soil	Clay	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
PCB BZ#28	T1	M105	0.05	µg/kg	**1.2**	**8.9**	**22**	**2.1**	**37**	**160**	**13**	**0.66**
PCB BZ#52	T1	M105	0.05	µg/kg	**1.2**	**32**	**47**	**3.8**	**25**	**120**	**28**	**0.58**
PCB BZ#101	T1	M105	0.05	µg/kg	**1.3**	**31**	**57**	**6.9**	**17**	**84**	**20**	**0.49**
PCB BZ#118	T1	M105	0.05	µg/kg	**0.71**	**19**	**42**	**6.5**	**12**	**61**	**13**	**0.36**
PCB BZ#153	T1	M105	0.05	µg/kg	**0.77**	**19**	**43**	**5.8**	**8.5**	**48**	**11**	**0.37**
PCB BZ#138	T1	M105	0.05	µg/kg	**1.0**	**24**	**57**	**9.0**	**11**	**69**	**15**	**0.47**
PCB BZ#180	T1	M105	0.05	µg/kg	**0.36**	**5.3**	**17**	**1.6**	**3.0**	**24**	**4.2**	**0.19**

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
PCB EC7

				SAL Reference	293783 019	293783 020	293783 023	293783 025	293783 028	293783 029	293783 032	293783 034
				Customer Sample Reference	TP04 3.0	TP05 0.1	TP05 2.0	TP06 0.1	TP07 0.5	TP07 1.0	TP08 0.5	TP08 2.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	3.0	0.1	2.0	0.1	0.5	1.0	0.5	2.0
				Type	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Clay
Determinand	Method	Test Sample	LOD	Units								
PCB BZ#28	T1	M105	0.05	µg/kg	**31**	**1.7**	**38**	**3.1**	**1.1**	**0.70**	**1.0**	**0.16**
PCB BZ#52	T1	M105	0.05	µg/kg	**54**	**3.2**	**39**	**4.8**	**2.1**	**2.4**	**0.67**	**0.16**
PCB BZ#101	T1	M105	0.05	µg/kg	**44**	**3.7**	**40**	**5.9**	**1.8**	**2.3**	**0.19**	**0.15**
PCB BZ#118	T1	M105	0.05	µg/kg	**33**	**2.1**	**27**	**2.5**	**0.90**	**1.0**	**0.08**	**0.06**
PCB BZ#153	T1	M105	0.05	µg/kg	**26**	**3.5**	**21**	**3.7**	**0.70**	**1.2**	**0.18**	**0.26**
PCB BZ#138	T1	M105	0.05	µg/kg	**35**	**4.3**	**32**	**5.8**	**1.1**	**1.6**	**0.19**	**0.27**
PCB BZ#180	T1	M105	0.05	µg/kg	**8.6**	**1.4**	**7.5**	**2.0**	**0.60**	**0.60**	**0.23**	**0.43**

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
PCB EC7

				SAL Reference	293783 036	293783 038	293783 039	293783 041	293783 043	293783 045	293783 047	293783 053
				Customer Sample Reference	TP09 0.1	TP10 0.1	TP10 0.5	TP10 2.0	TP11 0.5	TP11 2.0	TP12 0.5	TP13 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.1	0.1	0.5	2.0	0.5	2.0	0.5	1.0
				Type	Topsoil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Topsoil	Clay
Determinand	Method	Test Sample	LOD	Units								
PCB BZ#28	T1	M105	0.05	µg/kg	<0.05	**0.80**	(9) <0.50	(9) <0.50	**0.19**	<0.05	<0.05	<0.05
PCB BZ#52	T1	M105	0.05	µg/kg	<0.05	(9) <0.50	(9) <0.50	(9) <0.50	**0.25**	<0.05	**0.08**	<0.05
PCB BZ#101	T1	M105	0.05	µg/kg	<0.05	(9) <0.50	(9) <0.50	(9) <0.50	**0.49**	<0.05	**0.12**	<0.05
PCB BZ#118	T1	M105	0.05	µg/kg	<0.05	(9) <0.50	(9) <0.50	(9) <0.50	**0.40**	<0.05	**0.07**	<0.05
PCB BZ#153	T1	M105	0.05	µg/kg	<0.05	**0.70**	(9) <0.50	(9) <0.50	**0.25**	<0.05	**0.09**	<0.05
PCB BZ#138	T1	M105	0.05	µg/kg	<0.05	(9) <0.50	(9) <0.50	(9) <0.50	**0.46**	<0.05	**0.12**	<0.05
PCB BZ#180	T1	M105	0.05	µg/kg	**0.07**	**0.80**	(9) <0.50	(9) <0.50	**0.10**	<0.05	**0.06**	<0.05

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
PCB EC7

				SAL Reference	293783 057
				Customer Sample Reference	TP14 0.5
				Date Sampled	22-AUG-2012
				Bottom Depth	0.5
				Type	Topsoil
Determinand	Method	Test Sample	LOD	Units	
PCB BZ#28	T1	M105	0.05	µg/kg	<0.05
PCB BZ#52	T1	M105	0.05	µg/kg	<0.05
PCB BZ#101	T1	M105	0.05	µg/kg	<0.05
PCB BZ#118	T1	M105	0.05	µg/kg	<0.05
PCB BZ#153	T1	M105	0.05	µg/kg	<0.05
PCB BZ#138	T1	M105	0.05	µg/kg	<0.05
PCB BZ#180	T1	M105	0.05	µg/kg	**0.06**

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
Volatile Organic Compounds (USEPA 624) (MCERTS)

				SAL Reference	293783 002	293783 005	293783 006	293783 008	293783 011	293783 013	293783 015	293783 017
				Customer Sample Reference	TP01 0.5	TP01 3.0	TP02 0.1	TP02 1.0	TP03 0.5	TP03 2.0	TP04 0.1	TP04 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.5	3.0	0.1	1.0	0.5	2.0	0.1	1.0
				Type	Sandy Soil	Sandy Soil	Topsoil	Clay	Sandy Soil	Sandy Soil	Clay	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
1,1,1,2-Tetrachloroethane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
1,1,1-Trichloroethane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
1,1,2,2-Tetrachloroethane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
1,1,2-Trichloroethane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
1,1-Dichloroethane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
1,1-Dichloroethylene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
1,1-Dichloropropene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
1,2,3-Trichloropropane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
1,2,4-Trimethylbenzene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
1,2-dibromoethane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
1,2-Dichlorobenzene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
1,2-Dichloroethane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
1,2-Dichloropropane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
1,3,5-Trimethylbenzene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
1,3-Dichlorobenzene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
1,3-Dichloropropane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
1,4-Dichlorobenzene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
2,2-Dichloropropane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
2-Chlorotoluene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
4-Chlorotoluene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Benzene	T209	M105	10	µg/kg	(2) <20	(2) <20	<10	<10	<10	<10	<10	<10
Bromobenzene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Bromochloromethane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Bromodichloromethane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Bromoform	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Bromomethane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Carbon tetrachloride	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Chlorobenzene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Chlorodibromomethane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Chloroethane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Chloroform	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Chloromethane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Cis-1,2-Dichloroethylene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Cis-1,3-Dichloropropene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Dibromomethane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Dichlorodifluoromethane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Dichloromethane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
EthylBenzene	T209	M105	10	µg/kg	(2) <20	(2) <20	<10	<10	**110**	**37**	<10	<10
Isopropyl benzene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
M/P Xylene	T209	M105	10	µg/kg	(2) <20	(2) <20	<10	<10	**420**	**60**	<10	<10
n-Propylbenzene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
O Xylene	T209	M105	10	µg/kg	(2) <20	(2) <20	<10	<10	**84**	**23**	<10	<10
p-Isopropyltoluene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	**56**	<50	<50
S-Butylbenzene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Styrene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
T-Butylbenzene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Tetrachloroethene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Toluene	T209	M105	10	µg/kg	(2) <20	(2) <20	<10	<10	<10	**17**	<10	<10
Trans-1,2-Dichloroethene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Trans-1,3-Dichloropropene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Trichloroethene	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Trichlorofluoromethane	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50
Vinyl chloride	T209	M105	50	µg/kg	(2) <100	(2) <100	<50	<50	<50	<50	<50	<50

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
Volatile Organic Compounds (USEPA 624) (MCERTS)

				SAL Reference	293783 019	293783 020	293783 023	293783 025	293783 028	293783 029	293783 032	293783 034
				Customer Sample Reference	TP04 3.0	TP05 0.1	TP05 2.0	TP06 0.1	TP07 0.5	TP07 1.0	TP08 0.5	TP08 2.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	3.0	0.1	2.0	0.1	0.5	1.0	0.5	2.0
				Type	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Clay
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
1,1,1,2-Tetrachloroethane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
1,1,1-Trichloroethane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
1,1,2,2-Tetrachloroethane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
1,1,2-Trichloroethane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
1,1-Dichloroethane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
1,1-Dichloroethylene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
1,1-Dichloropropene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
1,2,3-Trichloropropane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
1,2,4-Trimethylbenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
1,2-dibromoethane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
1,2-Dichlorobenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
1,2-Dichloroethane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
1,2-Dichloropropane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
1,3,5-Trimethylbenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
1,3-Dichlorobenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
1,3-Dichloropropane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
1,4-Dichlorobenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
2,2-Dichloropropane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
2-Chlorotoluene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
4-Chlorotoluene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Benzene	T209	M105	10	µg/kg	<10	<10	<10	<10	<10	<10	<10	<10
Bromobenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Bromochloromethane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Bromodichloromethane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Bromoform	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Bromomethane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Carbon tetrachloride	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Chlorobenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Chlorodibromomethane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Chloroethane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Chloroform	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Chloromethane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Cis-1,2-Dichloroethylene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Cis-1,3-Dichloropropene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Dibromomethane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Dichlorodifluoromethane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Dichloromethane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
EthylBenzene	T209	M105	10	µg/kg	<10	<10	<10	<10	<10	<10	<10	<10
Isopropyl benzene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
M/P Xylene	T209	M105	10	µg/kg	<10	<10	<10	<10	<10	<10	<10	<10
n-Propylbenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
O Xylene	T209	M105	10	µg/kg	<10	<10	<10	<10	<10	<10	<10	<10
p-Isopropyltoluene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
S-Butylbenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Styrene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
T-Butylbenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Tetrachloroethene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Toluene	T209	M105	10	µg/kg	<10	<10	<10	<10	<10	<10	<10	<10
Trans-1,2-Dichloroethene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Trans-1,3-Dichloropropene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Trichloroethene	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Trichlorofluoromethane	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50
Vinyl chloride	T209	M105	50	µg/kg	<50	<50	<50	<50	<50	<50	<50	<50

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
Volatile Organic Compounds (USEPA 624) (MCERTS)

				SAL Reference	**293783 036**	**293783 038**	**293783 039**	**293783 041**	**293783 043**	**293783 045**	**293783 047**	**293783 053**
				Customer Sample Reference	**TP09 0.1**	**TP10 0.1**	**TP10 0.5**	**TP10 2.0**	**TP11 0.5**	**TP11 2.0**	**TP12 0.5**	**TP13 1.0**
				Date Sampled	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**
				Bottom Depth	**0.1**	**0.1**	**0.5**	**2.0**	**0.5**	**2.0**	**0.5**	**1.0**
				Type	**Topsoil**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**	**Clay**	**Topsoil**	**Clay**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
1,1,1,2-Tetrachloroethane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
1,1,1-Trichloroethane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
1,1,2,2-Tetrachloroethane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
1,1,2-Trichloroethane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
1,1-Dichloroethane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
1,1-Dichloroethylene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
1,1-Dichloropropene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
1,2,3-Trichloropropane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
1,2,4-Trimethylbenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
1,2-dibromoethane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
1,2-Dichlorobenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
1,2-Dichloroethane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
1,2-Dichloropropane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
1,3,5-Trimethylbenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
1,3-Dichlorobenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
1,3-Dichloropropane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
1,4-Dichlorobenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
2,2-Dichloropropane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
2-Chlorotoluene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
4-Chlorotoluene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Benzene	T209	M105	10	µg/kg	<10	<10	<10	<10	(2) <20	<10	<10	<10
Bromobenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Bromochloromethane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Bromodichloromethane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Bromoform	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Bromomethane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Carbon tetrachloride	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Chlorobenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Chlorodibromomethane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Chloroethane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Chloroform	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Chloromethane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Cis-1,2-Dichloroethylene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Cis-1,3-Dichloropropene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Dibromomethane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Dichlorodifluoromethane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Dichloromethane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
EthylBenzene	T209	M105	10	µg/kg	<10	<10	<10	<10	(2) <20	<10	<10	<10
Isopropyl benzene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
M/P Xylene	T209	M105	10	µg/kg	<10	<10	<10	<10	(2) <20	<10	<10	<10
n-Propylbenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
O Xylene	T209	M105	10	µg/kg	<10	<10	<10	<10	(2) <20	<10	<10	<10
p-Isopropyltoluene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
S-Butylbenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Styrene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
T-Butylbenzene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Tetrachloroethene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Toluene	T209	M105	10	µg/kg	<10	<10	<10	<10	(2) <20	<10	<10	<10
Trans-1,2-Dichloroethene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Trans-1,3-Dichloropropene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Trichloroethene	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Trichlorofluoromethane	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50
Vinyl chloride	T209	M105	50	µg/kg	<50	<50	<50	<50	(2) <100	<50	<50	<50

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Soil Analysed as Soil
Volatile Organic Compounds (USEPA 624) (MCERTS)

				SAL Reference	293783 057
				Customer Sample Reference	TP14 0.5
				Date Sampled	22-AUG-2012
				Bottom Depth	0.5
				Type	Topsoil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
1,1,1,2-Tetrachloroethane	T209	M105	50	µg/kg	<50
1,1,1-Trichloroethane	T209	M105	50	µg/kg	<50
1,1,2,2-Tetrachloroethane	T209	M105	50	µg/kg	<50
1,1,2-Trichloroethane	T209	M105	50	µg/kg	<50
1,1-Dichloroethane	T209	M105	50	µg/kg	<50
1,1-Dichloroethylene	T209	M105	50	µg/kg	<50
1,1-Dichloropropene	T209	M105	50	µg/kg	<50
1,2,3-Trichloropropane	T209	M105	50	µg/kg	<50
1,2,4-Trimethylbenzene	T209	M105	50	µg/kg	<50
1,2-dibromoethane	T209	M105	50	µg/kg	<50
1,2-Dichlorobenzene	T209	M105	50	µg/kg	<50
1,2-Dichloroethane	T209	M105	50	µg/kg	<50
1,2-Dichloropropane	T209	M105	50	µg/kg	<50
1,3,5-Trimethylbenzene	T209	M105	50	µg/kg	<50
1,3-Dichlorobenzene	T209	M105	50	µg/kg	<50
1,3-Dichloropropane	T209	M105	50	µg/kg	<50
1,4-Dichlorobenzene	T209	M105	50	µg/kg	<50
2,2-Dichloropropane	T209	M105	50	µg/kg	<50
2-Chlorotoluene	T209	M105	50	µg/kg	<50
4-Chlorotoluene	T209	M105	50	µg/kg	<50
Benzene	T209	M105	10	µg/kg	<10
Bromobenzene	T209	M105	50	µg/kg	<50
Bromochloromethane	T209	M105	50	µg/kg	<50
Bromodichloromethane	T209	M105	50	µg/kg	<50
Bromoform	T209	M105	50	µg/kg	<50
Bromomethane	T209	M105	50	µg/kg	<50
Carbon tetrachloride	T209	M105	50	µg/kg	<50
Chlorobenzene	T209	M105	50	µg/kg	<50
Chlorodibromomethane	T209	M105	50	µg/kg	<50
Chloroethane	T209	M105	50	µg/kg	<50
Chloroform	T209	M105	50	µg/kg	<50
Chloromethane	T209	M105	50	µg/kg	<50
Cis-1,2-Dichloroethylene	T209	M105	50	µg/kg	<50
Cis-1,3-Dichloropropene	T209	M105	50	µg/kg	<50
Dibromomethane	T209	M105	50	µg/kg	<50
Dichlorodifluoromethane	T209	M105	50	µg/kg	<50
Dichloromethane	T209	M105	50	µg/kg	<50
EthylBenzene	T209	M105	10	µg/kg	<10
Isopropyl benzene	T209	M105	50	µg/kg	<50
M/P Xylene	T209	M105	10	µg/kg	<10
n-Propylbenzene	T209	M105	50	µg/kg	<50
O Xylene	T209	M105	10	µg/kg	<10
p-Isopropyltoluene	T209	M105	50	µg/kg	<50
S-Butylbenzene	T209	M105	50	µg/kg	<50
Styrene	T209	M105	50	µg/kg	<50
T-Butylbenzene	T209	M105	50	µg/kg	<50
Tetrachloroethene	T209	M105	50	µg/kg	<50
Toluene	T209	M105	10	µg/kg	<10
Trans-1,2-Dichloroethene	T209	M105	50	µg/kg	<50
Trans-1,3-Dichloropropene	T209	M105	50	µg/kg	<50
Trichloroethene	T209	M105	50	µg/kg	<50
Trichlorofluoromethane	T209	M105	50	µg/kg	<50
Vinyl chloride	T209	M105	50	µg/kg	<50

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				SAL Reference	**293783 002**	**293783 005**	**293783 006**	**293783 008**	**293783 011**	**293783 013**	**293783 015**	**293783 017**
				Customer Sample Reference	**TP01 0.5**	**TP01 3.0**	**TP02 0.1**	**TP02 1.0**	**TP03 0.5**	**TP03 2.0**	**TP04 0.1**	**TP04 1.0**
				Date Sampled	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**
				Bottom Depth	**0.5**	**3.0**	**0.1**	**1.0**	**0.5**	**2.0**	**0.1**	**1.0**
				Type	**Sandy Soil**	**Sandy Soil**	**Topsoil**	**Clay**	**Sandy Soil**	**Sandy Soil**	**Clay**	**Sandy Soil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Ammoniacal nitrogen	T4	10:1	0.05	mg/l	**0.14**	<0.05	**0.06**	<0.05	<0.05	<0.05	<0.05	**1.9**
Sb (Dissolved)	T281	10:1	1	µg/l	**3**	**16**	**11**	**14**	**37**	**81**	**11**	**12**
As (Dissolved)	T281	10:1	0.2	µg/l	**0.8**	**10**	**7.1**	**8.7**	**2.5**	**5.0**	**2.5**	**10**
Ba (Dissolved)	T281	10:1	1	µg/l	**54**	**54**	**25**	**60**	**72**	**57**	**44**	**18**
Be (Dissolved)	T281	10:1	0.05	µg/l	**0.17**	**0.18**	**0.14**	**0.23**	**0.17**	**0.20**	**0.29**	**0.17**
Boron	T6	10:1	0.01	mg/l	**0.17**	**0.14**	**0.05**	**0.17**	**0.65**	**1.1**	**0.91**	**0.33**
Cd (Dissolved)	T281	10:1	0.02	µg/l	**0.13**	**0.13**	**0.12**	**0.36**	**0.18**	**0.22**	**0.18**	**0.15**
Chloride	T686	10:1	0.5	mg/l	**2.1**	**1.2**	**1.6**	**1.5**	**1.6**	**3.9**	**1.7**	**3.4**
Cr (Dissolved)	T281	10:1	1	µg/l	**10**	**51**	**22**	**13**	**4**	**11**	**21**	**6**
Cu (Dissolved)	T281	10:1	0.5	µg/l	**3.9**	**6.4**	**14**	**5.5**	**2.2**	**27**	**16**	**13**
Cyanide(Total)	T4	10:1	0.05	mg/l	**0.05**	**0.05**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cyanide(free)	T4	10:1	0.05	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	T6	10:1	0.01	mg/l	<0.01	<0.01	**0.01**	<0.01	<0.01	<0.01	**0.05**	**0.05**
Pb (Dissolved)	T281	10:1	0.3	µg/l	<0.3	**0.5**	**1.2**	**0.4**	**0.8**	**1.1**	**0.8**	**1.9**
Hg (Dissolved)	T281	10:1	0.05	µg/l	**0.22**	**0.61**	**0.49**	**0.42**	**0.27**	**1.2**	**0.52**	**0.15**
Mo (Dissolved)	T281	10:1	1	µg/l	**16**	**11**	**10**	**120**	**33**	**51**	**27**	**10**
Ni (Dissolved)	T281	10:1	1	µg/l	**6**	**2**	**1**	**2**	**6**	**11**	**4**	**7**
pH	T7	10:1			**7.7**	**8.9**	**9.3**	**8.6**	**8.9**	**10.4**	**8.8**	**6.1**
Se (Dissolved)	T281	10:1	0.5	µg/l	**0.7**	**1.4**	**1.0**	**3.8**	**1.0**	**2.5**	**1.3**	**2.6**
Sulphate	T686	10:1	0.1	mg/l	**230**	**94**	**6.9**	**31**	**210**	**150**	**23**	**47**
Sulphide	T4	10:1	0.05	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphur(Free)	T2	10:1	10	mg/l	<10	<10	<10	<10	<10	<10	<10	<10
Zn (Dissolved)	T281	10:1	2	µg/l	**6**	**6**	**7**	**6**	**4**	**12**	**6**	**10**

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				SAL Reference	293783 019	293783 020	293783 023	293783 025	293783 028	293783 029	293783 032	293783 034
				Customer Sample Reference	TP04 3.0	TP05 0.1	TP05 2.0	TP06 0.1	TP07 0.5	TP07 1.0	TP08 0.5	TP08 2.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	3.0	0.1	2.0	0.1	0.5	1.0	0.5	2.0
				Type	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Clay
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Ammoniacal nitrogen	T4	10:1	0.05	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sb (Dissolved)	T281	10:1	1	µg/l	26	2	41	4	4	4	7	7
As (Dissolved)	T281	10:1	0.2	µg/l	6.3	2.1	5.6	3.0	1.1	3.1	3.0	2.3
Ba (Dissolved)	T281	10:1	1	µg/l	67	30	72	38	110	130	42	67
Be (Dissolved)	T281	10:1	0.05	µg/l	0.22	0.23	0.20	0.20	0.23	0.29	0.22	0.24
Boron	T6	10:1	0.01	mg/l	0.51	0.10	0.81	0.07	0.15	0.19	0.04	0.07
Cd (Dissolved)	T281	10:1	0.02	µg/l	0.30	0.14	0.24	0.12	0.20	0.19	0.14	0.21
Chloride	T686	10:1	0.5	mg/l	11	1.6	4.1	1.1	1.2	1.8	1.4	1.2
Cr (Dissolved)	T281	10:1	1	µg/l	9	9	10	12	9	9	8	6
Cu (Dissolved)	T281	10:1	0.5	µg/l	16	4.5	17	13	5.4	7.7	3.8	5.4
Cyanide(Total)	T4	10:1	0.05	mg/l	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cyanide(free)	T4	10:1	0.05	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	T6	10:1	0.01	mg/l	0.06	0.05	0.01	0.04	<0.01	<0.01	<0.01	<0.01
Pb (Dissolved)	T281	10:1	0.3	µg/l	0.8	0.5	1.5	1.1	0.3	0.5	0.6	0.5
Hg (Dissolved)	T281	10:1	0.05	µg/l	0.48	0.15	0.42	0.20	0.10	0.11	0.08	0.09
Mo (Dissolved)	T281	10:1	1	µg/l	56	13	46	9	35	31	7	19
Ni (Dissolved)	T281	10:1	1	µg/l	10	1	9	2	9	10	2	4
pH	T7	10:1			9.4	8.7	8.8	8.5	7.8	7.5	8.3	8.1
Se (Dissolved)	T281	10:1	0.5	µg/l	3.6	0.9	2.5	1.1	0.8	1.1	0.8	1.2
Sulphate	T686	10:1	0.1	mg/l	490	7.1	120	0.2	360	470	90	210
Sulphide	T4	10:1	0.05	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphur(Free)	T2	10:1	10	mg/l	<10	<10	<10	<10	<10	<10	<10	<10
Zn (Dissolved)	T281	10:1	2	µg/l	7	4	10	6	7	11	5	9

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				SAL Reference	293783 036	293783 038	293783 039	293783 041	293783 043	293783 045	293783 047	293783 053
				Customer Sample Reference	TP09 0.1	TP10 0.1	TP10 0.5	TP10 2.0	TP11 0.5	TP11 2.0	TP12 0.5	TP13 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.1	0.1	0.5	2.0	0.5	2.0	0.5	1.0
				Type	Topsoil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Topsoil	Clay
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Ammoniacal nitrogen	T4	10:1	0.05	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	**0.86**	<0.05	<0.05
Sb (Dissolved)	T281	10:1	1	µg/l	<1	**4**	<1	<1	<1	<1	<1	<1
As (Dissolved)	T281	10:1	0.2	µg/l	**2.2**	**0.9**	**1.7**	**1.2**	**0.7**	**1.6**	**1.0**	**1.0**
Ba (Dissolved)	T281	10:1	1	µg/l	**13**	**52**	**61**	**33**	**19**	**3**	**31**	**20**
Be (Dissolved)	T281	10:1	0.05	µg/l	**0.23**	**0.11**	**0.13**	**0.22**	**0.22**	**0.22**	**0.24**	**0.18**
Boron	T6	10:1	0.01	mg/l	**0.02**	**0.31**	**0.23**	**0.05**	**0.03**	**0.02**	**0.01**	**0.02**
Cd (Dissolved)	T281	10:1	0.02	µg/l	**0.13**	**0.13**	**0.11**	**0.15**	**0.14**	**0.13**	**0.17**	**0.14**
Chloride	T686	10:1	0.5	mg/l	**1.6**	**4.3**	**15**	**8.1**	**2.0**	**2.2**	**1.5**	**1.3**
Cr (Dissolved)	T281	10:1	1	µg/l	**7**	**7**	**6**	**8**	**6**	**2**	**6**	**5**
Cu (Dissolved)	T281	10:1	0.5	µg/l	**6.4**	**2.4**	**1.3**	**5.2**	**2.4**	**2.0**	**2.7**	**2.3**
Cyanide(Total)	T4	10:1	0.05	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cyanide(free)	T4	10:1	0.05	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	T6	10:1	0.01	mg/l	**0.05**	<0.01	**0.16**	<0.01	**0.01**	**0.27**	**0.05**	**0.12**
Pb (Dissolved)	T281	10:1	0.3	µg/l	**0.4**	**0.4**	**0.3**	<0.3	<0.3	**0.3**	**0.4**	<0.3
Hg (Dissolved)	T281	10:1	0.05	µg/l	**0.06**	<0.05	<0.05	**0.05**	<0.05	<0.05	**0.09**	<0.05
Mo (Dissolved)	T281	10:1	1	µg/l	<1	**10**	**11**	**2**	**2**	<1	**2**	**3**
Ni (Dissolved)	T281	10:1	1	µg/l	**2**	**26**	**13**	**4**	**2**	<1	**1**	**1**
pH	T7	10:1			**6.5**	**7.2**	**7.5**	**7.5**	**8.0**	**5.1**	**7.7**	**8.0**
Se (Dissolved)	T281	10:1	0.5	µg/l	**0.9**	**0.8**	**1.0**	**0.8**	**0.5**	<0.5	**0.5**	<0.5
Sulphate	T686	10:1	0.1	mg/l	**1.7**	**1400**	**920**	**160**	**31**	**6.2**	**0.6**	**0.6**
Sulphide	T4	10:1	0.05	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphur(Free)	T2	10:1	10	mg/l	<10	<10	<10	<10	<10	<10	<10	<10
Zn (Dissolved)	T281	10:1	2	µg/l	**6**	**58**	**4**	**4**	**4**	**5**	**7**	**4**

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				SAL Reference	293783 057
				Customer Sample Reference	TP14 0.5
				Date Sampled	22-AUG-2012
				Bottom Depth	0.5
				Type	Topsoil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
Ammoniacal nitrogen	T4	10:1	0.05	mg/l	<0.05
Sb (Dissolved)	T281	10:1	1	µg/l	<1
As (Dissolved)	T281	10:1	0.2	µg/l	**1.0**
Ba (Dissolved)	T281	10:1	1	µg/l	**26**
Be (Dissolved)	T281	10:1	0.05	µg/l	**0.22**
Boron	T6	10:1	0.01	mg/l	**0.02**
Cd (Dissolved)	T281	10:1	0.02	µg/l	**0.16**
Chloride	T686	10:1	0.5	mg/l	**1.4**
Cr (Dissolved)	T281	10:1	1	µg/l	**5**
Cu (Dissolved)	T281	10:1	0.5	µg/l	**2.9**
Cyanide(Total)	T4	10:1	0.05	mg/l	<0.05
Cyanide(free)	T4	10:1	0.05	mg/l	<0.05
Iron	T6	10:1	0.01	mg/l	**0.06**
Pb (Dissolved)	T281	10:1	0.3	µg/l	**0.3**
Hg (Dissolved)	T281	10:1	0.05	µg/l	<0.05
Mo (Dissolved)	T281	10:1	1	µg/l	**2**
Ni (Dissolved)	T281	10:1	1	µg/l	**1**
pH	T7	10:1			**8.0**
Se (Dissolved)	T281	10:1	0.5	µg/l	**0.5**
Sulphate	T686	10:1	0.1	mg/l	**0.6**
Sulphide	T4	10:1	0.05	mg/l	<0.05
Sulphur(Free)	T2	10:1	10	mg/l	<10
Zn (Dissolved)	T281	10:1	2	µg/l	**4**

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				SAL Reference	293783 002	293783 005	293783 006	293783 008	293783 011	293783 013	293783 015	293783 017
				Customer Sample Reference	TP01 0.5	TP01 3.0	TP02 0.1	TP02 1.0	TP03 0.5	TP03 2.0	TP04 0.1	TP04 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.5	3.0	0.1	1.0	0.5	2.0	0.1	1.0
				Type	Sandy Soil	Sandy Soil	Topsoil	Clay	Sandy Soil	Sandy Soil	Clay	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Dissolved Organic Carbon	T21	10:1	1	mg/l	**6**	**4**	**7**	**4**	**10**	**40**	**9**	**23**
Gasoline Range Organics	T215	10:1	10	µg/l	<10	<10	<10	<10	<10	<10	<10	<10
TPH (C10-C35)	T81	10:1	0.01	mg/l	**0.06**	(100) <0.02	(100) <0.02	(100) <0.02	(100) <0.02	**0.37**	(100) <0.02	**0.36**

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				SAL Reference	293783 019	293783 020	293783 023	293783 025	293783 028	293783 029	293783 032	293783 034
				Customer Sample Reference	TP04 3.0	TP05 0.1	TP05 2.0	TP06 0.1	TP07 0.5	TP07 1.0	TP08 0.5	TP08 2.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	3.0	0.1	2.0	0.1	0.5	1.0	0.5	2.0
				Type	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Clay
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Dissolved Organic Carbon	T21	10:1	1	mg/l	**10**	**3**	**15**	**12**	**6**	**13**	**6**	**3**
Gasoline Range Organics	T215	10:1	10	µg/l	<10	<10	<10	<10	<10	<10	<10	<10
TPH (C10-C35)	T81	10:1	0.01	mg/l	**0.17**	**0.16**	**0.13**	**0.27**	(100) <0.02	(100) <0.02	(100) <0.03	(100) <0.03

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				SAL Reference	293783 036	293783 038	293783 039	293783 041	293783 043	293783 045	293783 047	293783 053
				Customer Sample Reference	TP09 0.1	TP10 0.1	TP10 0.5	TP10 2.0	TP11 0.5	TP11 2.0	TP12 0.5	TP13 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.1	0.1	0.5	2.0	0.5	2.0	0.5	1.0
				Type	Topsoil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Topsoil	Clay
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Dissolved Organic Carbon	T21	10:1	1	mg/l	**15**	**5**	**5**	**5**	**5**	**18**	**4**	**7**
Gasoline Range Organics	T215	10:1	10	µg/l	<10	<10	<10	<10	<10	<10	<10	<10
TPH (C10-C35)	T81	10:1	0.01	mg/l	(100) <0.02	(100) <0.02	(100) <0.02	(100) <0.02	(100) <0.02	**0.69**	**0.15**	(100) <0.02

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Leachate to BS EN 12457-2 (10:1) Analysed as Water
Miscellaneous

				SAL Reference	293783 057
				Customer Sample Reference	TP14 0.5
				Date Sampled	22-AUG-2012
				Bottom Depth	0.5
				Type	Topsoil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
Dissolved Organic Carbon	T21	10:1	1	mg/l	**14**
Gasoline Range Organics	T215	10:1	10	µg/l	<10
TPH (C10-C35)	T81	10:1	0.01	mg/l	(100) <0.02

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Leachate to BS EN 12457-2 (10:1) Analysed as Water
PAH US EPA 16 (B and K split) and Phenol

				SAL Reference	**293783 002**	**293783 005**	**293783 006**	**293783 008**	**293783 011**	**293783 013**	**293783 015**	**293783 017**
				Customer Sample Reference	**TP01 0.5**	**TP01 3.0**	**TP02 0.1**	**TP02 1.0**	**TP03 0.5**	**TP03 2.0**	**TP04 0.1**	**TP04 1.0**
				Date Sampled	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**
				Bottom Depth	**0.5**	**3.0**	**0.1**	**1.0**	**0.5**	**2.0**	**0.1**	**1.0**
				Type	**Sandy Soil**	**Sandy Soil**	**Topsoil**	**Clay**	**Sandy Soil**	**Sandy Soil**	**Clay**	**Sandy Soil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Naphthalene	T149	10:1	0.01	µg/l	**0.42**	**0.28**	**0.09**	**0.04**	**0.05**	**0.07**	**1.5**	**0.27**
Acenaphthylene	T149	10:1	0.01	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.02**	**0.10**
Acenaphthene	T149	10:1	0.01	µg/l	**0.04**	**0.05**	**0.06**	**0.02**	**0.03**	**0.14**	**0.21**	**0.16**
Fluorene	T149	10:1	0.01	µg/l	**0.02**	**0.02**	**0.03**	<0.01	**0.01**	**0.07**	**0.07**	**0.27**
Phenanthrene	T149	10:1	0.01	µg/l	<0.01	**0.03**	**0.05**	<0.01	<0.01	**0.09**	**0.03**	**1.1**
Anthracene	T149	10:1	0.01	µg/l	<0.01	<0.01	**0.02**	<0.01	<0.01	**0.04**	**0.04**	**0.31**
Fluoranthene	T149	10:1	0.01	µg/l	<0.01	<0.01	**0.06**	<0.01	<0.01	**0.06**	<0.01	**0.89**
Pyrene	T149	10:1	0.01	µg/l	<0.01	<0.01	**0.04**	<0.01	<0.01	**0.04**	<0.01	**0.68**
Benzo(a)Anthracene	T149	10:1	0.01	µg/l	<0.01	<0.01	**0.04**	<0.01	<0.01	**0.07**	<0.01	**0.77**
Chrysene	T149	10:1	0.01	µg/l	<0.01	<0.01	**0.03**	<0.01	<0.01	**0.03**	<0.01	**0.62**
Benzo(b)fluoranthene	T149	10:1	0.01	µg/l	<0.01	<0.01	**0.04**	<0.01	<0.01	**0.07**	<0.01	**1.0**
Benzo(k)fluoranthene	T149	10:1	0.01	µg/l	<0.01	<0.01	**0.01**	<0.01	<0.01	**0.02**	<0.01	**0.29**
Benzo(a)Pyrene	T149	10:1	0.01	µg/l	<0.01	<0.01	**0.02**	<0.01	<0.01	**0.03**	<0.01	**0.37**
Indeno(123-cd)Pyrene	T149	10:1	0.01	µg/l	<0.01	<0.01	**0.02**	<0.01	<0.01	**0.02**	<0.01	**0.24**
Dibenzo(ah)Anthracene	T149	10:1	0.01	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.11**
Benzo(ghi)Perylene	T149	10:1	0.01	µg/l	<0.01	<0.01	**0.02**	<0.01	<0.01	**0.01**	<0.01	**0.19**
PAH(total)	T149	10:1	0.01	µg/l	**0.48**	**0.33**	**0.51**	**0.06**	<0.01	**0.76**	**0.37**	**7.4**
Phenol	T149	10:1	0.5	µg/l	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

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Project Site: Nant Llesg
Customer Reference: G132

Leachate to BS EN 12457-2 (10:1) Analysed as Water
PAH US EPA 16 (B and K split) and Phenol

				SAL Reference	**293783 019**	**293783 020**	**293783 023**	**293783 025**	**293783 028**	**293783 029**	**293783 032**	**293783 034**
				Customer Sample Reference	**TP04 3.0**	**TP05 0.1**	**TP05 2.0**	**TP06 0.1**	**TP07 0.5**	**TP07 1.0**	**TP08 0.5**	**TP08 2.0**
				Date Sampled	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**	**22-AUG-2012**
				Bottom Depth	**3.0**	**0.1**	**2.0**	**0.1**	**0.5**	**1.0**	**0.5**	**2.0**
				Type	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**	**Clay**	**Clay**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Naphthalene	T149	10:1	0.01	µg/l	**0.04**	**0.03**	**0.07**	**0.15**	**0.03**	**0.14**	**0.09**	**0.06**
Acenaphthylene	T149	10:1	0.01	µg/l	<0.01	<0.01	<0.01	**0.01**	<0.01	**0.06**	<0.01	<0.01
Acenaphthene	T149	10:1	0.01	µg/l	**0.04**	**0.03**	**0.04**	**0.05**	**0.03**	**0.12**	**0.03**	<0.01
Fluorene	T149	10:1	0.01	µg/l	**0.02**	**0.02**	**0.03**	**0.05**	**0.02**	**0.16**	**0.02**	<0.01
Phenanthrene	T149	10:1	0.01	µg/l	**0.03**	**0.05**	**0.07**	**0.24**	<0.01	**0.26**	**0.06**	<0.01
Anthracene	T149	10:1	0.01	µg/l	<0.01	<0.01	**0.03**	**0.04**	<0.01	**0.11**	**0.02**	<0.01
Fluoranthene	T149	10:1	0.01	µg/l	<0.01	**0.02**	**0.07**	**0.14**	**0.02**	**0.44**	**0.04**	<0.01
Pyrene	T149	10:1	0.01	µg/l	<0.01	**0.02**	**0.06**	**0.12**	**0.02**	**0.33**	**0.03**	<0.01
Benzo(a)Anthracene	T149	10:1	0.01	µg/l	<0.01	**0.01**	**0.06**	**0.11**	**0.03**	**0.49**	**0.04**	<0.01
Chrysene	T149	10:1	0.01	µg/l	<0.01	**0.02**	**0.05**	**0.12**	**0.02**	**0.28**	**0.04**	<0.01
Benzo(b)fluoranthene	T149	10:1	0.01	µg/l	<0.01	<0.01	**0.09**	**0.14**	**0.03**	**0.56**	**0.06**	<0.01
Benzo(k)fluoranthene	T149	10:1	0.01	µg/l	<0.01	<0.01	**0.02**	**0.07**	**0.01**	**0.24**	**0.02**	<0.01
Benzo(a)Pyrene	T149	10:1	0.01	µg/l	<0.01	<0.01	**0.02**	**0.05**	<0.01	**0.29**	**0.02**	<0.01
Indeno(123-cd)Pyrene	T149	10:1	0.01	µg/l	<0.01	<0.01	**0.02**	**0.05**	<0.01	**0.20**	**0.02**	<0.01
Dibenzo(ah)Anthracene	T149	10:1	0.01	µg/l	<0.01	<0.01	**0.01**	**0.03**	<0.01	**0.10**	<0.01	<0.01
Benzo(ghi)Perylene	T149	10:1	0.01	µg/l	<0.01	<0.01	**0.02**	**0.04**	<0.01	**0.13**	**0.02**	<0.01
PAH(total)	T149	10:1	0.01	µg/l	**0.13**	**0.20**	**0.66**	**1.4**	**0.21**	**3.9**	**0.51**	**0.06**
Phenol	T149	10:1	0.5	µg/l	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

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Leachate to BS EN 12457-2 (10:1) Analysed as Water
PAH US EPA 16 (B and K split) and Phenol

				SAL Reference	293783 036	293783 038	293783 039	293783 041	293783 043	293783 045	293783 047	293783 053
				Customer Sample Reference	TP09 0.1	TP10 0.1	TP10 0.5	TP10 2.0	TP11 0.5	TP11 2.0	TP12 0.5	TP13 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.1	0.1	0.5	2.0	0.5	2.0	0.5	1.0
				Type	Topsoil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Topsoil	Clay
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Naphthalene	T149	10:1	0.01	µg/l	**0.10**	**0.07**	<0.01	**0.16**	**0.06**	**0.30**	**0.36**	**0.06**
Acenaphthylene	T149	10:1	0.01	µg/l	**0.03**	<0.01	<0.01	<0.01	<0.01	**0.02**	**0.06**	<0.01
Acenaphthene	T149	10:1	0.01	µg/l	**0.09**	<0.01	<0.01	**0.12**	**0.03**	**0.14**	**0.20**	**0.04**
Fluorene	T149	10:1	0.01	µg/l	**0.10**	<0.01	<0.01	**0.04**	**0.02**	**0.12**	**0.20**	**0.03**
Phenanthrene	T149	10:1	0.01	µg/l	**0.18**	<0.01	<0.01	**0.03**	<0.01	**0.24**	**0.39**	**0.09**
Anthracene	T149	10:1	0.01	µg/l	**0.07**	<0.01	<0.01	<0.01	<0.01	**0.07**	**0.12**	**0.02**
Fluoranthene	T149	10:1	0.01	µg/l	**0.14**	<0.01	<0.01	<0.01	<0.01	**0.18**	**0.46**	**0.10**
Pyrene	T149	10:1	0.01	µg/l	**0.13**	<0.01	<0.01	<0.01	<0.01	**0.15**	**0.37**	**0.07**
Benzo(a)Anthracene	T149	10:1	0.01	µg/l	**0.16**	<0.01	<0.01	<0.01	<0.01	**0.16**	**0.32**	**0.08**
Chrysene	T149	10:1	0.01	µg/l	**0.11**	<0.01	<0.01	<0.01	<0.01	**0.12**	**0.29**	**0.09**
Benzo(b)fluoranthene	T149	10:1	0.01	µg/l	**0.13**	<0.01	<0.01	<0.01	<0.01	**0.17**	**0.45**	**0.16**
Benzo(k)fluoranthene	T149	10:1	0.01	µg/l	**0.09**	<0.01	<0.01	<0.01	<0.01	**0.06**	**0.13**	**0.06**
Benzo(a)Pyrene	T149	10:1	0.01	µg/l	**0.08**	<0.01	<0.01	<0.01	<0.01	**0.03**	**0.07**	**0.06**
Indeno(123-cd)Pyrene	T149	10:1	0.01	µg/l	**0.08**	<0.01	<0.01	<0.01	<0.01	**0.07**	**0.18**	**0.05**
Dibenzo(ah)Anthracene	T149	10:1	0.01	µg/l	**0.07**	<0.01	<0.01	<0.01	<0.01	**0.04**	**0.07**	**0.03**
Benzo(ghi)Perylene	T149	10:1	0.01	µg/l	**0.05**	<0.01	<0.01	<0.01	<0.01	**0.05**	**0.14**	**0.04**
PAH(total)	T149	10:1	0.01	µg/l	**1.6**	**0.07**	<0.01	<0.01	**0.11**	**1.9**	**3.8**	**0.97**
Phenol	T149	10:1	0.5	µg/l	<0.5	<0.5	<0.5	<0.5	<0.5	**1.1**	<0.5	<0.5

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Leachate to BS EN 12457-2 (10:1) Analysed as Water
PAH US EPA 16 (B and K split) and Phenol

				SAL Reference	293783 057
				Customer Sample Reference	TP14 0.5
				Date Sampled	22-AUG-2012
				Bottom Depth	0.5
				Type	Topsoil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
Naphthalene	T149	10:1	0.01	µg/l	**0.11**
Acenaphthylene	T149	10:1	0.01	µg/l	**0.01**
Acenaphthene	T149	10:1	0.01	µg/l	**0.06**
Fluorene	T149	10:1	0.01	µg/l	**0.07**
Phenanthrene	T149	10:1	0.01	µg/l	**0.22**
Anthracene	T149	10:1	0.01	µg/l	**0.05**
Fluoranthene	T149	10:1	0.01	µg/l	**0.25**
Pyrene	T149	10:1	0.01	µg/l	**0.19**
Benzo(a)Anthracene	T149	10:1	0.01	µg/l	**0.22**
Chrysene	T149	10:1	0.01	µg/l	**0.19**
Benzo(b)fluoranthene	T149	10:1	0.01	µg/l	**0.33**
Benzo(k)fluoranthene	T149	10:1	0.01	µg/l	**0.12**
Benzo(a)Pyrene	T149	10:1	0.01	µg/l	**0.14**
Indeno(123-cd)Pyrene	T149	10:1	0.01	µg/l	**0.11**
Dibenzo(ah)Anthracene	T149	10:1	0.01	µg/l	**0.05**
Benzo(ghi)Perylene	T149	10:1	0.01	µg/l	**0.09**
PAH(total)	T149	10:1	0.01	µg/l	**2.2**
Phenol	T149	10:1	0.5	µg/l	<0.5

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Leachate to BS EN 12457-2 (10:1) Analysed as Water
PCBs EC7 congeners(28,52,101,118,138,153,180)

				SAL Reference	293783 002	293783 005	293783 006	293783 008	293783 011	293783 013	293783 015	293783 017
				Customer Sample Reference	TP01 0.5	TP01 3.0	TP02 0.1	TP02 1.0	TP03 0.5	TP03 2.0	TP04 0.1	TP04 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.5	3.0	0.1	1.0	0.5	2.0	0.1	1.0
				Type	Sandy Soil	Sandy Soil	Topsoil	Clay	Sandy Soil	Sandy Soil	Clay	Sandy Soil
Determinand	Method	Test Sample	LOD	Units								
PCB BZ#28	T1	10:1	0.005	µg/l	<0.005	<0.005	<0.005	<0.005	<0.005	**0.007**	<0.005	**0.009**
PCB BZ#52	T1	10:1	0.005	µg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.007**
PCB BZ#101	T1	10:1	0.005	µg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ#118	T16	10:1	0.005	µg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ#153	T1	10:1	0.005	µg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ#138	T1	10:1	0.005	µg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ#180	T1	10:1	0.005	µg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Leachate to BS EN 12457-2 (10:1) Analysed as Water
PCBs EC7 congeners(28,52,101,118,138,153,180)

				SAL Reference	293783 019	293783 020	293783 023	293783 025	293783 028	293783 029	293783 032	293783 034
				Customer Sample Reference	TP04 3.0	TP05 0.1	TP05 2.0	TP06 0.1	TP07 0.5	TP07 1.0	TP08 0.5	TP08 2.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	3.0	0.1	2.0	0.1	0.5	1.0	0.5	2.0
				Type	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Clay
Determinand	Method	Test Sample	LOD	Units								
PCB BZ#28	T1	10:1	0.005	µg/l	<0.005	<0.005	**0.006**	**0.026**	<0.005	<0.005	**0.006**	<0.005
PCB BZ#52	T1	10:1	0.005	µg/l	<0.005	<0.005	**0.005**	**0.027**	<0.005	<0.005	<0.005	<0.005
PCB BZ#101	T1	10:1	0.005	µg/l	<0.005	<0.005	<0.005	**0.025**	<0.005	<0.005	<0.005	<0.005
PCB BZ#118	T16	10:1	0.005	µg/l	<0.005	<0.005	<0.005	**0.019**	<0.005	<0.005	<0.005	<0.005
PCB BZ#153	T1	10:1	0.005	µg/l	<0.005	<0.005	<0.005	**0.015**	<0.005	<0.005	<0.005	<0.005
PCB BZ#138	T1	10:1	0.005	µg/l	<0.005	<0.005	<0.005	**0.021**	<0.005	<0.005	<0.005	<0.005
PCB BZ#180	T1	10:1	0.005	µg/l	<0.005	<0.005	<0.005	**0.006**	<0.005	<0.005	<0.005	<0.005

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Leachate to BS EN 12457-2 (10:1) Analysed as Water
PCBs EC7 congeners(28,52,101,118,138,153,180)

				SAL Reference	293783 036	293783 038	293783 039	293783 041	293783 043	293783 045	293783 047	293783 053
				Customer Sample Reference	TP09 0.1	TP10 0.1	TP10 0.5	TP10 2.0	TP11 0.5	TP11 2.0	TP12 0.5	TP13 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.1	0.1	0.5	2.0	0.5	2.0	0.5	1.0
				Type	Topsoil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Topsoil	Clay
Determinand	Method	Test Sample	LOD	Units								
PCB BZ#28	T1	10:1	0.005	µg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ#52	T1	10:1	0.005	µg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ#101	T1	10:1	0.005	µg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ#118	T16	10:1	0.005	µg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ#153	T1	10:1	0.005	µg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ#138	T1	10:1	0.005	µg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ#180	T1	10:1	0.005	µg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Leachate to BS EN 12457-2 (10:1) Analysed as Water
PCBs EC7 congeners(28,52,101,118,138,153,180)

				SAL Reference	293783 057
				Customer Sample Reference	TP14 0.5
				Date Sampled	22-AUG-2012
				Bottom Depth	0.5
				Type	Topsoil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
PCB BZ#28	T1	10:1	0.005	µg/l	<0.005
PCB BZ#52	T1	10:1	0.005	µg/l	<0.005
PCB BZ#101	T1	10:1	0.005	µg/l	<0.005
PCB BZ#118	T16	10:1	0.005	µg/l	<0.005
PCB BZ#153	T1	10:1	0.005	µg/l	<0.005
PCB BZ#138	T1	10:1	0.005	µg/l	<0.005
PCB BZ#180	T1	10:1	0.005	µg/l	<0.005

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Leachate to BS EN 12457-2 (10:1) Analysed as Water
Volatile Organic Compounds (USEPA 624)

				SAL Reference	293783 002	293783 005	293783 006	293783 008	293783 011	293783 013	293783 015	293783 017
				Customer Sample Reference	TP01 0.5	TP01 3.0	TP02 0.1	TP02 1.0	TP03 0.5	TP03 2.0	TP04 0.1	TP04 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.5	3.0	0.1	1.0	0.5	2.0	0.1	1.0
				Type	Sandy Soil	Sandy Soil	Topsoil	Clay	Sandy Soil	Sandy Soil	Clay	Sandy Soil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
1,1,1,2-Tetrachloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethylene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethylene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,2-dibromoethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
4-Chlorotoluene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Benzene	T54	10:1	1	µg/l	(13) <1	(13) <1	(13) <1	(13) <1	(13) <1	(13) <1	(13) <1	(13) <1
Bromobenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Bromoform	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Bromomethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Chlorodibromomethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Chloromethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Cis-1,2-Dichloroethylene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Cis-1,3-Dichloropropene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Dibromomethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Dichloromethane	T54	10:1	50	µg/l	<50	<50	<50	<50	<50	<50	<50	<50
EthylBenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	**1**	<1	<1	<1
Isopropyl benzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
M/P Xylene	T54	10:1	1	µg/l	<1	<1	<1	<1	**3**	**1**	<1	<1
n-Propylbenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
O Xylene	T54	10:1	1	µg/l	<1	<1	<1	<1	**1**	<1	<1	<1
p-Isopropyltoluene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
S-Butylbenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Styrene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
T-Butylbenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	**1**	<1	<1
Trans-1,2-Dichloroethene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Trans-1,3-Dichloropropene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Vinyl chloride	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Leachate to BS EN 12457-2 (10:1) Analysed as Water
Volatile Organic Compounds (USEPA 624)

				SAL Reference	293783 019	293783 020	293783 023	293783 025	293783 028	293783 029	293783 032	293783 034
				Customer Sample Reference	TP04 3.0	TP05 0.1	TP05 2.0	TP06 0.1	TP07 0.5	TP07 1.0	TP08 0.5	TP08 2.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	3.0	0.1	2.0	0.1	0.5	1.0	0.5	2.0
				Type	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Clay
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
1,1,1,2-Tetrachloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethylene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethylene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,2-dibromoethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
4-Chlorotoluene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Benzene	T54	10:1	1	µg/l	(13) <1	(13) <1	(13) <1	(13) <1	(13) <1	(13) <1	(13) <1	(13) <1
Bromobenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Bromoform	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Bromomethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Chlorodibromomethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Chloromethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Cis-1,2-Dichloroethylene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Cis-1,3-Dichloropropene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Dibromomethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Dichloromethane	T54	10:1	50	µg/l	<50	<50	<50	<50	<50	<50	<50	<50
EthylBenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Isopropyl benzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
M/P Xylene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
O Xylene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
S-Butylbenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Styrene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
T-Butylbenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Trans-1,2-Dichloroethene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Trans-1,3-Dichloropropene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Vinyl chloride	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Leachate to BS EN 12457-2 (10:1) Analysed as Water
Volatile Organic Compounds (USEPA 624)

				SAL Reference	293783 036	293783 038	293783 039	293783 041	293783 043	293783 045	293783 047	293783 053
				Customer Sample Reference	TP09 0.1	TP10 0.1	TP10 0.5	TP10 2.0	TP11 0.5	TP11 2.0	TP12 0.5	TP13 1.0
				Date Sampled	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012	22-AUG-2012
				Bottom Depth	0.1	0.1	0.5	2.0	0.5	2.0	0.5	1.0
				Type	Topsoil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Clay	Topsoil	Clay
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
1,1,1,2-Tetrachloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethylene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethylene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,2-dibromoethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
4-Chlorotoluene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Benzene	T54	10:1	1	µg/l	(13) <1	(13) <1	(13) <1	(13) <1	(13) <1	(13) <1	(13) <1	(13) <1
Bromobenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Bromoform	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Bromomethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Chlorodibromomethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Chloromethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Cis-1,2-Dichloroethylene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Cis-1,3-Dichloropropene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Dibromomethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Dichloromethane	T54	10:1	50	µg/l	<50	<50	<50	<50	<50	<50	<50	<50
EthylBenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Isopropyl benzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
M/P Xylene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
O Xylene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
S-Butylbenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Styrene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
T-Butylbenzene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Trans-1,2-Dichloroethene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Trans-1,3-Dichloropropene	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1
Vinyl chloride	T54	10:1	1	µg/l	<1	<1	<1	<1	<1	<1	<1	<1

SAL Reference: 293783
Project Site: Nant Llesg
Customer Reference: G132

Leachate to BS EN 12457-2 (10:1) Analysed as Water
Volatile Organic Compounds (USEPA 624)

				SAL Reference	293783 057
				Customer Sample Reference	TP14 0.5
				Date Sampled	22-AUG-2012
				Bottom Depth	0.5
				Type	Topsoil
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
1,1,1,2-Tetrachloroethane	T54	10:1	1	µg/l	<1
1,1,1-Trichloroethane	T54	10:1	1	µg/l	<1
1,1,2,2-Tetrachloroethane	T54	10:1	1	µg/l	<1
1,1,2-Trichloroethane	T54	10:1	1	µg/l	<1
1,1,2-Trichloroethylene	T54	10:1	1	µg/l	<1
1,1-Dichloroethane	T54	10:1	1	µg/l	<1
1,1-Dichloroethylene	T54	10:1	1	µg/l	<1
1,1-Dichloropropene	T54	10:1	1	µg/l	<1
1,2,3-Trichloropropane	T54	10:1	1	µg/l	<1
1,2,4-Trimethylbenzene	T54	10:1	1	µg/l	<1
1,2-dibromoethane	T54	10:1	1	µg/l	<1
1,2-Dichlorobenzene	T54	10:1	1	µg/l	<1
1,2-Dichloroethane	T54	10:1	1	µg/l	<1
1,2-Dichloropropane	T54	10:1	1	µg/l	<1
1,3,5-Trimethylbenzene	T54	10:1	1	µg/l	<1
1,3-Dichlorobenzene	T54	10:1	1	µg/l	<1
1,3-Dichloropropane	T54	10:1	1	µg/l	<1
1,4-Dichlorobenzene	T54	10:1	1	µg/l	<1
2,2-Dichloropropane	T54	10:1	1	µg/l	<1
2-Chlorotoluene	T54	10:1	1	µg/l	<1
4-Chlorotoluene	T54	10:1	1	µg/l	<1
Benzene	T54	10:1	1	µg/l	(13) <1
Bromobenzene	T54	10:1	1	µg/l	<1
Bromochloromethane	T54	10:1	1	µg/l	<1
Bromodichloromethane	T54	10:1	1	µg/l	<1
Bromoform	T54	10:1	1	µg/l	<1
Bromomethane	T54	10:1	1	µg/l	<1
Carbon tetrachloride	T54	10:1	1	µg/l	<1
Chlorobenzene	T54	10:1	1	µg/l	<1
Chlorodibromomethane	T54	10:1	1	µg/l	<1
Chloroethane	T54	10:1	1	µg/l	<1
Chloroform	T54	10:1	1	µg/l	<1
Chloromethane	T54	10:1	1	µg/l	<1
Cis-1,2-Dichloroethylene	T54	10:1	1	µg/l	<1
Cis-1,3-Dichloropropene	T54	10:1	1	µg/l	<1
Dibromomethane	T54	10:1	1	µg/l	<1
Dichlorodifluoromethane	T54	10:1	1	µg/l	<1
Dichloromethane	T54	10:1	50	µg/l	<50
EthylBenzene	T54	10:1	1	µg/l	<1
Isopropyl benzene	T54	10:1	1	µg/l	<1
M/P Xylene	T54	10:1	1	µg/l	<1
n-Propylbenzene	T54	10:1	1	µg/l	<1
O Xylene	T54	10:1	1	µg/l	<1
p-Isopropyltoluene	T54	10:1	1	µg/l	<1
S-Butylbenzene	T54	10:1	1	µg/l	<1
Styrene	T54	10:1	1	µg/l	<1
T-Butylbenzene	T54	10:1	1	µg/l	<1
Tetrachloroethene	T54	10:1	1	µg/l	<1
Toluene	T54	10:1	1	µg/l	<1
Trans-1,2-Dichloroethene	T54	10:1	1	µg/l	<1
Trans-1,3-Dichloropropene	T54	10:1	1	µg/l	<1
Trichlorofluoromethane	T54	10:1	1	µg/l	<1
Vinyl chloride	T54	10:1	1	µg/l	<1

Index to symbols used in 293783-1

Value	Description
M40	Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis.
10:1	Leachate to BS EN 12457-2 (10:1)
AR	As Received
M105	Analysis conducted on an "as received" aliquot. Results are reported on a dry weight basis where moisture content was determined by assisted drying of sample at 105C
N.D.	Not Detected
2	LOD Raised Due to Matrix Interference
100	LOD determined by sample aliquot used for analysis
13	Results have been blank corrected.
9	LOD raised due to dilution of sample
S	Analysis was subcontracted
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Method Index

Value	Description
T81	GC/FID (LV)
T16	GC/MS
T207	GC/MS(MCERTS)
T209	GC/MS(Head Space)(MCERTS)
T162	Grav (1 Dec) (105 C)
T21	OX/IR
T149	GC/MS (SIR)
T1	GC/MS (HR)
T54	GC/MS (Headspace)
T546	Colorimetry (CF)
T206	GC/FID (MCERTS)
T27	PLM
T215	GC/MS (Headspace)(LV)
T7	Probe
T2	Grav
T65	ICP/OES (Preconc.)
T4	Colorimetry
T277	Grav (1 Dec) (40 C)
T6	ICP/OES
T686	Discrete Analyser
T281	ICP/MS (Filtered)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Cresols	T16	AR	0.01	mg/kg	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Phenol	T149	AR	0.01	mg/kg	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Xylenols	T16	AR	0.01	mg/kg	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,1,1,2-Tetrachloroethane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,1,1-Trichloroethane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,1,2,2-Tetrachloroethane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,1,2-Trichloroethane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,1,2-Trichloroethylene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,1-Dichloroethane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,1-Dichloroethylene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,1-Dichloropropene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,2,3-Trichloropropane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,2,4-Trimethylbenzene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
1,2-dibromoethane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,2-Dichlorobenzene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,2-Dichloroethane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,2-Dichloropropane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,3,5-Trimethylbenzene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,3-Dichlorobenzene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,3-Dichloropropane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,4-Dichlorobenzene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
2,2-Dichloropropane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
2-Chlorotoluene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
4-Chlorotoluene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Benzene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Bromobenzene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Bromochloromethane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Bromodichloromethane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Bromoform	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Bromomethane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Carbon tetrachloride	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Chlorobenzene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Chlorodibromomethane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Chloroethane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Chloroform	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Chloromethane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Cis-1,2-Dichloroethylene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Cis-1,3-Dichloropropene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Dibromomethane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Dichlorodifluoromethane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Dichloromethane	T54	10:1	50	µg/l	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
EthylBenzene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Isopropyl benzene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
M/P Xylene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
n-Propylbenzene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
O Xylene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
p-Isopropyltoluene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
S-Butylbenzene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Styrene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
T-Butylbenzene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Tetrachloroethene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Toluene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Trans-1,2-Dichloroethene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Trans-1,3-Dichloropropene	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Trichlorofluoromethane	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Vinyl chloride	T54	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
PCB BZ#28	T1	M105	0.05	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
PCB BZ#52	T1	M105	0.05	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
PCB BZ#101	T1	M105	0.05	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
PCB BZ#118	T1	M105	0.05	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
PCB BZ#153	T1	M105	0.05	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
PCB BZ#138	T1	M105	0.05	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
PCB BZ#180	T1	M105	0.05	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Naphthalene	T149	10:1	0.01	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Acenaphthylene	T149	10:1	0.01	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Acenaphthene	T149	10:1	0.01	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Fluorene	T149	10:1	0.01	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Phenanthrene	T149	10:1	0.01	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Anthracene	T149	10:1	0.01	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Fluoranthene	T149	10:1	0.01	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Pyrene	T149	10:1	0.01	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Benzo(a)Anthracene	T149	10:1	0.01	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Chrysene	T149	10:1	0.01	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Benzo(b)fluoranthene	T149	10:1	0.01	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Benzo(k)fluoranthene	T149	10:1	0.01	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Benzo(a)Pyrene	T149	10:1	0.01	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Indeno(123-cd)Pyrene	T149	10:1	0.01	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Dibenzo(ah)Anthracene	T149	10:1	0.01	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Benzo(ghi)Perylene	T149	10:1	0.01	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
PAH(total)	T149	10:1	0.01	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Phenol	T149	10:1	0.5	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Antimony	T6	M40	1	mg/kg	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Arsenic	T6	M40	2	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Barium	T6	M40	1	mg/kg	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Beryllium	T6	M40	2	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Boron (water-soluble)	T6	AR	1	mg/kg	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Cadmium	T6	M40	1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Cadmium	T65	M40	0.2	mg/kg	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Chromium	T6	M40	1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Copper	T6	M40	1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Cyanide(Total)	T546	AR	1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Cyanide(free)	T546	AR	1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Iron	T6	M40	1	mg/kg	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Lead	T6	M40	1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Mercury	T65	M40	0.1	mg/kg	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Mercury	T6	M40	1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Molybdenum	T6	M40	1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Nickel	T6	M40	1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
pH	T7	AR			M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Selenium	T6	M40	3	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
SO4(Total)	T6	M40	0.01	%	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Sulphide	T546	AR	1	mg/kg	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Sulphur (total)	T6	M40	0.01	%	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Zinc	T6	M40	1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Ammoniacal nitrogen	T4	10:1	0.05	mg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Sb (Dissolved)	T281	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
As (Dissolved)	T281	10:1	0.2	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Ba (Dissolved)	T281	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Be (Dissolved)	T281	10:1	0.05	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Boron	T6	10:1	0.01	mg/l	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Cd (Dissolved)	T281	10:1	0.02	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Chloride	T686	10:1	0.5	mg/l	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Cr (Dissolved)	T281	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Cu (Dissolved)	T281	10:1	0.5	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Cyanide(Total)	T4	10:1	0.05	mg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Cyanide(free)	T4	10:1	0.05	mg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Iron	T6	10:1	0.01	mg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Pb (Dissolved)	T281	10:1	0.3	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Hg (Dissolved)	T281	10:1	0.05	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Mo (Dissolved)	T281	10:1	1	µg/l	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Ni (Dissolved)	T281	10:1	1	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
pH	T7	10:1			U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Se (Dissolved)	T281	10:1	0.5	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Sulphate	T686	10:1	0.1	mg/l	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Sulphide	T4	10:1	0.05	mg/l	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Sulphur(Free)	T2	10:1	10	mg/l	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Zn (Dissolved)	T281	10:1	2	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Asbestos ID	T27	AR			SU	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057,061
Total Organic Carbon	T21	M40	0.1	%	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
PCB BZ#28	T1	10:1	0.005	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
PCB BZ#52	T1	10:1	0.005	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
PCB BZ#101	T1	10:1	0.005	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
PCB BZ#118	T16	10:1	0.005	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
PCB BZ#153	T1	10:1	0.005	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
PCB BZ#138	T1	10:1	0.005	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
PCB BZ#180	T1	10:1	0.005	µg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,1,1,2-Tetrachloroethane	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,1,1-Trichloroethane	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,1,2,2-Tetrachloroethane	T209	M105	50	µg/kg	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,1,2-Trichloroethane	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,1-Dichloroethane	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,1-Dichloroethylene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
1,1-Dichloropropene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,2,3-Trichloropropane	T209	M105	50	µg/kg	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,2,4-Trimethylbenzene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,2-dibromoethane	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,2-Dichlorobenzene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,2-Dichloroethane	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,2-Dichloropropane	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,3,5-Trimethylbenzene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,3-Dichlorobenzene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,3-Dichloropropane	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
1,4-Dichlorobenzene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
2,2-Dichloropropane	T209	M105	50	µg/kg	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
2-Chlorotoluene	T209	M105	50	µg/kg	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
4-Chlorotoluene	T209	M105	50	µg/kg	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Benzene	T209	M105	10	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Bromobenzene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Bromochloromethane	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Bromodichloromethane	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Bromoform	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Bromomethane	T209	M105	50	µg/kg	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Carbon tetrachloride	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Chlorobenzene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Chlorodibromomethane	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Chloroethane	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Chloroform	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Chloromethane	T209	M105	50	µg/kg	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Cis-1,2-Dichloroethylene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Cis-1,3-Dichloropropene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Dibromomethane	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Dichlorodifluoromethane	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Dichloromethane	T209	M105	50	µg/kg	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
EthylBenzene	T209	M105	10	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Isopropyl benzene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
M/P Xylene	T209	M105	10	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
n-Propylbenzene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
O Xylene	T209	M105	10	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
p-Isopropyltoluene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
S-Butylbenzene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Styrene	T209	M105	50	µg/kg	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
T-Butylbenzene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Tetrachloroethene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Toluene	T209	M105	10	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Trans-1,2-Dichloroethene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Trans-1,3-Dichloropropene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Trichloroethene	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Trichlorofluoromethane	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Vinyl chloride	T209	M105	50	µg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Dissolved Organic Carbon	T21	10:1	1	mg/l	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Gasoline Range Organics	T215	10:1	10	µg/l	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
TPH (C10-C35)	T81	10:1	0.01	mg/l	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
TPH (C5-C6 aliphatic)	T209	M105	0.100	mg/kg	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
TPH (C6-C8 aliphatic)	T209	M105	0.10	mg/kg	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
TPH (C8-C10 aliphatic)	T209	M105	0.100	mg/kg	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
TPH (C10-C12 aliphatic)	T206	M105	1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
TPH (C12-C16 aliphatic)	T206	M105	2	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
TPH (C16-C21 aliphatic)	T206	M105	1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
TPH (C21-C35 aliphatic)	T206	M105	4	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
TPH (C6-C7 aromatic)	T209	M105	0.100	mg/kg	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
TPH (C7-C8 aromatic)	T209	M105	0.100	mg/kg	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
TPH (C8-C10 aromatic)	T209	M105	0.100	mg/kg	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
TPH (C10-C12 aromatic)	T206	M105	1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
TPH (C12-C16 aromatic)	T206	M105	1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
TPH (C16-C21 aromatic)	T206	M105	1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
TPH (C21-C35 aromatic)	T206	M105	1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Naphthalene	T207	M105	0.1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Acenaphthylene	T207	M105	0.1	mg/kg	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Acenaphthene	T207	M105	0.1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Fluorene	T207	M105	0.1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Phenanthrene	T207	M105	0.1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Anthracene	T207	M105	0.1	mg/kg	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Fluoranthene	T207	M105	0.1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Pyrene	T207	M105	0.1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Chrysene	T207	M105	0.1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	M	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
PAH(total)	T207	M105	0.1	mg/kg	U	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Moisture	T277	AR	0.1	%	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057
Moisture @ 105 C	T162	AR	0.1	%	N	002,005-006,008,011,013,015,017,019-020,023,025,028-029,032,034,036,038-039,041,043,045,047,053,057

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Nant Llesg Surface Mine

Incorporating Land Remediation

A18

Health and Welfare

Nant Llesg Surface Mine

Incorporating Land Remediation

Appendix MA/NL/A18/001

Health Impact Assessment

Nant Llesg Surface Mine,

Incorporating Land Remediation

Health Impact Assessment

Final

30 July 2013

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Executive Summary

Background

In keeping with best practice, a Health Impact Assessment (HIA) has been commissioned by Miller Argent to investigate and address the potential impact of the proposed Nant Llesg Surface Mine, including land remediation (referred to as the proposed project).

Approach and Methodology

The scope and focus of the HIA has been defined and iteratively refined through engagement with key stakeholders: initially through the formal EIA scoping exercise with statutory consultees; and subsequently through a separate HIA scoping exercise with key health stakeholders and local communities, via an integrated engagement strategy. It has further benefited from iterative input from the Welsh HIA Support Unit in the discussion and implementation of appropriate assessment protocols and influence on the development of the final Health Action Plan (HAP).

The assessment scope focuses on the key health issues raised during formal consultation and informal engagement, and implements an integrated approach with the Environmental Statement, to ensure that the HIA is based upon realistic changes in environmental and socio-economic conditions, that are attributable to the proposed project.

Community Profile

The community profile for the four wards of Twyn Carno, Darran Valley, Pontlottyn and Moriah indicates an ageing population, with slow growth and a net outward migration in the 20-24 year old age bracket. Although health is improving in the area, there are localised areas of health deprivation that strongly correlate with high levels of socio-economic deprivation and low educational attainment. Specific health challenges noted within the Caerphilly Borough Council Health Needs Assessment (Ref.15) include the need to tackle poor health behaviours to address the core health issues in the area, and the need to address antisocial behaviour.

Given the burden of existing poor health, local communities are sensitive to environmental impacts that might compound existing circumstance and health burdens, but, equally, are likely to respond positively to improvements in socio-economic circumstance (through improved education, employment and income) and lifestyle (such as improved diet and physical activity), which would alleviate the predominant causes of patterns of existing poor health in Caerphilly and neighbouring boroughs.

The HIA has considered such factors in its assessment, and also through the mitigation and community support initiatives within a Health Action Plan (HAP) intended to optimise potential health benefits associated with the proposed project.

Assessment

The assessment investigates each of the potential health pathways associated with the site enabling, land reclamation, mining, restoration and aftercare stages of the proposed project, including:

<u>Site enabling, land remediation mining and restoration activities</u>

- the potential impact from changes in emissions to air (including changes in exposure to PM_{10}, $PM_{2.5}$, NO_2, and dust) to residential and commercial receptors (including any consequent impact upon existing employment);

- the potential risk of accident and injury due to additional road traffic movements;

- the potential community disruption and annoyance from noise and vibration;

- the potential impact on access and accessibility (social connectivity, recreation and physical activity);

- the potential socio-economic health benefit from increased training, education, employment and income opportunities (direct, indirect and induced);

- the removal of existing environmental hazards on areas of public land surrounding the proposed surface mine, and addressing legacy mining activity, sediment runoff and water quality into local river tributaries; and

- the potential environmental amenity benefit from rapid reinstatement of remediated areas, drawing on local input to final landform and use.

Aftercare and beyond

- increased access and accessibility (improved social connectivity and recreation areas);

- enhanced public rights of way, recreational amenities and facilities free from environmental hazards (supporting physical activity and social cohesion through shared amenities); and

- provision of a gateway to the Valleys, including strategic green transport networks supporting local visitors, tourism and local spending.

Results

The core community health concern raised during public engagement is the potential risk from changes in air quality. Following a review of the available scientific evidence base and based on an exposure response assessment of worst case hypothetical scenarios applying the highest burdens of poor health in the area, it is concluded that changes in concentrations of PM_{10}, $PM_{2.5}$ and NO_2 air pollutants will be of minor significance. Total concentrations would remain within air quality standards set to protect health and would not be of a magnitude sufficient to quantify any significant adverse health outcome during the mining and remediation stages of the proposed project.

Such a conclusion is consistent with the findings from FLRS, where monitoring data has remained within all air quality standards set to protect health since the start of operations.

Concerns of dust impacts were also voiced. The proposed project seeks to draw from and build upon the experience and dust management best practice established at FLRS. It is noted that the monitoring of meteorological conditions to define daily site operations in combination with extensive dust suppression and mitigation, and the temporary stoppage of operational activities during high dust generation risk has led to the Ffos-Y-Fran mine being downgraded from a Medium to a Low Dust Risk within its permit to operate from Caerphilly Borough Council (2012) and Merthyr Tydfil Borough Council (2013).

Following mitigation, and the provision of additional dust monitoring stations, potential dust impacts are predicted to also be minor, and not of a level to result in any measurable adverse health outcome. Miller Argent will also continue to investigate every dust complaint lodged and if validated through meteorological monitoring data, will seek to further refine operational activities and mitigation to address/manage such complaints.

Transportation of coal to the CDP will increase vehicle movements along the junction of Fochriw Road/Bogey Road. Such movements do not present a risk of community severance or impact upon available capacity. The road link does however, currently have restricted visibility. As part of the proposed development, Miller Argent proposes permanent road improvements (to improve visibility and safety). Following such mitigation, and when coupled with a site environmental management plan which manages the safe passage of site vehicles to the CDP, there is limited risk of road traffic incidence between road users, staff and site vehicles, and a permanent enhancement to the local road link.

Road and rail noise is not considered to be significant, and not of an order of magnitude sufficient to quantify any change in cognitive function, sleep disturbance or annoyance.

The proposed development would generate similar economic opportunities to the FLRS, including between 144 to 239 direct jobs (dependant on shift pattern), 118 indirect employment jobs and an additional 25 induced employment opportunities (through employee spending).

Approximately 80% of direct jobs are likely to be taken up within ten miles of the site, helping to directly address the need for employment opportunities within the area. Average annual supplier expenditure on goods and services is estimated at £32.7m, with average annual wages at Nant Llesg in the region of £5m and a total project wage bill of approximately £70m. Of this, based upon experience at FLRS, and existing supply chains, approximately £8.9m will be spent on goods and services per year within ten miles of the site, with an additional £15.3 million spent within Wales per year.

The proposed project also represents an estimated £5.65 million Caerphilly County Borough Council investment in local environmental management, including the removal of hazardous shafts and adits on common land and along public rights of way and the improvement of siltation in Cwm Darran Country Park. Such investment removes the cost burden from the public purse, and reduces the time period within which remediation and enhancement work would be implemented.

In addition to bearing the cost of remediation, Miller Argent proposes to provide an additional Community Benefit Fund to support and invest in neighbouring communities. The fund and its administration is currently being assessed and will be agreed with CCBC, but is proposed to apply a sliding scale that factors in the price of coal and the amount extracted, up to a potential maximum of £1/tonne, with mechanisms to ensure expenditure in local communities.

Conclusion

On the basis that all regulatory environmental standards set to protect health have been achieved at FLRS, and are predicted to be achieved at Nant Llesg; that the assessment from relative changes in air quality, noise and transport upon existing burdens of health are not sufficient to quantify any adverse health outcome; and when considering the approach proposed to address community concerns, perceptions and priorities; operational procedures; and the commitment for on-going community engagement, the proposed project does not constitute a significant risk to local community health.

When further considering the significant underlying factors defining local burdens of poor health in the area (largely socio-economic and lifestyle related), and the direct, indirect and induced socio-economic benefits from the proposed project, the immediate and final land reclamation (removing existing environmental hazards and supporting regeneration) and the catalogue of committed community support initiatives (summarised within the HAP) to optimise local health benefit uptake, the proposed project is considered to constitute a net health benefit.

1 Introduction

Background

1.1 The proposed Nant Llesg Surface Mine, incorporating land remediation (hence referred to as the proposed project) would recover approximately 6 million tonnes of coal within 481.5 hectares of land over 11 years. In addition to mining the coal reserve, the scheme includes a series of remediation works that would address existing environmental issues and risk associated with the legacy of former works on the site. The Restoration Strategy for the site is proposed to help with meeting the needs of the local community.

1.2 In keeping with best practice and to meet the guidance set out in the Welsh Assembly Government's Minerals Technical Advice Note (Ref.1) (MTAN-2), Miller Argent has commissioned RPS to carry out a Health Impact Assessment (HIA) to assess and address the potential impact of the proposed project on the health and well-being of the surrounding communities.

1.3 The remainder of this section provides an introduction to the HIA, presents the specific aims and objectives of the assessment and outlines the stakeholder engagement strategy and methodologies applied.

Health Impact Assessment

1.4 HIA is a multidisciplinary process designed to identify and assess the potential health outcomes (both adverse and beneficial) of a proposed project, plan or programme and to deliver evidence-based recommendations that maximise health gains and reduce or remove potential negative impacts or inequalities.

1.5 Although not a statutory requirement of the UK planning process, in Wales there is an expectation for HIA of mineral extraction projects, established by MTAN-2 and the Ministers Interim Minerals Planning Policy Statement (MIMPPS) on HIA for opencast coal sites. The MIMPPS states:

'It is the policy of the Welsh Assembly Government that Health Impact Assessment should be provided to accompany any application for opencast coal working' (Ref. 2).

1.6 HIA is further driven by the Welsh Assembly through the provision of both overarching and sector-specific HIA guidance developed by the Wales HIA Support Unit (WHIASU) to facilitate the delivery of national strategic health objectives.

1.7 In addition to informing and involving local communities in the planning and decision making process, HIA provides an added means to investigate and address local community health

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[1] Welsh Assembly. (2009) Minerals Technical Advice Note 2:Coal http://wales.gov.uk/docs/desh/policy/090120coalmtanen.pdf last accessed June 2013

[2] Ministerial Interim Minerals Planning Policy Statement (MIMPPS) 01/2009 – on Health Impact Assessment for Opencast Coal Sites http://wales.gov.uk/docs/desh/publications/090602mimppscoaltan1en.pdf last accessed June 2013.

concerns, and to tailor mitigation and community support initiatives to more effectively address local community circumstance, relative sensitivity, concern and need.

1.8 HIA is therefore increasingly applied to support more health conscious development and to aid in achieving strategic health objectives (Ref. 3, 4). The following section details the specific approach, aim and objectives of this HIA and presents the core stages performed.

Approach

1.9 As detailed in MTAN-2, HIA is a flexible but systematic way of considering the possible impacts of developments on people's health.

1.10 The basis and principles of this HIA, which has been prepared in accordance with current guidance (Ref.3), are set on a broad socio economic model of health that encompasses conventional health impacts such as communicable disease, accidents and risk along with wider determinants of health vital to achieving good health and well-being. These wider determinants of health include income, employment, housing, education, the quality of the urban environment, crime and the perception of crime.

1.11 A key aspect of the HIA approach has been to work alongside, draw from and build upon the technical assessments of the Environmental Statement (ES) from the outset of the proposed project. The HIA has had regard to the following:

- the formal EIA Scoping Statement (December 2011);
- the pre-application consultation strategy;
- the public consultation process and statement of community engagement;
- the urban design and access statement;
- the air quality assessment and detailed air dispersion modelling;
- the noise and vibration assessment;
- the blasting assessment;
- the transport assessment; and
- the socio-economic assessment.

1.12 Integration with the planning and EIA process has enabled the HIA to iteratively inform the proposed development, but also ensures that the HIA is based upon realistic changes in environmental and socio-economic conditions directly attributable to the proposed project.

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[3] Wales HIA Support Unit (2012).Health Impact Assessment: A Practical guide. http://www.wales.nhs.uk/sites3/Documents/522/Whiasu%20Guidance%20Report%20%28English%29%20V2%20WEB.pdf last accessed June 2013.

[4] Wales HIA Support Unit (2011). A guide to assessing the health and wellbeing impacts of opencast mining. http://www.wales.nhs.uk/sites3/Documents/522/OpencastguidanceFinal.pdf last accessed June 2013.

Aims and Objectives

1.13 The primary aim of the HIA has been to build upon and complement the outputs of the ES to further integrate health and well-being within the proposed project, to identify and assess potential health outcomes and to put forward recommendations to maximise health gains whilst minimising potential negative impacts.

1.14 This aim has been achieved through the delivery of the following objectives:

- HIA scoping to establish, justify and agree an appropriate scope and focus of assessment with key stakeholders;
- development and implementation of an integrated EIA and HIA engagement strategy to facilitate meaningful consultation intended to identify, discuss and address local concerns and perceived risks;
- community profiling to establish local circumstance and relative sensitivity, forming the founding platform to the assessment process;
- iterative HIA support to address local circumstance and community health concerns through the refinement of the proposed project;
- development of an appropriate evidence base to address the key health pathways scoped within the HIA;
- quantifying and appraising the magnitude, distribution and likelihood of potential health outcomes (both adverse and beneficial) directly attributable to the proposed project; and
- development of a HAP to further address local circumstance, support the uptake of potential health benefits and inform on-going community engagement and feedback.

Process and Methodology

1.15 The overarching process comprised the following stages:

- HIA Scoping Exercise;
- Project Profile;
- Community Profile;
- Integrated Engagement Strategy;
- Assessment; and
- Health Action Plan.

1.16 Each stage is described below.

<u>HIA Scoping Exercise</u>

1.17 Scoping is the process by which the focus of the HIA is primarily set, defining the key health pathways to be assessed (i.e. aspects of the proposed project with the potential to influence health, both adversely and beneficially), and, just as importantly, rationalising aspects that are outside the scope of the HIA. This is necessary to ensure that the HIA is fit for purpose, meets stakeholder expectations and identifies potential opportunities to support local and strategic health objectives but does not cover matters that the proposed project does not affect or that the HIA cannot influence.

1.18 Although guidance indicates scoping to be a single task (Ref 5), in practice, scoping is iterative over the course of the HIA process, in which formal engagement and informal feedback from local communities and stakeholders provide the means to further refine the scope and focus of the assessment to best address local community concerns.

1.19 In this instance, the scope of the HIA has been derived and iteratively refined through the following tasks:

- A draft HIA scoping statement was initially defined through a review of the available project information, the previous Fros-Y-Fran HIA (Ref.6) and health literature, and issued to key health stakeholders for comment, including Caerphilly County Borough Council, the Aneurin Bevan Health Board and the WHIASU. A copy of the final HIA Scoping Statement is provided at Appendix A.

- A series of themed (community, health and environment) stakeholder workshops were held to discuss and refine the core community issues and opportunities to be explored with the HIA team.

- A community forum was established and the output of the meetings applied to inform the proposed project design and the scope and focus of technical assessments to be performed (including the HIA).

- A comprehensive engagement programme including an information leaflet to 4,717 local residents and businesses, poster advertising at local facilities and amenities, a dedicated website, telephone hotline, local press coverage and five public exhibitions was provided to raise awareness of the proposed project and seek community input. The HIA team was fully integrated with the community engagement programme, attending every public exhibition to gauge local concerns and to benefit from local knowledge on community priorities and needs.

- More recently (03/04/13), the HIA team attended a Caerphilly Council meeting to discuss the proposed project with Council members, to respond to questions regarding local community health, and to further refine the final HIA.

1.20 A more detailed account of the integrated consultation strategy, the methods applied, the stakeholders and communities engaged, and all consultation outputs, is provided in the Statement of Community Involvement chapter of the ES.

1.21 The scoping stage has therefore spanned the entire HIA process, from initial commission in July 2011 through to submission in June 2013.

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5 Wales HIA Support Unit (2012).Health Impact Assessment: A Practical guide. http://www.wales.nhs.uk/sites3/Documents/522/Whiasu%20Guidance%20Report%20%28English%29%20V2%20WEB.pdf last accessed June 2013.

6 Ffos-Y-Fran HIA Steering Group. (2007). A report of a HIA Study of an opencast Scheme at Ffos-Y-Fran, Merthyr Tydfil.

Project Profile

1.22 The project profile draws from the planning application, the ES and available literature to outline the core activities and associated health pathways to be investigated in greater detail within the assessment stage. A health pathway can be described as the way in which an activity influences a known determinant of health. As an example of how the health pathway concept is applied, construction activities are known to influence environmental determinants of health including air quality, noise and traffic. A health pathway is identified when such influences have the opportunity to impact on communities with the potential to cause a response or health effect.

1.23 Identification of potential health pathways helps to define the scope of the study, from which it is possible to develop a suitable evidence base and a more informed community profile. The distribution, magnitude and significance of the health pathways are then investigated within the assessment stage.

1.24 Although the project profile primarily draws from technical information and transferable knowledge from similar projects to investigate and address potential issues directly associated with the project, it is important to note that it is also informed through consultation with local communities, in order to ensure that the HIA addresses wider concerns, perceptions and local priorities.

Community Profile

1.25 Evidence suggests that different communities have varying susceptibilities to health impacts and benefits as a result of social and demographic structure, behaviour and relative economic circumstance (Ref 7). A community profile therefore not only forms the basis to exposure response modelling, but also provides a means to consider how potential health pathways identified in the project profile might act disproportionately upon certain communities and sensitive/vulnerable groups. In this instance, the community profile makes use of available demographic and health care data, complementing the socio-economic profile given in the ES.

Stakeholder Engagement

1.26 An important component of gathering an appropriate evidence base and tailoring the HIA to local circumstance is seeking the views of stakeholders and key representatives of communities likely to be affected by the proposed project. In this instance, an integrated engagement strategy was applied to engage and catalogue community and stakeholder concerns, providing informed feedback at exhibitions and a mechanism to both refine the proposed project to address such concerns through design, and influence the scope and focus of the final assessment.

1.27 Section 4 of the HIA provides a brief summary of engagement stages and outputs pertinent to the HIA. However, for a more detailed account of the integrated consultation strategy, the methods applied, the stakeholders and communities engaged and all consultation outputs, please refer to the Statement of Community Involvement chapter in the ES.

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7 Wales HIA Support Unit (2011). A guide to assessing the health and wellbeing impacts of opencast mining. http://www.wales.nhs.uk/sites3/Documents/522/OpencastguidanceFinal.pdf last accessed June 2013.

Assessment

1.28 The assessment stage maps the project profile and technical outputs of the ES against the community profile to assess and appraise the magnitude, likelihood and distribution of potential health outcomes (both adverse and beneficial) that would be directly attributable to the proposed project.

1.29 To keep the HIA a concise and publicly-accessible document, the assessment draws upon the technical assessment outputs of the ES but does not seek to repeat or replicate them. Key inputs are, however, cross referenced with the ES to aid transparency, and enable readers to navigate to areas of the ES of specific interest to them.

Health Action Plan

1.30 The HAP expands upon the normal recommendations section within HIA guidance (Ref 8, establishing recommended protocols and monitoring regimes to be implemented to further reduce and remove potential negative health impacts while maximising opportunities to increase health benefits. In this instance, the HAP draws from and builds upon the mitigation outlined in the ES and existing community support initiatives to optimise community support tailored to local circumstance and needs.

HIA Review Process

1.31 Although expected in Wales, through MTAN-2, HIA remains a non-regulatory requirement to the UK planning system, with varying approaches and methods bespoke to the project, community and assessment objectives.

1.32 The primary method to manage potential inconsistencies between HIAs and to ensure that the final HIA is robust, fit for purpose and meets both community and stakeholder requirements and expectations, is through the HIA scoping process. In this instance, the aims and objectives, approach, scope, process and methods applied have been informed, set and iteratively refined with key stakeholders and through community engagement. An internal review of the HIA has found that the all of the bespoke aims and objectives set with stakeholders have been met (Appendix B), and that the requirements for a HIA intended for planning submission have been delivered.

1.33 A more generic approach to evaluating HIA is through the use of HIA review packages, which primarily focus on the process/founding principle, the level of engagement applied, and the ability of the HIA to inform the decision making process.

1.34 Although useful in providing an additional level of quality assurance on HIA process, such review packages are not always effective for integrated assessments that do not seek to repeat information between disciplines (i.e. cross reference to overlapping sections within the ES).

1.35 Equally, a HIA intended for planning submission and use as a public document needs, by its nature, to be concise and accessible to the general public. As a consequence, there is often a

[8] Wales HIA Support Unit (2012).Health Impact Assessment: A Practical guide. Page 22-23. http://www.wales.nhs.uk/sites3/Documents/522/Whiasu%20Guidance%20Report%20%28English%29%20V2%20WEB.pdf last accessed June 2013.

trade-off between the level of information provided on the founding basis, principles and process of HIA (pointing to the guidance applied rather than repeating it), and the information pertinent to inform decision makers and address community concerns.

1.36 On the above basis, and to aid any external evaluation of the HIA, the HIA has been tested by applying the review package commonly used in Wales (Ref. 9). The findings of the review are given in Appendix B to this report, alongside additional commentary and justification where appropriate.

9 Cave, B et al, 2009, A Review Package for Health Impact Assessment Reports of Development Projects. Available www.hiagateway.org.uk last accessed June 2013

2 Project Profile

Introduction

2.1 This section draws from the description of the proposed project detailed in the ES, and sets the scope of potential health pathways to be investigated. For the sake of brevity, the HIA does not seek to repeat the full description of the proposed project, but outlines the key aspects and the associated health pathways. For further details of the proposed project, please refer to the Planning Statement and ES.

Project Description

2.2 Miller Argent is seeking consent to mine approximately 6 million tonnes of coal using surface mining methods and to carry out land remediation works within and adjacent to the surface mine to address public safety and land drainage concerns. The proposed project also incorporates ancillary operations including the progressive restoration of the land followed by a minimum five-year period of aftercare.

2.3 For the purpose of the HIA, the proposed project activities can be grouped into site enabling, remediation, mining, restoration and aftercare phases (albeit with some overlap), with key development features including:

<u>Site Enabling & Mining</u>

- Site enabling works;
- mineral workings, including the creation of the void and overburden mounds, construction of related buildings and installation of plant;
- road improvement works at the junction of Fochriw Road and Bogey Road to improve visibility for traffic using the junction by reducing the vertical alignment of Fochriw Road to the south of the junction; along with the formation of Access Point ‘A’ to the surface mine and minor improvements to Access Points ‘B’ and ‘C’ to Cwmbargoed Disposal Point (CDP);
- coal washing plant and ancillary water recycling facility at Cwmbargoed Disposal Point for the preparation and processing of coal for the duration of mining operations at the Nant Llesg and Ffos-y-fran (FRLS) surface mines;
- continued use of facilities at CDP for the duration of mining operations at the Nant Llesg and FRLS surface mines;
- works associated with Rhaslas Pond – the archaeological examination and recording of the northern embankment before its removal and the protection of and minor drainage works to the southern embankment, it being considered a prospective Scheduled Monument; and
- investigation, treatment and/or removal of waste materials from within a disused licenced inert landfill site that currently lies within the excavation area of the proposed project.

Remediation

- remediation of old shafts, adits and mining dereliction associated with former iron ore and coal mining; and land remediation to reduce silting of Darran Valley Country Park Lake, involving drainage works on the site of a former colliery tip to help address the scouring of tip material into the adjoining watercourse.

Restoration & Aftercare

- restoration of the land in accordance with the Restoration Strategy; and
- aftercare of the land for a minimum period of five years.

2.4 The quantity of coal transported from the CDP by road will continue to be limited to the existing rate of 50,000 tonnes per annum currently permitted for FRLS. All coal transported by rail will continue to be exported via the CDP.

2.5 Additional elements include the closure, diversion and replacement of public rights of way and the provision of temporary grazing land and public access land during the site enabling, remediation, mining, and restoration phases.

2.6 The aim of the proposal is to mine the sites coal resources while also taking responsibility for the management and cost of addressing the existing legacy issues and risks within and adjacent to the site, with the aim of remediating and restoring the site to meet the needs of the surrounding communities.

2.7 For a more detailed description of the proposed project, alongside the national policy driving coal extraction, please refer to the Planning Statement accompanying the Planning Application.

2.8 As shown in planning application drawing MA/NL/PA/003, the site covers approximately 480ha and is located on the western side of the Upper Rhymney Valley. Immediately east of the planning application boundary lie the Heads of the Valleys Industrial Estate and the Capital Valley Industrial Estate, beyond which is the residential area of Rhymney. The western application boundary is defined by the unclassified road known as 'Fochriw Road', which runs northwards over the Gelligaer and Merthyr Urban Common from Cwmbargoed towards the A470 Heads of the Valleys Road.

2.9 The northern extent of the site generally follows the Nant Carno watercourse, which meanders along the sites boundary. The southern limit of the site is largely defined by South Tunnel Road, which is an unclassified road over the Gelligaer and Merthyr Urban Common that runs east-south-eastwards towards Fochriw and Pontlottyn.

2.10 The operational area of the site would lie in the north-western sector. All mining operations associated with the surface mine would take place within this area, which is over 500m from the Rhymney and Fochriw settlement boundaries, for the duration of coal working (estimated to be approximately 10 years).

Design

2.11 The site would be worked from the west to the east, starting furthest away from communities, allowing improved screening of the excavation works from Rhymney, and enabling on-going community engagement on the effectiveness of site management and mitigation. This engagement will influence the refinement of operational activities, including mitigation, to minimise disruption as activities move closer to Rhymney, Pontlottyn and Fochriw.

2.12 A visual and acoustic screening bund would be constructed as part of the initial excavation works. The bund would be constructed during the first 4 months after the start of overburden excavation and would remain until all excavation and restoration works are completed. The visual and acoustic screening bund lies within 500m of the settlement boundary for Rhymney.

2.13 The site would be worked down to a maximum depth of approximately 165m.

2.14 Prior to mining commencement, a number of preparatory site enabling activities would be carried out. These would include relocating protected species and the preservation of any archaeological interests, prior to the stripping of any soil. Site fencing would be erected to make the area secure. The 33kV overhead power line crossing the site would be diverted with no disruption to supply, as power will be switched from other areas during change-over. In addition, water treatment areas and site drainage would be constructed and the access route installed. Prior to the commencement of coaling the proposed improvements to the junction between the Fochriw Road and Bogey Road would be completed.

2.15 Footpaths and bridleways crossing the area of the site will need to be stopped or diverted either on a temporary or permanent basis for the duration of site operations. However, a new route is proposed along the eastern area of the site providing north-south access, connecting to existing routes where possible.

2.16 For the purpose of assessment, the operational activities have been broken down into the following stages (known as Dispositions):

Disposition 1: site establishment and development of the box cut;

Disposition 2: development of maximum void;

Disposition 3: maximum void, with progressive backfilling continuing until the start of backfilling of overburden from the overburden mound;

Disposition 4: end of coaling; and

Disposition 5: final backfilling and restoration works to achieve the finished landform after coaling.

Extraction

2.17 The first stage of the mining element of the proposed project, the development of the box cut, would require clearance of the site, with soil being stripped from the excavation and overburden storage areas and stored. Excavation would commence with overburden used to create the visual and acoustic bund to the east, providing screening for the site, after which additional overburden would be stored in the overburden storage area to the south of the site. This stage will take approximately four months.

2.18 During Disposition 2, mining excavations would continue to progress, the southern overburden mound would be completed and progressively seeded to grass, further overburden would remain in the working void with progressive backfilling and the start of restoration work. During Dispositions 3 and 4 the excavation would reach its most easterly position, coaling would be to the maximum depth, and the southern overburden mound would be utilised to continue progressive backfilling of the void. Progressive restoration would continue, and in the final Disposition, the overburden mound and, lastly, the acoustic and visual bund would be removed.

Processing and Haulage

2.19 All coal extracted from the site would be transported to the CDP, by road. The coal would be taken to the CDP for processing prior to onward use, with a 400t/hr washing plant located at the CDPfor this purpose. A standalone planning application for the coal washing plant has already been submitted to the local planning authority with the intention of providing for the processing of FRLS coal. The same plant is included in this application.

2.20 The quantity of coal transported by road from the disposal point would be limited to 50,000 tonnes per annum (on average equating to 10 two way vehicle movements per day) with all other coal dispatched via rail. The maximum annual amount of coal from the project passing through the CDP would be 750,000 tonnes.

Remediation

2.21 Areas outside the operational boundary (shown in planning application drawing MA/NL/003,) have been included primarily to carry out land remediation works to improve the land and address existing public safety concerns regarding the collapse of mine shaft and adits on common land and public rights of way (Figure 2.1). Such work includes the location and stabilisation of the extensive old mine shafts and adits known to be prevalent throughout the area, some of which have failed recently, with potentially catastrophic outcomes.

Figure 2.1 Example of Local Collapsed Mine Shaft and Adits

Top Left Fochriw (2013), Top Right Nant Llesg (2004), bottom Trecatti

2.22 As part of the proposed project, Miller Argent would investigate the site to locate these particular shaft and adit locations and other possibly unrecorded abandoned mine entries that may also exist. Once located, Miller Argent would establish whether or not there is an associated risk. The following steps would then be undertaken by Miller Argent:

- available records of previous works to seal and secure the mine entry, either at the time of abandonment or later, would be investigated;

- the site would be physically investigated to establish the presence and condition of any existing capping, fill or seal;

- proposals for any necessary remedial works would be drawn up in liaison with the Coal Authority;

- any necessary physical works to render the shaft, adit or mine entrance safe would be carried out by Miller Argent at no cost to the public purse; and

- the Coal Authority would be fully advised of Miller Argent's findings and the detail and completion of any remedial works so that the Coal Authority can update their records.

2.23 All such works outside the coal working excavation area would be carried out within two years of the commencement of operations at the site.

Restoration

Overarching Restoration Strategy

2.24 The Restoration Strategy is put forward in the context of discussions with officers of Caerphilly County Borough Council, which established that, rather than the land being restored to a formal recreational use such as a country park, it would be preferable to provide for informal recreational uses, incorporating common land, footpaths, bridleways and cycle paths to act as links between the already established Cwm Darran and Bryn Bach Country Parks; and the provision of public access should be sympathetic to the existing ecological, nature conservation and cultural heritage interests and any created as part of the scheme.

2.25 The aim of the restoration strategy is to deliver these aspirations while restoring a landscape in keeping with and enhancing the landscape character and amenity of the area, integrating landscape objectives with those for nature conservation, cultural heritage, land use and access for recreation and amenity.

2.26 Within that overall aim, there are a number of objectives for the strategy, including:

- to provide a range of landscape characters reflecting the landscape patterns of the area and reintegrate the site into its surroundings, upgrading its contribution to the setting of Rhymney;

- to improve accessibility to the public and connection with nearby communities, and the amenity value of the site to the community;

- to provide a range of habitats offsetting the habitat loss due to the operations; and

- to reflect the history and archaeology of the area in landscape features, and provide access to the public and information about the cultural heritage in the site.

2.27 An important aspect of upgrading the environmental amenity value for the public is the opportunity for interaction with the nature and heritage interests, existing and new, and reconnection with the natural and cultural landscape.

Progressive Restoration

2.28 The restoration strategy would be implemented progressively as operations proceed and it includes the following:

- during operations, remediation works would be carried out to the lapwing area (the area south of South Tunnel Road and extending around the west of Fochriw) and the Rhymney Valley side;
- ponds would be established at the sites of former water treatment areas and within margins of the site that are to remain undisturbed;
- proposed public rights of way would be established in areas outside of operational parts of the site, including a new bridleway along the eastern edge of the site forming an alternative route to the Rhymney Valley Ridgeway Walk; and
- waymarked access routes, provision of seating and picnic areas, and informative signs explaining the mining, remediation and restoration works, would in some cases be established during coaling, or would otherwise be established in later phases.

2.29 In addition to this, in line with Local Development Plan Policies CW4 and 8, a plan is put forward for management of off-site land at Bryn Caerau Farm for ecological enhancement, with the creation of a permissive route for use as a bridleway looping though it.

Early Land Remediation Plans

2.30 A feature of the proposed project, is the inclusion of areas outside of the operational mining area for early remediation and restoration to be completed within 2 years from the commencement of coaling, and the provision of alternative areas of public land and Public Rights of Way to replace those temporally removed. Key features include:

- to provide a range of landscape character reflecting the landscape patterns of the area and to reintegrate these areas into the surroundings and upgrade their contribution to the setting of Rhymney;
- to improve accessibility to the public and connection with nearby communities, and increase the amenity value of the site to the community;
- to provide a range of habitats offsetting the habitat loss due to the operations;
- to reflect the history and archaeology of the area in landscape features, and provide access to the public and information about the cultural heritage in the site;
- to safely remediate coal and ironstone shafts and adits and mine entrances in these areas; and
- to carry out the remediation and drainage works north of Fochriw, with the aim of reducing and managing silt run-off to Cwm Darran Country Park.

Programme

Hours of Operation

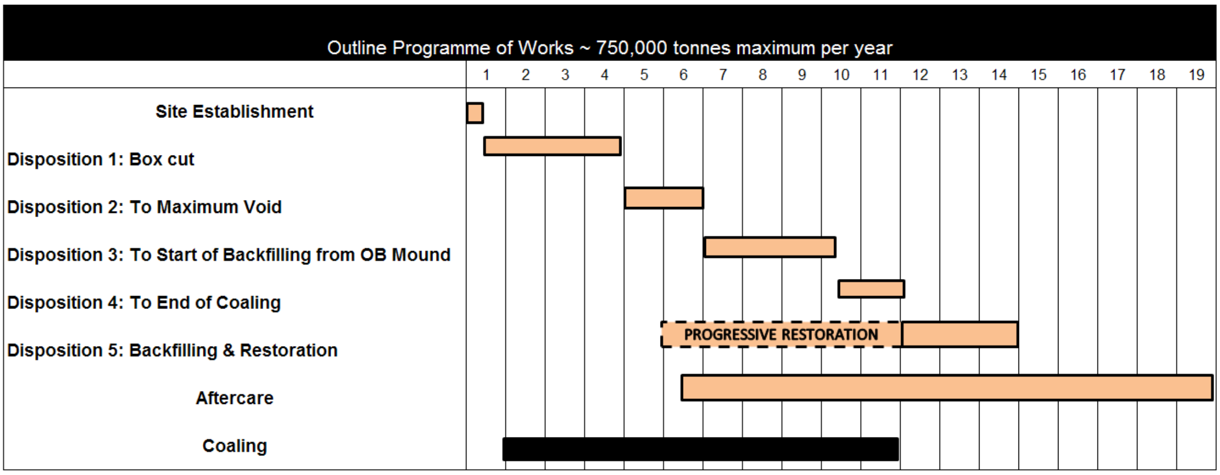
2.31 Coal would be extracted and transported to the CDP between the hours of 07:00 – 19:00 Monday to Friday and 07:00 – 14:00 on Saturdays. Blasting would be kept to a minimum, occurring only between 10:00 – 13:00 hours and 14:00-16:00 hours Monday to Friday and between 10:00 – 13:00 hours on Saturdays.

2.32 The CDP would continue with its existing hours of operation of 06:00 – 22:00 Monday to Friday and 07:00 – 18:00 on Saturdays. There would be no working on Sundays and public holidays. In total up to six trains per day could be dispatched at any time within the specified working hours.

Programme of Works

2.33 Figure 2.2 presents the approximate timescales required to complete the stages referred to above for a maximum annual rate of coal production of 750,000 tonnes.

Figure 2.2 Work Programme within the Operational Boundary (OP)



2.34 As shown, mining activities will proceed within year one with the initial box cut, reaching the maximum void by year five with progressive backfilling of the void thereafter.

2.35 Restoration of the site and associated aftercare will commence from year five, with the replacement and spreading of soils and/or soil-forming materials as each stage of the progressive backfilling operations is completed. The final restoration design for each stage of the progressive restoration shall accord with the restoration strategy and details submitted for the consideration and written approval of the local planning authority. On completion of coaling by year eleven, final restoration of the remaining areas will commence.

2.36 The replacement of overburden material and spreading of soils and soil-forming materials should be completed on all areas within 3 years of the completion of coaling.

2.37 Aftercare of each stage of the progressively restored land would continue for a minimum of 5 years after the completion of final restoration on that stage.

Health Pathways

2.38 Table 2.1 provides a summary of potential health pathways associated with the proposed project. The health pathways define the scope of the HIA and stem from the findings of the HIA scoping report, They have been assessed for each phase of the proposed project.

2.39 Feedback from consultation indicated the need to simplify and help the general public to navigate through the HIA. As such, the final column signposts to where the individual health pathways are assessed and addressed within this document.

Table 2.1 Health Pathways

Health Determinant	Adverse/Beneficial	Assessed/ investigated in Section	Addressed in Section
Changes in air quality – including PM_{10} and $PM_{2.5}$, and NO_2	Adverse	Section 5.2 to 5.40	Section 7.3 to 7.6
Change in noise and vibration exposure	Adverse	Section 5.41 to 5.58	Section 7.7 to 7.9
Impact on open space and access	Adverse	Section 5.89 to 5.93	
Changes in road and rail traffic movements	Adverse	Section 5.59 to 5.65	Section 7.10 to 7.11
Increased direct, indirect and induced employment opportunities	Beneficial	Section 5.66 to 5.83	Section 7 to 7.38
Potential impact on neighbouring industry	Adverse	Section 5.84 to 5.88	Section 7.13
Potential impact on community well-being and perceived risks	Adverse	Section 4	Section 7.13
Enhanced areas of common land	Beneficial	Section 5.89 to 5.93	Section 7.53 to 7.54
Improved access and connectivity	Beneficial	Section 5.89 to 5.93	Section 7.53 to 7.54
Increased visitation, tourism and associated local spending	Beneficial	Section 5.89 to 5.93	Section 7.53 to 7.54

3 Community Profile

Introduction

3.1 Evidence suggests that different communities have varying susceptibilities to health impacts and benefits as a result of social and demographic structure and socio-economic circumstance (Ref.10). The community profile therefore provides an overview of existing circumstance including demography, the burden of disease and poor health behaviours, and is further supplemented by local input gained during consultation.

3.2 The community profile not only forms the basis to exposure response modelling but also allows an insight into how potential health pathways identified within the project profile may act disproportionately upon certain communities and sensitive receptors.

Site Location and Setting

3.3 The proposed project is located in the Upper Rhymney Valley in the County Borough of Caerphilly to the south of the Heads of the Valleys Regeneration Area. The closest residential settlement is Rhymney to the east of the site, with the village of Fochriw a little farther to the south. Located between the site and the settlement of Rhymney is the Heads of the Valley Industrial Estate. This five hectare estate has been constructed on a former colliery site; the area is in mixed-use and includes a number of manufacturing industries that provide employment opportunities within the local area.

3.4 The proposed excavation area includes land within the wards of Darran Valley and Twyn Carno. However, the settlements in closest proximity to the site are located in the wards of Pontlottyn and Moriah (which includes Rhymney). All four wards are included in the community profile.

Site History and Legacy

3.5 South Wales has a long history of industrial activity due to the availability of natural resources, particularly coal and iron ore. The iron industry began to expand in the late eighteenth century and was swiftly followed by the coal industry in the mid-nineteenth century, which soon dominated the local area. However, the first sign of decline came by the late nineteenth century with the closure of Rhymney Ironworks in 1890. Following the First World War the depression saw coal prices drop and with little other industry to fall back on, unemployment increased across Glamorgan and Monmouthshire to 42%. The coal industry was nationalised in 1947, staving off immediate collapse, but nevertheless mines within the area steadily closed, with the last mine (Penalta Colliery) shutting in 1991 (Ref. 11). Following this, the area has experienced further economic decline, with the gradual closure of several industries in the area (most recently including the Hoover factory and Linde fork lift manufacturing company). The

10 Wales HIA Support Unit (2012).Health Impact Assessment: A Practical guide. http://www.wales.nhs.uk/sites3/Documents/522/Whiasu%20Guidance%20Report%20%28English%29%20V2%20WEB.pdf last accessed June 2013.

11 Caerphilly County Borough Council. (2011). Changing Fortunes. Available www.caerphilly.gov.uk last accessed 15/02/12.

community profile is influenced by this economic decline and is discussed in more detail in the following sections.

3.6 In addition to the social and economic legacy of mining and industry in the area, there is also a historic environmental legacy, where the site has previously been used for mining activities and consequently contains a number of disused shafts and adits. In places this has made the ground on common land and along public rights of way unstable and susceptible to collapse (Figure 2.1). Furthermore, surface colliery spoil tipping scars the site, creating problems of water run off carrying silt to the Darran Country Park and mine water discharge entering the Rhymney River. The site therefore presents both a hazard (in terms of safety), but also an environmental legacy requiring public resources to address.

Local Demography

Population Density and Migration

3.7 The County Borough of Caerphilly has a population of 173,100 people, and a population density of 6.24 people per hectare (pph), much higher than the national average for Wales of 1.45 pph (Ref. 12). The population in the County Borough of Caerphilly has gradually increased over the previous decade by approximately 2% (Ref. 13), attributed principally to natural change (more births than deaths) rather than migration, whereas Wales's population overall has increased by 3% in the same period.

3.8 There was almost no net change in population due to migration from 2009 – 2010 in Caerphilly, with 4,100 people entering the county and 4,200 leaving. However, this balanced migration total hides variation by age, with the greatest outward migration being in the 16-24 age bracket and the greatest inward migration in the 45-64 age bracket (Ref. 14).

3.9 Figure 3.1 shows the population density at the Lower Super Output Area (LSOA) level. LSOAs are a geographical area designed for use in small-area statistics, allowing comparisons to be made between different areas within a county. All LSOAs adjoining the site are in the lowest fifth of population density within the Caerphilly, Blaenau Gwent and Merthyr Tydfil local authority areas. However, looking at the population density in the wards around the site in more detail, Moriah, Pontlottyn and part of Twyn Carno do have a slightly greater population density than the Darran Valley ward.

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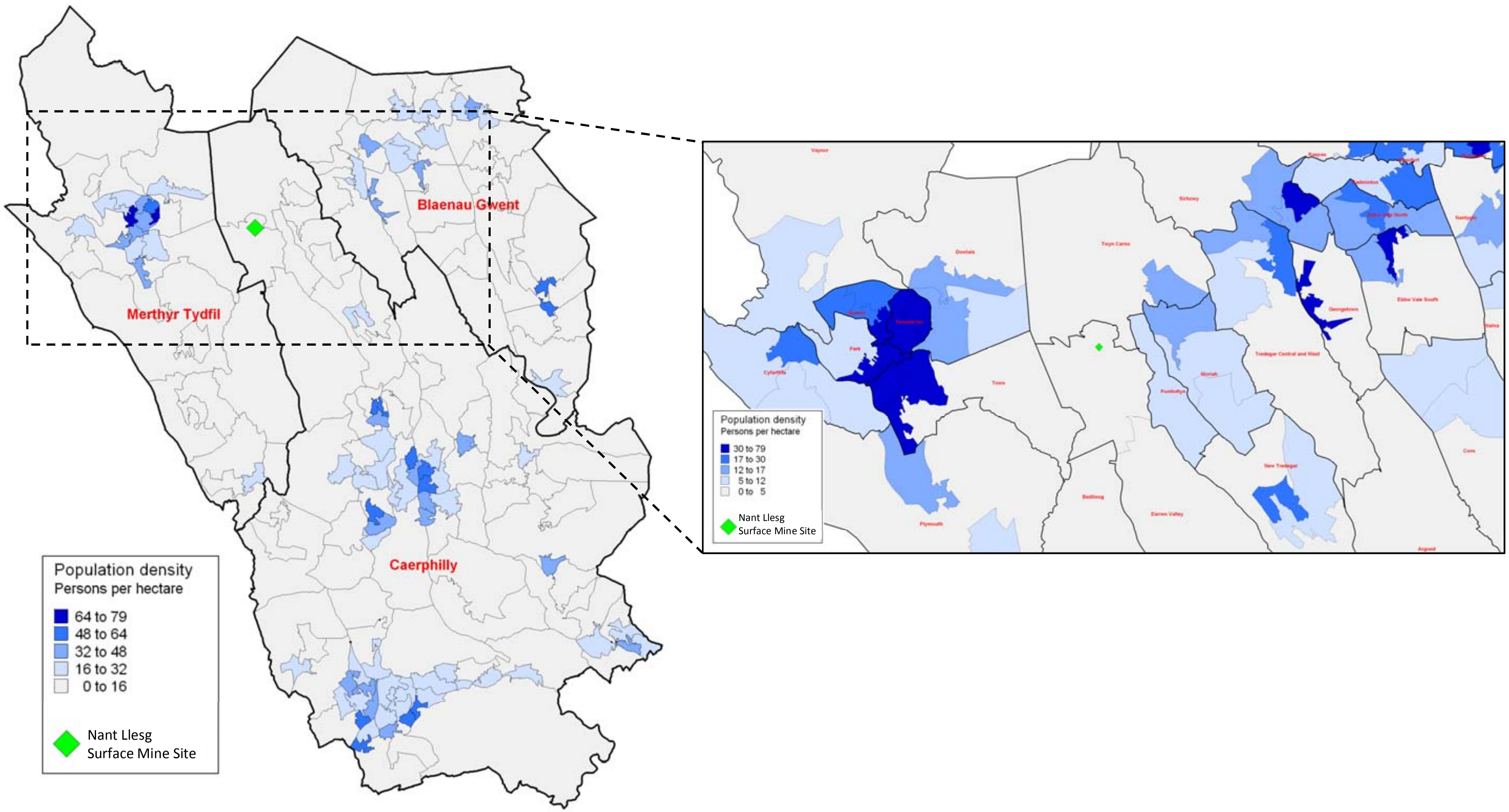
12 The Office for National Statistics. (2011). National Census: Available www.neighbourhood.statistics.gov.uk last accessed 07/05/13

13 Caerphilly County Borough. (2010). Health, Social Care and Well-being Strategy Needs Assessment. Available www.caerphilly.gov.uk/healthchallenge/pdf last accessed 15/02/12

14 The Office for National Statistics. (2011). Internal Migration by Local Authorities in England and Wales. Available www.statistics.gov.uk last accessed 08/08/11

Figure 3.1 LSOA Population Density (Census Data 2011)
Contains National Statistics and Ordnance Survey data © Crown copyright and database right 2013



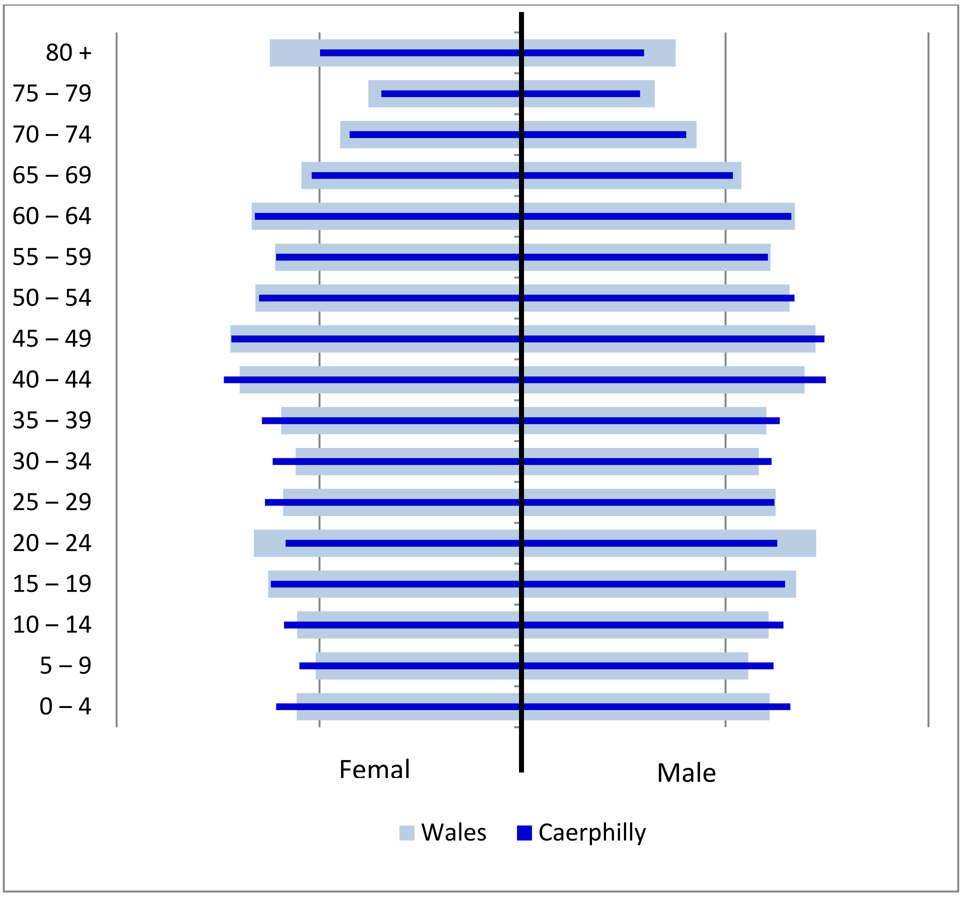
Population Structure

3.10 In keeping with the national trend, the gender split in Caerphilly's population is nearly equal, at 51% female and 49% male.

3.11 In Figure 3.2, the age profile for Caerphilly has been overlaid on that of Wales. Caerphilly has a relatively young population, with the exception of 20-24 year old age bracket. The Caerphilly population in this age bracket is notably lower than the Wales average. Caerphilly also has fewer people in all 65+ age brackets than the Wales average.

3.12 By 2033 the Caerphilly population is projected to have increased by 5.6%. This change is expected to be attributable to natural change (births outnumbering deaths, rather than inward migration. Again, this overall trend hides significant variation by age, with a 64% increase in the number of people aged 65 and over predicted (Ref. 15).

Figure 3.2 Age Structure, Caerphilly Compared with Wales (Census Data 2011)



3.13 Greater variability is apparent when looking at ward-level age structure data for Twyn Carno, Darran Valley, Pontlottyn and Moriah compared to Caerphilly, presented in Darran Figures 3.3

15 Caerphilly County Borough. (2010). Health, Social Care and Well-being Strategy Needs Assessment. Available www.caerphilly.gov.uk/healthchallenge/pdf last accessed 15/02/12

– 3.6. Data is taken from the 2001 census, as 2011 census data is not presently available for five-year age brackets at lower than local authority level. Pontlottyn has a notably ageing population, few children and younger working age adults, and a large imbalance between the number of male and female residents in some age brackets. Moriah and Darran Valley have somewhat fewer people in several working-age brackets than the Caerphilly average, suggesting that the population may have more younger families and retired individuals.

Figure 3.3 Age Structure, Twyn Carno Compared with Caerphilly (Census Data 2001)

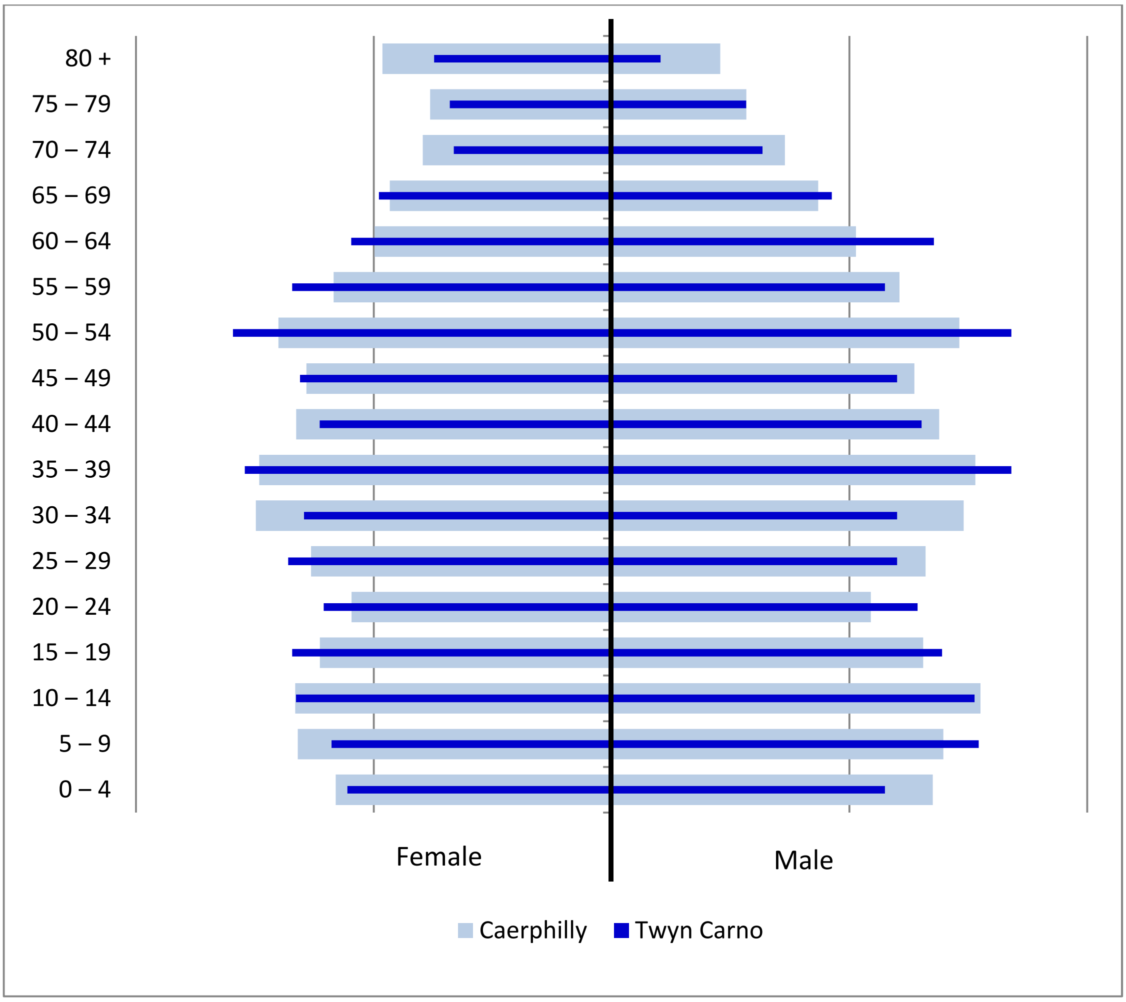


Figure 3.4 Age Structure, Darran Valley Compared with Caerphilly (Census Data 2001)

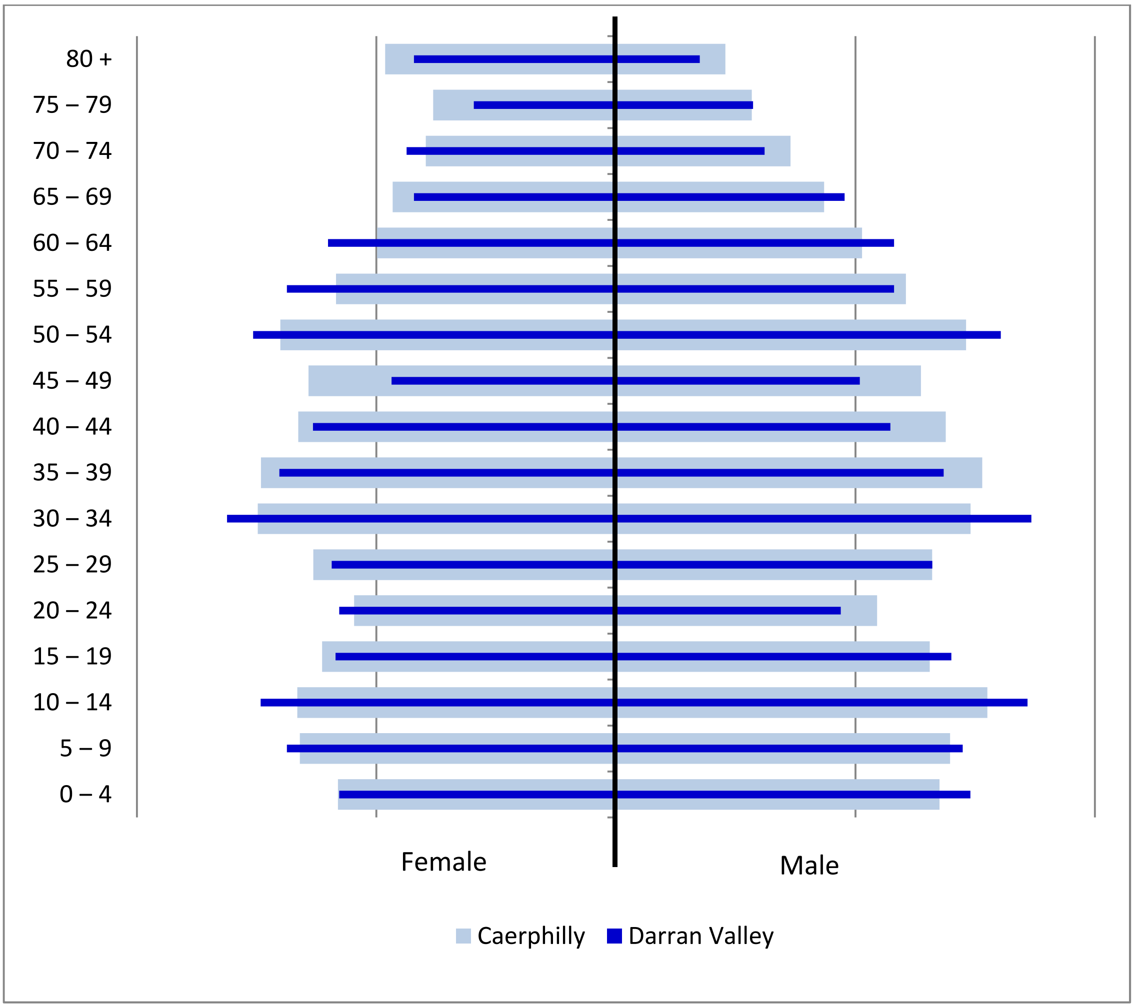


Figure 3.5 Age Structure, Pontlottyn Compared with Caerphilly (Census Data 2001)

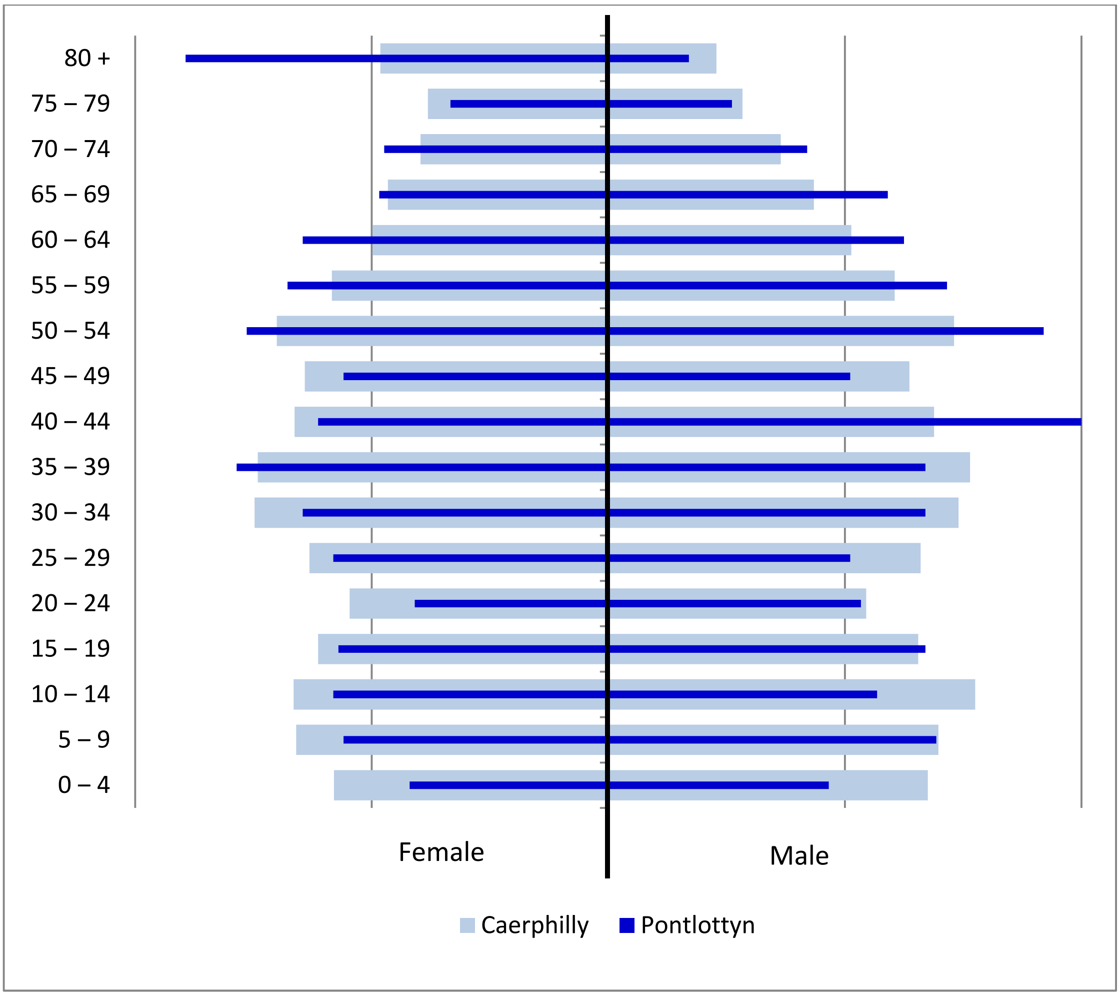
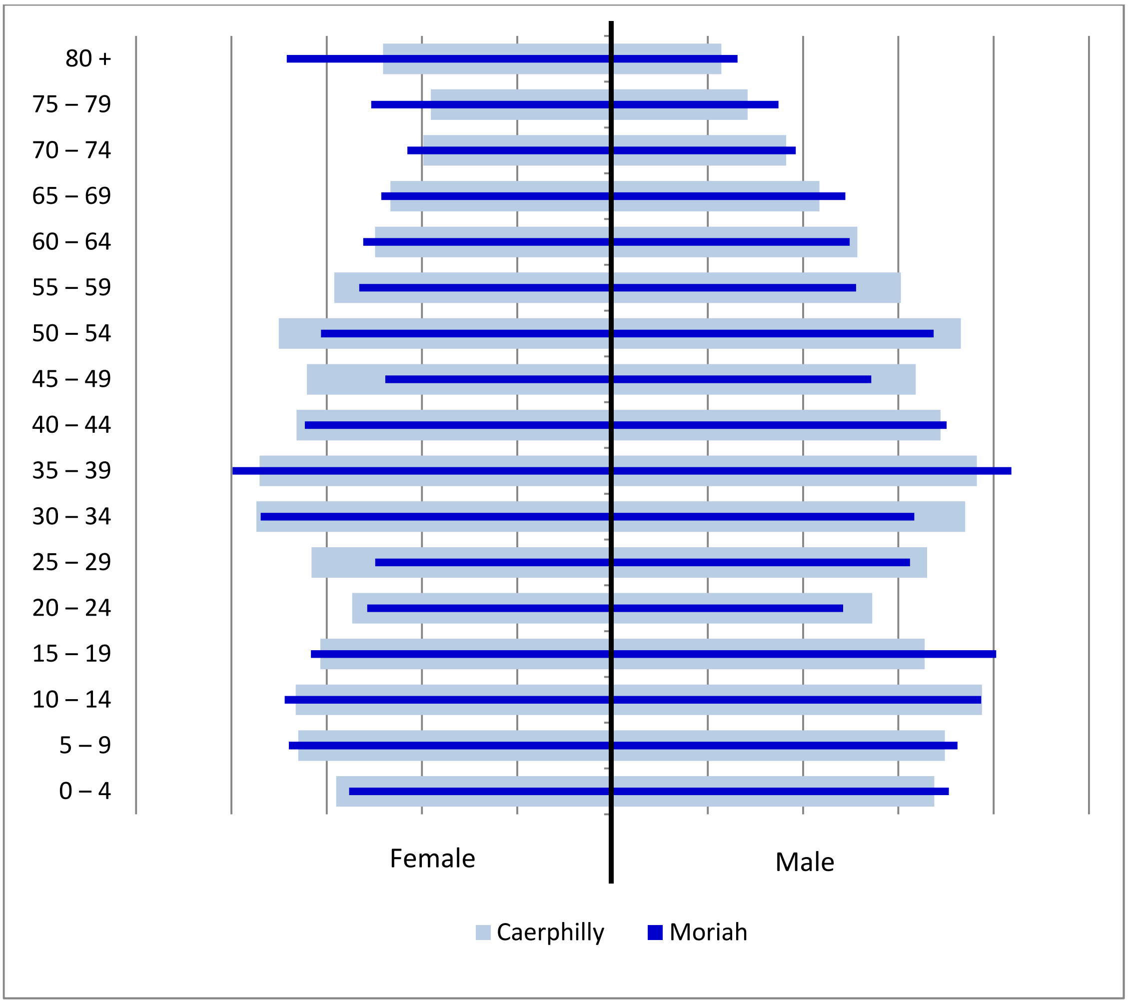


Figure 3.6 Age Structure, Moriah Compared with Caerphilly (Census Data 2001)



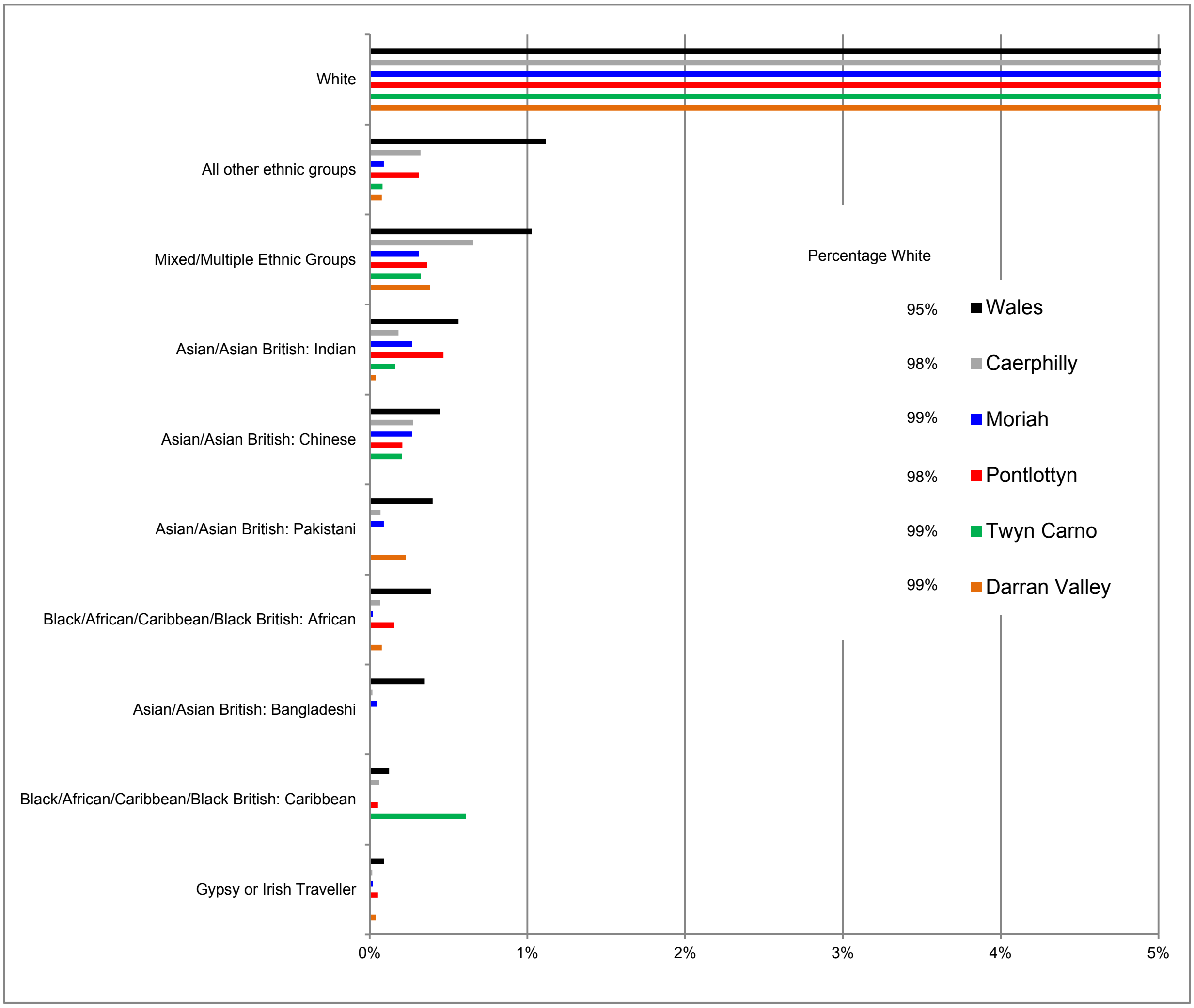
Ethnicity

3.14 The data in Table 3.1 indicates that local communities have a low ethnic diversity at both the ward and borough council level, with a predominantly white population and lower proportion of other ethnic groups when compared with Wales overall (Ref. 16, 17).

16 The Office for National Statistics. (2011). National Census: Ethnic Group, 2011. Available www.neighbourhood.statistics.gov.uk last accessed 07/05/13

17 NHS Wales. (2013). Minority Ethnic Groups. Available http://www.wales.nhs.uk/healthtopics/populations/minorityethnicgroups last accessed 23/01/13

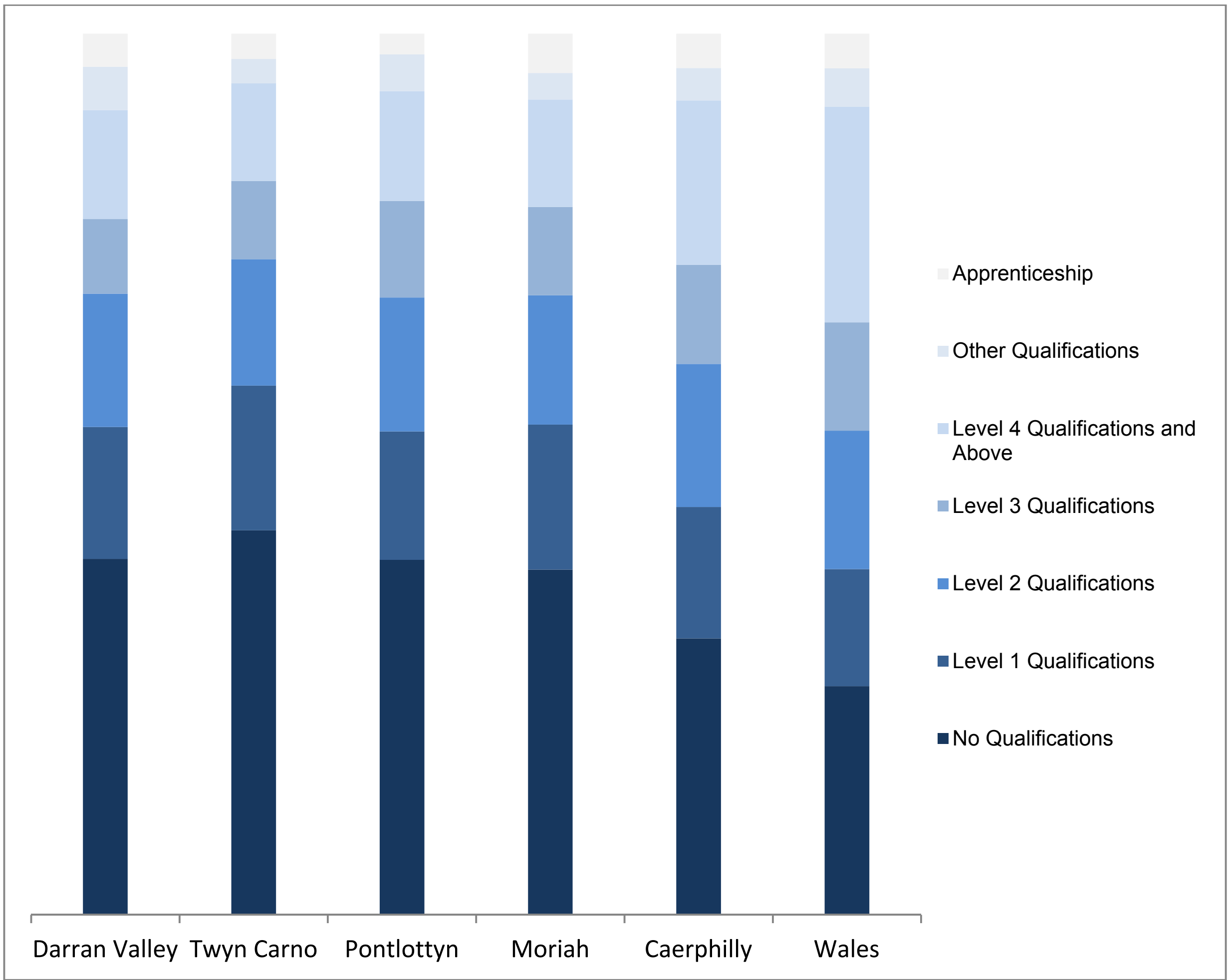
Table 3.1 Ethnic Group (2011) Expressed as a Percentage of the Population



Education

3.15 Educational attainment in all four wards (shown in Table 3.2) is significantly below the Wales and Caerphilly average. A much larger proportion of the population in these wards has no educational qualifications compared to Wales overall, and low rates of higher education attainment generally are apparent.

Table 3.2 Highest Qualification (2011 Expressed as a Percentage of Population Aged 16-74



Source: (Ref. **12**)

3.16 Local communities are therefore regarded as particularly sensitive to any activity that may impact education; conversely, they would also be sensitive to any activity that may support an improvement in local education attainment and skills development.

Economic Activity

3.17 The decline and eventual collapse of the steel and coal industry in Caerphilly left behind a legacy of unemployment. However, 70.2% of people in Caerphilly remain economically active with 62.5% in employment, which is only slightly below the proportion in Wales (66.3% in employment) and Great Britain (70.2% in employment) (Ref. 18). Available data from 2008

18 The Office for National Statistics. Nomis Official Labour Market Statistics. Available www.nomisweb.co.uk last accessed 18/08/11

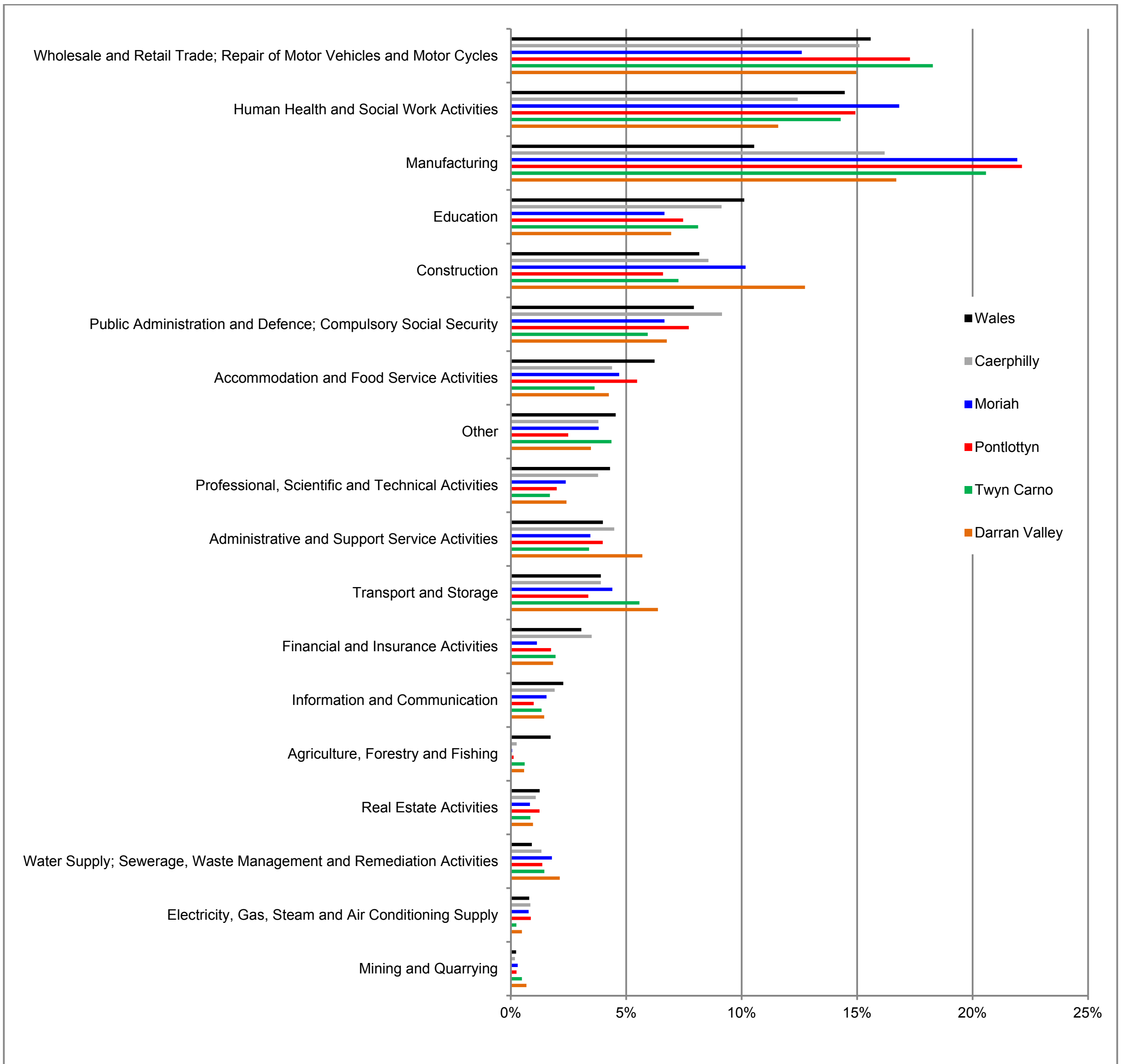
indicates that the largest employment sector in Caerphilly is the public sector (30.9%), followed by the manufacturing (24.3%) and hospitality (19.1%) sectors (Ref.18).

3.18 The 2011 census provides data for employment by occupation at both the ward and county level, shown in Table 3.3. The predominant area of employment within the four wards remains the manufacturing industry (a more significant employment area in these wards than in Caerphilly or Wales), and the wholesale/retail and construction sectors. When combined, the public administration, health and social care, and education sectors also represent a significant percentage of local employment in the area

3.19 The employment data suggests that local communities have an existing administrative, manufacturing and construction skill base pertinent to the proposed project. Darran Valley and Twyn Carno also have greater existing employment, and skills, in the mining and quarrying sector than Caerphilly or Wales. Caerphilly overall has 140 existing mining workers.

3.20 The mixture of employment industries in an area will generally correlate closely with earnings. Average hourly pay by residence is slightly lower in Caerphilly, at £11.34, than the Welsh average of £11.62 (Ref. 18).

Table 3.3 Employee Jobs by Industry (2011) Expressed as a Percentage of Total Employment



Source (Ref.19)

3.21 As shown in Table 3.4, the rate of unemployment in Caerphilly has been consistently greater than the average for both Wales and Great Britain since 2004, a gap that has further widened since 2007, which may be attributable to acute effects of the global recession on local manufacturing industry. This pattern can also been seen in the neighbouring county of Merthyr Tydfil. Moreover, the job density in Caerphilly is below the national trend with 0.55 jobs per person aged 16-64, whereas across Wales there are 0.71 jobs per person and Great Britain has 0.78 (Ref. 18).

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19 The Office for National Statistics. (2011). National Census: Industry, 2011. Available www.neighbourhood.statistics.gov.uk last accessed 07/05/13

3.22 The manufacturing sector has experienced a decline in this period. Closure of the Hoover factory in 2009, with the loss of 337 jobs, and the Linde fork lift manufacturer announcing closure in 2013 with the loss of 203 jobs, may also result in indirect and diffuse impacts upon other businesses in the area, including their suppliers.

Table 3.4 Percentage of Unemployment (2004 – 2011)

Percentage of Adults (16+) Unemployed	Caerphilly	Merthyr Tydfil	Wales	Great Britain
Jul 04 – Jun 05	6.1	6.6	4.8	4.8
Jul 05 – Jun 06	5.7	8.6	5.2	5.3
Jul 06 – Jun 07	6.3	7.8	5.4	5.3
Jul 07 – Jun 08	6.6	7.1	5.5	5.2
Jul 08 – Jun 09	10.0	10.0	7.7	6.9
Jul 09 – Jun 10	10.1	11.9	8.1	7.7
Jul 10 – Jun 11	10.6	12.0	8.5	7.7

Source: (Ref.20)

3.23 In 2011, 22.8% of working-aged people (16-64) in Caerphilly received social security benefits, compared with 18.4% in Wales and 14.5% in Great Britain. The majority of claimants (11.9% of working-aged people in Caerphilly, 9.4% in Wales and 6.5% in Great Britain) received Employment Support Allowance (previously incapacity benefit).

3.24 Second to this is the number of claims for Job Seeker's Allowance (JSA). In January 2012, approximately 5.6% of working age people in Caerphilly claimed JSA, compared with 4.4% in Wales and 4% in Great Britain. The neighbouring county of Merthyr Tydfil has a similarly high rate of JSA claimants (Table 3.5), indicating a low rate of employment across much of the Heads of the Valley area.

Table 3.5 Percentage of JSA Claimants by Age Group

Age Range	Caerphilly	Merthyr Tydfil	Wales	Great Britain
16-64 (Total)	5.6	7.0	4.4	4
18-24	15	16.8	9.5	8.1
25-49	5.5	7.2	4.6	4.1
50-64	2.3	2.8	2	2.2

Source: (Ref. 18)

3.25 In Caerphilly and Merthyr Tydfil, the proportion of people aged 18-24 claiming JSA is especially high – twice that of Great Britain, in the case of Merthyr Tydfil. Despite the trend in JSA claimants' age evident in Table 3.5, the number of school leavers aged 16 known to not be in education, employment or training (NEET) has decreased in Wales over the last two years from 7.1% in 2008 to 5.4% in 2010. The number of school leavers classed as NEET within Caerphilly also decreased from 7.1% in 2008 to 5% in 2009 but slightly increased again to 6% in 2010 (Ref. 21). Such a trend however, is not due to increased employment and education for school

20 The Office for National Statistics. Nomis Official Labour Market Statistics. Available www.nomisweb.co.uk last accessed 18/08/11

21 Welsh Government. (2012). Statistical Bulletin, Young People not in Education, Employment or Training (NEET) Year to 30 June 2011. Available http://wales.gov.uk/docs/statistics/2012/120118sb22012en.pdf last accessed 17/02/12.

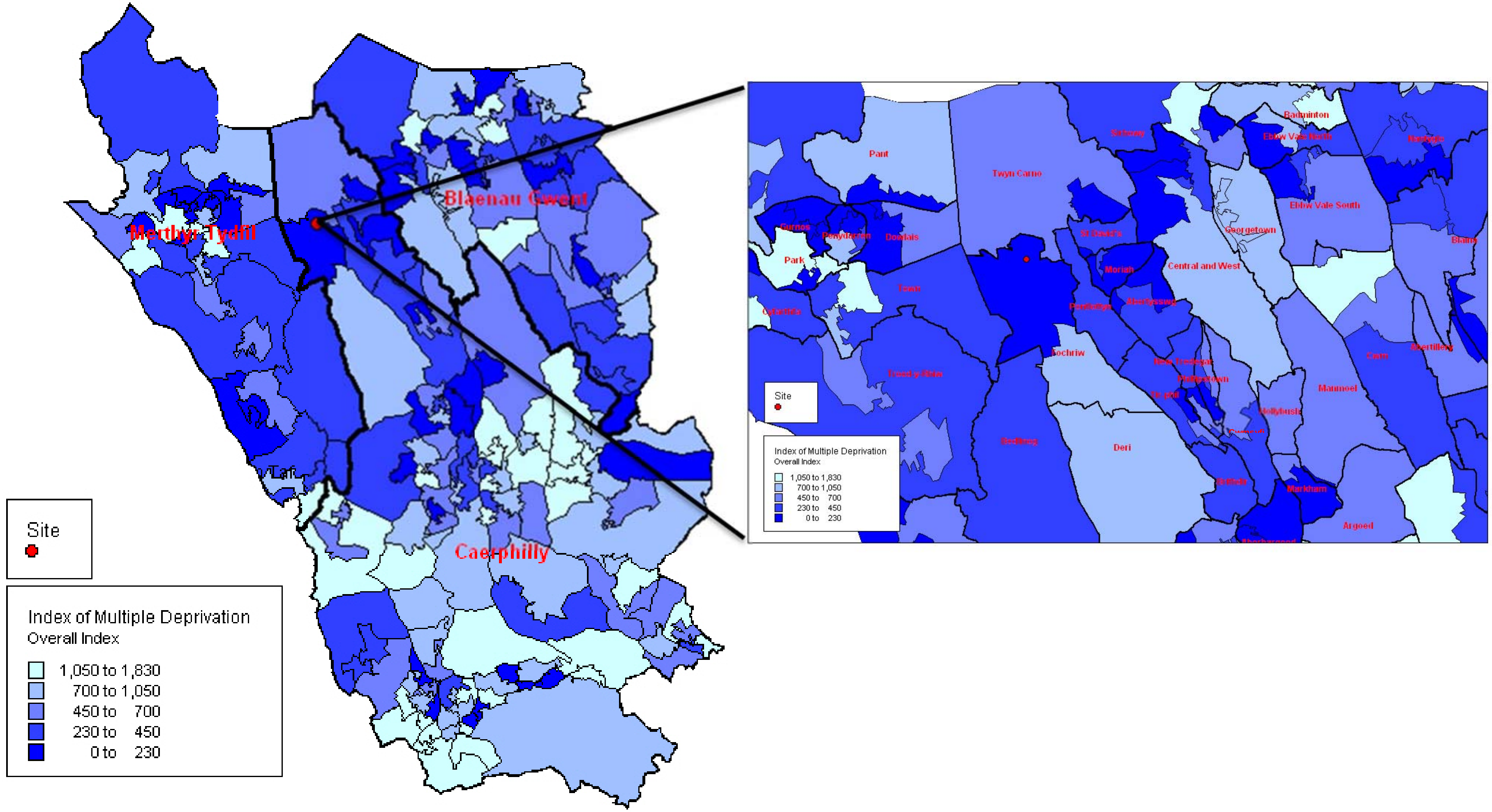
leavers, but correlates with the highest levels of outward migration being in the 16-24 age bracket (Ref. 22) in search of higher education and employment elsewhere. The increasingly high level of unemployment coupled with low educational achievement and outward migration of the youngest economically active age demographic is a key factor for the widening inequality within the area, and associated burden of poor health. In response to this Caerphilly County Borough Council has launched and funded a new apprenticeship scheme to support and retain young people within the area, providing over 100 work placements in the Council.

Deprivation

3.26 The 2011 Index of Multiple Deprivation provides a rank of the 1,896 LSOAs in Wales, in which a rank of 1 indicates the most deprived area and 1,896 indicates the least. The IMD is weighted by seven deprivation domains: income, employment, health, community safety, housing, education, living environment and access to services. The IMD rank for each of the wards in close proximity to the proposed project site is shown in Figure 3.7. The data indicates a high rate of multiple deprivation, particularly in the Moriah ward, Fochriw ward and areas around Merthyr Tydfil. This is in contrast to the south of Caerphilly, where levels of multiple deprivation are generally lower.

22 The Office for National Statistics. (2011). Internal Migration by Local Authorities in England and Wales. Available www.statistics.gov.uk last accessed 08/08/11

Figure 3.7 IMD Rank



Contains National Statistics and Ordnance Survey data © Crown copyright and database right 2013

3.27 The data in Figure 3.7 suggests that local communities should be regarded as sensitive to activity that may influence the deprivation domains, such as access to employment, education, and the quality of housing, local environment and access to services within the area, all of which have a combined influence upon physical, mental and social health. Equally, any activity that helps to address existing circumstance and barriers to improvements in those areas, will contribute in addressing a key factor associated with existing inequality, which is strongly linked to the existing burden of health and inequality evident within the area .

Health

3.28 Overall, health within Wales improved during 2001 – 2009, with a gradual decline in the all-age all-cause mortality rate per 100,000 people from 707 to 588 (Ref. 23). In Caerphilly the all-age all-cause mortality rate per 100,000 was 595 in 2009, increasing to 634 in 2010 after a three year period of steady decline (Ref.23). Comparatively, this ranks Caerphilly amongst the local authorities in Wales with the greatest mortality rate, at 19th out of the 29 (where 1 has the lowest all-age all-cause mortality rate). The authority areas adjacent to Caerphilly also have some of the greatest mortality rates in Wales, with Merthyr Tydfil having an all-age all-cause mortality of 610 (ranked the 2nd worst in Wales) and Blaenau Gwent 689 per 100,000 people in 2010 (ranked worst in wales) (Ref. 23). Subsequent data released by NHS Wales indicates that all cause mortally within Merthyr Tydfil and Blaenau Gwent during 2011 has worsened (a respective all-age all-cause mortality of 648 and 697 per 100,000 people). In contrast, the all-cause mortality rate in Caerphilly has improved, reducing to 603 (Ref.23).

Life Expectancy

3.29 Although life expectancy within Wales has improved and is better than Scotland and Northern Ireland (Ref.24), the rate of improvement has not been uniform throughout the country, with areas exhibiting socio-economic deprivation typically being slower to improve.

3.30 Life expectancy for residents in Caerphilly in 2008-10 was 76.7 years for males and 81.3 years for females. This is marginally below the average life expectancy at birth across Wales of 77.6 years for males and 81.8 years for females. Across Wales, Merthyr Tydfil has the lowest life expectancy for males of 75.4 years, with Blaenau Gwent having the lowest for females at 79.7 years.

3.31 Across Wales the age standardised all-cause mortality rate is 580 per 100,000 of the population. Caerphilly has a higher mortality rate of 635, while Merthyr Tydfil has a rate of 610 per 100,000.

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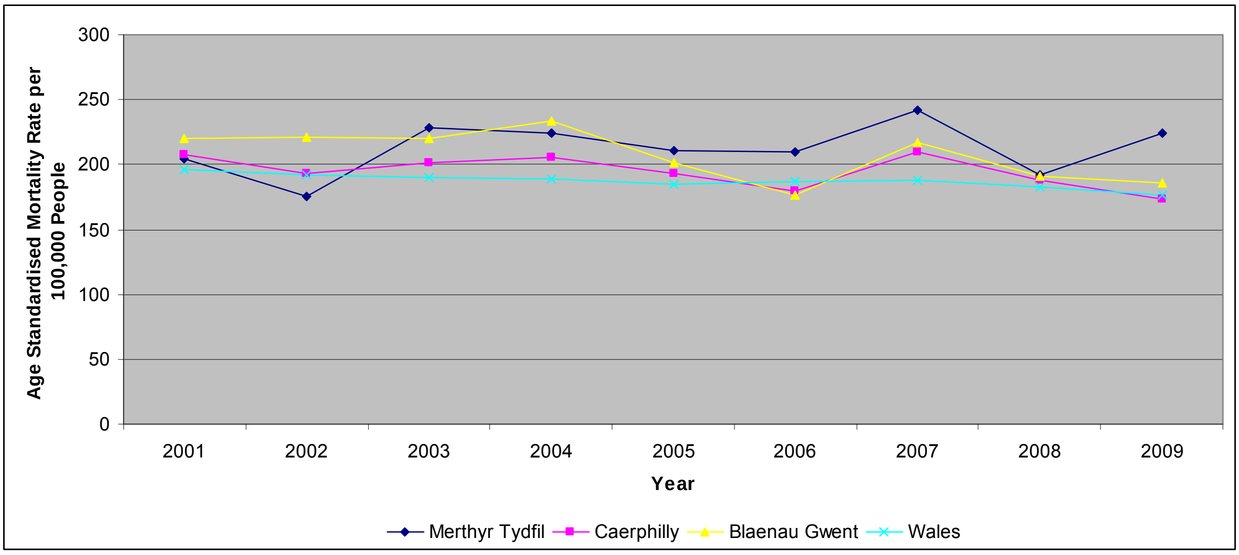
[23] Cymru Information Services. (2011). Health Maps Wales. Available www.healthmapswales.wales.nhs.uk last accessed 25/01/12

[24] Welsh Government. (2011). Life Expectancy, 2008-10. Available http://wales.gov.uk/topics/statistics/headlines/health2011/1110263/?lang=en last accessed 15/02/12.

Cancer

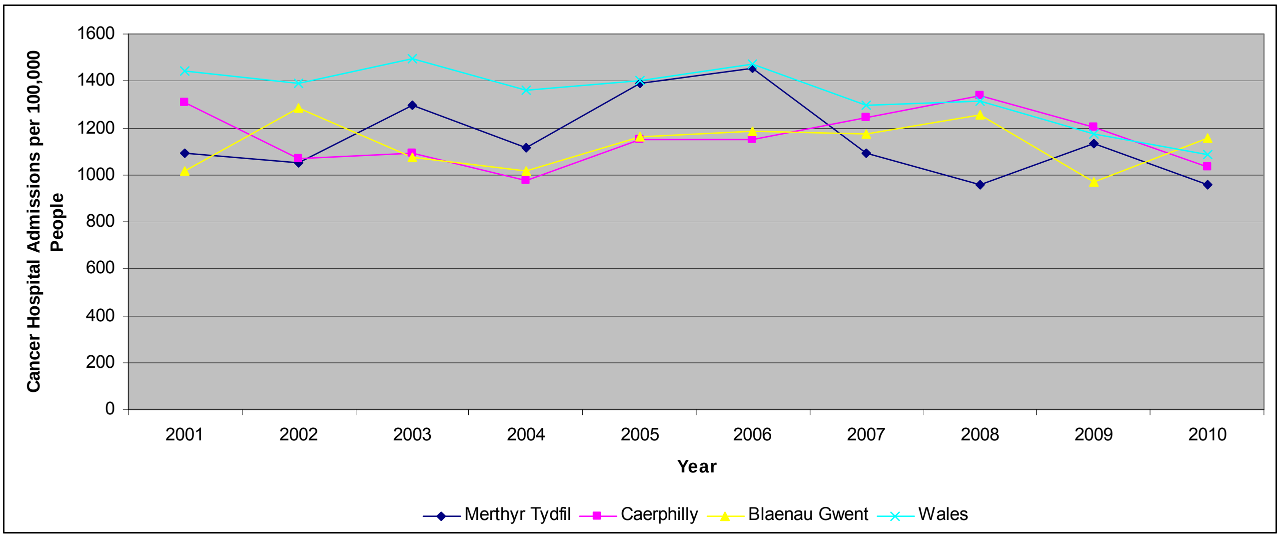
3.32 The mortality rate attributable to cancer per 100,000 people in Caerphilly is similar to the rate in Wales overall. As shown in Figure 3.8, the neighbouring local authority of Merthyr Tydfil has a significantly higher mortality rate and is the highest throughout Wales (Ref.25).

Figure 3.8 Age Standardised Cancer Mortality Rate per 100,000 People



3.33 However, as shown in Figure 3.9, Merthyr Tydfil has one of the lowest hospital admission rates for cancer per 100,000 people: of 955, compared with 1,038 in Caerphilly and 1,088 in Wales.

Figure 3.9 Hospital Admissions for Cancer per 100,000 People



25 Cymru Information Services. (2011). Health Maps Wales. Available www.healthmapswales.wales.nhs.uk last accessed 25/01/12

3.34 This highlights a gap between diagnosis and treatment for cancer for residents in Merthyr Tydfil (which can significantly impact upon early detection, treatment and survival rates), while the trend within Caerphilly is more in keeping with that of Wales. A key health challenge in the area is to therefore not only support healthy lifestyles, but to also raise awareness as to the benefits of early detection through self-checks and routine GP visits (particularly for at risk groups).

Respiratory and Cardiovascular Disease

3.35 Table 3.6 provides an overview of hospital admissions for respiratory and cardiovascular disease in Caerphilly and neighbouring local authorities, compared with the average for Wales. Among the categories of respiratory disease shown, pneumonia is the most common. The total number of hospital admissions for respiratory disease and the number for each disease type is greater in all of the local authority areas around the site than in Wales, and typically indicative of socio-economic deprivation, poor lifestyle and risk taking behaviour. A similar trend is evident for all cardiovascular hospital admissions.

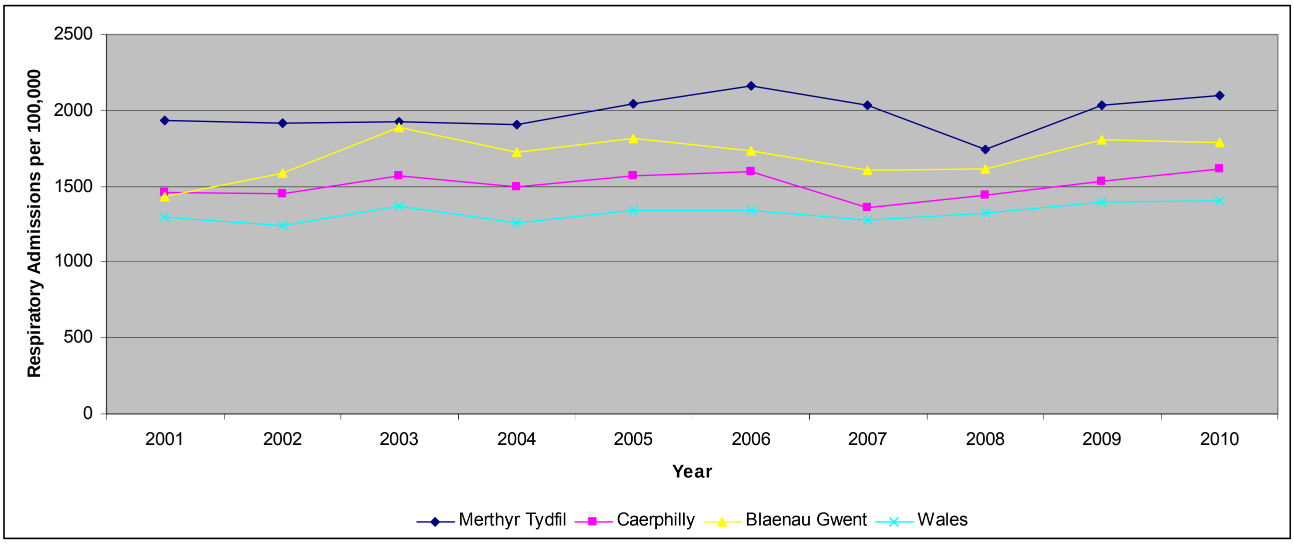
3.36 This trend (shown in Figure 3.10) has been fairly consistent since 2001. For the purpose of the assessment, local communities are considered sensitive to changes in air quality, and a conservative approach has been applied factoring the highest burden of poor respiratory health in the area.

Table 3.6 Respiratory Disease Hospital Admissions per 100,000 (Ref. 23)

Hospital Admissions per 100,000 (2010/11)	Caerphilly	Blaenau Gwent	Merthyr Tydfil	Wales
All respiratory disease	1,617	1,787	2,095	1,405
Pneumonia	263	359	336	238
COPD	277	310	273	184
Asthma	141	141	127	119
All cardiovascular disease	1485	1582	1861	1379

COPD = chronic obstructive pulmonary disease

Figure 3.10 Hospital Admissions for Respiratory Disease per 100,000 People



3.37 The greatest disparity at the county and national level between hospital admissions can be seen for respiratory disease. Chronic respiratory conditions such as COPD are largely attributable to poor health behaviours such as smoking (Ref. 26).

Access to Services

3.38 The Aneurin Bevan Health Board (ABHB) established in 2009 represents the areas of Blaenau Gwent, Caerphilly, Monmouthshire, Newport, Torfaen and South Powys. Caerphilly is the largest local authority in the ABHB area, with around 30% of the population (Ref. 27).

3.39 The AHB encompasses three A&E hospitals, two acute care hospitals, five community hospitals and five hospitals for psychiatric care. The average number of patients per GP in ABHB is 1,558, a little lower than the average in Wales of 1,584 (Ref. 2829), placing ABHB in the middle of the range among the seven health boards in Wales (Ref. 29). The neighbouring Local Authority of Merthyr Tydfil is covered by the Cwm Taf health Board

Lifestyle

3.40 Lifestyle can have a wide ranging influence on overall health and well-being. This includes elements such as diet and the level of physical activity a person undertakes but also covers risk taking behaviour, alcohol consumption and smoking, which are directly correlated with a range of adverse health outcomes. The following section considers each of these parameters.

Alcohol

3.41 The percentage of adults who are estimated to drink alcohol above recommended guidelines in Wales is 45%, whereas Caerphilly is just below this at 44% (Ref. 30). In contrast, The Welsh Health Survey results for 2009-10 indicate that rates of binge drinking among adults in Caerphilly and Merthyr Tydfil are comparative (at approximately 22% of the population) and both higher than then national average of 19%.(Ref. 31).

3.42 In financial year 2010/11 there were 500 hospital admissions per 100,000 people across Wales for alcohol-specific and related conditions. The local authorities of Caerphilly, Merthyr Tydfil and

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26 Welsh Assembly Government. (2006). A Profile of Long-Term and Chronic conditions in Wales. ISBN: 0-7504-4077-5

27 NHS Wales. (2007). Population Estimates, Caerphilly. Available http://www.wales.nhs.uk/sitesplus/documents/888/PopulationPyramids_1991to2007_v2d_E.xls last accessed June 2013.

28 Cymru Information Services. (2011). Health Maps Wales. Available www.healthmapswales.wales.nhs.uk last accessed June 2013

29 Welsh Government. (2011). StatsWales. Available http://statswales.wales.gov.uk last accessed June 2013.

30 Aneurin Bevan Health Board. (2011). Our Healthy Future? Annual Report of the Director of Public Health. Available www.wales.nhs.uk last accessed 27/01/12

31 Alcohol and health: A profile of alcohol and health in Wales. Available at http://www.wales.nhs.uk/sitesplus/documents/865/cwmtaf-2012.pdf last accessed June 2013.

Blaenau Gwent all had an admissions rate above the average, at 522, 541 and 753 per 100,000 respectively. As Caerphilly has a similar number of people who are estimated drink above guideline levels to Wales overall, it is perhaps unusual that alcohol specific hospital admissions remain a little above the national average.

3.43 The 2011 annual report from the ABHB identifies alcohol consumption and associated hospital admissions as a key issue for working age adults (Ref. 30). There are inequalities in alcohol-related mortality rates, with deprived communities in particular having a mortality rate due to alcohol that is three times higher than in the least deprived communities (Ref. 32). Furthermore, alcohol-related hospital admission rates and mortality rates across Wales have increased since the late 90's (Ref.33). The ten year substance misuse strategy launched in 2008 aims to reduce misuse through education programs, services and support. However, data published subsequent to 2008 shows that alcohol-related hospital admissions continue to increase in Caerphilly and Merthyr Tydfil (Ref. 23).

Smoking

3.44 Smoking is the largest preventable cause of premature death and it is estimated that approximately half of persistent smokers will die as a direct result of their habit (Ref. 34). Although the number of adults smoking in Wales has declined over the last 30 years, in 2005/06 approximately 25% of adults in Wales still smoked. There is an association between high rates of smoking and factors such as age, socio-economic group, deprivation, housing and education (Ref.34). The results of the Welsh Health Survey 2007 show that 27% of adults in Caerphilly smoke, slightly above the average for Wales (Ref.34). Despite a reduction in the percentage of adults smoking in Merthyr Tydfil levels remain above the national trend. As smoking is one of the key reasons for the gap in life expectancy between deprived and relatively affluent communities, a series of local programmes have been established to support the cessation of smoking, with a target reduction in smoking to at least 16% by 2020 (Ref. 35).

Obesity and Physical Activity

3.45 Being overweight or obese increases the risk of a range of adverse health outcomes including cardiovascular disease, diabetes, and hypertension. The number of people classed as obese is increasing across the UK, and it has been estimated that 50% of people will be obese by 2050 (Ref. 36).

3.46 Results from the 2010 Wales Health Survey indicate that 22% of people over 16 in Wales are obese and 57% are overweight (Ref. 37). 62% of adults over 16 in Caerphilly are classed as overweight or obese, significantly higher than the national average (57%), and the second

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32 Wales Centre for Health. (2009). A Profile of Alcohol and Health in Wales. Wales Centre for Health ISBN 0-9545544-9-3.

33 Cymru Information Services. (2011). Health Maps Wales. Available www.healthmapswales.wales.nhs.uk last accessed June 2013

34 Wales Centre for Health. (2007). Smoking in Wales: Current Facts. ISBN: 0-9545544-4-2.

35 Cwm Taf Health Board Annual Report (2011-12). Available at http://www.wales.nhs.uk/sitesplus/documents/865/cwmtaf-2012.pdf last accessed June 2013

36 NHS Wales. (2011). Health in Wales – Obesity. Available http://www.wales.nhs.uk/healthtopics/lifestyles/obesity last accessed 15/02/12.

37 Welsh Government. (2010). Welsh Health Survey 2010. Welsh Government, ISBN: 978-0-7504-6577-9.

highest proportion in Wales, the highest being Merthyr Tydfil with 64% of the population being overweight and obese (Ref. 38).

3.47 It is recommended that adults take 30 minutes or more of at least moderate physical activity on five or more days per week. Caerphilly has a relatively low physical activity rate in Wales, with 28% of adults meeting this target compared with the Welsh average of 30% with relatively comparable rates for Merthyr Tydfil (29%) (Ref. 37, 39). However, Caerphilly ranks 12th out of the 22 local authorities in Wales for the number of primary schoolchildren egularly participating in physical activity (57%), and ranks 1st in Wales for secondary school children's physical activity, with 49% participating (Ref. 40).

3.48 There are a range of national programs designed to reduce obesity, such as the 'Change 4 Life' initiative. CCBC also organises a 'Fun, Food and Fitness' program to encourage healthy eating and physical activity (Ref. 36). Although funding for this program ended in October 2011, the on-going 'Creating an Active Caerphilly County Borough Plan' covers the period 2011-2014 to help improve sport participation and active lifestyles. There is a recognised link between poor health behaviours, sedentary behaviour, socio-economic deprivation and a high prevalence of chronic disease. This link pushes the promotion of healthy lifestyles up the public health agenda within Caerphilly and Merthyr Tydfil, where lifestyle and physical activity constitutes an underlying cause for existing burdens of poor health

Lifestyle and risk taking behaviour summary

3.49 Poor health is closely associated with poor health behaviour. Within Caerphilly and Merthyr Tydfil, obesity is common and there is little adult participation in physical activity. Obesity is a particular health challenge facing the country as a whole and as such there are both national and local initiatives in place within Caerphilly and Merthyr Tydfil to help promote healthy lifestyles and physical activity in particular.

3.50 Lifestyles are often influenced by economic circumstance: unemployment is associated with poor health behaviour. This association is evident in Caerphilly and Merthyr Tydfil where smoking, excessive alcohol consumption and unemployment are all more common than the national average, and are consistent with areas exhibiting high levels of poor health (Ref.15). An excellent rate of physical activity among secondary school children is an area that can be built on in promoting healthy lifestyles for adults. However, for the purpose of the assessment, local communities in proximity to the site are considered sensitive to changes in air quality, and a conservative approach has therefore been applied.

Crime and Anti-Social Behaviour

3.51 Rhymney is served by the Gwent police force, which covers Blaenau Gwent, Monmouthshire, Torfean, Newport and Caerphilly. Statistics for 2011-12 published by Her Majesty's Inspector of Constabulary (HMIC) show that the local authorities served by the Gwent police force had 61 crimes per 1,000 population, below the England and Wales average of 66 crimes per 1,000

38 Caerphilly County Borough. (2010). Health, Social Care and Well-being Strategy Needs Assessment. Available www.caerphilly.gov.uk/healthchallenge/pdf last accessed 15/02/12

39 Health Challenge Caerphilly. (2008). Towards a Healthier Tomorrow – Caerphilly Food & Fitness Strategy and Action Plan 2008-2011.

40 Caerphilly County Borough Council. (2011). Creating an Active Caerphilly County Borough 2011-2014.

population. (Ref. 41). In contrast, The South Wales police force serving Merthyr Tydfil, Swansea and Cardiff exhibited a 67 crimes per 1,000 population, marginaly above the England and wales average.

3.52 During the 2011-2012 period, local authorities served by the Gwent police force expressed particularly high crime rates above the England and Wales average for public disorder, drugs offences and antisocial behaviour. Similarly, the South Wales police force serving Merthyr Tydfil expressed higher rates of public disorder, drugs offences, antisocial behaviour, violent crime and all victim based crime than both the England and Wales average, and that of rates experienced within local authorities served by the Gwent police force (Ref 41 and 42).

3.53 Although the rate of many crimes within the local authorities surrounding the proposed site is above the England and Wales average, fraud and robbery (with the use of force) are less common. This suggests that crime in the area involves vandalism and anti-social behaviour, typically associated with socio-economic deprivation rather than organised criminal activity.

3.54 The Safer Caerphilly County Borough Partnership joins together Caerphilly County Borough Council, Gwent Police, the Aneurin Local Health Board and South Wales Fire and Rescue Authority to work toward reducing crime and anti-social behaviour within the area. The first priority of the group is to reduce anti-social behaviour, which includes promotion of the four strike scheme and youth inclusion support panel (Ref. 43). Additional priorities include reducing the harm caused by alcohol and broadening partnership delivery to ensure programs are delivered efficiently (Ref. 43).

3.55 Community engagement also indicates that there are a number of existing social barriers, particularly within Rhymney (between south, mid and north Rhymney), which affects the level of social interaction, physical activity and the use of shared facilities and amenities within the area.

Conclusion

3.56 The local area in which the proposed project site is situated has a legacy of coal mining which has left the site unstable and in parts unsafe for public use. The decline of the mining industry has led to its replacement by manufacturing, retail and the public sector which now offer the predominant sources of employment. However, unemployment remains high, with the key area of manufacturing industry experiencing further decline (recent closures including the Hoover factory in 2009, with the loss of 337 jobs, and the Linde fork lift manufacturer announcing closure in 2013 with the loss of 203 jobs).

3.57 Caerphilly and Merthyr Tydfil has a high level of socio-economic and associated health deprivation. Limited income and employment opportunities coupled with poor health behaviour has a key influence on the existing burden of poor health (including high rates of alcohol consumption, smoking and drugs misuse). The IMD indicates that localised areas of socio-economic deprivation within Caerphilly and Merthyr Tydfil are closely associated with localised

41 HMIC. (2011). Crime and Policing Comparator. Available www.hmic.gov.uk/crime-and-policing-comparator last accessed 14/02/12.

42 This data is provided by HMIC with the caveat that it is not subject to the same checks applied to national statistics data. It has therefore been treated as a useful but non-definitive indicator of crime in the area of the proposed site.

43 Caerphilly County Borough Council. (2008). Safer Caerphilly community Safety Partnership Plan 2008-2011. Available http://www.caerphilly.gov.uk/saferccb/pdfs/sccspplan2008-2011.pdf last accessed 14/02/12

pockets of health deprivation (most notably Twyn Carno, which is the 4th most deprived LSOA for employment within Wales).

3.58 The population structure within the area is generally comparable with that of Wales. However, there is a net outward migration in the 20-24 year old age bracket which is likely to be attributable to young people leaving for university or to find employment.

3.59 Although health has been improving in the area, local communities have higher rates of morbidity and mortality than the regional and Wales averages. The local community (including the elderly) is therefore regarded as vulnerable/sensitive to potential health outcomes from environmental health pathways that may compound effects from existing local circumstance.

3.60 However, it is important to note that such burdens of poor health are largely associated with high levels of socio-economic deprivation, risk taking behaviour and lifestyle. Such communities are likely to respond positively to any activity with the potential to increase education, local income and employment and improve physical activity and healthier lifestyles (with associated physical, social and mental health improvements).

3.61 On this basis, it is important to consider how training, employment, the restoration strategy may help address the principal causes of patterns of existing poor health within the area in, in particular through: improving levels of physical activity; creating and supporting local tourism and recreation; and addressing existing social barriers (through increased and shared access to recreational and remediated land).

4 Stakeholder Engagement

Overview

4.1 An essential component of gathering an appropriate evidence base and tailoring the HIA to local circumstance is seeking the views of stakeholders and representatives of communities likely to be affected by the proposed project. The following section provides an overview of the key stages of engagement and the core health issues raised during each stage.

4.2 For a full account of the integrated engagement strategy and its outputs, please refer to the Statement of Community Consultation with the Planning Application.

Scoping

4.3 In keeping with best practice and following the recommendation made in MTAN-2, the CCBC scoping opinion (9 March 2012) highlighted the need for a HIA as part of or accompanying the ES, with consideration given to the significance of impacts, cumulative impacts and nearby sensitive receptor sites.

4.4 A draft HIA Scoping Statement was subsequently developed and issued to key health stakeholders including ABHB, WHIASU and CCBC in order that they could comment on the approach, aim and objectives, scope and specific methods to be applied. A copy of the HIA scoping statement is presented in Appendix A.

4.5 Feedback regarding the HIA aim, objectives and process was positive, indicating that the proposed HIA scope and focus was considered to be appropriate. Additional information was requested regarding the integrated engagement strategy, and the level of involvement HIA practitioners would have with local communities. The following sections provide that information.

Consultation Process

4.6 The consultation process included a range of events and initiatives aimed at reaching and engaging with residents across local communities in close proximity to the site. The programme of events included five public exhibitions, a community forum, stakeholder workshops and a further discrete stage of consultation specific to the HIA, comprising iterative engagement with key health stakeholders (including ad hoc input from the WHIASU), a telephone interview with Richards & Appleby Ltd, and engagement with local schools.

Formal Pre-application Consultation

4.7 The formal pre-application public consultation programme provided local residents and businesses with advance information about the proposed project and allowed for discussion with members of the development team to help refine the application.

4.8 This included:

- distribution of 4,717 information leaflets to local residents and businesses;
- a poster advertising campaign at local community facilities and amenities;

- a dedicated website;
- a telephone hotline;
- local press coverage; and
- five public exhibitions.

4.9 The HIA team was fully integrated with the engagement process, reviewing all website, leaflet and telephone consultation information and attending all of the public exhibitions (manning the community health station).

4.10 A final tier of engagement included consultation with Richards & Appleby Ltd and their representative via telephone interview.

Feedback received

4.11 During the engagement process, people who responded gave views that reinforced the key health pathways previously identified. Core concerns centred on the potential risk from changes in air quality when considering the existing burden of poor health in the area.

4.12 Equally, concern was raised regarding the proximity of mining activities, potential visual impact upon wellbeing and the quality of life, concern that common land was already inaccessible for recreation (due to general fencing of the area), and concern about the perceived impact upon the viability of neighbouring industries (Richards & Appleby Ltd).

4.13 Conversely, local residents acknowledged the potential income and employment opportunities associated with the proposed project, and welcomed the provision of a community benefit fund. However, it was clearly expressed that any such community fund must be invested in the local communities hosting the site, and not be diffused throughout Caerphilly.

4.14 Existing social barriers were also discussed, and how the proposed project could potentially help facilitate a more cohesive community through shared amenities and recreational areas, particularly within Rhymney.

4.15 The potential health benefits associated with the early land remediation and the final restoration of the scheme were also acknowledged. Feedback included suggestions for provision of better access to recreational areas, social amenities and facilities. Support for visitor interests in the area was also suggested, such as provision of a commemorative mining statue and reinstating local heritage features.

4.16 Whilst consultation did not materially alter the key health pathways to be assessed (with the sole addition being the perceived impact on neighbouring industry viability), it did reinforce the view that the scope and focus of the HIA are appropriate, tailored to local concerns and requirements.

4.17 Consultation with local communities provided a greater understanding of local heritage, people's concerns, priorities and needs, informing the proposed project, the HIA and the HAP.

Nant Llesg Community Forum

4.18 The Nant Llesg Community Forum was established to provide a mechanism for regular engagement and discussion between Miller Argent, representatives of the local community and stakeholders. The invitee list for the forum included organisations such as ABHB and CCBC.

4.19 The Community Forum met on the 14th of December and 15th of March. Minutes were published on the project website (www.nantllseg.co.uk) and are included as an appendix to the Statement of Community Consultation. An overview of the HIA was provided during the forum meeting on the 14th of December, with representatives from CCBC and Environment Agency Wales (now Natural Resources Wales) in attendance. During the meeting, comments and queries about the HIA were discussed, including the potential direct health impacts of the proposed project and wider local health issues such as health service provision, the ageing population, and exacerbation of existing poor health.

4.20 Although Community Forum input did not identify any additional health pathways to investigate, it did highlight the potential request for external evaluation of the final HIA by the Welsh HIA Support Unit (WHIASU). To aid any external evaluation, the HIA has been tested by applying the review package commonly used in Wales, and the findings are provided in Appendix B to this report, alongside additional commentary and justification where appropriate.

Stakeholder Workshops

4.21 The HIA team attended the three themed stakeholder workshops held on the 11th, 12th and 18th of January covering community, environment and health topics.

4.22 The health workshop held on the 18th January 2012 included an introduction to HIA and how it integrates with the regulatory planning process, the scope of the assessment and the health pathways under consideration. The workshop was attended by representatives from CCBC, Pen y Dre Residents Association, WHIASU and the South East Wales Hang Gliding and Paragliding Club. The meeting minutes are included in the Public Consultation Statement.

4.23 Following the HIA presentation, a discussion about the project raised the point that although there is the potential for community benefits, there is a high level of local concern about health impacts, and a strong need for need for information to address this concern.

4.24 Although the workshops did not identify any additional health pathways to investigate, they did reinforce the core HIA objective to investigate and address local concerns through engagement and targeted feedback. The primary outcome of which was for the provision of a health themed panel at the public exhibitions and attendance of all exhibitions by the HIA team.

Informal HIA Consultation

4.25 During the stakeholder meeting on the 18th January 2012, the possibility of further engagement and consultation with local schools was raised. Local schools were involved with the formal consultation process and were invited to participate in both the Community Forum and the Stakeholder Workshops. Further to this the HIA carried out a discrete stage of consultation in which the head teachers of primary schools, secondary schools and colleges in Caerphilly as well as colleges in Merthyr Tydfil were invited by email to discuss any concerns they had or opportunities for support initiatives to be explored through the HIA.

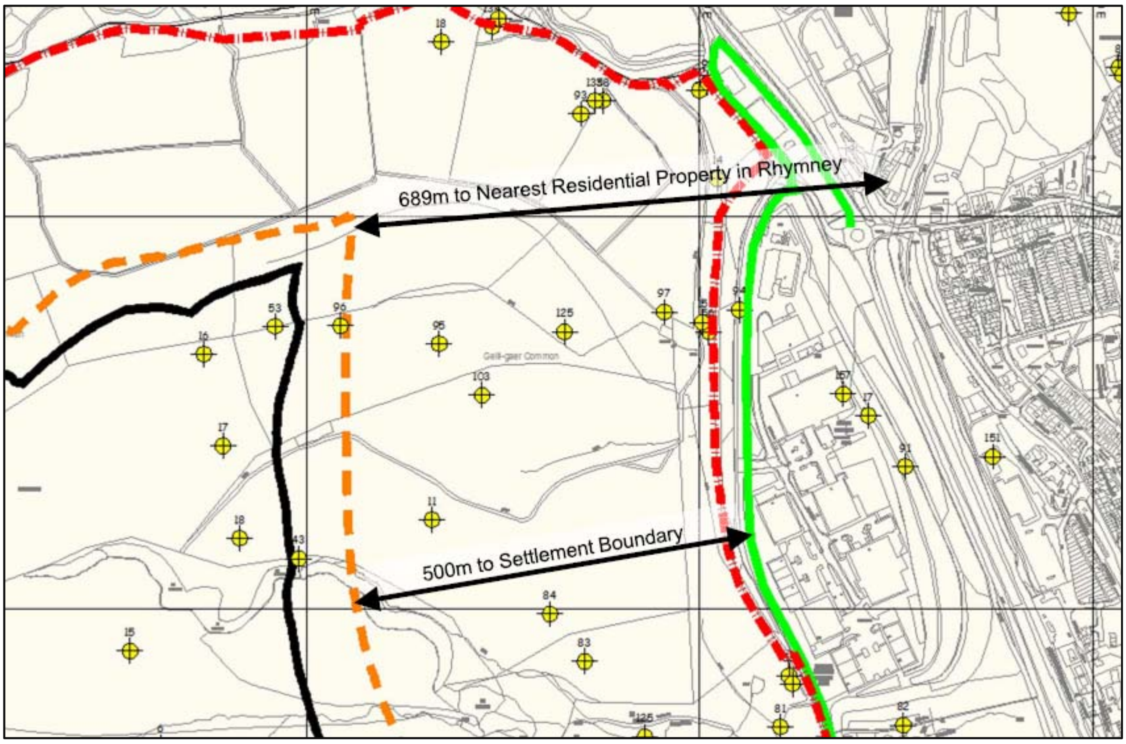
4.26 Follow-up discussions were held with three schools: Pontlottyn Primary, Upper Rhymney Primary and Ysgol Y Lawnt Primary. The only potential issue arising from the proposed project was viewed as changes in air quality and consequent impacts on the local community, with asthma being noted as a potential health concern.

Engagement Influence on the Proposed Project and HIA

Engagement Influence on the Project

4.27 The primary influence of engagement upon the proposed project was to significantly pull the mining area away from the settlement boundary, such that the industrial estate to the east of the site will now be at a minimum 500m from the coal excavation area, while the nearest residential property in Rhymney will be a 689m from the coal excavation area.

Figure 4.1 Amended Scheme: Excavation Limit

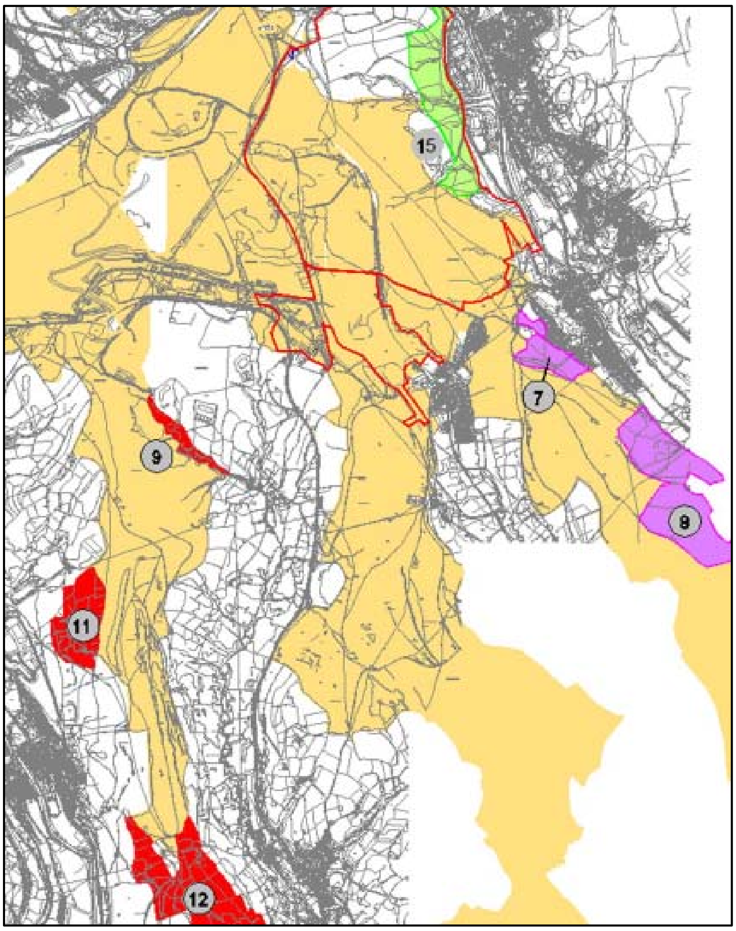


4.28 The overburden mound will be no less than 500m from any settlement boundary. These changes increase the remediation area at a cost to the mining area, but are intended to address the concerns raised by local communities regarding proximity.

4.29 A visual and acoustic bund has also been included to address concerns about potential visual and noise disturbance impacts on wellbeing in north Rhymney.

4.30 As shown in Figure 4.2, over 191ha of public access land (including 81ha of grazing land) will now be made available, to address concerns raised regarding potential impacts upon access to common land. The proposed provision of public access land replaces approximately 95% of the public access temporarily suspended for the duration of the site. With the exception of land requiring early reclamation (area 15, 38ha), public access land will be provided from the onset of the project

Figure 4.2 Additional Public Access and Grazing Land Provision



Areas 7 and 8 made available for public access
Areas 9, 11 and 12 made available for public access and grazing
Area 15 made available for public access after early reclamation

4.31 Engagement has therefore defined the proposed project such that the bulk of community concerns have been addressed through design. Residual impacts are tested and further addressed within the ES and HIA.

Engagement Influence on the HIA and HAP

4.32 Engagement has primarily reinforced the view that the scope and focus of the HIA were appropriately set, with the key input being a wealth of local knowledge to inform the community profile, and to frame local priorities, perceptions and needs within the assessment and the HAP.

5 Assessment

Introduction

5.1 The following assessment investigates each of the previously identified potential health pathways associated with the proposed project, grouped under environmental, transport and socio-economic headings. As detailed in the community profile, local communities are regarded as sensitive to these health pathways. As a consequence, a conservative approach has been applied, accounting for the existing burden of poor health in the area, which accounts for the sensitivity of the local population.

Environmental Health Pathways

Emissions to Air

5.2 A core health pathway associated with the proposed project is the generation of emissions to air and consequent community exposure. This includes emissions of dust and smaller particulate matter (PM) throughout the mining and remediation phases of the project (preliminary work, coal recovery and site reclamation), and also emissions from site vehicles and associated road traffic.

5.3 Research into the potential health effects of emissions is extensive and provides statistically significant associations between many air pollutants (i.e. PM, nitrogen dioxide and sulphur dioxide) and effects on a wide range of cardiovascular and respiratory health outcomes. The following section applies the current scientific evidence base to quantify the potential health outcome from emissions relating to the proposed project.

Air Quality Assessment

5.4 Following multiple air quality modelling scenarios (as a consequence of refinement through the consultation phase), the air quality assessment within the ES presents each of the proposed dispositions (defined in Section 2) separately. It also assessed cumulative effects by including consistently conservative emissions factors from the FLRS, CDP, the Trecatti landfill site and the proposed NET Wood Pellet Plant in Rhymney with the proposed project. Wider sources of dust from farming, demolition, construction and other industrial activity have also been accounted for and included within the assessment.

5.5 The predicted emissions have been assessed against air quality objectives set to protect both the environment and human health, and the results of the air quality assessment pertinent to the HIA are summarised in Table 5.1.

5.6 For a detailed account of the air quality assessment methodology, baseline conditions, and full dispersion modelling outputs, please refer to the ES Air Quality Assessment and its appendices.

Dispersion Modelling Results

5.7 Table 5.1 and 5.2 presents the highest predicted air pollutant concentrations during the different stages of the proposed project. The air quality assessment in the ES considered a range of residential and commercial receptor sites. However, for the sake of brevity, and to offer a highly conservative assessment, only those receptors at which the greatest predicted change due to the development at each stage would be experienced, are shown in Table 5.1 and 5.2. Predicted air pollutant concentrations that remain within standards set to protect the environment and health are highlighted in green.

Table 5.1 Maximum Predicted Change in Air Pollutant Concentration

Phase of Project	Parameter	Receptor (Residential and Commercial)*	Concentration (Including Background)	Proposed Project Contribution	Significance
Disposition 1 2017	PM_{10} annual average ($\mu g/m^3$)	Residential: Old Brewery Lane Rhymney	19.9	3.5	Negligible
		Commercial: Heads of the Valley Industrial Estate (14)	20.9	5	n/a
	$PM_{2.5}$ annual average ($\mu g/m^3$)	Residential: Cae Clas Fochriw	11.8	1.1	Negligible
		Commercial: Heads of the Valley Industrial Estate (15)	11	1.5	n/a
	NO_2 annual average ($\mu g/m^3$)	Residential: Old Brewery Lane Rhymney	16.8	3.5	Negligible
		Commercial: Heads of the Valley Industrial Estate (14)	18.3	5	n/a

Phase of Project	Parameter	Receptor (Residential and Commercial)*	Concentration (Including Background)	Proposed Project Contribution	Significance
Disposition 2 2019	PM_{10} annual average ($\mu g/m^3$)	Residential: Old Brewery Lane Rhymney	20.6	3.8	Negligible
		Commercial: Heads of the Valley Industrial Estate (15)	22.9	5.8	n/a
	$PM_{2.5}$ annual average ($\mu g/m^3$)	Residential: Cae Clas Fochriw	11.7	1.1	Negligible
		Commercial: Heads of the Valley Industrial Estate (15)	11.3	1.7	n/a
	NO_2 annual average ($\mu g/m^3$)	Residential: Old Brewery Lane Rhymney	17	3.7	Negligible
		Commercial: Heads of the Valley Industrial Estate (14)	19	5.7	n/a
Disposition 3 2021	PM_{10} annual average ($\mu g/m^3$)	Residential: Old Brewery Lane Rhymney	20.6	3.4	Negligible
		Commercial: Heads of the Valley Industrial Estate (15)	22.2	5.1	n/a
	$PM_{2.5}$ annual average ($\mu g/m^3$)	Residential: Old Brewery Lane Rhymney	10.6	1.1	Negligible
		Commercial: Heads of the Valley Industrial Estate (14)	11.2	1.8	n/a

Phase of Project	Parameter	Receptor (Residential and Commercial)*	Concentration (Including Background)	Proposed Project Contribution	Significance
	NO_2 annual average (µg/m^3)	Residential: Old Brewery Lane Rhymney	16.2	2.9	Negligible
		Commercial: Heads of the Valley Industrial Estate (14)	18.2	4.9	n/a
Disposition 4 2024	PM_{10} annual average (µg/m^3)	Residential: Old Brewery Lane Rhymney	20.4	3.5	Negligible
		Commercial: Heads of the Valley Industrial Estate (15)	22.3	5.2	n/a
	$PM_{2.5}$ annual average (µg/m^3)	Residential: Old Brewery Lane Rhymney	10.3	0.8	Negligible
		Commercial: Heads of the Valley Industrial Estate (14)	11	1.6	n/a
	NO_2 annual average (µg/m^3)	Residential: Old Brewery Lane Rhymney	16.4	3.0	Negligible
		Commercial: Heads of the Valley Industrial Estate (14)	17.6	4.3	n/a
Disposition 5 2025	PM_{10} annual average (µg/m^3)	Residential: Glan Yr Afon, Rhymney	18.3	1.7	Negligible
		Commercial: Heads of the Valley Industrial Estate (14)	20.4	3.6	

Phase of Project	Parameter	Receptor (Residential and Commercial)*	Concentration (Including Background)	Proposed Project Contribution	Significance
	$PM_{2.5}$ annual average (µg/m^3)	Residential: Glan Yr Afon, Rhymney	9.4	0.1	Negligible
		Commercial: Heads of the Valley Industrial Estate (14)	9.7	0.3	
	NO_2 annual average (µg/m^3)	Residential: Old Brewery Lane Rhymney	15.5	2.2	Negligible
		Commercial: Heads of the Valley Industrial Estate (15)	16.9	3.5	
Disposition 3 + FLRS	PM_{10} annual average (µg/m^3)	Residential: Old Brewery Lane Rhymney	21.0	4.1	Negligible
		Commercial: Heads of the Valley Industrial Estate (15)	23.2	6	n/a
	$PM_{2.5}$ annual average (µg/m^3)	Residential: Cae Clas Fochriw	12	1.4	Negligible
		Commercial: Heads of the Valley Industrial Estate (14)	11.5	2.1	n/a
	NO_2 annual average (µg/m^3)	Residential: Old Brewery Lane Rhymney	17.9	4.6	Minor Adverse
		Commercial: Heads of the Valley Industrial Estate (14)	19.9	6.6	n/a

Phase of Project	Parameter	Receptor (Residential and Commercial)*	Concentration (Including Background)	Proposed Project Contribution	Significance
Disposition 4 + FLRS	PM_{10} annual average ($\mu g/m^3$)	Residential: Old Brewery Lane Rhymney	21.3	4.5	Minor Adverse
		Commercial: Heads of the Valley Industrial Estate (14)	23.4	6.5	n/a
	$PM_{2.5}$ annual average ($\mu g/m^3$)	Residential: Old Brewery Lane Rhymney	10.6	1.1	Negligible
		Commercial: Heads of the Valley Industrial Estate (14)	11.3	1.9	
	NO_2 annual average ($\mu g/m^3$)	Residential: Old Brewery Lane Rhymney	18.3	4.9	Minor Adverse
		Commercial: Heads of the Valley Industrial Estate (14)	19.8	6.3	n/a
EAL for protection of public amenity = maximum 80mg/m2/day averaged over a week. Highlighted Green where compliant and Red where EAL exceeded.					

* Numbers in brackets refer to receptor locations in the air quality assessment

Table 5.2 Maximum Predicted Change in Dust Deposition

Phase of Project	Parameter	Receptor (Residential and Commercial)*	Maximum Daily Dust Deposition Averaged over one week Including Background mg/m²/day		Maximum Daily Dust Deposition mg/m²/day Averaged over one week		Significance
			CDP	St Athan	CDP	St Athan	
Disposition 1 2017	Maximum daily dust deposition averaged over one week mg/m²/day	Residential: Valletta Lodge Hill Road Pontlottyn	52.5		30.1		Minor Adverse
		Residential: Cae Clas Fochriw		63.1		9.1	Minor Adverse
		Commercial: Heads of the Valley Industrial Estate (15)	59.3	53.5	42	40.3	Minor Adverse
Disposition 2 2019	Maximum daily dust deposition averaged over one week mg/m²/day	Residential: Valletta Lodge Hill Road Pontlottyn	55.2		32.7		Minor Adverse
		Residential: Cae Clas Fochriw		63		9	Negligible
		Commercial: Heads of the Valley Industrial Estate (15)	64.3	59.6	47.1	46.4	Minor Adverse
Disposition 3 2021	Maximum daily dust deposition averaged over one week mg/m²/day	Residential: Valletta Lodge Hill Road Pontlottyn	51.9		29.4		Minor Adverse
		Residential: Cae Clas Fochriw		62.2		8.2	Minor Adverse
		Commercial: Heads of the Valley Industrial Estate (14)	56.2		40.8		Minor Adverse
		Commercial: Heads of the Valley Industrial Estate (15)		50.8		37.6	Minor Adverse
Disposition 4 2024	Maximum daily dust deposition averaged over one week mg/m²/day	Residential: Valletta Lodge Hill Road Pontlottyn	44.9		22.4		Minor Adverse
		Residential: Cae Clas Fochriw		49.1		-4.9	Negligible
		Commercial: Heads of the Valley Industrial Estate (15)	57.6	53.6	40.3	40.5	Minor Adverse
Disposition 5 2025	Maximum daily dust deposition averaged over one week mg/m²/day	Residential: Cwn Nant	18.4		8		Negligible
		Residential: Old Brewery Lane Rhymney		21.2		4.3	Negligible
		Commercial: Heads of the Valley Industrial Estate (14)	32.7	30.5	21.6	21.6	Minor Adverse

Phase of Project	Parameter	Receptor (Residential and Commercial)*	Maximum Daily Dust Deposition Averaged over one week Including Background mg/m^2/day		Maximum Daily Dust Deposition mg/m^2/day Averaged over one week		Significance
			CDP	St Athan	CDP	St Athan	
Disposition 3 + FLRS	Maximum daily dust deposition averaged over one week mg/m^2/day	Residential: Valletta Lodge Hill Road Pontlottyn	63		40.5		Minor Adverse
		Residential: Cae Clas Fochriw		72.7		18.7	Minor Adverse
		Commercial: Heads of the Valley Industrial Estate (15)	64.1	60.2	48.6	43.6	Minor Adverse
Disposition 4 + FLRS	Maximum daily dust deposition averaged over one week mg/m^2/day	Residential: Valletta Lodge Hill Road Pontlottyn	56.6		34.1		Minor Adverse
		Residential: Cae Clas Fochriw		56.5		2.5	Negligible
		Commercial: Heads of the Valley Industrial Estate (15)	69.6	65.9	52.4	52.8	Minor Adverse
EAL for protection of public amenity = maximum 80mg/m^2/day averaged over a week. Highlighted Green where compliant and Red where EAL exceeded.							

* Numbers in brackets refer to receptor locations in the air quality assessment

Dust

5.8 MTAN-2 sets a criterion for dust deposition of 80mg/m^2/day as a weekly average, The dust criterion of 80 mg/m^2/day is specific to coal deposition and is more stringent than limits applied to other sources of dust, for which a level of 200mg/m^2/day is typically used. This additional stringency is in place to account for the duration of mining activities, and the need to address minor, yet potentially long-term impacts.

5.9 The results from dust deposition monitoring (to establish existing background conditions) have been added to dust that is predicted to be generated by the proposed project, and the total has been compared with the MTAN-2 dust deposition criterion to determine the significance of changes in deposition due to emissions from the site. As shown in Table 5.2, the largest quantities of dust are predicted to be generated during Disposition 1, 2 and 3, but the resulting dust deposition will remain within the conservative dust deposition criterion in MTAN2 for all receptors during every disposition of the proposed project.

5.10 As detailed in the air quality assessment, based on the greatest predicted change in dust deposition (i.e. using both the CDP and the St Athan meteorological database), the proposed project represents at most a minor adverse dust impact for residential and commercial receptors. This is because, at most receptors, while there is predicted to be a potentially large change in dust deposition (i.e. more than 8mg/m^2/day) the dust deposition would still be less than 75% of the dust deposition criterion.

5.11 On this basis, prior to mitigation, the main effect of potential dust emissions would be a minor adverse impact potentially constituting soiling of surfaces, particularly to windows, cars and laundry. Although disruptive, such pathways do not constitute a physical health risk (where respiratory and cardiovascular risks are associated with finer particulates with the ability to enter the respiratory tract), with impacts limited to annoyance, complaints, and potential changes in behaviour to account for any such disruption.

5.12 However, since work commenced in 2007, Miller Argent has maintained a complaints register for the FLRS to test and iteratively refine site activities and mitigation. From 2007 to the end of October 2012 there were 170 dust complaints. However in 2012, following investigation, there were only nine justified complaints (i.e. attributed to mining activities at FLRS).

5.13 Such a low frequency of dust complaints is largely due to operational activities that are managed to prevent dust impacts (including monitoring meteorological conditions to prevent works during particular weather conditions that favour dust generation and offsite deposition), a comprehensive dust management plan and on-going community engagement.

5.14 A similar dust management plan would be provided for the proposed project. It would build on the experience and best practice applied at FRLS, including dust monitoring stations and on-going engagement with stakeholders and local communities to test the effectiveness of mitigation, iteratively refining site operations and mitigation where appropriate to address any residual concerns.

5.15 On this basis, following mitigation, potential dust impacts are predicted to be minor, not of a level to result in any measurable adverse health outcome. It will be iteratively assessed and residual concerns or complaints will be investigated and addressed through site management and on-going community engagement.

Particulate Matter (PM_{10})

5.16 PM_{10} is particulate matter with a mean aerodynamic diameter of 10 microns or less. The UK Department of Health's Committee on the Medical Effects of Air Pollutants (COMEAP) established that there is a 0.8% increased risk of respiratory disease hospital admissions per 10 $\mu g.m^3$ increase in PM_{10} (Ref. 44, 45).

5.17 Although air quality dispersion modelling indicates relative changes in PM_{10} concentration exposure will be negligible at all residential receptors, and will remain within air quality standards set to protect health, a hypothetical quantitative exposure response assessment was deemed appropriate to further address and alleviate community concerns.

5.18 Table 5.3 presents the greatest predicted PM_{10} exposure for each Disposition of the proposed project at any receptor, applying the risk ratio from COMEAP to calculate the risk of additional hospital admissions that may result, based on Moriah's population (4,580 people) and estimated existing rate of hospital admissions due to respiratory disease in order to remain representative of the relative health burden within the local population.

5.19 In 2010 there were 2,095 hospital admissions per 100,000 people in Merthyr Tydfil for total respiratory disease. This data has been used as a worst-case assumption (out of the areas for which data is presented in this HIA) to approximate the number of hospital admissions for the population of Moriah. The calculation (2,095 / 100,000 x 4,580) indicates a likely average of 96 hospital admissions per 4,580 people per year.

5.20 As shown in Table 5.3, assuming a highly hypothetical scenario, where the entire population of the Moriah Ward reside within each of the individual residential receptor locations subject to the highest change in PM_{10} concentration applying the worst case meteorological data, the relative change in exposure is not of a level to quantify a single additional respiratory hospital admission during any Disposition, or through the cumulative impact assessment with FLRS.

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44 Department of Health. (2007). Committee on the Medical Effects of Air Pollutants Draft Long-Term Exposure to Air Pollution: Effect on Mortality. Available at http://comeap.org.uk/images/stories/Documents/Reports/draft_mortality_report.pdf last accessed June 2013.

45 Department of Health. (2009). Committee on the Medical Effects of Air Pollutants. Long-Term Exposure to Air Pollution: Effect on Mortality. Available at http://comeap.org.uk/images/stories/Documents/Reports/mortality%20report%202009.pdf Last accessed June 2013.

Table 5.3 PM_{10} Respiratory Hospital Admission Exposure Response Assessment

Stage of Project	Residential Receptor	Annual Average Increase in PM_{10} ($\mu g/m^3$)	Percentage Increase in Hospital Admissions (%)	Additional Hospital Admissions Based on Moriah Ward Population
Disposition 1 2017	Residential: Cae Clas Fochriw	3.5	0.28	0.27
Disposition 2 2019	Old Brewery Lane Rhymney	3.8	0.30	0.29
Disposition 3 2021	Residential: Cae Clas Fochriw	3.4	0.27	0.26
Disposition 4 2024	Old Brewery Lane Rhymney	3.5	0.28	0.27
Disposition 5 2025	Old Brewery Lane Rhymney	1.7	0.14	0.13
Disposition 3 + FLRS	Cae Clas Fochriw	4.1	0.33	0.31
Disposition 4 + FLRS	Old Brewery Lane Rhymney	4.5	0.36	0.35

5.21 Considering that potential PM_{10} emission concentrations will remain within air quality standards set to protect health, and that actual levels of concentration and community exposure will be far lower than that assessed above, it is concluded that changes in PM_{10} concentration and exposure directly attributable to the proposed project are orders of magnitude lower than would be sufficient to cause a single additional respiratory hospital admission during any of the Disposition.

5.22 The COMEAP has also established that there is a 0.8% increased risk in cardiovascular hospital admissions (Ischemic Heart Disease) per 10 $\mu g.m^3$ increase in PM_{10} (Ref.46). As shown in Table 5.4, assuming a similar highly hypothetical scenario, where the entire population of the Moriah Ward reside within each of the individual residential receptor locations subject to the highest change in PM_{10} concentration applying the highest cardiovascular hospital admission rates in the areas for which data is presented in this HIA (Merthyr Tydfil 1,861 per 100,000 2010-2011), assuming all cardiovascular hospital admissions are for IHD and applying the worst case meteorological data, the relative change in exposure is still not of a level to quantify a single additional cardiovascular hospital admission during any Disposition, or through the cumulative impact assessment with FLRS.

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46 Department of Health. (2006). COMEAP. Cardiovascular Disease and Air Pollution. Available at http://comeap.org.uk/images/stories/Documents/Reports/cvd%20report%202006.pdf last accessed June 2013

Table 5.4 PM_{10} Cardiovascular Hospital Admission Exposure Response Assessment

Stage of Project	Residential Receptor	Annual Average Increase in PM_{10} ($\mu g/m^3$)	Percentage Increase in Hospital Admissions (%)	Additional Hospital Admissions Based on Moriah Ward Population
Disposition 1 2017	Residential: Cae Clas Fochriw	3.5	0.28	0.24
Disposition 2 2019	Old Brewery Lane Rhymney	3.8	0.30	0.26
Disposition 3 2021	Residential: Cae Clas Fochriw	3.4	0.27	0.23
Disposition 4 2024	Old Brewery Lane Rhymney	3.5	0.28	0.24
Disposition 5 2025	Old Brewery Lane Rhymney	1.7	0.14	0.12
Disposition 3 + FLRS	Cae Clas Fochriw	4.1	0.33	0.28
Disposition 4 + FLRS	Old Brewery Lane Rhymney	4.5	0.36	0.31

Particulate Matter ($PM_{2.5}$)

5.23 $PM_{2.5}$ refers to particles with a mean aerodynamic diameter of 2.5 microns or less and is a subset of PM_{10}.

5.24 In 2010, Defra published 'Air Pollution: Action in a Changing Climate' (Ref. 47), containing updated values for the loss of life expectancy and costs based on total 2008 anthropogenic (manmade) $PM_{2.5}$ levels. The report demonstrates that UK air quality has shown 'improvements beyond all recognition' in the last 50 years, driven by concerted action especially in the energy and transport sectors. Furthermore, the report indicates a specific improvement from findings in Defra's previous 2005 study, in that the reduction in UK life expectancy from total manmade sources of $PM_{2.5}$ had improved from 7-8 months to 6 months, with an associated annual treatment cost saving of £3 billion.

5.25 Cost-benefit analyses are regularly applied on a national basis to inform policy and strategic decision making. However, such statistics if taken out of context (without an appreciation of the exposure response mechanism from which they are derived, or the air quality data on which they depend) can lead to incorrect assumptions regarding risk from individual sources of $PM_{2.5}$.

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47 Department for Environment, Food and Rural Affairs (Defra) (2010) Air Pollution: Action in a Changing Climate

5.26 The following section addresses possible misconceptions by applying the same evidence base and exposure response methodology used in the 2010 Defra study to quantify the potential risk directly attributable to the proposed project.

5.27 Evidence suggests that increased exposure to $PM_{2.5}$ is potentially more hazardous to human health than larger particles: the COMEAP data indicates that there is a 6% increased risk in mortality per 10 µg.m^3 increase in $PM_{2.5}$ exposure (Ref. 45). Table 5.3 presents the highest predicted change in $PM_{2.5}$ exposure for each stage of the project, applying the risk ratio from COMEAP to calculate the potential change in all-age, all-cause mortality.

5.28 As with the PM_{10} exposure response assessment, a highly hypothetical scenario has been applied, where the entire population of the Moriah Ward reside within each of the individual residential receptor locations subject to the highest change in $PM_{2.5}$ concentration. Modelling indicates that even when applying the highest all-cause mortality rate from the areas for which data is presented in this HIA (Blaenau Gwent, 697 per 100,000 people), the relative change in exposure is not of a level to quantify a single additional mortality during any Disposition, or through the cumulative impact assessment with FLRS.

Table 5.5 $PM_{2.5}$ Mortality Exposure Response Assessment

Stage of Project	Residential Receptor	Change in $PM_{2.5}$ (µg/m^3)	Percentage Increase in Mortality (%)	Additional Mortality Based on Moriah Ward Population
Disposition 1 2017	Residential: Cae Clas Fochriw	1.1	0.66	0.21
Disposition 2 2019	Residential: Cae Clas Fochriw	1.1	0.66	0.21
Disposition 3 2021	Residential: Old Brewery Lane Rhymney	1.1	0.66	0.21
Disposition 4 2024	Residential: Old Brewery Lane Rhymney	0.8	0.48	0.15
Disposition 5 2025	Residential: Glan Yr Afon, Rhymney	0.1	0.06	0.02
Disposition 3 + FLRS	Residential: Cae Clas Fochriw	1.4	0.84	0.27
Disposition 4 + FLRS	Residential: Old Brewery Lane Rhymney	1.1	0.66	0.21

5.29 Although COMEAP recommends the application of the 6% risk ratio to quantify increased mortality per 10 µg.m^3 increase in $PM_{2.5}$, a higher risk ratio of 17% exists in the US. It is important to note that even when applying the higher risk ratio of 17%, actual changes in concentration exposure are not sufficient to quantify any measurable impact on mortality during any of the Dispositions.

5.30 As shown, applying the worst-case $PM_{2.5}$ contribution for any modelled receptor, assuming that the entire population of the Moriah ward resides at that receptor, and applying the highest mortality rate in Wales, the relative change in air quality is not of an order to quantify any measurable adverse health outcome in annual mortality.

5.31 Considering that potential $PM_{2.5}$ emission concentrations will remain within air quality standards set to protect health, and that actual changes in community exposure will be far lower than the hypothetical scenario assessed above, it is concluded that changes in $PM_{2.5}$ concentration and exposure directly attributable to the proposed project are orders of magnitude lower than is required to quantify any measurable adverse health outcome to local communities.

Nitrogen Dioxide

5.32 The air quality assessment in the ES has shown the greatest cumulative impact to be a contribution of 4.9 $\mu g.m^3$ to ambient annual mean NO_2 concentrations at a residential receptor on Old Brewery Lane, Rhymney. COMEAP does not consider that the evidence regarding NO_2 was sufficiently robust for quantification of health impacts, but provides a risk coefficient of 0.5% per 10 $\mu g.m^3$ increase for an effect on respiratory disease hospital admissions (for sensitivity analysis purposes only) (Ref. 48).

5.33 The NO_2 exposure response assessment applies the previous hypothetical scenario, assuming the entire population of the Moriah Ward reside within each of the individual residential receptor locations subject to the highest change in NO_2 concentration, and using the greatest rate of respiratory disease admissions from the areas for which data is presented in this HIA (Merthyr Tydfil, 2095 per 100,000 population) scaled to Moriah Ward's population (4,580 persons).

5.34 Table 5.5 presents the highest predicted change in NO_2 exposure for each stage of the proposed Project, applying the risk ratio from COMEAP to calculate the percentage increase in the rate of hospital admissions, and putting this in the context of the size of potentially exposed population in Moriah.

Table 5.6 NO_2 Respiratory Disease Hospital Admissions Exposure Response Assessment

Stage of Project	Residential Receptor	Increase in NO_2 ($\mu g/m^3$)	Percentage Increase in Respiratory Hospital Admissions (%)	Additional Hospital Admissions based on Moriah ward
Disposition 1 2017	Residential: Old Brewery Lane Rhymney	3.5	0.17	0.17
Disposition 2 2019	Residential: Old Brewery Lane Rhymney	3.7	0.18	0.18
Disposition 3 2021	Residential: Old Brewery Lane Rhymney	2.9	0.14	0.14
Disposition 4 2024	Residential: Old Brewery Lane Rhymney	3	0.15	0.14

48 COMEAP (1998). Quantification of the effects of air pollution on health in Great Britain. Department of Health Committee on the Medical Effects of Air Pollutants. The Stationary Office. ISBN 0-11-322102-9 available at www.comeap.org.uk/images/stories/Documents/Reports/quantification%20report%201998.pdf last accessed June 2013

Stage of Project	Residential Receptor	Increase in NO_2 (µg/m^3)	Percentage Increase in Respiratory Hospital Admissions (%)	Additional Hospital Admissions based on Moriah ward
Disposition 5 2025	Residential: Old Brewery Lane Rhymney	2.2	0.11	0.11
Disposition 3 + FLRS	Residential: Old Brewery Lane Rhymney	4.6	0.23	0.22
Disposition 4 + FLRS	Residential: Old Brewery Lane Rhymney	4.9	0.25	0.24

5.35 The results in Table 5.5 represent the potential change in respiratory hospital admissions should the entire population of the Moriah ward (4,580 people) be exposed to the predicted worst-case annual increase in NO_2. Despite this conservative assessment, it has not been possible to quantify any additional respiratory hospital admissions on average per year within any of the Dispositions, including the cumulative impact with FLRS.

5.36 Considering that potential NO_2 emission concentrations will remain within air quality standards set to protect health, and that relative changes in concentration exposure will be far lower to that assessed above, it is concluded that changes in NO_2 concentration and exposure directly attributable to the proposed project are orders of magnitude lower than is required to quantify any measurable adverse health outcome to local communities.

Vehicle Emissions

5.37 The key atmospheric emissions associated with road traffic are nitrogen oxides (NO_x) and particulate matter. As set out in the ES the impact of exhaust emissions from the coal trucks and other Nant Llesg traffic are localised, likely only to affect areas within around 200m from the road. As such, vehicle emissions are not anticipated to impact upon residential receptors, and their contribution is accounted for within the dispersion modelling and previous exposure response assessments.

5.38 The impact of emissions from locomotives has also been assessed in the ES; the greatest increase in NO_2 at a residential receptor is predicted to be 0.3 µg.m^3, which is considered to be of negligible significance. Applying the COMEAP risk ratio to the worst case NO_2 contribution represents a potential annual increase in background respiratory hospital admission rates of 0.015% ((0.5% / 10) x 0.3). This change in pollutant concentration and residential exposure is not of a magnitude sufficient to quantify any adverse health outcome directly attributed to the proposed project.

5.39 On the above basis, the risk to health from road or rail vehicle emissions is considered to be negligible, and not of an order of magnitude sufficient to quantify any adverse health outcome.

Air Quality Assessment Conclusion

5.40 As shown in Table 5.1, air pollutant concentrations at all modelled receptors are predicted to remain within air quality standards set to protect the environment and health. These standards are based upon the current scientific evidence base that applies a conservative approach to address potentially sensitive communities and receptors. However, such a broad population approach does not always account particularly high burdens of poor health as experienced in this instance, and does not fully allay local community concerns, of whom require more information on what the potential impact is to their health. To address these issues, the exposure response assessments have further tested the air quality standards, accounting for local burdens of poor health and applying risk ratios for changes in pollutant exposure. The findings demonstrate that the proposed project will not have a measurable adverse health impact on local communities during any of the Dispositions, or from cumulative impacts.

Noise and Vibration

5.41 Noise has the potential to affect health in a variety of ways; some of the effects can be to the auditory system and occur as a direct impact of the noise. Direct auditory system effects usually result in damage to the ear, in particular damage to the inner ear, from intense and prolonged exposure. Such risks are usually associated with occupational health or prolonged exposure to loud music and can be managed though good working practices and the provision of appropriate personal protection equipment to workers. Such auditory effects do not present a risk to local communities.

5.42 Community effects are more typically associated with non-auditory system health effects that may be associated with exposure to environmental noise, although the pathways and strength of association for these are not fully understood and can vary between individuals. Examples of non-auditory health effects include:

- annoyance;
- mental health;
- cardiovascular and physiological;
- cognitive performance (tasks and academic); and
- night-time effects (sleep disturbance).

5.43 A consensus on the level and duration of noise required to cause potential health impacts has not been clearly established. The main emphasis of noise standards and regulations is therefore placed on annoyance and sleep deprivation, as these are the most immediate consequences of noise impacts, and are applicable to everyone.

5.44 Detailed noise and vibration modelling has been carried out is presented in the noise and vibration and blasting chapter of ES. The HIA summarises this data and provides a qualitative appraisal of how local communities may respond to noise during the life of the site, including to noise from transport movements (road and rail).

Main Site

5.45 The baseline noise survey measured existing background noise levels at potentially sensitive receptors across surrounding communities. This has been compared with modelled noise emitted from the site that incorporates the sound power level for significant items of plant that will be used (such as excavators, dump trucks, dozers and wash plant). The type, size and number of items of equipment predicted at the site is based on equipment used at the operational FRLS site.

5.46 MTAN-2 recommends that noise from coal working should not be more than 10 dB higher than the background noise at a sensitive property, or limited to 55dB $L_{Aeq,\ 1hr}$, whichever is the lower.

5.47 As detailed in the noise assessment of the ES, prior to the commencement of the surface mine working there will be land remediation work carried out on an area of land immediately north of Fochriw and south of the land required for the mine. The noise from this work has been calculated and assessed against the guidance in the relevant British Standard, BS 5228, and shown to meet this guidance (Ref.49).

5.48 MTAN-2 recommends that noise from coal working should not be more than 10 dB higher than the background noise at a sensitive property, or limited to 55dB $L_{Aeq,\ 1hr}$, whichever is the lower.

5.49 The MTAN-2 noise limits will be met at all relevant locations during Dispositions 1 - 5.

5.50 Although noise will be audible in surrounding areas, potential noise impacts are predicted to be of negligible or minor significance in the Rhymney area. The increase in noise at Fochriw and some isolated properties to the north of the site is predicted to be of minor or moderate significance.

5.51 Given that noise will only be generated during working hours, remains within standards set to protect health, and is assessed as be of a negligible to moderate significance, potential health outcomes would be limited to potential annoyance.

Road Vehicle Noise

5.52 There are no houses or other sensitive properties along the sections of Fochriw Road and Bogey Road that the coal lorries will use to take coal to the CDP. The noise from this additional road traffic is not considered to cause a significant impact and is not assessed in this study.

5.53 Changes in road vehicle noise directly attributed to the proposed project is not of a magnitude or nature (timing, character and duration) to present a significant source of community exposure, and hence would not result in sleep disturbance, cognitive impacts or significant annoyance.

Train Movement Noise

5.54 The majority of coal will be exported from the disposal point by train using the existing freight line located to the south of the site; the trains will be similar to those used for FRLS and as such will create similar noise levels. As reported in the ES, to establish the existing background noise conditions, noise surveys were carried out at properties near to the railway line.

5.55 The noise survey along the main line showed that the noise from a coal train was similar to the noise caused by passenger trains, although the duration was longer as the coal trains took longer to pass by. A coal train pass-by lasted approximately 70 seconds, whereas the passenger train pass-bys typically lasted for 20 to 30 seconds. During the daytime there were up to 10 passenger train movements an hour and at night there were a further 10 passenger train movements. There will be an average of 1.3 additional coal train movements during the day, which means that typically there would be 1 or 2 more train movements a day. This results in an increase in movements from 10 to 11 in any day and these changes are not considered to be significant.

[49] British Standards Institution, (1999) BS 8233: 1999, Sound insulation and noise reduction for buildings – Code of practice, British Standards Institution, London

5.56 At night there would be an average increase of 0.6 train movements and therefore there is likely to be either no change in movements or an increase of one train movement on any given night. The World Health Organisation (WHO) recommends that maximum indoor noise levels at night should not exceed 45 dB L_{Amax} for more than 10 – 15 times a night (equivalent to a level of 60 dB L_{Amax} outside the building). Train pass-by noise for both passenger and coal trains is typically in the range 60 to 65 dB L_{Aeq} and therefore the recommended internal noise level is just exceeded by these movements; however, the total number of night-time movements including the additional coal trains is within the range given by the WHO. These changes in noise due to the additional coal train movements are considered to be of either negligible or low significance.

Blasting

5.57 The blasting impact assessment in the ES models the potential vibration and air overpressure at sixteen receptor sites including five residential properties that are in close proximity to the boundary of the site. Vibration from blasting presents a possible source of annoyance and disruption for residents in close proximity to the site boundary. The results of the blasting impact assessment indicate that blasting operations would be well within the vibration and air overpressure limits set out in MTAN-2. Vibration predictions for the nearest residential buildings to the site were almost below the human perception threshold of 0.50 mms^{-1} and well below the MTAN-2 maximum vibration limit guide of 6 mms^{-1}.

5.58 On this basis, impacts from blasting are not of an order of magnitude sufficient to quantify any adverse health outcome (such as on cognitive performance or annoyance).

Transport

5.59 Potential health pathways associated with changes in road and rail traffic movements include increased risk of road traffic accidents and injuries, and exposure to vehicle exhaust and noise emissions. The latter points are addressed in the previous sections on air quality of this HIA.

Risk of Road Accident and Injury

5.60 The major and most obvious hazard associated with road traffic is the potential increased risk of human injury as a result of collisions. The transport assessment in the ES contains personal injury and accident data for the Bogey Road, the A4060 (Mountain Hare to Dowlais Top), the A465 (Pant Road eastward to the county boundary), and Rhymney Road (Dowlais Top eastwards to the county boundary).

5.61 If the proposed project was implemented, there would be an increase in traffic movements on the local highway network during the site enabling works and site operation phases in particular. The increases would be greatest on the route between the entrance to the site on Fochriw Road and the entrance to the CDP on Bogey Road, a distance of approximately 700m, as well as the main route to the trunk road network, i.e. via Fochriw Road and Rhymney Common Road. An increase in traffic flows of 48% on Bogey Road (from the CDP entrance to its junction with Fochriw Road) and 27% on Fochriw Road (north of its junction with South Tunnel Road to Fochriw Road) is forecast as a result of the proposed project.

5.62 Although it is clear from the data that HGVs have not been instrumental in the cause of the accidents recorded, three accidents were recorded in the vicinity of the Fochriw Road/Bogey Road junction. The restricted visibility to the south of this junction may make this section of Fochriw Road sensitive in road safety terms.

5.63 Proposed measures to mitigate these impacts are largely addressed through the proposed improvements to the Bogey Road/Fochriw Road junction, to improve visibility and safety for turning vehicles, but are further addressed through site, plant and staff management.

5.64 As detailed in the transport assessment of the ES, following implementation of the above mitigation measures, it is considered that the road traffic impact of the project will be no worse than of a minor adverse significance with respect to highway operation, highway safety and non-motorised users (i.e. pedestrians/cyclists).

Community Severance

5.65 The transportation of extracted coal to the CDP via the existing highway network (Fochriw Road/Bogey Road) does not present a risk of community severance.

Socio-economic

5.66 Employment and income are potentially the most significant determinants of long-term health, influencing a range of factors including the quality of housing, education, diet, lifestyle, coping skills, access to services and social networks. Consequently, poor economic circumstances can influence health throughout life, where communities subject to socio-economic deprivation are more likely to suffer from morbidity, injury, mental anxiety, depression and tend to suffer from higher rates of premature death than those less deprived (Ref. 50, 51, 52).

5.67 Research (Ref.53) indicates that socio-economic circumstance and relative deprivation are key markers of poor health, associated with increased all-cause mortality in the US and five European countries. This association was seen independently of individual country-specific socio-economic characteristics, with no evidence from any of the countries in the study that substantially modified the association.

5.68 For men, living in the quartile of neighbourhoods with the highest unemployment compared to the lowest unemployment is associated with an increased risk of mortality (14%–46%), after adjustment for age, education, and occupation. A similar but statistically weaker association between unemployment and mortality was found for women.

5.69 Projects that have the potential to support regeneration, reduce unemployment and improve socio-economic circumstance, will contribute to improving the health and wellbeing of socio-economically deprived communities.

5.70 It is important to note, however, that increasing employment and income opportunities alone will not maximise health benefits. Increased support, training and community involvement is required in order to link and develop skills to employment and reduce the risk of inequality.

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50 Beland F, Birch S, Stoddart G. (2002). Unemployment and health: contextual level influences on the production of health in populations. Soc Sci Med 2002;55:2033-52.

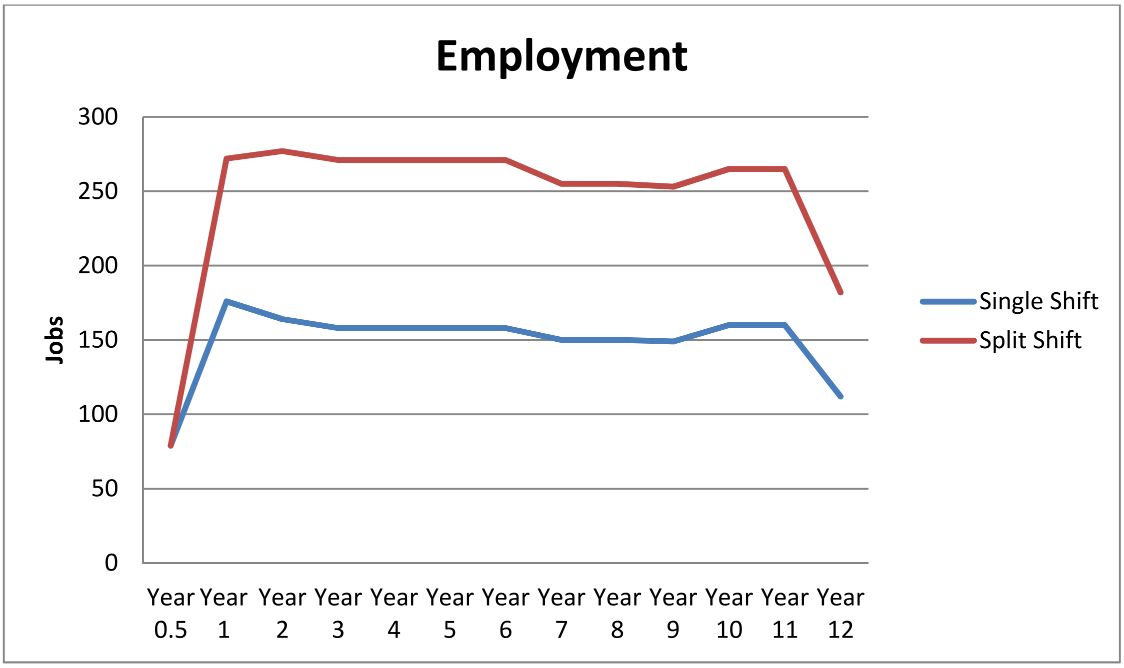
51 Stafford M, Martikainen P, Lahelma E, Marmot M. (2004). Neighbourhoods and self-rated health: A comparison of public sector employees in London and Helsinki. J Epidemiol Community Health 2004;58:772-8.

52 Van Lenthe FJ, Borrell LN, Costa G, Diez-Roux AV, Kauppinen TM, Marinacci C, Martikainen P, Regidor E, Stafford M, Valkonen T. (2005). Neighbourhood unemployment and all cause mortality: a comparison of six countries. J Epidemiol Community Health 2005;59:231.

Employment and Income

5.71 As detailed in the ES socio-economic assessment, and summarised in Figure 5.1, during peak operation it is anticipated that the site will employ maximum of on average between 158 to 266 members of staff depending upon whether a single or split shift employment strategy is applied. The shift pattern adopted depends on the current status of the Working Time Directive, which restricts the hours a person can work in a week.

Figure 5.1 Employment by Year



5.72 Regardless of the employment strategy applied, the labour costs to Miller Argent, and investment in the local area, are likely to remain the same.

5.73 Data from the nearby FRLS surface mine shows that 50% of employees commute less than five miles and a further 30% commute between five to ten miles. A similar trend is anticipated for the proposed project, and as such approximately 115 to 191 peak jobs would be recruited from within ten miles of the site. The HPA includes proposed initiatives to maximise the local update of jobs.

5.74 In addition to direct employment opportunities, the proposed project would also generate indirect employment through its requirement for goods and services. The socio-economic assessment in the ES estimates (again using data from FRLS as a proxy) that the proposed project would on average spend approximately £32.7 million on goods and services per annum, of which 27% (£8.9m) would be spent within ten miles of the site. The socio-economic assessment further estimates that during the peak year, employee spending would secure or support a further 118 jobs, of which 32 would be within ten miles of the site.

5.75 Induced impacts are also anticipated as a consequence of increased local spending from employees on goods services, recreation and amenities. As detailed in the socio-economic assessment in the ES, when applying the results of a local staff expenditure survey, the proposed project also has the potential to generate an additional £2.3 million per annum, of which £1.7 million would be spent within ten miles of the site, securing and supporting approximately 19 local jobs.

5.76 As detailed in the community profile, local burdens of poor health in the area are strongly associated to areas with high levels of unemployment and socio-economic deprivation. Given the level of socio-economic deprivation within Caerphilly, coupled with the current socio-economic climate and continued decline in local manufacturing industry (comprising the main area of employment within the area), the proposed project represents a significant socio-economic pathway to health benefits through direct, indirect and induced income and employment opportunities, and presents a means to address existing local health circumstance.

5.77 Although educational attainment in the area is relatively low, there is an existing and transferable skills base within the surrounding communities that supports the uptake of employment opportunities. On this basis, the proposed project represents a valuable opportunity to address existing and increasing socio-economic deprivation in the area, and closely associated physical, mental and social health issues.

5.78 Potential barriers to such uptake are addressed within the Health Action Plan, with suggested means to overcome any barriers including training, procurement programmes and community support initiatives.

Cost of Remediation

5.79 The remediation of the existing mining legacy on the site and surrounding area is not without cost, that would otherwise fall to the public purse to address (or alternatively the site and area would remain in its current state if that cost could not be met). A key feature of the proposed project is that coal extraction will fund the remediation and restoration of the site to a beneficial final land form. Key aspects include:

- investigating and making safe shafts and adits at an estimated cost of £1.4 million;
- remediation works addressing the silting up of Parc Cwm Darran lake at an estimated CCBC cost of £2 million[(*)]; and
- clean-up of existing Rhaslas Waste Tip, at an estimated cost of £1.75 million.

5.80 The proposed project therefore represents an estimated £5.65 million Caerphilly County Borough Council investment in local environmental management, including the removal of hazardous shafts and adits on common land and along public rights of way and the improvement of siltation in Cwm Darran Country Park. Such investment removes the cost burden from the public purse, and reduces the time period within which remediation and enhancement work would be implemented.

5.81 The health benefit associated with such remediation is twofold: primarily in removing existing environmental hazards that pose a risk to health and limit physical activity and recreation within the area, and secondarily in taking the cost from the public purse, representing an opportunity cost for such funding to be invested elsewhere within the borough and communities.

Community Benefit Fund

5.82 In addition to bearing the cost of remediation, Miller Argent proposes to provide an additional Community Benefit Fund to support and invest in neighbouring communities. Following

[*] Value of CCBC application (related to works only) to WDA for funding (2007 Costs)

consultation, it was made clear that local communities require the administration of the fund to be non-political and focussed locally (as residents expressed their concern that previous funds are perceived to be primarily spent outside of the host community area).

5.83 The fund and its administration is currently being assessed and will be agreed with the CCBC, but it is proposed to apply a sliding scale that factors in the price of coal and the amount extracted, up to a maximum of £1/tonne.

5.84 Miller Argent will work with CCBC to ensure that investment of the funds prioritises the communities around the proposed Development site.

Impact upon Neighbouring Industry Viability

5.85 During the course of the HIA, concern has been raised regarding the potential impact of the proposed project on the viability of neighbouring industries, with the potential to cause unemployment. Research on this subject is limited, but generally falls into three categories:

- competition;
- interference; and
- actual/perceived risk.

5.86 The proposed project does not present a form of competition to any local industry, nor does it represent any interference to local industries, processes or their supply chains.

5.87 The final category of risk is addressed through the regulatory planning and assessment process, where the proposed project is assessed against an extensive list of criteria set to protect the environment and health, and would not be granted planning consent should there be any unacceptable environmental or health risk.

5.88 On this basis, the proposed project is inherently designed to prevent activities that may constitute a risk to neighbouring communities and industries, and is unlikely to be the cause of any further industrial decline in the area.

5.89 Indeed on the contrary, the proposed project presents a significant local capital investment with indirect and induced income and employment opportunities that will help bolster and secure local economies/industries and increase local spending.

Socio-Cultural and Lifestyle

5.90 Potential adverse socio-cultural and lifestyle impacts reflect the disruption caused from the closure of public rights of way and to areas of common land, potentially limiting areas of physical exercise and recreation. However (as noted in Section 2), following consultation, over 191ha of public access land (including 81ha of grazing land) has been included in the scheme to address concerns raised regarding potential impacts upon access to common land.

5.91 The proposed provision of public access land replaces approximately 76% of the public access temporarily suspended for the duration of the site, and will be provided from the onset of the project. On completion of the early reclamation areas this will increase to 95%, all of this land is currently outside but adjacent to the existing common.

5.92 On this basis, initial impacts upon areas of recreation and physical activity would be negligible, as they are mitigated through the provision of alternative areas.

5.93 The emerging restoration plan, however, represents a significant opportunity to not only provide a final landform that helps address local circumstance and existing physical health burdens, but may also support removing existing social barriers (in particular within north, mid and south Rhymney) through the provision of informal recreational uses, incorporating open access land, footpaths, bridleways and cycle paths to act as links between communities and the already established Cwm Darran and Bryn Bach Country Parks.

5.94 The final restoration strategy therefore has the potential to deliver both local and regional health objectives, whilst supporting the growth and diversification of local tourism, and improving east west community travel opportunities across the site.

Cumulative Impact

5.95 The assessment of cumulative health impacts is addressed through the application of each of the technical assessments in the ES, which account for background, existing and consented developments in the area. On this basis, environmental health pathways (i.e. air quality, noise and transport) assessed within the HIA already account for cumulative impacts.

6 Conclusion

6.1 The proposed project has a number of features that could potentially influence the health of neighbouring communities (both positively and negatively). This HIA has drawn from the available literature, experience from the Ffos-Y-Fran Land Reclamation Scheme (FLRS) and local community input to define the scope and focus of the study, and examine the extent of these in a manner that considers local circumstance and the best available scientific evidence.

6.2 The core community health concern raised during public engagement is the potential risk from changes in air quality. Following a review of the available scientific evidence base and based on an exposure response assessment of worst case hypothetical scenarios applying the highest burdens of poor health in the area, it is concluded that changes in concentrations of PM_{10}, $PM_{2.5}$ and NO_2 air pollutants will be of minor significance. Total concentrations would remain within air quality standards set to protect health and would not be of a magnitude sufficient to quantify any significant adverse health outcome during the mining and remediation stages of the proposed project. Such a conclusion is consistent with the findings from FLRS, where monitoring data has remained within all air quality standards set to protect health since the start of operations.

6.3 Concerns of dust impacts were also voiced. The proposed project seeks to draw from and build upon the experience and dust management best practice established at FLRS. It is noted that the monitoring of meteorological conditions to define daily site operations in combination with extensive dust suppression and mitigation, and the temporary stoppage of operational activities during high dust generation risk has led to the Ffos-Y-Fran mine being downgraded from a Medium to a Low Dust Risk within its permit to operate from Caerphilly Borough Council (2012) and Merthyr Tydfil Borough Council (2013).

6.4 Following mitigation, and the provision of additional dust monitoring stations, potential dust impacts are predicted to be minor, and not of a level to result in any measurable adverse health outcome. Miller Argent will also continue to investigate every dust complaint lodged and if validated through meteorological monitoring data, will seek to further refine operational activities and mitigation to address/manage such complaints.

6.5 Transportation of coal to the CDP will increase vehicle movements along the junction of Fochriw Road/Bogey Road. Such movements do not present a risk of community severance or impact upon available capacity. The road link does however, currently have restricted visibility, as part of the proposed development, Miller Argent proposes permanent road improvements (to improve visibility and safety). Following such mitigation, and when coupled with a site environmental management plan which manages the safe passage of site vehicles to the CDP there is limited risk of road traffic incidence between road users, staff and site vehicles, and a permanent enhancement to the local road link.

6.6 Road and rail noise is not considered to be significant, and not of an order of magnitude sufficient to quantify any change in cognitive function, sleep disturbance or annoyance.

6.7 The proposed development would generate similar economic opportunities to the FLRS, including between 144 to 239 direct jobs (dependant on shift pattern), 118 indirect employment jobs and an additional 25 induced employment opportunities (through employee spending).

6.8 Approximately 80% of direct jobs are likely to be taken up within ten miles of the site, helping to directly address the need for employment opportunities within the area. Average annual supplier expenditure on goods and services is estimated at £32.7m, with average annual wages at Nant Llesg in the region of £5m and a total project wage bill of approximately £70m. Of this, based upon experience at FLRS, and existing supply chains, approximately £8.9m will be spent on goods and services per year within ten miles of the site, with an additional £15.3 million spent within Wales per year.

6.9 The proposed project also represents an estimated £5.65 million Caerphilly County Borough Council investment in local environmental management, including the removal of hazardous shafts and adits on common land and along public rights of way and the improvement of siltation in Cwm Darran Country Park. Such investment removes the cost burden from the public purse, and reduces the time period within which remediation and enhancement work would be implemented.

6.10 In addition to bearing the cost of remediation, Miller Argent proposes to provide an additional Community Benefit Fund to support and invest in neighbouring communities. The fund and its administration is currently being assessed and will be agreed with CCBC, but is proposed to apply a sliding scale that factors in the price of coal and the amount extracted, up to a potential maximum of £1/tonne, with mechanisms to ensure expenditure in local communities.

6.11 On the basis that all regulatory environmental standards set to protect health have been achieved at FLRS, and are predicted to be achieved at Nant Llesg; that the assessment from relative changes in air quality, noise and transport upon existing burdens of health are not sufficient to quantify any adverse health outcome; and when considering the approach proposed to address community concerns, perceptions and priorities; operational procedures; and the commitment for on-going community engagement, the proposed project does not constitute a significant risk to local community health.

6.12 When further considering the significant underlying factors defining local burdens of poor health in the area (largely socio-economic and lifestyle related), and the direct, indirect and induced socio-economic benefits from the proposed project, the immediate and final land reclamation (removing existing environmental hazards and supporting regeneration) and the catalogue of committed community support initiatives (summarised within the HAP) to optimise local health benefit uptake, the proposed project is considered to constitute a net health benefit.

7 Health Action Plan

Introduction

7.1 The Health Action Plan (HAP) builds on the information provided through the assessment section of this report and provides a series of recommendations to address local circumstance, concerns and needs. The HAP is not solely intended for Miller Argent, but rather should also be used by Caerphilly Borough Council and Aneurin Bevan Health Board to coordinate and complement community support initiatives with Miller Argent and wider regeneration projects (including Communities First Initiatives).

Environmental Impact Assessment Mitigation

7.2 The ES assesses a range of potential environmental impact pathways, with input from air quality, noise, transport and socio-economic disciplines. Given the multidisciplinary nature of health there is significant overlap with several of the technical disciplines that have informed the ES, and with the mitigation that they propose. Therefore, for the sake of brevity, the HAP does not seek to repeat this mitigation in full but signposts and summarise this as a useful basis to complementary HAP mitigation.

Air Quality

7.3 As outlined in the ES, there are a number of mitigation measures adopted as part of the proposed project to minimise the creation of dust. The principal dust protection measure is maintaining a distance of 500m between the coal excavation area or overburden storage mound and the settlement boundary. Further dust mitigation measures will include:

- use of mist sprays when required to dampen areas, following proactive identification of the conditions likely to give rise to off-site dust, including daily monitoring of weather conditions such as wind direction;
- dust collection on the equipment used to drill blast holes;
- use of bowsers and fog cannons during construction of the visual and noise bund;
- coal stockpiles would be fitted with mist sprays;
- mist sprays would also be fitted to loading equipment;
- if required fog cannons will be used at the southern overburden mound;
- unpaved haul routes will be regularly regraded and sprayed with water;
- wheel wash facilities will be used to minimise mud from the site tracked onto the public highway; and
- areas of hard standing and paved roads within the site will be regularly cleaned.

7.4 The Environment Management Plan (EMP) contains documents CP14: Community Issues and Corrective Action Procedure and CP64: Noise, Dust and Vibration. Both documents would be frequently reviewed and updated as necessary to identify solutions to problems as they arise, including those which may stem from complaints. Currently, CP64 contains the following mitigation measures:

- all vehicles will remain on designated roads and traffic routes within the site;

- all site roadways, where necessary, will be kept clean or damp by means of a water bowser and/or road sweeper;

- all vehicles leaving the site, having travelled on areas where potential dust raising material lies, will pass through the wheel wash;

- all mobile plant will have exhausts directed above the horizontal, wherever possible;

- the drop height of coal taken from stockpiles to the screen hopper, rail wagons or road vehicles by a front end loading shovel will be minimised;

- vehicles unloading will not encroach onto stocks of coal;

- coal stocks will be delineated with clearly defined transport routes allowing adequate room for vehicular access for stocking and de-stocking operations;

- stockpiles will be located in dedicated areas;

- active stockpiles will be wetted periodically if there is potential for dust emissions (e.g. during dry weather);

- dust suppression sprays will be fitted to mobile screen transfer points (if not enclosed) and used during periods when risk of dust emissions exist;

- dust suppression sprays will be used during excavation of overburden and coal during conditions when the risk of dust is high;

- crushers, when used, will have dust suppression sprays fitted or be totally enclosed;

- conveyor belt scrapers, where fitted, will be maintained in an effective working condition to prevent material build-up on return rollers and a risk of dust emissions;

- all vehicles on site will drive at speeds suitable to the road and weather conditions, with exception of the CDP, where a site maximum of 10 mph will be adhered to; and

- a high standard of housekeeping will be maintained throughout the site at all times.

7.5 CP64 also sets out procedures for monitoring dust. This includes a requirement for visual dust monitoring three times per day at the disposal point and twice daily on site. If airborne dust from the site is deposited off-site than remedial action will be taken; if this fails, then the site operation causing the dust will be stopped. If there is evidence of airborne dust being deposited off-site repeatedly, then further monitoring will be undertaken to identify the source and a suitable resolution. Additional measure include:

- all plant operating on site will be subject to a fully documented, comprehensive maintenance scheme;

- a programme of air quality and dust monitoring will be agreed with the local authority;

- rainfall, wind speed and direction and air temperature will be measured at the CDP and be downloaded daily to the Nant Llesg Site Office. Records will be kept electronically, with a hard copy of the summary data retained for the duration of the site operations; and

- staff will, when there is a risk of potentially dusty conditions off-site, visit the community areas likely to be affected, preferably prior to receiving any complaints, and assess the dust levels. If the dust levels are excessive, they will liaise with the site to vary operations and plant to reduce dust emissions to acceptable level. If sufficient reduction in dust is not achieved, the monitoring staff will cause that the site operation causing the dust be shut down.

7.6 The monitoring of air quality and dust in the local community, comprising monitoring of PM_{10} and $PM_{2.5}$ concentration and dust deposition, would continue throughput the operation of the site. Proactive management of the site, including forecasting when dust generating conditions may occur, will enable appropriate mitigation to be put in place before complaints are received. Should complaints be received, staff will visit the complainant to investigate. The findings of the investigation and the proposed mitigation will be recorded in a complaints register, to enable analysis of the data and potential trends to be identified.

Noise and Vibration

7.7 The creation and management of noise has been considered in the design of the site. This includes control of working hours, site layout and the selection of quiet plant. The larger or more numerous items of plant are calculated to control the noise emission from the mine; however, all plant will be procured to comply with appropriate noise limits. Early calculations showed that the overburden dump trucks, large excavators and large dozers will dominate noise emissions and that standard plant would not be sufficiently quiet to ensure that the requirements of MTAN-2 would be met.

7.8 Manufacturers of these plant items do provide versions of their plant fitted with noise control packages, but again it was found that these did not adequately attenuate the noise. Some mine operators in the UK and elsewhere have fitted additional noise control measures to the plant that they operate to further reduce lower noise levels. Miller Argent has done this with the large excavators and trucks that it operates at its FRLS mine. In general, it is preferable for any noise control measures to be built into the equipment by the manufacturer rather than fitted at a later date by the operator. Detailed discussions have been held with plant suppliers to investigate noise control developments that will be available for the plant to be used at the mine.

7.9 Dump trucks will be fitted with acoustic louvres on the cooling radiators, cladding and enclosures around the engine and transmission. The exhaust will be ducted through the body and additional attenuators will be fitted. The excavators will be fitted with acoustic louvres on the water and oil radiator fans, enclosures of the underside of the engine bay and damping or stiffening of the engine enclosure panels. The dozers will be fitted with engine enclosures. Sound absorption material will be fitted inside these enclosures and noise suppression will be included in the undercarriage.

Transport and Access

7.10 The Transport Assessment in the ES identifies an predicts in traffic movements on the local highway network during site establishment and operation. Recommended measures for mitigating these impacts include the production of a Site Environmental Management Plan (SEMP) and off-site highway improvements. The SEMP will include:

- Restricted hours of operation, with HGV movements restricted on Sundays and bank holidays, and coal haulage limited to 07:00 – 19:00 Monday to Friday and 07:00 – 14:00 on Saturdays;
- Development of an HGV routeing agreement to restrict vehicles to defined routes; and
- In the event there is a requirement for abnormal loads, they will travel on agreed routes, supervised and escorted by the police (if required; not all abnormal loads need a police escort).

7.11 The proposed highway improvements require agreement with the local highway authority, but are anticipated to include carriageway resurfacing, installation of warning and direction signs and improving vertical alignment and therefore visibility to the south of the Fochriw Road junction for vehicles entering/exiting Bogey Road.

Site Security

7.12 The lighting strategy for the site would ensure that all areas surrounding the on-site office buildings, workshops, walkways and CDP will be well lit outside of daylight hours. The lighting would be designed so as to be vandal proof. Signs would mark routes around the site and provide warnings to prohibit visitors travelling beyond the office and accommodation areas. Community safety has been considered and incorporated into the design through the provision of site fencing and clear warning signs.

Community Support

Perceived Risk and Community Anxiety

7.13 As highlighted during the community consultation, the proposed project has the potential to engender community concern about a number of perceived health impacts. The mitigation set out in the ES is intended to address key areas of concern such as air quality, noise, and transport. However, until the effectiveness of the proposed mitigation has been demonstrated to local communities, perceived risk often remains.

7.14 Addressing such concerns can be achieved through providing the local community with information in the form of updates regarding activities on site, progress, an overview of complaints received and how these have been dealt with, and information relating to the environmental management systems in place and beneficiaries of the community benefit fund.

7.15 A Community Liaison Group has already been established for this purpose, and subject to consent, will continue to discuss and monitor progress and the effectiveness of mitigation alongside on-going community engagement. To date this has included providing a website, telephone hotline and a newsletter circulated to approximately 5,000 residents and businesses.

7.16 On-going engagement will enable the enhancement and refinement of operational activities and mitigation to address concerns and continue the development of mining best practice.

7.17 In addition, the visitor centre will continue to operate at the CDP and enable local schoolchildren, residents and other stakeholders to visit the site, observe mitigation in action, and (subject to availability) participate in a guided tour of safe mining areas.

Education, Training Employment and Career Development

7.18 The proposed Development has the potential to help directly address some of the economic issues in the area through the creation of jobs and opportunities for local business. It is also in the interest of Miller Argent to maximise local recruitment and build its supply chain locally as this would contribute to the efficient delivery of the project. It is recognised, however, that there are barriers to local employment (most notably educational attainment) that need to be addressed to maximise the uptake of benefits locally, and assist in addressing an underlying cause for health deprivation and inequality.

7.19 With these issues in mind, Miller Argent will agree with local partners a detailed Training and Business Strategy. This will build on the work already undertaken at FLRS as a basis to begin the programme for Nant Llesg in advance of work commencing on site, so that residents and businesses can benefit immediately from the available opportunities.

7.20 In order to begin this process, Miller Argent has produced some initial objectives and considered the types of activities that might be undertaken, the groups that will be targeted and has undertaken initial discussions with JobCentre plus and other local partners.

7.21 The draft strategy objectives are as follows:

- to maximise employment opportunities to local residents of all ages;
- to reduce the travel to work time and cost for employees;
- to retain trained members of staff and reduce staff turnover;
- to widen the range of job opportunities for existing staff, provide continuous professional development, and to increase the number of in-house trainers and assessors;
- to pro-actively publicise job opportunities in mining and civil engineering to young people and encourage them to choose careers in the sector, improving the overall skills base of the Upper Rhymney Valley and enabling them to work on major projects across Wales and beyond;
- to ensure that local businesses are aware of contract opportunities from the project and can bid effectively for them;
- to develop effective partnerships with key stakeholders within the local community and, where appropriate, regional and national organisations; and,
- to promote the reputation of the organisation – both as a good employer and a key contributor to the local community.

<u>Target Groups</u>

7.22 Based on Miller Argent's experience of operating FLRS and an analysis of the labour market, the strategy will target the following groups:

- the current workforce at FLRS and skilled workers already working in the sector;

- the short and long term unemployed (including those recently made redundant); and
- young people, including school leavers, school and university students and young people who are unemployed.

7.23 Each group is discussed below.

The Current Workforce and Skilled Workers

7.24 Miller Argent has a strong commitment to staff training and development to ensure operational efficiency and make FLRS and Nant Llesg the sites of choice for skilled workers in the area. This will involve on-going training and support after induction to support continued skills development and allow staff to progress to higher-skilled jobs and/or greater responsibilities.

7.25 Training would focus largely on organisational policies, procedures and site-specific skills. It is likely to be largely delivered in-house, but could make use of specialist training providers/colleges if appropriate.

7.26 Miller Argent recruited a training assessor to the site team at the start of 2013, who will be responsible for identifying training needs and ensuring continuous progression for staff. As a first step, four current team members have been selected to train as assessors to support this work.

The Short and Long Term Unemployed

7.27 The strategy would seek to recruit local unemployed residents to be part of the workforce where they have the skills to work efficiently and safely on site. This would involve identifying the likely labour demand, jobs types and skills needs in advance with JobCentre Plus, Caerphilly County Borough Council and other providers so that they can design bespoke courses to address these needs.

7.28 Requirements would vary between, for example, those who have recently lost a job but have relevant skills, who may need limited refresher training, to the long-term unemployed who may need intensive support from agencies to help prepare them for work as well as job specific skills.

7.29 Miller Argent would see its role as identifying the job requirements, providing access to a training centre on site, and specifying what the training and skills needs are for key roles; looking to the public sector and training providers to provide the training to address these needs. Miller Argent would offer guaranteed job interviews to those successfully going through a training programme with referral back to the provider for unsuccessful candidates.

Young People

7.30 In common with the rest of the UK, the skilled workforce in extractive industries, civil engineering and environmental remediation is rapidly ageing. For example, around 40% of the workforce at FLRS is over 50. It is therefore essential for the long-term efficiency of the project that the next generation of skilled workers are trained to take on these roles as the current workforce retires. This fits in well with the need to address chronic levels of youth unemployment.

7.31 This type of employment is not just a project specific concern. There will continue to be opportunities in the mining sector, for example at sites run by Celtic Energy and Tower Regeneration Ltd. In addition, virtually all of the growth in construction output in Wales in the coming five years is forecast to be in the infrastructure sector, which would include projects such as the Heads of the Valley Road (A465 works) that require similar civil and plant operative skills. There is therefore both a long term need to invest in training in these sectors, and the opportunity to create a long term skills legacy for the area which will allow young people to work not just locally but in the longer term on projects across Wales and the UK.

7.32 Miller Argent will also continue to work with local schools, colleges, Universities and training providers to raise awareness of opportunities amongst school children and students, through site visits, careers talks, work placements, projects and trials, as well as through a bespoke apprenticeship programme. The apprenticeship programme would involve working with a local college or other training provider to devise a bespoke on-the-job apprenticeship, resulting in a recognised qualification. Young people would be recruited through local colleges following a pre-apprenticeship programme. Miller Argent is already engaging in such activities through work with local schools, provision of apprenticeships on site, and with local universities on access to MSc projects.

Procurement

7.33 Miller Argent already makes extensive use of the local supply chain through its operation at FLRS. It would continue to do so at Nant Llesg. This will involve identifying all major supply chain contracts in advance and liaising with local partners, such as Caerphilly County Borough Council's Business Enterprise Support Team and Caerphilly Business Forum, to identify local businesses that might be able to bid for such contracts. Miller Argent would be happy to be involved in 'Meet the Buyer' and other business events so that local businesses can understand requirements and expectations.

Partnership Working & Next Steps

7.34 Miller Argent is committed to ensuring that the types of activities described in this document are implemented and will commit to them through the planning application process.

7.35 The company recognises that it is important that there is a person identified within the organisation who would have a clear responsibility to make good these commitments. The newly appointed Training Assessor has a specific remit to liaise with local partners and take these activities forward.

7.36 Miller Argent is also committed to the provision of a training centre within easy access from both the Nant Llesg and FLRS sites. This could include classroom space and a room for one-to-one assessments and interviews, along with an area for plant training, subject to discussion with local providers.

7.37 Whilst Miller Argent recognises its responsibility to take a pro-active lead to bring forward the opportunities, the success of the strategy would be dependent on working in partnership with the full range of organisations with an interest in skills, training and business support. This would seek to link with existing publicly funded programmes and projects to deliver the outputs described above. Partners are likely to include:

- Caerphilly County Borough Councils' Economic Development and Regeneration Teams (Including Community First Initiatives);
- Jobcentre Plus and Work Programme Providers;
- Local Schools, Colleges & Training Providers;
- Employment agencies;
- The Voluntary and community sector, e.g. community centres, advice services;
- Careers Wales; and
- Business bodies and business advice agencies.

7.38 Miller Argent has produced this framework to support the Planning Application for the proposed project and as a basis for initial discussions with partners. The proposed Section 106 Heads of Terms for the scheme include a commitment to agree the strategy described with local partners and to implement it.

Community Fund

7.39 The community fund presents an excellent opportunity to support the local area. To make best use of it, the fund must be promoted sponsorship requests from local community groups encouraged. This can be achieved through an integrated approach to public engagement, in which information leaflets provided in regard to the environmental parameters associated with the project are also accompanied by information on how to apply to the fund.

7.40 Administration of the Community Fund will draw on good practice established by existing community support schemes, notable among which is the Rhymney Communities First Partnership. The Communities First Partnership is funded by the Welsh Assembly Government to help improve the living conditions and prospects of people living and working in disadvantaged communities across Wales. Within Rhymney the partnership runs a range of projects including a youth project, IT lessons, food co-operative and community allotment. It also includes the Rhymney Youth Project, which holds outreach sessions twice per week to provide activities to young people who may not otherwise access any form of youth provision.

7.41 The Communities First Partnership provides a good example of the types of projects and potential community benefits that can be gained through support schemes and community funding. The Welsh Government also provides funding to the Coalfields Regeneration Trust, that seeks to improve the social and economic regeneration of coalfield communities. The Trust is linked with local authorities, Community First Partnerships, and third sector organisations and networks to help ensure a joined up approach and to maximise associated health and social benefits.

7.42 Looking beyond Rhymney, the Merthyr Tydfil volunteer centre currently lists 318 voluntary vacancies ranging from community work and fundraising to education, working with the elderly and supporting mental health services. Similarly the Dial-a-Ride service offers free hire of three vehicles to enable people with mobility problems who live in Caerphilly and Blaenau Gwent (Ref. 53).

Community Participation and Support

7.43 Miller Argent already provides a range of informal local community support, including education and mentoring programmes, charity fundraising events and the free use of company minibuses to support local sports and recreation activities (including fuel).

7.44 It is recommended that Miller Argent formalises such support through a dedicated Nant Llesg Corporate Social Responsibility (CSR) programme, that both raises awareness of the contribution they make within the local communities, and sets out their commitment to continue such support.

7.45 The CSR programme would provide a means to catalogue and share the extent of community support initiatives with local communities annually, and provide a platform for wider support and charity fund raising events to be suggested and coordinated locally.

7.46 In addition to formalising existing support initiatives, it is recommended that Miller Argent explores an employee volunteering programme, encouraging staff to spend up to two days per year supporting local communities (be it through charity fund raising, local projects or mentoring).

Occupational Health

7.47 The focus of occupational health has changed in recent years, where the emphasis upon risk management has been extended to health promotion in order to facilitate a healthy, vibrant and effective workforce. Key benefits include reducing the rate of occupational safety incidents, through to reducing the number of days of sick leave and promoting faster recovery times.

Health Promotion Programmes

7.48 Wider community benefits include supporting local public health campaigns, and addressing the underlying causes of poor health within the area (including poor nutrition, low levels of physical activity, smoking, alcohol and substance misuse).

7.49 It is recommended that Miller Argent engages with local health providers to identify and apply health promotion campaigns that aim to maintain and improve the health and wellbeing of the workforce through raising awareness of both work and lifestyle related health issues.

7.50 General health campaigns would aim to improve workers' health through advice on smoking, diet, alcohol and stress with the potential for life long health benefits to both staff and their households.

53 Gwent Association of Voluntary Organisations. (2012). Supporting the Voluntary Sector in Gwent. Available www.gavowales.org.uk last accessed 10/07/12

7.51 It is recommended that physical activity be encouraged through the promotion of a corporate gym membership, or signing up to national bike purchase schemes that aid staff with spreading the cost.

Drug and Alcohol Policy

7.52 Miller Argent implements a drug and alcohol policy that includes confidential help and advice for employees who have a drug or alcohol issue. Drug and alcohol testing would be conducted either when there is reasonable suspicion that a person is under the influence or at random as part of an agreed programme of tests. Whilst such a programme is largely derived from the need to ensure the safety of staff on site, it can also have a beneficial effect within communities and households.

Final Restoration Scheme

7.53 The proposed project presents an opportunity to improve recreational facilities and land use across the Nant Llesg area. The choice of final land use will be influenced by ideas from the local community. The proposals include a fishing lake, cycle paths and nature conservation areas. In order to promote equality, support vulnerable groups and the success of the final restoration scheme it is important for it to appeal across all demographics.

7.54 As shown in section 4 of this report, feedback from the community consultation indicates a range of potential community benefits that centre on the provision of facilities that support an active lifestyles (swimming pool, skate park, cycle routes and footpaths) as well as facilities that benefit the wider community such as a new community centre, tourism centre and a commemorative mining statue. Agreement will be sought with the local planning authority on the type of final land use prior to land remediation being carried out.

Appendix A HIA Scoping Statement

Nant Llesg Surface Mine,
Incorporating Land Remediation

Health Impact Assessment Scoping Statement

June 2012

Nant Llesg Surface Mine,

Incorporating Land Remediation

Health Impact Assessment Scoping Statement

June 2012

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1 Introduction

Background

1.1 This HIA scoping statement presents the HIA approach and methodology applied to-date, and defines the final scope and focus of the HIA for the proposed Nant Llseg Surface Mine, Incorporating Land Remediation.

1.2 The purpose of this scoping statement is to act as a briefing aid during a meeting with the Aneurin Bevan Health Board and Welsh HIA Support Unit (22nd June 2012) to:

- discuss the iterative refinement of the HIA to address local community and key stakeholder health concerns and opportunities;
- discuss the post consultation refinement of the project to address health concerns;
- discuss and agree the key health pathways to be assessed and addressed; and
- define the external review of the final HIA.

1.3 Following the meeting, the scoping statement will be amended where appropriate and appended to the final HIA.

1.4 The remainder of this document presents the approach and methodology applied to-date, and details the final assessment parameters to be applied and community support initiatives to be explored.

2 Approach and Methodology

Health Impact Assessment

2.1 HIA is a multidisciplinary process which incorporates air quality, noise, transport, and socio-economics as well as more intangible elements important to good health and well-being. HIA's are designed to identify and assess the potential health outcomes (both adverse and beneficial) of a proposed project, plan or programme and to deliver evidence based recommendations that maximise health gains; and reduce or remove potential negative impacts or inequalities on health and well-being.

2.2 Although not a regulatory requirement of the UK planning process, HIA is considered to be an appropriate process to further investigate and address potential health and well-being issues on mineral extraction projects (Minerals Technical Advice Note: MTAN2: Coal. 2009).

2.3 In keeping with best practice, the HIA was commissioned by Miller Argent to inform the application, and to investigate and address local health concerns through a more joined up approach to planning, the environment and community health.

Approach

2.4 The basis of the HIA is in accordance with both Welsh (WHIASU 2004), (WHIASU 2011) and UK guidance (Kemm 2007) and is set on a broad socio-economic model of health that encompasses conventional health impacts such as communicable disease and accidents along with wider determinants vital to achieving good health and well-being.

2.5 As per the recommendation of MTAN2, a key aspect of the HIA approach has been integration with the regulatory consultation and environmental assessment process. Such an approach ensures the consistency and accuracy of the HIA to the Environmental Statement (ES), and further ensures the final HIA recommendations are given the same recognition and weight as those prescribed in the ES.

Aim and Objectives

2.6 The primary aim of the HIA has been to build on and complement the outputs of the ES to further integrate health and well-being within the Project, identify and assess potential health outcomes and put forward recommendations to maximise health gains whilst minimising potential negative impacts.

2.7 To-date, this aim has been achieved through the delivery of the following objectives:

- investigate key stakeholder and local community health concerns through an integrated environmental and health scoping exercise;
- community profiling to establish local circumstance and relative sensitivity;
- preliminary assessment to quantify and appraise the magnitude, distribution and likelihood of potential health outcomes (both adverse and beneficial) directly attributed to the proposed development;

- development of an appropriate evidence base to address the key health pathways scoped within the HIA; and
- iterative refinement of the HIA scope and focus through an integrated environment and health engagement strategy investigating local community and key stakeholder concerns, priorities and opportunities.

2.8 Remaining objectives necessary to achieve the overarching aim include:

- perform the final health assessment;
- provide a HIA document suitable for submission with the planning application; and
- develop a dedicated Health Action Plan drawing upon the consultation feedback to address potential risks, community disruption, remaining health concerns, and to facilitate the uptake of local health benefits.

Process and Methodology

2.9 Although guidance and a generic HIA process exists, the methods employed in HIA are often tailored to meet the particular assessment requirements of a project, and further vary depending on the level of integration within the regulatory assessment process. In this instance, the HIA has been designed to support and supplement the Environmental Impact Assessment (EIA) process, and will be submitted as a planning document. Such an approach provides a more joined up approach to planning, the environment and health, but also provides a means to more effectively feedback and address local community health concerns.

2.10 As set out below, the HIA comprises seven key stages including: 1) an integrated scoping exercise; 2) a project profile; 3) a community profile; 4) stakeholder engagement; 5) assessment; 6) a Health Action Plan; and 7) external review.

Integrated Environmental and Health Scoping Exercise

2.11 Scoping is the process by which the focus of the assessment is set, defining the key health pathways to be assessed (i.e. aspects with the potential to influence health, both adversely and beneficially); and just as importantly, rationalise aspects to be outside of the scope of the assessment. This is necessary to ensure the HIA is fit for purpose, meets stakeholder expectations and identifies potential opportunities to support local and strategic health objectives but does not cover matters that it cannot influence or does not affect.

2.12 The HIA scope and focus was primarily influenced through a review of the available literature on the health effects of surface mining, HIA case studies and professional experience. This provided the basis to the health assessment scope included within the integrated environmental and health Scoping Report. The report was subsequently issued to statutory consultees for comment as well as key health stakeholders such as the Aneurin Bevan Health Board and the Welsh HIA Support Unit.

2.13 Such input provided the means to draw from a wide range of impartial expertise, disciplines and local knowledge to ensure the HIA covers a broad range of topics and health concerns.

2.14 It was appreciated however, that key health stakeholders typically have varying levels of experience with the formal planning process and a wide range of existing responsibilities that can sometimes limit their participation during scoping. A separate invitation to participate on a health themed stakeholder workshop was therefore issued to the Aneurin Bevan Health Board and the Welsh HIA Support Unit to discuss the project and HIA.

2.15 The integrated stakeholder engagement stage (discussed below) constitutes the final formal stage influencing the scope and focus of the HIA to more effectively address local community concerns, requirements and needs. Informal feedback however, will continue to be applied through engagement to further inform and refine the HIA where appropriate.

2.16 Such a tiered approach provides a comprehensive approach to iteratively investigate and address the concerns and needs of statutory consultees, key health stakeholders and local communities alike.

Project Profile

2.17 The purpose of the project profile is to identify features associated with the scheme that potentially influence key determinants of health, this includes coal recovery, land reclamation and remediation and the operation of Cwmbargoed Disposal Point. The profile builds upon the health scoping criteria outlined in MTAN2, and has been compiled through an iterative review of both project specific and broad information including:

- the project description developed as part of the planning application process and post consultation amendments;
- the preliminary assessments, Environmental Statement (ES) and associated technical appendices (air quality, noise and vibration, traffic, socio-economic, visual, access and accessibility in particular);
- complaint data for the area and existing surface mine at Ffos-y-fran (sourced from both the Environmental Health Officer and Miller Argent); and
- consultation with the client, ES project team (including the community consultation team) and the Welsh HIA Support Unit (WHIASU).

2.18 By developing the project profile it is possible to list potential causal pathways, to aid in refining the development of an appropriate evidence base, to support the development of a meaningful community profile and to focus the core issues to be assessed.

2.19 In addition to known environmental and socio-economic health pathways the outputs from stakeholder engagement have been applied to identify and address wider health concerns within the assessment and through a dedicated Health Action Plan.

Community Profile

2.20 Evidence suggests that different communities have varying susceptibilities to health impacts and benefits as a result of social and demographic structure, behaviour and relative economic circumstance. A community profile therefore not only forms the basis to exposure response modelling but also allows an insight as to how potential health pathways (both adverse and beneficial) identified by the project profile might act disproportionately upon certain communities and sensitive receptors.

2.21 In this case, the community profile has made use of available small area demographic and socio-economic statistics taken from National Statistics supported by health and hospital admissions data available from the Local Health Board.

Stakeholder Engagement

2.22 Engagement is a key stage to planning, enabling local views and concerns to be shared, providing the basis to address potential issues and opportunities through design, while further influencing the scope of issues to be assessed and addressed though the final assessment.

2.23 The HIA implemented a tiered engagement strategy fully integrated within the EIA. Specific tiers included:

- an environment and health scoping exercise:
- a health themed discussion with the Community Forum (December 2011);
- a Stakeholder HIA Workshop (January 2012); and
- HIA participation at all five of the public exhibitions held in Rhymney (St David's Community Centre and Ael Y Bryn Sports and Community Centre), Abertysswg, Fochriw and Pontlottyn.

2.24 As detailed in the Public Consultation Statement, such a tiered approach provided a means to investigate and address a wide range of community health concerns within the HIA; to focus key issues with local communities and health stakeholders; and provided an opportunity to feed back preliminary information to address and alleviate health concerns and develop more effective mitigation and community support initiatives within the Health Action Plan.

Assessment

2.25 The assessment stage of the HIA is currently underway, and will draw from and build upon the emerging technical topic areas within the EIA to ensure the HIA is based upon realistic changes in environmental and socio-economic conditions as a consequence of the proposed development.

2.26 The assessment will address each of the core health pathways identified through both the project profile and through consultation, applying where possible internationally recognised quantitative assessment methods to establish the distribution, significance and likelihood of worst-case potential health outcomes. The assessment will include:

- quantitative exposure response modelling for changes in PM_{10}, $PM_{2.5}$ and NO_2 exposure during the phased coal recovery (quantifying changes in life expectancy and local cardiovascular and respiratory hospital admissions) with reference to the available scientific evidence base and accounting for local health burdens;
- dispersion modelling of dust deposition and qualitative appraisal as to the magnitude and significance upon local community health and well-being;
- quantitative risk assessment from changes in road traffic movements and subsequent risk of collisions directly attributed to the proposed scheme (drawing upon the detailed traffic assessment within the ES);
- qualitative appraisal as to community disruption and potential health outcomes from changes in noise and vibration (drawing from the detailed noise assessment of the ES);
- qualitative appraisal as to the socio-economic health benefits from direct, indirect and induced income and employment opportunities (drawing from the socio-economic section of the ES);

- qualitative appraisal as to the socio-economic impact upon property value and socio-economic health;

- qualitative appraisal of the potential health outcome from the temporary closure of common ground and re-alignment of public rights of way;

- qualitative appraisal as to the potential health benefit from the removal of existing environmental hazards (i.e. from old mine shafts and adits), the provision of new and enhanced recreational and leisure areas;

- qualitative appraisal as to the community health benefits from land remediation and hydrological improvements addressing an existing silting issue, supporting the continued improvement of the River Rhymney and Darren Valley Country Park Lake; and

- qualitative appraisal as to the potential impact on quality of life based upon local priorities, perceptions and values (including visual impacts).

2.27 Please note that the HIA will also seek to consider the cumulative impact of the coal reclamation scheme with existing, consented and planned developments drawing from the ES.

Health Action Plan

2.28 A Health Action Plan (HAP) expands upon the normal recommendations section outlined within HIA guidance, replacing voluntary recommendations with solid commitments through the planning process to further reduce and remove potential adverse health outcomes and disruption, while maximising opportunities to increase health benefits by addressing local circumstance and needs.

2.29 Potential community support initiatives raised during consultation and currently being explored include but are not limited to the following:

- interim and final land use design options to promote physical activity, recreation and community cohesion;

- re-introduction and enhancement of local heritage items of specific community value back into the landscape to 'build pride back into the community, encourage community ownership and deter crime';

- training, apprenticeship and education support to address existing barriers to benefit uptake;

- employment and procurement programmes to support the local uptake of direct, indirect and induced income and employment opportunities;

- a community benefit fund intended for local allocation only;

- ongoing transparent monitoring and feedback to local communities;

- ongoing community engagement; and

- enhanced community participation through sponsorship, charitable events.

External Review

2.30 In accordance with the MTAN 2, the HIA will undergo a quality assurance process involving external peer review, helping to ensure the study is robust and meets with best practice. The review process is required to be carried out by an independent professional, be it either the planning authority, Local Health Board or an independent specialist. In this instance, it is recommended that the review be conducted by the Welsh HIA Support Unit with the Aneurin Bevan Health Board utilising a bespoke appraisal criteria to be agreed with the Welsh HIA Support Unit and Health Board.

3 References

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Appendix B: HIA Review

Introduction

The following section provides a review of the HIA carried out to cross check the assessment against the tables provided in the HIA specific review package applied by the WHIASU (Ref. 54)

Table 1.1: Review area, categories and sub-categories

Context	Commentary
Site Description and Policy Framework	
The report should describe the physical characteristics of the project site and the surrounding area	The HIA has been informed by the full project description outlined in the Planning Statement and ES describing the physical character of the site and the surrounding area
The report should describe the way in which the project site and the surrounding area are currently used	This information is provided through the project profile (section 2 of the report) which describes the location of the site and surrounding residential areas
The report should describe the policy context and state whether the project accords with significant policies that protect and promote wellbeing and public health and reduce health inequalities	The relevant policies are described in the introductory text (section 1 of the report) in this case referring to MTAN-2
Description of project	
The aims and objectives of the project should be stated and the final operational characteristics of the project should be described	The introductory text (section 1 of the report) sets out the aims and objectives of the HIA. The final restoration scheme would be defined through a separate planning application but the potential restoration options are outlined in the HIA and HAP
The estimated duration of the construction phase, operational phase and, where appropriate, decommissioning phase should be given	The total duration for coal working is set out in the project profile, the duration for each stage of the project is defined under the assessment of air quality (section 5 of the report)
The relationship of the project with other proposals should be stated	The HIA takes account of and builds upon the technical assessments within the ES that account for existing and consented projects.
Public Health Profile	
The public health profile should establish an information base from which requirements for health protection, health improvement and health services can be assessed	Section 3 of the report outlines a comprehensive community profile, that summarises local health need and existing sensitivities

54 Cave, B *et al*, 2009, A Review Package for Health Impact Assessment Reports of Development Projects. Available www.hiagateway.org.uk last accessed 23/01/13

Context	Commentary
The profile should identify vulnerable population groups. The profile should describe, where possible, inequalities in health between population groups and should include the wider determinants of health	The profile reviews demographic information as well as key health statistics to identify vulnerabilities. Inequality, deprivation and life expectancy are all included in the profile. Core vulnerable groups are considered to comprise those experiencing a high burden of poor health, the socio-economically deprived and the elderly.
The information in the profile should be specific about the timescale, the geographic location and the population group being described and links should be made with the proposed project	The profile includes small area statistics alongside those for the county and region to further consider any risk to the local population
Management	**Commentary**
Identification and prediction of health impacts	
The report should describe the screening and scoping stages of the HIA and the methods used in these stages	A scoping exercise was carried out with the Aneurin Health Board, Welsh HIA support unit and Public Health Wales. The scoping opinion is provided as an appendix to the HIA
A description of how the quantitative evidence was gathered and analysed (where appropriate) should be given and its relevance to the HIA justified	The HIA identifies where quantitative data has been utilised from the Environmental Statement and cross-refers to the relevant reference document
A description of how the qualitative evidence was gathered and analysed (where appropriate) should be given and its relevance to the HIA justified	Qualitative evidence has been used for the discussion of perceived risk and well-being, an explanation to the data relevance is provided in the assessment of risk (section 5 of the report)
Governance	
The governance process for the HIA should be described	The HIA did not require a steering group, where the scope, focus and objectives were defined and refined though consultation with key health stakeholders and through local community engagement (section 4 of the report).
The terms of reference for the HIA should be available to the reader and the geographical, temporal and population scope of the HIA should be made explicit	The HIA outlines the exact location of the site, the duration of the project and the scope of the assessment
Any constraints in preparing the HIA should be explained	Constraints have not been identified
Engagement	
The report should identify relevant stakeholder groups, including organisations responsible for protecting and promoting health and wellbeing that should be involved in the HIA	This information is provided in section 4 of the report
The report should identify vulnerable population groups which should be involved in the HIA	A HIA representative attended the public exhibitions and community forum events advertised via 5,000 leaflets delivered within local communities

Context	Commentary
The report should describe the engagement strategy for the HIA	This is set out in section 4 of the report
Assessment	**Commentary**
Description of health effects	
The potential health effects of the project, both beneficial and adverse, should be identified and presented in a systematic way	The health pathways (both beneficial and adverse) are identified under the project profile for each stage of the project (section 2 of the report)
The identification of potential health impacts should consider the wider determinants of health such as socioeconomic, physical, and mental health factors	The wider determinants of health are incorporated in the HIA including environmental factors, access and open space, and socio-economic factors
The causal pathway leading to health effects should be outlined along with an explanation of the underpinning evidence	The assessment in section 5 of the report outlines the pathway for each health determinant and how it can influence health and well-being drawing from the available evidence base
Risk Assessment	
The nature of the potential health effects should be detailed	The potential health impacts are outlined through the assessment section i.e. respiratory hospital admission linked with changed in air quality and disturbance from noise and vibration
The findings of the assessment should be accompanied by a statement of the level of certainty or uncertainty attached to the predictions of health effects	The assessment protocols are based on the available scientific evidence base which is referenced within the report
The report should identify and justify the use of any standards and thresholds used to assess the significance of health impacts	As above the assessment protocols are based on the available scientific evidence base which is referenced within the report
Analysis of distribution of effects	
The affected populations should be explicitly identified	The assessment utilises information presented through the community profile to consider the population surrounding the site
Inequalities in the distribution of predicted health impacts should be investigated and the effects of these inequalities should be stated	The community profile considers relative sensitivity and existing inequality information that is used to inform both the assessment phase and health action plan
Effects on health should be examined based on the population profile	The information presented in the community profile has been used to inform both the assessment and also targeted measures for improvement as outlined in the health action plan
Reporting	**Commentary**
Discussion of results	
The report should describe how the engagement undertaken has influenced the HIA, in terms of results, conclusions or approach taken	The influence of the stakeholder engagement is reviewed in section 4 of the report. This includes changes to design that were made following the consultation process for the project (ES and HIA)

Context	Commentary
The report should state the effect on the health and wellbeing of the population of the option and any alternatives which have been considered	Alternatives have not been assessed within the HIA. The location is determined by resource availability (i.e. location of the coal seam). However proximity to residential communities has been assessed and discussed as part of the consultation exercise
The report should justify any conclusions reached, particularly where some evidence has been afforded greater weight than others	The conclusions reached are supported by the available scientific evidence base. Where weaknesses in this evidence exist it has been identified through the assessment section of the HIA
Recommendations	
There should be a list of recommendations to facilitate the management of health effects and the enhancement of beneficial health effects	Recommendations have been set out through the Health Action Plan (section 6 of the report)
The level of commitment of the project proponent to the recommendations and mitigation methods should be stated	MA are fully committed to all of the mitigation detailed within each of the EIA chapters. Reference Chapter 19 of the planning statement *"Schedule of Environmental Commitments"*
There should be a plan for monitoring future health effects by relevant indicators and a suggested process for evaluation	As above the Health Action Plan contains key performance indicators that assign responsibility for monitoring
Communication and layout	
Information should be logically arranged in sections or chapters and the whereabouts of important data should be signalled in a table of contents or index	The report is split into logical sections and includes a contents page and signposting exercise.
There should be a lay summary (executive summary) of the main findings and conclusions of the study. Technical terms, lists of data and detailed explanations of scientific reasoning should be avoided in this summary	The report includes an executive summary outlining the main findings of the assessment.
All evidence and data sources should be clearly referenced	Documents used in the report are referenced in the footnotes.

Nant Llesg
Surface Mine
Incorporating Land Remediation

A19
Sustainability and Climate Change

Nant Llesg Surface Mine

Incorporating Land Remediation

Appendix MA/NL/A19/001

Sustainability and Carbon Statement

miller argent

Nant Llesg Surface Mine

Incorporating Land Remediation

Sustainability and Carbon Statement

Miller Argent (South Wales) Limited

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Table of Contents

19. Introduction

19.1 Sustainability is recognised as *"a central organising principle"* of the Welsh Assembly Government, with sustainable development identified as the *"process by which we reach the goal of sustainability"*.

19.2 The development proposals for the Nant Llesg Surface Mine, Incorporating Land Remediation, have had regard to a series of sustainability objectives, termed the sustainability framework, to ensure that social, economic and environmental outcomes, the three pillars of sustainability, are promoted. The sustainability and carbon statement demonstrates how the proposed Nant Llesg scheme will be delivered within this sustainability framework, and in particular, demonstrates that the scheme complies with relevant policies for sustainability, promoted at relevant national, regional and local levels of Government. It demonstrates how sustainable development has been integral to the planning of this project, and how it would be delivered during the construction, operation and eventual decommissioning of the proposed facilities.

Description of proposals

19.3 Miller Argent (South Wales) Limited ("Miller Argent") is submitting a planning application for a surface coal mine including land remediation at Nant Llesg, north of Fochriw and west of Rhymney, in the County Borough of Caerphilly.

19.4 The proposed development would cover some 478.06 hectares of land, as shown on Drawing MA/NL/PA/001 and would include plant, infrastructure and buildings to:

- mine approximately 6 million tonnes of coal from the land using surface mining methods;
- facilitate the remediation of land within and adjacent to the surface mine to address public safety and land drainage concerns;
- carry out road improvement works at the junction of Fochriw Road and Bogey Road;
- infill approximately 50% of Rhaslas Pond (a designated reservoir) and carrying out works to protect the southern embankment and remove the northern embankment;
- erect a new building at Cwmbargoed Disposal Point (CDP) and install within it a new coal washing plant to prepare coals that arrive at the disposal point;
- prepare, process and dispatch to market coal from the Nant Llesg Surface Mine and the Ffos-y-fran Land Reclamation Scheme (FLRS) at the CDP;
- continue the use of all facilities at the CDP for the duration of coal working operations in the project, including the provision of a new layout for the water treatment facilities for the period 31st December 2024 until the cessation of mining operations at the Nant Llesg Surface Mine; and
- progressively restore the land in accordance with the proposed restoration strategy and rehabilitate the restored land for a minimum five-year aftercare period.

Miller Argent Corporate Policies

19.5 Miller Argent has implemented an integrated management system covering their commercial activities and operations at the existing FLRS. This includes a Quality Management System (QMS), Mining Management System (MMS) and an Environmental Management System

(EMS). This system details all potential issues that could arise during the lifetime of FLRS and includes controlled procedures to manage these issues sustainably. This management system would be adopted for the project and as such relevant procedures have been considered within this sustainability and carbon statement.

19.6 The management system is a working model, which evolves and improves over time. As new technologies and improved methods of control are introduced, Miller Argent's environmental procedures continue to be adapted to incorporate these changes.

Structure of this report

19.7 The sustainability and carbon statement is structured to firstly set out the overall approach followed, and the overarching sustainability framework that has been developed based on a review of the regional and national sustainability aims and objects. Following this, a description is provided of how the proposals respond to each of the relevant sustainability objectives within the sustainability framework, with a final concluding statement on how the proposed scheme fits with the overall vision of a sustainable development.

19.8 In order to review the proposals against the sustainability objectives, a number of technical studies and strategies have been reviewed. These include:

- Environmental Statement and supporting drawings and appendices;
- Miller Argent's Quality Management System (QMS);
- Miller Argent's Mining Management System (MMS);
- Miller Argent's Environmental Management System (EMS);
- Details of the Design, (as set out in the Planning Statement and shown in Drawings MA/NL/PA/001 – 040);
- Restoration Strategy; and
- Training Strategy.

19.9 These reports should be read in conjunction with this sustainability and carbon statement and are cross referenced where appropriate.

20. Approach of Sustainability and Carbon Statement

Introduction

20.1 Local Planning Authorities (LPAs) require that developers demonstrate how they have taken sustainable development concepts into account within their proposals. There is no specific guidance on the methodology to follow and different approaches can be taken. The approach taken for this sustainability and carbon statement has been developed based on sustainability statements carried out for other developments of similar type and scale.

20.2 The original scoping opinion for the proposed Nant Llesg scheme, provided by Caerphilly County Borough Council (26 August 2011), did not include any specific reference to the need for a sustainability statement, although it did request that the ES outline actions relating to the reduction of carbon emissions.

20.3 Miller Argent submitted a scoping report and further request for a scoping opinion to Caerphilly on 31st December 2011. This recommended that sustainability and carbon statements would be prepared for the proposed Nant Llesg scheme, as standalone reports. The response from Caerphilly County Borough Council (9 March 2012) confirmed this would be required, stating that "*the Environmental Statement should take account of the following potential impacts on the environment: … Sustainability and Climate Change Assessment*". To address this response, the sustainability and carbon statement has been included as an appendix to the Environmental Statement, with a short section included within the Environmental Statement to explain how sustainability and climate change has been addressed within the project proposals.

Methodology

20.4 The diagram overleaf illustrates the methodology that has been followed to consider sustainability as the proposals have evolved.

Development of Sustainability Framework

20.5 The first part of the process involves the development of a Sustainability Framework, consisting of a series of themes and objectives, against which to consider the proposals, based on a review of relevant policies and guidance.

20.6 The Request for Revised Scoping Opinion (Miller Argent December 2011), included a section on the proposed approach to this sustainability statement, the review of relevant policies and guidance, and set out an outline of the main objectives of the sustainability framework for the proposed project. This is set out in the next chapter.

Evolution of proposals

20.7 As the project proposals have evolved, the objectives of the sustainability framework have been given due consideration and they have influenced how the proposals have developed. The sustainability framework has played an important role in the consideration of opportunities to reduce impacts and improve the sustainability of the proposals.

Sustainability and Carbon Statement

20.8 The production of the sustainability and carbon statement is the final stage in the process, drawing together the evolution of the project proposals and demonstrating how far they accord with the sustainability objectives of relevance. This has drawn information from a range of sources, including Miller Argent's policies and procedures, the Environmental Impact Assessment (EIA), Health Impact Assessment (HIA), design drawings and supporting reports and information.

Figure 1: The Sustainability Appraisal Methodology

Inputs	Process & Outcomes
National, Regional and Local Planning Policies & Strategies	Sustainability Framework
Miller Argent's policies and procedures Evolving Proposals	Initial Sustainability Findings Consideration of Further Sustainability Opportunities
Final Technical Documents e.g. EIA and HIA	Sustainability and Carbon Statement

21. Sustainability Framework

21.1 The sustainability framework sets out the scope of the sustainability and carbon statement. This framework is developed following a review of government strategies, planning policies and guidance, at national, regional and local level, which are considered relevant. These policies, guidance and objectives/criteria for appraising sustainability were given careful consideration in the preparation of the sustainability framework.

Policy Review

21.2 Appendix 1 provides a summary of the review of relevant Welsh Government policies and national and local planning policies and guidance. The review of relevant national, regional and local policies and guidance has illustrated the importance of sustainability within Welsh Government policies in general, and specifically planning policies and the delivery of new developments.

21.3 The Welsh Assembly Government adopted its first sustainable development scheme, "Learning to Live Differently" in 2000 (National Assembly for Wales, 2000), and this is reflected in the Mineral Planning Policy Wales (MPPW) published in 2001 (see further details below).

21.4 Subsequently, the Government of Wales Act 2006 set a legal duty on Welsh ministers to *"make a scheme ("the sustainable development scheme") setting out how they propose to promote sustainable development"* (HMSO, 2006). "One Wales: One Planet - The Sustainable Development Scheme of the Welsh Assembly Government" (Welsh Assembly Government, 2009) sets out the Welsh Assembly Government's vision of a sustainable Wales, and confirms that sustainable development is the central organising principle of the Welsh Assembly Government. In "One Wales: One Planet", sustainable development is defined as *"enhancing the economic, social and environmental well-being of people and communities, achieving a better quality of life for our own and future generations"*, and the "*Vision of a Sustainable Wales*" is "*one where Wales:-*

- *lives within its environmental limits, using only its fair share of the earth's resources so that our ecological footprint is reduced to the global average availability of resources, and we are resilient to the impacts of climate change;*
- *has healthy, biologically diverse and productive ecosystems that are managed sustainably;*
- *has a resilient and sustainable economy that is able to develop whilst stabilising, then reducing, its use of natural resources and reducing its contribution to climate change;*
- *has communities which are safe, sustainable and attractive places for people to live and work, where people have access to services, and enjoy good health;*
- *is a fair, just and bilingual nation, in which citizens of all ages and backgrounds are empowered to determine their own lives, shape their communities and achieve their full potential*."

21.5 Planning Policy Wales (PPW) (Welsh Assembly Government, 2012) sets out the land use planning policies of the Welsh Assembly Government. It confirms sustainability to be at the heart of the Welsh Assembly Government's decision making process, and that the planning system has a fundamental role in delivering sustainable development.

21.6 Mineral Planning Policy Wales (MPPW) (National Assembly for Wales, 2001) sets out the Welsh Government's land use planning policy in relation to mineral extraction and related development in Wales. MPPW sets out how the main aims of the first the Welsh Sustainable Development Scheme (Learning to Live Differently", National Assembly for Wales, 2000) relate to mineral planning:-

- *"Social progress which recognises the needs of everyone: to provide for the benefits of increased prosperity through an adequate supply of minerals that society needs now and in the future, together with protecting and improving amenity;*
- *Effective protection of the environment: to protect things that are highly cherished for their intrinsic qualities, such as wildlife, landscapes and historic features; and to protect human health and safety by ensuring that environmental impacts caused by mineral extraction and transportation are within acceptable limits; and to secure, without compromise, restoration and aftercare to provide for appropriate and beneficial after-use;*
- *Prudent use of natural resources: to help conserve non-renewable resources for future generations through efficient use, recycling and minimisation of waste; to protect renewable resources from serious harm or pollution; and to promote the use of appropriate alternative materials;*
- *Maintenance of high and stable levels of economic growth: to ensure an adequate supply of minerals that are needed at prices that are reasonable; and to safeguard mineral resources for future generations".*

21.7 MPPW then defines the key principles to be adhered to in order *"to provide a sustainable pattern of mineral extraction"*. In summary, these are:-

- *"To provide mineral resources to meet society's needs and to safeguard resources from sterilisation;*
- *To protect areas of importance to natural or built heritage;*
- *To limit the environmental impact of mineral extraction;*
- *To achieve high standard restoration and beneficial after-use; and*
- *To encourage efficient and appropriate use of minerals and the re-use and recycling of suitable materials".*

21.8 Minerals Technical Advice Note 2: Coal (MTAN2) (Welsh Assembly Government, 2009) sets out detailed advice on policies in relation to coal extraction in Wales. Detailed guidance is provided against each of the key principles set out in MPPW, in order that the *"environmental and social costs of coal operations … are properly met by the operator"*.

21.9 At a local level, Caerphilly Borough Council Local Development Plan's Sustainability Appraisal (Caerphilly Borough Council, October 2008) defines the issues and objectives relevant to the local area, under the following topics (full detail of these objectives are included in Appendix 1):-

- *Population and Human Health;*
- *Air Pollution;*
- *Cultural Heritage and Landscape;*

- *Water;*
- *Geology and Geomorphology;*
- *Climatic Factors; and*
- *Material Assets.*

Proposed Sustainability Framework

21.10 In the request for a scoping opinion to Caerphilly on 31st December 2011, Miller Argent proposed to use the key principles of MPPW (National Assembly for Wales, 2001) to form the sustainability framework for the Nant Llesg sustainability assessment. However, subsequent review and consideration of best practice has suggested that it would be more appropriate to take the principles of MPPW, the definition of sustainable development and the issues and objectives identified at a local level, and propose a specific set of themes and sustainability objectives relevant to the Nant Llesg scheme. This will ensure that the scope of the sustainability assessment is sufficiently broad to address all the three pillars of sustainability and not too narrow in its focus.

21.11 A comparison of all the relevant sustainability objectives from the local and national planning polices and guidance has been undertaken, and appropriate objectives have been selected as representatives of the different objectives, and developed to be applicable to the proposed scheme. These themes and sustainability objectives form the sustainability framework for this sustainability and carbon assessment.

21.12 It is therefore proposed that the sustainability framework for the project's sustainability assessment is as follows:-

Theme	Sustainability Objective	Key Considerations for Nant Llesg
Economy and Skills	To promote a resilient and stable economy	• Employment opportunities • Educational development of employees • Indirect stimulation of the local economy
Social Well Being	To provide mineral resources to meet society's needs	• Supply for energy generation • Supply for manufacturing
	To minimise the impact on health and wellbeing	• Health impact • Access to recreational opportunities
Climate Change	To reduce carbon emissions from the extraction and transportation of coal	• Carbon emissions arising from extraction methods and associated operations • Transport related carbon emissions

Theme	Sustainability Objective	Key Considerations for Nant Llesg
	To minimise vulnerability and adapt to a changing climate	• Flood risk • Adaptation to a changing climate
Natural and Cultural Heritage	To protect areas of importance to natural or cultural heritage	• Protection and enhancement of ecological resources • Protection and enhancement of the landscape • Protection and enhancement of cultural heritage
Pollution	To minimise the environmental impact of mineral extraction and related operations	• Traffic • Noise and Vibration • Air Quality and Dust • Light • Water Quality
Resources and Waste	To encourage the efficient use of resources and minimise the production of waste	• Use of resources within mining operations • Waste and Recycling • Soil management and remediation

21.13 This sustainability and carbon statement is structured to demonstrate how the proposals for the Nant Llesg scheme respond to each of these themes and objectives. The relevance of each sustainability theme, objective and key consideration, and their policy context, is explained at the beginning of each of the following chapters.

22. Economy and Skills

Introduction

22.1 The continuing enhancement of the economy is identified as one of the three 'pillars' of sustainable development, when appropriately balanced with social and environmental considerations in the definition of sustainable development in "One Wales: One Planet" (Welsh Assembly Government, 2009), through *"enhancing the economic, social and environmental well-being…"* (see chapter 3 for full definition). 'One Wales: One Planet' sets out the vision of a sustainable Wales, where Wales *"has a resilient and stable economy that is able to develop, whilst stabilising, then reducing, its use of natural resources and reducing its contribution to climate change"*.

22.2 At a local level, the issues and objectives of the Caerphilly Borough Council Local Development Plan Sustainability Appraisal Framework (Caerphilly Borough Council, 2008) include:-

- *"Education - to improve educational achievement;*
- *Employment - to increase the percentage of people of working age in employment;*
- *Wealth Level of Economic Activity – to increase the wealth of individuals in CCBC".*

22.3 The sustainability framework for the project therefore includes **Economy and Skills** as one of the themes, with the sustainability objective as reflecting the vision in One Wales: One Planet, **to promote a resilient and stable economy**, and the key considerations, based on the relevant local issues, identified as:-

- Employment opportunities
- Educational development of employees
- Indirect stimulation of the local economy

To promote a resilient and stable economy

Employment opportunities

22.4 The project would impact positively upon the local area through the creation of jobs. It is anticipated that the scheme would employ on average between 144 and 239 workers on site for fourteen years of operation and restoration, plus 10 workers during the aftercare period. After taking account of the multiplier effects, in total it is estimated that the project would generate between 173 and 249 local jobs based on onsite mining operations and land remediation, supplier spending created by the scheme and spending by the employees.

22.5 The coaling period of the Nant Llesg scheme is expected to last for a duration of 10 years, with a 15 year timescale proposed taking into account for all site enabling and coaling operations. Following the end of coaling, the aftercare period is estimated to last for a minimum of 5 years. The enabling, coaling and aftercare periods of the Nant Llesg scheme would provide differing numbers and types of employment opportunities, as summarised above and set out in chapter 5 (Social Assessment) of the Environmental Statement.

22.6 As discussed in chapter 5 (Social Assessment) of the Environmental Statement, there is relatively high and long term unemployment, particularly among young men in the surrounding area. There are also low levels of economic activity among the working age resident population, again with young men most affected. The consequence of low economic activity coupled with high unemployment is a problem for local prosperity and economic sustainability.

22.7 Economic activity rates in both Caerphilly and Merthyr Tydfil are below the Wales and Great Britain average, with the unemployment rate amongst economically active men higher when compared to Wales and Great Britain averages. This indicates the lack of suitable jobs available in the towns surrounding the proposed project. There is a significant need for more employment opportunities to arise especially for uptake by the local unemployed younger male population. The proposed project scheme provides a significant opportunity to reduce the numbers that currently fall into this unemployed target group as the types of job opportunities arising from the project align with the type of employment being sort.

22.8 Whether the jobs that will become available are filled by local residents already working in other local businesses or sectors, it is envisaged that there is a surplus labour within the local area to absorb the additional jobs directly created by the project or those jobs vacated by new workers employed in the project. This would result in freeing up alternative jobs within the wider local area not related to the project, enabling them to be filled up by the surrounding local population that may currently be unemployed or looking for a change in employment.

22.9 Miller Argent will be using local recruitment and are seeking to link with local partners such as training agencies and Job Centre plus which would maximise the social and economic benefits that the project can bring to the local area. The focus will be mostly on recruiting in the adjacent towns including Rhymney, where high unemployment or economic inactivity was identified in chapter 5 (Social Assessment) of the Environmental Statement to be common among local residents.

22.10 Based on data collected from the neighbouring FLRS on the locations of where employees live in relation to the site and as detailed in the Social Assessment of the Environmental Statement, it is estimated that 80% of workers might be recruited for the project who live no further than 10miles from the site.

Educational development of employees

22.11 As described in chapter 5 (Social Assessment) of the Environmental Statement, Miller Argent are looking to link with a local training agency and Job Centre plus to ensure that the job opportunities proposed by their project can be tailored to match local skills. By recruiting from local towns that currently suffer high levels of unemployment, the social and economic benefits of the Nant Llesg scheme would be experienced locally.

22.12 In 2010, the level of qualifications possessed by locals in both Caerphilly and Merthyr were well below levels of Wales and Great Britain. Miller Argent would work with a local training agency to ensure that their local employees received the appropriate training to undertake work on the site. Although this would not significantly change these statistics, those individuals who did benefit from the project would receive high quality training and qualifications. Employees would be able to develop a host of transferable skills that may be beneficial to them in the future. This would continue for the lifetime of the project.

22.13 Miller Argent have developed an outline Training Strategy in order to ensure that it effectively engages with the local community over the employment opportunities on offer and to ensure that its employees are provided with opportunities for on-going continuous professional development and training. The Training Strategy would be based on the following objectives:

- to engage with the unemployed local residents eligible to work and to train them as required;
- to have a positive engagement with the local community;
- to offer appropriate apprenticeships and employment to local young people with on-the-job training leading to job specific qualifications;
- to attract skilled workforce with experience of the sector;
- to have a high proportion of its employees living locally;
- to educate local young people on the range of careers and opportunities within the sector; and
- to have a low level of staff turnover.

22.14 The Training Strategy would ensure that, where possible, the project provides employment opportunities to local residents throughout the life time of the scheme. This combination of long-term stable employment along with opportunities for personal development could contribute to improving the health and well-being of local communities. This is further detailed in the next chapter of this report.

Indirect stimulation of the local economy

22.15 The ongoing operation of the project and its associated employment brings further benefits to the local area in security of job supply and income to the local communities. Employment created by the project would generate positive effects through suppliers as a result of the new activity generated by the project. The induced generation of jobs and disposable income into the area from the project is anticipated to positively benefit the local economy. The further multiplier effects occur as the suppliers' and associated firms' employees generate further profit and employment in the local economy.

22.16 Regarding the expected level of expenditure on goods and services associated with the scheme, an exact figure cannot be predicted. However, data provided from the FLRS shows that in over a period of three years, 27.1% of its £98 million expenditure on goods and services from suppliers was spent within 10 miles of FLRS; with 46.7% of this expenditure being spent within Wales. Miller Argent anticipate that a similar expenditure on suppliers would occur for the Nant Llesg scheme and envisage that around 27.1% of spending on suppliers would occur within 10 miles of the site. Annually this figure could approximate to £8.9 million on goods and services and would be a significant revenue for local suppliers.

22.17 It is estimated that the travelling distance for 80% of workers would be 10 miles or less. Caerphilly currently shows a significant level of out commuting by residents to work and has a self-containment figure well below the Wales average. The proposed project would increase containment, ensuring expenditure of money on local provisions and services. Local recruitment would see disposable incomes invested locally, resulting in increased revenues for local businesses and suppliers.

22.18 Allocation of jobs locally would also provide further benefits, as it is expected that workers will already have accommodation in adjacent towns surrounding the site. Therefore it is anticipated that no problems would arise through increased pressures upon local availability of new public funded services and housing.

22.19 It is likely that some of the specific skills required for enabling, operation or restoration works would be sourced from outside of the local areas. These individuals may require temporary accommodation in local hotels, and may temporarily increase local spend in local shops and services. This is further discussed in chapter 5 (Social Assessment) of the Environmental Statement and is regarded as a positively induced effect resulting from the scheme.

22.20 The potential physical risks to existing businesses and workers within the local area in relation to transport, noise, visual and other environmental effects have been assessed in the Environmental Statement and whilst businesses are located adjacent to the site, the project would be screened by a visual and acoustic bund for the majority of its operation.

Conclusion

22.21 The above describes how the proposed project would provide employment opportunities focused on local people, with associated training and education opportunities. The increase in income in the local area, and use of local suppliers bring further indirect benefits. These together enable the proposed scheme to contribute positively to the objective to promote a resilient and stable economy.

23. Social Well Being

Introduction

23.1 One of the four main aims of the Welsh Assembly Government's Sustainable Development Scheme, as set out in 'One Wales, One Planet' (Welsh Assembly Government, 2009), is "s*ocial progress which recognises the needs of everyone".* In relation to mineral planning, this is defined in MPPW (National Assembly for Wales, 2001) as "*to provide for the benefits of increased prosperity through an adequate supply of minerals that society needs now and in the future, together with protecting and improving amenity".*

23.2 'One Wales, One Planet' describes the vision of a sustainable Wales to include *"one where Wales… has communities which are safe, sustainable and attractive places to live and work, where people have access to services, and enjoy good health"*. (The 'Vision of a Sustainable Wales is set out in full in Appendix 1 of this report, extracted from "One Wales, One Planet" (Welsh Assembly Government, 2009).

23.3 MPPW (National Assembly for Wales, 2001) defines one of the key principles of delivering sustainable mineral extraction as *"to provide mineral resources to meet society's needs and to safeguard resources from sterilisation".*

23.4 At a local level, the issues and objectives of the Caerphilly Borough Council Local Development Plan Sustainability Appraisal Framework (Caerphilly Borough Council, 2008) include :-

- "Health – To improve the health of individuals;
- Well-Being – To all residents easy access to leisure facilities;
- Crime - To reduce the incidence of crime."

23.5 Therefore, to reflect the wide ranging considerations under the topic of **Social Well Being**, the sustainability framework for the project includes two sustainability objectives.

23.6 The first objective, reflecting the principle set out in MPPW (National Assembly for Wales, 2001)is **to provide mineral resources to meet society's need**. The key considerations, relevant to the project are:-

- Supply for electricity generation
- Supply for manufacturing

23.7 The second objective, reflecting 'Vision of a Sustainable Wales' as set out in One Wales, One Planet (Welsh Assembly Government, 2009), and the local issues and objectives, is **to minimise the impact on health and wellbeing**, with key considerations defined as:-

- Health impact (including both potential beneficial and negative impacts associated with community safety, local traffic, air quality, noise and employment opportunities); and
- Access to recreational opportunities, and its influence on the health and wellbeing of the local community.

To provide mineral resources to meet society's needs

23.8 It is estimated that the project has a potential recoverable reserve of 6 million tonnes of Welsh Dry Steam Coal, a rarer low to medium volatile coal type that is currently largely imported into the UK.

23.9 Chapter 15 of the Planning Statement sets out the principal need case for the project, demonstrating how the objective of the MPPW (National Assembly for Wales, 2001) to ''provide positively for the working of mineral resources to meet society's needs'' would be delivered by the project. The following summarises the key points of the need case, demonstrating how the proposals address this aspect of sustainability.

Supply for electricity generation

23.10 A proportion of the coal extracted from the project would be used to generate electricity. In 2012 the UK's use of coal for energy generation was 54.8 million tonnes, an increase of 31% on 2011 usage levels (DECC, 2013). Despite current UK energy targets looking ever more to generate electricity from renewable sources, coal still plays a significant contribution to meeting energy demand in the UK.

23.11 The needs case, as set out in the Planning Statement, illustrates how in 2010 the UK was the third largest consumer of coal of EU countries, a repeated trend for ten consecutive years. However, whilst demand for coal has remained high since 2010, the extraction of coal both in Wales and elsewhere in the UK has reduced, and imports have risen. The UK has a high demand for certain types of coal, specifically Welsh Dry Steam Coal and where the UK cannot meet its coal demand it relies upon international imports predominantly from Russia, Australia, Colombia and the USA. In 2012, greater coal demand by electricity generators and low UK production levels have both been responsible for an increased rate of coal importation in the UK by 38% (+12 million tonnes) compared to 2011 levels (DECC, 2013). On average annually, around 80% of total UK coal imports are represented by Steam Coal, with this increasing to 89% of total imports in 2012 being comprised alone of Steam Coal (DECC, 2013). The UK's dependency on the importation of coal to meet its demands of Welsh Dry Steam Coal has significant concerns for security of supply and conflicts with National Policy. These figures demonstrate the need to extract UK coal reserves and specifically the Nant Llesg reserve of highly demanded Welsh Dry Steam Coal.

23.12 Aberthaw Power Station (APS) was designed to specifically burn Welsh dry steam coal. Coal from the project meets APS's requirements. APS is a major source of electricity for a large area of South Wales and will continue to be so for many years providing reserves of Welsh dry steam coal can be obtained locally. Until now, the FLRS has been key to prolonging APS's security, efficiency and sustainability, but its reserves are limited and its depletion projected by 2021. As explained in the needs case of the Planning Statement, the Nant Llesg reserve of Welsh dry steam coal has been identified as being the only suitable resource to meet APS's requirements and so coal from the project is essential to ensure its operation continues.

23.13 Currently the only other facility that currently also recovers Welsh dry steam coal is the neighbouring FLRS. As demand for Welsh dry steam coal continues to exist and as reserves of this coal are depleting at the FLRS, a new reserve is sought, highlighting the importance of the proposed extraction of coal. Currently the FLRS supplies electricity generators like RWE Npower (APS owner and operator) who require significant amounts of coal to operate. RWE Npower have shown serious interest for the coal reserve at Nant Llesg scheme due to the rapidly declining supply of suitable Welsh dry steam coal that they are heavily reliant upon for their operations at APS. If the project does not proceed, then for power stations like APS, their requirements for low volatile steam coal demand will be met through an increasing dependence upon imports. Such reliance upon coal importation creates significant concerns for security of supply for electrical generators like RWE npower, and would consequently result in increased carbon emissions due to the transportation requirements of importing coal.

Supply for manufacturing

23.14 Currently the coal extracted from the operating FLRS also supplies manufacturing companies like Tata Steel who require significant amounts of coal to operate. This coal is used not only to supply energy needs, but as a key component of the manufacturing process, with coal providing the carbon element of steel production. Like RWE Npower, Tata Steel are keen to receive coal extracted from the project in order to guarantee the local supply of Welsh dry steam coal.

23.15 As described above in the ‘supply for electricity generation’ section, without coal from the project, manufacturing companies like Tata Steel would be forced to meet their coal requirements from importation and there would be concerns for security of supply and could result in increased carbon emissions due to the transportation requirements of importing coal.

Conclusion

23.16 There is a demonstrable need for Welsh dry steam coal for both electricity generation and manufacturing in order to reduce reliance on importation and improve security of supply. Coal from the project could meet this need, providing a local supply and avoiding reliance on importation. If the project were not to proceed there would be concerns for security of supply and there could also be increased carbon emissions due to the transportation requirements of importing coal.

To minimise the impact on health and wellbeing

Health impacts

23.17 A Health Impact Assessment (HIA) has been undertaken by Miller Argent which investigates, assesses and addresses the potential effects of the project upon the health of the local community.

23.18 The scope and focus of the HIA has been defined and iteratively refined through engagement with key stakeholders: initially through the formal EIA scoping exercise with statutory consultees; and subsequently through a separate HIA scoping exercise with key health stakeholders and local communities via an integrated engagement strategy. It has further benefited from iterative input from the Welsh HIA Support Unit in the discussion and implementation of appropriate assessment protocols and influence on the development of the final Health Action Plan (HAP).

23.19 Although the activities to be carried out in the project have potential to bring health risks to the local community relating to dust and air quality, noise, water, waste and traffic, Miller Argent would undertake a number of measures to mitigate and minimise the risks of these impacts and to reduce perceived risk. The FLRS demonstrates the effectiveness of mitigation that has been implemented on site against health risks upon the local community. Similar measures would be adopted in the project, alongside further measures where appropriate, to minimise potential impacts upon the health of the local community.

Community Safety

23.20 The design of the project has been conscious of local community safety. Appropriate signage and safety fencing would mark routes around the site. Warning signs and fencing would dissuade trespassers from entering onto the site. A lighting strategy would ensure the site is well lit for onsite personnel. Health and safety on site is uppermost in Miller Argent's mind and best practice will be followed. Miller Argent's health and safety statistics show that the number of accidents are below the industry average and have improved year on year since the commencement of coaling at Ffos-y-Fran.

Air quality

23.21 The chapter 12 (Air Quality and Dust) of the Environmental Statement identifies the potential air quality emissions that may arise as a result of the project throughout its lifetime and anticipates that the greatest impact during the project's operation would be on dust deposition. It addresses where coal extraction operations and preliminary works could cause nuisance upon local residents but offers the implementation of significant mitigation measures to reduce the potential for and the effects of dust.

23.22 Mitigation against the potential human health impacts that dust can cause has been incorporated into site design and would also be applied throughout all phases of the scheme's operations. As set out in chapter 12 (Air Quality and Dust) of the Environmental Statement, proactive site management of dust would be adopted through early dust forecasting, weather forecasting, community monitoring and dust emissions suppression through the appropriate use of equipment with water application capabilities. On site operations would only occur within the set working hours outlined in the Planning Statement, agreed between Miller Argent and the local authority. Additionally, outside of site operational hours, periods of adverse weather conditions with the potential to cause increased dust emissions and deposition may require the use of equipment like water bowsers to suppress dust. These measures would aim to confine dust emissions on site as much as possible and would strive to limit the exposure of the public to dust emissions associated with the project. Further detail of the mitigation that would be implemented to minimise the potential impacts of air quality is included in the Pollution chapter of this report.

23.23 Workers would be protected from suffering any potential human health effects through the appropriate adoption and wearing of PPE and by ensuring that daily working activities relating to dust / conditions comply with safety standards/ limits that are in line with health and safety guidance.

Noise and vibration

23.24 Operational activities undertaken at the project have the potential to create noise and vibration that could impact upon the health and wellbeing of the local community through disturbance and disruption. Chapters 13 (Noise) and 14 (Blasting and Vibration) of the Environmental Statement outline how noise, blasting and vibration would be controlled to adhere with MTAN 2 guidelines (Welsh Assembly Government, 2009) and would be minimised through the site design of the project and from onsite mitigation to be implemented by Miller Argent in their day to day operations. Further detail of the mitigation that would be implemented to minimise the potential impacts that could arise from noise and vibration is included in the Pollution chapter of this report.

Water

23.25 Chapter 10 (Hydrogeology) and chapter 11 (Hydrology and Drainage) of the Environmental Statement along with the accompanying Surface Water Management Plan (SWMP) outline the water management procedures and systems that would be implemented in the project to minimise the risks from contaminated runoff from the site and flooding. This would ensure that any pollution incidents that could arise relating to spillages or water contamination are dealt with appropriately and promptly. All site personnel would be trained to deal with water pollution incidents to ensure immediate action is taken following a potential spillage event. Construction workers would wear appropriate PPE to protect them from any potential health effects that they could be subjected to through exposure to contaminated water.

Waste

23.26 Chapter 17 (Waste) of the Environmental Statement explores the potential human health impacts that may arise as part of this scheme due to interactions with waste.

23.27 Regarding human contact with waste existing on site, Miller Argent would ensure that waste operations would: i) follow best practice working methods, ii) follow an onsite Material Management Plan, and iii) comply with planning policies and legislation associated with waste disposal. This would ensure that all waste generated by the project is appropriately stored, disposed of, transported and handled with no risk to human health and wellbeing. Greater detail on policies relating to appropriate waste management are detailed in chapter 17 (Waste) of the Environmental Statement.

23.28 Chapter 17 (Waste) of the Environmental Statement anticipates that volumes of traffic associated with waste haulage would be insignificant in comparison to the overall scale of the project, and all waste transportation would be appropriately managed by Miller Argent.

Traffic

23.29 Chapter 7 (Traffic and Transport) of the Environmental Statement details the roads and public highways that would be utilised by vehicles entering and leaving the site. In order to reduce the likelihood of potential accidents occurring, road improvements, including junction amendments have also been proposed to increase visibility and safety for other road users.

23.30 To minimise the potential impacts that traffic movements could have on the local receptors, restrictions would be in place to control when vehicles can enter and leave the site. HGV movements, deliveries and dispatches would be distributed evenly throughout the working day and would be restricted to 0700 to 1900 Mondays to Fridays and 0700 to 1400 on Saturdays. This would ensure steady and consistent movements. Daily car traffic would also enter and leave the site at the start and end of each work shift. Haulage of coal from the extraction site to the CDP would follow the proposed coal haulage route as shown on MA/NL/PA/003 so as to have minimal disturbance and impact upon local communities. An HGV routeing agreement would be developed to ensure that all HGVs are restricted to using the defined coal haulage route. Abnormal loads will only travel along routes agreed by a dedicated team and would be supervised and escorted by the local police.

23.31 Chapter 12 (Air Quality and Dust) of the Environmental Statement identifies that the key atmospheric emissions associated with road traffic are nitrogen oxides (NOx) and particulate matter. It is anticipated that vehicle emissions arising from the project would not impact upon local residential receptors since exhaust emissions from the coal trucks and other traffic associated with the project are localised. The emissions produced by rail transport would exert a negligible significance on the nearest residential receptor and so is not considered to impact upon local health and wellbeing.

23.32 Chapter 7 (Traffic and Transport) of the Environmental Statement assesses local personal injury and accident data for the local road network that surrounds the site. In order to minimise the risk of human injury relating to traffic created by the proposal, Miller Argent would undertake some improvements to the local road network. As set out in Chapter 7 (Traffic and Transport) and as mentioned in 5.29 above, improvements to the Bogey Road/Fochriw Road junction would be undertaken to improve visibility for turning vehicles.

23.33 The proposals have evolved based on the potential impacts of the scheme in relation to traffic upon health and wellbeing. The proposal has been redesigned so that all coal from the project is hauled by road to the CDP. Previously it was envisaged that a coal haulage route would need to be constructed across land either south of the site or to the west over land north of the Bogey Road. Such alternative routes would have required two controlled crossing points where they crossed sections of the public highways, which may have caused nuisance to local road users. Additionally, the proposal now includes improvement works to be made to the layout and vertical alignment of the junction between Fochriw Road and the Bogey Road and also in relation to kerbing, road marking and signage. For greater detail of this refer to the Planning Statement.

Induced benefit from local employment

23.34 As detailed in the HIA community profile, local burdens of poor health in the area are strongly associated to areas with high levels of unemployment and socio-economic deprivation. Given the level of socio-economic deprivation within Caerphilly, coupled with the current socio-economic climate and continued decline in local manufacturing industry (comprising the main area of employment within the area), the proposed project represents a significant socio-economic pathway to health benefits through direct, indirect and induced income and employment opportunities, and presents a means to address existing local health circumstance.

23.35 Although educational attainment in the area is relatively low, there is an existing and transferable skills base within the surrounding communities that supports the uptake of employment opportunities.

23.36 The proposal offers positive impacts upon local health and wellbeing due to the long term employment and training. Chapter 5 (Social Assessment) of the Environmental Statement anticipates that as well as bringing employment opportunities to the local area the project would instil a range of positive social and wellbeing impacts such as enhanced self-esteem, health and psychological benefits in those returning to work following periods of unemployment should they be employed by Miller Argent, or benefit from indirect and induced income and employment opportunities as a consequence of the project.

23.37 Potential barriers to such uptake are addressed within the HIA Health Action Plan, with suggested means to overcome any barriers including training, procurement programmes and community support initiatives.

Access to recreational opportunities

23.38 The proposed site area comprises land that is used for informal recreational activities. Approximately 201ha of the operational area consists of open access and urban common land, with public rights of way that run within the proposed site. The Nant Llesg scheme will have both positive and negative impacts upon access to recreational opportunities that currently exist in the Caerphilly County Borough, although negative impacts have been assessed in the Environmental Statement as being short term and temporary in nature. As discussed in greater detail in chapter 6 (Recreation and Tourism) of the Environmental Statement, the main long-term objective is to enhance public access opportunities across and around the Nant Llesg site by improving the connections with the local communities of Fochriw, Pontlottyn and Rhymney and local recreational resources.

23.39 A restoration strategy has been developed following consultation with Caerphilly County Borough Council (CCBC), to restore the site for informal recreational use following completion of the mining operations. This strategy includes the reinstatement of common land and the provision of public rights of way to replace those stopped up during the project's operational lifetime, together with the creation of new public rights of way upon restoration of the site to improve and enhance the recreational resources locally. During the operational phase, to reduce the impacts from the temporary loss of common land, areas of temporary access land would be provided as explained in greater detail below.

Recreational resources affected during operation of scheme

Common land

23.40 As illustrated in chapter 6 (Recreation and Tourism) of the Environmental Statement, the proposal contains a large proportion of land which is registered as urban common land. This forms part of the Gelligaer and Merthyr Urban Common which extends to approximately 3,090ha and over which the public have a right of access for air and exercise. This area of urban common is also designated as ‘Access Land’ and provides the commoners with grazing land. The area of common within the operational boundary comprises approximately 6.5% of the total area of the Gelligaer and Merthyr Urban Common available for public access and approximately 3.5% of the total area of access land available (5783 hectares) within Caerphilly County Borough.

23.41 Historical mining activity in the area has left land within the Nant Llesg planning application area and its surroundings with a large number of abandoned mine shafts. The area has also been subject to fly tipping activity and a number of old mine colliery spoil tips are also prevalent there. These features present considerable risk of land subsidence/mine collapse to the public that use this area for recreational purposes. Around 138 potentially dangerous mine shafts and entrances have been identified within the site which pose significant risk to the safety of the public using this land for informal recreation.

23.42 Areas of the Gelligaer and Merthyr Urban Common within the operational area of the site would be fenced off for the duration of the project, until such time as aftercare is completed. To reduce this loss of recreational land, five areas of replacement temporary access/grazing are being proposed as part of the scheme. The areas proposed are as a result of the assessment of suitability of all areas available, as shown on Drawing MA/NL/PA/035. The areas identified for temporary public access land for the duration of the Nant Llesg project are set out below and shown on the Common Land Strategy Drawing MA/NL/PA/036. Greater detail on the provision of replacement access land for recreation is explained in chapter 6 (Recreation and Tourism) of the Environmental Statement.

- Area 7 – this area to the south west of Pontlottyn and to the east of Fochriw has been proposed as land available for public access only and includes an existing track to the west and south of this area along which the Rhymney Valley Ridgeway Walk runs in part and other public footpaths commonly used by local residents;

- Area 8 – this area, between the A469 and the access track/road across the common running south from Pontlottyn and centred on the former settlement of Troedrhiwfuwch, has been proposed as land available for public access only. This area links directly with the Gelligaer and Merthyr Common affected by the project and would provide an additional access resource for recreation. Parc Cwm Darran is located 1 km from this area and would be linked by the existing common land and public rights of way;

- Area 9 – This area comprises a linear piece of land lying immediately north of the existing Merthyr Common and the Bargod Taf to the south of the FLRS and is proposed for both public access and common grazing. However its landscape conditions are deemed more suitable for grazing usage. On completion of the final restoration and aftercare phases, this area would be put forward for registration as permanent common land;

- Area 11 – this area, located on a west facing slope above Pentrebach and Troedyrhiw and surrounded by existing urban common land, has been proposed to provide land for both temporary access and common grazing. Several informal tracks link to this area which additionally join the new Sustrans National Route 477 and a traffic-free path comprising part of the Taith Trevithick Trail; and

- Area 12 – this area at Pendducae Fawr has been proposed to provide land for both temporary access and common grazing. The land lies immediately adjacent to the existing urban common land to the north, west and along part of its southern boundary. Informal routes exist in this area, which comprise the Loops and Links network and part of a waymarked trail that are designed for use by walkers, cyclists and horseriders.

Cycle routes

23.43 As detailed in chapter 6 (Recreation & Tourism) of the Environmental Statement, no national cycle routes fall within the project area. The nearest sections of national cycle route comprise of the National Route 46 along the Heads of the Valleys Road to the north and National Route 469 to the south of Fochriw, which links with Parc Cwm Darran to the south. These routes would not be directly affected by the scheme operations. Measures to improve the local cycle network have been included in the proposed Restoration Strategy, as set out in the relevant section below.

Public Rights of Way (PRoWs) and promoted/linear routes

23.44 A number of Public Rights of Way (PRoW) either cross the site, are proximate to or link with it. Chapter 6 (Recreation and Tourism) of the Environmental Statement identifies the PRoW that either link to surrounding PRoW or cross the Nant Llesg site that would be stopped up during the operational activities of the proposed scheme.

23.45 As explained in paragraph 5.47 below, the project proposes areas of land to be remediated within the first 2 years of the commencement of the project. This early land remediation would make land available locally for recreation and establish permissive routes for public use whilst the PRoWs affected by the project are stopped up. Access along these permissive routes will continue to be allowed during the early remediation works, subject to any deviations to these routes in the event of work being required in their vicinity.

Other facilities / Rhaslas Pond

23.46 The only other facility that falls within the site that is used for recreation is Rhaslas Pond. This recreational resource is a popular destination for walking and in the past has been used for swimming and paddling. During the preliminary works, the size of Rhaslas Pond would be reduced and the site fenced. Access to and around Rhaslas Pond would be reinstated and enhanced as part of the Restoration Strategy (see further details in paragraph 5.52 below).

Short-term enhancement of recreational resources

Early Remediation works

23.47 Three main areas outside the Nant Llesg operational site located in east, west and south are included for early land remediation works within the first 2 years of the commencement of coaling (as shown on Drawing MA/NL/PA/003). The early reinstatement of these areas, along with final land restoration activities following completion of the coaling operations, would see the removal of hazardous mining relics and would result in the provision of land of an improved quality that is available to the public for informal recreational activity. Early reinstatement works outside of the operational site will provide the public with recreational opportunities throughout the operational phase of the project. These works will make the area safe from previous mining features and would incorporate landscape and ecological habitat enhancement works to which the final site restoration works will link.

23.48 Access to common land in these areas will be available throughout the remediation works, subject to any areas being temporarily fenced out of the common on safety grounds, until such time as the remediation works is completed.

23.49 In the eastern area, remediation works will see the removal of dangerous mining features. Whilst the existing PRoWs will be stopped up, permissive access would be available, subject to any deviations to these routes in the event of work being required in their vicinity., . Additionally, a new linear recreational route will be established. This will be in the form of a bridleway along the lower slopes of the Rhymney valley side, linking with existing bridleways, cycle paths or minor roads. It would remain in situ as an additional public right of way following the final restoration phase. A new footpath running north from Gelligaer BR89, would be created on the edge of new woodland planting and up the stream valley to the edge of the common land. This would be extended to meet the re-aligned Rhymney Valley Ridgeway Walk on completion of the restoration works.

23.50 To the western side of the operational site, although temporarily interrupted to allow completion of the works to divert the power line, which would be completed at an early stage to enable the operational phase to begin, this land would remain common land allowing for north-south pedestrian and equestrian access.

23.51 To the south of the operational site, remediation works would take the form of a drainage scheme and works to shafts and adits. Again, although temporarily interrupted by these remediation works, the land would remain as urban common.

Long-term enhancement of recreational resources

23.52 Following completion of the mining operations, the site would be restored in accordance with the Restoration Strategy developed following consultation with CCBC. The aim is to restore the site for informal recreational use, which would include the creation of a network of public rights of way to replace and enhance those that have been stopped up including those across the urban common. Some of these routes would provide links to existing recreational facilities and would also replace and enhance the popular route to and around Rhaslas Pond.

Common land

23.53 Following completion of the restoration works and aftercare programme, the right of access for air and exercise over those parts of the site designated as common land would be reinstated and 11.5 ha of additional land that is currently not within the common would be put forward for registration in the Commons register (refer to Chapter 6 of the Environmental Statement for more details). The remainder of the temporary land assigned to the public for recreational use and (in some cases) common grazing throughout the operational phase of Nant Llesg would be returned to its former agricultural use.

Public Rights of Way (PRoWs) and promoted/linear routes

23.54 Following completion of the restoration and remediation works, the PRoW across the site that were subject to stopping-up orders would be re-provided on routes determined and agreed in consultation with CCBC. This will comprise the Gelligaer PRoWs (footpath references: FP86, FP90, FP96, FP96, FP97, FP149 and FP151).

23.55 The Rhymney Valley Ridgeway Walk would also be routed along a newly created bridleway, albeit with some variation to its strategic route so it relates well with the landscape features of the restoration design. It would be waymarked, with signposting where it is accessed from the surrounding area and marker cairns at strategic points along the route through the site.

23.56 The project also provides additional benefits through offering new routes and links or improvements to existing PRoWs. As detailed in chapter 6 (Recreation and Tourism) of the

Environmental Statement, these would provide a new network of PRoW to better suit the restored landform and compliment the public rights of access for air and exercise that will exist over the reinstated urban common. Full details are set out in chapter 6 (Recreation and Tourism) of the Environmental Statement, and shown on Drawing MA/NL/PA/039.

23.57 Other new PRoW would also be created in accordance with the Restoration Strategy comprising:

- A bridleway running along the alignment of the dismantled railway between Fochriw and the diverted bridleway Gelligaer BR93 on the northern boundary of the site. As well as providing a new long north-south route across the common, this route would also facilitate new links to the national cycle network and key local recreational facilities such as Parc Cwm Darran;

- Two new footpaths would be created north and east of Rhaslas Pond;

- A new bridleway from the bridleway running along the eastern slopes to the A469 north of Pontlotyn.

- A new north-south public bridleway would be created along which the Rhymney Valley Ridgeway Walk would run and would link to other bridleways in the area and the urban common, north of Fochriw;

- A new footpath would be created running north-east from the Rhymney Valley Ridgeway to link to new and existing PRoW to the west of the Heads of the Valleys Industrial Estate; and

- A new footpath from Gelligaer FP151 to the south of Rhaslas Pond to link to public rights of access beyond the site to the west.

- A new footpath from Gelligaer FP151 to the north of Pond Feeder to new footpaths to be created within the CDP.

23.58 The emerging restoration plan, represents a significant opportunity to not only provide a final landform that helps address local circumstance and existing physical health burdens, but may also support removing existing social barriers (north, mid and south Rhymney) through the provision of informal recreational uses, incorporating open access land, footpaths, bridleways and cycle paths to act as links between communities and the already established Cwm Darran and Bryn Bach Country Parks.

23.59 The final restoration strategy therefore has the potential to deliver both local and regional health objectives, whilst supporting the growth and diversification of local tourism.

Other improvements

23.60 The Restoration Strategy aims to upgrade the amenity of this area for the public to encourage interaction with the existing and new nature and heritage interests locally and to reconnect them with the natural and cultural landscape. Areas to be restored will be remediated with ecological and cultural assets in mind as explained in greater detail in the Restoration Strategy and would enhance the land used for recreation. On completion of operations, to fulfil the above aim of the Restoration Strategy, a number of improvements would be undertaken, as follows:

- Footbridges would be provided at stream crossings and kissing-gate type stiles or field gates at hedgerow crossings;

- Signposts and route markers would be provided at strategic points such as junctions of routes;

- Where there is access to features of particular ecological, cultural heritage, landscape and amenity interest, information signs would be provided to promote them;

- Progressive restoration and land management to provide ecological enhancements would be undertaken through the creation of new habitats (pond, grassland, trees and shrubs) including the development of the southern embankment and the southern part of Rhaslas pond into a broad wetland margin, including reed bed. Ecological management of off-site land at Bryn Caerau Farm is also proposed a part of the Nant Llesg scheme with permissive managed access;

- The scheme offers opportunities to retain some archaeological sites located within areas around the perimeter of the project. Any conservation work deemed necessary would be undertaken on such cultural heritage features so they can be promoted as a visitor attraction.

- Suitable locations for seats and picnic areas would be identified during the development of detailed proposals; and

- All footbridges, seats, signs and other 'landscape furniture' will reflect traditional styles and craftsmanship to continue to reflect the cultural history of the area.

23.61 A number of water-based recreational activities are undertaken around the project which would be positively affected by the improvements in water quality that will result from the project. It is anticipated that the water management procedures undertaken at the Nant Llesg scheme during the operational phase could have positive impacts upon local recreational fishing through improved water quality. Chapter 11 (Hydrology and Drainage) of the Environmental Statement details the waterbodies and rivers/streams that lie within the catchment area of the project or which may receive water from water sources draining or receiving runoff from the project. This chapter explains that the project falls within the Water Framework Directive (WFD, Directive 2000/60/EC surface water body known as "*Rhymney R - source to confluence with Nant Bargoed Rhymni*". Currently this water body has been rated as having a moderate ecological status based upon the reduced health of the river's fish stocks. It is anticipated that the water management activities that would be undertaken as a part of the project would help to improve the water quality of this river basin and its fish stocks would improve which would positively impact upon local recreational activities like fishing.

Conclusion

23.62 The project has the potential to impose potential health risks upon the local community relating to dust and air quality, noise, water, waste, traffic and recreational access, if not appropriately mitigated, compensated or managed. Equally, the proposed project presents a significant socio- economic opportunity, and presents a series of training, employment and procurement initiatives to support local uptake and address existing health and socio-economic inequality.

23.63 During the lifetime of the project, Miller Argent would ensure that strong management is undertaken at the site in order to appropriately control and minimise the potential impacts of the scheme upon the health and wellbeing of the local community. Planning conditions requiring appropriate mitigation and compensation would also be appropriate and enforceable against Miller Argent.

23.64 The provision of continued access to land for recreation and grazing during the operational phase as a result of the early completion of remediation works and the provision of considerable areas of temporary public access and grazing land, together with the consequential long-term benefits associated with the proposed Restoration Strategy would provide further opportunities for recreation which would positively influence on the health and wellbeing of the local community.

24. Climate Change

Introduction

24.1 Climate change is widely regarded as the most pressing challenge for sustainable development, and mitigating its impacts through reduction of greenhouse gas (GHG) emissions is a key focus of national energy policy and planning guidance. The "Climate Change Strategy for Wales" (Welsh Assembly Government, October 2010) recognises this challenge and sets out how the Assembly Government intends to reduce emissions, setting an annual target *"to reduce greenhouse gas emissions by 3% per year from 2011 in areas of devolved competence, against a baseline of average emissions between 2006-2010"* (pg 34, Chapter 5, Climate Change Strategy for Wales, October 2010). .

24.2 MTAN 2 (Welsh Assembly Government, 2009) identifies the potential for GHG emissions during excavation and associated transportation. Paragraph 10 of MTAN 2 requires applications for coal working to *"demonstrate that actions to reduce carbon emissions from the extraction and transport of coal are included in the proposals".* There is also potential for methane to be released as the seams are extracted by surface workings, and paragraph 225 of MTAN 2 recommends that *"applicants should mitigate the carbon produced by the extraction process, making the extraction operation itself carbon neutral".*

24.3 Recent developments in EIA best practice, including "Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment" (European Commission, 2013) and "IEMA Principles Series: Climate Change Mitigation & EIA" (IEMA, 2010), have indicated that it may be appropriate for climate change to be addressed within the EIA. However, there is still a wide range of opinions on whether this is appropriate, given the global nature of climate change which conflicts with the "Environmental Impact Assessment: A guide to good practice and procedures" (DCLG, 2006) which refers to *"the surrounding environmental features"* when introducing the approach to assessing environmental impacts (Chapter 4, Paragraph 106). There is no guidance currently available on an appropriate assessment methodology for climate change, or how to select an appropriate baseline or significance criteria. Climate change is a global issue and therefore does not easily fit into project level assessments used in standard EIA methodology.

24.4 In considering what is important to decision makers, both the EU and IEMA guidance confirm that the focus should be on consideration from the earliest stage of minimising carbon and other greenhouse gas emissions, to minimise the impact of the proposed development on climate change. In addition, appropriate consideration should be given to the consequences of a changing climate. This sustainability and carbon statement sets out how the GHG emissions have been reduced during the extraction and transport of coal, and how the carbon potentially emitted during the extraction process has been mitigated.

24.5 The appraisal of GHG emissions associated with this project has been undertaken within the context that this project is consistent with the Energy White Paper (DTI, 2007) which confirms, in section 5.4, that *"coal will continue to play a significant role in global electricity generation for the foreseeable future, partly because it is the most abundant global fossil fuel but also because it brings security of supply benefits"*. The reduction of GHG emissions associated with the use of coal in both the energy and manufacturing industries is addressed more widely in the Climate Change Act 2008 and the EU ETS (Emissions Trading Scheme Directive) and is not within the scope of this project.

24.6 For this project, as well as considering how a proposed development can mitigate climate change by reducing GHG emissions associated with its operations, appropriate consideration should also be given to ensure that the proposed scheme is resilient to potential future changes in climate conditions. Chapter 15 of the "Climate Change Strategy for Wales" (Welsh Assembly Government, October 2010) sets out how Wales will need to adapt to a changing climate.

24.7 At a local level, the issues and objectives of the Caerphilly Borough Council Local Development Plan Sustainability Appraisal Framework (Caerphilly Borough Council, 2008) include :-

- "Climate Change – to reduce the total amount of CO2 produced within the county borough each year
- Flood – to minimise the number of developments affected by flooding."

24.8 The sustainability framework for the project therefore includes **Climate Change** as one of the themes, with two sustainability objectives on mitigation and adaptation.

24.9 The first objective, reflecting the requirement of MTAN 2, is **to reduce carbon emissions from the extraction and transportation of coal**. The key considerations, relevant to the Nant Llesg scheme, are:-

- Carbon emissions arising from extraction methods and associated operations; and
- Transport related carbon emissions.

24.10 The second objective, reflecting the need for Wales to adapt to a changing climate, as set out in the Climate Change Strategy is **to minimise vulnerability and adapt to a changing climate**. The key considerations, relevant to the Nant Llesg scheme, are:-

- Flood risk
- Adaptation to a changing climate.

To reduce carbon emissions from the extraction and transportation of coal

24.11 All mining operations will use fuel during the extraction process and in transportation of the mined product. In addition, the ancillary offices and support buildings will use energy for heating, lighting and other energy consuming activities. It is therefore inevitable that carbon emissions would be produced as a result of the project. However these carbon emissions associated with the project can be significantly reduced by careful planning and management, as summarised below.

Carbon emissions arising from extraction methods and associated operations

24.12 As stated earlier in this report, Miller Argent has implemented an Environmental Management System (EMS), accredited to ISO14001, to manage all its potential environmental impacts for its existing operation at FLRS. This includes specific procedures for the management of the use of fuel and energy in the coal extraction activities and associated operations on site. This EMS would be adopted for the proposed Nant Llesg scheme.

24.13 During the lifetime of the proposed Nant Llesg scheme, use of fuel and energy would arise during the following:-

Mine Operations

- Use of diesel fuel to operate plant for excavation, storage and backfilling of overburden;
- Use of diesel fuel to operate plant for cleaning, lifting and loading the coal and transporting to the CDP.

At the CDP

- Use of electricity to operate coal processing plant and barrel wash;
- Use of diesel fuel for mobile plant operations

Office operations

- Use of energy for lighting, heating and use of IT equipment.

Mine and CDP Operations

24.14 Use of diesel fuel for operating plant in the above operations is one of the main considerations in the process of designing and operating the mine. Miller Argent recognises the importance of this, and the senior personnel of the Nant Llesg scheme would be responsible for optimising site efficiency, ensuring a dynamic and efficient mine design and implementation.

24.15 A hierarchy of key personnel would have responsibility for mine design, through from the Operations Director, Operations and Planning Managers to the General Foreman and all onsite supervisory staff and the engineering department. This cascade of design and instruction would ensure that carefully considered designs are set out by site engineers and implemented by the general foreman. Productivity and efficiency in the excavation and transportation of the overburden and coal keep fuel consumption, life expectancy of tyres and filter changes to a minimum, reducing carbon emissions at the same time as optimising the site's efficiency. There are commercial imperatives to reduce fuel consumption that will ensure efficiencies are achieved and carbon consumption minimised.

24.16 Specific measures that are currently implemented at FLRS to minimise carbon emissions that would also be adopted for the project, are set out in the following paragraphs.

24.17 Careful preparation and forward planning in terms of the overall mine design is crucial to achieve optimisation of the movement of material i.e. moving material in the right order and to the correct place at the right time thus not double handling material, which would otherwise increase fuel consumption, plant wear and man power.

24.18 The road surface to be designed to be hard wearing and to be well maintained to ensure the dump trucks & the coal wagons can travel up and down the haul roads with minimum resistance, using less fuel and reducing tyre wear and minimising the number of truck units required to operate. Maintenance is carried out on a daily basis, taking account of weather conditions and monitoring the condition of the road surface.

24.19 The condition of the haul roads is vital to ensure the efficient operation of a shovel and truck type mine. Well designed, constructed and maintained roads will keep the overall operational truck hours to a minimum. This includes maintaining a defined maximum gradient to reduce rolling resistance on the dump truck thus resulting in lower fuel consumption.

24.20 The size of the mine void is designed to minimise the amount of overburden taken to storage dumps in preparation for restoration whilst maintaining a safe and productive mine. The distance to overburden dumps is also considered to reduce the distance the dump trucks have to travel to deposit their load.

24.21 Surface mining blasts are designed to fracture hard material to allow excavators to dig more efficiently, thus optimising fuel consumption.

24.22 All plant is regularly maintained, and operators are encouraged to switch off engines when not in use.

24.23 The 777F dump trucks (90 tonne load capacity) are equipped with an on-board computer system which is monitored by Finnings who conduct the plant maintenance. Daily information includes speed, fuel consumption, time idle etc. This is used as part of the overall training strategy for plant operators. This data can identify potential additional plant operator training requirements (such as gear change selection to increase efficiency) which can be addressed within operator training. Plant which is operated efficiently will ultimately burn less fuel and produce less carbon emissions.

Office Operations

24.24 The proposed office buildings would be designed in compliance with current building regulations, thus energy efficient designs would be incorporated. Consideration may be given during the detailed design to the most efficient method of providing the energy to heat and light the proposed buildings.

24.25 Once occupied, the energy use of these buildings would be managed as part of the existing Miller Argent Environmental Management System, with procedures set out to ensure that staff adhere to good energy management practices when in the office, through turning off all lights, computers and heating/air conditioning units when leaving the building or meeting rooms.

Additional potential carbon emissions during the extraction process

24.26 The soils identified at the site are divided into three main categories, clayey with a peaty surface, loamy over clayey and loamy shallow. (The soil identification and classification is described in detail in Chapter 9 (Agricultural Land Use and Soil) of the Environmental Statement). During the extraction process it is anticipated that soil stripping activities could result in the potential release of carbon emissions through the degradation of peat, if the soils are not appropriately handled, stored and managed. In order to reduce the release of potential carbon emissions, two individual soil handling methodologies have been developed for both the site’s peat and non-peaty soils following consultation with relevant consultees. The soil handling methodologies follow best practice guidance and have incorporated the following principles below to ensure that soil from the project is appropriately managed in order to reduce the potential for carbon emission release:

- Different kinds of topsoils, subsoils and other potential soil forming materials that are available on site would be recognised, handled separately and stored appropriately;

- Soil handling would only be undertaken during appropriate weather conditions and would cease during wet weather;

- Soil handling during restoration would be undertaken by such machinery and operated in such a way as to reduce the potential for soil damage and compaction. Any work on the stored peat would be undertaken by machinery operating from a stable surface;

- Peat would be appropriately stored in cells to ensure it is kept in a wet condition during storage. The water level within the storage voids would be monitored and regulated as necessary to ensure that peat resources do not become excessively dry close to the surface, leading to oxidation and loss of materials;

- Wherever possible, soil would be moved directly from the area being stripped to areas being restored in order to reduce double handling of material and the potential for damage and losses of soil materials during storage;

- During restoration peat would be appropriately prepared, placed and seeded to ensure that the resources remain in place;

- All personnel involved in the soil handling operations would be made aware of the objectives and methodology; and

- All operations would be adequately monitored by a site supervisor.

24.27 As recognised in MTAN 2 (Welsh Assembly Government, 2009), surface mining has the potential to emit methane as the coal is extracted from the ground. Due to the previous mining operations undertaken on the site, it is likely that some of this methane has already been emitted by previous workings, although this is difficult to confirm in advance of the operations. MTAN 2 recommends that applicants mitigate for this potential emission of methane to make the extraction operation itself carbon neutral. The recommended approach is to offset this release of methane by planting trees, based on a broad calculation of average emissions of methane for shallow virgin coal, converted to equivalent carbon, and subsequently converted to equivalent absorption of carbon by temperate forest, measured in hectares. The proposed approach is for every 100,000 tonnes of coal per year, planting an additional half-hectare of trees would make the process carbon neutral.

24.28 The Nant Llesg scheme proposes to extract a maximum of 6 million tonnes of coal, which, using the above approach, would translate to 30 hectares of tree planting over the life of the site to align with MTAN 2 guidance for neutralising methane emissions from the extraction process. The proposed restoration strategy includes 16.1 hectares of tree planting within the site, and an additional 14 hectares of tree planting as part of the ecological enhancement at Bryn Caerau, making a total of 30.1 hectares, slightly in excess of the area required for offsetting the theoretical quantity of methane emitted during excavation.

Transport related carbon emissions

24.29 The project would allow for the extraction of approximately 6 million tonnes of good quality Welsh dry steam coal. Currently there is a high demand for coal and specifically Welsh dry Steam coal. There is a current high level of importation of coal into the UK to meet the high demand and it is important to exploit the UK's own coal reserves, so as to ensure continuity of supply and reduce carbon emissions that arise from the transportation of coal from overseas. Utilisation of coal extracted from the project, in comparison to importing coal from overseas, will undoubtedly result in lower carbon emissions from transportation.

24.30 Potential carbon emissions associated with the project can be significantly reduced through the efficient transportation of coal, and carbon emissions have been considered in relation to the transport methods chosen to transport coal to the end user. As set out in the Planning Statement, extracted coal would be transported by HGV for processing at the CDP and then either by road (within the existing limit of 50,000 tonnes per annum of coal by road from the CDP) or rail from the CDP to its end user. The existing limit of 50,000 tonnes per annum of coal by road would continue to apply (regardless of the source of coal or the tonnages delivered to the CDP). All other coals would be dispatched by rail.

24.31 The transport modes of rail and road have been chosen for this scheme based upon the success of the transport modes undertaken at the operational FLRS. The majority of the coal will be transported from the CDP by rail. The transportation of a maximum of 50,000 tonnes per annum of coal by road is the same as the current situation for FLRS, and is proposed to apply to exports from the CDP, rather than from the project itself. Therefore no greater quantity of coal would be transported by road from the CDP than happens at present. This scenario for transport of coal from the project is considered to minimise the carbon footprint of the project whilst ensuring coal is delivered to its users to satisfy demand.

24.32 In addition, coal quality can diminish with excessive handling. Where coal is directly transported by road or rail from the CDP to its end location, handling is able to be minimised so as to maintain quality. Miller Argent aim to minimise quality diminution by ensuring efficient handling, with consequent benefits to carbon emissions.

24.33 The dispatch of coal from the project by rail will result in an increased number of trains using the route from the CDP compared to the current number of trains. These trains will only be permitted to use the train paths already available for coal trains. Currently, there are only a small number of days and nights where the maximum permitted number of train movements is already used. Miller Argent would continue to always ensure that all rail wagons are loaded to full capacity to minimise the number of train paths required for coal haulage. This would ensure that carbon emissions would be reduced by optimising the number of rail wagons involved in the haulage of coal which would ensure maximum efficiency.

24.34 As stated in chapter 7 (Traffic and Transport) of the Environmental Statement, the use of public transport by Miller Argent personnel or subcontractors to access the site is deemed unlikely due to the distance from the nearest bus stops/rail stations to the site. All employees would live in offsite accommodation and would predominantly live in the local area and would travel to and from the site by private vehicle. As a potential mitigation measure, chapter 7 (Traffic and Transport) of the Environmental Statement proposes that Miller Argent would produce a Site Travel Plan, which would set out measures that would be implemented during the project to encourage employees and visitors to use sustainable modes of transport wherever possible and keep carbon emissions to a minimum. Measures proposed in the Site Travel Plan include car sharing, facilitating cycling to work and the potential scope for the use public transport by visitors (for the main part of their journey).

Conclusion

24.35 Miller Argent prioritises maximising fuel efficiency as one of the critical factors of successful design and operation. This significantly reduces the carbon emissions associated with the extraction of coal. The proposed planting of trees will also lead to the potential emissions of methane released during coal extraction being offset, enabling this aspect to be carbon neutral.

24.36 The carbon emissions associated with transportation are significantly reduced by no greater movements of coal by road than at present, with rail used as the main mode of transport. Coal will be efficiently handled and train capacities will be efficiently used, so as to minimise carbon emissions. The implementation of the Site Travel Plan would assist in minimising the carbon emissions associated with employee and visitor travel.

To minimise vulnerability and adapt to a changing climate

24.37 The potential impact of the Nant Llesg scheme upon climate change has been reviewed above. However it is also important to assess the potential impacts that climate change could have upon the project through its lifetime and to ascertain what mitigation could be taken to minimise the project’s vulnerability to effects resulting from climate change, such as flooding and more extremes in temperature and wind speeds.

Flood risk

24.38 Miller Argent recognises the importance to design the proposals taking into account the potential flooding risks. Chapter 11 (Hydrology and Drainage) of the Environmental Statement identifies the site to be located in WAG TAN15 Flood Zone A, a flood zone defined as having “of little or no risk of flooding”. Even though it is unlikely to flood, the surface of the site will be altered considerably during the operational phase and any potential risks of flooding would be minimised further through the implementation of appropriate water management systems and procedures and through a Surface Water Management Plan (SWMP), as agreed with Natural Resources Wales (NRW), formerly the Environment Agency Wales. This is the approach that is already followed at FLRS. Appropriate consents and licences would be obtained from NRW for water management, which would comply with local water policy and legislation outlined in chapter 11 (Hydrology and Drainage) of the Environmental Statement. Flood Defence Consents would be obtained for all operations to ensure that the works do not increase the risk of flooding.

24.39 Chapter 11 (Hydrology and Drainage) of the Environmental Statement identifies the water management procedures to be adopted and specifically the water attenuation facilities to be provided, which are fundamental to reduce the potential impacts that flooding could have upon the surrounding area. The benefits of the operational procedures that have been undertaken at the FLRS to reduce local flood risk have been recognised. The project would implement the same procedures as FLRS and it would be anticipated that the successful management of water quality and flood risk would be mirrored in the project.

24.40 Four Water Treatment Areas (WTAs) are proposed for the treatment and storage of surface water. Under the SWMP, runoff and dewatering would be managed; excess runoff would be diverted and stored in the excavated void or the WTAs and dewatered at appropriate times. The void would be used to attenuate excess water arising from any flooding of Rhaslas reservoir. WTAs would be designed to treat and attenuate water volumes of large magnitude above the 1 in 100 year with 10% climate change allowance resulting from flood events.

24.41 Surface run off from overburden mounds would be appropriately managed, with water runoff being routed to WTA’s for attenuation and water quality management before discharge. In order to provide water quality treatment (via settlement), water discharge off site would occur at rates slower than green field runoff rates (i.e. lower than the existing site run off rates). This will help to further minimise the risk of flooding in the area surrounding the project.

24.42 Miller Argent would ensure that the laying of impermeable surfaces within the project would not result in increased flood risks in the area surrounding the site. The area covered by impermeable surfaces would follow agreements made with NRW.

Adaptation to a changing climate

24.43 It is anticipated that during the lifetime of the project, the site will experience impacts of climate change/potential extremities in the seasonal weather conditions than are currently experienced, with droughts and storm events/floods becoming more frequent. Miller Argent already recognise the risk of severe weather events that could result in the offsite deposition of dust emissions and monitor the local weather conditions in order to pre-empt the need to change their planned operations.

24.44 Miller Argent would undertake a variety of procedures to minimise any potential impacts arising from drought conditions. Under drought conditions the risk of dust generation would be increased. Miller Argent would implement its EMS procedures connected to reducing dust generation as further detailed in the Pollution section. Where extreme drought conditions may restrict the available volume of water required to properly manage dust emissions generated, Miller Argent would manage its operations accordingly or be forced to shut down its operations temporarily whilst the conditions remained.

24.45 Flood protection schemes have been incorporated within the site design. Paragraphs 6.36 to 6.40 above explain the procedures that Miller Argent would undertake to minimise the potential flood risk impacts associated with its activities throughout the lifetime of the project. The procedures that would be undertaken at the project would significantly minimise the risk of flash floods occurring in the surrounding areas of the site. This offers further induced benefits through preventing or minimising the knock on effects that would be felt locally from flooding.

Conclusion

24.46 The proposed SWMP, including the proposed water treatment areas designed to attenuate and treat water volumes from a 1 in 100 year + 10% climate change allowance storm event, enable the project to respond efficiently to the potential increased risks of flooding associated with a changing climate.

24.47 The proposed weather monitoring to be undertaken, continuing from existing monitoring at FLRS, and clear actions to be undertaken in the event of extreme conditions, will enable Miller Argent to respond appropriately to more adverse weather conditions that may arise in the future as a result of potential climate change.

25. Natural and Cultural Heritage

Introduction

25.1 The definition of sustainable development, as set out in "One Wales: One Planet" (Welsh Assembly Government, 2009), includes *"enhancing the economic, social and environmental wellbeing of people and communities .... in ways which enhance the natural and cultural environment and respect its limits"*.

25.2 MPPW (National Assembly for Wales, 2001) sets out how the main aims of the Welsh Assembly Government's Sustainable Development Scheme relate to mineral planning, including "*effective protection of the environment: to protect things that are highly cherished for their intrinsic qualities, such as wildlife, landscapes and historic features*". MPPW also defines one of the key principles of delivering sustainable mineral extraction as "*to protect areas of importance to natural or built heritage from inappropriate mineral development*".

25.3 At a local level, the issues and objectives of the Caerphilly Borough Council Local Development Plan Sustainability Appraisal Framework (Caerphilly Borough Council, 2008) include :-

- "Landscape – To protect the landscape value of the most important landscapes in the county borough and maintain a clean and accessible environment to encourage a greater sense of belonging
- Culture – To protect the cultural identity of the county borough
- Historic Assets – To protect and enhance important historic assets".

25.4 Therefore, reflecting the above policies, the sustainability framework for project includes **Natural and Cultural Heritage** as one of the themes, with the sustainability objective **to protect areas of importance to Natural and Cultural Heritage**. The key considerations, relevant to the Nant Llesg scheme, are:-

- Protection and enhancement of ecological resources
- Protection and enhancement of the landscape
- Protection and enhancement of cultural heritage

To protect areas of importance to natural or cultural heritage

25.5 Measures to minimise the impact of the project upon the Natural and Built Heritage have been incorporated in the project design.

25.6 Miller Argent's EMS outlines the measures and procedures that would be delivered to minimise any potentially detrimental impacts that the project could impose upon the local natural and cultural heritage. Following its EMS, Miller Argent would ensure that sensitive working practices and operating standards are implemented throughout the life time of the project to protect the natural and cultural heritage that surrounds or is located on land associated with the project.

Protection and enhancement of ecological resources

25.7 As explained in greater detail in chapter 8 (Ecology and Nature Conservation) of the Environmental Statement, development of the Nant Llesg proposals, and the assessment of ecological effects of the proposals, has considered a number of ecological resources/receptors that could be potentially affected as follows:

- Statutory designated sites within 10 km radius of the site consisting of Special Areas of Conservation, Sites of Special Scientific Interest, Local Nature reserves and Country Parks;
- Non-statutory designated sites within 2 km radius of the site consisting of Sites of Importance for Nature Conservation;
- Habitats including grassland, shrub heath, rivers and streams, ponds and lakes, flush, woodland, and mixed plantation; and
- Species including great crested newt and other amphibians, common lizard, bats, otter, breeding birds, wintering birds, fish and invertebrates.

25.8 In order to protect and enhance these ecological resources, the site and its surrounding ecological characteristics have been taken into consideration during the design process, as explained in greater detail within the Restoration Strategy and chapter 8 (Ecology and Nature Conservation) of the Environmental Statement. The Nant Llesg scheme includes measures to minimise any potential ecological effects through control of working methods and environmental management, site restoration works and offsite ecological works and compensation.

25.9 An Environmental Management Plan would be prepared and implemented for the project that would include requirements for mitigation of potential ecological impacts associated with the project. Measures to minimise potential effects through control of working methods are as follows:

- Existing ecological features would be retained where possible and protected;
- Measures to ensure that water courses are protected from any potential pollution leakages, as compliant and regulated with/by NRW guidance. Appropriate monitoring would be carried out and measures adapted as required to ensure effectiveness;
- Dust generation and deposition as a result of the operations would be controlled, as explained in chapter 8 of this report under the air quality and dust section, to ensure good dust mitigation at all stages of the development, which would minimise any potential ecological effects due to dust deposition on vegetation;
- Potential sources of noise during the operations would be controlled as explained in chapter 8 of this report under the noise and vibration section which would minimise any potential noise effects upon ecology;
- All site personnel would be made familiar with the ecological requirements of the Environmental Management Plan at induction courses and tool-box talks;
- Where necessary, site works would be monitored by an ecologist to ensure that all ecological requirements are fulfilled;
- Works undertaken would utilise only the minimum area and time, and precautions would be taken to avoid damage to habitats or features of ecological significance; and

- Planning and supervision of operations would seek to ensure that disturbance to existing undisturbed habitats and species, whether protected, of conservation concern, or undesignated, was kept to a minimum. Future site maintenance would also have due regard to the well-being of habitats, flora and fauna.

25.10 Site restoration works are outlined through the Restoration Strategy which sets out the requirements and measures to be taken to restore the landscape, improve biodiversity interest of the site and to provide a range of habitats to replace the habitats lost due to the operations associated with the Nant Llesg scheme. The Restoration Strategy incorporates the proposals below referring to a number of zones identified for restoration, with greater detail provided in chapter 8 (Ecology and Nature Conservation) of the Environmental Statement and in the Restoration Strategy itself:

- The Lapwing area – on the CCBC land to the south of the main operational area, existing features would be retained and protected owing to the presence of nesting lapwing. Early reclamation work to this area of the site would be undertaken to reduce the problem of erosion of the Fochriw Tips that contributes to pollution of the Nant Bargod Rhymni and silting up of the lake in Parc Cwm Darran;

- The open upland – would be restored to upland grassland wet heathland habitat. Areas in the west and east of this part of the site would be left undisturbed throughout the operational phase and would later be merged back with the landscape following final restoration;

- The northern slopes – would be restored to smaller enclosed fields of pasture, divided by hedgerows and woodlands which would be established. In the north-west of this area, a stream course would be reinstated and a marshy grassland and pond habitat would be developed;

- The eastern valley side – would see the reclamation and remediation of hazards and tips remaining from old coal mining in the area at an early stage within the project. The land would be restored to fields of pasture and habitats of woodland, heathland and ponds would be developed;

- Seed mixtures would be specified according to the soil types and to the proposed after use of the various areas of the site. Trees and shrub species for planting would be agreed with the Local Planning Authority and would be protected against grazing animals by fencing until the end of the aftercare period;

- New ponds would be created at suitable locations to compensate for the ponds lost. Pond locations would be with good connections to vegetation, providing cover to improve their suitability for amphibians;

- Vegetation would be established similar to that currently present across the site. Hedgerows would be reinstated and enhanced to create new habitats and would provide greater connectivity between areas of woodland. This would improve the potential of the site for bat foraging and commuting and provide habitat for invertebrates and both wintering and nesting birds. Design features like low south facing banks would also be implemented to encourage use by reptiles;

- Improvements to water quality in the River Rhymney as a result of the Surface Water Management Plan (SWMP) (as set out in chapter 8 of this report under the section water quality) and the removal of coal strata would be beneficial to the ecology of the watercourse and may improve the conditions of waterbodies fed by this watercourse. Refer to paragraph 7.15 below for greater detail;

- Reinstatement of Rhaslas Pond, new surface watercourses and pond creation would provide new habitat for fish, amphibians and birds; and

- Aftercare land management could ensure that grazing is appropriately managed across the site to enable the reinstated vegetation to properly establish.

25.11 In addition, offsite ecological enhancement work is proposed in Bryn Caerau to provide compensation for the potential ecological effects associated with the Nant Llesg scheme. Improvement work aims to increase the ecological value of this area and includes the enhancement and creation of habitat features of woodland, grassland, waterbodies, wetland areas, hedgerows and improvement works to drystone walls and derelict buildings.

25.12 The project has evolved based on the potential impacts of the scheme in relation to ecology. The proposal now excludes an area of Cwn Carno Tips in the north western sector of the site owing to it being an area of ecological interest. Additionally, the proposal has been redesigned so that all coal from the project is hauled by public road to the CDP. Previously it was envisaged that a coal haulage route would need to be constructed across land either south of the site or to the west over land north of the Bogey Road. Such alternative routes would have brought the proposed route over or within close proximity of areas of high nature conservation values and would have been more environmentally disruptive than the current proposed route. For greater detail of this refer to the Planning Statement.

25.13 The Habitats Directive (92/43/EEC) requires any significant impacts of new developments, including the impacts of air pollution, on Natura 2000 sites to be assessed by the competent authority. This is implemented into Welsh legislation by the conservation of Habitats and Species Regulations 2010. There are no likely adverse impacts on the integrity of such sites.

25.14 The completion of the process for translocation of any great crested newts shall be carried out in accordance with European Protected Species License from NRW. The detailed methodology would be agreed with NRW in advance of the licence application.

25.15 Chapter 11 (Hydrology and Drainage) of the Environmental Statement describes the waterbodies and rivers/ streams that lie within the catchment area of the project or which may receive water from water sources draining or receiving runoff from the project. This chapter explains that the project falls within the River Basin Management Plan surface water body known as “Rhymney R - source to confluence with Nant Bargoed Rhymni”. Currently this water body has been rated as having a moderate ecological status based upon the reduced health of the river’s fish stocks. It is anticipated that the water management activities that would be undertaken in carrying out the project could help to improve the water quality of this river and in the long-term to achieve the Water Framework Directive’s Ecological Objectives for it to be a water body with good ecological status.

Protection and enhancement of the landscape

25.16 The project is located on a broad ridge between the Fochriw Road to the west and the upper slopes of the Rhymney Valley to the east. The open upland of the ridge falls gently north, to enclosed agricultural land, then falls more steeply towards the A465 Heads of the Valleys Road. To the east, the land falls rapidly to form the eastern valley side to the Rhymney Valley. To the south, the land rises to Mynydd Fochriw. The open upland continues to the west and is currently occupied by the FLRS. The proposed site is largely on open land, with enclosed fields bordering its northern and eastern edges and consists largely of urban common and access land and is crossed by several PRoW.

25.17 As explained in chapter 16 (Landscape and Visual) of the Environmental Statement, the landscape and visual impacts of the project have been assessed. Early on in the design process of the scheme, potential effects were considered and mitigation measures were incorporated in the project proposal. These include the creation of a screening bund in the north east, measures to enhance the landscape and amenity of the eastern valley side during the initial phase of the project, and through the landscape objectives of the Restoration Strategy, to minimise visual effects associated with the scheme and, where possible, to protect and enhance the landscape of the site in the long term.

25.18 Despite the layout of major elements of the operational site being largely dictated by the location and accessibility of the coal reserve , a number of short term measures are proposed at Nant Llesg to minimise potential visual intrusion and landscape effects associated with the scheme during site operation:

- Soil storage mounds would be located on the perimeters of the site, where they would also provide a degree of screening, or on the edges of the overburden mound;
- A proposed screening mound along the eastern and north-eastern edges of the extraction area would provide screening and greatly reduce the extent of visibility of the proposed excavation void in views, especially from Rhymney;
- The built and operational support facilities would be located close to an existing busy road and away from the nearby communities. The overburden and soils mounds would provide a degree of screening, so that they would be visible only from particular viewpoints where the elevation and angle of view would allow; and
- To reduce the potential visual instruction of lighting on Dark areas, lighting has been considered and chosen to ensure that the spread of light would be limited and only focussed upon working areas.
- The overburden and screen mounds would themselves screen the visibility of the operational voids from the east, south and south-west, and the existing mounds at FLRS would screen views from further west. Mitigation to reduce potential adverse effects of mound construction is possible through the method of constructing the mound as set out in the following:
- First an outer bund to each layer is built up, with backfilling continuing behind. The procedure would be reversed during removal;
- The overburden mound would remain in place for 3.5 years and the outer slopes would be grass-seeded as work proceeds as well as the finished top surface. As the grass became established, the degree of potential intrusion would reduce; and
- After formation of the overburden and screening mounds, they would remain in place for the medium term, as elements in the landscape, but would screen other operational areas of the site from view.

25.19 The Nant Llesg scheme additionally proposes to undertake early remediation work on areas of the site within the first two years of operation. This work will see the restoration and enhancement of the existing landscape that would improve the landscape character of the area through:

- drainage improvements that would be developed into new areas of wetland habitat;
- the removal of old mine hazards and colliery spoil from former mining working areas that would improve the integration of the land into the surrounding landscape;
- addressing the scouring of old colliery tip material into water course feeding Darren park lake;

- tidying up and treating areas closest to settlements;
- identifying and conserving those cultural heritage features that can be made safe;
- enhancing ecological features;
- improving public access, initially on the eastern and north-eastern slopes, with information about the natural and man-made features of the landscape;
- the restoration, creation and enhancement of existing and new landscape features of fields of pasture, woodland, ponds and hedgerows and landscape pattern and character, and the setting that the eastern and north-eastern ridge side provides to Rhymney; and
- Early treatment of the eastern, southern and western margins of the site would provide additional access and improve people's connection with the landscape.

25.20 Following completion of the site operation works, remediation and restoration of operational areas would aim to mitigate and/or offset landscape effects and achieve benefits to the landscape character in the long term. Full details are set out in the Restoration Strategy , and include the following:

- . The landscape character of the open upland would be restored;
- Landscape features of fields of pasture, woodland, ponds and hedgerows would be established on the northern and eastern slopes;
- New habitats would be created and established that would enhance the landscape character of the area; and

25.21 The recreational, historic and ecological elements of the Restoration Strategy are further detailed within the relevant sections of this report.

25.22 The project has evolved based on the potential impacts of in relation to landscape and visual amenity. As explained in Chapter 4 (Site selection and Alternatives) of the Environmental Statement, the proposal now includes substantial areas of land for surface land remediation works as evident through the extension of the south-eastern limit of the site that has been extended slightly north of Fochriw to include additional land in need of remediation. Additionally, an acoustic and visual screening bund is now proposed to the east and north of the coal excavation area.

25.23 During the site operations, Miller Argent would implement their standard EMS procedures to reduce the potential visual impacts of the project on local receptors. This would include measures such as ensuring that whenever possible, plant machinery is parked below ground level or in a screened area to reduce adverse effects on views from a site boundary, and mounds and dumps would be shaped to minimise visual impact.

25.24 Wherever possible, lighting would be located and directed in a manner which would prevent nuisance on Dark areas. An assessment of the effects of the scheme on Darkness is set out in chapter 16 (Landscape and Visual) of the Environmental Statement.

Protection and enhancement of cultural heritage

25.25 Chapter 15 (Cultural Heritage) of the Environmental Statement provides a detailed description of the cultural heritage assets within and within the vicinity of the project in terms of archaeology and historic landscape. The cultural heritage assets include heritage remains from the industrial period relating to the past mining legacy of the landscape. The proposal has considered the heritage receptors of its landscape and the effects of the current scheme upon cultural heritage has been reduced through on going scheme design as set out below:

- It is proposed that the southern half of Rhaslas Pond would be retained, due to its anticipated designation as a scheduled monument, it being a core element of the early Dowlais Free Drainage System (DFDS). During the implementation of the scheme, this feature would be protected from accidental damage and on-going decay. Access to it would additionally be restricted via fencing and a programme of archaeological and engineering monitoring would be undertaken. Should structural remains of the DFDS be encountered, a section of these would be dismantled and recreated on the restored landscape;

- Some of the originally proposed operational areas have been moved following the identification of archaeological assets;

- The mediaeval occupation platforms, quarrying and mining landscape towards the eastern boundary of the site will be protected during the operational lifetime of the scheme, and enhanced as part of the restoration strategy;

- Areas chosen as temporary common lands for grazing and public access have been selected owing to them having minimal buried or surface heritage features; and

- Areas around the perimeter of the site would allow for the retention and conservation of some archaeological sites. Where these features are encountered at the surface they will be investigated to improve understanding of them and what conservation work they may require. These features may be promoted as a tourist attraction of the landscape.

25.26 To minimise any potential impacts upon archaeology found on the site during the operational lifetime, Miller Argent's EMS procedures would be implemented. These would consist of the preparation of the Programme of Archaeological Works by Miller Argent and Local Authority approval for it would be sought. Onsite, the resident Archaeologist would coordinate and manage Archaeological Consultants and Archaeological Contractors relevant to the planned works being undertaken and would liaise with Regulators when deemed appropriate. As the site develops, the resident Archaeologist would be responsible for carrying out the Programme of Archaeological Works, as detailed in chapter 15 (Cultural Heritage) of the Environmental Statement. Within all areas where the ground surface will be moved, it is assumed that all archaeological features would be removed. The same process would be applied to the land remediation works where the removal of mining features would be undertaken following the Programme of Archaeological Works. Throughout the scheme, areas designated to preservation would be protected from accidental damage and vandalism.

25.27 As detailed in Miller Argent's EMS, in the event that archaeological remains are identified on site, any work within that area would be stopped to protect the area from disturbance. If suspected human remains are found the appropriate site management would be notified along with the Police. The resident Archaeologist would be contacted/ involved accordingly and would implement the necessary regulatory process and requirements to legally deal with remains. The resident Archaeologist is responsible for management and conserving any removed artefacts offsite in accordance with the Programme of Archaeological Works. The Archaeologist would regularly liaise with Regulators to ensure compliance.

25.28 Data would be collected for publication and reporting in accordance with the Programme of Archaeological Works. The Programme of Archaeological Works would be updated throughout the lifetime of the project to record the heritage assets that the scheme would remove.

25.29 The project design has evolved based on the potential impacts of the scheme in relation to cultural heritage. The proposal now excludes an area of Cwn Carno Tips in the north western sector of the site owing to it being an area of combined heritage and ecological interest. Additionally, since the southern embankment of Rhaslas Pond was identified as having particular archaeological value and has to date been identified to have potential to be classified as a Scheduled Monument this feature has been incorporated into the on-going scheme design and the proposals have been amended to reflect the anticipated scheduling of this monument. The proposed overburden storage area has also been redesigned and withdrawn from the pond accordingly. For greater detail of this refer to Chapter 4 (Site selection and Alternatives) of the Environmental Statement.

Conclusion

25.30 Measures to minimise the impact of the project upon natural and cultural heritage have been considered throughout the project design. The project has been developed to avoid and retain features of ecological, landscape and heritage interest where possible in order to protect these existing resources throughout the lifetime of the project.

25.31 The proposed early remediation works and long-term restoration strategy would ensure the enhancement of the local environment in terms of natural and cultural heritage and would result in the integration of these features on land incorporated within the project.

25.32 As concluded in Chapter 8 (Ecology and Nature Conservation) of the Environmental Statement, taking into account the likelihood of the wet heath recovering, the existing and continued threats from overgrazing, and the habitat improvement and management of Bryn Caerau, then the overall balance of biodiversity of the area would be maintained.

26. Pollution

Introduction

26.1 MPPW (National Assembly for Wales, 2001) sets out how the main aims of the Welsh Assembly Government's Sustainable Development Scheme relate to mineral planning, including "e*ffective protection of the environment: to protect things that are highly cherished for their intrinsic qualities, such as wildlife, landscapes and historic features and to protect human health and safety by ensuring that environmental impacts caused by mineral extraction and transportation are within acceptable limits".* MPPW also defines one of the key principles of delivering sustainable mineral extraction is "t*o limit the environmental impact of mineral extraction"*.

26.2 At a local level, the issues and objectives of the Caerphilly County Borough Council Local Development Plan Sustainability Appraisal Framework (Caerphilly Borough Council, 2008) include :-

- "Air Quality – To reduce air, noise, light and odour pollution and ensure air quality improves.
- Water Quantity, Quality and Use – To protect aquifers and improve the quality and quantity of the water in our rivers and to reduce water consumption."

26.3 The sustainability framework for the project therefore includes **Pollution** as one of the themes, with the sustainability objective, reflecting the principle in MPPW, "**to minimise the environmental impact of mineral extraction and related operations**. The key considerations, relevant to the project, are:-

- Traffic
- Noise and Vibration
- Air Quality and Dust
- Light
- Water Quality.

To reduce the environmental impact of mineral extraction and related operations

26.4 Pollution control measures are proposed as part of the project and would be implemented through Miller Argent's EMS, which is accredited to ISO 14001. The EMS system aims to ensure that throughout the lifetime of the project sensitive working practices and operating standards are implemented to minimise the likelihood of potential pollution risks occurring.

26.5 Miller Argent's EMS, currently implemented at FLRS and proposed to be implemented for the project, details procedures of how to undertake environmental site inspection and monitoring for any potential pollution sources associated with operations. Its procedures include the completion of monitoring checksheets and daily environmental logs to appropriately identify and log any visible dust emissions and noise and vibration emissions. These checksheets and environmental logs address the action that has been undertaken to remediate the pollution incident and to prevent a repeat occurrence from happening. During the project, environmental site inspection and monitoring using environmental checklists and environmental logs would be undertaken to identify and document any potential pollution sources, with consequential actions as currently undertaken at FLRS.

26.6 The EMS also includes the correct environmental procedures to be undertaken in the event of an emergency. At the site prior to the commencement of site works, environmental procedures would be prepared and implemented to outline the procedures for dealing with emergency pollution incidents; such procedures would follow but not be limited to those currently implemented at FLRS Miller Argent would ensure that all staff it employs at the project would be familiar with these Environmental Procedures and that al staff are fully prepared to implement them should the situation arise. Tool box talks would be carried out and Emergency Procedure drills undertaken to ensure staff are suitably prepared and trained. Training of staff undertaken at the project would follow but not be limited to that as is currently undertaken at the FLRS.

26.7 At FLRS, all incidents are recorded and details relating to the location, scale of emergency and corrective action applied to that incident are reported to prevent recurrence. The same procedures would be adopted for the project to appropriately record and manage any potential pollution incidences that may arise. Miller Argent's preventative procedures to control and manage pollution incidents that would be applied in carrying out the project have been improved and made more robust owing to their existing experience at FLRS. The same environmental management procedures currently applied at the FLRS would be applied in carrying out the project to ensure that the site is suitably inspected and monitored by appropriately trained staff in order to minimise the potential of pollution incidents occurring.

26.8 Miller Argent currently deploys an Air Quality, Noise and Vibration (AQNV) Strategy at the FLRS to effectively monitor and manage the potential impacts it may have upon the local community and environment through the noise, vibration and dust emissions that it may generate. The same AQNV strategy would be applied for the project to ensure the appropriate and effective management of these impacts upon the local area. Greater detail of the procedures currently undertaken at FLRS and that are proposed in carrying out the project relating to noise, vibration and air quality are described below in the relevant sections.

Traffic

26.9 Pollution that may arise from vehicles and plant machinery involved in the operations at the site could arise during refuelling or vehicle maintenance activities. The EMS would ensure that chemicals are stored in appropriately bunded areas of hard standing and vehicles are serviced appropriately to minimise the risk of potential contamination. All personnel would be appropriately trained to undertake these operations.

26.10 To ensure that contaminants or mud relating to the site is contained onsite, all vehicles would need to pass through a Vehicle Washing Facility before leaving the site. This would ensure that roads outside of the proposed scheme are kept clean.

26.11 The traffic and transport associated with the project would be responsible for producing emissions that could reduce the local air quality conditions. As set out above in the climate change section, vehicles movements would be planned. All vehicles involved in the project would adhere with emissions standards and would be maintained to be fuel efficient.

26.12 Chapter 13 (Noise) of the Environmental Statement recognises the potential for noise pollution impacts that could result from traffic generated as a result of the project. Miller Argent would ensure that any noise complaints relating to traffic would be appropriately managed. As explained below in paragraph 8.25, restricted hours of operation and site access to the site will ensure that no traffic associated with the project would occur within 'anti-social hours' or outside of agreed operational hours. HGV routeing agreements would restrict the use of traffic to certain roads containing few sensitive receptors to noise.

Noise and vibration

26.13 Chapter 13 (Noise) and chapter 14 (Blasting and Vibration) of the Environmental Statement set out the potential impacts that could arise at and around the proposed Nant Llesg scheme and has undertaken a noise assessment to assess the significance of noise impacts associated with the project. The main noise producing activities associated with the proposed surface mine are: soil stripping, removal of overburden, coaling, backfilling the void, haulage within the site and site restoration.

26.14 The AQNV strategy outlines the noise monitoring procedures that are implemented at FLRS as agreed with the local Planning Authority to manage and monitor noise emissions produced from its site operations. The same AQNV procedures undertaken at FLRS would be applied to the Nant Llesg scheme to ensure noise emissions would be controlled and the EMS would be applied to investigate and take remedial action if necessary.

26.15 Currently at FLRS noise emissions generated by site operations are monitored both long-term (fixed monitors) and short-term (temporary monitors) using sound level metres located close to nearby buildings that have been identified (for the purposes of the Environmental Statement) as being noise sensitive receptors. For the project, chapter 13 (Noise) of the Environmental Statement has identified the potential noise sensitive receptors and assessed the potential impacts of noise associated with the project upon various receptors. Noise emissions would be suitably monitored by sound monitoring equipment to ensure that noise emissions are compliant with agreed noise levels and relevant legislation, and the EMS will apply in order to ensure that, in the event of any exceedance, remedial action is taken.

26.16 At FLRS, all noise data are currently recorded hourly, compiled and made available to the Local Planning Authority on request. Should it be the case that noise levels might exceed acceptable levels, operations would be modified to reduce noise to acceptable levels. Details of all noise incidents and related shut downs would be recorded. In carrying out the project, Miller Argent would continue to adopt this level of noise monitoring and take similar remedial actions, where required, and would ensure that noise data are available on request by the Local Planning Authority. Additionally, all site personnel would ensure that all of their operations are carried out to keep noise to a minimum through adopting best practice and through following the AQNV strategy and EMS procedures.

26.17 The implementation and adherence to measures outlined in the AQNV Strategy and EMS procedures will ensure that all noise emissions generated throughout the lifetime of the scheme are minimised. The MTAN 2 noise guidelines (Welsh Assembly Government, 2009) state that noise emissions generated by the Nant Llesg scheme should not exceed 55dB or 10 dB higher than the background noise at sensitive receptors, whichever is the lowest. Noise levels would be monitored to ensure they comply with MTAN 2 recommendations and remain within acceptable levels for the surrounding communities. Remedial action would be taken if necessary.

26.18 Throughout the project, mitigation measures for potential noise impacts have been considered as a major design consideration. As described in greater detail in chapter 13 (Noise) of the Environmental Statement, the operational area of the project is located 500 metres away from the closest settlement boundary, with the coal working area being located in excess of 650 metres from the nearest residential property in Rhymney, so as to minimise the risk of disturbance from noise emissions associated with the project. Specific mounding is being provided around the northern edge of the void to provide screening for the isolated houses located near that boundary.

26.19 Miller Argent recognises that some plant machinery would generate significant noise emissions. All plant machinery will be procured to comply with appropriate noise limits. Noise limits for plant and machinery will be specified to ensure that the community noise requirements given in MTAN 2 are met, Where possible, new plant would be factory fitted with noise control packages to reduce noise emissions. At the FLRS, Miller Argent has fitted additional noise control measures to some of its plant that it operates to further reduce noise levels. For the project, detailed discussions have been held with plant suppliers to investigate noise control developments that will be available for the plant to be used at the mine and it is intended that these measures be implemented. For greater detail refer to chapter 13 (Noise) of the Environmental Statement.

Blasting

26.20 The potential vibration and noise impacts that could arise from blasting activities associated with the project operations have been assessed in chapter 14 (Blasting and Vibration) of the Environmental Statement. At the site the main potential for impact relates to blasting operations through blast induced vibration and air overpressure at local receptors of buildings (residential, farming and industrial) but also through the generation of flyrock. It is anticipated that the only source of vibration that would occur is as a result of blasting activities.

26.21 All blasting operations would adhere to best practice guidelines as outlined in MTAN 2 and would comply with the Quarries Regulations 1999 or any superseding legislation. Compliance with relevant policy and regulation would ensure that potential impacts relating to blasting operations upon the health of the local community are minimised.

26.22 Since blasting practices employed on the Nant Llesg site would be the same as those currently employed on the nearby FLRS site, predictions of the levels of vibration and air overpressure upon local buildings/receptors that could be expected in carrying out the project have been made using FLRS's historic data to test the accuracy of predictions. From these predictions it is anticipated that for project the potential impact from blast induced vibration and air overpressure on all of the potential receptors identified in the scheme would be negligible and would comply with the limit stated in the MTAN 2 guidance. Currently at FLRS, blasting activities are confined to 4 daily individual blasting events that last for only approximately 1 second at a time. It is anticipated that the same frequency of blasting activity would be undertaken in carrying out the project.

26.23 Good blasting design, practice and monitoring regimes would be implemented to minimise impacts so far that no alternative mitigation measures for blast induced vibration and air overpressure impact are required for the project. For greater detail refer to chapter 14 (Blasting and Vibration) of the Environmental Statement.

26.24 Blasting activities could lead to the generation of flyrock as described in greater detail in chapter 14 (Blasting and Vibration) of the Environmental Statement. Flyrock generation and deposition within land surrounding the project could serve as a potential source of pollution to the local environment and could result in impacts upon the local wellbeing and health of local residents. However, as previously mentioned, the implementation of good blasting design, practice and monitoring regimes at the project would significantly minimise the potential risks that flyrock could have upon the local environment and upon the local community. At the nearby FLRS, there have been no incidents of flyrock generation to date, which positively demonstrates the management procedures of blasting undertaken there. Therefore it is anticipated that the proposed procedures for implementation of the project to control blasting activities would effectively manage any potential incidents associated with flyrock generation.

26.25 To minimise the potential nuisance of noise impacts upon the surrounding communities, Miller Argent has imposed set working hours of 07.00 to 19.00 on weekdays and 07.00 to 14.00 on Saturday. Blasting activities would be confined to set periods of short durations as set out in chapter 13 (Noise) of the Environmental Statement. No blasting would occur after 16.00 between Monday and Friday, or after 13.00 on a Saturday, to allow for minimal disruption from the hours of the late afternoon onwards. These are the current operational conditions that are imposed at the FLRS as agreed with the Local Authority.

Air Quality and Dust

26.26 Chapter 12 (Air Quality and Dust) of the Environmental Statement sets out the potential air quality and dust emissions associated with the proposed activities during the construction / enabling works, operation and decommissioning phases of the project. This chapter assesses the predicted air quality and dust impacts against the air quality objectives in the Air Quality Strategy and the Air Quality Regulations (Wales) 2000 and the indicative PM2.5 EU limit value for 2020.

26.27 Chapter 12 (Air Quality and Dust) of the Environmental Statement identifies the potential sources of dust emissions associated with the project that could arise from coaling operations through its extraction, loading and unloading activities, stocking, and crushing. During operation of the project, the main concern is the potential generation of dust and its deposition on surrounding receptors and the associated annoyance it may cause.

26.28 Where possible, measures to minimise dust generation have been built into site design for the project. Miller Argent understands the potential impacts that could arise from its operations relating to dust and air emissions due to its experiences at FLRS and has designed the site accordingly to minimise these impacts as evident through the proposed phased disposition operations (shown on planning Drawings MA/NL/PA/004-008), haul route locations, locations of mounds and stockpiles as discussed further below.

26.29 Currently at the FLRS a number of procedures are implemented through the EMS and the AQNV Strategy to maintain local air quality and to suppress the emissions of airborne particles that may be generated by site activities. The AQNV strategy outlines the air quality and dust monitoring procedures that are required to be implemented at FLRS as agreed with the Mineral Planning Authority to manage and monitor these emissions. The same procedures would be adopted for the project to ensure that local air quality conditions prior to the commencement of site works are retained and that potential dust emissions generated by the proposed scheme are minimised and effectively managed.

26.30 To prevent the contamination of dust on public highways where vehicles need to cross highways such as the Bogey Road, they are required to pass through a vehicle wheel washing facility to remove dust material deposits from their vehicle body or wheels. At FLRS the vehicle washing facility is set back from the Bogey Road and, after being cleaned by this facility, vehicles travel over a metalled internal haul road before accessing the highway. This reduces the release of any site dust/material onto the highway. Should any dry mud or dust be deposited on highways following vehicle crossings, a road sweeper and/or brushes would be available for clean up operations. In carrying out the project the same dust management procedures through the use of wheel washing facilities and road cleaning equipment would be applied to minimise the potential for the deposition of mud and dust on public highways.

26.31 To further ensure that highways are not affected by potential mud or dust deposited by the haulage activities associated with the project or the FLRS, several additional procedures are implemented. These ensure coal wagons do not leave site overloaded and are properly trimmed. This ensures that dust emissions relating to coal haulage are minimised as far as possible. Where equipment leaving site may be too large to pass through the vehicle washing facility, they undergo individual cleaning to a satisfactory standard before leaving site onto the public highway. Miller Argent personnel are and would continue to be trained to adequately undertake all of these procedures and to maintain cleaning standards.

26.32 Dust generation from the construction of overburden mounds within the project would be managed appropriately, as they are being managed at FLRS. The overburden mound would be built in layers and would initially be constructed to provide a barrier between tipping operations and local settlements. Following construction of the mound, and where and when possible, the outward faces of overburden mound would be grass seeded to contain material. Where mounds are unable to receive grass seeding they would be dampened to increase its moisture content as an additional way to prevent dust generation. Miller Argent would undertake daily weather forecasting to plan its operations in connection with weather conditions.

26.33 Blasting activities have the potential to generate dust. At FLRS prior to blasting a number of procedures are undertaken and these would be adopted for the project, as summarised below:

- Blast areas would be sprayed with water to dampen and consolidate material;
- All arisings from blast hole drilling are bagged and disposed of safely;
- Effective dust collection systems are fitted to all blast hole drilling machines before such machines are operated.

26.34 To minimise dust emissions produced from coal stock piles, site design will ensure that stockpiles would be located within dedicated areas and outside of clearly defined transport routes to allow adequate room for vehicular access for stocking and de-stocking operations. Vehicles unloading coal would ensure that their wheels did not encroach onto existing stocks of coal to avoid crushing material and increasing the risk of dust emissions. Since active stockpiles pose a higher risk of dust emissions, if the potential for dust emission is evident in such stockpiles (particularly in dry periods) then they would be periodically dampened by dust suppressing equipment including water bowsers and water cannons.

26.35 Miller Argent instils a company culture where it is acceptable to request plant shut down when air quality could become unacceptable due to the generation of dust emissions from the site's works. Personnel are trained to fully understand the importance of minimising dust emissions. This training would be continued for the Nant Llesg project.

26.36 To mitigate against increased dust sources at the CDP, a new coal processing plant is to be located within a building. This plant will mainly use wet processes and is not considered to be a significant source of dust. As explained in greater detail in chapter 12 (Air Quality and Dust) of the Environmental Statement, at the new coal processing plant, all external conveyors will be covered and transfer chutes enclosed and fitted with dust suppression sprays. Since the loading of the crushing plant is anticipated to be the only potential source of dust at the CDP, coal loading equipment will be mounted above the coal loading area to suppress dust. Additionally, coal washing will occur within a total enclosed building, whilst the building housing the feed hopper will only be open on one side.

26.37 Miller Argent has considered the potential impacts that could occur upon the communities located in the immediate vicinity of the project and so have implemented a standoff between the settlement boundary and excavation works. The distance between the excavation works and any residential areas is 650m. The erection of a Visual and Acoustics Screening Bund will take place within 500m of the settlement boundary. The construction of this has potential to create dust, which is considered in chapter 12 (Air Quality and Dust) of the Environmental Statement but these works do not fall within the definition of coal working. In any event, the works will be limited in duration and there are clearly longer term mitigation benefits of these works to the local community, which is considered to be an exceptional circumstance.

26.38 At FLRS, the use of plant machinery and vehicles follows procedures to minimise dust generation. The same approach would be applied in carrying out the project, where plant vehicles and plant would be well-maintained and would undergo regular servicing according to manufacturer's specifications. Vehicles and plant equipment would only be switched on for immediate use. The exhausts and through-body exhaust systems of plant and vehicles are such as to prevent exhaust gases being emitted downwards at an angle and that minimises the height that dust can be raised off roads. All vehicles on site will adhere to the maximum speed limits, indicated by speed limit signs.

Air quality and dust monitoring

26.39 In accordance with its AQNV strategy a programme of air quality monitoring is undertaken at FLRS following agreement with the Local Planning Authority. Similar procedures relating to air quality and dust monitoring would be applied to the project and an appropriate AQNV Strategy would be agreed with the Local Planning Authority.

26.40 In carrying out the project regular monitoring would be undertaken as agreed with the Local Planning Authority to identify any potential visual dust sources on site. Additionally, like at FLRS, Miller Argent personnel would record all monitoring results and any remedial action that may be required to be implemented.

26.41 Dust monitoring within the community is also undertaken by Miller Argent in line with procedures detailed in the AQNV Strategy. Currently for FLRS potential dust flux in the community is monitored using the DustScan system. Monitoring locations have been chosen for FLRS based upon the most local sensitive receptors to dust with other locations being additionally monitored since the start of the FLRS. These same procedures would be undertaken in carrying out the project to ensure that dust deposition is appropriately monitored and accounted for.

26.42 A monitoring programme would be agreed with Caerphilly County Borough Council. This programme would be decided as part of the detailed design works and would set out the type and location of the air quality and dust monitoring. Automatic airborne particulate matter monitoring would also be undertaken at a nearby monitoring station. Data from this monitoring station would be downloaded daily alongside daily meteorological data from two weather stations. This data would be recorded and available on request by the Local Planning Authority.

26.43 Miller Argent maintains a complaints register to record any dust concerns raised by the local community, which would be employed in carrying out the project. Staff will visit the complainant to investigate and will inform them of the results of the investigation. Appropriate follow up actions are undertaken to propose any required management actions. This approach would be undertaken in carrying out the project to ensure that any complaints are appropriately captured, investigated and if required, are acted upon.

Light

26.44 As set out in chapter 16 (Landscape and Visual) of the Environmental Statement it is anticipated that the lighting of the site and operations would be visible to varying degrees and varying with the different phases of operation. Lighting would be required at the site during hours of darkness especially during the winter months. As outlined in the Planning Statement, the proposed working hours are Monday to Friday 07.00 to 19.00 and on Saturday from 07.00 - 14.00 and so within these working hours lighting would be on when required. Roads within the proposed site boundary would require lighting for HGV vehicles. Lighting will not be needed outside of working hours.

26.45 Screening effects provided by the overburden storage mound and some of the existing vegetation to be retained on site would help in some areas to reduce the impact of the lighting of the site. Lighting will however be sensitively designed so as to minimise overspill into surrounding areas and impact on surrounding receptors.

26.46 An assessment of the effects of the scheme on darkness is set out in chapter 16 (Landscape and Visual) of the Environmental Statement.

Water Quality

26.47 Chapter 10 (Hydrogeology) and Chapter 11 (Hydrology and Drainage) of the Environmental Statement describe the existing drainage and hydrological setting of the Nant Llesg scheme.

These chapters identify the potential benefits that the project could have upon local water management and specifically water quality through controlling water draining from the site. For further detail of the management of flood risk refer to the climate change chapter in this report.

26.48 As well as the need to manage the water pollution risks the project has considerable potential to improve local water quality; through beneficial water management procedures:

- A SWMP has been produced for the project to set out the water quality measures that would be implemented on site to manage surface runoff and to ensure that any water discharged into downstream water course receives appropriate treatment.
- An extensive surface water and groundwater monitoring scheme is to be agreed with NRW and appropriate actions in response to results will be identified. Baseline water quality monitoring has been underway since 2011.

26.49 The details of the proposed SWMP and water quality monitoring scheme for the project are set out in the paragraphs below.

Fuel storage and Emergency response

26.50 Miller Argent's EMS procedures include requirements for fuel, oil and chemicals to be appropriately stored on site within constructed bunds and at distances greater than 10 metres away from water sources (i.e. drains, soakaways, trials pits) to restrict the potential for any spillages or leakages to occur into the surrounding environment. Storage areas would be inspected weekly to identify early on for any signs of leakage or spillage. Miller Argent would ensure that any personnel undertaking these inspection operations would be appropriately trained to do so.

26.51 Designated re-fuelling points would be used for the majority of mobile machinery and these would be located within hard-standing areas on impermeable surfaces. For practical reasons, where the fuelling of large plant (e.g. excavators) would need to occur on site within an operational location, drip trays and absorbent mats and pellets would be used to contain or absorb any accidental spillages. All plant maintenance would also be undertaken in a designated area and would adopt similar contamination prevention measures involved in fuelling. Any run off or groundwater seepage that may be collected from these activities would be discharged into one of the four Water Treatment Areas for treatment before final release into the water environment. Discharge into the local groundwater or watercourses would be strictly in accordance with the requirements of a discharge license from the NRW.

26.52 Additionally, a project specific spillage response plan would be developed and implemented for the project. The spillage response plan would include sufficient procedures to ensure that should any spillage occur, any potential impacts of water pollution upon local sensitive receptors would be contained to allow for an efficient and effective immediate clean up response.

Storage and Treatment of Surface Water

26.53 Four Water Treatment Areas (WTAs) would be incorporated into the project, for the treatment and attenuation of surface water. Under the SWMP, runoff and dewatering would be managed; excess runoff would be diverted and stored in voids on site or the WTAs and dewatered at appropriate times. WTAs would be constructed in suitable areas. They would treat contaminated water for recycled use on the site and for final discharge into downstream watercourses.

Water for Coal Washing

26.54 A water recycling facility is to be located at the CDP to provide additional water storage capacity for use in the coal washing process and dust suppression activities throughout the CDP. The water recycling facility would store surface water run-off from the disposal point during periods of high rainfall for use in dust suppression and the coal washing process during the drier summer months. The additional capacity would supplement that currently provided by the existing lagoons at the CDP. There would be no discharge from the facility into any adjoining watercourse. Water levels would be controlled by automated pumping between the recycling facility and the existing CDP lagoon system.

Water Quality Monitoring

26.55 A robust water monitoring strategy would be implemented in carrying out the project to ensure water discharged from the site is compliant with consent conditions. Lagoons and discharge points would be inspected daily and in line with procedures set out in the EMS. Automatic permanent fixed water monitoring equipment would be installed at lagoons and discharge points and would be regularly maintained and calibrated (to measure pH, temp and turbidity). Automatic storm overflow monitoring equipment would also be installed, maintained and calibrated in accordance with the discharge consent. (Further detail on storm water management is set out in chapter 6 above, and in the SWMP. Water monitoring data would be compiled and analysed by the Environmental Liaison Officer to ensure that the highest standard of water management was being performed on site. Should any concerns arise then remediation actions to improve the situation would be taken and their effectiveness monitored. Chapter 11 (Hydrology and Drainage) of the Environmental Statement describes the water quality monitoring work that Miller Argent currently carries out in relation to the FLRS and the water quality monitoring that has already been undertaken for the project. Water monitoring would continue to be undertaken throughout the lifetime of the project and remedial actions will be carried out where there is an identified issue.

26.56 Chapter 11 (Hydrology and Drainage) of the Environmental Statement and the SWMP both outline the waterbodies that could be affected by the activities undertaken in carrying out the project. As part of the Nant Llesg scheme, it is proposed that the manmade Rhaslas Pond (a reservoir within the definition of the Reservoirs Act 1975) would be being partially infilled. The pond would receive weekly inspections to monitor its water quality, pH, turbidity. In the event that its condition may have suffered degradation, the appropriate EMS procedures would be undertaken to rectify the problem.

Potential Improvements to Water Quality

26.57 A number of streams rise on the site and drain in an easterly direction towards Rhymney and across the site to the north and south. These could be at risk from pollution or contamination effects resulting from the project. Activities undertaken to these streams would follow procedures agreed with the NRW. As detailed in chapter 11 (Hydrology and Drainage) of the Environmental Statement, following completion of coaling, as part of the site remediation works, watercourses that were stopped up would be reinstated to ensure that features are left stable and not at risk of erosion. It is anticipated that surface water levels would revert to their current levels. As previously discussed, water quality would likely improve where historic contamination and eroding spoil is remediated, but would continue to be monitored to manage and maintain the standard of local water quality. Additionally, during operations, some water that would normally contribute to the base flows of local rivers would be intercepted. Such interception would be compensated with water being returned to the river flow having undergone treatment in the WTAs located on site. This treated water would be discharged from the WTAs and returned to the River Rhymney at a higher quality than currently exists.

26.58 As well as managing potential pollution during the operation of the project, the scheme has the potential to improve water quality in the long term. The proposed water management strategy would improve local water quality by:

- The interception and treatment of minewater flows into the Bute Level, and long term removal of a significant proportion of the coal, and sulphur within the coal, that leaches into the Bute Level, and on into the River Rhymney, thus assisting with ameliorating that which the Coal Authority currently considers to be the second worst unmitigated minewater discharge in Wales; and

- Significantly reducing the accumulation of fine materials produced from the erosion of colliery spoil which is currently contributing to the siltation of the lake within Parc Cwm Darran Country Park. This is as a result of the proposed remediation works to stabilise and re-vegetate the unstable eroding spoil along this watercourse.

26.59 The costs associated with achieving these improvements in water quality without the proposed Nant Llesg scheme are considerable. Both improvements have a direct positive environmental effect, and also have a positive effect on valuable community resources, thereby delivering economic, social and environmental benefits.

Conclusion

26.60 Miller Argent's existing EMS has robust procedures for monitoring and managing pollution risks associated with FLRS. Similar procedures would be agreed and adopted for the project and as such would ensure that potential pollution impacts associated with local traffic, noise and vibration, air quality and dust, light and water quality are all minimised.

26.61 The proposed water management strategy would have two positive effects on the local water quality, by improving the quality of the minewater discharge entering the Bute Level, and downstream into the River Rhymney; and by significantly reducing the siltation of the lake at Parc Cwm Darran Country Park. These improvements would deliver economic, social and environmental benefits.

27. Resources and Waste

Introduction

27.1 MPPW (National Assembly for Wales, 2001) sets out how the main aims of the Welsh Assembly Government's Sustainable Development Scheme related to mineral planning, including "*Prudent use of natural resources: to help conserve non-renewable resources for future generations through efficient use, recycling and minimisation of waste; to protect renewable resources from serious harm or pollution; and to promote the use of appropriate alternative materials".*

27.2 MPPW also defines one of the key principles of delivering sustainable mineral extraction *"to encourage the efficient use of minerals by promoting the appropriate use of high quality materials and by minimising the production of waste by maximising the potential for re-use and recycling where environmental acceptable"*.

27.3 At a local level, the issues and objectives of the Caerphilly County Borough Council Local Development Plan Sustainability Appraisal Framework (Caerphilly Borough Council, 2008) include :-

- "Resource Consumption – To reduce the average resource consumption of each resident
- Water Quantity, Quality and Use – To protect aquifers and improve the quality and quantity of the water in our rivers and to reduce water consumption.
- Soils – To make the most efficient use of land and to reduce contamination and safeguard soil quantity, quality and permeability
- Waste – To reduce the amount of waste produced and increase the reuse of materials".

27.4 The sustainability framework for the project therefore includes **Resources and Waste** as one of the themes, with the sustainability objective reflecting the principle in MPPW **to encourage the efficient use of resources and minimise the production of waste**. The key considerations, relevant to the project , are:-

- Use of resources within mining operations
- Waste and Recycling
- Soil management and remediation

To encourage the efficient use of resources and minimise the production of waste

Use of resources within mining operations

27.5 During all phases of the proposed Nant Llesg scheme, significant amounts of fuel will be required to operate plant machinery and equipment and in the transportation of coal. As already discussed in the climate change section, Miller Argent will adopt measures to ensure the efficient utilisation of fuel through all operations, and minimise the use of energy in its site offices.

27.6 Water is another resource to be used in the proposed operations. Water is essential for use in coal washing operations at the CDP and in machinery necessary to minimise the potential impacts of dust emissions both at the CDP and within operational areas of the project. Water required for coal washing and dust suppression activities would be obtained from site or recycled onsite through appropriate storage and treatment. Mains supply water would be used in the site office. EMS procedures would ensure that the mains water usage is minimised through the efficient water recycling processes and water abstraction processes.

27.7 At the CDP, extracted coal would be washed, re-using as much of the process water as possible. Then the used process water would initially be sent to the WTA adjacent to the wash for treatment before being routed to the WTA for its final treatment.

27.8 The proposals have evolved based on the potential impacts of the scheme in relation to water use during the coaling operations. The proposals have been redesigned to incorporate a new water recycling facility on land to the west of the existing CDP. This facility would provide the CDP with water collected during periods of wet weather and store it until required. The facility is designed to reduce as far as possible the need to use mains water. For greater detail refer to chapter 4 (Site selection and Alternatives) of the Environmental Statement.

27.9 Specification of construction materials would follow best practice in specifying material with low environmental impact and maximising efficient use of resources. Materials would be sourced as locally as possible to make full use of local suppliers and to reduce the carbon emissions involved in their transport.

Minimising wastage of coal

27.10 During the coaling periods of the project, Miller Argent would ensure that it implements robust procedures to ensure that it fully maximises the quantity of coal that is obtained following initial extraction. These procedures are summarised below:

27.11 When coal seams are exposed during surface mining, they are cleaned on site to remove as much of the adhering overburden material as is possible before the seam is excavated. These ‘cleanings’ inevitably include some coal and are therefore collected into piles. When the coal seam has been excavated, it is again inevitable that some of the base of the seam remains adhered to the underlying overburden and small amounts of broken coal from mechanical excavation of the seam remain on the floor. This contaminated coal is then ‘gleaned’ (gathered over a period of time in small amounts) by a small dozer scraping the remaining coal from the underlying overburden. These ‘gleanings’ are also gathered into piles, often into the same pile as the ‘cleanings’. These “cleanings and gleanings” are then put through the onsite coal washing plant to recover the clean coal. This coal is then taken to the CDP to be blended with the other coals recovered from the site.

27.12 In order to minimise the degradation of coal quality through excessive handling, Miller Argent would ensure that direct handling of coal is minimised throughout its operations as far as possible.

27.13 At the CDP, the coal washing process is set up to fully maximise the output of coal that can be extracted. This process maximises the production of washed coal by separating the shale and stone contents from the coal. This material is then returned back to site for further washing in the on-site coal washing plant, All discards from this process would be returned to the backfill as part of the site restoration. The coal washing process is described in full detail in the Planning Statement.

Waste and Recycling

27.14 Waste produced as a result of this scheme would be minimised and recycled as much as possible in line with waste management expectations set out by Waste Framework Directive and the European Commission Directive 2006/21/EC (Mining Waste Directive). Miller Argent would ensure that all operations would be undertaken in compliance with the relevant legislations and would prepare an Extractive Minerals Management Statement (EMMS) to ensure its compliance with the Mine Waste Directive. A Material Management Plan/ Site Waste Management Plan is to be established on site to ensure the appropriate materials and waste handling procedures and associated disposal of waste where necessary.

27.15 Miller Argent would adopt the principle of waste minimisation through reducing the initial need to use materials and resources, reuse already used items where possible, recycle where they cannot reuse resources and then dispose of all other materials that do not fall into any of the previous categories.

27.16 During operations, waste would be produced from both office and site operations. Procedures will ensure that all unwanted office materials are collected and segregated in separate bins, as much as practicable, to optimise recycling and minimise waste. Site waste would be segregated as much as possible to optimise recycling and minimise waste. Currently at the FLRS a waste minimisation system is implemented that categorises and segregates waste on site in line with appropriate disposal methods. Currently, timber materials are separated and where possible are utilised for firewood. Metals are collected for sale for recycling, alongside the recycling of batteries. Waste materials in the form of oil filters, oil, or oil rags will be collected for disposal as hazardous waste. These measures would be adopted for the project.

27.17 One specific potential waste is worn out tyres from the trucks used to transport coal and overburden. Each 777F dump truck requires 6 tyres at a time. Tyres should last for 1.5 years (approx.), after this time they may be remoulded and reused on site (usually a tyre with its casting in good condition can be remoulded twice). Good road maintenance reduces the wear rate on the tyres making them last longer, reducing the number of tyre replacements required. Therefore road maintenance will be regularly carried out within the site.

27.18 The haulage of waste from the site would follow procedures addressed in Miller Argent's EMS and legislative requirements. These procedures would be similar to those currently in place at the FLRS. At FLRS, personnel responsible for waste consignment ensure that all hauliers and disposal arrangements are licensed and registered waste carriers are authorised to transport specific waste streams. Under the Waste (England and Wales) Regulations 2011, any waste transferred off site requires a waste transfer note or consignment note and these legal requirements will be complied with.

27.19 It is to be expected that land within the site is contaminated – this applies especially to the Merthyr Industrial Services Landfill site, detailed further below, but there are likely to be other areas where contamination is discovered due to the history of the area. In the event that contamination is identified, Miller Argent's EMS procedures would be implemented. Site personnel would isolate the contaminated area in question for investigation. Miller Argent would seek the advice from the necessary regulatory bodies, deploy specialist consultants as appropriate to remediate the contamination and adopt best practice to ensure the safety of site operatives.

27.20 Fly tipping activities are prevalent in the areas that currently surround the project. All staff will be obliged to inform the Environmental Liaison Officer should they witness any fly tipping on or adjacent to Miller Argent owned land.

MIS landfill

27.21 The proposed operational area of the Nant Llesg mine includes an existing landfill site known as the Merthyr Industrial Services Landfill (MIS Land). In order for the overburden areas to be constructed, Miller Argent would have to undertake procedures to appropriately remove waste and cap the MIS Land. As detailed in chapter 17 (Waste) of the Environmental Statement, material deemed suitable for reuse on site would be used to backfill the MIS Land void. This material would then be contained by an engineered capping layer prior to construction of the overburden mound. The engineered capping layer shall be designed in agreement with NRW and shall ensure that any generation of leachate is minimised. Miller Argent would undertake regular monitoring of the landfill to ensure that any potential impacts of leaching upon the downstream water quality is managed and prevented.

27.22 In order to ensure appropriate waste treatment and to minimise the volume of waste that would be sent for disposal, Miller Argent would implement its integrated management procedures to correctly categorise waste and reduce the capacity of waste sent for disposal. Waste Acceptance Criteria (WAC) testing would be undertaken to identify the presence of any potentially hazardous materials within the unlicensed landfill and to ensure they it would be sent to the appropriate offsite treatment facilities in compliance with correct disposal procedures. Miller Argent would minimise the potential health impacts that could be incurred upon its personnel working at the MIS Land through the adoption of standard best practice working methodologies and appropriate PPE. All works associated with the MIS landfill would be carried out with the full approval of NRW. Further details on the disposal of waste from the MIS Land can be found in chapter 17 (Waste) of the Environmental Statement.

Soil Management and Remediation

27.23 As referenced in chapter 9 (Agricultural Land Use and Soils) of the Environmental Statement and in the Planning Statement, on completion of coaling operations, final restoration and aftercare would occur through the redistribution of topsoils, subsoils and soil forming materials.

27.24 Where soils are identified to be of ecological/environmental interest, these would be appropriately stripped and stored separately in accordance with recognised best practice. As previously explained in chapter 6 of this report, soil handling methodologies would be implemented for these soils identified on the site. The implementation of these methodologies would ensure that all soil resources are appropriately stripped, stored and restored in order to maintain their physical characteristics, as far as possible. Greater detail of soil handling methodologies is set out in Appendices MA/NL/ES/A09/002-003 of the Environmental Statement.

Conclusion

27.25 The project would use construction materials, fuel, energy, and water during the lifetime of the scheme, and produce waste. It would also have an impact on the local soil resources. Measures are proposed to minimise the use of the resources, including identifying and implementing methods of reuse where feasible, and minimising the production of waste, and to protect the soil resource through an appropriate soil handing strategy.

28. Conclusions and Summary

28.1 The preceding chapters have set out in detail how Miller Argent's existing policies and procedures and the evolved design of the proposed Nant Llesg scheme responds to each of the themes, sustainability objectives and key considerations of the sustainability framework, and thus how the project meets the objectives of sustainable development throughout its lifetime. The table below summarises the main ways in which the proposed scheme meets each of the objectives.

Theme	Policy Objective	Key Considerations for Nant Llesg	How the Proposed Scheme Meets the Objective
Economy and Skills	To promote a resilient and stable economy	• Employment opportunities • Educational development of employees • Indirect stimulation of the local economy	• Employment of between 144 and 239 workers • Outline training strategy • Use of local suppliers and increased level of local income and job security
Social Well Being	To provide mineral resources to meet society's needs	• Supply for energy generation • Supply for manufacturing	• UK/Wales based supply of welsh dry steam coal for electricity and steel manufacture industries.
	To minimise the impact on health and wellbeing	• Health impact • Access to recreational opportunities	• Active site management procedures to minimise potential impact on health and well-being of local community • Temporary provision of alternative land for public access and grazing, incorporating areas of common land and public rights of way. • Early remediation works to provide additional areas for public access and recreation, together with

Theme	Policy Objective	Key Considerations for Nant Llesg	How the Proposed Scheme Meets the Objective
			the provision of considerable areas of temporary common grazing and public access land for the duration of the scheme. • Long term and enhanced restoration strategy to provide additional land for recreation, new public rights of way and improved linkages to existing recreational facilities
Climate Change	To reduce carbon emissions from the extraction and transportation of coal	• Carbon emissions arising from extraction methods and associated operations • Transport related carbon emissions	• Maximising fuel efficiency through mine design and operation • Offset methane emissions through onsite and offsite tree planting • Coal transported by rail • Site Travel Plan to minimise carbon emissions from employee and visitor transport
	To minimise vulnerability and adapt to a changing climate	• Flood risk • Adaptation to a changing climate	• Attenuation of surface water for up to a 1 in 100 years storm event with 10% allowance for climate change • Weather monitoring and site procedures minimise effects of increased adverse weather conditions
Natural and Cultural Heritage	To protect areas of importance to natural or	• Protection and enhancement of ecological resources	• Retention and avoidance of existing natural and cultural heritage features

Theme	Policy Objective	Key Considerations for Nant Llesg	How the Proposed Scheme Meets the Objective
	cultural heritage	• Protection and enhancement of the landscape • Protection and enhancement of cultural heritage	• Early remediation work in first two years from the start of coaling • Long-term Restoration strategy and enhancement work
Pollution	To minimise the environmental impact of mineral extraction and related operations	• Traffic • Noise and Vibration • Air Quality and Dust • Light • Water Quality	• Stringent environmental management procedures to minimise potential pollution risks • Economic, social and environmental benefits of improving local water quality as a result of the proposed scheme
Resources and Waste	To encourage the efficient use of resources and minimise the production of waste	• Use of resources within mining operations • Waste and Recycling • Soil management and remediation	• Specification of construction material with low environmental impact • Recycling of water on site • Minimisation and management of waste from operations • Soil handling strategy to protect soil resource

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Welsh Assembly Government (June 2009) Technical Advice Note 12: Design

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Annex 1

Review of Policies and Guidance

National Policies and Guidance

One Wales: One Planet (May 2009)

"One Wales: One Planet - The Sustainable Development Scheme of the Welsh Assembly Government" sets out the Assembly Government's vision of a sustainable Wales, and confirms that sustainable development is the central organising principle of the Welsh Assembly Government. It includes the following statements:-

Sustainable Development in Wales

In Wales, sustainable development means enhancing the economic, social and environmental wellbeing of people and communities, achieving a better quality of life for our own and future generations:

- In ways which promote social justice and equality of opportunity; and
- In ways which enhance the natural and cultural environment and respect its limits – using only our fair share of the earth's resources and sustaining our cultural legacy.

Sustainable development is the process by which we reach the goal of sustainability.

Our Vision of a Sustainable Wales is one where Wales:

- Lives within it environmental limits, using only its fair share of the earth's resources so that our ecological footprint is reduced to the global average availability of resources, and we are resilient to the impacts of climate change;
- Has healthy, biologically diverse and productive ecosystems that are managed sustainably;
- Has a resilient and stable economy that is able to develop whilst stabilising, then reducing, its use of natural resources and reducing its contribution to climate change;
- Has communities which are safe, sustainable and attractive places for people to live and work, where people have access to services, and enjoy good health;
- Is a fair, just and bilingual nation, in which citizens of all ages and backgrounds are empowered to determine their own lives, shapes their communities and achieve their full potential.

Planning Policy Wales Edition 5 (November 2012)

This edition of Planning Policy Wales (PPW) replaces PPW Edition 2 issued in June 2010, which consolidated Ministerial Interim Planning Policy Statements (MIPPS) issued between 2002 and 2009.

PPW sets out the land use planning policies of the Welsh Assembly Government (WAG) and confirms that sustainable development will be the central organising principle of the Welsh Government and places sustainability at the heart of their decision making process (paragraph 4.1.2 and 4.1.3). Paragraph 4.1.2 confirms that the Welsh Government is committed to bringing forward legislation to strengthen their duty and to commit government at local and national level, to sustainable development. The planning system has a fundamental role in delivering sustainable development. In particular, the planning system is required to provide for homes, infrastructure, investment and jobs in a way which is consistent and in favour with sustainability principles and to ensure that social, economic and environmental issues are balanced and integrated (paragraph 4.2.2).

The goal of sustainable development within the PPW is to ‘’enable all people throughout the world to satisfy their basic need and enjoy a better quality of life without compromising the quality of life of future generations’’(paragraph 4.1.1). Sustainable development in Wales is defined as “a means for enhancing the economic, social and environmental well-being of people and communities, achieving a better quality of life for our own generations in ways which:

- Promote social justice and equality of opportunity: and
- Enhance the natural and cultural environment and respect its limits – using only our fair share of the earth’s resources and sustaining our cultural legacy”.

“Sustainable development is the process by which we reach the goal of sustainability.’’ (Paragraph 4.1.4/ Figure 4.1)

The following main outcomes are those that PPW want to deliver and reflect their vision of sustainable development:

- Sustainable resource use;
- Sustaining the environment;
- A sustainable economy;
- A sustainable society; and
- The well-being of Wales.

In addition to these, the principles that underpin PPW’s policy for sustainable development are set out below:

- Promoting resource-efficient and climate change resilient settlement patterns that minimise land-take and urban sprawl, especially through the re-use of suitable previously developed land and buildings, wherever possible avoiding development on greenfield sites;
- Locate developments so as to minimise the demand for travel, especially by private car;
- Support the need to tackle the causes of climate change by moving towards a low carbon economy. This includes facilitating development that reduces emissions of greenhouse gases in a sustainable manner, provides for renewable and low carbon energy sources at all scales and facilitates low and zero carbon developments;
- Minimise the risks posed by, or to, development on or adjacent to unstable or contaminated land and land liable to flooding. This includes managing and seeking to mitigate the consequences of climate change by building resilience into the natural and built environment;
- Play an appropriate role to facilitate sustainable building standards (including zero carbon) that seek to minimise the sustainability and environmental impacts of buildings;
- Play an appropriate role in securing the provision of infrastructure to form the physical basis for sustainable communities (including water supplies, sewerage and associated waste water treatment facilities, waste management facilities, energy supplies and distribution networks and telecommunications), while ensuring proper assessment of their sustainability impacts;

- Contribute to the protection and improvement of the environment, so as to improve the quality of life, and protect local and global ecosystems. In particular, planning should seek to ensure that development does not produce irreversible harmful effects on the natural environment and support measures that allow the natural heritage to adapt to the effects of climate change. The conservation and enhancement of statutorily designated areas and of the countryside and undeveloped coast; the conservation of biodiversity, habitats, and landscapes; the conservation of the best and most versatile agricultural land; and enhancement of the urban environment all need to be promoted;

- Help to ensure the conservation of the historic environment and cultural heritage, acknowledging and fostering local diversity;

- Maximise the use of renewable resources, including sustainable materials (recycled and renewable materials and those with a lower embodied energy). Where it is judged necessary to use non-renewable resources they should be used as efficiently as possible. The use of renewable resources and of sustainably produced materials from local sources should be encouraged and recycling and re-use levels arising from demolition and construction maximised and waste minimised;

- Encourage opportunities to reduce waste and all forms of pollution and promote good environmental management and best environmental practice. Waste arising from demolition and construction should be minimised, and opportunities to recycle and re-use this waste promoted;

- Ensure that all local communities - both urban and rural - have sufficient good quality housing for their needs, including affordable housing for local needs and for special needs where appropriate, in safe neighbourhoods;

- Promote access to employment, shopping, education, health, community, leisure and sports facilities and open and green space, maximising opportunities for community development and social welfare;

- Foster improvements to transport facilities and services which maintain or improve accessibility to services and facilities, secure employment, economic and environmental objectives, and improve safety and amenity. In general, developments likely to support the achievement of an integrated transport system should be encouraged;

- Foster social inclusion by ensuring that full advantage is taken of the opportunities to secure a more accessible environment for everyone that the development of land and buildings provides. This includes helping to ensure that development is accessible by means other than the private car;

- Promote quality, lasting, environmentally-sound and flexible employment opportunities;

- Support initiative and innovation and avoid placing unnecessary burdens on enterprises (especially small and medium sized firms) so as to enhance the economic success of both urban and rural areas, helping businesses to maximise their competitiveness;

- Respect and encourage diversity in the local economy;

- Promote a low carbon economy and social enterprises; and

- Contribute to the protection and, where possible, the improvement of people's health and well-being as a core component of sustainable development and responding to climate change. Consideration of the possible impacts of developments - positive and/or negative - on people's health at an early stage will help to clarify the relevance of health and the extent to which it needs to be taken into account (paragraph 4.4.3).

Technical Advice Notes

Technical Advice Notes have been written to provide supplementary guidance to Planning Policy Wales. '***Technical Advice Note 12: Design'*** provides *"more detailed advice on how* [the commitments made to achieve good design in Planning Policy Wales] *may be facilitated within the planning system"* (Welsh Assembly, 2002). Within this document, one of the key objectives of good design is stated as *"**achieving sustainable design solutions** which represent best value by making prudent use of natural resources, incorporate sustainable energy use, waste control measures and provide the means for effective long-term maintenance, efficient operation and management".*

TAN 12 identifies 5 objectives of good design as listed below:

- Environmental Sustainability
    - Efficient use of natural resources
    - Enhancing biodiversity
    - Designing for future change/adaptability.
- Access
    - Ensures ease of access for all by adopting inclusive design principles
- Movement
    - Promotes sustainable means of travel through integration of transport networks and reducing reliance on the car.
- Character
    - Sustaining/enhancing local character
    - Promotes legible development
    - Promotes successful relationship between public and private space
    - Promotes innovative design
- Community Safety
    - Ensuring attractive, safe public space
    - Security through natural surveillance through a sense of community ownership and responsibility.

Minerals Planning Policy Wales (MPPW) (National Assembly for Wales, 2001)Minerals Planning Policy Wales sets out the Welsh Government's land use planning policy in relation to mineral extraction and related development in Wales. MPPW sets out the key principles of sustainable mineral extraction, which must be taken into account by authorities in formulating their development plan policies and in development control.

The key principles of sustainable mineral extraction, stated in full, are

(1) To provide positively for the working of mineral resources to meet society's needs through, as far as practicable, the identification of areas for future working where this can be undertaken in a

sustainable way; and to safeguard deposits of minerals from permanent development that would prevent or hinder their subsequent extraction for future generations.

(2) To protect areas of importance to the natural and built heritage from inappropriate mineral development.

(3) To reduce the impact of mineral extraction and related operations during the period of working by, for example, ensuring sensitive working practices and improved operating standards.

(4) To achieve a high standard of restoration and aftercare, and provide for beneficial after-uses when mineral working has ceased.

(5) To encourage the efficient use of minerals by promoting the appropriate use of high quality materials and by minimising the production of waste by maximising the potential for re-use and recycling where environmental acceptable.

Minerals Technical Advice Note 2: Coal (MTAN 2) (Welsh Assembly Government, 2009)

MTAN 2 sets out detailed guidance in relation to coal extraction in Wales. The aim of the advice note is *"to set out how impacts should be assessed and what mitigation measures should be adopted, and seeks to identify the environmental and social costs of coal operations so that they are properly met by the operator".* Detailed guidance is provided against each of the key principles set out in MPPW.

With specific regard to carbon, MTAN 2 recognises that *"the future use of coal in Wales will be governed by the requirements to reduce carbon emissions".* It identifies that *"carbon dioxide is produced in the combustion of coal"* and during its transport, and *"methane is released by its excavation".* MTAN 2 states that "applications for coal working should demonstrate that actions to reduce carbon emissions from the extraction and transport of coal are included in the proposals".

Local Planning Policy

Caerphilly County Borough Development Plan

The Caerphilly County Borough Local Development Plan (November 2010) sets out the planning policies for Caerphilly County Borough. The vision statement for the development strategy reflects the importance of sustainability, incorporating the key concept *"to balance environmental, economic and community interests and needs, to create a sustainable future for all of the County Borough's residents"*. The aims of the LDP and the detailed policies reflect this.

Alongside the deposit draft of the Caerphilly Borough Council Local Development Plan, the Strategic Environmental Assessment/Sustainability Appraisal Report was published (October 2008). This defined the key sustainability issues, problems and opportunities of the local area, and also the Sustainability Framework which has been used to carry out the appraisal. The issues and objectives defined in this Sustainability Framework are listed below.

Population and Human Health

- Resource Consumption - To reduce the average resource consumption of each resident
- Housing - To improve the condition of housing and ensure the range of housing types are accessible to meet the needs of residents
- Crime - To reduce the incidence of crime
- Education - To improve educational achievement
- Equalities - To allow equal opportunities for all

- Employment - To increase the percentage of people of working age in employment
- Wealth Level of Economic Activity - To increase the wealth of individuals in CCBC
- Business - To ensure a sufficient range of employment sites are available
- Health - To improve the health of individuals
- Population - To retain the population of county borough to at least current levels and attain a more balanced demographic structure
- Well-Being - To all residents easy access to leisure facilities

Air Pollution

- Air Quality - To reduce air, noise, light and odour pollution and ensure air quality improves

Cultural Heritage and Landscape

- Landscape - To protect the landscape value of the most important landscapes in the county borough and maintain a clean and accessible environment to encourage a greater sense of belonging
- Culture - To protect the cultural identity of the county borough
- *Historic* Assets - To protect and enhance important historic assets

Water

- Water Quantity, Quality and Use - To protect aquifers and improve the quality and quantity of the water in our rivers and to reduce water consumption
- *Flood - To minimise* the number of developments affected by flooding

Geology and Geomorphology

- Soils - To make the most efficient use of land and to reduce contamination and safeguard soil quantity, quality and permeability
- Geology - To protect geologically important sites and improve their accessibility
- Waste - To reduce the amount of waste produced and increase the reuse of materials
- *Biodiversity* - To enhance the biodiversity of the county borough

Climatic Factors

- Climate Change - To reduce the total amount of CO2 produced within the county borough each year
- Transport - To reduce congestion by minimising the need to travel, encourage alternatives to the car and make best use of the existing transport infrastructure
- *Energy* - To increase the proportion of energy gained from renewable sources

Material Assets

- Material Assets - To improve the performance of material assets within the county borough

Contact Us

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These details will put you in touch with PPS Group which coordinates our Nant Llesg public consultation activity.