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Issue 1

Site Restoration Programme

Trawsfynydd Deposit for Recovery Permit Application

Waste Recovery Plan (updated) v3

March 2025

Trawsfynydd Deposit for Recovery Permit Application – Waste Recovery Plan v3

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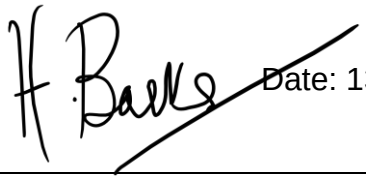
Signature:  Date: 13 March 2025

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1	4 December 2023	H. Barker and R.Jones	Sent for assessment by NRW
2	1 May 2024	H. Barker S. Fuller R Jones	Updated with additional info requested by NRW
3	12 March 2025	H.Barker	Updated with revised drawings and volumes following Arup design changes

Distribution

Nuclear Restoration Services

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1. Background

1.1 Introduction

Nuclear Restoration Services (NRS) has developed a Waste Recovery Plan (WRP) for the use of suitable waste materials derived from the decommissioning works at Trawsfynydd Power Station, in the Snowdonia National Park, Gwynedd, North Wales.

This document is the WRP which is being submitted for assessment and will ultimately support a permit application for storage, treatment and deposit for recovery.

The WRP should be read in conjunction with other supporting application information, which is provided in the appendices. It has been drafted in accordance with the specific requirements described in the Waste permitting guidance – *prepare a waste recovery plan* published online on 28 December 2022 by Natural Resources Wales (NRW) and in pre-application advice provided by NRW in May 2022.

The WRP seeks agreement from NRW that the proposed activity satisfies all the principles of recovery, in accordance with their published guidance. Further technical details on the proposals including risk assessment, stability, engineering, and monitoring will be provided within the subsequent permit application.

1.2 Nuclear Restoration Services

Since 1 April 2024, Nuclear Restoration Services (NRS) is the new name for Magnox Limited, which is a wholly owned subsidiary of the Nuclear Decommissioning Authority. We recognise that some of the older drawings within this WRP may still contain reference to Magnox Limited.

1.3 Structure of the Waste Recovery Plan (WRP)

The structure of the Waste Recovery Plan (WRP) is detailed below.

Table 1 Structure of the WRP

Section	Description
1 - Background	An overview of nuclear decommissioning and the site location.
2 – Waste Recovery Test	A summary of the key criteria within the test relating to:- • financial/ commercial benefit or appropriate funding • obligations to do the work and achieve results • Suitability of waste for the specific purpose • Evidence of scheme design, construction and that its fit for purpose • Quantity of waste to be used • Evidence of how sustainable the work is
3 – Quantity & Nature of Waste	• Description of waste types taken from the List of Waste Codes • Quantity of materials being used.

Section	Description
4 – General Obligations	• Obligations to do the work and to achieve results • Sustainability of the work.
5 – Design of Scheme, Construction and Meeting Quality Standards	• Evidence of the scheme design and construction. • Suitability of the wastes • Details of the quality standards will be achieved including material testing, recording of 'as-built' information and Construction Quality Assurance (CQA) requirements.
6 – Conclusions	• Summary of reasons supporting this scheme as a recovery activity
Appendices	• Contour plans before and after proposed scheme • Additional information to support the WRP.

1.4 Nuclear Decommissioning

The work required at Trawsfynydd Nuclear Power Station is the overall decommissioning, i.e. the removal of buildings and built structures associated with its former use as a nuclear power generation plant, and the restoration of the site to enable subsequent re-development or re-use, as required under the Energy Act 2004 (see obligations detailed in Section 4.4).

Trawsfynydd is a nuclear power station which ceased generating electricity in in 1991 and was defueled between 1993 – 1995. All the fuel was removed from the reactors and transported to Sellafield for reprocessing. Decommissioning activities began in 1995 and the site is currently preparing for the next stage. The Reactor Building Height Reduction (RBHR) Project will begin in 2025.

The current reactor buildings are 55m high and present an imposing feature within the surrounding landscape of Snowdonia National Park. A planning Public Inquiry in 2002 agreed with the proposal to carry out several decommissioning activities, including the height reduction of the two reactor buildings from 55m to approximately 35m.

NRS operates Trawsfynydd under an existing Radioactive Substances Regulation (RSR) Environmental permit. As the operator, NRS has general obligations under the permit requirements, to ensure that the site is decommissioned and cleaned-up in a manner which protects public safety and the environment.

In July 2018, Guidance on Requirements for Release from Radioactive Substances Regulation (GRR) was published jointly by EA, NRW and the Scottish Environment Protection Agency (SEPA)[1], which covers the management of radioactive waste from decommissioning of nuclear sites. It requires decommissioning to be carried out in a way which achieves an optimised end state. This involves adopting a holistic approach which includes reviewing available options for the potential reuse and recovery of site generated wastes and materials which arise during decommissioning, and to adopt those options which are the most sustainable.

[1] Natural Resources Wales / Requirements for release from radioactive substances regulation

Decommissioning takes place over many decades and includes the phased demolition of site buildings and structures which in turn will result in several void spaces and open space being created as plant and equipment is removed. Reaching an optimised end state will include the backfilling of these voids and this could be achieved by using radioactive waste, non-radioactive waste, virgin materials, or a combination of these.

In planning the next stage of the decommissioning works, NRS has been reviewing the options available for achieving the desired end state. Preferential consideration has now been given to options which can both:-

- reduce the previous need to import virgin materials to complete the laydown area
- Minimise the volume of waste materials which would have needed to be removed from the site.

1.5 Site Location

The site is a twin nuclear reactor power station, operated by NRS and currently undergoing decommissioning. It is located on the northern shore of Llyn Trawsfynydd, an artificial lake in the Snowdonia National Park, Gwynedd, North Wales. The area around Trawsfynydd is mountainous and the site has been built on the lower slopes of Craig Gyfynys. The land was reprofiled to create the site and the elevation falls from the lake in the south towards the northeast.

The power station lies approx. 400m west of the A470 trunk road which forms the main route between Dolgellau to the south and Ffestiniog to the north. The small village of Gellilydan is located 1.5 km northeast of the site and Trawsfynydd village is located about 3 km to the southeast across the lake.

A number of nationally designated sites lie within 4 km of the site including:

- Afon Eden - Cors Goch Trawsfynydd, which is a Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC);
- Migneint-Arenig-Dduallt which is a SSSI, and SAC and a special protection area (SPA),
- Snowdonia National Park and its network of nationally and internationally important wildlife sites;
- Coed Y Rhygen SSSI which is part of the wider network of sites comprising Meirionnydd Oakwoods Special Area of Conservation (SAC). The site is also a designated National Nature Reserve (NNR). It is an important area for birds and is located on the western shore of Llyn Trawsfynydd;
- Coedydd Dyffryn Ffestiniog Deheuol SSSI which extends along the banks of the Afon Prysor down gradient of Llyn Trawsfynydd; and
- Coed Camlyn NNR which is an area designated for its birdlife located on the confluence between the Afon Dwyryd and Afon Prysor.

The site location, permit boundary and the Environmental Setting of the site are shown in Appendix A1 and A2.

Part of the laydown area for the proposed extension and improvement is illustrated in Appendix A3. There is an area bounded in red which includes yellow and green shading. The yellow is currently used as a temporary store for scaffolding and the green area is used to store ISO containers. Both yellow and green areas require

resurfacing and will become part of the overall laydown area. The total proposed laydown area is shown in Appendix A5.

1.6 Reactor Buildings Height Reduction (RBHR) and Reactor Dismantling (RD) Programmes

NRS has previously submitted a WRP for assessment. This was for a specific obligation to create three screening mounds detailed in an associated Planning Permission, which was issued following a Planning Inquiry. On 31 July 2003 planning permission was granted for the construction of a new Intermediate Level Radioactive Waste (ILW) Store, the Reactor Buildings Height Reduction (RBHR) of both reactor buildings, over cladding these buildings and general site landscaping.

One of the main features of the proposed landscaping was formation of the three screening mounds, one to the North and two to the East of the reactor buildings. The intention was to use the crushed & processed concrete and brick from the RBHR work to form the landscaping mounds, with imported growing medium e.g. topsoil covering the mounds, to support vegetation / new trees.

RBHR is scheduled to proceed in 2025 as originally planned and approved. However the intention now is to accelerate decommissioning by carrying out Reactor Dismantling (RD), rather than entering an extended period known as Care and Maintenance. Following on from RBHR, the intention is to remove the buildings and internal plant/reactor core, instead of cladding the reactor buildings and leaving them in situ. This strategic change of approach means that screening mounds may no longer be required.

The volume of wastes generated during RBHR will be the same but given the change in strategy there will not be an immediate need to form the landscape mounds as originally proposed. The area designated for the landscaping mounds will now be required as a laydown area to facilitate the operational needs of the subsequent RD programme of works. The final landscaping requirements will be confirmed and will likely form the basis of future Planning Applications associated with the RD Programme of works.

In addition, the revised strategy means continuous phases of work to decommission the site to achieve its end state.

The RD programme is a massive undertaking, requiring construction of numerous temporary waste processing buildings, another ILW Store, large office and welfare requirements etc. In addition to dismantling both reactors and eventually demolishing both reactor buildings. The current site footprint is relatively small, and therefore, they will require as much space as possible on site, to facilitate the works. The programme of works will be ongoing for decades.

The new proposal is to place the crushed and processed concrete arising to the northern end of the site, to widen and improve the existing laydown area so that it can be used for the RD programme. This is the focus of this WRP.

If the crushed concrete arising from RBHR was not placed as proposed, then prior to the commencement of the RD programme, virgin aggregate or potentially other suitably processed wastes would need to be imported to extend and improve the laydown area. The laydown area is a key requirement for the RD programme as it

provides a suitable working platform for dismantling the reactors and to store plant and equipment during the programme.

1.7 Consultation With Natural Resources Wales (NRW)

Following submission of the original WRP, several meetings were held with representatives of Natural Resources Wales (NRW), and NRS are also in receipt of two letters:

- 5 May 2022 Additional pre-application advice
- 5 May 2022 Assessment of WRP

The assessment of the original WRP submitted on 7 December 2021 confirms that '*the creation of screening mounds is a recovery operation 'in principle' and that this advice is based on the information provided in the draft WRP and the additional information requested and supplied on 01/04/2022 and 06/04/2022'*.
NRW provided additional information during their assessment regarding the preparation and management of interim material stockpiles for storing waste materials for reuse throughout the demolition and restoration programme for the Trawsfynydd site.

NRW did not agree that this activity is a deposit for recovery operation as set out in the guidance. '*Temporary storage of waste materials is not a permanent deposit of waste and therefore cannot be permitted as such. Whilst there may be storage of waste associated with a deposit for recovery scheme, it is at the point of use that the waste is recovered'.*

As a result, this latest WRP does not refer to stockpiling or storage of wastes on site. However, storage and stockpiling of wastes is an integral part of demolition and decommissioning. Waste storage will therefore form one of the activities set out in the subsequent permit application, along with treatment and deposit for recovery.

The pre-application advice included the following suggestion to manage future deposits for recovery. This is in recognition of the uniqueness, complexity and extended timeframes required for nuclear decommissioning and in achieving an optimised end state.

'If issued, any agreed Waste Recovery Plan for the screening mounds will form part of the permit, to prevent confusion ***we would advise that the agreed Waste Recovery Plan is not amended to include future deposit for recovery schemes at the site. Any future deposit for recovery will require separate assessment of the Waste Recovery Plan against the guidance, a separate new Waste Recovery Plan could then be submitted*** *for any future scheme and a variation to any permit issued be applied for to incorporate the new Waste Recovery Plan'.*

In response to the advice, this latest WRP focuses solely on the extension and improvement of the laydown area. NRS acknowledges that any future deposits for recovery (in other areas of the site) would each require their own individual WRP, and these would be assessed separately.

In summary, NRS now submits this WRP for the extension and improvement of the laydown area ahead of a permit application for storage, treatment and deposit for recovery activities using wastes arising on site.

2. Waste Recovery Test

2.1 Demonstrating Waste Recovery

Depositing waste is only a recovery activity if sufficient evidence is provided to demonstrate that we could and would carry out the works using a non-waste material. This may be referred to as 'substitution'. In this WRP, NRS is providing evidence of the following to demonstrate that this is a recovery activity:

- there is worthwhile benefit in completing the scheme
- we have funding to pay for the scheme and ongoing costs
- we are obliged to achieve certain results by completing the scheme
- we intend to use waste that is suitable for the specific purpose
- the scheme will be designed and constructed to ensure that it's fit for purpose

2.2 Financial, Commercial Or Other Worthwhile Benefit

The ultimate purpose of the scheme is to facilitate the extension and improvement of the laydown area required for RD Programme.

The proposal is to improve by levelling-off and extending an existing laydown area made from hardstanding in the northern portion of the site. The improvement and extension of this laydown area will result in existing ground levels being slightly raised and extended to provide a more consolidated and larger level working area, which is an essential requirement for the RD programme.

The proposed scheme includes:

- the repair and levelling of an existing laydown area that has settled over time
- the maintenance of a vehicle bund to provide edge protection along the perimeter of the laydown area
- the extension of the existing laydown area towards the south-west of the current area, and
- compaction and consolidation of the whole area to enable it to support heavier plant and equipment during the RD programme.

The scheme is not only worthwhile but essential to facilitate ongoing decommissioning works and the delivery or the RD programme. There is an essential requirement to have a suitably sized laydown area (which is capable of being fully utilised by large plant and equipment) so that NRS can progress reactor dismantling activities. This in turn is necessary to enable the site to eventually be transformed into its agreed end state, which is likely to include the redevelopment of the site with a Small Modular Reactor. See Section 4.1 for more details.

Trawsfynydd is a relatively small site, with a limited area of usable flat ground for laydown areas to take plant and equipment required during the Reactor Dismantling (RD) programme. In addition, there are several constraints with existing available areas e.g. asset congestion, below ground voids, uncompacted fill and ground conditions, which mean that the current available area is insufficient to carry out RD in the most efficient and effective way.

The plan for RD is currently being developed and involves a complex 20-year programme scheduled from 2035-55[2]. It involves deplanting large pieces of equipment e.g. the boilers, the reactor pile cap and parts of the reactor structure.

The information and level of detail that we are presenting is currently accurate, however it is conceptual, given the complexity and forward-looking nature of the RD programme. The RD drawings, plans and information presented within the WRP will be subject to changes and refinement prior to commencement of the programme.

A larger laydown area (than is currently available) will enable RD to progress more efficiently, safely and with less disruption to the local amenities within the National Park and the communities living nearby.

The proposed development area is 12,260 m^2, with the level plateau area of 7,735m^2. The sizing of the plateau considers the indicative concept design and measurements required for boiler and ducting removal, which has been provided in a boiler removal and transportation feasibility assessment undertaken in conjunction with a specialist heavy lifting and transportation contractor.

The costs of construction and ongoing maintenance of the extended and improved laydown area is estimated as £952,748 (cost breakdown in Appendix A.8).

The alternative options which we considered include: -

Supplementing the existing laydown area with additional storage either created elsewhere on site or rented off site to accommodate works e.g. boiler removal and to safely remove the pile cap from both reactors in one go.

Option 1

An additional laydown area (to the existing smaller area to the north west of the site) could be constructed from the floor slab of the existing Pen y Bryn Office Block, if the offices were demolished. The dimensions of the floor slab would be circa. 1,000 m^2. The costs for demolishing the office block have been estimated at £277k (inclusive of waste disposal or recovery). Note that this is a high-level estimate which is based on costs of demolishing similar structure, therefore detailed breakdown of costs and volumes is not available.

The office block currently houses up to 200 staff and so alternative office accommodation would need to be rented for them for the duration of the RD programme. The closest rental offices are in Bangor and Rhyl (approx. 80-mile round trip) from Trawsfynydd and would cost £122k pa Within the twenty-year RD programme, the costs of renting office accommodation would exceed the costs of constructing the extended laydown area within ten years. In addition to the office rental costs, we estimate this would create an additional 384,000 miles of car travel (£153k) and approx 58 tonnes of CO2 per year. Over the lifetime of the RD programme the additional rental costs and expenses would be in the region of £5.5M.

[2] Link to Strategic plan for site and Gantt chart of indicative timescales

Option 2

If we rented an additional storage are for plant and equipment off-site based on online property portals (Rightmove, Zoopla), the only covered, secure storage facility currently available of comparable size is located in Amlwch (Anglesey), which is 100-120 miles / 2.5 hr round trip from Trawsfynydd. The rental cost is £225k pa based on a comparable storage area of 5,000 m^2, and therefore the rental costs would exceed the total cost of constructing an extended laydown area within 5 years. It's difficult to quantify the exact number of vehicle movements which would be needed during a year, but we could reasonably anticipate generating substantial CO2 emissions because of the additional journeys and also a considerable amount of unproductive travel time with a round trip of 2.5 hours. Over the lifetime of the RD programme the additional rental costs would be in the region of £4.5M.

Both alternative options were discounted because of disruption to the local community, the environment, and our staff, lengthening the time to complete the RD programme and placing an additional unnecessary burden on taxpayers (who indirectly fund our decommissioning activities).

2.3 Funding to Use Non-waste

NRS is part of the Nuclear Decommissioning Authority (NDA) Group. The NDA is a non-departmental public body created by the Energy Act 2004 to lead the clean-up and decommissioning work of civil nuclear facilities on behalf of the UK government. The NDA is sponsored and funded by the Department for Energy Security and Net Zero (DESNZ).

The annual funding for the NDA programme is set by DESNZ and HM Treasury and is a combination of government funding and income from the NDA commercial assets. NRS is allocated a portion of the funding each year to cover planned decommissioning and clean-up activities. The current NDA budget is around £3-4bn annually for 14 nuclear sites, and an estimated overall total budget of approx. £150bn for the foreseeable duration of the decommissioning programme.

Decommissioning, clean-up, and restoration costs at Trawsfynydd, are estimated at £1.31Bn. An approved business case has been accepted by the NDA Group Investment Committee (GIC) to proceed through development and procurement phase of the RBHR project. This is evidenced by the NDA 2023-2026 business plan which confirms business case approval and identifies RBHR as a key activity to be completed. The project has since commenced the Tender process and is now scheduled to award contract in Spring 2025. It is expected that funding for FY 2025-26 and 2026-27 of the NDA business plan will be confirmed following a Spending Review to be scheduled at some point within 2024.

NRS operate an annual rolling business planning look ahead, aligned with the NDA business plan. The NRS look ahead includes RBHR and preparatory works for Reactor Dismantling. At present, the total lifecycle estimated budget for RBHR is £73.1M[3]. The estimated costs of completing the north end infilling with imported fill is £952,747 equating to approx. 1.3% of the RBHR budget.

Transport costs have not been broken out from purchase costs as suppliers typically provide an all-inclusive rate. Outturn costs are £666k base estimate

[3] This figure is taken from the Outline Business Case which was agreed with the NDA Group Investment Committee in 2022

exclusive of contractor fee and prelims and £953k inclusive of fee (10% of base estimate) and prelims (30% of base estimate). A breakdown is provided in Appendix A.8.

The laydown area will also require maintenance to ensure the remains fit for purpose. Typical maintenance will consist of visual inspections, removal of vegetation from the embankments, and occasional compaction/filling of potholes etc. It is estimated that maintenance activities will be carried out every 6 months, costing c.£1-£1.5k on each occasion. Assuming maintenance is required until the completion of dismantling works in in the mid 2050's, the cost of maintaining the area will be in the region of £60k-£90k.

2.4 Obligations To Achieve Certain Results By Completing The Scheme

The primary reason for undertaking this scheme at Trawsfynydd Nuclear Power Station is to facilitate the accelerated decommissioning works which form part of a government sponsored strategy.

NRS is responsible for delivering the NDA mission to decommission the UK's earliest nuclear sites safely, securely and cost effectively.

In line with the move to site-specific decommissioning strategies, NRS will assess whether decommissioning should be progressed straight through to site end state or deferred i.e. placed in an interim safe and secure state for an agreed period. The intention is that together the site-specific strategies will result in a rolling programme of decommissioning that will commence at Trawsfynydd, where an accelerated programme approach will be pioneered.

The RBHR programme is scheduled to begin in 2025 and last for 2-3 years. Demolition arisings will also begin to be generated in 2025. NRS has also obtained planning permission for the extension and improvement of the laydown area (reference NP5/73/287T[4] granted 25/11/2024), which excludes the scaffold area (the area bounded in red in Appendix A.3) as the improvements to this area are minor and considered to be operational maintenance..

We are therefore seeking to provide evidence to support a general rather than a specific obligation for this scheme, to demonstrate that this is a recovery activity and so that we can submit a bespoke permit application for storage, treatment and deposit for recovery in 2025. See section 4 for further details.

In Section 2.2 we considered two alternative options for delivering the RD programme. However, the two alternative options are likely to extend the duration of the RD programme because of the impact of smaller working areas on logistics. For example, each reactor as a pile cap which is 15m diameter, constructed of 4m thick concrete and weighing approx. 1,500 tonnes. If the pile cap can be removed in one lift and processed separately outside of the reactor building, it allows other dismantling activities within the reactor core to continue concurrently. The engineering design consultant has tentatively suggested a 2-year programme benefit of removing the pile cap in one go.

[4] https://planning.agileapplications.co.uk/snowdonia/application-details/20007 , accessed 6 March 2025

Using either of the alternative two options would mean not only incurring significant additional costs to the RD programme, but it's also unlikely that we would be able to deliver the preferred optioneering proposals to remove the pile caps in one go and to construct suitably sized facilities to enable boiler removal and processing. Having to carry out reactor dismantling using sub-optimal options e.g. cut structures into smaller sections or processing less quickly or carrying out dismantling sequentially rather than concurrently will all add substantial additional amounts of time to the overall programme.

If we were to use the alternative options which relocate staff, plant and equipment off-site, then this would create an additional number of journeys through the national park and over the course of the year substantial additional CO2 emissions.

Using the alternative options would also mean that we would have to reduce the size of the structures being dismantled before they could be processed. Grinding, crushing, screening, cutting, and compacting activities would be increased along with the potential for further disruption to the local communities and local environment.

3. Quantity And Nature Of The Waste

3.1 Material Suitability

The RBHR programme will remove equipment and plant from above the building planned cut line, and then each of the two reactor buildings will be demolished to the desired height using standard construction industry practices.

Only non-radioactive materials will be recovered within the proposed scheme, and these will be subject to:

- Chemical Testing – to confirm the material is not contaminated and is acceptable for recovery within the extension and improvement of the laydown area
- Geotechnical Testing – to confirm the material meets the minimum physical requirements for use in the extension and improvement of the laydown area

The waste material to be used to extend and improve the laydown area shown in Appendix A3 will be selected on the basis that it is suitable for processing to a specification which is comparable to the non-waste (virgin aggregate) material being replaced.

The List of Waste Codes to be used are set out in Table 2 and are consistent with those published in the NRW online guidance – *prepare a waste recovery plan.* The wastes generated and then processed during the demolition works will be chapter 17 01.

All of the waste to be used to extend and improve the laydown area will be generated on site during phased demolition. Imported virgin material will only be used as a last resort to address any deficits due to:

- Contamination being detected within site generated material which then makes it unsuitable for recovery
- Risk assessment based on the site conceptual model shows that site generated material is unsuitable for the intended use

- Volumes or types of wastes generated on site are less than that estimated

Most of the demolition material generated during the RBHR programme will be concrete and brick. Once confirmed as being free from contamination, it will then be processed to the specification required (Highway Works - Series 600 Earthworks: 2016 or equivalent) to extend and improve the laydown area. This will be done to ensure free drainage of the laydown area, to avoid the risk of post-placement instability and to ensure that the laydown area can take larger and heavier plant and equipment (as necessary for the RD programme).

All material will be processed to single aggregate grade, 6F2. The intention is that only site-won demolition materials (concrete and brick) will be used i.e. Chapter 17 EWC codes.

Specifically:
• The demolition arisings will be segregated (so far as reasonably practicable) with cementitious product placed on the northern quadrant of the site in accordance with an agreed deposition plan (contractor to generate for agreement with NRS but will need to take into account substantiating documents and key planning agreements. The material shall be placed on a delineation membrane of permeable quality jointed in accordance with manufacturer's specification (Terram hi-vis nonwoven geotextile T1000 or equal approved). The processed 6F2 shall be laid in accordance with the specification for Highway Works, Series 600 earthworks clause 612 and table 6/4.

• The cementitious product will be covered with a permeable geotextile (HPS 3.3 or equal approved) and capped with segregated at source non-cementitious brickwork or pre-cast concrete panels (would be free from bagwash) to formation (realising a consistent topography of the area). This capping layer shall be of 150mm depth sized 40mm to dust in accordance with the Specification for Highway Works or as otherwise agree with NRS reflective of the limitation in suitable material arisings.

In summary, the intention is that all material will be sourced from site won waste concrete and bricks. It will be processed to 6F2 aggregate using mobile plant. The waste inputs and outputs will be limited to EWC 17 01 01 (C&D concrete), 17 01 02 (C&D bricks), 17 01 03 (C&D tiles and ceramics) and 17 01 07 (non-hazardous mixtures of concrete, bricks, tiles and ceramics), with cementitious material being classified as 17 01 01 and 17 01 07, and non-cementitious material being classified as 17 01 02 and 17 01 07.

See also section 5.2 for further design and construction details.

Table 2 Waste types to be used

List of Waste Codes	Description	Restrictions
17 01	**Concrete, Bricks, Tiles and Ceramics**	
17 01 01	Concrete	
17 01 02	Bricks	
17 01 03	Tiles and Ceramics	
17 01 07	Mixtures of Concrete, Bricks, Tiles and Ceramics	Metal from reinforced concrete must be removed

3.2 Quantity of Waste

Planning Permission (Appendix A.9) was granted in 09/10/2023 for the construction of the existing laydown area as seen in drawing TRA/3210/LA/49269 (Appendix A.10). The existing laydown area was constructed to a height of 196.75m with a relatively level central area and a perimeter bund extends approx. 1m higher than the level plateau. The perimeter bund was identified as a safety feature to prevent larger vehicles or plant from working close to the edge of the laydown area.

The proposal extends and improves the laydown area (see drawing TRA-3210-LA-42972-01 in Appendix A.6a) to provide a larger level working area. There will be a marginal increase in finished height to 197.50m. The additional thickness across the site will vary from 0.15-1.25 m and is necessary to enlarge the level working area ready to accommodate the larger plant and equipment which will be necessary for the RD programme. The perimeter bund will be retained as a safety feature and to maintain slope stability. It will be raised 1.5m higher than the level plateau (see cross-sectional drawing in Appendix A.6b).

The volume of material required to extend and improve the existing laydown area has been calculated based on achieving the size of the level surface area needed to support a series of activities which will be taking place during the RD programme. Boiler removal and processing provides an illustrative example of how the size of the required laydown area has been derived. The NRS boiler removal and transportation feasibility study estimated a minimum level laydown area of 7,775 m^2 (5,525 m^2 for boilers, 2,250 m^2 for ducts) would be required.

This working area is based on Figure 2 which shows a minimum indicative area of approx. 85.16m x 64.85m (5,523.48 m^2) will be required for boiler processing and storage. This area is shown by the black dashed line on the drawing. In addition to Figure 3 which shows a minimum indicative area of approx. 44.94m x 49.50m (2,224.53 m^2) will be necessary for the temporary storage of ductwork associated with boiler dismantling. Ductwork will need to be removed to allow access to boiler sections and stored on-site pending completion of boiler processing. Therefore, the total area required for boiler removal and transportation is estimated to be 7,775 m^2.

The proposed laydown area must also be able to accommodate a range of specialist haulage vehicles such as the low-loader illustrated within the drawings.

These vehicles require considerable turning circles to operate safely. The heavy vehicles are required to transport sections of boiler and ductwork off-site to a smelting facility.

The development area totals over a Hectare (12,260 m²), with a level working area of approx. 7,735 m² . There will be a slope from the level working area to the base of the embankment.

Table 3 Estimated volume of waste arisings during demolition works and volume required to extend and improve the laydown area.

Material Type	Total estimated volumes (m^3)
Demolition waste generated from:- • reducing the height of the reactor buildings by 20m, and • removing the concrete cladding from the buildings • this includes bricks, cast in situ reinforced concrete and precast concrete	**13,192**
Demolition waste arisings:- • processed to 6F2 or equivalent and then recompacted into laydown area	**14,692**
Material needed to extend and improve the laydown area:- • repair and level existing laydown area • construct a vehicle bund to provide edge protection along the perimeter • extend the existing laydown area towards the south-west • level and resurface the scaffolding and ISO container storage areas • infill settlement associated with compaction and consolidation to be able to take heavier plant and equipment.	**14,662**

Table 3 above shows the current estimates of site won demolition arisings which will be suitable and available for the extension and improvement of the laydown area. 13,192 m^3 equates to 31,492 tonnes (using conversion factors of 2.4 t/m^3 for concrete and 2.2 t/m^3 for concrete and brick respectively).

Demolition waste taken from the reactor buildings is in its monolithic form as large concrete blocks, which will then be processed into crushed aggregate, thereby increasing the total volume due to the change in form and the introduction of air voids once the waste is crushed into a recycled aggregate. This is the reason for the increased estimated volume from 13,192 m^3 up to 14,692 m^3. The total estimated volume required to extend and improve the laydown area is 14,662 m^3. This would lead to a potential small surplus of 70 m^3

Table 3 also shows the volume of material needed to extend and improve the laydown area. A comparison of the two volumes shows that the processed arisings

are likely to be slightly less than the volume required for the proposed design. If processed waste arisings are generated which are surplus to requirements, then these will be taken off-site for recycling/recovery at a suitably licensed facility.

See Appendices A4-A7 for further details of the pre and post scheme contours and calculations estimating the volume of suitable material arisings during the RBHR programme.

The NRS feasibility study for the boiler removal and transportation considered four lifting / transport strategies, including size reduction of boiler sections in-situ (allowing use of a smaller crane and laydown area), and removal of large sections with processing outside of the reactor buildings (requiring a larger crane and laydown area). Each option was scored based on a range of operational parameters including cost, duration, worker safety, ease of processing and minimising disruption both on and off-site concluded that constructing the larger proposed laydown area was the preferred option.

The angle of repose (slope) for granular materials is usually cited as between 25 – 45 degrees[5]. We have proposed an angle of 30 degrees within the extended laydown area since this is recognised as being appropriate for a non-reinforced embankment. We consider a shallower slope of more conservative angle being appropriate given the size and nature of the haulage vehicles which will be using the laydown area in the future.

Design of the slope also considers future maintenance. It is expected that vegetation will grow on the embankment and regular maintenance will be required to remove this. BS 4428:1989 Code of Practice for General Landscape Operations states a maximum gradient for hand maintenance of 33 degrees, indicating that it would not be practicable to significantly increase the gradient from a safety and ease of maintenance perspective.

The design and delivery of the Scheme will be carried out in ways which prevent pollution, harm to human health or the environment. See Section 5 and the Environmental Risk Assessment and Environmental Setting and Site Design documents for more details including a Conceptual Site Model.

[5] (PDF) A review on the angle of repose of granular materials (researchgate.net)

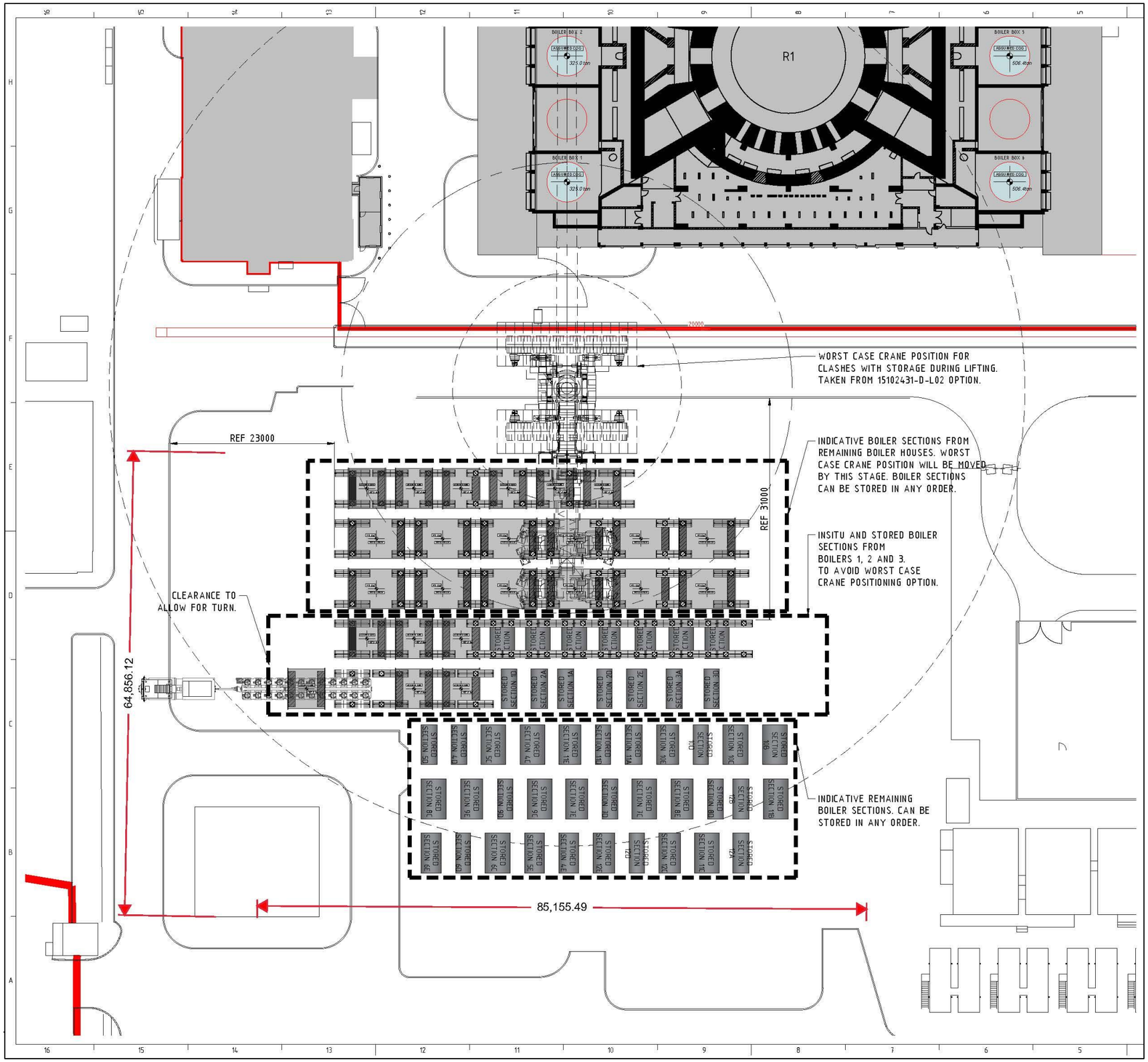


Figure 2

Illustrative General Arrangement – Boiler Laydown Area

Indicative dimensions of laydown area shown, all units are in mm.

Minimum indicative area of approx. 85.16m x 64.85m (5,523.48 m2) will be required for boiler processing and storage.

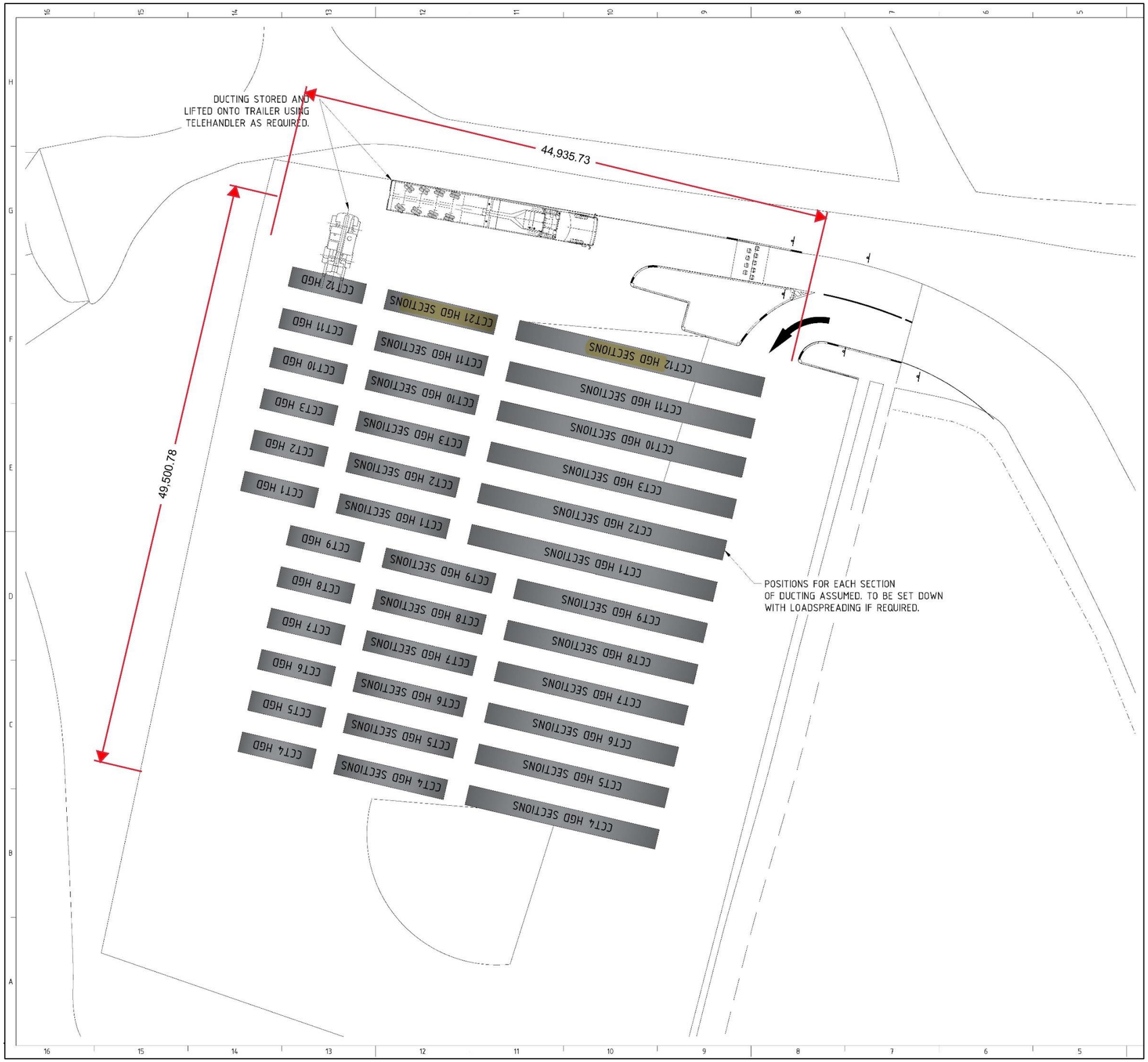


Figure 3

Illustrative General Arrangement – Ducting Storage

Indicative dimensions of laydown area shown, all units are in mm

Minimum indicative area of approx. 44.94m x 49.50m (2,224.53 m2) will be necessary for the temporary storage of ductwork associated with boiler dismantling.

4. General Obligations

4.1 Overview

In a written statement in October 2020, Ken Skates MS, Minister for Economy, Transport and North Wales said '*I can confirm that we intend to establish a new development company, Cwmni Egino, at Trawsfynydd.* ***Cwmni Egino will help exploit the huge economic benefits of small modular reactors and associated technologies at Trawsfynydd****, including the potential for a medical research reactor, to provide a secure and sustainable supply of medical radioisotopes for Wales, the UK and Europe.*

The announcement by the NDA that a continuous decommissioning approach would be piloted at Trawsfynydd (subject to Business Case approval) is good news for the supply chain in Wales. ***Decommissioning work should now continue on site …with both reactor buildings being fully demolished and the reactor cores removed using advanced robotic technologies****. Such expertise developed in Wales has significant export potential.*[6]

In summary, NRS as an operating company within the NDA group is funded by the UK government to decommission Trawsfynydd so that the site can be redeveloped. This requires deplanting, the systematic demolition of all structures on the site, and backfilling voids to create a level platform.

Due to the nature and scale of reactor dismantling, this can only take place once a suitably sized and constructed laydown area is available on site. The scheme described in this Waste Recovery Plan details the improvement and extension to an existing laydown area to the north of the site, which is required to enable reactor dismantling to go ahead. The works described in this scheme are scheduled to take place between 2025-27.

We have been tasked by the Government to pioneer an accelerated programme of decommissioning to reach the planned site end state quicker than previously expected. This is to enable earlier reuse of the site for a range of potential activities including the construction of a new Small Modular Reactor (SMR) for North Wales. Either of the alternative options will extend the duration of the RD programme and reduce our ability to dismantle the reactor parts concurrently. This would fundamentally impact on accelerated decommissioning and our ability to return the site to its future use. Using either of the alternative options would require us to dismantle the reactor parts sequentially rather than concurrently, this could potentially add another 10-years to the RD programme. A programme the size and budget of RD would typically incur contractor overheads measured in the £100ks/month, meaning any lengthening of programme will quickly have a substantial cost impact.

4.2 Obligations under Nuclear Reactors (Environmental Impact assessment for Decommissioning)Regulations (EIADR)

The Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations (EIADR) is a legal instrument that requires operators such as NRS to consider the environmental impact of decommissioning nuclear power stations in detail before consent to commence decommissioning can be granted by HSE/ONR. The specific requirements on the decommissioning project depend on whether the

[6] Written Statement: Up-date on the Nuclear Sector in Wales (23 October 2020) | GOV.WALES

project started before or after EIADR entered into force on 19 November 1999. Decommissioning projects (such as Trawsfynydd) that commenced prior to 19 November 1999 do not need EIADR consent. All decommissioning projects, regardless of when they started, are required to seek a determination from ONR when the project is subject to a change or extension, which may have a significant adverse effect on the environment under Regulation 13 of EIADR.

To obtain a consent, the licensee must submit to ONR an 'environmental statement which presents a detailed environmental impact assessment for the proposed decommissioning project and any features of the project or measures envisaged to avoid, prevent or reduce and, if possible, offset, any likely significant adverse effects on the environment'. The statement is considered by ONR (or previously by HSE) in extensive consultation with stakeholders such as relevant regulatory authorities, the public and any other interested parties. If the EIA demonstrates the project is acceptable a consent for the decommissioning is issued in a project assessment report (PAR). Once consent is granted the decommissioning project must begin within 5 years of the date the consent is given.

The consent has conditions attached, including the requirement for the licensee to prepare and implement an Environmental Management Plan (EMP) to cover mitigation measures to prevent, reduce and where possible offset any significant adverse effects on the environment. The EMP shall:

- list the mitigation measures that are already identified in the environmental statement and evidence submitted (to the ONR) to verify information in the environmental statement; and

- list the work activities where mitigation may be required but where assessments to identify mitigation measures will only be possible in the future

It is also a requirement of the conditions attached to the consent to describe the effectiveness of the mitigation measures over time. The EMP is therefore a living document that is periodically reviewed and revised throughout the decommissioning project. EMPs are usually published annually, and the licensee must send a copy of the EMP to ONR and make it available to the public.

As Trawsfynydd commenced decommissioning in 1995, prior to the introduction of the EIADR 1999 it was not required to produce an Environmental Statement based on an EIA but has subsequently received consent under the planning regime after public consultation on an EIA submitted under the Town and Country Planning (EIA) Regulations 1999.

The EIA for Trawsfynydd has identified the following decommissioning approaches and mitigation measures which the disposal for recovery permit will help facilitate:

- For conventional decommissioning aspects, all buildings will be demolished in their to ground level, structures including cabling will be removed to ground and the voids will be backfilled

- Voids will be backfilled with clean, inert materials

- Minimisation of unnecessary material and waste handling to minimise impact of dust on residences, and

- Sampling and testing of potentially contaminated soils, wastes and materials to optimise recovery and to prevent pollution, harm to human health or the environment.

NRS has also prepared the necessary EMP for Trawsfynydd, which is reviewed annually and identifies the above mitigation measures, describes the implementation and effectiveness of mitigation measures, and describes changes to mitigation measures and reasons for changes considering experience. The latest version of the EMP contains no changes to the above approaches.

To this end in relation to the issue of waste management, NRS has applied an integrated waste management approach which focusses on moving waste up the hierarchy and providing more sustainable solutions to decommissioning. The extension and improvement of the laydown area on site using suitable waste streams as a replacement for virgin aggregate will therefore:

- Replace up to 15, 500 m^3 of virgin aggregates with a suitable waste alternative to provide an extended and improved laydown area on site.

- Remove traffic impact associated with the export of waste from site during the RBHR programme and the import of virgin aggregates to site to be used to extend and improve the laydown area to facilitate the RD programme.

4.3 Obligations under the Health and Safety At Work Act 1974

Under HASWA 1974, employers such as NRS are required to ensure so far as reasonably practicable:

- Clause 2(1) – the health, safety and welfare at work of all his employees; and

- Clause 3 (1) – that his undertaking is conducted in such a way as to ensure that persons not in his employment who may be affected are not exposed to risks to their health and safety.

With respect to the decommissioning and site clean-up NRS is therefore obligated to ensure that the end state optimisation process and the associated work required is demonstrated to be the one with the lowest risk. In terms of the recovery operations proposed, extending and improving the laydown area will contribute to achieving this lower risk by:

- Making it safer to manoeuvre large, heavy vehicles and equipment

- Reducing the likelihood of a trip hazard for workers.

- Providing a more consolidated/firmer storage area for deplanting larger structures generated during the RD programme.

4.4 Obligations under the Energy Act 2004

With regards to the work proposed under the Deposit for Recovery Permit, this is related to the decommissioning and remediation activities associated with achieving the site's interim and ultimate end-states.

The EA-2004 clause 3 (1) (b) and 3 (1) (f) states the NDA has responsibility for securing the decommissioning of designated nuclear installations and designated

installations in NDA facilities and Clauses 11 (1) and 12 (1) requires the preparation of a decommissioning strategy which sets out:

- Clause 12 (2)(a) – the priorities with respect to the discharge of NDA responsibilities
- Clause 12 (2)(d) - proposals for ensuring the adoption of what it considers to be good practice by the persons (i.e. NRS) with control of the designated facilities/site, and
- Clause 12 (4) - objectives describing what the NDA intends decommissioning and clean-up to achieve and how it intends those objectives to be achieved.

In developing the required decommissioning and clean up strategy, NDA is also obligated under Clause 9 (1) to have regard to:

a) Relevant Government Policy – this includes government strategy on waste management and climate change

b) Need to safeguard the environment, and

c) Need to protect persons from risks to their health and safety from activities involving the use, treatment, storage, transportation or disposal of hazardous material.

Further to this under clause 15 (2) has a duty to undertake such steps as it considers appropriate to achieving:

a. The implementation of the NDA strategy at a site level (i.e. at Trawsfynydd), and

b. The objectives set out in the NDA strategy applicable to the site.

To deliver its obligations in relation to the strategy successfully the NDA must work with the individual operating companies including NRS to decommission and clean-up its portfolio. NRS in turn therefore has a general obligation to deliver the required decommissioning and clean-up requirements as specified by the NDA in its strategy including obligations under Clause 18 (2) to:

a. Prepare such plans for the decommissioning or operation of the installation, for cleaning up or management of the site or for the operation of the facility as the NDA may direct
b. Prepare such plans for the cleaning up of any related sites as the NDA may direct
c. To submit plans for NDA approval
d. To comply with all such further directions falling within sub-section (3) as the NDA may him from time to time with respect to the installation, site or facility
e. To comply with such directions as the NDA may give him for the purpose of securing or facilitating the discharge by the NDA of its responsibilities by virtue of section 3 (1).

4.5 Obligations under the NDA Decommissioning Strategy

The NDA strategy states that:

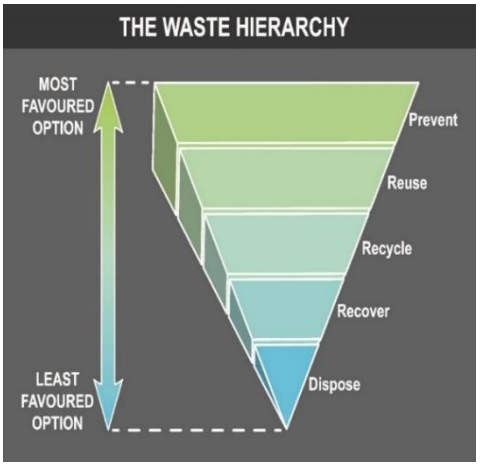
The NDA owns significant quantities of land, of which around one quarter is designated, i.e. land that has been assigned to us by the UK government for decommissioning and remediation. NRS as part of the NDA Group, is responsible to government to propose the end state for designated land at each of our sites.

The site end state describes the condition to which the site (land, structures and infrastructure) will be taken at the end of the decommissioning process.

The optimum end state (the end state that delivers the greatest net benefit) will be site specific. This recognises that, in some cases, removing all traces of a site's industrial use does more harm than good. It is our strategic preference to work with government, regulators and local communities to ensure that remediation of our sites is safe, sustainable and publicly acceptable, and enables their beneficial reuse as early as possible using controls to protect people and the environment from residual hazards where necessary. Consequently, experience has shown that as well as describing the physical state of the site, the end state description should include an indication of the future use(s) that the site will be able to accommodate over time and any controls that might be required until the site is suitable for unrestricted use.

Identifying the optimum end state involves working with stakeholders to compare the performance of different options against factors in the NDA Value Framework. The evaluation of options must be holistic, considering impacts on and off the site both now and in the future. For example, it is necessary to look beyond the site in question and also consider the impact on people and the environment at the disposal facility receiving waste from the site.

In line with the strategy and its obligations under the Energy Act 2004, the NDA expects its operating companies including. NRS, to apply the waste hierarchy during this process.



Any such application of the hierarchy must ensure there is an effective balance of priorities including value for money, affordability, technical maturity and the protection of health, safety, security and the environment.

To meet their obligations under Clause 18 (2) of the EA-2004, NRS is required to produce and maintain a decommissioning strategy and plan for each site, which considers all relevant factors and demonstrates how they have been reflected at the site, including but not limited to:

- Minimising risk to worker and public safety
- Minimising environmental impacts, including the reusing or recycling of materials wherever practicable, and
- Using resources effectively, efficiently and economically.

Building on the experience gained at the 3 “lead and learn” sites (i.e. Winfrith, Dounreay and Trawsfynydd), NRS will at Trawsfynydd continue to:

- Prevent waste generation by looking at options such as minimising the amount of material being excavated and disposed of as waste where it aligns with a sustainable end state (e.g. non-excavation of existing voids);

- Explore the potential to replace natural resources/virgin materials with suitable site-derived wastes for site landscaping, void filling, flood defences or preparation of development platforms for infrastructure which must be constructed to facilitate the wider site decommissioning and clean-up. Any recovery and reuse activities must represent a net benefit and allow the defined end state to be achieved

- Minimise the volume of material that is removed from site for offsite treatment and/or disposal

This approach is being followed to:

- Reduce emissions associated with transport movements associated with both exporting waste and importing virgin materials to achieve the desired end state. As outlined in Section 3.2, if all identified suitable site won materials were realised this would avoid approx. 3,150[7] transport movements in and out of the site associated with waste export and virgin material import

- Protects natural resources by minimising the demand for virgin materials; and

- Provides for low carbon material selection by using waste as opposed to virgin materials.

4.6 Waste Regulations 2011

Revisions to the Waste Framework Directive have been implemented in England and Wales through the Waste (England and Wales) Regulations 2011 and ancillary legislation in Wales, which were both introduced in April 2011. These regulations place an obligation on businesses such as NRS to:

- Confirm that they have applied the waste management hierarchy when transferring waste and to include a declaration on their waste transfer note (WTN) or consignment note
- Take all reasonable measures to apply the following waste hierarchy:
  - Prevention
  - Preparation for reuse
  - Recycling
  - Other recovery such as energy recovery, and finally
  - Disposal.

[7] Assuming the density of waste aggregate is 1200 kg/m^{3,} then the scheme requires 31,492 tonnes. Assuming each lorry load is 20 tonnes, then that’s the equivalent of 1,575 movements to import sufficient materials and a further 1,575 lorry movements to export all of the wastes derived from RHR programme

In proposing to recover suitable site generated materials to extend and improve a laydown area and achieve end state requirements, NRS will be applying the waste hierarchy and minimising the amount of virgin resources that will be required.

4.7 Demonstrate Sustainability Of The Scheme

NRS intends to use suitable wastes derived from on-site demolition works as a substitute for non-wastes materials in the extension and improvement of the laydown area.

The majority if not all the wastes to be used will be generated on site and this, along with appropriate CQA (see Section 5.4) will ensure that the waste is suitable, uncontaminated and capable of being processed to achieve similar physical, engineering and chemical properties to a virgin comparator, in this case limestone aggregate.

The scheme will be managed within the sites Environmental Management System to enable delivery of the following:

- Reduce the amount of non-waste materials required by NRS to deliver its restoration obligations by 14,662 m^3 and thus help to conserve natural resources.
- Avoid over 3,150 lorry movements (a significant amount of site traffic (and associated emissions)) which would otherwise be required to import non-waste materials and export site-generated wastes to complete the scheme.
- Replace the use of virgin materials within the scheme with suitably recovered wastes generated on-site as a low carbon alternative.

Thereby allowing NRS to meet its decommissioning obligations safely and in a sustainable manner, which respects the environmental sensitivity of the location within Snowdonia National Park (SNP) and its network of nationally and internationally important wildlife sites, which includes:

The CSM is provided in the Environmental Setting and Site Design Report includes the following key receptors:

- Twenty isolated cottages within 3km of the site including Ty Gwyn Farm (residential receptor 0.5km to the north) and Gellilydan (village 1.5km to the north east)
- Several protected species such as bats, otters, reptiles and badgers which have been recorded within or near the site.
- Two ancient woodlands within the site boundary and a further ancient woodland within 31 m of the site boundary to the east of the A470.
- Local woodlands and heathland features which support nationally important plant and bat populations.
- Groundwater flow through the site is overwhelmingly through a shallow sub-system of superficial deposits of made ground, drift and small areas of boulder clay
- Surface water bodies include Llyn Trawsfynydd, the Afon Tafarn-Helyg and its tributaries

There are no groundwater abstractions or private water supplies close to the site which could be affected by the Scheme.

The re-profiling layer and extension will be engineered to ensure that it does not result in any environmental problems such as soil erosion, pollution or increase the risk of flooding in the surrounding area.

The surface contouring of the laydown area will ensure that any infiltration will flow through the porous aggregate layers without the potential for flooding. The slope of the embankment will be at 30 degrees to ensure stability and prevent erosion of the underlying soils. The toe of the embankment will stand off the existing vegetation by a minimum of 2.5m to ensure that the roots and soils are sufficiently protected to avoid impact.

The permit application for storage, treatment and deposit for recovery will contain a tiered risk assessment. This will demonstrate how the sensitive receptors will be protected and the Scheme delivered without causing harm to human health, nuisance or negative impact on the environment.

5. Design Of Scheme, Construction and Meeting Quality Standards

5.1 Overview

Operations at the site would be undertaken in accordance with NRS's Environmental Management System (EMS), which would also ensure procedures are implemented to achieve appropriate standards for managing environmental impacts.

The recovery activities would be supervised by technically competent persons who hold the necessary Certificate of Technical Competence (CoTC) under the Waste Management Industry Training and Advisory Board (WAMITAB).

The proposed storage and treatment of wastes arising during on-site demolition and clean-up and the proposed deposit for recovery activity would be compliant with the conditions of a permit issued under the Environmental Permitting (England & Wales) Regulations 2016.

Demolition, clean-up and restoration activities will be conducted in accordance with an appropriate risk assessment, method statements, guidance and appropriate measures, relevant standards e.g. ISO 14001:2015 and relevant specifications e.g. Specification for Highways Works, Series 600 Earthworks: 2016. All relevant standards and specifications will be identified within the EMS.

The EMS will include:

- A comprehensive risk assessment for the permitted activities which demonstrates their suitability for use in the identified areas of the site. The risk assessment will be based on the conceptual site model and intended materials for use
- Material acceptance procedures, testing and classification
- Material placement methodology
- Requirements for any in-situ testing or monitoring relating to the engineering works
- Procedures for dealing with unsuitable waste arisings
- Pollution prevention and minimisation techniques which reflect the environmental sensitivity of the location

5.2 Design and Construction

The design of the scheme showing cross-sectional drawings through the laydown area are given in Appendix A4-6.

The contractor, once appointed, will be required to deliver the Scheme according to industry best practice and relevant standards e.g. Highways Works Series 600 Earthworks Specifications 2016 or equivalent. The whole Scheme will be delivered under an appropriate CQA plan (see Section 5.4).

The waste arisings will be processed on site using mobile plant to achieve 6F2 (selected granular material coarse grading) as described in Highway Works Series 600 Earthworks Specifications 2016. This is a recognised material used for bulk fill, capping and the creation of laydown areas and hardstanding. The proposed crushed and screened waste arisings will comply with Table 6/2 gradings for 6F2, typically 125-75mm and down.

The processed waste arisings shall be laid in accordance with the specification for Highway Works, Series 600 earthworks clause 612 and table 6/4. We anticipate that the waste aggregate will be placed in lifts of thickness 100-125mm and compacted with between 8-12 passes using a smooth roller (2100-2700kg) or vibrating smooth roller (700-1300kg), or other suitable lift depths and passes to achieve the required levels of compaction as described in Table 6/4 and clause 612 of Highway Works Series 600 Earthworks Specifications 2016.

The cementitious arisings from the crushed concrete will be covered with a permeable geotextile (HPS 3.3 or equal approved) and capped with a mixture of segregated non-cementitious (brick) masonry and crushed concrete which is free from bagwash[8]. The capping layer shall be of 150mm depth sized 40mm to dust in accordance with the Specification for Highway Works or as otherwise agree with NRS reflective of the limitation in suitable material arisings.

The design and construction is consistent with the need to provide a hard-wearing stable and well-compacted level laydown area capable of use by heavy plant, equipment and temporary buildings. The coarse layers are consistent with the need to minimise rainwater infiltration and the geotextile and capping layer is an added precaution to prevent the potential liberation of ubiquitous asbestos fibres when the laydown area is being driven on by heavy plant.

5.3 Delivering the scheme

As stated in Section 1.4 above, the primary reason for undertaking the deposit for recovery operations at Trawsfynydd is to deliver the site decommissioning and clean-up strategy required under the Energy Act 2004 (see obligations detailed in Section 4.4), in a manner which:

- Minimises the risk to worker and public safety
- Minimises environmental impacts, including the reusing or recycling of site-generated materials wherever practicable

[8] A bagwash product was used to finish the interior exposed surfaces of the reinforced concrete superstructure. The product was locally applied to pour joints removing surface imperfections. Whilst it is not reasonably practicable to remove this material, NRS have calculated that the concentration is several orders of magnitude below hazardous waste limits. The presence of bagwash could contribute to ubiquitous or trace levels of asbestos fibres in the crushed material. Further information on the quantification of bagwash was presented to NRW in 2020 and is included in Appendix 3 of the Environmental Risk Assessment

- Uses resources effectively, efficiently and economically.

In developing the site decommissioning and restoration strategy, NRS has approached the management of waste likely to be generated because of decommissioning activities on-site in an integrated manner, applying the waste hierarchy where possible, including:

- Minimising the amount of waste generated
- Recovering and reusing suitable waste materials generated on site to achieve the optimised End State, including using such waste(s) for site landscaping, void filling, flood defences or the preparation of development platforms for infrastructure (which must be constructed to facilitate the wider site decommissioning and clean-up).
- The importation of materials from off-site sources will only be undertaken in the unlikely event that there is a substantial deficit of suitable on-site materials

5.4 Meeting Quality Standards

The EMS would ensure that only suitable materials are stored, treated, and recovered at the site.

Following completion of the works a Construction Quality Assurance (CQA) Report will be prepared, this will include:

- A summary of the works undertaken
- The results of any laboratory and in-situ testing carried out during or following the works.
- Supervision checks during placement of materials in accordance with the CQA plan
- Surface water and/or groundwater monitoring as determined through the development of the site conceptual model.
- The results of any monitoring carried out during or following the works which may include dust and noise assessments
- Details of any remedial works undertaken
- Site checks and visual inspections at a frequency appropriate to the phase of activity and to ensure that the requisite levels and layer thicknesses have been achieved.

The proposed monitoring regime (if required) will be described in the permit application and will where appropriate link with the existing monitoring regime under the existing environmental permit. Based on our current knowledge we do not believe that there will be a gas risk from the creation of the laydown areas. We will supply a gas risk assessment with the permit application to confirm this.

NRS will document each item above and the documentation will be both retained on-site and be presented in the CQA Validation Report

6. Conclusion

The proposed extension and improvement of the laydown area at Trawsfynydd site using inert waste satisfies all the requirements of a recovery operation. It replaces a non-waste material which would have been sourced and imported to complete the

scheme, with a waste material that is fit for purpose, suitable and performs the same function.

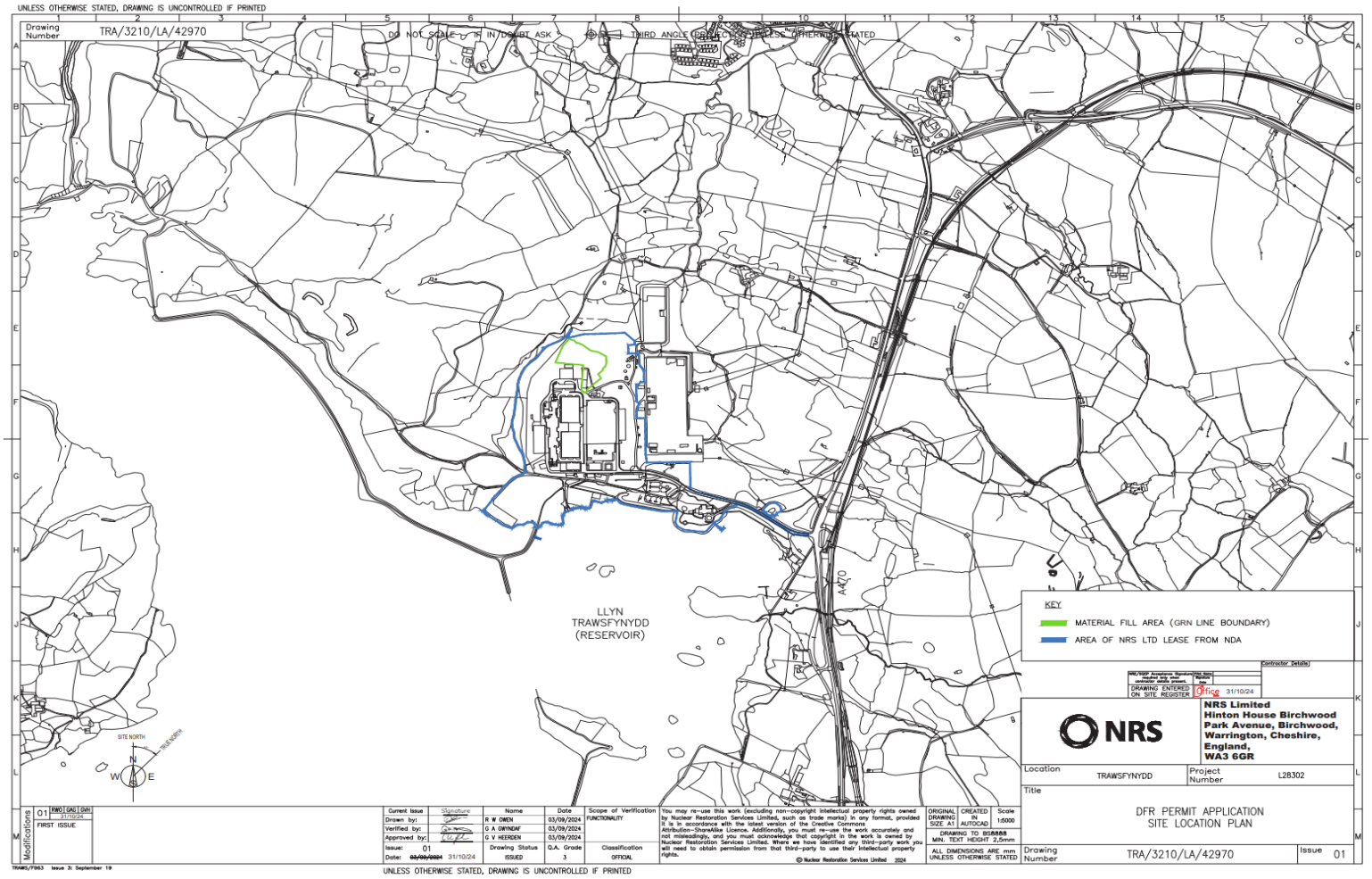
This deposit for recovery activity meets the waste recovery test in that:

- There are general obligations to do the work
- the waste is suitable for the intended purpose
- there are clear benefits to the construction and consequently there is a genuine need to do the work
- the laydown areas will be constructed to meet a high standard of engineering works as described in the CQA plan, to protect the environmental sensitivity of the surrounding locality and in a way that prevents or minimises pollution

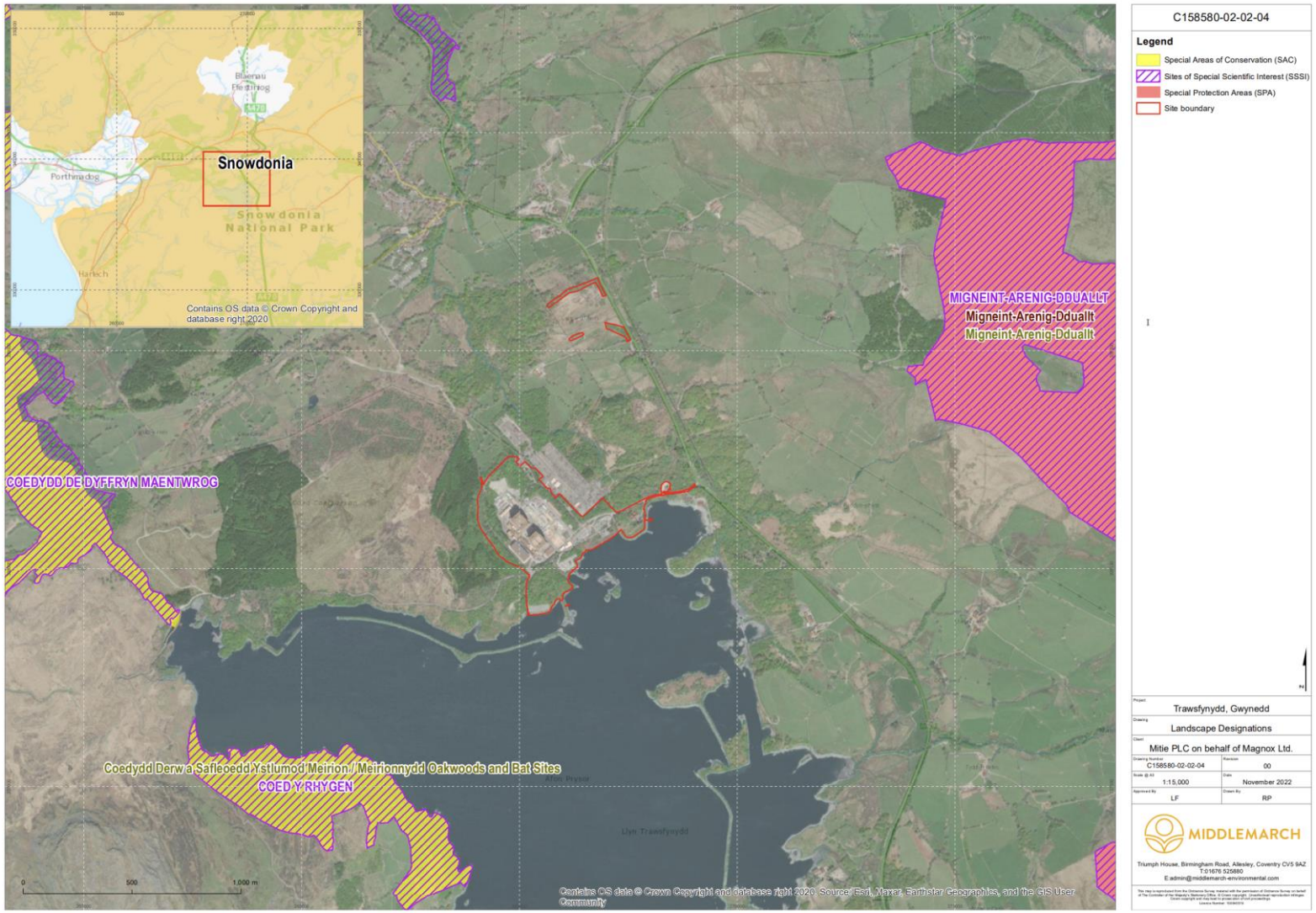
NRS has identified a legitimate opportunity to recover suitable waste materials which will be generated during the RBHR programme, in a sustainable fashion to achieve significant environmental benefits as part of the overall programme of works associated with the decommissioning and clean-up of Trawsfynydd Nuclear Power Station.

7. Appendices

A.1 Site location and permit boundary (in green)



A.2 Environmental Setting



A.3 Location of part of the extension and improvement to laydown area

A.4 Site plan showing original contours (prior to scheme)

Submitted as a pdf alongside the WRP

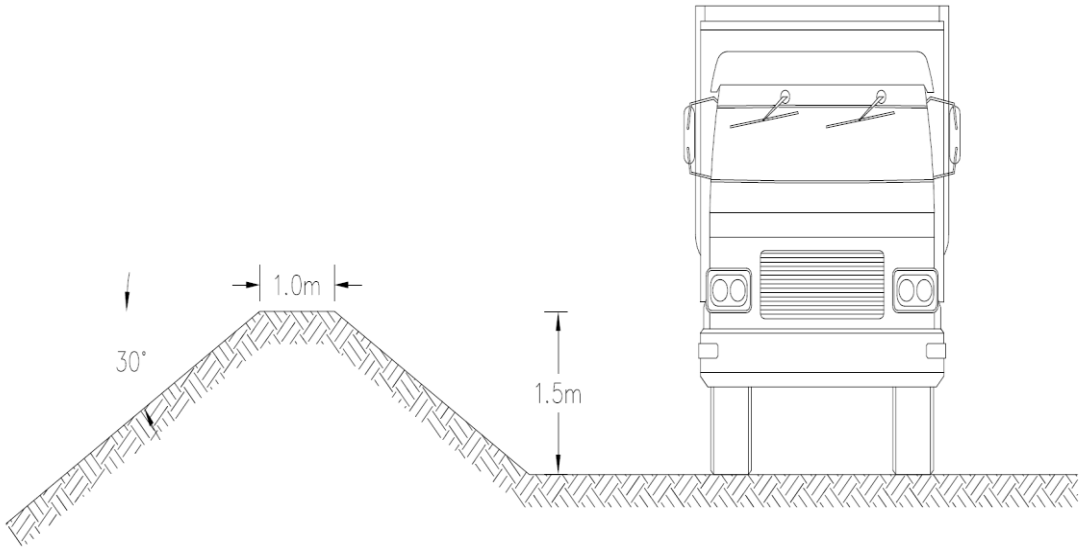
A.5 Site plan showing post scheme completion general arrangements

Submitted as a pdf alongside the WRP

A.6a Site plan showing post scheme completion contours to create a level plateau

Submitted as a pdf alongside the WRP

A.6b Cross-sectional detail of proposed perimeter safety bund



The perimeter safety bund (cross section as indicated in the diagram) is to be constructed on top of the level plateau illustrated in Appendix A.6a.

Its purpose is to provide an additional safety feature to prevent plant, equipment, and heavy vehicles from being close to the edge of the extended laydown area.

The cross-sectional area is estimated to be ~ 5m² **The total volume of material needed to construct the bund, the access ramp and resurface the temporary storage areas is estimated to be approx. 1,690 m³** This figure is included in Appendix A.7 below and Table 3

A.7 Estimate of volume needed to extend and improve existing laydown area

Waste arisings from RBHR project	13,192m^3
Bulking factor applied	1.35
Volume of processed 6F2	17,809 m^3
Compaction factor applied	0.825
Total estimated volume of waste arisings from RBHR project	**14,692 m^3**

Assumptions

- Bulk density of monolithic concrete 2.2-2.4 tonnes/ m^3
- Bulk density of 6F2 1.9-2.1 tonnes/ m^3
- Bulking factor for crushed concrete 6F2 and stockpiled 1.25-1.45 (mean applied (1.35)
- 5m easement maintained around the boundary to protect mature trees
- Maximum slope profile of the embankment 30 degrees
- Plateau area of laydown resurfaced to 197.5 m AOD This is the minimum thickness of fill required to create a level plateau across the area which has sufficient bearing capacity for its intended use.

Volume of 6F2 waste arisings required to improve and extend the laydown area

The revised design to extend and improve the existing laydown area requires 14,622m^3. By reconfiguring the design, this will provide a level working area of 5,358 m^2. In addition, the temporary Scaffolding and ISO container storage areas (highlighted in yellow and green respectively on Appendix A3) will be levelled and resurfaced. This requires 1,690 m^3 (perimeter bund + access ramp + resurface) and will provide an additional level working area of 2,377 m^2.

Total estimated volume of waste arisings required for the scheme is 14,622 m^3 to create a level plateau of 7,735m^2. There is a surplus of 70 m^3 of waste.

A.8 Costings for the construction and maintenance of the laydown area

Provided as an excel spreadsheet alongside the WRP.

A.9 Planning Permission for the existing laydown area

Provided as a pdf document alongside the WRP.

A.10 Drawing accompanying Planning Permission

Provided as a pdf document alongside the WRP.