



CSCC•CWIC

Engineering Design Services

Salt Storage Infrastructure



Strategic Salt Storage
Feasibility Report
September 2017

Contents

Introduction.....	3
Aims and objectives.....	4
Primary Issues.....	6
Design Considerations.....	7
Site Options.....	10
Current Storage Capacity.....	51
Salt Storage Structures – Available Options.....	53
Conclusion and recommendation.....	62

Introduction

This study has been undertaken as a result of the findings of the Department of Transport independent review by David Quarmby of salt stock storage in England following the national shortage of salt stocks during the winter of 2009/10. In 2010 the Secretary of State for Transport instructed the Highways Agency in England to build up an emergency salt reserve to ensure national resilience.

In Wales the Welsh Government (WG) has also acted on David Quarmby's review and have provided additional strategic storage of salt at locations across Wales, such a facility has been constructed in Llanidloes, Powys.

Welsh Government in partnership with the WLGA and local authorities via the "Salt Union" (a forum of local Welsh authorities) agreed targets for authorities to achieve sufficient stock levels, to ensure Wales was more resilient.

Welsh Government have also indicated that unless authorities make efforts to store 1.5 times the average 5 year usage, then this may prejudice that authority from accessing the nationally strategic stock reserve. Given the difficulty in acquiring salt at such times of national crisis it is incumbent on this authority to increase its stock levels.

Powys County Council currently provides winter maintenance activities for the Powys highway network and on behalf of NMWTRA the trunk road network in Powys. Its current total Salt stock capacity is approximately 23,000 tonnes, and the five year average usage (for Trunk & County) applying the 1.5 multiplier is approximately 32,500 tonnes. An approximate total shortage of 9500 tonnes and a county shortfall (63.89% of this) of approx. 6070 tonnes.

Operations have recently been moved from both Presteigne and Crickhowell depots as part of proposals to optimise and rationalise depots. Both sites continue to store salt within the existing salt barns on site, which potentially could be re-distributed to other sites (approx. 3,200t) if there is opportunity for the sites to be surplus to requirements. The overall increase in salt stock for the County would need to be 9270 tonnes.

Salt storage forms part of the Winter Service Plan which invariably links to the Powys One Plan in terms of delivering services for Stronger Communities.

The following report will investigate the options available for additional salt storage capacity and discuss the options available. It will also identify any potential strategic storage areas that may suit the Welsh Government, who we understand are investigating further store facilities in the North-East of Powys.

Aims and Objectives

The aim of the report is to:

- Provide confirmation of additional salt required to reach target
- Identify sites capable of housing further salt stocks
- Establish/confirm the preferred locations
- Establish/confirm the preferred method of storage facility

The project aims to increase Powys' resilience to extreme adverse conditions (or white out), and thereby also enable it to access national strategic salt stocks (like those at Llanidloes) at times of national shortage. The project will also give secondary benefits of being able to better manage winter maintenance activities through rotation of salt stocks and provide the opportunity to access barns for inspection and repair.

The objectives are

- to increase salt storage stocks by constructing additional barns
- ensure any new barns correlate with the logistics review
- evaluate what can be achieved within the capital budget

Furthermore, the overall project objectives are to

- Establish accurate salt stocks
- Identify candidate sites and evaluate options (barn sizes, types, layout)
- Review existing infrastructure
- Design, procure and construct infrastructure
- Increased resilience to adverse weather
- Gain access to strategic salt stocks at times of salt shortages
- Ability to rotate stock piles
- Ability to inspect and repair salt infrastructure
- Greater ability to purchase salt at off peak periods (efficiency)
- To ensure new barns do not conflict with the optimisation project
- Review existing assets
- Assess any increase in depot charges and depreciation/capital charges to NMWTRA and gain agreement
- Preliminary Design and estimate barns
- Planning Permission and other consents
- Detailed Design and procurement
- Supervise construction

Local highway authorities have a responsibility to ensure that they are adequately prepared for winter by maintaining sufficient salt stock.

Powys are working towards providing the Strategic Salt Storage levels agreed by the WLGA, WG and Salt Union forum.

Salt Storage Infrastructure Feasibility Report

The funding for the project is only for additional storage provision and does not cover any renewal or repairs of any existing salt storage infrastructure.

The project does not include the purchase of salt stocks.

Primary Issues

The project has a first year (2017/18) budget of £1.4m.

Assumptions

- Tonnage records are assumed to be correct
- Type of salt product remains the same
- NMWTRA will agree to increase charges as a result of betterment in resilience

Constraints

- Site availability
- Budget
- Procurement

Dependencies

- Depot rationalisation and Central Fleet workshop projects
- Bulking, HWRC & Transfer station projects.
- Optimisation of routes

Design Considerations

Good storage facilities with adequate capacity can go a long way toward guaranteeing sufficient salt when it is needed to maintain a high level of winter maintenance. Because salt is so vital, proper storage must be provided to protect it from the elements and to protect the environment.

Good storage becomes even better with proper housekeeping around storage areas a fact that should be considered in its design.

Why use proper bulk salt storage facilities?

- economy
- availability
- convenience.

Bulk salt is known to be the most economical de-icing material available. Advantages include its handling and storage are simple and in terms of operation its spreading is fast and easy.

Salt never loses its ice melting power no matter how long it is stored or how old it is. It is just as effective as though freshly mined or harvested. Neither is there any loss to moisture from the air if salt is stored properly. Salt does not absorb moisture until the humidity exceeds 75 per cent. Moisture that is absorbed will later evaporate, but there may be a thin crusting on the surface of the stockpile that is easily broken up.

However, it can be lost to precipitation and stockpiles, therefore, whether large or small, should never be left exposed to the elements – rain or snow.

Proper storage inside a building or under cover will also prevent detrimental effects on the environment. When salt is stored outside, runoff must be properly controlled in order not to contaminate local drainage systems and watercourses.

Storage should always be on impermeable pads, either in a building or covered with one of the many types of temporary covering materials, such as tarpaulin, polyethylene, polyurethane, polypropylene or Hypalon. These materials are also available with reinforcement for added strength.

Why Store Salt Properly?

Properly stored salt will:

- * Prevent formation of lumpy salt that is difficult to handle with loaders and to move through spreaders,
- * Eliminate the possibility of contaminating water courses with salt runoff. Salt is not only stored in a contained environment but it can be delivered and loaded under cover too. Stock loss due to leaching and contamination of the salt is virtually eliminated resulting in reduced wastage and cost savings. It is estimated that a reduction of 20 – 30% in salt usage can be achieved.

- * Eliminate the loss of salt by runoff and dissolving by precipitation. The moisture content of the salt is controlled which allows more accurate spreading and consequently less usage i.e increased efficiency and cost savings.
- * Anticaking Additives. The best way to prevent or minimize caking is to store salt under cover. Most salt producers add anticaking agents. However, if left exposed to weather, anticaking agents can be washed from the outer layer of salt.
- * The amount of dust and noise would be reduced compared to operations carried out in the open.

Selecting the Right Site

Safety - safety for workers is a prime concern at a storage site. Equipment operators need good visibility in all directions. Access roads should not open directly into heavily travelled routes. The area should be secure, preferably fenced, to prevent entrance by unauthorized persons. Children can be attracted by salt piles, which could be dangerous for them. It is also essential to secure the area in such a way as to provide safety for the surrounding environment.

Accessibility - Storage sites should permit easy access by lorries and other equipment entering and leaving these areas during storms, when visibility is low. The storage area must be large enough for front-end loaders to manoeuvre freely, safely and expediently. If stored in a building, make sure the doors and openings are large enough to prevent interference with loading and unloading. Provide easy accessibility for delivery lorries, keeping in mind the prevailing wind and weather pattern.

Legality - Must comply with environmental legislation, water treatment and planning conditions.

Salt storage

It is preferable to screen salt storage yards from adjacent roadways and residential areas.

Tidiness - Make storage facilities blend with local surroundings when possible, especially in residential areas. They should be well kept, with no junk or scrap material piled around that would give an impression of sloppiness or waste and allow the possibility of getting foreign objects in spreaders.

Consideration of “live” fences that offer an attractive alternative to chain link or wood.

Economics -

Permanent covered storage is a good method. Unprotected piles waste salt and could be harmful to the environment.

Drainage - Locate all storage structures to provide good drainage away from the stockpile. Pads should have a slope away from the centre. Pads, aprons and other adjacent work areas should be capable of supporting the stockpile and equipment.

Ensure that the storage area does not accidentally drain into a water course. If needed, kerbs can be installed around the storage area to direct drainage or run-off. All drainage should be properly contained.

The Environment Agency document “Pollution Prevention Guidelines – Highways Depots, PPG10” recommends the provision of roofed salt stores in order to prevent the risk of contamination due to run off from open stockpiles.

Receiving Salt

For in-building storage facilities, the most common method of filling is by unloading the salt directly in front of the building and pushing it inside with front-end loaders. When empty some barns and the domes can receive salt inside the building first depending on the entrance height and lorry dipping height. This is the current method used in all Powys depots.

Conveyors are sometimes used. Slingers, short conveyor belts capable of throwing the salt some distance, are used by some firms. Use of either of these types of equipment requires sufficient volume in order to justify the cost of use. Where conveyors are installed in buildings, support structures and loadings should be carefully evaluated to avoid structural overloading and possible damage or failure. Taller structures are now being built that will allow trucks to empty their load inside the building.

Salt Delivery

No matter how you store salt, it will be delivered to the site by lorry. There are several ways to speed delivery.

- Allow enough room for manoeuvring.
- The average length of the articulated lorries' that deliver salt is around 14m.
- Room for turning and backing should be at least twice the length of the longest delivery truck entering the site.
- When unloading, trailer beds may rise 10m above ground level. Allowance for this should be made when planning the front of storage buildings and when locating power lines and lights.

Site Options

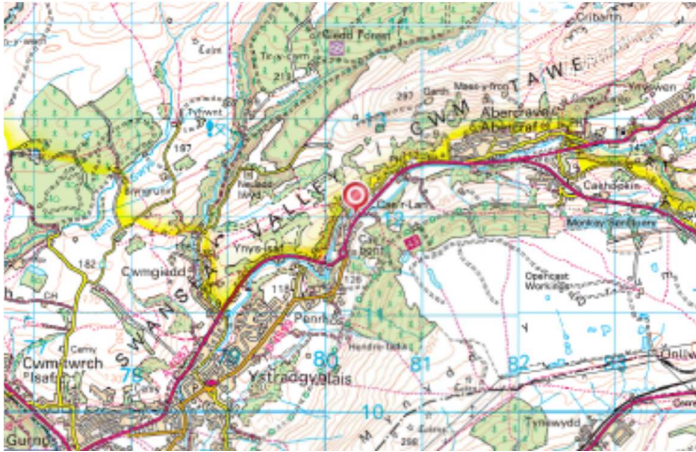
The list of sites below are not in any order of priority. Each site has been viewed and assessed on the pros and cons for the additional storage of salt.

Site 1 – Caerbont, Abercrave Depot

SN 80339 12056

SN803120 280339E, 212056N

Address: Brecon Road, Caerbont, Abercrave SA9 1SQ



Abercrave depot contains a number of buildings comprising a materials storage shed, storage units, large vehicle garage, office and a large welfare facility. The depot has an existing infrastructure for salt storage comprising a salt dome with a salt storage capacity of 2,500t.

Access to the site is off the A4067 Brecon to Sennybridge road, a busy section of this road as it serves industrial units opposite and is a link to the A465 at Glynneath.

The site is compact which has been an issue when receiving salt deliveries. When the supply delivery has been poorly planned by the hauliers, lorries have had to park and

wait outside the depot on the A4067 causing traffic congestion on the busy class I road.

However some space has been made available in the yard with the rationalisation of the refuse service and possible relocation of Building Maintenance storage facilities.

Strategically the depot location is within a remote location of the County and the present facility is more than adequate to fulfil the needs of the area which services the County network of South West Powys only. The depot does not serve the Trunk Road Network for winter maintenance purposes.

Due to the narrow compact features of the site an additional salt storage barn may be of little benefit in terms of storage capacity as any form of salt storage building would be relatively small with very little room for manoeuvring of salt delivery lorries. The potential freeing up of yard space with the relocation of refuse and building maintenance services will ease existing salt delivery issues.

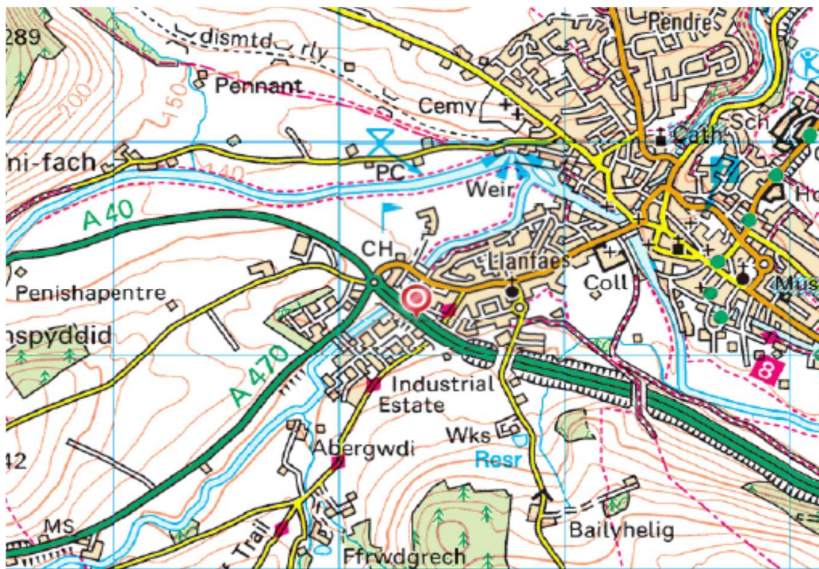
Planning objections have been raised in the past by the community when new structures have been introduced or when existing structure alterations made. Likely objections on the grounds of increase in large vehicle traffic; visual amenity and noise. The site is outside the BBNP.

Site 2 – Ffrwdgrech Depot, Brecon

SO 03352 28092

SO033280 303352E, 228092N

Address: Ffrwdgrech Industrial Estate, Brecon LD3 8LJ



Salt Storage Infrastructure Feasibility Report



Ffrwdgrech depot, Brecon, contains numerous buildings housing different service area functions of Powys County Council. The buildings comprise of materials storage sheds and storage units, two large vehicle garage, fleet workshops, offices, welfare facility and training room and the old vicarage house which is used as offices. The depot has an existing infrastructure for salt storage comprising a salt dome with a salt storage capacity of 3,000t.

Access to the site is via the Ffrwdgrech Industrial Estate, South West of Brecon Town, off the A470 Trunk Road.

With the closure of Crickhowell depot, Ffrwdgrech manages the Trunk Road winter maintenance for the A40 in Powys. This has put pressure to maintain salt stock at the depot.

Existing buildings are poorly laid out which causes obstacles to the safe performance of the operations carried out at and from the depot.

The existing salt dome is conveniently located for receiving deliveries to the depot, but unable to receive more than two Lorries at a time due the lack of manoeuvring space, this can lead to lorries waiting outside the depot if the hauliers poorly plan the deliveries, causing congestion on the industrial estate.

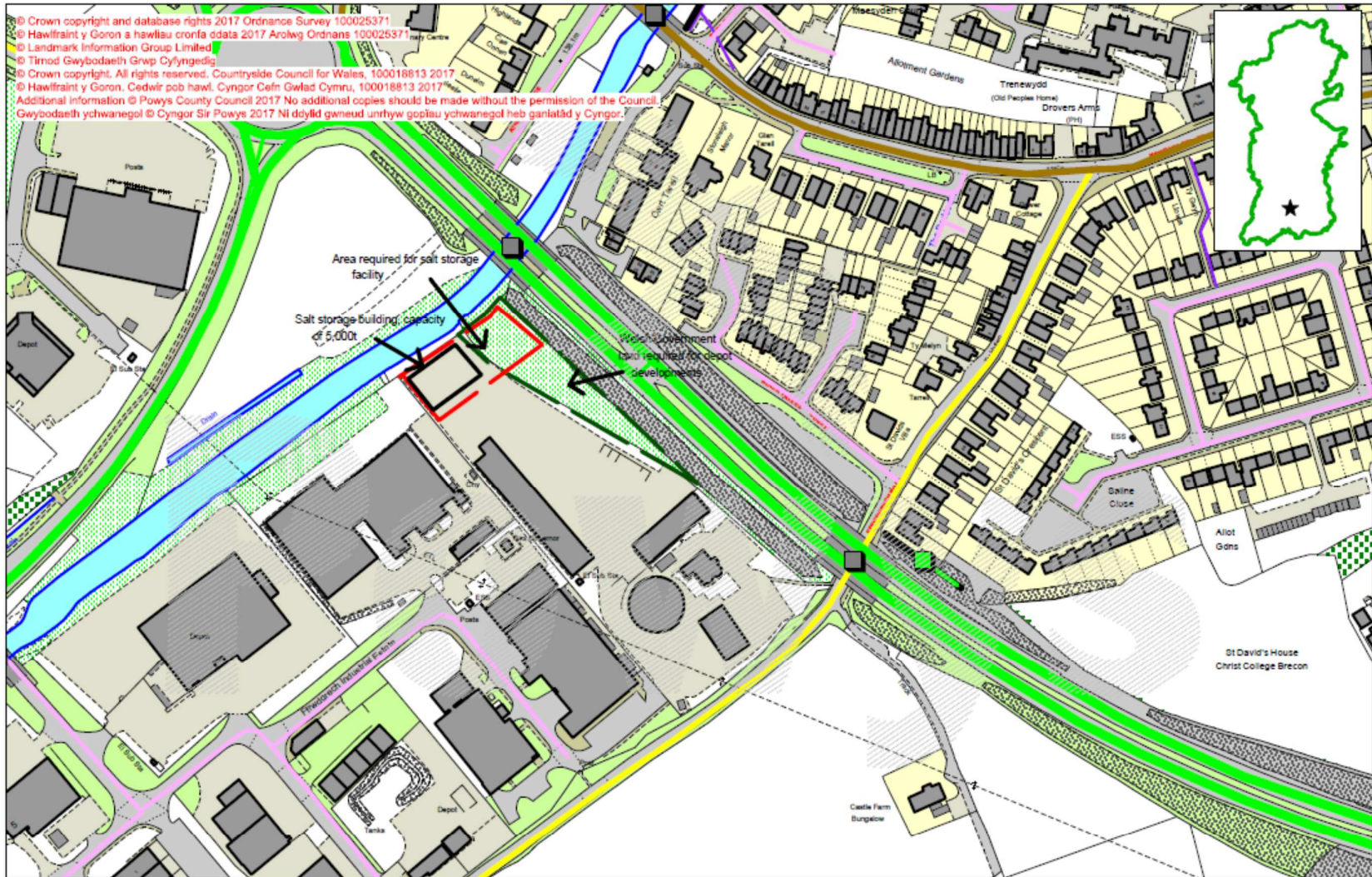
Space within the depot will be made available with the relocation of the refuse service off site also neighbouring WG land may be acquire which could be considered for depot developments.

It may be worth looking at the requirements of the Old Vicarage building and the relocation of the Highways garages / mess & training facility and staff car park.

Other developments within the depot will need to be considered if this site is progressed.

The site is located within the BBNP.

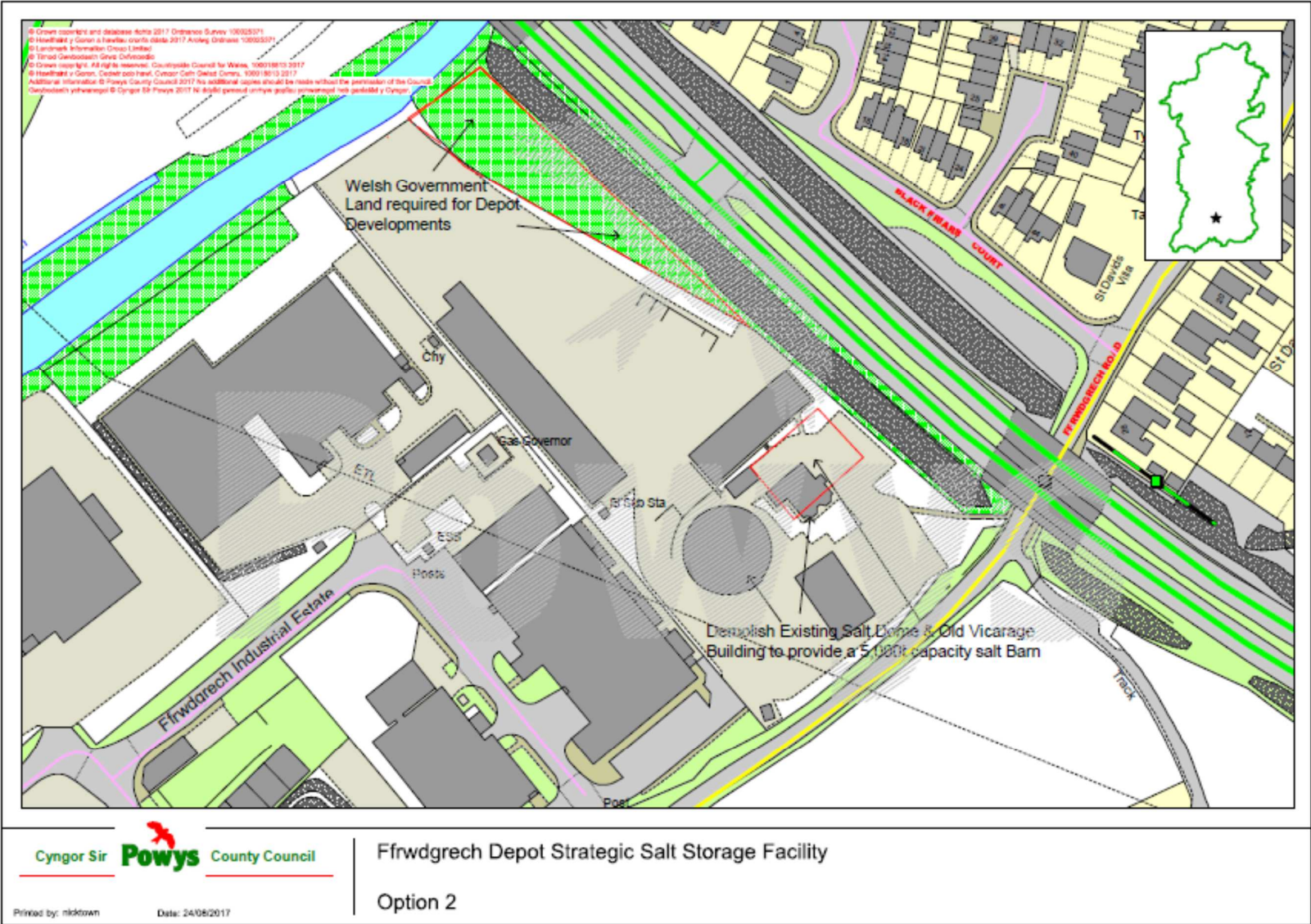
© Crown copyright and database rights 2017 Ordnance Survey 100025371
 © Hawfrant y Goron a hawliau cronfa o data 2017 Arolwg Ordnans 100025371
 © Landmark Information Group Limited
 © Tirnod Gwybodaeth Grwp Cyfyngedig
 © Crown copyright. All rights reserved. Countryside Council for Wales, 100018813 2017
 © Hawfrant y Goron, Cedwir pob hawl, Cyngor Cefn Gwlad Cymru, 100018813 2017
 Additional information © Powys County Council 2017 No additional copies should be made without the permission of the Council.
 Gwybodaeth ychwanegol © Cyngor Sir Powys 2017 Ni ddylid ganeud unrhyw gopïau ychwanegol heb ganiatâd y Cyngor.



Salt Storage Infrastructure Feasibility Report



Salt Storage Infrastructure Feasibility Report





Option 1 for Ffrwdgrech depot, relies on the acquisition of Welsh Government land adjacent to Brecon By-Pass. It would be necessary to relocate Fleet parking area and would require some drainage improvement works. The area would allow for ease of delivery of salt, provided that sufficient space is kept for vehicle movements. The location could be used for strategic salt storage only, keeping the existing dome in place, or as a larger replacement.

Option 2 for Ffrwdgrech depot would free up space at the far end of the depot and concentrate salt storage at the depot entrance end. It would comprise of a “super barn” to replace the existing salt dome.

Demolition of the Old Vicarage offices would be needed to accommodate the structure as well as the existing salt dome.
The existing drainage system for the salt dome could be utilised for the new facility.

Relocation of office staff would need reviewing and current leasing arrangements with the newly formed Heart of Wales Property Services Ltd. who use the Old Vicarage office would need consideration.

Staff parking facilities would also need reviewing as a number of available spaces will be reduced with the barn construction. This may be counterbalanced by the relocation of office staff.

Site 3 – Ffrwdgrech Industrial Estate (South East)

SO 03009 27725

SO030277 303009E, 227725N

Address: Ffrwdgrech Industrial Estate, Brecon LD3 8LA



This site is also on the Ffrwdgrech Industrial Estate at the opposite end to the highways depot.

PCC owned site which is currently vacant, previously used by recycling operators.

The shape of the site is not conducive to receiving salt storage facilities in that it tapers at the “closed end”. In this respect any significant sized building would need to be at the entrance, which could provide difficulty for delivery lorries unloading and turning within the site. Deliveries could impact on neighbouring businesses. Adjacent to the

Salt Storage Infrastructure Feasibility Report

entrance is the site of the public recycling centre owned by PCC. The site is very busy and this could hinder deliveries of salt.

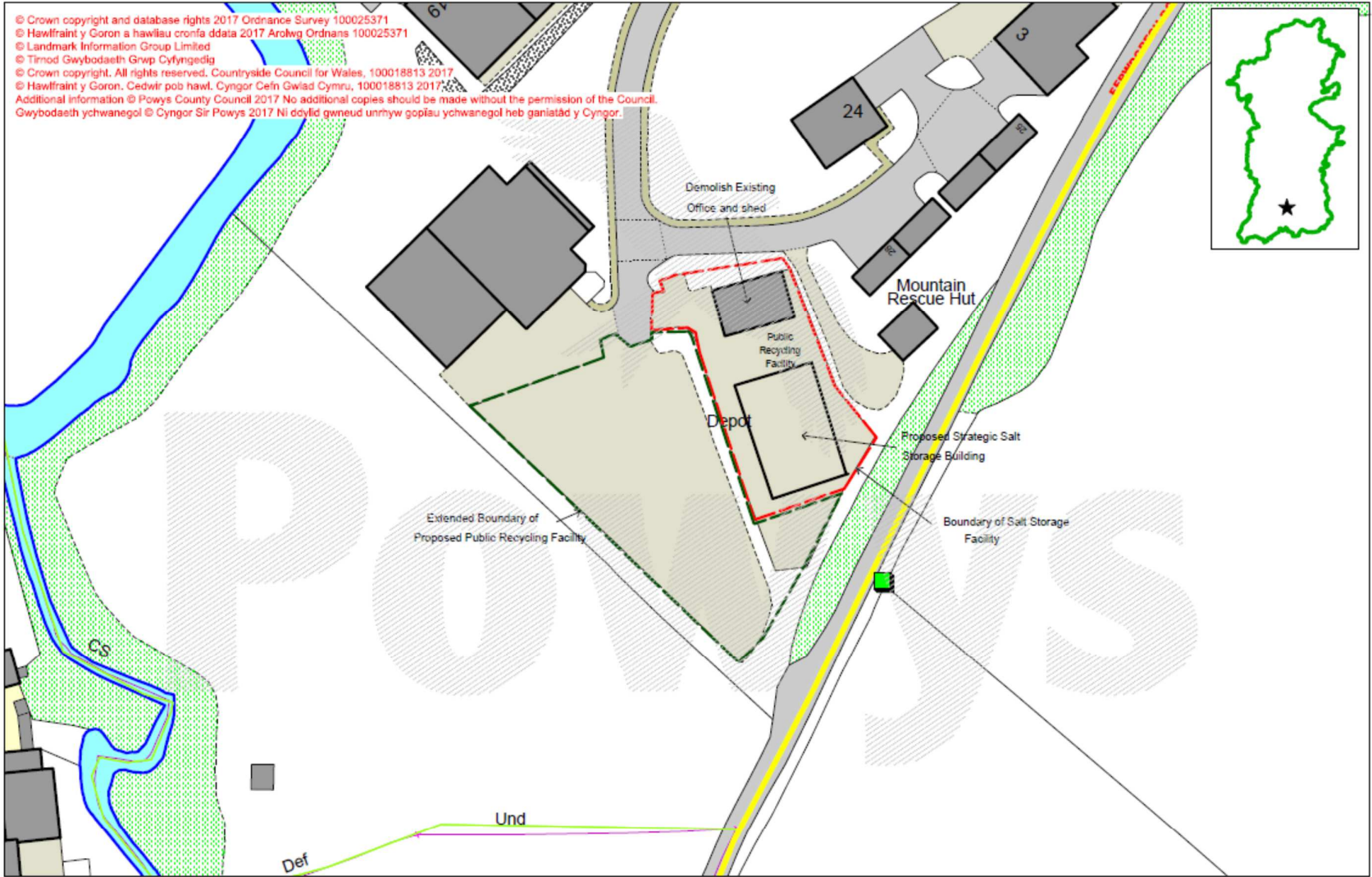
Also the site would require suitable drainage provision.

Alternative option (subject to planning consent) would be to swap with the recycling site, with the demolition of the recycling shed and office, salt barns could be constructed at the Ffrwdgrech Rd boundary of the site providing room at the access end to manoeuvre vehicles.

The land is within the BBNP.



© Crown copyright and database rights 2017 Ordnance Survey 100025371
© Hawfrant y Goron a hawliau cronfa ddata 2017 Arolwg Ordnans 100025371
© Landmark Information Group Limited
© Tirnod Gwybodaeth Grwp Cyfyngedig
© Crown copyright. All rights reserved. Countryside Council for Wales, 100018813 2017
© Hawfrant y Goron. Cedwir pob hawl. Cyngor Cefn Gwlad Cymru, 100018813 2017
Additional information © Powys County Council 2017 No additional copies should be made without the permission of the Council.
Gwybodaeth ychwanegol © Cyngor Sir Powys 2017 Ni ddylid gwneud unrhyw gopïau ychwanegol heb ganiatâd y Cyngor.



Site 4 – Crickhowell Depot

SO 22149 17009

SO221170 322149E, 217009N

Address: A4077, Crickhowell NP8 1HS



Crickhowell, Dan y Park depot, contains some buildings comprise of a garage, office & welfare facilities and material storage units. The depot has an existing infrastructure for salt storage comprising a salt barn with a salt storage capacity of 1,600t.

The depot has been decommissioned as an operational highways depot and is currently leased to an external company and has potential re sale value.

The salt barn is currently full to its capacity for use as additional back up salt storage.



Similar to Abercrave the depot is remote and poorly accessible from the main road network as there are restrictions to most approaches apart from Crickhowell which involves narrow congested roads and a single lane bridge.

However it is relatively close to the Trunk Roads – A40 & A479.

As a non-operational depot there is plenty of space available for salt storage facilities and as such could be considered for strategic salt reserve storage should it remain under PCC ownership.

Drainage in the area is historically poor – watercourse close by, suffered from flooding in the past. However there is a system currently in place to satisfy the operational use of the existing small salt barn.

Residential housing adjacent. Within the BBNP

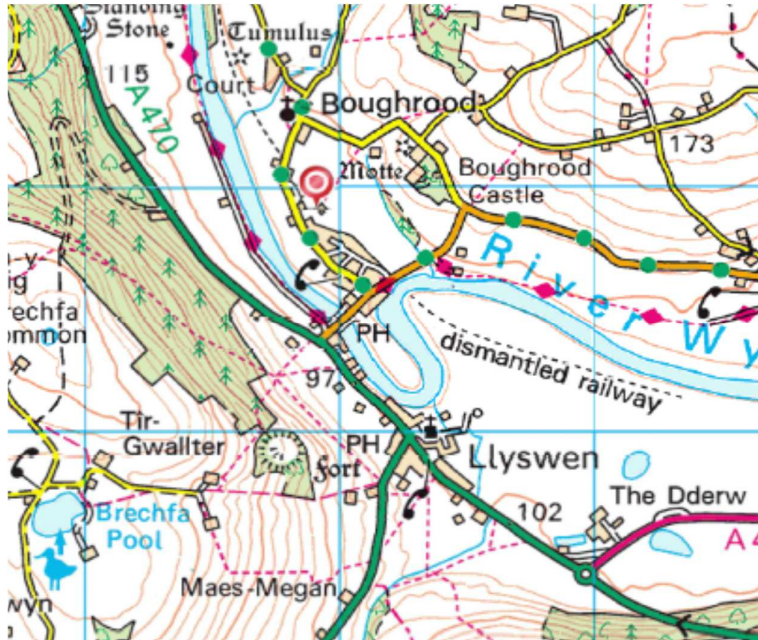
Site located in a depression below the A4077.

Site 5 – Boughrood Depot

SO 12833 38922

SO128389 312833E, 238922N

Address: Station Road, Bougrood, Brecon LD3 0YF





Boughrood depot contains a number of buildings comprise of materials storage shed with garage incorporated, storage units, offices and welfare facilities. The depot covers a vast area of land which has been used for open storage of a variety of construction materials collected over the years from capital works schemes. There is a vast area of unused, surplus land.

The depot has an existing infrastructure for salt storage comprising a salt barn with a salt storage capacity of 1,600t.

Good existing drainage infrastructure.

Delivery vehicles can be accommodated on site with ease.

Site issues with contaminated land, however the location of this is not certain. Gas monitoring has been undertaken with low results.

Residential properties surround site with a new development to the South, so planning may have objections. The site is just outside the BBNP

Due to the vast area of the site, there are a number of options available for the additional storage of salt:

Option 1 – Replace the existing barn with a larger capacity “super barn”. By keeping the storage facility at the present location would entail minimum amount of groundworks and utilise the existing drainage system. Planning objections could arise from the surrounding residential properties with the increased size of the structure, however the site is well screened by mature trees.

Option 2 – Retain the existing salt barn and provide a separate strategic salt storage building of 5000t capacity. The additional structure could be located adjacent to the existing barn with some drainage alterations to suit. The same planning objections as option 1 would apply.

Option 3 – Provide a smaller salt storage structure as an addition to the existing barn, the structure could have a 2500t capacity and be sited adjacent to the existing barn.

The advantage of this option is ease of operation in that during the winter season the site would have a capacity of near 4,000t, by the end of the season one barn could be

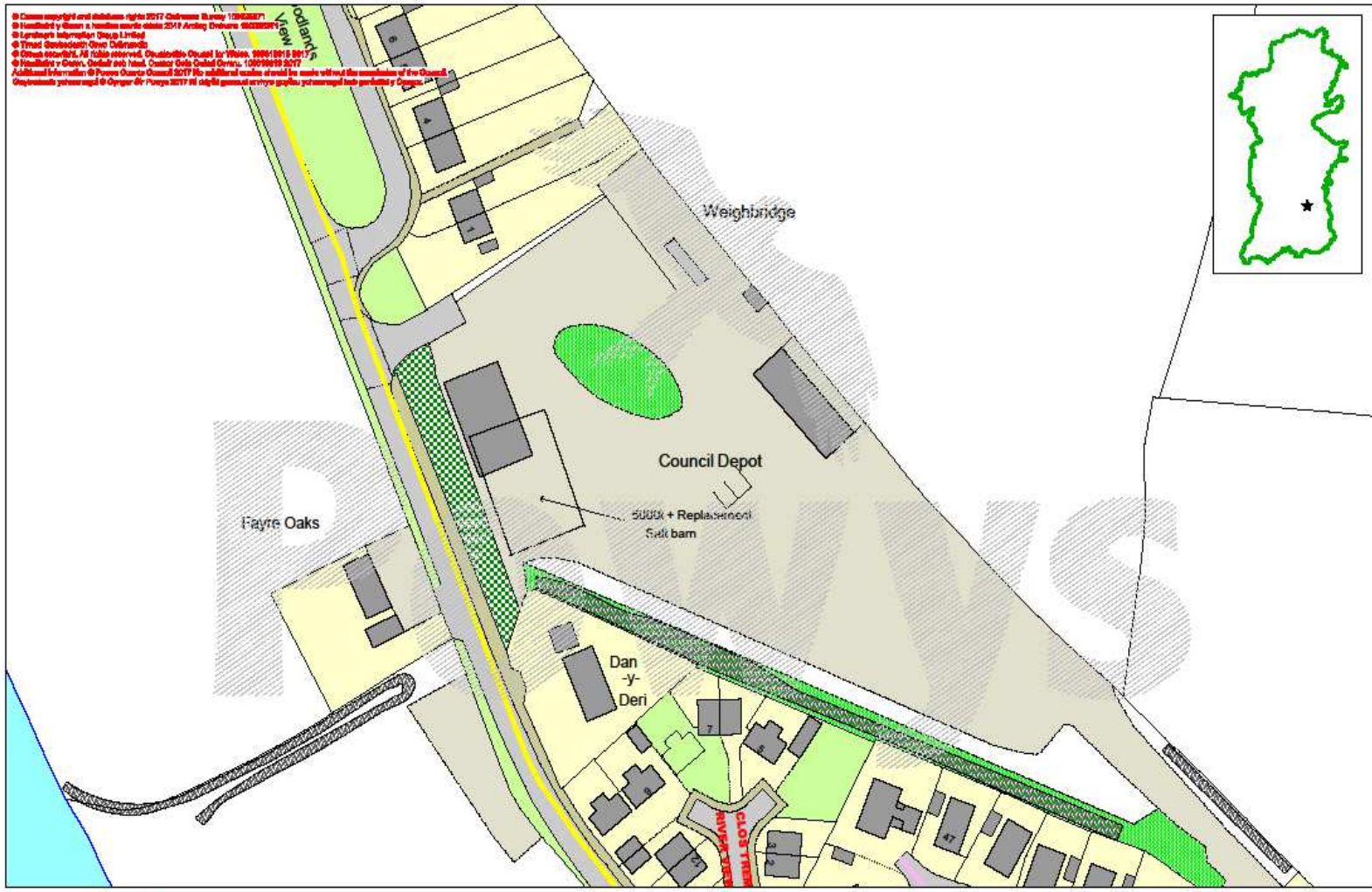
Salt Storage Infrastructure Feasibility Report

emptied to allow maintenance work to the structure whilst the salt stock is retained in the other building.

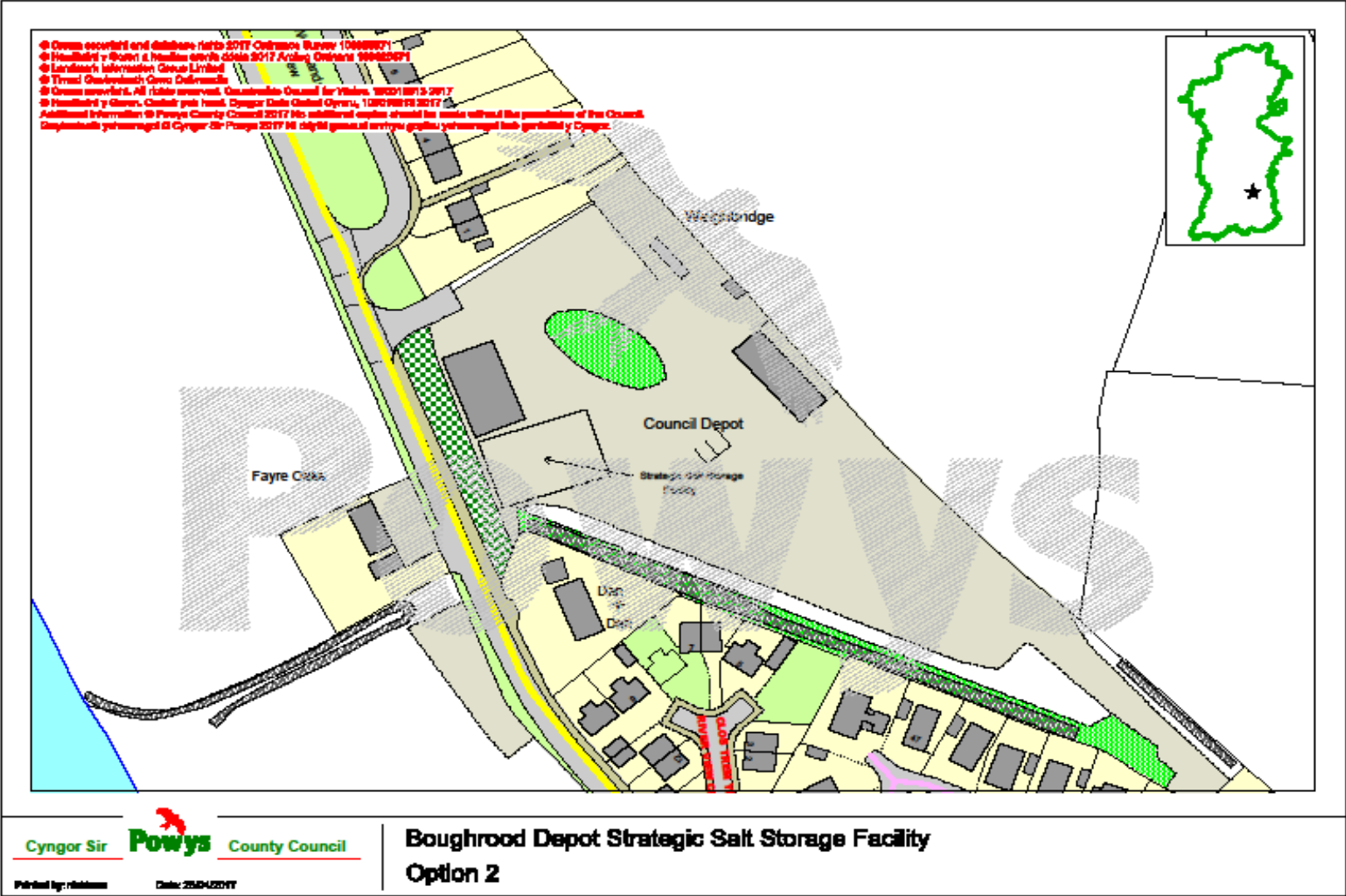
This also allows for a turn over of salt stock, ensuring that all the salt is used and not left at the back of the building.

The additional structure could be sited alongside the existing barn, therefore utilising the existing drainage system and would be less intrusive to the surround environment.

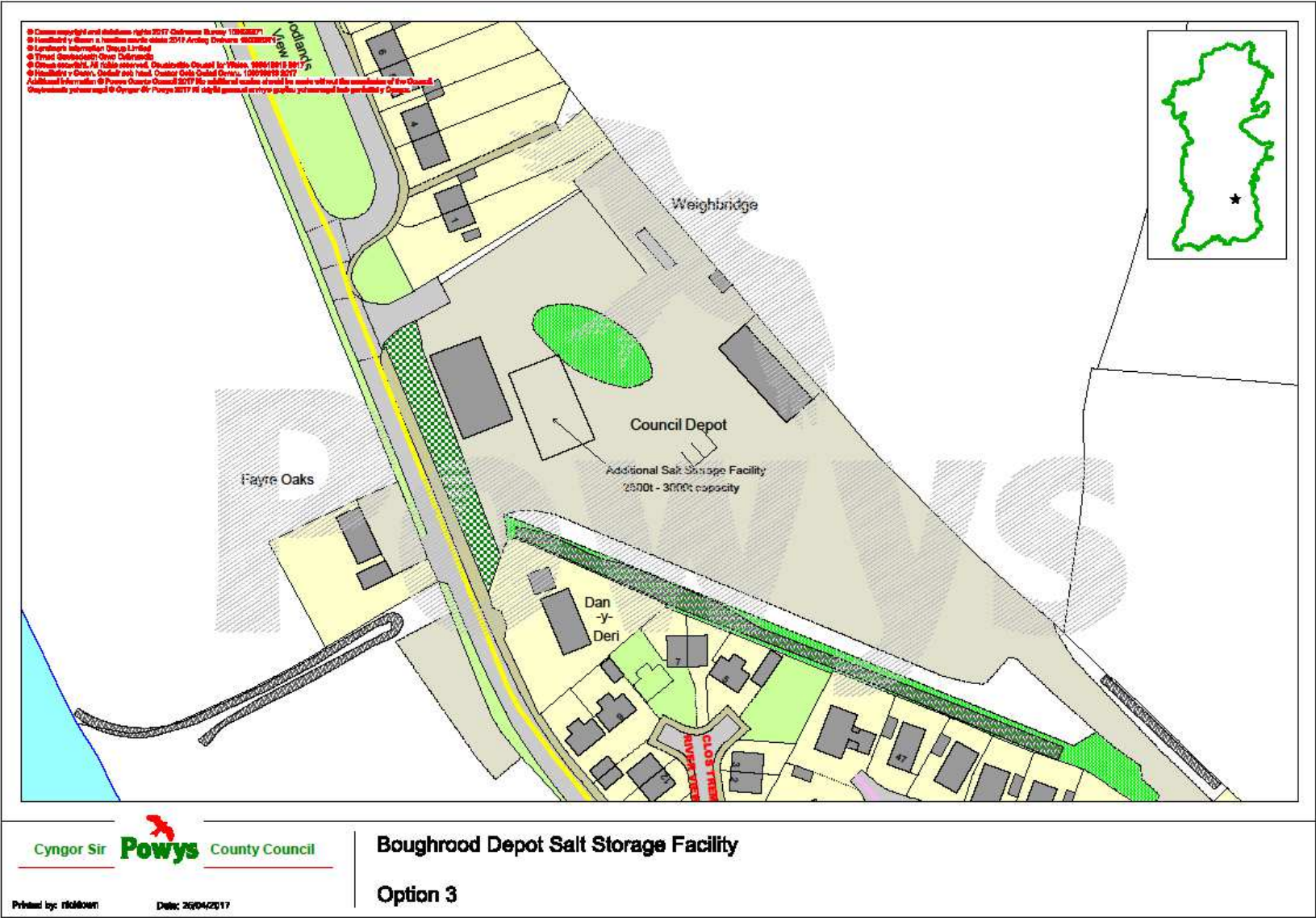
© Crown copyright and database right 2017 Ordnance Survey 100020371
 © Ordnance Survey & Ordnance Survey 2017 Ordnance Survey 100020371
 © Ordnance Survey & Ordnance Survey 2017 Ordnance Survey 100020371
 © Ordnance Survey & Ordnance Survey 2017 Ordnance Survey 100020371
 © Ordnance Survey & Ordnance Survey 2017 Ordnance Survey 100020371
 © Ordnance Survey & Ordnance Survey 2017 Ordnance Survey 100020371
 Additional Information © Powys County Council 2017 No additional copies should be made without the permission of the Council.
 Ordnance Survey & Ordnance Survey 2017 Ordnance Survey 100020371



Salt Storage Infrastructure Feasibility Report



Salt Storage Infrastructure Feasibility Report



Site 6 – Llangammarch Wells Depot

SN 934 13 47352

SN934473 293413E, 247352N

Address: Cammarch, Llangammarch Wells LD4 4BY



Llangammarch depot contains a number of buildings comprising of materials storage shed with garage incorporated, storage units, office building and separate welfare facilities. The depot has a large area of land in front of the existing salt barn which has been used for open storage of a variety of construction materials.

The depot has an existing infrastructure for salt storage comprising a salt barn with a salt storage capacity of 1,700t.



The site has scope to provide additional storage facilities without too much alteration of the existing infrastructure. The existing salt barn is situated in the middle of the site and provides a natural one way system around the site which would benefit delivery of salt.

Drainage system on site.

The site is screened by natural vegetation on all boundaries.

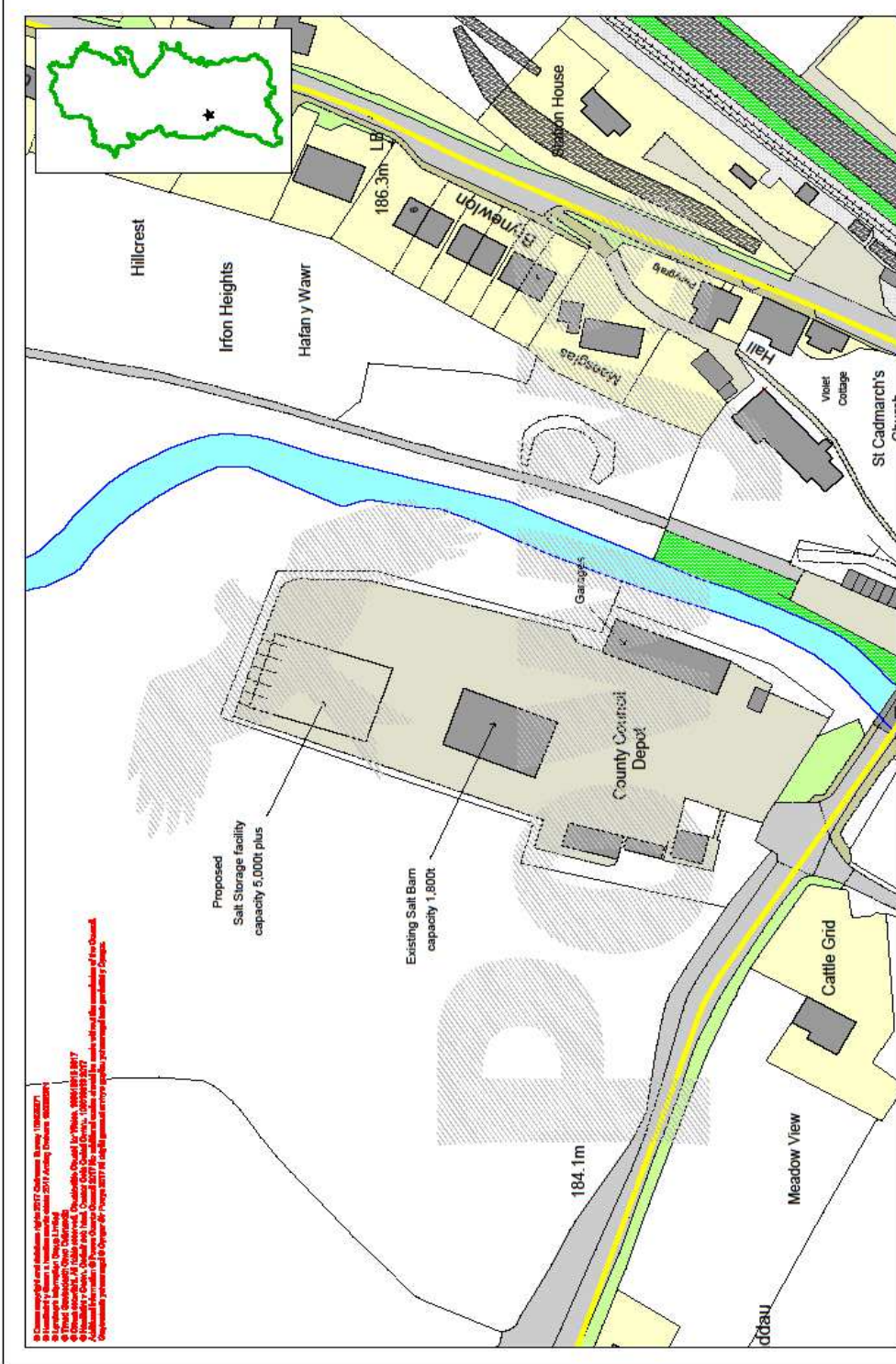
There is just the one residential property near by diagonally opposite the site entrance.

The location is in a relatively remote part of the highway network between Builth Wells and Llanwrtyd Wells near the County boundary with Carmarthenshire, with the nearest trunk road, the A483, accessed via the village of Garth, a distance of 3Km away. The depot provides the winter maintenance service for the A483 in the Mid East.

The options available are:

- To construct a multi purpose “super barn” to replace the existing salt barn of 4,000t – 5,000t capacity. This would free space in the depot with the demolition of the existing barn and allow ease of movement for delivery vehicles
- Provide a separate strategic salt storage structure of a maximum 5,000t capacity. This could congest the depot and restrict vehicle movements
- Provide a smaller capacity barn of around 2,500 – 3,000t , similar to option 3 at Boughrood depot, to supplement the existing facility.

In all cases the preferred location of the structure would be the North West corner of the depot where the existing drainage system can be utilised.



© Powys County Council 2017. All rights reserved. This document is the property of Powys County Council and is not to be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without the prior written permission of Powys County Council.

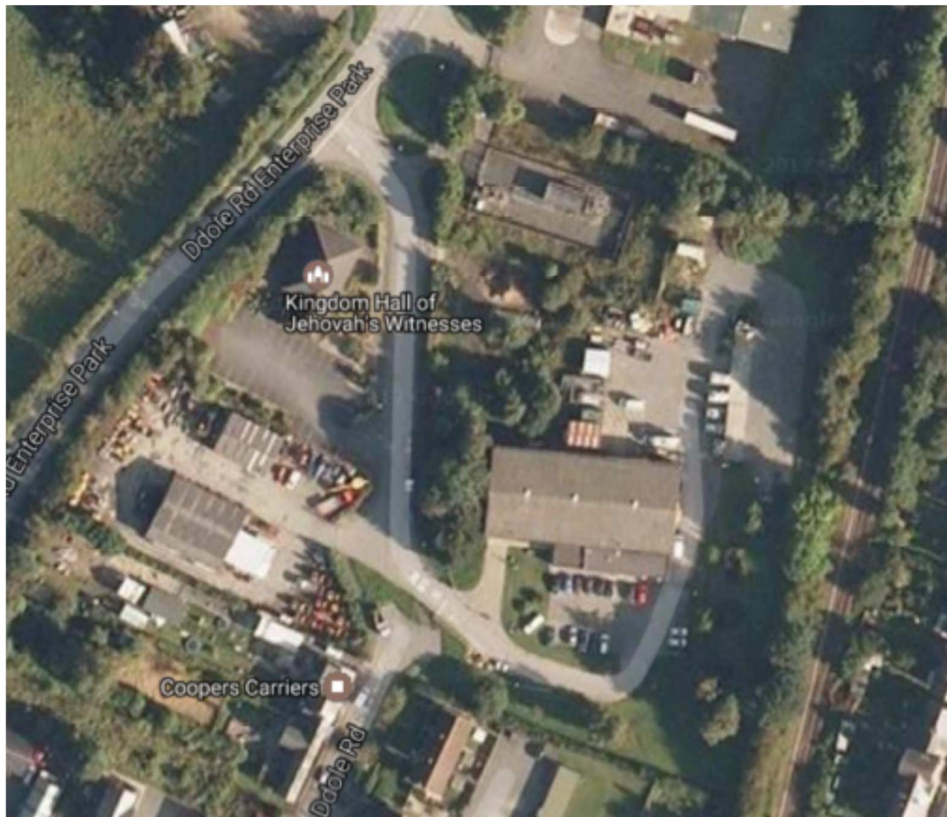
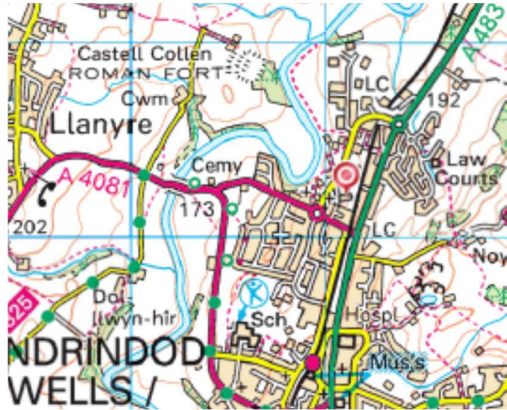
Proposed Salt Storage Facility Llangamarch Depot

Site 7 – Ddole Road Depot, Llandrindod Wells

SO 06106 62211

SO061622 306106E, 262211N

Address: Ddole Road Industrial Estate, Llandrindod Wells LD1 6PF



Ddole road depot is a compact site with no existing salt storage infrastructure.

Current use centres on Fleet Management and small plant with some highways / street lighting storage.

Salt Storage Infrastructure Feasibility Report

The site is on a split level with offices, workshops and greenhouses, a review of the requirements of these structures could open up sufficient space for salt storage facilities.

The site is within an industrial / enterprise park, although there are some residential properties fairly close by.

The site would require extensive alterations to receive a salt storage structure at a considerable cost, but may be worth consideration as a highways depot possibly replacing an existing depot.

Site 8 – Penybont Depot

SO 11713 64121

SO117641 311713E, 26412N

Address: A488 / A44 Penybont, Llandrindod Wells LD1 5UA



Penybont depot, contains a number of buildings comprising offices, welfare facilities, materials storage units and a large fleet workshop (no longer operational). The depot has an existing infrastructure for salt storage comprising a salt barn with a salt storage capacity of 1,600t.

With the closure of Presteigne depot, Penybont also manages the County Road winter maintenance for the far mid-East area of the County. This has put pressure on maintain salt stock at the depot.

Split level site with redundant workshops at the lower level.

Residential properties adjacent to depot – may be an issue with planning objections with structures and additional activities in winter.

Option 1:

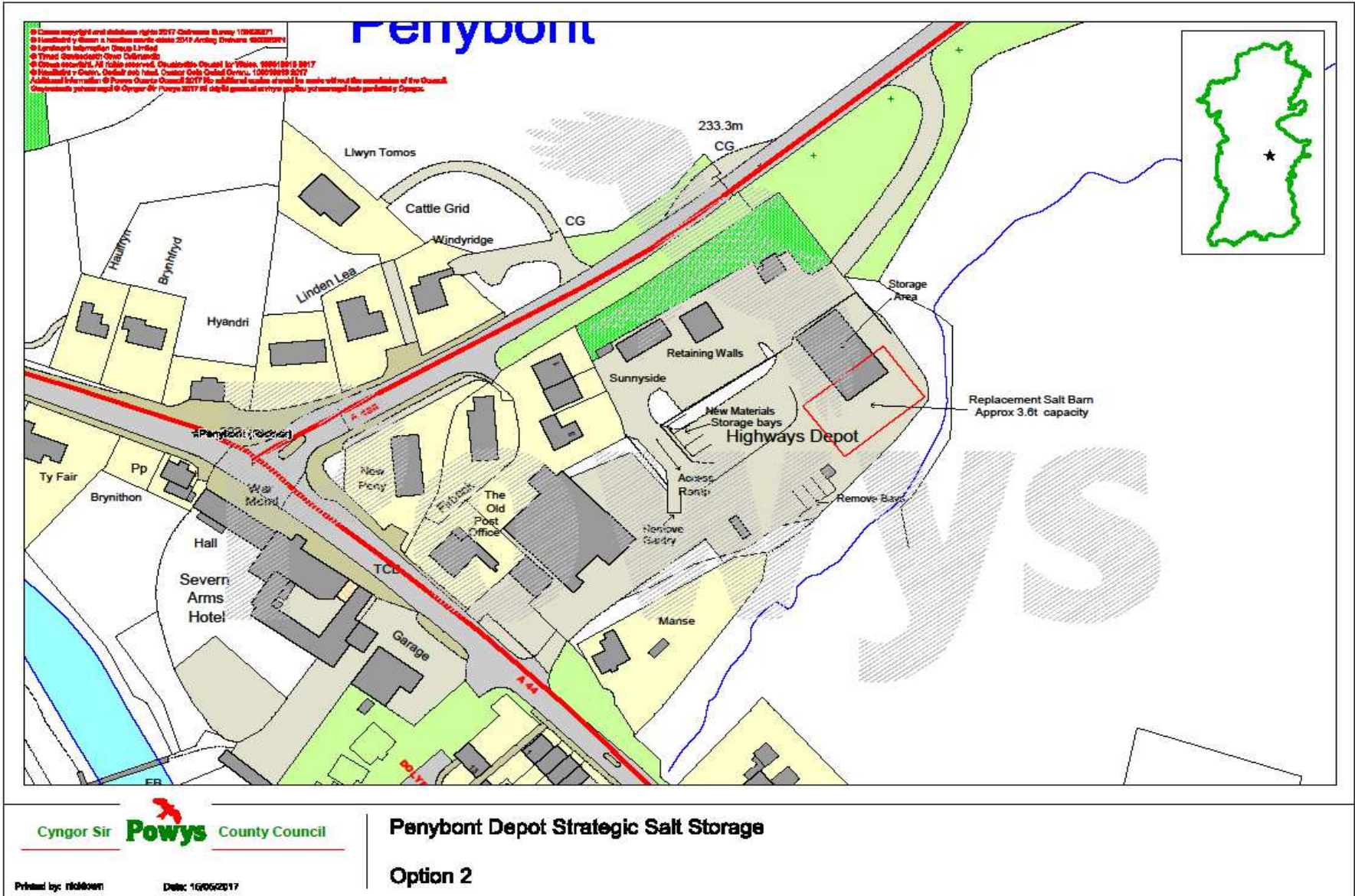
There is sufficient room for accommodating two salt barns of same capacity of the existing barn, providing an additional 3,400t on site, adjacent to the existing barn. Drainage system available close by which may need upgrading.

To provide a level area for the new barns and relocation of the materials bays, retaining walls will need to be constructed to retain the upper level used for parking.

Workshop area could be used for material storage and plant/equipment/vehicle parking.

A one way system could be used with entry from the common and exit onto the A44, although this may be an issue when salt is being unloaded.

Salt Storage Infrastructure Feasibility Report



Option 2:

Replacement of the existing barn with a larger capacity barn (4.5 – 5t capacity). The new barn would be rotated 90 degrees to the existing and retaining walls constructed to retain the existing higher level of the site. This would provide additional storage space within the depot. The disadvantage of this option is the requirement to temporarily store the salt during demolition and construction.

Site 9 – Presteigne Depot

SO 31240 64746

SO312647 331240E, 264746N

Address: Mill Lane, Presteigne LD8 2DA



Presteigne depot, contains some buildings comprise of a garage, office & welfare facilities and material storage units. The depot has an existing infrastructure for salt storage comprising a salt barn with a salt storage capacity of 1,600t.

The depot is no longer operational and the salt barn decommissioned.

Drainage system in the yard has not been confirmed, but is assume sufficient for the existing facilities.

Access to the yard is poor via narrow residential streets.

Depot is situated in a remote area of the County with no major class I roads connecting.

Site 10 – Kirkhamsfield Depot, Newtown

SO 116917

SO116917 311691E, 291792N

Address: Pool Rd, Kirkhamsfield, Newtown SY16 3AF



Kirkhamsfield depot, Newtown, contains numerous buildings housing different service area functions of Powys County Council. The buildings comprise of materials storage sheds and storage units, twin fleet workshops, offices and welfare facilities, training sheds. The North & Mid Wales Trunk Road Agency also rent a section of the offices.

The depot has an existing infrastructure for salt storage comprising a salt barn with a salt storage capacity of 1,600t.

Access to the site is via the A483 (current – pending reclassification on completion of Newtown By Pass), Pool Road, North of Newtown Town centre. Residential properties adjacent to the South, however the location is predominantly a commercial / industrial area.

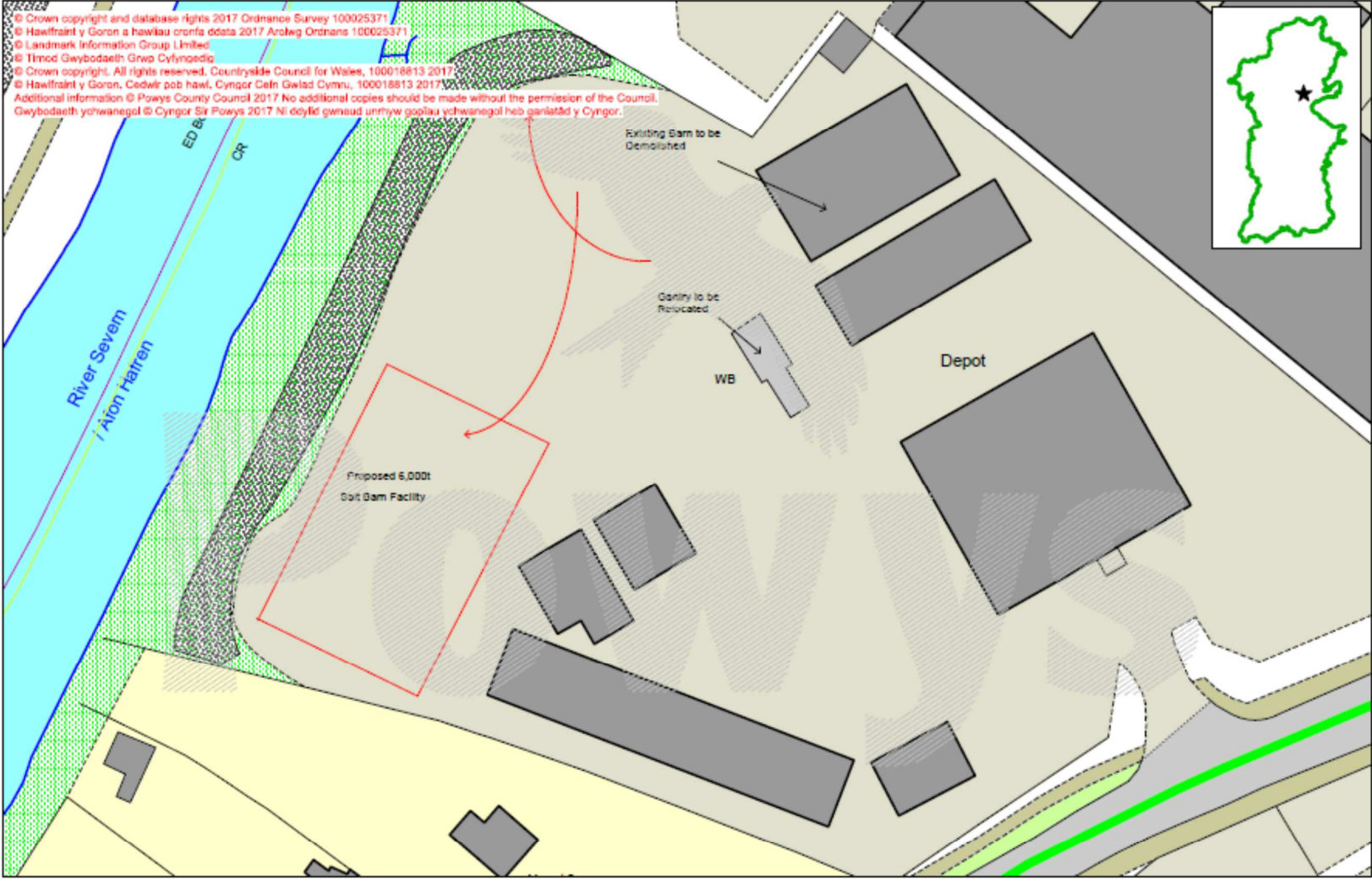
There are other infrastructure project being considered for Kirkhamsfield depot which will need consideration in planning the location of an additional salt storage facility or a larger facility to replace the existing barn.

The relocation of the refuse and recycling services would release space in the depot; improvements to the fleet management facilities would likely to require more space.

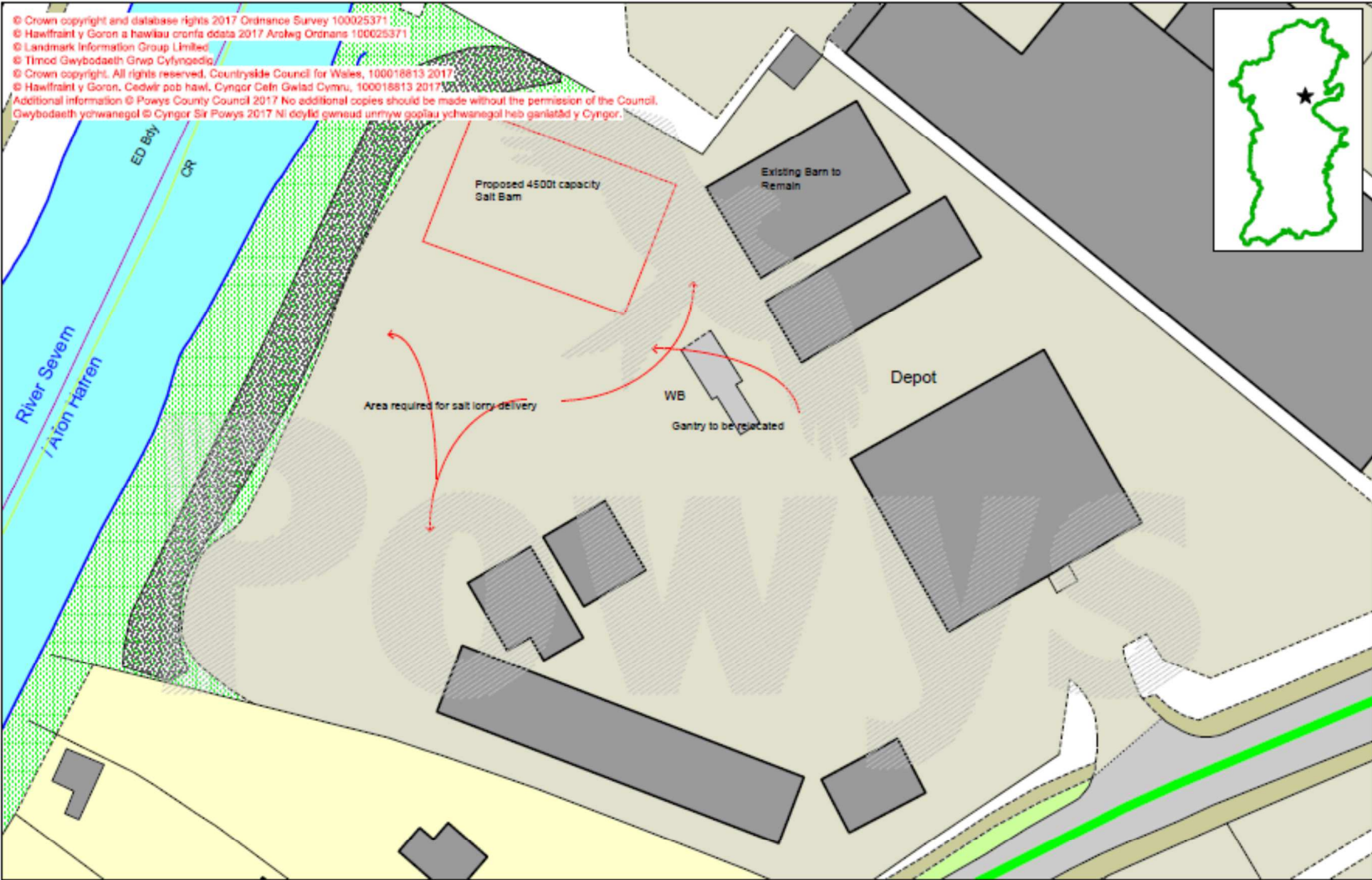
The existing salt barn presents some operation problems in that the large opening that is West facing, suffers from driving rain which causes some wash out of the salt stock when full. Also the portal is not high enough to allow the full tipping of the articulated lorries. Therefore it may be best to consider a larger replacement storage building on the site.

Alternative to one replacement barn, the existing barn could be retained and small barns could be sited close by as suggested for Boughrood and Penybont with the advantages of easy maintenance previously mentioned

© Crown copyright and database rights 2017 Ordnance Survey 100025371
© Hawffraint y Goron a hawliau cronfa ddata 2017 Arolwg Ordnans 100025371
© Landmark Information Group Limited
© Tîmrod Gwybodaeth Grŵp Cyfymedig
© Crown copyright. All rights reserved. Countryside Council for Wales, 100018813 2017
© Hawffraint y Goron, Cedwir pob hawl, Cyngor Cefn Gwlad Cymru, 100018813 2017
Additional information © Powys County Council 2017 No additional copies should be made without the permission of the Council.
Gwybodaeth ychwanegol © Cyngor Sir Powys 2017 Ni ddylid gwneud unrhyw gopïau ychwanegol heb ganiatâd y Cyngor.

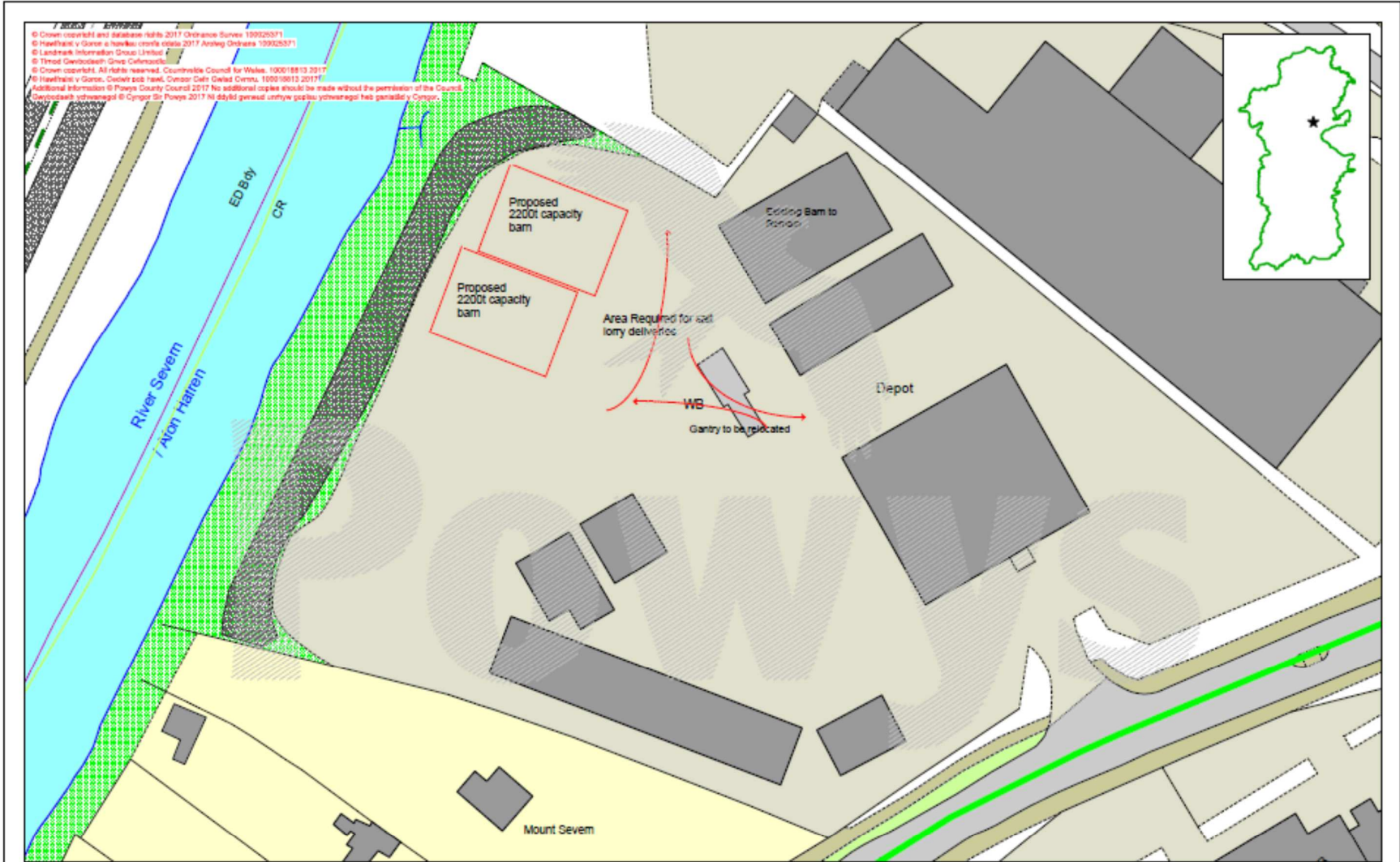


Salt Storage Infrastructure Feasibility Report



© Crown copyright and database rights 2017 Ordnance Survey 100025371
© Hawffraint y Goron a hawliau cronfa ddata 2017 Arolwg Ordnans 100025371
© Landmark Information Group Limited
© Tlmod Gwybodaeth Grwp Cyfynodiad
© Crown copyright. All rights reserved. Countryside Council for Wales, 100018813 2017
© Hawffraint y Goron. Cedwir pob hawl. Cyngor Cefn Gwlad Cymru, 100018813 2017
Additional information © Powys County Council 2017 No additional copies should be made without the permission of the Council.
Gwybodaeth ychwanegol © Cyngor Sir Powys 2017 Ni odydd gwneud unrhyw gopïau ychwanegol heb ganiatâd y Cyngor.

Salt Storage Infrastructure Feasibility Report



Site 11 – Penstrowed

SO 07137 91010

SO071910 307137E, 291010

Address: A489, Penstrowed, Caersws SY17 5SG



Compact site with no existing salt storage facilities or general structures, currently used for open storage – no suitable drainage system.

Adjacent to Trunk road.

Deliveries would be an issue – little room for lorry movements, likelihood of lorries queuing on Trunk road. Limited access options – insufficient space for recessed gate entry. Present entry via County road close to TR junction – not suitable for salt deliveries. Alternatives would be directly off the TR – too close to County Rd junction or top end of site on the County Rd – road too narrow to accommodate articulated lorries turning on to site.

Residential properties close by – possible planning issues.

Exposed site, very open – would need environmental screening which would be a problem due to height of structure and limited space on site.

Site not suitable.

Site 12 – Llanidloes Depot

SN 95808 84737

SN958847 295808E, 284737N

Address: B4518, Victoria Avenue, Llanidloes SY18 6BA



Llanidloes depot, contains some buildings comprise of office & welfare facilities and material storage units. The depot has an existing infrastructure for salt storage comprising a salt dome with a salt storage capacity of 2,500t, situated on a separate site above the highways depot with an entrance off the B4518, close to the A470 roundabout of the Llanidloes by pass. Both sites has little capacity to provide additional storage, in particular the salt dome site, as an additional structure here would hinder the existing efficient delivery process.

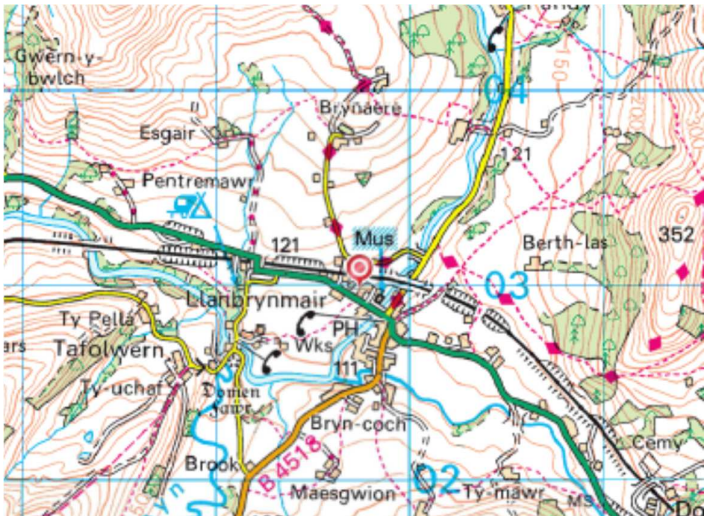
The WG strategic salt storage facility is close by and it may be preferable to provide a similar facility in another part of the County (Mid or South Powys)

Site 13 – Llanbrynmair Depot

SH 89739 02985

SH897029 289739E, 302985N

Address: Bryn Meini, Llanbrynmair SY19 7AA



Llanbrynmair depot is a large site with very little structures, only a large multi function shed. The depot does not have any formal infrastructure for salt storage, but does hold 800t of salt in open heaps.

The depot has development potential for a salt storage facility, however its use as an operational depot is limited with regard to winter maintenance. It is also subject of the depot rationalisation plans.

Drainage infrastructure is unknown and may require improvements to provide the legislative requirements.

However as a strategic salt storage facility, its location may be considered remote to the network and relatively close to the Llanidloes facility.

Site 14 – Llanfyllin Depot

SJ 14652 19139

SJ146191 314652E, 319139N

Address: High St, Llanfyllin SY22 5BQ



Llanfyllin depot, contains some buildings comprise of a garage, office, welfare facilities and material storage units. The depot has an existing infrastructure for salt storage comprising a salt barn with a salt storage capacity of 1,600t.

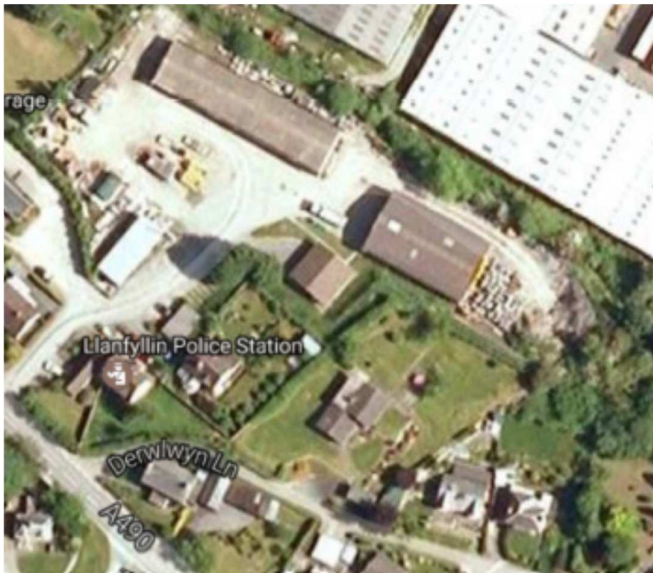
Salt Storage Infrastructure Feasibility Report

There is limited space for additional storage facilities, but with some reconfiguration of the existing infrastructure it would be feasible, however this would also involve alteration of the drainage system.

The depot does not serve the Trunk Road network, however the current salt storage is sufficient for the County area it serves.

Access in and out of the depot is narrow and shared by third parties who occupy adjacent properties.

Close to the A490 class I road which has connections to the main County class I & II network.



Site 15 – Welshpool Depot

SJ 22879 06639

SJ228066 322879E, 306639N

Address: Severn Lane, Welshpool SY21 7DF



Welshpool depot, contains some buildings comprise of a garage / material storage shed, office and welfare facilities and material storage units. The depot has an existing infrastructure for salt storage comprising a salt dome with a salt storage capacity of 3,000t.



Salt Storage Infrastructure Feasibility Report

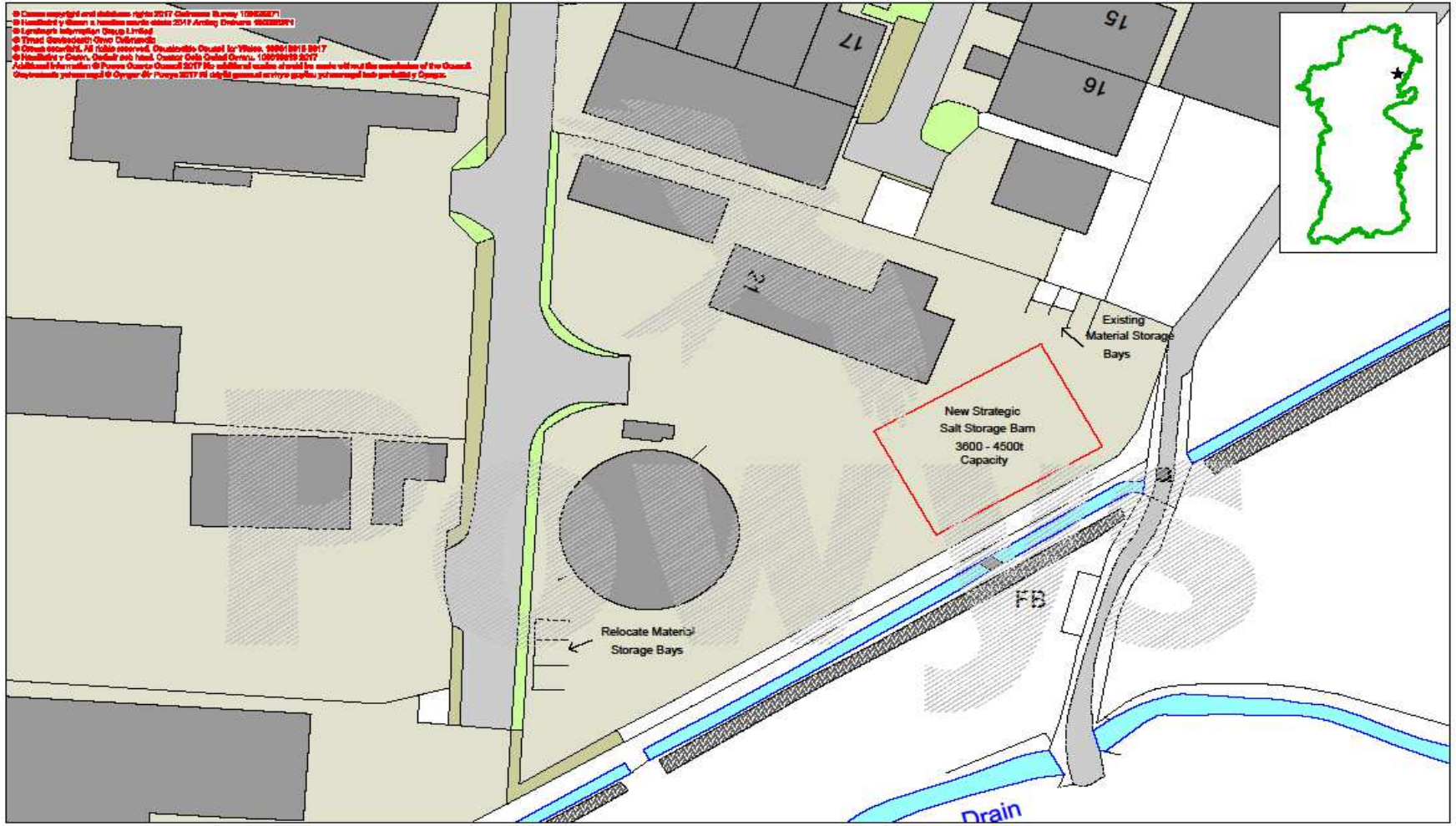
Welshpool depot is a compact site with little additional capacity.

However the freeing of space with the transfer of Refuse services could allow a reconfiguration of general storage areas and may provide sufficient space on the East side of the site for a salt barn.

Improvements / alterations to the drainage system would be required.

There is a good network communications to the A483 / A458 Trunk Roads.

© Crown copyright and database rights 2017 Ordnance Survey 100026271
 © Landfill & Sites & Remediation Practice 2019 Arding Division 000000000
 © Landmark Information Group Limited
 © Tarmac Construction Group Deliverables
 © Crown copyright. All rights reserved. Ordnance Survey Licence 100018918 2017
 © Ordnance Survey, Details not final. Contact Geospatial Centre, 100018918 2017
 Additional information © Powys County Council 2017 No additional content should be added without the permission of the Council.
 Cynnyddol ymstrwyngol © Cynghorir Powys 2017. Ni ddigwydd gwasanaethau awyrlu ychwanegol heb ganiatâd y Cynghorir.



Site 16 – Outside Powys

The final consideration is to provide strategic salt storage outside the County, which could be at a location close to the supply, such as the dock or a neighbouring authority, probably within the boundary of the North & Mid Wales Trunk Road Agency on land owned by WG.

NMWTRA have indicated that Powys could have access to the wider stock from their strategic store at Parc Hafren, Llanidloes for use on the Trunk Road Network and such a deficiency therefore would not restrict Powys from gaining access to strategic salt stores for Trunk Road operations.

Use of existing WG strategic salt stores for County operations could be an option with agreements put in place with NMWTRA / WG. This option could place a strain on the County revenue budget annually depending on the type of agreement, such as a fixed retention charge, whether the County accesses the stock or not.

Political “will” would be needed for out of County storage and the complications of transportation and accessibility issues would possibly hinder the business case. Likewise constructing our own storage building on WG land would incur similarly costs, or possibly more, to that if using one of our own existing sites.

Current Storage Capacity

Depot Salt Storage per Operational Service Requirements

Operations Depot	Route	County Km	Trunk Km	Total Km	Ave Salt used (based on 15g/sm) Tonne	Ave Salt used per depot (15g/sm run) Tonne	Current Salt Storage Capacity Tonne	Number of runs possible (15g/sm) per max. storage capacity	Comments
Abercrave	A1FT	33.1	0	33.1	3.4				
Abercrave	A2FT	22.02	11.46	33.48	3.7	7.1	2500	352	
Brecon	B DTR	1.57	0	1.57	0.16				
Brecon	B1FT	26.29	12.27	38.56	3.9				Brecon currently uses
Brecon	B2FT	14.41	27.75	42.16	4.6				surplus salt from Abercrave
Brecon	B3FT	34.27	0.52	34.79	3.5				or Crickhowel as emergency
Brecon	B4FT	52.72	0	52.72	5.1				stock
Brecon	B5FT	2.98	53.74	56.72	6.2	23.46	3000	128	
Boughrood	BO1FT	32.92	17.74	50.66	5.3				Crickhowel used as
Boughrood	BO2FT	42.4	9.66	52.06	5.4	10.7	1600	149	Emergency stock
Llangammarch	LG1FT	27.64	16.73	44.37	4.7				
Llangammarch	LG2FT	16.18	48.27	64.45	7.1				
Llangammarch	LG3FT	47.16	0	47.16	5.2	17	1600	94	
Penybont	P1FT	32.5	23	55.5	6.1				Prestegne used as
Penybont	P2FT	46.83	0	46.83	5.1				emergency store, holding
Penybont	P3FT	62.55	0	62.55	6.7				1600t of salt increasing run
Penybont	P4FT	55.43	0	55.43	5.9	23.8	1600	67	capacity to 134

Salt Storage Infrastructure Feasibility Report

Operations Depot	Route	County Km	Trunk Km	Total Km	Ave Salt used (based on 15g/sm) Tonne	Ave Salt used per depot (15g/sm run) Tonne	Current Salt Storage Capacity Tonne	Number of runs possible (15g/sm) per max. storage capacity	Comments
Newtown	N DTR	15.16	0	15.16	1.5				
Newtown	N1FT	22.16	23.89	46.05	5				
Newtown	N2FT	40.93	0	40.93	4.4				
Newtown	N3FT	32.39	13.56	45.95	4.8	15.7	1600	102	
Llanidloes	LD1FT	33.41	18.88	52.29	5.5				
Llanidloes	LD2FT	43.95	35.29	79.24	8.3	13.8	2500	181	
Llanbrynmair	LB1FT	9.45	29.51	38.96	4.2	4.2	800	190	
Welshpool	W1FT	47.79	12.95	60.74	6.5				
Welshpool	W2FT	38.25	4.72	42.97	4.5				
Welshpool	W3FT	31.26	12.33	43.59	4.6				
Welshpool	W4FT	11.53	51.77	63.3	6.9	22.5	3000	133	
Llanfyllin	LF1FT	69.46	0	69.46	7.2				
Llanfyllin	LF2FT	53.84	0	53.84	5.5	12.7	1600	126	
Totals		1000.55	424.04	1424.59	150.96				

Salt Storage Structures – Available Options



De Boer All Weather Hall

Salt Storage Infrastructure Feasibility Report



Constructed for Derby City Council

Salt Storage Infrastructure Feasibility Report

Built within the Council's existing depot, it has the capacity to store 5,000t of salt, doubling its previous stock held. The structure was completed in 11 weeks.

Constructed from a robust galvanised steel frame with high walls and a clear span allowing to optimise the space available, stabilised by steel wind braces in the roof and side walls. Industrial grade PVC roof. Complies to EN NEN 13782, ISO 9001 & 14001.

Service life guarantee of 20 – 25 years.

Cardiff City Council has also used a similar design at their Brindley Road depot:

1. 30m deep by 20m wide structure
2. Cost around £350,000 to construct
3. Holds 4,750 tonnes of salt
4. Has been in use since November 2011

The Cardiff structure has been built with a fabric wall cladding, which hasn't been too successful in recent years and therefore we would need to look at other cladding options which would add to the cost.



Salt Domes



Dome Uk Salt Dome, PCC Welshpool Depot



Dome UK have supplied 4 salt domes to Powys County Council, most of which were constructed about 20 years ago.

Timber domes provide optimum salt storage and are marketed in offering long term returns with minimal maintenance costs – the construction process and storage conditions are intended to ensure that losses are as low as they can be and ensuring savings are maximised.

These include obvious savings from avoiding leaching and overspreading, together with those that are often forgotten – savings resulting from increased route lengths, reduced labour costs and reduced machinery maintenance.

Low cost foundations; domes by their very nature are self-supporting structures, meaning no heavy below-ground foundations are needed. They can be built on a standard asphalt or concrete base. On very poor ground the dome itself can be supported on piles, independent of the storage area, meaning no compromise in functionality.

Timber dome storage will ensure that salt stocks are maintained in prime condition. Stock rotation is unnecessary, making summer and top-up stocking simple, efficient and fast. Domes are idea for making provision for large strategic stocks.

The continuous design of the dome structure ensures that, apart from the door, there are no gaps through which salt can escape. If the dome is designed to incorporate inside delivery vehicle tipping and gritter loading, then there is little need to provide special foul drainage. The roof drainage can itself be directed to surface water collection or alternatively be used for rainwater harvesting.

Visual impact of the domes are lower than that of high barns as the natural curved profile blends into many settings, the roof of the dome has a wide choice of colours to blend in with the surrounding environment.

The very high hoop strength of the walls make them more resistant to shovel impact than straight walls.

The dome's high entrance can be designed especially for inside tipping. Can also accommodate more inside working and loading by increasing the internal area.

McGregor Fabric Structures





McGregor Fabric Structures manufacture salt storage buildings that provide secure coverage for salt and sand, based in Hampshire.

Salt storage buildings ensure salt and sand stocks remain dry, enabling even spreading of the stored material. This substantially reduces the ongoing costs of salt storage, increases storage capacity and enhances the usefulness of the salt itself.

These buildings can be moved to new locations quickly as requirements change, this makes them very cost effective and flexible for the long term.

- **Reduced vehicle movements**
- **Higher quality gritting products**
- **Ability to purchase and store salt when the costs are lower**
- **Reduced environmental impact**

The buildings are clear-span facilities with front or side entry enabling road gritting supplies to be moved securely under cover.

- **Fast manufacture and installation times**
- **Low capital expenditure and reduced ongoing costs**
- **Flexible buildings can be extended or moved**
- **Long lasting materials**
- **Highly trained construction teams**

Clear span widths are from 10.00m to 30.00m according to site requirements.

Buildings are manufactured from hot-dip galvanised steel framework clad in heavy duty PVC cladding giving a light environment that provides excellent working conditions and is guaranteed to last in the conditions.

Structures are anchored either directly to a concrete pad or footings. Precast concrete blocks or walls of all shapes and sizes can be fastened to.

- 1/ Fast manufacture and installation
- 2/ Low capital expenditure
- 3/ Flexible buildings can be expanded and moved
- 4/ Long lasting materials

Rubb Building Systems



Port of Workington | Workington, UK

The Port of Workington offers high quality **storage facilities** in the form of two relocatable Rubb constructed ports buildings.

The **ports structures** measure 25m span x 32m length and 25m span x 61m in length. These port facilities provide storage space for animal feed and protection from the elements and light. The design features a split storage capability.

As this part of the west coast of England is susceptible to severe winds and rain, the storage systems were constructed on top of 4m retaining walls. The walls consist of a steel support structure complete with pre-stressed concrete infill panels, which allow for quick and easy construction. This method provides a fully sealed facility to prevent water ingress and also allows for internal retaining walls to be built for different storage needs.

The client required a dark covered **port storage facility** as animal feed needs to be protected from light, however the translucent PVC material used on other Rubb ports projects provides a brighter working environment without the need for windows.

Gateshead Council Salt Barn

Rubb Buildings Ltd designed, manufactured and installed a custom salt storage barn to support Gateshead Council's expanding winter road maintenance plans.

Rubb provided a custom designed salt barn that sits on top of a 3m high concrete supporting wall. The salt storage structure measures 30m wide x 30m long with a tapered leg height of 5m. The overall height of the storage facility is 13m.

The building benefits from an open front gable end to maximize storage space and accessibility. To accommodate this large opening, the rear gable of the building was reinforced with anti-flap pvc pockets to prevent fabric damage due to strong winds.

Salt Storage Infrastructure Feasibility Report



Rubb came up with this flexible storage facility to meet the specific perimeters set by **Gateshead Council**, including conforming to planning restrictions for the colour of the building, which was clad in goosewing grey and white fabric. Rubb also met the required local building codes throughout the project.

Specification

Span: 30 m
Overall length:
Eaves height: 5 m
Overall height: 13 m
Clear area: 900 sq m

Conclusion and Summary

The scope of the project includes the following work streams:

1. Evaluate the optimisation proposal of the winter network, and ensure new infrastructure correlates with this strategy
2. Review existing assets and identify sites capable of housing further salt stocks
3. Establish a preferred option
4. Undertake surveys, produce preliminary designs and gain planning permissions & other consents
5. Detailed Design and procurement
6. Supervise construction of new infrastructure

This feasibility report has outlined the options available reviewing the existing assets within the County and considering external options.

Reviewing the 16 site options the disadvantages highlighted suggest that Abercrave, Crickhowell, Ddole Road, Presteigne, Penstrowed, Llanidloes, Llanbrynmair and Llanfyllin should not be considered further along with the out of Powys option for County stock. However Presteigne and Crickhowell could be retained short term.

Six sites have the option of using one operational large storage building or having smaller dedicated storage buildings – Ffrwdgrech depot, Boughrood, Llangammarch, Penybont, Kirhamsfield and Welshpool.

Based on current operations and depot storage capacity, Penybont and Llangammarch have the least capacity to maintain sustainable stock, followed by Kirhamsfield and Brecon (Ffrwdgrech).

Currently Penybont can source stock from the non-operational depot in Presteigne and likewise Brecon from Crickhowell or / Abercrave. Llangammarch which services a considerable length of Trunk Road, is cut off from current stand-by stocks.

Strategic Salt Storage managed by Powys within existing Highway Depots, has the advantage of spreading the additional capacity across the County, North, Mid and South making the managing and accessibility of the reserves easier.

- South options being Ffrwdgrech and / or Boughrood. Ffrwdgrech is better situated strategically, construction would be at a higher cost due to site constraints. Boughrood has far more free space available for construction which would cut down on costs although planning objections are likely to be high due to its residential environment close by, also its current capacity is sufficient for the operational needs of the area.
- Mid options are Llangammarch and / or Penybont. Similar to the South options, Penybont is far better located strategically, but very costly to construct, plus the potential for planning objection from local residents. Llangammarch would be less costly to construct with a low planning risk, however the site is not strategically located. Both sites have storage

capacity below the requirements for servicing their areas and are in need of expansion of salt storage.

- North options are Kirkhamsfield, Newtown and / or Welshpool. Kirkhamsfield has the better potential in available space and is more centrally located for the area. Welshpool is quite a restricted site and would be congested with a second / larger store installed. Construction costs would be comparable for both sites.

Sites	Low Storage Capacity	Alternative Storage Support	Suitability for Additional Storage	Constraints / Risks	Estimated Cost	Preferred Sites for Additional Storage	Suggested Additional Tonnage
Abercrave	X	N/A	L	Existing facility sufficient for current local operations	N/A	X	
Ffrwdgrech, Brecon	✓	Abercrave / Crickhowell	M	Depot redevelopments, Old Vicarage leased to HOWPS (Kier), dependant on requisition of WG land	£950K - £1.2m	✓	2,800t
Crickhowell	X	N/A	N/A	Non operational depot currently leased to third party	N/A	X	
Boughrood	X	Crickhowell	H	Residential area, possible planning objections. Existing facility adequate for current local operations	£600K	X	
Llangammarch	✓	Presteigne / Crickhowell	H	Remote from main network / 3km from Trunk Rd	£750K	✓	2,600t
Penybont	✓	Presteigne	M	Site consists of three levels, generally sloping from North to South. Residential properties adjacent and may be subject to planning objections	£950K	✓	2,800t
Presteigne	X	N/A	N/A	Non operational depot currently seeking to lease out to third party. Environmental issues of invasive plants	N/A	X	
Llanidloes	X	N/A	L	Existing facility sufficient for current local operations although not sufficient to cover neighbouring depot shortfalls.	N/A	X	
Llanbrymair	X	N/A	M	Existing facility sufficient for current local operations, however there is no structured storage	N/A	X	

Salt Storage Infrastructure Feasibility Report

Sites	Low Storage Capacity	Alternative Storage Support	Suitability for Additional Storage	Constraints / Risks	Estimated Cost	Preferred Sites for Additional Storage	Suggested Additional Tonnage
Kirkhamsfield, Newtown	✓	Llanidloes	M	Depot redevelopments will have a bearing on type of storage required which would affect infrastructure requirements for additional storage structure	£850K	✓	4,500t
Welshpool	✓	Llanidloes	L	Compact site with little room for additional storage. Possible major drainage alterations and provisions required	N/A	X	
Llanfyllin	✓	Llanidloes	L	Remote to Trunk Road network and main County network. Moderately sufficient for current local operations. Compact site.	N/A	X	
							Total 12,700t

Recommendation

It is recommended that the Authority pursues increasing its salt stock at the four locations within the county of high salt usage and low storage capacity, being Penybont, Llangammarch, Brecon and Newtown.

Provided storage remains in Presteigne and Crickhowell in the short term, priority for additional storage facility is Llangammarch and Newtown.

In view of the services requirements for the areas, Llangammarch would benefit from a storage capability of 4,200t and Newtown 6,100t which would also assist any shortfall in Welshpool. This would increase stocks by 7,000 tonnes.

Penybont would benefit from a storage capacity of 4,400t which would make Presteigne surplus to requirements, likewise Brecon would require 5,800t making Crickhowell surplus to requirements. This would further increase stocks by 5,600 tonnes, which could facilitate the disposal of Crickhowell and Presteigne depots.

It is recommended that storage structures are built on each of the four sites in addition to the current facilities. This makes best use of the existing barns and should be operationally beneficial facilitating a continuous turnover of stock and for the ease of maintenance of the structures.

Therefore Llangammarch requires an additional 2,600t capacity structure, Newtown – 4,500t capacity structure(s), Penybont – 2,800t and Brecon a 2,800t capacity structure.

Moving Forward

- Agreement on site locations
- Commence preliminary designs
- Consult – planning consents / ecological consents / drainage consents
- Detailed design
- Procurement
- Construction / supervision

The £1.4M budget should fund storage improvements at one of the sites and preparation works at another, it is recommended to progress the project in two phases, phase 1 including Newtown and Llangammarch Depots. Newtown depot however will be dependent on both Abermule bulking site and the Fleet workshop project. Costs are variable depending on solutions chosen, building types, orientation and exact sizes and may require an additional £400K to complete. Works would span over two financial years between 2017/18 and 2018/19. Phase 1 would meet the county's objectives and increase its resilience in line with the Salt Union targets.

Phase 2 of the project would require additional funding to increase storage at Penybont and Brecon and potentially dispose of Presteigne and Crickhowell depots. A separate business case could be put forward for this phase, using the capital receipt from disposals to contribute to the project.