# Newgale Beach Access and Shingle Bank Realignment Scheme (NBASBR)

# Design and Access Statement

October 2024

## Contents

# 1. Introduction

The existing shingle bank referred to runs alongside the straight coastal stretch of the A487 in Newgale, Pembrokeshire.

During heavy storms the road occasionally, and only during winter (a time of lower road usage due to lower economic activity on the Peninsula), suffers from some overtopping of pebbles which in turn very occasionally results in enough pebbles on the road to require physically clearing a few hours every other year. This causes the road to be closed for short periods until it is cleared of these loose stones. The length of time the road is closed is more to do with the Council's ability to respond (scheduling and manpower) rather than the volume of pebbles on the road.

More often Pembrokeshire County Council (PCC) closes the road as a precaution (up to several hours each year) – these closures, which mostly do not see any over-topping or even pebbles on the road, have nevertheless been used in data to show 'road closures' without explaining that they were in effect unnecessary or over cautious.

Extremely rarely, and again only in winter, the shingle bank is disrupted more dramatically – (we believe at least twice since WW2). Such an event is as a result of a rare and very particular combination of extreme tides, wind and rainfall. This occurred most recently in 2014. Clearance only incurred a special one off cost of £13,000 but nevertheless  triggered the initiation of the NCAP development plans- £2.5 million to date - and the suggested solution to replace the coastal road at Newgale – current estimated cost £30 million.

## 2. Applicant details

*Planning application Site Location:*

Shingle Bank adjacent A487 coastal stretch length approx 399m
Newgale
Haverfordwest
Pembrokeshire
SA62 6AS

*Applicant:*

Peter Keeling
On behalf of STUN (Stand up for Newgale Community Group)
Newgale
Haverfordwest
Pembrokeshire
SA62 6AS

## 3. Executive Summary

The intention of this planning application is to promote improved beach access and a superior, vastly more cost-effective alternative option to the current "New Road" plan to be submitted by PCC/Atkins in the Newgale Coast Adaption Project (NCAP) to the planning authority Pembrokeshire Coast National Park Planning Authority (PCNPA). We believe that this alternative (moving the shingle bank seaward) should have been the preferred option had the correct Welsh Transport Appraisal Guidance (WelTAG) procedures been followed.

This application is not intended as a substitute for PCC and PCNPA fulfilling their statutory obligations under WelTAG and EIA regulations as part of their NCAP process. And the application cannot be used in argument by PCC and PCNPA to claim that these obligations to consider the remedy we outline has been fulfilled. It has not. Rather, as a citizens group, we are seeking to draw decision makers' and the public's attention to an alternative, environmentally sensitive, cost effective solution that PCC and PCNPA have an unfulfilled statutory obligation to consider.

The proposals contained in this application will not only prevent the destruction of the natural habitats of Brandy Brook valley, minimise carbon emissions in line with the Welsh Government's policy to reduce road building where possible but also be significantly more cost effective. Furthermore, the proposal will preserve the existing village commercial operations, enhance access to the beach and remove the need to dig up the existing coastal section of the A487 and subsequent re-routing of existing infra-structure.

The proposal to move the shingle bank seaward 'buys time' during which real time monitoring of sea levels over the ensuing decades can inform whether there will indeed be a need for a new road to bypass Newgale in the future or not.

## 4. Proposals

Summary of and commentary on current proposals from Atkins/PCC compared to STUN (Stand Up for Newgale) proposals.

### A. STUN- Newgale Beach Access & Shingle Bank Realignment Scheme (NBASBR)

This application proposes that the section of the existing shingle bank running parallel to the A487 at Newgale be realigned 10 – 12 meters seaward leaving an over wash barrier between the shingle bank and the road to capture any pebbles and sea water as a result of any storm 'overtopping'.
The proposals would protect the coastal road and the commercial premises alongside the road from any landward movement of the shingle bank for 80-100 years.

Access to Newgale beach throughout its entire length is severely compromised. In addition the proposal addresses the issue of access by the less able-bodied and the safety of all crossing the road from the pub, campsite and surf shop to the beach.

STUN acknowledges that this 399m x 25m section of the shingle bank may require further modelling and studies to identify optimum realignment which may result in a greater or lesser movement of the bank.

It should be noted that all the commercial premises behind the shingle bank in Newgale are currently subject to not insignificant reinvestment – the rebuilding of the Duke of Edinburgh pub, improvement to Newgale Campsite facilities, current and future improvements to the Surf Shop and Sands Cafe.

Above is an example of stepped Gabion Baskets similar to the STUN beach access design featured as a significant portion of this project proposal. Above right is the previous method that PCC provided as a safer means to access the sandy beach. An example of a shingle bank access deck. This has since been removed by PCC and not replaced with any alternative.

| CRITERIA | STUN's NBASBR | Atkin's NCAP |
|---|---|---|
| Fulfills Shoreline Management Plan (SMP) of managed realignment | **Yes** | **Yes** |
| Fulfills value for public money | **Yes** | **No** |
| Minimises environmental destruction | **Yes** | **No** |
| Fulfills Future Generations Act | **Yes** | **No** |
| Fulfills Wales Transport Strategy | **Yes** | **No** |
| Fulfills Net Zero Wales | **Yes** | **No** |
| Fulfills WelTAG guidance | **Yes** | **No** |

## B. Atkins/ PCC - Newgale Coastal Adaptation Project (NCAP)

The Newgale Coastal Adaptation Project (NCAP) attempts to demonstrate, using modelling and projections, that the existing shingle bank will migrate landward over the next 10-20 years, engulfing the road by 2030 and thereafter submerging the Duke of Edinburgh pub, the surf shop and the campsite. In response to these projections, and as a consequent 'remedy', Atkins / PCC propose a costly and destructive new replacement road further inland across the Brandy Brook valley. This will effectively split the village of Newgale in half, force the closure of the several thriving Newgale businesses and and cause considerable environmental damage to the sensitive habitats, hydrology and biodiversity of the Brandy Brook Valley.

**Above: Deep at the heart of the Brandy Brook valley. The PCC new road will likely be a concrete blot on this rich landscape.**

STUN has engaged a consultant who has carefully considered the available studies and reports contained in the NCAP Scoping Document submitted to the Pembrokeshire Coast National Park Planning Authority (PCNPA) and examined assumptions and data used in the modelling. STUN's consultant is clear that the results do not in fact lead to the 'doomsday' projections that Atkins has presented both to the local and Welsh Governments and that the consequent 'remedy', a replacement road further inland across Brandy Brook valley, is therefore unnecessary. (See Section 7 – Independent Consultant Assessment).

## a) Commentary on the unlawful exclusion of realigning the existing shingle bank as an option in the Welsh Transport Appraisal Guidance (WelTAG) process and Environmental Impact Assessment (EIA) legislation process

Current legislation clearly requires all possible alternatives to be considered and presented to decision makers to enable informed decisions to be made. NCAP has deployed exceptionalism and exclusion to navigate around the good governance checks and public protections built into the WelTAG and EIA project shaping, permission and funding processes.

Involving, as it does, the construction of a major new road in a sensitive biodiverse valley, the NCAP proposals break every single principle and goal of the Welsh Government's Future Generations Act, the Wales Transport Strategy, Net Zero Wales and the recent Roads Review Panel's opinion. The serious shortcomings of NCAP:

1) An alarmist, non peer-reviewed Review of Coastal Change, June 2020, and

2) The exclusion of re-aligning the existing shingle bank seaward as an option at every stage of the statutory process.

The data and modelling paper produced by Akins/PCC's consultant Royal Haskoning to underpin the NCAP proposals is the sole piece of evidence used to create the perceived and overstated assumption of the imminent and permanent loss of an A487 road to the sea. This modelling report is non peer-reviewed and uses extreme upper end climate disaster data. Even in its own terms the report does not allow for the interpretation placed upon it by Atkins / Royal Haskoning and relied upon by PCC, citing as it does the need for site specific data to be more accurate.

These proposals are examined in detail below in STUN's independent consultant's review and it is STUN's view that the Royal Haskoning paper is a poor foundation for spending many tens of millions of pounds of public money.

In the spirit of constructive citizenship, and to support best practice, good governance and value for money, we have encouraged PCC independently to review the original paper and independently to scientifically model realignment of the existing shingle bank. There have been (limited) encouraging noises in face-to-face meetings with Atkins /PCC, although in most recent correspondence, PCC noted that no money has yet been identified to study the realignment of the existing shingle bank.

However, it was stated that it would be considered as part of 'refreshing' the business case for NCAP under WelTAG guidelines. This has recently been shown to be a sham exercise as the remedy we suggested, far from being examined, was dismissed at PCC cabinet (9 September 2024) without examination and deploying semantics – arguing that it was 'defence' not 'realignment'.

***STUN believe that proper consideration of NABSBR is essential in order for PCC to fulfil legal obligations under both WelTAG and (EIA) legislation.***

### b) WelTAG Stage 0

STUN believe that proper consideration of the realignment of the existing shingle bank cannot be dealt with as a difficult to fund extra in a late stage retrofit exercise to a pre-existing plan unless, as indicated in the WelTAG guidance outlined below, it is considered honestly and thoroughly as part of the WelTAG **'going back a stage'** process.

From a statutory perspective, realignment of the existing shingle bank, as proposed by STUN, should have been properly considered much earlier in the WelTAG process and should also have been included at ***WelTAG Stage 0 – The case for change*** as part of the original 'case for change scoping report'.

### c) WelTAG Stage 1

Stage 1 states that the '***do nothing or do minimum***' option must be looked at. Authorities ***'must explore and if necessary, dismiss this option before going further'***. Although the ***'do nothing'*** option was dismissed as 'not an option' by the time the public and wider stakeholders were invited to take part in the process, the only evidence presented for dismissing the ***'do nothing'*** option was the flawed modelling paper cited above. STUN note that (see Section 5), even accepting the paper's extreme and generalised view of sea level rise and possible storm damage, ***'do nothing'*** remains a far more cost-effective option even in the long term. (See Section 5 below).

### i) Do Minimum

The ***'do minimum'*** option of considering the re-alignment of the existing shingle bank was never explored as part of the Atkins /PCC proposals contrary to the authority's statutory obligations. For the avoidance of doubt, ***WelTAG Stage 1 - strategic outline case*** specifically requires examination of ***'options to make better use of existing infrastructure'***, citing that ***'Sustainable Transport Hierarchy sets out that we will make better use of existing infrastructure before investing in new infrastructure'*** going on to say that authorities must ask themselves ***'are there options to upgrade or make better use of existing infrastructure – for example to adapt to climate change or meet accessibility obligations?'***

This exclusion at the early **WelTAG stage 0 and stage 1** processes, designed to avoid unnecessary public spend and environmental damage, has been further compounded at every subsequent WelTAG stage by its continued exclusion despite clear government advice to the contrary. WelTAG makes clear that during the ***Stage 1 'refining options'*** process and ***Stage 2 outline business case*** and ***Stage 3 – business case***, the ***'do nothing'*** **or** ***'do minimum' options should be included in any business case for comparison'.*** This has not happened.

In summation, decision makers, stakeholders and the public have never been offered or consulted on this ***'do minimum'*** option, effectively undermining the WelTAG process and misdirecting the public and government (both local and Welsh) in their consideration of the case for change and remedies at Newgale.

This unlawful exclusion of the consideration of the re-alignment of the existing shingle bank at every stage of the WelTAG process is especially egregious as realignment fulfils every statutory Welsh Government target for transport infrastructure projects from active travel, cost, environmental, biodiversity, habitat, transport, economic, cultural and other impacts.

WelTAG provides clear guidance as to how the issue should be tackled.

**View of Newgale Shingle bank looking South.**

### ii) Going back a stage.

The WelTAG states: ***'..it may be necessary to rethink the programme or project. In this case, do not be afraid to go back a step. This might involve simply revisiting some earlier assumptions, rethinking some options or even revisiting the case for change. Hopefully much of the earlier work will still be relevant.'***

***'Having a clear sense of whether the reasons why you need to take action are the same or have changed, and whether your objectives are still the right ones or no longer valid, can help you reassess your options and your final scheme.'***

***'You may also need to go back a stage if planning work is more than five years old or there have been significant events or policy changes.'***

WelTAG guidance is clear. Now that we have discovered that the foundational modelling paper is flawed and that the 'do minimum' option of realigning the existing shingle bank was not explored at any stage of the WelTAG process, the guidelines allow for and encourage PCC to ***'go back'*** to ***'even revisiting the case for change'***.

As outlined above, failure properly to follow WelTAG means that the PCC cabinet decision of October 8, 2018 in the selection of a preferred route for a replacement road, as compounded by the PCC cabinet decision of 9 September, 2024, was flawed as incomplete information was available to decision makers at both meetings.

To conclude, the WelTAG process, the clear direction of travel of subsequent Welsh legislation and the current Welsh Government's commitment to tackling the climate and biodiversity crises as a priority, all point to the fact that re-alignment of the existing shingle bank should have been considered in the decision-making process at every level.

## d) Statutory obligations – EIA

Part II of Schedule 4 of the EIA Regulations requires the applicant to provide ***'an outline of the main alternatives'*** and ***'an indication of the main reasons'*** for choices made, ***'taking into account the environmental effects'.***

As revealed in the EIA scoping document for NCAP submitted to PCNPA by PCC, realignment of the existing shingle bank was at no stage considered as an alternative.

## e) The outstanding work under WelTAG:

In light of the above commentary, STUN consider that Atkins / PCC must carry out the following actions:

i) A new peer-reviewed modelling study that includes the Newgale site specific data lacking in the earlier studies of the effects of climate change on the seafront in Newgale. This should follow a rigorous scientific methodology, and must properly explain its assumptions and weaknesses in lay language that allow lay decision makers to draw their own informed conclusions.

ii) A proper, independent, peer reviewed modelling paper to consider the realignment of the existing shingle bank as an option.

iii) The consideration of the ***'do nothing'*** and ***'do minimum'*** options at all stages of the business case.

iv) Consultation of stakeholders and public on the realignment of the existing shingle bank ***'do minimum'*** option, and the ***'do nothing'*** option enabling them to be meaningfully consulted.

v) Revisiting PCC cabinet decision on *preferred route / option* after the above actions i – iv have taken place, enabling an informed decision to be made.

View from A487 looking West to Newgale Beach.

## 5.Costs

### NBASBR vs NCAP vs No Action

STUN draws decision makers' attention to the estimated overall costs of STUN's Newgale Shingle Bank Realignment Scheme (NBASBR) of circa £0.25 – £0.5m. Contrast this with NCAP's consultation costs to PCC so far of over £2 million (see appendix C - PPC Response EIR 13305) and final estimated construction cost of over £20 million (NCAP website – 2018 cost estimate). STUN believe that the final cost will be far in excess of this 2018 estimate and understand from PCC sources that £30m is now the estimated project cost (although this figure is not yet publicly available).

- Atkins have repeatedly stated to PCC that taking 'no action' is not an option. It is useful to consider, however, that the £13,000 costs of remedying the removal of shingle from the road following the 2014 overtopping event (a statistically one in 25-year occurrence) means that PCC could have used the £2m Atkins consultation costs (to 2023) to protect Newgale for the next 3,846 years.

- Even if climate change were to make 2014 events more likely – for example in an extreme scenario (far exceeding current climate predictions) – up to twice every single year, then the £2 million consultation cost alone could have been used to protect Newgale for the next 77 years.

- Using the £30m figure for road replacement (the conservative projected cost of the current NCAP replacement road as of 2024) the current PCC protection strategy of clearing stones from the road when necessary, could be financed for the next 1,153 years (twice a year overtopping) or for the next 57,692 years (one in 25 year overtopping event).

Elected members and officers are invited carefully to examine the data, modelling and outcomes underpinning Atkin's assertions – both for their own satisfaction that physical and financial decisions they are making are on a sound basis, and to fulfil their legal obligations on good governance and value for money.

# 6. Methodology

These proposals consider the principles of the access to the beach and movement of the shingle bank.
Technical, traffic management and engineering would be developed post planning submission in consultation with the relevant stakeholders

**Some examples of locations where a shingle bank has been moved to prevent overtopping:**

Dungeness, Kent (Shingle Bank near Dungeness Power Station)

Selsey, West Sussex (as part of the current Shoreline Management Plan)

Chesil Beach, Dorset

Holderness coast, Yorkshire

Nordfriesland, Germany

Seaford coastal reprofiling
https://www.gov.uk/government/news/shingle-all-the-way-at-seaford-beach-this-winter

The Netherlands - The Dutch have implemented various coastal management strategies, including the relocation of shingle banks, to reduce wave overtopping. For example, in the Zandmotor project, a large volume of sand was placed offshore to create a new shingle bank, which helps dissipate wave energy and reduce the risk of flooding.

## 7. Independent consultant assessment

It is the considered opinion of our consultant, Professor David Keeling, moving the shingle bank by 10-12 meters seaward will delay any landward movement by 80-100 years with no more maintenance being required than currently carried out by PCC following the occasional storm event.

### Expert Opinion by Professor David J. Keeling, B.A., M.A, Ph.D

*During late July, 2022, I reviewed the various consultant and government documents related to the proposed A487 Newgale bypass project, the short- to long-term implications for the dynamic physical environment of Newgale Beach in terms of rising sea levels, and options for maintaining the existing roadway as is between Wood Hill and Newgale Hill. My summary conclusions follow:*

1. *Data provided to support the contention that sea-level rise, coupled with higher tides and stronger storms, will cause the shingle barrier to migrate eastward (towards the A487) over the short-term resulting in an overtopping of the Duke of Edinburgh Inn are unnecessarily alarmist, and are overstated in terms of the maximum potential damage over the shortest period of time. The data do not provide important ranges of potential impact over longer periods of time and are not supported by the raw inputs (measurements, models, etc.) used in the assessment.*

2. *Weaknesses exist in the prognostications related to potential overtopping of the shingle barrier – to whit:*
   *(a) No discussion has been provided concerning the implications of isostatic rebound for St. Bride's Bay and how upward or downward movement of*

*the land may offset a potential sea-level rise. Since the end of the last glacial maximum (circa 12,000 YBP) land has generally increased its position above sea-level (ASL) by 1-1.5 inches (2.54 – 3.81 cm) over a 100-year period. For example, the average ASL for Scotland and Northern England continues to increase, while there is evidence in the scientific literature that southeast England (Devon and Cornwall coasts primarily) has dropped by an average of 1.15 inches (2.9 cm) over the past century. What are the rebound values for the Pembrokeshire coast and Newgale Beach specifically, and how might these values impact or offset potential sea-level rise?*

*(b) The data in the various reports dramatically overstate the maximum potential sea-level increase projected over the next couple of decades for St. Bride's Bay. The UK Met Office projects a sea-level rise in selected locations of 0.12 – 0.2 inches (0.3-0.5 cm) annually through 2100. In the worst-case scenario for Newgale Beach, these data suggest a 16-inch increase in sea level over the next 80 years, hardly sufficient to cause the shingle barrier to migrate dramatically eastward towards the property on the other side of the A487. Global sea-level analyses in the scientific literature also align with these projections. However, there are significant known unknowns related to localized sea-level increase. For instance, what might be the impact on Newgale Beach over the next 80 years of a significant acceleration of the Greenland Icecap melting, or of the collapse of the Thwaite glacier on the Antarctic Peninsula? Have events such as these been incorporated into the various models used by the Council?*

*(c) The various reports do not make mention of potential disruptions in the North Atlantic Oscillation (NAO) climate system that has a significant steering impact on the west-to-east airmasses that affect storms along the coasts of Pembrokeshire.*

*What data are available to model how tidal maxima in St. Bride's Bay may be affected by NAO shifts over the next century?*

*(d) There is no discussion in the reports about the potential impact on the Pembrokeshire coasts of projected changes in the Gulf Stream, as freshwater from the melting Greenland icecap continues to force heavier salt water deeper into the North Atlantic, thus potentially disrupting existing ocean currents and changing the tidal regimes during a typically annual cycle along the Pembrokeshire coast.*

3. *A visual assessment of the shingle barrier along Newgale Beach suggests that the projected eastward movement of the barrier is significantly overstated in the various reports. Comments from long-time Newgale residents and existing photographic evidence from the past 50 years or so suggest that there has been negligible change in the position, stability, and overall movement of the shingle barrier. References in the reports to a potential 15 to 20-metres of eastward movement in 8 years make no sense given the existing site and situation of the existing barrier. Data on the tidal and storm force necessary to cause such a movement is not provided in the various reports, and such a violent and dramatic movement landward is not supported in the scientific literature (absent a major earthquake, violent Category 5 hurricane, or other force majeure! There is no evidence of any such events in the study area capable of causing such a movement).*

4. *Analysis of the length, depth, and height of the shingle barrier on Newgale Beach suggests that a more cost-effective solution to the existing high-tide, strong-storm potential overtopping problem can be found. Rather than spending millions of pounds on a short bypass road around Newgale Beach, a project that contradicts the Welsh Government's argument against building more roads, its commitment to reducing greenhouse gas emissions, and its stated aims of protecting, preserving, and enhancing rural communities and their way of life, moving the barrier seaward would be more cost effective. Given the potential for modest sea-level rise (vastly overstated in the project reports), changing coastal dynamics, tidal shifts, and the low-tide expanse of existing sand beach, moving the shingle barrier 10 metres seaward on an angle that maintains the southern end of the barrier and protects the overflow stream at the northern end is preferred as a cost-effective, long-term (80-100 years) solution. Building an excess water seepage canal between the existing seawall along the A487 and the relocated barrier would likely absorb overtopping or seepage water during the highest of tides and the roughest of storms, channeling this water to the stream that begins at the northern end of the barrier and flows into the wetlands. Widening the barrier and/or flattening its top would also facilitate easier access from the road to the beach for visitors and residents alike. A wooden "carpet" across the canal*

*and relocated barrier at several intervals would be a cheap and easy fix for existing access challenges.*

5. *A further solution to reducing or redirecting on-shore deposition could be to install a number of groynes angled from north to south to ensure a steady supply of beach sand during the summer months. Given the geologic age and structure of the existing cobbles that make up the barrier, there is little evidence that a steady supply of new cobbles is moving from the bay onshore to the barrier. The existing cobbles are likely aged between 8,000 and 12,000 years old, from the most recent glacial retreat, and the shallow bed of St. Bride's Bay is unlikely to yield significant new deposits of glacial remnants. Significant storm events (e.g., 1:100 years or even 1:50 years) likely will move some material onshore, as ongoing erosion and retreat of the cliffs surrounding Newgale Beach will have an impact over the next century.*
6. *Additionally, any deposition of material on the existing A487 during high-tide, strong-storm events may well necessitate a council removal of the material, but the cost associated with this activity amortized over the next century would be orders of magnitude cheaper than the millions of pounds required for the proposed bypass.*

*Respectfully submitted to the Newgale Community group (STUN), September 2022:*
*David J. Keeling, B.A., M.A, Ph.D.*
*Distinguished Professor of Geography, Emeritus*

*Further notes relating to Storm Overtopping of Pebble Barrier at Newgale Beach:*

*Gravel or pebble barriers can support a steep gradient typically of the order of 1 in 8 with a tendency to form a near vertical berm towards the high-water mark and a step at the normal wave break point. Average winter (or occasional summer) storm conditions can move sediment from the bay to the barrier, and sediments can be highly mobile. In the case of Newgale Beach on St. Brides Bay, there is little evidence of significant onshore deposition of new pebbles (gravel), given the geomorphology of the area. Quantitative estimation of sediment transport rates is extremely difficult on a gravel beach, and pre-storm, during, and post-storm measurements over several years are needed to determine with any statistical accuracy the actual or potential movement of the barrier. Based on local resident observations and historical photographs of the beach environment, it would seem highly likely that there has not been any significant movement of the barrier in recent decades. The single observation used as a historical marker of barrier movement refers to the 2014 winter storm event at Newgale Beach that overtopped the barrier and flooded the A487, pushing a bus off the road and depositing pebbles across the area behind the barrier. However, one single observation point does not provide any statistical basis for determining the likely future movement of the barrier during high storm events, nor does it provide a scientific basis for determining how far the barrier is likely to move with rising sea levels and stronger winter storms. Presuming that little-to-no evidence exists of significant landward movement of the Newgale Beach barrier in recent decades, it is logical to estimate that moving the barrier 10-12 metres seaward should have a positive impact on the mechanisms that cause overwash and gravel deposition on the A487 during storm events. Creating an overwash drain between the relocated barrier and the wall that runs along the seaward side of the A487 should eliminate any damage to the road for the foreseeable future.*

*Barrier overtopping has typically been estimated by laboratory experiments that attempt to determine outcomes such as: (a) the crest raised by overtopping; (b) the crest lowered due to undermining of crest but with no overtopping; (c) the crest raised by over-washing with roll-back; (d) the crest lowered by over-washing with roll-back; and finally (e) no change to the crest elevation with profile contained to seaward of the barrier crest. Measuring overtopping and barrier movement during actual storm conditions is a difficult process. One would need to measure in real time the sediment load of each wave, determine the volume of water containing this*

*sediment entering the barrier, its penetration force, any uplift of the upper layers of the barrier, and the observed movement of pebbles from the top layer of the barrier landward or seaward. Each wave will have different characteristics, such as periodicity, force or thrust, sediment load, and volume, couple with wind force (direction of current) and height of the high-tide mark. Not every storm will have the capacity to move pebbles on the barrier, and not every storm will reach the top of the barrier. One of the most common models used to theorize overtopping uses an expression for an over-washing threshold of barrier crests, based on regression analysis. It is a function of wave steepness (wave height/wavelength, Hs/Lm), barrier free board (still water depth above barrier crest, Rc) and barrier cross-sectional area Ba (above the still water level), given by:*

$$BaRc/H3s \leq 0.0006\ (Hs/Lm) - 2.54$$

*Data gathered from a real-time observed storm event could then be entered into the equation to determine the predicted outcome and impact of overtopping events. Based on the observed existing barrier during normal high-tide conditions, it seems statistically improbable that any significant movement of the barrier might occur during a random winter storm event that could move the crest of the barrier across the A487 to deposit pebbles on the roof of the Duke of Edinburgh Inn.*

*Respectfully submitted to the Newgale Community group (STUN), September 2022:*
*David J. Keeling, B.A., M.A, Ph.D.*
*Distinguished Professor of Geography, Emeritus*

*David J. Keeling (signed electronically)*

# 8. Contingency

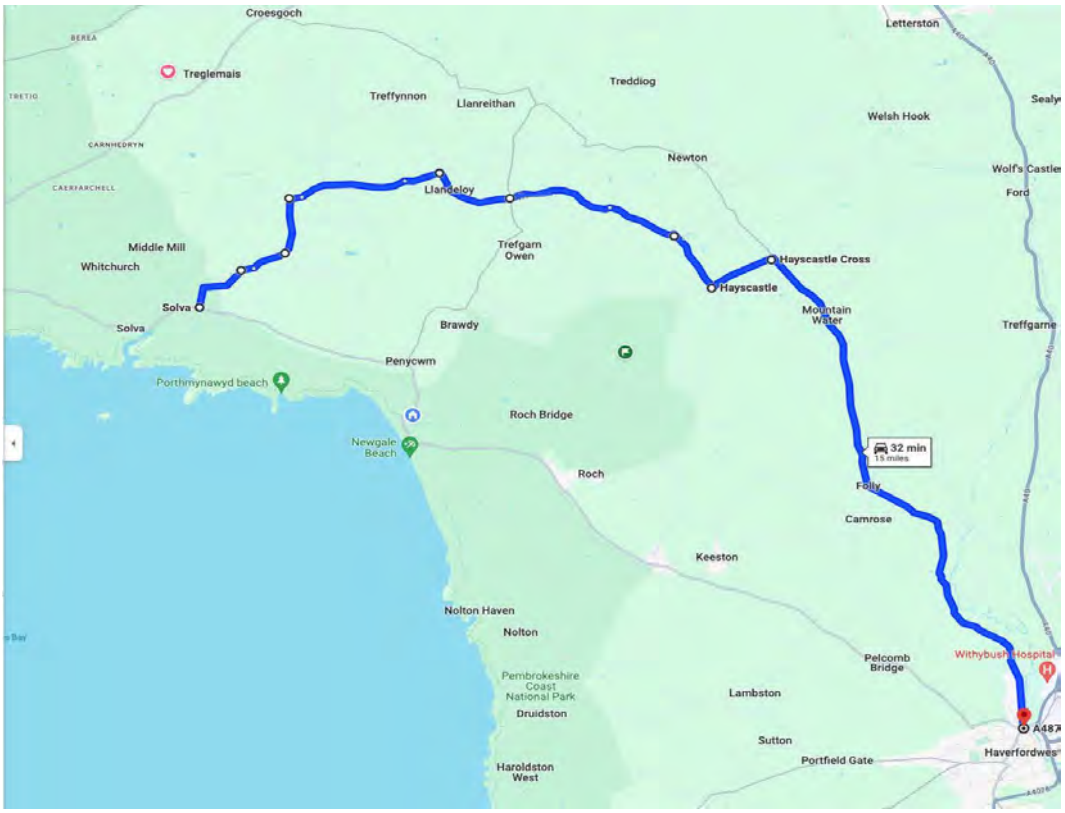
## Possible diversion routes:

In the interim and in the unlikely event there is a need to close the road due to Brandy Brook flooding or other circumstances, and prior to the realignment of the shingle bank, STUN proposes separate diversion routes for north and southbound traffic. This would eliminate the pressure of traffic on narrow lanes that cannot accommodate heavy traffic in both directions. The route is based for comparison purposes on the normal St Davids <> Haverfordwest A487 trunk road which is approximately 16.4 miles and 32 minutes.

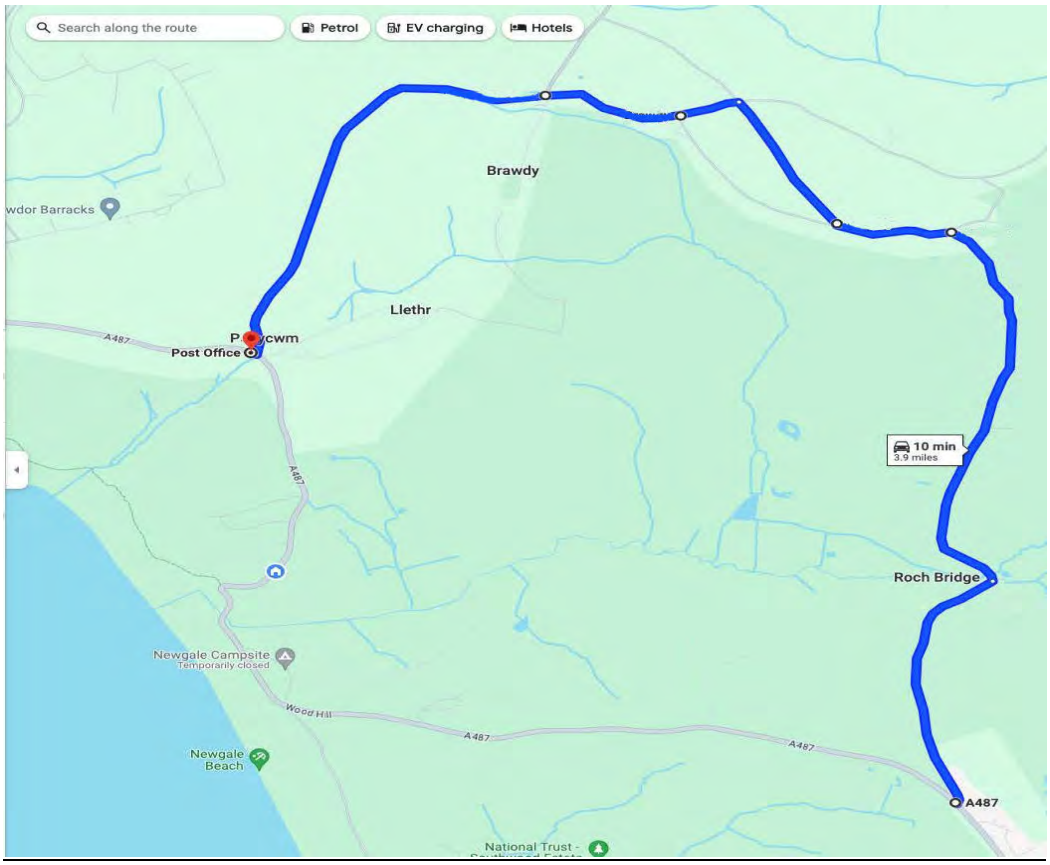
The Southbound diversion section goes from Penycwm via Brawdy towards Roch Bridge rejoining the A487 at the Victoria Pub heading Southbound through Roch. The total extra distance amounts to 1.3 miles (approx 4 minutes)

The Northbound diversion section goes from Lidl, Haverfordwest via Hayscastle Cross and Llandeloy and joins the A487 at the Cambrian Inn Solva. The total extra distance amounts to 3.2 miles (approximately 11 minutes)

See below road maps covering the two proposed routes.




**Above: Proposed northbound diversion section from Hwest to Solva**




**Above: Proposed southbound diversion section from Penycwm to Roch (Victoria Inn)**

# 9. Appendices

Appendix A – Drawings

Appendix B – Historical Background

Appendix C - (Response EIR 13305)

Appendix D - Response FOI Shingle Bank Repair Costs 2014

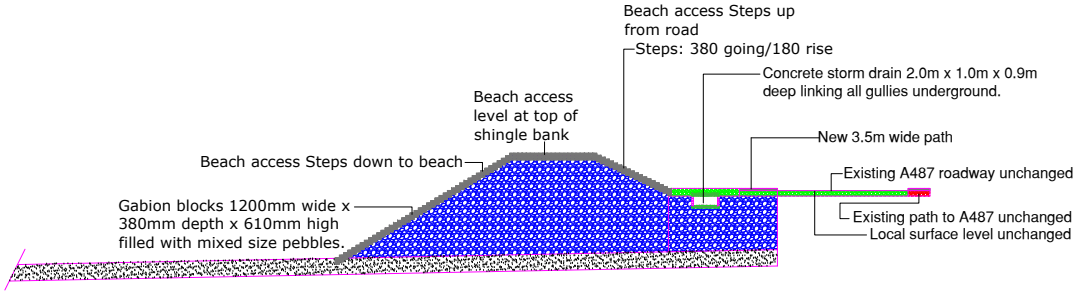
# Appendix A

## Drawings

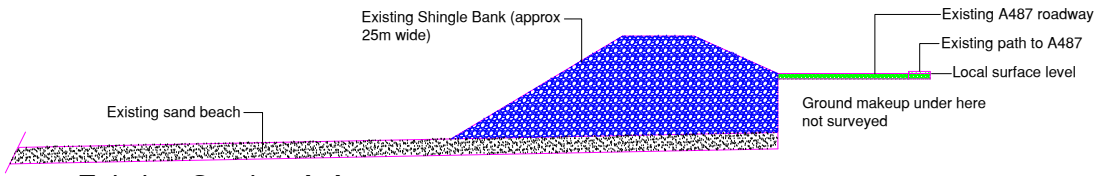
Newgale Beach A1 2018 Format-10-01 – GA
Newgale Beach A1 2018 Format-10-02 - Detail - Site Plan
Newgale Beach A1 2018 Format-10-03 - Sections AA
Newgale Beach A1 2018 Format-10-04 - Beach Access Steps Section BB
Newgale Beach A1 2018 Format-10-05 - Detail plan - Shingle bank
Site Grid Reference
Beach Plan


Existing Site Plan - scale 1:5000

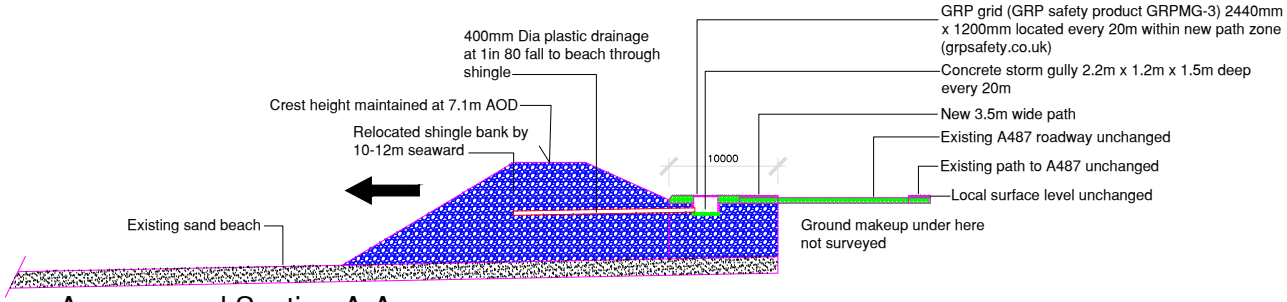

Proposed Site Plan - scale 1:5000




Beach Access Steps (relocated and new) Scale 1:250
Section B-B

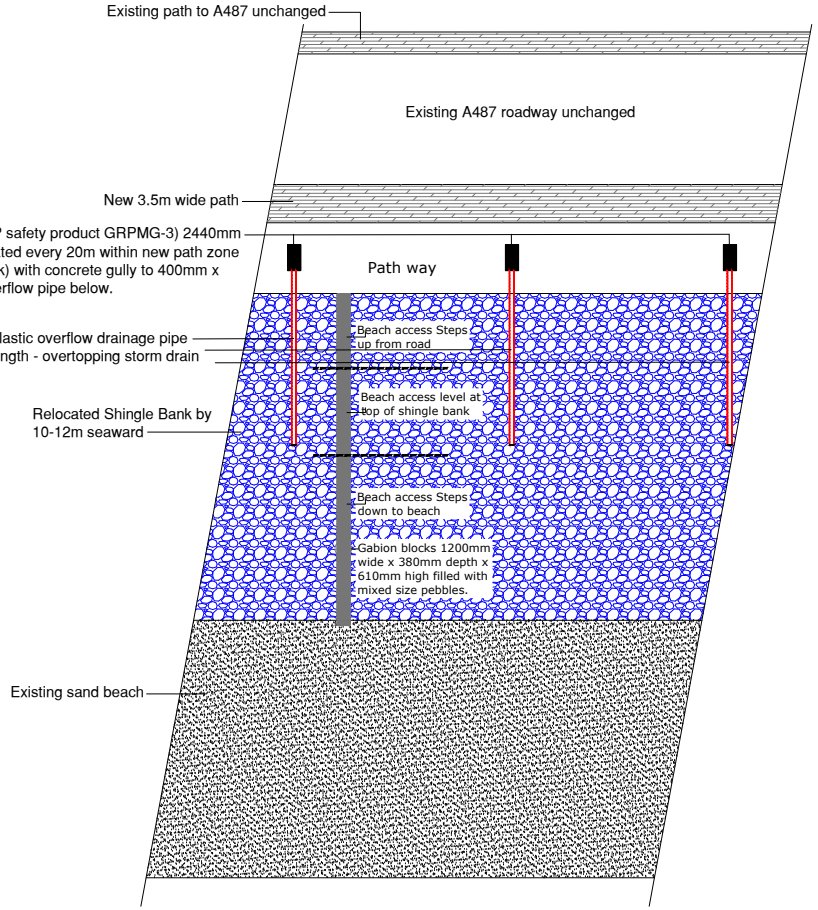



Existing Section A-A




As proposed Section A-A

Scale 1:250




As proposed Detail Plan - scale 1:250


Newsurf Beach Access steps - Scale 1:2500

[1:500] 0 10 20 30 40 50m

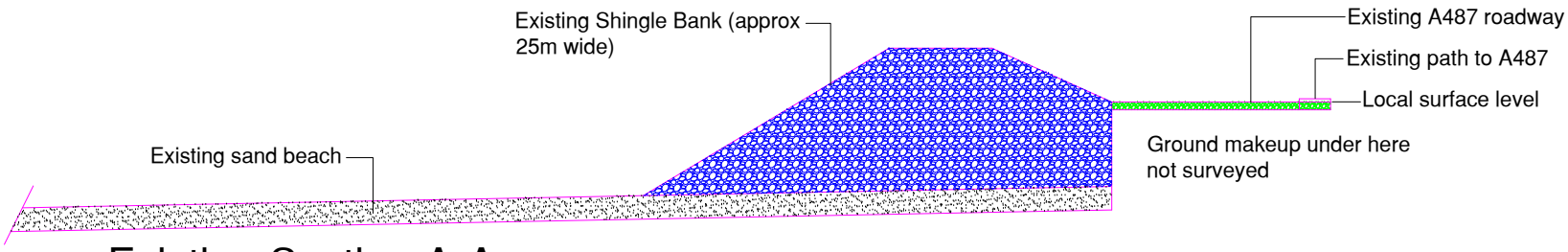
[1:250] 0 5 10 15 20 25 m

| | | | |
|---|---|---|---|
| DWG: | 10-01 - GA | Rev: | D |
| Title: | SHINGLE BANK PROPOSED RELOCATION Appendix A | | |
| Issue: | A | Scale: | 1:250/1:5000 |
| Filename: | NEWGALE BEACH.DWG | View: | PLAN/SECTION |
| Last Edited by: | Peterkeeling | Acad: 2023 / Paper: A1 | Plot: 15:44:01 06/09/2024 |
| STUN Tel: 07977-043763 | Client: STUN NEWGALE HAVERFORDWEST PEMBROKESHIRE SA62 6AS | | |

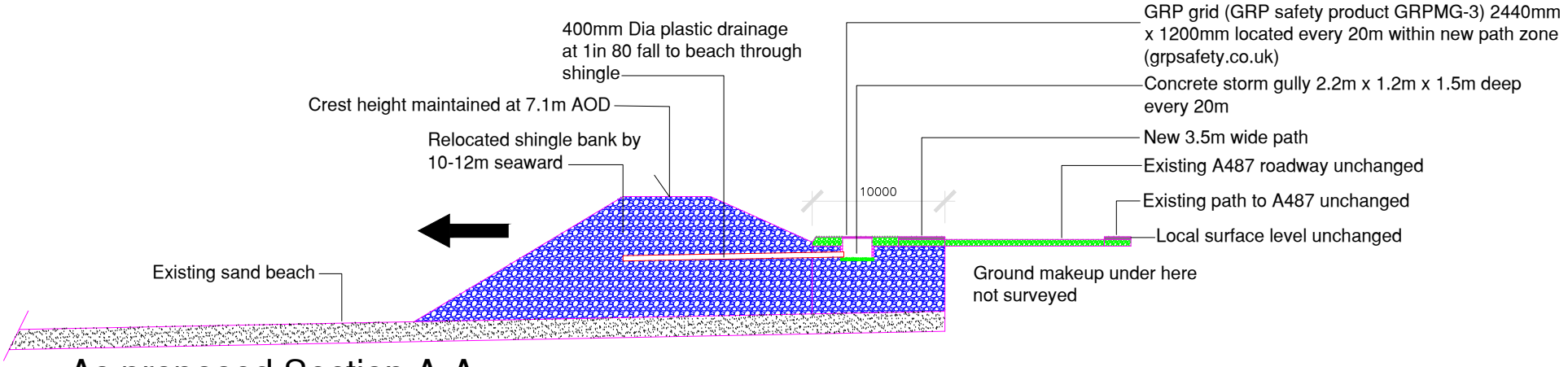

Existing Site Plan - scale 1:5000


Proposed Site Plan - scale 1:5000

| | | | | |
|---|---|---|---|---|
| DWG: | | 10-02 - Detail - Site Plan | Rev: | D |
| Title: | SHINGLE BANK PROPOSED RELOCATION Appendix A1 | | | |
| Issue: | A | | Scale: | 1:250/1:5000 |
| Filename: | NEWGALE BEACH.DWG | | View: | PLAN |
| Last Edited by: Peterkeeling | | Acad: 2023 / Paper: N/A | Plot: 12:19:10 06/09/2024 | |
| STUN Tel: 07977-043763 | | Client: STUN NEWGALE HAVERFORDWEST PEMBROKESHIRE SA62 6AS | | |




# Existing Section A-A




# As proposed Section A-A

Scale 1:250

**Grating Code: GRPMG-3**

Grating Type: Standard Square Open Mesh, 50 x 50mm hole centres

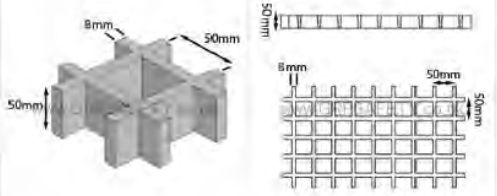
Depth: 50mm

Load bar thickness: 8mm

Open area: 71%

Weight: Concave Top – 23.5kg per square metre, Grit Top 24.5kgs per square metre

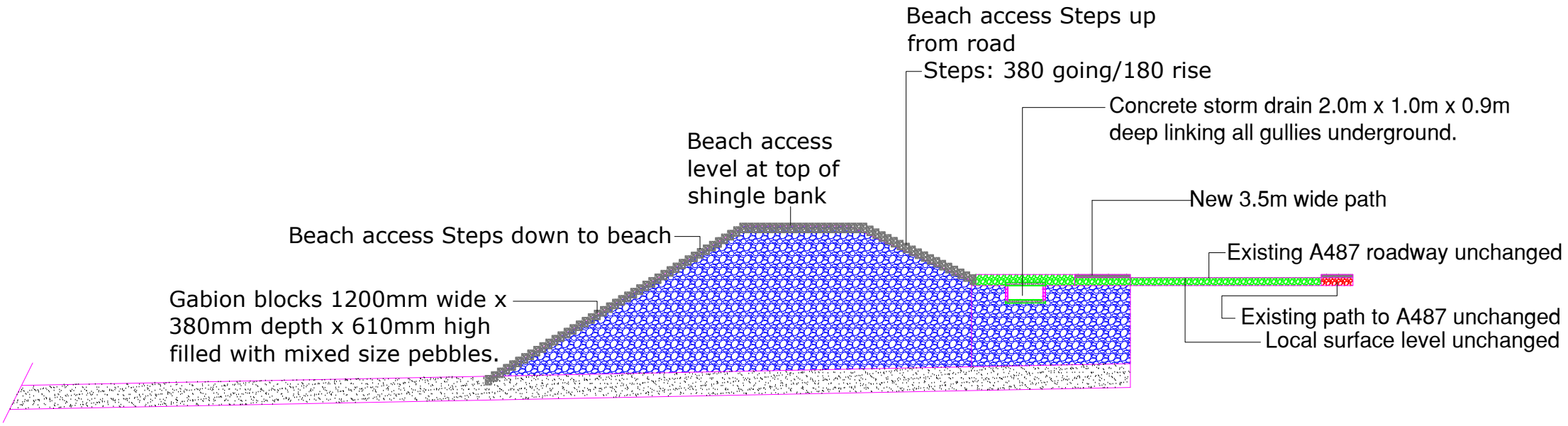
Panel sizes available: 4000 x 1220mm, 3660 x 1220mm, 2440 x 1220mm, 3050 x 915mm




Existing Beach Access
North end of Beach
Demolish existing and re-construct 10m to new shingle line.
See Section BB

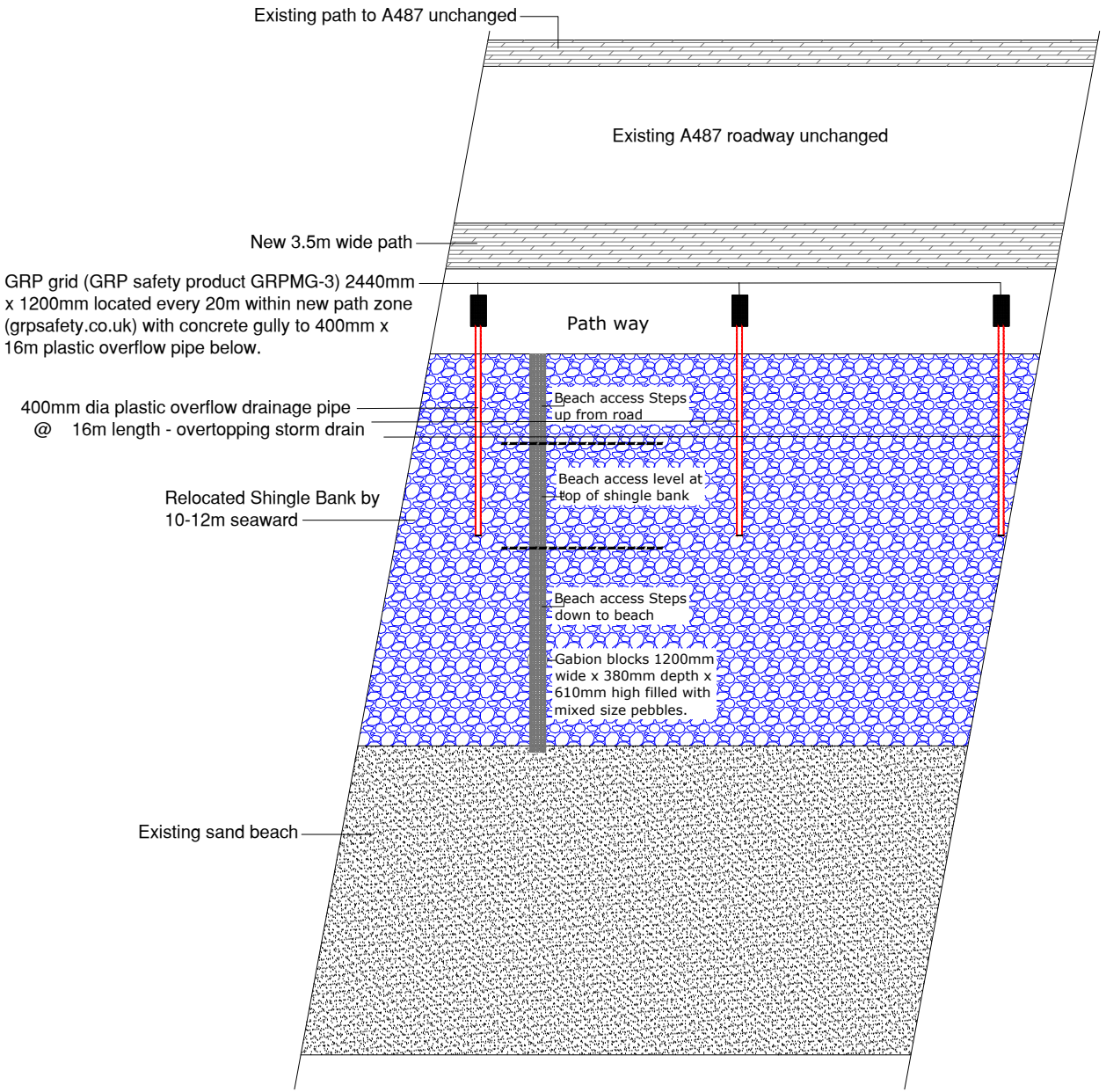
Newsurf Beach Access steps - Scale 1:2500

| | | | | |
|---|---|---|---|---|
| DWG: | | 10-03 - Sections AA | Rev: | D |
| Title: | SHINGLE BANK PROPOSED RELOCATION Appendix A2 | | | |
| Issue: | A | | Scale: | 1:250/1:5000 |
| Filename: | NEWGALE BEACH.DWG | | View: | PLAN/SECTION |
| Last Edited by: Peterkeeling | | Acad: 2023 | Paper: N/A | Plot: 15:46:29 06/09/2024 |
| STUN Tel: 07977-043763 | | Client: STUN NEWGALE HAVERFORDWEST PEMBROKESHIRE SA62 6AS | | |




# Beach Access Steps (relocated and new) Section B-B
# Scale 1:250

| | | | | |
|---|---|---|---|---|
| DWG: | | 10-04 - Beach Access Steps Section BB | Rev: | D |
| Title: | SHINGLE BANK PROPOSED RELOCATION | Appendix A3 | | |
| Issue: | A | | Scale: | 1:250/1:5000 |
| Filename: | NEWGALE BEACH.DWG | | View: | SECTION |
| Last Edited by: Peterkeeling | | Acad: 2023 | Paper: N/A | Plot: 12:54:55 06/09/2024 |
| STUN Tel: 07977-043763 | | Client: STUN NEWGALE HAVERFORDWEST PEMBROKESHIRE SA62 6AS | | |




# As proposed Detail Plan - scale 1:250

| | | | | | |
|---|---|---|---|---|---|
| DWG: | | 10-05 - Detail plan - Shingle bank | | Rev: | D |
| Title: | SHINGLE BANK PROPOSED RELOCATION | | Appendix A4 | | |
| Issue: | A | | | Scale: | 1:250/1:5000 |
| Filename: | NEWGALE BEACH.DWG | | | View: | PLAN/SECTION |
| Last Edited by: Peterkeeling | | Acad: 2023 | Paper: N/A | Plot: 14:32:40 06/09/2024 | |
| STUN Tel: 07977-043763 | | Client: STUN NEWGALE HAVERFORDWEST PEMBROKESHIRE SA62 6AS | | | |

**Instructions:** Simply right click on the map to find a grid reference at that point. Enter a location search below to zoom to the approximate location.

Post Code

SA62 6AS Go

Location (Road , Town)

NEWGALE CAMPSITE Go

Grid Reference

Go

X (Easting) Y (Northing)

Go

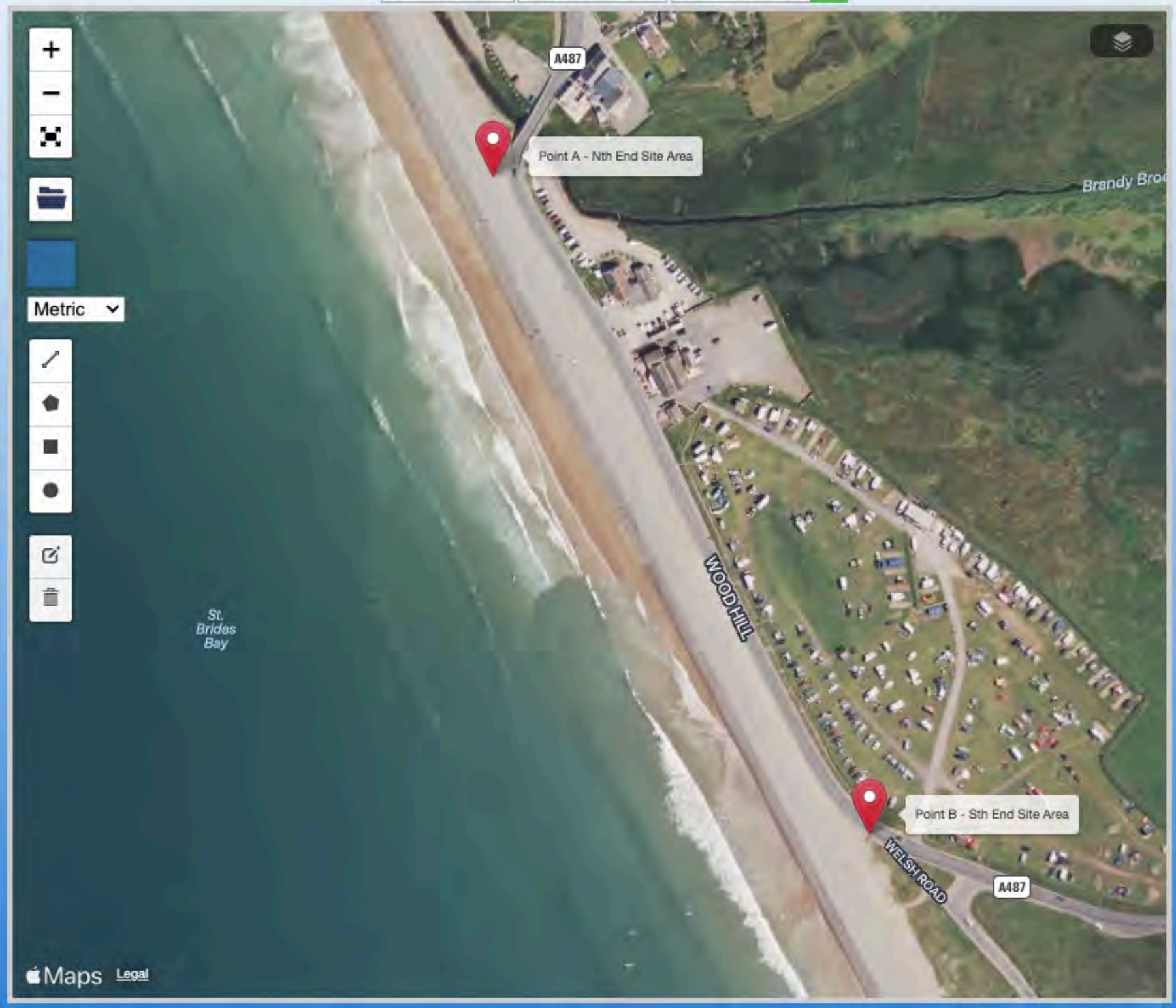
Lat Long

Go

What3Words

Go

Zoom All Points | Link for All Points | Auto Show Info On




Link for All Points | Elevation Chart | Show Points on OS Map | Show Points on OpenStreetMap | Distance Matrix | Heatmap | Toggle Show Pin Labels | Delete All Points

Export Points to CSV | Export Points to Excel | Export Points to Google Earth (KML) | Export Points to GPX (route) | Export Points to GPX (waypoints)

| Grid Reference | X (Eastings) | Y (Northings) | Latitude | Longitude | Description (Click to Edit) | Address | Postcode | Link | Center | Zoom | Style (click to change) | Show | Delete |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SM 84742 22262 | 184742 | 222262 | 51.857318 | -5.1273108 | Point A - Nth End Site Are | Newgale Hill, Nolton and Roch, Newgale, Pembrokeshire, W | SA62 6AS | | | | | | |
| SM 84924 21910 | 184924 | 221910 | 51.854227 | -5.1244515 | Point B - Sth End Site Are | A487, Nolton and Roch, Newgale, Pembrokeshire, Wales, S | SA62 6AS | | | | | | |


Newgale Hill
A487
The Big Blue Experience
399.89 m
Newsurf
Surf shop
Duke Of Edinburgh Inn
Temporarily closed
A487
200.00 m
Newgale Campsite
Temporarily closed
Wood Hill
Welsh Rd

# Appendix B

## Origin of the Newgale pebble bank

It is often recounted that the pebble bank at Newgale was created by a great storm in 1859. However, historical records and published literature indicate clearly that there is no basis for this. Whilst Wikipedia relates that the pebble bank at Newgale was created in this way in 1859, the historical references make no mention of this at all. An elegant explanation for not only the location of the pebble bank in its current position but also for the origins of the pebbles is proposed by Harrison (1968). He writes that the energy of the wave formation is concentrated in the northern end of Newgale beach in St Brides Bay due to the sheltering effect of the southern headland. It is suggested that the pebble bank is composed of drift derived shingle from the bay floor which is deposited in this location due to this wave derived energy at the northern end of the bay.

Early 1900s photos depicting the Shingle bank and Bridge Inn pub.

## Historical evidence for the probable existence of the pebble bank before 1859.

There exists significant historical evidence that the pebbles have been present for hundreds of years and that they have been cleared from a road at Newgale intermittently after storms during that time. In his book "A Tour Through Wales", Giraldus Cambriensis (Gerald of Wales ) wrote in 1585 of the exposed trunks of trees and the sands being driven from the beach by a storm. He also mentions there being a pilgrims road to St David's passing through Camros (Camrose) and also a turnpike road to the left which passed through Newgale. The same book records that St Caradoc was conveyed to St Davids after his death in 1124 from the area of Haroldstone where he lived as a hermit. The route was almost certainly via the Old Welsh Road:- "It was in the region of Newgale a prodigious storm occurred and a prodigious fall of rain did inundate the country. But on coming forth after the rain the conductors of the sacred burden found the silken pall with which the bier was

cover was dry". In 1774 the book "A Gentleman's Tour through Wales"( Henry Penruddock Wyndham) relates the same as that of Giraldus Cambriensis (Gerald of Wales).
Many earlier storms have been described other than the one attributed to have created the pebble bank in 1859. Indeed the notes of the County Council for that time (November 1859) make no mention of such a great occurrence having happened. However, pebbles are known to have been on the road after storms much earlier in history. The parish records of Roch noted by the Rev J W Reese state "a very high spring tide in January 1796 fell all over Britain and Newgale beach was driven in several yards. The road at Sibbernook Point (on the Old Welsh Road) washed away and must be made over grass. The sand washed away leaving two lines of very large pebbles shewing (showing) the old surface as it was before." It was subsequently noted in April that the sand was not returned over the beach (Roch Parish register 1796). The year earlier the same author noted "on October 29th 1795 the high tide and wind drove in the beach at Newgale Haven several feet. A cottage croft this side of the bridge built fifty or sixty years ago with a smooth area between it and the beach is now a good bit buried under pebbles."

Further reference to the existence of pebbles at Newgale before 1859 is documented by Richard Fenton in his book " A historical tour through Pembrokeshire". Born in 1747 at Rhosson outside of St Davids he wrote "of the Newgall beach being several miles long and of pebbles of infinite variety and exquisitely polished." He also wrote about the storm of 1795 causing an overflowing of Newgall beach leaving some pebbles on the bridge.

There is clear historical evidence of significant pebbles at Newgale before the storm of 1859 and previous storms affecting the road in the village. The pub at Newgale now known as the Duke of Edinburgh was originally known as The Bridge Inn and may have been located on the seaward side of the road until it succumbed to a storm in 1897. The licensee Mrs Allen was rescued by horse and trap, witnessed by William Henry Davies, and subsequently may have had the inn rebuilt on the landward side of the road (P. Raggett 1999).
In conclusion, the pebbles have been at Newgale and documented for many hundreds of years. Historical records show that they have occasionally encroached on the road and other areas and been cleared during this time.

Newgale beach approaching sunset looking West.

References:

1. Harrison C. 1968 Nature vol 217 p255.

2. Giraldus Cambriensis 1585 A tour through Wales. Translation by Sir Richard Colt Hoare in 1806 of the original Latin written in 1585

3. Roch Parish records, Pembrokeshire Archive.

4. Fenton R. 1811 A historical tour through Pembrokeshire, first published Longman, Hurst, Rees Orme and Co.)

5. Visit Pembrokeshire.com

6. Paul Raggett 1999 From Roch to Ramsey, The St David's peninsula. MPI media.

**Pembrokeshire County Council**

**Cyngor Sir Penfro**

**Environmental Information Regulations Request: 13305**
**Directorate: Community Services – Infrastructure and Resources - Finance**
**Response Date: 06/06/2023**

## Request:

Request for information regarding – Newgale Coastal Adaption Scheme

I note from the following link https://www.gov.wales/roads-review-funding-schemes-date that, as of 14 February 2023, the Roads Review Panel have spent £615,000 on the Newgale Coastal Adaption Scheme.

There is no detailed breakdown of expenditure and it is not clear whether or not this includes the total spend on the project since the decision was made to investigate the construction of a replacement road in the aftermath of the A487 road closure in 2014.

As PCC is the lead on this project, please could you provide full details of the total running costs for the Newgale Coastal Adaption Scheme to date including any third-party funding received.

## Response:

Table below shows expenditure up to and including financial year 2022-23;

| Funding | Feasibility | Capital Works | Total |
|---|---|---|---|
| Grant | 155,392 | 1,674,502 | 1,829,894 |
| PCC | | 221,387 | 221,387 |
| | **155,392** | **1,895,889** | **2,051,281** |

**Pembrokeshire County Council**

**Cyngor Sir Penfro**

**Freedom of Information Act Request**
**Transportation, Housing & Environment Directorate**
**Response date: 11 November 2016**

## Request:

Request for information regarding the cost of maintaining Newgale's shingle bank:-

1. I am requesting information on the annual cost of maintenance of Newgales shingle bank and the potential cost of managed realignment if that future strategy was adapted.

2. Also the cost of maintaining the stretch of coastline defences between Saundersfoot's Strand and Amroth would be gratefully received.

## Response:

1. Annual Maintenance costs of the shingle bank will vary enormously from year to year dependent upon the intensity and frequency of storms. In some years there are very minimal costs, but in 2014 the cost of removing the shingle amounted to £13,000 approximately. Over the last 2 years the cost of maintaining the bank has been less than £500-00. We do not have any specific information as to the costs of the Managed Realignment Scheme as we have not yet completed the assessment. We have a current budgetary indication of £20million.

2. The total expenditure on this stretch of coastline between April 2014 and now is £19,124.

*PLEASE NOTE:* The above costs do not include the wider costs associated with closure - i.e., transport and infrastructure cost, revenue costs associated with road close, loss of income to local economy, etc.