

Medmerry Managed Realignment

The new flood bank is 7km long, parts are almost 2km inland from the open



Summary

Medmerry has long faced problems with flooding from the sea, with regular breaches of the shingle bank, most recently in 2008, when over £5m of damage was caused. We spent several hundred thousand pounds annually repairing and maintaining the shingle bank.

Medmerry is the largest managed realignment of the open coast in Europe, and the first in the UK, on the stretch of southeast coast most

threatened by coastal flooding. Medmerry maximises the creation of intertidal habitat, replacing vital areas being lost in the Solent, allowing new defences to be built protecting thousands more properties along the coastline.

The scheme is recognized locally, nationally and internationally as an exemplar scheme and is one of the most sustainable projects the Environment Agency has delivered.

In planning and constructing this challenging scheme we've:

- Protected 348 properties, sewage works and the main Selsey road, serving over 5000 residents
- Created 183 hectares of intertidal habitat
- Realised maintenance savings of £300,000 p.a.
- Incorporated extensive public access and economic growth opportunities

Recent extreme weather events serve as a reminder of our changing climate. Medmerry defences stood up to the worst storms for 20 years fully protecting the areas that would previously have faced extensive flooding.

Project Team

Mackley – Principal Contractor
Environment Agency – Client
RSPB – Project Partner
Arcadis – ECC Project Management
Jacobs – Principal Designer

Category

Environmental Dredging

Overview



Recent extreme weather events serve as a reminder of the impacts and consequences of our changing climate. There is a need to develop more holistic and integrated strategies to manage the threat of flooding to create a more flood resilient society.

Medmerry is the largest managed realignment of the open coast in Europe, and the first in the UK, on the stretch of southeast coast that was most threatened by coastal flooding. It is recognized locally, nationally and internationally as an exemplar scheme. Eliminating the need

for intensive ongoing maintenance saves approximately £300,000 per annum and removes a significant safety risk for operations staff.

We recognized that **planning and constructing a scheme of this scale would not be easy**. We took steps throughout to engage, plan and communicate, whilst always remembering the 3 core scheme objectives:

- Sustainable flood risk management
- Maximising habitat opportunities
- Engaging with the community

Medmerry delivers reduced flood risk, compensatory habitat and long term community benefit and is **one of the most sustainable projects the Environment Agency has delivered**. Rising sea levels and the economic challenges of maintaining coastal sea defences will make coastal realignment an increasingly sustainable future option.

The project demonstrates adherence to the 3 pillars of sustainable development.

Economic - Sustainable Flood Risk Management

This picture shows the area at risk from coastal flooding. As well as the low lying farmland, the area includes properties, roads, businesses and infrastructure. It highlights a risk that Selsey could be cut off as an island with tidal waters joining between Medmerry and Pagham Harbour.



We managed coastal flood risk at Medmerry by maintaining a 2km raised shingle bank. Extensive work was required throughout each winter to keep the bank in place. Bulldozers were on site reprofiling and moving shingle from October through to March each year, which was costly and unsustainable over the long term. Even with this maintenance, there was a risk of storms breaching the defence.



Options for managing coastal flood and erosion risk

were considered for the whole peninsula in the Pagham to East Head Coastal Defence Strategy which was completed in 2009. 'Hold the line' for Selsey couldn't be justified and managed realignment was recommended at Medmerry and East Head. The scheme has been designed to be resilient to sea level rise for at least 100 years.

This project covers an area over 500 hectares in size, and required a staggering 400,000 cubic metres of clay to build the new flood banks. ***All of this material was sourced from within the site area***, saving over 40,000 lorry movements on the local road network and probably 2 to 3 years in delivery time alone. The "borrow pits"

created by excavating the clay were incorporated into the final design, increasing the amount of intertidal habitat created.

We minimised the haulage of material on site, balancing design requirements with the quality of material. Other sustainability initiatives included:

- 3D model of site produced linked to a detailed materials management plan
- Realtime GPS data on plant optimised all excavation activities
- 100% excavated material reused on site
- 60,000 tonnes of rock delivered by sea minimising impact on the local road network
- 20,000 tonnes of recycled aggregate used to construct access tracks
- 90% of the waste from compound recycled off-site

The carbon footprint of constructing the project was minimised as far as possible. The new habitat will absorb carbon emissions, meaning that the site will be making a positive contribution to carbon reduction in the long term.

Medmerry provides a major boost for green tourism and will be managed by the RSPB as a nature reserve, providing access, education and volunteering opportunities.

- Protection to 348 properties, sewage works and local caravan parks on which Selsey's economy is dependent
- Protection of Selseys main road serving over 5000 residents
- £300,000 p.a. saved on flood defence maintenance
- £90m direct economic benefits
- Local caravan parks have extended opening periods by two months, generating income and jobs for the area.

Economic

Environmental - Maximising habitat opportunities

Sea level rise, coupled with maintaining and renewing defences for major cities including Southampton and Portsmouth, mean internationally important coastal wetland habitat is being lost across the Solent. Medmerry is the first site in the Solent to offer the opportunity to compensate for these losses on a large scale.

Working in partnership with the RSPB during the early stages maximised the habitat delivery, integrating it into the design and scheme construction.



Prior to the scheme, Medmerry held protected wildlife, careful steps were taken through the scheme's design and construction to ensure their future was guaranteed. We built four new 'eel and fish friendly' freshwater outfall structures and over 10km of new drainage ditches and ponds to maintain drainage for the wider area. This system provides habitat for aquatic invertebrates and Water Voles.

- 183ha intertidal habitat, ensuring resilience for other losses in the Solent
- 300ha habitats of principle importance (UK BAP) including mudflats, reed beds, saline lagoons, grassland areas
- 1000 reptiles were moved to safe new habitat.
- Resilience protecting existing and new habitats, providing long term sustainability
- Formation of a fish nursery, to sustain the local fishing fleet.

Environmental

Social - Engaging with the community

When formulating the coastal strategy for the Selsey coastline, we identified concerns about the idea of a managed realignment. Residents doubted the scheme would work and leave the community open to tidal inundation.

Addressing these concerns head-on, the project team devised a new strategy for engagement:

- Specialist independent facilitation
- Forming a Medmerry Stakeholder Group (MStAG), with self elected member representation
- Agreeing the project objectives to ensure all interests included

Planning approval was granted with unanimous committee vote and over 100 comments of support.

With MStAG's advice, we included a network of new footpaths, bridleways, viewpoints and car parks in what will be the new RSPB nature reserve, providing access, education and volunteering opportunities. We are part of initiatives using Medmerry as the catalyst for further green links, connecting communities.

Whilst delivering the Medmerry scheme we carried out a pro-active multi media campaign. Our success at Medmerry reached many audiences including BBC South TV live headline coverage from site during the breach. Figures from the campaign include:

- 2.8m newspaper readers, including National titles
- 2.5m radio listeners, including Radio New York
- 250m TV and website viewers, including BBC breakfast news
- 5800 Youtube views and 260 tweets



Excavation of Medieval Fish Weir

Constructing Medmerry enabled extensive archaeological assessment and excavation, including finds such as a 100m long medieval fish weir and extensive Bronze Age settlements and cremation sites. The archaeology at Medmerry provides new understanding of the archaeological risk for developments in the coastal plain, and how to manage archaeology on large construction sites.

- Improved public health associated with access to countryside and wildlife
- Giving people the opportunity to influence the creation and development.
- 10km of new access routes
- Opportunities for green tourism
- Improved knowledge of the history of site through archaeological excavation

Social

Involvement/Engagement

The flood defences were completed in September 2013 and within months have withstood some of the worst coastal storms the area has seen for over 20 years.

When formulating the coastal strategy for the Selsey coastline, we identified local concerns about managed realignment scheme. Residents doubted the scheme would work, would leave the community open to tidal inundation, or damage the local economy.

Addressing these concerns, we devised a new strategy for engagement:

- Specialist independent facilitation
- Forming a Medmerry Stakeholder Group (MStAG), with self elected member representation
- Agreeing the project objectives to include all interests
- Being clear what could and couldn't be influenced

Community involvement has centered on MStAG who represented local authorities, parishes, residents, businesses and local interests. We consulted MStAG first, for advice on decision making and messaging about the scheme. MStAG channeled input from their communities and fed back decisions and information.

We listened to concerns from the wider community. Working with them enabled us to include and deliver local development opportunities. With MStAG's advice, we included a network of new footpaths, bridleways, viewpoints and car parks in what will be the new RSPB nature reserve.



Archaeology Guided Walk summer 2013

We setup a dedicated internal communications team from Environment Agency, RSPB, Team Van Oord and EC Harris and dedicated public liaison officer. This proved invaluable to manage the large number/range of stakeholders.

Our approach centered around digital media with regular e-updates distributed to over 500 recipients, dedicated webpage for scheme information and links to Flickr and you tube.

During construction we wanted to share as much as possible, with guided walks, school visits and archaeology days. Volunteers helped with scrub clearance, archaeology fieldwork, and Universities with ongoing monitoring and research.

Health & Safety

The Environment Agency's "Safety is paramount" was adopted throughout the scheme.

Safety specific workshops took place during design, with changes to improve safety of construction and operation including:

- All outfall elements were pre-cast concrete
- Widening the public access area to reduce pedestrian and equestrian interfaces
- Use of saloon style outfall doors aiding fish passage and reducing maintenance.



Medmerry presented unique site security, health and safety challenges, being over 500 hectares and in a low lying area. Taking a partnership approach we used:

- Project branded PPE – easy identification of site personnel
- Scheme business cards for staff to hand out to the public
- Working with RSPB and tenant farmers to enable farming throughout construction
- Pro-actively asking emergency services to site to agree rescue points
- Eupdate/media coverage used to communicate health and safety messages.

Excavation of the 110m wide breach in the existing sea defences was a key safety risk. With so much public interest we acknowledged people wanted to see progress of the breach and inundation of the sea.

We planned this carefully:

- Closing the beach with Heras fencing/signage
- Safety messages via e-update, webpage, MStAG, BBCTV and social media
- Timelapse photography, as viewpoints not possible
- Constantly emphasising it was not safe to view the works on site.

It wasn't easy working with timelapse in a windy coastal area we mounted cameras on mobile lighting towers. The breach footage was hosted on a dedicated webpage viewed by over 800 people.

Evidence

The project has scored highly in the Environment Agency 'Team Performance Measures'. The highest scores have been in the area of project communications, scoring 10 on several occasions, meaning of national significance.

Environmental KPI's are recorded quarterly, demonstrating that 100% of excavated material was reused on site, use of recycled materials and aggregates whenever possible and 100% of timber from sustainable sources.

During the winter 2013/2014 storms, no flooding was experienced and no maintenance was required. These storms were in excess of those in 2008 when £5m damage was caused.

Recognition of how the scheme has considered it's neighbours, is being a Considerate Constructors 2014 national award winner and winning a CIPR Community Engagement award in 2012.

The scheme has received positive praise from the community and stakeholders, demonstrated by the following quotes:

“Medmerry’s really been tested! We’re just amazed at how well we’ve come out of it,” “Normally by now we would’ve had flooding, but we’ve had none at all.”
Alan Chamberlain Medmerry Park Holiday Village, Jan 2014

“Medmerry will enhance the area around Earnley and I am sure it will become a major attraction for wildlife and tourists alike.” Keith Martin, Local Resident

“This project will become a thriving wildlife haven and a big draw for nature lovers. We should take confidence from the success here at Medmerry and help to secure our and nature’s future by investing in these sort of landscape scale projects.” Mike Clarke, RSPB Chief Executive

Lessons learnt

The key learning points:

- Good planning required to fully understand a large site, ensure surveys are specific from an early stage, understand the difficult areas in detail
- Good communications internally and externally are essential, consider using a RACI tracker for large project teams
- Involve archaeology fieldworks as early as possible to understand risk and investigation techniques such as GPR and intrusive works.



We were keen to share our successes and experiences, nationally and internationally. We hosted a knowledge day with colleagues from around the UK, to advance engineering understanding, and hosted a visit from the Japanese Ministry of Land. Medmerry has been presented as a case study at NCE, ICE and CIWEM conferences and appeared in trade publications, reaching as far as an article in the American Society of Civil Engineers journal.

We have worked with voluntary groups and Universities, to involve students in long-term monitoring of the habitat and species establishment. Brighton University currently have masters and PhD students undertaking research that includes Medmerry. There is also the potential to include Medmerry in core environmental and wetland modules.

Lessons from translocating water voles, have been published in 'In Practice' to ensure good practice is circulated amongst professionals. This includes specifications of water vole exclusion fencing; for example, the mesh size formerly recommended in the water vole conservation handbook proved to be too large, allowing juvenile water voles to pass through.

Impact

Rising sea levels and the economic challenges of maintaining coastal sea defences will make coastal realignment an increasingly sustainable option in the future. The uniqueness, scale and innovative ecological approaches implemented on this scheme are influencing Environment Agency policies on the economic and environmental benefits of managing coastal flood risk through managed realignment.

Innovative ecological mitigation techniques developed during this project, including the problems encountered and solutions adopted, have been documented and can therefore inform the design of future managed realignment schemes, reducing cost and increasing the chances of success.

To determine the success of the scheme's objectives and strategies for ecological mitigation, a suite of environmental and physical parameters are being monitored for at least five years after the breach being undertaken and the site flooded.

Above all, the pro-active work to publicise the scheme has really shown and convinced people that it is possible to complete ambitious realignment schemes such as Medmerry, protecting people and working with nature.