# Seaton Beach Management Plan – Notes on the Impacts of Various Dredge Disposal Options – For Consideration by Natural England

Prepared by Nancy James, September 2018.

## Background Information

### Information Relating to Dredging Practices

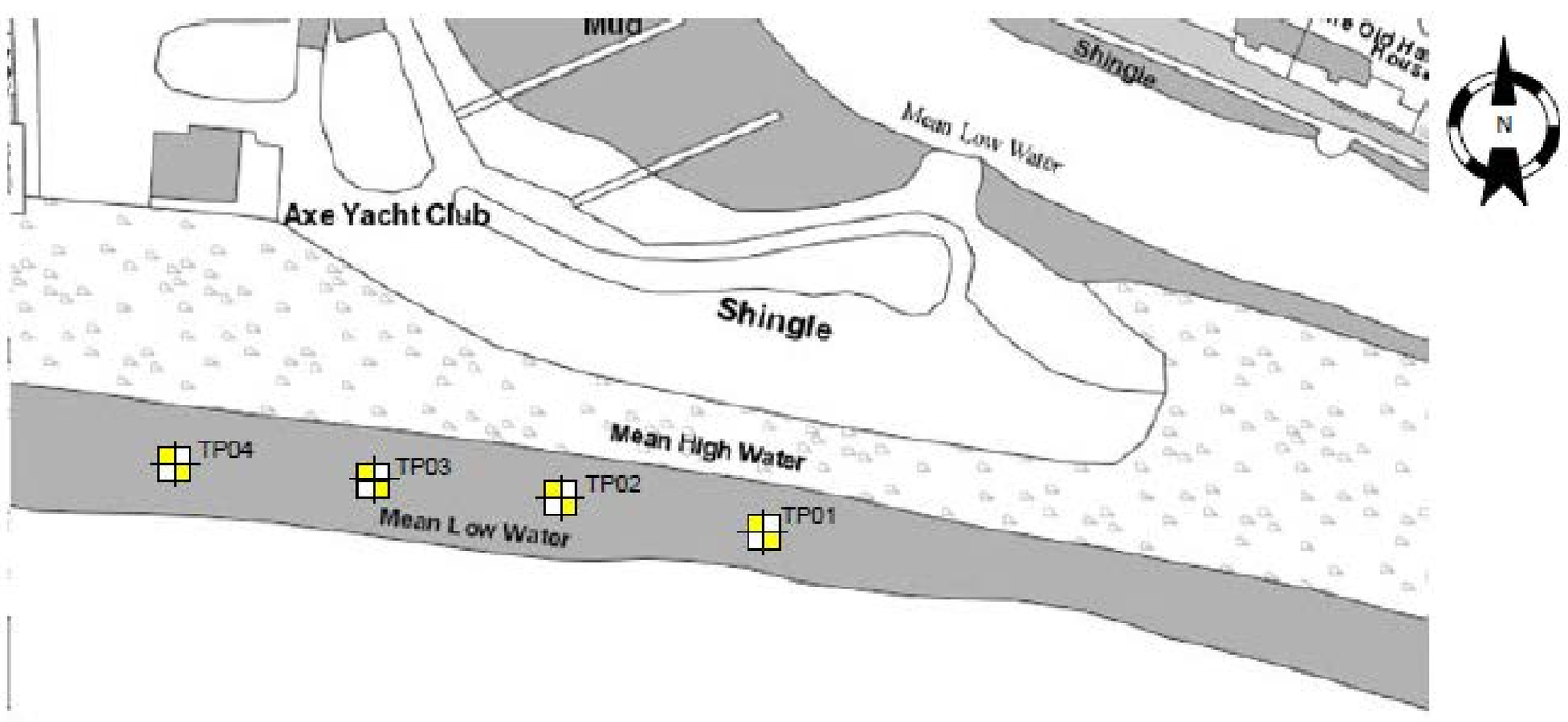
- Volume dredged – a maximum of 1500m$^3$ of material is dredged from the harbour per year (the amount per dredge operation varies, but the total over the dredge campaign doesn't exceed this).
- Frequency / duration/ seasonality – the harbour is dredged over the winter period (generally September to March), during daytime and not at weekends so as to minimise disruption.
- Type of material dredged – sediment at the locations where material is dredged and could be placed has been analysed and the results supplied previously to Natural England.
- Quality of material dredged - sediment at the locations where material is dredged have been confirmed to be uncontaminated (no chemical levels above Cefas action levels).
- Method of extraction – suction dredger.
- Disposal (at present) – material is piped from the dredger directly into a trench pit that is dug into the beach – the location of the trench has varied over time.

### Dredge Disposal Options

Various disposal options have been identified, with the three likely preferred options being disposal directly into the estuary on the ebb tide, or disposal via fixed or flexible pipe below Mean High Water Springs (MHWS). The existing beach material could be scraped back, the disposal material placed, and the shingle put back on top.

### Approximate Location of Disposal Sites

The approximate locations for the disposal of material via fixed or flexible pipe onto the lower beach, and below MHWS, is shown in the figure below.



## Notes on the Impacts of Various Dredge Disposal Options – For Consideration by Natural England

| Option | Option Details | Impacts on Lyme Bay and Torbay candidate Special Area of Conservation (cSAC)/Site of Community Importance (SCI) | | Acceptable to proceed with option | Impacts on potential Marine Conservation Zone (pMCZ) Axe Estuary pMCZ | | Acceptable to proceed with option |
|---|---|---|---|---|---|---|---|
| **Option 6** | **Deposit dredge material within spit below MHWS** | **Annex I habitats that are a primary reason for selection of this site** | **1170 Reefs** - Some reef features are likely to be present adjacent to the BMP study area. They are entirely subtidal. The literature review that has been undertaken for the BMP has shown that coastal processes move the sediment both west and east, laterally, along the coast. Therefore, it is considered that any outflow of deposited material within the spit will take the same pathway and will have settled out of suspension in the shallows before it reaches the reef structures, especially considering the relatively small amount that would be placed. Therefore, this option is not considered to have an adverse effect on the reefs. | **Yes** | **Important Habitats** | **Coastal saltmarshes -** MAGIC mapping for MCZ Habitat Features of Conservation Importance indicates that there are no coastal saltmarshes present within 20km of the Seaton area. Therefore, this option will not have any adverse impacts on coastal saltmarshes. | **Yes** |
| | | | | | | **Saline reedbeds -** MAGIC mapping for MCZ Habitat Features of Conservation Importance, indicates that there are no saline reedbeds present within 20km of the Seaton area. Therefore, this option will not have any adverse impacts on coastal saltmarshes. | **Yes** |
| | | | | | | **Intertidal coarse sediment -** There is much intertidal coarse sediment adjacent to the spit. It is considered that any seepage of material from within the spit will consist of a mixture of gravels and slightly gravelly muddy sand (as determined by the laboratory testing of samples from the harbour) that will readily settle out of suspension and become well mixed with this sediment. Therefore, this option does not pose any adverse effects on intertidal coarse sediments. | **Yes** |
| | | | **8330 Submerged or partially submerged sea caves -** The nearest sea cave is at Beer Head, approximately 2km southwest of the BMP study area. It is considered unlikely that any significant quantity of deposited material would reach any cave feature, due to dispersal and dissipation in the dynamic and highly mobile coastal environment between the deposition site and the cave features. | **Yes** | | **Intertidal mixed sediments -** MAGIC mapping for MCZ Habitat Features of Conservation Importance indicates that there are no intertidal mixed sediments within 20km of the Seaton area. Therefore, this option will not have any adverse impacts on intertidal mixed sediments. | **Yes** |
| | | | | | | **Intertidal mud -** MAGIC mapping for MCZ Habitat Features of Conservation Importance indicates that there are no intertidal mud within 20km of the Seaton area. Therefore, this option will not have any adverse impacts on intertidal mud. | **Yes** |
| | | | | | | **Subtidal mixed sediments -** The closest subtidal mixed sediments are approximately 440m offshore from the spit. It is considered that any minor outflow of deposited material (which is itself mixed sediment) within the spit will have settled out of suspension in the shallows before it reaches the subtidal mixed sediments. Therefore, this option is not considered to have an adverse effect on subtidal mixed sediments. | **Yes** |
| | | | | | **Species of Conservation Importance** | **European eel (Anguilla anguilla) –** Young (or 'glass') eels migrate into south coast estuary and river systems include the Axe in Spring and Summer, usually moving at night on a rising tide. Adult eels (10 to 14 years) old migrate out of river systems in response to high / spate flows typically in Summer months. As the works to place the dredged material within the spit would take place during September to March they will not affect eel movement. Therefore, this option is not considered to have an adverse effect on European eels. | **Yes** |
| | | | | | | **Nursery area for fish, including bass -** As the shallows off Seaton are an important nursery area for many species of fish, there could potentially be short term and temporary impacts on these species. However, these species are highly mobile and are constantly on the move in search of food, so they will readily move if the surrounding environment is not entirely suitable for them. Therefore, it is considered that there will not be any adverse impacts on nursery areas for fish. | **Yes** |
| | | **Associated ecological communities of the Lyme Bay reefs** | **Reef Communities -** The reefs are home to a diverse community of invertebrates, immobile filter feeders and anemones anchored to the substrate. An assortment of hydroids, bryozoans, sea squirts, erect sponges and corals populate the area. As any discharge of sediment from within the spit is considered likely to have settled out of suspension in the shallows before it reaches the reef structures, it is not expected that the ecological communities present will be adversely affected. | **Yes** | | | |
| **Option 7** | **Pump dredge material into the estuary on the ebb tide** | **Annex I habitats that are a primary reason for selection of this site** | **1170 Reefs** - Some reef features are likely present adjacent to the BMP study area. They are entirely subtidal. There is a risk that pumping the sediment into the estuary on an ebb tide could cause the dredged material to be pushed further into the bay, through a combination of fluvial sediment transport and tidal action. This could result in transport to the reefs which could lead to smothering of the associated ecological communities. Therefore, this option could have an adverse effect on the reefs. | **No** | **Important Habitats** | **Coastal saltmarshes -** MAGIC mapping for MCZ Habitat Features of Conservation Importance indicates that there are no coastal saltmarshes present within 20km of the Seaton area. Therefore, this option will not have any adverse impacts on coastal saltmarshes. | **Yes** |
| | | | | | | **Saline reedbeds -** MAGIC mapping for MCZ Habitat Features of Conservation Importance indicates that there are no saline reedbeds present within 20km of the Seaton area. Therefore, this option will not have any adverse impacts on coastal saltmarshes. | **Yes** |

| Option | Option Details | Impacts on Lyme Bay and Torbay candidate Special Area of Conservation (cSAC)/Site of Community Importance (SCI) | | Acceptable to proceed with option | Impacts on potential Marine Conservation Zone (pMCZ) Axe Estuary pMCZ | | Acceptable to proceed with option |
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| | | | | | | **Intertidal coarse sediment -** There is much intertidal coarse sediment adjacent to the estuary mouth. It is considered that any deposition of material pumped into the estuary will consist of a mixture of gravels and slightly gravelly muddy sand (as determined by the laboratory testing of the samples from the harbour ) that will readily settle out of suspension and become well mixed with the sediment within the estuary mouth. Therefore, this option does not pose any adverse effects on intertidal coarse sediments. | **Yes** |
| | | | | | | **Intertidal mixed sediments -** MAGIC mapping for MCZ Habitat Features of Conservation Importance indicates that there are no intertidal mixed sediments within 20km of the Seaton area. Therefore, this option will not have any adverse impacts on intertidal mixed sediments. | **Yes** |
| | | | **8330 Submerged or partially submerged sea caves -** The nearest sea cave is at Beer Head, approximately 2km southwest of the BMP study area. It is considered unlikely that any significant quantity of pumped dredge material would reach any cave feature, due to dispersal and dissipation in the dynamic and highly mobile coastal environment between the deposition site and the cave features. | **Yes** | | **Intertidal mud -** MAGIC mapping for MCZ Habitat Features of Conservation Importance indicates that there are no intertidal mud within 20km of the Seaton area. Therefore, this option will not have any adverse impacts on intertidal mud. | **Yes** |
| | | | | | | **Subtidal mixed sediments -** The closest subtidal mixed sediments are approximately 440m offshore from the spit. It is considered that any deposited material from the estuary (which is itself mixed sediment) will have settled out of suspension in the shallows before it reaches the subtidal mixed sediments. Therefore, this option is not considered to have an adverse effect on subtidal mixed sediments. | **Yes** |
| | | | | | **Species of Conservation Importance** | **European eel (Anguilla anguilla) –** Young (or 'glass') eels migrate into south coast estuary and river systems include the Axe in Spring and Summer, usually moving at night on a rising tide. Adult eels (10 to 14 years) old migrate out of river systems in response to high / spate flows typically in Summer months. As the works to pump the dredged material would take place during September to March they will not affect eel movement. Therefore, this option is not considered to have an adverse effect on European eels. | **Yes** |
| | | **Associated ecological communities of the Lyme Bay reefs** | **Reef Communities -** The reefs are home to a diverse community of invertebrates, immobile filter feeders and anemones anchored to the substrate. An assortment of hydroids, bryozoans, sea squirts, erect sponges and corals populate the area. There is a risk that pumping the sediment into the estuary on an ebb tide could cause the dredged material to be pushed further into the bay, through a combination of fluvial sediment transport and tidal action. This could result in transport to the reefs which could lead to smothering of these communities. Therefore, this option could have an adverse effect on the associated ecological communities of the reefs. | **No** | | **Nursery area for fish, including bass -** As the shallows off Seaton are an important nursery area for many species of fish, there could potentially be short term and temporary impacts on these species from dredged material being pumped into the estuary on an ebb tide. However, these species are highly mobile and are constantly on the move in search of food, so they will readily move if the surrounding environment is not entirely suitable for them. Therefore, it is considered that there will not be any adverse impacts on nursery areas for fish. | **Yes** |
| **Option 8** | **Pump dredged material directly into the sea (onto the beach, below MHWS), using fixed pipes. May require material on beach to be pulled back, fine dredge** | **Annex I habitats that are a primary reason for selection of this site** | **1170 Reefs** - Some reef features are likely to be present adjacent to the BMP study area. They are entirely subtidal. The literature review that has been undertaken for the BMP has shown that coastal processes move the sediment both west and east, laterally, along the coast. Therefore, it is considered that any outflow of pumped material will take the same pathway and will have settled out of suspension in the shallows before it reaches the reef structures, especially considering the relatively small amount that would be pumped. Therefore, this option is not considered to have an adverse effect on the reefs. | **Yes** | **Important Habitats** | **Coastal saltmarshes -** MAGIC mapping for MCZ Habitat Features of Conservation Importance indicates that there are no coastal saltmarshes present within 20km of the Seaton area. Therefore, this option will not have any adverse impacts on coastal saltmarshes. | **Yes** |
| | | | | | | **Saline reedbeds -** MAGIC mapping for MCZ Habitat Features of Conservation Importance indicates that there are no saline reedbeds present within 20km of the Seaton area. Therefore, this option will not have any adverse impacts on coastal saltmarshes. | **Yes** |
| | | | | | | **Intertidal coarse sediment -** There is much intertidal coarse sediment within the bay area. It is considered that the dredged material being pumped through a fixed pipe into the sea will consist of a mixture of gravels and slightly gravelly muddy sand (as determined by the laboratory testing of samples from the harbour) that will readily settle out of suspension and become well mixed with the sediment within the bay. Therefore, this option does not pose any adverse effects on intertidal coarse sediments. | **Yes** |

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| | **disposal placed, and shingle replaced.** | | | | | **Intertidal mixed sediments -** MAGIC mapping for MCZ Habitat Features of Conservation Importance indicates that there are no intertidal mixed sediments within 20km of the Seaton area. Therefore, this option will not have any adverse impacts on intertidal mixed sediments. | **Yes** |
| | | | **8330 Submerged or partially submerged sea caves -** The nearest sea cave is at Beer Head, approximately 2km southwest of the BMP study area. It is considered unlikely that any significant quantity of pumped material would reach any cave feature, due to dispersal and dissipation in the dynamic and highly mobile coastal environment between the release site and the cave features. | **Yes** | | **Intertidal mud -** MAGIC mapping for MCZ Habitat Features of Conservation Importance indicates that there are no intertidal mud within 20km of the Seaton area. Therefore, this option will not have any adverse impacts on intertidal mud. | **Yes** |
| | | | | | | **Subtidal mixed sediments -** The closest subtidal mixed sediments are approximately 440m offshore from the spit. It is considered that, so long as the fixed pipe was not overly long, the outflow of dredged material (which is itself missed sediment) will settle out of suspension in the shallows before it reaches the subtidal mixed sediments. Therefore, this option is not considered to have an adverse effect on subtidal mixed sediments. | **Yes** |
| | | | | | **Species of Conservation Importance** | **European eel (Anguilla anguilla) –** Young (or 'glass') eels migrate into south coast estuary and river systems include the Axe in Spring and Summer, usually moving at night on a rising tide. Adult eels (10 to 14 years) old migrate out of river systems in response to high / spate flows typically in Summer months. As the works to pump the dredged material would take place during September to March they will not affect eel movement. Therefore, this option is not considered to have an adverse effect on European eels. | **Yes** |
| | | **Associated ecological communities of the Lyme Bay reefs** | **Reef Communities -** The reefs are home to a diverse community of invertebrates, immobile filter feeders and anemones anchored to the substrate. An assortment of hydroids, bryozoans, sea squirts, erect sponges and corals populate the area. As any pumped sediment is considered likely to have settled out of suspension in the shallows before it reaches the reef structures, it is not expected that the ecological communities present will be adversely affected. | **Yes** | | **Nursery area for fish, including bass -** As the shallows off Seaton are an important nursery area for many species of fish, there could potentially be short term and temporary impacts on these species. However, these species are highly mobile and are constantly on the move in search of food, so they will readily move if the surrounding environment is not entirely suitable for them Therefore, it is considered that there will not be any adverse impacts on nursery areas for fish. | **Yes** |
| **Option 9** | **Pump dredged material directly into the sea (onto the beach, below MHWS), using flexible pipes. May require material on beach to be pulled back, fine dredge disposal placed, and shingle replaced.** | **Annex I habitats that are a primary reason for selection of this site** | **1170 Reefs** - Some reef features are likely to be present adjacent to the BMP study area. They are entirely subtidal. The literature review that has been undertaken for the BMP has shown that coastal processes move the sediment both west and east, laterally, along the coast. Therefore, it is considered that any outflow of pumped material will take the same pathway and will have settled out of suspension in the shallows before it reaches the reef structures, especially considering the relatively small amount that would be pumped. Therefore, this option is not considered to have an adverse effect on the reefs. | **Yes** | **Important Habitats** | **Coastal saltmarshes –** MAGIC mapping for MCZ Habitat Features of Conservation Importance indicates that there are no coastal saltmarshes present within 20km of the Seaton area. Therefore, this option will not have any adverse impacts on coastal saltmarshes. | **Yes** |
| | | | | | | **Saline reedbeds -** MAGIC mapping for MCZ Habitat Features of Conservation Importance indicates that there are no saline reedbeds present within 20km of the Seaton area. Therefore, this option will not have any adverse impacts on coastal saltmarshes. | **Yes** |
| | | | | | | **Intertidal coarse sediment -** There is much intertidal coarse sediment within the bay area. It is considered that the dredged material being pumped through a flexible pipe into the sea will consist of a mixture of gravels and slightly gravelly muddy sand (as determined by the laboratory testing of samples from the harbour) that will readily settle out of suspension and become well mixed with the sediment within the bay. Therefore, this option does not pose any adverse effects on intertidal coarse sediments. | **Yes** |
| | | | | | | **Intertidal mixed sediments -** MAGIC mapping for MCZ Habitat Features of Conservation Importance indicates that there are no intertidal mixed sediments within 20km of the Seaton area. Therefore, this option will not have any adverse impacts on intertidal mixed sediments. | **Yes** |
| | | | **8330 Submerged or partially submerged sea caves -** The nearest sea cave is at Beer Head, approximately 2km southwest of the BMP study area. It is considered unlikely that any significant quantity of pumped material would reach any cave feature, due to dispersal and dissipation in the dynamic and highly mobile coastal environment between the release site and the cave features. | **Yes** | | **Intertidal mud -** MAGIC mapping for MCZ Habitat Features of Conservation Importance indicates that there are no intertidal mud within 20km of the Seaton area. Therefore, this option will not have any adverse impacts on intertidal mud. | **Yes** |
| | | | | | | **Subtidal mixed sediments -** The closest subtidal mixed sediments are approximately 440m offshore from the spit. It is considered that, so long as the flexible pipe was not overly long, the outflow of dredged material (which is itself | **Yes** |

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|---|---|---|---|---|---|---|---|
| | | | | | | mixed sediment) will settle out of suspension in the shallows before it reaches the subtidal mixed sediments. Therefore, this option is not considered to have an adverse effect on subtidal mixed sediments. | |
| | | | | | **Species of Conservation Importance** | **European eel (Anguilla anguilla) –** Young (or 'glass') eels migrate into south coast estuary and river systems include the Axe in Spring and Summer, usually moving at night on a rising tide. Adult eels (10 to 14 years) old migrate out of river systems in response to high / spate flows typically in Summer months. As the works to pump the dredged material would take place during September to March they will not affect eel movement. Therefore, this option is not considered to have an adverse effect on European eels. | **Yes** |
| | | **Associated ecological communities of the Lyme Bay reefs** | **Reef Communities -** The reefs are home to a diverse community of invertebrates, immobile filter feeders and anemones anchored to the substrate. An assortment of hydroids, bryozoans, sea squirts, erect sponges and corals populate the area. As any discharge of pumped sediment is considered likely to have settled out of suspension in the shallows before it reaches the reef structures, it is not expected that the ecological communities present will be adversely affected. | **Yes** | | **Nursery area for fish, including bass -** As the shallows off Seaton are an important nursery area for many species of fish, there could potentially be short term and temporary impacts on these species. However, these species are highly mobile and are constantly on the move in search of food, so they will readily move if the surrounding environment is not entirely suitable for them. Therefore, it is considered that there will not be any adverse impacts on nursery areas for fish. | **Yes** |
| **Option 11** | **Pump material onto a dredger and dispose of at sea.** | **Annex I habitats that are a primary reason for selection of this site** | **1170 Reefs** - The dredged material would be disposed of at an existing Marine Licenced site so will not impact on any reefs. | **Yes** | **Important Habitats** | **Coastal saltmarshes -** The dredged material would be disposed of at an existing Marine Licenced site so will not impact on any coastal saltmarshes. | **Yes** |
| | | | | | | **Saline reedbeds -** The dredged material would be disposed of at an existing Marine Licenced site so will not impact on any saline reedbeds. | **Yes** |
| | | | | | | **Intertidal coarse sediment -** The dredged material would be disposed of at an existing Marine Licenced site so will not impact on any intertidal coarse sediment | **Yes** |
| | | | | | | **Intertidal mixed sediments -** The dredged material would be disposed of at an existing Marine Licenced site so will not impact on any intertidal mixed sediments. | **Yes** |
| | | | **8330 Submerged or partially submerged sea caves -** The dredged material would be disposed of at an existing Marine Licenced site so will not impact on any sea cave. | **Yes** | | **Intertidal mud -** The dredged material would be disposed of at an existing Marine Licenced site so will not impact on any intertidal mud. | **Yes** |
| | | | | | | **Subtidal mixed sediments -** The dredged material would be disposed of at an existing Marine Licenced site so will not impact on any subtidal missed sediments of particular ecological value. | **Yes** |
| | | | | | **Species of Conservation Importance** | **European eel (Anguilla anguilla) –** The dredged material would be disposed of at an existing Marine Licenced site so will not impact on any migration patterns of European eel. | **Yes** |
| | | **Associated ecological communities of the Lyme Bay reefs** | **Reef Communities -** The dredged material would be disposed of at an existing Marine Licenced site so will not impact on any reef communities. | **Yes** | | **Nursery area for fish, including bass -** The dredged material would be disposed of at an existing Marine Licenced site so will not impact on any nursery areas for fish. | **Yes** |