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Forth Crossing Bridge Constructors

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Project **FORTH REPLACEMENT CROSSING**

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ECOLOGICAL MANAGEMENT PLAN

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ECOLOGICAL MANAGEMENT PLAN

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1 INTRODUCTION

- 1.1.1 This Ecological Management Plan (EcMP) ensures that the implementation of the project complies with the provisions of the Forth Replacement Crossing Act (2011) regarding the protection of the ecology, as identified in the Environmental Statement and Reports to Inform Appropriate Assessment (RIAA), the Schedule of Developments (prepared by FCBC and approved by EDT) and the requirements of the Code of Construction Practice (CoCP) and the Employer's Requirements.
- 1.1.2 The Conditions accompanying the Act for the Forth Replacement Crossing include a number of ecological considerations relating to the protection and enhancement of ecological resources during construction and operation. The EcMP identifies procedures to be followed to mitigate environmental impacts on ecological resources present within the site.
- 1.1.3 An Ecological Clerk of Works (ECoW) has been appointed who is responsible for implementing the procedures in the EcMP. The purpose of the EcMP is to consolidate all ecological information and to assist FCBC, subcontractors and the site ECoW with the compliant execution of the project construction and operation.

2 SCOPE

2.1.1 This EcMP includes the following:

- A summary of all known areas of nature conservation interest which may be affected on or adjacent to the project.
- Details of proposed protection measures to avoid any unnecessary encroachment into adjoining areas of nature conservation interest;
- Details of measures proposed to mitigate potential impacts on areas of nature conservation interest.
- A programme for undertaking ecological survey works prior to and during construction to verify the baseline ecological conditions disclosed in the Environmental Statement and undertake appropriate monitoring during the construction and post construction phases.
- Details of any restrictions on the timing of construction works and construction methods to protect species or areas of nature conservation interest.
- Details of appropriate watching briefs to be implemented during construction works.
- Procedures to be implemented in relation to relocation or translocation of species.
- Procedures to be adopted in the event of unanticipated discovery or disturbance of protected species or important habitats.
- Reinstatement procedures to be implemented for any areas of temporary habitat loss.
- Reference to the relevant procedures in the Pollution Incident Response Plan to be implemented in the event of a pollution incident on or adjacent to a designated nature conservation site.

2.1.2 Management Plans for the following species and habitats are included in **Section 5**:

- Terrestrial habitats.
- Estuarine habitats.
- European Protected Species (cetaceans, great crested newt, otter and bats).
- Badger.
- Breeding birds; and
- Freshwater fish, including migratory species.

2.1.3 The EcMP is related to measures incorporated in the following management plans:

- Noise and Vibration Management Plan;
- Dust and Air quality Management Plan;
- Surface and Ground Water Management Plan;
- Pollution Incident Response Management Plan; and
- Area Management Plan.

2.1.4 This EcMP was prepared in consultation with EDT, SNH, SEPA and Marine Scotland (MS). Where relevant the EcMP includes references to licencing requirements where applicable and sets out specific measures necessary to comply with the relevant legislation, including the:

- Wildlife and Countryside Act 1981, as amended;
- Nature Conservation (Scotland) Act 2004;
- Conservation (Natural Habitats, & c.) Regulations 1994, as amended;
- Food and Environment Protection Act 1985;
- Protection of Badgers Act 1992;
- Environmental Protection Act 1990;
- Wild Mammals (Protection) Act 1996; and
- Salmon and Freshwater Fisheries Act 1975.

3 KEY ISSUES

3.1.1 FCBC have sought to reduce any habitat loss within the land provided for the Project by keeping the working area to the minimum necessary for construction of the Project.

3.1.2 Where appropriate, FCBC have mitigated the loss of ecologically important habitats through habitat creation. Where replacement planting is provided, this mitigation has been integrated with landscape planting, as appropriate, and native species of local provenance was used as outlined in the Landscape Management Plan.

3.1.3 The success of ECoW appointments is dependent on well-defined lines of communication. Robust construction method statements incorporate many of the areas of ECoW concern into the daily activities of construction personnel. All staff know of the circumstances when the ECoW should be contacted, and the relevant phone numbers.

4 PROTECTED SITES

4.1 Designated Sites

4.1.1 Some areas of land, inland water and the sea have special legal protection (designated Natura 2000 sites) to prevent damaging activities and conserve important habitats and species. Sites of European importance are Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) for birds. Sites of Special Scientific Interest (SSSIs) are areas within the UK that are nationally important for plants, animals, geological or physiographical features and are protected by law.

4.1.2 There are four nearby internationally designated (Natura 2000) sites and three Sites of Special Scientific Interest (SSSI):

- Firth of Forth (SPA);
- Forth Islands SPA;
- Imperial Dock Lock SPA (mitigation measures for this SPA are contained within the Forth Islands RIAA);
- River Teith SAC;
- St Margaret's Marsh SSSI;
- Ferry Hills SSSI; and
- Firth of Forth SSSI.

4.1.3 Site personnel are notified of working areas containing or close to protected sites via toolbox talks and informed of the constraints during site and method statement briefings. The ECoW undertakes appropriate monitoring of the construction works which may affect the SPAs, SAC and SSSIs, as appropriate.

4.1.4 Construction of the foundations associated with the main crossing and approach viaducts within the Firth of Forth SPA are undertaken in line with the requirements of the Environmental Statement and RIAAs to mitigate the potential effects on fish, marine mammals and birds, including impacts associated with the following:

- noise and vibration due to piling and blasting works;
- habitat loss due to piling and dredging works, including the disposal of dredgings;
- release of sediment, including any contamination, due to construction works;
- chemical spills due to construction works;
- light pollution due to temporary lighting; and
- disturbance from increased traffic/vessels.

4.2 St Margaret's Marsh

4.2.1 St. Margaret's Marsh SSSI is situated to the north of the Firth of Forth immediately west of the proposed alignment. The site comprises a mosaic of coastal reed bed habitat with smaller areas of saltmarsh, scrub and tall ruderal vegetation.

Summary of previous survey

4.2.2 Jacobs Arup undertook site surveys between March and August 2008 and October 2008. Jacobs Arup submitted three further reports on St Margaret's Marsh during the tender phase:

- St Margaret's Marsh Tidal Hydrology Memo - 12th August 2010;
- Draft St Margaret's Marsh SSSI Management plan – September 2010; and
- St Margaret's Marsh Hydrogeological Assessment – October 2010.

4.2.3 Consultation with SNH was undertaken for St. Margaret's Marsh as it is designated as a SSSI, SNH advised the following:

- The central/western area of this site is of higher value than the area south of the sewage treatment works.
- The treatment of run-off will be a key consideration.
- Improved management of the existing habitat is preferable to habitat replacement by creation out with the existing site boundary.

General protection measures

4.2.4 The main mitigation item for St Margaret's Marsh is a management plan. This will not be delivered by the contractor, but the contractor will liaise with the EDT and SNH as required to implement the works outlined in the Employers Requirements.

4.2.5 The contractor will replace the two existing inlets and provide an additional inlet to the west of the marsh. The new inlet location will be agreed with the EDT and SNH.

4.2.6 The design will maintain the hydrological connectivity of the marsh whilst ensuring that the directional flow of groundwater is not affected.

4.2.7 Storage of chemical, fuel or oil tanks or refuelling locations will be located more than 10m beyond the boundary of St. Margaret's Marsh SSSI.

4.2.8 Concrete mixing and washing areas will be located more than 10m beyond the boundary of St. Margaret's Marsh SSSI.

4.2.9 The area of species-rich grassland will be avoided, where practicable.

5 PROTECTED SPECIES

5.1 Bats

Legislation

5.1.1 All British bat species and their roosts are protected under the following legislation and guidance:

- Habitats Directive 1992 (Annex IV);
- Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (Schedule 2 - which requires that they are given full legal protection) and;
- Wildlife and Countryside Act 1981.

5.1.2 Bat use a variety of roost locations including tree roosts, buildings and underground sites. Because bats tend to reuse the same places to breed and shelter (roost sites) legal opinion is that the roost is protected whether or not the bats are present at the time. A licence is required for all developments which will affect areas known to contain bat roosts. This licence is issued by SNH.

Summary of previous survey results

5.1.3 Bat surveys were originally undertaken by Jacobs Arup in between April 2008 and February 2009 with an update survey completed in August 2010.

5.1.4 Five species of bat were reported during the initial ES; soprano pipistrelle (*Pipistrellus pygmaeus*), common pipistrelle (*P. pipistrellus*), Daubenton's bat (*Myotis daubentonii*), brown long-eared bat (*Plecotus auritus*). Bat roosts were recorded at Inchgarvie House, Admiralty House and Echline Woodland. Further potential roost locations were also noted in South Queensferry wood, Dolphinton wood, Dundas wood, St Margaret's Hope Wood and Port Edgar Barracks/Society Road.

5.1.5 Additional pre-construction surveys were conducted by Direct Ecology and the ECoW between August 2011 and March 2013. A bat roost was destroyed under licence (12995) during the demolition of Inchgavie garage in March 2012. No further bat species were recorded during this period. Pre-construction surveys will continue to be conducted as and where it is deemed necessary by the ECoW, as outlined below.

General protection measures

- 5.1.6 In accordance with the mitigation measures set out in the Environmental Statement, pre-construction surveys were undertaken in advance of works. These identified bat roost locations and ensure that exclusion zones are in line with best practice and are appropriate considering the nature of the construction works to be undertaken.
- 5.1.7 All relevant site personnel are briefed by site supervisors on ecological receptors within a working area. The briefings are in the format of a toolbox talk and where applicable include a section on bats.
- 5.1.8 The toolbox talks aim to ensure that personnel are aware of the legal obligations placed upon them in relation to bats and their responsibilities for ensuring they do not breach that legislation. The status of the species on the project will be discussed and personnel will be informed of the procedure to be followed if a bat roost or suspected bat roost is identified in the construction zone.

Procedures in the event of discovering or damaging a bat roost

A) Procedure in the event of discovering a suspected bat roost

- 5.1.9 All construction activity within a minimum of 30 m of the suspected roost will stop immediately and no site personnel will approach the area of the suspected roost. The ECoW will be informed immediately of the location of a suspected bat roost and will inform the EDT of the situation.
- 5.1.10 The ECoW will attend to the location as a matter of urgency to ensure that activity has stopped in the area and no personnel are within 30 m of the suspected roost site. The ECoW will inspect the suspected bat roost or, if the ECoW is not licensed to carry out such work, a licensed bat worker will attend the site.
- 5.1.11 If the structure is confirmed as a bat roost, the ECoW will devise appropriate mitigation and consult SNH for advice if required in more complex situations. If a licence is required for further work, the responsibility for applying for such a licence will lie with the ECoW in consultation with the EDT. Appropriate mitigation to ensure the protection of the roost will be agreed with SNH.
- 5.1.12 If no bat roost is present, the ECoW will authorise continuation of works in the area.

B) Procedure in the event of disturbance to a bat roost

- 5.1.13 In the event of accidental damage to a bat roost, an offence will have been committed under The Conservation (Natural Habitats, & etc.) Regulations 1994 (as amended). This procedure describes the actions that should be carried out in response to committing this offence.
- 5.1.14 Any accidental damage or disturbance to a bat roost will be reported to the ECoW and work within a minimum of 30 m of the roost will stop immediately.
- 5.1.15 The ECoW will investigate the nature of the damage or disturbance and report this immediately to the EDT. If necessary, a licensed bat worker will attend the site.
- 5.1.16 The ECoW will advise SNH of the incident, any action taken and any proposed subsequent action as soon as possible after the incident. Work in the vicinity of the shelter will not commence until any subsequent advice from SNH has been complied with.
- 5.1.17 If a licence is required for further work, the responsibility for applying for such a licence will lie with the ECoW in consultation with EDT. Appropriate mitigation to ensure the protection of the roost will be agreed with SNH.
- 5.1.18 The ECoW will be responsible for ensuring that any injured or displaced bats are passed to the appropriate organisations for care.

5.2 Badger

Legislation

5.2.1 Badger (*Meles meles*) and their setts are legally protected by the Protection of Badgers Act 1992 (PBA, 1992), as amended by the Nature Conservation (Scotland) Act (NCSA) 2004. They are listed in Schedule 6 of the Wildlife and Countryside Act (WCA) 1981 (as amended) and Section 11 of this Act prohibits the use of certain methods of taking or killing a wild animal. Taken together it is an offence to:

- wilfully kill, injure or take, or attempt to kill, injure or take, a badger;
- disturb a badger when it is occupying a sett;
- obstruct access to, or any entrance of, a badger sett; and
- Interfere with a badger sett by damaging or destroying it.

5.2.2 Disturbance is defined by SNH as any new procedure which approaches within a minimum of 30m of a sett margin. For particularly severe effects, such as blasting or piling, this exclusion zone may be extended to 100m. Activities within these zones can only be undertaken legally under a licence from SNH.

5.2.3 All location details of badgers and their setts must remain confidential to prevent persecution of badgers. No sett locations will be on general display on the site.

Summary of previous survey results

5.2.4 Badger surveys were originally undertaken by Jacobs Arup in between April 2008 and February 2009 with update surveys in March 2010 and advance works with further surveys in June – September 2011.

5.2.5 Badger activity was present across the south section of the project (data is confidential and therefore not included here). Three setts were located within the Land Made Available (LMA) in the south. These have now been replaced by three artificial setts (locations confidential). No badger activity was recorded within the northern section of the site.

5.2.6 Badger activity has been recorded around all three artificial sett locations between surveys carried out between November 2011 and September 2013. Badger activity on site will continue to be recorded for the duration of the project.

General protection measures

- 5.2.7 In accordance with the mitigation measures set out in the Environmental Statement, pre-construction surveys have been undertaken in advance of works to identify badger sett locations and to ensure that the exclusion zones are in line with best practice and are appropriate considering the nature of the construction works to be undertaken.
- 5.2.8 All relevant site personnel are briefed on ecological receptors within a working area. The briefing is in a format of a toolbox talk and included a section on badger. The toolbox talk aim to ensure that personnel are aware of the legal obligations placed upon them in relation to badger and their responsibilities for ensuring they do not breach that legislation. The status of the species on the project will be discussed and personnel will be informed of the procedure to be followed if a badger sett or suspected badger sett is identified in the construction zone.
- 5.2.9 Due to animal welfare issues, exact locations of any badger setts found on site are not to be disclosed to construction personnel. Only the relevant personnel working in the nearby areas are specifically informed about the location of 'ecological mitigation zones' which are to be avoided. The exclusion zones are not specifically be identified as those of badger.
- 5.2.10 General protection measures, considered as good practice on construction sites will be put in place site-wide to safeguard badger interest on site:
- safe storage of oil, fuels and other potential pollutants or poisonous materials on site;
 - capping of all on site stored pipes or vertical storage of pipes at the end of each working day to prevent badger becoming entrapped;
 - ramping of trenches and excavations to avoid entrapment of badger;
 - avoiding the use of floodlights where possible;
 - enforcing a speed limit of 15 mph on all site access tracks, during both construction and operation;
 - provision of an telephone number for the ECoW to all site personnel.

Procedures in the event of discovering or damaging a badger sett

A) Procedure in the event of discovering a suspected badger sett

- 5.2.11 All construction works will stop immediately within a minimum of 30m of the suspected badger sett and the suspected sett area will not be approached by any site personnel. For high disturbance impacts such as piling or blasting, this buffer zone may require to be larger, based on the judgement of the ECoW.
- 5.2.12 The ECoW will be immediately informed of the suspected sett location and the EDT will be advised of the situation and any current exclusion zones.
- 5.2.13 The ECoW will attend to the location as a matter of urgency to ensure that construction activity has stopped in the area and no site personnel are within a minimum of 50 m of the suspected sett. The ECoW will inspect the structure to confirm whether or not it is a badger sett, to ascertain any damage to the structure or injured badgers and the location and behaviour of any animals still in the vicinity.
- 5.2.14 If the suspected shelter is a badger sett, the ECoW will determine the status of the sett (i.e. main, annex, subsidiary or outlier sett) and whether procedures B or C, for a confirmed badger sett apply.
- 5.2.15 If the shelter is not a badger sett, the ECoW will authorise the recommencement of construction works.

B) Procedures for a confirmed badger sett (outside the breeding season)

- 5.2.16 In the event of a confirmed badger sett being found by the site personnel outside the breeding season i.e. setts identified between 1 July and 30 November, actions as described in paragraphs 5.2.10 to 5.2.13 of Procedure A will apply and then the following procedure will be put in place:
- 5.2.17 An exclusion area will be advised by the ECoW at a minimum distance of 30m from the sett location. For high disturbance impacts such as piling or blasting, this buffer zone may require to be larger, based on the judgement of the ECoW. The exclusion area boundary will consist of appropriate temporary fencing with notices indicating an ecological buffer zone.
- 5.2.18 If the sett can be avoided, the exclusion area will remain in place until the completion of construction works.

5.2.19 If work is required within the exclusion area of an outlier sett, but will not directly impact on the sett, the sett can be temporarily excluded, under a licence from the SNH. This does not include a main or annex sett, which should be left open and the procedure at Step B followed. The sett exclusion process will involve following steps:

- the ECoW will apply suitable one-way gates on the sett entrance(s) and monitor these until it is certain that no animal is within the sett;
- the ECoW will monitor all activities within the exclusion zone until works completion;
- following completion of works within 30m of the sett, the sett will be re-opened for use by badgers.

5.2.20 If work will directly impact on the sett, the sett will be excluded and destroyed only if there are no alternative solutions and after full consultation with SNH and when a licence is in place. All attempts will be made to avoid exclusion and destruction of a main or annexe sett. The sett exclusion process will involve the following steps:

- the ECoW will select a suitable site near to the natural sett, but no less than 50m from the construction zone, and will construct an artificial sett, surrounded by a 30m mitigation area. The new sett will be constructed as long as possible before exclusion of a natural sett begins;
- at an appropriate time the ECoW will apply suitable one-way gates on the entrance(s) of the natural sett and will monitor these until it is certain that no animal is within the sett;
- the ECoW will monitor the destruction of the sett. Destruction will be carried out with extreme care to ensure that any animal that may have remained within the sett is not injured (although it is rare, animals can be extremely gate-shy and they can survive for a considerable period, past the point where all indicators from monitoring suggest that the sett is empty);
- sett destruction will be carried out using hand tools where possible;
- following the sett destruction, the ECoW will advise EDT and SNH on the destruction completion and will authorise construction works in the area;
- the exclusion area around the artificial sett will remain in place until the completion of works site-wide;
- the ECoW will monitor the artificial sett for signs of use on a monthly basis.

C) Procedures for a confirmed badger sett (within the breeding season).

- 5.2.21 In the event of a confirmed badger sett being found by the site personnel within the breeding season i.e. setts identified between 1 December to 30 June, steps described at 5.2.10 to 5.2.13 of Procedure A will apply and then the following procedure will be put in place:
- 5.2.22 An exclusion area will be set up by the ECoW at a minimum distance of 30m from the sett location. For high disturbance impacts such as piling or blasting, this exclusion area may need to be larger, based on the judgement of the ECoW. The exclusion area boundary will consist of suitable temporary fencing with notices indicating an ecological buffer zone.
- 5.2.23 If the sett can be avoided, the exclusion area will remain in place until the completion of construction works.
- 5.2.24 The ECoW or other badger specialist will assess the use of a sett and its likelihood to have a pregnant or lactating female present. Monitoring of the sett will be used if necessary to determine this situation.
- 5.2.25 If the sett cannot be avoided by construction, SNH will be consulted on the ECoW's proposals with regard to closing the sett temporarily or permanently. If agreement to close the sett is reached, the procedure for a sett closure will be followed as given in Procedure B.
- 5.2.26 However, if disturbance to a sett that potentially contains a pregnant or lactating female badger appears to be unavoidable, works must be delayed until the end of the close season (30 June). Exclusion and destruction of the sett after this time will follow procedures as described in Procedure B.
- 5.2.27 No work will take place within the exclusion while the female is present with young.
- 5.2.28 The hierarchy of approaches taken with regards to mitigation for badger setts must always be avoidance of impacts as a first choice, followed by temporary exclusion, with permanent exclusions only being carried out as a last resort. There is a strong presumption against granting licences within the badger breeding season.

5.3 Otter

Legislation

5.3.1 The otter (*Lutra lutra*) is a species of European importance, protected under Regulation 39 of The Conservation (Natural Habitats, & etc.) Regulations 1994 (as amended). Under these regulations it is an offence to;

- deliberately or recklessly kill, injure or capture an otter;
- deliberately or recklessly disturb or harass an otter; and
- to, damage, destroy or obstruct access to a breeding site or resting place of an otter (i.e. an otter shelter).

5.3.2 A licence is required for all developments which will affect areas known to contain otter shelters. This licence is issued by SNH.

Summary of previous survey results

5.3.3 Otter surveys were originally undertaken by Jacobs Arup in between May and June 2008 with update surveys within the LMA during August 2011 to November 2011.

5.3.4 All evidence of use by the species was recorded, including: spraints; sign heaps; rolling places; slides; footprints; holts and lying up sites. Where any resting up sites were recorded, their likely usage was assessed e.g. breeding, temporary. Otter signs were very limited with some resting places found within the LMA (data is confidential and therefore not included here).

5.3.5 Otter surveys were undertaken by the ECoW before shore line works in the north and south sections of the LMA. No otter signs have been recorded within these areas during the period of November 2011 to 2013.

General protection measures

5.3.6 In accordance with the mitigation measures set out in the Environmental Statement, pre-construction surveys have been undertaken in advance of works to identify otter resting locations and to ensure that the exclusion zones are in line with best practice and are appropriate considering the nature of the construction works to be undertaken.

- 5.3.7 All relevant site personnel are briefed on ecological receptors within a working area. The briefing is in the format of a toolbox talk and includes a section on otter. The toolbox talk aims to ensure that personnel are aware of the legal obligations placed upon them in relation to otter and their responsibilities for ensuring they do not breach that legislation. The status of the species on the project will be discussed and personnel will be informed of the procedure to be followed if an otter shelter or a suspected otter shelter is identified in the construction zone.
- 5.3.8 Due to animal welfare issues, exact locations of any otter resting sites found on site will not be disclosed to construction personnel. Only the relevant personnel working in the nearby areas will be specifically informed about the location of 'ecological exclusion zones' which are to be avoided. The exclusion zones will not specifically be identified as those of otter.
- 5.3.9 Pollution prevention measures will be installed and maintained as appropriate, including silt interception traps, settling lagoons or mobile silt-trapping units (such as Siltbusters or equivalent device), chemicals, oils and hazardous materials will be stored securely away from the watercourses. Spillage contingency kits will be provided and weekly environmental checks for pollution prevention measures will be conducted.
- 5.3.10 All open excavations close to watercourses will either be covered during the night or be ramped to enable easy exit by otter and other species. Pipes stored on site will be capped or if caps are not available, stored vertically, to prevent otter entrapment. Design of any permanent or temporary lighting will be such that it will be directed away from watercourses and will maintain an unlit corridor of 30m either side of watercourses. Construction personnel will be provided with a telephone contact for the ECoW.
- 5.3.11 Permanent mammal fencing will be erected at ch3350 and ch2750 in accordance with DMRB and SNH guidance 'Otters and Development'. Associated planting will be placed in such a way that animals will be directed towards safe passing places.

Procedures in the event of discovering or damaging an otter shelter

A) Procedure in the event of discovering a suspected otter shelter

- 5.3.12 If disturbance to a known otter shelter occurs, an offence will have been committed under The Conservation (Natural Habitats, & etc.) Regulations 1994 (as amended). Although disturbance to a known otter shelter is extremely unlikely, it has been included for comprehensiveness.
- 5.3.13 Procedures B and C describe the procedure in the event of the discovery of, a non-breeding and breeding shelter, respectively.
- 5.3.14 All construction activity within 200m of the suspected shelter will stop immediately and no personnel will approach the area of the suspected shelter. The ECoW will be informed immediately of the location. The ECoW will inform the EDT of the situation.
- 5.3.15 The ECoW will attend to the location as a matter of urgency to ensure that activity has stopped in the area and no personnel are within 200m of the suspected site, and then investigate any damage to the structure and the location and behaviour of any animals still in the vicinity.
- 5.3.16 If at this point the ECoW is able to confirm whether the suspected shelter is that of an otter he/she will follow Procedure B for a non-breeding shelter or Procedure C for a breeding shelter. If the shelter is still not confirmed as being that of an otter, the ECoW will proceed to the next step of this procedure (5.3.17) and construction will be delayed until the status of the shelter has been confirmed.
- 5.3.17 The ECoW will monitor any potential shelter site daily as necessary to confirm its status (and if a breeding female is present the number and approximate age of young). If it is confirmed that the shelter is not that of an otter, then works may continue.
- 5.3.18 The ECoW will check any suspected couch sites (above ground shelters, normally in a nest of rushes or grass) for any signs of occupancy. This will require a Licence to disturb the species issued by SNH, although it is highly likely that no otter will be present at that time as a result of disturbance. If it is confirmed that the shelter is that of non-breeding otter, Procedure B will be adopted and for that of a breeding otter, Procedure C. The ECoW will authorise continued works in the area of the couch once it is confirmed that no otter is present.

B) Procedure in the event of discovering a non-breeding shelter

- 5.3.19 All construction works within 50m of the shelter site will cease immediately and an exclusion area of a minimum of 30m from the shelter will be erected using appropriate, temporary fencing with notices indicating an ecological buffer zone. No personnel will enter the buffer zone except when accompanied by the ECoW. In some circumstances, particularly where high disturbance activities are taking place (e.g. blasting or piling) the buffer zone may need to be larger, based on the judgement of the ECoW. The ECoW will inform the EDT of the status of the shelter.
- 5.3.20 The ECoW will consult SNH if a licence or amendments to the existing licence will be required and will seek an approval of proposed suitable actions and mitigation proposals. These will only be pursued where there are no alternative solutions.
- 5.3.21 If the shelter can be avoided, the exclusion area will remain in place until construction is finished. If work is required within the mitigation area but will not directly impact the shelter, the shelter will be temporarily excluded or other appropriate mitigation/supervision will be put in place.
- 5.3.22 If work will directly impact the shelter, the shelter will be excluded and destroyed, however, only if there are no alternative solutions and after full consultation with SNH. The ECoW will apply for any relevant licence or licence amendments which may be required before work can proceed.
- 5.3.23 In the event that temporary exclusion is required, the following procedure will be followed:
- the ECoW will apply suitable one-way gates on the shelter entrances and monitor these until it is certain that no animal is within the shelter;
 - the ECoW will monitor all activities within the exclusion zone until completion;
 - upon completion of work activities the shelter will be re-opened for use by otters; and
 - the exclusion zone will remain in place until completion of works within the general area.

5.3.24 In the event of destruction of a shelter, the following procedures will be followed and may need consultation with an otter specialist:

- The ECoW will decide on a suitable site near to the natural shelter site but no less than 50m from the construction zone, and will construct an artificial shelter and an exclusion area of 30m around the new shelter. The artificial shelter will be left in place for as long as possible before exclusion of the natural shelter begins;
- at an appropriate time, the ECoW will apply suitable one-way gates on the holt entrances and monitor these until it is certain that no animal is within the holt;
- the ECoW will supervise the destruction of the shelter. Destruction will take place with extreme care to ensure that any animal that may have remained within the shelter is not injured. Although it is rare, animals can be extremely gate shy, and if water is available below ground they can survive for a considerable period, past the point where all indications from monitoring suggest that the shelter is empty;
- destruction will be by hand tools if possible; upon completion of shelter destruction, the ECoW will advise the EDT and SNH that destruction is complete, and authorise construction within the area;
- the exclusion area will remain in place around the artificial shelter until site completion. The ECoW will monitor the artificial shelter on a monthly basis for signs of use.

5.3.25 All of the above exclusion activities may be carried out by another otter specialist in addition to the ECoW in the case that specialist knowledge is required. All exclusion activities described in paragraphs 5.3.23 and 5.3.24 can only be legally undertaken under the terms of an appropriate licence from SNH. No licences are required at the present moment.

C) Procedure in the Event of Discovering a Breeding Shelter

5.3.26 All construction works will stop immediately within 200m of the shelter site and an exclusion area of at least 100m will be erected, consisting of appropriate fencing with notices indicating an ecological exclusion area. In some circumstances, particularly where high disturbance activities are taking place (blasting, piling) the mitigation area may require to be larger, based on the judgement of the ECoW.

5.3.27 No personnel will enter the exclusion area except when accompanied by the ECoW. The ECoW will inform the EDT of the status of the shelter. Relevant licences or licence amendments will be sought from SNH by the ECoW in consultation with the EDT.

5.3.28 The shelter site will be avoided until young are mobile. The ECoW will determine when this occurs. No work will take place within the exclusion area while the female is present with young.

- 5.3.29 If disturbance to the shelter is unavoidable and there are no alternative solutions, SNH will be consulted and advice sought on appropriate actions and mitigation measures. Actions to deal with the holt will reflect those mitigation measures described in paragraphs 5.3.23 and 5.3.24 of Procedure B.
- 5.3.30 While the female is present, the ECoW will select a suitable site near to the natural shelter site but no less than 200m from the construction zone, and will construct an artificial shelter and implement an exclusion area of 100m. The shelter will be left in place for as long as possible before exclusion of the natural shelter begins. This will only be done after full consultation with SNH.
- 5.3.31 When the ECoW determines that young are mobile an exclusion can take place. The ECoW will obtain the necessary licence and destruction of the shelter would be carried out as described at paragraph 5.3.24 of Procedure B.
- 5.3.32 All of the above exclusion activities may be carried out by another otter specialist in addition to the ECoW in the case that specialist assistance is required. All exclusion activities described can only be legally undertaken under the terms of an appropriate licence from SNH.
- 5.3.33 No known otter shelters will be directly affected by construction activities. However, there is potential for indirect effects on the species across the site as a result of disturbance due to construction light, noise and vibration, disrupted movement corridors and pollution, specifically along the north and south shores of the Firth of Forth.

5.4 Marine Mammals

Legislation

- 5.4.1 The Conservation (Natural Habitats, & etc.), Regulations 1994 (as amended) protects all cetaceans (whales, dolphins and porpoises). Under these regulations it is an offence to;
- deliberately capture, injure or kill a cetacean;
 - deliberately disturb wild animals of any such species;
 - to impair their ability to survive, to breed or reproduce, or to rear or nurture their young, in the case of migratory species, to migrate;
 - to affect significantly the local distribution or abundance of the species to which they belong; and
 - damage or destroy a breeding site or resting place of such an animal.

- 5.4.2 The Marine (Scotland) Act was introduced in March 2010. The Act makes provision in relation to functions and activities in the Scottish marine area, including marine plans, licensing of marine activities (such as dredging), the protection of the area and its wildlife including seals, and connected purposes. Marine Scotland was inaugurated to act as a statutory advisor and regulator for the legislation introduced by the Bill.
- 5.4.3 The Marine (Scotland) Act 2010 replaced the Conservation of Seals Act 1970; The Marine (Scotland) Act 2010 now prohibits the killing, harming or taking of pinnipeds (seals) by certain methods.
- 5.4.4 The Conservation of Seals Order (Scotland) 2007 extends the protection of common seals in Shetland, Orkney and an area of the east coast between Stonehaven and Dunbar through a year-round closed season, which includes the Firth of Forth (Wild-Scotland, 2007).

Summary of previous survey results

- 5.4.5 Baseline data on marine mammals was collected by Jacobs Arup via internet searches, existing literature and from a variety of statutory and non-governmental organisations.
- 5.4.6 Distributional data displayed four species of cetacean that frequently occur in the estuary: harbour porpoise (*Phocoena phocoena*), bottlenose dolphin (*Tursiops truncatus*), white-beaked dolphin (*Lagenorhynchus albirostris*) and the minke whale (*Balaenoptera acutorostrata*). Both the grey (*Phoca vitulina*) and common seals (*Halichoerus grypus*) frequent the Firth of Forth throughout the year.

General protection measures

Conducted during blasting and piling activities (now completed)

- 5.4.7 A trained Marine Mammal Observer (MMO) was present when blasting or piling occurs within the estuary. If cetaceans and pinnipeds were present, blasting and piling activities was delayed until the cetacean/group of cetaceans passed beyond a threshold distance. This exclusion zone was set dependant on predicted noise levels following JNCC guidance (JNCC, 2010).
- 5.4.8 Passive Acoustic Monitoring (PAM) was used by a trained operative to identify mammals within the mitigation zone prior to piling. Piling did not commence if marine mammals were detected within the mitigation zone or until 20 minutes after the last visual or acoustic detection. The PAM operative followed JNCC guidance (JNCC, 2010).
- 5.4.9 Surveys were conducted around blasting operations in April 2012 and piling operations in 2012-14. The ECoW provided the EDT with details of marine mammal sightings.

Procedures in the event of discovering a marine mammal during piling or blasting operations

- 5.4.10 A letter (FRC/CR1/LSN/01135) was sent to the client on 04/04/2013 to amend the procedure to negate the need to stop piling works when pinnipeds (seals) were observed within the working area. This proposal was sought after consultation with SNH due to the number of seals observed close to the works when piling operations were working on full power.
- 5.4.11 The MMO briefed operatives and establish a chain of command for halting operations, in the event of a marine mammal appearing in the mitigation zone.
- 5.4.12 The MMO was aboard the vessel closest to the blasting zone and providing the best viewing platform (needs to be 360o). The PAM operative was aboard the boat that circled the blast area. The MMO established the 1km mitigation zone around the blasting area.
- 5.4.13 MMO and PAM operatives began the pre-operation search within the mitigation zone, at least 1 hour before detonation. If a marine mammal was found within the mitigation zone, procedure A and B were followed.
- 5.4.14 If no marine mammals we found, the operation continued once the MMO and PAM have given the all clear.

A) Procedures in the event of discovering a marine mammal during blasting

- 5.4.15 The PAM operations stopped 15 minutes prior to blasting. MMO operations continued right up until blast. If a marine mammal was observed/heard during the pre-operation search, blasting was be delayed for 20 minutes or until the mammal moved from the area.
- 5.4.16 Once the MMO/PAM gave all clear for the blast, a 15 minute countdown commenced. I a marine mammal was recorded during this period, operations halted for 15 minutes. If no mammals were recorded during this count down, procedures followed paragraph 5.4.17. MMO and PAM recommenced monitoring for 15 minutes immediately after detonation.

B) Procedures in the event of discovering a marine mammal during piling

- 5.4.17 Piling had a soft start ramping up of piling power before full power commences, for no less than 20 minutes. PAM operations stopped 15 minutes prior to “soft start” piling. The MMO continued right up until full piling began. If a marine mammal was observed/heard during the pre-operation search, piling was delayed for 20 minutes or until the mammal moved from the area.

- 5.4.18 If a mammal entered the mitigation zone, “soft start” piling did not increase until the MMO gave the all clear, and the mammal had left the area for no less than 20mins. Once the MMO/PAM gave the all clear, piling power increased to full power.
- 5.4.19 When piling at full power, there was no requirement to cease piling or reduce the power if a marine mammal was detected in the mitigation zone (it was deemed to have entered “voluntarily”). It was also acknowledged that, for engineering reasons, it was not possible to stop piling at full power until the pile is in final position.

5.5 Birds

Legislation

- 5.5.1 Resident and migratory bird populations within the UK are protected under the following legislation:
- Birds Directive 1979 (the identification and classification of SPAs for rare or vulnerable species, as well as for all regularly occurring migratory species, paying particular attention to the protection of wetlands of international importance is listed in Annex I of the Directive);
 - Conservation (Habitats, &c.) Regulations 1994 (as amended);
 - Habitats Directive 1992; and
 - The Wildlife and Countryside Act (WCA) 1981 (as amended).
- 5.5.2 The WCA 1981 (as amended) and NCSA 2004 taken together ensure that all wild birds, their nests and eggs are protected, which, with respect to the proposed scheme, makes it an offence to:
- intentionally or recklessly kill, injure or take any wild bird;
 - take, damage or destroy the nest of any wild bird while it is in use or being built;
 - take or destroy the egg of any wild bird; and
 - disturb any wild bird listed on Schedule 1 while it is nest building or is at (or near) a nest with eggs or young; or disturb the dependent young of such a bird.

Summary of previous survey results

- 5.5.3 Terrestrial breeding bird surveys were undertaken by Jacobs Arup in April 2008 and June 2008. Terrestrial wintering bird surveys were undertaken by Jacobs Arup in November and December 2008 and February 2009.
- 5.5.4 Surveys for non-breeding costal birds and passing migrants were undertaken by MBEC from October 2007 to April 2008. Surveys for breeding and passing migrant terns were undertaken in April – October 2007. All surveys were agreed in consultation with SNH.
- 5.5.5 Pre-construction/felling surveys were conducted through the breeding bird season between March 2012 and August 2012. Monitoring of Long Craig Island and the Port Edgar Tyre Raft (known Tern breeding sites) were conducted during May 2012 and October 2012.

Special protection for nesting terns

- 5.5.6 Long Craig Island and a tyre raft at Port Edgar both sustain breeding colonies of common tern (*Sterna hirundo*), roseate tern (*Sterna dougallii*), sandwich tern (*Sterna paradisaea*) and arctic tern (*Sterna paradisaea*).
- 5.5.7 Monitoring of noise levels from construction activities is undertaken close to Long Craig Island during the breeding tern season (May to August) and at Long Craig Island and Port Edgar tyre raft from 1hr before sunset until sunrise between mid-August and October. The ECoW will assess the significance of these noise levels.
- 5.5.8 Noisy activities are avoided at night (between 1 hour before dusk and 1 hour after dawn) and during the post-breeding/passage period for terns (between 15 August and 31 October). If it is unavoidable that noise limits will be breached between May and August, then Port Edgar and Long Craig Island will not be simultaneously impacted as one can be used as a refuge for roosting terns if the other is disturbed.
- 5.5.9 No construction boat traffic including small water vessels will go within 100m of Long Craig Island (except in the case of an emergency). If in exceptional circumstances, encroachment within 100m of Long Craig Island is unavoidable, prior approval by the ECoW will be required and the ECoW will oversee the specified activity.
- 5.5.10 For boats/barges transporting personnel and supplying materials for construction, the ECoW (in consultation with SNH and the Harbour Master) will identify where construction boat traffic is not permitted so that the constructor can stipulate routes in consultation with the Harbour Master.

General protection measures for birds

- 5.5.11 Site clearance of vegetation is undertaken outside of the main bird breeding season where practicable (typically March-July inclusive). Where site clearance works must be undertaken during the main bird breeding season, methods of exclusion and deterrent will be used to prevent birds beginning to nest in clearance areas.
- 5.5.12 Vegetation clearance/tree felling is agreed with the ECoW. The ECoW monitors vegetation removal and associated activities. All cleared material is rendered unsuitable for nesting birds.
- 5.5.13 Any clearance works undertaken during February or August are at moderate risk of affecting breeding birds. During this period, if clearance is required, the ECoW will check any areas for evidence of breeding birds prior to works commencing.
- 5.5.14 Where practicable, works compounds, storage sites, access roads and construction work will be located/carried out at least 30m away from sensitive habitats for birds. Any works undertaken within this distance must be subject to consultation with SNH, and undertaken under licence where applicable on a case by case basis.
- 5.5.15 Monitoring of construction site lighting will be undertaken at night by the ECoW to identify any potential adverse impacts on birds.
- 5.5.16 The ECoW will advise all construction staff of the requirement to stop work should nesting birds be encountered.

Procedures in the event of discovering a bird nest.

- 5.5.17 All construction works within 30m of the nest will cease immediately and an exclusion area of a minimum of 10m from the shelter will be erected.
- 5.5.18 The ECoW will be immediately informed of the nest location and the EDT will be advised of the situation and any current exclusion areas.
- 5.5.19 The ECoW will attend to the location as a matter of urgency to ensure that construction activity has stopped in the area and no site personnel are within a minimum of 10m of the nest. The ECoW will inspect the structure to confirm whether or not the nest is in use, to ascertain any eggs, chicks or birds are in the location and the behaviour of any birds still in the vicinity.

- 5.5.20 If eggs are present, the nest will be left and a 10m exclusion will be implemented until chicks have fledged. The ECoW will monitor the nest daily and will give the all clear once the chicks have left the nest. Depending on the species, the ECoW may increase the exclusion zone in consultation with SNH.
- 5.5.21 If no eggs are present and no birds are present the ECoW will monitor the nest until confirmation the nest is not in use is determined.

5.6 Reptiles

Legislation

- 5.6.1 All reptiles are protected under the Wildlife and Countryside Act (1981, as amended) and the Nature Conservation (Scotland) Act (2004) against intentional or reckless killing, injury and sale (or advertising for sale).
- 5.6.2 Of the six reptile species native to the UK, Adder *Vipera berus*, Common lizard *Zootoca vivipara* and Slow worm *Anguis fragilis* are found in Scotland.

5.6.3 ***Summary of previous survey results***

- 5.6.4 Reptile surveys were undertaken by Jacobs Arup in July, August and September 2008. Consultations with SNH and JA during the tender process revealed reptiles were not typically found in the area. It is therefore very unlikely that reptiles will be found during the construction phase.

General protection measures

- 5.6.5 All relevant site personnel will be given an environmental induction for each area. The induction will be in a format of a toolbox talk and will include a brief section on reptiles. The induction will aim to ensure that all personnel are aware of the legal obligations placed upon them in relation to reptiles and their responsibilities for ensuring they do not breach that legislation.
- 5.6.6 In the event that a reptile is seen all work will stop in that area and the ECoW will be called to visit the site. The ECoW will conduct a fingertip survey of the area the reptile was spotted, and will then supervise the works as they recommence. The ECoW will inform SNH and the EDT of the sighting.
- 5.6.7 If a reptile is caught it will be moved by the ECoW to a suitable area of habitat outside the working area. All translocation will be carried out in consultation with SNH. To ensure that staff are familiar with what to look out for pictures of reptiles will be included on the environmental notice board.

5.7 Amphibians

Legislation

5.7.1 Great crested newt (*Lissotriton cristatus*) is a species of European importance, protected under Regulation 39 of The Conservation (Natural Habitats, & etc.) Regulations 1994 (as amended). Under these regulations it is an offence to;

- deliberately capture or kill a great crested newt;
- deliberately disturb a great crested newt;
- deliberately take or destroy the eggs of a great crested newt
- damage or destroy a breeding site or resting place of a great crested newt.

5.7.2 The legislation applies to all life stages of great crested newts. Furthermore this species is a Priority Species in the UK Biodiversity Action Plan (BAP).

Summary of previous survey results

5.7.3 Amphibian surveys were undertaken by Jacobs Arup in March, April and June 2008. During these surveys a great crested newt, palmate newt (*Lissotriton helveticus*) and smooth newt (*Lissotriton vulgaris*) were recorded at Ferry Loch. Smooth newt and palmate were recorded at the railway pond. Common toad (*Bufo bufo*) and common frog (*Rana temporaria*) were found in Ferry Loch and the Railway pond.

5.7.4 Resurveys of Ferry Loch will be conducted in 2012 and 2013 to assess the presence of great crested newt as works in the area not scheduled to start until late 2013. At this point 5 years will have passed since the last survey, and a requirement to resurvey will be required to inform any mitigation measure that may be required.

General protection measures

5.7.5 All relevant site personnel will be given an environmental induction for each area. The induction will be in a format of a toolbox talk and will include a brief section on amphibians (in the relevant areas). The induction will aim to ensure that all personnel are aware of the legal obligations placed upon them in relation to great crested newts and their responsibilities for ensuring they do not breach that legislation.

5.7.6 Destructive searches of terrestrial habitat maybe required prior to site clearance to make habitat unsuitable for amphibians. Searches will be carried out between March – September when amphibians are out of hibernation.

- 5.7.7 Amphibians that are captured during this procedure will be relocated to pre-identified receptor areas that have been chosen by the ECoW. These locations will be established through consultation with SNH.
- 5.7.8 Amphibian exclusion fencing will be installed between approximately ch7200 – ch7500 (on the east side of the highway), where applicable/practicable and through consultation with SNH to prevent the movement of amphibians in to the construction area.
- 5.7.9 If great crested newts are encountered (during the destructive search or during construction) work must cease immediately and will not be resumed until an appropriate licence is obtained from SNH. The ECoW will advise and implement the conditions of a licence.

5.8 Fish

Legislation

- 5.8.1 Fish species are afforded protection under one or more of the following conservation legislative frameworks:
- Conservation (Habitats, &c.) Regulations 1994 (as amended);
 - Habitats Directive 2010;
 - European Eel (Council Regulation (EC) No 1100/2007);
 - Salmon and Freshwater Fisheries Act (Consolidation) (Scotland) 2003; and
 - Surface Waters (Fishlife) (Classification) (Scotland) Amendment Regulations 2007
- 5.8.2 The Conservation Regulations 1994 (as amended) place a duty on the Secretary of State to propose a list of sites which are important for either habitats or species (listed in Annexes I and II of the Habitats Directive respectively) to the European Commission. Under this legislation, Annex II species within European sites designated through the implementing regulations are afforded legal protection. In this catchment, protection is afforded to those Annex II fish species (Atlantic salmon, sea lamprey, river lamprey and brook lamprey) present in the River Teith SAC.
- 5.8.3 All freshwater fish species are protected under the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act (2003). Atlantic salmon, bullhead, sea lamprey, river lamprey and brook lamprey are all listed in Annex II of the EC Habitats Directive which requires the designation of SAC. Atlantic salmon and river lamprey are also listed on Annex V of the EC Habitats Directive which lists species whose taking in the wild and exploitation may be subject to management measures.

Summary of previous survey results

- 5.8.4 Jacobs Arup surveyed the scheme for freshwater fish between March and June 2008 of those species found in the Forth catchment, seven are afforded legislative protection: Atlantic salmon (*Salmo salar*), Brown/sea trout (*Salmo trutta*), European eel (*Anguilla anguilla*), Brook lamprey (*Lampetra planeri*), River lamprey (*Lampetra fluviatilis*), Sea lamprey (*Petromyzon marinus*), and Bullhead (*Cottus gobio*).

General protection measures

- 5.8.5 To reduce the impact of blasting explosive excavation in intertidal zones was undertaken during low water periods to restrict underwater noise (i.e. when area is exposed) where possible. To reduce the impact of blasting explosive excavation were undertaken within Beamer Rock so that edges of the Rock acted as noise buffers reducing emissions to water. Non-explosive techniques were used for rock fracturing when possible.
- 5.8.6 Strings of explosions milliseconds apart were used, rather than large single blasts, to reduce the peak emission rather than one explosion that would reach a higher peak emission (see Noise Management Plan).
- 5.8.7 Where marine piling is required a soft-start (ramp-up) approach will be used to allow any receptors in the vicinity to leave the area (following JNCC guidelines). Where possible, alternative techniques to piling will be used.
- 5.8.8 Acoustic deterrents will be used at appropriate frequency during key construction periods.
- 5.8.9 Best practice measures will be implemented to prevent pollution in the marine and freshwater environments.
- 5.8.10 The dredging footprint will be reduced as much as practicable to reduce impacts from increased turbidity.

5.9 Flora

Habitats

- 5.9.1 Surveys of terrestrial habitats including National Vegetation Classification (NVC) were undertaken between March and August 2008 and in October 2008. Further surveys of bluebell populations were undertaken in spring 2011.
- 5.9.2 Terrestrial habitats are represented largely by farmland comprising arable land and fields of poor semi-improved or improved grasslands. The most extensive semi-natural non-agricultural habitat present within the study area are woodland, many of which are included within the Ancient Woodland Inventory (AWI). The sections of woodland are of varying sizes, connectivity, ages, management regimes and community types.
- 5.9.3 Other semi-natural habitats present within the study area comprise coastal reed beds and saltmarsh together with areas of small and fragmented unimproved and semi-improved neutral grassland.

Terrestrial Habitat management

- 5.9.4 If required by the ECoW, plant and personnel will be constrained to a prescribed working corridor through the use of temporary barriers, thereby reducing damage to habitats, potential direct mortality and disturbance to species.
- 5.9.5 Vegetation buffer strips are maintained where practical.
- 5.9.6 Tree felling is carried out by experienced contractors according to agreed felling methods and any licensing conditions.
- 5.9.7 Where the removal of dead standing, fallen and felled timber is necessary, the material is relocated into areas of existing and newly created woodland habitat within the limits of the site where practicable.
- 5.9.8 During the operation of the proposed scheme, management and maintenance of roadside verges is to be undertaken to maintain and enhance floral diversity.
- 5.9.9 Bankside habitat creation comprising planting and enhancement of detention basins will be undertaken.
- 5.9.10 Monitoring of planting and seeding will be undertaken for 5 years after completion of construction works.

Terrestrial Habitat reinstatement

- 5.9.11 All areas of habitat loss due to temporary works, site compounds, easements, working areas or access roads will be reinstated following construction on a like for like basis.
- 5.9.12 Habitat creation will contribute to biodiversity targets identified in local (LBAP) and national (UKBAP) strategies.
- 5.9.13 Appropriate management will be undertaken of existing boundary habitats such as hedgerows or rough edges for the benefit of key farmland species of conservation concern such as yellowhammer (*Emberiza citronella*), skylark (*Alauda arvensis*), linnet (*Carduelis cannabina*), tree sparrow (*Passer montanus*), meadow pipit (*Anthus pratensis*) and grey partridge (*Perdix perdix*).
- 5.9.14 Existing trees and vegetation will be retained wherever practicable and incorporated with new planting proposals.
- 5.9.15 Landscape planting and newly created habitat will be comprised of predominantly native species of local provenance where available, and will comprise a mixture of species.
- 5.9.16 Habitat creation to be undertaken using broad-leaved and mixed plantation woodland of native species of local provenance where available.
- 5.9.17 Planting was undertaken to enhance biodiversity and conserve the integrity of existing habitats. Scrub woodland planting will be provided to replace lost vegetation and soften appearance of cutting.
- 5.9.18 Grass seeding for verges is Roadside Verge Mix which is low maintenance, fast establishing and tolerant of traffic and salt spray. Grass seeding for all other soft areas, outwith planting areas are Species Rich Grassland Mix consisting of native, non-invasive grasses and wildflower species to reflect locally occurring semi-natural flora.
- 5.9.19 Sowing/planting will be undertaken as soon as possible following completion of the works to reduce the likelihood of the areas being colonised by invasive, non-native species which are of lower value to wildlife.
- 5.9.20 Scrub woodland planting is provided to replace lost vegetation and soften appearance of cutting. Specific landscape planting details are included in the Landscape Management Plan.

General protection measures

- 5.9.21 Pre-construction surveys have been undertaken by the EcoW within the limits of the site and will extend 50m out width the site boundary within areas of appropriate habitat to identify sensitive and vulnerable species.
- 5.9.22 If required by the EcoW, plant and personnel will be constrained to a prescribed working corridor through the use of temporary barriers, thereby reducing damage to habitats, potential direct disturbance to species.
- 5.9.23 EcoW will be informed immediately if any adverse impacts to habitats occur out with the LMA or areas set aside for construction within the LMA.

Protection of Trees

- 5.9.24 Trees will be protected in line with the recommendations in BS 5837 Trees in Relation to Construction. Tree surgery operations will comply with the recommendations in BS 3998 Recommendations for Tree Works, as appropriate.
- 5.9.25 Fencing of individual and blocks of trees will be used to prevent vehicles tracking over the trees root zone, and to ensure no canopies are damaged by vehicles passing underneath. Fencing will also prevent the storage of materials in root protection zones.
- 5.9.26 Fenced off areas will remain vegetated to help trap dust and runoff. Where possible similar vegetated buffer strips will be implemented across the site, especially near sensitive environmental receptors such as rivers.
- 5.9.27 An Arboricultural consultant is consulted on works relating to the protection of trees. If any canopies require trimming to prevent damage this will be assessed by the FCBC Arboriculturalist.
- 5.9.28 The Arboriculturalist will be employed by FCBC to assess tree works where necessary. This will ensure that only essential trees are removed, and where possible trees may be coppiced or pollarded.
- 5.9.29 The EDT will be consulted on all tree clearance, tree protection and tree surgery work to be conducted.
- 5.9.30 To help prevent the compression of soils whilst in storage, stockpiles of soil to be re-used will be no higher than 2m. If soil is to be stockpiled for more than one growing season it will be seeded to help prevent runoff in wet conditions and dust in dry conditions.

- 5.9.31 Tree felling is carried out taking appropriate consideration of the Forestry Commission's Forest and Water Guidelines 2003 to mitigate risks from felling areas of woodland and trees on the freshwater environment. Where there are no wind throw or landscape visual issues, tree felling will be reduced to that necessary to allow the safe construction and operation of the proposed project. Tree felling operations will consider the legal protection given to roosting bats and breeding birds.
- 5.9.32 Any tree felling in land outside the extents of the Land Made Available which is occupied with the agreement of the relevant landowner will require consent in accordance with Forestry Act 1967. FCBC will obtain any consent necessary in this regard.

Tree Planting and Replacement

- 5.9.33 Any trees intended to be retained which are felled or die as a consequence of construction works are replaced. Where reasonably practicable, the size and species of replacement trees are selected to achieve a close resemblance of the original trees most effectively using locally occurring native species of local provenance and taking cognisance of any management plans for immediately adjacent areas of woodland.
- 5.9.34 The supply, storage, handling, planting and maintenance of new planting will be undertaken in accordance with appropriate British Standards, including BS 5837 Trees in relation to construction; BS 3998 Recommendations for Tree Works and BS 4428 Code of Practice for General Landscape Operations (excluding hard surfaces) and other guidance including the UK Forestry Standard and the UKWAS Standard.

Bluebells

- 5.9.35 The results of the additional blue bell survey (2011), together with the strategy to mitigate the effects on bluebells (as agreed with SNH) are reported in document FRC-)-EL-001-R-OT-ENV-30401-01a "Proposals for mitigation of Bluebells" dated August 2011.
- 5.9.36 As per the report 200 tons of topsoil from St Margaret's Hope containing bluebell bulbs has been translocated to an area designated for woodland planting at Castland Hill. This has been store separately from other topsoil from St Margaret's Hope and spread on top of earthwork bunds as soon as reasonably practicable.
- 5.9.37 A method statement for bluebell soil translocation was produced and agreed by the EDT and SNH.

Maiden Pink

- 5.9.38 Areas containing maiden pink (*Dianthus deltoides*) are not programmed to be disturbed.
- 5.9.39 If required, maiden pink will be translocated to a suitable adjacent location. Translocation will be undertaken with necessary permissions under the supervision of an ECoW in accordance with a detailed method statement prepared in advance.
- 5.9.40 The ECoW will be informed immediately if any adverse impact occurs to maiden pink habitat within the LMA without mitigation being completed, or to areas which have received maiden pink plugs.

Intertidal Habitat

- 5.9.41 Suitable constructed access roads/bridges will be created within the intertidal zone to limit activities in direct contact with habitat.
- 5.9.42 Explosive excavation in intertidal zones will be undertaken where practicable during low water periods to restrict underwater noise (i.e. when area is exposed).
- 5.9.43 Drainage over intertidal areas on both shores will be taken back to land-based SUDS systems.
- 5.9.44 Monitoring will be undertaken by the ECoW throughout the construction phase.
- 5.9.45 ECoW to be informed immediately if any adverse impact to habitat occurs out with the LMA or areas set aside for construction within the LMA.

Benthic Habitat

- 5.9.46 If suitable controls for the construction phase were not implemented benthic habitat could be degraded beyond the areas to be lost through dredging.
- 5.9.47 The dredging footprint was reduced as much as practicable to reduce the direct impact on benthic habitat.
- 5.9.48 The Contractor applied for the necessary consents required for any dredging activities and complies with the mitigation measures as set out in the consents and the Dredging Management Plan.
- 5.9.49 The Contractor liaises with Forth Ports to request information on any proposed dredging within the Firth of Forth during the programmed dredging period for the proposed scheme. The Contractor makes reasonable efforts to avoid carrying out proposed scheme dredging at the same time as other dredging within 3km of the Main Crossing.
- 5.9.50 Dredged material is disposed of appropriately to minimise impacts on benthic habitats.

Freshwater Habitat

- 5.9.51 Reasonable precautions are undertaken to avoid/reduce in-channel works and translocation of channel substrate.
- 5.9.52 Best working practices in relation to works within salmonid watercourses are adhered to.
- 5.9.53 Where night works are required, directional lighting is used to ensure that water bodies are not directly illuminated.
- 5.9.54 Construction works at watercourses not prevent the movement of animals along the bank throughout the works period.
- 5.9.55 Best practice guidance including but not limited to the following is adhered to:

SEPA Pollution Prevention Guidelines - PPG01, PPG02, PPG03, PPG04, PPG05, PPG06, PPG07, PPG08, PPG10, PPG13, PPG14, PPG18, PPG20, PPG21, PPG22, and PPG26; CIRIA Guidelines Report 142 Control of Pollution from Highway Drainage Discharges; CIRIA Report 168 Culvert Design Guide; CIRIA C609 Sustainable Drainage Systems; CIRIA C648 Control of Water Pollution from Linear Construction Projects; CIRIA C649 Control of Water Pollution from Linear Construction Projects Site Guide; CIRIA C697 The SUDS Manual; BS6031:1981 Code of Practice for Earthworks; and Defra Code of Practice for Using Plant Protection Products.

6 INVASIVE AND ALIEN SPECIES

6.1 Terrestrial

- 6.1.1 Invasive weeds listed on Schedule 9 of the WCA 1981 (as amended) were recorded at a number of locations within the study area (refer to Invasive Species Report (Jacobs Arup, 2009)). New Zealand pygmy weed (*Crassula helmsii*) was recorded in a small water body adjacent to Castlandhill Woods. Japanese knotweed (*Fallopia japonica*) was recorded at Jamestown Pond, at two locations within St. Margaret's Hope and in the Society Road/Port Edgar area. Giant hogweed (*Heracleum mantegazzianum*) was recorded within St. Margaret's Marsh SSSI and near Port Edgar.
- 6.1.2 Toolbox talks are provided to inform contractors of invasive species in specific areas. These talks visually show examples of the species present and provide contact numbers for the ECoW.
- 6.1.3 The ecological verification walkover of the whole site checked the status of known stands of alien/invasive plants and records any new stands.
- 6.1.4 Reasonable precautions are taken during construction to avoid the spreading of soil borne pests and diseases, animal and crop diseases and invasive species. Reasonable precautions include:
- Do not excavate or move any soil from within 7m of an invasive species without instruction.
 - Do not track plant or vehicles over the area.
 - Do not stockpile potentially contaminated material within 10m of a watercourse or drain.
 - Do not disturb the seed pods.
 - Do not handle the plant before taking further advice.
- 6.1.5 Sowing/planting is undertaken as soon as possible following completion of the works to reduce the likelihood of the areas being colonised by invasive, non-native species which are of lower value to wildlife.
- 6.1.6 A Japanese Knotweed and Giant Hogweed management plan (**Appendix 1**) has been developed to provide guidance for dealing with species on site.

6.2 Estuarine

- 6.2.1 Carpet sea squirt (*Didemnum vexillum*) is an invasive species which has recently been found around the coast in the UK.
- 6.2.2 A Green Blue warning poster informing site personnel of carpet sea squirt will be added to notice boards in the marine offices and vessels engaged on the project. Should carpet sea squirt be found, SNH will be consulted for advice.
- 6.2.3 Vessels involved in the construction activities for the FRC will operate in accordance with industry recommended guidelines for preventing the introduction of non-native marine species. UK Marine SAC (2009) recommends that vessels comply with International Maritime Organisation guidance wherever possible, seek guidance from the relevant navigation or harbour authorities port authority regarding areas where ballast water uptake should be avoided (e.g. near sewage outfalls), encourage the exchange of ballast water in the open ocean, and discourage/prohibit the unnecessary discharge of ballast water in port and harbour areas.

**7 APPENDIX 1: JAPANESE KNOTWEED AND GIANT HOGWEED
MANAGEMENT PLAN**