DARTMOOR TRAINING AREA

Environmental Appraisal

Surface Water

14

14. Surface Water

14.1 Introduction

14.1.1 Military training that currently takes place at Dartmoor has the potential to affect surface water across the site and off-site both directly and indirectly.

14.1.2 A number of water quality and run-off issues were identified as potentially being affected by military training activities within the Scoping Report (Entec, 2006). It was considered unlikely that, with current management measures in place, any effects from training are likely to have a significant effect on water quality, but that further work would be undertaken to demonstrate this.

14.1.3 Work conducted has been undertaken by water quality specialists with previous experience of military training areas. John Pomfret, BSc (Chemistry), MSc (Biology), MCIWEM undertook the initial scoping study and made recommendations for this work. Tamsin Watt BSC (Physical Geography and Biology) undertook the assessment and wrote this chapter.

14.2 Context

14.2.1 The following section sets the context for the surface water assessment at Dartmoor Training Area (DTA). It is important to consider the site from both a legislative and policy context.

14.3 Legislative Context

14.3.1 Several pieces of environmental legislation are relevant to the assessment of surface water quality at DTA. This does not just include the relevant water Acts, which are concerned for example with the correct treatment of waste water, foul water, spillages and discharge consents but must also refer to those Acts which are concerned with the correct treatment and disposal of waste, particularly those which if leaked may have adverse affects on surface water runoff, such as oil, paint and antifreeze. These include;

- Water Resources Act 1991;
- Water Industry Act 1991;
- Groundwater Regulations 1998;
- Pollution Prevention and Control Act 1999 and Pollution Prevention and Control Regulations 2000;
- EC Water Framework Directive (2000/60/EC);
- The Environment Act 1995;
- Environmental Protection Act 1990, Part III;
- Environmental Protection (Duty of Care) Regulations 1991;

- Control of Major Accident Hazards Regulations 1999 (COMAH);
- Control of Pollution (Oil Storage) (England) Regulations 2001; and
- Special Waste Regulations 1996 (as amended in 2001).

Policy Context

14.3.2 This section provides a review of relevant policies for the control and management of water quality across the DTA.

14.3.3 Planning Policy Statement 23 (PPS23) is concerned with planning pollution control to protect the quality of land, air and water resources. In accordance with national policies the Government expects Regional Planning Bodies and Local Authorities to adopt a strategic approach to integrate their land use planning processes with plans and strategies for the control, mitigation and removal of pollution, as far as possible and is practicable to do so. Pollution control is concerned with reducing or preventing pollution to the environment to ensure that water quality meet standards that guard against impacts to the environment and human health. PPS23 Annex 1: Pollution Control, Air and Water Quality gives further guidance on control regimes and the planning system for the consideration of any development. Local and regional polices are outlined in **Table 14.1.**

Table 14.1 Relevant Policies and their Implications

Policy Reference[1]	Implications
SWRSS Policy RE6	The region's network of ground, surface and coastal waters and associated ecosystems will be protected and enhanced. Surface and groundwater pollution risks must be minimised so that environmental quality standards are achieved and where possible exceeded.
DNPLP	Dartmoor plays a pivotal role in the water resources of Devon and east Cornwall and is important for supplying drinking, agricultural, industrial and domestic waters as well as a wider network of water dependent habitat. The plan recognises the importance of forward planning and sustainable management of water resources across Dartmoor both now and in a future under the threat of climate change

Note 1 – The full names of the plans and guidance cited are given in Appendix 4.4, which details all policies and guidance that are relevant

14.4 Scope of the Assessment

14.4.1 This Section describes the scoping procedures undertaken to produce the Environment Appraisal (EA). Initially a scoping study was conducted by Entec in September 2006 which formed the basis of this work. The Scoping Report identified that it was unlikely that military training is having a significant effect on water quality, however, it was agreed that further data would be obtained and analysed to confirm this. In combination, consultation with various groups and organisations continued throughout the project lifecycle to ensure that the most up to date and relevant information was collected and that all views from all interested parties were able to be expressed. Water quality issues were also discussed as part of the Land Use Working group meetings (see **Chapter 8** for further information on these meetings).

Consultations

14.4.2 A number of organisations and individuals were contacted during the course of this project to discuss the scope of the surface water assessment at DTA. These included;

- The Environment Agency, which also provided data and took part in working group meetings to resolve issues relating to surface water;
- MoD, who provided further information and clarification relating to training activities and management and mitigation measures across the site;
- Dartmoor National Park Authority (DNPA), provided further information and clarification relating to water levels and quality across the site; and
- South West Water, which provided clarification of uses of and quality within the Meldon and Burrator Reservoirs on site.

Effects Requiring Further Consideration

Effects Scoped-in in the Scoping Report

14.4.3 The Scoping Report concluded that there were no likely significant effects on water quality from military activities, however, it was agreed that the following areas of work would be undertaken to confirm that there are no significant effects associated with water quality and military activities.

- Environment Agency Data: Obtaining more recent routine sample analysis data from the Environment Agency to check that the conclusions drawn within the scoping report are still valid.
- Reservoir Data: Further investigation of possible contaminants for abstractions from the Burrator and Meldon Reservoirs. These analyses will include some additional parameters to the Environment Agency data obtained for the scoping study. The assessment will be made in relation to users of the public water supply as well as any likely effects on aquatic flora and fauna, including fish.
- Leats: Clarification of the relationship of Devonport Leat to Cramber and Ringmoor Training Areas and to determine the sensitivities of both the Prison Leat, Reddaford Leat and Devonport Leat to effects of military activities.
- Sewage Discharges: Confirmation that treated sewage discharges from the camps are being controlled appropriately.
- Digging Activities: Further investigation to ascertain the extent of digging activities and the potential effects on drainage of standing waters in bog areas.
- Mitigation measures: Further consideration of mitigation measures regarding surface water run-off at the camps. It is considered likely that existing infrastructure and measures in the EMS are sufficient to prevent adverse effects. This is detailed in **Section 14.4**.

14.4.4 It is considered unlikely that, with the current mitigation measures in place, the potential effects from training activities are significant. The above issues will, however be considered as part of the EA in order to determine that this is the case.

Effects Subsequently Scoped-in to the Appraisal

14.4.5 Following production of the Scoping Report, working group meetings and consultation have been held to discuss environmental issues including water quality. There have not been any additional effects scoped-in relating to surface water as a result of these discussions.

Effects Not Requiring Further Consideration

Effects Scoped-out in the Scoping Report

14.4.6 Effects that were scoped-out at this stage include:

- Potential changes to run-off rates are not considered significant due to the very restricted use of vehicles overall within DTA, the EMS limitations on off-road use and the requirement to repair any damage. Management measures are detailed further in **Section 14.4** below.
- Potential drainage of pools and the effects on flushes due to rutting caused by vehicle activity and effects of vehicles on streambeds were scoped out for the reasons stated above.
- The pollution of water courses from fuel or other chemical spillages on site is considered insignificant as there are procedures in place to minimise spillages and to mitigate their adverse effects. This is detailed further in section 1.4 below.
- The potential pollution from liquid wastes, specifically chemical toilet waste is considered insignificant as liquid waste is disposed of off-site by a licensed specialist contractor.

Effects Subsequently Scoped-out of the Appraisal

14.4.7 Following production of the Scoping Report, working group meetings and consultation have been held to discuss environmental issues relating to water quality. From these discussions there have not been any additional effects scoped out.

14.5 Environmental Management Measures

14.5.1 Responsibility for the implementation of the mitigation measures lies with the MoD through DTE to Comdt DTA assisted by SLA DTE SW and MoD's Service Provider. Implementation and compliance will be ensured through DTA's EMS, management plans and DTE SW SOs.

14.5.2 There are a number of management measures in place across DTA which mitigate against, reduce the magnitude of, or compensate for the potential damaging effects to surface water across the site. A number of these measures manage effects to the extent that they have been effectively scoped out of the EA while the introduction of further management measures might assist in the control of other issues identified. The existing mitigation and compensation measures currently in place are detailed below**.** Provided these controls are implemented effectively it is considered that surface water across the site is managed effectively.

- On-site sewage treatment works at Okehampton and Willsworthy Camps treat sewage to the required level to ensure environmental protection and, at Okehampton, discharge it to river under Environment Agency consent, which is designed to protect the receiving water.

- Measures in place to minimise risk from accidental spillages include; preparation and dissemination of a spillage plan, provision of spill control kits, provision of oil interceptors on surface water drainage from main vehicle parking area and from helicopter and vehicle refuelling areas, installation and maintenance of oil and grease traps, an inspection regime for the refuelling point and locking of refuelling facilities when not in use.
- To avoid pollution or contamination from chemical toilets, self-contained portable toilets are used on the ranges and contents are disposed of appropriately by licensed contractors.
- To avoid ordnance contamination the MoD ensure careful clearance of unexploded ordnance and use of new, modern ordnance that does not leave toxic residue.
- To avoid fuel spillages and contamination, refuelling on DTA is minimised. Where necessary spill control kits are provided for users and operators. HQ control of locations for any refuelling other than jerry can refuelling of individual vehicles is imposed.
- Waste disposal, collection and removal is monitored for all wastes on site to ensure proper control.
- To avoid damage from vehicles and driving activities, off road vehicle use is strictly limited and controlled. Any rutting caused by vehicle damage is repaired.
- Digging is prohibited in areas outside DTA. Inside DTA digging is only permissible in specifically allocated areas and heather areas are avoided. Where digging takes place ground is to be reinstated, trenches refilled and turf replaced.
- Cooking oil is stored in bunded containers and re-cycled by specialist contractors.

14.5.3 The following additional measures have also been identified.

- Improved waste management and salvage (being addressed in a waste management report, currently under preparation by Enviros).
- Improved waste management and salvage (being addressed in a waste management report, currently under preparation by Enviros)

14.6 Data Analysis

Data Gathering and Survey Work

14.6.1 To address the remaining issues highlighted within the Scoping Report, further data collection has been undertaken and assessed from a variety of sources. Information on current conditions has been collected from the following documents and sources of information:

- Ordnance Survey 1:50,000 scale mapping;
- Cramber Tor Training Area, Dartmoor. Volume 1 Environmental Statement, WSP Environmental, September 2002;
- External Audit of Dartmoor Training Area's Environmental Management System: Final Report – Impact Assessment, Gap Analysis and Recommendations for Improvement. RPS Health, Safety & Environment August 2005;

- Standing Orders for Defence Training Estate South West. 2007 (DTE SW SOs);
- water quality data for Meldon and Burrator Reservoirs from South West Water;
- routine sample analysis data from the Environment Agency's website;
- appropriate discharge consents from the Environment Agency; and
- Pollution Incident reports from the Environment Agency.

14.6.2 A comprehensive review of the above information has been undertaken to provide an assessment of baseline conditions relating to water quality issues at DTA. To date no field survey specific to surface water issues has been undertaken.

14.6.3 A key aspect in determining the effects of water quality across DTA was to obtain water quality data for the treatment works at both the Meldon and Burrator reservoirs. These water bodies are used for public supply and it is therefore imperative that the quality of water within them is of a very high standard. In addition a large proportion of the training estate drains towards these supply reservoirs; the Okehampton Training Area, via the west Okehampton river valley to the Meldon reservoir and the Merrivale and Ringmoor Training Areas, via the rivers Plym and its tributary the Meavy to the Burrator Reservoir. This data therefore provides a good overview of the potential effects of training activities on water quality across DTA.

14.6.4 In addition further data has been obtained relating to the rules and operations for digging activities across the site, the quality of water in other waterways and water bodies on site and the controls in the operation of treated sewage discharges from the Okehampton and Willsworthy Camps.

14.7 Analysis of Baseline Conditions

14.7.1 In order to provide a baseline for water quality across the site a summary of the current conditions relating to all surface water issues is provided below, for clarity issues have been subdivided and described in turn.

Environmental Setting

14.7.2 The high ground of Dartmoor forms the principal watershed in Devon, with rivers draining the area running to both the north and south Devon coasts.

14.7.3 The northern part of Okehampton Training Area drains northwards via the East and West Okement Rivers, which flow into the River Torridge. The Torridge and the Taw discharge on the north Devon coast through a combined estuary between Bideford and Barnstaple. The West Okement River valley includes Meldon Reservoir, a public water supply reservoir forming part of DTA's boundary.

14.7.4 The central part of Okehampton Training Area, Willsworthy Training Area and part of Merrivale Training Area drain westwards via the River Tavy and via the River Lyd, a tributary of the River Tamar. The Tavy and Tamar discharge into the sea on the south Devon coast via Plymouth Sound.

14.7.5 The south eastern and eastern parts of Okehampton and Merrivale Training Areas drain towards the south east, via the River Teign and the River Dart, with its tributaries the East and West Dart, Blackbrook River and Cowsic River. The Teign and Dart drain to the English Channel at Teignmouth and Dartmouth respectively.

14.7.6 The western part of Merrivale Training Area drains to the south west via the River Walkham, a tributary of the River Tavy.

14.7.7 Cramber and Ringmoor Training Areas drain to the River Plym and its tributary the River Meavy. The Plym enters the sea at Plymouth. Burrator Reservoir is a public water supply owned by South West Water on the River Meavy.

14.7.8 DTA does not form part of the catchment of the Fernworthy Reservoir, situated on the South Teign River.

14.7.9 The catchments within the Training Areas comprise mainly of open peaty moorland and blanket bog, resulting in naturally low pH in many of the rivers leaving the moor. The geology results in the water being 'soft' with little capacity to buffer the effects of acid rainfall and this may reduce the pH further.

Meldon and Burrator Reservoirs

14.7.10 Water quality data for the 10 year period 1995 – 2005, for Burrator and Meldon Reservoirs was obtained from South West Water. Data was obtained for water chemistry, microbiology and algae. Data tables can be found in **Appendix 14.1.** An assessment of the data was made comparing monitored determinants with the Environmental Quality Standards (EQS) stipulated in the current Directives.

Water Chemistry

14.7.11 Water chemistry at the Burrator water treatment works demonstrate that nitrate and phosphate nutrients both fall into the 'very low' or 'low', GQA class 1 or 2, indicating good water quality. Metals such a dissolved iron demonstrate no failures of the Dangerous Substances Directive EQS and pH ranges from 5.6 to 8.3, reflecting the natural characteristics of the catchment.

14.7.12 The microbiology records for coliforms and faecal coliforms were compared against the EQS of the Bathing Water Directive (although this is not a designated Bathing Water). Bacterial counts are very low and all fall within the EQS, indicating no contamination by sewage.

14.7.13 Algal counts are perfectly normal for an inland lake or reservoir, showing a seasonal fluctuation, with higher counts experienced during the summer months.

14.7.14 The chemistry of water within Burrator Reservoir itself again demonstrate that nitrate and phosphate nutrients both fall into the 'very low' or 'low', GQA class 1 or 2, indicating good water quality. pH ranges from 6.4 to 7.3, reflecting the natural characteristics of the catchment. Ammonia and dissolved oxygen levels reflect excellent water quality. Algal counts are perfectly normal for an inland lake or reservoir and although present for most of the year, show a seasonal fluctuation, with higher counts experienced during the summer months. There were no microbiological data for this sample point.

14.7.15 Water chemistry at the Meldon treatment works demonstrate that nitrate and phosphate nutrients both fall into the 'very low' or 'low' GQA class 1 or 2, indicating good water quality. Metals such a dissolved iron demonstrate no failures of the Dangerous Substances Directive EQS and pH ranges from 5.6 to 8.3, reflecting the natural characteristics of the catchment. Counts of total coliforms and faecal coliforms fluctuate throughout the year but indicate no sewage contamination. Algal counts are perfectly normal for an inland lake or reservoir, and although present for most of the year, show a seasonal fluctuation, with higher counts experienced during the summer months.

14.7.16 Similarly nitrate and phosphate nutrient within the reservoir itself both fall into the 'very low' or 'low', GQA class 1 or 2, indicating good water quality. Levels of copper and zinc metals are very low, which is excellent as the water is also low in hardness. Ammonia levels reflect excellent water quality. Counts of total coiliforms and faecal coliforms are very low, indicating no sewage contamination. Algal counts are perfectly normal for an inland lake or reservoir, and although present for most of the year, show a seasonal fluctuation, with higher counts experienced during the summer months.

14.7.17 In summary the water quality of both reservoirs at the treatment works and within the water body itself is excellent. No List 1 or List 2 pesticides exceed any EQS of the Dangerous Substances Directive. Metal and nutrient levels are consistently low for all samples and dissolved oxygen and ammonia levels are excellent. Therefore there is no indication from these data of any contamination or adverse effect arising from military training or indeed any other activity on DTA.

Environment Agency Data Review

Routine River Monitoring Data 2003-2005

14.7.18 The results of chemical analysis of monthly samples collected by the Environment Agency over the 3 year period 2003-2005, for their general quality assessment (GQA), for rivers leaving DTA, are given in **Table 14.2**. These cover 'sanitary' parameters (biochemical oxygen demand [BOD5(atu)] , ammonia, dissolved oxygen), which are indicative of organic pollution such as sewage, as well as pH, copper and zinc and the plant nutrients nitrate and phosphates. Results quoted are mean values across all the samples and are the most recent data available on the Environment Agency's website.

14.7.19 All of the rivers listed have a water quality objective of RE1, the highest quality objective in the Rivers Ecosystem Classification, which takes into account the sanitary parameters and copper and zinc. RE1 represents water quality high enough to support a good salmonid fishery.

14.7.20 All rivers comply with this objective apart from one failing simply on the pH criterion. This is indicated by shading in the pH results column. Note that results are based on percentile compliance data, full details of which are omitted from the table for clarity.

Table 14.2 Environment Agency Routine River Monitoring Data, 2003 -2005

Location	NGR	BOD mg-O_2/l	Ammonia mg-N/l	Dissolved oxygen %	pH	Dissolved Copper mg/l	Total Zinc mg/l	Nitrate mg-N/l	Phosphate mg-P/l	Biology no. of taxa (grade)	Biology ASPT (grade)
North Dartmoor (Okehampton, Merrivale and Willsworthy Training Areas)											
East Okement River u/s of Okehampton	SX604946	0.67	0.001	98.19	6.90	1.37	7.63	2.95	0.01	31 (a)	7.13 (a)
River Taw at Sticklepath	SX644940	0.40	0	96.72	7.04	0.22	3.27	0.18	0.01	32 (a)	6.19 (b)
North Teign River at Gidleigh Park Hotel	SX678879	0.33	0.002	95.97	6.84	0.62	1.45	0.87	0.01	27 (a)	6.04 (c)
East Dart River at Postbridge	SX648789	0.77	0.0	97.37	6.25	0.04	1.66	0.76	0.01	26 (a)	6.77 (b)
Cowsic River at Beardown Farm	SX603753	0.45	0.001	96.78	6.08	1.72	4.96	1.37	0.04	25 (a)	6.76 (b)
Blackbrook River at Tor Royal NB d/s of Princetown sewage works	SX602738	0.94	0.025	96.90	6.67	0.36	4.93	4.27	0.03	33 (a)	6.42 (b)
River Walkham at Merrivale Bridge	SX550751	0.31	0.01	94.55	6.61	0.27	2.30	0.68	0.01	22 (b)	6.86 (a)
River Tavy at Hill Bridge	SX532804	0.55	0.001	95.80	7.2	1.92	4.02	2.06	0.01	21 (b)	6.62 (b)
River Lyd at Lydford	SX520845	0.41	0.06	97.08	7.07	0.80	2.17	1.44	0.01	26 (a)	6.73 (b)
West Okement River at Meldon reservoir inflow	SX555906	0.46	0.002	96.50	5.84	0.43	2.66	0.65	0.01	16 (d)	6.31 (b)
South Dartmoor (Cramber and Ringmoor Training Areas)											
River Meavy at weir above Burrator Reservoir	SX567693	0.47	0.0	92.64	6.70	0.57	2.59	0.75	0.01	24 (b)	6.88 (a)
River Plym above Blackbrook	SX565645	0.46	0.02	92.93	6.24	ungraded	ungraded	1.21	0.04	20 (c)	6.55 (b)

14.7.21 Nutrient levels are all in the 'very low' or 'low' category used in the Environment Agency's GQA classification system, with the exception of the sampling point on the Blackbrook River, reflecting its location downstream of entry of treated effluent from Princetown sewage treatment works. Slightly elevated nitrate levels are not a cause for concern, however, being in the 'moderately low' GQA class.

14.7.22 The slightly acidic pH of the surface waters is an expected phenomenon from a moorland catchment such as DTA and does not indicate contamination that could have arisen from military training. There is no indication at all from these data of any contamination or adverse effect arising from military training on DTA. The results indicate that there is no significant sanitary pollution and probably no natural metalliferous pollution from metal bearing rocks in the area, as copper and zinc levels are very low. This is supported by reservoir water quality monitoring data that has also been examined for other metal contaminants.

14.7.23 **Table 14.2** also shows the results of biological analysis of macroinvertebrate sampling data for a single year in the period 2004 to 2005. The results show the number of taxa (in this case biological families from a selected list) and the average score per taxon (ASPT) using the Biological Monitoring Working Party system. These values are compared with expected values predicted by the RIVPACS computer programme, based on physical and basic chemical characteristics of the river at the sample point. The comparison of 'observed' data with 'expected' results gives a grading from (a) to (e), which is also shown.

14.7.24 Most results fall into categories (a) 'very good' or (b) 'good'. Bearing in mind that low-pH, nutrient-poor waters tend to have a naturally low productivity and a restricted fauna, the few lower categorisations are not unexpected and the overall pattern remains one of high water quality.

14.7.25 Good water quality is also demonstrated by reports from DTE personnel and by RPS that indicate streams within DTA are populated by brown trout and some migratory salmonid fish. Mire areas along Sheepstor Brook have also been reported to support scarce and rare species of dragonfly, the larvae of which are water dependent. Presence of freshwater pearl mussel (Margaritifera margaritifera) has also been reported in the vicinity of the Cramber and Ringmoor Training Areas.

Pollution Incidents

14.7.26 The Envirocheck report identifies 2 pollution incidents as having taken place within 1km of the Okehampton site. The first was a category 3 (minor incident), and was related to an unknown pollutant into a freshwater stream/river. This was located at NGR 263500 88100. The second was also Category 3 incident and involved process water entering a freshwater stream/river. This was located at NGR 261700 91100.

14.7.27 At Ringmoor Training Area the report identifies fifteen pollution incidents to controlled waters, the majority of these were Category 3 (minor incidents) and relate to the China Clay works or unknown pollutants. One major incident was reported at NGR 256150 64500, this was found to relate to quarry extraction water. The incidents largely relate to process water into a freshwater stream/river.

14.7.28 At Cramber Training Area the report identifies only one pollution incident to controlled waters, this was a Category 1 (major incident) involving an unknown pollution entering a freshwater stream/river the location of the incident was reported at NGR 260001 73201.

14.7.29 In summary there are no pollution incidents that can be related to military activities. Where sources are identified they relate to china clay and quarrying activities.

Water Quality of Artificial Leats

14.7.30 There are a number of artificial leats built for collecting and transporting water from the moor. The Prison Leat collects water from the upper valley of the Blackbrook River and Devonport Leat collects water from the upper catchments of the West Dart River and the Cowsic River, in the Merrivale Training area. Reddaford Leat collects water from Willsworthy to feed Wheal Jewel Reservoir and the Mary Tavy hydro electric power station.

14.7.31 Where available, sample analysis data has been obtained from the Environment Agency for waterways and water features across DTA. However at the time of report production there was a relative lack of data available for the leats on site, making a relationship between water quality and military training difficult to qualify. Any additional sample data for these waterways or other water bodies would normally be associated with abstraction or discharge consents. There are a number of abstractions and discharges recorded at or near DTA. In general 11 abstractions are recorded, the majority of which relate to domestic or agricultural use and 12 discharges are recorded all of which relate to sewage discharges and are therefore under appropriate control measures. Abstractions and discharges are the responsibility of the Environment Agency and would have associated monitoring data, however the collection and analysis of all abstraction and discharge data is deemed outside the scope of work for this assessment. However, this information has been obtained as part of the Land Quality Assessment work completed by Entec (September 2007).

14.7.32 The local authorities contacted are not aware of any groundwater contamination issues at the site. This combined with the good quality of waterways that have been sampled across the site, indicates that any adverse effect upon the leats is unlikely.

Appropriate Control of Sewage Discharges

14.7.33 In accordance with the Water Resources Act 1991, the Environment Agency has the responsibility to adequately control sewage discharge consents across the Dartmoor training area and to monitor these at both the Willsworthy and Okehampton camps. Treated domestic sewage discharges at both these locations are monitored to ensure compliance with Environment Agency standards. Water flow is recorded and various water quality tests are carried out which include acidity, temperature, BOD, Ammonia, suspended solids, nitrates, phosphates and zinc.

14.7.34 There are a number of criteria that must be complied with that are site specific to each camp, In general discharges must not be found to contain;

- any poisonous, noxious, or polluting matter;
- any solid waste matter; or
- any signs of oil or grease.

14.7.35 More specifically at Okehampton Camp discharges must not exceed 66m^3 in any consecutive 24 hour period and no single sample taken should be found to contain in excess of;

- 40 mg per litre of biochemical oxygen demand for five days at 20 ºC;
- 60 mg per litre of suspended solids (measured after drying for one hour at 105 ºC); or
- 10 mg per litre of ammoniacal nitrogen expressed as nitrogen.

14.7.36 At the Okehampton outfall, surface water must be kept separate from treated effluent at all times and irrigation fields associated with outfalls must not fall within 250 m of any well, borehole, spring source or private water supply, 150 m of any existing soakaway or 80 m of any watercourse.

14.7.37 At Willsworthy Camp discharges must not exceed 20m^3 in any consecutive 24 hours and no single sample taken should be found to contain in excess of;

- 20 mg per litre of biochemical oxygen demand for five days at 20 ºC;
- 30 mg per litre of suspended solids (measured after drying for one hour at 105 ºC); or
- 20 mg per litre of ammoniacal nitrogen expressed as nitrogen.

14.7.38 At the Willsworthy outfall, surface water must again be kept separate from any treated effluent at all times and no part of the soakaway associated with the outfall shall be within 200 m of any well, borehole or spring source of private water supply, 100 m of any existing soakaway or 100 m of any watercourse. In addition at this site at least 1.5 m of soil shall be present below the invert level of the soakaway and the invert level of the soakaway shall be at least 1.5 m above the winter water table.

14.7.39 Provided these strict standards are maintained, discharges from both the Okehampton and Willsworthy camps are considered to be under appropriate control and it is unlikely that any contamination would take place due to sewage discharges.

Digging Activities

14.7.40 Digging activities do take place in certain locations across Dartmoor. These activities have the potential to affect the drainage of peat pools and of flushes which in turn may affect their water dependent habitats and their flora and fauna.

14.7.41 To avoid damage to waterways from trench digging and silt intrusion there are strict regulations in place across DTA. Digging is prohibited in any areas outside DTA. , Within DTA digging is controlled by Comdt DTA through DTE SW SOs and enforced by DTA staff. Digging is not permitted near watercourses, in peat areas or where there are good stands of heather. After exercises trenches are backfilled and turf replaced.

Summary

14.7.42 The activities at both the Willsworthy and Okehampton camps mean that there is a possible risk of contaminated surface water runoff. However the strict management and mitigation measures in place (referred to in **Section 14.4**) combined with the existing infrastructure are considered sufficient to control any potential contamination and prevent adverse effects.