

Ramsar Advisory Mission No.79:
Nordre Tyrifjord Wetland System, Norway (2015)

Ramsar Site No.802

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MISSION REPORT

by

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Summary

- S.1 The Nordre Tyrifjord Wetland System Ramsar Site sits in a remarkable inland delta system of natural meanders, oxbow lakes and other habitats on the lower reaches of the rivers Storelva and Sokna north of Oslo. There are plans to extend the designation to represent more fully the true “Nordre Tyrifjord wetland system”, including parts of the Steinsfjord arm of Tyrifjord further to the east. This part of Norway has been continuously settled by humans since the Stone Age, and contains some of the country’s most productive agricultural land, historic features and rich biodiversity.
- S.2 Ramsar advisory inputs on road and rail proposals affecting this area go back to the time of the Ramsar Site’s designation in 1996, and include visits by the Convention Secretariat followed by recommendations to the Norwegian authorities. A variety of alternative transport routes has been proposed over the years, with options being sifted and narrowed, but also with preferences switching and construction specifications being changed to meet new ambitions. In March 2015 the Norwegian Ministry of Climate and Environment requested a Ramsar Advisory Mission to review the most recent approach being urged by Parliament, namely a four-lane highway for the E16 road and a high-speed “Ringeriksbanen” rail link in a common corridor between Kroksund and Hønefoss, with three alternative routes through the Storelva delta area.
- S.3 The Mission team visited in July 2015, examined various field locations and benefited from a wealth of evidence provided in documents, presentations and meetings with representatives of central government, local government, project consultants, civil society organisations, local residents, businesses and other stakeholders. All are warmly thanked for their input.
- S.4 This report summarises Ramsar principles on environmental impact assessment, mitigation and compensation; and reviews some of the main implications of each of the three proposed route options. On the narrow question of the relative merits of these three, the Mission supports the view of the Norwegian Environment Agency that the “Busund” and “Helgelandsmoen” routes should not be selected. The latter option in particular is likely to raise legal issues under the Nature Diversity Act and Ramsar Article 2.5. The “Monserud” option would cause less damage to wetland values. This option is however still negative overall and would be better avoided; but if it proceeds, a full package of appropriate mitigation and compensation measures should be implemented. A full environmental impact assessment of the overall scheme is also required.
- S.5 All the currently proposed routes involve bridge crossings of the Kroksund strait, and there are significant environmental concerns to be addressed here. In any event, whatever is decided in respect of the road/rail developments, there is (as already recommended in 1997) a need to implement measures to improve the water quality in Steinsfjord.
- S.6 The Mission is uncomfortable with the restricted nature of the “three options” choice that has been presented; and notes that on earlier occasions the Environment Agency and the Buskerud County Governor (among others) have stated that none of these three is acceptable on environmental grounds.
- S.7 The national Government is clearly anxious for decisions on this scheme to be finalised as rapidly as possible so that construction can begin, and it appears that the current options have been restricted largely in the interests of speeding up the planning process. We are aware that there are many who consider the abandonment of certain previous options to be

premature. Too much streamlining of the process could ultimately be a false economy, if it excludes potential solutions to environmental impact problems. The end result could be more expense (e.g. in remediation measures) and lengthier decision-making than would otherwise be the case.

- S.8 In the Mission's view, investigating options for arterial road and rail infrastructure in an integrated way makes good strategic planning sense. However routing both road and rail together in a common corridor is a different matter, and we have not heard convincing arguments for doing so in this case. This approach restricts the choices unnecessarily in terms of routes, bend radius and tunnels. We also concur with the Environment Agency's view that it will unduly limit the scope for mitigating environmental impacts.
- S.9 The advice provided by the Ramsar Secretariat following its visit in 1997 remains fully applicable today, namely that "To meet its obligations under the Ramsar Convention, Norway should select the rail and/or road development route(s) with the lowest direct and indirect impacts on the ecological character of the wetland system". Where there is any conflict with local and national interests, international obligations should generally carry greater weight.
- S.10 In the Mission's view therefore, in common with some of the representations received, there is a strong argument for giving renewed consideration to earlier options (which were officially preferred at one stage) for a rail route east of Steinsfjord through the Åsa area, and an in-line upgrade of the existing E16 road, perhaps with variable speed limits and three lanes instead of four. We do not minimise the engineering, safety and journey-time challenges associated with these options, but we consider that they may not be insoluble and they should anyway be properly weighed against the environmental and other costs of constructing a new route through the Storelva delta area.
- S.11 There is a concern to see that the planning process is not unduly short-circuited, and that options which may prove preferable in the long term are not abandoned prematurely. There is equal concern to ensure that development needs expressed in terms of speeding up travel journeys and speculation about local economic regeneration are backed by robust evidence, and are weighed appropriately against any damage that may result, including to Norway's international reputation as well as to its natural environment and the area's attractiveness to tourists. The 13 specific recommendations in this report are offered as a contribution to this.
- S.12 Norway has shown leadership in many areas of Ramsar implementation over the years. The civic engagement, transparent accountability invited through the present Mission and the professional attitude of the public authorities involved in the E16/Ringeriksbanen case have been praised by scheme supporters and opponents alike. The constructive spirit of Ramsar's RAM process could not have been better exemplified, and the national authorities will be offered every encouragement in following it through.

1. Recommendations from the Mission

Conservation planning in the Nordre Tyrifjord area

Recommendation 1: Extended protection measures

As already recommended in 1997, priority attention should be given to progressing the proposals for extending protection status to a wider area around the existing Nordre Tyrifjord/Storelva nature reserves (unrelated to compensation measures for infrastructure developments). As far as possible the boundaries of a suitable protection regime should be determined by the hydro-ecological functioning of the wetland system as a whole, and should not be unduly fragmented. In due course the Ramsar Site should be extended accordingly. A unified conservation management plan for the area should be adopted, building on the draft drawn up by Buskerud County in 2011. In the meantime all planning decisions should be taken as though these extended protection measures were already in effect. *[See chapter 4]*

Recommendation 2: Integrated ecosystem restoration

Priority should be given to progressing the proposals already drawn up independently for wetland and water system restoration in the Nordre Tyrifjord/lower Storelva area, in a way that is coherently integrated with management planning and extension of relevant protected areas, and with works to mitigate and compensate for any transport developments that go ahead in the area. *[See chapter 4]*

Impact assessment, mitigation and compensation for transport developments

Recommendation 3: Applying Ramsar guidance on EIA and SEA

Assessments of the strategic and location-specific environmental impacts of the E16 Skaret - Hønefoss motorway and the Ringeriksbanen Sandvika - Hønefoss railway should be reviewed against relevant good practice principles set out in Ramsar guidance (notably Resolution X.17, further explained in Ramsar Handbook 16 on impact assessment) and other relevant international standards such as those used in the context of EU legislation. The advice given on this by the Ramsar Secretariat following its 1997 site visit should also be followed. *[See chapter 7]*

Recommendation 4: Full scheme impact assessment

A full strategic environmental assessment of different options and specific environmental impact assessments of chosen options should be undertaken with adequate time, scope and consultative input to enable a thorough consideration of all relevant potential impacts, mitigation options, route choices and design solutions, including the aspects highlighted in the present report.. *[See chapter 7]*

Recommendation 5: Approach to mitigation and compensation

In respect of mitigation of any negative impacts on wetlands which cannot be avoided, or compensation for impacts which cannot be mitigated, the planning and execution of relevant measures should follow the general principles and guidance on these aspects referred to in chapter 7 of this report. Solutions should be evaluated and costed on their own merits and not “traded off” against another, for example between the different south-to-north planning sections of the overall route. *[See chapter 7]*

The individual road and rail route options

Recommendation 6: Addressing the “Monserud” option

A full package of appropriate mitigation measures for the Monserud route option should be defined, based on the findings of an eventual EIA and having regard to chapters 7-8 of the present report. Options to re-site the planned road intersection away from the proposed Storelva protected area extension should be investigated. Appropriate habitat compensation should be considered in relation to residual impacts on environmental interests (including wetlands) in all parts of the route, both those adjacent to the Ramsar Site and elsewhere. *[See chapter 8]*

Recommendation 7: Addressing the “Helgelandsmoen” option

The Mission supports the Environment Agency’s view that to uphold Norway’s Ramsar obligations, the Helgelandsmoen route should not be selected. If it goes ahead nevertheless (assuming the tests in Section 48 of the 2009 Act can be met), mitigation should be optimised by use of bridges rather than embankments, plans for future management of erosion and accretion changes in the river channel should be developed, and a major habitat compensation scheme should be developed based on “re-wetting” the Mælingen/Gomserud peninsula, extending conservation protection status in the area and compensating landowners for loss of farmland. *[See chapter 9]*

Recommendation 8: Addressing the “Busund” option

The Busund route should not be selected. If it goes ahead nevertheless, a comprehensive assessment of mitigation and compensation possibilities should be undertaken prior to construction beginning. Such an assessment should be based on the findings of an eventual EIA and should have regard to chapters 7-8 of the present report. *[See chapter 10]*

Recommendation 9: Addressing the crossing of Kroksund

Earlier decisions to avoid new bridges at Kroksund by choosing routes around the east of Steinsfjord or crossing with tunnels instead are still the options that would cause least damage to the wetland system here. If despite this, bridging options are now chosen, a full assessment of their environmental impacts and mitigation/compensation possibilities should be carried out, giving particular attention to hydrodynamics, water quality, fish ecology and bird-strike risks. Tunnelling spoil should not be disposed of on the lakeshore or in bays. *[See chapter 11]*

Conservation measures in the Steinsfjord area

Recommendation 10: Ensuring water quality of Steinsfjord

As already recommended in 1997, measures should be implemented to reduce eutrophication in Steinsfjord and improve its water quality. Reducing input of nutrients (both point-source and diffuse), increasing water circulation, controlling fish introductions, opening up flows under the road causeway and minimising barriers to wind-driven mixing of surface waters should all be considered. Opportunities should be explored for funding such measures as part of the overall environmental management and mitigation plan for the E16/Ringerikesbanen scheme if it goes ahead. *[See chapter 11]*

Choosing the most appropriate transport routes

Recommendation 11: Reconsidering an “Åsa” option for the railway

Any time, distance, cost, track specification and construction-related challenges of a rail route east of Steinsfjord through the Åsa area should be weighed against the environmental, agricultural and cultural challenges of a route across Kroksund and through the Storelva delta area. The Mission supports those who argue that the decision to abandon consideration of the “Åsa” option was premature, and that this decision may not necessarily shorten the planning process or save costs overall. The “Åsa” route should therefore receive further consideration. *[See chapter 12]*

Recommendation 12: Reconsidering separate corridors for road and rail

Planning of transport infrastructure north of Oslo should continue to take an integrated approach to road and rail improvements, including attention to the relative environmental costs and benefits of each mode of travel; but this should not constrain the consideration of separate route corridors for the Ringeriksbanen railway and the E16 highway in cases where such separation could reduce negative environmental impacts or offer greater scope for mitigation. *[See chapter 12]*

Recommendation 13: Reconsidering improvement of the existing road line

The Mission does not minimise the challenges, including of ensuring adequate road safety, that would be associated with upgrading the E16 highway along its existing line; but these may not be insoluble and they should be weighed against the environmental and other costs of constructing a new route instead through the Storelva delta area. We support those who argue that the decision to abandon consideration of an in-line improvement to the E16 was premature. This in-line option, including the possibility of widening to three lanes instead of four and imposing variable speed limits, should therefore receive further consideration. *[See chapter 12]*

2. Introduction and purpose of this report

- 2.1 Ramsar Advisory Missions (RAMs) are means by which the Convention on Wetlands (Ramsar Convention) provides technical assistance to Contracting Parties in the management and conservation of listed wetlands of international importance (Ramsar Sites) whose ecological character has changed, is changing or is likely to change as a result of technological developments, pollution or other human interference. Around 80 such Missions have been completed to date.
- 2.2 The Mission procedure (formerly known under other names) was adopted by Recommendation 4.7 of the 4th meeting of the Conference of Parties (COP4) in 1990. The main objective is to undertake fact-finding activities and to provide advice (at the request of the Party concerned) in solving problems relating to the maintenance of the ecological character of a particular Ramsar Site or Sites. Missions are sometimes also able to advise on other Convention implementation issues at the same time.
- 2.3 The benefit of a Mission is often in providing an additional (international) source of assurance for a national decision-making process, through auditing and peer review. It is an opportunity for the relevant authorities to test and demonstrate the quality (thoroughness, precaution, transparency, consistency etc) of the decision-making processes involved, in the context of Ramsar requirements. This means that it is not necessarily expected to generate ideas or insights that have not already been thought of; but it will cast them in a new light, bring independent scrutiny, and distil those issues that have particular relevance to the requirements and the adopted guidance of the Convention.
- 2.4 The process overall assists implementation, reinforces standards and credibility and raises awareness, and the availability of the RAM tool is often seen as one of the benefits of being a Ramsar Party. Where relevant, the Convention's Scientific & Technical Review Panel (STRP) is available as a network of expertise. Mission reports are published once the Party concerned has had an opportunity to study the report and comment on it; and this offers lesson-learning benefits for the Convention as a whole.
- 2.5 Ramsar advisory inputs at Nordre Tyrifjord go back to the time of the Site's designation in 1996, when a formal letter about road and rail proposals was sent to Norway by the Convention Secretariat, followed by a site visit in June 1997 which resulted in several recommendations being made.
- 2.6 Article 3.2 of the Convention requires that information on actual or potential changes in ecological character of Ramsar Sites should be passed without delay by the relevant Contracting Party to the Ramsar Secretariat. In this specific context, the Norwegian Environment Agency (as the responsible national implementing authority for the Convention) formally informed the Secretariat in March 2013 about new plans for routing a road development through parts of the Tyrifjorden wetlands system, which could potentially affect part of the Ramsar Site as well as other wetland areas proposed for inclusion within it. This was corroborated by information separately received from the Norwegian Ornithological Society (BirdLife Norway).
- 2.7 A brief Secretariat visit to the site was made in August 2014, and further representations were received from national NGOs. In September of that year the Secretariat wrote to the NEA referring to the earlier advice, expressing surprise that road and rail routes through the

area appeared to be being considered again, and offering to undertake a Ramsar Advisory Mission. A further letter was sent in March 2015 requesting an update on the situation.

- 2.8 A response came from the Ministry of Climate and Environment on 26 March 2015, indicating that the Norwegian Parliament had decided that the E16 highway should be upgraded from two to four lanes, and that a new report recommended constructing this in combination with a new high-speed railway. Three route options were under discussion, at least two of which would affect the Ramsar Site and other important wetlands. The Government aimed to take a decision within the year, so in a context of some urgency, the Ministry requested a RAM and offered to cover its costs.
- 2.9 The Mission was undertaken from 1 to 3 July 2015, with a team consisting of two senior members of the Ramsar Secretariat staff and one independent expert from the STRP. Two members of this team had experience of a previous RAM at a different Site in Norway in 2010 (also involving transport infrastructure). See the Annex to this report below for details of the Mission team, the programme and the participants.
- 2.10 Terms of Reference were agreed with the Ministry, according to which the objectives of the Mission (paraphrased) were as follows:
- (Within the constraints of a very brief exposure to a long and complex planning process) to assess the road and rail development proposals in the area of the Nordre Tyrifjord Wetland System, in terms of the potential implications of the different route options for the ecological character of the Nordre Tyrifjord Ramsar Site and other important wetlands in the area;
 - To indicate Ramsar requirements and adopted guidance that are particularly relevant to this situation;
 - To comment on aspects to which special attention should be given in studies of environmental impact before decisions are taken and before any construction begins;
 - To advise on ways in which any negative impacts on the Northern Tyrifjord Wetland System of the proposed road and rail developments might be avoided, mitigated where they cannot be avoided, or compensated where they cannot be avoided or mitigated, including observations (where relevant) on best practice for technical solutions;
 - To bring in any relevant experience from other projects elsewhere which may offer suggestions for mitigating impacts of transport infrastructure on river ecosystems and floodplain habitats.
- 2.11 As mentioned above, once the recipient government has had the opportunity to study and comment on the initial version, each RAM report is published on the Ramsar website. It is expected that updates on the Nordre Tyrifjord situation will feature regularly in dialogue between Norway and the Ramsar Secretariat thereafter, and in particular that implementation of the recommendations made here will be monitored and reported.

3. Overview of the Nordre Tyrifjord Wetland System

- 3.1 Tyrifjord is a land-locked freshwater body in the county of Buskerud in south-east Norway, lying around 40 km to the north-west of Oslo. At around 137 sq km it is Norway's fifth largest lake. It has a central area, two long arms to the south and two to the north, and several islands. The north-eastern arm is known as Steinsfjord, joined to the rest by a narrow strait at Kroksund. The north-western arm is fed by the fjord's main inflow river, the Storelva. These northern areas of the fjord have been continuously settled by humans since the Stone Age, and contain some of Norway's most productive agricultural land, historic features, heritage buildings and rich biodiversity.
- 3.2 The Storelva is one of the largest rivers in southern Norway. Where it flows south from the town of Hønefoss to join Tyrifjord, it has formed a remarkable delta landscape of natural meanders, islands, oxbow lakes, mudbanks, floodplain marshes and wet woodland. Nearby to the west, another smaller inflow, the Sokna river, features similar habitats. The delta areas of these two rivers taken together are referred to as the "Nordre Tyrifjord Wetland System", within which a sub-set of specific locations (consisting of five disjunct nature reserves, in the municipalities of Hole and Ringerike) combine to form the Nordre Tyrifjord Wetland System Ramsar Site.
- 3.3 The site was designated as a Wetland of International Importance (Ramsar Site) in March 1996, based on national nature reserve areas designated in 1985 (except for the Lamyra reserve which dates from 1975). The designated area totals 322 ha, and contains the following reserves:
- Averøya (107 ha)
 - Karlsru dtangen (87 ha)
 - Lamyra (34 ha)
 - Juveren (44 ha)
 - Synneren (50 ha).

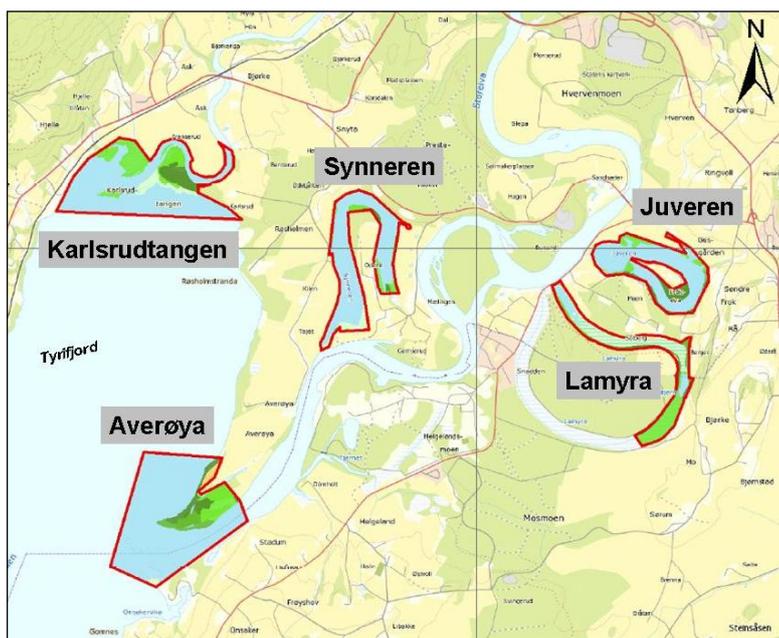


Figure 1: Constituent parts of the Nordre Tyrifjord Ramsar Site.

- 3.4 The original Ramsar Information Sheet for the Site was updated in March 2012, at which time individual Information Sheets were also completed for each of the five constituent areas. These Sheets give a wealth of detail on the Site, together with maps; and they are accessible at the on-line Ramsar Sites Information Service (<https://rsis.ramsar.org/ris/802>).
- 3.5 The Site qualifies on six of the Ramsar criteria for international importance. Concerning natural wetland types, it is a large and interesting example of inland river delta geomorphology, demonstrating a variety of successional stages (Criterion 1). Concerning endangered species, it is important for several vegetation types, plant species, charophytes, mosses, amphibia, fungi and birds (including bean goose *Anser fabalis*, smew *Mergellus albellus* and hen harrier *Circus cyaneus*) that are listed on the Norwegian national Red List (Criterion 2).
- 3.6 Concerning regional biodiversity, the rich, varied and typical vegetation of a relatively undeveloped inland delta is especially noteworthy and increasingly rare. This includes annual vegetation on exposed banks and seasonally flooded meadow habitats, along with bog and rich fen vegetation associated with oxbow lakes at different stages of succession. These biotopes are key to supporting both the typical and threatened species found in the area (Criterion 3).
- 3.6 After the Ramsar Site at Nordre Øyeren, Nordre Tyrifjord is the most important inland site for migrating and wintering waterbirds in southern Norway. It is a staging area for up to 3% of the Svalbard population of pink-footed geese *Anser brachyrhynchus* in spring (Criterion 6), the most important site in southern Norway for goosanders *Mergus merganser* in autumn, and in autumn and winter it also hosts good numbers of whooper swans *Cygnus cygnus*, wigeon *Anas penelope* and cormorants *Phalacrocorax carbo* (Criterion 4). There are also significant spawning and rearing grounds for fish species, notably trout *Salmo trutta*, smelt *Osmerus eperlanus* and pike *Esox lucius* (Criterion 8).
- 3.7 The area is popular for boating, swimming, fishing and birdwatching. Hunting is not permitted, except for elk, red and roe deer. Grazing (some of it as part of conservation management) and water abstraction for irrigation takes place. Drinking water for Hole Municipality is supplied from Bønsnes on the Røyse peninsula, and for Asker and Bærum Municipalities and parts of Lier Municipality it is supplied from Holsfjord, the south-eastern arm of Tyrifjord. Upstream regulation of the water flows in the Storelva/Begna river system for hydroelectric power generation affects the water levels and the fluvial geomorphological processes of the delta, including accelerating vegetation succession in the oxbows (which selective grazing is now attempting to address). Nutrient inputs from surrounding farmland have increased in some areas (due to higher levels of fertiliser use), which is implicated in the spread of invasive Canadian pondweed *Elodea canadensis* (notably in Juveren and Synneren); while nutrient levels have decreased in other areas (due to greater treatment efforts).
- 3.8 Responsibility for management of the site lies with the office of the County Governor of Buskerud, under the supervision of the Norwegian national Environment Agency. Individual management plans have been in effect for each of the five reserves since 1999-2000. A draft of a single consolidated plan was drawn up in 2011 but has not yet been adopted, given the ongoing uncertainties about development in the area and the pending intentions to extend protection designations and launch a restoration project (see next chapter).

4. Current plans for enhancement of the conservation status of the area

- 4.1 It is obvious from the preceding description that the formally designated areas are merely fragments of the true ecological system that is of importance in the Nordre Tyrifjord delta, and they have been shaped by the practicalities of where it was opportune at the time to establish national nature reserves.
- 4.2 Systematic surveys by the Norwegian Ornithological Society in the late 1990s demonstrated the equal importance for birds of other areas in the vicinity, and the case was made to extend protection status to a more all-encompassing continuous coverage of the lower Storelva and northern part of Tyrifjord, as well as other areas further east at Steinsfjord and along the Randselva and Begna rivers.
- 4.3 The Ramsar Secretariat visit report in 1997, referred to in chapter 1 above, recommended that these proposals should be given priority attention; and a formal proposal for expanding existing protected areas and establishing new ones, covering a total of 3,000 ha, was drawn up by the office of the Buskerud County Governor in 2007 and updated in 2011-12 (see Figure 2).

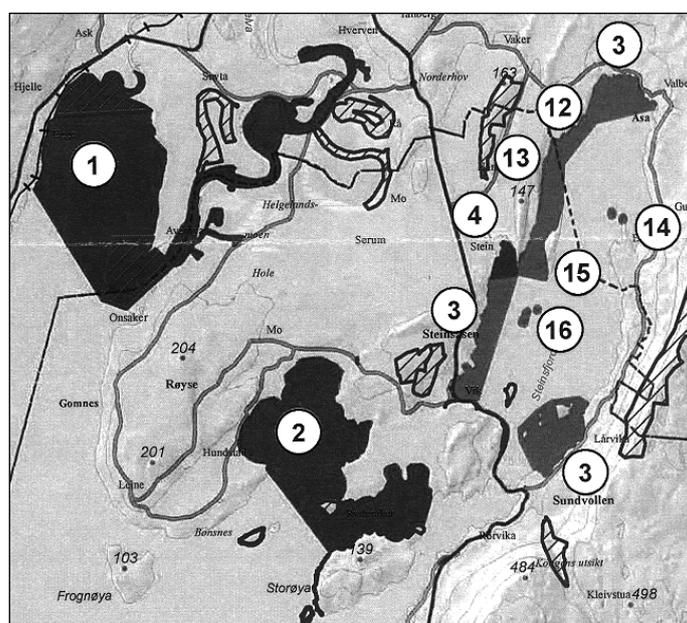


Figure 2: Proposals for extending protected areas in the Nordre Tyrifjord/Storelva area. (Office of County Governor of Buskerud, 2011). Areas 1, 2 and 4 = proposed nature reserves; other numbered areas = proposed designated biotopes. Existing reserves are cross-hatched (RamsarSite segments appear at top centre-left).

- 4.4 The Mission supports the general direction being taken by this thinking, but notes that it still falls short of defining protected area coverage on a basis of overall ecological functionality. In the case of the lower Storelva delta for example, this could more completely encompass the full system of meanders and oxbows and their floodplain hinterland, which would make for a more meaningful geographical unit for the purposes of strategic conservation management.

Recommendation 1: As already recommended in 1997, priority attention should be given to progressing the proposals for extending protection status to a wider area around the existing Nordre Tyrifjord/Storelva nature reserves (unrelated to

compensation measures for infrastructure developments). As far as possible the boundaries of a suitable protection regime should be determined by the hydro-ecological functioning of the wetland system as a whole, and should not be unduly fragmented. In due course the Ramsar Site should be extended accordingly. A unified conservation management plan for the area should be adopted, building on the draft drawn up by Buskerud County in 2011. In the meantime all planning decisions should be taken as though these extended protection measures were already in effect.

- 4.5 In 2012 the then Norwegian Directorate for Nature Management (now the Environment Agency) drew up a national plan for wetland restoration, to run from 2014-18. Based on a nationwide survey of several hundred potential locations, ten priority projects were defined (unrelated to any possible compensation needs arising from planned developments). Among the priority projects, Buskerud County, Hole Municipality, BirdLife Norway and the Water Resources Directorate (in a context of water body ecological status targets) have supported proposed restoration work in the Nordre Tyrifjord/lower Storelva area, particularly in respect of increasing water circulation in the oxbow lakes and controlling succession of vegetation.

Recommendation 2: *Priority should be given to progressing the proposals already drawn up independently for wetland and water system restoration in the Nordre Tyrifjord/lower Storelva area, in a way that is coherently integrated with management planning and extension of relevant protected areas, and with works to mitigate and compensate for any transport developments that go ahead in the area.*

5. History of road and rail development proposals in the area

- 5.1 The E16 highway connects Oslo with Bergen. In 1997, plans were launched to construct a new route for the section between Rørvik and Vik, to the south and north respectively of the Kroksund strait. Various route options were explored, and in 2002, Hole Municipality and the Norwegian Public Roads Administration recommended a tunnel solution slightly to the east of the existing bridge. No further progress was made at that time however.
- 5.2 In 2007 the Public Roads Administration launched plans again for improvement of the E16, this time for a longer stretch covering 25km from Skaret north to Hønefoss, with the aim of speeding up journey times, improving access and reducing accidents. Twenty-nine different route options were examined, in assessments that were concluded in 2012. The alternatives were clustered in four main corridors: a “yellow” corridor travelling east of Steinsfjord through the Åsa area (avoiding a crossing of Kroksund); a “green” corridor involving a crossing of the Storelva wetlands on a line roughly similar to the current “Busund” option (see chapter 6 below); a “blue” corridor just abutting the eastern side of the Ramsar Site on a line roughly similar to the current “Monserud” option; and several “red” and “pink” variants in a corridor further east making partial use of the existing road line.
- 5.3 In 2012 the Roads Administration recommended the “green” route but accepted that the “blue” route would also be feasible. The crossings of the Storelva river and Kroksund were both proposed to be by bridges. In the case of Kroksund this was a change to the recommendation in 2002, on the grounds of cost (four lanes were now being considered instead of three) and concerns about safety. The “yellow” (Åsa) option was rejected on the grounds that its longer journey time would fail to attract sufficient traffic away from the existing road.
- 5.4 Passenger rail travel from Oslo to Bergen currently follows a route south-west from Oslo to Drammen and up the western side of Tyrifjord. Options for a “Ringeriksbanen” railway to take a shorter route between Oslo and Hønefoss have been under consideration since 1992. At the time of the Ramsar Secretariat’s visit to Tyrifjord in 1997 (see chapter 1 above), two main options for this were under consideration: one taking a route over Kroksund and through the Storelva wetland system; and the other going east of Steinsfjord through the Åsa area.
- 5.5 In 2002 the Norwegian Parliament decided in favour of the Åsa corridor, principally on the grounds of the likely negative environmental impacts of the Kroksund/Storelva alternative. This was consistent with the advice given by the Ramsar Secretariat that to meet obligations stemming from the Convention, the route with the lowest impacts on the ecological character of the Nordre Tyrifjord wetland system should be chosen.
- 5.6 In their comments on the E16 road proposals in 2012, the Norwegian National Rail Administration advised that the road should not be developed without considering the Ringeriksbanen railway at the same time, although the the Ministry of Transport and Communications at the time took a different position. By 2013 however the Ministry had changed its view, and the Road and Rail Administrations were asked to work together to investigate coordinated planning options.
- 5.7 Since the Road Administration’s favoured options all involved passing across Kroksund and through Hole Municipality, it was argued that environmental impacts in those locations would occur anyway from the road development, and so an “environmental” reason for routing the Ringeriksbanen away from these areas (through Åsa) was no longer so valid. In

the Mission's view this reasoning is questionable – it could just as well be argued that if the railway was being directed away from environmental impacts, that would strengthen the case for the road to do likewise.

- 5.8 Other reasons were however also adduced for re-opening Kroksund/Hole options for the railway, notably cost and journey time, both of which were also affected by “high speed” specifications for the railway that were more exacting than those applying in 2002. Regional development of Ringerike, reducing commuter pressure around Oslo and enhancing the connection to Bergen were all part of the motivation, and it was considered that with a high-speed link (up to 250 kph), train journeys between Oslo and Hønefoss could be reduced by 50 minutes or more.
- 5.9 The County Governor of Buskerud and the Norwegian Environment Agency however, among others, considered that none of the route options across Kroksund and through Nordre Tyrifjord were acceptable on environmental grounds, and that consequently the best solution for the road would be to upgrade the E16 along its existing line, and the best solution for the railway would be to continue investigating an Åsa option.
- 5.10 Nonetheless, in late 2014/early 2015 the Road and Rail Administrations recommended taking both the E16 and the Ringeriksbanen in a common route across Kroksund and through Hole, and in June 2015 the Parliament rescinded its previous decision in favour of an Åsa route for the railway. The plans with the various remaining route options went out to public consultation and were examined at a public hearing in early 2015.
- 5.11 It is clear from the foregoing that preferences have changed on a number of occasions; including tunnelling under Kroksund (favoured in 2002 and rejected in 2012), treating road and rail separately (favoured prior to 2013 and rejected thereafter), and considering an easterly/Åsa corridor among the route options (favoured prior to 2012 and rejected thereafter for the road; favoured in 2002 and rejected in 2015 for the railway). Throughout this time, the Ramsar Secretariat's 1997 advice (to choose the route/s with the lowest impacts on the ecological character of the Nordre Tyrifjord wetland system) has remained unchanged.

6. Current proposals for the E16 Skaret - Hønefoss motorway and the Ringeriksbanen Sandvika - Hønefoss railway

- 6.1 The current Norwegian Government is anxious to press ahead as fast as possible with the road and rail developments, in the context of the National Transport Plan 2014-2023. There are aspirations for provision to be made in the budget bill for 2016, construction to start in 2018-19 and completion to occur in 2024. In the interests of speed, Parliament has said that the decision on choice of routes is now for the Government to make.
- 6.2 This timeframe is predicated on some streamlining of normal planning processes (according to the Roads Administration, reducing by half the time these would otherwise take). No new concept study for the combined road/rail scenario will be undertaken, with reliance being placed instead on the national plan and on the previously defined route corridors. No "Municipal Sector Plan" will be required, with matters progressing immediately to "Zoning Plan" stage. An Environmental Impact Assessment will be undertaken only of the eventually selected route, rather than as a comparison of the different candidate routes (an approach which would not be permitted under regulations applying in the EU). And finally the options to be considered have been narrowed down, such that the Administrations are now tasked with examining only a combined road/rail option, and only the three route alternatives described below.
- 6.3 Planning of the route from Sandvika to Hønefoss has been divided into five sections. The southernmost section (1) from Sandvika to Kroksund and the northernmost section (5) from Styggedalen to Hønefoss are not at issue here. Section 2 involves the crossing of Kroksund, and section 3 (past Vik) has some implications for agricultural land and cultural heritage. It is section 4 which involves the crossing of the Storelva river and has the most direct implications for the areas currently covered by in the Nordre Tyrifjord Ramsar Site. In this section there are three alternative route options, referred to as the Monserud, Busund and Hegelandsmoen routes (see Figures 3-4).
- 6.4 For the crossing of Kroksund, three alignment options have been considered: two with separate road and rail bridges and one with a combined bridge. The Road and Rail Administrations favour a separated option, with the railway crossing at Sundøya and the road crossing somewhere between Rørvik and Elstangen. Considerations in this choice include cost, the scope for constructing a railway station in Sundvollen (preferred by the Rail Administrations and by Hole Municipality to the alternatives of doing so in Vik or Rørvik), and the aim of allowing speeds of up to 110 kph on the road (hence requiring its line to have limited curvature).
- 6.5 In route section 3 (passing through the Vik area), objections by Hole Municipality and others (on the grounds of impacts on agricultural land, natural environment and cultural heritage) have led to a recommendation that both road and railway lines be underground in tunnels. This of course adds significantly to the overall cost of the scheme.

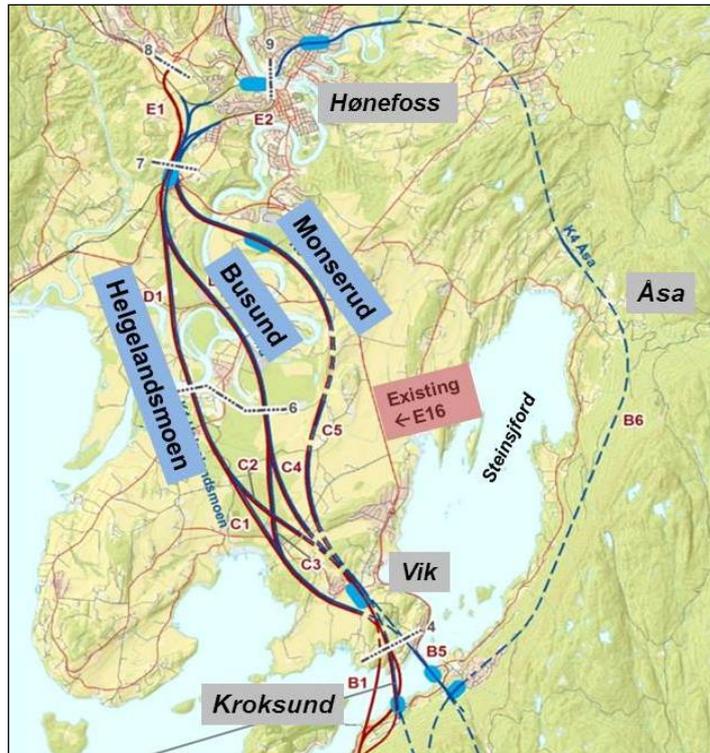


Figure 3: Current combined road/rail route options in the Nordre Tyrifjord area (Monserud, Busund and Helgelandsmoen lines).

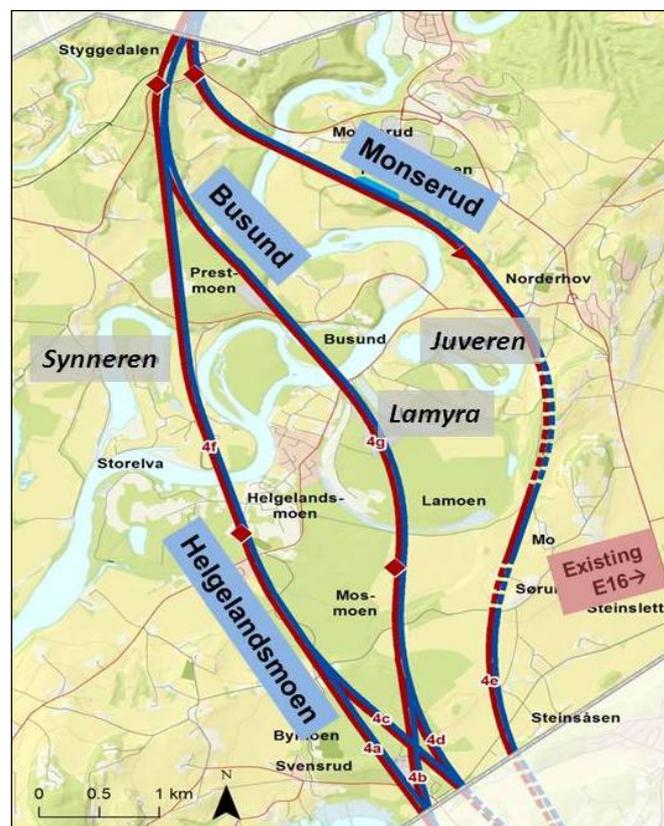


Figure 4: Closer view of route planning section 4, showing the three most closely affected portions of the Nordre Tyrifjord Ramsar Site (Synneren, Lamyra and Juveren).

- 6.6 Figure 4 shows the three alternative route options for crossing the Storelva river and its associated wetland systems. Although the Monserud option passes just outside the boundary of the Ramsar Site, all three routes have the potential to impact upon the ecological character of the Site and on other important wetlands, including proposed additional protected areas (see chapter 4 above); and all three have implications for cultural heritage and loss of valued agricultural land. The issues are discussed further in chapters 8-10 below.
- 6.7 There are also some construction engineering challenges associated with subsurface geology and hydrology at the river crossings. The Monserud route is considered to have the highest costs, although some of the longer bridging options for the Helgelandsmoen route would push up its costs and narrow the difference. The Administrations on balance favour a combined road and rail route on the Helgelandsmoen line (including a road intersection at the location marked with a red diamond in Figure 4).
- 6.8 Assumptions regarding land-take are based on the following specifications. A two-track high-speed railway requires a minimum width of 15m, plus a 20m safety buffer zone either side, making a total corridor width of 55m for a rail-only line. A 110 kph four-lane road requires a minimum width of 23m, plus a 20m safety buffer zone either side, making a total corridor width of 63m for a road-only line. Putting road and rail side by side in a common corridor, including buffer zones either side and a separation gap between them, requires a minimum total width of 90m. Where embankments, cuttings, trenches, noise barriers and other structures are required, these dimensions increase accordingly; particularly where road intersections or railway stations are to be built.

7. Impact assessment, mitigation and compensation

Impact assessment: policies and principles

- 7.1 The Ramsar Convention Parties have adopted guidelines on environmental impact assessment (EIA) and strategic environmental assessment (SEA) of plans and projects which may affect the ecological character of wetlands, most recently in 2008 (Resolution X.17). Common international standards on such things, and transparency in the processes followed in a given case, are particularly important where there is a shared interest in the fate of a global asset such as a listed Ramsar Site, which by definition is a “Wetland of International Importance”.
- 7.2 The Ramsar guidance stresses principles such as having good baseline data; taking a functional approach to impacts on ecosystems; taking a strategic approach to implications for whole water catchments/whole migration routes/networks of protected areas/wildlife corridors; paying attention to impacts on delivery of ecosystem services as well as on the ecosystem itself; considering cumulative and indirect impacts; examining alternatives; addressing options for mitigation and compensation (where impacts cannot be avoided); beginning assessment in good time; involving stakeholders; and providing for post-project monitoring.
- 7.3 The Ramsar Secretariat letter sent to the Norwegian authorities in follow-up to the site visit made to Nordre Tyrifjord in June 1997 (referred to in chapter 1 above) also particularly stressed the need to look at indirect as well as direct impacts, and to consider the wetland system as a whole rather than just each individual reserve. The Mission strongly endorses this advice.

Recommendation 3: Assessments of the strategic and location-specific environmental impacts of the E16 Skaret - Hønefoss motorway and the Ringeriksbanen Sandvika - Hønefoss railway should be reviewed against relevant good practice principles set out in Ramsar guidance (notably Resolution X.17, further explained in Ramsar Handbook 16 on impact assessment) and other relevant international standards such as those used in the context of EU legislation. The advice given on this by the Ramsar Secretariat following its 1997 site visit should also be followed.

- 7.4 Environmental impacts of new transport infrastructure may include effects on people e.g. in respect of noise, air quality and visual intrusion; and systematic assessments will no doubt also be needed of potential social, health and economic impacts. These are matters that lie beyond the scope of the Ramsar Advisory Mission and they are not discussed here. Cultural impacts may however be within the scope, in the context of the cultural ecosystem values of wetlands, as addressed in “Culture and wetlands: a Ramsar guidance document” (2008).
- 7.5 Certain principles have also been agreed in the Norwegian national context. The Nature Diversity Act of 2009 provides (in its section 10) that “any pressure on an ecosystem shall be assessed on the basis of the cumulative environmental effects on the ecosystem now or in the future”. The Act also puts the precautionary principle into law by its section 9, which provides that “when a decision is made in the absence of adequate information on the impacts it may have on the natural environment, the aim shall be to avoid possible significant damage to biological, geological or landscape diversity”; and that if there is a risk of serious or irreversible damage to such diversity, “lack of knowledge shall not be used as a reason for postponing or not introducing management measures”.

- 7.6 Following an earlier Ramsar Advisory Mission to Norway which also reviewed a road development proposal (at the Åkersvika Ramsar Site in 2010), the Ministry of Environment commissioned the Environment Agency to produce a set of “Guidelines for treatment of development issues that could affect Ramsar Sites and other protected wetlands”. These guidelines (M-47, finalised in 2013) emphasise that where several options for a project are under consideration, all of the options which potentially affect protected wetlands should be assessed against the conservation values at stake and the protective regulations that apply.
- 7.7 Ramsar Resolution XI.9 (2012) provides an “Integrated Framework and guidelines for avoiding, mitigating and compensating for wetland losses”, giving advice on how these aspects may be addressed, often in a context of EIA or SEA, and linked to the earlier Resolution X.16 (2008) on a “Framework for processes of detecting, reporting and responding to change in wetland ecological character”.
- 7.8 The guidance advocates a risk-based approach to seeking to avoid unwanted impacts; and only where this is not possible then to investigate mitigation, or in other words seeking ways in which the scale, design, location, siting, process, sequencing, phasing or other aspects of a project might be changed (including by additional measures) to reduce those environmental impacts that cannot be avoided.

Impact assessment: the present case

- 7.9 In reply to the Ramsar Secretariat’s letter of concern in September 1996, the then Norwegian Directorate for Nature Management (DNM) confirmed that EIAs would be undertaken for the two rail route options under consideration at that time (see chapter 5 above), emphasis would be given to potential impacts on the ecosystems of Nordre Tyrifjord, and final route decisions would be made only after completion of these assessments. DNM expected to take an active part in this process, with Norway’s Ramsar obligations in mind. Findings were to be presented to Parliament.
- 7.10 The Secretariat’s letter in September 2014 to the Environment Agency enquired as to the outcome of the EIA process, and reference was made to this again in communications in April and June 2015 concerning preparations for the RAM. The Mission has since had access to a Norwegian-language “screening report” from January 2015, but otherwise the comments which follow are based on presentations and discussions during the visit, and on documents containing some Directorate/Agency comments on parts of the assessment process in 2012 and 2014.
- 7.11 Partial assessments of different parts of the proposed developments have been undertaken, including some work in the 1990s and in 2012 which was relied on to a large extent in a study done by Norconsult in a compressed timeframe in the second half of 2014. (This study has not been seen by the Mission). A joint working group of Agencies, Directorates and Administrations was established by the Ministry of Transport and Communications and the Ministry of Local Government and Modernisation to draw up the screening report mentioned above, which took account of the Norconsult work. The working group reported to the Ministries in January 2015, and the likely impacts on “landscape”, “natural environment/ biodiversity”, “cultural heritage”, “natural resources”, “local surroundings” and “outdoor leisure” were assigned severity rankings for each of the current (indicative) combined road/rail route options, alongside cost comparisons.

- 7.12 As an input to this process, the Environment Directorate (now Agency) made comments on the “value maps” and “theme reports” compiled to form part of the baseline for assessment studies. While generally commending the work done on these, the Agency observes that the rarity and international importance of the river meanders and associated wetland ecosystems of Nordre Tyrifjord have been insufficiently reflected; there are gaps in knowledge about some of the values at stake (which need to be properly surveyed); surrounding values should also be mapped (including as a basis for compensatory enhancements); geological diversity, climate aspects and risks of indirect effects (e.g. from nearby development stimulated by improved transport infrastructure) have not been assessed; and there are some flaws in the methods used for assessing noise, air pollution, landscape, visual amenity and recreation impacts.
- 7.13 The Agency also commented in 2014 on a preliminary assessment of the earlier “green” and “blue” corridors (two variants of each) where they pass through the central parts of Hole Municipality and the Nordre Tyrifjord wetland system, and considered that it was not justified to narrow the choice to these four options given that they threatened unacceptable “major negative consequences for cultural and natural diversity of national and international importance”, and that opting for a combined road and rail line unduly limits the scope for mitigation. Buskerud County expressed similar concerns.
- 7.14 Citing Ramsar obligations and the national Nature Diversity Act (section 10 on cumulative effects and section 12 on choosing least damaging alternatives), the Agency concluded that **solutions for the E16 road should be sought along its existing corridor, and that Parliament’s 2002 decision in favour of an “Åsa” route for the Ringerike railway** (see chapter 5 above) **should be upheld**.
- 7.15 The Norwegian Water Resources and Energy Directorate (NVE) also commented, considering that a combined road/rail crossing of the Storelva at Helgelandsmoen or Lamyra would “degrade the whole of this unique river landscape”, and questioned whether mitigation for these most damaging route variants was feasible.
- 7.16 Clearly a full EIA of the overall scheme still remains to be done. This will *inter alia* also have to assess the extent to which the wetland values and services encapsulated in the Ramsar designation criteria (summarised in paragraphs 3.5 and 3.6 above) might be affected. It has been noted in chapter 6 above that as part of the aspiration to streamline the planning process, the intention is to undertake a full EIA only of the eventually selected route, rather than as a comparison of the different candidate routes. The Mission shares the concern expressed by the Buskerud County Governor that this may not be an adequate way to proceed, since full knowledge of environmental impacts should itself inform the choice of preferred route. According to Ramsar Resolution X.17 a Strategic Environmental Assessment of alternative routes is required.
- 7.17 It would also be of concern if the eventual assessment relied too heavily on a synthesis of work done for earlier proposals (based on different route configurations, including narrower corridors for separate road and rail lines), rather than examining all the relevant issues (see further below) as they stand today. Too much streamlining could ultimately be a false economy, if unexamined issues prove problematic later and need to be remedied when they could instead have been avoided.
- 7.18 “Route-specific” comments are made in the individual report chapters which follow below. As well as land-take and habitat fragmentation (not only from the road/rail lines themselves

but from junctions, stations, disposal of tunnelling/excavation spoil etc), there are some other categories of impact that can be highlighted in a more general sense here.

- 7.19 Concerning the water environment for example, embankments, bridge pilings, drains and other structures may alter levels and flows of both surface water and groundwater, with hydrological effects well beyond the immediate area. Water quality is also a concern, with risks associated with runoff containing salt, grit, de-icing agents, oil residues, precipitated exhaust emissions, spillages from accidents, effluent from trains and other contaminants. This is relevant not only to the area's ecological character but also to its role as a water source for farm irrigation and drinking water. Specific concerns have been expressed to the Mission by the Ringerikes Sportsfiskere angling club about impacts on the river's breeding population of brown trout *Salmo trutta*.
- 7.20 Direct mortality of wildlife from collisions with traffic or trains is a likely factor, increasing with higher vehicle speeds. The proposed road and rail lines cut across known bird migration routes, and across regular animal movement corridors on the ground. Partial mitigation measures have been attempted in schemes elsewhere featuring culverts under tracks at regular animal crossings or reduced lighting solutions, but specific assessment of the local circumstances are needed to assess the extent of this problem and the scope for minimising it.
- 7.21 A particular concern has been highlighted by BirdLife Norway, relating not to moving traffic but to mortality of flying swans colliding in poor weather with bridges and cables. Following the listing of Nordre Tyrifjord as a Ramsar Site, major investments were made to move power lines underground for this reason, but swan deaths at river bridges continue, and would be expected to increase with the new crossings that are planned in the present scheme.
- 7.22 Agricultural land accounts for only 3% of the land surface of Norway, and national policy seeks to limit developments that may affect this resource. Some relevant areas lie within the route corridors being considered for the present road/rail proposals. The Mission notes however that in the case of any conflict of priorities between this policy and the needs of wetland conservation, where Ramsar Sites are concerned, the conservation resource at stake is one of international (as opposed to national) significance.
- 7.23 As detailed by the Directorate for Cultural Heritage in particular, a wealth of archaeological features, scheduled historic monuments, listed buildings and other cultural interests lie in the affected area. In any case where there is a link between these things and the functioning of wetland systems there may be relevance to the scope of Ramsar, and the Convention has published guidance on this subject (see 7.4 above).
- 7.24 Landscape, scenic quality and recreational amenity are often linked to aspects of ecosystem functioning, so are relevant here. They can have major economic significance, and are likely to be impacted at least to some degree by any introduction of new transport infrastructure into the rural environment. Noise and light pollution can also disturb both people and wildlife.
- 7.25 Air quality is a further factor, not only for its potential local impacts on health and the environment, but also the climate change implications of greenhouse gas emissions. Norway has a policy that seeks to encourage a shift from car travel to public transport, cycling and walking; but this has a focus on the urban context and does not specifically address the relationship between road and rail. Nonetheless, the arterial scale of the E16 highway and

the Ringeriksbanen railway raises a strategic question about the national balance between different transport modes, in terms of their carbon footprint.

Recommendation 4: *A full strategic environmental assessment of different options and specific environmental impact assessments of chosen options should be undertaken with adequate time, scope and consultative input to enable a thorough consideration of all relevant potential impacts, mitigation options, route choices and design solutions, including the aspects highlighted in the present report.*

Compensating for residual impacts

- 7.26 One way of reducing overall consequences for an ecological resource (eg a population of flora or fauna, or the hydrological functioning of a wetland system) might be to provide compensation, in the form of new habitats to offset those that may be lost. Ramsar guidance stresses that this is only to be considered as a “last resort”, to address residual impacts that cannot first be avoided or mitigated; because (as the Ramsar Contracting Parties have previously noted in Resolutions VII.17 and VIII.16) restoration or creation of replacement wetlands does not *ex ante* provide a guarantee for replacing the loss or degradation of existing wetlands and their functions.
- 7.27 Extensive Ramsar guidance on wetland compensation has also been adopted, notably in Resolution VII.24 (1999). Some of the scenarios to which this applies are governed by Article 4.2 of the Convention, where a development meets certain highly exceptional tests of public need, to the extent that the boundary of a listed Ramsar Site becomes changed. Those very rare and specific circumstances are considered separately in chapter 13 below.
- 7.28 Otherwise, the Convention’s more general guidance on compensation urges Parties to “take all practicable measures for compensating any loss of wetland functions, attributes and values, both in quality and surface area, caused by human activities”. Note that the trigger does not necessarily have to be a loss in wetland area.
- 7.29 Parties have emphasised (Resolutions VII.24, VIII.20 and XI.9) that it is preferable to compensate for wetland loss with wetlands of a similar type and in the same local water catchment. Resolution VIII.20 advises taking into account the relevance of the compensatory measure to the ecological character, habitat, or value of the affected wetland. Hence a generally “like for like” approach is encouraged, where what is provided should approximate as closely as possible to what has been lost (with the addition of safety margins for inevitable uncertainty, and tempered in some cases by knowledge about long-term changes in the underlying resource).
- 7.30 Resolution VIII.20 mentions the importance of the timing of the compensatory measure relative to the proposed action, and Resolution XI.9 advises that as far as possible it should be delivered in advance of the impacts to which it relates; so that, for example, affected biodiversity interests have some opportunity to translocate. Compensation made after the loss of wetlands cannot be considered adequate as the carrying capacity of the system will have been reduced in the interval (which may be exacerbated in the case of loss of a mature system that is replaced with a newly created system). A further reason is the inherent uncertainty involved in any manipulation of ecological systems. Most compensatory measures are essentially experimental, and time is required to verify whether they are delivering what was intended. Adaptive adjustments may be required in light of the emerging results.

- 7.31 A compensatory wetland restoration or creation project may be on-site or off-site, provided it adds value beyond what would have happened otherwise. Sometimes a case is made for preferring on-site (or *in situ*) compensation, in the interests of observing the “like-for-like” aspect mentioned above. This however is more often relevant to mitigation (reducing/repairing impact) than compensation *per se*. Generally speaking, on-site benefits, where there is scope to achieve them, are likely to be embraced by management goals already established for theSite, rather than being able to be counted towards the off-setting of an undesirable change.
- 7.32 There may be a role in certain circumstances for on-site habitat enhancement as part of a hierarchical approach, subject to the requisite proof that more desirable solutions are not practicable. Otherwise the general principle should be not to draw upon the capacities of a designatedSite in order to offset or justify damage to other parts of thatSite. At its worst this could place reliance on a smaller and smaller (and more and more relatively vulnerable) sample of wetland area to support the values the Convention seeks to conserve. If there are desirable and worthwhile conservation aims which draw on the capacity of theSite, these should be built into the management objectives set for it, rather than having to wait to be “bought” at the price of damage to some other part of it. Hence the annex to Resolution XI.9 advises that compensation for post-mitigation residual impacts should be *ex situ* (i.e. off-site).
- 7.33 According to the annex to Resolution XI.9, relying on an already-planned benefit can not constitute compensation. Measures required for the “normal” implementation of the Ramsar Convention cannot be considered compensatory for a damaging project. Using already-protected land as the source of areas for compensation will not contribute any gain to the number of hectares under conservation management, and the result will instead be an uncompensated net loss. Anything foreshadowed in a management plan or a restoration plan (or a plan for increasing statutory protection for another wetland) should be excluded from the compensation equation. Gains that would have happened in any case are part of the overall stock of value from which something is being lost, hence they cannot be “double-counted” as compensation for that loss.
- 7.34 In light of the foregoing, restoration of a formerly valuable wetland area may or may not be a valid part of a compensation scheme. Practical guidance on wetland restoration is available in the Annex to Ramsar Resolution VIII.16.
- 7.35 Compensation should address uncertainty. Most compensatory measures are essentially experimental, and there exist certain eco-hydrological viability risks in restoring, replacing or enhancing wetlands. The greater the value, complexity and size of the wetland that is lost or degraded, the more area should be (re-)created as insurance, and the greater the margin for error that should be anticipated. One obvious way of building in such margins is to provide compensatory areas that are much larger than the areas to be lost.
- 7.36 Habitat compensation proposals should themselves be subject to environmental impact assessment, to identify and address any unwanted negative side-effects. And finally, thorough attention should be given to methods for delivery assurance, for example through guarantees of long-term funding, sanctions for under-performance, monitoring and contingency plans (see e.g. Resolution XI.9).

Recommendation 5: *In respect of mitigation of any negative impacts on wetlands which cannot be avoided, or compensation for impacts which cannot be mitigated, the planning and execution of relevant measures should follow the general principles and guidance on these aspects referred to in chapter 7 of this report. Solutions should be evaluated and costed on their own merits and not “traded off” against another, for example between the different south-to north planning sections of the overall route.*

8. Crossing the Ramsar Site (Storelva river area): route option 4(e) - “Monserud”

- 8.1 The indicative corridor proposed for this option is shown in Figure 4. Some of the generic types of possible environmental impact are discussed in chapter 7.
- 8.2 The route runs close to the eastern boundaries of the Juveren and Lamyra reserve portions of the Ramsar Site, and for much of this stretch the proposal is to set it in a tunnel. Further north it passes alongside a bend in the river which is at the northern end of the proposed future protected area (not visited by the Mission), and directly crosses a small eastern branch of this area. A road intersection also appears to be proposed exactly at this proposed branch of the protected area. Further north still, the route would cross the Storelva by a new bridge closer to Hønefoss (a site also not visited by the Mission).
- 8.3 Some of the general wetland impacts mentioned in chapter 7 could be potential risks to Juveren in particular, especially perhaps during the construction phase. The site has some hydrological vulnerabilities, in relation both to quality and quantity of water. The bund currently linking the shore to the island already causes some water quality problems, and there is a plan to replace it with a bridge or culvert. Water flows out of the oxbow lake to the river for most of the year, and then this reverses during two months in the spring when the system is replenished by inflow from river levels that are higher due to snow melt in the catchment upstream. There is thus a fairly finely balanced hydrological regime to protect at this site.
- 8.4 Ecological interests exist elsewhere on this route, including some wetland habitats in agricultural areas which are important in winter because they remain unfrozen while other areas are under ice. The woods by Nordherov are relevant to the wetland system in that they host the only natural hole-nesting goldeneyes and goosanders in the area. Corncrakes and quails breed at Steinsletta.
- 8.5 Without prejudice to the Environment Agency’s general position (which it shares with Buskerud County) that route options other than the three discussed here should be favoured, the Agency’s opinion is that, of the three, the Monserud option would cause the least landscape fragmentation and the least direct damage to nature conservation interests.
- 8.6 For both the Agriculture Agency and the Directorate for Cultural Heritage, however, this route is the worst of the three. To the south-east of the Ramsar Site it runs through the 1,200 ha Steinsletta area, which is one of the country’s 22 “Selected Agricultural Landscapes”. These are high value areas chosen jointly by the Agriculture and Environment Agencies on a basis of continuous historical use and good management. They benefit from government subsidies to maintain their management, although they are not legally protected. Steinsletta is also a “Selected Cultural Landscape”; and cultural interests affected by the route also include the nearby Norderhov church and a number of other listed buildings.
- 8.7 Although the Monserud option is similar to the “blue” line which was “accepted” by the Road and Rail Administrations (though not preferred) in 2012, of the three routes under consideration now they rate it as the worst choice, based on the cultural and agricultural concerns mentioned above. The Mission notes that this must mean they have given less weight to environmental concerns (which would produce the opposite ranking), for reasons that are not clear. A further factor however is that (largely due to its long tunnelled sections) Monserud is also the most expensive option of the three, roughly estimated at NOK 5.5 bn.

- 8.8 Measures to control noise, to direct and treat runoff appropriately, avoid unwanted impacts on drainage, minimise accident risk and dispose of tunnelling spoil in non-damaging locations could mitigate many of the risks posed to the RamsarSite by the Monserud route. These risks cannot be completely eliminated however, and there will also be residual impacts on environmental interests (including wetlands) in other parts of this route that can not be mitigated.

Recommendation 6: *A full package of appropriate mitigation measures for the Monserud route option should be defined, based on the findings of an eventual EIA and having regard to chapters 7-8 of the present report. Options to re-site the planned road intersection away from the proposed Storelva protected area extension should be investigated. Appropriate habitat compensation should be considered in relation to residual impacts on environmental interests (including wetlands) in all parts of the route, both those adjacent to the RamsarSite and elsewhere.*

9. Crossing the Ramsar Site (Storelva river area): route option 4(f) - "Helgelandsmoen"

- 9.1 The indicative corridor proposed for this option is shown in Figure 4. Some of the generic types of possible environmental impact are discussed in chapter 7.
- 9.2 This route was not part of the previous "blue" or "green" lines: it lies to the west of both of those, and it crosses the Storelva from the western side of the settlement of Helgelandsmoen on the south side of the river to the Mælingen/Gomserud peninsula on the north side. On this narrow (down to 210 m) peninsula it runs mostly just outside the eastern boundary of the Synneren reserve portion of the Ramsar Site, although it also passes directly through one small part of the north-east corner of this reserve. On the other side of the peninsula, upstream of the proposed crossing, it runs along part of the bank of the main river, all of which at this point is included in the proposed new protected area.
- 9.3 In addition to the general wetland impacts mentioned in chapter 7, the land-take of farmland adjacent to Synneren involves areas with a high water-table which were formerly floodlands (prior to introduction of river regulation upstream for hydroelectric power purposes), and which represent important waterbird habitat that is functionally connected in ecological terms to the Ramsar Site. Also, in addition to the general remarks in chapter 7 concerning the important population of trout, there is a particular concern in relation to the sufficiency of river volumes for this species at the proposed road/rail crossing point for this route. Water quality impacts here could also be severe.
- 9.4 Without prejudice to the Environment Agency's general position (which it shares with Buskerud County) that route options other than the three discussed here should be favoured, the Environment Agency's opinion is that, of the three, Helgelandsmoen would have the greatest negative impact on the natural environment, notably the wetland system. It refers to likely effects on Busundevja and the Synneren reserve during the construction phase in particular, given the challenging narrowness of the peninsula and the width of a combined road/rail corridor.
- 9.5 In this case the Buskerud County Governor's Office has taken a different view from that of the Agency, considering that the Helgelandsmoen option might cause the least damage to affected values overall; but stressing at the same time that there is not yet enough information available on which to make a proper assessment.
- 9.6 In respect of the portion of the route that directly crosses the north-east corner of Synneren (at Seterstøa, below Prestmoen), the Environment Agency points out that an exemption from the legal protection conferred on this area by the 2009 Nature Diversity Act would be required. Such exemptions are provided for under Section 48 of the Act, if they are "not contrary to the purpose of the protection decision and cannot make a significant impact on the conservation value, or if safety considerations or important public interests make it necessary". Clearly in this case it is the "important public interests" test that would be relevant, and on this the Act provides that "when weighing other important public interests against the interests promoted by the protected area, particular emphasis shall be placed on the importance of the protected area for the overall network of protected areas and on whether a corresponding protected area can be established or developed elsewhere". Authority to grant such exemptions rests with the "management authority", which in this case is the County Governor of Buskerud, and there is a right of appeal to the Environment Agency and thereafter to the Courts.

- 9.7 The Environment Agency interprets Section 48 as requiring a comprehensive assessment of the conservation values at stake and the likely impacts on them, as well as an assessment of the important public interests at stake and the extent to which these can be satisfied through alternative solutions. The Agency further interprets this to mean that an exemption under S48 cannot be granted if there are feasible alternatives to the proposed development; and hence it reasons in turn that to uphold Norway's international obligations under the Ramsar Convention, the Helgelandsmoen route should not be selected.
- 9.8 The Water Resources and Energy Directorate (NVE) sees the Helgelandsmoen option as threatening to degrade the whole river landscape. It has concerns about the impact of any constructed road/rail embankments on the behaviour of the floodplain (including erosion/accretion in the river channel, water levels in the Synneren reserve, the groundwater flow regime and local climatic effects). It observes that seeking to reduce these impacts by the use of tunnels or long bridges make the project very costly, and in any event it questions whether such measures would be practically feasible.
- 9.9 One of the constraints mentioned by NVE is the soft nature of the substrate in this location. This was echoed in impressive representations made to the Mission by farmers residing on the Mælingen/Gomserud peninsula (and whose families had done so for generations before them). The underlying geology is described as being deep layers of mostly sand with some clay, and as being unstable in flooding conditions. There is considerable groundwater pressure in this area which forces upwards into built structures; but also creates risks for the driving of piles for a bridge or an overpass, in that doing so would allow surface/near-surface water to penetrate deeper into the substrate and thus increase its instability further.
- 9.10 Seepage connections between the peninsula surface water, the groundwater and the river are an important part of this picture, and new embankments could disrupt this. Impervious barriers at this point in the system could change upstream flooding patterns, with potential implications for Helgelandsmoen itself and for the hydrological regimes at Lamyra and Juveren (see chapter 8).
- 9.11 The geomorphology of this area is such that the river channel itself is evolving and shifting over time. In due course when the oxbow immediately upstream closes, the flow speed and energy of the river at the proposed Helgelandsmoen crossing will increase, and (unless reinforced) the river bank will experience erosion on its northern side. No particular attitude has yet been decided, in management/restoration planning for the riverine protected areas that are proposed in this area, concerning the extent to which such trends should be actively managed, or (subject to protection of properties etc) should be left to run their natural course. Decisions on this would need to be addressed in mitigation/compensation plans if the road/rail development is routed through this area.
- 9.12 The Agriculture Agency considers that the agricultural implications of this route option are generally similar to those of the Busund option (see chapter 10 below). In their view, neither has impacts as significant as those of the Monserud option (see chapter 8 above). In addition to direct land-take of some fertile land however, the peninsula farm owners pointed out that an embankment there would direct more rainfall into the river and away from the land (reducing its productivity unless compensated by extra irrigation effort); and an overpass would reduce productivity by its shading effect.

- 9.13 South of Helgelandsmoen, on the proposed road route, lies a forest area designated as a “Climate Conservation Zone”. This is not for carbon sequestration purposes, but serves instead to moderate local wind and frost impacts; and hence any loss of this area constitutes another type of agriculture-related impact.
- 9.14 The former military camp at Helgelandsmoen, which lies on the proposed road/rail route, has remaining buildings which have some cultural heritage value. Their loss, if this route is chosen, would be of some concern to the Directorate of Cultural Heritage. In addition the buildings are currently used for business offices and light industrial units, and there is an outdoor recreation centre. Hole Municipality prefers the Busund option to the Helgelandsmoen option, but if the latter is chosen it would wish to see some commercial infrastructure advantages resulting, for example by provision of a road intersection for the former camp area, and/or provision of a railway station somewhere in the Municipality. Ringerike Municipality on the other hand favours the Helgelandsmoen option.
- 9.15 Of the three current options, Helgelandsmoen is the one recommended by the Road and Rail Administrations. In their view there is little to choose between Helgelandsmoen and Busund, but they see more scope at Helgelandsmoen for reducing environmental impacts. This view is consistent with that of the Buskerud County Governor, but is the opposite of that expressed by the Environment Agency.
- 9.16 Helgelandsmoen is also the least costly of the three (roughly estimated at NOK 3.6 bn); although attempting to mitigate impacts in the area of the river system by constructing a longer bridge would push these costs up significantly. (Mitigation by tunnelling is seen as unrealistic here, because of the cost of keeping a sub-river tunnel dry, and because if a tunnel for the railway is used too far north, there is not enough distance remaining in which to climb the gradient to Hønefoss).

Recommendation 7: *The Mission supports the Environment Agency’s view that to uphold Norway’s Ramsar obligations, the Helgelandsmoen route should not be selected. If it goes ahead nevertheless (assuming the tests in Section 48 of the 2009 Act can be met), mitigation should be optimised by use of bridges rather than embankments, plans for future management of erosion and accretion changes in the river channel should be developed, and a major habitat compensation scheme should be developed based on “re-wetting” the Mælingen/Gomserud peninsula, extending conservation protection status in the area and compensating landowners for loss of farmland.*

10. Crossing the Ramsar Site (Storelva river area): route option 4(g) - “Busund”

- 10.1 The indicative corridor proposed for this option is shown in Figure 4. Some of the generic types of possible environmental impact are discussed in chapter 7.
- 10.2 This route travels on a line mid-way between the other two proposed routes. It crosses the now mostly overgrown (and undesignated) former western portion of the Lamyra oxbow, and passes alongside the northern arm of the present-day Lamyra nature reserve which is part of the designated Ramsar Site. It then crosses both the main river and a swamp forest offshoot of it on its northern side (forming the early stage of a new oxbow); both of which are included in the proposed Storelva/Busundevja protected area.
- 10.3 In addition to the general wetland impacts mentioned in chapter 7, Lamyra is a rich calcareous fen mire ecosystem with active management and a finely balanced water regime that would be vulnerable to any disturbances in the local hydrology. The islands, swamp forest habitats and water inlets in the area of the proposed river crossing for this route are also influenced by the active balance of erosion and sedimentation in the river channel (albeit nowadays behaving differently from the past, due to upstream river regulation), and these areas would also be very sensitive to change.
- 10.4 The adjacent island supports beaver and lynx, and elk pass through the area: these could be affected by the introduction of new barriers to movement, and by disturbance. Bird mortality (particularly swans) at bridges has been mentioned above, and given the bankside profiles at Busund, the river crossing here would involve a bridge with an estimated height of 10m.
- 10.5 In commenting on the Busund option when it was formerly known as the “green” route, the Environment Agency considered that it posed significant threats to biodiversity in a core area of the Northern Tyrifjord wetland system which was already subject to pressures from other land-uses in the area that are unacceptably high for a Ramsar Site. Without prejudice to its general position (in common with that of the Buskerud County Governor) that route options outside the three discussed here should be favoured, the Agency’s opinion is that Busund and Helgelandsmoen are both more environmentally damaging than Monserud.
- 10.6 The Water Resources and Energy Directorate (NVE) has expressed concerns about the Busund option in similar terms to those it has expressed about the Helgelandsmoen option (see chapter 9 above).
- 10.7 The Agriculture Agency notes that there would be some loss of cultivated land: this route is similar to the Helgelandsmoen route in that respect, with neither causing losses as serious as the Monserud route would cause. If there is a difference between Helgelandsmoen and Busund it is that the latter may cause an additional loss of farmland as a result of the proposed Mosmoen road intersection; but the Roads Administration has indicated that the site of this intersection is not necessarily fixed and it could be relocated further to the north to reduce the problem.
- 10.8 Hole Municipality prefers the Busund option to the Helgelandsmoen option, considering that the Busund one would be better for supporting the growth of local businesses and outdoor leisure activities.

- 10.9 In its earlier incarnation as the “green” route, the Busund option was the one recommended by the Road Administration in 2012. In terms of environmental impact the Road and Rail Administrations see it as being similar to the Helgelandsmoen route, but with less scope for further mitigation of effects on the wetland system, because it already includes 700m long bridges across the Storelva and adjacent wetlands. This route may encounter even greater problems of soft substrates for supporting road/rail structures. Crossing the river by tunnels is not seen as feasible, for the same reasons as described above for the Helgelandsmoen option. The roughly estimated costs of this route lie mid-way between those for the other two, at NOK 4.2 bn.
- 10.10 No investigation of compensation possibilities has been made: reproducing ecological values lost from such a rich, complex and dynamic mosaic of oxbow lake habitats as this would be likely to be particularly challenging.

Recommendation 8: *The Busund route should not be selected. If it goes ahead nevertheless, a comprehensive assessment of mitigation and compensation possibilities should be undertaken prior to construction beginning. Such an assessment should be based on the findings of an eventual EIA and should have regard to chapters 7 and 8 of the present report.*

11. Crossing Kroksund

- 11.1 Although this part of the E16/Ringeriksbanen scheme lies outside the current Ramsar Site area, it nevertheless has implications for important wetland resources (including the proposed future extensions to the Ramsar Site); and it has excited at least as much (if not more) public interest as the “section 3” route options in the Storelva river area have done.
- 11.2 Buskerud County’s protected area extension proposals in this area (see Figure 2 above) cover the same parcels of land and water as are included in this part of BirdLife Norway’s existing international “Important Bird Area” for the Northern Tyrifjord Wetland System. Upstream of the current Kroksund E16 road crossing this includes nearly all of the western shore of Steinsfjord and waters adjacent to it, an area of water and islands in the south-east corner of the lake immediately adjacent to Sundvollen, and other islands. Downstream of the strait it includes two Tyrifjord bays lying between Strorøya island and the Røyse peninsula.
- 11.3 As recognised by these conservation proposals, and based on usage by populations of fish and birds and on other ecological considerations, all of these geographic elements are regarded as integrally interconnected parts of the overall Nordre Tyrifjord wetland system. This thinking is reflected in the vision for a future more coherent extension of the Ramsar Site, as discussed in chapter 4 above.
- 11.4 As described in chapters 5 and 6, the original preferred solution for the Ringeriksbanen was to route it around the east side of Steinsfjord, so the question of a new crossing at Kroksund did not then arise. In 2002, a road tunnel was preferred, but abandoned in 2012. In the meantime, a combined road/rail scheme was developed, with changed speed and width specifications for the E16 road in particular. This was later changed to a preference (by the Road and Rail Administrations) for a crossing at Sundøya (where the current road crosses) for the railway, and a crossing somewhere between Rørvik and Elstangen for the road. Considerations in this have also included cost factors, and an aspiration to develop a railway station at Sundvollen (although some would prefer to see it instead at Vik, the municipal centre of Hole Municipality).
- 11.5 The Ramsar Secretariat visit report in 1997, referred to in chapter 1 above, noted that “due to its narrowness, Kroksund is clearly a key point in the ecological functioning of the whole region; proposals for new road and rail crossings at Kroksund should therefore be treated with particular caution”. This was part of the reason for the decision in 2002 to route the railway around the east side of Steinsfjord. The Mission has been able to re-confirm the ecological importance of this area, and hence it endorses the earlier Secretariat advice.
- 11.6 There is particular concern about water quality in this area. The 1997 Ramsar Secretariat report referred to risks of excessive eutrophication of the Steinsfjord part of the Nordre Tyrifjord wetland system, due to artificial narrowing of Kroksund (i.e. the current E16 road crossing); and recommended that measures should be implemented to improve water circulation in Steinsfjord.
- 11.7 The present Mission was provided with a wealth of research evidence on the continuing presence of this problem. The introduction of hydro-electric dams in the upstream catchment in the early 1970s has stopped the major influx of spring meltwaters that previously promoted water circulation in the fjord and helped to maintain the health of the system. Circulation is now more dependent on prevailing westerly winds than on river

inflows, and the effect is thus more limited to surface waters. Regular water quality monitoring by the Steinsfjorden Fishing Association (with support from the county of Buskerud) shows anoxic conditions below a depth of 15m, and it has been calculated that full turnover of the fjord's water volume now takes six years to achieve.

- 11.8 Eutrophication is also exacerbated by high levels of nutrients now present in the water column from surrounding farmland runoff: algal blooms are a regular feature, and these have even been recorded proliferating under surface ice when lack of snow cover allows sunlight to penetrate. The composition of fish species has changed, added to which has been the introduction of roach *Rutilus rutilus* which deplete the natural zooplankton and thus exacerbate still further the algal spread.
- 11.9 A key part of this picture is the toxic cyanobacterium *Planktothrix* sp, which is now being intensively monitored here by the Norwegian Institute for Water Research (NIVA) and the National Veterinary Institute. This has raised human health concerns, and attention is focusing on the bioaccumulation of the bacteria in crayfish *Astacus astacus*, populations of which in Steinsfjord have declined since a time when it was reputedly the best crayfish lake in Norway.
- 11.10 Urban wastewater inputs add further water quality risks. Development of new road/rail infrastructure, including a new railway station, is expected to increase the area's human population. Figures given to the Mission refer to a predicted increase of 3,700 residents in Sundvollen, 2,400 in Vik and 2,900 elsewhere in Hole following the completion of new transport infrastructure. These are large percentage increases over the current total population which stands at only 6,600 for the whole of the Municipality.
- 11.11 Any further narrowing of the outflow at Kroksund with new crossings could be expected to add to these problems. A contribution to the current narrowing is made by the former stone road bridge which has been retained (for heritage reasons) underneath the current concrete structure; but a larger contribution is made by the rock-armoured causeway sections of the current crossing. There have in the past been proposals to replace at least parts of this with raised pillar supports instead, to improve water flows and hence improve the water quality.
- 11.12 Norwegian and international experts consider however that increasing the water flows between Steinsfjord and Tyrifjord may not solve the eutrophication problem of Steinsfjord and may create unwanted effects on Tyrifjord. This is why the road authorities have refused to remove existing road infillings until the environmental consequences of doing so can be better predicted. The eutrophication problem of Steinsfjord needs to be solved by addressing its root cause, i.e. reducing the agricultural and urban waste water inputs. With the projected additional settlements in the catchment basin of Steinsfjord (see 11.10 above) as a consequence of new transport infrastructure, the eutrophication problem in Steinsfjord may significantly increase.
- 11.13 As mentioned above, wind energy is an important part of the water mixing regime here, and any crossing of the strait creates a barrier which reduces the force of this. Obviously the higher and more solid the barrier (including measures for blocking noise) the greater this effect will be, and all new constructions over Kroksund will therefore add to water quality concerns in this respect too. Local residents argued during the Mission for a re-examination of tunnel options for this reason in particular.

- 11.14 Kroksund is an important corridor for movements of significant numbers of waterbirds between Steinsfjord and other parts of Tyrifjord. The concerns mentioned earlier about collision mortality with cables and structures over the water are particularly acute here, and were the reason for previous aerial power-lines being re-routed under the water where they cross the strait. New bridges would present new threats in this regard, especially to large birds such as the many swans that use the area; and obviously any re-examination of tunnel options would help with this issue too.
- 11.15 The proposed rail and road routes involve some considerable landward tunnelling either side of the Kroksund crossing, generating large volumes of spoil. One plan for disposal of this that was explained to the Mission involves infilling of the small bay at Sundvollen by the southern end of the current road crossing, along with some use of excavated material in the construction of a new railway station on the Sundøya promontory. Such infilling would destroy rare shoreline and shallow bay habitats and impact on the water circulation issues discussed above thus representing both direct loss and degradation of wetland habitats.
- 11.16 More particularly it is at this location that a small stream enters the fjord, and this has significance as one of the only remaining brown trout spawning streams in the area (the next nearest being said to be around 13km away). Trout are no longer found upstream in Steinsfjord itself, and the small bay here is a key resting area for them at the stream mouth. Even without any infilling, the proposed rail route crosses the bay and (depending on the construction methods used) it could pose risks for this population of fish.

Recommendation 9: *Earlier decisions to avoid new bridges at Kroksund by choosing routes around the east of Steinsfjord or crossing with tunnels instead are still the options that would cause least damage to the wetland system here. If despite this, bridging options are now chosen, a full assessment of their environmental impacts and mitigation/compensation possibilities should be carried out, giving particular attention to hydrodynamics, water quality, fish ecology and bird-strike risks. Tunnelling spoil should not be disposed of on the lakeshore or in bays.*

Recommendation 10: *As already recommended in 1997, measures should be implemented to reduce eutrophication in Steinsfjord and improve its water quality. Reducing input of nutrients (both point-source and diffuse), increasing water circulation, controlling fish introductions, opening up flows under the road causeway and minimising barriers to wind-driven mixing of surface waters should all be considered. Opportunities should be explored for funding such measures as part of the overall environmental management and mitigation plan for the E16/Ringerikesbanen scheme if it goes ahead.*

12. The choice between options

- 12.1 In summary, the options under consideration have previously included an easterly/Åsa corridor for the road, which was favoured prior to 2012 but not considered thereafter; a similar corridor for the railway, which was favoured in 2002 but withdrawn from consideration in 2015; a crossing of Kroksund by tunnelling, which was favoured in 2002 but withdrawn from consideration in 2012; and separate treatment of road and rail options, which was favoured prior to 2013 and not considered thereafter.
- 12.2 The streamlined planning process in place at the time of the Mission had reduced the choice to three alternative routes through the Storelva river area south of Hønefoss, (4e Monserud, 4f Helgelandsmoen and 4g Busund), all involving wide corridors that combine both road and rail together, and all involving bridges over Kroksund.
- 12.3 If considering only these three options, Helgelandsmoen is the one recommended by the Road and Rail Administrations; although they had previously recommended a line not dissimilar to Busund and they still consider the latter a close second choice. Along with the Agriculture Agency and the Cultural Heritage Directorate they rate Monserud as the worst of the three, based on cultural and agricultural concerns (which perhaps raises a question about how much weight has been given to environmental concerns).
- 12.4 The Buskerud County Governor's office do not like any of the three options, but if forced to choose they might consider Helgelandsmoen to be the least damaging, although they also stress that more assessment information is required to decide this.
- 12.5 The opposite view is taken by the Environment Agency. Like the County they do not think any of the three options are acceptable (in light of Ramsar obligations, among other things), but if forced to choose, they consider that Monserud would be less environmentally damaging than the other two routes. Helgelandsmoen in particular would involve land-take from part of the Ramsar Site, and would require a formal rescinding of the protection currently in effect under the Nature Diversity Act at this part of the Site. (All three routes would also require mitigation and compensation measures).
- 12.6 The Water Resources and Energy Directorate similarly consider that Monserud would be less damaging than the other two routes; while Hole Municipality has expressed a preference for the Busund route.
- 12.7 **On the narrow question of the relative merits of these three options, the Mission supports the view of the Norwegian Environment Agency. We are not comfortable however with the narrowness of the question; for reasons explained below.**
- 12.8 It appears that the choice of options now under consideration has been restricted largely in the interests of speeding up the planning process. A number of business and political interests are legitimately very keen to have rapid progress, and there are timing considerations also relating to phasing of other parts of the overall E16 improvement scheme.
- 12.9 However, based on reports of the public hearing into the scheme in early 2015 and the subsequent Parliamentary debate in June, as well as representations made during the Mission's visit, we are aware that there are those who consider that the abandonment of wider options may be premature. Full assessments of the environmental and other cost-

benefit implications of the previously wider range of options are not available to make a side-by-side comparison, and it has been pointed out that too much streamlining of the process could ultimately be a false economy if it prematurely excludes some of the potential solutions to environmental impact problems. The end result could be more expense (e.g. in remediation measures) and lengthier decision-making than would otherwise be the case. One Parliamentarian in the June debates suggested that the current route options affect an area with a greater concentration of environmental, agricultural and cultural values than anywhere else in Norway.

- 12.10 The Ramsar Secretariat in its letter of September 2014 expressed surprise that routes across Kroksund and through the Storelva river area are now the focus of decision-making, given that the previous advice had been to choose options with the lowest impact on the Nordre Tyrifjord wetland system. The Environment Agency, commenting in December 2014, has indicated that the national guidelines referred to as “M-47” (see paragraph 7.6 above) advise that “appropriate alternatives that do not affect Ramsar Sites must not be discarded at an early stage”.
- 12.11 Although Parliament has revoked its previous decision in favour of a route for the railway east of Steinsfjord via the Åsa area, this route still has many supporters, and the Mission is not convinced that there are overriding reasons to remove it from consideration at this stage. Indeed there are even calls for developing an alternative further east of this, based on upgrading the existing line from Oslo to Gjøvik through Grua, with a new connection to Hønefoss via Jevnaker.

Recommendation 11: Any time, distance, cost, track specification and construction-related challenges of a rail route east of Steinsfjord through the Åsa area should be weighed against the environmental, agricultural and cultural challenges of a route across Kroksund and through the Storelva delta area. The Mission supports those who argue that the decision to abandon consideration of the “Åsa” option was premature, and that this decision may not necessarily shorten the planning process or save costs overall. The “Åsa” route should therefore receive further consideration.

- 12.12 In the Mission’s view, investigating options for arterial road and rail infrastructure together in an integrated way makes good strategic planning sense. It is an entirely different matter however to translate this into seeking only to route both road and rail together *in a common corridor*. This restricts the choices available in terms of routes, bend radius and tunnels. Apart from the desire to simplify decision-making as mentioned above, the Mission has not heard convincing *planning* arguments as to why this coupling of road and rail is necessary in the present case, and we concur with the Environment Agency’s view that it unduly limits the scope for mitigating environmental impacts.
- 12.13 The Environment Agency is also among those who have pointed out that there are wider public policy issues associated with the overall balance between different transport modes, not least Norway’s targets for reducing greenhouse gas emissions. Given that usage of roads is affected by rail infrastructure and vice-versa, they recommended (at the time they were supporting the “Åsa” rail route) that the rail development should take priority, and its effect on car travel demand should be assessed before planning a new E16 road.

Recommendation 12: Planning of transport infrastructure north of Oslo should continue to take an integrated approach to road and rail improvements, including attention to

the relative environmental costs and benefits of each mode of travel; but this should not constrain the consideration of separate route corridors for the Ringeriksbanen railway and the E16 highway in cases where such separation could reduce negative environmental impacts or offer greater scope for mitigation.

- 12.14 A number of groups have maintained that road improvement options along the existing E16 corridor have also been abandoned prematurely. There is significant congestion on this road at weekends which would certainly require some kind of traffic management improvement solution to be found. The Roads Administration's objection to doing so by upgrading the existing line appears to be based on the agricultural land loss, property relocation and road safety challenges that would be associated with upgrading to a four-lane highway and allowing speeds of up to 110 kph. Others argue however that this should not be the only specification considered; suggesting for example that expanding to just three lanes could be a solution.

Recommendation 13: *The Mission does not minimise the challenges, including of ensuring adequate road safety, that would be associated with upgrading the E16 highway along its existing line; but these may not be insoluble and they should be weighed against the environmental and other costs of constructing a new route instead through the Storelva delta area. We support those who argue that the decision to abandon consideration of an in-line improvement to the E16 was premature. This in-line option, including the possibility of widening to three lanes instead of four and imposing variable speed limits, should therefore receive further consideration.*

13. Restriction of Ramsar Site boundaries

- 13.1 The Ramsar Convention anticipates that, in certain exceptionally rare circumstances, a Contracting Party may be legally justified in proceeding with a development that causes an irrevocable loss of habitat or deterioration of the values represented by a Ramsar Site to the extent that the boundaries of the designated area ought to be re-drawn (or even that the wholeSite may need to be de-listed).
- 13.2 According to Article 2.5 of the Convention this is only allowable where it can be demonstrated that the deletion or restriction of the boundaries of the Site is necessary in the Party's "urgent national interests". Guidance on these issues has been adopted by the Conference of Parties, notably in Resolution VIII.20 (2002); and much has been written by legal advisers and others on interpretation of the concepts.
- 13.3 It is difficult to satisfy the test in Article 2.5, and it is a grave matter (in which the whole international community takes an interest) to consider restricting the boundaries of a site of globally-recognised importance. In Ramsar's 44 year history and with over 2,200 listedSites, the whole process of formally justifying and proceeding with a boundary change according to the terms of Article 2.5 has only been fully followed on two occasions.
- 13.4 Norway is to be commended in having followed diligently the requirements of Ramsar Article 3.2 concerning notification of a potential change in ecological character of the Nordre Tyrifjord Ramsar Site. At the time of the Mission, there has been no suggestion that this would need to escalate to a notification of a need ultimately to restrict any of the boundaries of theSite, and hence to present a substantiation of the "urgent national interest" justifying such a move. If such a need becomes apparent, the Mission expects Norway to present the case for it in depth and without delay.
- 13.5 We are concerned to note that the Helgelandsmoen route option, discussed in chapter 9 above, would appear to involve some land-take from the Synneren part of the Ramsar Site and formal rescinding of the protection applied to this area by the Nature Diversity Act; so it would seem that if this option were to be selected, the Ramsar Article 2.5 process *would* need to be invoked in respect of that area.
- 13.6 Any case that becomes justified under Article 2.5 creates a liability for provision of habitat compensation under Article 4.2. (This is assumed to be ecologically feasible: where there are doubts on this score, the situation is more complicated). Some of the principles and guidance relating to this are discussed in chapter 7 above.

14. Concluding remarks

- 14.1 When a country accedes to the Ramsar Convention, it remains free to exercise its sovereign rights to make its own land use and resource management decisions. At the same time, it is making a solemn commitment to respect the shared international interest in the fate of its wetland resources, notably its listed Ramsar Sites; and the Convention supports this commitment with defined standards, agreed guidance and targeted advice.
- 14.2 This Advisory Mission report comes at a time when the global community is finalising UN goals and targets for sustainable development up to the year 2030, including target 6.6 on the protection of wetlands. In this context it is ever more important for already well-developed countries to model wise examples of investing in the benefits that ecosystems provide, and not to sacrifice long-term sustainability for short-term material gains.
- 14.3 Norway has shown leadership in many areas of Ramsar implementation over the years. The civic engagement, transparent accountability invited through the present RAM and the professional attitude of the public authorities involved in the E16/Ringeriksbanen case have been praised by scheme supporters and opponents alike.
- 14.4 There is however great concern to ensure that the planning process is not unduly short-circuited now, and that options which may prove preferable in the long term are not abandoned prematurely. There is equally great concern to ensure that development needs expressed in terms of speeding up travel journeys and speculation about local economic regeneration are backed by robust evidence, and are weighed appropriately against any damage that may result, including to Norway's international reputation as well as to its natural environment.
- 14.5 We can do little better than to echo Norway's own Nature Diversity Act of 2009, which stresses the importance of the public interest represented by the role of protected areas in wider systems (section 48), and the commitment to avoiding possible significant damage to biodiversity by taking a precautionary approach (section 9).
- 14.6 We find that the advice provided by the Ramsar Secretariat following its visit in 1997 remains fully applicable today as a conclusion to this report, namely that: "To meet its obligations under the Ramsar Convention, Norway should select the rail and/or road development route(s) with the lowest direct *and indirect* impacts on the ecological character of the wetland system". Our 13 recommendations set out the specific ways in which we invite the relevant authorities now to address this conclusion, and every encouragement will be offered in following them through.

Acknowledgements

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Particular thanks are due to Irene Lindblad and Morten Gluva of the Ministry of Climate and Environment, and to Jan-Petter Huberth Hansen of the Norwegian Environment Agency, for swift and comprehensive organisation of all logistical and protocol matters both before and during the Mission, as well as the provision of a large amount of supporting information. Eldfrid Engen and Viggo Ree also gave very valuable local assistance.

The wide range of participants listed in the Annex to this report, from central government, local government, NGOs, residents, landowners and the private sector, is testament to the intensity of public engagement in this case and committed interest in the Mission's purpose. The in-depth inputs received, sometimes including substantial written submissions and source material in addition to presentations and meetings during the visit, hugely enriched the team's perspectives on the issues at stake. We are profoundly grateful to all concerned.

We also wish to acknowledge the supremely professional, measured and knowledgeable way in which all interactions during the Mission were conducted, regardless of viewpoint. The constructive spirit of Ramsar's RAM process could not have been better exemplified; and this too is much appreciated.



Annex: Mission programme and participants

The main programme of the Mission was as follows:

Wednesday 1 July 2015

Evening:

- Mission team meeting with representatives of the Ministry of Climate and Environment, Norwegian Environment Agency and office of the Buskerud County Governor.

Thursday 2 July 2015

Morning:

- Meeting at Sundvollen with statutory agencies, local authorities and invited audience of around 50 stakeholders. Welcome by Assistant County Governor of Buskerud, then presentations (followed by audience questions and comments) by:
 - Ministry of Climate and Environment.
 - Mayor of Hole Municipality (speaking also on behalf of Mayor of Ringerike Municipality).
 - Ramsar Secretariat.
 - Office of the Buskerud County Governor.
 - Norwegian Environment Agency.
 - Norwegian Agriculture Agency.
 - Norwegian Public Roads Administration.
 - Norwegian National Rail Administration.
 - Norwegian Ornithological Society (BirdLife Norway).
 - Norwegian Biodiversity Network (SABIMA).
 - Directorate for Cultural Heritage.
 - Spokespersons for local landowners, residents and other stakeholders.

Afternoon:

- Field tour of locations along the proposed road and rail routes, in the Ramsar Site and in the surrounding area, accompanied by agencies, advisers, stakeholders and the press. Locations visited included:
 - Sundøya (Kroksund crossing and Steinsfjord).
 - Frok (Monserud route option).
 - Norderhov (Monserud route option).
 - Lamyra (Busund route option).
 - Helgelandsmoen (Helgelandsmoen route option).
 - Busundveien 203 (Busund route option).
 - Mælingen former racecourse (Helgelandsmoen route option).

Evening:

- Further discussions with agencies.

Friday 3 July 2015

Morning:

- Field tour of additional locations, accompanied by representatives of the Ministry of Climate and Environment, Norwegian Environment Agency, office of the Buskerud County Governor and BirdLife Norway. Locations visited included:

- Hill road above Sundvollen, giving vistas over the whole region.
- Røyse peninsula, including views over Averøya.
- West shore of Tyrifjord, with view over Karlsrudtangen.
- Re-visit of views over Synneren, Lamyra and Juveren.
- Travel along existing E16 road.

Afternoon:

- Individual closed meetings between the Mission Team and agency/stakeholder representatives, including:
 - Norwegian Public Roads Administration and Norwegian National Rail Administration (seen together).
 - Kåre Bech and Ingeborg Bech (residents).
 - Jørn Hanssen (resident farmer, Mælingen) and Ole Richard Mælingen (farm owner, Mælingen).
 - Viggo Ree (BirdLife Norway, Hole & Ringerike Branch).
 - Fredrik Hildisch (resident, business owner, and representative of the group “Environment in our Village”).
- Final discussions between Mission team, Ministry of Climate and Environment and Norwegian Environment Agency; and agreement of post-Mission action steps.

Participants in the various segments of the Mission included the following:

Mission team:

Ania Grobicki	Deputy Secretary General, Ramsar Secretariat.
Tobias Salathé	Senior Regional Adviser (Europe), Ramsar Secretariat.
Dave Pritchard	Independent consultant and invited expert, Ramsar Scientific and Technical Review Panel.

Central Government, and project consultants:

Jens Frølich Holte	Ministry of Climate and Environment
Morten Gluva	Ministry of Climate and Environment
Irene Lindblad	Ministry of Climate and Environment
Øyvind Andreassen	Ministry of Climate and Environment
Anders Andgard	Ministry of Transport and Communications
Kristian Hole Fløtre	Ministry of Local Government and Modernisation
Brynhild Resell	Ministry of Agriculture and Food
Aina Holst	Norwegian Environment Agency
Jan-Petter Huberth Hansen	Norwegian Environment Agency
Silje-Karine Reisz	Norwegian Environment Agency
Kjell Tore Hansen	Norwegian Environment Agency
Gert Myhren	Norwegian Public Roads Administration
Frode Nordang Bye	Norwegian Public Roads Administration
Lars Christian Stendal	Norwegian National Rail Administration
Jan Terje Strømsæther	Norwegian Agriculture Agency
Kari Larsen	Directorate for Cultural Heritage
Alf Terje Fotland	Norconsult
Frode Løset	SWECO consultants

Local Government:

Runar Schau Carlsen	Assistant County Governor, Buskerud
Eldfrid Engen	Office of the County Governor of Buskerud
Helge Nordby	Office of the County Governor of Buskerud
Per R. Berger	Mayor, Hole Municipality
John Morten Landrø	Hole Municipality
Ståle Tangestuen	Hole Municipality
Eivind Bjerke	Hole Municipality
Lisa Grenlund Helgesson	Ringerike Municipality
Torbjørn Røberg	Hole Liberal Party
Knut Arild Melbøe	Ringerike Green Party

Non-government organisations:

Kjetil A. Solbakken	BirdLife Norway
Viggo Ree	BirdLife Norway
Anne Sørensen	BirdLife Norway
Merete Wiken Dess	BirdLife Norway
Even Woldstad-Hanssen	SABIMA
Kristin Bjartnes	Buskerud Botanical Society
Vidar Helmer Larsen	Ringerikesportfiskere
Wenche H. Redtepi	Buskerud Farmers Union
Ole Andersen Lilloe-Olsen	Buskerud Farmers Union
Fredrik C. Hildisch	Environment in our Village
Truls Kristensen	Environment in our Village

Local residents, businesses and other stakeholders:

Aashild Bang
Nina Basberg
Kåre Bech
Kirsti Bech
Ingeborg Bech
Anders Bjerke
Beate Moe Haugen Brørby
Lars Fjeldstad
Jørn M. Hanssen
Erik Moe Haugen
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Rolf Lie
Ole Rishovd
Marianne Slåtte
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