Heritage Impact Assessment - Phase 2
The potential impact of the Stockholm Bypass and Ekerö Road project on the World Heritage Property ‘Royal Domain of Drottningholm’

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SUMMARY

Heritage Impact Assessment - Phase 2
The potential impact of the Stockholm Bypass and Ekerö Road project on the World Heritage Property 'Royal Domain of Drottningholm'

1. Background and goal of this HIA report
The World Heritage property 'Royal Domain of Drottningholm' is subject to changes due to the planned new Stockholm Bypass and the planned remodelling of Ekerö Road. The 21 km long Stockholm Bypass is a new north-south motorway link west of Stockholm and will be built as a tunnel under the island of Lovön and the proposed buffer zone for the World Heritage property. Two junctions connect the Stockholm Bypass with the existing Ekerö Road, which passes through the World Heritage property.

The Ekerö Road project aims at improving the public transport situation between the growing Ekerö Municipality and the mainland to which this is the only road connection at present. It is planned to add a fourth traffic lane to the existing Ekerö Road which will be reserved for public bus transport.

Against this background, the goal of this Heritage Impact Assessment (HIA) is to assess from an independent point of view the potential positive and negative impacts of the planned Stockholm Bypass and the planned remodelling of Ekerö Road on the Outstanding Universal Value of the World Heritage property of 'Royal Domain of Drottningholm'. On this basis, potential mitigation measures and recommendations for future spheres of activity are provided.
In this context, the ICOMOS technical review of Heritage Impact Assessment Phase 1 (2014-02-11) is taken into account, which requested an update on progress concerning the following aspects:

1. Phase II of the Heritage Impact Assessment of the Stockholm Bypass,
2. The road plan for Ekerö Road (also referred to as ‚road 261' in this report),
3. The Stockholm Bypass review and
4. The creation of a protected area of Lovö - Kärsö and proposed buffer zone for the World Heritage property ‚Royal Domain of Drottningholm'.

Consequently, these aspects have also been addressed in this HIA Phase 2-report.

In general, the HIA follows the guidelines recommended by ICOMOS (Advisory Body to the World Heritage Committee), in particular the *2011 ICOMOS Guidance on Heritage Impact Assessments for Cultural World Heritage Properties.*

2. Baseline of evaluation of impact of this HIA report
According to the ICOMOS Guidance, the *Retrospective Statement of Outstanding Universal Value* adopted by the World Heritage Committee in 2016, formed the starting point of this HIA.

Here, the following key values and attributes were emphasized:

- The Royal Domain of Drottningholm was inscribed in 1991 in the World Heritage List under Criterion (iv):
  as the best example of a royal residence built in the 18th century in Sweden and is representative of all European architecture of that period, heir to the influences exerted by the Chateau of Versailles on the construction of royal residences in western, central and northern Europe.

- The *brief description* of the Royal Domain of Drottningholm highlights the significance of the whole ensemble and the continuity of use and function of the Royal Domain. The consequent time layers are still legible in the layout of buildings and gardens and its function and context with the agricultural landscape illustrates the economic function of a royal estate:
  The Royal Domain of Drottningholm, situated on the island of Lovön close to Stockholm, is an exceptionally well-preserved ensemble of gardens and buildings with original interior furnishings. It includes Drottningholm Palace, the Palace Theatre, the Chinese Pavilion, Canton Village, the gardens and part of Malmen, and has been used for pleasure and summer recreation from the Baroque era until today. As the current home of the Swedish Royal Family, Drottningholm upholds a cultural continuity with the original purpose of the site. (Ref: Retrospective Statement of Outstanding Universal Value (WHC/16/40.COM/8E, rev.))

- The HIA assessment focuses on the following key components of the World Heritage which are identified in the Retrospective Statement of Outstanding Universal Value:
  1. Drottningholm Palace; 2. The Palace Theatre ; 3. The Chinese Pavilion together with Canton Village: 4. The gardens ; 5. Malmen and 6. The surrounding area which has been part of the Crown Estate since the 16th century, thus generating a character of the landscape resulting from the way it has been used and farmed to support the Crown's need of supplies and to uphold the King's household.

- The integrity and authenticity of the property are justified as follows:
  No significant changes have been made to this World Heritage property since the time of inscription. The unique whole that existed then is still present and maintains all the necessary attributes to convey the Outstanding Universal Value of the property [...].

  The historical setting, with the Drottningholm Palace, the Palace Theatre, the Chinese Pavilion, the gardens and the facades of Malmen's buildings, is intact in form and material from the 17th and 18th centuries [...].

- Protection and management requirements
  Here, it is emphasized that the World Heritage property 'Royal Domain of Drottningholm' is protected by the most important Swedish legislation safeguarding the buildings and gardens of this World Heritage property, the so-called *Ordinance for State-owned Listed Buildings*. But it is also stated here that:
  Preliminary assessments indicate that adverse impacts, defined as functional, visual and noise disturbances during the construction of the Stockholm Bypass and Ekerö Road extension, are expected to affect to different degrees the attributes of the property, as well as create permanent visual changes in the pastoral landscape when the road is completed. Given these conclusions, all involved parties will aim to limit the negative impacts and work to identify new possibilities and solutions for improved accessibility to the area in conjunction with the developments related to the ongoing Stockholm Bypass and Ekerö Road extension project.

In summary, the Retrospective Statement of Outstanding Value shows that the Outstanding Universal Value of the World Heritage property is linked to the whole domain of Drottningholm, consisting of an ensemble of gardens and buildings and embedded in a characteristic cultural landscape. It is further emphasized that the above-mentioned key values of the World Heritage property are fully intact and protected by the most important Swedish legislation. But it is also stated that previous assessments concluded that the property is threatened to undergo irreversible adverse impact in terms of function, visual integrity and noise due to the planned construction of Stockholm Bypass and remodelling of Ekerö Road. Further, it is mentioned in the Retrospective Statement of Outstanding Universal Value that "all involved parties will aim to limit the negative impacts and work to identify new possibilities and solutions for improved accessibility to the area in conjunction with the developments related to the ongoing Stockholm Bypass and Ekerö Road extension project".

Consequently, these aspects have been taken as a starting point for the impact assessment.

3. Scope, methodology and assessment process:
This HIA assessment followed four crucial steps:

- Step 1: Understanding the OUV of the World Heritage property 'Royal Domain of Drottningholm'.
- Step 2: Description of the planned changes.
- Step 3: Identification of the impacts and assessment of their scale and severity.
- Step 4: Proposal for mitigation measures and recommendations for next steps.

The working process started in May 2016 with a site visit of the authors of this report and a kick-off meeting with representatives of :

- Swedish Transport Administration and its consulting office WSP (in charge of the planned changes of Stockholm Bypass and Ekerö Road)
- National Property Board (in charge of the management of the World Heritage property)
- Drottningholm Palace Adminsitration (also in charge of the management of the World Heritage proeprty)

During this meeting, crucial steps of the working process and objectives of the assessment process were discussed and defined. Afterwards, several meetings with the client and other stakeholders were arranged during the working process. It was the goal of these meetings to discuss intermediate results of the impact assessment so as to feed them back immediately in the planning and assessment process. Representatives of the National Heritage Board and the National Property Board were comprised in these activities. Besides that, representatives of NGOs which expressed their concerns about the planned projects to the authors during the assessment process were consulted.

Due to this working process, the planned Ekerö Road design was further elaborated during the HIA assessment. Consequently, the assessment also took these improvements into account.

4. Results of the Heritage Impact Assessment:
4. 1 Conflicting interests
Both the working and assessment process carried out during this HIA Phase 2 showed clearly that there is a conflict of interests concerning the development goals with regard to Ekerö Road. Ekerö Municipality has a large potential to grow in the

future, the population is expected to increase with 20 % until 2030 according to the municipality's general plan. Hence, especially in the period until the Stockholm Bypass will be completed in 2026, the main interest focuses on a fast and efficient access to the mainland. In contrast to this, stakeholders which position themselves closer to the values of cultural and natural heritage in general and World Heritage in particular claim that increasing traffic flow should be avoided due to their negative impact on heritage values. Consequently, it is argued that the junctions between Stockholm Bypass and Ekerö Road should have been be located further away from the World Heritage property. Besides that, it is suggested that measures to remodel Ekerö Road should be reversible and eventually taken back after the completion of Stockholm Bypass. The design process of Ekerö Road, which was meant to find a compromise between these two positions, clearly reflects this conflict of interests.

Despite these conflicting interests, the authors of this report gained the impression during the working process of this HIA report that there is common ground between all stakeholders with regard to the planned Stockholm Bypass, which is considered as an important measure to diminish the increase of through traffic on Ekerö Road. Further, although the locations of the junctions between the planned Stockholm Bypass and Ekerö Road on Lovön Island are discussed and criticized up until now, this HIA Phase 2 has taken as a starting point that these plans have been fully adopted in 2011.

Against this background, the focus of this HIA Phase 2 has been laid on Ekerö Road. Particularly the section of Ekerö Road located in the World Heritage property 'Royal Domain of Drottningholm' has been investigated in detail. Wherever possible, potential improvement measures were elaborated in cooperation with the stakeholders during the HIA assessment process. The recommendations resulting from the assessment are meant to support the continuation of this constructive working process.

4.2 Starting point and content of impact assessment:

Despite Ekerö Road was already there long before the Drottningholm World Heritage site was inscribed on the World Heritage List in 1991, the existing Ekerö Road forms a spatial barrier in the World Heritage property. Consequently, the existing Ekerö Road has been judged as an element which already has a negative impact on the UNESCO World Heritage property 'Royal Domain of Drottningholm'. As a result, during this assessment the impact of the planned remodelling of Ekerö Road has been compared to the impact of the existing Ekerö Road. It was the starting point of this assessment that the impact of all measures linked to the planned remodelling of Ekerö Road should either be neutral or lead to a positive development with regard to the road's current situation.

In detail, this assessment focused on the following aspects:

1. Environmental impacts
   - Noise and vibration, road surface water management
   - Expected impact on the proposed buffer zone
2. Cumulative impacts
   - Potential increase of through traffic (Phase 1, until completion of Stockholm Bypass)
   - Potential increase of through traffic (Phase 2, after completion of Stockholm Bypass)
3. Visual Impacts
   - The visual impact assessment intends to show both the planned changes on Ekerö Road and the consequences of through traffic. Hence, each visualization is shown with and without through traffic.

In summary, the assessment of the environmental, cumulative and visual impacts leads to the conclusions that the existing situation of Ekerö Road in the World Heritage property has been improved in comparison to the existing situation with regard to the following aspects:

- Due to speed limits, noise disseminated by traffic on Ekerö Road will decrease in the World Heritage property.
- Due to the new drain water management, the pollution of the World Heritage property's currently very vulnerable water system will be lowered.
- A comprehensive monitoring program with regard to vibrations disseminating from Ekerö Road has been started during this assessment process. It is not yet clear which impact the planned construction measures and potential increase of through traffic will have on the World Heritage property. But the initiated monitoring program generates a basis to control the potential impact on historic buildings in the future which is beneficial for the World Heritage property.
- The quality of the planned road design in the section between Drottningholm Bridge and Hemmet will be considerably higher than the shape of the existing Ekerö Road.
- Due to the planned modifications at the entrance area at Malmen, the barrier effect of the road will be lowered and the visitor's management of the World Heritage property can be improved.
- Due to the planned dislocation of the park & ride facilities at Karusellplan in direction to Ekerö, it will be possible to use this square in a more suitable and sustainable manner in the future.

- Although the functional connection of Lovö Kyrkallé and Skolallén cannot be restored, the visual coherence of both tree alleys could be enhanced during the HIA 2 working process.

However, the assessment also showed clearly that the following questions still have to be considered more in detail:

- *Environmental Impacts:* In principle it is beneficial for the World Heritage property that a comprehensive vibration monitoring program has been initiated in the context of the planned remodelling of Ekerö Road. Nevertheless, the potential risks in terms of vibrations due to construction works and increasing traffic are still unclear.
- *Cumulative impacts:* Despite the planned fourth bus lane, a temporary increase of through traffic on Ekerö Road is forecasted until the completion of the Stockholm Bypass in 2026 (from 23.000 veh./weekday at present to 27.000 veh./weekday in 2025).
- Stockholm Bypass is the most important measure to reduce through-traffic on Ekerö Road. Nevertheless, the planned growth of Ekerö Municipality and traffic expected to enter Ekerö Road from southern directions via the Stockholm Bypass will increase through traffic on Ekerö Road after the completion of the Bypass.
- *Visual and functional impacts:* Despite the above-mentioned first improvements at Lovö Kyrkallé and Skolallén, a negative impact remains in visual and functional terms due to Ekerö Road in the section of the road between Vilan and Canton and particularly at the intersection between Ekerö Road and Lovö Kyrkallé and Skolallén.
- *Planning and Management:* There are several questions to be solved with regard to the spatial development and the organisation of visitor's traffic in the World Heritage area and its surroundings. This question refers not explicitly to the planned remodelling of Ekerö Road, but rather to the management of the World Heritage property.

Consequently, the suggestions for mitigation measures and future steps to take focus on these above-mentioned negative impacts, with the intention to to support the continuation of the constructive working process during HIA Phase 2 in cooperation with relevant stakeholders.

5. Conclusions and recommendations:

Recommendation 1: Prolongation of vibration monitoring program during construction period Stockholm Bypass
Until the completion of Stockholm Bypass, a temporary increase of through traffic is expected on Ekerö Road. Since it is not yet possible to assess the impact of vibrations which will caused during the planned construction and due to increasing through traffic on Ekerö Road, it is urgently recommended to prolong the recently started comprehensive vibration monitoring program until Stockholm Bypass is completed (scheduled for 2026). Besides that, considered the high value of the buildings and parks in the World Heritage property, it is recommended to establish a continuous vibration monitoring program.

Recommendation 2: Reducing negative cumulative impacts to the largest extent possible / Informing the World Heritage Committee and its Advisory Bodies regularly about all states of development and planned counter measures
Until the completion of Stockholm Bypass, the traffic volume on Ekerö Road is forecasted to increase up to a number of 27.000 veh./weekday. This development will cause a *temporary negative impact* on the World Heritage property. The completion of the Stockholm Bypass will lead to a decrease of through traffic on Ekerö Road. But traffic will consist to a large extent of transit traffic and to a minor extent by 'islander traffic' coming from Ekerö Municipality due to additional through-traffic coming from southern directions via Stockholm Bypass.

Against this background, the Swedish Transport Administration plans to establish a monitoring program the traffic on Ekerö Road. A threshold has been defined with 27.000 veh./weekday during the construction process of Stockholm Bypass and 23.000 veh./weekday after its completion (Swedish Transport Administration, 2016a). If these thresholds are exceeded, all stakeholders will be informed by the Swedish Transport Administration. In case these thresholds are exceeded, the following options to reduce through traffic are suggested at present:

PHASE 1 (during construction of Stockholm Bypass):
- Ferry connections, in combination with a Mobility Management Program
- Recently started measurements of vibration and noise in order to safeguard the World Heritage
- Financial incentives for taking public transport
- Strictly monitored speed limits

PHASE 2 (after construction of Stockholm Bypass):

- Reducing the speed through the World Heritage property to 40 km/h through the entire World Heritage property.
- Competitive bus schemes such as Bus Rapid Transit in the corridor.
- Congestion charges (technical arrangements for toll booths are already foreseen in the tunnel openings for Stockholm Bypass).
- The long term scenario does not exclude a road tunnel passing under the World Heritage Site, but it is stressed that this is "a costly and technically challenging project" (Swedish Transport Administration, 2016a).

Against this background HIA Phase 2 recommends to:

- a.) immediately implement a traffic monitoring program along with immediate measures to decrease traffic flow on Ekerö Road as much as possible (such as ferry connections, mobility management program and particularly speed limits).
- b.) make sure that all adopted traffic control measures can be implemented to limit the traffic passing the World Heritage property after the Stockholm Bypass is opened to traffic in 2026.
- c.) UNESCO`s policy intends to avoid the increase of motorized traffic in World Heritage properties. However, through traffic in the World Heritage property 'Royal Domain of Drottningholm' increased from 16.700 veh./weekday at the time of inscription (1991) up to 23.000 veh./weekday at present. A further increase of traffic up to 27.000 veh./weekday is expected until Stockholm Bypass is completed. When Stockholm Bypass is completed, there will exist two additional options to access the mainland from Ekerö Municipality. Consequently, it is strongly recommended that the States Party supports efficient measures to reduce through traffic on Ekerö Road, such as toll stations, after the Bypass is completed in 2026. It is further recommended that the States Party provides the World Heritage Committee and its Advisory Board ICOMOS annually with a detailed report at least up to the year 2026. Here, the current condition of through traffic on Ekerö Road should clearly be described and it should also clearly be stated which measures have been taken to reduce the traffic flow on Ekerö Road.

Recommendation 3: Decreasing negative impact of Ekerö Road between Vilan and Canton (future working progress)

The visual impact assessment carried out in this HIA Phase 2 showed clearly that the planned remodelling of Ekerö Road will lead to a negative impact in the section between Vilan and Canton. This is especially true for Canton village, where both Lovö Kyrkallé and Skolallén are interrupted in functional terms.The planned width of the traffic lanes of 3,50 m leads here to the need to widen Ekerö Road. Besides that, the intended speed limit is planned to be 60 km/h here after the planned remodelling of Ekerö Road. This speed limit is 10 km/h lower than at present but higher than in the stretch of remodelled Ekerö Road between Hemmet and Malmen, where a speed limit of 40 km/h is planned. As a result, it is required to keep the existing bus stop pockets here according to the Swedish traffic legislation.

Consequently, it is urgently recommended to investigate immediately whether it is possible to plan the remodelled Ekerö Road with a speed limit of 40 km/h also in the section between Vilan and Canton so that it can be avoided to build additional bus stops in this section and the barrier effect of Ekerö Road can be reduced to the smallest extent possible.

Recommendation 4: Spatial Development Plan to support an integrated management of the whole area of the World Heritage property 'Royal Domain of Drottningholm'

The OUV of the World Heritage property is based on the qualities of the domain as a whole and the strategic goals outlined in the World Heritage Management Plan which has been developed in 2007 are reflecting this aspect. Consequently, the Management Plan includes a strategic vision for the coming thirty years and an outline for the intention to install an overall site management.

Nevertheless, the analysis of the present situation of the World Heritage property carried out during this HIA-report lead to the conclusion that this aspect is not yet reflected sufficiently in praxis. In contrast to the general goals set out in the Management Plan's vision until 2030, the management of the property focused strongly on the area of the landscape garden and its historic building stock in recent years. As a result, the functional and visual links between the landscape garden and the surrounding 'pastoral landscape' were increasingly lost and the barrier effect of Ekerö Road was even strengthened. Interviews and meetings of the authors of this report with various stakeholders confirmed this conclusion.

It is therefore suggested to elaborate a Spatial Development Plan which serves as both a concrete vision and a backbone to preserve the Outstanding Universal Value and an element to support the sustainable development of the World Heritage property and its setting and context. The encouraging results which have been achieved at the entrance area in Malmen, where a considerable improvement was reached due to close cooperation between the Swedish Transport Authorities and the National Property Board, should be taken as a starting

point for this plan. It is therefore strongly suggested that all stakeholders which were embedded in the working process of this HIA should be integrated in the elaboration of the Spatial Development Plan. Additionally, it would be vital to include Ekerö Municipality in this planning process.

The so-called *Vårdplan,* currently conceived by the National Property Board as a comprehensive maintenance plan, and the general goals set out in the World Heritage Management Plan 2007 – 2012 should serve as a starting point and guideline for the elaboration of the Spatial Development Plan. Besides that, especially the World Heritage property`s location in a Natural Reserve with outstanding landscape features which functions at the same time as the property's proposed buffer zone should be seen as a unique chance and an important starting point to define concrete spatial measures and guidelines for the property's future development.

In detail, the Spatial Development Plan should focus on the following goals:

- Supporting the understanding and the visibility of the entire Royal Domain of Drottningholm and its connections to its proposed proposed buffer zone on Lovö island.
- Rethinking the access to the World Heritage from Ekerö. This part functions currently as a 'backside', but it should rather be treated as a second main entrance to the property. Such a solution could also open up the opportunity to welcome visitors coming from Ekerö to the World Heritage property.
- In this context, it should also be investigated how to improve the negative visual impact of Ekerö Road between Vilan and Canton and the loss of functional links of the World Heritage property via Skolallén and Lovö Kyrkallé to its surroundings.
- Improving the traffic and management in the World Heritage property. This refers especially to the organization of the visitor's traffic in Malmen and Canton.

CONTENT

1 INTRODUCTION

1.1 BACKGROUND AND GOAL OF THIS HERITAGE IMPACT ASSESSMENT

The World Heritage property 'Royal Domain of Drottningholm' is subject to changes due to the planned new Stockholm Bypass and the planned remodelling of Ekerö Road.

The 21 km long Stockholm Bypass is a new north-south motorway link west of Stockholm and will be built as a tunnel under the island of Lovö and the proposed proposed buffer zone for the World Heritage property. Two junctions connect the Stockholm Bypass with the existing Ekerö Road, which passes through the World Heritage property.

The Ekerö Road project aims at improving the public transport situation between the growing Ekerö Municipality and the mainland to which this is the only road connection at present. In this context it is planned to remodel Ekerö Road. A fourth traffic lane which will be reserved for public transport by buses will be added to the existing three traffic lanes.

Against this background, it is the goal of this Heritage Impact Assessment (HIA) to assess from an independent point of view the potential positive and negative impacts of the planned Stockholm Bypass and the remodelling of Ekerö Road on the Outstanding Universal Value of the World Heritage property of 'Royal Domain of Drottningholm'. On this basis, potential mitigation measures and recommendations for future spheres of activity are provided.

In general, the HIA follows the guidelines recommended by ICOMOS (Advisory Body to the World Heritage Committee), particularly the *2011 ICOMOS Guidance on Heritage Impact Assessments for Cultural World Heritage Properties.*

1.2 WORLD HERITAGE CONCERN

States Parties to the World Heritage Convention are obliged to report to the World Heritage Committee on all changes that may have an impact on World Heritage value of properties in their territory.

The State of Conservation of the World Heritage property 'Royal Domain of Drottningholm' has been a subject of reporting since 2009 concerning the planned infrastructure projects. ICOMOS International and World Heritage Centre have been informed by ICOMOS Sweden, ICOMOS Europe, NGOs and concerned citizens. The World Heritage Centre asked for further information and proposed an advisory mission and a Heritage Impact Assessment (21 April and 10 August 2011).

ICOMOS technical review of Heritage Impact Assessment Phase 1 (2014-02-11) requested an update on progress concerning the following aspects:

1. Phase II of the Heritage Impact Assessment of the Stockholm Bypass,
2. The road plan for Ekerö Road (also referred to as 'road 261' in this report),
3. The Stockholm Bypass review and
4. The creation of a protected area of Lovö - Kärsö and proposed buffer zone for the World Heritage property 'Royal Domain of Drottningholm'.

The Swedish National Heritage Board informed the World Heritage Centre 2014-06-17 about the progress of the above-mentioned projects.

The potential impacts of the infrastructure projects in question are recognized in the Retrospective Statement of Outstanding Universal Value which has been adopted by the World Heritage Committee in 2016:

Current developments in the infrastructure of Greater Stockholm will affect the Drottningholm area in the future. Road 261 [= Ekerö Road] passed through the World Heritage property long before Drottningholm nomination, but the traffic situation has changed significantly. Preliminary assessments indicate that adverse impacts, defined as functional, visual and noise disturbances during the construction of the Stockholm Bypass and Ekerö Road extension, are expected to affect to different degrees the attributes of the property, as well as create permanent visual changes in the pastoral landscape when the road is completed.

Given these conclusions, all involved parties will aim to limit the negative impacts and work to identify new possibilities and solutions for improved accessibility to the area in conjunction with the developments related to the ongoing Stockholm Bypass and Ekerö Road extensions project.

The monitoring process of all World Heritage properties includes a periodic reporting cycle every six years. In the latest cycle, 2012 - 2015, Sweden reported that:

The description of the agricultural setting adjacent to the World Heritage site is a significant part of the historical and present use of the area should be added to the OUV. The suggested area for the proposed buffer zone originates from those aspects. The demesne and farmland are part of that area.

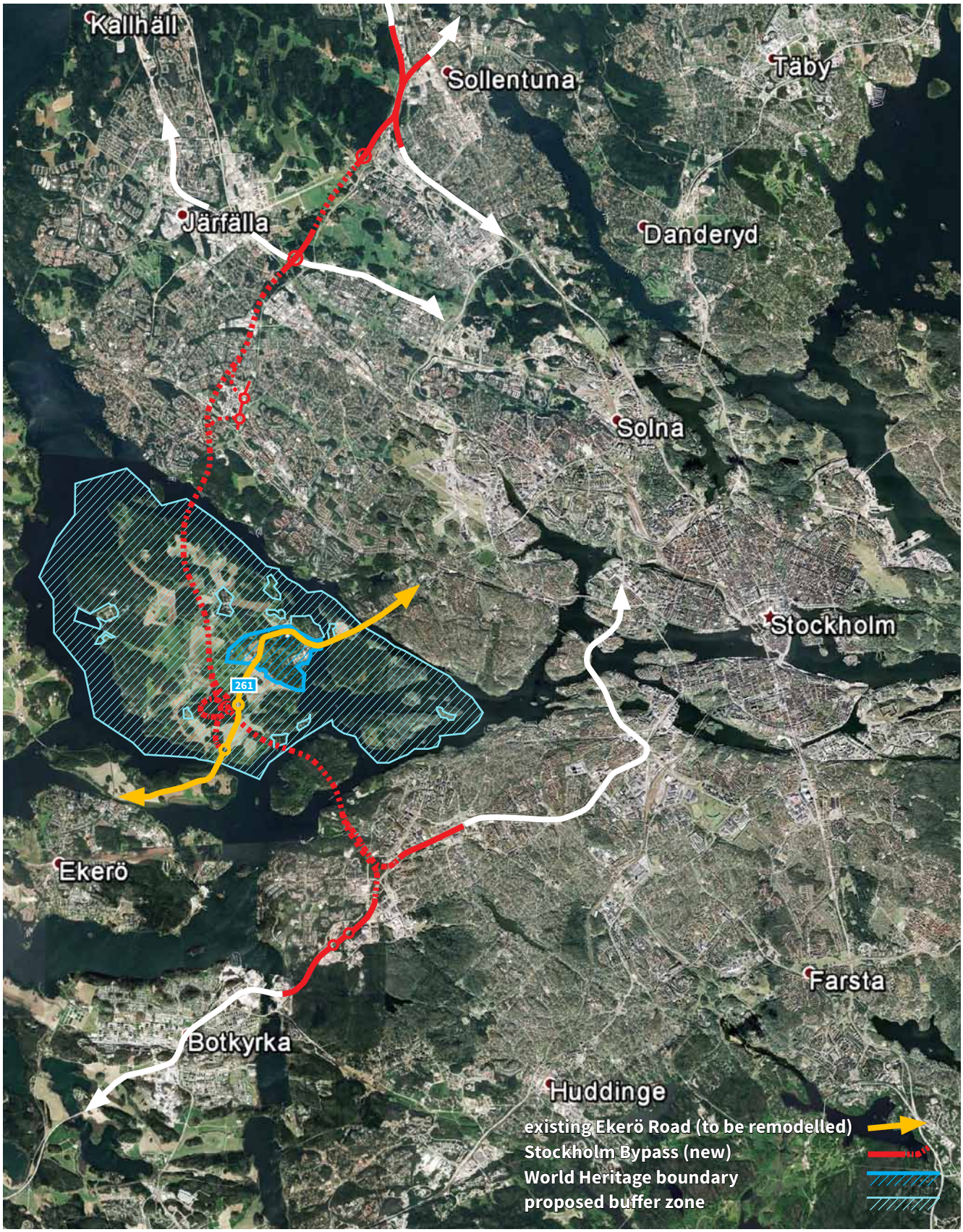


Fig. 1.1: Stockholm Bypass (red) and Ekerö Road (Road 261, orange) site limits and proposed proposed buffer zone of World Heritage property ‚Royal Domain of Drottningholm' (cyan). (© Google Earth, Philipp Tebart)

1.3 PRECONDITIONS FOR THE STOCKHOLM BYPASS AND EKERÖ ROAD PROJECTS

The Stockholm Bypass and the remodelling of Ekerö Road are two projects which stand, in principle, loose from each other.

The 21 km long Stockholm Bypass is a new north-south motorway link west of Stockholm and will be built as a tunnel under the island of Lovö and the proposed proposed buffer zone for the World Heritage property. Two junctions connect the Stockholm Bypass with the existing Ekerö Road, which passes through the World Heritage property.

The Ekerö Road project aims at improving the public transport situation between the growing Ekerö Municipality and the mainland to which this is the only road connection at present. It is planned to add a fourth traffic lane to the existing Ekerö Road which will be reserved for public transport by buses.

The Stockholm Bypass junctions with Ekerö Road are located in the sensitive cultural and natural landscape which functions as a proposed buffer zone for the World Heritage property. Both the Stockholm Bypass and the planned remodelling of Ekerö Road are permitted to be built according to the decision for the proposed buffer zone. Similarly, the location of the junctions has been granted permissions by the Swedish government, as long as the stipulated conditions are met, and the alternatives have not been subject to this HIA Phase 2. A HIA Phase 1 was conducted in 2011 where the overall impacts of the infrastructure projects are assessed.

The Swedish government's decision to approve the Stockholm Bypass stipulated several conditions for the subsequent detailed road plans. Among other, there should be limited negative consequences to the cultural environment, and the values of the World Heritage property 'Royal Domain of Drottningholm' should not be threatened. The Swedish National Heritage Board (Riksantikvarieämbetet) the Swedish Transport Administration (Trafikverket), The National Property Board (Statens Fastighetsverk) and Ekerö Municipality have made an agreement (April 7, 2011). According to the agreement, the target of the involved parties is that the traffic projects are to:

- be designed and implemented with a comprehensive view of and good adaptation to the cultural landscape within the World Heritage property and its proposed buffer zone so that the values of the World Heritage property are not threatened,
- contribute to significant improvements within the World Heritage property and its proposed buffer zone with regard to spatial contexts and noise,
- improve accessibility for those who live and work in and visit Ekerö Municipality,
- lead to an increased proportion of public transport and
- improve the traffic situation through the World Heritage property when the Stockholm Bypass has opened.

If the agreed measures do not lead to the expected improvements regarding the traffic situation in the World Heritage Property, an alternative solution of a tunnel for Ekerö Road under the World Heritage property will be explored.

A decision by Swedish National Transport Administration (Trafikverket) to establish a control and monitoring program has been signed 2016-10-10. It states that monitoring will be done continuously on Ekerö Road and results will be reported annually to the parties of the agreement. A threshold of 27.000 veh./weekday in Phase 1 when the Ekerö Road widening has been completed and 23.000 veh./weekday when the Stockholm Bypass is opened has been defined.

If these threshold values are exceeded, the Swedish Transport Administration will convene the parties for the development of an action plan.

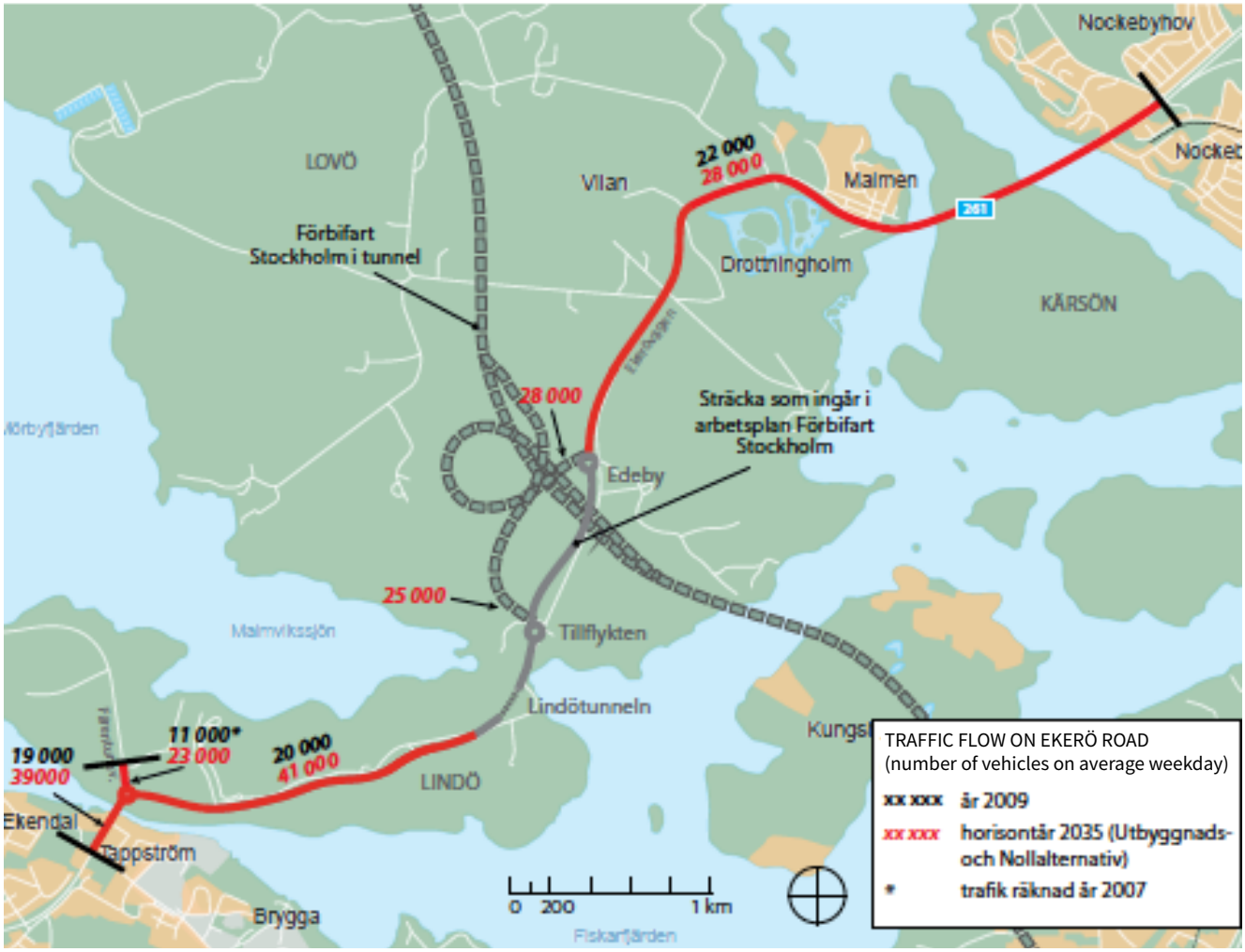


Figure 1.2: The traffic flows on the Ekerö Road in 2009 (black) and estimation for 2035 (red). (©Trafikverket: Miljökonsekvensbeskrivning för vägplan. 2014-10-30 pp.14)

2 HERITAGE IMPACT ASSESSMENT FRAMEWORK

2.1 SCOPE AND PROCESS OF THE ASSESSMENT

This Heritage Impact Assessment aims of to identify and assess both negative and positive impacts of the planned Stockholm Bypass and the planned remodelling of the Ekerö Road project on the World Heritage Outstanding Universal Value (OUV) and to define potential strategies and precise recommendations for the mitigation of negative impacts.

The Heritage Impact Assessment is based on HIA Phase 1 which was submitted to the World Heritage Centre in 2012. In this first phase of the assessment, the scale and the significance of the impact on the property have been identified. Against this background, the potential impact of the two infrastructure projects on the Outstanding Universal Value of the World Heritage property 'Royal Domain of Drottningholm' were assessed. The focus was the overall future impacts of the new traffic infrastructure projects on the World Heritage property and its setting. In HIA Phase 1 the traffic through the World Heritage property was identified as the main impact. The summary of impacts was assessed negative from moderate/ large within the range of slight – large/very large depending on the measures for traffic control.

In the last four years, the outcome of HIA Phase 1 has been integrated in the planning process of the two infrastructure projects. Both the Stockholm Bypass and the Ekerö Road project were subsequently elaborated. This elaboration process of both road projects during the last four years lead to more detailed design proposals. Consequently, the scope of this HIA Phase 2 is based on this previous planning and assessment process. The task of this assessment is now to provide a more detailed overview how the projects Stockholm Bypass and the planned widening of the Ekerö Road (Road 261) impact on the Outstanding Universal Value of the World Heritage property 'Royal Domain of Drottningholm'. In this context, especially the part of the road which is located in the World Heritage property and its proposed proposed buffer zone, will be assessed more in detail.

2.2 HERITAGE IMPACT ASSESSMENT METHODOLOGY

2.2.1 WORLD HERITAGE OUTSTANDING UNIVERSAL VALUE

UNESCO World Heritage Sites are protected within the 1972 *Convention concerning the Protection of the World Cultural and Natural Heritage*. which is an international treaty between Member States. It seeks to identify, protect, conserve, present and transmit to future generations cultural and natural heritage of *Outstanding Universal Value (OUV)*.

The HIA uses the definitions used in the *Operational Guidelines for the Implementation of the World Heritage Convention (2015).*

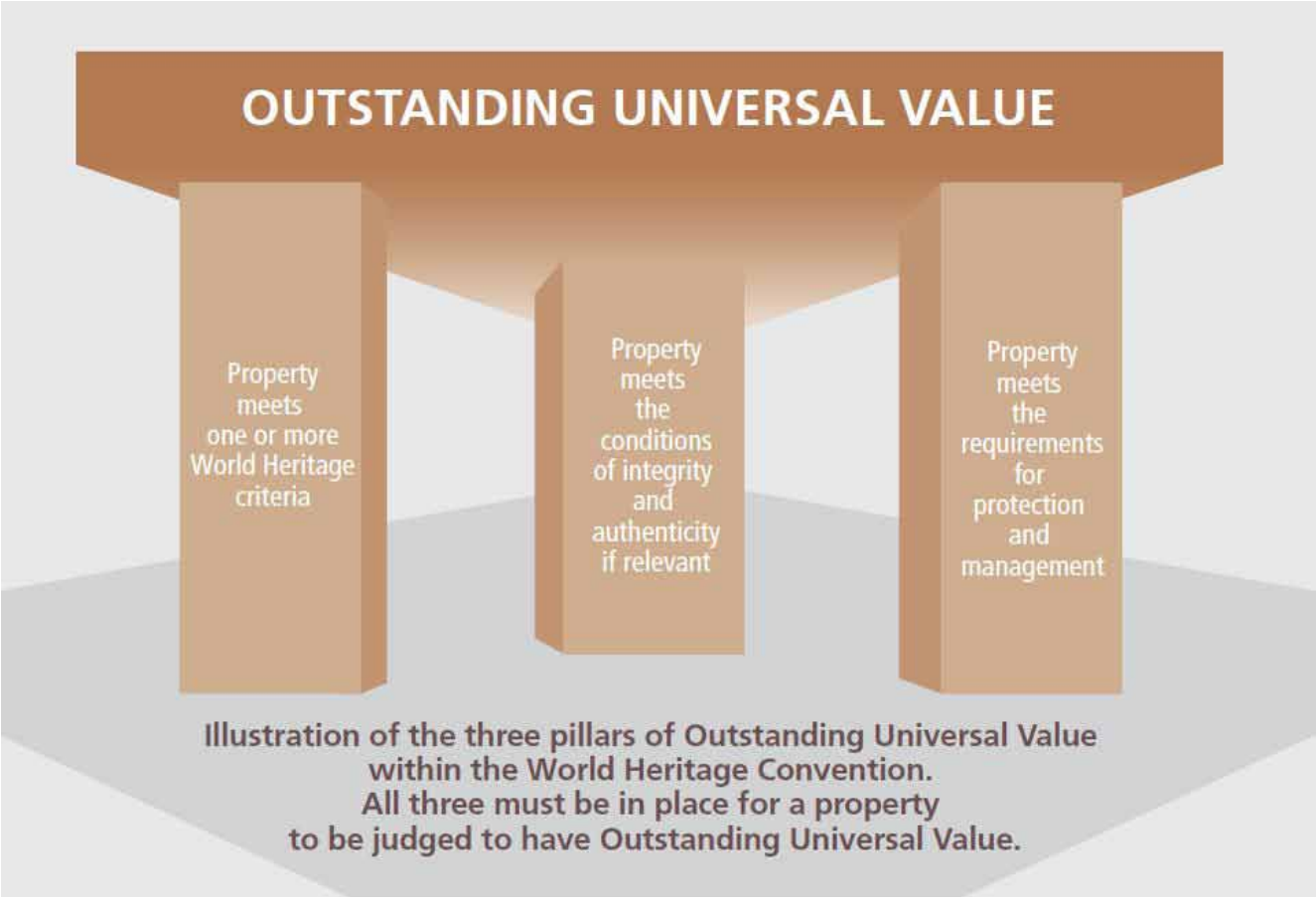
Outstanding Universal Value means *a cultural and/or natural significance which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity (Operational Guidelines for the implementation of the World Heritage Convention*. *(2015, Paragraph 49)*

The World Heritage Committee considers a property as having OUV if it meets one or more of the World Heritage criteria (Operational Guidelines, Paragraph 77) which for the Royal Domain of Drottningholm is criterion (iv): *to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history;*

To be deemed of *OUV*, a property must also meet the conditions of integrity and/or authenticity, and must have an adequate protection and management system to ensure its safeguarding (Paragraph 78).

OUV is composed of three elements; the criteria, the qualifying conditions of integrity and authenticity and the safeguarding; protection and management of the values.

Figure 2.1: The three components of the Outstanding Universal Value (OUV). (©: Managing Cultural World Heritage 2014 p 35)



Attributes are key features of a property, which are associated with or express the OUV. They express also intangible aspects of the heritage, which can be, for example, the spirit and feeling of the place and the relationship between a material and intangible aspect. An attribute can also be a process.

(Par 82) Properties are understood to meet the conditions of authenticity if their cultural values as recognized in the nomination criteria proposed are truthfully and credibly expressed through a variety of attributes including:

- *form and design;*
- *materials and substance;*
- *use and function;*
- *traditions, techniques and management systems;*
- *location and setting;*
- *language, and other forms of intangible heritage;*
- *spirit and feeling; and*

- *other internal and external factors.*

(Par 88) Integrity is a measure of the wholeness and intactness of the natural and/or cultural heritage and its attributes. Examining the conditions of integrity requires assessing the extent to which the property
- *Includes all elements necessary to express its outstanding universal value*
- *Is of adequate size to ensure the complete representation of the features and processes, which convey the property's significance.*
- *Suffers from adverse effects of development and/or neglect*

2.2.2. ICOMOS *GUIDANCE ON HERITAGE IMPACT ASSESSMENTS FOR CULTURAL WORLD HERITAGE PROPERTIES*

The methodology of this HIA Phase 2 report follows the *ICOMOS Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (2011).*

Accordingly, the methodology of this HIA assessment follows four crucial steps:
- Step 1: Understanding the OUV of the World Heritage property 'Royal Domain of Drottningholm' (Chapter 3)
- Step 2: Description of the planned changes (Chapter 4)
- Step 3: Identification of the impacts and assessment of their scale and severity (Chapter 5)
- Step 4: Proposal for mitigation measures and recommendations for next steps (Chapter 6)

According to the ICOMOS Guidance, the HIA methodology includes a grading system from neutral to very large adverse or beneficial impact on the World Heritage OUV. For example:
- A major change results in a total alteration of the key attributes and comprehensive changes in the setting.
- A minor change means that the key attributes are slightly different, and that the change to setting of an historic building is noticeably changed. The intangible cultural heritage attributes or associations encompass visual links and cultural appreciation.

VALUE OF HERITAGE ASSET	**SCALE AND SEVERITY OF CHANGE / IMPACTS**					
	Positive	**No change**	**Negligible Change**	**Minor Change**	**Moderate Change**	**Major Change**
	SIGNIFICANCE OF EFFECT OR OVERALL IMPACT					
	BENEFICIAL	ADVERSE				
For WH properties Very High – attributes which convey OUV	**Positive**	Neutral	Slight	Moderate	Large	Very Large

Fig. 2.2: Grading system of the Heritage Impact Assessment (based on ICOMOS 2011, page 9)

2.3 HIA PROCESS

This HIA Phase 2 report is compiled by an international team of independent consultants. Michael Kloos (michael kloos planning and heritage consultancy) and Katri Lisitzin (Architect SAR / MSA) were commissioned by the Swedish Transport Administration in March 2016 to compile the report.

A so-called 2nd opinion will be given in a separate and independent report by the international World Heritage expert Dr Christopher Young. The report will address how the HIA has been conducted, a review of the World Heritage Committee policy and practice requirements and the OUV and its implications for the road scheme as well as the effectiveness and adequacy of the HIA Phase 2 assessment and recommended mitigation measures.

The working process started in May 2016 with a site visit of the authors of this report and a kick-off meeting with representatives of:

- Swedish Transport Administration and its consulting office WSP (in charge of the planned changes of Stockholm Bypass and Ekerö Road)
- National Property Board (in charge of the management of the World Heritage property)
- Drottningholm Palace Adminsitration (in charge of the management of the World Heritage property)

During this meeting, crucial steps of the working process and objectives of the assessment process were discussed and defined. Afterwards, several meetings with the client and other stakeholders were arranged during the working process. It was the goal of these meetings to discuss intermediate results of the impact assessment so as to feed them back immediately in the planning and assessment process. Representatives of the National Heritage Board and the National Property Board were comprised in these activities.

Fig. 2.3: Site Survey with representatives of the National Property Board (May 2016) (© Michael Kloos)

As a second step of the assessment and negotiation process, additional meetings with representatives of NGOs which contacted the authors during the assessment process and expressed their concerns about the planned road projects were arranged during the assessment process. The authors of this HIA report offered several times to meet up with representatives of Ekerö Municipality during the working process. However, it is was not possible to arrange such a meeting. Hence, the authors regret that it was not possible to embed all relevant stakeholders in the working process of this HIA report.

2.4 DATA SOURCES

Relevant data included into the assessment process was delivered by the Swedish Transport Administration, the National Property Board and NGOs. The visualizations used for the visual analysis of the impact of the planned projects were generated by the Swedish Transport Administration on the basis of a virtual 3D model.

3 WORLD HERITAGE PROPERTY 'ROYAL DOMAIN OF DROTTNINGHOLM'

3.1 THE PROPERTY

The Royal Domain of Drottningholm stands on an island in Lake Mälaren in a suburb of Stockholm. With its castle, perfectly preserved theatre (built in 1766), Chinese pavilion and gardens, it is the finest example of an 18th -century north European royal residence inspired by the Palace of Versailles.
(Short description from UNESCO World Heritage Centre website http://whc.unesco.org)

The 'Royal Domain of Drottningholm' on the island of Lovö close to Stockholm was inscribed on the World Heritage List in 1991 as *"the best example of a royal residence built in the 18th century in Sweden and is representative of all European architecture of the period, heir to the influences exerted by the Chateau of Versailles on the construction of royal residences in western, central and northern Europe"* (criteria (iv)).

The property of 162.429 ha encompasses a unique whole of a royal estate with the Drottningholm Palace, the Palace Theatre, the Chinese Pavilion, Canton Village, the gardens and part of Malmen.

Fig. 3. 1: Boundaries of the Royal Domain of Drottningholm World Heritage property inscribed to the World Heritage List in 1991. (© Google Earth/Philipp Tebart, Ref: http://whc.unesco.org/en/list/559)

3.2 THE PROPOSED BUFFER ZONE OF THE ROYAL DOMAIN ON THE ISLAND OF LOVÖ

A buffer zone for the World Heritage property was not required at the time of its inscription in 1991. However, the importance to emphasize and protect its context and setting of on Lovö island is essential for understanding the function of the whole Royal Domain. Visual connections and interlinkages with the surrounding agricultural landscape have also been a key design concept in the historic development of Drottningholm Palace and gardens.

Figure 3.2: World Heritage property 'Royal Domain of Drottningholm' Vista to Canton Village and to surrounding ‚pastoral' agricultural landscape (© Michael Kloos)

Against this background, a formal buffer zone is currently being prepared and proposed which encompasses an area of 3.285.600 ha on the island of Lovön. The relevance of the proposed buffer zone of the Royal Domain of Drottningholm has been emphasized throughout the management and monitoring of the property. For example, in the Periodic Reporting process which is done for all World Heritage properties Sweden reported in 2015 that:

The description of the agricultural setting adjacent to the World Heritage site is a significant part of the historical and present use of the area and should be added to the OUV. The suggested area for the proposed buffer zone originates from those aspects. The demesne and farmland are part of that area.

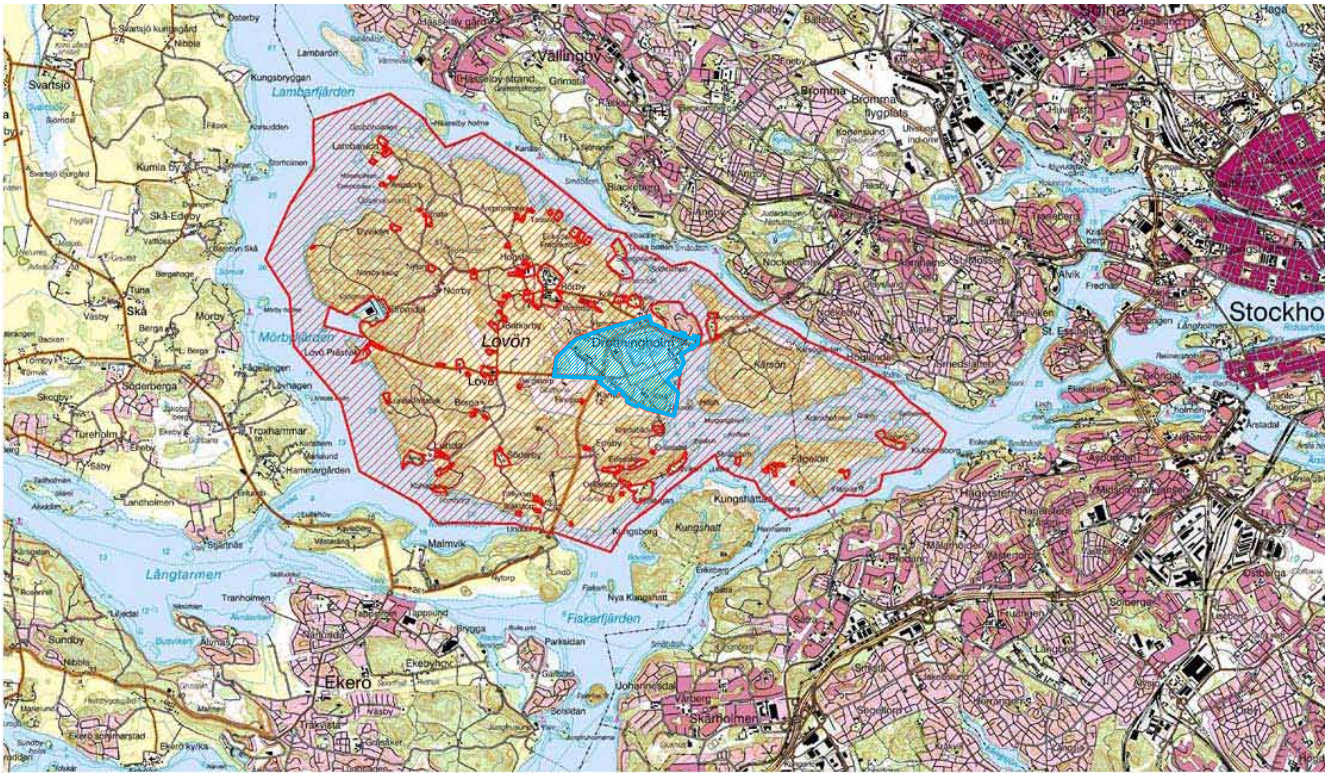


Fig. 3.3: Natural reserve on Lovö which has also been proposed as buffer zone of the World Heritage Property (red circle). (©www.lansstyrelsen.se/Stockholm/Site-Collection Images)

At present the proposed buffer zone is taken into consideration in the World Heritage management plan. In connection with the Stockholm Bypass project a new natural reserve (Lovö naturreservat) was created in 2014 with the aim to protect the natural and cultural landscape with a specific focus on World Heritage property and proposed buffer zone. The area of this natural reserve is congruent to the proposed buffer zone. Both the Stockholm Bypass and the planned remodelling of Ekerö Road are permitted to be built according to the decision for the proposed buffer zone. In addition to the proposed buffer zone, the surrounding historic landscape of Lovö and Kärsö with continuity in land use since Bronze Age is also protected as an Area of National Interest for Cultural Heritage (Riksintresse för kulturmiljövården).

3.3 OUTSTANDING UNIVERSAL VALUE (OUV)

At the time of the inscription of the World Heritage property 'Royal Domain of Drottningholm' a Statement of Outstanding Universal Value was not required. A Retrospective Statement of OUV has been adopted by the World Heritage Committee in 2016. It has been used as the baseline for the evaluation of impacts in this HIA. Key elements of the Retrospective Statement of OUV are therefore summarised in this section.

The brief description of the Royal Domain of Drottningholm in the Retrospective Statement of Outstanding Universal Value adopted by the World Heritage Committee in 2016 highlights the significance of the whole ensemble and the continuity of use and function of the Royal Domain. The consequent time layers are still legible in the layout of buildings and gardens and its function and context with the agricultural landscape illustrates the economic function of a royal estate:

The Royal Domain of Drottningholm, situated on the island of Lovön close to Stockholm, is an exceptionally well-preserved ensemble of gardens and buildings with original interior furnishings. It includes Drottningholm Palace, the Palace Theatre, the Chinese Pavilion, Canton Village, the gardens and part of Malmen, and has been used for pleasure and summer recreation from the Baroque era until today. As the current home of the Swedish Royal Family, Drottningholm upholds a cultural continuity with the original purpose of the site. (Ref: Retrospective Statement of Outstanding Universal Value (WHC/16/40.COM/8E, rev.))

3.4 KEY COMPONENTS OF THE OUTSTANDING UNIVERSAL VALUE

The HIA assessment is based on the following key components of the World Heritage which are identified in the Retrospective Statement of Outstanding Universal Value:

1. ***Drottningholm Palace*** *is representative of 17th and 18th century western and northern European architecture, and the palace grounds were also created during that period. The palace was created with strong references to 17th century Italian and French architecture. The interiors reflect Sweden's ambitions as one of the most powerful nations of 17th century Europe, from both cultural and political viewpoints. Leading Swedish architects worked together with the best craftspeople in Europe to create a unique ensemble of buildings with rich and lavish interiors.*

2. ***The Palace Theatre*** *is the only surviving 18th century theatre where the original machinery is still regularly used and the original stage sets are preserved. The sophisticated stage machinery, built by Georg Fröman according to drawings prepared by Christian Gottorp Reuss, is still fully intact, permitting quick changes of scene with the curtain up. A unique collection of stage sets, the dressing rooms, the storerooms, the scenery, and the large auditorium, seating 400 spectators, are preserved. Historical opera productions performed at the theatre are often staged and accompanied by music performed on authentic period instruments by the Drottningholm Theatre Orchestra.*

3. ***The Chinese Pavilion*** *with its incomparable combination of architecture, interior decoration and collections is preserved and is a symbol of 18th century contacts between Europe and Asia. Together with* ***Canton Village****, which includes former buildings for manufacture and living quarters for members of the royal court, this ensemble of buildings gives a comprehensive picture of court life during this era, with touches of influences from distant places.*

4. ***The gardens*** *were created during different periods and show both continuity and changes in fashion over time. The French formal garden, the rococo garden and the Ideal Landscape Garden are preserved side by side. The French formal garden holds the world's largest collection of sculptures by Adriaen de Vries.*

5. ***Malmen*** *is an adjoining 18th century residential area for courtiers and officials of the royal court as well as a site for various palace offices. Malmen was granted a town charter in the late 18th century. The buildings in this area still partly retain their original functions, and their facades are important features of this historical setting.*

6. ***The surrounding area has been part of the Crown Estate*** *since the 16th century. The character of the landscape is a result of the way it has been used and farmed to support the Crown's need of supplies and to uphold the King's household. This continuous use and the way it is and has been managed over the years is still visible in the landscape.*

Fig. 3.4: World Heritage property and State Owned Listed Site. The key areas are identified in the Maintenance Plan for the State Owned Listed Site. (© Google Earth /Maaike Goedkoop/Philipp Tebart)

3.5 IDENTIFICATION OF ATTRIBUTES OF THE OUTSTANDING UNIVERSAL VALUE AND THEIR AUTHENTICITY AND INTEGRITY

As described in the previous chapter, the understanding the OUV of a property and identifying the attributes that transmit this value are the baseline for assessing changes as well as for all measures for protecting and enhancing the World Heritage value. They are also the baseline for HIA assessment. These attributes can be physical qualities or fabric, but can also be related to associated processes (please compare section 2.2.1).

The following table summarises the attributes which are identified in the HIA process:

Outstanding Universal Value Key Element	Value	Attributes expressing the value
The Crown Estate and Royal Domain of Drottningholm	Continuity of land use and state ownership as a part of the King's household since 16th century.	►Agricultural use ►Farmsteads and villages ►Lovö Church and Kyrkallén ►Vegetable garden and Orangery
Drottningholm Palace and formal French Garden	Drottningholm Palace is representative of the 17th and 18th century western and northern Europe architecture with reference to leading French and Italian architecture associated with Sweden's political position in 17th century. Continuity as Royal residence. Formal French Garden is representative of the Baroque Period and holds world's largest collection of sculptures of Adriaen de Vries.	►Palace exterior and interiors ►Palace setting with waterfront and gardens ►Approach by sea and land ►Use as Royal residence ►Visual and functional connections with all elements of the Palace complex, including Hemmet and Vilan
Palace Theatre	Unique 18th century court theatre with original machinery and stage set in use.	►The theatre building and stage machinery ►Context and setting of the Palace Theatre within the Palace complex and the Ideal Garden
Chinese Pavilion and Rococo Garden, Canton Village	Both Chinese Pavilion and Canton Village represent the life of a 18th century court with oriental influences and ideal of manufacture society.	►Chinese Pavilion and the pavilion's visual and functional connections with the surrounding gardens and landscape ►Canton Village buildings and context ►Formal treelines, Canton Street and Kyrkallén
Ideal Landscape Garden (English Park)		►Canals, ponds, pathways Gothic Tower ►Monumentholmen ►Karusellplan ►Visual and functional connection with Palace complex at Vilan, Hemmet and Malmen ►Agricultural landscape
Malmen residential area	Continuity of administrative and residential function for Royal Court from 18th century. Designed part of the Palace ensemble.	►Facades, urban character and visual linkage with Palace ensemble and gardens ►Administrative and residential function for Royal court

Tab: 3.1: Key Values of the World Heritage property 'Royal Domain of Drottningholm

3.6 AUTHENTICITY AND INTEGRITY

The Retrospective Statement of Outstanding Universal Value (Ref. WHC/16/40.COM/8E, rev.) identifies the high degree of authenticity and integrity of both different elements of the Palace ensemble as well as the continuity of use of the Royal Domain including its context and setting with the surrounding royal estate on the island of Lovö:

Statement of authenticity

The historical setting, with the Drottningholm Palace, the Palace Theatre, the Chinese Pavilion, the gardens and the facades of Malmen's buildings, is intact in form and material from the 17th and 18th centuries. The primary guidelines for this property focus on conservation and not restoration, and on maintaining the original forms, the original materials, and the designed landscape.

Statement of integrity

No significant changes have been made to this World Heritage property since the time of inscription. The unique whole that existed then is still present and maintains all the necessary attributes to convey the Outstanding Universal Value of the property. The Drottningholm Palace, the Palace Theatre, the Chinese Pavilion, and the gardens remain intact and represent a royal domain with important elements of 17th and 18th century Swedish and European history.

The Royal Domain of Drottningholm has been an intercultural meeting place for centuries, from the time of its construction by architects and workers of different nationalities to the theatre activities and tourism of today. For centuries, the Drottningholm area has been used for pleasure and summer recreation. Theatre performances and the interest shown by visitors to Drottningholm both maintain this tradition and its function as the home of the Swedish Royal Family.

Tab: 3.2: Authenticity and Integrity of the World Heritage property 'Royal Domain of Drottningholm (source: Retrospective Statement of Outstanding Universal Value / Ref. WHC/16/40.COM/8E, rev.)

3.7 PROTECTION AND MANAGEMENT REQUIREMENTS

With regard to protection and management requirements of the property, the Retrospective Statement of Outstanding Universal Value identifies both the increase of traffic and the planned construction of Stockholm Bypass and the planned remodelling of Ekerö Road as a major task of current challenges to be tackled. In this context, it is particularly emphasised that "all involved parties will aim to limit the negative impacts and work to identify new possibilities and solutions for improved accessibility to the area in conjunction with the developments related to the ongoing Stockholm Bypass and Ekerö Road extension project.":

[...]

Current developments in the infrastructure of Greater Stockholm will affect the Drottningholm area in the future. Road 261 passed through the World Heritage property long before Drottningholm's nomination, but the traffic situation has changed significantly. Preliminary assessments indicate that adverse impacts, defined as functional, visual and noise disturbances during the construction of the Stockholm Bypass and Ekerö Road extension, are expected to affect to different degrees the attributes of the property, as well as create permanent visual changes in the pastoral landscape when the road is completed. Given these conclusions, all involved parties will aim to limit the negative impacts and work to identify new possibilities and solutions for improved accessibility to the area in conjunction with the developments related to the ongoing Stockholm Bypass and Ekerö Road extension project. The parties will also consider the Heritage Impact Assessment which has been done in connection with the infrastructure projects. The recommendations and the results of this assessment will assist in identifying potential courses of action to maintain the attributes of the property, its authenticity, and its integrity.

Tab: 3.3: Protection and Management requirements of the World Heritage property 'Royal Domain of Drottningholm (source: Retrospective Statement of Outstanding Universal Value / Ref. WHC/16/40.COM/8E, rev.)

Against the background of the Outstanding Universal Value, the above-mentioned key values and the current challenges outlined in the Retrospective Statement of Outstanding Universal Value, the following sections will describe these aspects more in detail so as to provide a basis for the impact assessment.

3.8 HISTORIC LAYERS OF THE ROYAL DOMAIN OF DROTTNINGHOLM

The islands of Lovö and Kärsö where populated in prehistoric times with hunters and fishermen. In the transition to Middle Ages, around 1050 AD the Mälaren islands of Lovö, Lindö and Kärsö were already fully colonized. The villages of the Lovö parish consisted of five settlements. The Lovö church was built in late 12th century.

Fig. 3.5a, b: Lovö Church was built in the late 12th century. The Church was later refurbished. (© Michael Kloos)

The royal history of Drottningholm started in the 16th century, when in the 1530's the King Gustav Vasa initiated a successive acquisition of the villages of Lovö which later would constitute the Crown demesne called Torvesund. In the 1570's the building of the future Drottningholm Palace was started. The Royal Domain of Drottningholm has been in continuous use as a royal household since 1660. In the end of the 18th century King Gustav III took over the Palace and the Crown Demesne and initiated large projects. The Palace gardens were extended, two bridges to the mainland were built and the residential area of Malmen was established.

Fig. 3.6a, b: Erik Dahlberg Suecia Antiqua et Hodierna, 1698-1701: Drottningholm Palace east elevation (left) and French Formal Garden (right). (© National Library of Sweden / www.suecia.kb.se)

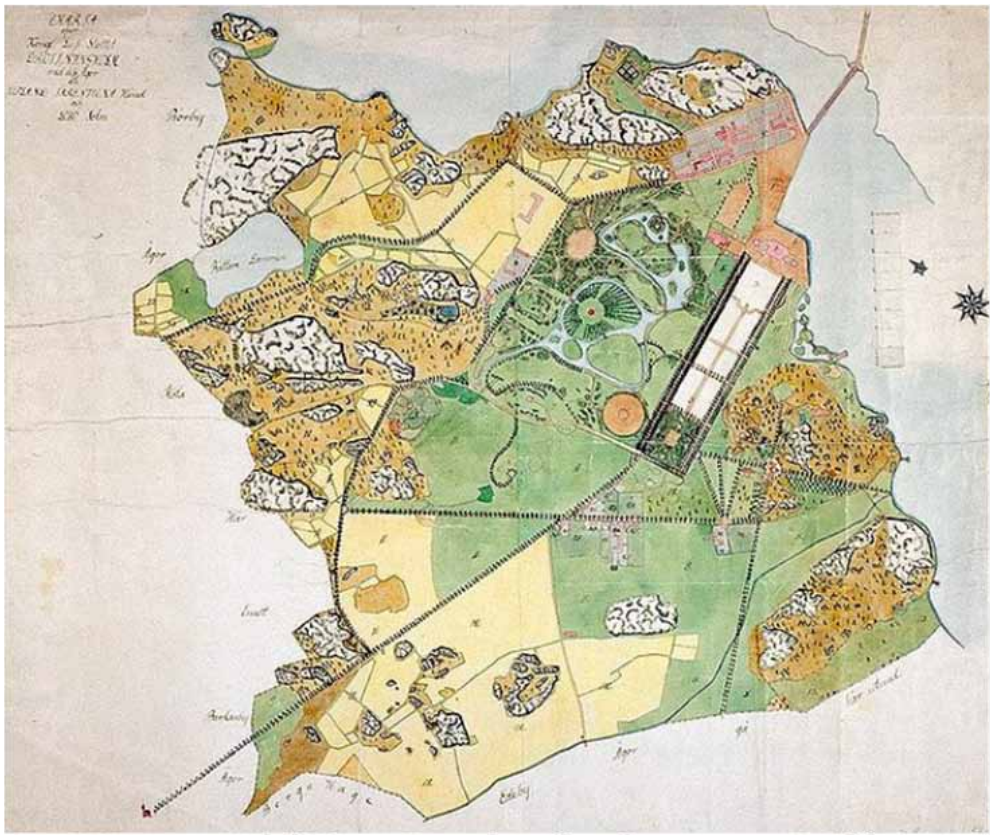


Fig. 3.7: Map from late 18th century which shows the Palace ensemble. (©Statens Fastighetsverk Vårdprogram)

Today's **Drottningholm Palace** is mainly a building of the 17th century. It was built during the period when Swedish Kingdom was one of the great powers in Europe. The builder – Dowager Queen Hedvig Eleonora – engaged architects, artists and craftsmen from different parts of Europe. The architect Nicodemus Tessin the older was commissioned to draw up a new palace with gardens, after a large fire in 1661. The work was completed by his son, Nicodemus Tessin the younger, who also laid out the gardens to the west of the palace, where there had previously been a hunting ground.

Fig. 3.8: Drottningholm Palace (© Sxenko at English Wikipedia, CC BY 2.5)

In the middle of the 18th century, Queen Lovisa Ulrika commissioned great changes to the palace domain. The current **Drottningholm Palace Theatre** was built in accordance with drawings by Carl Fredrik Adelcrantz. The building was completed in 1766. On King Gustav III's initiative, a foyer, the Déjeuner Salon, was added later in accordance with drawings by Louis Jean Desprèz.

Fig. 3.9a, b: Drottningholm Palace Theatre (© Michael Kloos)

The **Chinese pavilion** was built in the 1760s, at a time when chinoiserie was fashionable in Europe. The architects were Carl Fredrik Adelcrantz and Jean Eric Rehn. The architecture and interiors even today produce a picture of the relationship between the continents of Asia and Europe 300 years ago, and the collections provide a sample of exotic craftsmanship.

Canton village, a small mercantile community was built along the Canton Road with workshops for products intended for the court and, initially, an attempt at Swedish silk manufacture. Production ceased already in the 18th century, and the houses in Canton Street have since then mainly been used for housing. Canton Village with its buildings, gardens and streetscape still maintains its 18th and early 19th century character of a small scale mercantile manufacture village.

Fig. 3.10a, b: Chinese Pavilion and Canton Village (© Michael Kloos)

The residential area of **Malmen** received town privileges in 1782 during the reign of Gustav III. The existing buildings dating from the 16th century were supplemented in the 18th century due to the need for buildings for overnight stays and business operations in the area.

Fig. 3.11: Malmen (© Holger Elgard)

The Drottningholm Palace gardens, each characteristic of its period – a Baroque garden from 1680-1780, a more intimate topiary garden in Rococo style from 1750-1780 in conjunction with the Chinese pavilion and an Ideal Landscape Garden (English Park) from 1770 to the early 19th century can still be experienced with their different functions and character. Significant vistas connect the gardens dating from various periods.

Fig. 3.12a, b: Ideal Landscape Garden. Vista from and to Hemmet, the home of the governor, designed approx. in 1780. The building is located north of Ekerö Road and serves as a focus point of an important sight line from and to the Ideal Landscape Garden. (© Michael Kloos)

3.8.1 INFRASTRUCTURE DEVELOPMENT ON LOVÖ

The infrastructure on Lovö is dominated by three generations of roads. In the medieval system the Lovö church is in the centre of the village roads. The 18th century road system is characterized by the presence of the Royal Crown on Lovö. In the end of the 18th century when King Gustav III initiated large projects for the Drottningholm Royal Domain, even the road structure was reoriented towards the Palace instead of Lovö Church. The connection between the Palace and the church was important and marked by a tree lined straight avenue and even other connections were established between the Palace administration, Canton Village and Chinese Pavilion.

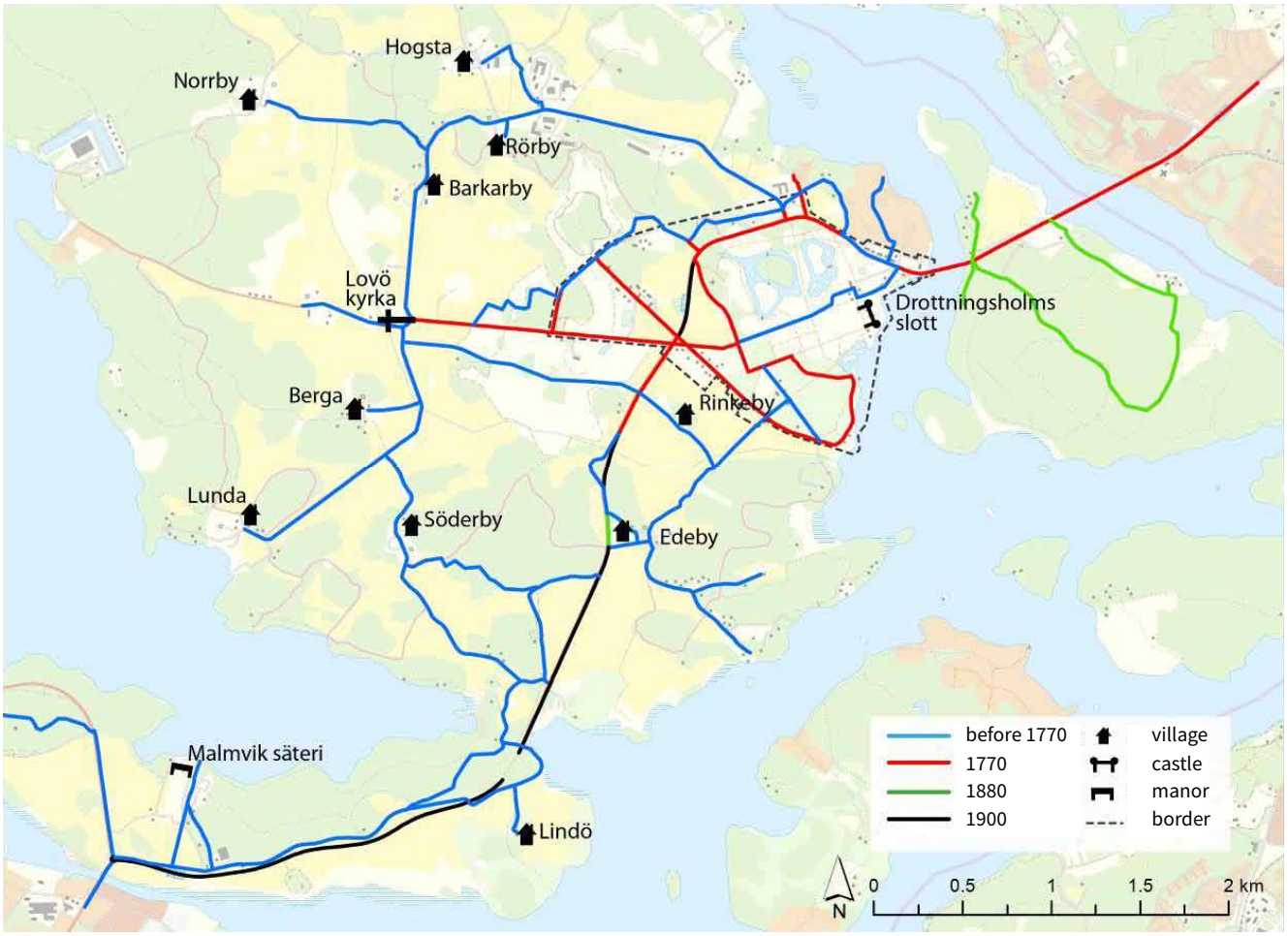


Fig. 3.13: Infrastructure Development on Lovö. Blue: before 1770 / Red: 1770 / Green 1880 / Black 1900. (©Trafikverket, Kulturmiljöutredning-Vägplan för Ekerövägen väg 261 Tappström-Nockeby, 2015-05-28 p19)

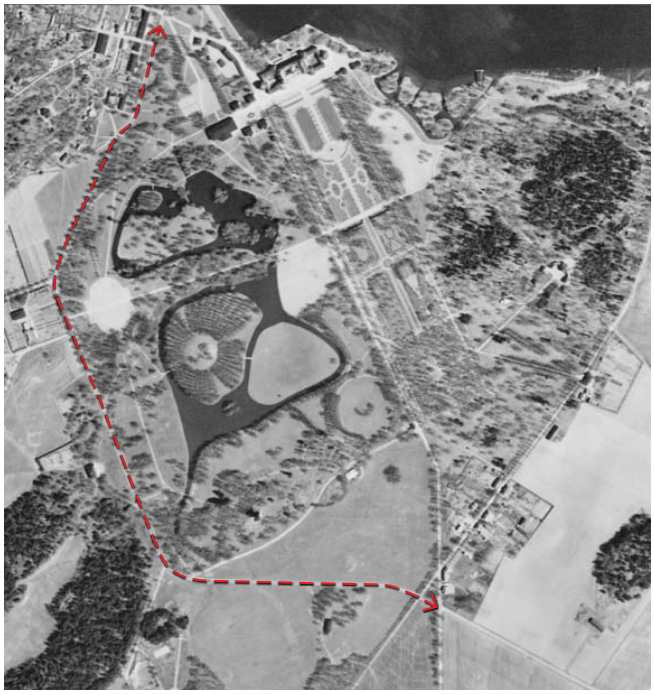
The island of Lovö was connected with the mainland in 1787 with a bridge near the present location of the Drottningholm bridge which dates from the 1970's.

During 1930's a new road was laid out between Canton Village and the Ideal Landscape Park. Ekerö Road in its present delineation through the World Heritage property dates from the 1940's. It was broadened to two lanes and designed as a tree line avenue in the between Hemmet and Canton. A third traffic lane was added in the late 1980's.

Both the successive increase of traffic and increased speed of vehicles and the fact that Ekerö Road is the only link between Ekerö and the mainland have changed the character of the Ekerö Road from a rural road to a major commuter link between Ekerö Municipality and the mainland. As a result, the dominance of Ekerö Road in the World Heritage property increased significantly.

Fig. 3.14a-f: Transformation of the character of Ekerö Road from 1800 until present (© HIA Phase 1)

Aerial photographs out of the 20th century confirm that the successive widening of Ekerö Road has encroached on the Ideal Landscape Garden especially in the time period between 1954 and 1993.



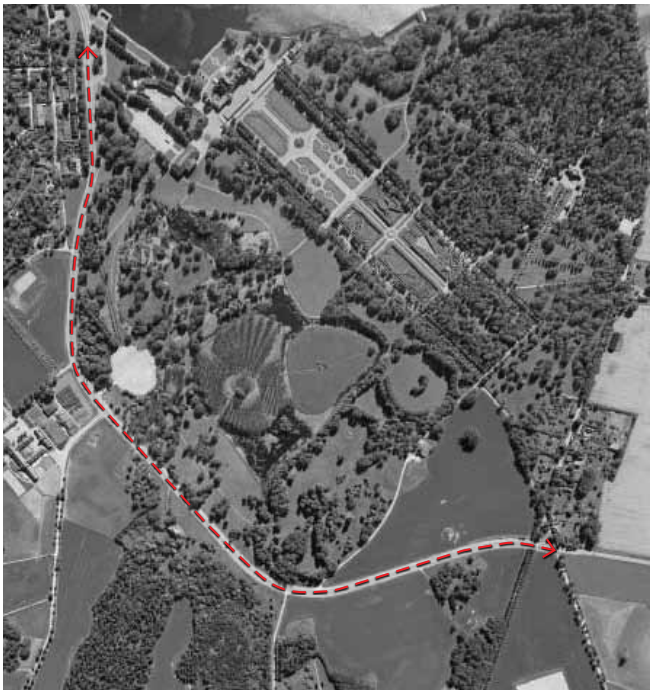


Fig. 3.15a, b: Aerial photographs showing Ekerö Road in 1942 and 1985 in the World Heritage property. (©Statens Fastighetsverk: Vårdprogram/2014/Drottningholms slottsområde/AB302:500/Bilagor/5.Flygfoton LMV).

3.9 DROTTNINGHOLM TODAY

Drottningholm is the home of the royal family today. Drottningholm attracts a large number of visitors, up to 700.000 per year during the summer period. The Palace Theatre has opera and ballet performances which are limited in number in order to conserve its 18th century interior and stage mechanism.

3.9.1 VISITOR'S MANAGEMENT AT MALMEN

In summer times, it is possible to reach Drottningholm from Stockholm Centre by boat. Ferries are mooring immediately at Drottningholm Palace. Another option to reach Drottningholm World Heritage property is public transport by bus via Ekerö Road. At present, there is a bus stop at Malmen. Visitors have to cross Ekerö Road in order to reach the World Heritage property's Vistor's centre.

Fig. 3.16a, b, c: Current situation of bus stops on Ekerö Road at Malmen, traffic on Ekerö Road and Drottningholm Visitor's Centre (previous page). (© Michael Kloos / http://www.kungahuset.se / Swedish Transport Administration)

Currently, the entrance situation of the World Heritage property shows partly deficits in terms of its spatial and functional quality. Besides Ekerö Road, which forms a barrier for visitors who want to access the World Heritage site, the existing Pressbyran kiosk in the entrance area has only a low quality in terms of its design and appearance. Besides that, both the visitor's parking area and the existing tennis courts in the immediate vicinity of Drottningholm Theatre form a sharp contrast to Drottningholm Theatre, which is one of the most valuable buildings of the World Heritage property.

Fig. 3.17a, b, c, d: Current situation of the World Heritage property's entrance area. Kiosk and paths, parking facilities and tennis court nearby the Palace Theatre. (© Michael Kloos)

3.9.2 KARUSELLPLAN AND ITS SURROUNDINGS

Similarly, also other areas of the World Heritage property show currently constraints with regard to their quality and design. This is particularly true for the area of Karusellplan, which was originally designed as an area for festivities but which is currently used as a park& ride facility for commuters coming from Ekerö.

Besides that, the link of Karusellplan to its surroundings shows currently severe deficits in spatial and functional terms. Here, Ekerö Road forms a spatial barrier, thus hindering visitors of the World Heritage property to explore the areas located in the north of Ekerö Road.

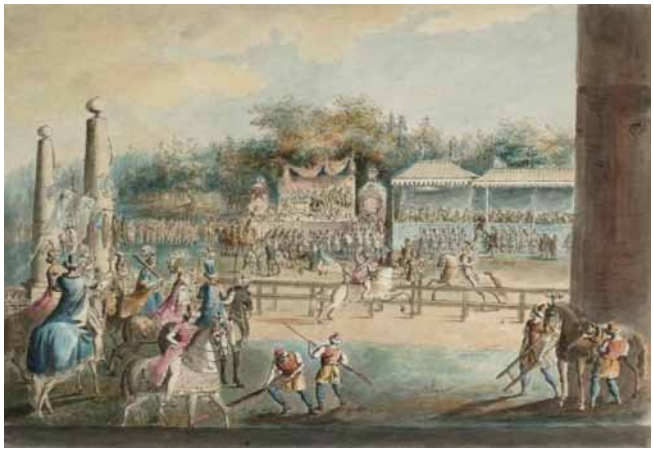


Fig. 3.18 a, b, c: Karusellplan around 1785 (left) and current use as park and ride facility (right). View from Karusselplan towards Ekerö Road and the northern area of the World Heritage property (bottom). (© Trafikverket: Kulturmiljöutredning- Vägplan för Ekerövägen väg 261 Tappström - Nockeby, p. 32 / Michael Kloos)

3.9.3 CANTON

At Canton, the two tree line avenues Lovö Kyrkallé and Skolallén form together with Gothic Tower architectural motifs that have the greatest cultural significance for the area. Both avenues used to form an important link of both the Drottningholm Palace garden and the agricultural area surrounding it and Canton Village with Canton school. This functional and visual link has been increasingly interrupted by Ekerö Road which was built in the 1930s and successively broadened afterwards. Nowadays, the functional and the visual link provided by the two tree line avenues is barely existing anymore.

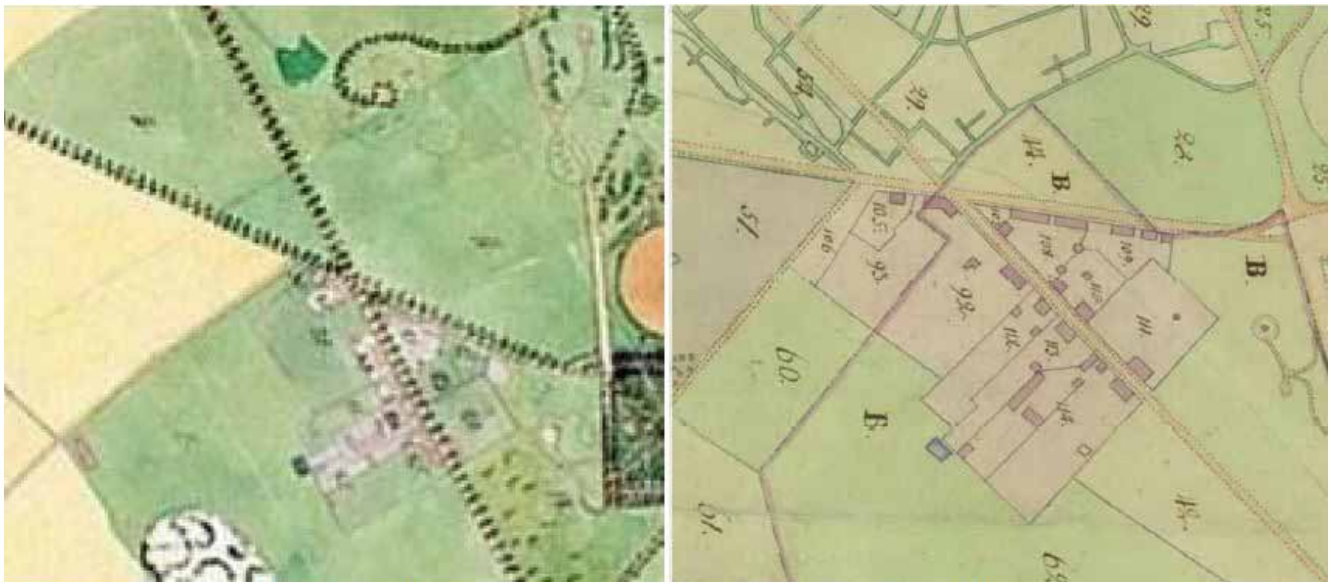


Fig. 3.19a, b, c: Historic maps dating from 1700 and 1811 showing the historic situation of Canton and the two alleys of Lovö Kyrkallé and Skolallén (top) and current situation of this area. (©Trafikverket: Kulturmiljöutredning- Vägplan för Ekerövägen väg 261 Tappström - Nockeby, p. 23 / Michael Kloos)

3.10 MANAGEMENT AND PROTECTION

3.10.1 LEGAL PROTECTION

3.10.1.1 WORLD HERITAGE PROPERTY

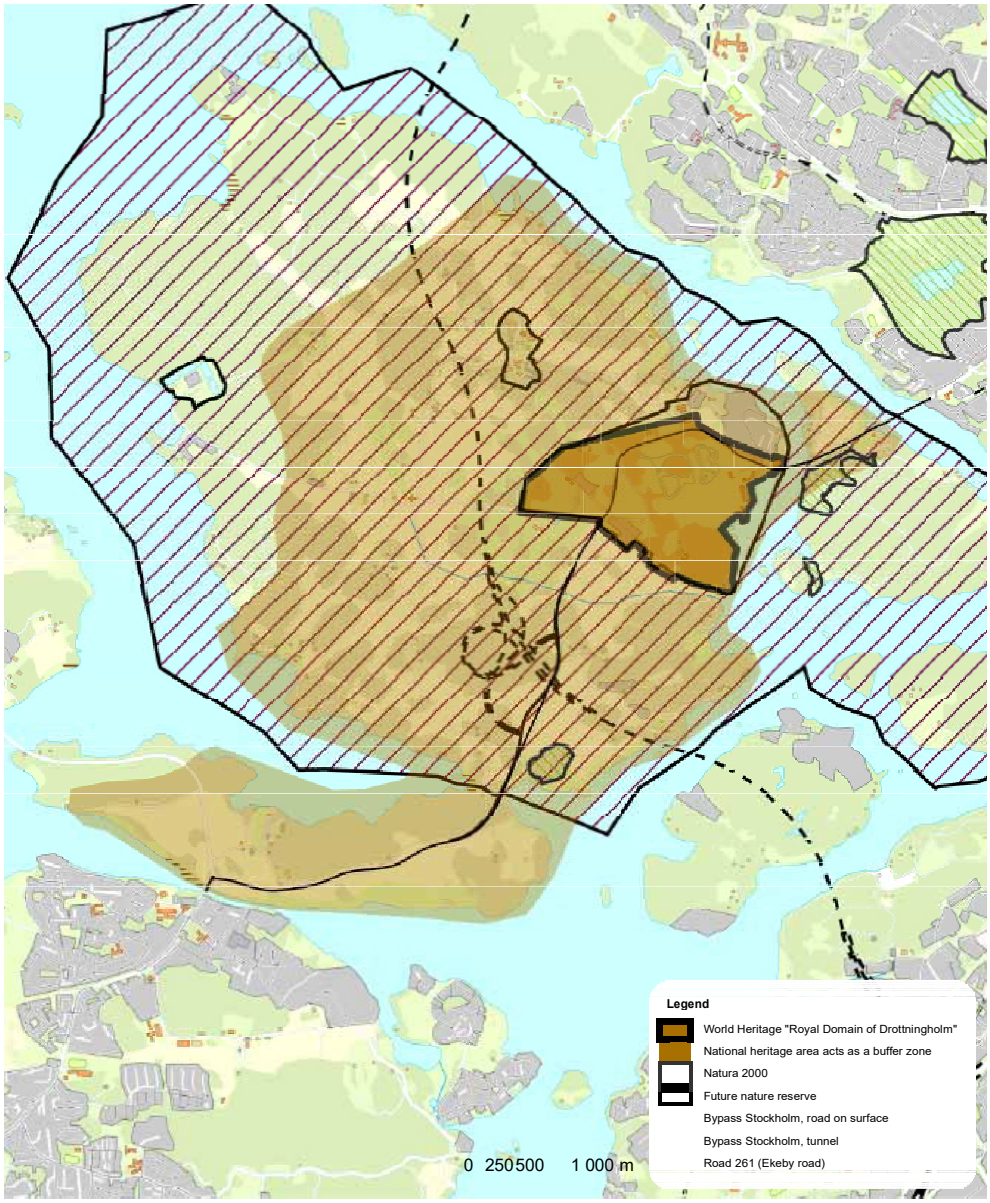


Fig.3.20: Designated protected areas. (Source: HIA Phase 1. p 19)

The World Heritage property and its proposed buffer zone on the island of Lovö has multiple levels of designations and national legal protection.

Since 1935 Drottningholm has the status as State owned listed site (Statligt Byggnadsminne, SBM) which includes the World Heritage property. This is the most important Swedish legislation protecting the buildings and gardens of the World Heritage property.

The Swedish National Heritage Board (Riksantikvarieämbetet), the County Administrative Board of Stockholm (Länsstyrelsen Stockholms Län) and Ekerö Municipality are the national, regional and local authorities responsible for granting permits according to legal instruments for the protection and management of the World Heritage property. The National Property

Board (Statens Fastighetsverk) is responsible for the conservation and management of State owned listed sites. Accordingly, the Swedish National Heritage Board is responsible for the supervision of State owned listed sites.

The State owned listed site regulations (rev. 2014-11-10) include, among other issues, restrictions about changes in the topography, vegetative structure, dams, road systems, tree avenues, tree lines and tree groups. The regulations concerning landscape and garden design, for example the baroque terrace and designed gardens must not be changed. Visual connections and sightlines, for example between relation between the different gardens and visual connections in the Ideal Landscape Garden, must not be obstructed. Additional elements as signs and lighting must not be placed within the area.

3.10.1.2 PROPOSED BUFFER ZONE

The whole area of the proposed buffer zone on the island of Lovö is designated as nature reserve. The County Administration of Stockholm is the controlling authority according to regulations in the Environmental Code. However, the Stockholm Bypass and the remodelling of Ekerö road will not be impeded by the decision. In addition to protecting the area against future exploitation, the aim of the nature reserve is to preserve and develop natural values, recreational values and cultural heritage.

The main conditions for the nature reserve are:

- The farming of the land and forests is at the heart of the landscape and its values today.
- The historical layers that are clearly visible today are of a high educational value.
- The boundaries between cultivated land and forest land are historically significant.
- Intervention in the landscape must be designed to ensure the least possible change both functionally and visually.

The proposed proposed buffer zone is also designated as an area of National interest for cultural heritage (Riksintresse för kulturmiljövården). In an area of national interest, the value must not be significantly damaged and should be given priority in planning on local and regional level. The County Administrative Board is supervising authority for areas of national interest.

- The justification for the area of national interest is related to the Drottningholm Royal palace reflecting the seventeenth and eighteenth centuries, and the areas of Lovö and Lindö influenced by the royal land holdings and proximity to the palace.
- Agricultural landscape that has been continuously farmed and inhabited since the Bronze Age.

3.10.2 WORLD HERITAGE MANAGEMENT PLAN

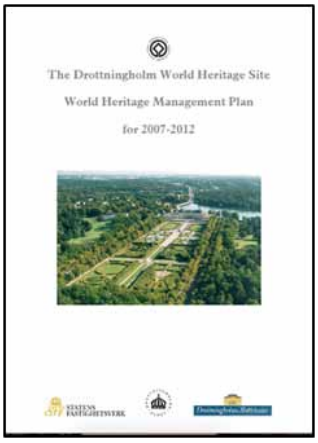


Fig.3.21: Management Plan of the World Heritage property.

The Drottningholm Palace Administration is the management authority for the World Heritage property. The Members of the Drottningholm World Heritage Council are the National Property Board, Drottningholm Palace Theatre Museum Foundation, The Royal Collections and the Palace Architect.

The Drottningholm World Heritage Management Plan (2007-2012) has a vision until 2035 and long term goals for the property. Four focus areas; protection, maintenance and environmental issues, use and appreciation and management and direction have specific guidelines and measures.

The relation between HIA and management objectives were assessed in the HIA Phase 1 as follows:

GUIDELINE MANAGEMENT PLAN 2007-2012	ISSUE
1 Borders and proposed buffer zone shall be monitored in order to ensure that the universal values of the area are properly protected	- permanent impact on historic landscape structure in the proposed buffer zone, possible cumulative impacts on land-use continuity - direct visual and noise impacts on WH property impacts on perception of approach and cultural appreciation of WH property
2 All main actors at the WH site shall make a risk assessment and maintain suitable guidelines for responding to these risks	– road access
3 The unique unity that exists in both exteriors and interiors at the World Heritage site should be covered by a unified view on maintenance and restoration, which facilitates management and care in the long term and in the day-to-day work	– environmental impacts due to traffic
4 Care, preservation and restoration of the gardens and parks at the World Heritage site should be governed by a unified view to facilitate the management and care in the long term as well as in day-to-day work	- environmental impacts due to traffic - visual and functional impacts due to road construction and traffic - future restoration of parks and rehabilitation of their integrity
5 Cultural tourism and visitor operations at the World Heritage site shall be used to emphasize the development of good finances, provided this does not have any negative effects on the integrity and universal values of the World Heritage site	- visitor access and management - cultural tourism development including the royal domain and cultural landscape of Lovö as a cultural resource

6 Accessibility to and within the World Heritage site should be improved	- visitor access , adapted parking facilities - cultural appreciation of historic approach by land and sea
7 Facilities and information for visitors to the World Heritage site shall be developed at all levels to meet their expecta- tions and to enhance the experience and understanding of the universal value and status of Drottningholm as a World Heritage site	- cultural appreciation of historic ap- proach by land and sea - development of cultural tourism in the whole Royal Domain and in the cultural landscape of Lovö
8 All efforts shall be made to improve understanding of how the World Heritage concept was created, developed and now used. The educational activities should be developed and be based on the principles of life-long learning	- legibility of the historic environment - understanding of the cultural context of the whole Royal Domain - future scientific research - educational activities - understanding of World Heritage concepts of continuity and use

Tab. 3.4: Relations between World Heritage management objectives and HIA 1 (source: HIA 1)

A comprehensive maintenance plan (Vårdprogram – mark) for the Drottningholm State owned listed site is currently being finalized and it has been used in the HIA as assessment baseline.

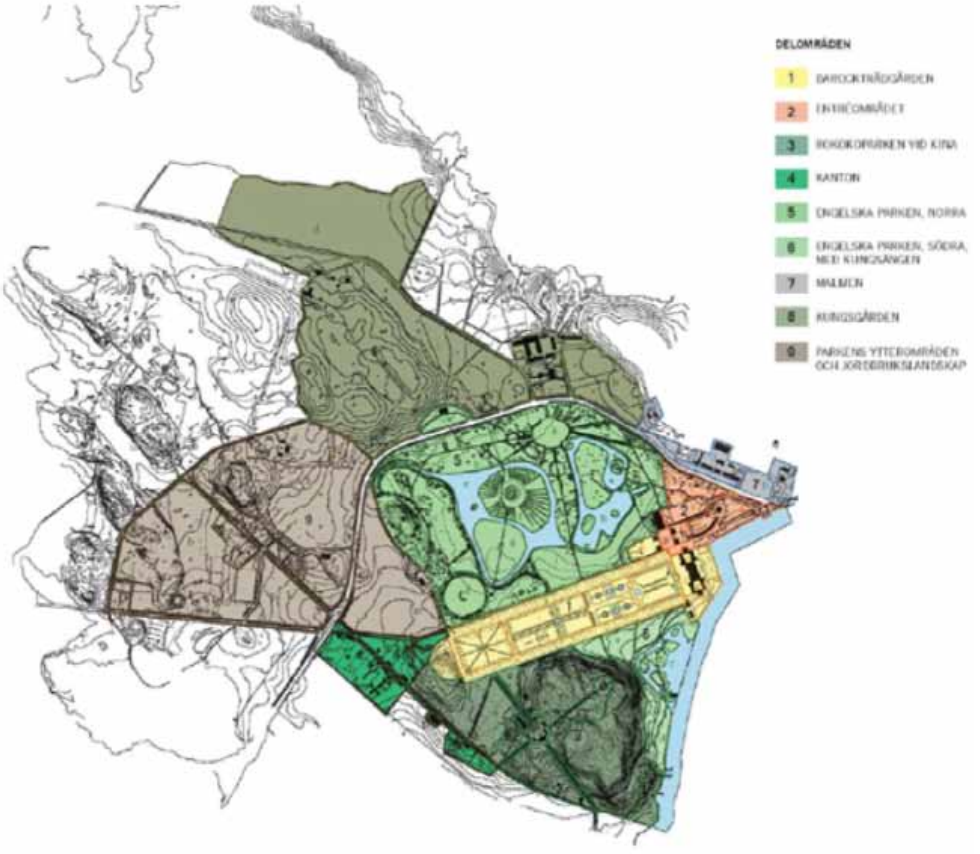


Fig. 3.22: The management areas of the maintenance plan for the Drottningholm state owned listed site. (© Statens Fastighetsverk - Vårdprogram)

1 Baroque Garden

2 Entrance area

3 Rococo Park at Chinese Pavilion

4 Canton

5 English Park, North

6 English Park, South with Royal Demesne

7 Malmen

8 Royal Demesne

9 Park outward area and agricultural landscape

3.11 OTHER DESIGNATIONS

3.11.1 Nature conservation

Natura 2000 is an EU effort to preserve biodiversity in Europe. Two Natura 2000 sites are located adjacent to the area of the road plans – one in Kärsö and one in the south of Lovö (Edeby oak pasture). Natura 2000 is regulated by the Swedish Environmental Code by way of both provisions regarding the protection of the sites and provisions regarding national interests. Canton and Malmen tree line avenues are also protected as habitat protection areas. The whole of Lake Mälaren and its islands and shorelines comprise an area of national interest under the Swedish Environmental Code. Within this area the interventions that cause significant harm to the area's natural values and cultural heritage must not be carried out. Tourism and outdoor life, particularly that which is movement-based, must also be taken into account.

3.11.2 EKERÖ MUNICIPALITY

The general plan (Översiktsplan) for the Ekerö municipality 2005 states that the area of national interest and the most important natural and cultural environments on Lovö should be protected. A new general plan for 2015 – 2030 with a vision for 2050 is being prepared. The municipality's cultural environment programme from 1988 recognises that Drottningholm highlights important parts of the municipality's history. The conservation of the urban area of Malmen, adjacent to the World Heritage property, is regulated by the Master Plan of Ekerö Municipality.

3.12 CONCLUSION: OUTSTANDING UNIVERSAL VALUE, PROTECTION AND CURRENT DEFICITS OF THE WORLD HERITAGE PROPERTY

The World Heritage property 'Royal Domain of Drottningholm' encompasses a unique whole of a royal estate with the Drottningholm Palace, the Palace Theatre, the Chinese Pavilion, Canton Village, the gardens and part of Malmen. Visual connections and interlinkages with the surrounding agricultural landscape have been a key design concept in the historic development of Drottningholm Palace and gardens and form therefore an important part of the Outstanding Universal Value of the property. Consequently, it is essential to preserve not only the World Heritage property's area enclosed by Ekerö Road, but also its context and setting on Lovö island, because this relationship is a vital element for the understanding and the function of the whole Royal Domain.

At present, the World Heritage property is protected by both the Swedish legislation and its status as World Heritage property. Besides that, a buffer zone has been proposed. Additionally, a Management Plan which includes a vision for the coming thirty years with regard to the sustainable development of the World Heritage property has been outlined between 2007 and 2012.

However, the overview provided in chapter 3 shows that the World Heritage property currently shows deficits in terms of its spatial quality. This is particularly true for the transition areas between the World Heritage property and Ekerö Road. Especially the entrance area at Malmen, the area of Karusellplan and its surroundings and Canton village, where the property is connected via the two valuable tree line avenues Lovö Kyrkallé and Skolallén to the its surroundings on Lovö Island, show shortcomings at present.

These deficits are on the one hand related to Ekerö Road which forms a spatial barrier in the World Heritage property since several decennias. But on the other hand, they are also related to shortcomings in the traffic and visitor's management of the World Heritage property. Especially Canton appears currently as the 'backside' of the World Heritage area, despite this valuable part of the property has the potential to be developed into a 'second entrance' to the World Heritage property which connects the property and Lovö Island.

4 DESCRIPTION OF THE CHANGES – STOCKHOLM BYPASS AND REMODELLING OF THE EKERÖ ROAD

This chapter provides a brief description of the projects with regard to the questions assessed in the HIA. All project documentation can be downloaded on the Swedish Transport Administration's website (www.trafikverket.se).

The plan for the Stockholm Bypass has legal binding. The construction started in 2015 and will be completed in 2026. The parts of Stockholm Bypass concerning Ekerö Road, including the junctions, will start in 2017. Construction time is estimated for 3 years until 2020-2021. The estimated costs for Stockholm Bypass are 3.1 billion €.

In the Ekerö Road section through the World Heritage property the construction can start when the plan for Ekerö road has legal binding which is estimated for spring 2018.

4.1 NEED FOR CHANGE

The regional development plan for Stockholm (until 2035) forecasts a continuing increase in population growth. Demand for housing in Stockholm and the surrounding municipalities, including Ekerö, will continue to grow. The population of Ekerö Municipality is expected to grow with 20 % until 2030 according to the municipality's general plan. The municipality of Ekerö on the islands in the Lake Mälaren has at present one permanent road connection to the mainland and to Stockholm which is the Ekerö Road No 261 through the World Heritage property 'Royal Domain of Drottningholm' and its proposed buffer zone. The Ekerö Road widening aims at improving the overall traffic situation and public transport between Ekerö Municipality and Stockholm. By 2035 traffic is expected to increase with 22%, from today's 23.000 vehicles to 28.000 vehicles per weekday through the World Heritage property. The traffic was 16.900 vehicles per weekday in 1991, when Royal Domain of Drottningholm was inscribed on the World Heritage List.

The Ekerö Road project is not part of but closely linked to the E 4 Stockholm Bypass project which is a new 21 km long north-south motorway link west of Stockholm, of which 18 km as a tunnel. The section through Lovö will be constructed completely as a tunnel with two openings in the proposed buffer zone of the World Heritage property. These junctions will connect the motorway with Ekerö Road. They will be located about 0,9 and 2.1 km southwest of the World Heritage property's boundary in the proposed buffer zone (please compare Fig. 4.1 and 4.2).

The Stockholm Bypass will provide the Ekerö Municipality with two new permanent road connections and increased accessibility to the mainland, which in turn will facilitate the housing and business growth in the region. The new connections to the mainland are estimated to change the traffic mobility pattern and the increase in traffic growth on Lovö following the expansion of Ekerö Municipality will be around 25 %. If measures are taken to prevent evasive traffic through the World Heritage property, the road plan with improved public transport and cycle lanes gives an opportunity to limit traffic going through the Drottningholm World Heritage property.

As described in Chapter 1.3, a decision by Swedish Transport Administration (Trafikverket) to establish a control and monitoring program has been taken in 2016-10-10. It states that monitoring will be done continuously on Ekerö Road and results will be reported annually to the parties of the agreement. A threshold of 27.000 veh./weekday in Phase 1 when the Ekerö Road widening has been completed and 23.000 veh./weekday when the Stockholm Bypass is opened has been defined. If these threshold values are exceeded, Swedish Transport Administration will convene the parties for the development of an action plan.

4.2 STOCKHOLM BYPASS ROAD DESIGN

As mentioned before, for considerations of natural and cultural heritage of natural and cultural heritage 18 km of the 21 km long Stockholm Bypass will be built in tunnel under the whole Lovö island. Two junctions are planned to connect the motorway with the currently existing Ekerö Road. These junctions will be located near the World Heritage property boundary (at a distance of 0.9 and 2.1 km respectively) in the proposed buffer zone / natural heritage reserve.

Fig. 4.1 a, b: Left: View from the World Heritage property towards Bypass Stockholm. The junctions between Ekerö Road and Stockholm Bypass will not be visible from the World Heritage property. Right: The visualization shows a vista from the planned junction towards the World Heritage property (©Swedish Transport Administration).

Ekerö Road between the roundabouts will be widened from 3 to 4 lanes, it will be slightly moved aside and will, partly, be placed deeper than today. It will be widened also towards Ekerö and therefore there will be a new small tunnel beside the present Lindö tunnel.

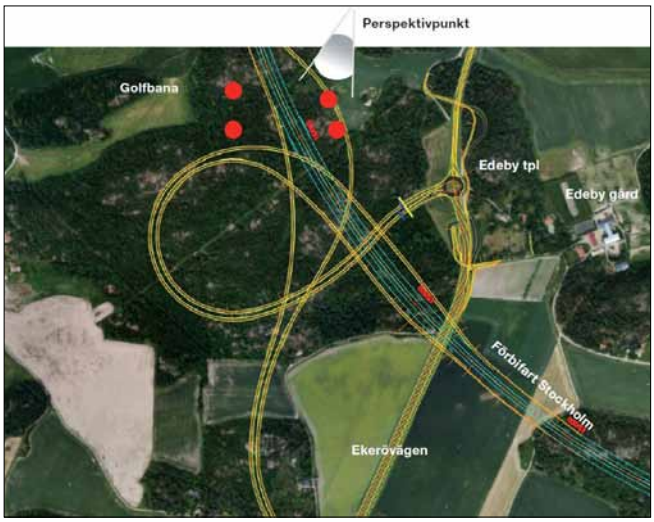
During the planning process there were several alternatives for the location and design of the junctions. In the decision for permission (Tillåtlighetsbeslut) in 2009 (see HIA1, p.9) the government clearly pointed out the importance to show the greatest respect to the high values of nature and culture in the area, and avoid any threats to the OUV of the World Heritage property 'Royal Domain of Drottningholm'. It was also stated that the further planning should be done after consultation with the different stakeholders, such as for example Ekerö Municipality, the Swedish National Heritage Board (Riksantikvarieämbetet), and the National Property Board Sweden (Statens Fastighetsverk).

The alternative that was finally chosen, in 2011, was not the first choice of the cultural heritage point of view by National Heritage Board and National Property Board who advocated for the alternative further south from the World Heritage property on the island Lindö. This alternative was considered to have longer tunnels and therefore more excavation of the rock, with higher costs and larger environmental impact. This alternative was not be accepted by the Ekerö Municipality, because it would counteract the development of the community and difficult the access to outdoor life. The difference between the alternatives regarding traffic amount was negligible.

As there was no possibility to reach consensus, due to conflicting interests, the Swedish Traffic Administration finally made a decision, connected with an agreement with the stakeholders. The purpose was to ensure the respect to the natural and cultural values, and still achieve the objectives with the project. (see Chapter 1.3 and HIA1, chapter 1.4)

Fig. 4.2 a, b: Visualizations of planned widened Ekerö Road and planned junction with Stockholm Bypass (© Swedish Transport Administration)

In the proposed buffer zone / natural reserve four ventilation stations will be built. To limit the visibility of the ventilation buildings with a height of ca 10 m they are planned to be located in forested areas. Since HIA Phase 1 was compiled in 2012, the existing plans of the junctions and necessary technical buildings have been further elaborated and modified so. (Detailed information about these measures is provided in the document "*Fördjupat gestaltningsprogram Förbifart Stockholm,2014-12-05").*



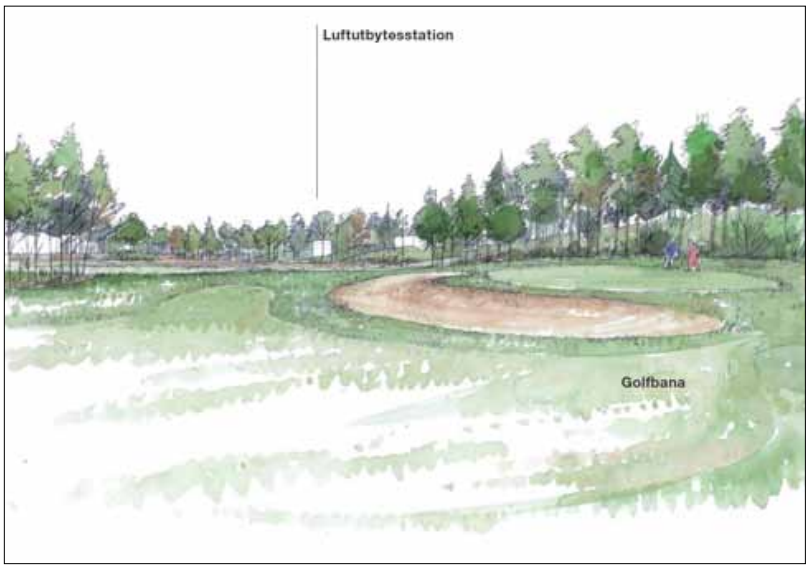


Fig. 4.3 a, b, c: Location of planned ventilation shafts for Stockholm Bypass (top) and sketch of planned ventilation shafts (bottom). (© Swedish Transport Administration, Fördjupat gestaltningsprogram Förbifart Stockholm,2014-12-05)

4.3 EKERÖ ROAD

4.3.1 PROJECT OBJECTIVES

Since Ekerö Road is currently the only access from Ekerö to the mainland, the remodelling of Ekerö Road aims at improving the traffic situation between Ekerö Municipality and Stockholm. The aim is at present to make public transport more competitive by faster, more reliable and more effective bus connections without a major widening the road itself. One new traffic lane will be added to use for public transport during the peak period to enable a faster public transport service.

The road plan includes:
- construction of an additional traffic lane for public transport
- cycle path
- widening of the Drottningholm bridge

According to the Swedish Transport Administration's new planning process, this road plan offers no alternative corridors since the plan refers to the remodelling of an existing road.

The entire stretch of the road plan comprises an overall extension of the road envelope of 74.000 m2, which will have an adverse effect on cultural heritage. The project design aims at minimising this impact by careful design of the road and junctions.

The project objectives are based on the overall transport policy functionality and consideration objectives.

Functionality objectives – availability:
- Accessibility for vehicle traffic including buses and bicycles must be improved.
- The share of public transport must increase.

Consideration objectives – health, safety and the environment:
- The proposed buffer zone of the World Heritage property and the natural values and cultural heritage of the areas of national interest are to be preserved, cared for and developed.
- Traffic safety must be improved.

When taking into account predicted traffic growth, in 2035 journeys with public transport will be up to 20 minutes faster when compared to a situation with no remodelling. Bus services are expected to be more competitive even outside of peak hours by having access to more lanes. However, the bus lanes are not regulated by the road plan but by local traffic regulations. Improvements for car traffic will not be as pronounced as for bus traffic but the travel time of 12-13 min in the afternoons today is not expected to increase compared to the remodelling of the Ekerö Road.

4.3.2 ROAD DESIGN

The design of Ekerö road and of the connections to the Stockholm Bypass has been made in consultation with the Swedish Transport Administration, the Municipality of Ekerö, the National Property Board of Sweden and the Swedish National Heritage Board. This is in accordance with the agreement concluded by the parties in 2011 after extensive consultation.

A detailed design proposal for the section through World Heritage property includes the design of lighting, signposting, other street furniture, surface materials and ground and vegetation.

No separate underpasses for pedestrians and cyclists are proposed for consideration of the cultural environment (Trafikverket: *MEMO: ROAD ARCHITECTURE – AN ENHANCED DESIGN PROGRAMME. Road 261 (Ekerövägen) through Drottningholm*, Stockholm 2015).

4.3.2.1 SECTION THROUGH PROPOSED BUFFER ZONE

The section from Edeby to Canton Village connects to the work plan for the Stockholm Bypass. The existing cycle paths on either side of the road are planned to be replaced by a new path which combines these cycle lanes on the south side of the road. Hence, the Ekerö Road plan includes a new four-metre-wide pedestrian and cycle path on the south/east side. This solution was chosen to eliminate the need for a cycle bridge at Edeby. A three-metre-wide grass division strip will be located between the pedestrian and cycle path and the road. The road width through the proposed buffer zone is widened to a total road area of 32,5 m.

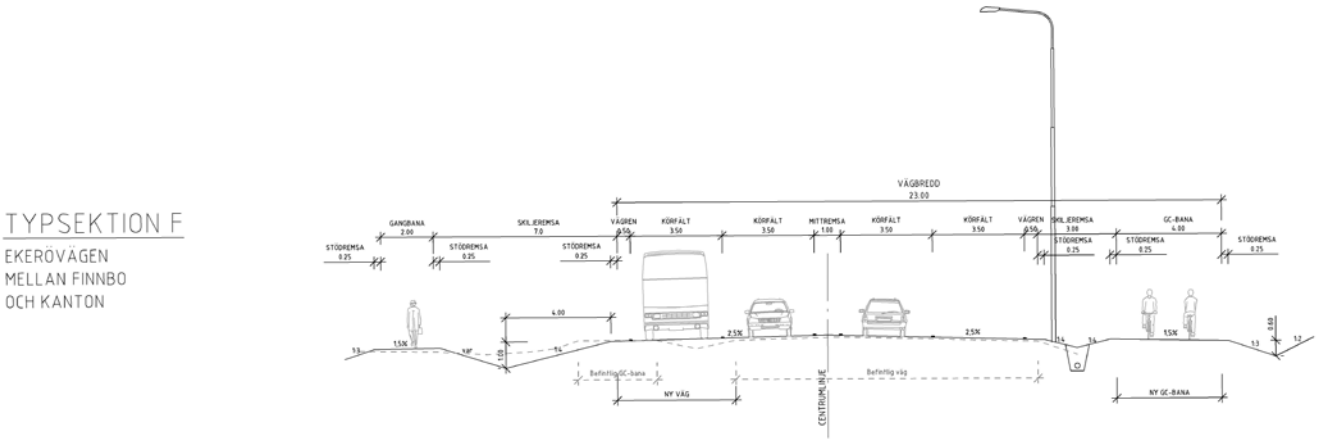


Fig. 4.4a, b: Visualization and section of planned widened Ekerö Road in the proposed buffer zone of the World Heritage property. (© Swedish Transport Administration).

4.3.2.2 SECTION THROUGH THE WORLD HERITAGE PROPERTY

In general, the traffic speed is planned to be lowered by 10 km/h in the World Heritage property. The Ekerö Road section from Edeby junction in the proposed buffer zone to Vilan within the World Heritage property will be lowered with 10 km/h from 70 km/h to 60 kmh. At Vilan the speed limit will be lowered from 50 to 40 km over the Drottningholm bridge.

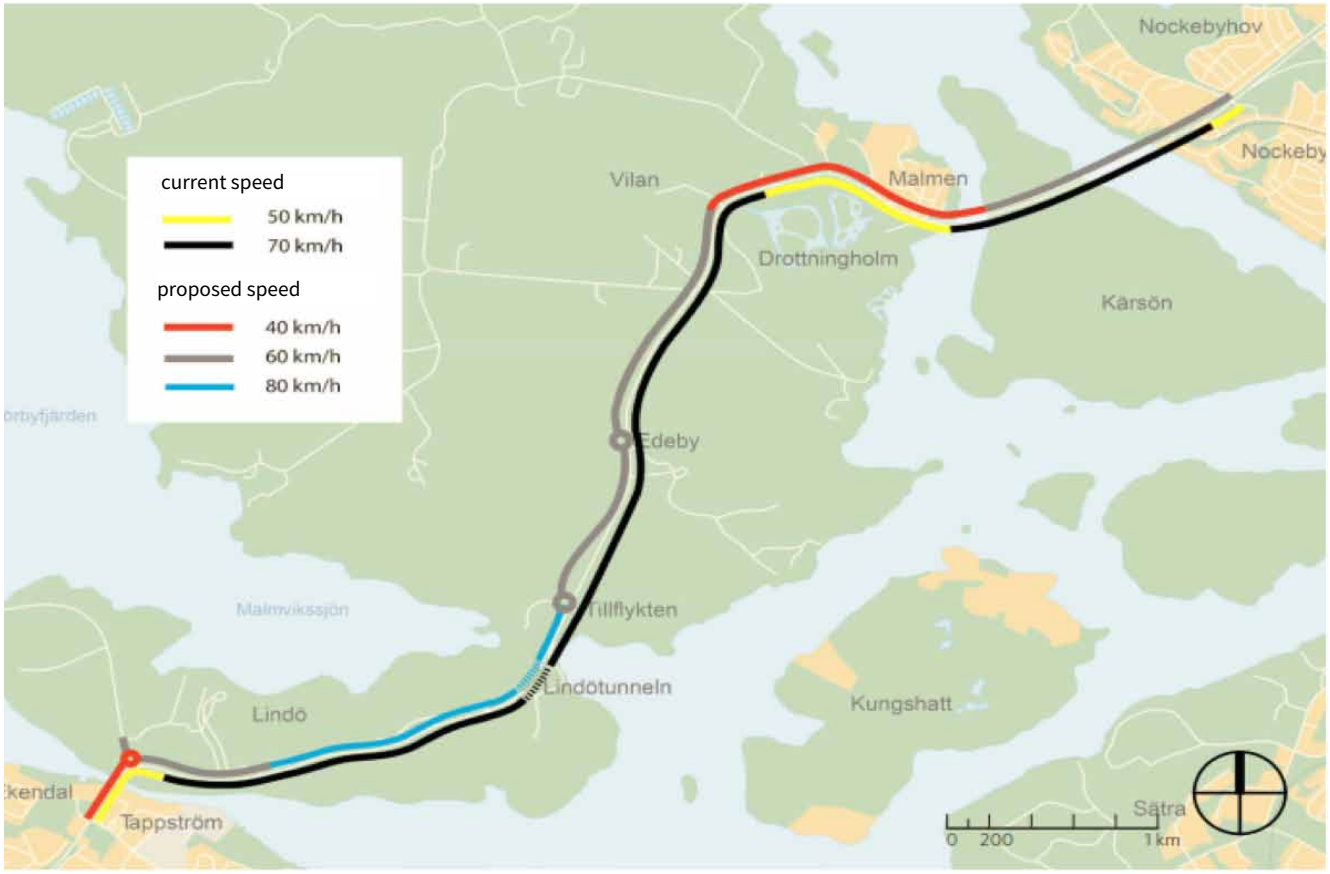


Fig. 4.5: Speed limits on Ekerö Road between Edeby and Drottningholm Bridge (© Swedish Transport Administration)

The section on Lovö up to Vilan within the World Heritage property (see Fig. 4.5) is planned to have regular-width lanes of 3.5 metres, the same as today. The section from Canton - Vilan through the World Heritage is planned to have narrower lanes of 3,25. In the most sensitive area of Drottningholm, the road width is around 17 metres, which is narrower than the Vilan-Hemmet section, where the width is 19.8 metres.

After the opening of the Stockholm Bypass, Canton is expected to become a more important entrance to the World Heritage property. The nearby Drottningholm school with around 60 pupils use the bus stops at the Canton intersection. The intersection will still be regulated by traffic lights, and the westbound bus stop will be relocated beyond the intersection. The pedestrian crossing will be retained in its current position. The new 3.5-metre-wide pedestrian and cycle path, which will replace the existing cycle paths on either side of the road, will be laid on the south/east side of the road, with a three-metrewide grassed dividing strip. The new pedestrian and cycle path is 0,5 m narrower than normally foreseen according to the Swedish traffic legislation.

Fig. 4.6 a, b: Existing situation of intersection between Ekerö Road and Lovö Kyrkallé and planned design of the intersection of Ekerö Road with Lovö Kyrkallé and Skolallén at Canton (© Michael Kloos / Swedish Transport Administration)

Due to the current deficits in this area (please compare 3.8), the National Property Board has developed a new proposal for the Canton area during the HIA process. The investigation shows that the Canton area was formed in the first place in the 1700s and the western part of the Palace area was integrated with the English park. The Ekerö Road obtained its current alignment in the 1930s and has gradually been widened since then. As a result, the two tree line avenues Lovö Kyrkallé and Skolallén have been increasingly disrupted in functional and visual terms.

Since the intersecting tree line avenues together with Gothic Tower are the architectural motifs that have the greatest cultural significance for the area, the National Property Board plans to strengthen Lovö Kyrkallé and Skolallén so as to reduce the negative impact of the Ekerö Road. Measures in the area of State Owned protected area will be carried out in conjunction with road construction works.

In detail, it the following measures are planned:

- 1. Lovö Kyrkallé closest to Ekerö road will be cleared of stones and roadside straightened up. Lovö Kyrkallé will be extended until Ekerö road and connected to the bicycle path.
- 2. The trees in the Lovö Kyrkallé will pruned so that the line of sight is intact.
- 3. Lovö Kyrkallé will be supplemented with trees on both sides of the Ekerö road
- 4. The intersection between Lovö Kyrkallé and Skolallén will be reduced so that the breakpoint will be clarified.
- 5. Skolallén will be supplemented with avenue trees.
- 6. Shrubbery adjacent to the tree line avenues will be cleared away.

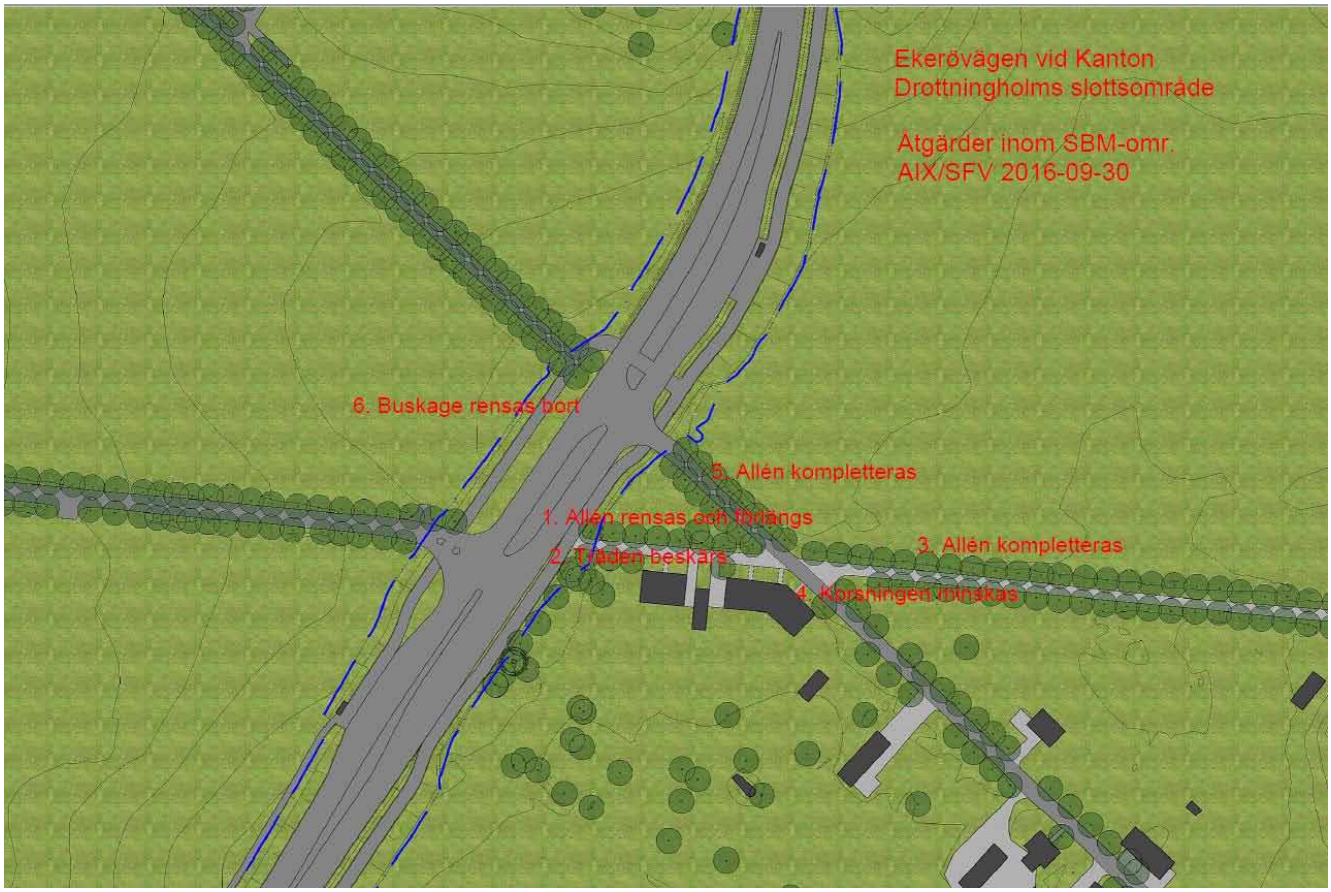


Fig. 4.7a, b: Planned situation of Lovö Kyrkallé (top) and National Property Board's new design for the Canton area (bottom). (© Swedish Transport Admimistration / National Property Board).

4.3.2.3 KARUSELLPLAN

Karusellplan was a place for festivities in the Drottningholm Palace ensemble. It is currently used as a park-and-ride facility for commuters from Ekerö to Stockholm, with a capacity of 250-300 cars and free parking. Currently (October 2016) a new parking plan with restrictions (fees and time) for commuter parking is been developed together with the National Property Board which is responsible for the parking regulations in Drottningholm.

Fig. 4.8: Design of junction between Karusellplan and Ekerö Road (© Swedish Transport Administration)

4.3.2.4 MALMEN AND DROTTNINGHOLM PALACE ENTRANCE AREA

At Malmen, the existing pedestrian and cycle path area will be requisitioned for the remodelling of the traffic lanes, whilst the new pedestrian and cycle path will be laid on the south/east side of the road with kerbstones and a grass strip of variable width to separate it from the road. Like in the section between Edeby and Hemmet, the new cycle path will be 3.5 m wide which is smaller than normal regional cycle paths in Sweden. Two connecting roads from Malmen will be closed to improve traffic safety and the flow of traffic past Drottningholm. The approach road which remains constitutes a part of the historic road structure. Lane widths will be 3.25 metres and the design speed limit is 40 km/h. The total road surface will be the same as today.

Due to the current deficits in terms of function and spatial quality in the entrance area of the World Heritage property (please compare 3.9), the National Property Board and the Swedish Transport Authority have developed a new design proposal during the HIA process. The starting point for this development was when the road plan was presented to the National Property Board in spring 2016 it showed that the remodelling of the road at the eastern entrance area would mean that at least four major trees nearest to the road would be cut down. Hence, the area would have been exposed to the road without protective vegetation. Another effect would have been that the newsagent kiosk would have become even more visible from the road and for visitors to Drottningholm.

The changes that the investigation and the subsequent dialogue between National Property Board and Swedish Transport Administration have resulted in is that the road plan has been modified and a vision for the eastern entrance area has been established. The plans have been agreed on by National Property Board, Drottningholm Palace Administration, National Heritage Board and Swedish Transport Administration.

In detail, the proposal includes the following measures:

- 1. Pressbyrå kiosk is planned to be removed.
- 2. The old country road stretching between the Palace Stables and Malmen will be restored. The road is lined with avenue trees, tentatively lime trees.
- 3. The lime tree avenue leading into the Theatre parking lot will be supplemented and completed until Ekerö road. Where the two avenues meet a small star place will be designed .
- 4. Kvarnbacken on the other side of the Ekerö road will be supplemented with avenue trees in order to tie together both sides of the road.
- 5. Paving in the Palace area shall generally be gravel. Asphalt coating on the avenue at the waterfront quay will be taken away and replaced by gravel.
- 6. A larger gravel place adjacent to the steamboat quay will be established. New walkways to Karamellan and bus stop from the boat quay will be arranged.
- 7. Theatre car park will regain its original geometry by the removal of today's smaller lawns closest to the road. The sidewalk on the way to the parking lot will be removed.

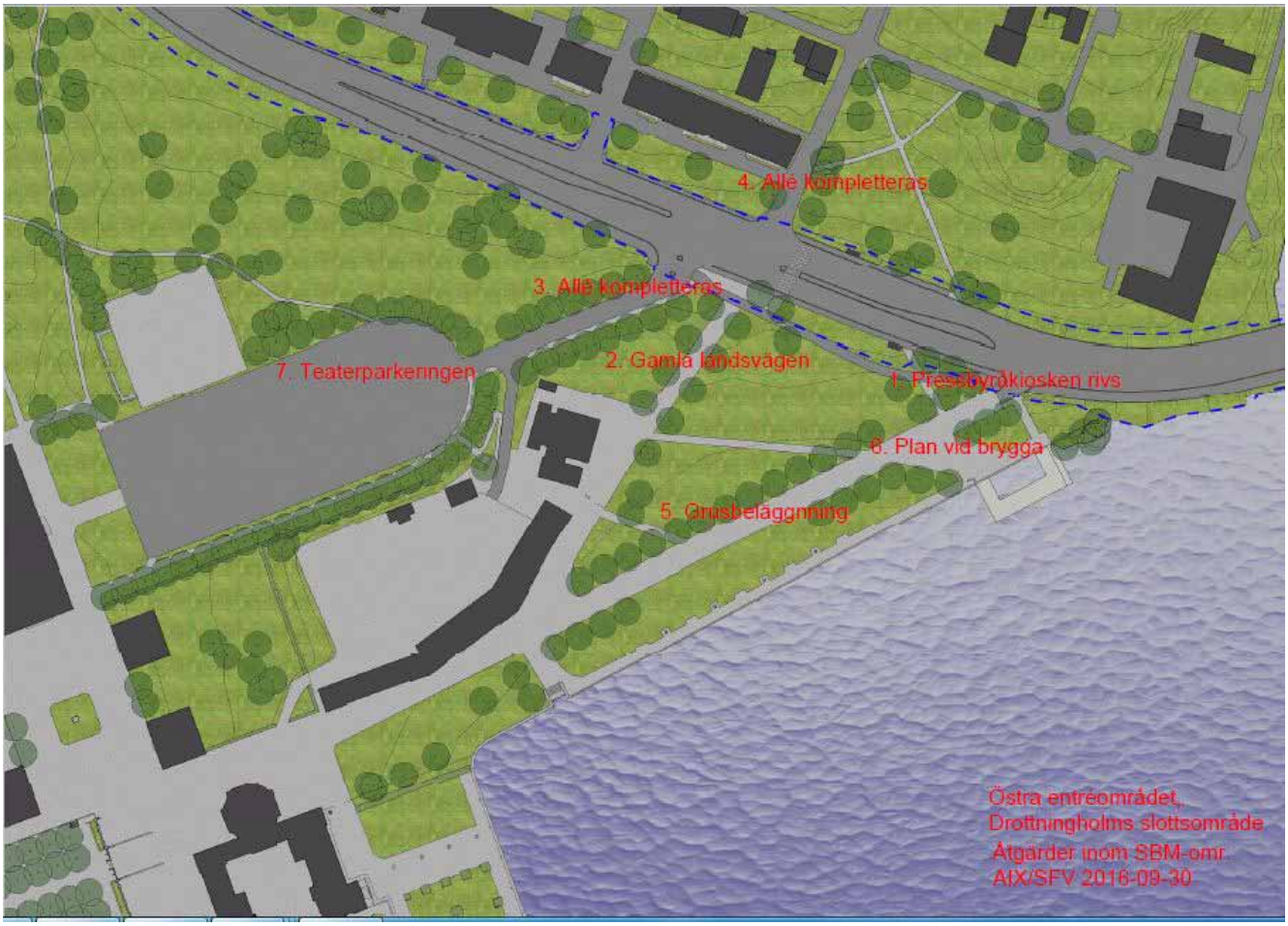


Fig. 4.9: National Property Board's new design of the Eastern entrance area. (© National Property Board)

4.3.2.5 DROTTNINGHOLM BRIDGE

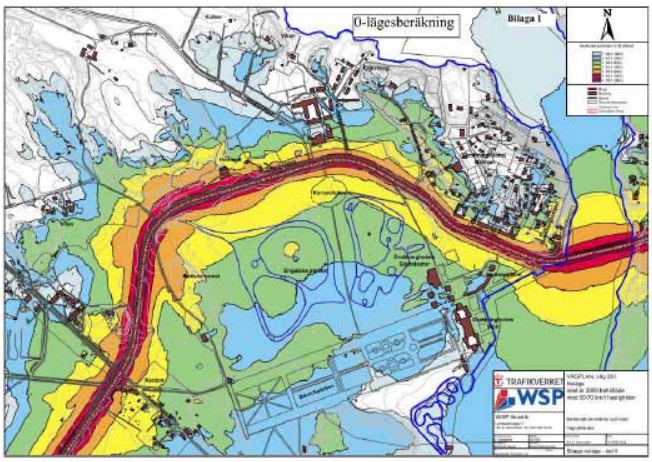
The Drottningholm bridge will be widened with 0,5 meters on each side. On the southern side of the bridge the lighting will be in the bridge rail in order to keep the views towards Drottningholm Palace and minimize the impact of the bridge.

Fig. 4.10a, b: Ekerö Road / Drottningholm Bridge. Current and planned situation (© Swedish Transport Administration)

4.3.3 ENVIRONMENTAL MANAGEMENT

4.3.3.1 NOISE AND VIBRATION

Without any protective measures, noise levels will increase by between 1-6 dB (A) at current levels along the entire Ekerö road by 2035 due to changes in traffic rates. However, through the World Heritage property, noise levels will decrease as a result of speed limit reductions of 10 km/h compared with current speed limits.



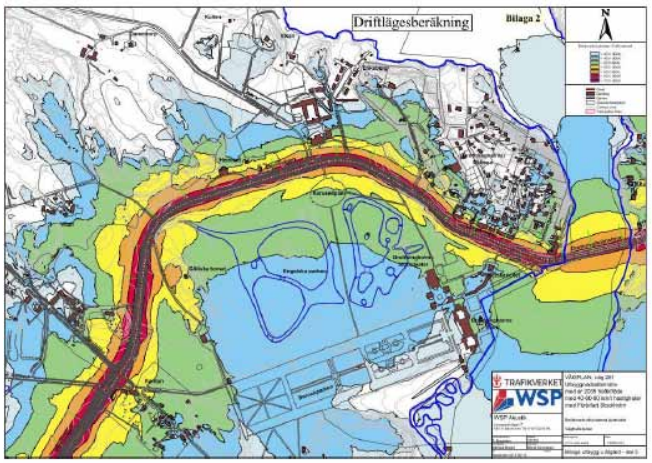


Fig. 4.11 a, b: Noise and vibration: 0-alternative and planned situation (© Swedish Transport Administration / WSP)

The Swedish Transport Administration has the responsibility to ensure that noise levels generated by the traffic from national roads are kept to an acceptable level in the indoor environment in residential buildings. If noise reduction is needed, an offer is made to building owner for noise reduction measures. Suitable noise reduction regarding the cultural heritage value of the building is chosen in cooperation with the National Property Board. However, the owner can reject the offer. The noise reduction works are expected to be finished before the road work begins.

A noise and vibration monitoring programme for the State owned listed site will be established both during construction works and after completion. Measures for noise reduction include restoration of an existing noise wall in Canton and options for indoor noise reduction. Measures within State Listed Buildings must be authorized and carried out under expert supervision. For buildings which are not State Listed Buildings records must be retrieved from each property owner and/or through inspection. Eventual measures shall be adjusted to the building's cultural-historical value. Even for these buildings the window measures for traffic noise protection may only be done on the inside, mostly by reversible additional window glass. The residential buildings to be investigated have been chosen from the noise pollution calculation made when the sound levels at the façade exceeds the threshold level. The measures chosen and drawings have to be approved by the Swedish National Heritage board according to regulations.

4.3.3.2 RISK ASSESSMENT FOR INDIVIDUAL BUILDINGS

A risk monitoring programme is established concerning the risks during construction period. The risk zone is 150 m around the construction area.

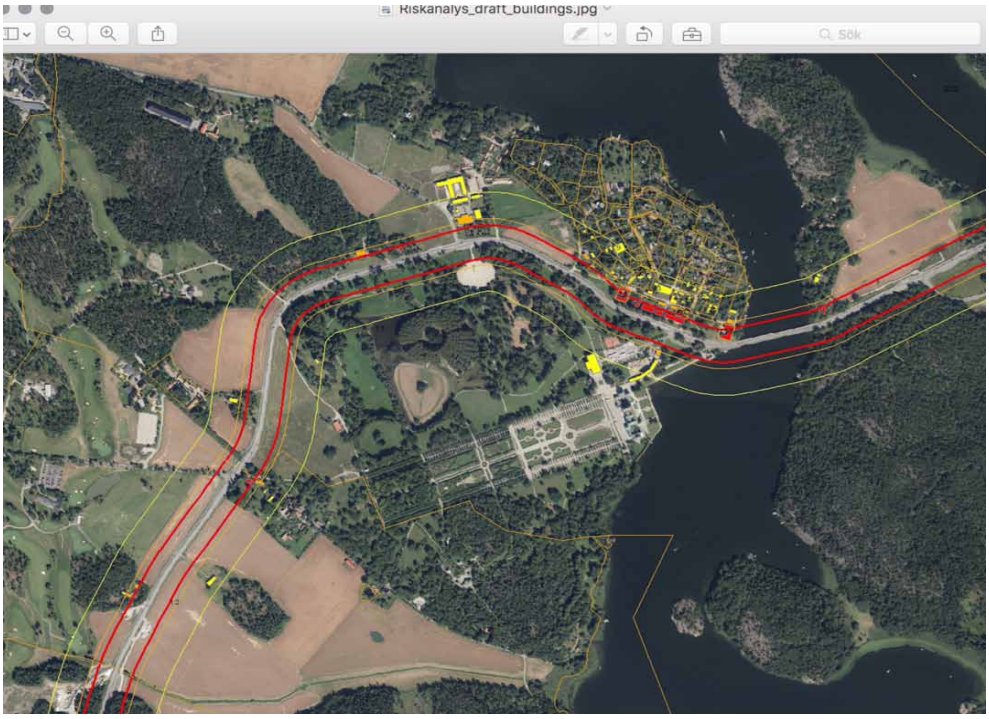


Fig. 4.12: Risk Analysis of buildings ; Risk Management Programme (© Swedish Transport Administration)

4.3.3.3 ROAD SURFACE WATER MANAGEMENT

The Ekerö Road runs along the Ideal Landscape Garden ponds which are today in a very vulnerable condition. Investigations of the dams conducted by Swedish Transport Administration shows that the main problem regarding the water quality in the dams originate from surface water from the surrounding farm land and water that is lead from the nearby golf course .

To improve this situation, Swedish Transport Administration has designed the water management through open ditches where the water will be purified through sedimentation before it reaches the dams. The new water management design will lead to a lower contribution of

nutrient originating from the remodelled road than the levels of the existing road. A control programme for measuring contamination levels in the dams during construction and 2 years after will be initiated.

4.4 ENVIRONMENTAL IMPACT ASSESSMENTS FOR STOCKHOLM BYPASS AND EKERÖ ROAD

Environmental Impact Assessments (EIAs) have been approved for both projects according to Swedish legislation. On two occasions (2010 and 2012), the County Administrative Board, who adopts the EIA's, decided that the Stockholm Bypass project is likely to have a significant impact on the environment. In both decisions, the County Administrative Board noted that the Stockholm Bypass with adjoining Ekerö Road affects an area with many prominent conservation interests, such as areas of national interest for nature and cultural heritage such as the Drottningholm National/World Heritage property.

4.4.1 ENVIRONMENTAL IMPACT ASSESSMENTS FOR STOCKHOLM BYPASS AND EKERÖ ROAD

The following summary tables are compiled and translated from the Environmental Impact Assessments for the purpose of this HIA. The assessment definitions and grading are translated according to the EIA in question. Please note that the EIA's are made considering the project status at the time of the EIA and do not fully reflect the current project situation.

4.4.1.1 EIA STOCKHOLM BYPASS

The EIA on Stockholm Bypass lead to the following findings:

Issue	Impact	Assessment grading in EIA
Reduction of traffic	Potential reduction of traffic through Drottningholm.	positive
Cumulative impacts on the landscape; natural geographic structure, scale and adaptability in terms of location, volume and movement in the landscape.	Impact of tunnel openings, widening of the road and ventilation towers. Roundabout at Edeby intrudes on one of the historic farms. Physical and perceived barrier effect and broken historical connections. Audible and visual disturbances.	moderate negative

Tab. 4.1: Summary of findings of the EIA for Stockholm Bypass. (source: EIA 2010 / 2012)

4.4.1.2 EIA Ekerö Road (Road 261)

In 2014-11-13, the EIA was approved by the County Administrative Board of Stockholm
In summary, the following proposals for further action were made:

- Road traffic load is the single most significant factor for the negative the impact on the cultural environment of the World Heritage, for the national historical building.
- and in the national interest area.
- A limitation of traffic using e.g. road tolls should be considered in the future when Bypass Stockholm has been opened.

Fig.4.13: Map showing the areas assessed in the EIA for Ekerö Road. (© Trafkikverket: Miljökonsekvensbeskrivning för vägplan. Väg 261 Ekerövägen, Tappström-Nockeby, 2014-06-10 rev 2014-10-30)

In keywords, the EIA assessment on Ekerö Road lead to the following conclusions:

Issue / Area	**Impact**	**Assessment grading in EIA (if assessed)**
Landscape	Widening of the road means a more marked road on Lindö and Lovö. Between Edeby and Canton visual connections and sightlines in the open agricultural landscape and views towards Drottningholm will be affected in a more tangible way.	Moderate negative impact compared to the current situation
Landscape of Drottningholm	A number of measures in the design of the road leads to improvements. The overall asphalt surface and land for pedestrian and bicycle path will not be wider than the current road area on the main part of the road. However, surface to be used by car and public transport is increasing and greater future traffic will make road more dominant than today.	Small to moderate negative impact
Overall landscape	The significant increase in traffic which will enhance the road's negative impact on the landscape is as large both in zero alternative and Ekerö Road project. In Ekerö Road project road is more tangible.	Moderate negative impact

Issue / Area	**Impact**	**Assessment grading in EIA (if assessed)**
Cultural environment: Edeby – Canton in the proposed buffer zone	Between Edeby and Canton the widening of the road will add to the road's dominance in the historic farmland with an exceptional long continuity Prehistoric settlement at Rinkeby will possibly be removed. Visual sightlines in the open agricultural landscape and view to Drottningholm will be affected.	Moderate negative impact
Canton Village	The present negative visual impact is strengthened by the new road widening The intersecting tree line avenues are further fragmented EIA proposes mitigation by lowering speed at Canton for reduction noise and noise protection measures and for reviewing the traffic solution	Small to moderate negative impact (provided that new avenue trees are planted)
Through World Heritage	More negative consequences due to added encroachment in historically valuable environment Ekerö road will be emphasized despite narrower lanes, the ability to read the historical landscape is obstructed, increase of visual and physical barrier between the English Park with Royal Palace and Palace Theatre and Malmen. Positive road design improvements include smaller encroachment in parkland, remodelling of existing slopes, speed reduction with 1-4 db lower noise levels.	Moderate negative impact
Natural environment	Consideration to the area's natural values limit the loss of natural environmental values. Largest negative impact is on biotope protected and other important trees. During construction loss of smaller habitats and slightly increased barrier effect. Compared to 0-option, the negative consequences become larger. No impact on Natura 2000 areas No impact on national interest Mälaren including islands and shore areas.	Small negative impact
Accessibility and recreation	Both positive and negative consequences for cyclists and pedestrians. Noise reduction positive for recreational values. Despite improvement noise levels near Ekerö Road is still disturbing and impair recreational experience.	Positive and negative impacts

Issue / Area	Impact	Assessment grading in EIA (if assessed)
Noise and vibrations	Ekerö Road causes today high noise levels. Planned noise barriers are not feasible in Canton and Drottningholm. As a whole, in 2035 the noise situation will be as today or improved.	Neutral or improved (slight positive) impact
Surface water	Current levels exceed guideline limits between Canton and Drottningholm ditches/ponds.	
Risk and security	Transport of dangerous goods causes a risk for buildings within 25 m from the road, in Malmen and the stables at Drottningholm Palace. Nearest buildings in Canton Village have a high risk level today but they will be removed from the risk zone.	
Climate	Share of public transport is expected to increase. The increased traffic volume will result in larger carbon dioxide emissions. They will be somewhat lower after the road development project and its construction, operation and maintenance in comparison to the 0- option.	
Environmental impact during construction (3 years)	Noise pollution, vibrations and limitations of accessibility and availability.	Small to large negative consequences

Tab. 4.2: Summary of findings of EIA on Ekerö Road 261 (201) and key impacts regarding World Heritage (Ref. Miljökonsekvensbeskrivning för Vägplan, Väg 261 Ekerövägen, Tappström- Nockeby, Granskningshandling. 2014-10-30. www.trafikverket.se)

4.4.2 STATEMENTS DURING CONSULTATION PROCESS OF EKERÖ ROAD PLAN

4.4.2.1 CHANGES TO THE DROTTNINGHOLM STATE PROTECTED AREA APPROVED BY THE SWEDISH NATIONAL HERITAGE BOARD 2015-10

In the review of the Ekerö Road plan (2015-01-19) the National Heritage Board highlights that considerable improvements regarding spatial interrelations and noise are not achieved although improvements are made due to lower speed limits. The improved traffic situation through the World Heritage property after the opening of the Stockholm Bypass still needs to be investigated. The whole of World Heritage property should have the same very low traffic speed limitation.

Several of the comments of the National Heritage Board have been taken into consideration in further road planning process, e.g. the tree planting, surface water management, entrance area at Malmen, monitoring program for individual buildings concerning vibration and noise and ground water levels.

County Administrative Board of Stockholm (2016-02-05) approved the Ekerö Road Plan according to the Environmental Impact Assessment. The County makes an assessment about Area of national interest, but has no mandate to make an assessment of the World Heritage property.

4.4.2.2 THE NATIONAL PROPERTY BOARD (2016-03-14)
Maintains the comments made in review (Granskningsutlåtande 2014-12-19 SFV dnr 234-1640/09.). Among them:

- The National Property Board highlights the importance of low traffic speed on the whole stretch of Ekerö Road over Lovö island in order to reduce noise and the barrier effect of the road.
- The same low speed limit should be within the whole World Heritage property; from Canton Street / Lovö Church avenue and Drottningholm bridge.
- The barrier effect of the Ekerö Road concerning agricultural use will increase due to widening of the road from 11,50 m to 16,00 m and increased traffic volume.

4.4.2.3 EKERÖ MUNICIPALITY (2014-11-28 REV 2014-12-18)
Reports objections on the following issues related to World Heritage:

- Need to include the traffic situation between Nockeby and Brommaplan (Stockholm).
- Material transports during construction period (6-8 years) should be by sea only in order to avoid heavy vehicles on Ekerö Road.
- A ferry commuter connection between Ekerö Centrum and Stockholm City to compensate limited accessibility during construction and to reduce the traffic load.
- Underpasses for pedestrians and cycle traffic in Canton and Dukes' stall.
- Roundabouts at Canton Village and Rörbyvägen are suggested.

4.4.2.4 NON GOVERNMENTAL ORGANISATIONS: *LOVÖ LOCAL HERITAGE ASSOCIATION, FRIENDS OF DROTTNINGHOLM PALACE PARK* AND *ICOMOS SWEDEN*
During the assessment process of this HIA phase 2, the authors of this report were contacted by representatives of *The Lovö Local Heritage Association* (Lovö Hembygdsförening), *Friends of Drottningholm Palace Park* (Drottningholmsparkens vänner) and the former president of ICOMOS Sweden responsible for its statements and activities during consultation period 2010 to 2013. The representatives of the NGOs expressed their concerns about the irreparable damage to the World Heritage property caused by the planned Stockholm Bypass and the planned remodelling of the Ekerö Road. The documents related to these concerns between 2008 - 2010 can be found on *www.icomos.se* webpage (http://www.icomos.se/wp-content/uploads). Furthermore, ICOMOS International has been informed and 2013-07-16 a Heritage Alert proposal was submitted.

In order to give a full overview about the various positions of stakeholders with regard to the two planned Stockholm Bypass, the planned remodelling of Ekerö Road and the two planned junctions connecting these projects, the key points of the statements presented to the authors are summarised in this section.

- According to a summary by Kerstin Westerlund Bjurström (former president of ICOMOS Sweden) the location of the Stockholm Bypass in a tunnel under the Lovö Island has been accepted. The reason for this is the regional and national importance and lack of effective and acceptable alternatives.
- Contrary to the location of the Bypass, the junctions and the remodelling of the Ekerö Road are only seen as an element of local importance which should not be considered more important than a site by Swedish law designated as a "national interest" and by the Convention as a World Heritage. This results in the opinion that an alternative location of the planned

junctions between the Bypass and Ekerö Road, which is further away from the World Heritage property on Lindö but nearer to the centre of Ekerö where most people live, would be technically and economically feasible. Besides that, it would be more reasonable in functional terms because such a solution would make it less convenient to take the road over Lovö and via the World Heritage property to Stockholm instead of using the tunnel bypass.

- A compromise solution would be to move only the junction nearest the Drottningholm Palace and park (0,9 km from World Heritage property) to Lindö to decrease the impact onthe park and the open agricultural landscape. Furthermore, critique is voiced because this junction is planned to be situated near Edeby which is a settlement dating from Younger Iron Age and due to the harm of the hilly landscape. But the main reason to refuse this solution is considered by ICOMOS Sweden the development potential of Lindö.

- It is further stated that the planned widening of Ekerö Road from three to four lanes will be intrusive in the World Heritage property. Moreover, it is criticised that it can never be guaranteed that a broader road will not be used to its maximum in the future. Hence, the widening is considered as unacceptable and useless in a longer perspective. Consequently, it is stated that any measures increasing the flow of traffic through the World Heritage property must be only temporary and removed as soon as the Stockholm Bypass is operational (scheduled for 2026).

- In a letter to ICOMOS International (2012-04-09) ICOMOS Sweden urges that the current plans for the junctions are not compatible with World Heritage Convention, since appropriate alternative available, and that the planned remodelling of the Ekerö Road should not be carried through. Instead after the opening of Stockholm Bypass Ekerö Road should be reduced to two traffic lanes. The placing of the junctions should be chosen with the least destructive effect on the heritage site. The likelihood of a shortcut across World Heritage property to reach the centre of Stockholm should be reduced instead of prioritizing Ekerö Municipality's development plans. A strong criticism is expressed that HIA Phase 1 did not include a comparative study of the alternative solutions for Stockholm Bypass and especially for the junctions nearer the centre of Ekerö.

- According to the Bertil Ottoson, representative of Lovö Local Heritage Association, there is an urgent need to initiate and implement other solutions for a sustainable traffic between Ekerö and mainland, particularly more effective collective traffic by electrical ferry boats on Lake Mälaren.

4.4.3 HIA PHASE 1 (JANUARY 2012)

The Heritage Impact Assessment Phase 1 (January 2012) concludes that the traffic through Drottningholm has the main impact on the OUV of the World Heritage property. All measures should aim at reducing already the present through traffic as well as the estimated traffic growth and amend the historic character and context of the Royal Domain of Drottningholm.

The HIA Phase 1 pointed out that the Stockholm Bypass junctions and technical installations will as such have an irreversible adverse impact on the setting and cultural context of the proposed buffer zone of the World Heritage property. The past and present relationship of the Drottningholm Royal Court with the whole Crown Estate on Lovö is essential for the understanding and appreciation of the World Heritage.

5.5 Summary of Impacts on OUV Key Features

This is a technical summary of the assessments. It will be developed and adjusted in the next phases of the HIA process.

VALUE OF HERITAGE ASSET	SCALE AND SEVERITY OF CHANGE/IMPACTS				
	No change	Negligible Change	Minor Change	Moderate Change	Major Change
Key attributes	0	2	3	1	0
	SIGNIFICANCE OF EFFECT OR OVERALL IMPACT (ADVERSE OR BENEFICIAL)				
World Heritage Properties VERY HIGH	Neutral	Slight	Moderate/Large	Large/ Very Large	Very Large

Tab. 4.3: Results of assessment of HIA Phase 1 (source: HIA 1)

Impact / issue	Issues to be considered
Traffic through WH property	– Development of detailed proposals for reducing through traffic including tunnel alternative – Enforcement of decisions regarding conditions for traffic regulation through WH property before construction
Widening of the Ekerö road	– Detailed proposals for the road adjustment and the bicycle/pedestrian lane in its entire length to allow for a comprehensive impact assessment – Adaptive design solutions without disruptive elements like over- or underpasses (Edeby, Canton Street, Malmen) – Enhancement of a coherent experience of the World Heritage character (including ways of approaching the site, traffic behavior with consistent low speed limit) – Proposals for the rehabilitation of the historic character by tree avenues (Hemmet – Canton and Lovö church avenue) and road surface adjustments (Hemmet, Malmen) – Detailed proposals for the Drottningholm bridge taking into consideration its landscape context – Consideration of reversibility of measures in case of traffic reduction
Environmental impacts (noise, vibrations)	– Detailed vulnerability and impact studies on environment and buildings – Establishment of monitoring mechanism
Impacts of the Stockholm Bypass junctions	– Formal evaluation by ICOMOS and adoption by World Heritage Committee of the buffer zone regulations to give guidance to all conservation and development decisions – Finalization of the cultural / natural reserve designation of Lovö Kärsö with special attention to the World Heritage OUV – Development of detailed design solutions for the road design and technical arrangements to allow for an impact assessment – Secure continuity of use and environmental protection during construction works

4.5 CONCLUSION: CONFLICT OF INTERESTS WITH REGARD TO EKERÖ ROAD

The results of the above-mentioned assessments of the impact of Stockholm Bypass and Ekerö Road and especially the above-mentioned statements of the various involved stakeholders clearly show that there is a conflict of interests with regard to the planned remodelling of Ekerö Road. Ekerö Municipality has a large potential to grow in the future, the population of Ekerö Municipality is expected to increase with 20 % until 2030 according to the municipality's general plan. Hence, especially in the period until the Stockholm Bypass is completed the main interest focuses on a fast and efficient access to the mainland. As a consequence, it is suggested to integrate elements such as roundabouts at Canton village or irreversible elements such as underpasses for pedestrians and cyclists into the Ekerö Road design.

In contrast to this, stakeholders which position themselves closer to the values of cultural and natural heritage in general and World Heritage in particular claim that increase of traffic flow should be avoided due to its negative impact on these heritage values and due to its negative barrier effect with regard to agricultural activities. Consequently, it is argued that the junctions between Stockholm Bypass and Ekerö Road should be located as far away as possible from the World Heritage property and it is suggested that measures to widen Ekerö Road should be taken back after the completion of Stockholm Bypass (please compare 4.4.2.4).

Both the discussions about the discussions about the location of the planned junctions between Stockholm Bypass and Ekerö Road and the road design process of Ekerö Road, which is meant to find a compromise between these two positions, clearly reflect this conflict of interests. Similarly, the Retrospective Statement of Outstanding Universal Value, where it is stated that "all involved parties will aim to limit the negative impacts and work to identify new possibilities and solutions for improved accessibility to the area in conjunction with the developments related to the ongoing Stockholm Bypass and Ekerö Road extension project", reflects this fact (please compare 3.7).

When the assessment process of this HIA Phase 2 started, construction works on the Stockholm Bypass already had been started (since 2015) and the decision to locate the discussed junctions between the Stockholm Bypass and Ekerö Road had been taken several years ago by the Swedish Transport Administration (2009). Additionally, based on the recommendations provided in HIA Phase 2 (2012), the road design programme of the planned remodelling of Ekerö Road had already been carried out.

Against this background, it was decided to put a focus in the assessment process this HIA Phase 2 clearly on the planned remodelling of Ekerö Road. Further, it was decided to feed back intermediate findings during the assessment process of HIA Phase 2 immediately in the planning process of the planned remodelling of Ekerö Road, with the goal to improve both encountered shortcomings in the quality of the road design and the traffic and visitor's management of the World Heritage property. This lead to several modifications in the road design which were also taken into account in the assessment.

The next chapter will a provide a detailed overview about the positive and negative impacts of the planned remodelling of Ekerö Road.

5 ASSESSMENT AND EVALUATION OF IMPACT OF STOCKHOLM BYPASS AND REMODELLING OF EKERÖ ROAD

5.1 ASSESSMENT BASELINE

The road projects Stockholm Bypass and the remodelling of the Ekerö Road are complex infrastructure projects with a long planning process. Consequently, the assessment baseline for HIA Phase 2 consists of multiple planning levels and documents. In Chapter 4 an attempt is made to outline the main issues which relate to the OUV of the World Heritage property on basis of this documents.

- HIA Phase 1 (January 2012), which focused on potential impacts of the overall traffic situation and foreseen conflicts with the World Heritage value. The conclusions of HIA Phase 1 and response to the proposed mitigation measures are also taken into account in this HIA Phase 2.
- Environmental Impact Assessments (EIA), including consideration for cultural heritage, have been carried out for both projects. Generally, the present HIA Phase 2 supports the main assessments made in the EIA's regarding impacts in the World Heritage property and its proposed buffer zone.
- This HIA Phase 2 assessment is based on the documentation about the adopted Ekerö Road Plan (Trafikverket: *Vägplan Väg 261 Ekerövägen, Granskningshandling* 201-11-26 rev 2015-04-13 TRV 2012/19667 and related documents. Available in English: *The Road Plan for Road 261 Ekerövägen, Plan Description. Adoption Document,* 15/02/2015).
- Besides that, the outcomes of the working process during this HIA Phase 2 are taken into account in the assessment.
- Stockholm Bypass in its current project planning and design stage (Trafikverket: *Stockholm Bypass. Lovön Interchange. Enhanced Design Programm*, Stockholm 5 December 2014)

Stockholm Bypass is under construction since 2015. Works on the Bypass on Lovö Island are scheduled to be started in 2017. The Swedish Transport Administration, as the responsible for implementing the admissibility decision, has chosen the alternative which is now been assessed. On September 3, 2009, the Swedish Government granted permission for the location of the motorway which will be constructed in a tunnel under the island of Lovö. The Government's decision stipulated several preconditions for the subsequent detailed plans (see Chapter 1.3 for more information).

5.2 IDENTIFICATION OF THE IMPACTS AND ASSESSMENT OF THEIR SCALE AND SEVERITY

In detail, this assessment focuses on the following aspects:

- 1. Environmental impacts (Chapter 5.1)

- Noise and vibration, road surface water management, (Section 5.1.1)
- Expected impact on the proposed buffer zone (Section 5.1.2)

- 2. Cumulative impacts (Chapter 5.2)

- Potential increase of through traffic (Phase 1, until completion of Stockholm Bypass) (Section 5.2.1)
- Potential increase of through traffic (Phase 2, after completion of Stockholm Bypass) (5.2.2)

- 3. Visual Impacts (Chapter 5.3)

- The visual impact assessment intends to show both the planned changes on Ekerö Road and the consequences of through-traffic. Hence, each visualization is shown with and without through-traffic.

It has been stated earlier that the existing Ekerö Road has already a negative impact on the UNESCO World Heritage property 'Royal Domain of Drottningholm', despite this road was already there when the Drottningholm World Heritage site was inscribed on the World Heritage List.

Consequently, during the assessment the impacts of the planned remodelling of Ekerö Road are compared to the impacts of the existing Ekerö Road.

Based on this assessment, recommendations for potential mitigation measures and future spheres of activity are provided in chapter 6.

5.3 ASSESSMENT OF ENVIRONMENTAL IMPACTS

5.3.1 NOISE[1]

Ekerö Road causes high traffic noise levels at present. In 2035, in spite of increased traffic, the EIA's evaluate that the noise situation will be improved due to lower speed limits through the World Heritage property (from 70 to 60 km/h and 50 to 40 km/h respectively). However, accepted noise levels are estimated to be exceeded in Canton Village and at Malmen. An existing noise barrier in Canton must still be kept.

The Swedish Transport Administration has the responsibility to ensure that noise levels generated by the traffic from national roads are kept to an acceptable level in the indoor environment in residential buildings. If noise reduction is needed, an offer is made to building owner for noise reduction measures. House owners can decline these offers.

Current plans of the Swedish Transport Administration and its consulting office WSP foresee that several buildings where the noise level will be critical will undergo measuring for traffic noise within the Ekerövägen project during fall 2016. Within the World Heritage, it is planned to adjust eventual window measures, so that the cultural heritage value does not decrease. According to the explanations of the Swedish Transport Administration and the consultant office WSP (WSP, 2016b), potential noise reduction measures will be proposed according to the framework of the historic buildings.

Since most of the buildings in question are not only part of the World Heritage property but also State Listed Buildings (*byggnadsminne*), possible measures to reduce the impact of noise on the historic buildings in Canton and Malmen have to meet the Swedish legislation framework. Detailed descriptions and examples of potential measures for noise reduction can be found in chapter 4.3.3.

The measures are planned to be finished before the construction works on Ekerö Road are started. The work will be carried out by contractors and coordinated by the National Property Board, which is currently in charge of the maintenance of the historic building stock in the UNESCO World Heritage property. The National Property Board has therefore a profound knowledge how to adjust potential noise reduction measures.

Assessment: In general, HIA Phase 2 considers that all measures for a substantial reduction of the noise impact on the World Heritage property should be sought in order to sustain the quality of life in the residential buildings. At present, it is too early to assess if and how the proposed measures will impact on the World Heritage value of the buildings at Canton and Malmen. However, based on the shown examples and the experience of the National Property Board concerning maintenance and preservation of the historic building stock in the World Heritage

1 Ref:
▶ MEMO Trafikverket: Noise Reduction measures within the World heritage Drottningholm, Stockholm 2016a
▶ WSP: Nulägesbeskrivning av kommande riskanalys och kon-trollprogram för kommande ombyggnad av väg 261, Stockholm 2016

area, it can be expected that encroachments due to potential noise reduction measures can be kept on a moderate level.

Overall impact of planned modifications on Ekerö Road on noise level: *positive*
Impact of noise reduction measures on historic building stock: *moderate*

5.3.2 VIBRATIONS AND NOISE, RISK ASSESSMENT[2]

Immediately after the kick-off meeting of this HIA Phase 2, in May 2016, a monitoring programme to control potential vibrations due to through-traffic on Ekerö Road was started by the Swedish Transport Administration. Within this programme, it is also planned to monitor potential risks during the planned construction works.

Several measure points have been installed on both historic buildings of the UNESCO World Heritage sites and trees in the Ideal Landscape Garden. The risk zone is 150 m around the construction area (please compare Figure 4.4).

Assessment: Up until now, no problems were encountered. However, it is too early to draw final conclusions from these vibration measurements with regard to the impact of traffic and future construction works on the World Heritage property. It is planned to leave the measure points at place and to prolong the monitoring program after the works on Ekerö Road are finished. Hence, there will be better possibilities to control the impact of vibrations and noise after the remodelling of Ekerö Road which is in general beneficial for the World Heritage property.

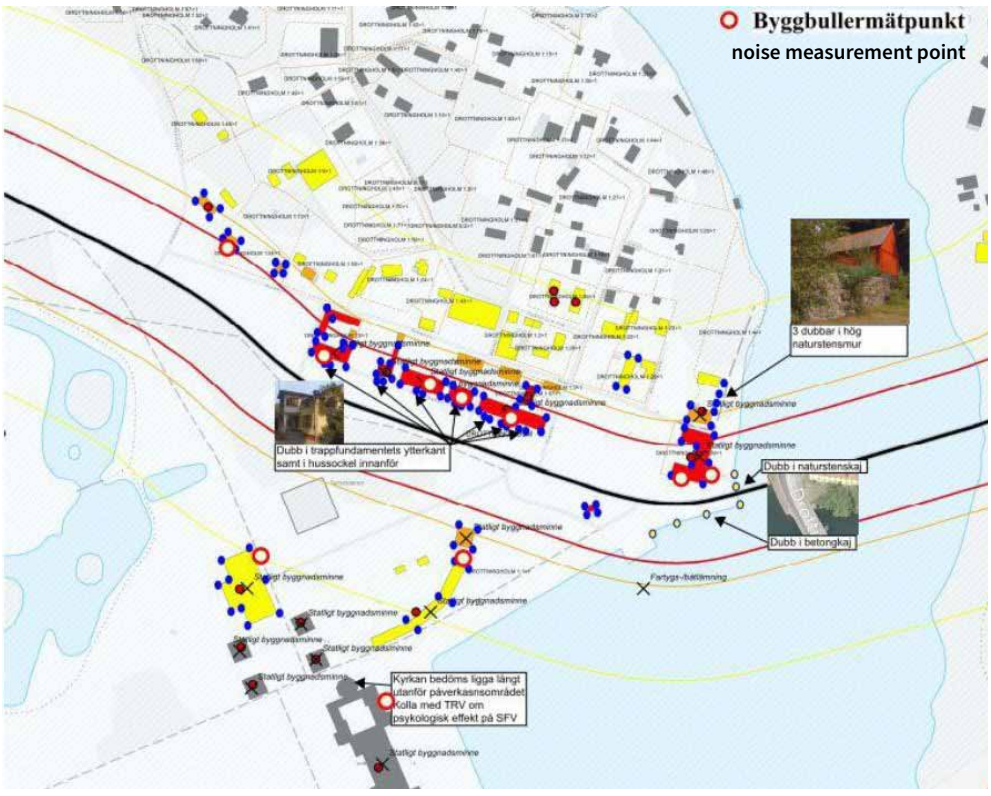


Fig. 5.1: Risk analysis concerning potential impact of noise and vibration in the World Heritage property (© WSP, 2016d: Nulägesbeskrivning buller och vibrationer, WSP, 2016-04-27, p.12)

2 Ref:
►WSP: Nulägesbeskrivning av kommande riskanalys och kon-trollprogram för kommande ombyggnad av väg 261, Stockholm 2016d

5.3.3 ROAD SURFACE WATER MANAGEMENT[3]

Ekerö Road is located in the immediate vicinity of the Ideal Landscape Garden ponds which are today in a very vulnerable condition. To avoid further encroachments of the water quality of the ponds, Swedish Transport Administration plans to collect the road surface water in open ditches and purifying it by sedimentation before it reaches the dams and the water system of the Ideal Landscape Garden (please compare chapter 4.3.3.3 and Trafikverket 2016b).

Assessment: The new water management design will lead to a lower contribution of nutrient originating from the road than the levels at present. Additionally, the Swedish Transport Administration develops currently a water management programme in cooperation with the National Property Board. The programme's aim is to improve the currently unstable situation of the ponds in the Ideal Landscape Garden. In conclusion, the planned modifications of Ekerö Road will have a positive impact in comparison to the present situation.

Overall impact of planned remodelling of Ekerö Road on World Heritage water system: *positive*

5.3.4 IMPACTS ON THE PROPOSED BUFFER ZONE

A Natural Reserve (Naturreservat) was created in 2014 with the aim to protect the natural and cultural landscape with a specific focus on World Heritage property and proposed buffer zone. The recently established natural reserve's objectives are to safeguard the historic landscape of Lovö and Kärsö which are of highest relevance for the context and setting of the World Heritage property. The area of this natural reserve is congruent to the proposed buffer zone of the World Heritage property. Both the Stockholm Bypass and the planned remodelling of Ekerö Road are permitted to be built according to the decision for the proposed buffer zone.

Assessment: In principle, HIA Phase 2 supports the assessments in HIA Phase 1 (2012) and in the Environmental Impact Assessments for Stockholm Bypass and Ekerö Road. The potential negative impacts during ten years of construction works are in detail assessed in the Environmental Impact Assessments. According to these studies, the widening of the road, two junctions close to the World Heritage property border as well as the necessary technical installations (e.g. ventilation shafts) will have a permanent negative impact on the proposed buffer zone of the World Heritage property. In addition, uncontrolled increase of traffic and changes in access to Lovö may cause unforeseen negative impacts on the cultural landscape.

In principle, all efforts spent since HIA Phase 1 to adapt the ventilation shafts, necessary technical buildings, the junctions between the remodelled Ekerö Road and Stockholm Bypass and the tunnel entrances are evaluated positive. (Detailed information about these measures is provided in the document "*Fördjupat gestaltningsprogram Förbifart Stockholm, 2014-12-05").*

Overall impact of planned remodelling of Ekerö Road: *large - moderate*

3 Ref:
▶ Ref: Trafikverket: Väg 261 Ekerövägen Edeby-Nockeby. 0 Gemensamt. PM. Dagvatten till Slottsdammarna, Stockholm 2016b

5.4 CUMULATIVE IMPACTS

5.4.1 IMPACT DUE TO INCREASING THROUGH TRAFFIC ON EKERÖ ROAD[4]

Ekerö Road is at the moment the only permanent connection to the mainland from Ekerö Municipality. The capacity of the road is very limited regarding the demand of transportation need of the inhabitants of Ekerö Municipality (one lane in both directions plus one commuter lane in the direction for Stockholm). The traffic situation concerning both public transport by bus and individual motor car traffic on the Ekerö Road has since long been stressed with severe congestion during rush hours (Trafikverket 2016c).

The development of through traffic in the World Heritage property clearly shows the increased traffic flow on Ekerö Road. In 1991, when the Royal Domain of Drottningholm was inscribed on the World Heritage List, 16.700 veh./weekday crossed Drottningholm Bridge. This number has increased to 22.500 veh./weekday in 2009 and to 23.000 veh./weekday at present (Figure 5.2).

Both the plan to add a bus lane on Ekerö Road and the planned Stockholm Bypass are expected to lower the current traffic flow. After completion of Stockholm Bypass, which is scheduled for 2026, there will be four more lanes for traffic to enter or exit the Ekerö island. Due to the two more accesses in the south and the north, as well as the improved public transport options on Ekerö Road, the current traffic model projects that only approx. 25 % of the car traffic will remain on the existing eastern link passing Drottningholm Bridge while 50 % of the car traffic will use the northern access. As a result, the pressure on Ekerö Road will be reduced as the road capacity connecting the island is more than doubled.

But the new Stockholm Bypass will also invite through traffic which does not exist today where all trips either start or end in Ekerö. Most of this traffic will pass under the island but some through traffic will also pass through the World Heritage property (WSP, 2016a). As a consequence, an increased traffic flow is forecasted on Ekerö Road, which will enter through the Stockholm Bypass. This traffic will partly counterbalance the decrease of traffic from Ekerö Municipality according to the traffic model forecast. This results in a remaining effect which is shown as a dip in the curve (Fig. 5.2).

A second factor which will significantly influence the traffic volume on Ekerö Road before and after the completion of Stockholm Bypass is the a great potential to grow of Ekerö Municipality. Currently, the political will in Ekerö focuses on an annual growth of the municipality's population of 1.5 % for the next ten years. Since Ekerö Road is the only link of Ekerö Municipality to the mainland and the inner city of Stockholm, Ekerö Municipality's growth will lead to an annual traffic increase of about 2.0 to 2.5 % per year until Stockholm Bypass is completed (depending on economic development, fuel prices, car ownership among other factors) (WSP, 2016a; 2016c).

4 Ref:
- ▶ Trafikverket: Measures to improve the traffic situation, Stockholm 2016c
- ▶ Trafikverket: BESLUT Ekerövägen – kontrollprogram för trafikflöden efter ombyggnad_signerat, Stockholm 2016d
- ▶ Trafikverket : Ekerövägen – Measures to improve the traffic situation, Stockholm 2016d
- ▶ Trafikverket : Commuter Ferry Ekerölinjen, Stockholm 2016e

Trafikverket: MOBILITY MANAGEMENT: ROUTE 261 AND THE STOCKHOLM BYPASS, Stockholm 2016f

- ▶ Trafikverket : Clarifications regarding delivery Draft HIA_meeting next Monday, Stockholm 2016g
- ▶ WSP: Memo regarding Ekerövägen Traffic Forecast, Stockholm 2016a
- ▶ WSP: The Four Step Principle, Stockholm 2016c

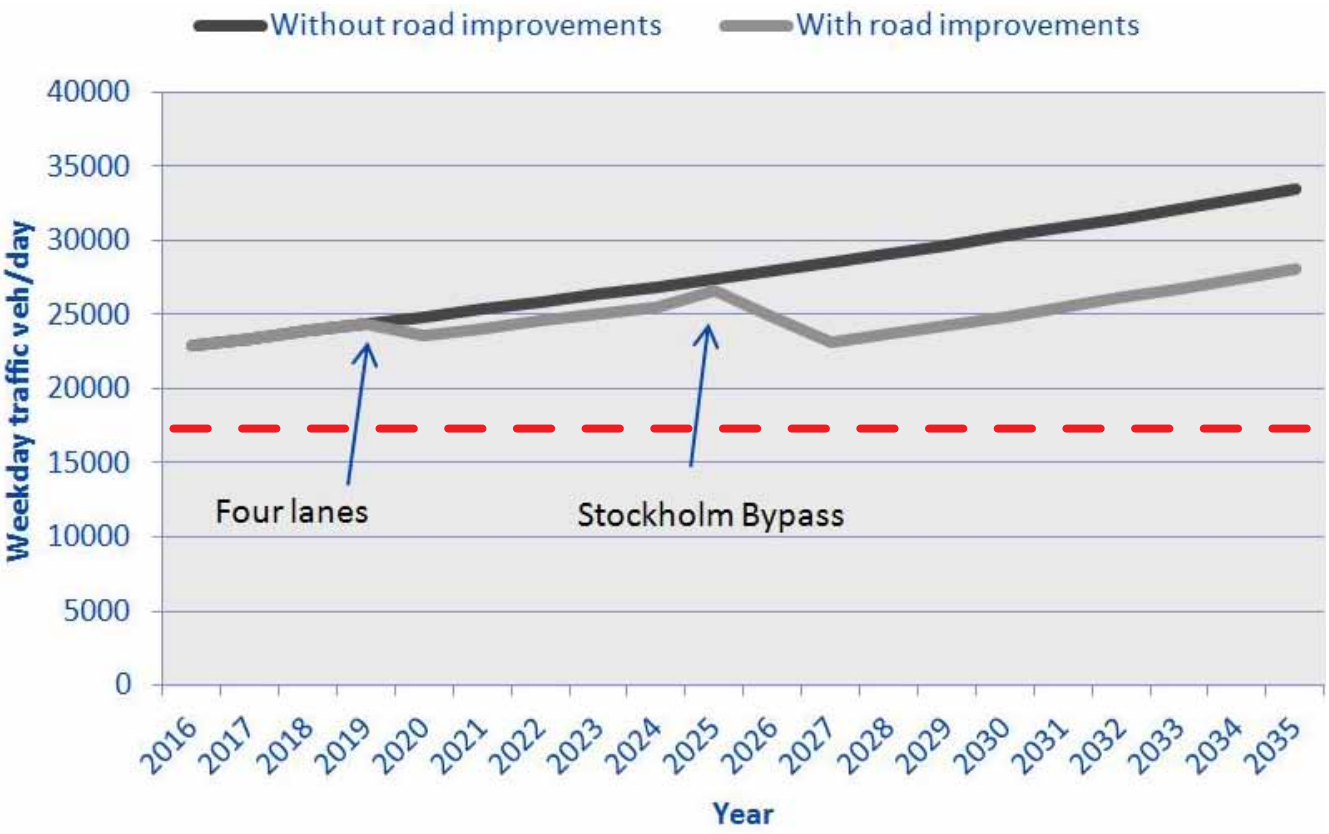


Fig. 5.2: Expected traffic flow on Ekerö Road 2016 - 2035 on Drottningholm Bridge based on available traffic projections. The black line illustrates an annual traffic increase of 2 % if no measures are taken (‚0-solution'). The grey line shows the impact of the road projects, compared to this. The red dashed line shows the traffic rate at the time of the inscription of the World Heritage property (1991, 16.700 cars). It is clearly visible that traffic will increase in phase 1 and phase 2 if no regulation measures are taken (© Swedish Transport Administration)

According to the present traffic prognosis, an increase of vehicles on Ekerö Road in two phases is predicted (Fig. 5.2). In the beginning of phase 1 (until the opening of Stockholm Bypass in 2026) a slight decrease of traffic flow is forecasted when the fourth traffic lane reserved for public transport will be completed (scheduled for 2019). Afterwards, traffic will increase again until Stockholm Bypass is completed. Immediately after the opening of Stockholm Bypass in the year 2026, traffic will decrease again to a lower level than at present. But due to the improved accessibility from Stockholm Bypass and due to the expected rapid land use development of Ekerö Municipality, a more rapid traffic increase is forecasted if no additional traffic control measures are implemented.

5.4.2 MEASURES TO REDUCE THROUGH-TRAFFIC ON EKERÖ ROAD

Against this background, the Swedish Transport Administration intends to monitor the traffic numbers when Ekerö Road's widening is completed. The Swedish Transport Administration has defined thresholds for traffic on Ekerö Road:

- Phase 1: Limit 27,000 veh./weekday.
- Phase 2 (after completion of Stockholm Bypass): Limit 23 000 veh./weekday (Trafikverket, 2016d)

In case these limits are exceeded, the Swedish Transport Administration will inform all stakeholders to discuss the following potential measures to reduce the traffic flow on Ekerö Road.

5.4.2.1 PHASE 1: FERRIES, SPEED REDUCTION MEASURES AND MOBILITY MANAGEMENT PROGRAMME

At present there is a car ferry operating between Jungfrusund on Ekerö and Slagsta/Fittja. This so-called *Slagstafärjan* ferry is a commuter ferry which is operating during day time. The ferry is financed by Ekerö Municipality and fees. It is operated by the Swedish Transport Administrations ferry company but administrated by Ekerö Municipality. The Swedish Transport Administration is planning to finance this ferry during construction of Ekerö Road so as to ensure its continuous operation. The ferry is meant to reduce the traffic load on Ekerö Road especially during big traffic disturbances by connecting the traffic on Ekerö islands to the main land.

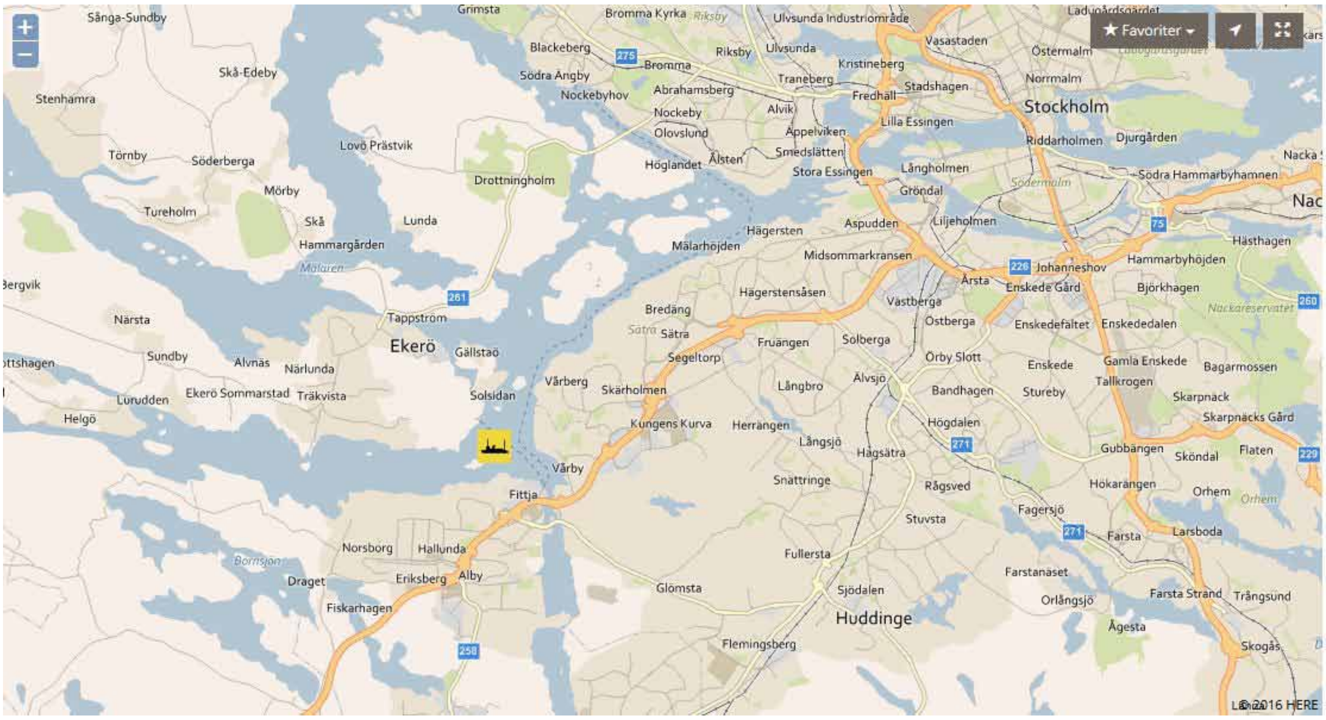


Fig. 5.3: Car Ferry Slagstafärjan (Swedish Transport Administration)

The Stockholm public transportation service provider SL started on the 22nd of August 2016 a new ferry line from Ekerö to Stockholm city centre. The new line is meant to reduce the traffic load on Ekerö Road and congestion problems in the transport system.
The line will have five stops:

- Tappström (Ekerö)
- Jungfrusunds when there is ice in the Tappströmskanalen.
- Kungshättan (when called upon)
- Ekensberg
- Lilla
- Essingen
- Klara Mälarstrand

One vessel will operate on this line. A one way trip will take about 50 minutes and the ferry makes 3 trips back and forth each day at commuter hours. The same trip takes about 45 minutes by bus and subway. During spring and autumn the operating vessel will carry 190 passengers 30 bikes and 2 wheel chairs. During periods of ice there will operate another vessel with a capacity of 140 passenger 10 bikes and 2 wheel chairs.

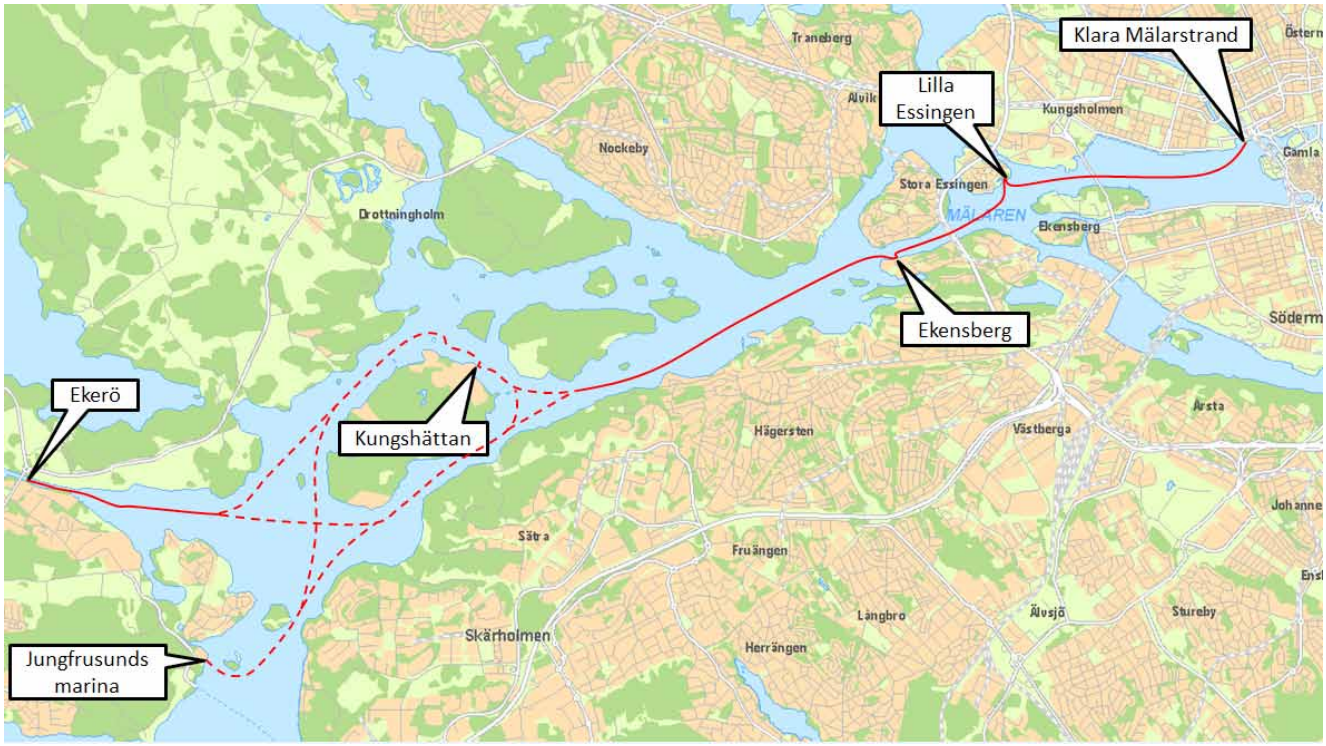


Fig. 5.4: Commuter Ferry Ekerölinjen (Swedish Transport Administration)

During the construction of the four lane road speed reductions for car traffic and buses will be given priority. A number of measures to promote bicycling and public transport will be implemented in order to reduce peak traffic and this is estimated to translate to a daily reduction of traffic with about five per cent.

To improve the current situation and future traffic volumes the Swedish Transport Administration has initiated a mobility management programme. Mobility management is a concept to encourage sustainable transport and reduce car use by changing travellers' attitudes and behaviour. The mobility management program comprises "soft" measures, such as information and communication, organizing services and coordinating activities and stakeholders. Most often, such "soft" measures increase the effectiveness of "hard" measures within urban transport (for example, new roads and bike lanes). The mobility management scheme will be launched when construction work commences and will include measures with a long term perspective. After the completion of Ekerö Road the effect of the mobility management scheme is expected to partly remain.

After completion of the mobility management program, the next envisaged step is to conclude agreements between the parties, for instance between the Swedish Transport Administration, Ekerö Municipality and the bus operator, Arriva, on Route 261. (Trafikverket, 2016f). It is decided that a Mobility Management Program will be started and implemented, yet up until now there are no concrete measures approved.

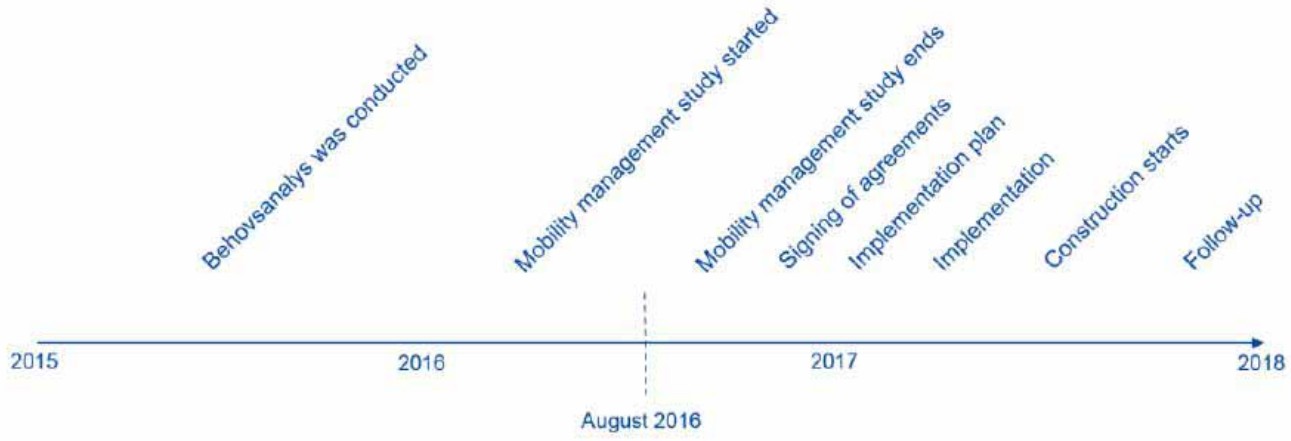


Fig. 5.4: The mobility management process for Route 261 and Stockholm Bypass

5.4.2.2 PHASE 2: TRAFFIC CONTROL PROGRAM

To counterbalance the increase of traffic after the bypass opens, the Swedish Transport Administration has produced a control program that has been adopted by the Lovö steering committee. The Swedish Transport Administration will monitor the traffic and gather the steering committee to produce an action plan on measures to implement to reduce the traffic to under the threshold level.

Some of the measures to be considered in the this case:

- Adjustment of speed limits within the World Heritage property
- Expanded public transportation
- Economic incentives.
- In case of unacceptable high amount of traffic through the world heritage are, even though the measures above are carried out, and alternative stretch can be considered long term. In such an event a tunnel from the Lovö conjunction to Kärsön or Nockeby is possible to investigate. This is however considered to be a very costly and technically complicated measure.

In general, implemented measures will be dependent on analysis of the traffic development.

5.4.3 CONCLUSION: ASSESSMENT OF CUMULATIVE IMPACTS DUE TO THROUGH-TRAFFIC ON EKERÖ ROAD

In conclusion, the assessment of Swedish Transport Admistration's traffic prognosis and the suggested measures to reduce through traffic on Ekerö Road to be considered leads to the following results:

- 1. *PHASE 1:* When Ekerö Road will be the only access from Ekerö to Stockholm, there will be increasing traffic flow of 2.0 percent to 2.5 percent annually until 2025 to a maximum level of 27.000 veh./weekday, despite there are measures intended to compensate this development. Consequently, this has to be evaluated as a *temporary negative* impact on the World Heritage property.

- *2. PHASE 2:* After completion of the Stockholm Bypass, the traffic volume will be considerable lowered. However, this effect will be partly counterbalanced by increasing through traffic on Ekerö Road due to the growth of Ekerö Municipality and additional traffic coming from Stockholm Bypass. Hence, the positive impact of Stockholm Bypass will be limited. Provided that the adopted traffic monitoring and regulation measures will be implemented so as to avoid that through traffic in the World Heritage property will exceed the current level of 23.000 veh./weekday, the impact is evaluated as *moderate.*

5.5 ASSESSMENT OF VISUAL IMPACTS

5.5.1 GENERATION OF VISUALISATIONS

The visualizations were generated by the Swedish Transport Administration on the basis of a virtual 3D model. During the working process, the authors of this HIA report chose a set of eight prominent viewpoints in cooperation on the basis of the historical analysis provided in chapter 4. Afterwards, the Swedish Transport Administration generated the visualizations in cooperation with an external office.

The visualizations intend to show both the impact of the road itself and the impact of the potential traffic on the road on the OUV of the World Heritage property 'Royal Domain of Drottningholm'. Consequently, either visualization is shown with and without buses and cars. In the proposed buffer zone the roundabouts for the Stockholm Bypass are illustrated.

5.5.2 CATEGORIES OF VISUAL IMPACTS

Related to the compressed study of the cultural and historical development and the present state of the World Heritage property provided in chapter 3, the chosen viewpoints represent the most important categories of perception:

1. Vistas with high cultural and historical relevance (e.g. due to the design concept of the Royal Domain of Drottningholm or historical development phases)

2. Viewpoints which display places with important functional links

3. Sight connections which play an important role for the 'every-day- perception' of the Royal Domain of Drottningholm (e.g. for visitors or commuters)

Several of the viewpoints are conveying various of the above-mentioned perception qualities.

The visual analysis focuses on the most significant sections in the World Heritage property. These are:

- Access from Drottningholm Bridge
- Malmen
- Hemmet
- Vilan
- Pastoral Landscape
- Canton
- Access from Ekerö (Edeby)

Fig. 5.5: Assessed significant sections of the World Heritage property (© Maaike Goedkoop, Philipp Tebart)

5.5.3 VIEWPOINTS

The following viewpoints have been chosen:

Category 1: Vistas with high cultural and historical relevance:

- 1. Drottningholm Bridge: View to Drottningholm Palace
- 2. Malmen: View to Palace Theatre
- 4. View from Ideal Landscape Garden to Hemmet
- 5. View from Hemmet to Ideal Landscape Garden

Category 2: Sight connections which play an important role for the ‘every-day- perception’ of the Royal Domain of Drottningholm :

- 3. Malmen / View to entrance area
- 10. View from Ekerö Road to the Ideal Landscape Garden with Gothic Tower

Category 3: Viewpoints which display important places with regard to functional links:

- 6. View from Vilan to pastoral landscape
- 7. View from Gothic Tower
- 8. View to Canton village from Lovö Kyrkallé
- 9. View from Canton village

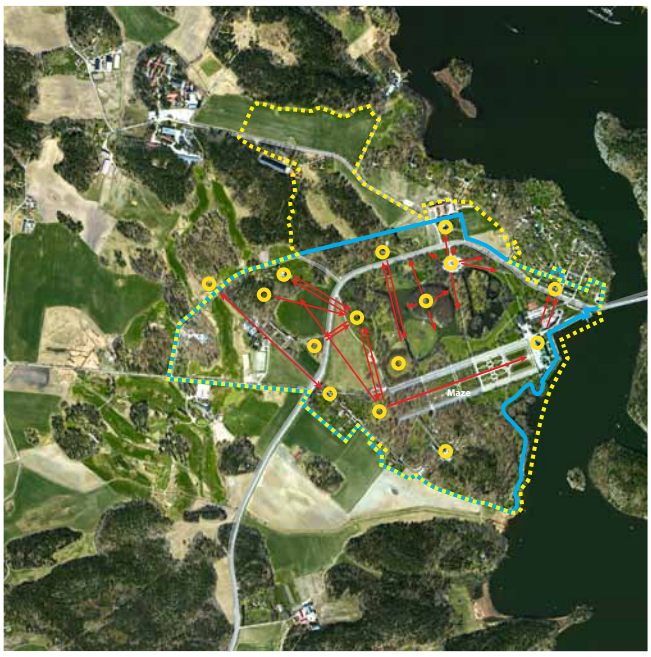


Fig. 5.6 a, b: World Heritage area, visual nodes, sightlines, vistas and important visual connections (left) and chosen viewpoints (right) (@Maaike Goedkoop)

5.5.4 ASSESSMENT CRITERIA

The assessment is carried out according to the 2011 ICOMOS Guidance. The impact of Ekerö Road is judged on a scale between ‘neutral’ (no change) and ‘very large’ (loss of OUV).

VALUE OF HERITAGE ASSET	**SCALE AND SEVERITY OF CHANGE / IMPACTS**					
	Positive	**No change**	**Negligible Change**	**Minor Change**	**Moderate Change**	**Major Change**
	SIGNIFICANCE OF EFFECT OR OVERALL IMPACT					
	BENEFICIAL	ADVERSE				
For WH properties Very High – attributes which convey OUV	**Positive**	Neutral	Slight	Moderate	Large	Very Large

Tab. 5.1: Grading system of the Heritage Impact Assessment (based on ICOMOS 2011, page 9)

The impact of Ekerö Road has been assessed against the key elements of the Outstanding Universal Value as identified in the Retrospective Statement of Outstanding Universal Value (adopted by the World Heritage Committee in 2016 and described more in detail in Chapter 3).

Key elements:
- Drottningholm Palace and formal French Garden
- Palace Theatre
- Chinese Pavilion and Rococo Garden
- Ideal Landscape Garden
- Canton Village
- Crown Estate and Royal Domain of Drottningholm

The visual assessment takes into account the following aspects of the OUV:
- Impact on Garden / Landscape scenery / Setting
- Impact on Historic Buildings
- Impact on Everyday perception
- Function and use

As stated before and in HIA Phase 1, already the existing Ekerö Road compromises the OUV of the World Heritage property Royal Domain of Drottningholm. Consequently, it is the starting point of the assessment that all measures taken in the context of the modifications of Ekerö Road should contribute to the improvement of the existing situation. In order to be able to assess whether the modifications on Ekerö Road improve the existing situation, each visualization is provided with an assessment of the current impact of Ekerö Road on the OUV of the World Heritage property and a comparison with the impact of the modified road.

5.5.5 ASSESSMENT OF VISUALIZATIONS

1. DROTTNINGHOLM BRIDGE: VIEW TO DROTTNINGHOLM PALACE

Situation: Drottningholm Bridge, the first land connection from 1787 and the present one dating from 1973, still provides a prominent view of the entrance to Drottningholm Palace for both visitors and commuters coming from Stockholm. Besides that, the waterway from Stockholm Centre to Drottningholm is an important link for visitors coming to Drottningholm especially during the summer months at present. In total, the impact of existing Ekerö Road is to be judged as 'slight'.

World Heritage Value: Very high

Assessment: The increase of width of Drottningholm Bridge in order to accommodate the fourth traffic lane for buses does not compromise the prominent view to Drottningholm Palace. In principle, the view stays intact. However, vehicles can compromise the view to Drottningholm Palace's facade at present. If traffic would further increase in the future, the view to Drottningholm Palace could be considerably compromised.

Attribute (‚Key Value')	**Impact of existing Ekerö Road**	**Impact of modifications**	**Impact of remodelled Ekerö Road (negative/positive)**
Waterfront and representative entrance	slight (except sight constraints due to vehicles)	neutral	slight (increasing traffic could compromise the vista)
Park / Landscape scenery / setting	slight	neutral	slight
Historic buildings / monuments	slight	neutral	slight
Everyday perception	slight	neutral	slight
Function and use	neutral	neutral	neutral
TOTAL	**slight**	**neutral**	**slight**

REMODELLED EKERÖ ROAD

2. MALMEN: VIEW TO THEATRE

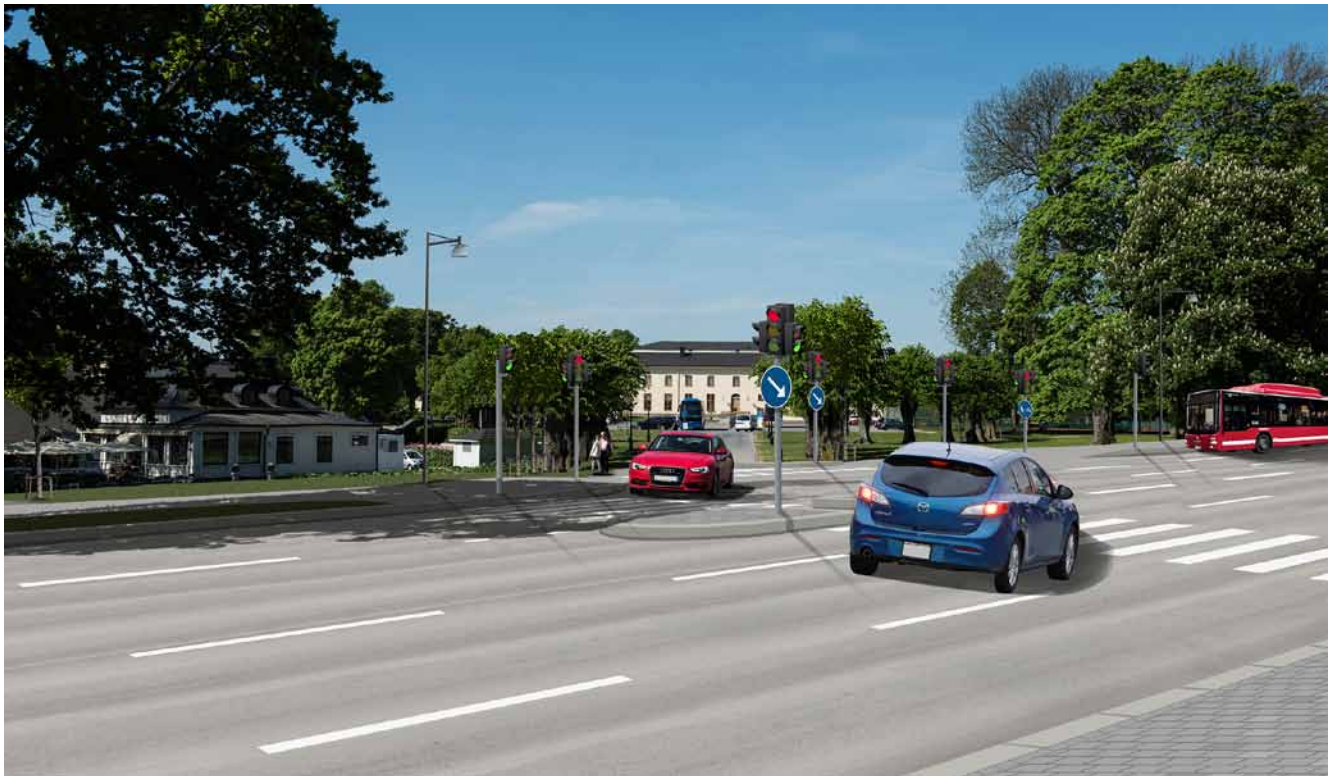
Situation: The visualization shows the visual connection between Malmen and the Palace Theatre which is one of the most important attributes of the World Heritage property. At present, the view to the Theatre is compromised because of the existing traffic lights and the traffic on Ekerö Road. Besides that, the parking space in front of the Theatre which is used by visitors of Drottningholm compromises the OUV of the World Heritage property significantly (this aspect is not related to the remodelling on Ekerö Road). In total, the existing Ekerö Road has a large impact on the OUV of the World Heritage property.

World Heritage Value: Very high

Assessment: The reorganisation of Ekerö Road with improved pavement materials, less and lower traffic lights and a clear guidance system for pedestrians to cross Ekerö Road (cross-walk and pedestrian refuge island) helps to clarify the overall situation of the entrance area of the World Heritage property. The view to the Palace Theatre is not blocked although it is clearly visible that the remodelled Ekerö Road and especially the vehicles on the road will still cause a barrier effect. In total, due to the planned remodelling, the impact of Ekerö Road is to be judged as 'moderate'.

Attribute (‚Key Value')	Impact of existing Ekerö Road	Impact of modifications	Impact of remodelled Ekerö Road (negative/positive)
Important visual connection Drottningholm Palace ensemble	large	positive	moderate (due to potential increasing traffic)
Park / Landscape scenery / setting	moderate	neutral	moderate
Historic buildings / monuments	moderate	positive	slight-moderate
Everyday perception	large	positive	moderate
Function and use	large	positive	moderate
TOTAL	**large**	**positive**	**moderate**

REMODELLED EKERÖ ROAD



3. MALMEN: VIEW TO ENTRANCE AREA

Situation: The visualization shows the area of the future bus stop between Malmen and the entrance area and Drottningholm Palace. Malmen is one of the key elements of the World Heritage value. It was built as a representative resident and administrative area for the Palace Ensemble and constitutes a backdrop for the gardens. Today Malmen is the entrance for both visitors and commuters coming from Stockholm to Drottningholm.

World Heritage Value: Very high

Assessment: There is no increase of width of Ekerö Road due to accommodation of the fourth traffic lane for buses. However, the width of the footpath will be reduced while space for motorised traffic will increase. The reorganisation of traffic lights, the new light poles and upgraded materials for the pavement help to emphasize the historic urban character of Malmen, thus improving the current situation. Despite the reorganisation of the entrance situation with pedestrian refuge islands and relocated bus stops the remodelled Ekerö Road and the vehicles on the road still generates a barrier effect, especially for visitors coming from Stockholm. In total, due to the planned remodelling, the impact of Ekerö Road is to be judged as 'moderate'.

Attribute (‚Key Value')	Impact of existing Ekerö Road	Impact of modifications	Impact of remodelled Ekerö Road (negative/positive)
Entrance area to the World Heritage property / Drottningholm Palace ensemble	moderate-large	positive	moderate (due to potential increasing traffic)
Park / Landscape scenery / setting	moderate	neutral	moderate
Historic buildings / monuments	moderate	neutral	moderate
Everyday perception	moderate	positive	slight-moderate
Function and use	large	positive	moderate
TOTAL	**moderate-large**	**positive**	**moderate**

REMODELLED EKERÖ ROAD

4. VIEW TO HEMMET

Situation: The view from Drottningholm Palace and Ideal Park to Hemmet belongs to the most important features of the landscape garden of the Royal Domain of Drottningholm. At present, the view to Hemmet is intact and only compromised due to a light pole and the vehicles on Ekerö Road.

World Heritage Value: Very high

Assessment: There are no visible changes, the view stays intact. However, especially larger vehicles on the road interrupt the visual connection from the Ideal Landscape Garden to Hemmet. A future increase of traffic could further impair the view to Hemmet and should therefore be strictly avoided.

Attribute (‚Key Value')	Impact of existing Ekerö Road	Impact of modifications	Impact of remodelled Ekerö Road (negative/positive)
Most important visual connection between the Palace and the Ideal garden	slight-moderate (vista compromised due to vehicles)	neutral	slight-moderate (due to potential increasing traffic)
Park / Landscape scenery / setting	slight-moderate	neutral	slight-moderate
Historic buildings / monuments	slight	neutral	slight
Everyday perception	neutral	neutral	neutral
Function and use	neutral	neutral	neutral
TOTAL	**slight-moderate**	**neutral**	**slight-moderate**

REMODELLED EKERÖ ROAD

5. VIEW FROM HEMMET

Situation: The view from Hemmet to the Ideal landscape Garden (English garden) belongs to the most important features of the Royal Domain of Drottningholm. At present, the view from Hemmet to the park is in principle intact. However, Ekerö Road generates a barrier between Hemmet and the Ideal Garden, thus compromising the landscape scenery significantly. This effect is strengthened by the vehicles on Ekerö Road.

World Heritage Value: Very high

Assessment: The width of the remodelled Ekerö Road will not increase and the view from Hemmet to the park stays, in principle, fully intact. However, increase of traffic in the future could compromise the view significantly. In total, the impact of the remodelled Ekerö Road stays 'moderate'.

Attribute (‚Key Value')	Impact of existing Ekerö Road	Impact of modifications	Impact of remodelled Ekerö Road (negative/positive)
Most important visual connections between the Palace and the Ideal garden	moderate	neutral	moderate
Park / Landscape scenery / setting	moderate-large	neutral	moderate-large
Historic buildings / monuments	neutral	neutral	neutral
Everyday perception	neutral	neutral	neutral
Function and use	neutral	neutral	neutral
TOTAL	**moderate**	**neutral**	**moderate**

REMODELLED EKERÖ ROAD

6. VIEW FROM VILAN

Situation: The view from Vilan to the open Landscape of the Ideal landscape Garden is a very important feature of the Royal Domain of Drottningholm. At present, the view is significantly compromised due to Ekerö Road which is an intrusive element in the landscape since the transition from the park to the surrounding agricultural landscape is interrupted. Additionally, the road disrupts the functional links between the park and the Royal Domain. This is clearly illustrated by the existing path which in original connected Vilan with the park but stops now at Ekerö Road.

World Heritage Value: high

Assessment: The width of remodelled Ekerö Road will not increase so that, in general, the overall situation is neither improved nor deteriorated. However, the new bicycle lane on the south side of the road lets appear the overall road surface larger than in the existing shape. In case of a future increase of traffic the situation could be even further compromised.

Attribute (‚Key Value')	Impact of existing Ekerö Road	Impact of modifications	Impact of remodelled Ekerö Road (negative/positive)
Integrated whole of the different components of the Ideal landscape garden	large	slight-moderate	large-very large
Park / Landscape scenery / setting	large	slight-moderate	large-very large
Historic buildings / monuments	neutral	neutral	neutral
Everyday perception	large	slight-moderate	large-very large
Function and use	large	slight-moderate	large-very large
TOTAL	**large**	**slight-moderate**	**large-very large**

REMODELLED EKERÖ ROAD

7. VIEW FROM GOTHIC TOWER

Situation: The view from Gothic Tower shows the transition between the Ideal landscape Garden and the pastoral agricultural landscape. This interrelation is a key concept in the Ideal Landscape Garden design principles. At present, the visual connection is in principle intact but it is clearly visible that this park is severely compromised due to Ekerö Road and the high traffic flow on the road. Gothic Tower is not accessible for visitors of the park, therefore this view has been judged as neutral concerning everyday-perception.

World Heritage Value: Very high

Assessment: The visual relationship between the park and its surrounding stays fully intact. However, Ekerö Road disrupts the functional and ideal link between the Ideal Landscape Garden and pastoral agricultural landscape. Due to the planned remodelling of Canton junction this effect is even strengthened. If the traffic would increase in the future, this visual link would even be further compromised.

Attribute (‚Key Value‘)	Impact of existing Ekerö Road	Impact of modifications	Impact of remodelled Ekerö Road (negative/positive)
Visual connection between the Ideal Landscape Garden and the surrounding pastoral landscape	large	slight-moderate	large-very large
Park / Landscape scenery / setting	large	slight-moderate	large-very large
Historic buildings / monuments	moderate	neutral	moderate
Everyday perception	large	slight-moderate	large-very large
Function and use	large	slight-moderate	large-very large
TOTAL	**large**	**slight-moderate**	**large-very large**

REMODELLED EKERÖ ROAD

8. VIEW TO CANTON VILLAGE FROM LOVÖ KYRKALLÉ

Situation: The visual connection from Lovö Kyrkallé to Canton Village is a very important design concept in the Royal Domain of Drottningholm because Lovö Kyrkallé (and Skolallén similarly) connect Drottningholm Palace and gardens with Lovö church and the whole Crown Estate on Lovö in the proposed buffer zone. Hence, both streets are important functional links between the gardens and the 'pastoral' agricultural area of the Crown Estate. At present, this visual connection is significantly compromised due to Ekerö Road which interrupts Lovö Kyrkallé (and Skolallén) in both visual and functional terms. Further visual obstacles are the existing traffic signs, switch boxes, etc.

World Heritage Value: Very high

Assessment: The overall situation is slightly improved due to the reorganisation of traffic signs as well as the removal of the switch box. However, the functional disconnection of Lovö Kyrkallé from Canton village has not been solved. In case of a future increase of traffic the situation could be further compromised.

Attribute (‚Key Value')	Impact of existing Ekerö Road	Impact of modifications	Impact of remodelled Ekerö Road (negative/positive)
Integrated whole of the different components of the Ideal landscape garden	large	positive	moderate-large
Park / Landscape scenery / setting	large	positive	moderate-large
Historic buildings / monuments	moderate	neutral	moderate
Everyday perception	large	neutral	large
Function and use	large	neutral	large
TOTAL	**large**	**positive**	**moderate-large**

REMODELLED EKERÖ ROAD

9. VIEW FROM CANTON VILLAGE TO LOVÖ KYRKALLÉ

Situation: The visual connection from Canton Village to Lovö Kyrkallé is, similar as described in the previous visualization, a very important feature of the Royal Domain of Drottningholm. Lovö Kyrkallé (and Skolallen similarly) connect Canton Village, Drottningholm Palace and gardens with Lovö church and the whole Crown Estate on Lovö. Besides that, Lovö Kyrkallé is the most important functional link between the park and the agricultural area of the Crown Estate. At present, the visual connection is significantly compromised in both visual and functional terms because Lovö Kyrkallé has been interrupted several meters before it reaches Ekerö Road.

World Heritage Value: Very high

Assessment: Due to the planned measures to prolong Lovö Kyrkallé again in direction to Ekerö Road, the visual connection to the northern part of the tree line avenue can be restored. The traffic on remodelled Ekerö Road will still cause visual constraints. No significant difference in terms of the functional link of Lovö Kyrkallé will be caused by the planned remodelling of Ekerö Road.

Attribute (‚Key Value‘)	Impact of existing Ekerö Road	Impact of modifications	Impact of remodelled Ekerö Road (negative/positive)
Integrated whole of the different components of the Ideal landscape garden	large	positive	moderate
Park / Landscape scenery / setting	large	positive	moderate
Historic buildings / monuments	moderate	neutral	moderate
Everyday perception	large	positive	moderate
Function and use	very-large	neutral	very large
TOTAL	**large**	**positive**	**moderate-large**

REMODELLED EKERÖ ROAD

10. VIEW FROM EKERÖ ROAD TO THE IDEAL LANDSCAPE GARDEN WITH GOTHIC TOWER AND ENTRANCE TO THE WORLD HERITAGE PROPERTY

Situation: The view from Ekerö Road to the Ideal Landscape Garden provides commuters driving from Ekerö Municipality to Stockholm with a first impression of the World Heritage property. At present, the view to the Ideal Landscape Garden is severely compromised by Ekerö Road at this point. Lovö Kyrkallé is disrupted by Ekerö Road and it is not possible anymore to perceive the tree line avenue as a coherent element.

World Heritage Value: Very high

Assessment: Despite the planned remodelling of Ekerö Road, the view to the Ideal Landscape Garden is still severely compromised. Other than in the section of Malmen, where a speed limit of 40 km/h allows to integrate the bus stops on the road, it is necessary to keep these bus stops at Canton. Alongside this, the width of the traffic lanes is differing from the section of Canton (3,50 instead of 3,25 m). As a result, and due to the forth traffic lane, the total width of the road increases. Consequently, the negative impact on the Ideal Landscape Garden and Lovö Kyrkallé is even increased at this point.

Attribute (‚Key Value‘)	Impact of existing Ekerö Road	Impact of modifications	Impact of remodelled Ekerö Road (negative/positive)
Integrated whole of the different components of the Ideal landscape garden	large	moderate	large-very large
Park / Landscape scenery / setting	large	moderate	large-very large
Historic buildings / monuments	large	moderate	large-very large
Everyday perception	large	moderate	large-very large
Function and use	large	moderate	large-very large
TOTAL	**large**	**moderate**	**large-very large**

REMODELLED EKERÖ ROAD

5.5.6 CONCLUSIONS OF VISUAL IMPACT ASSESSMENT

In general, the visualizations show clearly that already the existing Ekerö Road compromises the OUV of the World Heritage property Royal Domain of Drottningholm significantly. Partly, it has been managed during the working process to improve this situation despite the planned forth traffic lane on Ekerö Road. This is especially the case in the section between Drottningholm Bridge and Malmen. Since Ekerö Road is still located at the same position than the historic road through Malmen and it has been managed to keep the total width of the road similar to the present dimensions, the impact of the road stays on a moderate level. The quality of the road design with new light poles, pedestrian refuge islands, lower traffic lights and improved pavement materials will help to upgrade the existing situation. Hence, it can be expected that the entrance situation to the World Heritage property will be significantly improved. Nevertheless, it has to be stated that the road still causes a barrier effect. Consequently, a future increase of the traffic volume should be strictly avoided so as to prevent that the OUV of the World Heritage property is further compromised.

The impact of the planned modification of Ekerö Road can also be judged as moderate in the section between Malmen and Hemmet. It is very beneficial that the National Property Board is supported by the Swedish Transport Administration to reorganise the current parking conditions at Karusellplan. The planned clearing of Karusellplan from park & ride car traffic will help to improve the situation in the UNESCO World Heritage property considerably in functional terms and can open up new options to use Karusellplan for other, more suitable purposes.

In contrast to the situation between Drottningholm Bridge and Hemmet, the visualizations in section between Vilan and Kanton show clearly that both the existing Ekerö Road and the planned remodelling of the road cause severe conflicts with the World Heritage property. Here, the transition between the designed park into the pastoral agricultural landscape, which is an important attribute of the World Heritage property, is harshly interrupted by Ekerö Road. For a large part, these difficulties are caused because Ekerö Road is not following the historic structure of the park in this section. Other than the above-mentioned sections of the road between Malmen and Hemmet, this part of Ekerö Road was build completely new in the 1930s. Hence, already the existing road forms a barrier which disconnects functional and visual links between the park and the ‚pastoral' agricultural area of the Crown Estate.

In contrast to the section between Drottningholm Bridge and just before Canton, where the width of the traffic lanes has been limited to 3, 25 m, the traffic lanes are conceived with a width of 3,50 at the Canton section due to the geometry of the road. Consequently, the total width of the road will increase in this section. Despite the speed limit is planned to be reduced from 70 km/h to 60 km/h in this section, this limit is 20 km/h higher than in the other parts of the remodelled Ekerö Road. As a consequence, additional bus stops are needed due to the Swedish traffic legislation in order to guarantee security for potential passengers. As a result, the negative impact of the existing Ekerö Road will even increase. This is especially obvious at Canton, where Lovö Kyrkallé and Skolallén used to connect Drottningholm Palace and gardens with Lovö church and the whole Crown Estate on Lovö. It has to be appreciated that much effort has been taken to improve this situation during the planning and working process of this HIA. Nevertheless, the disconnection of both roads has not yet been solved here yet.

VIEWPOINT / NUMBER	IMPACT	ATTRIBUTE					
		Key Value	Park / Landscape scenery / Setting	Historic Buildings / Monuments	Everyday perception	Function and use	TOTAL
01 Drottning-holm Bridge	EXISTING EKERÖ ROAD	slight	slight	slight	slight	neutral	slight
	REMODELLING	neutral	neutral	neutral	neutral	neutral	neutral
	REM. EKERÖ ROAD	slight	slight	slight	slight	neutral	slight
02 Malmen: View to Theatre	EXISTING EKERÖ ROAD	large	moderate	moderate	large	large	large
	REMODELLING	positive	neutral	positive	positive	positive	positive
	REM. EKERÖ ROAD	moderate	moderate	slight-moderate	moderate	moderate	moderate
03 Malmen: View to entrance area	EXISTING EKERÖ ROAD	moderate-large	moderate	moderate	moderate	large	moderate-large
	REMODELLING	positive	neutral	neutral	positive	positive	positive
	REM. EKERÖ ROAD	moderate	moderate	moderate	slight-moderate	moderate	moderate
04 View to Hemmet	EXISTING EKERÖ ROAD	slight-moderate	slight-moderate	slight	neutral	neutral	slight-moderate
	REMODELLING	neutral	neutral	neutral	neutral	neutral	neutral
	REM. EKERÖ ROAD	slight-moderate	slight-moderate	slight	neutral	neutral	slight-moderate
05 View from Hemmet to Ideal Land-scape Garden	EXISTING EKERÖ ROAD	moderate	moderate-large	neutral	neutral	neutral	moderate
	REMODELLING	neutral	neutral	neutral	neutral	neutral	neutral
	REM. EKERÖ ROAD	moderate	moderate-large	neutral	neutral	neutral	moderate
06 View from Vilan to pas-toral land-scape	EXISTING EKERÖ ROAD	large	large	neutral	large	large	large
	REMODELLING	slight-moderate	slight-moderate	neutral	slight-moderate	slight-moderate	slight-moderate
	REM. EKERÖ ROAD	large-very large	large-very large	neutral	large-very large	large-very large	large-very large
07 View from Gothic Tower	EXISTING EKERÖ ROAD	large	large	moderate	large	large	large
	REMODELLING	slight-moderate	slight-moderate	neutral	slight-moderate	slight-moderate	slight-moderate
	REM. EKERÖ ROAD	large-very large	large-very large	moderate	large-very large	large-very large	large-very large
08 View from Lovö Kyrkallé to Canton Village	EXISTING EKERÖ ROAD	large	large	moderate	large	large	large
	REMODELLING	positive	positive	neutral	neutral	neutral	positive
	REM. EKERÖ ROAD	moderate-large	moderate-large	moderate	large	large	moderate-large
09 View from Canton Vil-lage to Lovö Kyrkallé	EXISTING EKERÖ ROAD	large	large	moderate	large	very large	large
	REMODELLING	positive	positive	neutral	positive	neutral	positive
	REM. EKERÖ ROAD	moderate	moderate	moderate	moderate	very large	moderate-large
10 View to Ideal Landscape Garden and Gothic Tower	EXISTING EKERÖ ROAD	large	large	large	large	large	large
	REMODELLING	moderate	moderate	moderate	moderate	moderate	moderate
	REM. EKERÖ ROAD	large-very large	large-very large	large-very large	large-very large	large-very large	large-very large

Tab. 5. 2: Conclusions visual assessment (overview)

5.6 CONCLUSION: ASSESSMENT OF ENVIRONMENTAL, CUMULATIVE AND VISUAL IMPACTS

In summary, the assessment of the environmental, cumulative and visual impacts leads to the following conclusions:

- 1. *Environmental impact:* The planned remodelling of on Ekerö Road will have a positive impact in terms of overall noise development and drain water management. At present, it is too early to assess if and how the proposed measures will impact on the World Heritage value of the buildings at Canton and Malmen, but based on the shown examples and the experience of the National Property Board concerning maintenance and preservation of the historic building stock in the World Heritage area, it can be expected that encroachments due to potential noise reduction measures can be kept on a moderate level. The potential risks in terms of vibrations due to construction works and increasing traffic are still unclear.

- 2. *Cumulative impacts:* Despite the planned fourth bus lane, a temporary increase of through traffic on Ekerö Road is forecasted until the completion of the Stockholm Bypass in 2025 (from 23.000 veh./weekday at present to 27.000 veh./weekday in 2026). Hence, there will be temporary negative impact.

- Although Stockholm Bypass is the most important measure to reduce through-traffic on Ekerö Road, there is also a risk of increasing through traffic on Ekerö Road forecasted for the period after its completion due to the planned growth of Ekerö Municipality. Additional through traffic is expected to enter Ekerö Road from southern directions via the Stockholm Bypass. The impact of the Stockholm Bypass on the OUV of the World Heritage property has therefore been evaluated as moderate.

- 3. *Visual Impacts:* The assessment of visual impacts lead to conclusion that the planned remodelling of Ekerö Road will have a positive between the sections of Drottningholm Bridge but a negative impact in the section Vilan - Canton - Edeby. Consequently, this negative visual impact should be diminished to the possible minimum.

- 4. *Management:* The analysis of the present state of the World Heritage area lead to the conclusion that the traffic and visitor management in the property should be improved especially at the entrance area in Malmen, at Karusellplan and at Canton. At all three locations, first improvements were made during the HIA working process. Consequently, these improvements should be further stimulated in the future.

IMPACT	A. EXISTING EKERÖ ROAD	B. REMODELLED EKERÖ ROAD	C. FINAL RESULT	D. REMARKS
PLEASE NOTE: ►Impact of existing Ekerö Road has been assessed as negative (colom A). ►Impact of remodelled Ekerö Road is compared to negative impact of existing Ekerö Road (colom B).	**Severity of negative impact of existing Ekerö Road.**	**Consequences of remodelling of Ekerö Road**	**Final result of HIA Phase 2.**	**Detailed explanations with regard to assessments**
1. Environmental				
Noise (overall impact of remodelled Ekerö Road)	large	positive	moderate	Lower speed limits lead to reduction of noise.
Noise (impact on historic buildings in Canton/Malmen)	large	positive	moderate	Noise reduction measures adapted to historic building stock will be offered to house owners.
Water	large	positive	moderate	New water drain system leads to improvements in water system of World heritage property.
Vibration	moderate	unknown	Dependent on monitoring results of just activated monitoring program	In general, it is beneficial for the WH-property that a vibration monitoring program has been activated due to the remodelling of Ekerö Road.
Expected impact on proposed buffer zone	large	positive	moderate-large	During the working process of the last four years, several details of the road design were improved. Positive assessment refers to these improvements. In general, HIA Phase 2 supports the assessments done in HIA Phase 1 (2012) and in the EIAs for Stockholm Bypass and Ekerö Road. ►The widening of the road, two junctions and roundabouts close to the WH-property border as well as the necessary technical installations (e.g. ventilation shafts) will have a negative impact on the proposed buffer zone of the WH-property. ►Uncontrolled increase of traffic and changes in access to Lovö may cause unforeseen negative impacts on the cultural landscape. ►The potential negative impacts during ten years of construction works are in detail assessed in the EIAs.
2. Cumulative				
Phase 1 (until completion of Stockholm Bypass, 2026)	large	large-negative (temporary)	large-very large (temporary)	Despite improved public transport facilities, there will be a temporary negative impact due to increase of through traffic caused by growth of Ekerö Municipality (from 23.000 to 27.000 veh./ weekday).
Phase 2 (Stockholm Bypass completed, 2026 and later)	large	positive	moderate	Positive impact will only occur if future traffic flow will not exceed 23.000 veh./weekday and/or concrete measures will be defined due to the adopted monitoring program not to exceed this number of vehicles.
3. Visual				
Section Drottningholm Bridge	moderate	neutral	moderate	Widening of bridge has no negative impact on vista to Drottningholm Palace.
Section Malmen	large	positive	moderate	Remodelling improves quality of road design.
Section Karusellplan-Hemmet	moderate	neutral	moderate	No changes. (Visual constraints possible due to vehicles on Ekerö Road).
Section Vilan-Canton	large	neutral	large	Both existing and remodelled Ekerö Road disrupt coherence of 'pastoral landscape'.
Section Canton-Edeby	large	large-negative	large-very large	Ekerö Road even widened due to remodelling and higher speed limit than in other parts of WH property .
4. Management				
Traffic and visitor management in the property should be improved especially at the entrance area in Malmen, at Karusellplan and at Canton.				

Tab. 5.3: Summary of impact assessment

6 CONCLUSIONS, MITIGATION MEASURES AND RECOMMENDATIONS

The results of the previous impact assessments with regard to Stockholm Bypass and Ekerö Road and especially the statements of various stakeholders quoted in section 4.4.2 clearly show that there is a conflict of interests concerning the development goals with regard to Ekerö Road. Ekerö Municipality has a large potential to grow in the future, the population is expected to increase with 20 % until 2030 according to the municipality's general plan. Hence, especially in the period until the Stockholm Bypass will be completed in 2026, the main interest focuses on a fast and efficient access to the mainland. As a consequence, it is suggested to integrate elements such as roundabouts at Canton village or underpasses for pedestrians and cyclists into the Ekerö Road design.

In contrast to this, stakeholders which position themselves closer to the values of cultural and natural heritage in general and World Heritage in particular claim that increasing traffic flow should be avoided due to their negative impact on heritage values. Consequently, it is argued that the junctions between Stockholm Bypass and Ekerö Road should have been located as further away from the World Heritage property. Besides that, it is suggested that measures to remodel Ekerö Road should be reversible and eventually taken back after the completion of Stockholm Bypass (please compare 4.4.2).

The discussions about the location of the junctions between Stockholm Bypass and Ekerö Road and the design process of Ekerö Road itself, which is meant to find a compromise between these two positions, clearly reflect this conflict of interests. Similarly, the intention expressed in the Retrospective Statement of Outstanding Universal Value, where it is stated that "all involved parties will aim to limit the negative impacts and work to identify new possibilities and solutions for improved accessibility to the area in conjunction with the developments related to the ongoing Stockholm Bypass and Ekerö Road extension project" reflects these tensions (please compare 3.7).

Despite these conflicting interests, the authors of this report gained the impression during the working process of this HIA report that there is a common ground between all stakeholders that the planned Stockholm Bypass is an important measure to diminish the increase of through traffic on Ekerö Road. Besides that, the construction works on the Stockholm Bypass had already been started (since 2015) and the decision to locate the discussed junctions between the Stockholm Bypass and Ekerö Road had been taken several years ago by the Swedish Transport Administration (2009) when the assessment process of this HIA Phase 2 started. Additionally, based on the recommendations provided in HIA Phase 2 (2012), the road design programme of the planned remodelling of Ekerö Road had already been carried out.

Against this background, it was decided to focus this HIA Phase 2 on the plans to remodel Ekerö Road. Particularly the section of Ekerö Road located in the World Heritage property 'Royal Domain of Drottningholm' has been investigated in detail.

6.1 STARTING POINT OF THE IMPACT ASSESSMENT: EXISTING EKERÖ ROAD HAS A NEGATIVE IMPACT ON THE OUV OF THE WORLD HERITAGE PROPERTY

The crucial element of the OUV of the UNESCO World Heritage property 'Royal Domain of Drottningholm' is the court ensemble as a whole which displays all features of the life at the court: the Palace, the church and the theatre with its outstanding authentic machinery dating from the 18th century; the park which was developed in various steps throughout history and

which includes outstanding elements such as the Chinese Pavilion, the village of Canton as an early example of industrial production; the agricultural structure surrounding the park as an essential part of the concept of a 'pastoral landscape'; and Malmen which was in functional terms developed as an administrative district closely related to the Palace, a fact which is also expressed by the design of the buildings as a 'background setting' for the Palace.

The analysis of the OUV and relevant attributes of the World Heritage property ‚Royal Domain of Drottningholm' carried out in this HIA Phase 2 showed clearly that this ensemble developed on either side of Ekerö Road. This is also illustrated by both the World Heritage area extending beyond Ekerö Road and the various visual and functional links across this road (please compare chapter 3). Consequently, it was a crucial starting point of HIA Phase 2 that already the existing Ekerö Road is an element which disrupts the World Heritage property in both functional and visual terms. Despite Ekerö Road was already there long before the property was inscribed in the World Heritage List in 1991, it clearly has a negative impact on the OUV of the World Heritage property at present.

Against this background, it was the starting point of the assessment that all planned modifications of Ekerö Road should either improve the negative impact of the road on the World Heritage property or at least be neutral concerning their impact. Consequently, all planned modifications of Ekerö Road were assessed in comparison to its present situation.

6.2 RESULTS OF EKERÖ ROAD DESIGN PROCESS AND WORKING PROCESS DURING HIA PHASE 2

The impact assessment carried out in the previous chapter led to the conclusion that it has been managed to improve the existing situation of Ekerö Road in the World Heritage property in comparison to the existing situation with regard to the following aspects:

- Due to the fact that speed limits will be lower than at present, noise disseminated by traffic on Ekerö Road will decrease in the World Heritage property.
- Due to the new drain water management, the pollution of the World Heritage property's currently very vulnerable water system will be lowered.
- A comprehensive monitoring program with regard to vibrations disseminating from Ekerö Road has been started during this assessment process. It is not yet clear which impact the planned construction measures and potential increase of through traffic will have on the World Heritage property. But the initiated monitoring program generates a basis to control the potential impact on historic buildings in the future which is beneficial for the World Heritage property.
- The quality of the planned road design in the section between Drottningholm Bridge and Hemmet will be considerably higher than the shape of the existing Ekerö Road.
- Due to the planned modifications at the entrance area at Malmen, the barrier effect of the road will be lowered and the visitor's management of the World Heritage property can be improved.
- Due to the planned dislocation of the park & ride facilities at Karusellplan in direction to Ekerö, it will be possible to use this square in a more suitable and sustainable manner in the future.
- Although the functional connection of Lovö Kyrkallé and Skolallén cannot be restored, the visual coherence of both tree alleys could be enhanced during the HIA 2 working process.

However, the previous chapter also showed clearly that the following questions still have to be considered more in detail:

- *Environmental Impacts:* In principle it is beneficial for the World Heritage property that a comprehensive vibration monitoring program has been initiated in the context of the planned remodelling of Ekerö Road. Nevertheless, the potential risks in terms of vibrations due to construction works and increasing traffic are still unclear.
- *Cumulative impacts:* Despite the planned fourth bus lane, a temporary increase of through traffic on Ekerö Road is forecasted until the completion of the Stockholm Bypass in 2026 (from 23.000 veh./weekday at present to 27.000 veh./weekday in 202).
- Stockholm Bypass is the most important measure to reduce through traffic on Ekerö Road. Nevertheless, the planned growth of Ekerö Municipality and traffic expected to enter Ekerö Road from southern directions via the Stockholm Bypass will increase through traffic on Ekerö Road after the completion of the Bypass.
- *Visual and functional impacts:* Despite the above-mentioned first improvements at Lovö Kyrkallé and Skolallén, a negative impact in visual and functional terms remains due to Ekerö Road in the section of the road between Vilan and Canton and particularly at the intersection between Ekerö Road and these tree line avenues.
- *Planning and Management:* There are several questions to be solved with regard to the spatial development and the organisation of visitor's traffic in the World Heritage area and its surroundings. This question refers not explicitly to the planned remodelling of Ekerö Road, but rather to the management of the World Heritage property.

Consequently, the following suggestions for mitigation measures and future steps to take focus on these above-mentioned aspects.

6.3 RECOMMENDATION 1: PROLONGATION OF VIBRATION MONITORING PROGRAM DURING CONSTRUCTION PERIOD STOCKHOLM BYPASS

Until the completion of Stockholm Bypass, a temporary increase of through traffic is expected on Ekerö Road. Since it is not yet possible to assess the impact of vibrations which will caused during the planned construction and due to increasing through traffic on Ekerö Road, it is urgently recommended to prolong the recently started comprehensive vibration monitoring program until Stockholm Bypass is completed (scheduled for 2026). Besides that, considered the high value of the buildings and parks in the World Heritage property, it is recommended to establish a continuous vibration monitoring program.

6.4 RECOMMENDATION 2: REDUCING NEGATIVE CUMULATIVE IMPACTS TO THE LARGEST EXTENT POSSIBLE / INFORMING THE WORLD HERITAGE COMMITTEE AND ITS ADVISORY BODIES REGULARLY ABOUT ALL STATES OF DEVELOPMENT AND PLANNED COUNTER MEASURES

The forecasted traffic flow clearly demonstrates that despite the currently planned measures for an additional bus lane on Ekerö Road it will not be possible to limit the future traffic flow on the level of the year 2009 (22.500 veh./weekday and 10.000 bus passengers) until Stockholm Bypass is completed. Present measures show a number 23.000 veh./ weekday. Until the completion of Stockholm Bypass, the increasing traffic volume on Ekerö Road is forecasted to increase up to a number of 27.000 veh./weekday. This development will cause a *temporary negative impact* on the World Heritage property.

The completion of the Stockholm Bypass will lead to a decrease of through traffic on Ekerö

Road. But traffic will consist to a large extent of transit traffic and to a minor extent by 'islander traffic' coming from Ekerö Municipality due the growth of Ekerö Municipality and additional through-traffic coming from southern directions via Stockholm Bypass after the opening of the Stockholm Bypass traffic on Ekerö Road.

Against this background, the Swedish Transport Administration plans to establish a monitoring program the traffic on Ekerö Road. A threshold has been defined with 27.000 veh./weekday during the construction process of Stockholm Bypass and 23.000 veh./weekday after its completion (Swedish Transport Administration, 2016a). Swedish Transport Administration will report the results of the monitoring program to the stakeholders and shall, as soon as the defined traffic amount limits (phase 1 and phase 2) are achieved, and together with the stakeholders, activate a plan for possible measures to improve the traffic situation. In case the above-mentioned thresholds are exceeded, the following options to reduce through traffic are suggested at present:

PHASE 1 (during construction of Stockholm Bypass):
- Ferry connections, in combination with a Mobility Management Program
- Recently started measurements of vibration and noise in order to safeguard the World Heritage
- Financial incentives for taking public transport
- Strictly monitored speed limits

PHASE 2 (after construction of Stockholm Bypass):
- Reducing the speed through the World Heritage property to 40 km/h through the entire World Heritage property.
- Competitive bus schemes such as Bus Rapid Transit in the corridor.
- Congestion charges (technical arrangements for toll booths are already foreseen in the tunnel openings for Stockholm Bypass).
- The long term scenario does not exclude a road tunnel passing under the World Heritage Site, but it is stressed that this is "a costly and technically challenging project" (Swedish Transport Administration, 2016a).

Against this background HIA Phase 2 recommends to:
- a.) immediately implement a traffic monitoring program along with immediate measures to decrease traffic flow on Ekerö Road as much as possible (such as ferry connections, mobility management program and particularly speed limits).
- b.) make sure that all adopted traffic control measures can be implemented to limit the traffic passing the World Heritage property after the Stockholm Bypass is opened to traffic in 2026.
- c.) UNESCO's policy intends to avoid the increase of motorized traffic in World Heritage properties. However, through traffic in the World Heritage property 'Royal Domain of Drottningholm' increased from 16.700 veh./weekday at the time of inscription (1991) up to 23.000 veh./weekday at present. A further increase of traffic up to 27.000 veh./weekday is expected until Stockholm Bypass is completed.

When Stockholm Bypass is completed, there will exist two additional options to access the mainland from Ekerö Municipality. Consequently, it is strongly recommended that the States Party supports efficient measures to reduce through traffic on Ekerö Road, such as toll stations, after the Bypass is completed in 2026.

It is further recommended that the States Party provides the World Heritage Committee and its Advisory Board ICOMOS annually with a detailed report at least up to the year 2026. Here, the current condition of through traffic on Ekerö Road should clearly be described and it should also clearly be stated which measures have been taken to reduce the traffic flow on Ekerö Road.

6.5 RECOMMENDATION 3: DECREASING NEGATIVE IMPACT OF EKERÖ ROAD BETWEEN VILAN - CANTON (FUTURE WORKING PROGRESS)

The visual impact assessment carried out in this HIA Phase 2 showed clearly that the planned remodelling of Ekerö Road will lead to a negative impact in the section between Vilan and Canton. This is especially true for Canton village, where both Lovö Kyrkallé and Skolallén are interrupted in functional terms. The planned width of the traffic lanes of 3,50 m leads here to the need to widen Ekerö Road. Besides that, the intended speed limit is planned to be 60 km/h here after the planned remodelling of Ekerö Road. This speed limit is 10 km/h lower than at present but higher than in the stretch of remodelled Ekerö Road between Hemmet and Malmen, where a speed limit of 40 km/h is planned. As a result, it is required to keep the existing bus stop pockets here according to the Swedish traffic legislation (please compare visualizations 7-10, chapter 5).

Consequently, it is urgently recommended to investigate immediately whether it is possible to plan the remodelled Ekerö Road with a speed limit of 40 km/h also in the section between Vilan and Canton so that it can be avoided to build additional bus stops in this section and the barrier effect of Ekerö Road can be reduced to the smallest extent possible.

6.6 RECOMMENDATION 4: SPATIAL DEVELOPMENT PLAN TO SUPPORT AN INTEGRATED MANAGEMENT OF THE WHOLE AREA OF THE WORLD HERITAGE PROPERTY ‘ROYAL DOMAIN OF DROTTNINGHOLM’

The OUV of the World Heritage property is based on the qualities of the domain as a whole and the strategic goals outlined in the Management Plan which has been developed in 2007 are reflecting this aspect. Consequently, the Management Plan includes a strategic vision for the coming thirty years and an outline for the intention to install an overall site management.

Nevertheless, the analysis of the present situation of the World Heritage property carried out during this HIA-report lead to the conclusion that this aspect is not yet reflected sufficiently in praxis. In contrast to the general goals set out in the Management Plan’s vision until 2030, the management of the property focused strongly on the area of the landscape garden and its historic building stock in recent years. As a result, the functional and visual links between the Landscape Garden and the surrounding ‘pastoral landscape’ were increasingly lost and the barrier effect of Ekerö Road was even strengthened. Various interviews and meetings of the authors of this report with relevant stakeholders confirmed this conclusion.

It is therefore suggested to elaborate a Spatial Development Plan which serves as both a concrete vision and a backbone to preserve the Outstanding Universal Value and an element to support the sustainable development of the World Heritage property and its setting and context. The encouraging results which have been achieved at the entrance area in Malmen, where a considerable improvement was reached due to close cooperation between the Swedish Transport Administration and the National Property Board, should be taken as a starting point for this plan. It is therefore strongly suggested that all stakeholders which were embedded in the working process of this HIA should be integrated in the elaboration of the Spatial Development Plan. The authors if this report are very concerned that it was not possible to include

representatives of Ekerö Municipality in the working process of this HIA Phase 2. Hence, it is considered to be vital to include representatives of Ekerö Municipality in this future planning process.

The so-called Vårdplan, currently conceived by the National Property Board as a comprehensive maintenance plan, and the general goals set out in the World Heritage Management Plan 2007 – 2012, should serve as a starting point to develop such a Spatial Development Plan. Besides that, especially the World Heritage property's location in a Natural Reserve with outstanding landscape features which functions at the same time as the property's proposed buffer zone should be seen as a unique chance and an important starting point to define concrete spatial measures and guidelines for the property's future development (please compare Fig. 3.22).

The following general goals set out in the Management Plan 2007 – 2012 should serve as a guideline for the elaboration of the Spatial Development Plan:

2 *Borders and proposed buffer zone shall be monitored in order to ensure that the universal values of the area are properly protected*

3 *All main actors at the World Heritage site shall make a risk assessment and maintain suitable guidelines for responding to these risks*

4 *The unique unity that exists in both exteriors and interiors at the World Heritage site should be covered by a unified view on maintenance and restoration, which facilitates management and care in the long term and in the day-to-day work*

5 *Care, preservation and restoration of the gardens and parks at the World Heritage site should be governed by a unified view to facilitate the management and care in the long term as well as in day-to-day work*

9 *Facilities and information for visitors to the World Heritage site shall be developed at all levels to meet their expectations and to enhance the experience and understanding of the universal value and status of Drottningholm as a World Heritage site*

10 *All efforts shall be made to improve understanding of how the World Heritage concept was created, developed and now used. The educational activities should be developed and be based on the principles of life-long learning*

In detail, the Spatial Development Plan should focus on the following goals:

- Supporting the understanding and the visibility of the entire Royal Domain of Drottningholm and its connections to its proposed buffer zone on Lovö island.
- Rethinking the access to the World Heritage from Ekerö. This part functions currently as a 'backside', but kept in mind that Stockholm Bypass will change this situation in the future, it should rather be treated as a second main entrance to the property. Such a solution could also open up the opportunity to welcome visitors coming from Ekerö to the World Heritage property.
- In this context, it should also be investigated how to improve the negative visual impact of Ekerö Road between Vilan and Kanton and the loss of functional links of the World Heritage property via Skolallén and Lovö Kyrkallé to its surroundings.
- Improving the traffic and management in the property. This refers especially to the organization of the visitor's traffic in Malmen and Canton.

RECOMMENDATION	MEASURE	REMARK
Recommendation 1: **Prolongation of vibration monitoring program during construction period Stockholm Bypass**	**►Prolongation of the recently started comprehensive vibration monitoring program until Stockholm Bypass is completed (scheduled for 2026).** **►Besides that, considered the high value of the buildings and parks in the World Heritage property, it is recommended to establish a continuous vibration monitoring program.**	
Recommendation 2: **Reducing negative cumulative impacts to the largest extent possible / Informing the World Heritage Committee and its Advisory Bodies regularly about all states of development and planned counter measures**	**►a.) Immediate implementation of a traffic monitoring program along with immediate measures to decrease traffic flow on Ekerö Road as much as possible (such as ferry connections, mobility management program and particularly speed limits).** **►b.) Make sure that all adopted traffic control measures can be implemented to limit the traffic passing the World Heritage property after the Stockholm Bypass is opened to traffic in 2026 and that the maximum amount of traffic does not increase the present level of 23.000 veh./weekday after this point of time.** **►c.) When Stockholm Bypass is completed, there will exist two additional options to access the mainland from Ekerö Municipality. Consequently, it is strongly recommended that the States Party supports efficient measures to reduce through traffic on Ekerö Road, such as toll stations, after the Bypass is completed in 2026.** **►d.) It is further recommended that the States Party provides the World Heritage Committee and its Advisory Board ICOMOS annually with a detailed report at least up to the year 2026. Here, the current condition of through traffic on Ekerö Road should clearly be described and it should also clearly be stated which measures have been taken to reduce the traffic flow on Ekerö Road.**	**UNESCO's policy intends to avoid the increase of motorized traffic in World Heritage properties. However, through traffic in the World Heritage property 'Royal Domain of Drottningholm' increased from 16.700 veh./weekday at the time of inscription (1991) up to 23.000 veh./weekday at present. A further increase of traffic up to 27.000 veh./weekday is expected until Stockholm Bypass is completed.**
Recommendation 3: **Decreasing negative impact of Ekerö Road between Vilan - Canton - Edeby (future working progress)**	**►Due to negative impact of remodelled Ekerö Road, it is urgently recommended to investigate immediately whether it is possible to plan the remodelled Ekerö Road with a speed limit of 40 km/h also in the section between Vilan and Canton so that it can be avoided to build additional bus stops in this section and the barrier effect of Ekerö Road can be reduced to the smallest extent possible.**	**The visual impact assessment carried out in this HIA Phase 2 showed clearly that the planned remodelling of Ekerö Road will lead to a negative impact in the section between Vilan and Canton. This is especially true for Canton village, where both Lovö Kyrkallé and Skolallén are interrupted in functional terms.**

Recommendation 4: **Spatial Development Plan to support an integrated management of the whole area of the World Heritage property 'Royal Domain of Drottningholm'**	**►Elaboration of a Spatial Development Plan which serves as both a concrete vision and a backbone to preserve the Outstanding Universal Value and an element to support the sustainable development of the World Heritage property and its setting and context.**	**In detail, the Spatial Development Plan should focus on the following goals:** **►Implementing the strategic goals outlined in the World Heritage Management Plan.** **►Supporting the understanding and the visibility of the entire Royal Domain of Drottningholm and its connections to its proposed buffer zone on Lovö island.** **►Rethinking the access to the World Heritage from Ekerö. This part functions currently as a 'backside', but kept in mind that Stockholm Bypass will change this situation in the future, it should rather be treated as a second main entrance to the property. Such a solution could also open up the opportunity to welcome visitors coming from Ekerö to the World Heritage property.** **►In this context, it should also be investigated how to improve the negative visual impact of Ekerö Road between Vilan and Kanton and the loss of functional links of the World Heritage property via Skolallén and Lovö Kyrkallé to its surroundings.** **►Improving the traffic and management in the property. This refers especially to the organization of the visitor's traffic in Malmen and Canton.**

Tab. 6.1: Recommendations with regard to mitigation measures and future spheres of activity

7 REFERENCES

7.1 LITERATURE

ICOMOS: ICOMOS Guidance on Heritage Impact Assessments for Cultural World Heritage Properties, Paris 2011

Trafikverket: *E4 Förbifart Stockholm. Remissvar angående E4 Förbifart Stockholm. 2013-06-26. Planprövning. ARBETSPLAN,* Stockholm 2013

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Trafikverket: *Kulturmiljöutredning- Vägplan för Ekerövägen väg 261 Tappström - Nockeby,* Stockholm 2015

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WSP: *Conditions for window measures for noise protection within World Heritage Drottningholm*, Stockholm 2016b

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WSP: *Nulägesbeskrivning av kommande riskanalys och kon-trollprogram för kommande ombyggnad av väg 261,* Stockholm 2016d

UNESCO: *Operational Guidelines,* Paris 2015

7.2 LINKS

http://www.trafikverket.se/
http://www.icomos.se/wp-content/uploads

7.3 ILLUSTRATIONS