



Strategic Environmental
Assessment (SEA) of
the Glasgow 2014
Commonwealth Games
Strategy and Framework
November 2010

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1. INTRODUCTION TO PART C

Part C of the Environmental Report summarises the SEA assessment of the CG Strategy and Framework and the recommendations made for mitigating its potential negative environmental effects and enhancing positive ones. In addition, Part C makes a number of recommendations on approach for monitoring the CG Strategy and Framework's likely significant environmental effects.

The approach taken to the assessment is described in Environmental Report Part B Chapter 2 'SEA Approach'. Part B Chapters 4, 5 and 6 summarise the environmental objectives, baseline and context that have informed the SEA assessment. The assessment summary in Part C of the Environmental Report should be read in conjunction with the background information on the Games plans in Part A and the supporting context in Part B along with other supporting evidence in the Appendices including maps, the detailed assessment summary matrices and the outputs from the individual project causal chain and spatial analysis scoping assessment.

The assessment, mitigation and enhancement recommendations and monitoring proposals outlined in this report will need to be re-visited after consultation on the CG Strategy and Framework and Environmental Report has been undertaken. Any significant post-consultation changes to the CG Strategy and Framework may have to be assessed for potential environmental effects and mitigation, enhancement and monitoring recommendations changed accordingly. Within a statutory period after the CG Strategy and Framework has been formally adopted, we will publish an SEA Post-adoption Statement. Among other statutory requirements, the SEA Post-adoption Statement will include:

- The outcomes of any additional assessment undertaken for significant post-consultation changes to the CG Strategy and Framework;
- A summary of how the SEA process (including this consultation) has influenced the development of the CG Strategy and Framework; and
- A comprehensive framework for monitoring the significant environmental effects of the CG Strategy and Framework.

2. ASSESSMENT OF THE COMMONWEALTH GAMES STRATEGIC FRAMEWORK

The approach taken to assessing the Commonwealth Games Strategic Framework – the Games Strategy – is described in Environmental Report Part B section 2.6. Further information on the Games Strategy can be found in Environmental Report Part A section 2.2 and Appendix C.

2.1 Environmental commentary of the CG Strategic Framework

The overarching strategy for the Commonwealth Games (the ‘CG Strategic Framework’ or the ‘Strategy’) comprises several elements ranging from a strategic vision to a more detailed discussion of related strategic issues and a list of important output measures. It is clear from an analysis of the CG Strategic Framework that environmental and sustainability considerations have played a key role in its development. This is reflected in a range of key environmental strengths that are inherent to either some or all parts of the strategy.

In addition however, the analysis has highlighted how some aspects of the strategy are potentially less strong, environmentally speaking, than others. In essence, there are a number of important environmental opportunities still to be considered that the ongoing development of other elements of the CG Strategy and Framework (i.e. the more detailed pre, during and post-games provisions that will deliver the Strategy) should have regard for. Informed by these opportunities, the SEA has helped to facilitate this process through the development of a wide range of recommendations aimed specifically at improving the strategic environmental benefits that may be derived from the implementation of pre and post-games provisions.

The remainder of this section summarises the environmental analysis undertaken on the CG Strategic Framework and highlights proposed recommendations for improving its environmental performance. Given the limitations inherent to this part of the assessment (see ER Part B section 2.6.1 for further information), recommendations for improving the Strategy’s environmental performance have been directed primarily at key elements of the Games’ pre and post-games provisions.

2.1.1 Analysis of the Commonwealth Games Strategic Framework

As discussed above, there are a number of key environmental strengths inherent to some or all parts of the strategy. These strengths can be broadly categorised on the basis of whether they are ‘strategic’ or ‘project’ focused and are outlined in further detail below. By definition, the focus of a strategy should be on strategic issues to guide and inform the approach taken to initiatives occupying ‘lower level’ positions in the hierarchy of plans, programmes and projects. In effect, such ‘lower level’ initiatives should be informed by objectives and policies that are cohesive and balanced across a range of issues at the strategy level. Such an approach should include the development of appropriately defined environmental objectives and policies.

Given its scale (both in terms of budget and scope), the Commonwealth Games raises a key opportunity to deliver a broad range of strategic environmental benefits, primarily in the Glasgow area (this assertion is supported by several national, regional and local level policies as outlined further below). Environmental benefits in this context are Games driven environmental outcomes that would not be realised through the ongoing delivery of existing plans, programmes and projects alone (examples include the environmental benefits that will be derived from the 2014 Clyde Walkway Pilot Project). Despite this, some of the strategy’s ‘environmental strengths’, rather than being additional environmental benefits, are more akin to environmentally focused approaches to development. It is important to remember that, in part at least, a key

objective of the Strategy is to support regeneration and whilst it **will** deliver additional environmental benefits, it **will also** cause a significant environmental impact¹.

Where possible, the scale and magnitude of the Games' environmental impact should be reduced through the careful consideration of alternatives and development of appropriate mitigation measures. Key aims of the SEA in this regard have been twofold. Firstly, the SEA has helped to highlight, from an environmental perspective, the tensions inherent to delivering a sustainable Games. Secondly, it has aimed to support the transparent balancing of sustainability conflicts as and when they arise (by providing decision makers with timely information on the Games' potential environmental effects). The CG Strategic Framework has the following 'strategically' focused environmental strengths:

- Large scale remediation of contaminated land, particularly in the east end of the City;
- Large scale redevelopment of vacant and derelict land, particularly in the east end of the city;
- The location of Glasgow based venues supports a sustainable approach to transport strategy by minimising the need to travel. This should contribute to lower emissions of air pollutants and greenhouse gases during Games-time. This represents a clear synergy between '*providing the conditions in which athletes can reach their optimum level of performance*' (i.e. by minimising journey times between the Athletes' Village and competition venues) and environmental protection and enhancement;
- The strategy's approach to venue provision incorporating wide spread use of existing venues over new build venues constitutes a highly sustainable approach. Key benefits are likely to include lower carbon emissions/ smaller carbon footprint and fewer construction related environmental issues (e.g. land take/ habitat loss, traffic disruption, temporary declines in air quality, noise and dust nuisance etc); and
- The spatial strategy for Games related development (including new build venues and environmental projects) focuses on the east end of the City where multiple deprivation and environmental issues are most acute and where regeneration priorities are highest.

In addition to these strategically orientated strengths, the strategy also features the following more project/ site focused measures: 1) incorporation of best-practice technological solutions to environmental/ sustainable design considerations in new build projects; and 2) integration of environmental enhancement measures as part of new build projects.

Despite the strengths above, there are also a number of strategic environmental opportunities that remain to be capitalised on. Given the time that has elapsed between the bid-development stage in 2006/ 2007, environmental and planning policy has evolved to the extent that the scope of the strategy's provisions, whilst capturing consideration of many key environmental issues, does not fully cover the range of issues addressed by current policy and thinking. Although a number of additional and welcome Games related environmental policies and programmes have emerged since the bid stage (e.g. the Glasgow 2014 Sustainability Policy produced by Glasgow City Council), there is still a clear need for strategic guidance on several linked environmental issues.

¹ The acceptability of any negative environmental impact that may arise as a result of the Games must be decided through political and societal debate informed by a range of information sources such as this SEA. Given that SEA's key objective is to provide for a high level of environmental protection and enhancement, the environmental issues/ effects (both positive and negative) and recommendations highlighted through the SEA process must be balanced against the wide ranging socio-economic benefits that the Games will support (e.g. development driven regeneration activities in the east end of Glasgow).

As discussed above, strategies should provide an effective steer to 'lower level' decision making processes whereby strategic level objectives and policy inform all other aspects of programme development and delivery. In the Games' case, the overarching CG Strategic Framework establishes the context for all pre-games development activity, games-time management and, crucially, post-games legacy delivery. Given this, it is vital that any relevant environmental opportunities that have been missed in the bid stage strategy-development process are addressed to ensure the strongest environmental legacy possible.

The SEA has played a key role in this process by supporting a thorough understanding of the relationship between the Strategy and the extant environmental policy framework. This has helped to identify shortcomings and gaps where, in principle, the Games could be more supportive of environmental objectives from related plans, programmes and strategies. In essence, this gap analysis highlighted a range of additional/ current key environmental opportunities that the ongoing development of the wider CG Strategy and Framework should consider. As the development of 'lower level' provisions (e.g. pre-games development programmes) has already begun and time is of the essence, there would be limited benefit in preparing a revised Games Strategy to incorporate environmental recommendations from this analysis. By way of a solution however, the SEA provides a suitably strategic level framework within which recommendations can be developed to ensure that strategic environmental opportunities are identified and, where possible, incorporated with relevant 'lower level' provisions (i.e. the SEA process assumes the role of providing strategic level environmental guidance).

In light of the issues highlighted above, the Games Strategy arguably contains two key shortcomings. The first relates to the wording and coverage of some of the provisions and these issues are addressed directly in the recommendations section below.

The second relates to a key omission demonstrating the evolution in environmental and planning policy since the bid stage in 2006/ 2007. In particular, the importance of effective green network provision to an area's regeneration and sustainable economic growth has been recognised and addressed in national, regional and local level environmental and planning policy. The Central Scotland Green Network (CSGN) Partnership Board describe green network as *connected green spaces and natural elements both within urban areas and between towns and cities providing links through to the wider countryside* (CSGN Partnership Board, 2010). In addition, the Glasgow and Clyde Valley (GCV) Green Network Partnership describe green network benefits as 1) health improvement; 2) stronger communities; 3) biodiversity and environment enhancement; and 4) enterprise development (GCV Green Network Partnership Board, 2010).

Given the scope of the Commonwealth Games, there exists an important opportunity for green network development and enhancement to be delivered as a key part of the strategy. This assertion is supported by several policies:

- **National Planning Framework 2 or NPF2** (Scottish Government, 2009) outlines the importance of green network development and enhancement in the Clyde Corridor and, more specifically, the Clyde Gateway and Waterfront areas. In particular, NPF2 highlights the potential for *substantial habitat restoration and enhancement associated with the Clyde Gateway and Commonwealth Games projects*, in support of green network enhancement in the area (Scottish Government, 2009);
- **The Central Scotland Green Network draft Vision and Work Plan** (CSGN Partnership Board, 2010) identifies spatial priorities for the CSGN area. The plan highlights that regeneration efforts in the Glasgow and Clyde Valley area should adopt the green network as a framework for delivering the environmental services necessary to support regeneration and sustainable economic growth. In

addition, the plan recognises the links between green network based outdoor exercise and the Commonwealth Games and calls for the green network to have greater prominence in Games legacy plans;

- **Glasgow City Plan 2** (Glasgow City Council, 2009) recognises the importance of effective green network provision for the Clyde Gateway area's regeneration. The plan outlines how *new areas of greenspace and links to the network will be delivered as a result of new development and the scope to enhance the quality of the existing network* (Glasgow City Council, 2009); and
- **The Clyde Gateway Green Network Strategy** (LUC, 2007) explicitly recognises the importance of effective green network provision to Games delivery by including an objective of *supporting the 2014 Commonwealth Games*. Key tasks identified to support delivery of this objective include *implementing priority open space projects and ensuring that new development contributes positively to the coordinated development of the green network* (LUC, 2007). One such priority open space project is the proposed Dalmarnock Riverside Park which would incorporate a regional level SuDS scheme with a high quality greenspace.

The analysis of relevant environmental and planning policy has helped to identify some potentially key Games Strategy gaps and shortcomings with respect to green network provision and related issues. Recommendations to address these gaps/ shortcomings through potential changes to CG Strategy and Framework provisions where some decisions are yet to be made are outlined in section 2.2.2. Key Games Strategy shortcomings in this regard include:

- Inclusion of an appropriate provision(s) supporting a strategic/ landscape scale approach to Games related green network development and enhancement. The future incorporation any such provisions (i.e. through elements of the CG Strategic Framework where decisions are yet to be made e.g. pre-games development programmes) should provide integrated guidance that supports programme-wide consideration of green network enhancement opportunities;
- Inclusion of the necessary provisions and strategic guidance to ensure that any green network enhancements delivered as part of the CG Strategic Framework are truly multi-functional e.g. supporting site and/ or regional level SuDS schemes in conjunction with the development of improved access networks such as core paths and public open space. An example of such a project (on a large scale) is the proposed Dalmarnock Riverside Park; and
- There is a need to ensure that the Games strategy's objectives for strategic environmental improvements (especially those in relation to green network development), whilst focusing on the east end, are applied to other parts of the City as appropriate (i.e. where Games related activity is taking place).

2.1.2 Recommendations

Although of limited benefit to the ongoing development of the CG Strategic Framework, recommendation of amendments to improve the environmental performance of the Games Strategy can help to further highlight issues and shortcomings that should be addressed elsewhere (see below). Table 2.1 highlights several key Games Strategy changes that would help to improve its environmental performance. The issues highlighted here have been addressed through other parts of the SEA assessment with recommendations made to inform the development of key CG Strategic Framework provisions where decisions are yet to be made.

Table 2.1 Recommendations for improving the Games Strategy’s environmental performance

Strategy provision	Proposed recommendation
Strategy-wide	<ul style="list-style-type: none"> • Provisions within the strategy would benefit from a more explicit consideration of environmental issues • This would reflect the importance of environmental objectives and policies in the delivery of ‘<i>a green Games in the dear green place</i>’ • Thorough integration of relevant environmental issues would help to ensure their effective consideration throughout the strategic approach to all Games activities
Vision	<ul style="list-style-type: none"> • Amend the vision to encompass reference to sustainability issues • This would ensure that sustainability is considered at the very highest level within the Games strategy. For example: • <i>“To promote a unique, friendly, sustainable and world class Commonwealth Games and to develop sport for the benefit of the people, the nations and territories of the Commonwealth and thereby strengthen the Commonwealth”</i>
Key principles	<ul style="list-style-type: none"> • Include an additional ‘Key Principle’ where the remit would be to exclusively addresses environmental issues • In conjunction with other recommendations outlined here, this amendment should aim to raise the profile of environmental issues within the strategic approach but without precluding consideration of environmental issues in other Key Principles and/ or other strategy provisions. For example: • <i>“To ensure that where relevant, the Games contributes to strategic/ landscape scale environmental enhancements particularly around green network provision (including enhancements of access provision, opportunities for outdoor leisure and recreation, biodiversity, sustainable infrastructure and climate change mitigation and adaptation) but also in relation to air quality and soil quality”</i>
Objectives	<ul style="list-style-type: none"> • Amend the existing and/ or include an additional environmentally focused objective • This amendment should highlight explicitly the importance of a large scale event such as the Commonwealth Games working towards the delivery of additional large scale environmental benefit, over and above ‘<i>environmental and sustainability standards that set new benchmarks</i>’. For example: • <i>“To provide appropriate support in the delivery of strategic/ landscape scale environmental benefits”</i>
Key output measures	<ul style="list-style-type: none"> • The inclusion of ‘wide-ranging environmental improvements’ as a key output measure is welcomed • This should be expanded on to include a range of specific environmental indicators that can be measured to monitor the Games’ environmental performance with respect to environmental commitments enshrined in other parts of the strategy (e.g. vision, key principles, objectives etc). Examples may include: <ul style="list-style-type: none"> ○ Hectares of contaminated land remediated and brought back into use (Ha per year) ○ Hectares of vacant and derelict land brought back into sustainable use (Ha per year) ○ In legacy mode, public transport miles reduced as a result of Games related public transport infrastructure enhancements (km per year) ○ Core paths developed and/ or brought back into well managed use (km per year) ○ Hectares of multi-functional green network developed and/ or brought back into well managed use (Ha per year)

As outlined above, there is limited rationale in trying to address the Games strategy’s shortcomings directly (i.e. by recommending changes to policy wording, removal/ addition of new policies, principles, objectives etc). The logical approach is to address any environmental shortcomings/ tensions by making recommendations to change other aspects of the CG Strategic Framework where decisions are yet to be taken (e.g. the pre-games development programmes, additional legacy projects etc).

The strategy's key environmental shortcoming in this regard relates to the appropriate coverage of green network issues in line with current environmental and planning policy principles. Given the scale of the Games (both in terms of budget and scope), addressing this shortcoming is particularly important in the context of strategic/ landscape scale green network enhancements.

Existing coverage of environmental enhancement within the Games strategy is primarily related to the incorporation of individual enhancement projects delivered as part of new build developments. Whilst this approach is welcomed, it raises two key shortcomings. Firstly, the spatial strategy for Games related new build is focused primarily on the east cluster area around Parkhead and Dalmarnock (i.e. where regeneration need is greatest). Secondly, delivery of environmental enhancement on a project-by-project/ piecemeal basis, as a part of new build projects, does not necessarily support the more strategic approach required to deliver landscape scale improvements in line with the direction and approach endorsed in current policy (see above). In response, the following recommendations are proposed that will be delivered primarily through SEA recommendations directed towards the CG Strategic Framework's pre and post-games provisions:

- The SEA should support the identification of realistic and strategic green network enhancement opportunities. This should be undertaken for all parts of the City where Games related activity is taking place. Crucially, adoption of a more strategic approach should support the identification of synergies whereby a number of individual projects are delivered in such a way that their combined benefit is greater than that of the individual projects themselves. In biodiversity terms for example, this type of benefit could be realised through strategic improvements to habitat connectivity which in turn would contribute to enhanced species resilience to climate change. This approach is likely to contribute to enhanced benefits over and above those that would be realised through a project-by-project/ piecemeal approach to enhancement;
- Potential green network enhancement projects should be identified on the basis of current policy priorities and informed by a range of criteria including ecological, access, recreation, climate change adaptation and sustainable infrastructure criteria. In particular, the GCV Green Network's Integrated Habitat Network (IHN) model should be used as an initial starting point to identify optimal solutions in terms of ecosystem resilience and functionality. Outputs here should then be overlaid/ considered in conjunction with other strategic issues such as regional SuDS provision, access networks etc; and
- Green network enhancement projects should be truly multi-functional and support at least two related policy objectives including access provision, support for outdoor leisure and recreation, sustainable and community food production (e.g. the SAGE project), biodiversity protection and enhancement, climate change adaptation and sustainable infrastructure provision (e.g. SuDS).

2.2 Compatibility analysis of Commonwealth Games objectives and SEA objectives

The approach taken to the compatibility analysis of CG Strategic Framework objectives and SEA objectives is described in ER Part B at section 2.6.2. The purpose of the compatibility analysis was to highlight key areas of potential synergy and/ or tension between what the CG Strategy and Framework is trying to achieve and relevant aspirations for the environment as per the SEA objectives.

Ideally, compatibility analysis should be undertaken early on in PPS-development i.e. when there is still an opportunity for the assessment to inform the scope of environmental considerations within PPS objectives (and consequently the environmental approach to the other elements of the PPS). As outlined in ER Part B section 2.6, the CG Strategic Framework (including the objectives subject to assessment here) was

developed at the bid stage in 2006/ 2007 and, consequently, there is limited opportunity (or indeed rationale) for the assessment to influence its provisions. That said, the compatibility analysis has played a key role in subsequent more detailed stages of the SEA assessment and development of related CG Strategy and Framework provisions (e.g. the pre-games development programmes) by helping to:

- Highlight aspects of the environment that are more likely to be affected (both positively and negatively) by the CG Strategy and Framework i.e. key areas of support/ conflict between CG Strategic Framework objectives and SEA objectives. This in turn helped to scope the more detailed assessment by highlighting key environmental issues to consider; and
- Highlight the potential synergies and tensions between the CG Strategy and Framework objectives and SEA objectives (and therefore flag up related parts of the programme that may have greater potential to cause significant environmental effects, both positive and negative).

Whilst there is limited opportunity or rationale for the SEA to influence the CG Strategic Framework's objectives, tensions and synergies identified through the compatibility assessment have, where possible, been addressed through recommendations for improving the environmental performance of other aspects of the programme (i.e. the pre-games development programmes, games-time management strategies and post-games legacy framework).

2.2.1 Summary commentary and recommendations

Generally speaking, considerable uncertainty and/ or areas of 'neutral' compatibility were identified between CG Strategic Framework objectives and SEA objectives. Uncertain compatibility is largely due to the potential for positive and/ or negative effects depending on the approach taken to implementation of CG Strategic Framework objectives. These uncertainties have been addressed by highlighting key issues that were then subject to more detailed consideration in other parts of the assessment under both beneficial (potential positive effects) and adverse (potential negative effects) scenarios (see below and Appendix M for further information).

In addition to the key areas of uncertain compatibility identified, several of the CG Strategic Framework objectives were considered to have 'neutral' compatibility whereby there was no identified conflict or support with SEA objectives. Given that the core focus of the Games is a large scale two week sporting event, several of the CG Strategic Framework objectives are concerned primarily with media/ 'client experience' type issues. These include:

- **Objective 2:** to deliver a quality experience in a safe environment for the Commonwealth Games family and the spectators;
- **Objective 3:** to nurture the Commonwealth Games Federation's brand and to be true to its values of humanity, equality and destiny;
- **Objective 4:** to generate significant commercial revenues to support the public investment in the Games; and
- **Objective 7:** to create an atmosphere that encourages and supports positive and comprehensive media coverage.

In the wider context of the programme and the other key issues addressed therein (e.g. the large scale pre-games development activity, games-time transportation and management etc), any potential that the four objectives above may have to cause significant areas of tension and/ or synergy with SEA objectives was considered to be minimal. That said, there may be some potential for actions delivered in support of

objectives 3 and 7 to be used as a platform for raising awareness about environmental issues. This is of particular relevance to the issue of public health and its relationship with a range of key environmental determinants (e.g. the effective provision of and access to outdoor leisure and recreational opportunities) and the importance of Glasgow's historic environment and cultural heritage to the sustainability of its economy (e.g. the degree to which Glasgow's historic environment is a key component of the City's tourism offer). Where relevant, these issues have been considered in other more detailed parts of the assessment and recommendations made accordingly.

In addition to the uncertain and 'neutral' compatibility outlined above, several key areas of potential support and conflict between CG Strategic Framework objectives and SEA objectives were identified. In summary key areas of potential support were identified in relation to SEA objectives covering population and human health, biodiversity, soil, cultural heritage and townscape/ landscape. It was noted that CG Strategic Framework objective 5 '*provision of first class venues*' has potential to support several SEA objectives including those relating to health, biodiversity, soil, cultural heritage and townscape/ landscape.

Key areas of potential conflict were identified in relation to SEA objectives covering biodiversity, air, noise, climate change mitigation, cultural heritage and townscape/ landscape issues. CG Strategic Framework objectives 1 '*provision of an outstanding environment for athletes to perform*' and 5 '*provision of first class venues*' were noted as having significant potential to conflict with a range of SEA objectives.

Table 2.2 provides additional information on the key areas of potential support and conflict identified along with recommendations for their further consideration as appropriate through other more detailed parts of the assessment (e.g. highlighting opportunities for capitalising on the key synergies identified). Please refer to Appendix M for a full summary of the compatibility analysis and its key outputs.

Table 2.2 Summary compatibility analysis of Commonwealth Games objectives and SEA objectives

Compatibility analysis key findings	Recommendations for consideration in related parts of the assessment
Key areas of support/ synergy	
<p><i>People, health & access</i> CG Strategic Framework objectives 5 and 9 are potentially supportive of SEA objective 'To improve the health and well being of the population'. Development of new and refurbished venues (supporting objective 5) will improve access to a range of leisure and recreational opportunities. In conjunction with the above, appropriate use of engagement activities (supporting objective 9) may help raise awareness about a range of health issues including the relationship between health, outdoor leisure and recreation and access provision</p>	<ul style="list-style-type: none"> • SEA assessment should ensure that Games related opportunities for raising awareness about health issues (particularly those relating to key environmental determinants of health) are explored fully • Key CG Strategy and Framework provisions that have potential to support health objectives include the pre-games development programmes and legacy actions (especially any aspects that have potential to improve access and green network provision)
<p><i>Soils & soil quality</i> CG Strategic Framework objectives 1, 5, 6 and 8 are supportive of SEA objective 'To reduce levels of soil contamination'. Development of new and refurbished venues will involve large scale soil remediation at several key sites, particularly in the east of the City where there is a particularly high prevalence of potentially contaminated sites</p>	<ul style="list-style-type: none"> • Key CG Strategy and Framework provisions with potential to support soil contamination objectives are the pre-games development programmes (particularly the east cluster programme)
<p><i>Landscape & the historic environment</i> CG Strategic Framework objective 5 is potentially supportive of SEA objectives 'To conserve and where appropriate enhance the historic environment and cultural heritage' and 'To maintain and enhance the quality of landscapes and townscapes'. Sensitive development of venues and other Games related infrastructure may support an improved context/ site and setting for an area's key historic environment features. This is likely to be a particularly key issue in areas where the historic environment is already fragmented and/ or degraded e.g. parts of Parkhead and Dalmarnock.</p>	<ul style="list-style-type: none"> • Key CG Strategy and Framework provisions with potential to support cultural heritage landscape/ townscape objectives include the pre-games development programmes (especially the substantial built development projects therein) • SEA assessment to focus on identifying opportunities for Games related development and other activities (including legacy actions and projects) to work towards the protection and enhancement of Glasgow's historic environment. This may include promotional and/ or educational projects that raise awareness of the City's heritage and its importance e.g. as a key part of the tourism offer
<p><i>Objective 5 provision of first class venues</i> CG Strategic Framework objective 5 has key areas of potential support with several SEA objectives, primarily related to health, biodiversity, soil, cultural heritage and townscape/ landscape. Sensitive development of new and refurbished venues in conjunction with public realm and environmental enhancement projects has, amongst others, potential to protect and enhance habitat and species at local and landscape scale levels (i.e. local/ venue level environmental enhancements, if integrated effectively, may enhance connectivity and functionality of habitat networks and therefore ecosystems), to enhance areas where the townscape and landscape is currently degraded/ fragmented and to enhance local and potentially regional level SuDS schemes</p>	<p>Related CG Strategy and Framework provisions supporting objective 5 are primarily related to the pre-games development programmes and their constituent projects. The SEA assessment should consider the following to ensure that key environmental opportunities relating to objective 5 are maximised:</p> <ul style="list-style-type: none"> • Ensure that any project driven biodiversity enhancements improve the connectivity and functionality of habitat networks by supporting a more strategic approach that 'looks beyond' site boundaries • Identify opportunities for Games related development (including legacy actions/ projects and awareness raising activities) to work towards the enhancement of Glasgow's historic environment

Compatibility analysis key findings	Recommendations for consideration in related parts of the assessment
	<ul style="list-style-type: none"> Identify opportunities for whereby Games related infrastructure and environmental projects can enhance regional level SuDS schemes
Key areas of conflict/ tension	
<p><i>Landscape & the historic environment</i> CG Strategic Framework objective 5 is potentially incompatible with SEA objectives 'To conserve and where appropriate enhance the historic environment and cultural heritage' and 'To maintain and enhance the quality of landscapes and townscapes'. Inappropriate development of new and refurbished venues and other Games infrastructure may contribute to an erosion of historic character in key areas</p>	<ul style="list-style-type: none"> Key CG Strategy and Framework provisions with potential to conflict with cultural heritage landscape/ townscape objectives include the pre-games development programmes (especially the substantial built development projects therein) SEA assessment to focus on identifying and mitigating any significant Games related risks to the historic environment
<p><i>Air quality, noise & dust</i> CG Strategic Framework objectives 1 and 5 are potentially incompatible with SEA objectives 'To improve air quality', 'To reduce levels of air pollution' and 'To reduce noise levels from all sources'. Conflicts may arise as a result of two key issues related to the construction and operation of new/ refurbished venues and other Games related infrastructure. Firstly, given the scale and spatially focused nature of pre-games development activity, there is substantial potential for increased traffic congestion during construction works as a result of temporary traffic management measures etc. This may contribute to localised/ temporary increases in air quality/ noise issues. Secondly, post-games increases in visitor numbers and associated traffic to new venues may contribute to additional air quality/ noise nuisance issues over and above pre-games levels. This issue may be particularly acute in or near to noise and air quality management areas</p>	<ul style="list-style-type: none"> Key CG Strategy and Framework provisions with potential to conflict with air and noise objectives include the pre-games development programmes (especially the substantial built development projects therein that may either disrupt traffic during construction or promote additional traffic during operation) and the post-games legacy actions SEA assessment to focus on the identification of significant permanent (i.e. as a result of increased traffic in areas around new venues) and temporary (e.g. as a result of construction activities and Games-time transportation issues) risks to air quality and noise nuisance. A particular focus should be placed on sites in/ adjacent to air quality and noise management areas. Where possible, the SEA should inform the development of alternatives that minimise air pollution and noise nuisance risks
<p><i>Climate change issues</i> CG Strategic Framework objectives 1, 5 and 6 are potentially incompatible with SEA objective 'To reduce greenhouse gas emissions'. In effect, many actions that will support delivery of objectives 1 and 5 will necessitate some degree of built development. Given the likely scale of this development, there is potential for a substantial (albeit largely 'one off') increase in greenhouse gas emissions due to the embodied carbon in built development (i.e. regardless of the sustainability in design, built development is likely to lead to a net increase in carbon emissions).</p> <p>There are concerns around the suitability of benchmarking (see objective 6) as an approach to environmental management where the Organising Committee (OC) and their partners have less direct control over the management issue. A key example is transport where the success of the management strategy will depend on public</p>	<ul style="list-style-type: none"> Key CG Strategy and Framework provisions with potential to conflict with greenhouse gas emissions objectives include the pre-games development programmes (especially the substantial built development projects therein) and the post-games legacy actions The SEA assessment should focus on identifying realistic opportunities for reducing the Games' carbon impact, particularly as a result of pre-games development activity (e.g. ensuring that environmental enhancement projects, including habitat creation, maximise any net increase in carbon sink) and the potential for promoting access improvements that either reduce the need to travel or increase the attractiveness of sustainable transport modes over private car usage (e.g. green network enhancements)

Compatibility analysis key findings	Recommendations for consideration in related parts of the assessment
<p>perception and choice. As a result of the new facilities in Glasgow, there will be an increased need to travel to access additional recreational opportunities. Depending on transport choice, this may also contribute to future increases in emissions. This issue is likely to be particularly significant during the post-games/ legacy period when all new venues/ facilities are accessible to the public</p>	
<p><i>Objective 5 provision of first class venues</i> CG Strategic Framework objective 5 has key areas of potential conflict with several SEA objectives, primarily related to biodiversity, air, noise, greenhouse gas emissions, cultural heritage and townscape/ landscape. Please see above for further information about the nature and implications of these potential conflicts</p>	<p>Please see above for further information about the nature and implications of these potential conflicts</p>

3. ASSESSMENT OF THE COMMONWEALTH GAMES STRATEGY AND FRAMEWORK'S PRE-GAMES PROVISIONS

3.1 Introduction

The approach taken to the assessment of pre-games provisions is described in detail in Part B of the Environmental Report, Section 2.7. The four pre-games development programmes (east/ south/ west clusters and satellite venues) have been assessed to help:

- Identify significant environmental effects (positive and negative) that the CG Strategy and Framework's pre-games provisions may give rise to;
- Inform the Cumulative Effects Assessment (CEA) of the CG Strategy and Framework as a whole;
- Inform recommendations for amending the four pre-games development programmes, other elements of the CG Strategy and Framework and/ or other relevant PPS to reduce the likelihood of significant negative environmental effects arising;
- Inform the development of mitigation measures for significant negative effects that cannot be avoided by amending relevant provisions from the CG Strategy and Framework;
- Inform the development of measures to enhance positive environmental effects; and
- Inform the development of a framework for monitoring the significant environmental effects of the adopted pre-games development programmes and the wider cumulative effects of the CG Strategy and Framework as a whole.

The remainder of this chapter summarises the different stages of the pre-games assessment undertaken for each of the four pre-games development programmes. Section 3.2 describes the outputs of the causal chain and spatial analysis and how this informed other stages in the pre-games assessment. Section 3.3 describes the findings and recommendations from the assessment of several key individual projects proposed for the West, South and East clusters.

Informed by sections 3.2 and 3.3, section 3.4 summarises the outputs of the detailed assessment undertaken for the three Glasgow based pre-games development programmes including the Cumulative Effects Assessment (CEA). Key findings from the satellite venue assessment are provided in Appendix L. Each 'score' in the detailed assessment has been informed by maps, environmental baseline information, key issues, and trends and based on criteria established through the SEA objectives and sub-objectives and significance criteria.

Finally, section 3.5 summarises the recommendations that have developed to improve the environmental performance of the three Glasgow based pre-games development programmes. Comprehensive draft 'SEA design guides', developed for each of these three programmes², are provided in Appendices Y, Z and AA. The Environmental Assessment (Scotland) Act requires the identification of measures to prevent, reduce or as fully as possible offset the significant adverse effects on the environment of implementing the plan or programme. Furthermore (and in line with good-practice), measures have been developed to enhance the potential beneficial effects of the CG Strategy and Framework's pre-games provisions.

In addition and where relevant, specific mitigation/ enhancement measures have been developed for key potential environmental effects of individual pre-games development projects. Measures here have been

² The programme specific SEA design guides will be refined following community engagement events undertaken as part of the consultation on the CG Strategy and Framework and this Environmental Report.

informed specifically by the causal chain and spatial analyses of individual projects (see section 3.2) and have been developed to help account for situations where a project has the potential to give rise to particularly significant effects (e.g. where impact magnitude has potential to be particularly large or in situations where the receiving environment is particularly vulnerable to change). These recommendations are outlined in detail at section 3.3.

3.2 Causal chain and spatial analysis of individual projects

The approach taken to the causal chain and spatial analysis is described in ER Part B section 2.7.1. The primary aim of this part of the pre-games assessment was to identify broad areas of environmental risk and opportunity associated with individual pre-games development projects. The assessment was by no means definitive and was used primarily as a scoping exercise to inform the more detailed programmatic assessment and also the consideration of potential cumulative effects issues (see section 3.4). Four individual causal chain analyses were undertaken to identify the potential environmental effects of the four generic categories of pre-games development project under consideration:

- **CCA1:** venue development;
- **CCA2:** public realm enhancement;
- **CCA3:** transport infrastructure enhancement; and
- **CCA4:** environmental enhancement.

3.2.1 Causal chain analysis of individual projects and key outputs

Prior to carrying out the causal chain analyses, examples of generic project actions and scope of works were work-shopped to identify the types of activity that may potentially cause environmental effects. This was based on examples of project actions/ scope of works from actual pre-games development projects (as per ER Part A and Appendix A) and also input from various experts which helped to identify the full range of potentially impact causing activities. A collated list of key project actions and summary scope of works for each of the four generic categories of pre-games development project is provided in Appendix N.

A similarly expert led approach was undertaken to the causal chain analysis. Based on the generic types of project activity discussed above, a workshop style approach involving various experts was undertaken to identify, for each of the generic types of project, potential primary, secondary, tertiary and resultant environmental effects. This in turn helped to highlight specific aspects of the environment that may be affected by a given project (e.g. aquatic ecosystems, access provision, air pollutant vulnerable groups etc). The four causal chain analyses are depicted diagrammatically in Appendix O.

Following the causal chain analysis workshops, a further analysis stage was undertaken to help rationalise the initial outputs (i.e. those depicted in Appendix O). In essence, this step helped to prioritise the potential effects identified to ensure that the subsequent spatial analysis, detailed assessment and CEA stages did not become unwieldy and overly detailed. The approach involved the following: 1) all potential primary effects were scoped in for further consideration; and 2) potential secondary, tertiary and resultant effects were only scoped in for further consideration where there was perceived to be a particularly strong link between cause and effect. This is explained further in ER Part B section 2.7.1 and Appendix P. For each generic category of pre-games development project, outputs from this rationalisation stage were:

- A full list of potential primary environmental effects;
- A prioritised list of potential secondary and resultant environmental effects; and

- A list of generic environmental receptors that may be affected.

The above outputs have been categorised by SEA topic. A full summary of these outputs is provided in Appendix P. Key outputs for each of the four categories of pre-games development project are summarised in Table 3.1.

Table 3.1 Summary outputs of pre-games development project causal chain analysis

Generic categories of pre-games development project	Key outputs of causal chain analysis
<p>Venue development <i>Key issues: people, health & access; water bodies & flooding; and wildlife conservation & ecosystem services</i></p>	<ul style="list-style-type: none"> • Generally speaking, venue development projects have significant potential to cause <i>adverse</i> environmental effects, particularly during the construction phase (short term) but also during operation (medium to long term). Key aspects of the environment that may be affected include people, health & access (e.g. potential for increased noise, dust and vibration nuisance during construction contributing to a temporary reduction in amenity value and temporary impacts on human health, particularly among health vulnerable groups), water bodies & flooding (e.g. potential for construction run-off related decreases in water quality, increased flood risk as a result of increased areas of hard standing etc) and wildlife conservation & ecosystem services (e.g. increased pressure on aquatic ecosystems driven by potential for temporary and/ or permanent increases in contaminated run-off) • Venue development projects also have significant potential to cause <i>beneficial</i> environmental effects, particularly during operation and particularly in relation to people, health & access. Examples include potential for improved access as a result of increased public transport provision (to meet demand at new venues/ facilities), and increased uptake of outdoor leisure
<p>Public realm enhancement <i>Key issues: people, health & access; landscape & the historic environment</i></p>	<ul style="list-style-type: none"> • Causal chain analysis indicates that public realm enhancement projects have significant potential to cause <i>beneficial</i> effects, particularly during operation and particularly in relation to people, health & access and landscape & the historic environment issues. Examples include improved access and enhanced amenity (which may in turn contribute to increased uptake of outdoor leisure and recreational opportunities) and improved character/ site and setting of historic townscape and landscape • Despite the broadly positive issues highlighted above, potential construction phase impacts, whilst temporary, may contribute to increased local traffic and traffic congestion with the associated risks of increased air pollution and related human health impacts. In addition, whilst it is reasonable to anticipate that public realm enhancements will help to enhance an area's character, there are inherent tensions between delivering a practical/ cost effective solution and the use of appropriate design and materials
<p>Transport infrastructure enhancement <i>Key issues: people, health & access; air quality, noise & dust; wildlife conservation & ecosystem services</i></p>	<ul style="list-style-type: none"> • Generally speaking, transport infrastructure enhancement projects have significant potential to give rise to <i>adverse</i> environmental effects. Similarly to other types of project assessed here, many of the potential adverse effects are likely to arise during the construction phase (i.e. short term) as a result of any construction related traffic management measures utilised and their potential to contribute to temporary increases in local traffic and traffic congestion. This in turn has risks associated with increased air pollution and related human health impacts. In addition, there is also potential for

Generic categories of pre-games development project	Key outputs of causal chain analysis
	<p>increased standing traffic during operation (along with the associated risks outlined above) as a result of any increase in traffic management, bus stops, pedestrian crossings etc</p> <ul style="list-style-type: none"> Equally, transport infrastructure enhancements may cause a range of potential <i>beneficial</i> environmental effects, particularly during operation. Key beneficial effects are primarily related to people, health & access issues and include increased provision and connectivity of the green network and enhanced pedestrian and cycle access. In combination, these two 'enhanced access' type effects may contribute to increased uptake of outdoor leisure and recreation, walking/ cycling for some journeys and associated potential for improved public health
<p>Environmental enhancement <i>Key issues: people, health & access; landscape & the historic environment; wildlife conservation & ecosystem services</i></p>	<p>Environmental enhancement projects have substantial potential to cause a range of <i>beneficial</i> environmental effects, primarily in relation to people, health & access and wildlife conservation & ecosystem services issues. Some potential effects support objectives for both health and biodiversity. For example, increased provision and enhanced connectivity of green network (including habitat networks) may contribute to increased uptake of outdoor leisure and recreation activities, enhanced species resilience to climate change and other pressures and enhanced provision of key ecosystem services such as flood risk attenuation and environmental education resources</p>

3.2.2 Spatial analysis of individual projects and key outputs

As outlined above, the causal chain analysis helped to identify a range of potential environmental effects that may arise as a result of the construction and operation of four different types of 'generic' pre-games development project. Whilst these effects are necessarily generic (i.e. assessing each project individually would have taken a substantial amount of time and would also constitute an overly detailed approach given the scope and objectives of SEA), they provide a useful albeit broad brush indication of the environmental risks and opportunities associated with the four different types of project.

During the second stage of the pre-games assessment, the generic effects identified through the causal chain analysis were framed in spatial terms to reflect a project's local environmental context given its proposed location³. This process helped to rationalise the significance of a specific project's potential environmental effects given the location of environmental receptors in its vicinity. In essence, the generic effects identified through the casual chain analysis were only subject to further consideration in instances where a 'suitable' environmental receptor was identified in the vicinity of the project (e.g. the potential environmental effect *erosion of historic character* was discounted from further consideration where the area surrounding a project did not have any historic character of noteworthy importance).

One issue raised by the above was a need to agree likely distances over which the generic environmental effects identified would have significant potential to affect a relevant receptor. Similarly to other parts of the pre-games assessment described here, an expert led approach was adopted whereby reasonable distances were estimated by the core SEA team. These were then subject to a check by various specialists internal to

³ Please refer to ER Part A sections 2.3.3 to 2.3.5 for maps of proposed locations for the various pre-games development project.

Glasgow City Council (GCC) to further validate the estimations (e.g. air related effect distances were checked by GCC air quality specialists). An example *effect-distance-receptor* relationship is shown below:

- **Effect:** increased risk of air pollution related human health impacts, particularly among vulnerable groups (e.g. people with respiratory conditions)
- **Receptor(s):** people, health vulnerable groups, population centres, retail centres, key pedestrian and cycle routes
- **Distance over which effect has potential to affect relevant receptors:** 0.3km

It is important to stress that all estimations are precautionary and have not be informed by any modelling or other quantitative analysis approaches. As discussed above and in ER Part B, the key focus of the assessment here was to provide a broad brush indication of key areas of environmental risk and opportunity that were then considered in the more detailed programmatic assessment.

Appendix Q lists a full schedule of all *effect-distance-receptor* estimations used in the spatial analysis. For each of the pre-games development projects considered, this schedule facilitated the screening of generic environmental effects to 'sieve-out' only those effects considered reasonable given a project's proposed location and therefore its specific environmental context (i.e. the key environmental receptors in the vicinity). This screening process was carried out using the measuring tool in GIS and key spatial data available as part of the Commonwealth Games SEA GIS project.

The output of this process, for each pre-games development project considered, is a collated list of potential environmental effects. These potential effects have been categorised on the basis of whether they are temporary/ short term (i.e. construction related), permanent/ medium and long term (i.e. operation related) and also by SEA topic (i.e. which aspect of the environment they would affect e.g. population and human health, air, water etc). This is documented in Appendix R where write-ups of the individual project assessments have been grouped by pre-games development programme (i.e. West, South and East cluster projects) and generic category of pre-games development project (e.g. public realm enhancement, venue development etc).

The spatial analysis process produced a wealth of data, the analysis of which has played a key role in other related parts of the assessment. In particular, information generated in the spatial analysis has played a key role in the detailed assessment of the pre-games development programmes 'as wholes' i.e. whilst the programmatic assessment is just that, the conclusions reached, key environmental issues raised and SEA recommendations developed have been informed, where relevant, by project/ site specific considerations raised through the spatial analysis process. Secondly, the spatial analysis process helped to highlight key projects where, given their potential to cause particularly significant environmental effects (both positive and negative) and/ or the sensitivity of or opportunities raised by the project's immediate environment, there was substantial benefit in undertaking some more detailed assessment at the project level (see section 3.3 for further information).

Finally, the spatial analysis component of the pre-games assessment was absolutely key to the pre-games development programme CEA by highlighting similar environmental effects occurring repeatedly as a result of several projects in combination and/ or key receptors that may be affected repeatedly. In particular, the spatial analysis approach helped to differentiate potential cumulative effects issues on the basis of whether they are likely to be of major significance (effects identified as having potential to occur **very frequently**) or minor significance (effects identified as having potential to occur only **frequently**). At the level of individual

pre-games development programmes, Table 3.2 highlights some of the key cumulative effects issues raised in the spatial analysis of pre-games development projects.

Table 3.2 Pre-games development project spatial analysis cumulative effects summary

Cluster	Potential cumulative effects issues
West cluster pre-games development programme	<ul style="list-style-type: none"> • Cumulative effects issues of potential major significance were identified in relation to people, health & access, air, dust & noise and traffic/ transport and landscape & the historic environment. Population and human health and air/ traffic and transport related issues are considered to have potential major significance given that a significant majority of pre-games development projects in the West cluster area have potential to cause related construction orientated effects e.g. increased noise, dust and vibration. This is linked directly to issues surrounding the densely populated nature of Glasgow's west end i.e. there are a broad range of receptors that may be vulnerable to and fall within the spatial scope of these types of effect e.g. population centres, retail centres, key pedestrian and cycle routes etc • Whilst the majority of the issues identified in the west cluster area have broadly negative connotations (e.g. <i>increased risk of air pollution related human health impacts, increased noise, dust and vibration nuisance during construction, visual impact of increased signage and other street furniture</i> etc), a key theme identified in the analysis is that most major cumulative effects issues are more likely to be temporary in nature i.e. construction phase orientated. Positive/ major cumulative effects issues were identified in relation to enhanced access provision and increased uptake of outdoor leisure and recreation • A number of other potential cumulative effects issues were considered to have more minor significance. Whilst the analysis here indicated a higher distribution of potential positive effects (e.g. <i>enhanced adaptation to local climate change issues through increased distribution of permeable ground, improved character/ site and setting of historic townscape and landscape</i> etc), the potential negative issues identified were considered more likely to be permanent in nature (e.g. <i>accidental disturbance of habitats, species and buried archaeology during site investigation and land remediation</i>)
South cluster pre-games development cluster	<ul style="list-style-type: none"> • Similarly to the West cluster analysis, cumulative effects issues of potential major significance were identified in the South cluster area in relation to people, health & access and air, dust & noise and traffic/ transport. In addition however, issues were also identified in relation to wildlife conservation & ecosystem services. In contrast to the West, the potential for beneficial and adverse issues to arise is considered to be more balanced. Furthermore, adverse issues are considered more likely to be temporary (e.g. <i>increased noise, dust and vibration nuisance and increased local traffic and traffic congestions during construction</i>) and beneficial issues more likely to be permanent (e.g. <i>increased provision and enhanced connectivity of the green network</i>)
East cluster pre-games development programme	<ul style="list-style-type: none"> • As per both the West and South cluster analyses, adverse cumulative effects issues of potential major significance have been identified in relation to people, health & access and air, dust & noise and traffic/ transport. Potential adverse effects are considered more likely to be temporary. Beneficial cumulative effects issues of potential major significance have been identified in relation to <i>improved access provision</i> including as a result of <i>increased provision and connectivity of the green network</i> • Increased provision and connectivity of the green network also has potential to support wildlife conservation & ecosystem services objectives. This is a particularly key issue in the East cluster area given that several of the transport infrastructure enhancement projects and indeed the two key environmental enhancement projects have substantial potential to work towards the protection and enhancement of the area's green network resource. In addition, the scale of Games related development in the east cluster area combined with the propensity of vacant and derelict sites and areas of poorly managed and/ or degraded habitat represent a latent opportunity for landscape scale green network enhancements. Whilst this is a key benefit for the East end of Glasgow, the importance of the integrated habitat network component of green network means that improvements in the East cluster area have potential to contribute to enhanced connectivity and functionality of the city-wide and indeed the wider Glasgow and Clyde Valley green network resource

3.3 Potential environmental effects of key individual projects

By its very nature, the SEA assessment of the CG Strategy and Framework’s pre-games provisions has focused on strategic issues. Despite this, several key projects that may give rise to majorly significant environmental effects have been subject to a more detailed assessment on an individual basis. These individual projects along with their key environmental effects and mitigation and enhancement recommendations are summarised in sections 3.3.1 – 3.3.3 below (see Table 3.3).

Table 3.3 Pre-games development projects considered addressed in individual assessments

Cluster	Pre-games development projects assessed		
West cluster	<ul style="list-style-type: none"> • Venue development/ refurbishment: Kelvingrove bowling greens replacement • MP1: Lancefield/ Anderston Quay wall reconstruction and public realm works 		
South cluster	<ul style="list-style-type: none"> • Venue development/ refurbishment: Cathkin Braes Glasgow 2014 Mountain Bike Course 		
East cluster	<ul style="list-style-type: none"> • Venue development/ refurbishment: Glasgow Green Hockey Centre • MP14: Saltmarket public realm project • ENV2: Glasgow 2014 Clyde Walkway Pilot Project (CWPP) 		
Key to scoring potential environmental effects of individual projects			
++	Major positive	++/-, +/- etc.	Mixed effects
+	Minor positive	?	Uncertain effects
0	Neutral	S	Short term effects i.e. between the present day and the event itself in 2014
-	Minor negative	M	Medium term effects i.e. the ensuing legacy period immediately after the event up to 2019
--	Major negative	L	Long term effects i.e. the long term legacy period – 2020 and beyond

3.3.1 Potential environmental effects of key West cluster individual projects

The West cluster individual projects assessment considered two key individual projects – the Kelvingrove Bowling Greens replacement and MP1 Lancefield/ Anderston Quay wall reconstruction and public realm works which is currently being considered as a potential project. Table 3.4 summarises the assessment of these two key individual projects including the specific SEA recommendations developed. A full summary of the assessment is provided in Appendix S. A broad range of potential environmental effects have been identified, primarily in relation to **people, health & access, wildlife conservation & ecosystem services, air, noise & dust, water bodies & flooding and landscape & the historic environment** related issues. Both positive and negative potential environmental effects have been identified, the majority of which are considered to be minor in terms of the significance criteria (see above and ER Part B).

In addition, MP1 has potential to cause a majorly significant positive effect in relation to enhanced Clyde Walkway access provision and the associated uptake of outdoor leisure and recreation and active travel (this conclusion recognises potential synergies with related projects e.g. Broomielaw public realm enhancements). In contrast, MP1 also has potential to cause a majorly significant negative effect as a result of construction related traffic congestion/ air quality issues and noise, dust and vibration nuisance. Whilst temporary, the potential magnitude of effects (MP1’s construction phase will last two years) and sensitivity of the local environment (e.g. proximity of residential properties and presence of an NO₂ vulnerable location at Finnieston St) mean that any potential negative air quality effects are likely to be of major significance.

Table 3.4 Key West cluster projects – potential environmental effects and SEA recommendation

Note: please refer to Appendix S for a full summary of the West cluster individual projects assessment

Kelvingrove Bowling Greens replacement		
Potential key environmental effects		Mitigation and enhancement recommendations
People, health & access	SEA Objective: to improve the health and well being of the population	+/- S-M-L
<p><i>Potential positive effects:</i> promotion of public transport enhancements (e.g. additional bus stops in the vicinity to promote public transport use) and increased provision and/ or upgrade of pedestrian and cycle paths and associated infrastructure has substantial potential to improve access provision in the area. This in turn may support healthy living and lifestyles through the promotion of outdoor leisure and recreation and/ or the use of active travel.</p> <p><i>Potential negative effects:</i> given the proximity of relevant receptors there is a risk that any temporary and/ or permanent air quality and noise/ dust nuisance issues may affect public health (see air assessment below for further information). This may contribute to a significant albeit temporary reduction in amenity value for residents and recreational users in the project's vicinity.</p>		<p>Enhancement:</p> <ul style="list-style-type: none"> Consider how the bowling green project could be used as a key opportunity to promote 'low-level' outdoor leisure and recreation activity, particularly amongst target neighbourhoods in the west cluster area i.e. those where health issues such as coronary heart disease are more pronounced Ensure that the upgraded facility has adequate provision for securing bikes to promote the use of active travel Advertise sustainable modes and routes (including active travel modes) that can be used to access the facility. This should be done on the relevant Glasgow City Council pages and also at the facility itself e.g. notice boards etc <p>Mitigation:</p> <ul style="list-style-type: none"> See recommendations for sustainable transport above Ensure that contractors comply with relevant legislation and guidelines to minimise noise, dust and vibration nuisance e.g. conducting noisy operations at appropriate times of the day Ensure that temporary traffic management measures are designed to minimise traffic congestion e.g. use side streets for site access. Where possible, deploy any temporary traffic management measures during non-peak times
Wildlife conservation & ecosystem services	SEA Objective: to protect and enhance biodiversity, flora and fauna	- S-M-L
<p><i>Potential negative environmental effects:</i> construction and operation have potential to affect the River Kelvin's aquatic ecology by contributing to increased diffuse source water pollution from contaminated run-off. Construction effects may be caused by accidental liberation of contaminants during site investigation, remediation and other works and increased heavy plant usage (hydrocarbon</p>		<p>Mitigation of potential construction related effects:</p> <ul style="list-style-type: none"> Ensure that contractors comply with relevant legislation and guidelines to minimise potential issues associated with hydrocarbon contaminated run-off e.g. ensuring that any vehicles and machinery used on-site are fit for purpose and well maintained Where significant risks are identified, consider the use of bunds and/ or other physical interventions to reduce the likelihood of contaminated run-off entering the Kelvin Ensure that a site investigation is undertaken and a risk assessment is in place <p>Mitigation of potential operational effects:</p> <ul style="list-style-type: none"> Consider alternative approaches to bowling green management that don't rely on the use of chemical treatments

Kelvingrove Bowling Greens replacement			
Potential key environmental effects			Mitigation and enhancement recommendations
contaminated run-off). Operational effects may arise due to changes in bowling green management (e.g. changes to chemical treatments)			<ul style="list-style-type: none"> Ensure that adequate drainage infrastructure and, where appropriate, on-site treatment facilities are installed to minimise the risk of untreated pesticide/ fertiliser contaminated run-off entering the Kelvin
Air quality, noise & dust	SEA Objective: to improve air quality; and to reduce levels of air pollution	- S-M-L	Mitigation: see recommendations for sustainable transport under the population and human health assessment.
<i>Potential negative effects:</i> given this project's scale, there is significant potential for construction related increases in noise, dust and vibration nuisance. Temporary construction phase traffic management measures on adjacent streets may contribute to local (temporary) air quality issues. Increased traffic during operation (caused by increased transport demand/ induced travel effect) may contribute to local air quality issues arising during the medium and long term			
Water bodies & flooding	SEA Objective: to improve water quality; and to reduce levels of water pollution	- S-M-L	Mitigation: see recommendations under the biodiversity assessment.
<i>Potential negative effects:</i> any additional pressure on the Kelvin has significant potential to increase levels of water pollution and negatively affect water quality. See biodiversity assessment above for further information			
Landscape & the historic environment	SEA Objective: to conserve and where appropriate enhance the historic environment and cultural heritage	+/- M-L	Enhancement: <ul style="list-style-type: none"> Ensure that development of any new structures incorporates appropriate design and use materials to complement and enhance the area's historic environment features Consider opportunities for environmental and/ or heritage based education e.g. provision of information highlighting Kelvingrove Park's historic outdoor leisure and recreational usage e.g. bowls Mitigation: <ul style="list-style-type: none"> Minimise any additional signage and street furniture Where additional street furniture is essential, use appropriate design and materials that complements the area's historic environment Where additional signage is essential, consider opportunities for rationalising new and existing signage e.g. can two or more signs be
<i>Potential positive effects:</i> given the dilapidated state of the current pavilion, development of a sensitively designed replacement has potential to work towards the protection and enhancement of historic townscape and landscape in the Kelvingrove area. Renovation of the site in line with its historic usage will help to ensure that future generations of Glaswegians can enjoy playing bowls in Kelvingrove Park			
<i>Potential negative effects:</i> increased use of signage and other street furniture (e.g.			

Kelvingrove Bowling Greens replacement	
Potential key environmental effects	Mitigation and enhancement recommendations
signs indicating access/ parking for the new facility) has significant potential to adversely affect the site and setting of key statutory/ non-statutory historic environment features in the area	integrated to minimise the need for additional signage?

MP1 Lancefield/ Anderston Quay wall reconstruction and public realm works			
Potential key environmental effects			Mitigation and enhancement recommendations
People, health & access	SEA Objective: to improve the health and well being of the population	++/- S-M-L	<p>Enhancement:</p> <ul style="list-style-type: none"> Consider how careful use of additional signage and/ or other awareness raising activities may encourage increased use of the Clyde Walkway as a key active travel route and as an outdoor leisure and recreational resource in its own right (this should include updates to GCC web pages where appropriate) Consider how newly enhanced sections of the Clyde Walkway can be incorporated with existing and/ or new 'health walk' routes e.g. integration with Kelvingrove Park routes Other awareness raising activities may include information/ interpretation boards along the route outlining key information about the relationship between health and related issues including outdoor leisure and recreation <p>Mitigation:</p> <ul style="list-style-type: none"> Ensure that contractors comply with relevant legislation and guidelines to minimise noise, dust and vibration nuisance e.g. conducting noisy operations at appropriate times of the day Ensure that temporary traffic management measures are designed to minimise traffic congestion e.g. use side streets for site access Where possible, deploy any temporary traffic management measures during non-peak times
<p><i>Potential positive effects:</i> given current Clyde corridor access issues, MP1 has substantial potential to improve access at Lancefield/ Anderston Quays. MP1's proposed public realm enhancements should help to improve the attractiveness of the Clyde Walkway as a key outdoor leisure and recreational resource and as a key route for active travel. This in turn may support health enhancements. There are clear synergies between MP1 and related projects in the vicinity e.g. public realm enhancements at Broomielaw/ Tradeston.</p> <p><i>Potential negative effects:</i> given the immediate proximity of relevant receptors (e.g. residential properties) there is a risk that any temporary air quality and noise/ dust nuisance issues may affect public health including health vulnerable groups (see air assessment below for further information). This may contribute to a significant albeit temporary reduction in amenity value for residents and Clyde Walkway recreational users in the project's vicinity.</p>			
Wildlife conservation & ecosystem services	SEA Objective: to protect and enhance biodiversity, flora and fauna	? S-M-L	<p>Enhancement:</p> <ul style="list-style-type: none"> Liase with the GCV Green Network partnership, SNH and other key stakeholders as appropriate to ascertain the biodiversity/ green network value of the site's existing habitat (e.g. consider the value of protecting and/ or enhancing habitat in line with outputs from the GCV Green Network's Integrated Habitat Network model – this should include consideration of synergies with other current and reasonably foreseeable future green network enhancement projects in the vicinity) Consider opportunities for incorporating existing habitat with project design
<p><i>Potential positive effects:</i> MP1 has significant potential to improve green network connectivity though this is primarily in relation to enhanced access and public</p>			

MP1 Lancefield/ Anderston Quay wall reconstruction and public realm works			
Potential key environmental effects			Mitigation and enhancement recommendations
<p>realm/ 'grey space' provision (see population and human health assessment above for further information). MP1 does however include some limited provision for the 'greening' of Lancefield/ Anderston Quay. Despite this, landscaping activity is likely to be low maintenance and of aesthetic as opposed to biodiversity value.</p>			
<p>Air quality, noise & dust</p>	<p>SEA Objective: to improve air quality; and to reduce levels of air pollution</p>	<p>+/-- S-M-L</p>	<p>Mitigation/ enhancement: see recommendations under the population and human health assessment. Additional enhancement:</p> <ul style="list-style-type: none"> • Consider the network wide implications of Clyde corridor access enhancements • Identify opportunities for joining-up gaps in walking and cycling route provision between key community/ population centres and the Clyde Walkway (i.e. the baseline highlights how core path provision in the West cluster area, whilst providing good access along key linear features such as the Clyde and Kelvin Rivers, provides limited access between community/ population centres and the area's key linear routes. This may be a key barrier to the use of active travel modes for key journeys to and from the City centre for example)
<p><i>Potential positive effects:</i> enhanced access provision (see population and human health assessment) may increase the attractiveness of active travel for key journeys. In conjunction with other enhancements along the Clyde corridor, this has substantial potential to encourage increased uptake of active travel with the associated benefits of reduced traffic congestion and linear source emissions of air pollutants in the medium to long term.</p> <p><i>Potential negative effects:</i> there is significant potential for increased noise, dust and vibration nuisance during the project's construction phase. In addition, any temporary construction phase traffic management measures may contribute to an increase in traffic with the associated risk of local, albeit temporary, air quality issues arising. The scale of MP1's potential air quality and nuisance issues combined with the proximity of an NO₂ vulnerable location (Finnieston St) and key population orientated receptors means that any negative effects, whilst temporary, are likely to be of major significance.</p>			
<p>Water bodies & flooding</p>	<p>SEA Objective: to reduce the risk of flooding</p>	<p>+ M-L</p>	<p>Enhancement:</p> <ul style="list-style-type: none"> • Consider opportunities for integrating the site's existing habitat with any additional soft landscaping measures • Aim for development that contributes to a net increase in permeable ground cover – where this is not possible, ensure that project design incorporates suitable drainage provision to compensate for any net increase in impermeable ground cover and the associated potential for increased flood risk
<p><i>Potential positive effects:</i> MP1 includes provision for enhanced flood defences between the Kingston Bridge and the Clyde Arc bridge. This will contribute to substantially improved resilience to fluvial flooding in the area, complementing other recent flood defence enhancements at the Broomielaw and Tradeston Quay for example. In addition, soft landscaping works delivered as part of MP1's public</p>			

MP1 Lancefield/ Anderston Quay wall reconstruction and public realm works	
Potential key environmental effects	Mitigation and enhancement recommendations
realm enhancement strategy may contribute to an overall increase in permeable ground cover in the area. This in turn may contribute to enhanced resilience to pluvial flooding issues.	

3.3.2 Potential environmental effects of key South cluster individual projects

The South cluster individual projects assessment considered one key project – the Cathkin Braes Glasgow 2014 Mountain Bike Course. Table 3.5 summarises the assessment of this project including the specific SEA recommendations developed. A full summary of the assessment is provided in Appendix T. Potential environmental effects have been identified in relation to **population and human health** and **biodiversity** related issues. Both positive and negative potential environmental effects have been identified. This includes some potential positive effects that are considered to be of major significance in terms of the significance criteria (see above and ER Part B).

Health related positive effects of major significance may arise due to the potential for substantial access improvements and enhanced opportunities for outdoor leisure and recreation. Whilst the project will focus on the development of a course for mountain biking which is, by rights, quite a specialist activity, the potential access improvements afforded through the development of additional paths, additional active travel infrastructure and public transport enhancements will be of relevance to a much wider demographic. Any positive effects will also be of key significance given the scale of the health issues faced by some South cluster residents including issues that are linked to key environmental health determinants (e.g. heart disease and cerebrovascular disease which can be linked to poor uptake of exercise, including outdoor leisure and recreation).

Biodiversity related positive effects of major significance may arise as a result of the combined impact of several key benefits and opportunities raised by the project. A key example is the proposed habitat creation project which has the potential to enhance the overall connectivity and functionality of habitat networks in the area (and ultimately the wider Glasgow and Clyde Valley area). Habitat network enhancements in this context can help to ensure that a more diverse range of species and habitat can be supported.

In addition, there are clear synergies between habitat network enhancements per se and enhancement of the wider green network. Any action that increases the attractiveness or raises awareness of the importance of outdoor recreation and leisure and/ or the use of active travel for key journeys has potential to support green network objectives by promoting sustainable travel and healthy living and lifestyles. Whilst also raising a possible tension with biodiversity objectives, increased visitor numbers to the site should be regarded as a key opportunity for environmental education and awareness-raising, particularly around the issue of protecting and enhancing biodiversity.

Table 3.5 Key South cluster projects – potential environmental effects and SEA recommendations

Note: please refer to Appendix T for a full summary of the South cluster individual projects assessment

Cathkin Braes Glasgow 2014 Mountain Bike Course		
Potential key environmental effects		Mitigation and enhancement recommendations
People, health & access	SEA Objective: to improve the health and well being of the population	++ S-M-L
<p><i>Potential positive effects:</i> this project will undoubtedly increase access provision in the area and promote opportunities for outdoor leisure and recreation (i.e. as a result of the facility itself and related infrastructure such as additional paths, public transport enhancements etc). Potential effects are likely to be particularly significant in the context of health issues currently faced by South cluster communities, particularly those in close proximity to Cathkin Braes.</p>		<p>Enhancement:</p> <ul style="list-style-type: none"> • Ensure that local communities are aware of changes at CBCP and the opportunities these will raise for enhanced access to outdoor leisure and recreational activities • Consider the potential benefits of running an awareness-raising campaign in tandem with project development and construction to bring attention to the potential health benefits of regular outdoor leisure/ recreation • Consider how the project can be used as a lever for raising additional funds to develop an enhanced core path providing improved pedestrian and cycle access between CBCP and Castlemilk • Advertise sustainable modes and routes (including active travel modes) that can be used to access the facility • Consider how the Cathkin Braes project can be used as a lever to prevent anti social behaviour e.g. quad/ motor bike riding <p>Mitigation:</p> <ul style="list-style-type: none"> • Minimise any temporary reduction in amenity by ensuring that contractors engage in careful site management and sensitive construction practices • Consider opportunities for temporary designation of alternative walking and cycling routes to minimise any short lived reductions in amenity
Wildlife conservation & ecosystem services	SEA Objective: to protect and enhance biodiversity, flora and fauna	++/- S-M-L
		<p>Enhancement:</p> <ul style="list-style-type: none"> • Liaise with relevant stakeholders (e.g. SNH, GCV Green Network partnership etc) and/ or employ suitably qualified consultants to gather good-practice advice when planning and designing habitat creation • Ensure that any habitat creation projects are aligned to the GCV Green Network's Integrated Habitat Network (IHN) model

Cathkin Braes Glasgow 2014 Mountain Bike Course

Potential key environmental effects	Mitigation and enhancement recommendations
<p><i>Potential positive effects:</i> sensitive delivery of proposed habitat creation should enhance the overall connectivity and functionality of habitat networks which in turn should support a more diverse range of species and enhance ecosystem health. Additional site maintenance activity may contribute to improved management of key habitats on site. Increased visitor numbers to the site may pose an opportunity for environmental education e.g. to raise awareness about the importance of natural heritage (including its protection and enhancement) in the wider context of sustainable development.</p> <p><i>Potential negative effects:</i> inappropriate physical development of the mountain bike course and related infrastructure has potential to cause habitat severance and fragmentation and/ or disturbance of species on site. During operation, increased visitor numbers to the site, if managed poorly, has potential to exert increased pressure on sensitive habitat and species.</p>	<ul style="list-style-type: none"> • Consider the need to undertake fresh survey work on site to support the identification of an optimal habitat creation strategy • Focus additional habitat management measures on the needs and priorities of key habitats that are currently found on site • Review current public engagement provision on site and identify scope for improvements based on potential environmental education benefits <p>Mitigation:</p> <ul style="list-style-type: none"> • Consider the need to undertake fresh survey work on site to support a better understanding of ecosystem functioning and help ensure that development of the mountain bike course is not to its detriment • Ensure that contractors are aware of ecological constraints/ sensitivities on site and that the proposed works are delivered with minimal disturbance • Liaise with key stakeholders (e.g. SNH) to identify key good-practice considerations that contractors should adhere to • Develop a communications strategy that raises awareness about natural heritage issues and helps to ensure that additional outdoor leisure and recreational use is responsible

3.3.3 Potential environmental effects of key East cluster individual projects

The East cluster individual projects assessment considered three key projects – the Glasgow Green Hockey Centre, MP14 Saltmarket Public Realm Enhancement Project which is currently being considered as a potential project and ENV2 – the Glasgow 2014 Clyde Walkway Pilot Project (the CWPP). Table 3.6 summarises the assessment of these projects including the specific SEA recommendations developed. A full summary of the assessment is provided in Appendix U. A broad range of potential environmental effects have been identified across the full range of issues considered in the SEA Framework. Both positive and negative potential environmental effects have been identified including effects considered to be of major significance in terms of the significance criteria (see above and ER Part B). Some of the most key issues are summarised below.

The Saltmarket Public Realm Enhancement Project (Ref. MP14) has potential to cause majorly significant positive as well as negative effects. Substantial population and human health orientated benefits may arise as a result of enhanced green network connectivity. Whilst this part of the City is not immediately associated with 'green' network per se, improving the attractiveness of a considerable area of public realm such as Saltmarket will enhance the 'greyspace' component of green network provision in the area. Given the proximity of Glasgow Green and other parts of the City that have recently benefited from similar public realm enhancements (e.g. Ingram Street, City Halls etc), the cumulative effect of enhanced public realm/ an improved network of linked attractive spaces, in a spatial context wider than Saltmarket in its own right, may encourage more people to walk and cycle when making key journeys in the area. Also, given that Calton/ Bridgeton residents have raised issue with the satisfactory provision of 'attractive buildings' and an 'attractive environment' in their area, MP14 may go some way to addressing these issues.

The Saltmarket project has potential to cause a major albeit temporary negative effect in relation to increased emissions of air pollutants/ decreased air quality and increased noise, dust and vibration nuisance. Given the current air quality and traffic congestion issues (e.g. Saltmarket is on the border of the City Centre AQMA, falls within the central part of the City recognised as being particularly vulnerable to NO₂ related air quality issues and experiences regular traffic congestion during peak hours), any traffic management measures deployed during the project's construction phase have substantial potential to contribute to a significant yet temporary worsening of the current situation.

ENV2, the Glasgow 2014 Clyde Walkway Pilot Project (CWPP), has substantial potential to cause majorly significant positive environmental effects in relation to population and human health and biodiversity. Potential health effects are primarily related to improved access provision with the associated benefits in terms of increased opportunities for outdoor leisure and recreation. In addition, potential access improvements are considered to be particularly key given the various growth strategies for the East cluster area and the pressure this may place on transport infrastructure (i.e. improved Clyde Walkway access may increase the attractiveness of active travel to existing and new East cluster residents).

Table 3.6 Key East cluster projects – potential environmental effects and SEA recommendations

Note: please refer to Appendix U for a full summary of the East cluster individual projects assessment

Glasgow Green Hockey Centre		
Potential key environmental effects		Mitigation and enhancement recommendations
People, health & access	SEA Objective: to improve the health and well being of the population	- S
<p><i>Potential positive effects:</i> any potential positive effects are likely to be insignificant (or at least not constitute any worsening of the existing situation) in the context of the baseline, key environmental issues and the wider SEA Framework (i.e. the assessment criteria). There is substantial potential however to enhance these broadly neutral effects as outlined to the right. Please refer to Appendix U for further information on the Hockey Centre's potential positive health effects.</p> <p><i>Potential negative effects:</i> given the proximity of population centres, the large public amenity resource of Glasgow Green on which the Hockey Centre is sited and the major pedestrian and cycle access routes nearby (e.g. the Clyde walkway), there is a risk that any temporary and/ or permanent air quality and noise/ dust nuisance issues may affect public health including health vulnerable groups (see air assessment below for further information). Taken in the round, the issues described above have substantial potential to contribute to a significant albeit temporary reduction in amenity value for residents and recreational users in the project's vicinity. Any potential negative effects are more likely to be of minor significance due to their (mostly) temporary nature.</p>		<p>Enhancement:</p> <ul style="list-style-type: none"> Consider the scope for broadening out the Hockey Centre's access provision enhancements to incorporate a stretch of the Clyde walkway. This could be delivered by improving signage and lighting provision for example Other access orientated enhancement opportunities to consider are raised in the East End Local Development Strategy's (EELDS) potential green network. This outlines the potential for a range of key green links in the east cluster area that could be developed to enhance access provision as well as biodiversity and SuDS provision e.g. between Bridgeton centre and Glasgow Green Any additional green network enhancements would support compliance with local planning policy which requires development in or adjacent to a green network site (i.e. Glasgow Green and the River Clyde) to demonstrate how it has accounted for the need to maintain and enhance the City's green network resource <p>Mitigation: see recommendations under the air assessment.</p>
Wildlife conservation & ecosystem services	SEA Objective: to protect and enhance biodiversity, flora and fauna	- S-M-L
<p><i>Potential negative effects:</i> during site investigation, land remediation and construction works, there is a potential albeit minimal risk that contaminants may be liberated. Also, any increase in heavy plant and other traffic during construction</p>		<p>Mitigation of potential construction related effects:</p> <ul style="list-style-type: none"> Ensure that contractors comply with relevant legislation and guidelines to minimise potential issues associated with hydrocarbon contaminated run-off e.g. ensuring that any vehicles and machinery used on-site are fit for purpose and well maintained Where significant risks are identified, consider the use of bunds and/ or other physical interventions to reduce the likelihood of contaminated run-off entering the Clyde at this point Ensure that contractors develop and utilise an appropriate remediation strategy that accounts for risks to ecological receptors during remediation

Glasgow Green Hockey Centre			
Potential key environmental effects			Mitigation and enhancement recommendations
<p>may contribute to increased hydrocarbon contaminated run-off. During operation, there is potential for a similar hydrocarbon contaminated run-off effect to arise as a result of car park operation i.e. an increased number of private cars in close proximity to the river. Given that there may be plausible pathways between the site and the river, there is a risk that contaminated run-off may enter the river with associated negative effects on aquatic ecology.</p>			<p>works</p> <p>Mitigation of potential operational effects:</p> <ul style="list-style-type: none"> • Ensure that adequate drainage infrastructure and, where appropriate, on-site treatment facilities are installed to minimise the risk of operation related hydrocarbon contaminated run-off entering the Clyde • Consider approaches to site configuration (e.g. with respect to car park size and location) that minimise risks of diffuse source water pollution from areas of hard standing • See mitigation recommendations under air and water assessments also
Air quality, noise & dust	SEA Objective: to improve air quality; and to reduce levels of air pollution	- S-M-L	<p>Mitigation:</p> <ul style="list-style-type: none"> • Ensure that the Hockey Centre facility has adequate provision for securing bikes to promote the use of active travel • Advertise sustainable modes and routes (including active travel modes) that can be used to access the facility. This should be done on the relevant Glasgow City Council pages and also at the facility itself • Highlight the Clyde Walkway as a key active travel route for journeys to and from the Hockey Centre. Consider synergise and overlaps with the 2014 Clyde Walkway Pilot Project • Ensure that contractors comply with relevant legislation and guidelines to minimise noise, dust and vibration nuisance e.g. conducting noisy operations at appropriate times of the day • Ensure that temporary traffic management measures are designed to minimise traffic congestion e.g. use side streets for site access • Where possible, deploy any temporary traffic management measures during non-peak times • Recommend that other initiatives within the East cluster area (as delivered through related frameworks e.g. City Plan 2, the EELDS etc) promote the use of active and/ or sustainable travel modes • Consider options for integrating any Hockey Centre travel planning activities with those for related initiatives/ facilities in the East cluster area
<p><i>Potential negative effects:</i> given this project's scale (including the potential requirement for soil remediation works), there is significant potential for increased noise, dust and vibration nuisance during the project's construction phase. In addition, any temporary construction phase traffic management measures may contribute to increased traffic with the associated risks to local air quality. Potential increases in linear source air pollution are more likely to be a significant issue during operation given that new facilities can increase the need to travel to an area. This is particularly significant given issues highlighted in the baseline e.g. the likely trend of increased transport demand in the east cluster area in line with relevant growth strategies.</p>			
Water bodies & flooding	SEA Objective: to improve water quality; and to reduce levels of water pollution	- S-M-L	<p>Mitigation:</p> <ul style="list-style-type: none"> • See recommendations under the biodiversity assessment • Consider opportunities/ technical design feasibility of a regional approach to Hockey Centre related SuDS infrastructure. This approach would be able to

Glasgow Green Hockey Centre			
Potential key environmental effects			Mitigation and enhancement recommendations
<p><i>Potential negative effects:</i> see biodiversity assessment above. Also, given the Clyde's current water quality status (overall ecological status – poor and overall chemical status – fail), any additional pressure on the river has significant potential to increase levels of water pollution and negatively affect water quality. Any additional pressure on the aquatic environment should be avoided to support the Clyde's ongoing improvement in line with SEPA's objectives under the Water Framework Directive.</p>			<p>support (as a minimum) water quality, flooding and biodiversity objectives</p> <ul style="list-style-type: none"> Consider opportunities (including joint funding streams for example) for integration of such a scheme with related projects and initiatives – from the CG Strategy and Framework but also from related plans and programmes e.g. the EELDS, South Dalmarnock Masterplan etc
Soils & soil quality	SEA Objective: to reduce soil sealing and loss	+/- M-L	<p>Enhancement: see recommendations under the soil contamination assessment.</p> <p>Mitigation:</p> <ul style="list-style-type: none"> See recommendations under the water and biodiversity assessments also Consider how the careful design and use of soft landscaping features (potentially as part of an integrated approach to regional SuDS schemes) can mitigate any potential increases in flood risk caused by increased areas of hard standing/ decreased areas of permeable ground
<p><i>Potential positive effects:</i> the proposed Hockey Centre is sited on brownfield land with potential soil contamination issues. Development of the site, whilst contributing to an increase in soil sealing, is likely to improve soil quality and condition through the suitable remediation of contaminated soils.</p> <p><i>Potential negative effects:</i> although by definition the brownfield land on which the proposed Hockey Centre is to be sited contains poor quality soil, venue development will increase levels of soil sealing.</p>			
Soils & soil quality	SEA Objective: to reduce levels of soil contamination	+ M-L	<p>Enhancement:</p> <ul style="list-style-type: none"> Ensure that the remediation strategy adopted is the most sustainable option given constraints (e.g. cost) Where possible, use onsite remediation techniques to minimise waste and/or carbon impact associated with soil excavation, transportation and disposal
<p><i>Potential positive effects:</i> the proposed Hockey Centre is sited on brownfield land with potential soil contamination issues. Site preparation activities (in line with likely planning conditions relating to contaminated land issues) will lead to the effective remediation of any contaminated soils on site.</p>			
Landscape & the historic environment	SEA Objective: to conserve and where appropriate enhance the historic environment and cultural heritage	- M-L	<p>Mitigation:</p> <ul style="list-style-type: none"> Minimise any additional signage and street furniture Where additional street furniture is essential, consider the use of appropriate design and materials that complements the area's historic environment Where additional signage is essential, consider opportunities for

Glasgow Green Hockey Centre	
Potential key environmental effects	Mitigation and enhancement recommendations
<p><i>Potential negative effects:</i> development of new recreational facilities may necessitate increased signage and other street furniture (e.g. signs indicating access/ parking for the new facility, additional bus stops etc). Any such development at the site of the Hockey Centre has significant potential to adversely affect the site and setting of key statutory/ non-statutory historic environment features in the area.</p>	<p>rationalising new and existing signage e.g. can two or more signs be integrated to minimise the need for additional signage?</p>

MP14 Saltmarket public realm enhancement project		
Potential key environmental effects		Mitigation and enhancement recommendations
<p>People, health & access</p>	<p>SEA Objective: to improve the health and well being of the population</p>	<p>++/- S-M-L</p>
<p><i>Potential positive effects:</i> improving the public realm in Saltmarket has substantial potential to promote environmental conditions which support improved health. In particular, it may contribute to improved green network connectivity by enhancing the 'greyspace' component therein i.e. improving the attractiveness and functionality of public places may encourage more people to walk/ cycle for key journeys utilising networks of linked, attractive places. Also, Calton/ Bridgeton residents have raised issue with the satisfactory provision of 'attractive buildings' and an 'attractive environment' in their neighbourhood area. The Saltmarket project may well go some way to addressing these issues.</p> <p><i>Potential negative effects:</i> given the proximity of population centres, the large public amenity resource of Glasgow Green and the major pedestrian and cycle access routes nearby (e.g. the Clyde walkway), there is a risk that any temporary and/ or permanent air quality and noise/ dust nuisance issues may affect public health including health vulnerable groups (see air assessment below for further information). Taken in the round, the issues described above have substantial potential to contribute to a significant albeit temporary reduction in amenity value for residents and recreational users in the project's vicinity.</p>		<p>Enhancement:</p> <ul style="list-style-type: none"> • In conjunction with the Saltmarket public realm project, consider opportunities for increasing awareness about the range of outdoor leisure and recreation opportunities in the vicinity and also the relationship between health and the uptake of appropriate leisure and recreation activities including outdoors • One approach may be to integrate a way-marked Saltmarket 'heritage route' with a way-marked 'health/ heritage route' in Glasgow Green • Ensure that any awareness raising activities are delivered to maximum effect e.g. publication on GCC web pages, local information boards etc <p>Mitigation: see recommendations under the air assessment.</p>

MP14 Saltmarket public realm enhancement project		
Potential key environmental effects		Mitigation and enhancement recommendations
Air quality, noise & dust	SEA Objective: to improve air quality; and to reduce levels of air pollution	-- S
<p><i>Potential negative effects:</i> given this project's scale, there is significant potential for increased noise, dust and vibration nuisance during the project's construction phase. In addition, any temporary construction phase traffic management measures on Saltmarket and/ or adjacent streets may contribute to an increase in traffic with the associated risk of local albeit temporary air quality issues arising. Given the current traffic congestion issues in proximity to Saltmarket and also current air quality issues, any pressure from additional linear or area source air pollution is likely to be of major significance. Depending on timescales for project construction, this issue may be further compounded by related growth strategies</p>		<p>Mitigation:</p> <ul style="list-style-type: none"> • Ensure that contractors comply with relevant legislation and guidelines to minimise noise, dust and vibration nuisance e.g. conducting noisy operations at appropriate times of the day • Ensure that temporary traffic management measures are designed to minimise traffic congestion e.g. use side streets for materials/ vehicle storage, installation of temporary structures etc • Where possible, deploy any temporary traffic management measures during non-peak times across various timescales e.g. morning and evening rush hours within a 24 hour timeframe, summer break during a one year timeframe etc
Landscape & the historic environment	SEA Objective: to conserve and where appropriate enhance the historic environment and cultural heritage	++/- M-L
<p><i>Potential positive effects:</i> sensitive enhancement of public realm has substantial potential to improve the site and setting of historic environment features in and around Saltmarket. This in turn should support the overall protection and enhancement of the area's historic townscape. In addition, significant parts of the East cluster area have suffered loss of historic character through demolition and piecemeal development. Synergies between the Saltmarket project and recent enhancement projects elsewhere in the Merchant City have substantial potential to raise the profile of the area which may help to promote further enhancements.</p> <p><i>Potential negative effects:</i> the opposite side of the coin is that inappropriate use of design and/ or materials may contribute to the erosion/ worsening of the area's historic character. There are inherent tensions between delivering a solution that is both practical and financially feasible and a design that uses appropriate materials and is keeping with the area's historic character.</p>		<p>Enhancement/ mitigation:</p> <ul style="list-style-type: none"> • Liaise with relevant stakeholders to identify key aspects of design and/ or materials considerations that should be incorporated with any public realm works at Saltmarket • Consider whether support from suitably qualified external professionals could be useful in the design/ planning stage of public realm enhancements • Explore synergies with related past and reasonably foreseeable future public realm/ historic environment enhancement projects and initiatives (e.g. Ingram Street public realm enhancements, Merchant City Townscape Heritage Initiative etc) to ensure that the Saltmarket project design is complementary. This approach should be aimed at supporting cumulative and synergistic benefits that are realised outwith Saltmarket and its immediate vicinity e.g. the whole of the Merchant City area • Consider how potential synergies between public realm enhancement projects and Games related educational/ promotional initiatives can be used to raise awareness about the importance of Glasgow's historic environment (e.g. to the City's tourism offer) and therefore the importance of its protection also

ENV2 Glasgow 2014 Clyde Walkway Pilot Project		
Potential key environmental effects		Mitigation and enhancement recommendations
People, health & access	SEA Objective: to improve the health and well being of the population	++ M-L
<p><i>Potential positive effects:</i> non-Games related East cluster growth strategies are likely to increase housing and local population. Enhancing Clyde Walkway access in this context may encourage new residents to use active travel modes for key journeys (e.g. City centre commutes) thus promoting walking and cycling. Clyde Walkway enhancements may encourage Bridgeton/ Dalmarnock residents to take more health improving exercise which in turn may contribute to substantial health benefits (e.g. life expectancy, coronary heart and cerebrovascular deaths in under 75's etc). Improved access between Dalmarnock and Glasgow Green may contribute to the increased use of Glasgow Green as a key outdoor leisure and recreational resource and/ or increased use of the Clyde Walkway as a key resource in its own right.</p>		<p>Enhancement:</p> <ul style="list-style-type: none"> • Ensure that any management synergies and/ or cost savings identified through the CWPP are channelled back into East cluster health improvement projects • Ensure that key developments coming forward under the various East cluster growth strategies recognise any Clyde Walkway access enhancements and the potential opportunities these may raise • Identify opportunities for 'joining-up gaps' in walking and cycling route provision between existing and planned East cluster community/ population centres and the Clyde Walkway • Consider the potential benefits of running an awareness-raising campaign in key target communities, in tandem with the CWPP. This should outline the healthy living opportunities raised by appropriate levels of exercise • Consider opportunities for broadening the scope of the health walks initiative to integrate way-marked trails in Glasgow Green with new way-marked trails in and around key target communities • Ensure that any additional signage in and around Dalmarnock highlights access, distance and journey times between Dalmarnock and Glasgow Green, City centre etc
Wildlife conservation & ecosystem services	SEA Objective: to protect and enhance biodiversity, flora and fauna	++ M-L
<p><i>Potential positive effects:</i> the CWPP may contribute to improved management and rehabilitation of River Clyde riparian habitat which in turn may help to restore and enhance this key component of East cluster green network. In addition, prioritised management actions may create opportunities for habitat creation. CWPP management regime improvements have substantial potential to improve current invasive non-native species issues by supporting relevant actions from the Rivers and Streams HAP e.g. developing a cohesive strategy for the management of riverbank vegetation. The CWPP has substantial potential to support increased</p>		<p>Enhancement:</p> <ul style="list-style-type: none"> • Ensure that CWPP considers green network enhancement opportunities that look beyond the area immediately adjacent to the Clyde Walkway • Where relevant, identify potential green link enhancements that would help to integrate the River Clyde green network resource with the wider East cluster and, ultimately, the GCV wide green network • Consider the potential role of community allotment projects in enhancing green links between the Clyde Walkway and adjacent areas/ nearby communities • Consider opportunities for rolling out relevant CWPP biodiversity and green network management recommendations throughout the East cluster. This may support a more integrated/ strategic approach to east cluster green network enhancements • Ensure that any habitat creation projects are aligned to the GCV Green Network's Integrated Habitat Network (IHN) model

ENV2 Glasgow 2014 Clyde Walkway Pilot Project	
Potential key environmental effects	Mitigation and enhancement recommendations
<p>public understanding of ecosystem services and their role in our every day lives. In particular, appropriate use of awareness raising activities (see above) may contribute to increased use of the Clyde Walkway for outdoor leisure and recreation and key active travel journeys</p>	<ul style="list-style-type: none"> • Liaise with GCC LES and DRS, SNH, GCV Green Network Partnership and other relevant stakeholders to identify best-practice in riparian habitat and invasive non-native species management • Consider synergies between biodiversity orientated CWPP enhancements and those related to population and human health as per the above

3.4 Potential environmental effects of Glasgow based pre-games development programmes

Informed by the causal chain and spatial analyses and key individual project assessments (see sections 3.2 and 3.3) the three Glasgow based pre-games development programmes (West, South and East clusters) have been subject to a detailed 'programmatic style' assessment. The outcomes of these assessments are summarised in sections 3.4.1 – 3.4.4.

3.4.1 Overview of pre-games development programme assessment

Overall, the three Glasgow based programmes of development are likely to have a mixed effect on the environment as depicted on Figure 3.1. Despite this broadly mixed effect, some key themes have emerged in the assessment. These are dealt with extensively in the remainder of this chapter, the more detailed assessment summary appendices and in the pre-games development programme SEA Design Guides (see section 3.6).

Significant areas of pre-games related environmental benefit have been identified in relation to: 1) people, health and access (with particularly significant benefits identified in relation to West and East cluster area access improvements); 2) wildlife conservation and ecosystem services; 3) air, noise and dust (improved access in the West and East cluster areas may promote a modal shift from private car use to active and sustainable modes, potentially contributing to a reduction in linear source air pollution); 4) climate change adaptation (improved resilience to local climate change impacts including better flood defences; and 5) landscape and the historic environment.

In addition however, significant areas of pre-games related adverse environmental effects have also been identified in relation to: 1) water bodies and flooding (West and East cluster development may contribute to a minor increase in diffuse source water pollution during both construction and operation, potentially affecting Clyde and Kelvin water quality); 2) air quality, noise and dust (all three programmes have potential to cause construction related air pollution/ quality issues and West and East cluster activity may cause operational issues as new facilities are likely to increase travel demand in key areas); 3) climate change mitigation (all three programmes will contribute to a significant, albeit largely one-off, construction related increase in GHG emissions); and 4) landscape and the historic environment.

The pre-games development programme's likely significant environmental effects, both beneficial and adverse, have informed the development of three detailed and evidence based strategies for dealing with environmental problems and issues and capitalising on environmental opportunities – the West, South and East Cluster SEA Design Guides.

In addition to likely significant environmental effects, the pre-games assessment has highlighted a range of broadly neutral environmental effects. Whilst these are considered insignificant in the context of the significance criteria used, they are none the less important and in line with good-practice, recommendations have been developed to mitigate and enhance this type of effect. These recommendations are described in the detailed pre-games assessment summary matrices in Appendices V, W and X. In addition, consideration of these recommendations has helped to shape the overarching recommendations that are of relevance to all pre-games development activity (see section 3.6).

Key to scoring				
++	Major positive			
+	Minor positive			
0	Neutral			
-	Minor negative			
--	Major negative			
++/-, +/- etc.	Mixed			
?	Uncertain			
S	Short term effects			
M	Medium term effects			
L	Long term effects			
SEA Objectives		West Cluster pre-games development programme	South Cluster pre-games development programme	East Cluster pre-games development programme
To improve the health and well being of the population		++/- S-M-L	+ M-L	++/- S-M-L
To protect and enhance biodiversity, flora and fauna		?/- S-M-L	+/- S-M-L	+/- S-M-L
To improve water quality		- S-M-L	0	- S-M-L
To reduce levels of water pollution		- S-M-L	0	- S-M-L
To reduce the risk of flooding		+/? M-L	0	0
To improve air quality		?/- S-M-L	0	?/- S-M-L
To reduce levels of air pollution		+/- S-M-L	- S	+/- S-M-L
To reduce noise levels from all sources		- S	- S	- S
To reduce levels of soil contamination		?	?	+ S-M-L
To reduce soil sealing and soil loss		0	- M-L	0
To reduce greenhouse gas emissions		+/- S-M-L	?/- S-M-L	+/- S-M-L
To reduce vulnerability to the effects of climate change		+ M-L	+ M-L	+ M-L
To conserve and, where appropriate, enhance the historic environment and cultural heritage		+/- M-L	0	++/- M-L
To maintain and enhance the quality of landscapes and townscapes		+/- M-L	0	+ M-L

Figure 3.1 Glasgow based pre-games development programmes – assessment overview

Note: see Appendices V, W and X for detailed summaries of the Glasgow based pre-games development programme assessments

3.4.2 West cluster pre-games development programme assessment

Overall, West cluster development activity is likely to cause a mixed effect on the environment with potential for a range of both positive and negative effects. The scale of proposed enhancements to the area's cycling and walking network, in conjunction with related projects such as the recently completed Broomielaw public realm works, are likely to contribute to substantial walking and cycling access improvements. This should increase the attractiveness of active and sustainable travel contributing to a range of benefits including health improvements and reductions in traffic related air pollution and GHG emissions.

Conversely, new and better facilities may increase the need to travel to the area contributing to increased linear source air pollution and GHG emissions. In any event, West cluster development will contribute to a significant albeit 'one off' increase in GHG emissions associated with construction (e.g. aggregates, delivery miles etc). Two West cluster projects have been subject to a more detailed individual project assessment: 1) the Kelvingrove Bowling Green Replacement project; and 2) MP1 Lancefield/ Anderston Quay Refurbishment. These assessments are summarised in section 3.3.1.

The outcomes of the West cluster pre-games development programme assessment, along with key enhancement and mitigation recommendations, are summarised in Table 3.7. Please refer to Appendix V for a detailed summary of the West cluster assessment.

Table 3.7 West cluster pre-games development programme assessment summary

Potential environmental effects	Summary of proposed SEA recommendations
Potential positive environmental effects	
<p>People, health & access: West cluster development will contribute to the enhancement of walking and cycling routes in the area, particularly the Clyde and Kelvin Walkways. These type of access improvements may help incentivise the use of active travel and increase the uptake of outdoor leisure and recreation, contributing to health benefits</p> <p>Water bodies & flooding: proposed MP1 flood defence works will help to reduce Clyde related fluvial source flood risk in the West cluster area. The detailed assessment summary outlines the scope for additional benefits in terms of pluvial source flood risk mitigation</p> <p>Air, noise & dust and climate change issues (mitigation): West cluster access improvements (see health assessment) may contribute to a reduction in linear source air pollution and transport related GHG emissions by incentivising a modal shift from private car use to more sustainable modes for certain journeys (e.g. West cluster to City centre commutes)</p> <p>Climate change issues (adaptation): proposed flood defence works will help to reduce West cluster area vulnerability to local climate change impacts</p> <p>Landscape & the historic environment: sensitive public realm enhancements have substantial potential to enhance the site and setting of many of the West cluster's historic environment features. Benefits may be particularly</p>	<p>Summary of enhancement measures:</p> <ul style="list-style-type: none"> • Identify opportunities for joining up gaps in West cluster active travel provision, particularly those between population and community centres and key linear routes such as the Clyde and Kelvin walkways • Consider opportunities for increasing the attractiveness of the Clyde Walkway as a leisure and recreational resource in its own right • Where possible, ensure that walking/ cycling route access enhancements avoid areas of existing poor air quality • Consider opportunities for using the carbon impact of West cluster development activity as a lever for more substantial Games related green network development in the area including woodland and other habitat creation projects where appropriate • Consider how an area's historic environment features can inform, guide and improve project design • Consider how public realm projects in the SECC complex area can help to 'join-up' the area's fragmented historic

Potential environmental effects	Summary of proposed SEA recommendations
<p>noticeable in areas where the historic environment is fragmented such as the SECC complex</p> <p>Landscape & the historic environment: West cluster development has substantial potential to improve the area's landscape and townscape, particularly along the Clyde corridor. In particular, proposed public realm works in the SECC complex area may help to improve landscape character at this iconic section of the Clyde corridor by helping to 'join-up' the area's fragmented historic environment features within an overall context of modernity</p>	<p>environment features</p> <ul style="list-style-type: none"> • Ensure that project design and delivery within each of the West cluster Games 'complex' areas take a strategic and/ or masterplanned approach to ensure that synergies are developed and the strongest cumulative townscape and landscape benefit realised
Potential negative environmental effects	
<p>People, health & access: construction activities may contribute to significant albeit temporary air pollution and noise issues, affecting public health and amenity. May be particularly acute at locations with existing traffic congestion and air quality issues e.g. MP1 related development at Finnieston Street</p> <p>Wildlife conservation & ecosystem services: venue development in the Kelvingrove Park area may contribute to increased diffuse source water pollution, increasing pressure on aquatic ecosystems. Development of new walking/ cycling paths may contribute to habitat fragmentation and severance</p> <p>Water bodies & flooding: potential increases in diffuse source water pollution, particularly in the Kelvingrove Park area, may adversely affect the River Kelvin's water quality status. Water pollution effects may arise during construction (e.g. hydrocarbon contaminated run-off from heavy plant operation) and operation (e.g. changes to chemical treatments at the bowls site)</p> <p>Air quality, noise & dust: short term reductions in air quality may arise during the construction phase due to deployment of traffic management measures/ increased risk of traffic congestion. During operation, linear source air pollution may increase as new facilities increase the need to travel and additional transport/ access infrastructure measures (e.g. pedestrian crossings) can contribute to increased standing traffic</p> <p>Climate change issues (mitigation): West cluster development activity will contribute to a significant albeit mostly temporary increase in GHG emissions</p> <p>Landscape & the historic environment: new signage and other street furniture combined with potential inappropriate design can pose a significant threat to West cluster historic environment, particularly around Kelvingrove Park and Scotstoun. This is an important issue as the individual impact of new signs, benches, pedestrian crossings etc may be insignificant yet highly significant when considered cumulatively</p>	<p>Summary of mitigation measures:</p> <ul style="list-style-type: none"> • Ensure that contractors comply with relevant legislation/ guidelines to minimise noise, dust and vibration nuisance • Ensure that temporary traffic management measures are designed to minimise traffic congestion • Ensure that the upgraded facilities have adequate provision for securing bikes to promote active travel • Where habitat connectivity cannot be maintained, consider the use of appropriate habitat compensation • Reduce the impact of diffuse source water pollution by dealing with potentially contaminated run-off close to source using appropriately designed regional and local level SuDS schemes • Where relevant, integrate biodiversity interests and existing habitat and landscape features with SuDS design • Consider the appropriate phasing of West cluster projects to ensure that synergies and efficiency gains in delivery journeys etc can be maximised • Where possible, ensure that recycled and secondary aggregates (RSA) are used in construction projects Use AggRegain's CO₂ emissions estimator tool to approximate emissions savings in different construction techniques and/ or supply chain alternatives • Consider the need to undertake additional assessments of signage/ street furniture development in key areas of historic interest such as Scotstoun and Kelvingrove

3.4.3 South cluster pre-games development programme assessment

South cluster activity is likely to cause a mixed effect on the environment though unlike the West and East cluster pre-games development programmes, effects across many SEA issues are likely to be broadly neutral (e.g. water quality and water pollution, flood risk, air quality and the heritage topics). Although effects are considered neutral in the context of the environmental baseline and the significance criteria used, 'insignificant' positive and negative effects may still arise. SEA recommendations have been developed specifically to account for these effects, ensuring that environmental benefit is maximised and cumulative environmental threats suitably mitigated.

The outcomes of the South cluster pre-games development programme assessment, along with key enhancement and mitigation recommendations, are summarised in Table 3.8. Please refer to Appendix W for a detailed summary of the South cluster assessment.

Table 3.8 South cluster pre-games development programme assessment summary

Potential environmental effects	Summary of proposed SEA recommendations
Potential positive environmental effects	
<p>People, health & access: South cluster development will contribute to walking/ cycling route and sustainable transport enhancements though benefits are likely to be focused on the Cathkin Braes site. Improved access may increase the site's attractiveness as a leisure and recreational resource, particularly amongst residents of nearby Castlemilk where certain health issues are prevalent</p> <p>Wildlife conservation & ecosystem services: substantial potential for green network enhancement including habitat management and restoration. Benefits are likely to focus on the Cathkin Braes site given the proposals for habitat creation and community woodland projects in and around Castlemilk. The detailed assessment outlines the scope for some additional benefits elsewhere in the South cluster</p> <p>Climate change issues (adaptation): several South cluster projects have potential to contribute, cumulatively, to improved climate change resilience, primarily in relation to the development and enhancement of ecologically resilient and varied landscapes. Habitat creation and management projects at the Cathkin Braes site may be particularly significant due to the range of habitats and species currently supported though actions elsewhere may also be beneficial in this regard e.g. proposals for soft landscaping works at Hampden</p>	<p>Summary of enhancement measures:</p> <ul style="list-style-type: none"> • Consider opportunities for improving South cluster access provision outwith the Cathkin Braes site • Consider how proposed core paths between Mount Florida, King's Park, Croftfoot and Castlemilk can be developed to improve access to key South cluster greenspace resources such as King's Park and Cathkin Braes Country Park • Consider opportunities for broadening the scope of ENV1 to include volunteer habitat management programmes • Identify and capitalise on synergies between any volunteer habitat management programme pursued and ENV1's 'forest schools' and 'woodland workout' programmes • Consider how the appropriate design of soft landscaping works in South cluster projects can be delivered to maximise biodiversity and habitat connectivity benefit, contributing to improved ecosystem resilience
Potential negative environmental effects	
<p>Wildlife conservation & ecosystem services: improved access to the Cathkin Braes site as a result of the mountain bike project and ENV1 may lead to increased 'people pressure' to the detriment of the site's more vulnerable habitats and species</p> <p>Air quality, noise & dust (1): traffic management</p>	<p>Summary of mitigation measures:</p> <ul style="list-style-type: none"> • Identify tangible opportunities whereby South cluster green network enhancements can also contribute to habitat network enhancements • Consider how construction of projects

Potential environmental effects	Summary of proposed SEA recommendations
<p>measures deployed during project construction phase may contribute to temporary increases in traffic congestion and air pollution. Effects are likely to be most pronounced on already busy roads in Hampden and Ibrox</p> <p>Air quality, noise & dust (2): South cluster development activity may contribute to acute noise issues at several locations including areas zoned as candidate Noise Management Areas (NMAs). Although noisy activity may take place in or near NMAs, acute noise impacts may be more of a problem in areas that do not currently experience noise issues e.g. residential areas. This problem may be even more pronounced when noisy activities have to take place at night for health and safety reasons</p> <p>Soils & soil quality: several South cluster projects have potential to contribute to substantial levels of soil sealing. New access tracks and paths at Cathkin Braes may be a particular issue due to the versatile nature of soils. Also, increased potential for overland flow during rain storms (across new areas of hard standing) may contribute to soil erosion at adjacent greenspace sites</p> <p>Climate change issues (mitigation): South cluster development activity will contribute to a significant albeit mostly temporary increase in GHG emissions</p>	<p>within the same area can be phased to avoid significant air and noise related cumulative effects issues</p> <ul style="list-style-type: none"> • During project design and construction strategy development, ensure that relevant stakeholders are engaged to advise on the best practicable approach to air pollution and noise mitigation strategy • Ensure that tensions between air and noise mitigation strategies are addressed with 'win-win' outcomes in mind • Where noisy operations have to be undertaken at night time, ensure that works are carried out as early as possible • Consider the need to notify people in neighbouring areas of noisy operations • Consider the need to develop an access strategy to help minimise walking/ cycling related soil erosion impacts at the Cathkin Braes site • Consider the use of soft landscaping and/ or habitat creation at key sites to minimise overland flow of water and help protect against soil erosion issues

3.4.4 East cluster pre-games development programme assessment

Overall, East cluster development activity is likely to cause a mixed effect on the environment with potential for a range of both positive and negative effects. Similarly to the West cluster, the scale of proposed enhancements to the East cluster's cycling and walking network, including major improvements to the Clyde Walkway/ NCN75, are likely to contribute to substantial access improvements. Additionally, East cluster VAR projects include public transport infrastructure enhancement proposals. These types of enhancement should increase the attractiveness of active and sustainable travel contributing to a range of benefits including health improvements and reductions in traffic related air pollution and GHG emissions.

On the other hand, the scale of new and better facilities in the area (including several major projects not considered in this SEA such as the NISA/ Sir Chris Hoy Velodrome and Athletes' Village) are likely to increase the need to travel to the area contributing to increased linear source air pollution and GHG emissions. Other beneficial effects may arise in relation to biodiversity (habitat creation and improved management), soil contamination, climate change adaptation (improved habitat connectivity and ecosystem resilience to external pressures) and landscape and historic environment topics.

The outcomes of the East cluster pre-games development programme assessment, along with key enhancement and mitigation recommendations, are summarised in Table 3.9. Please refer to Appendix X for a detailed summary of the East cluster assessment.

Table 3.9 East cluster pre-games development programme assessment summary

Potential environmental effects	Summary of proposed SEA recommendations
Potential positive environmental effects	
<p>People, health & access: East cluster VAR projects are likely to improve access to both sustainable and active travel options, particularly around the Calton/ Bridgeton and Parkhead/ Dalmarnock areas. Increased uptake of active travel may support health objectives. MP12 and ENV2 should substantially improve Clyde corridor access provision and management in the East cluster area</p> <p>Wildlife conservation & ecosystem services: ENV2 and ENV3 may contribute to minor scale positive effects, primarily in the Clyde corridor area and at the Cuningar Loop site. ENV2 may support key LBAP management type actions whilst ENV3 is likely to contribute to biodiversity benefits associated with habitat creation, management and restoration and environmental education</p> <p>Air quality, noise & dust: enhanced East cluster access has potential to promote and encourage a modal shift from private car use to sustainable modes for key journeys. This may contribute to a reduction in linear source air pollution in the East cluster area</p> <p>Soils & soil quality: potential soil contamination issues at the ENV3 and Hockey Sites are likely to be addressed as part of planning conditions, contributing to a net reduction in East cluster soil contamination</p> <p>Climate change issues (mitigation): East cluster habitat creation projects (ENV3 in particular) may contribute to minor GHG mitigation benefits by providing a sizeable addition to the area's carbon sink. Also, East cluster access improvements may help to reduce transport related GHG emissions by facilitating a modal shift from private car use to sustainable modes for key journeys</p> <p>Climate change issues (adaptation): several East cluster projects will contribute to habitat network improvements, supporting ecologically resilient and varied landscapes and local climate change impact resilience. In addition, appropriate design of VAR project landscaping works may also support enhanced habitat networks and ecological resilience</p> <p>Landscape & the historic environment (1): sensitive enhancement of public realm around Saltmarket is likely to improve the setting of several key historic environment features and contributing to major improvements to the area's overall townscape. VAR project landscaping works should improve townscape in East cluster areas where there are few remaining historic environment features</p> <p>Landscape & the historic environment (2): well designed approach to development should ensure that the area's townscape and public realm is enhanced to a degree,</p>	<p>Summary of enhancement measures:</p> <ul style="list-style-type: none"> • Ensure that VAR related bus service enhancements are integrated with sustainable and active travel modes • Ensure that VAR related access improvements support the full range of core paths objectives • Explore synergies between ENV2 and MP12, ensuring that duplication is avoided and resources available for habitat management, creation and rehabilitation are maximised • Where possible, ensure that walking/ cycling route access enhancements avoid areas of existing poor air quality • Consider opportunities for using the carbon impact of East cluster development activity as a lever for more substantial Games related green network development in the area including woodland and other habitat creation projects where appropriate • Consider how the appropriate design of East cluster VAR project landscaping works can be delivered to maximise biodiversity, habitat connectivity and climate change resilience benefits • Consider how an area's key historic environment features can inform and improve project design • Consider how VAR6 and 7 works can help to 'join-up' fragmented historic environment features in and around Parkhead • Ensure that Saltmarket public realm improvements are delivered in line with the objectives, policies and criteria of the City Centre Conservation Area • Consider the use of a sensitive approach to tree planting strategy at the ENV3 site that restricts planting of non-native species to locations outwith sight lines from the north bank and/ or other key vantage points

Potential environmental effects	Summary of proposed SEA recommendations
<p>especially given the historic environment's disjointed nature. Public realm improvements around Saltmarket should ensure that the area's local distinctiveness is enhanced. ENV3 planting of appropriate species of native tree should help to improve Clyde corridor landscape character. ENV2 improved river bank management may enhance Clydeside views</p>	
Potential negative environmental effects	
<p>People, health & access: temporary risk of construction related air quality/ noise issues affecting public health and amenity. Effects may be particularly pronounced in areas with existing traffic congestion and air quality issues. Similar effects may arise during operation as a result of an increased need to travel to the area combined with housing and population growth in the area</p> <p>Wildlife conservation & ecosystem services: East cluster development adjacent to the Clyde has potential to contribute to increased diffuse source water pollution and increased pressure on aquatic ecosystems</p> <p>Water bodies & flooding: diffuse source water pollution from several Clydeside projects in the East cluster area raises a potential threat to River Clyde water quality. Chemical and ecological parameters may be affected given the potential for both chemical and nutrient diffuse source water pollution. Increased heavy plant and other traffic during construction may contribute to increased hydrocarbon contaminated run-off. New car parking facilities may contribute to an increased risk of hydrocarbon contaminated run-off. ENV3 habitat management raises potential risks associated with chemical and/ or nutrient contaminated run-off</p> <p>Air quality, noise & dust (1): construction related traffic management may increase congestion and exacerbate existing air quality problems, particularly at Parkhead Cross and Saltmarket. During operation, new facilities and growth strategies will increase the need to travel to and within the area. Unless this increased travel demand can be met with sustainable and active modes, there is a concern that existing air quality problems will be exacerbated and new problems arise</p> <p>Air quality, noise & dust (2): acute construction related noise effects may arise in sensitive locations that do not currently experience significant noise problems. MP15 raises noise issues given its location in proximity to residential areas in Bridgeton. VAR9 construction activities may contribute to a significant, albeit temporary, reduction in noise quality in the Tollcross Park candidate-Quiet Area</p> <p>Climate change issues (mitigation): East cluster development activity will contribute to a significant albeit largely 'one off' increase in GHG emissions</p>	<p>Summary of mitigation measures:</p> <ul style="list-style-type: none"> • Ensure that SuDS approaches are considered as part of MP12 design • Where possible, avoid the use of chemical treatments at the ENV3 site • Use appropriate soil management and drainage techniques at the ENV3 site to avoid soil erosion and/ or nutrient loading of the Clyde at this point • Ensure close integration between Games plans and other related plans and projects in the East cluster area • Ensure that Games related access improvements are communicated as part of related strategies to raise awareness and promote sustainable and active travel use • Where relevant, ensure that Bridgeton residents and users of Tollcross Park are pre-warned of any potentially noisy operations • Consider the appropriate phasing of West cluster projects to ensure that synergies and efficiency gains in delivery journeys etc can be maximised • Where possible, ensure that recycled and secondary aggregates (RSA) are used in construction projects Use AggRegain's CO₂ emissions estimator tool to approximate emissions savings in different construction techniques and/ or supply chain alternatives • Consider the need to undertake additional assessments of signage/ street furniture development in key areas of historic interest

Potential environmental effects	Summary of proposed SEA recommendations
Landscape & the historic environment: any inappropriate use of design and materials in VAR related signage, street furniture and lighting development at Bridgeton/ Parkhead Cross, Glasgow Green and Tollcross Park may contribute to an erosion of the area's historic character	

3.5 Cumulative effects

Consideration of potential cumulative effects issues has been an important part of the pre-games development programme assessment. The various stages of the assessment outlined above have helped to highlight the potential for similar environmental effects to occur repeatedly and/ or for the same receptor to be affected repeatedly – either in a geographical (e.g. a given site/ habitat or waterbody) or categorical (e.g. certain groups within the cluster's population regardless of where they live) sense. The causal chain and spatial analyses of individual pre-games development projects were particularly useful in this regard.

The most significant cumulative effects, both positive and negative, have been predicted where several different aspects of a pre-games development programme are considered to have the potential to affect a particular issue, receptor or location repeatedly. The effects identified are not intended to be an exhaustive list as predicting the interactions and additive effects is complex and uncertain. However, the cumulative effects identified are considered to be some of the most significant.

3.5.1 West cluster cumulative effects assessment

The west cluster pre-games development programme has potential to contribute to a range of additive and secondary type cumulative effects issues, both positive and negative, across all of the headline SEA topics covered in the assessment framework. Whilst many of the West cluster programme's potential environmental effects highlighted in section 3.4.2 are beneficial, the majority of the cumulative effects issues are adverse. That said, many of these issues are temporary/ construction related and may be mitigated through a careful approach to project construction strategy development. Key outcomes from the West cluster cumulative effects assessment (CEA) are summarised in Table 3.10.

Negative air quality effects may arise as a result of a secondary or induced type effect. New and improved facilities in the area are likely to increase transport demand. Unless any additional demand can be met using sustainable and/ or active means (including the necessary promotional and awareness raising activities to encourage people to use these modes), there is a concern that increased traffic may also contribute to increased linear source air pollution and decreased air quality in vulnerable areas e.g. Byers Road, Dumbarton Road and Finnieston Street.

Table 3.10 West cluster cumulative effects assessment summary

Potential cumulative effects	Spatial and categorical receptors affected
Potential positive cumulative effects	
People, health & access: many West cluster projects are likely to contribute to enhanced access provision e.g. MP1, MP2, MP3, MP4 and MP6. Effects are likely to be particularly pronounced in the Clyde corridor area and will complement recently completed initiatives such	<ul style="list-style-type: none"> • People/ residents • Public Health • Access provision • Key pedestrian cycle routes

Potential cumulative effects	Spatial and categorical receptors affected
as the Broomielaw Public Realm project contributing to a stronger cumulative benefit. New public transport provision to meet demand at new venues and other facilities may contribute to an overall improvement in sustainable travel access and provision	(Clyde and Kelvin Walkways)
Landscape & the historic environment: a sensitive and well designed approach to West cluster public realm strategy may contribute to significant cumulative improvements to the character and site and setting of the area's historic environment t features, historic townscape and landscape. Effects may be particularly significant around the SECC complex as the historic environment is currently largely fragmented and disjointed in this area	<ul style="list-style-type: none"> • Kelvingrove Park SSLI • St Vincent Crescent Conservation Area • Park Conservation Area
Climate change issues (adaptation): increased distribution of permeable ground cover and/ or the use of soft landscaping strategy will help to address local climate change issues including pluvial source flooding during extreme weather events	<ul style="list-style-type: none"> • Pluvial source flood risk • SuDS capacity
Potential negative cumulative effects	
People, health & access and air quality, noise & dust: potential increases in traffic congestion, air pollution and noise as a result of temporary traffic (construction related) traffic management measures, may contribute to temporary reduction in amenity value at key locations and/ or an increased risk of air pollution related human health impacts, particularly among vulnerable groups. The scope and significance of effects is likely to depend on the phasing of projects across the West cluster area. Effects may arise as a result of all West cluster projects but may be more pronounced in areas with existing air quality issues. There is a concern that issues may arise during operation also as a result of induced traffic effects (see above)	<ul style="list-style-type: none"> • People/ residents • Public Health • Key pedestrian cycle routes (Clyde and Kelvin Walkways) • Retail centres • Population centres
Wildlife conservation & ecosystem services: given the locations of several West cluster projects i.e. on or adjacent to City Plan 2 designated green network sites (including local and city-wide SINCS), there is a concern that any accidental disturbance of habitats and species during site investigation, land remediation and construction works may be to the detriment of key habitat networks in the West cluster area	<ul style="list-style-type: none"> • Corridor of Wildlife Importance (CWLI) Ref: 010, Green Corridor, River Kelvin • CWLI Ref:012, Green Corridor (Victoria Park Walkway) • River Clyde SINC • River Kelvin SINC • Kelvingrove Park SSLI
Soils & soil sealing: West cluster development activity has potential to contribute to a net increase in soil sealing in the area	N/A
Landscape & the historic environment: the visual impact of increased signage and other street furniture across several parts of the West cluster area has significant potential to adversely affect the site and setting of several important historic environment features as well as historic townscapes and landscapes. Effects may be particularly pronounced in the Kelvingrove Park and Scotstoun areas	<ul style="list-style-type: none"> • Kelvingrove Park SSLI • St Vincent Crescent Conservation Area • Park Conservation Area

3.5.2 South cluster cumulative effects assessment

South cluster activity constitutes the smallest (in terms of number and scale of projects) of the three Glasgow based pre-games development programmes. Additionally, the proposals for development are spread over a large area of Glasgow's south side – from Govan, Ibrox and Craigton in the south west, through King's Park

and Toryglen to Castlemilk and Carmunnock at the City's south eastern periphery. Accordingly, the potential cumulative effects issues are less significant than those for the West and East clusters where development is of a larger scale and focused on key sub-areas or 'precincts' such as the SECC and Kelvingrove in the West cluster area and Parkhead/ Dalmarnock in the East cluster area.

That said, key cumulative effects issues, both positive and negative have been identified in relation to; 1) people, health & access; 2) wildlife conservation & ecosystem services; 3) air quality, noise & dust; and 4) landscape & the historic environment. South cluster CEA outcomes are summarised in Table 3.11.

Table 3.11 South cluster cumulative effects assessment summary

Potential cumulative effects	Spatial and categorical receptors affected
Potential positive cumulative effects	
<p>People, health & access: several South cluster projects are likely to contribute to improved access provision (both in terms of active and sustainable modes) and better access to outdoor leisure and recreational facilities. Whilst these improvements are likely to focus on the Cathkin Braes site, the combined effect of several projects has potential to make a real difference to Castlemilk residents. This in turn may help to address key health issues that can be affected by environmental determinants and may go some way to resolving local 'quality of your environment' type issues raised by residents (see Environmental Report Part B section 6.2.2 for further information)</p>	<ul style="list-style-type: none"> • People/ residents • Health vulnerable groups • Population centres • Key pedestrian and cycle routes • Public health • Access provision (Public Transport)
<p>Wildlife conservation & ecosystem objectives: several South cluster projects are likely to contribute to green network improvements. In many cases, the scope of improvements is also likely to result in habitat network improvements, supporting better habitat connectivity and resilience to external pressures such as climate change and development. Again, the main benefits are likely to focus on the Cathkin Braes site though potential benefits may arise in other areas depending on the approach taken to certain projects</p>	<ul style="list-style-type: none"> • Big Wood and Cathkin Braes cSINC • Cathkin Braes Country Park SSLI • Big Wood Long Established Woodland
Potential negative cumulative effects	
<p>People, health & access: the cumulative effect of South cluster construction activities may contribute to a temporary reduction in amenity value in certain areas (e.g. Ibrox, Hampden/ Toryglen and Cathkin Braes Country Park). While short lived, there is a concern that these effects may deter leisure and recreational use at Cathkin Braes. The significance of effects may be greatly reduced through the adoption of appropriate mitigation measures e.g. phasing of projects to avoid cumulative pressures</p>	<ul style="list-style-type: none"> • People/ residents • Health vulnerable groups • Population centres • Key pedestrian and cycle routes • Public health
<p>Air quality, noise & dust: the vast majority of South cluster projects have some potential to contribute to temporary, construction related air pollution issues (as a result of temporary traffic management measures and associated increased traffic congestion) and noise nuisance. See people, health & access for further information</p>	<ul style="list-style-type: none"> • People/ residents • Health vulnerable groups • Population centres • Key pedestrian and cycle routes • Public health • Air quality
<p>Landscape & the historic environment: the combined visual impact of many individual signage, public transport infrastructure (e.g. bus stops, benches etc), lighting and other street furniture additions</p>	<ul style="list-style-type: none"> • Big Wood and Cathkin Braes cSINC • Cathkin Braes Country Park

Potential cumulative effects	Spatial and categorical receptors affected
may contribute to adverse cumulative effects issues in relation to the South cluster's historic townscapes and landscapes	<ul style="list-style-type: none"> • SSLI • Big Wood Long Established Woodland

3.5.3 East cluster cumulative effects assessment

Development in the East cluster area has substantial potential to contribute to a range of primarily positive cumulative effects. In contrast to the West cluster area, development in the East cluster is more likely to contribute to beneficial cumulative effects given the area's capacity for change e.g. large areas of vacant and derelict land, the isolated and fragmented nature of the historic environment and habitat management issues such as the prevalence of invasive non-native species in River Clyde riparian habitat.

Consequently, potential positive cumulative effects have been identified across the following SEA topics: 1) people, health & access; 2) wildlife conservation & ecosystem services; and 3) landscape & the historic environment. Potential adverse cumulative effects issues are primarily concerned with air pollution related public health issues which are a concern given the area's existing air quality and traffic congestion problems. Key outcomes from the East cluster CEA are summarised in Table 3.12.

Table 3.12 East cluster cumulative effects assessment summary

Potential cumulative effects	Spatial and categorical receptors affected
Potential positive cumulative effects	
People, health & access: many East cluster projects are likely to lead to enhanced active and sustainable transport access. In particular, MP12 and ENV2 are likely to greatly improve Clyde Walkway walking and cycling provision whilst East cluster VAR projects should improve access to bus services throughout the area. There is scope for MP12 and ENV2 related access improvements to incentivise and promote walking and cycling for some journeys and outdoor leisure and recreation more generally, contributing to health improvements amongst key target communities	<ul style="list-style-type: none"> • People/ residents • Health vulnerable groups • Population centres • Key pedestrian and cycle routes • Public health
Wildlife conservation & ecosystem objectives (1): several East cluster projects are likely to contribute to green network improvements. In many cases, the scope of improvements is also likely to result in habitat network improvements, supporting better habitat connectivity and resilience to external pressures such as climate change and development. Significant habitat creation/ management projects such as the Commonwealth Games Arboretum (ENV3) and Clyde Walkway Pilot Project (ENV2) are likely to be complemented by smaller scale projects such as VAR project landscaping works, the cumulative effect being a substantial improvement in East cluster habitat network	<ul style="list-style-type: none"> • GCV, City-wide and East cluster green network • GCV, City-wide and east cluster habitat networks • River and stream habitats • River Clyde Corridor of Landscape and Wildlife Importance (CLWI) • Glasgow Green Site of Special Landscape Importance (SSLI) • Tollcross Park SSLI
Wildlife conservation & ecosystem objectives (2): several East cluster projects may support long-term/ legacy scale improvements to management, conservation and enhancement of key natural heritage sites, contributing to increased provision and enhanced connectivity of the area's habitat networks (see above) Wildlife conservation & ecosystem services (3): better	<ul style="list-style-type: none"> • GCV, City-wide and East cluster green network • GCV, City-wide and east cluster habitat networks • River and stream habitats • River Clyde Corridor of

Potential cumulative effects	Spatial and categorical receptors affected
management of riparian habitats, creation of a sizeable new woodland on the banks of the Clyde and a range of smaller scale habitat improvements such as VAR related soft landscaping works have substantial potential to enhance the provision of several key ecosystem services including flood risk attenuation, outdoor leisure and recreation and environmental education	<ul style="list-style-type: none"> Landscape and Wildlife Importance (CLWI) • Glasgow Green Site of Special Landscape Importance (SSLI) • Tollcross Park SSLI
Landscape & the historic environment: pending sensitive design and delivery using appropriate materials etc, all East cluster projects have substantial potential to improve the site and setting of the area's remaining historic environment features and contribute to overarching improvements to townscape and landscape. This is especially important given that many parts of the East cluster area's historic environment is fragmented and isolated e.g. Parkhead and Dalmarnock	<ul style="list-style-type: none"> • Glasgow Green Site of Special Landscape Importance (SSLI) • Conservation Area: Central • Conservation Area: Parkhead Cross • Tollcross Park SSLI
Potential negative cumulative effects	
People, health & access: the cumulative effect of East cluster construction activities may contribute to a temporary reduction in amenity value in several areas (e.g. Saltmarket, Bridgeton Cross etc). The significance of effects may be greatly reduced through the adoption of appropriate mitigation measures e.g. phasing of projects to avoid cumulative pressures	<ul style="list-style-type: none"> • People/ residents • Health vulnerable groups • Population centres • Key pedestrian and cycle routes • Public health
Air quality, noise & dust: the vast majority of East cluster projects have some potential to contribute to temporary, construction related air pollution issues (as a result of temporary traffic management measures and associated increased traffic congestion) and noise nuisance. See people, health & access for further information	<ul style="list-style-type: none"> • People/ residents • Health vulnerable groups • Population centres • Key pedestrian and cycle routes • Public health • Air quality
Wildlife conservation & ecosystem services: the potential cumulative effect of land take in the East cluster area (e.g. for the physical development of new paths and access routes) may contribute to habitat severance, fragmentation and disturbance issues	<ul style="list-style-type: none"> • GCV, City-wide and East cluster green network • GCV, City-wide and east cluster habitat networks

3.6 Pre-games enhancement and mitigation strategy

Across the three Glasgow based clusters, the pre-games assessment has identified a broad range of potential positive and negative environmental effects as outlined throughout this section. In response, a suite of SEA recommendations has been developed to help enhance the positive and mitigate the negative environmental effects that the pre-games development programmes may cause.

As discussed extensively in Environmental Report Part B, the CG Strategy and Framework's relatively advanced stage in its development means that our options for avoiding potential negative effects outright are limited. Within the boundaries of the mitigation strategy constraints highlighted in Part B section 2.7.4, we have developed mitigation measures that, where possible, aim to avoid significant negative effects outright and reduce effects to an acceptable level where not. The main thrust of our approach, however, has been to focus on the potential positive environmental effects and enhance these. We have developed a plethora of enhancement recommendations and, following the statutory SEA consultation and the five community consultation events, our aim is to pursue as many of these as possible given constraints.

Mitigation and enhancement measures have been developed across two levels: 1) those addressing the effects of key individual projects, the assessment of which is summarised in section 3.3; and 2) those addressing the programme-wide effects of each of the three Glasgow based pre-games development programmes, the assessment of which is summarised in section 3.4.

Our approach to pre-games mitigation and enhancement strategy has been to develop three cluster specific SEA Design Guides. The guides can be found in Appendices Y, Z and AA. Accounting for local environmental baseline issues in each cluster, these recommendation strategies address all potential environmental effects identified in the pre-games assessment and include the following information:

- The potential positive and negative environmental effects that may arise as a result of the pre-games development programmes;
- Proposed enhancement and mitigation recommendations of programme-wide relevance;
- Proposed enhancement and mitigation recommendations from the individual projects assessment;
- Supporting technical information and/ or notes on approach to implementing recommendations;
- Proposed responsibility for action;
- Lists of relevant pre-games projects to which the recommendations relate;
- List of relevant themes from the Glasgow 2014 Legacy Framework that the proposed recommendations would support.

Following consultation on the CG Strategy and Framework, this Environmental Report and the five community consultation events, we will revise and prioritise recommendations in the SEA Design Guides to take account of comments and opinion, particularly on local issues identified at the community events. We anticipate making significant revisions to our initial proposals for action responsibility and we will develop a programme detailing when and by whom actions will be delivered. Based on the three SEA design guides, we have developed an overarching suite of SEA recommendations that are applicable to most pre-games development activity as detailed in Table 3.13.

Table 3.13 Overarching pre-games SEA recommendations

SEA Topic	SEA Recommendations
People, health & access	Enhancement: <ul style="list-style-type: none"> • Where relevant, ensure that access improvements facilitate ease of travel by sustainable and active modes at a City-wide level • Where possible, identify and address gaps in active travel provision along the City's most important linear routes and also within and between communities • Promote use of the Clyde and Kelvin Walkways as active travel routes and as leisure and recreational resources in their own right
	Mitigation: <ul style="list-style-type: none"> • Where possible, ensure that development of new walking and cycling routes avoids areas of existing or emerging poor air quality • Ensure that new and upgraded facilities and venues have adequate provision for securing bikes to promote active travel
Wildlife conservation & ecosystem services	Enhancement: <ul style="list-style-type: none"> • Ensure that access related green network enhancements also support improvements to habitats networks (e.g. ensure that the development of new walking and cycling routes consider biodiversity as well as access issues) • Where relevant, ensure that Games related environmental community programmes incorporate consideration of green network and habitat network issues to help raise

SEA Topic	SEA Recommendations
	<p>awareness of nature conservation</p> <ul style="list-style-type: none"> • Consider opportunities for broadening the scope of the Commonwealth Community Forests project to include volunteer led habitat management programmes • Consider how Games related development can be used as a lever for habitat creation and/ or soft landscaping projects <p>Mitigation:</p> <ul style="list-style-type: none"> • Where habitat disturbance, fragmentation or severance is likely, ensure that project design incorporates appropriate mitigation measures • Where development is likely to result in loss of habitat, consider the use of appropriate habitat compensation as guided by the GCV Green Network's Integrated Habitat Network (IHN) model and advice from key stakeholders
Water bodies & flooding	<p>Enhancement:</p> <ul style="list-style-type: none"> • Ensure that SuDS projects are designed to support a range of green network objectives including biodiversity protection and enhancement, recreation and access • When planning regional and local level SuDS schemes, consider opportunities for integration with existing habitat, landscape and topographical features <p>Mitigation:</p> <ul style="list-style-type: none"> • Consider how regional and local SuDS scheme development can be used to deal with diffuse source water pollution close to source • Consider rolling out well planned soft landscaping works across all projects to help reduce rainwater/ overland flood risk, reduce soil erosion and contribute to habitat network improvements • Ensure that contractors comply with relevant legislation and guidelines to minimise water pollution risks
Air quality, noise & dust	<p>Enhancement:</p> <ul style="list-style-type: none"> • Raise awareness of access and active travel improvements at the community level. Target communities where existing air pollution problems are prevalent <p>Mitigation:</p> <ul style="list-style-type: none"> • Ensure that contractors comply with relevant legislation and guidelines to minimise noise, dust and vibration nuisance • Ensure that temporary traffic management measures are designed to minimise traffic congestion. Where possible, deploy temporary traffic management measures during non-peak times • During design and construction strategy development of all pre-games development projects, ensure that relevant stakeholders (GCC Public Health Unit) are engaged to advise on the best practicable approach to minimising construction related air pollution and noise impacts • Promote the use of sustainable transport to help mitigate any increases in air pollution associated with increased travel to access new venues and facilities • Ensure that tensions between air pollution and noise impact mitigation strategies are addressed with 'win-win' outcomes in mind
Soils & soil quality	<p>Enhancement:</p> <ul style="list-style-type: none"> • Where significant land contamination issues exist, ensure that the remediation strategy used is the most sustainable option given constraints • Where possible, use onsite soil remediation techniques to minimise the waste and carbon impact associated with soil excavation, transportation and disposal • Consider the use of soft landscaping and/ or habitat creation to help address soil erosion issues. This would also help to reduce flood risk and diffuse source water pollution whilst enhancing habitat networks

SEA Topic	SEA Recommendations
	<p>Mitigation:</p> <ul style="list-style-type: none"> • Minimise soil sealing and/ or increased areas of hard standing at the Cathkin Braes site • Consider the appropriateness of developing a strategy to minimise walking and cycling related soil erosion impacts at the Cathkin Braes site
Climate change issues	<p>Mitigation:</p> <ul style="list-style-type: none"> • Use CO₂ emissions estimator tools to approximate emissions savings in different construction techniques and/ or supply chain alternatives • Consider setting an appropriate benchmark to establish an ambitious minimum target for recycled and secondary aggregate use in Games related construction projects
Landscape & the historic environment	<p>Enhancement:</p> <ul style="list-style-type: none"> • Consider how the City's historic environment can inform and improve project design, especially in Conservation Areas and other areas of historic environment interest • Consider how West cluster proposals for the SECC complex area can help to join-up and reinvigorate the area's fragmented historic environment <p>Mitigation:</p> <ul style="list-style-type: none"> • Minimise any additional signage and street furniture. Where additional street furniture is essential, consider the use of appropriate design and materials that complements the area's historic environment • Where additional signage is essential, consider opportunities for rationalising new and existing signage e.g. can two or more signs be integrated to minimise the need for additional signage? • Liaise with key stakeholders (e.g. Historic Scotland and Glasgow City Council DRS – Heritage & Design Team; West of Scotland Archaeological Services) at project design stage to ensure that key threats to the integrity of local historic environment features are addressed early on • Avoid development at the Cathkin Braes site that may result in loss of views

4. ASSESSMENT OF THE COMMONWEALTH GAMES STRATEGY AND FRAMEWORK'S GAMES-TIME PROVISIONS

4.1 Introduction

The approach taken to the assessment of games-time provisions (i.e. the assessment of the Transport Strategic Plan or TSP) is described in detail in Part B of the Environmental Report, Section 2.8. The remainder of this chapter summarises the two main stages of the pre-games assessment undertaken: 1) assessment of the plan's proposed traffic management measures – section 4.2; and 2) appraisal of the Games Route Network (GRN) to identify key environmental vulnerabilities and constraints – section 4.3.

Following the consultation on the CG Strategy and Environmental Report, we will work with our transport stakeholders to develop an environmentally sustainable traffic management strategy for each GRN journey. Our aim will be to balance socio-economic considerations such as technical feasibility, cost and social impact with the potential environmental risks and vulnerabilities identified through this assessment.

4.2 Assessment of the TSP's proposed traffic management measures

The approach taken to the traffic management measures assessment is described in detail in ER Part B section 2.8.2 including details of the five different measures that are currently being considered for Games-time deployment. For the purposes of the assessment, 'banned turns and road closures' and 'diversion routes' were grouped together given their inherent similarities. Also, 'traffic signal controls and junction improvements' were considered as two different interventions given their key differences in terms of potential environmental effects.

The assessment involved causal chain analysis of the different traffic management measures. This followed a very similar method to that used in the causal chain analysis of pre-games development projects as summarised in section 3.2.1 above. In particular, generic examples of key traffic management measure actions and, where relevant, physical development scope of works were work-shopped to identify the types of activity that have potential to cause environmental effects. A collated list of key actions/ summary scope of works for each of the five proposed traffic management measures is provided in Appendix BB.

A diagrammatic representation of the proposed traffic management measure causal chain analysis is provided in Appendix CC and a full summary of the analysis is provided in Appendix DD. Key outputs for each of the traffic management measures are summarised in Table 4.1. A key theme emerging from the causal chain analysis is that, generally speaking, the proposed traffic management measures have significant potential to cause adverse environmental effects during Games-time operation. It is important to stress however that given the Games-time specific timescale of their deployment, the majority of potential environmental effects that may arise as a result of traffic management measures are likely to be temporary in nature.

Despite the broad potential for adverse effects, there is potential for some subtle environmental benefits to emerge as a result of Games-time operation of the GRN. For example, fewer private cars on the GRN may improve accessibility for cyclists and pedestrians and contribute to an increased uptake of active travel modes (this assumes that cyclists and pedestrians **will** have access to the GRN). Also, any awareness-raising activities around the issue of sustainable transport both before and during the Games, in conjunction with Games lanes and other restrictions and the pre-games programme of transport infrastructure enhancements may encourage private car users to make a modal shift during and after the Games.

Table 4.1 Summary outputs of proposed traffic management measure causal chain analysis

Proposed traffic management measure	Key outputs of causal chain analysis
<p>Kerbside controls <i>Key issues: people, health & access; air quality, noise & dust and traffic/ transport</i></p>	<ul style="list-style-type: none"> • Deployment of kerbside controls is unlikely to require any built development activity and therefore there are likely to be no/ limited significant construction related effects. Generally speaking, kerbside controls have significant potential to cause <i>adverse</i> environmental effects during Games-time operation • Key aspects of the environment that may be affected include people, health & access (e.g. Temporary reduction in amenity/ quality of life for residents and businesses during Games-time in affected areas and decreased pedestrian/ cycle access on local roads in neighbouring areas) and air quality, noise & dust and traffic/ transport (e.g. displacement of resident car parking in affected areas during Games-time operational hours, displacement of loading activities in affected areas during Games-time operational hours and potential for increased noise/ air pollution on local roads in neighbouring areas)
<p>Games lanes <i>Key issues: people, health & access; wildlife conservation & ecosystem services; air quality noise & dust; traffic/ transport and landscape & the historic environment</i></p>	<ul style="list-style-type: none"> • A review of case studies where similar lane segregation approaches have been used indicates that there may be some requirement for road widening schemes etc. Despite this, it is anticipated that Games lanes will generally occupy existing road space and therefore there will be minimal requirement for any construction related activity. Despite this and in the interests of a precautionary approach, the causal chain analysis gave some consideration to the potential environmental implications of small scale construction activities such as minor road widening. As such, deployment of Games lanes has significant potential for construction related effects • In general, Games lanes have significant potential to cause <i>adverse</i> environmental effects during Games-time operation. Crucially however, the scope for certain construction related activity means that there is also potential for adverse effects that may be felt outwith Games-time. These potential effects are primarily related to wildlife conservation & ecosystem services (any land take for road widening and/ or short sections of new road where required may contribute to habitat fragmentation, severance etc) and landscape & the historic environment (any additional markings/ signage may contribute to erosion of historic character in sensitive areas) • Key aspects of the environment that may be affected during Games-time include people, health & access (e.g. decreased accessibility and/ or increased waiting times for pedestrians and cyclists at key GRN crossings, increased journey times and decreased accessibility for non-Games family vehicles etc) and air quality, noise & dust and traffic/ transport (e.g. increased congestion for non-Games family vehicles on the GRN where Games lanes are in operation, increased vibration nuisance on local roads network as vehicles, including HGVs, are displaced from the GRN etc)
<p>Traffic signal controls <i>Key issues: people, health & access; air quality, noise & dust and traffic/ transport</i></p>	<ul style="list-style-type: none"> • Deployment of traffic signal controls is unlikely to require any built development activity and therefore there are likely to be no/ limited significant construction related effects. Generally speaking, traffic signal controls have potential to cause minor <i>adverse</i> environmental effects during Games-time operation. Effects are more likely to be minor as traffic signal controls will only be deployed at certain locations and only at certain times (e.g. peak GRN operation) • Key aspects of the environment that may be affected, albeit in a very minor fashion, during Games-time operation include people, health & access (e.g. decreased accessibility and/ or increased waiting times for pedestrians and cyclists at affected junctions) and air quality, noise & dust and traffic/ transport (e.g. increased waiting times for non-Games vehicles at key junctions during certain periods)
<p>Junction improvements <i>Key issues: people, health & access;</i></p>	<ul style="list-style-type: none"> • Junction improvements, by definition, have significant potential for construction related effects as a result of a range of actions including establishment of temporary traffic management measures during construction where necessary, physical development of new/ improved junction and provision of new pedestrian

Proposed traffic management measure	Key outputs of causal chain analysis
<i>wildlife conservation & ecosystem services; air quality noise & dust and traffic/ transport</i>	<p>crossings including physical development where necessary</p> <ul style="list-style-type: none"> • A key premise of junction improvement projects is improved safety. It follows that Games related junction improvement projects have significant potential to cause <i>beneficial</i> environmental effects during Games-time operation and post-games in legacy mode. Key aspects of the environment that may be affected beneficially include people, health & access (e.g. enhanced and safer accessibility for pedestrians and cyclists at affected junctions, increased incentive to use sustainable/ active travel modes for key journeys that use affected junctions, enhanced amenity etc) and air quality, noise & dust and traffic/ transport (e.g. decreased delays and congestion at affected junctions) • In addition to the environmental benefits outlined above, there is also significant potential for adverse environmental effects either during or as a result of construction activities. Key aspects of the environment that may be affected include people, health & access (e.g. increased noise/ dust/ vibration nuisance during construction), wildlife conservation & ecosystem services (e.g. any land take required may contribute to habitat fragmentation, severance etc) and air quality, noise & dust and traffic/ transport (e.g. temporary increase in emissions of traffic related air pollutants and noise/ vibration nuisance)
<p>Banned turns, road closures and diversion routes <i>Key issues: people, health & access; air quality noise & dust and traffic/ transport</i></p>	<ul style="list-style-type: none"> • Deployment of banned turns, road closures and diversion routes is unlikely to require any built development activity and therefore there are likely to be no/ limited significant construction related effects. Generally speaking, these three types of similar traffic management measure have significant potential to cause <i>adverse</i> environmental effects during Games-time operation • Key aspects of the environment that may be affected are primarily related to air quality, noise & dust and traffic/ transport e.g. increased congestion at banned turns/ road closures – particularly as a result of confusion if diversionary routes have been ‘missed’, unplanned and/ or planned displacement of traffic to neighbouring areas and local roads network during operation as drivers seek alternative routes to avoid perceived or actual congestion issues, increased congestion on local roads network in neighbouring areas as drivers seek alternative routes to avoid actual or perceived congestion on the arterial routes comprising the GRN and increased emissions of air pollutants and noise/ vibration nuisance on local roads network in neighbouring areas

4.3 Assessing the GRN’s environmental vulnerabilities and constraints

Four of the core Glasgow based GRN journeys have been assessed to help identify the potential environmental vulnerabilities and constraints that the deployment of Games-time traffic management measures should consider. As discussed elsewhere, post consultation, we will work with our transport stakeholders to develop an environmentally sustainable traffic management strategy that takes cognisance of the issues raised in this assessment. The remainder of this section provides a summary of the assessment undertaken. Appendix EE provides a detailed summary of the assessment and Appendices FF, GG and HH contain plans of the individual GRN journeys and their constituent sections or chainages. These plans also include key environmental receptors including AQMAs, listed buildings, conservation areas and corridors of landscape and wildlife importance (CLWI sites). The four GRN journeys considered are:

- **GRN Journey 1:** Athletes’ Village to the Tollcross National Swimming Centre also encompassing the journey to Parkhead Stadium/ NISA and Sir Chris Hoy Velodrome journey;
- **GRN Journey 2:** Athletes’ Village to Cathkin Braes also encompassing the journey to the National Stadium at Hampden Park;

- **GRN Journey 3:** Athletes' Village to Ibrox Stadium (**please note:** this journey will utilise the not yet completed M74 extension and has therefore not been assessed at this time); and
- **GRN Journey 4:** Athletes' Village to Scotstoun Squash Centre also encompassing the journey to Glasgow Green, the SECC complex, Kelvingrove and Kelvin Hall.

4.3.1 GRN Journey 1 Athletes' Village to Tollcross National Swimming Centre

GRN Journey 1 runs between London Road at Fielden Street in the east to Tollcross Leisure Centre at Wellshot Road in the east. The journey has been assessed as two individual chainages: **CR13:** London Road between Fielden Street in the west and Canmore Street in the east; and **CR14:** London Road to Tollcross Park from Methven Street in the west via Braidfauld Street. The route is not considered to have any highly significant environmental constraints or vulnerabilities. Please see Appendices EE and FF for further information including summary recommendations for addressing potential issues.

4.3.2 GRN Journey 2 Athletes' Village to Cathkin Braes

GRN Journey 2 encompasses the routes to both the Cathkin Braes and Hampden sites running from the Athletes' Village site via Dalmarnock Road and Baltic Street in the north to Carmunnock Road at Lainshaw Drive in the south. Several of the chainages are considered to have highly significant environmental constraints and vulnerabilities as outlined in Table 4.2. Please see Appendices EE and GG for further information including summary recommendations for addressing potential issues. The journey has been assessed as six individual chainages as outlined below:

- **CR12:** Athletes' Village site (via Dalmarnock Road and Baltic Street) to the river crossing at Richmond Park (Rutherglen Bridge) via Dunn Street;
- **CR10:** from Rutherglen Bridge to the north to Polmadie Road (Jessie Street junction) to the south via Shawfield Drive and Rutherglen Road;
- **CR11_1:** Polmadie Road at Jessie Street to the north to Toryglen Park at Aikenhead Road;
- **CR11_2:** Toryglen Park at Aikenhead Road to Hampden Stadium at Curling Crescent via Aikenhead Road;
- **CB1:** Aikenhead Road at King's Park Avenue to the north to Carmunnock Road at Crofffoot Road to the south; and
- **CB2:** Carmunnock Road at Raithburn Road to the north to Carmunnock Road at Lainshaw Drive to the south.

Table 4.2 GRN Journey 2 key environmental constraints summary

GRN Chainage Reference	Details of potential environmental constraints and key issues
CR10	<p>Wildlife conservation & ecosystem services: the journey passes within 10m of an SSLI and two CLWIs. No immediate constraints evident</p> <p>Townscape, landscape and the historic environment: the journey passes within 50m of one Category B listed building. No immediate constraints evident</p>
CR11_1	<p>People, health & access: the journey terminates at a residential area at the junction of Polmadie and Aikenhead Roads</p> <p>Wildlife conservation & ecosystem services: the journey passes within 10m of an SSLI and two CLWIs. No immediate constraints evident</p> <p>Landscape and the historic environment: the journey passes within 50m of two listed buildings, A and B Category. No immediate constraints evident</p>

GRN Chainage Reference	Details of potential environmental constraints and key issues
CB1	<p>People, health & access: the journey passes through residential areas for its duration and a primary school at Carna Drive and a secondary school at Fetlar Drive to the south</p> <p>Wildlife conservation & ecosystem services: the journey passes within 10m of an SSLI. No immediate constraints evident</p> <p>Landscape and the historic environment: Journey passes within 50m of one Category B listed building</p>
CB2	<p>People, health & access: the journey passes residential areas for its duration and a primary school at Dougrie Road</p> <p>Wildlife conservation & ecosystem services: the journey passes within 10m of two SSLIs, a CWLI, an LSINC and a TPO site. No immediate constraints evident</p> <p>Landscape and the historic environment: Journey passes within 50m of two Category B and one C(S) listed building</p>

4.3.3 GRN Journey 4 Athletes' Village to the Scotstoun Squash Centre

GRN Journey 4 encompasses routes to the Glasgow Green Hockey Centre, the SECC and Kelvingrove complexes and the Scotstoun Squash Centre. Given that the route passes through the City centre and sensitive areas of historic environment interest in the West cluster area, the majority of the chainages are considered to have highly significant environmental constraints and vulnerabilities as outlined in Table 4.3.

Please see Appendices EE and HH for further information including summary recommendations for addressing potential issues. The journey has been assessed as eight individual chainages as outlined below, starting in the east of the City at Newhall Street and culminating at the Scotstoun Leisure Centre at Danes Drive:

- **CR10:** Newhall Street at the junction with Dunn Street to The Green at the junction with King's Drive and James Street;
- **CR9:** The Green (as per the above) to Crown Street at the College of Nautical Studies via King's Drive and Ballater Street;
- **CR8:** Crown Street (as per the above) to Broomielaw at York Street via the Albert Bridge and Clyde Street;
- **CR6:** Anderston Quay at Washington Street to the Kelvingrove Bowls site at Kelvin Way Bridge and Kelvin Hall International Sports Arena at Bunhouse Road. The route goes via Finnieston Street, Argyle Street and Dumbarton Road. **Please note:** this section of GRN Journey 4 provides access to the Kelvingrove Park complex;
- **CR4:** Clydeside Expressway at Cooperage Place to Clydeside Expressway at Hayburn Street in the west;
- **CR3:** Clydeside Expressway (as per the above) to Clydeside Expressway interchange at Laghall Road/ Sawmill Road;
- **CR2:** A814/ Clydeside Expressway at Laghall Road/ Sawmill Road interchange to Victoria Park Drive South at Haldane Street; and
- **CR1:** Victoria Park Drive South (as per the above) to Scotstoun Leisure Centre, Danes Drive at Vancouver Road.

Table 4.3 GRN Journey 4 key environmental constraints summary

GRN Chainage Reference	Details of potential environmental constraints and key issues
CR10	<p>People, health & access: the journey passes through residential areas to the east for its duration</p> <p>Wildlife conservation & ecosystem services: journey passes within 10m of an SSLI and a CWLI. No immediate constraints evident</p> <p>Landscape and the historic environment: two Category B listed building complexes lie within 50m of the route</p> <p>Water bodies & flooding: within flood potential area</p>
CR9	<p>Wildlife conservation & ecosystem services: journey passes within 10m of one SSLI and a CWLI. No immediate constraints evident</p> <p>Landscape and the historic environment: One Category A and two Category B listed building complexes lie within 50m of the route. The route passes through the Glasgow Central Conservation Area</p> <p>Water bodies & flooding: within flood potential area</p> <p>Ai quality, noise & dust: route lies within the City Centre AQMA</p>
CR8	<p>People, health & access: the journey is adjacent to the Clyde Walkway for its duration and passes several of the City's key business and office areas e.g. the 'International Finance' district at Broomielaw</p> <p>Wildlife conservation & ecosystem services: journey passes within 10m of one SSLI and a CWLI. No immediate constraints evident</p> <p>Landscape and the historic environment: Five Category A, seven Category B, and one Category C(S) listed buildings lie within 50m of the route. The route passes through the Glasgow Central Conservation Area</p> <p>Water bodies & flooding: within flood potential area</p> <p>Air quality, noise & dust: route runs within the City Centre AQMA</p>
CR6	<p>People, health & access: the journey is adjacent to the Clyde Walkway up until Finnieston Street. After this, the journey passes office buildings on Finnieston Street and a densely populated residential area at Argyle Street</p> <p>Wildlife conservation & ecosystem services: journey passes within 10m of a CWLI (Clyde Expressway) and terminates within a SSLI adjacent to a SINC of City-wide importance (River Kelvin)</p> <p>Water bodies & flooding: within flood potential area</p> <p>Air quality, noise & dust: route runs within the City Centre AQMA and an emerging air quality issue area at Finnieston Street</p> <p>Landscape & the historic environment: journey passes within close proximity to several category A and B listed buildings and terminates within the Park</p>
CR4	<p>Wildlife conservation & ecosystem services: journey passes within 10m of three CWLIs</p> <p>Landscape and the historic environment: route passes within 50m of a Category B listed building</p> <p>Water bodies& flooding: within flood potential area</p>
CR3	<p>People, health & access: journey runs in close proximity to residential areas at Glasgow harbour</p> <p>Wildlife conservation & ecosystem services: journey passes within 10m of one CWLI</p> <p>Landscape and the historic environment: journey passes within 50m of a Category B listed building</p> <p>Air quality, noise & dust: route runs within 50m of the Byres Rd/ Dumbarton Rd AQMA</p>
CR2	<p>People, health & access: the journey passes the large and well used outdoor leisure and recreational resource of Victoria Park to the north of Victoria Park Drive South and a</p>

GRN Chainage Reference	Details of potential environmental constraints and key issues
	<p>residential area to the south</p> <p>Wildlife conservation & ecosystem services: journey passes within 10m of one CWLI and one SSLI</p> <p>Landscape and the historic environment: route passes within 50m of a Category B listed building complex (3 buildings) and a Category C(S) listed building complex (10 buildings).</p> <p>Air quality, noise and dust: route runs past a cNMA</p>
CR1	<p>People, health & access: the journey passes the large and well used outdoor leisure and recreational resource of Victoria Park to the east and runs through densely populated residential areas in all other orientations</p> <p>Wildlife conservation & ecosystem services: journey passes within 10m of one CWLI, one SSLI one SSSI and one I-SINC</p> <p>Landscape and the historic environment: route passes within 50m of two Category B listed buildings; and two Conservation Areas</p>

5. IMPLEMENTATION AND MONITORING OF THE CG STRATEGY AND FRAMEWORK

5.1 Proposals for monitoring

Monitoring the significant environmental effects of implementing the CG Strategy and Framework is a fundamental part of the SEA process. The SEA Directive and Act require the significant environmental effects of a plan or programme to be monitored and that the Environment Report (this report) should include a description of measures 'envisaged' for monitoring the implementation of the plan. The approach taken to developing monitoring proposals has been twofold:

- Firstly, a number of contextual indicators have been identified to support the ongoing maintenance of the environmental baseline (as summarised in Part B of the Environmental Report) and provide up to date context information to inform any future revisions and updates of the CG Strategy and Framework's constituent plans and programmes. Additionally, an up to date baseline can support the development of any additional games-time management strategies that may be developed between now and the event itself. Context indicators have been identified on the basis that they can be maintained with readily available environmental information that is already collated by other agencies. Furthermore, this part of the proposed monitoring will help to flag up any unanticipated effects of implementing the CG Strategy and Framework; and
- Secondly, a smaller suite of key indicators has been identified to monitor the significant environmental effects of the CG Strategy and Framework - outcome or significant effects indicators.

Where possible, monitoring potential significant environmental effects for SEA should be integrated with monitoring the performance of the CG Strategy and Framework and any existing monitoring regimes e.g. water quality, public health and well-being, condition of SSSIs etc. Where possible, SEA monitoring has been aligned to that under our sustainability performance monitoring framework and the Glasgow 2014 Sustainability Plan.

The approach taken to developing monitoring proposals has been, where possible, to identify indicators that can be maintained with readily available information that is already collected by other agencies. In some instances, the information required to support the maintenance of a specific indicator is not readily available. In these circumstances, the indicator has been retained as 'aspirational' given that the necessary information may become available in the future to support the CG Strategy and Framework's ongoing development, implementation and, where relevant, subsequent revisions of its constituent plans and programmes.

Appendix II lists the proposed indicators for monitoring the significant environmental effects of the CG Strategy and Framework. The table identifies several different types of indicators as discussed above including contextual, outcome and significant effects indicators. Where possible, we have focused on output and significant effects indicators to support a clear understanding of the resultant environmental effects of CG Strategy and Framework implementation. Further information on these types of indicators is provided below:

- Contextual indicators monitor the background against which the CG Strategy and Framework will operate once adopted. Examples of information collected under context indicators may include male and female mortality rates from all causes, background air quality data and area of green network in the City;

- Output indicators monitor specific actions arising from the CG Strategy and Framework such as hectares of contaminated land remediated or number of developments incorporating SuDS; and
- Outcome or significant effects indicators facilitate an understanding of the actual nature of predicted effects. For example, monitoring the health impacts of potential increases in traffic related air pollution around Parkhead Cross might consider the additional number of asthma cases recorded within Parkhead and Dalmarnock health centres.

As noted elsewhere in the Environmental Report, assessment, mitigation/ enhancement recommendations and monitoring proposals outlined in this part of the report will need to be revisited after the consultation has been undertaken on the CG Strategy and Framework and this Environmental Report to take account of any responses and significant changes that may be made to the plan.

In addition, a comprehensive framework for monitoring the significant environmental effects of the CG Strategy and Framework will need to be developed and submitted to the Scottish Government SEA Gateway within a statutory period after the plans are adopted. This will include a more tailored suite of indicators along with targets to support more meaningful monitoring and review of the CG Strategy and Framework's likely significant effect on the environment. As such, the monitoring proposals outlined in this Environmental Report are only an initial starting point. They are likely to require refinement and update once final changes to the CG Strategy and Framework have been made and reassessed where appropriate.

6. CONCLUSIONS AND NEXT STEPS

6.1 Key findings and the difference the SEA has made

This SEA has highlighted the CG Strategy and Framework's potential to cause a number of significant positive and negative environmental effects across most SEA topics considered in the assessment framework. Where relevant, the SEA has made a number of recommendations for mitigating negative and enhancing positive environmental effects.

Beneficial effects are likely to arise across the following issues: 1) **people, health & access** – improved green network and access provision, in terms of both active and sustainable modes, potentially contributing to increased uptake of outdoor leisure and recreation and improved health; 2) **wildlife conservation & ecosystem services** – habitat creation and better habitat management may contribute to network-wide habitat enhancements and increased ecosystem resilience to a range of external pressures including climate change, development and invasive non-native species; 3) **water bodies & flooding** – proposed flood defence works in the West cluster area combined with several more 'soft' approaches to flood risk alleviation elsewhere such as landscaping and habitat creation should help to reduce fluvial and pluvial source flood risks. Benefits may be greatly improved through the appropriate incorporation of SuDS techniques in all Games related projects; and 4) **landscape & the historic environment** – pre-games development, particularly in the East cluster area, is likely to substantially improve the City's historic townscapes and landscapes.

Conversely, there is substantial potential for adverse effects across many of the same issues. The key difference, however, is that several of the CG Strategy and Framework's significant adverse effects are more likely to be temporary, especially those relating to **people, health & access** and **air quality, noise & dust**. In addition, adverse effects may arise across the following issues: 1) **wildlife conservation & ecosystem services** and **water bodies & flooding** – Games related developments adjacent to the Clyde and Kelvin rivers may contribute to an increase in diffuse source water pollution during both construction and operation, contributing to increased pressure on aquatic ecosystems; 2) **climate change issues** – Games related development is likely to contribute to a significant, albeit largely 'one-off', increase in GHG emissions. It should be noted that the climate change assessment in this SEA has **not** considered the 'external' carbon impact of the Games associated with participant and spectator travel to and from the Games (including from various locations around the Commonwealth; and 3) **landscape & the historic environment** – the visual impact of several small scale Games related developments such as minor transport infrastructure improvements and additional signage and lighting may be missed in isolation. The cumulative effect of several of these projects in one location however has substantial potential to adversely affect the site and setting of the City's historic environment, townscape and landscape.

Due to the SEA and CG Strategy and Framework-development integration issues described extensively in this Environmental Report, the SEA has yet to make a tangible difference to the scope and objectives of the Games' various plan, programme and project initiatives. That said, SEA activities including environmental baseline collation, informal consultation activities and the assessment itself has been used to forge a useful and constructive dialogue around environmental issues with key Games stakeholders including: 1) the Glasgow 2014 Transport and Environment Steering Group; and 2) Games project leads at Glasgow City Council Land and Environmental Services (LES) and Development and Regeneration Services (DRS). In particular, the SEA has played a key role in the development of the recently launched Glasgow 2014 Sustainability Plan.

Following consultation on the CG Strategy and Framework and this Environmental Report, we will continue to work with the technical stakeholders responsible for the various Games related plans, programmes and projects. We will communicate the SEA findings and recommendations to ensure that environmental considerations are taken on board in the ongoing develop and implementation of the CG Strategy and Framework. In essence, SEA activities to date have outlined a broad framework of environmental opportunities that should be considered in all Games related plans and projects – the SEA Design Guides provide a toolkit to facilitate this approach including mitigation of the Games' potential adverse environmental effects.

6.2 Next steps

Consultation on the CG Strategy Framework and its accompanying Environmental Report and Non-Technical Summary marks the point at which we are seeking your views on the Games plans and their potential effect on the environment. Anyone can respond to this consultation and we are required by law to take account of every response received.

Details of how to respond are provided in Environmental Report Part A section 1.4 and section 2.2 of the Non-Technical Summary. We will also be holding five Glasgow 2014 environmental community consultation events in November and December 2010. These events will provide you with an opportunity to highlight the local environmental issues that are important to you and your community. Your comments and suggestions will help to shape the Games' environmental legacy and the finalisation of the CGSF's various plans and programmes. **Please note:** attendance at a community consultation event does not preclude you from responding directly to this statutory SEA consultation. Further details of these events are available on the Glasgow 2014 Ltd and Glasgow City Council 'Glasgow Consult' websites: <http://www.glasgow2014.com/> and <http://www.glasgow.gov.uk/en/YourCouncil/Consultations/>. The next steps in the CGSF-development and SEA processes are outlined in Table 7.1.

Table 6.1 Next steps in CG Strategic Framework-development and SEA

CG Strategic Framework-development/ SEA stage	Next steps
1. Consultation	<ul style="list-style-type: none"> • Submission of the CG Strategy and Framework's various plans and programmes and accompanying Environmental Report to the Scottish Government's SEA Gateway • Submission of documents to the SEA Gateway marks the beginning of the five week statutory consultation period agreed with Consultation Authorities at the Scoping stage. This is likely to commence on Monday 15th November 2010 • Five week formal consultation on the CG Strategy and Framework and Environmental Report
2. Taking account of consultation responses	<ul style="list-style-type: none"> • Review of consultation responses • Making changes to the CG Strategy and Framework in light of consultation responses on either the plans themselves itself or the potential environmental effects outlined in this Environmental Report • We may need to carry out an environmental assessment of any significant changes to the CG Strategy and Framework. These will be reported in a revised Environmental Report or an Environmental Report addendum if changes are minor
3. Post-adoption	<ul style="list-style-type: none"> • Adoption of the CG Strategy and Framework • Preparation of the SEA Post-adoption Statement. This will describe the

CG Strategic Framework-development/ SEA stage	Next steps
	main findings of the SEA process, how SEA influenced the CG Strategy and Framework's development and how consultation responses have been accounted for in the finalisation of the its constituent plans and programmes
4. Monitoring and review	<ul style="list-style-type: none"> • Monitoring progress towards the CG Strategy and Framework's objectives • Monitoring the CG Strategy and Framework's significant environmental effects • Review