

Appendix A

Table A1: Land Designations & Applicable Policies

Theme	Designation Coverage	Site/ Designation/ Land	Designated by / Policies outlined in Relevant Document	Relevant part of text	Source
Land in General	England	Best and most versatile agricultural land (Grades 1, 2, 3a)	NPPF	Local planning authorities should take into account the economic and other benefits of the best and most versatile agricultural land. Where significant development of agricultural land is demonstrated to be necessary, local planning authorities should seek to use areas of poorer quality land in preference to that of a higher quality	Para 112
			BathNES Local Plan	Development which would result in the loss of the best and most versatile agricultural land will not be permitted unless sustainability considerations are sufficient to override the protection afforded to the agricultural value of the land. Development should be directed towards the lowest grade agricultural land except where sustainability considerations indicate otherwise.	Policy NE.16
	England	Green Belt	NPPF	For decision taking this means...where the development plan is absent, silent or relevant policies are out-of-date, granting permission unless...specific policies in this Framework [For example, those policies relating to... land designated as Green Belt...] indicate development should be restricted.	Para 14
				The Government attaches great importance to Green Belts. The fundamental aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open; the essential characteristics of Green Belts are their openness and their permanence.	Para 79
				Green Belt serves five purposes: <ul style="list-style-type: none"> to check the unrestricted sprawl of large built-up areas; to prevent neighbouring towns merging into one another; to assist in safeguarding the countryside from encroachment; to preserve the setting and special character of historic towns; and to assist in urban regeneration, by encouraging the recycling of derelict and other urban land	Para 80
				As with previous Green Belt policy, inappropriate development is, by definition, harmful to the Green Belt and should not be approved except in very special circumstances.	Para 87
				When considering any planning application, local planning authorities should ensure that substantial weight is given to any harm to the Green Belt. 'Very special circumstances' will not exist unless the potential harm to the Green Belt by reason of inappropriateness, and any other harm, is clearly outweighed by other considerations.	Para 88
				A local planning authority should regard the construction of new buildings as inappropriate in Green Belt. Exceptions to this are: <ul style="list-style-type: none"> buildings for agriculture and forestry; provision of appropriate facilities for outdoor sport, outdoor recreation and for cemeteries, as long as it preserves the openness of the Green Belt and does not conflict with the purposes of including land within it; the extension or alteration of a building provided that it does not result in disproportionate additions over and above the size of the original building; the replacement of a building, provided the new building is in the same use and not 	Para 89

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				<p>materially larger than the one it replaces;</p> <ul style="list-style-type: none"> limited infilling in villages, and limited affordable housing for local community needs under policies set out in the Local Plan; or limited infilling or the partial or complete redevelopment of previously developed sites (brownfield land), whether redundant or in continuing use (excluding temporary buildings), which would not have a greater impact on the openness of the Green Belt and the purpose of including land within it than the existing development. 	
				<p>Certain other forms of development are also not inappropriate in Green Belt provided they preserve the openness of the Green Belt and do not conflict with the purposes of including land in Green Belt. These are:</p> <ul style="list-style-type: none"> mineral extraction; engineering operations; local transport infrastructure which can demonstrate a requirement for a Green Belt location; the re-use of buildings provided that the buildings are of permanent and substantial construction; and development brought forward under a Community Right to Build Order 	Para 90
				<p>When located in the Green Belt, elements of many renewable energy projects will comprise inappropriate development. In such cases developers will need to demonstrate very special circumstances if projects are to proceed. Such very special circumstances may include the wider environmental benefits associated with increased production of energy from renewable sources.</p>	Para 91
				<p>Community Forests offer valuable opportunities for improving the environment around towns, by upgrading the landscape and providing for recreation and wildlife. An approved Community Forest plan may be a material consideration in preparing development plans and in deciding planning applications. Any development proposals within Community Forests in the Green Belt should be subject to the normal policies controlling development in Green Belts.</p>	Para 92
	Local	Green Belt	BathNES Local Plan	<p>Within the Green Belt, as shown on the Proposals Map, permission will not be given, except in very special circumstances, for development other than... iv) Park and Ride development in accordance with Policy GB.1A.</p>	Policy GB.1
				<p>Park and Ride development in the Green Belt will only be permitted where: (a) there are not any more suitable or more sustainable alternative sites; (b) the scheme will not seriously compromise the purposes of the Green Belt; (c) the proposal is contained within the Local Transport Plan and based on a thorough assessment of travel impacts; and (d) any new or re-used buildings are included only where they are essential facilities associated with the operation of the park and ride scheme</p>	Policy GB.1A
				<p>Permission will not be granted for development within or visible from the Green Belt which would be visually detrimental to the Green Belt by reason of its siting, design or materials used for its construction.</p>	Policy GB.2
	Western Wiltshire Green Belt	North Wiltshire Local Plan	<p>In the Green Belt, outside the village of Box, approval will not be given, for the construction of new buildings, other than:</p>	Policy NEI	

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				<ul style="list-style-type: none"> i) For agriculture and forestry; ii) Essential facilities for outdoor sport and recreation, for cemeteries and for other uses of land which preserve the openness of the Green Belt and do not conflict with the purpose of including land within that designation; iii) The limited extension, alteration or replacement of existing dwellings or existing employment buildings. <p>The re-use of buildings will be approved providing:</p> <ul style="list-style-type: none"> (a) it will not have a materially greater impact than the present use upon the openness of the Green Belt and the purposes of including land within that designation; (b) strict control is exercised over the extension of re-used buildings, and over any associated uses of land surrounding the building which might conflict with the openness of the Green Belt and the purpose of including land within that designation; and (c) the buildings are of permanent and substantial construction, and are capable of conversion without major or complete reconstruction. <p>Approval will not be given for development, which would not preserve the openness of the Green Belt, nor would conflict with the purpose of including land within that designation.</p>	
	England	Local Green Space	NPPF	<p>For decision taking this means...where the development plan is absent, silent or relevant policies are out-of-date, granting permission unless...specific policies in this Framework [For example, those policies relating to... land designated as Local Green Space...] indicate development should be restricted.</p> <p>By designating land as Local Green Space local communities will be able to rule out new development other than in very special circumstances.</p> <p>Local policy for managing development within a Local Green Space should be consistent with policy for Green Belts.</p>	<p>Para 14</p> <p>Para 76</p> <p>Para 78</p>
Biodiversity	International	Ramsar Sites	1971 Convention on Wetlands of International Importance	Article 3(1) of the Ramsar Convention requires the contracting parties [including the UK government] to 'formulate and implement their planning so as to promote the conservation of the wetlands included in the List, and, as far as possible, the wise use of wetlands in their territory'	Article 3 (1)
			ODPM Circular 06/2005 / Defra Circular 01/2005	Article 3(1) of the Ramsar Convention requires Contracting Parties to 'formulate and implement their planning so as to promote the conservation of the wetlands included in the List, and, as far as possible, the wise use of wetlands in their territory'.	p19 Para 53
			NPPF	the following wildlife sites should be given the same protection as European sites: —listed or proposed Ramsar sites	Para 118
	European	Special Protection Area (SPA)	EU Birds Directive 1979 as transposed into UK law through <i>Conservation of Habitats & Species Regulations 2010</i>	A competent authority, before deciding to...give permission for...a plan or project which <ul style="list-style-type: none"> a) is likely to have a significant effect on a European site ... (either alone or in combination with other plans or projects), and b) is not directly connected with or necessary to the management of the site, must make an appropriate assessment of the implications for that site in view of the site's conservation objectives	

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			NPPF	For decision taking this means...where the development plan is absent, silent or relevant policies are out-of-date, granting permission unless...specific policies in this Framework [For example, those policies relating to sites protected under the Birds and Habitats Directives (see paragraph 119)...] indicate development should be restricted.	Para 14	
				The presumption in favour of sustainable development (paragraph 14) does not apply where development requiring appropriate assessment under the Birds or Habitats Directives is being considered, planned or determined.	Para 119	
	European	Special Area of Conservation (SAC) and Candidate SACs (cSACs)	EU Habitats Directive 1992 as transposed into UK law through <i>Conservation of Habitats & Species Regulations 2010</i>	A competent authority, before deciding to...give permission for...a plan or project which a) is likely to have a significant effect on a European site ... (either alone or in combination with other plans or projects), and b) is not directly connected with or necessary to the management of the site, must make an appropriate assessment of the implications for that site in view of the site's conservation objectives		
				For decision taking this means...where the development plan is absent, silent or relevant policies are out-of-date, granting permission unless...specific policies in this Framework [For example, those policies relating to sites protected under the Birds and Habitats Directives (see paragraph 119)...] indicate development should be restricted.	Para 14	
				NPPF	The presumption in favour of sustainable development (paragraph 14) does not apply where development requiring appropriate assessment under the Birds or Habitats Directives is being considered, planned or determined.	Para 119
	England	National Nature Reserves (NNRs)	Wildlife & Countryside Act 1981	(1) In this Part, "nature reserve" means— (a) land managed solely for a conservation purpose, or (b) land managed not only for a conservation purpose but also for a recreational purpose, if the management of the land for the recreational purpose does not compromise its management for the conservation purpose. (2) Land is managed for a conservation purpose if it is managed for the purpose of— (a) providing, under suitable conditions and control, special opportunities for the study of, and research into, matters relating to the fauna and flora of Great Britain and the physical conditions in which they live, and for the study of geological and physiographical features of special interest in the area, or (b) preserving flora, fauna or geological or physiographical features of special interest in the area, or for both those purposes. (3) Land is managed for a recreational purpose if it is managed for the purpose of providing opportunities for the enjoyment of nature or for open-air recreation.	s15	
	England	Site of Special Scientific Interest (SSSI)	NPPF	When determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principles... proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits of the development, at this site,	Para 118	

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				clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest;	
			BathNES Local Plan	Development which would adversely affect SSSIs, either directly or indirectly, will not be permitted unless; i. there are imperative reasons of national importance for the development; and ii. any harm to the nature conservation value of the site is minimised; and iii. compensatory provision of at least equal nature conservation value is made.	Policy NE.8
	Local	Locally Important Species and their Habitats	BathNES Local Plan	Development which would adversely affect a species of importance to Bath & North East Somerset or the habitat of such species, directly or indirectly, will not be permitted unless: (i) the importance of the development and its need for that particular location is sufficient to override the local value of the species; and (ii) any harm to the species and their habitats is minimised; and (iii) compensatory provision of at least equivalent nature conservation value is made.	Policy NE.11
	England	Nature Improvement Areas	Defra press release, 27-02-2012, following Natural Environment White Paper	The option set out in NEWP for local authorities to recognise an NIA in their local plan is a continuation of current planning policy, not an extension of it. It is not the intention for NIAs to stifle sustainable development. It is a matter for local authorities to decide what weight they wish to give to NIAs in their local plans. 12 chosen from 76 bids	n/a
	England	Ancient Woodland and veteran trees	NPPF	planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss; and	Para 118
	Local	Sites of Nature Conservation Interest (SNCIs) / Local Nature Reserves (LNRs) / Regionally Important Geological & Geomorphological Sites (RIGS)	BathNES Local Plan	Development which would adversely affect, either directly or indirectly the nature conservation value of, Sites of Nature Conservation Importance, Local Nature Reserves or Regionally Important Geological and Geomorphological Sites, as shown on the Proposals Map, or any other sites of equivalent nature conservation value, will not be permitted unless: <ul style="list-style-type: none"> i. material factors are sufficient to override the local biological geological / geomorphological and community/amenity value of the site; and ii. any harm to the nature conservation value of the site is minimised; and iii. compensatory provision of at least equal nature conservation value is made. 	Policy NE.9
		Sites of Nature Conservation Interest (SNCIs) / Local Nature Reserves (LNRs) / Regionally Important Geological & Geomorphological Sites (RIGS)	North Wiltshire Local Plan	Development likely to have an adverse effect on a Wildlife Site (including Regionally Important Geological/Geomorphological Sites) or a Local Nature Reserve will not be permitted unless it can be clearly demonstrated that there are reasons for the proposal which outweigh the need to safeguard the substantive nature conservation and/or geological value of the site. Where development is permitted, the authority will impose conditions and/or seek to negotiate planning obligations to provide appropriate mitigation and compensatory measures.	NE7

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Community Infrastructure & Transport	England & Wales	Public Rights of Way	NPPF	Planning policies should protect and enhance public rights of way and access	Para 75
	Local	Protection of playing fields and recreational open space	BathNES Local Plan	Development involving the loss of all or any part of playing fields or other recreational open space, including those shown on the Proposals Map, or land last used for such purposes will not be permitted unless: i) there is no longer a demand or evidence of future need for the recreational use of the site and a deficiency would not be created in the short or long term by the development; or ii) the proposed development only affects land which is incapable of being used for recreation; or iii) suitable replacement facilities of at least equivalent quality, quantity and community benefit are provided in an easily accessible locations well served by a range of transport modes; or v) the proposed development is for an indoor or outdoor sports facility with at least equal benefit to the development of sport to outweigh the loss of the existing or former recreational use.	Policy SR.1A
	Local	National/Local Cycle Routes	BathNES Local Plan	Cycle routes shown on the Proposals Map which form part of the Bath & North East Somerset Strategic Cycling Network will be safeguarded against prejudicial development.	Policy T.7
Cultural Heritage & Built Environment	International (UNESCO)	World Heritage Sites	NPPF	For decision taking this means...where the development plan is absent, silent or relevant policies are out-of-date, granting permission unless...specific policies in this Framework [For example, those policies relating to.... designated heritage assets ...] indicate development should be restricted.	Para 14
				Substantial harm to or loss of designated heritage assets of the highest significance, notably ... World Heritage Sites, should be wholly exceptional.	Para 132
			BathNES Local Plan	Development which would harm the qualities which justified the inscription of Bath as a World Heritage Site or which would harm the setting of the World Heritage Site will not be permitted.	Policy BH.1
	England	Register of Parks and Gardens of Special Historic Interest	NPPF	For decision taking this means...where the development plan is absent, silent or relevant policies are out-of-date, granting permission unless...specific policies in this Framework [For example, those policies relating to.... designated heritage assets ...] indicate development should be restricted.	Para 14
				Substantial harm to or loss of designated heritage assets of the highest significance, notably ... grade I and II* registered parks and gardens ... should be wholly exceptional. Substantial harm to or loss of a grade II listed ... park or garden should be exceptional.	Para 132
			BathNES Local Plan	Development which adversely affects sites on English Heritage's Register of Historic Parks and Gardens or their settings will not be permitted.	Policy BH.9
	England (designated by LPA)	Conservation Areas	Planning (Listed Buildings and Conservation Areas) Act 1990	LPA's should pay special attention to the desirability of preservation or enhancement of the character and appearance of conservation areas	s72
NPPF			For decision taking this means...where the development plan is absent, silent or relevant policies are out-of-date, granting permission unless...specific policies in this Framework indicate development should be restricted [For example, those policies relating to.... designated heritage assets ...]	Para 14	

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			BathNES Local Plan	Development within or affecting a Conservation Area will only be permitted where it preserves or enhances the character or appearance of the area, in terms of size, scale, form, massing, position, suitability of external materials, design and detailing. Particular attention will be given to: i) the retention of buildings, groups of buildings, existing street patterns, historic grain, spaces, building lines and ground surfaces which contribute to the character or appearance of the Conservation Area; ii) the retention of architectural features which contribute to the character of the area, including boundary walls; iii) the impact of the proposed development on the townscape, roofscapes, massing and relative scale and importance of buildings in the area; iv) the relationship of buildings to open space and historic grain; v) the need to protect existing trees and landscape which contribute to the character or appearance of the Conservation Area; and vi) the removal of unsightly and inappropriate features that detract from the character or appearance of the Conservation Area. [see also Policies BH.7, BH.8]	Policy BH.6
England		Buildings of Special Architectural or Historic Interest (Listed Buildings)	Planning (Listed Buildings and Conservation Areas) Act 1990	When considering planning applications, LPAs should have special regard to the desirability of preserving the listed building or its setting or any features of special architectural or historic interest which it possesses	s66
			NPPF	For decision taking this means...where the development plan is absent, silent or relevant policies are out-of-date, granting permission unless...specific policies in this Framework [For example, those policies relating to.... designated heritage assets ...] indicate development should be restricted.	Para 14
				Substantial harm to or loss of designated heritage assets of the highest significance, notably ... grade I and II* listed buildings ... should be wholly exceptional. Substantial harm to or loss of a grade II listed building, park or garden should be exceptional	Para 132
			BathNES Local Plan	Development affecting a listed building or its setting will only be permitted where it would: i) preserve the building's special architectural or historic interest; ii) preserve any feature of special architectural or historic interest which the building may possess; iii) retain the historic form and structural integrity of the building; iv) respect the character of the building in terms of scale, style, design and materials; and v) not adversely affect the building's contribution to the local scene including its role as part of an architectural composition.	Policy BH.2
Local	Locally Important Buildings	BathNES Local Plan	Development which affects a building or structure on the list of Locally Important Buildings will only be permitted where: i) the architectural interest and integrity of the building is conserved or enhanced; ii) the contribution to its context, local interest or historical associations is not adversely affected.	Policy BH.5	
England	Scheduled Monuments & Ancient Monuments		NPPF	Substantial harm to or loss of designated heritage assets of the highest significance, notably scheduled monuments ... should be wholly exceptional	Para 132
			BathNES Local Plan	Development which would adversely affect Scheduled Ancient Monuments, or any other sites of national importance, and their settings and does not preserve such sites in situ will not be permitted.	Policy BH.11
England		Register of Historic Battlefields	NPPF	Substantial harm to or loss of designated heritage assets of the highest significance, notably ... protected battlefields ...should be wholly exceptional	Para 132

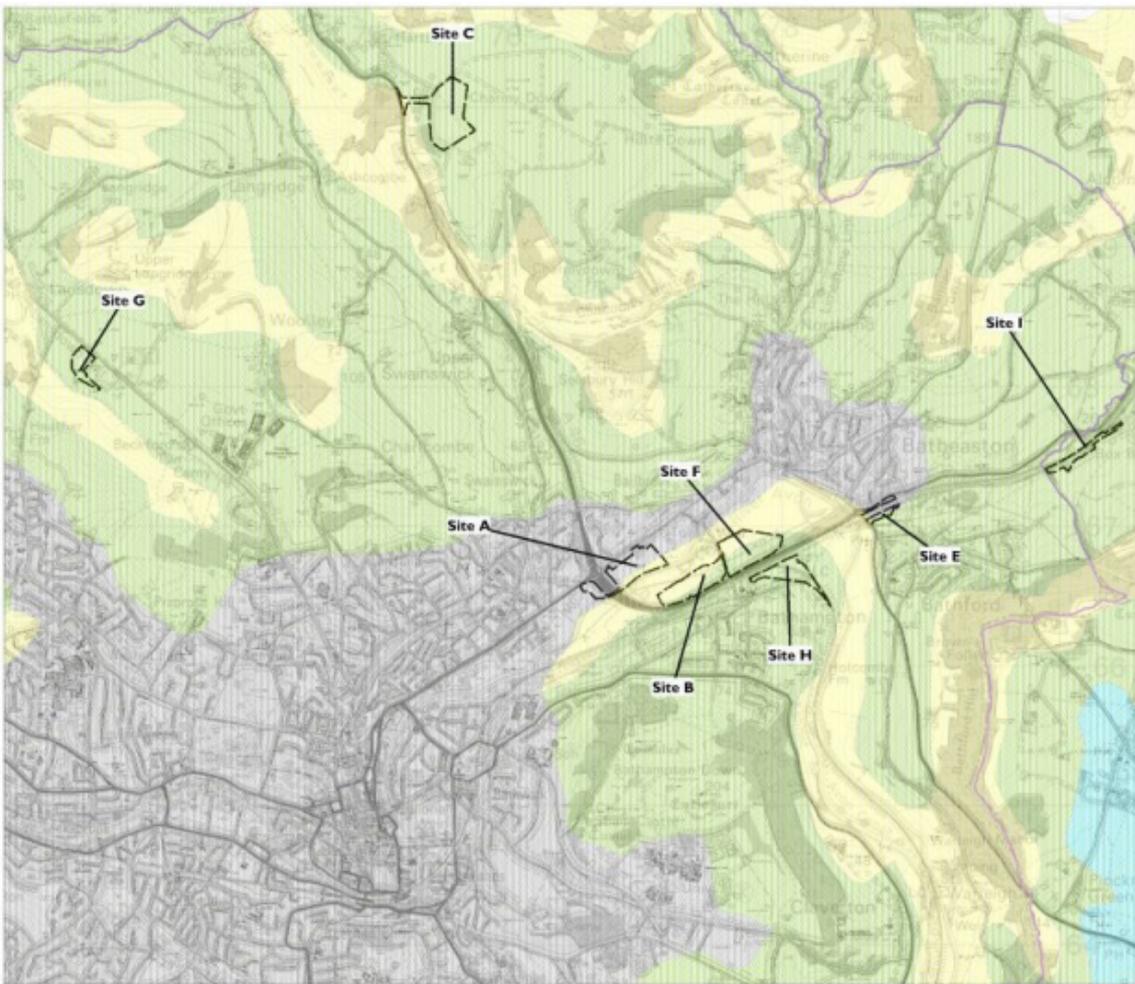
Theme	Designation Coverage	Site/ Designation/ Land	Designated by / Policies outlined in Relevant Document	Relevant part of text	Source
			BathNES Local Plan	Development affecting a Registered Historic Battlefield or its setting will only be permitted where: i) the historic character and appearance of the site is not harmed; and ii) the proposed development conserves and enhances the historic character and appearance of the site.	Policy BH.14
	Local	LA Historic Environment Record (HER) / Sites & Monuments Record (SMR)	BathNES Local Plan	Development which would harm important archaeological remains or their settings outside the scope of Policy BH.11 will not be permitted unless the adverse impact of the proposal on the remains can be mitigated.	Policy BH.12
Flooding	England	Flood Zones 2 & 3	NPPF	Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere... Local Plans should apply a sequential, risk-based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account of the impacts of climate change,	Para 100
			Technical Guidance to the National Planning Policy Framework	As set out in the [NPPF], inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. For these purposes: <ul style="list-style-type: none"> “areas at risk of flooding” means land within Flood Zones 2 and 3; or land within Flood Zone 1 which has critical drainage problems and which has been notified to the local planning authority by the Environment Agency; “flood risk” means risk from all sources of flooding - including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources. 	Para 2
Landscape	England & Wales	National Parks, Areas of Outstanding Natural Beauty etc	National Parks & Access to Countryside Act 1949 as amended	The provisions of this Part of this Act shall have effect for the purpose— (a) of conserving and enhancing the natural beauty, wildlife and cultural heritage of the areas specified in the next following subsection; and (b) of promoting opportunities for the understanding and enjoyment of the special qualities of those areas by the public.	s5(1)
			Countryside & Rights of Way Act 2000	In exercising or performing any functions in relation to, or so as to affect, land in an area of outstanding natural beauty, a relevant authority shall have regard to the purpose of conserving and enhancing the natural beauty of the area of outstanding natural beauty.	s85(1)
			NPPF	For decision-taking this means...where the development plan is absent, silent or relevant policies are out-of-date, granting permission unless...specific policies in this Framework indicate development should be restricted [For example, those policies relating to... land designated as...an Area of Outstanding Natural Beauty...or within a National Park (or the Broads Authority)]...	Para 14
				Great weight should be given to conserving landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to landscape and scenic beauty. The conservation of wildlife and cultural heritage are important considerations in all these areas, and should be given great weight in National Parks and the Broads.	Paras 115

Theme	Designation Coverage	Site/ Designation/ Land	Designated by / Policies outlined in Relevant Document	Relevant part of text	Source
				<p>Planning permission should be refused for major developments in these designated areas except in exceptional circumstances and where it can be demonstrated they are in the public interest. Consideration of such applications should include an assessment of:</p> <ul style="list-style-type: none"> • the need for the development, including in terms of any national considerations, and the impact of permitting it, or refusing it, upon the local economy; • the cost of, and scope for, developing elsewhere outside the designated area, or meeting the need for it in some other way; and • any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated. 	Para 116
		AONB	BathNES Local Plan	Development which adversely affects the natural beauty of the landscape of the designated Areas of Outstanding Natural Beauty will not be permitted. Major development within an AONB or outside it which would harm the designated area will be determined on the basis of the advice in PPS7. Minerals development within an AONB will only be permitted where it is in the national interest or meets a local requirement for traditional building materials.	Policy NE.2
			North Wiltshire Local Plan	<p>In Areas of Outstanding Natural Beauty (AONB), priority will be given to then conservation and enhancement of the natural beauty of the landscape. The environmental effects of all development will be a major consideration. Development will be restricted to:</p> <ul style="list-style-type: none"> i) The change of use of existing buildings; and/or ii) That which is appropriate to the economic and social well-being of the area; iii) That which is desirable for the understanding and enjoyment of its amenities; <p>And provided the proposal:</p> <ul style="list-style-type: none"> a) Conserves or enhances, the natural beauty of the landscape, including its open rural character, and any riverside or water features, wildlife sites, trees or woodland; b) Is sited and designed so as to minimise its impact on the natural beauty of the area and, where possible, is located close to and in association with existing buildings; and c) Uses appropriate building materials and landscaping. <p>Other proposals and major developments including of an industrial or commercial nature will not be permitted except in exceptional circumstances. These proposals shall be subject to the most rigorous examination and will be demonstrated to be in the public interest. Consideration of such applications will include an assessment of:</p> <ul style="list-style-type: none"> i) the need for the development, in terms of national considerations, and the impact of permitting it or refusing it upon the local economy; ii) the cost of and scope for developing elsewhere outside the area or meeting the need for it in some other way; iii) any detrimental effect on the environment and the landscape, and the extent to which that should be moderated. <p>Major developments that are permitted will be carried out to high environmental standards through the application of appropriate conditions.</p>	Policy NE4
	Local	Forest of Avon	BathNES Local Plan	Development in the Forest of Avon, as shown on the Proposals Map, will only be permitted where it: i. respects the existing and developing woodland setting; and ii. does not conflict with the objectives of the Forest Plan and has regard to its aims in the layout of development,	Policy NE.4

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				including landscaping.	
	Local	Landscape Areas	BathNES Local Plan	Development which does not either conserve or enhance the character and local distinctiveness of the landscape will not be permitted.	Policy NE.1
	Local	Landscape Character of the Countryside	North Wiltshire Local Plan	The landscape of North Wiltshire and its locally distinctive characteristics shall be conserved and enhanced, development will be permitted if it does not adversely affect the character of an area and features that contribute to local distinctiveness. Development shall take into account: <ul style="list-style-type: none"> i) The setting of, and relationship between, settlement and buildings and the landscape. ii) The pattern of woodland, trees, field boundaries, other vegetation and features. iii) The special qualities of watercourses and water bodies and their surroundings such as river valleys. iv) The topography of the area avoiding sensitive skylines, hills and not detracting from important views. The best and most versatile agricultural land shall be protected from non agricultural development.	Policy NE15
	England	Local Green Space	NPPF	For decision taking this means...where the development plan is absent, silent or relevant policies are out-of-date, granting permission unless...specific policies in this Framework [For example, those policies relating to... land designated as Local Green Space...] indicate development should be restricted.	Para 14
				By designating land as Local Green Space local communities will be able to rule out new development other than in very special circumstances.	Para 76
				Local policy for managing development within a Local Green Space should be consistent with policy for Green Belts.	Para 78
Pollution prevention	European	Air Quality Management Areas	NPPF	Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan	Para 124
	Local	Water Source Protection Area	BathNES Local Plan	Development within the groundwater source protection areas shown on the Proposals Map, or any other groundwater catchment area, will not be permitted where it has an adverse impact on the quality of groundwater resource in terms of pollution and derogation of the resource.	Policy NE.13
	Local	Bath Hot Springs Protection Area	BathNES Local Plan	Development within the Bath Hot Springs Protection Area, as shown on the Proposals Map, that has an adverse impact on the quality or yield of the Bath Hot Springs, will not be permitted.	Policy NE.13A

Table A2: Other relevant local policies without designations on Proposals Maps

Theme	Designation coverage	Site/ Designation/ Land	Designated by / Policies outlined in Relevant Document	Relevant part of text	Source
Biodiversity	Local	District's Tree & Woodland Resource	BathNES Local Plan	<p>Development will only be permitted where:</p> <ul style="list-style-type: none"> i) it does not have an adverse impact on trees and woodlands of wildlife, landscape, historic, amenity, productive or cultural value; and ii) it includes the appropriate retention and new planting of trees and woodlands; and iii) it does not have an adverse impact on a veteran tree; <p>In the case of an unavoidably adverse impact on trees and woodlands of wildlife, landscape, amenity, productive or cultural value, compensatory provision is made.</p>	Policy NE.4
Community and transport infrastructure		Railway land		<p>Development will not be permitted which would prejudice:</p> <ul style="list-style-type: none"> 1) the efficient functioning and acceptable development of the railway network; or 2) the use of former railway land shown on the Proposals Map for Sustainable Transport purposes. 	Policy T.9
Cultural Heritage & Built Environment		Archaeology in Bath		Development which adversely affects significant archaeological remains within Bath will not be permitted unless the preservation in situ of these remains can be achieved through a detailed design and construction scheme.	BH.13
Landscape		Visually Important Open Spaces		Development which adversely affects open spaces that make a contribution to the character of the settlement or locality will not be permitted.	BH.15



Legend

Bath & North East Somerset Boundary

Assessment Sites

Agricultural Land Classification

- Grade 7 - Urban
- Grade 2 - Very Good
- Grade 3 - Good / Moderate
- Grade 4 - Very Poor
- Grade 5 - Poor / Moderate
- Grade 6 - Very Poor
- Grade 1 - Excellent

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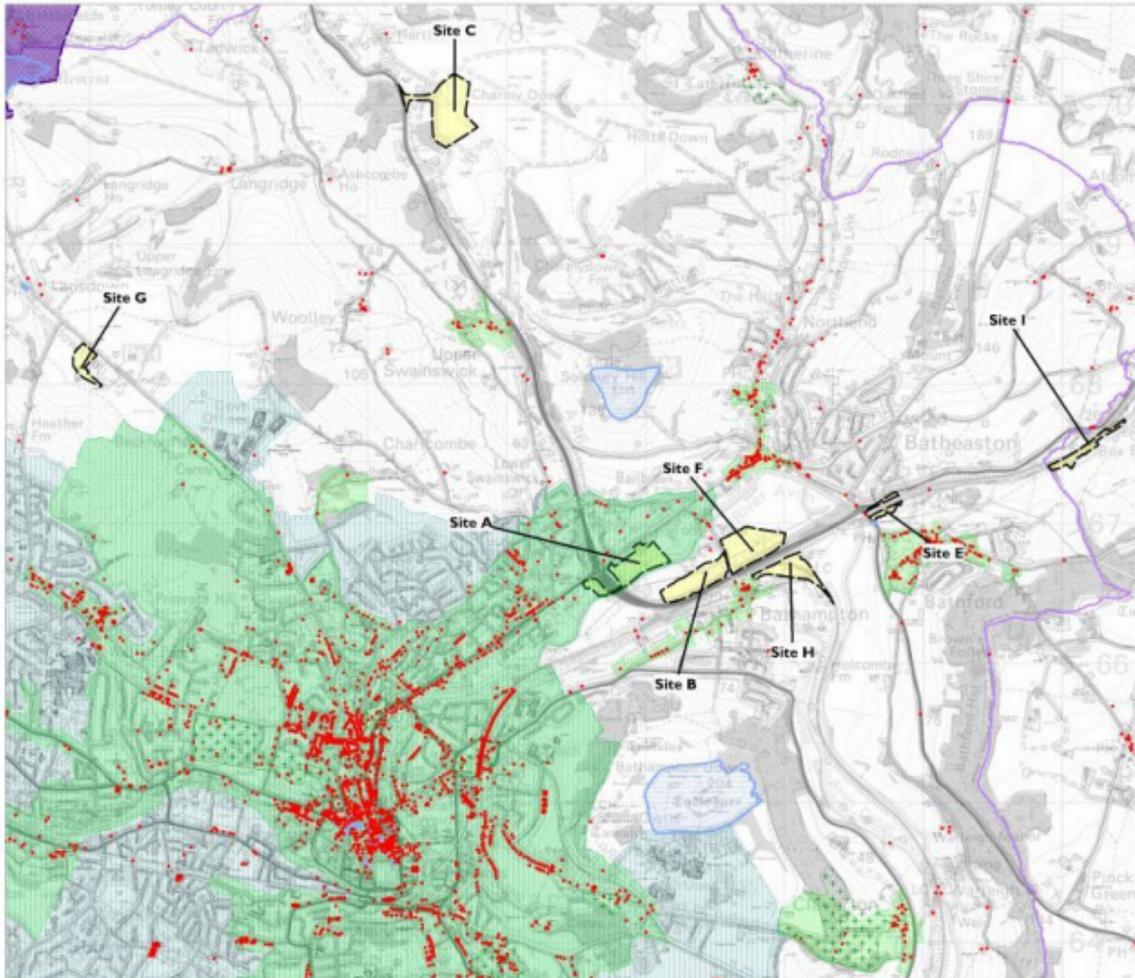
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 Scale: 1:25,000 @ A3
 Date: February 2013

Project: **Bath Eastern Park & Ride**

Figure 7 **Policy Designations: Agricultural Land**

Figure Number: **Figure A1**
 Revision: -



Legend

- World Heritage Site: Bath & North East Somerset Boundary
- Reg Park And Garden: Assessment Sites
- Battlefield: Listed Building
- Listed Building: Scheduled Monument
- Scheduled Monument

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Project: **Bath Eastern Park & Ride**

Figure 1: **Policy Designations: Cultural Heritage / Built Environment**

Figure Number: **Figure A4**

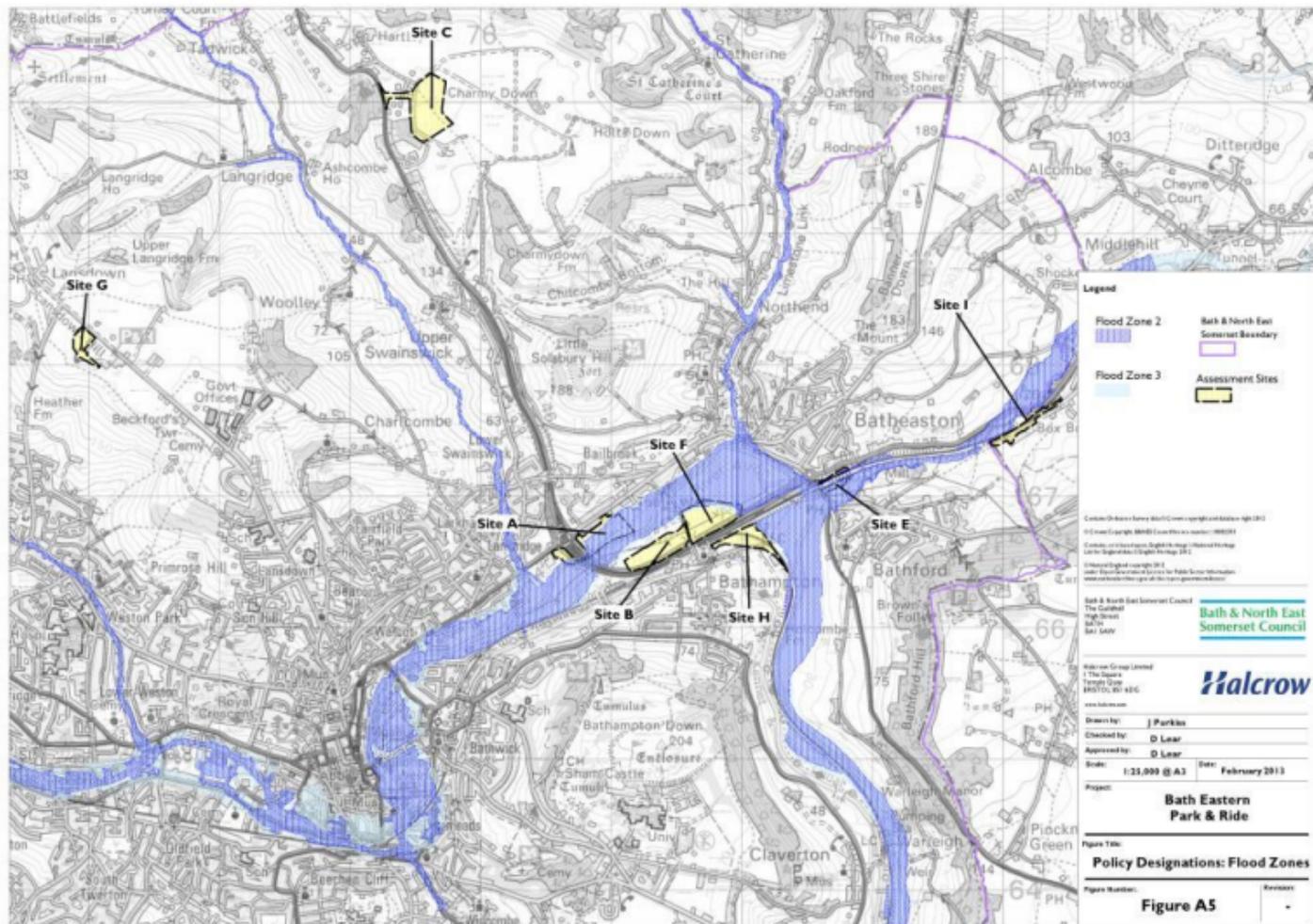
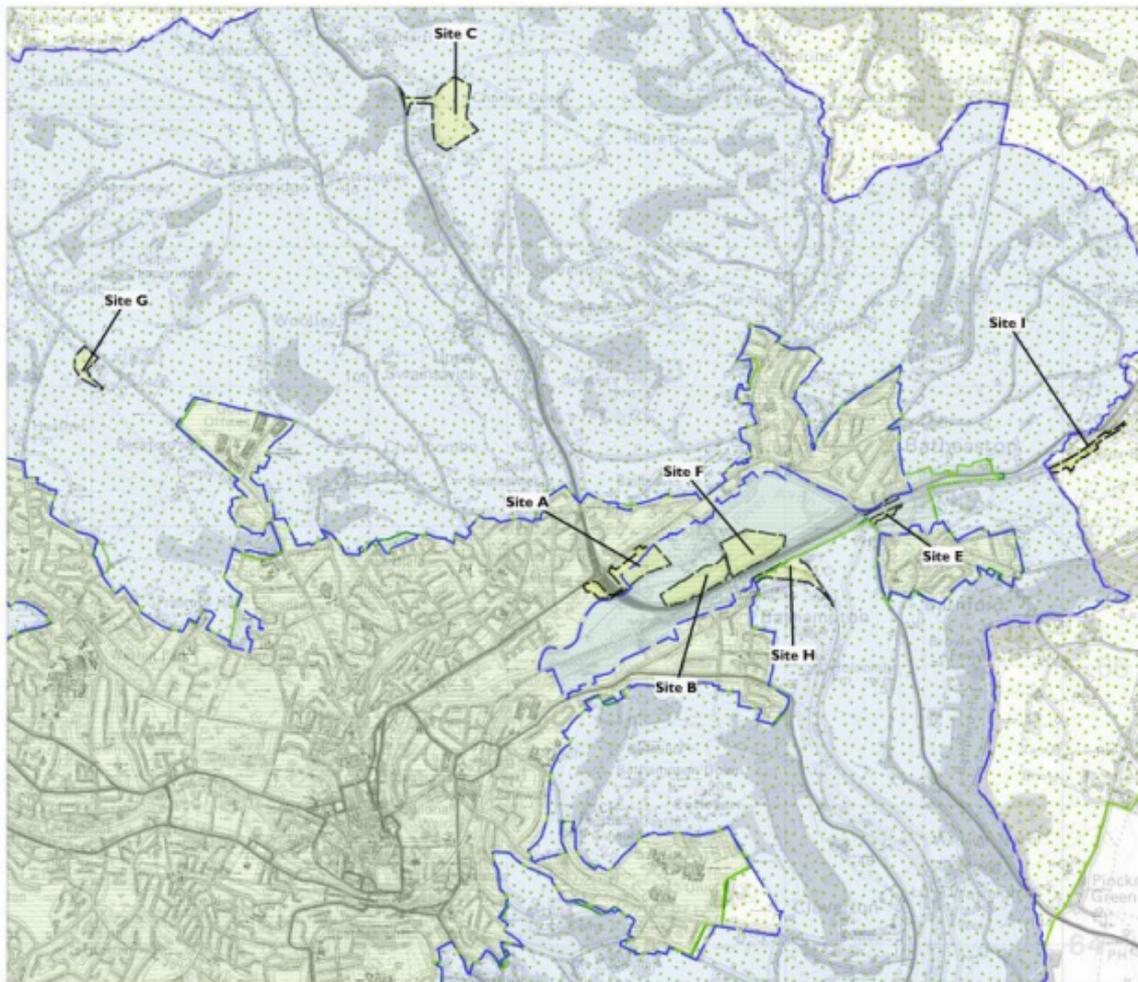


Figure A5



Legend

- Assessment Sites
- Bath & North East Sensorat Boundary
- BATHNES Green Belt
- Cotswolds AONB
- Forest of Avon

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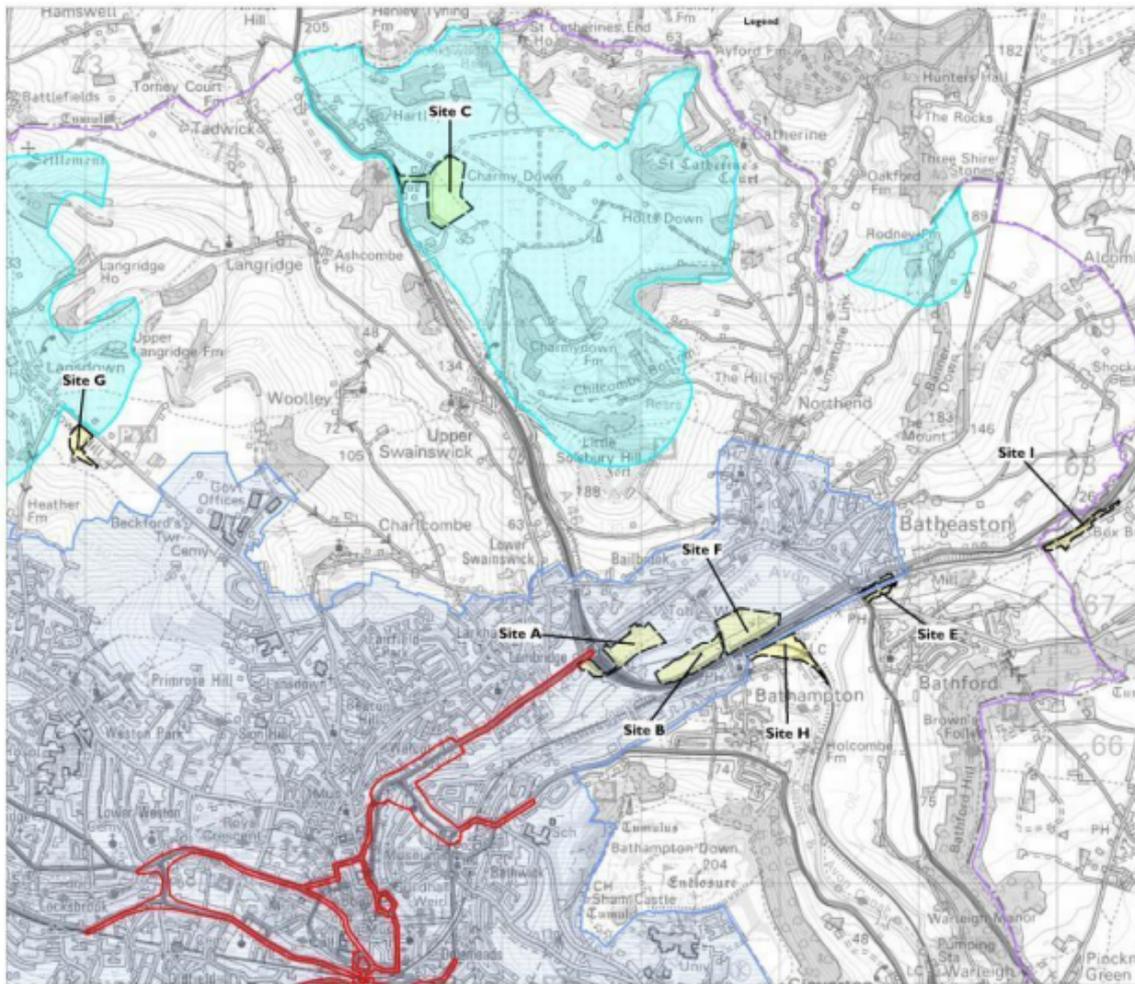
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Project: **Bath Eastern Park & Ride**

Figure Title: **Policy Designations: Landscape & Green Belt**

Figure Number: **Figure A6**



- Legend**
- Bath & North East Somerset Boundary
 - Assessment Sites
 - Bath Hot Springs Protection Area
 - Water Source Protection Area
 - Air Quality Management Area

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Project: **Bath Eastern Park & Ride**

Figure Title: **Policy Designations: Pollution Prevention**

Figure Number: **Figure A7**

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Petts Hill Underbridge Reconstruction

Customer: Network Rail

Petts Hill railway bridge carries the Chiltern Line over the road on the boundary between Harrow and Ealing, immediately south of the junction of the A312 (Northolt Road) and A4090 (Alexandra Avenue). It was a 'bottleneck' for all traffic and had been identified as a source of delay to buses because of the restricted width of the carriageway under the bridge.

Birse Rail was appointed to replace the existing structure in order to accommodate a four lane carriageway with footways and cycleways on both sides.

Works included the installation of four 3.6m overall diameter caisson-constructed reinforced concrete piles. The piles, which were approximately 22m deep, carried the transverse precast reinforced concrete crosshead beams and provided direct support to the bridge superstructure. The bridge abutment walls and wing walls were formed by contiguous bored piles which provided earth retention and resistance to train surcharge loading.

Demolition of the existing structure and installation of the new bridge deck took place during a 60 hour possession over Christmas 2008.

Innovation

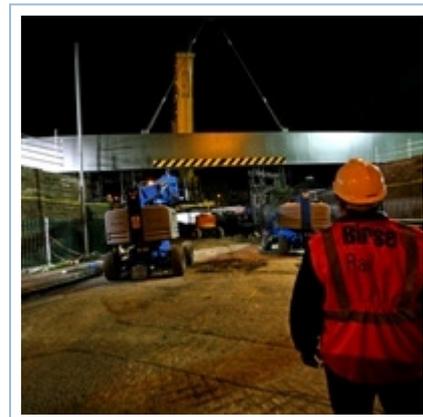
The original design for the works to Petts Hill railway bridge was based on using four large diameter bored piles installed during possession to support the new bridge deck. The use of piling rigs to install the piles would necessitate possession access requiring additional cost and programme time to complete.

Birse Rail's alternative solution involved replacing the existing bored pile solution with four 3.6m diameter Caisson piles which allowed the works to be undertaken in normal working hours.

The piles were constructed using low headroom equipment and were positioned such that a fenced 'green zone' could be established adjacent to the running lines.

The benefit of this approach was a significant reduction in the number of possessions required to construct the caissons. Furthermore, during the tender process Birse Rail was able to develop the alternative solution to AIP status and offer this to the client. This approach led to a reduced design programme for Birse Rail's alternative solution.

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Vehicular under-bridge, M1 motorway, J15A,

Northamptonshire, England

45m long, 14m wide, 8.5m high



The improvement of Junction 15A on the M1 motorway was a requirement of the planning consent for the Swan Valley Industrial area. The existing junction consists of a two lane underpass beneath the motorway, with roundabouts on each side servicing the M1 slip roads. The capacity of the junction was to be increased by providing a second underpass and remodelling the roundabouts.

In order to minimise disruption to the 112,000 vehicles which daily use the motorway the new underpass was tunnelled under the M1 using the 'Jacked Box Tunnel' technique rather than by conventional 'cut-and-cover' methods that would have involved diversions, lane closures and contra-flow systems. The under-bridge was to be installed at a minimum of 1.5m below the motorway surface.

The ground conditions consisted of stiff clay and glacial deposits with clay fill and pulverised fuel ash in the motorway embankments. The water table was below the box.

A three level concrete cellular shield with steel cutting edges was used. Face excavation in the upper cells was carried out by miners and in the middle and lower cells by machine excavators. The motorway was monitored for movement throughout the construction and installation periods.

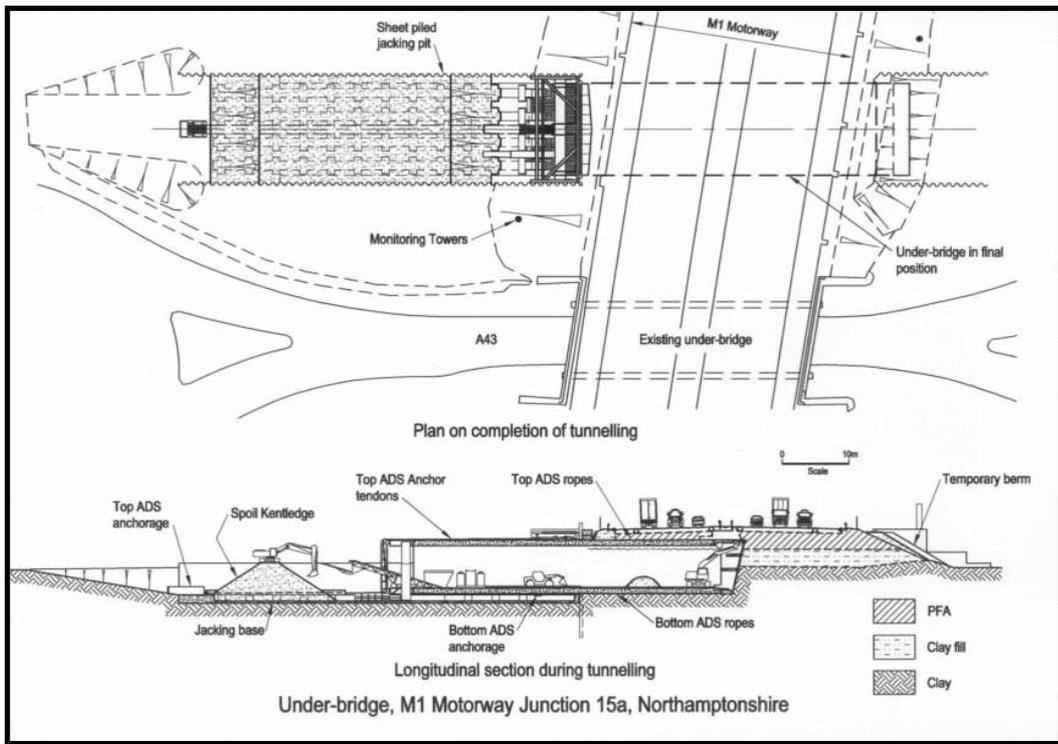


The patented 'anti-drag system' (ADS) was used at the top and bottom of the box and anchored to the jacking base. Due to geometric constraints the top ADS was anchored at each side to the sheet pile side walls of the jacking pit, and at the centre by a series of tendons that were passed around pulleys mounted on the back of the box and then fixed to anchorages at the rear of the jacking base. Jacks were used at the tendon anchorages to compensate for stretch in the tendons as the load in the tendons progressively increased to around

350t.

The tunnel was installed to within 30mm of level and 60mm of line and required a maximum jacking thrust of 4,500t. The jacking operation took three weeks following headwall entry and was successfully completed in December 2002. Surface movements were well within specified tolerances and motorway traffic continued uninterrupted throughout.

The first application of the technology beneath a live motorway proved to be highly successful.



Client: Highways Agency

System design: John Ropkins Ltd

Contractor: Edmund Nuttall Ltd

Scope of work: Design and construct

Contract period: 17 months

Completion date: April 2003

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Technical note

Project Bath Eastern Park and Ride Option Sites
Subject Site H: Bathampton Junction - Bridge Works
Author John Sreeves
Date 22 January 2013
Ref 204269.AI.00.09/App C

1 Introduction

In order to ease traffic congestion in Bath, a possible Park and Ride (P&R) scheme is proposed at Bathampton junction. This P&R option would be rail based making use of train services that currently serve the route to or from Trowbridge and Westbury. A new railway station with parking facilities would be required; this station being alongside and east of the location of the previous station that closed to passengers in 1966.

The following entries were extracted from The Bristol Railway Archive; http://bristol-rail.co.uk/wiki/Bathampton_Station_and_Junction, and gives the history of the Bathampton station site:

- *Opened on 2nd February 1857;*
- *Closed to goods services on 10th June 1963 and passenger services on 3rd October 1966;*
- *Both Bathampton and Bathampton West signal boxes were replaced by a single box on 21st September 1956; and*
- *There were sidings to a timber mill on the south side of the station which came into use on 10th October 1922.*

Bathampton forms a junction between the London to Bristol main line and the Trowbridge line. Historical maps show that the original station had platforms flanking the main line west of the junction divergence point, thus trains on both the mainline and the branch could serve the station.

The A4 Batheaston bypass opened in 1996 and this runs parallel to and immediately north of the London to Bristol railway line for a distance of 1.5km. Direct vehicular access from the

Prepared by	John Sreeves	Date	22/01/13
Checked by	David Lear	Date	11/02/13
Approved by	David Lear	Date	11/02/13

P&R to the bypass is proposed. This Technical Note considers the engineering issues and potential costs associated with bridging under the Great Western Main Line (GWML); and also under the A4 to create a new 'diamond' interchange.

2 Bridge Engineering Works

2.1 Proposed Concept

Road access is envisaged from the A4 Batheaston bypass to the P&R via a grade separated junction on the A4 and a bridge passing under the GWML. At this point, 375 metres east of Mill Lane over bridge, the railway and the A4 road are approximately at the same level, and the road is at the summit of a crest curve. This gives maximum headroom availability underneath the road. On/off slip roads in both directions flanking the dual carriageway descend at gradients of about 5%.

2.2 Construction Methodologies

The two bridges under the A4 and railway line need to provide a minimum internal width of 10.3m based upon two 3.65m lanes and 1.5m wide verges (TD 27/05). There will be a need for wing-walls in the form of retaining walls at either end splayed back to satisfy sighting distance criteria. The minimum headroom required is 5.3m to be provided over the full width of the carriageway and verges, to which must be added an allowance for cross fall and longitudinal drainage gradient. The thickness of the roof, walls and floor for a reinforced concrete box would be about 0.85m resulting in external box dimensions in the order of 12.0m wide and 7.5m high. On top of the box must be added 0.468m for track and 0.35m for ballast and waterproofing, thus total construction depth would be a minimum of 1.668m from soffit to rail level.

Possible forms of construction include:

- Jacked box advanced through the embankments under live traffic (example: M1 J15a). **Refer to Annex A;**
- Jacked box constructed off line for positioning during an extended possession (example: Owen St, Tipton, <http://www.halcrow.com/Our-projects/Project-details/Owen-Street-Relief-Road-England>);
- Portal structure constructed off line and slid into place on guides pre-placed within small tunnels within the base of the embankment; the slide taking place during an extended possession (example: Chippenham A350 bypass http://www.hochtief-construction.co.uk/bridges_holywell.shtml);
- Railway Bridge Only: A conventional half through steel bridge superstructure on transversely spanning crossbeams supported by large diameter piles or caissons at each corner. The piles are bored outside the railway clearance so do not interfere with operations. The bridge is lifted in by crane during a short possession (example Petts Hill <http://www.birserail.co.uk/Case-Study/Petts-Hill-Underbridge-Reconstruction>). **Refer to Annex B**
- Road Bridge Only: in-situ concrete construction with traffic diverted along the slip roads that would be constructed in advance.

A major consideration is avoidance or minimisation of disruption to railway operations. Possession planning often requires a three year lead in time and 'extended possessions' up to four days or more are typically only available at Christmas and Easter. The box jack under the M1 motorway at junction 15a was accomplished without any interruption of traffic; in this case the top surface of the box was 1.5m below the highway running surface. Such an approach would be preferred if acceptable to Network Rail albeit a temporary rail speed restriction would be necessary for a period of about three weeks.

At the proposed bridge location, the A4 road is in a cutting about 3m to 4m deep as shown in the photo below, looking eastwards:



Photo 3.1 View east along the Bathampton bypass at proposed under-bridge location

The raised earth profile currently occupying the space between the road/railway and on the north side of the road would have to be fully removed and a cutting excavated in its place over a distance of some 400 metres in order to accommodate the slip roads on descending gradients. The depth of these cuttings would need to reach about 7m below existing road level to gain sufficient headroom for turning vehicles to pass under the road and railway bridges, to which must be added a further volume of excavation to represent the height of the ground above existing road level at the site. Subject to soil investigation and slope stability considerations, a 1 in 2 side slope may be expected, requiring a top cutting width of around 37 metres at the level of the A4 road. This width would fully occupy the space between the road and the railway, suggesting the need for retaining walls to ensure slope stability at the toe of both of the road and the railway embankments.

Drawing No 204269-001 in **Annex C** shows a General Arrangement of the bridge and allied slip-road works with possible bridge construction forms indicated.

2.3 **Construction Access**

The triangle of land proposed for the area of the P&R car park is land-locked with the railway on two sides and the River Avon on the third side. The only means of access at present is via the level crossing to Bathampton Farm, and this is at the end of the single track no-through Tynning Road. The former accommodation bridge under the railway next to Bathampton Farm was filled in when Batheaston Bypass was built.

The level crossing has user worked gates with miniature lights to indicate approach of trains. The road approach to the level crossing from the west is on the inside of the railway curve with reduced sighting distances of and from trains. Despite the use of gates and lights, use by frequent construction traffic would increase the risk of a collision between road and rail vehicles. Tynning Road itself passes a primary school and can only be reached via the toll bridge to the north (4 ton weight limit) or a humped canal bridge to the south (4 ton axle limit shown on a heritage sign). Both of these bridges are historic and Grade 2 listed.

Use of Tynning Road and the level crossing for large volumes of construction traffic and materials would be impractical and unacceptable. Consequently all construction activities for both P&R bridges under the A4 and railway would have to be carried out from the north of the railway. Furthermore, since the space between the A4 and the railway would need to be excavated for the junction slip roads, it follows that the construction compound can only be north of the road.

Any off line construction of a new railway bridge (e.g. jacked box or portal) will need to be as close as possible to its final position in order to be viable. Therefore such construction would need to be immediately south of the railway; subject to access constraints discussed above being overcome, or north of the railway in the narrow strip of land between the railway and the road. For in-situ railway bridge construction similar to Petts Hill, the same proximity requirements would apply for crane positioning.

To obtain sufficient working space and a site compound in the area between the railway and the road; the area would need enlarging by temporarily narrowing the A4 dual carriageway to single lanes in each direction and diverting to the north. The northern extremity of the road diversion would ideally be maintained within the future highway footprint to minimise encroachment onto the flood plain further north. Working space thus obtained would be sufficient for construction for both the railway bridge the road bridge. Depending upon the limitations of the available space that could be obtained by this method; construction of the two bridges is likely to be consecutive as opposed to concurrent. As such; a construction period of up to 18 months would be needed, during which the temporary traffic diversion with speed restriction would need to be in force on the A4.

The option of having the site compound and working area wholly to the north of the A4 is unlikely to be feasible since any off-line railway bridge construction would be more remote from its final position. The temporary working area required would be likely to extend beyond the future highway boundary into the flood plain to the north, with greater risk to the project, environmental impact and the need for remediation measures.

3 Other Structural Works and Issues

3.1 The Grange and Mallard Cottage

There will be a need for a retaining wall at the back of the gardens of The Grange and Mallard Cottage to support the foot of the cutting which needs to be widened to accommodate the new track alignment. There used to be an accommodation bridge crossing over the railway in this area; probably demolished as part of the Batheaston bypass works. The presence of foundations and old abutments should be expected in the area just north of The Grange, and the need for removal of these obstructions should be expected. The likely extent of this retaining structure is shown on Drawing 204269.001 (Annex C).

3.2 Multi-Storey Car Park

The area earmarked for the car park is on rising land between the two railway lines as shown on the aerial Photo 3.2 below.



Photo 3.2 <http://bristol-rail.co.uk/wiki/File:Bathamptonjunction6.jpg>

Substantial volumes of excavation will be needed to create a three storey car park, and the basement retaining walls will need to be sufficiently deeply founded to secure the railway embankment against slope instability. The lowest level of the car park is likely to be affected by extreme flood events, as the Environment Agency flood map envelopes the whole of Bathampton Farm (just off the right of the picture above). To minimise disposal costs, all of the excavated material could be reused on site to create a flood bund to the east of the site; which would offer an environmental screen as well. However, this will impact on land within Flood Zone 3 (High Risk) and, as such, flood compensation works may be a requirement.

The presence of a Pleistocene-aged rock outcrop in the nearby Hampton Rocks Cutting SSSI gives an indication of what may lie beneath the surface, subject to a fully detailed ground investigation.

3.3 Mill Lane Bridge

Mill Lane Bridge is a Grade 2 listed structure (ref. no. 1320554) designed by I K Brunel and built in 1840. It has three arches; currently as shown in Photo 3.3 below; but only the larger central span is in use accommodating two lines of railway. The northern arch has adequate space for a single track of railway to be reinstated underneath.



Photo 3.3 Mill Lane bridge west elevation photographed from George Inn PH car park

Historical maps between 1903 and 1970 show a loop line passing underneath the northern arch; this line had been removed by 1989.

There is no evidence that a railway track was ever laid through the southern arch but as the bridge appears to be symmetrical the four-track scheme suggested by Dorian Baker should be possible. It is assumed that sufficient clearance for overhead electrification wires would be obtained by track lowering if it is needed, in deference to the Grade 2 listed status of this bridge.

4 Third party interfaces

Parts of the works outside the foot print of the former station and goods yard would require purchase of adjacent land which affects one residential property, an industrial area and an SSSI. The level crossing which is currently the only means of access to Bathampton Farm would be closed as part of the works requiring an alternative route via the P&R car park area. Realignment of tracks towards the west end of the station will bring the railway closer to the rear of properties in Church Close, namely The Grange and Mallard Cottage. In addition to retaining wall works, screening and other mitigation measures may be needed to reduce detrimental affect on these residences.

5 Procedures

In addition to planning consents granted by the local planning authority (B&NES), a Transport & Works Act Order is likely to be needed prior to the construction and operation of the new railway alignment and its station. A level crossing order will be required for stopping up the level crossing that provides access to Bathampton Farm; and further orders will be required for the diversion of the public footpath right of way that currently uses this route. Other consents will be needed in relation to the SSSI and construction on or near the flood plain.

Any objections will have to be dealt with; possibly through a Public Inquiry, leading to uncertain outcomes in terms of decision, cost and programme. Land acquisition may require compulsory purchase powers.

6 Estimated Cost of Bridge/Interchange Construction

The cost of construction of a bridge under the A4, a bridge under the railway, earthworks, retaining walls, slip roads and for maintaining a road diversion is estimated to be in the order of **£10-12M**. This is based upon a construction working area being established between the road and the railway as described earlier. This estimate does not include for railway costs such as possessions, removal/reinstatement of track, protection of signalling cables or monitoring of settlement during adjacent excavation and retaining wall works.

7 Conclusions and recommendations

If this site is to be taken forward a number of issues need to be addressed and investigated more fully, mostly on grounds of practicability. This will be needed to provide a more robust estimate of out-turn costs although these are likely to be considerable. The main issues identified; in addition to any rail engineering ones identified separately, are as follows:

- Optimum means to place bridge under live railway;
- Temporary site access;
- Reinstatement of tracks under side arches of Mill Lane Bridge;
- Impact on SSSI;
- Possession planning;
- Land purchase;
- Impact on residential properties;
- Availability of specialist railway resources; and
- Programme relating to time needed for consents, Orders, land acquisition and compulsory purchase powers.

Bath Eastern Park and Ride Site Options

Bathampton Parkway

Review of Dorian Baker report dated 6th
February 2012

Revision 01

P. Harper
G. Ockenden
G. Pollard

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1 Executive Summary

Halcrow have been requested by Bath and North East Somerset Council to undertake a high level review of a proposal for a new Bath Eastern Park and Ride site at Bathampton Junction, as included in a report dated 6th February 2012 produced by Mr Dorian Baker.

Due to cost limitations, our review looks at the engineering, operational and cost issues associated with the report at a very high level.

To keep our review focused we have restricted our comments to the original proposal for a park and ride scheme and avoided commenting on any of Network Rail's long term plans and strategies in the area.

In summary;

- There are some considerable engineering technical problems to be addressed.
- There are considerable problems with the operations of layout as proposed.
- The engineering costs are very expensive.
- In addition to the above, there are considerable issues to be addressed regarding land take, road layout operations, housing blight, business relocation and compensation costs.
- It is highly unlikely that any funding would come from the railway companies.
- This scheme needs to be considered carefully against the various bus park and ride options before any further work is undertaken.

2 Introduction

Halcrow have been requested by Bath and North East Somerset Council to undertake a high level review of a proposal for a new Bath Eastern Park and Ride site at Bathampton Junction, as included in a report dated 6th February 2012 produced by Mr Dorian Baker.

Our review looks at the engineering, operational and cost issues associated with the report.

It must be borne in mind that due to cost limitations our review has been undertaken with certain restrictions as follows:

- It has not been possible to visit the site
- We have no accurate survey or access to existing as built drawings/plans - we have had to rely on Mr Baker's drawings (pdfs not to scale) and aerial photographs.
- It has not been possible to liaise with Network Rail to ascertain their overall strategy / plans for this area.
- It has not been possible to look into a possession strategy except as a very high level assessment of likelihood.

3 General Overview of Report

3.1 General Approach

The general approach in Mr Baker's report raises the following issues:

- To maximise the amount of land available for the car park and to provide a platform that is mostly on the straight it is proposed to move the tracks including the mainline junction to the west of their current position.
- The case for moving the junction is then further justified by suggesting weaknesses in the existing layout that could be resolved by his proposed new alternative one which ties in with his platform proposal.
- Nevertheless another more complex layout is proposed over and above the original option.
- Other issues then dealt with include regional route and electrification issues. However, these are not directly relevant to this scheme and have no impact on the viability of the track layout proposals in respect of their ability to serve the park and ride facility or the local Bathampton area..
- To keep our review focused we have restricted our comments to the original proposal for a park and ride scheme and avoided commenting on any of Network Rail's long term plans and strategies in the area.

3.2 Permanent Way

Whilst the report demonstrates some significant engineering knowledge, (e.g. the comments on concrete strength on page 15 the assumptions regarding

permanent way (track) engineering appear to be based on a more limited understanding –specific issues in this respect are made in section 4.

There are two major drawbacks to the scheme from a P Way point of view. From analysis of the drawing provided, the radii of the proposed curve appears to be somewhere in the region of approximately 390m radius. In addition, from information extracted from the railway industry Five Mile Line Diagrams the new platform would be located on land almost immediately adjacent to the track on an existing < 1 in 330 gradient. This is in contravention of the track design handbook NR/L2/TRK 2049, which states:

“Station platforms shall not be located on horizontal curves with radii less than 1000m”; and

“Wherever possible, platforms shall be located with an average gradient not steeper than 1 in 500. It is permissible for platforms to be located on track with average gradients steeper than 1 in 500 provided trains are not planned to terminate or reverse at the platform”

It is worth noting that the length of platform appears to over-cater for the use of two car units suggested in the document. The platforms appear to be much longer than required. However, this may not be a problem as there are a number of regional and inter-regional services in the area.

It is possible that detailed design may be able to improve on the existing situation and/or a dispensation may be obtained, but it is by no means certain. This one aspect alone may prevent the approval of the scheme.

3.3 Signalling

The report produced by Mr Baker contains little if any reference to either the existing Signalling arrangements in the Bathampton and Bath Spa areas, or what new equipment would be necessary to accommodate his suggested park and ride service.

The Signalling alterations required by his report can be sub-divided into three geographical areas, plus their controlling signal box. All three are currently controlled from Bristol Power Box, via a conventional Entrance / Exit (NX) panel and free wired interlockings to E10K standards. As discussed below, all signalling equipment in the area covered by this report is due to be replaced as part of the Great Western Mainline Electrification project, (due for completion in 2019).

- 1) Great Western Up/Down Mainlines in the Bathampton Junction area &
- 2) Up / Down Trowbridge lines in the Bathampton Junction area.

The report states that “there is a once in a generation opportunity to amend the layout at Bathampton, as part of the work associated with the Great Western Main Line Electrification project”. Whilst this is correct, in that the Signalling equipment will be entirely replaced by this project, Mr

Bakers report appears to presume that the substantial changes to track, signalling and electrification which he recommends at Bathampton Junction would be completed and funded as part of this far larger project. Presuming that Network Rail is willing to incorporate into Great Western Electrification the suggested substantial alterations to the junction is a major assumption, the funding of it even more so.

Comparing the new and old layouts simply by numbers of switches and crossings does not address the additional and possibly excessive complexity of the new layout, for signalling purposes. The addition of the central bi-directional loop appears to add little functionality compared to the existing layout and it is unlikely it would in practice be used for either of the “advantages” quoted by Mr Baker. (Train preparation and passing of Freight trains). Constraints on signal overlaps forced by the revised junction layout would still require an appropriate train planning path to be provided to cross the Great Western Down Main, or be forced to wait in the loop whilst the protecting signal release times off. This would require approach control of the protecting signal, so potentially slowing the speeds of trains routed off the GWR Up into the central loop.

Similarly the proposal for a bay platform sited in between the Up & Down Trowbridge lines adds unnecessary complication to the layout and the island platform arrangement would prevent Regional services on the Up Trowbridge line from calling at Bathampton. Signalling into a bay platform necessitates the slowing of the approach speed of the terminating train, which in this case would result in a slow running speed across the GWR Down Main. A simplified layout could minimise this whilst reducing the number of new point ends to be provided.

The re-alignment of the Up/Dn Trowbridge lines, in order to avoid demolition of the existing Bathampton Interlocking Signalling Relay Room, is not relevant unless the re-signalling of the Great Western Main Line was not to go ahead. This project will entirely replace the contents of the relay room and most likely demolish the building as a cost saving measure.

Lastly, the suggestion to provide a light rail line adjacent to the Great Western Down Main should be treated with caution. Although there is no track here at present, all the signalling equipment cabinets and associated cable routes are presently located on this side of the line. Re-Signalling of the Great Western Main Line may or may not replicate this arrangement. The addition of new track here could potentially require the re-location of and consequent re-testing of all of the main line signalling equipment adjacent to the light rail.

Re-signalling of this layout to the track diagram provided in Mr Bakers report would require the removal of two existing main signals and the provision of approximately 6 new main signals, together with all associated track circuiting, train protection equipment and signage. 7 ends of points (or switches) would require removal and 7 new ends of points installing, (in different positions). Costs for this work to be done as a separate project,

(rather than being provided gratis as part of GWML Electrification), can be found in Appendix C.

3) Bath Spa Station and Westmorland Road Sidings:

There is also an almost complete absence of detail in M Bakers report regarding the arrangements at the western end of the new rail service, other than to state that any new service “would make its western reversal at the existing Westmorland Road sidings.” Unfortunately these sidings do not currently have any provision for the reversing of trains back into Bath Spa Station, there being no signal at the eastern end of the loop. Also the points at this end of the loop would require conversion from unpowered “spring” points, to powered points controlled from Bristol Power Box. Again, cost for the provision of this equipment can be found in Appendix C.

4) Bristol Power Box:

Should this scheme be implemented other than part of GWML electrification, significant alterations would be required to Bristol power box control panel and it’s associated signal interlocking. Also, data transmission equipment between Bristol PSB and Bathampton / Westmorland road interlockings would require increased capacity to control the extra signalling equipment.

3.4 Telecommunications

New signal post telephones (SPTs) will be mounted on posts on the approach to the new platform signals. They shall be jumpered to the main cabling and terminated at the controlling signalling centre.

The SPTs shall be connected to the concentrator at the controlling signalling centre. New line cards will be installed as necessary and the touchscreen reprogrammed or key panel relabelled in agreement with the Local Operations Manager.

Train despatch at the new station may require the installation of a Driver Only Operation (DOO) CCTV system. Whereby a new monitor bank shall be designed and installed at the end of the platform, cameras shall be installed along the platform to allow the driver to assess the platform / train interface before finishing station operations.

Due to the need to connect systems and services at the new station to the Fixed Telecoms Network (FTN), copper and fibre cables would be laid alongside the alignment to the new station. This necessitates the installation of a new troughing route to protect the cables. This route would be suitable to house any signalling, telecoms or other low voltage cables.

The fibre cable would be jointed with a minimum number of spliceless joints, housed within cable joint bays. The copper cable would be jointed and terminated on the lineside to ensure tail cables are kept to within limits described by FTN standards.

Transmission equipment and various modems required for data services would be located within an equipment rooms at the new station.

Existing cables and routes along side the current alignment would require slewing to the new.

Station information and Security Systems (SISS) will be installed at the station in accordance with the requirements of the Train Operating Company, Network Rail and the Equality Act 2010. The Customer Information Systems covering the station shall be required to be connected to the CIS network to enable passengers to receive real time visual and audio information about train running.

CCTV cameras shall be fitted to give coverage of the public areas of the station, including the station car park. Recording equipment shall be located within an equipment room at the station and the system configured to transmit recordings on request.

A passenger help point will also be installed on the platform.

3.5 Civil Engineering

The civil engineering works immediately associated with the 'railway' part of this scheme are the provision of a 200m island platform and a footbridge to access the platform from the car park. There are problems with the proposed location of the platform which have already been discussed in section 3.2. The footbridge provision should be relatively straightforward.

3.6 Electrification

The Great Western electrification scheme covers inter-city routes to Bristol via both Bristol Parkway and Bath. It does not cover the electrification of local or regional routes that share these routes for any part of their journeys. While an aspiration exists for electrification of local services, there is no concrete business case as yet, and Bristol Metro Phase 1 assumes diesel operation at its inception. On this basis, while any potential trains to Bathampton will run under the wires between there and Bristol Temple Meads, the other legs of the local service pattern will require diesel operation and therefore there need currently be no expectation of electrification of any Bathampton park and ride facility.

3.7 Operations

The layout proposed by the Baker report for the bay platform, incorporating turnback, is over-complex. A simpler layout could be achieved with the same operational effect, but this would still be subject to the risk and issues associated with alignment constraints (gradient and curve) and the need to acquire land and carry out civil works to make it up to the right level.

We note that it is suggested by Mr Baker that the park and ride site be served by a rail shuttle service to Bath Spa station. We do not regard this as being operationally feasible in itself. Bath Spa station has very limited capacity for turning trains back and the nature and layout of turnouts at Bath do not allow turning back from/to the east. The site might possibly be served by other existing and proposed services. These would be:

- Existing regional services that link Westbury and Bath hourly.
- The Bristol Metro Phase 1 new service terminating at Bath, provided that it can be extended to serve Bathampton.

Early work on Bristol Metro Phase suggested that an operationally robust turnback for Bath would require running to Bathampton to turn around there. However, further work has concluded that this is not necessary to make the Metro Phase 1 service to Bath work reliably. It remains potentially feasible to extend this service to Bathampton, but given that the Bathampton turnback is no longer required for Bristol Metro the park and ride scheme's overall income stream would have to cover the additional operational and infrastructure costs.

3.8 Possession Strategy

Comments from Mr Baker outside of his report implied that the implementation of signalling alterations could be staged over no more than 2 weekend possessions. We do not agree with this conclusion and believe the true figure would be considerably greater. However, to provide a comprehensive staging strategy as evidence of this would be beyond the remit of this study, and would require significant further investigation.

4 Critique of Specific Points in Report

Page number and paragraph	Original comment	Halcrow response
1.1	A scheme to provide a Park & Ride railway station and high capacity car park, largely on existing railway land at Bathampton Junction.	Is there evidence that can be provided to show that ownership of the land has been established, and that it is available for purchase and change of use?
1.6	If a car park site could be identified near to the railway junction at Bathampton at which a railway station could be built, then the rail journey into Bath Spa main line railway station would be about 3.75 minutes - based on current Westbury line train operating timetables.	We would say that this is approximately right. Time would be 3½ minutes at best or 4 minutes at worst.
2.1	To the south of the existing road and railway corridor at Bathampton an area of “brown land”, the site of the original Bathampton Station, could provide a site area of 3.1 hectares in the angle of the railway junction and its embankments.	Part of this scheme bisects an existing timber yard which would presumably have to be relocated. Also see 1.1 above.
2.2	To make up the site area, the greater part would be achieved by moving track switches that form the “railway junction” about 200 metres to the west so that two parcels of “brown land” that are, today, divided by the railway branch to Trowbridge can be utilised as a single area of about 1.9 ha.. A further 1.2 ha of land would be taken from the Green Belt, mainly land of Bathampton Farm in the angle of the railway junction, to the south of the A4 Batheaston Bypass and the GWML railway corridor.	It is not at all clear how easily this movement 200m west could be achieved. Apart from the land take issues already referred to, the tracks would move closer to existing properties and most likely necessitate road layout alterations. In addition it is not by any means proven that they could be located where suggested, not least because of possible clearance issues to the existing Mill Lane over-bridge. Also, The potential

		of this development being in Green Belt land would make the proposed development extremely difficult to get planning permission for.
2.3	The existing railway operational infrastructure at Bathampton Junction includes a “signalling relay room”, on the south side of the main line tracks, opposite the “down main” track connection to the railway to Trowbridge and Salisbury. By moving the track switches 200m to the west it is possible to avoid the need to completely demolish and re-site this relay room and the complex signalling apparatus that it houses.	As mentioned in the main text, the contents of this relay room will be entirely replaced by GWML re-signalling. It is highly likely that they will then demolish the relay Room to save on paying rates on the permanent structure. (Any replacement will be re-locatable and therefore rates free). Consequently this proposal is effectively pointless.
2.4	Rearranging the railway junction in this way, moving the entry to the switches about 200 metres to the west, would also enable the speed capability of the track fittings to be improved. Today speed through this junction for trains travelling from Trowbridge is limited to 50 mph and for those travelling towards Trowbridge the speed limit is 40mph. A new junction, using switches that permit faster speeds, could be built to deliver a speed limit of 65mph for trains in both of these directions. This is seen as a very desirable objective by Network Rail and the train operators.	The existing speeds referred to appear to be correct. However, just increasing the junction speed does not automatically increase speed or capacity. The through line speeds on both any main or branch line are dependent on many other things than just turnout speed. Adjacent track geometry, signalling, train performance and many other features can affect overall line speed at a particular location. In this particular case, the speed of trains towards Trowbridge are constrained by the track layout and the consequent signalling arrangements regardless of any improvements in track geometry. From an operational timetabling perspective, capacity and performance tend to be optimised when train running speed is uniform,

		<p>regardless of the absolute maximum speed. This section of the inter-city route will not be the highest speed route, given the approach to Bath Spa station meaning that, say, a 125mph line speed could not be exploited. Line speed at the junction therefore needs to be sufficiently uniform, or of a suitable range that trains on diverging/converging routes can be timetabled effectively. In the case of the proposed park and ride all trains approaching and departing from or to the west will be running at a relatively low speed because of the platform stop, so a higher speed turnout is not necessarily essential to the success of a park and ride scheme here.</p>
2.5	<p>Journey time between a new Bathampton Parkway Station at this site and Bath Spa Station would be about 3.75 minutes - considerably faster than an articulated bus travelling via London Rd. The Joint Local Transport Plan included support for a 30minute clock face interval service pattern over the railway route between Bristol, Bath and points on the Trowbridge line so that a 30 minute interval service to a new station could be provided without any additional train services other than those currently planned.</p>	<p>We would concur with the rail journey time, but are unable to comment on the bus journey time. It should be noted though that a 30 minute interval service is probably the most that could be achieved by rail, entailing a longer wait for park and ride users. In comparison a more frequent bus link, while having a longer travel time could reduce waiting time for users. This trade off would need to be fully examined before a decision on mode is made in any such scheme.</p>
2.6	<p>A new "Bathampton Station" would be built on the new alignment of the Trowbridge line,</p>	<p>Agree completely with this statement.</p>

	<p>at the south side of the new car park. Building a new railway station alongside a new track alignment before these tracks are put into use by trains, enables the station to be built at very, very, much less cost than building alongside a “live” railway.</p>	
3.1	<p>The new infrastructure is in the angle of the railway junction, with the Trowbridge line tracks moved westward to enable the existing area of brown land of the original Bathampton Station site to be utilised as a single plot and to ease the radii of curvature of railway tracks through the curve and at the junction fittings.</p>	<p>The proposed curves are very similar to the existing. There is no significant improvement.</p>
8.3	<ul style="list-style-type: none"> • Weaknesses of the existing layout are that: • The route through three switches between the Up Main and the Up Trowbridge including two reverses of curvature on un-canted track with the result that speed through this junction is limited to 40mph. • The existing layout of the Down connection from the Trowbridge line onto the Down Main also includes two reverses of curvature which, although less severe than the Up direction curves, limit speed to 50mph through the junction in the Down direction. • All Up Trowbridge trains leave the Up Main at a ‘facing cross-over’ at which they cross to the Down Main. This means that for each Up Trowbridge train, the working time-table must 	<ul style="list-style-type: none"> • There is nothing unusual in this and it is not correct to imply that it is just the reverses that limit the speed. As stated above, other technical and operational factors will also determine the appropriate junction speed. • As above • This is normal at flat junctions. The new layout offers no advantage and possibly increases the difficulty in getting Trowbridge trains off the

	<p>provide co-incident train-paths in the Up Main and in the Down Main at Bathampton Junction;</p> <ul style="list-style-type: none"> • If a Trowbridge train is held in the Up Loop it must rejoin and cross the Up Main again before it can cross to the Down Main and take the connection to the Up Trowbridge line, hence it still requires coincident paths in the Up Main and in the Down Main. 	<p>Up GWML. Only grade separation would avoid this, and the report does not propose or seek to justify such a solution. We do not see a specific need for grade separation.</p> <ul style="list-style-type: none"> • This is only an issue if there is no choice but to path such a train via the Up Loop. However, this is unlikely as to slow into and accelerate from the loop would take more capacity than pathing it straight across the junction.
8.4	<p>Any changes that a Bath & North East Somerset scheme might wish to propose that affect the main line railway need to be put forward quickly and start their progress through the railway industry assessment, design and installation process as soon as possible because once the forthcoming re-signalling and electrification schemes are at their own planning and installation stages, the shape of the railway track layout at Bathampton Junction will become fixed for a generation.</p>	<p>It is unlikely that the proposed infrastructure changes could be accelerated to become a part of the current infrastructure development plans. The only local scheme that has achieved this is Bristol Metro Phase 1, which is now a priced option in the Great Western franchise ITT. Other phases of Bristol Metro would need to be developed later, and this scheme would probably have to follow a similar process. It would certainly be unacceptable to Network Rail, DfT and the TOCs that the cost of any of these proposed changes at Bathampton should be borne as part of the GWML electrification and resignalling works. Any development and works cost relating to the park and ride would have to be fully borne by the scheme</p>

<p>13.6</p>	<p>The pre-feasibility design for a new railway permanent way layout at Bathampton Junction is based on using SG20.25 RT60 inclined Switch & Crossing (S&C) units (“points”) that can be used at up to 125mph on the through track and at up to 65mph on the turn-out track. This would offer Network Rail and the train operator a considerable improvement over 40mph Up or 50mph in the Down direction at Bathampton Junction today. The geometry has been designed with transition lengths to achieve the required curves entering the Trowbridge Line. S&C design for connections to a bay platform or pair of side platforms at Bathampton Parkway or Park & Ride Station can be completed when a train service pattern is more clearly known. The track layout at the station should be designed to serve the train service rather than be allowed to become a constraint on the train service that can be operated. The GWML track fittings and transition curves shown on the January 2012 pre-feasibility design would be appropriate to a range of design options for track connections in the station area.</p>	<p>In theory, any geometry of S & C unit can be suitable for running at 125mph on the through track – this comment is a red herring as such a speed capability is not needed at this location.</p> <p>Please also refer to comments to 2.4 above.</p> <p>We have not been provided with and are unaware of any documentation described as the 2012 pre-feasibility design, and therefore cannot comment on it. We have commended on the layout and proposals contained in the report with which we have been provided.</p>
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5 Conclusion

There are various problems with the proposal as listed below:

- Horizontal and vertical track alignments are not suitable for a platform at this location.
- The additional complexity of the proposed new layout appears to add little functionality compared to the existing layout and may make some operations more difficult.
- The proposal for a future light rail line could potentially have a major impact on the re-signalling of the GWML.
- There is no current provision to enable the reversal of a shuttle service at Bath Spa Station.
- Journey times to Bath may not be competitive with a bus based park and ride at the same site.
- Considerable alterations to the telecommunications will be required to provide all the modern facilities necessitated by a new station, PA. CCTV etc.
- There are considerable issues to be addressed regarding land take, road layout operations, housing blight, business relocation and compensation costs.

It is highly unlikely that any of the proposed changes at Bathampton would be provided / funded as part of the GWML electrification and resignalling works, or as part of Bristol Metro Phase 1.

6 Recommendations

This scheme need to be considered carefully against the various bus park and ride options at Bath east before any further work is undertaken.

Appendix A Line Diagram of Bathampton Junction Area

(Showing amendments as proposed in D. Baker report)

Appendix B Aerial photograph of proposed location

Appendix C Costs

(+/- 50%)

Note: This does not include land purchase, demolition / removal of timber yard or compensation costs to land / building / business owners.

Permanent Way

(Note that we have estimated for what we believe to be the minimum requirements to meet the Dorian Baker scheme)

1900m of new plain line and formation		£1,250,000
1 no sliding buffer stop		£15,000
7 no CV 9 ¼ turnouts		£1,050,000
1 no EV 21 xover		£300,000
2 no EV15 turnouts		£500,000
Slue 1800m of ex plain line		£170,000
Drainage	Provisional Sum	£5,000

Civil Engineering

New island platform 200m x 5m wide	provisional sum	£870,000
New footbridge (including ramps)	provisional sum	£200,000
New lifts	provisional sum	£200,000
	sub-total	£4,605,000

Signalling

Signalling Alterations at Westmorland Road Sidings

New TPWS OSS Arm & Trigger loops for "Down Main" signal provided	£17,000
New TPWS TSS Arm & Trigger loops for "Down Main" signal provided	£13,000
New "Up/Dn Goods Loop" Red/Yellow/Green/Yellow signal with Route Indicators	£44,000
New "Down Main" Red/Yellow/Green/Yellow signal with Route Indicators	£44,000
New AWS suppressed magnet provided for "Down Main" signal	£21,000
New AWS suppressed magnet provided for "Up/Dn Goods" signal	£21,000
New Points Machine	£44,000
Panel Alterations	£44,000
Interlocking alterations	£110,000
New locations, x 4	£115,000
	£473,000

Signalling Alterations - Bathampton Jn

Provision of TPWS TSS for 7 Signals	£91,000
New Track joints x 20	£506,000
Old Track joint bonded out x 10	£122,000
New AWS suppressed magnet provided x 5	£103,000
New Signal Red/Yellow/Green/Yellow signal with Route Indicators x 7	£308,000
New TPWS OSS Arm & Trigger loops x 6	£124,000
New HVI Track Circuit x 12	£325,000
Sign boards to provide x 10	£14,000
New TI21 Track Circuit x 12	£360,000
Panel Alterations	£110,000
New Points Machine x 8	£354,000
New TPWS OSS Arm & Trigger loops for Buffer Stop provided	£17,000
New Buffer Stop to be lit	£2,000
Interlocking alterations	£220,000
New Locations, x 24	£687,000
Removals of redundant points, signals tracks, TPWS, AWS	£220,000
Altered Locations x 24	£343,000
	£3,906,000
	sub-total £4,379,000

Telecommunications	Subtotal	£75,000
	Grand Total	£9,059,00

**Appendix D Dorian Baker report dated 6 February
2012**



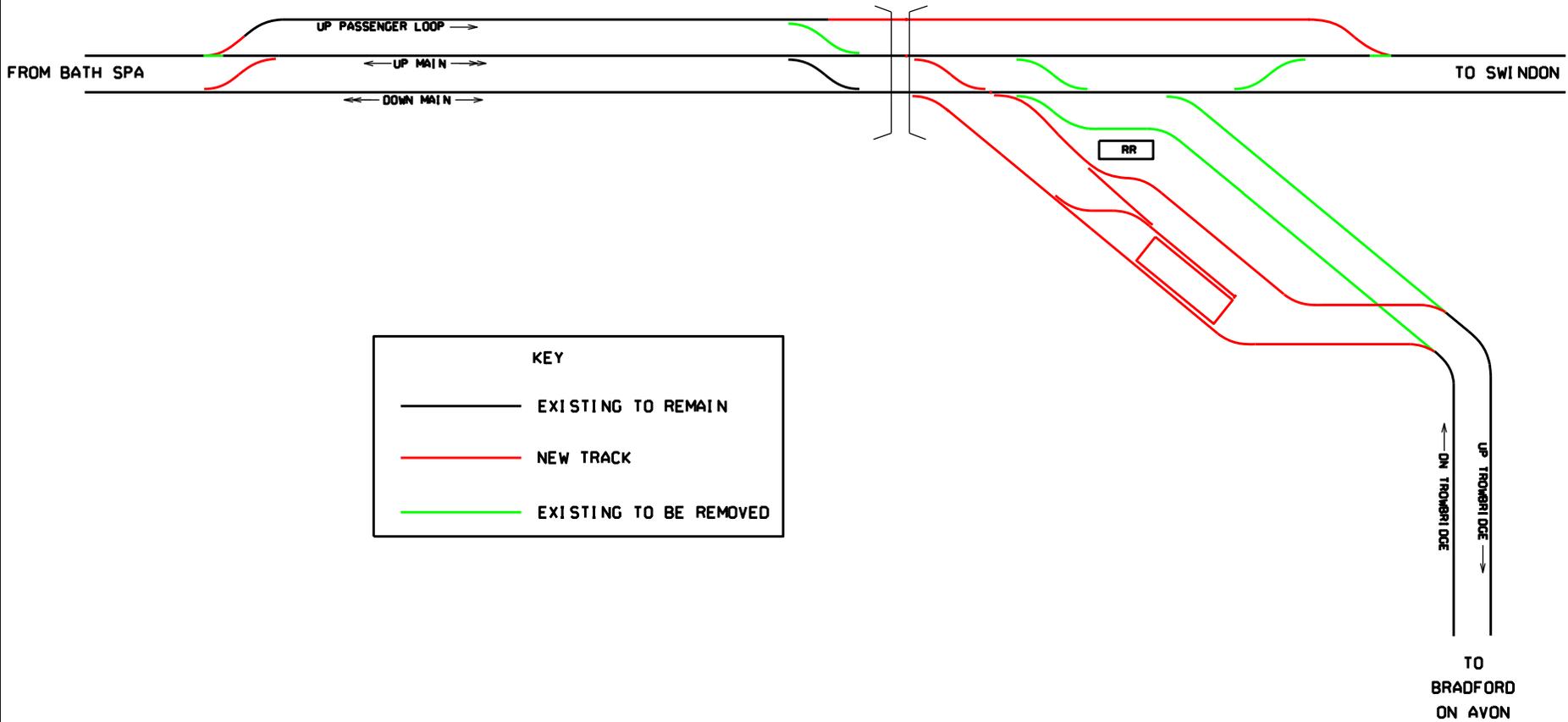
Image © 2013 Getmapping plc

Google earth

feet
meters



BATHAMPTON JUNCTION AREA - ORIGINAL LAYOUT WITH AMENDMENTS TO D. BAKER REPORT



KEY	
	EXISTING TO REMAIN
	NEW TRACK
	EXISTING TO BE REMOVED

Key Plan

Notes

Rev	By	Chkd	Apprv	Date	Description
-	-	-	-	-	Preliminary Issue

Status: **PRELIMINARY**

Client: —
—
—

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Project: **Bathampton Study**

Drawing: **Bathampton P/Way Line Diagram**

Sheet 1 of 1

Drawn by: jgt Date: 01/02/2013

Checked by: pjt Date: 01/02/2013

Approved by: -- Date: --

Drawing No. Revision

Bathampton/Pway/LineSketch01 00

Drawing Scale: As Shown CAD Ref.: --.dgn

Bathampton Parkway.

A scheme to provide a Park & Ride railway station and high capacity car park, largely on existing railway land at Bathampton Junction.

The scheme is to provide a new Bathampton Park & Ride railway station at a new bay platform track as part of the carrying out of works to rebuild the railway track layout at Bathampton Junction to improve its flexibility and capacity in preparation for 25kV AC overhead line electrification. Adjacent to this station a new car park on three levels would be built mainly on railway land of the original station yard and in the angle between the two existing railways, with the lowest level at about that of the base of the embankment, outside the flood plain.

**A proposal prepared by:
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Kelso Cottage, 25 Sion Road
BATH BA1 5SH
Telephone: 01225 333 641**

Date: 6th February 2012

Draft 2.

1. Introduction

■ **The need for a Park & Ride scheme to serve the East side of the City of Bath.**
Bath today has Park & Ride car parks with bus services into the centre of the city for car users approaching from the north, the west and the south but not from the east. A particular challenge for a Park & Ride scheme on the east side of the city is that a bus service between the car park and the central area would need to use London Road, the most congested, slowest moving route into the centre, despite the in-bound bus lane.

A car park site was proposed at Bathampton Meadows on the north side of the A4 Batheaston Bypass and Great Western railway corridor. The site would have taken approximately 4.8 hectares from the Green Belt, currently all green fields clearly visible from the surrounding hills. It has been estimated that a P&R bus service from a Bathampton Meadows car park site should take 14 minutes for the journey into a central area terminus but might take up to 20 minutes during peak periods.

If a car park site could be identified near to the railway junction at Bathampton at which a railway station could be built, then the rail journey into Bath Spa main line railway station would be about 3.75 minutes - based on current Westbury line train operating time-tables.

The electrification of the Great Western Main Line (GWML) provides a once-in-a-lifetime window of opportunity for the development of stations and track improvements on the route, including a feasible station site at Bathampton.

2. A new Park & Ride car park and public transport terminal facility at Bathampton Junction.

■ A feasible car park site to the south of the A4 highway and the GWML railway.

To the south of the existing road and railway corridor at Bathampton an area of "brown land", the site of the original Bathampton Station, could provide a site area of 3.1 hectares in the angle of the railway junction and its embankments. Here a part-buried structure of up to three levels of car parking could be arranged with the top floor just below existing railway track level, hidden behind the existing railway embankment. A total of approximately 7.3 ha. of car parking over the 3 levels, spaces for of the order of 3000 cars, could be provided.

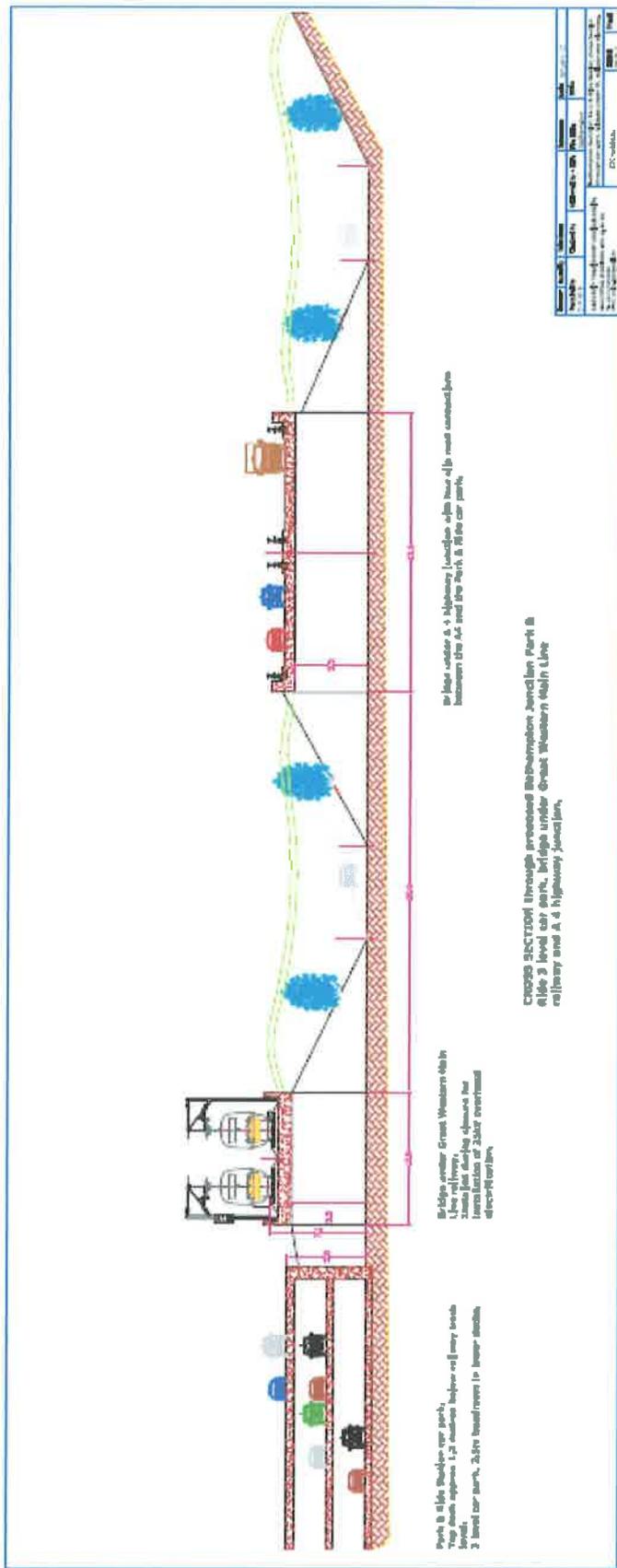
To make up the site area, the greater part would be achieved by moving track switches that form the "railway junction" about 200 metres to the west so that two parcels of "brown land" that are, today, divided by the railway branch to Trowbridge can be utilised as a single area of about 1.9 ha.. A further 1.2 ha of land would be taken from the Green Belt, mainly land of Bathampton Farm in the angle of the railway junction, to the south of the A4 Batheaston Bypass and the GWML railway corridor.

The existing railway operational infrastructure at Bathampton Junction includes a "signalling relay room", on the south side of the main line tracks, opposite the "down main" track connection to the railway to Trowbridge and Salisbury. By moving the track switches 200m to the west it is possible to avoid the need to completely demolish and re-site this relay room and the complex signalling apparatus that it houses.

Rearranging the railway junction in this way, moving the entry to the switches about 200 metres to the west, would also enable the speed capability of the track fittings to be improved. Today speed through this junction for trains travelling from Trowbridge is limited to 50 mph and for those travelling towards Trowbridge the speed limit is 40mph. A new junction, using switches that permit faster speeds, could be built to deliver a speed limit of 65mph for trains in both of these directions. This is seen as a very desirable objective by Network Rail and the train operators.

Journey time between a new Bathampton Parkway Station at this site and Bath Spa Station would be about 3.75 minutes - considerably faster than an articulated bus travelling via London Rd. The Joint Local Transport Plan included support for a 30minute clock face interval service pattern over the railway route between Bristol, Bath and points on the Trowbridge line so that a 30 minute interval service to a new station could be provided without any additional train services other than those currently planned.

A new "Bathampton Station" would be built on the new alignment of the Trowbridge line, at the south side of the new car park. Building a new railway station alongside a new track alignment before these tracks are put into use by trains, enables the station to be built at very, very, much less cost than building alongside a "live" railway. Platforms of this new station would be approximately 300metres from the canal bridge at The George in Bathampton and could therefore also provide direct services to Bath and Bristol for this community. It would also be worthwhile to up-grade the existing footpath over the 600metres to the A4 roundabout, midway between Batheaston and Bathford, so as to offer these two communities a very attractive new public transport option for getting into Bath or Bristol.



Section through the proposed Park & Ride 3 level car park, the existing Great Western Main Line railway embankment and the existing A4 dual carriageway Batheaston Bypass.

The section illustrates the relationship of the proposed car park top level to that of the existing railway.

3. Environmental impacts compared, initial indications, I.

■ Comparison of net land area taken from the Green Belt.

The two drawings below show,

- Figure 1: the area of land taken from Green Belt for a Bathampton Meadows Park & Ride scheme, total: 4.8 hectares
- Figure 2: the area of land taken from Green Belt for a Bathampton Park & Ride Station scheme, net of 1.9ha redundant railway "brown land" utilised, total: 1.2 hectares.

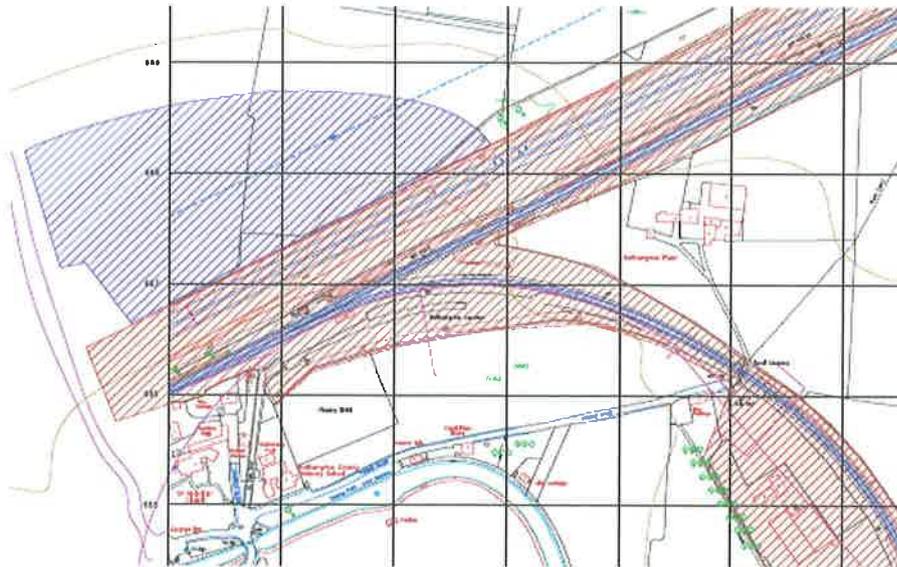


Figure 1: The existing land area taken by the railway and the A4 highway at Bathampton Junction, hatched tan, and the formerly proposed Bathampton Meadows Park & Ride site to the north of the road and railway corridor, hatched blue.



Figure 2: The existing land area taken by the railway and the A4 highway at Bathampton Junction, hatched tan, and a Park & Ride site and railway station in the angle between the two railway routes, hatched blue, showing the redeployment of unused railway land to provide the car park and station site.

4. Environmental impacts compared, initial indications, II.

■ Visual and Noise impacts.

A road link between the A4 Batheaston Bypass and a Bathampton Park & Ride Station car park to the south of the main line railway could pass under the railway at a point where railway track level and highway carriageway level are approximately 7 metres above feasible lower basement car parking level. It is therefore possible to achieve a link to and from the A4 eastbound carriageway passing under the railway and under this dual carriageway road, and thereby avoid the visual and noise impacts that would have been so unacceptable with the earlier "A46 to A36 Link Road" scheme.

The length of the A4 Batheaston Bypass alongside and parallel to the Great Western Main Line railway between Bathampton Junction and the Batheaston bridges, cannot be seen from most viewing points in Batheaston, as shown for example by the pictures published by "Save Bathampton Meadows". An earth bund was constructed on the north side of this length of highway to contain noise from the road and preserve the character of the views southward over the green belt lands of Bathampton Meadows as far as the railway.

The Bathampton Meadows Park & Ride scheme proposed in the Bath Transport Package would have been:

(a) clearly visible, and

(b) clearly audible within the area that the A4 bund was intended to protect.

In fact the bund would have been breached by the new road access into the car park with the result that not only noise associated with the car park but also: noise from the existing highway would have found a new path directly towards the settlement of Batheaston.

It is also note-worthy that an important reason why the even earlier proposal for an A46 to A36 link road from this point on the A4 to the A36 near "Dry Arch", Bathampton, was rejected was that the grade separated junction at the A4 would have included slip roads and a bridge rising above the A4 and out of its protective environmental bund. A further span was then to cross above the railway, then continuing southwards on a tall bank or viaduct, continuing to gain height as it crossed the canal to reach a junction with the A36 at a level approximately 30metres above that of the railway at Bathampton Junction. All parts of this proposed link road would have been clearly visible from many vantage points in Batheaston and Bathford and the surrounding hills and its highway noise would not have been contained.

In complete contrast, the link road into a Bathampton Park & Ride Station car park in the angle between the Great Western Main Line and the Trowbridge Line railways would be completely hidden and inaudible from viewpoints in the Batheaston area.



Bathampton Farm.

Railway track and its ballast can be seen on the left side of the picture, at about the level of gutters on the farm house. Lowest floor of the proposed three level car park would be at about farm house ground floor and outside paved area level, top level of the car park would be a little below existing rail level.

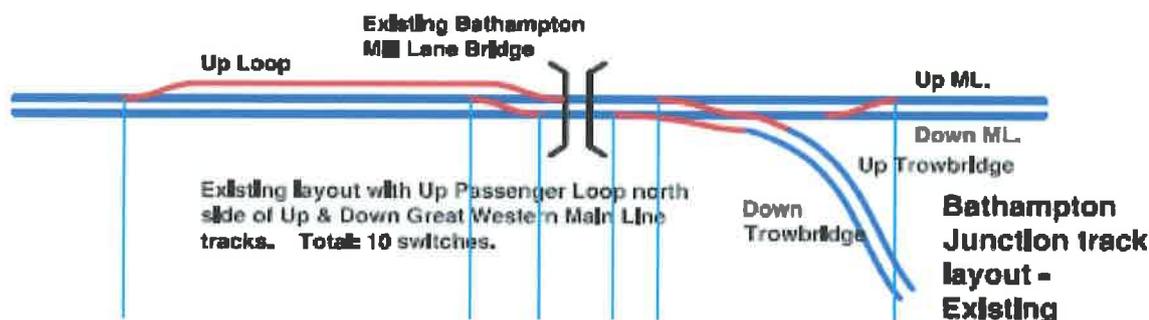
5. The existing railway track layout at Bathampton Junction.

The existing track layout at Bathampton Junction includes, in railway terminology, the following features:

- an Up Loop on the Up side of the GWML with exit to rejoin the Up Main ahead of;
- a Facing cross-over in the ML between the exit from the Up Loop and the Up Trowbridge turnout;
- a Trailing cross-over to the London side of the Trowbridge line connections;
- a second Facing cross-over, Bristol side of the exit from the Up Loop.

These connections give the railway infrastructure operator train routing options:

- an Up Loop on the Up side of the GWML in which Up trains can be held before continuing on the Up Main or before taking the Up Trowbridge line;
- 'facing' and 'trailing cross-overs' in the main line to enable Up ML or Down ML trains to cross to operate 'wrong road' or cross from 'wrong road' working or to reverse from either direction at Bathampton Junction;
- the connections also enable either the Up or Down Trowbridge Line to be operated as a bi-directional single track.



Weaknesses of the existing layout are that:

- The route through three switches between the Up Main and the Up Trowbridge including two reverses of curvature on un-canted track with the result that speed through this junction is limited to 40mph;
- The existing layout of the Down connection from the Trowbridge line onto the Down Main also includes two reverses of curvature which, although less severe than the Up direction curves, limit speed to 50mph through the junction in the Down direction;
- All Up Trowbridge trains leave the Up Main at a 'facing cross-over' at which they cross to the Down Main. This means that for each Up Trowbridge train, the working time-table must provide co-incident train-paths in the Up Main and in the Down Main at Bathampton Junction;
- If a Trowbridge train is held in the Up Loop it must rejoin and cross the Up Main again before it can cross to the Down Main and take the connection to the Up Trowbridge line, hence it still requires coincident paths in the Up Main and in the Down Main.

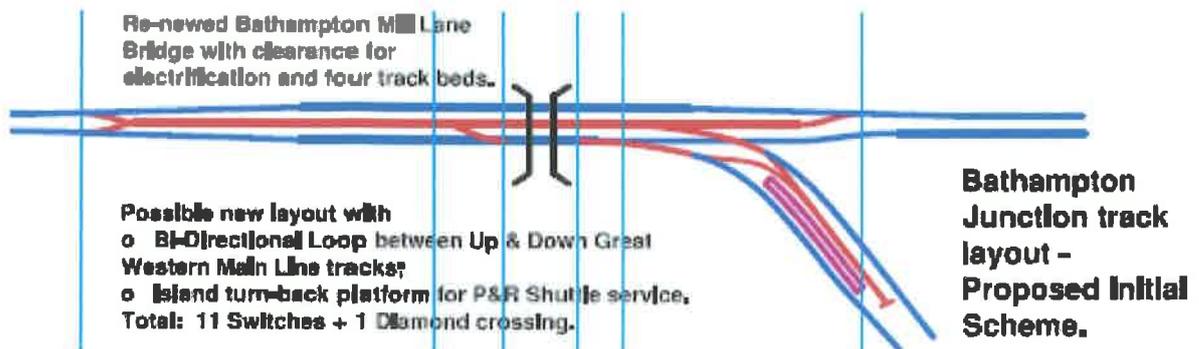
Any changes that a Bath & North East Somerset scheme might wish to propose that affect the main line railway need to be put forward quickly and start their progress through the railway industry assessment, design and installation process as soon as possible because once the forthcoming re-signalling and electrification schemes are at their own planning and installation stages, the shape of the railway track layout at Bathampton Junction will become fixed for a generation.

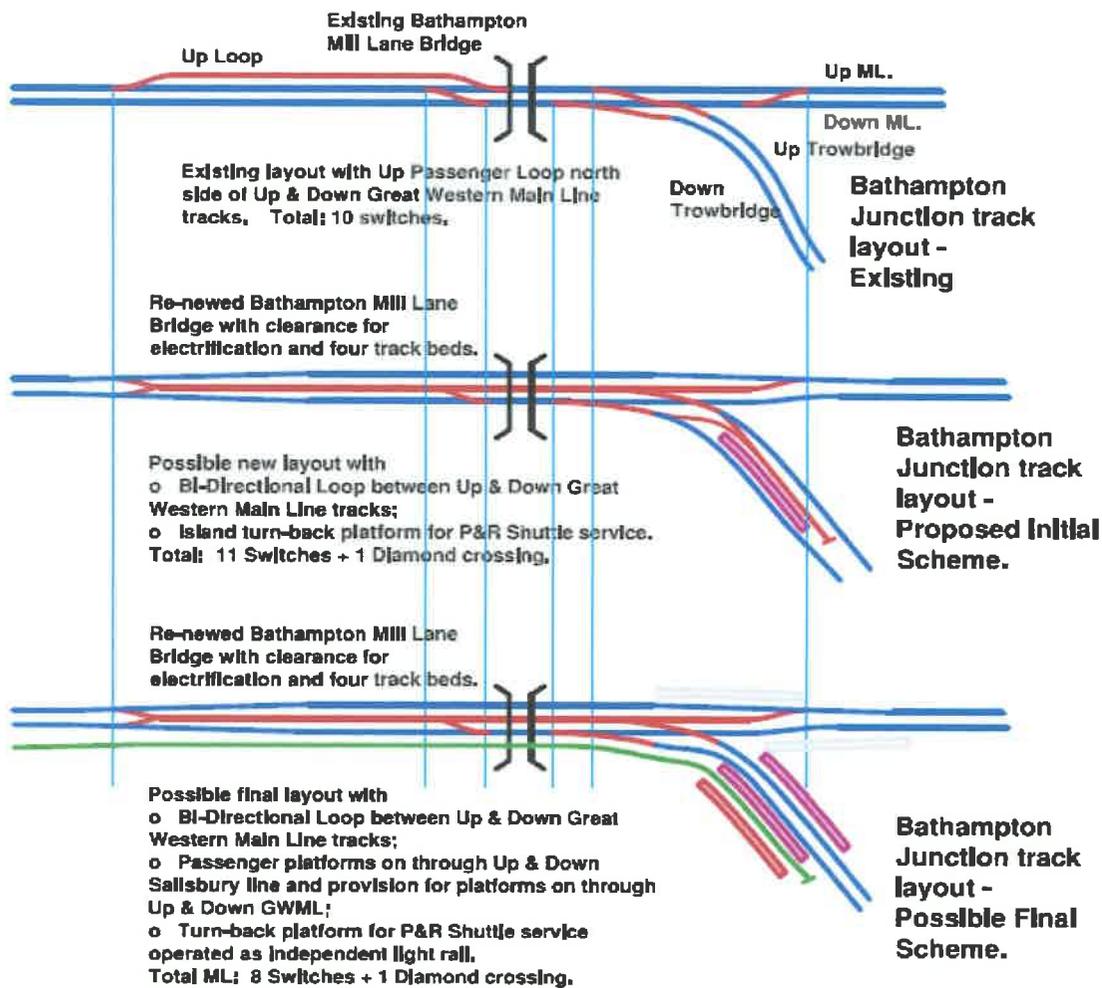
6. The proposed initial railway track layout at Bathampton Junction.

■ Shuttle service option.

The proposed layout will provide:

- In the GWML, a central, bi-directional, loop available for Up or Down traffic, either Main Line or Trowbridge Line;
 - Up or Down passenger trains would be able to pass a freight train or slower passenger train moving in any of the four directions;
- 'facing' and 'trailing cross-over' connections to the Up Main and Down Main to enable Up ML or Down ML trains to cross to operate 'wrong road' or cross from 'wrong road' working or to reverse from either direction at Bathampton Junction;
 - this is as the existing layout but with the additional benefits of:
 - being able to hold a reversing train in the central loop between its leaving the first track and joining the second, including to enable train staff to prepare the train for reversal off the running line before the train joins its new route;
 - being able to hold an Up Trowbridge train off the Up Main to await a train-path to enable it to cross the Down Main; coincident train-paths in both tracks of the GWML would no longer be required.
- Connections to a central bay platform for trains terminating and reversing at Bathampton Parkway;
 - train staff of a Bath - Bathampton shuttle would be able to prepare a newly arrived train for its return journey at the same time as passengers leave and join their 'park & ride' transport.
 - while in the 'bay' track the train will have left the Up Trowbridge but will not have interrupted or joined the Down Trowbridge and it will not interrupt the Up Trowbridge track again when it leaves, using the Down Trowbridge.
- Connections between the Up & Down GWML tracks and the Up & Down Trowbridge tracks with a speed capability of 60 mph, 20mph and 10mph faster than the existing Up and Down connections respectively.





Diagrams of the existing and feasible alternative track layouts at Bathampton Junction

7. Train service and rolling stock options.

■ Shuttle service option.

A simple, high passenger capacity, shuttle service operating between Bathampton P&R and Bath Spa stations would make its eastern reversal at the new bay platform at Bathampton and its western reversal at the existing Westmoreland Road sidings.

The most efficient rolling stock option would be a two-car d.m.u. (diesel multiple unit) or, with electrification of Westmoreland Road siding as well as Bathampton bay platform, e.m.u. (electric multiple unit) with seating simplified to provide a longitudinal bench seating arrangement, as in many London Underground "Tube" trains, along each side of the interior of each car together with hand-holds for standing passengers for the 3.75 minute journey between Bath Spa and the Bathampton Park & Ride station. A two-car unit of this layout would offer about 100 seats plus standing room for a further 240, total: up to 340 passengers, or LUL crush load standard, total: up to 440 passengers.

Initial draft working time-table input data would be as follows:

- Train standing in Bathampton, reverse control, passengers alight & board: 3.0 min
- Journey to Bath Spa, Down platform, allow: 4.0 min
- Passengers alight Bath Spa: 0.5 min
- Train moves forward into Westmoreland Rd sidings, allow: 1.0 min
- Reverse control in Westmoreland Rd sidings, allow: 3.0 min
- Await signal to cross Down Main and move into Bath Spa Up platform: 2.5 min
- Passengers board Bath Spa, Up platform: 1.0 min
- Journey to Bathampton P&R bay platform, allow: 4.0 min
- Total cycle time: 19.0 min

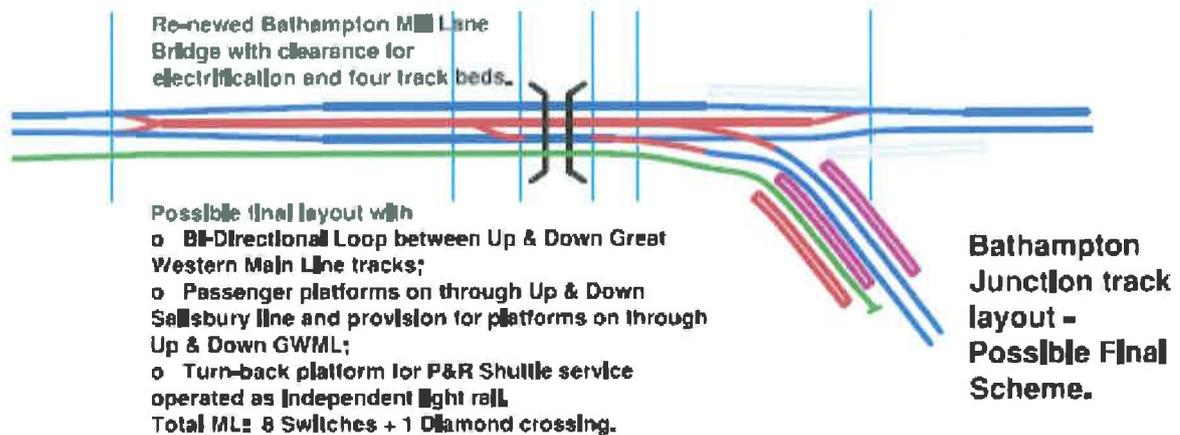
For a service operating over a part of the main line, in amongst long distance main line trains, to provide a robust operating time-table it should be assumed that one two-car train would be able to provide a 30 minute periodicity service, one train service to Bathampton P&R every 30 minutes and one service from the P&R station into Bath Spa every 30 minutes. A second two-car set would enable a 15 minute interval shuttle service to be provided throughout the day.

■ Regional service option.

An alternative, simpler, track layout can be defined if all services between Bath Spa station and Bathampton Park & Ride station can be provided by regional train services calling at Bathampton. At present the operator of the Bristol to Portsmouth and Weymouth services finds that there is not always sufficient make-up time in the working time-table to allow trains to make an additional stop even if Freshford and Avoncliff are not served by these trains. The south coast services operated today would only provide three trains every two hours, one train to Portsmouth every hour, one train to Weymouth every two hours, which is very much less frequent than is needed to support a Park & Ride service.

If this group of services were re-cast with a regular pattern of four trains per hour to Bradford-on-Avon, certain trains continuing via Westbury to Portsmouth, Weymouth, and perhaps to Radstock and Melksham, a 15 minute interval service to and from Bathampton Park & Ride could be provided.

In this option no bay platform with connections to the Up Trowbridge and to the Down Trowbridge are required on the main line railway.



■ **Long term Light Rail option.**

A further option with this main line track arrangement is that an additional track could be provided for an independent light rail route using the original Down Goods Loop track bed between Mill Lane Bridge and a point 800metres to the west and a further strip of un-used land of the original Bathampton Station yard around the beginning of the curve to a third platform at the new Bathampton Park & Ride station.

In order to make "passive provision" for this type of development to be added at a later stage, perhaps 20 years time, all that is need now is to ensure that the Mill Line bridge is rebuilt as a four track-width bridge, across the existing four-track-width railway right of way at this point.

A light rail route developed into the central area of the city from a western terminus at the Bathampton P&R station could certainly provide a tram every 15 minutes into and through the central area, 4 services per hour. In the long term, this would be more attractive than a service calling at Bath Spa main line station, the southern-most corner of the central area of the city, requiring Park & Ride travellers to mix with users of long distance main line trains as they pass through the station. Nevertheless, the less attractive option of using Bath Spa main line station is likely to be the "least risk" means of commencing a rail-based P&R scheme.

■ **Regional route options.**

■ **Using Bradford-on-Avon North & East Junctions into the future.**

Into the longer term, the restoration of the Bradford Junctions, discussed below with Electrification works, would enable two Bristol (or Portishead) services to run to Chippenham via two other West Wilts towns, establish regular train services at Melksham - and avoid the need for a Bathampton scheme to build platforms on the GWML, thereby implying that services calling at Bathampton could have a significant impact on the GWML working timetable as trains make the additional stop. Rather, the Bathampton scheme would be able to avoid competing with Corsham's bid for slots in the GWML working T-T to enable some trains to stop there. Perhaps the future electrified Bristol-London via Bath and Chippenham services with improved acceleration would be able to call at Corsham whereas that type of rolling stock would be inappropriate for a local service calling at Bathampton Park & Ride.

An ideal service would therefore be

[Portishead when this length is ready]-Portbury - Ashton Gate P&R -Bedminster - Bristol TM -Keynsham -Oldfield Park- Bath Spa - Bathampton Jcn P&R- (Freshford)- (Avoncliff)-Bradford-on-Avon -Melksham-Chippenham.

This would give Melksham a regular train service and enable the request stops at Freshford and Avoncliff to be served only by local trains; and allow Weymouth and Portsmouth services to cease calling at these in favour of calling at Bathampton P&R. This would provide 4 trains per hour each way at Bathampton until the local service could be upgraded to 4 per hour.

In order to avoid problems with the main line time-table as local trains via Melksham re-join the ML at Thingley for the last 2 miles 14 chains to Chippenham, and avoid the cost and time-table impacts of Up local trains crossing the Down Main, then crossing back at Chippenham as they reverse, the solution would be to give them their own bi-directional third track between Thingley and the original Down side platform at Chippenham (at present an unused platform) where these local trains would terminate and reverse. The right of way and all but one of the under-line bridges are already wide enough because the Gt Western company had at one time envisaged a four track railway here.

Just east of Thingley, the new A350 Ceppen Way is four tracks wide as is Saltersford Lane and the A4 at Chippenham Bath Rd roundabout, and a minor road linked to St Peter's Court. Just one under-line bridge at Lowden Hill would need to be widened. At the biggest structure, Chippenham Viaduct, there is a wide gap between the two running lines one option would be to slue the Down Main to the centre of the viaduct then lay a new track on the Down side of the right of way, a the (Down-side) Bi-Directional Melksham.

The foregoing is an option for the development of railway routes in the Bath & NE Somerset and West Wiltshire area. It becomes a policy making and planning issue for the long term that needs to be considered now, ahead of the electrification work, if only to ensure that it would at least be possible to install a third track for a West Wilts local service at a later date, after electrification. To permit the third track to be installed later, what is needed at this stage is to ensure that Network Rail installs the OL Electrification fittings between Chippenham and Thingley with spans that cross a three-track width.

Given each hour:

- (i) existing 2 Cardiff-Bristol-Bath-Bradford-Trowbridge-Westbury >> south coast;
 - (ii) 2 Corsham stops on ML services to Oxford; and
 - (iii) 2 Portishead- Bristol- Bath- Bradford- Melksham- Chippenham local services;
- then the last logical service to add to the Bath & NES and West Wilts rail map would be:
- (iv) (Swindon)-Chippenham-Melksham-Trowbridge-Westbury-[Frome-(then when all running well - Radstock, but with a re-sited station at Frome)] or: Westbury-Salisbury

■ **Track design.**

The pre-feasibility design for a new railway permanent way layout at Bathampton Junction is based on using SG20.25 RT60 Inclined Switch & Crossing (S&C) units ("points") that can be used at up to 125mph on the through track and at up to 65mph on the turn-out track. This would offer Network Rail and the train operator a considerable improvement over 40mph Up or 50mph in the Down direction at Bathampton Junction today. The geometry has been designed with transition lengths to achieve the required curves entering the Trowbridge Line. S&C design for connections to a bay platform or pair of side platforms at Bathampton Parkway or Park & Ride Station can be completed when a train service pattern is more clearly known. The track layout at the station should be designed to serve the train service rather than be allowed to become a constraint on the train service that can be operated. The GWML track fittings and transition curves shown on the January 2012 pre-feasibility design would be appropriate to a range of design options for track connections in the station area.

If the OLE team only needed a shorter blockade to fit out Box Tunnel and the rest of this length, say just four weeks, then an alternative bridge construction sequence at the new under-line bridge utilising a short "blockade" would be:

- (i) remove a short length of the tracks;
- (ii) install structural abutments using contiguous bored piling;
- (iii) lay bridge decks for the two tracks onto these abutments;
- (iv) put the tracks back ready for reopening;
- (v) then excavate out from inside the bridge structure and complete finished surfaces after train services have re-commenced.

Similarly, if West Wilts wanted to build Corsham Station this would be the moment. Station construction costs in normal working hours would be reduced to about one third the cost of trying to build it between operational train services and with short weekend possessions.

To achieve a construction programme as outlined during a blockade for electrification works it would be vital to open discussions with the Network Rail possessions planning team for the OLE scheme as soon as possible and put forward a proposal that they should

- (i) wire the South Wales Direct first, with the connection Bristol Parkway to Temple Meads and the new electric train depot, then
- (ii) open the new Bristol TM- Bristol Pkwy-London service and
- (iii) leave the HSTs operating the old route but via Bradford-on-Avon during a blockade of the Box Tunnel length between Bathampton and Thingley Junctions.

9. Appendix: Box Tunnel and Other civil engineering work that will be required for the Electrification scheme.

■ Structure Gauge clearance for Overhead Line Equipment.

The railway maintains a standardised database of surveys of all over-line, under-line and beside-the-line structures which can be interrogated using an industry standard program known as "Clear Route". This survey data indicates the following challenges for Over-Head Line Electrification Equipment (OHLE or OLE) to be installed over the length of the Great Western Main Line within Bath & NES.

Sydney Gardens group of structures.

- Through Sydney Gardens East Tunnel 106ml 24ch-28ch and through Sydney Gardens West Tunnel 106ml 29ch-33ch - the tunnel beneath Bathwick Hill and Raby Place. These structures were built by Brunel for broad gauge track and 16ft tall locomotive chimneys and despite all the ballast that has been added over 175 years there is still quite generous clearance for OHLE supported from centre line of tunnel intrados, as measured from the existing track levels.
- Sydney Gardens Bridge 106ml 10ch is a bit more of a problem, at least 300mm track lowering needed (but see below on OHLE), which will be more than enough for:
- Sydney Gdns Footbridge 106ml 14ch, and then also;
- Sydney Wharf Bridge 106ml 22ch.

This group of structures should not require "slab track" in order to achieve required clearance.

Slab track.

Slab Track is a concrete pavement structure founded on compacted firm formation or directly on a rock formation. It is normally poured using "slip form" technique. The concrete structure is up to 300mm less deep between formation level and finished running rail level than conventional ballasted track using sleepers.

For OHLE and the electrically live pantograph of a 25kV AC electric train to pass under an over-line structure, bridge or tunnel, requires of the order of 500mm more vertical clearance at centre line than is required for trains without overhead electrical power supply. [However, please note the complete analysis is more complex than this, including: the shape of the top of standard passenger train rolling stock is arched, the pantograph is a horizontal fitting about 2.2m wide with a requirement for electrical clearance, rather than simply passing clearance, that is also dependant on the elasticity of the OHLE against which it bears].

Things made of concrete, like slab track, may have a high compressive strength but when the concrete is first poured and the cement has only just been mixed with water it has no strength at all. Cement gains strength up to a maximum at about 28 days from pouring. It is common practice on construction jobs to remove "shuttering" (the mould) the day after concrete has been poured but 1 day old concrete can do little more than carry its own weight, it cannot have new loads imposed on it, neither can it be subjected to vibration such as drilling for rail fastenings or ground-borne vibration from traffic on an adjacent track. This means that when "slab track" - a continuous concrete base on which the steel railway track components are assembled is poured it must:

- (i) be given time to "cure" before it can be drilled for rail fixing and then run over, and
- (ii) not be subjected to direct or ground borne vibration levels that could cause micro-cracking of concrete that has not yet developed adequate strength.

For these reasons railway routes must be closed for relatively extended periods if a length is to be rebuilt as "slab track" . There are various techniques for reducing the closure time a little but they do not escape from the fundamental requirement to let the concrete foundation cure and reach strength before it can be run on by 120 tonne locomotives.

Hence, it will be particularly important for the Wales/ Bristol to south coast train services, Wales - Bristol - Bath - Bradford-on-Avon - Westbury etc, that NR try to avoid any need for "slab track" in the Sydney Gardens area and the associated line closure whilst it is installed. These services would be broken in two if there were to be a "blockade" at Sydney Gardens.

More Bathonians will be concerned about extended interruption of our main line services to London, but during the electrification programme disruption of services on this route will be fairly inevitable. However, as described above, it is possible for the impact of medium term closure of Box Tunnel to be mitigated.

Box Tunnel.

The Sydney Gardens group of structures should not need "slab track" and all the "track possession" impacts that this technique implies, but the survey data does indicate that the 1mile 1452yard Box Tunnel does include some more difficult lengths. The problems might be resolved by excavating out all track ballast through the whole length of the tunnel, further excavation through rock to a new formation level, then lay "slab track" throughout the length of the tunnel. (It may also be important to keep in mind that "slab track" can be very noisy and transmit more ground-borne vibration than conventional track on ballast - it will be important to consider what is kept in the adjacent caverns today.)

A weakness of this approach is that clearance for OHLE is really only particularly tight at two discrete lengths, around 99ml 45ch 10yds and around 99ml 19ch 12yds where low arch structures have been inserted at a date after original construction in order to support a failed or failing length of the intrados of the excavation and/or tunnel structure. However, the real problem is that at about the position of the first interior buttress arch there is an underground river and pool passing under the railway which constrains scope for excavation of the track bed formation downwards - unless a new "under-line" bridge structure is to be built at this point within the tunnel. We do not have the exact chainage of this underground river and pool, but it would be a reasonable assumption that this was the cause of a failure of the tunnel structure above and explain the need for one of the interior buttress arches.

In addition, at 99ml 46ch 12yds, 99ml 49ch 15yds and 99ml 52ch 9yds amongst others, there are bulges in the tunnel intrados that may be stable rock intrusions or may be failed brick-lining, and all may warrant structural attention before 25kV OLHE is installed.

Taken together, this indicates that it may be more beneficial to examine all of the failed lengths in detail and re-construct these support arch structures in such a way as to allow adequate clearance above track on ballast at about the level of the tracks today, and deal properly with the "bulges" in the intrados, rather than say too quickly that "slab track" will fix the problem. - There is even the risk that over-zealous track-bed excavation might make matters worse at the underground river and pool.

West of Bath Spa Station.

The Brougham Hayes bridge is listed by NR as "R" for "reconstruct" or since it is a steel structure the engineers might be thinking of "raising" it, jacking it up using hydraulic jacks then reconstruct abutment supports and the highway pavement to meet both ends afterwards. The Bath & NES Highways Engineer should keep a close watch on what is proposed to be carried out. As anyone who drives up - or down - Brougham Hayes knows, the existing bridge already presents a hump with a sharp corner (and a busy road junction) to the south and a zebra crossing outside Hayesfield Lower School to the north. If the bridge is simply raised the problems associated with the hump: poor driver sight lines and a steepened gradient northbound approaching the zebra crossing at the school, will be exacerbated. If the bridge is removed and replaced with a completely new structure it will be advisable to utilise a skinny structure making efficient use of available structural depth to provide a raised soffit (underside) without raising the highway. NR should have opened discussion of the options and their impacts with the Bath & NES Highway Engineer.

Track lowering at Brougham Hayes may have been ruled out because of the need to lower all the sidings and crossover connections in the Westmoreland Rd yard area. However, at Brook Road (107-76-0) track is to be lowered, given the shape of the bridge and the survey data, probably by as much as 400mm. With no track lowering at Brougham Hayes, 600m away, this would be an acceptable track gradient but the platforms of Oldfield Park Station would need to be rebuilt. It might be more sensible not to touch the platforms of Oldfield Park Station but to spend the money thus saved on rebuilding Brook Road Bridge with a new wider carriageway and a pavement for pedestrians on both sides - even if the B&NES Highway Engineer were to choose to keep the road as one way, southbound only. Again, NR should have discussed the options and their impacts with the Local Authority.

The Somerset & Dorset bridge at 108miles 9chains is not on the list noted down but is definitely foul of gauge. Perhaps the NR engineer is coupling it in his mind with the adjacent "Hayters" Bellots Rd bridge (108-09-0). Track lowering will have implications for track drainage and I think I remember (from 30-something years ago) there were drainage problems in this length in cutting between Brougham Hayes and the beginning of the Twerton Viaduct.

■ Over-Head Line Equipment, its construction and appearance.

View from the "green rim".

The railway has not been installing steel gantry structures at sequential plain line OHLE support locations for many years. Standard form of construction is to use "head span" cable stayed arrays supporting the catenary that in turn supports the 25kV contact wire. The catenary cable structure has itself also been simplified over the years, particularly where line speed is under 100mph. This should mean that over the most sensitive length in terms of the view of the central area of the city from the "green rim", the curve around the Cricket Ground, over St James Bridge, through the station and then over the Skew Bridge, it will be possible to keep the "knitting" fairly unobtrusive. The mast, cable and strut support system could be further reduced in its visual impact if carbon fibre support cables and compressive strut members were to be used. I do not know whether NR's OHLE designers have thought about using these types of modern materials but we might draw to their attention that the Secretary of State for Business was recently in Bristol opening a new R&D facility aimed at making this area and the UK world leaders in the use of these modern structural materials as well as the more widely known new technologies.

Sydney Gardens.

Within the Sydney Gardens length, discussed above, the visual impact issues will be different. Not the problems associated with the view from the "green rim" some distance away, but rather the problems of appearance from nearby and appearance of detail when associated with architectural detail within Sydney Gardens. A system of "overhead contact bar" was first developed a number of years ago by a Swiss company for installation in tunnels where clearance is limited and has recently been approved for high speed train operations. This equipment has been approved for use on the railway here in Britain and has been adopted at a few particularly difficult locations. Through the Sydney Gardens length the overhead contact bar system would enable the OHLE structure to be considerably simplified and thereby greatly reduce the visual impact on this particular part of our valued environmental and architectural heritage. At the same time, use of the overhead contact bar system through the Sydney Gardens group of structures would tighten down the structural depth required for the OHLE system, thereby reduce the extent of track lowering required, and make it certain that "slab track" would not be required here.

In conclusion on Electrification through the Bath area.

If Bath & NES can arrange some consultative meetings with NR on the impacts of their proposals on our local environment, that is to say: an interactive discussion and exchange of views and proposals rather than just NR telling Bath & NE Somerset what they (NR) are going to do, I would be very happy to attend as a Bath & NES railway engineering consultant. Over the years whilst I have been doing this sort of thing for the deep sea ports and others we have actually been able to achieve quite a lot in terms of changes to schemes designed by or for the railway infrastructure operator without adequate consideration of impacts on other parties, my clients. Bath is a World Heritage City, but it is also worth noting that UNESCO considered listing the whole of Brunel's Great Western Railway as a World Heritage Site and as such even the NR "permitted development rights" are constrained to respect the historic status of this railway and should, reasonably, therefore be expected to respect ours too.

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January 2012*