Worcestershire Minerals Local Plan Background Document

Water Transport

Background Document

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Executive Summary

1.1. Mineral products are generally used within a 30-mile radius of a quarry and so tend to be transported by road.[1] However, the impacts of road transport, including traffic congestion, carbon emissions and road noise are important issues[2], and we need to consider alternative ways to transport minerals in order to minimise these impacts.

1.2. In the UK, every year fewer than a million tonnes of aggregates are transported by inland waterways, but this has the potential to rise.

1.3. The concept of moving aggregate minerals by water has already been established in Worcestershire, with Cemex using water-borne vessels to deliver excavated material two miles along the River Severn from the company's Ripple quarry to its processing plant two miles away at Ryall.

1.4. All the bodies responsible for managing the waterways in Worcestershire are supportive of increasing movement of freight by water transport where possible, where environmental and social impacts can be managed, and where this can be achieved alongside the continued use of the waterways by leisure craft.

1.5. The Transport Act 1968 divides waterways into three categories[3]:

- Commercial Waterways principally available for the commercial carriage of freight;
- Cruising waterways principally available for cruising, fishing and other recreational purposes; and
- The remainder (Remainder Waterways).

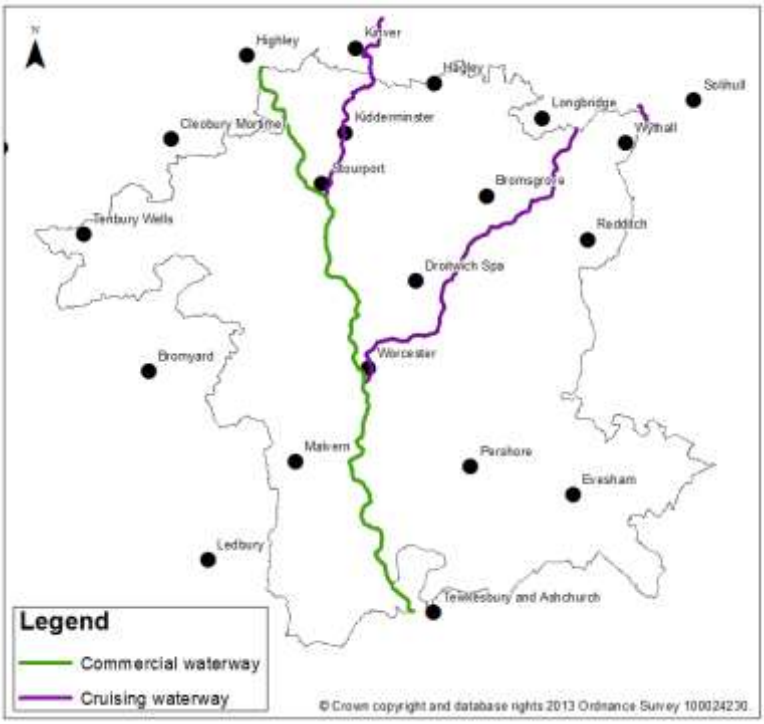
1.6. The Commercial and Cruising Waterways in Worcestershire are listed below and shown in Figure 1.

- Commercial Waterways:
  - the River Severn from Stourport to its junction with the Gloucester and Sharpness Canal at Gloucester

- Cruising Waterways:
  - The Staffordshire and Worcestershire Canal
  - The Stratford-on-Avon Canal from its junction with the Worcester and Birmingham Canal at King's Norton to its junction with the Grand Union Canal at Kingswood
  - The Worcester and Birmingham Canal.

[1] Mineral Products Association, *General Issues: Transportation of mineral products* http://www.mineralproducts.org/iss_key01.htm#transportation [accessed 30.08.2018].
[2] Agg-Net, *Aggregate Transportation* https://www.agg-net.com/resources/articles/transport-distribution/aggregate-transportation [accessed 30.08.2018].
[3] Office of Public Sector Information (OPSI) Transport Act 1968 (c.73) (2009) Weblink to Transport Act 1968

Figure 1. Commercial and Cruising Waterways in Worcestershire



1.7. Experiences elsewhere in Europe and examples of successful waterway traffic in the UK show that inland waterways can provide viable and environmentally friendly freight transport. However, there are a number of barriers to the rapid development of waterborne freight in the UK, including a perceived lack of suitable vessels, a planning system that fails to address water freight transport needs, and inadequate promotion of waterway freight.

1.8. When considering waterways for freight transport, there is a need to take account of the availability and suitability of wharves for loading and unloading vessels and for onward distribution of cargo. Another important issue to consider is that, once cargo is on a waterway, there are generally no ready alternatives if the main route is temporarily or permanently blocked. The predominance of leisure uses on inland waterways means that careful management is required to ensure the co-existence of freight and leisure craft.

1.9. Inland waterways have the potential to reduce congestion and to reduce the impact of road transport. Aggregates form the greatest volume cargo transported by inland waterway, and there is the potential for further growth in this area. Planning can influence this through protecting existing wharves and freight traffic facilities, promoting new wharves, and encouraging new land uses to make use of water transport.[4]

1.10. Where movement by inland waterways is proven to be unviable, grants may be are available through the government's Mode Shift Revenue Support grant scheme for 'Bulk and Waterways', which is designed to support the movement of all freight on inland waterways where it would otherwise be moved by road.

[4] Association of Inland Navigation Authorities on behalf of the Department for Transport and the Department for Environment, Food and Rural Affairs (2004) *Planning for Freight on Inland Waterways* [accessed 30.08.2018 from https://canalrivertrust.org.uk/media/library/1265.pdf]

1.11. Some care may be needed when considering planning conditions to secure water transport, as such conditions may prevent developments from being eligible for grant aid and therefore put at risk the viability of water transport, although without a planning condition, there would be little ability to ensure that water transport takes place or will not revert to road transport.

1.12. The Minerals Local Plan should include a positive policy framework to encourage and enable movement of freight by water and to safeguard any associated facilities during the life of the plan.

Contents

2. Introduction

Context

2.1. The Council has a statutory duty to produce a Minerals Local Plan (MLP) to deliver minerals development. The current Hereford and Worcester MLP was adopted in 1997 and needs to be updated to reflect current policy, practice and guidance. The new Minerals Local Plan will replace the existing Minerals Local Plan and will be a Development Plan Document which is used to guide new development and determine planning applications.

2.2. The Minerals Products Association states that "Mineral products are generally used within a 30-mile radius of a quarry and so tend to be transported by road."[5] However, the impacts of road transport, including traffic congestion, carbon emissions and road noise are important issues[6], and we need to consider alternative ways to transport minerals in order to minimise these impacts.

2.3. This document explores the potential for the transportation of minerals by water in Worcestershire and provides background evidence to inform the development of the Minerals Local Plan. In the UK, every year fewer than a million tonnes of aggregates are transported by inland waterways but, by restoring canals and abandoned waterways, the volume of aggregates being distributed in this way has the potential to rise[7].

2.4. For some types of cargo, the biggest problem with water freight is that it can be slow and unable to compete with 'just in time' deliveries such as food and parcels, but for bulk loads such as minerals this is less important and can remove a substantial number of lorries from the roads[8].

2.5. The concept of moving aggregate minerals by water has already been established in Worcestershire, with Cemex using water-borne vessels to deliver excavated material two miles along the River Severn from the company's Ripple quarry to its processing plant two miles away at Ryall.

2.6. Rail transport is sometimes used for long-distance haulage[9] and is discussed in a separate background document on rail freight.

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[5] Mineral Products Association, *General Issues: Transportation of mineral products* http://www.mineralproducts.org/iss_key01.htm#transportation [accessed 18/12/2013].
[6] Agg-Net, *Aggregate Transportation* https://www.agg-net.com/resources/articles/transport-distribution/aggregate-transportation [accessed 31.08.2018].
[7] Agg-Net, *Aggregate Transportation* https://www.agg-net.com/resources/articles/transport-distribution/aggregate-transportation [accessed 31.08.2018].
[8] Internal email communication from Worcestershire County Council's Sustainable Schemes Team to the Minerals Planning Policy Team (07.02.2014).
[9] Mineral Products Association, *General Issues: Transportation of mineral products* http://www.mineralproducts.org/iss_key01.htm#transportation [accessed 31.08.2018].

3. Responsible Bodies

Canal & River Trust

3.1. The Canal & River Trust is a charitable trust with responsibility for 2,000 miles of waterways in England and Wales.

3.2. Canals were originally built to transport goods around the country and although the carriage of freight is no longer the main purpose of the waterway network, there continues to be a role for freight by water[10]. The Trust states that "*There has been growing interest in the potential for freight traffic as fuel costs have risen and awareness of the environmental benefits of freight by water has increased. Wherever we can do so cost effectively, the Canal & River Trust endeavours to facilitate freight on our larger waterways. In recent years we've focused on aggregates, container, waste and recycling sectors in particular.*" [11]

3.3. The Canal & River Trust responded to the First Stage Consultation on the Minerals Local Plan, setting out their interests in Worcestershire, including the Staffordshire and Worcestershire Canal, the Worcester and Birmingham Canal, the Droitwich Canal[12] and the River Severn Navigation. The Trust stated that: "*while the scope for transporting freight on waterways may be limited due to the size of the navigations and the available navigation routes, where it is appropriate to move freight by water this option should not be disregarded. [The] Canal & River Trust are aware that minerals/materials are currently transported by barge along the River Severn, demonstrating that due to its size and available navigation routes, it is appropriate to move freight by water.*" [13]

3.4. In addition, the Trust suggested that working minerals adjacent to waterways could have benefits such as accommodating materials dredged from canals either for reprocessing for aggregates or for use in restoration schemes, and that mineral site restoration schemes might be able to accommodate marina and mooring basin developments. However, the Canal & River Trust would require any mineral development adjacent or in proximity to the Staffordshire and Worcestershire Canal, Worcester and Birmingham Canal, Droitwich Canal or River Severn Navigation to "*not adversely affect the integrity of the waterway structure, quality of the water, result in unauthorised discharges and run off or encroachment; detrimentally affect the landscape, heritage, ecological quality and character of the waterways; prevent the waterways potential for being fully unlocked or discourage the use of the waterway network.*" [14]

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[10] Canal & River Trust, *Freight* Weblink to Canal & River Trust freight page [accessed 31.08.2018]
[11] Canal & River Trust, *Freight* Weblink to Canal & River Trust freight page [accessed 31.08.2018]
[12] The Droitwich Canal consists of the Droitwich Barge Canal and the Junction Canal.
[13] Canal & River Trust response to *Worcestershire Minerals Local Plan First Stage Consultation*, response reference A24-1280.
[14] Canal & River Trust response to Worcestershire Minerals Local Plan First Stage Consultation, response reference A24-1280.

Avon Navigation Trust

3.5. The Avon Navigation Trust is the statutory navigational authority for the River Avon. The navigable River Avon runs from Alveston Weir, above Stratford-upon-Avon, for 46 miles (74km) through Warwickshire, Worcestershire and Gloucestershire, to Tewkesbury, where it joins the River Severn[15].

3.6. The River Avon was one of the first natural rivers to be 'improved' by the construction of weirs and locks to allow the regular passage of barges transporting goods up and down the waterway, although the river is currently only used by non-commercial traffic. The Avon Navigation Trust is strongly in favour of developing and promoting the use of the River Avon Navigation for commercial carrying[16].

Association of Inland Navigation Authorities

3.7. The Association of Inland Navigation Authorities (AINA) was set up in 1996 to provide a single voice for waterway management and operation. The broad purpose of the AINA is to facilitate the management and development of inland waterways as an economic, environmental, and social resource[17].

3.8. The AINA defines 'inland waterways' as including all navigable and operational, non-tidal channels including rivers, canals and lakes, and all associated land and assets such as lock sites, towpaths and amenity areas - in other words any land which has an impact on, or relationship with an operational waterway. These inland waterways may be in public ownership, have public access, or be privately owned[18].

The AINA reports that "there is scope to increase the use of the traditional narrow and broad canals for freight movement"[19]. However, due to the fact that only a very small minority of AINA members have any interest in water freight, AINA took a policy decision in 2006 to exclude water freight issues from its future work programme[20].

[15] Avon Navigation Trust Weblink to Avon Navigation Trust website [accessed 01.09.2018]
[16] Email (10.02.2014) from Clive Matthews, General Manager of Avon Navigation Trust in response to initial consultation on Worcestershire's draft *Water Transport* background document.
[17] Association of Inland Navigation Authorities, *About AINA* Weblink to 'About AINA' website [accessed 31.08.2018]
[18] Association of Inland Navigation Authorities, *About AINA* Weblink to 'About AINA' website [accessed 31.08.2018]
[19] Association of Inland Navigation Authorities on behalf of the Department for Transport and the Department for Environment, Food and Rural Affairs (2004) *Planning for Freight on Inland Waterways* (citing The Freight Study Group/DEFRA (2002) *Freight on Water - A New Perspective: The Report of the Freight Study Group* [accessed on 31.08.2018 from https://canalrivertrust.org.uk/media/library/1265.pdf]
[20] Association of Inland Navigation Authorities (2012) *Water Freight* Weblink to AINA freight website [accessed 24/12/2013]

Inland Waterways Association

3.9. The Inland Waterways Association is a registered charity that works to protect and restore canals and rivers and campaigns for the use, maintenance and restoration of Britain's inland waterways[21]. More than 500 miles of canals and navigable rivers have been re-opened to public use since the association was founded in 1946.

3.10. The Inland Waterways Association supports the use and development of freight carriage on UK inland waterways, where this is sustainable in economic, environmental and social terms and believes in multi-functional use of waterways by freight and leisure craft[22]. The association has a dedicated Freight Group as a sub-committee of its navigation committee.

3.11. Many types of cargo can be carried on inland waterways but costs of cargo handling influence competitiveness. Dry and liquid bulk cargoes are typically important as they can be loaded and discharged efficiently[23].

3.12. The Inland Waterways Association considers that there is untapped potential for transfer of freight to inland waterways but that this is constrained in the UK by a number of barriers[24], including:

- lack of appropriate continuing development of waterway infrastructure, for example, raising bridge headrooms to facilitate use of container barges;
- lack of operational experience in many types of industry, where transport managers are unfamiliar with processes, availability and costs, so rarely consider waterborne transport as an option;
- lack of knowledge about water-freight operational issues in some navigation authorities;
- inadequate promotion of waterborne freight as a modern transport mode;
- lack of immediate availability of suitable vessels or trained crew in some cases;
- a planning system that does not adequately take account of waterway freight transport infrastructure needs at national, regional or local levels;
- the lack of co-ordination between Government departments on waterborne freight transport matters, where Defra is responsible for supporting waterways managed by the Canal and River Trust, the Environment Agency and the Broads Authority, the Department for Transport is responsible for shipping and freight grants and the Department of Communities and Local Government is responsible for planning.

[21] Inland Waterways Association, *About Us* Weblink to Inland Waterways Association 'About us' webpage [accessed 03.09.2018]
[22] Inland Waterways Association, *IWA Policy on Freight on Inland Waterways* https://www.waterways.org.uk/pdf/freight_policy [accessed 03.09.2018]
[23] Inland Waterways Association, *IWA Policy on Freight on Inland Waterways* available from Weblink to IWA freight document [accessed 03.09.2018]
[24] Inland Waterways Association, *IWA Policy on Freight on Inland Waterways* available from Weblink to IWA freight document [accessed 03.09.2018]

4. Policy context

European policy

4.1. The European Commission supports a modal shift away from road transport to the greater use of inland waterways:

"*Compared to other modes of transport which are often confronted with* congestion *and capacity problems, inland waterway transport is characterized by its reliability, its low environmental impact and its major capacity for increased exploitation. The European Commission aims to promote and strengthen the competitive position of the inland waterway transport in the transport system, and to facilitate its integration into the intermodal logistic chain.*

Inland waterway transport is a competitive alternative to road and rail transport. In particular; it offers an environment friendly alternative in terms of both energy consumption and noise and gas emissions. Its energy consumption per km/ton of transported goods is approximately 17% of that of road transport and 50% of rail transport. Its noise and gaseous emissions are modest. In addition, inland waterway transport ensures a high degree of safety, in particular when it comes to the transportation of dangerous goods. Finally it contributes to the decongestion of the overloaded road network in densely populated regions." [25]

National context

The Transport Act 1968

4.2. The provisions of the Transport Act 1968 divide waterways into three categories[26]:

- Commercial Waterways principally available for the commercial carriage of freight;
- Cruising waterways principally available for cruising, fishing and other recreational purposes; and
- The remainder (Remainder Waterways).

4.3. The Waterways Board (which became British Waterways and whose responsibilities have now transferred to the Canal & River Trust) were given a duty to secure the general availability of the commercial and cruising waterways for public use by:

- maintaining the commercial waterways in a suitable condition for use by commercial freight-carrying vessels; and
- maintaining the cruising waterways in a suitable condition for use by cruising craft (vessels constructed or adapted for the carriage of passengers and driven by mechanical power).

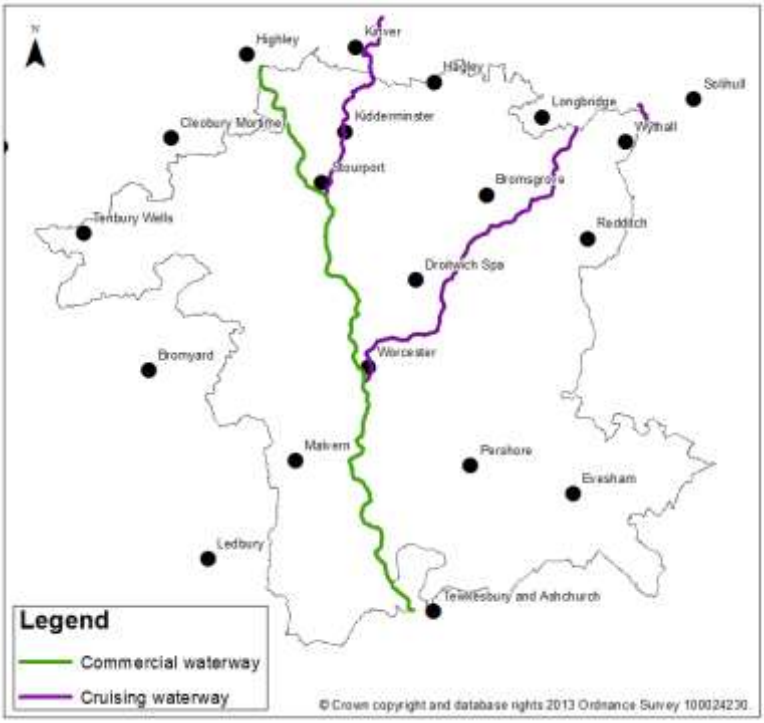
[25] European Commission, *Inland Waterways* Weblink to European Commission's inland waterways webpage [accessed 03.09.2018]
[26] Office of Public Sector Information (OPSI) Transport Act 1968 (c.73) (2009) Weblink to Transport Act 1968

4.4. Schedule 12, Part I of the Act sets out the Commercial Waterways and Schedule 12, Part II identifies Cruising Waterways[27]. All other waterways are classed as "remainder" waterways and are not listed in the Act. The Commercial and Cruising Waterways in Worcestershire are listed below and shown in Figure 2:

- Commercial Waterways:
  - the River Severn from Stourport to its junction with the Gloucester and Sharpness Canal at Gloucester

- Cruising Waterways:
  - The Staffordshire and Worcestershire Canal
  - The Stratford-on-Avon Canal from its junction with the Worcester and Birmingham Canal at King's Norton to its junction with the Grand Union Canal at Kingswood
  - The Worcester and Birmingham Canal.

Figure 2. Commercial and Cruising Waterways in Worcestershire



Waterways for Tomorrow (2000) and 2007 Review

4.5. Waterways for Tomorrow (WfT) was published in 2000 setting out proposals for the future of inland waterways in England and Wales. It stated that the Government wanted to "*promote the inland waterways, encouraging a modern, integrated and sustainable approach to their use... [and] to maximise the opportunities the waterways offer for leisure and*

[27] Office of Public Sector Information (OPSI) Transport Act 1968 (c.73) (2009) Weblink to Transport Act 1968

recreation; as a catalyst for urban and rural regeneration; for education; and for freight transport."[28]

4.6. The document stated that there is scope to increase the amount of freight carried on the inland waterways, particularly the larger river navigations and canals which still carry some freight, and that they are particularly suited to bulk cargoes whose origins and destinations are directly accessible by water, such as aggregates. It stated that the Government wanted to encourage the transfer of freight from roads to waterborne transport and was considering enhancements to the Freight Facilities Grant scheme which can help companies proposing to move freight by water rather than by road.[29]

4.7. A review was conducted in 2007[30] to evaluate what had been achieved since the publication of WfT. It stated that in the context of Government concern about carbon emissions, the level of support for water transport in WfT might be regarded as rather modest.

4.8. It concluded that experiences elsewhere in Europe and examples of successful waterway traffic in the UK showed that inland waterways can provide viable and environmentally friendly freight transport. However, there are a number of barriers to the rapid development of waterborne freight in the UK, including a perceived lack of suitable vessels, a planning system that fails to address water freight transport needs, and inadequate promotion of waterway freight[31].

Planning for Freight on Inland Waterways: A Good Practice Guide[32]

4.9. This good practice guide was developed by the Association of Inland Navigation Authorities to show, through practical advice and examples, how good planning can help support and encourage the use of inland waterways for freight transport.

4.10. The good practice guide states that all types of waterway have some potential for freight transport but that waterway dimensions vary considerably, which has a corresponding effect on the size of vessel that can be accommodated. Generally the large waterways with access to ports and the coast will have the greatest potential for carrying significant

[28] Department for Environment, Food and Rural Affairs (2000) *Waterways for Tomorrow*.
[29] Department for Environment, Food and Rural Affairs (2000) *Waterways for Tomorrow*.
[30] Inland Waterways Advisory Council (October 2007) *The Inland Waterways of England and Wales in 2007: What has been achieved since the publication of Waterways for Tomorrow in June 2000 and what needs to be done*, available from http://issuu.com/waterwaysassoc/docs/waterways_fortomorrow_review_07_10?mode=window&viewMode=doublePage [accessed 03.09.2018]
[31] Inland Waterways Advisory Council (October 2007) *The Inland Waterways of England and Wales in 2007: What has been achieved since the publication of Waterways for Tomorrow in June 2000 and what needs to be done*, available from http://issuu.com/waterwaysassoc/docs/waterways_fortomorrow_review_07_10?mode=window&viewMode=doublePage [accessed 03.09.2018]
[32] Association of Inland Navigation Authorities on behalf of the Department for Transport and the Department for Environment, Food and Rural Affairs (2004) *Planning for Freight on Inland Waterways* [accessed 03.09.2018 from https://canalrivertrust.org.uk/media/library/1265.pdf]

volumes of freight. The broad waterways and narrow canals are less suitable but may nevertheless be capable of accommodating localised, specialist markets.[33]

4.11. The document divides waterways into four categories and describes some of their characteristics and other roles[34]:

- Estuaries and tidal rivers
  - Seagoing traffic extending journey inland
  - Suitable for bulk carriage and containers
  - Also used for land drainage, aggregate extraction (dredging) and some leisure use

- Large non-tidal waterways (e.g. River Severn)
  - Lock size determines craft size, but considerably larger than broad waterways
  - Vessel payload in hundreds of tonnes
  - Suitable for bulk carriage, may be suitable for containers
  - Also used for land drainage and some leisure use

- Broad waterways
  - Locks approximately 4.5m wide and up to 30m long
  - Vessel payload 50-100 tonnes
  - Suited to specialist markets such as aggregates
  - Also used for land drainage, leisure use of towpath and significant leisure use of waterway which may restrict capacity for freight

- Narrow canals
  - Locks approximately 2.1m by 21m
  - Vessel payload typically 20-25 tonnes
  - Also used for land drainage, leisure use of towpath and significant leisure use of waterway which may restrict capacity for freight.

4.12. Characteristics of waterways which need to be taken into account when considering freight transport include the need for wharves for loading and unloading vessels and for onward distribution of cargo, the fact that waterways are usually single routes with no alternative waterway route if the main route is temporarily or permanently blocked, and the predominance of leisure uses on inland waterways which means that

[33] Association of Inland Navigation Authorities on behalf of the Department for Transport and the Department for Environment, Food and Rural Affairs (2004), *Planning for Freight on Inland Waterways* [accessed 03.09.2018 from https://canalrivertrust.org.uk/media/library/1265.pdf]

[34] Association of Inland Navigation Authorities on behalf of the Department for Transport and the Department for Environment, Food and Rural Affairs (2004), *Planning for Freight on Inland Waterways* [accessed 03.09.2018 from https://canalrivertrust.org.uk/media/library/1265.pdf]

careful management is required to ensure that freight and leisure uses can co-exist[35].

4.13. The good practice guide states that inland waterways have the potential to reduce congestion and to reduce the impact of road transport. Aggregates form the greatest volume cargo transported by inland waterway and there is further potential for growth in this area. Planning can influence this through protecting existing wharves and freight traffic facilities or promoting new wharves, and encouraging new land uses to make use of water transport[36]. Some care may be needed when considering planning conditions to secure water transport, as such conditions may prevent developments from being eligible for grant aid and therefore put at risk the viability of water transport. Without a planning condition, however, there would be little ability to ensure that water transport takes place or that the site would not revert to road transport.

Grant aid

4.14. The Department for Transport supports the shift away from road to rail and water transport through the Mode Shift Revenue Support (MSRS) and Waterborne Freight Grant (WFG) schemes.

Mode Shift Revenue Support (MSRS)

4.15. MSRS assists companies with the operating costs associated with running rail or inland water freight transport instead of road, where rail or inland waterway transport is more expensive. It is designed to facilitate and support modal shift, generating environmental and wider social benefits from reduced lorry journeys on Britain's roads[37]. The scheme operates in two parts:

- MSRS (Intermodal) for the purchase of intermodal container movements by rail; and
- MSRS (Bulk and Waterways) for the purchase of other freight traffic movements by rail and all movements by inland waterway.

4.16. MSRS (Bulk and Waterways) is designed to support the movement of all freight on inland waterways where it would otherwise be moved by road. Each grant is limited by the value of the identified environmental benefits and/or the financial need for the grant as demonstrated through a financial appraisal. Applications are assessed on an individual basis.

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[35] Association of Inland Navigation Authorities on behalf of the Department for Transport and the Department for Environment, Food and Rural Affairs (2004), *Planning for Freight on Inland Waterways* [accessed 03.08.2018 from https://canalrivertrust.org.uk/media/library/1265.pdf]

[36] Association of Inland Navigation Authorities on behalf of the Department for Transport and the Department for Environment, Food and Rural Affairs (2004), *Planning for Freight on Inland Waterways* [accessed 03.09.2018 from https://canalrivertrust.org.uk/media/library/1265.pdf]

[37] Department for Transport, *Mode shift revenue support (MSRS) scheme 2015 to 2020* *Weblink to DfT's MSRS guidance* [accessed 03.09.2018]

4.17. This grant would not be paid if the service could be commercially justified without the support of the grant, or would proceed in any event without it, or where use of inland waterways is a planning or other legal requirement on the site from where the freight is to be carried. This means, therefore, that a planning condition requiring water transport might prevent a grant application being approved and could jeopardise the viability of the development. However, there may be some flexibility in this if the freight would move by road to or from a different site rather than the one restricted to waterway[38].

4.18. In calculating the benefits of moving to water transport, the Department for Transport has identified specific values, known as 'mode shift benefits', which quantify the value of taking a lorry off different categories of road. In some cases there may also be onward road journeys from the end rail or water destination. These journeys are classed as disbenefits and will need to be subtracted from the calculated benefits.

Waterborne Freight Grant (WFG)

WFG can assist a company with the operating costs associated with running waterborne freight transport instead of road, where transport by water is more expensive[39]. However, the grant only applies to coastal and short sea shipping and is therefore unlikely to be applicable to minerals sites in Worcestershire.

National Planning Policy

National Planning Policy Framework (NPPF)

4.19. The National Planning Policy Framework (NPPF) seeks to focus significant development on locations "which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health"[40]. Encouraging the transfer of freight from roads to waterways has the potential to reduce CO_2 emissions, traffic congestion and HGV accidents.

4.20. Opportunities for sustainable modes of transport to be taken up will depend on the nature and location of a site but could reduce the need for major transport infrastructure. Improvements to the transport network (including waterways) might cost-effectively limit significant impacts of development, and the NPPF states that "Development should only be prevented or refused on highways grounds if there would be an

[38] Department for Transport (April 2015) *Guide to Mode Shift Revenue Support (MSRS) Scheme* [available from Weblink to DfT's MSRS guidance, accessed 03.09.2018]
[39] Department for Transport, *Waterborne freight grant scheme: guide, 2015 to 2020* Weblink to DfT's Waterborne Freight Grant Scheme [accessed 03.09.2018]
[40] Ministry of Housing, Communities and Local Government (2018) *National Planning Policy Framework*, paragraph 103.

unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe[41].

4.21. The NPPF states that, when assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location; that safe and suitable access to the site can be achieved for all users; and that any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree[42]. It also states that applications should minimise the scope for conflicts between pedestrians, cyclists and vehicles[43].

4.22. The NPPF also requires the safeguarding of existing, planned and potential sites for the bulk transport, handling and processing of minerals; the manufacture of concrete and concrete products; and the handling, processing and distribution of substitute, recycled and secondary aggregate material[44].

National Planning Practice Guidance

4.23. The National Planning Practice Guidance web-based resource does not contain any further guidance for plan-making on sustainable transport. However, it does advocate that Transport Plans, Transport Assessments and Transport Statements can encourage sustainable travel, help to lessen traffic generation and its detrimental impacts, reduce carbon emissions and climate impacts, improve road safety, and reduce the need for new development to increase existing road capacity or provide new roads[45].

[41] Ministry of Housing, Communities, and Local Government (2018) National Planning Policy Framework, paragraph 109
[42] Ministry of Housing, Communities, and Local Government (2018) National Planning Policy Framework, paragraph 108
[43] Ministry of Housing, Communities, and Local Government (2018) *National Planning Policy Framework*, paragraph 110
[44] Ministry of Housing, Communities, and Local Government (2018) *National Planning Policy* Framework, paragraph 204.
[45] Department for Communities and Local Government, *Planning Practice Guidance: Travel plans, transport assessments and statements in decision-taking*, Weblink to relevant Planning Practice Guidance webpage [accessed03/09.2018]

Local policy

Local Transport Plan 2018-2030

4.24. Worcestershire County Council's Local Transport Plan (LTP4) is primarily focussed on passenger transport. It does not include water transport and has no specific water freight policies.

Bromsgrove District Plan 2011-2030

4.25. The Worcester and Birmingham Canal is the only navigable waterway to cross Bromsgrove District.

4.26. Strategic Objective SO6 of the Bromsgrove District Plan is to "encourage more sustainable modes of travel and a modal shift in transport…", and policy BDP16.7 states that "Retail and employment development should make proper provision for freight delivery and collections and should consider using sustainable methods of freight transport". The supporting text to this policy states that "The District's Inland Waterway network including the Worcester and Birmingham Canal may offer short haul high volume and long term opportunities for the sustainable movement of freight through the District. Any freight carriage must be compatible with the canals' roles for leisure, sport and recreation use and as ecosystems".

Redditch Local Plan No.4 (2011-2030)

4.27. There are no navigable waterways in Redditch borough, and no policies or supporting text within the plan relating to waterborne freight.

Wyre Forest Core Strategy 2006-2026

4.28. Wyre Forest district has three main waterways: the River Severn, River Stour and the Staffordshire and Worcestershire Canal. The district's three main towns of Kidderminster, Bewdley and Stourport-on-Severn have been significantly influenced by these waterways.

4.29. The Wyre Forest Core Strategy states that traffic congestion is rapidly increasing within the District and is prevalent within the three towns. The urban areas are experiencing declining air quality and there are two designated Air Quality Management Areas (AQMAs). Minerals developments have the potential to exacerbate these problems, particularly as many of the major roads in the district pass through the urban areas.

4.30. Although there is some focus on the role of waterways in green infrastructure, biodiversity and tourism (Policy CP15 "Regenerating the Waterways"), the Core Strategy states that the district's inland waterway network including the Staffordshire & Worcestershire Canal and the Rivers Severn and Stour offer longer-term opportunities for the sustainable movement of freight through the district.

4.31. Core Policy CP03 "Promoting Transport Choice and Accessibility" requires development proposals to have regard to the traffic impact on the local highway network and major development proposals to demonstrate that they have fully considered access by all modes of transport. It also expects impacts on air quality to be considered.

South Worcestershire Development Plan (2006-2030)

4.32. The rivers Severn, Avon and Teme, the Worcester and Birmingham Canal and the Droitwich Canal run through one or more of the three districts in South Worcestershire (Worcester City, Wychavon and Malvern Hills).

4.33. Policy SWDP 4 "Moving Around South Worcestershire" requires proposals to demonstrate that the location of development will minimise demand for travel, offer genuinely sustainable travel choices and improve road safety.

4.34. The South Worcestershire Development Plan states that the waterways in the area provide opportunities for recreation, tourism and commercial activities and play a crucial role in providing and enhancing wildlife habitats and Green Infrastructure. It also recognises that these uses need to be flexible enough to allow for possible future use of the network for transportation.

Surrounding authorities

4.35. Chapter 5 of this background document considers the potential for transportation of minerals on Worcestershire's waterways. Most of these waterways are not confined to one county, but rather they link to other counties and major urban areas, including Gloucester, Stratford-upon-Avon, and Birmingham.

4.36. These waterways might provide a means for minerals to be transported across the county boundary, both into and out of Worcestershire. It is therefore necessary to consider whether such movements would be supported by surrounding authorities' planning and transport policies. It is possible that minerals could be transported to or from further afield, but minerals are relatively inexpensive to produce and transportation costs therefore have a greater impact on the final price of the mineral (particularly for aggregates minerals); this means it becomes less cost-effective to transport minerals over long distances.

Black Country (Dudley, Sandwell, Walsall and Wolverhampton)

4.37. The Black Country Core Strategy was developed jointly by Dudley Metropolitan Borough Council, Sandwell Metropolitan Borough Council, Walsall Council and City of Wolverhampton Council. The borough of Dudley is adjacent to the northern boundary of Worcestershire. The Black Country Core Strategy addresses the identification and safeguarding of mineral-related infrastructure, although it does not identify any specific water transport facilities. In its response to an earlier draft of this

background document[46], Dudley MBC noted that none of the major waterways identified in the document run from Worcestershire into Dudley borough.

4.38. Dudley MBC supports the principle of transporting minerals by other than the road network, although opportunities for this are very much limited within the Black Country[47].

Birmingham

4.39. The Worcester and Birmingham Canal links Worcestershire with Birmingham and the Stratford-upon-Avon Canal crosses a small part of Worcestershire between Solihull borough and the city of Birmingham.

4.40. The Birmingham Development Plan includes policy TP38 'A sustainable transport network' which promotes improvements and development of water freight routes to support the sustainable and efficient movement of goods.

4.41. The plan suggests that the existing network of canals in Birmingham offers some potential for freight transport, and policy TP42 'Freight' expects developments which involve the transport of bulk materials to make use of rail or water for freight movements wherever practical. It also protects sites which are used or are suitable for inter-modal transfer facilities, including water-borne freight facilities for these uses.

Gloucestershire

4.42. Worcestershire and Gloucestershire are linked by the rivers Severn and Avon which meet at Tewkesbury in Gloucestershire.

4.43. Gloucestershire County Council has developed a technical evidence base document on transport to inform its minerals and waste planning policy[48]. This document states that the Sharpness Docks on the Bristol Channel provide extensive cargo-handling facilities and port-related services, accommodating vessels of up to 6,000 tonnes, handling cargoes including minerals. The River Severn and the Gloucester and Sharpness canal provide Gloucestershire with the possibility to develop sustainable waterborne transport. Additional wharfage potential may also exist on the opposite bank of the River Severn at Lydney Docks in the Forest of Dean.

[46] Email (04.02.2014) from David Piper, Senior Planning Policy Officer, Dudley MBC, in response to initial consultation on Worcestershire's draft *Water Transport* background document.
[47] Email (04.02.2014) from David Piper, Senior Planning Policy Officer, Dudley MBC, in response to initial consultation on Worcestershire's draft *Water Transport* background document.
[48] Minerals & Waste Core Strategies, Joint Technical Evidence Paper WCS-MCS-1 Transport, Living Draft, January 2008, available from https://www.gloucestershire.gov.uk/planning-and-environment/planning-policy/minerals-local-plan-for-gloucestershire/evidence-base-for-the-minerals-local-plan-for-gloucestershire/

4.44. The document states that Sharpness Docks potentially has an advantage over larger docks such as Bristol, as it is cheaper for smaller operators who may be put off using larger, more expensive docks. It has the potential to service specific local needs including the transportation of minerals and waste in Gloucestershire.

4.45. Gloucestershire's publication Minerals Local Plan is supportive of water transportation within and beyond Gloucestershire, and includes policy DM03 part (a) 'Alternatives to road transport', which states that "Mineral development proposals will be permitted that use more sustainable, alternative modes of non-road transport". The supporting text states that "Gloucestershire still contains numerous rail links, navigable waterways and canals that under the right circumstances could be used as an alternative to the movement of minerals by road" and that "Ideally using existing transport infrastructure that supports non-road modes of transport such as rail and inland waterways within and beyond the county, and port facilities for more strategic journeys, should occur wherever possible".

4.46. Neither the plan nor the transport evidence paper make any reference to the constraints for vessels at Tewkesbury locks (discussed further in chapter 5 below). The Worcestershire Minerals Local Plan will need to be developed in close discussion with Gloucestershire County Council and Tewkesbury Borough Council if works to Tewkesbury Locks are required to enable minerals development in Worcestershire.

Herefordshire

4.47. There are no navigable waterways with direct links between Worcestershire and Herefordshire.

Shropshire

4.48. The River Severn links Shropshire with Worcestershire, but is not navigable north of Stourport.

Staffordshire

4.49. Worcestershire and Staffordshire are linked by the Staffordshire and Worcestershire Canal.

4.50. Staffordshire's Minerals Core Strategy does not provide any specific support for the transport of minerals by waterways.

4.51. Staffordshire's Local Transport Plan[49] identifies that the county's navigable inland waters primarily consist of the canal network, with over 200km of canal and canal towpath. These are important resources for recreation, tourism and commuting as well as providing safe off-road transport links between and within urban and rural areas. However, although the Local

[49] Staffordshire County Council, 2011, *Staffordshire Local Transport Plan 2011: Strategy Plan*, available at https://www.staffordshire.gov.uk/transport/transportplanning/localtransportplan/home.aspx

Transport Plan's appendix L (Freight Strategy) notes that the canal network also plays a modest role in moving freight in particular sectors, this is not discussed further and there is no indication of whether this could or should be developed.

Solihull

4.52. A very short length of the Stratford-upon-Avon Canal – less than 1km – passes through the north-east of Worcestershire, continuing either side into Solihull borough. The Solihull Local Plan states that the movement of freight by sustainable modes will be encouraged, particularly via rail and canal networks, but emphasis is given to developing the tourism, leisure and heritage aspects of the canal network, and there is no policy statement encouraging the use of canals for freight transport.

Warwickshire

4.53. The River Avon connects Worcestershire with Warwickshire.

4.54. Warwickshire's Proposed Submission Minerals Local Plan states that "At present there is no bulk transportation of minerals by either rail or inland waterways in Warwickshire and no prospect of different modes of transport becoming available in the foreseeable future". However, it also says that "Although there is no transportation of minerals by canal or rail in the County at present and for the foreseeable future it is a highly sustainable option and should an opportunity arise during the plan period it should be encouraged". Objective (vi) of the plan is to minimise the impact of the movement of bulk materials by road on local communities and where possible encourage the use of alternative modes of transport.

5. Potential for transportation of minerals on Worcestershire's inland waterways

5.1. There are approximately 5,000km of navigable inland waterways in Britain. Out of this total, around 2,100km are classified as 'commercial waterways', which means they are either used for the movement of freight or are deemed to be capable of carrying freight in a commercial way[50]. There is a fairly extensive network of inland waterways in the West Midlands, but a large majority of these are narrow canals which are not classified as commercial waterways. The absence of a network of commercial inland waterways in the West Midlands is likely to mean that only small vessels with a limited cargo carrying capacity can operate to and from the West Midlands.[51] However, the West Midlands Regional Freight Study does

[50] MDS Transmodal Limited and Mott Macdonald (2005) *A Recommended West Midlands Regional Freight Strategy – Final*
[51] MDS Transmodal Limited and Mott Macdonald (2005) *A Recommended West Midlands Regional Freight Strategy – Final*

recognise that some small-scale niche market opportunities are likely to be available[52].

5.2. Although environmental benefits can be gained by moving minerals by water, through relieving road congestion and considerably reducing carbon emissions, the use of inland waterways is limited by the proximity of rivers and canals to minerals sites and onward markets/freight hubs[53]. Waterway dimensions also vary considerably, affecting the size of vessel that can be accommodated[54,55].

5.3. Proposals to increase the navigability of Worcestershire's waterways could have environmental impacts and may need planning permission, although some works may be classed as permitted development. The number of locks on a waterway may also impact on viability of water transport due to the increased time and manpower required to navigate through them.

5.4. There can also be environmental risks from water transport, such as from materials inadvertently entering the water during loading or unloading or whilst in transit. There is also a need to prevent unacceptable impacts on the integrity of waterway structures and quality of the water; prevent unauthorised discharges, run-off or encroachment; and ensure the landscape, heritage, ecological quality and character of the waterways are protected[56].

5.5. Figure 3 shows the distribution of the major waterways in Worcestershire, and Figure 4 shows their classifications as either commercial, cruising or remainder waterways.

[52] MDS Transmodal Limited and Mott Macdonald (2005) *A Recommended West Midlands Regional Freight Strategy – Final*
[53] Agg-Net, *Aggregate Transportation* Weblink to agg-net's aggregate transportation webpage [accessed 04.09.2018].
[54] Association of Inland Navigation Authorities on behalf of the Department for Transport and the Department for Environment, Food and Rural Affairs (2004) *Planning for Freight on Inland Waterways*
[55] Dimension data for the Canal and River Trust navigations can be found at https://canalrivertrust.org.uk/media/original/32433-waterway-dimensions.pdf
[56] Canal & River Trust response to Minerals Local Plan First Stage Consultation, response reference A24-1280.

Figure 3. Major waterways in Worcestershire

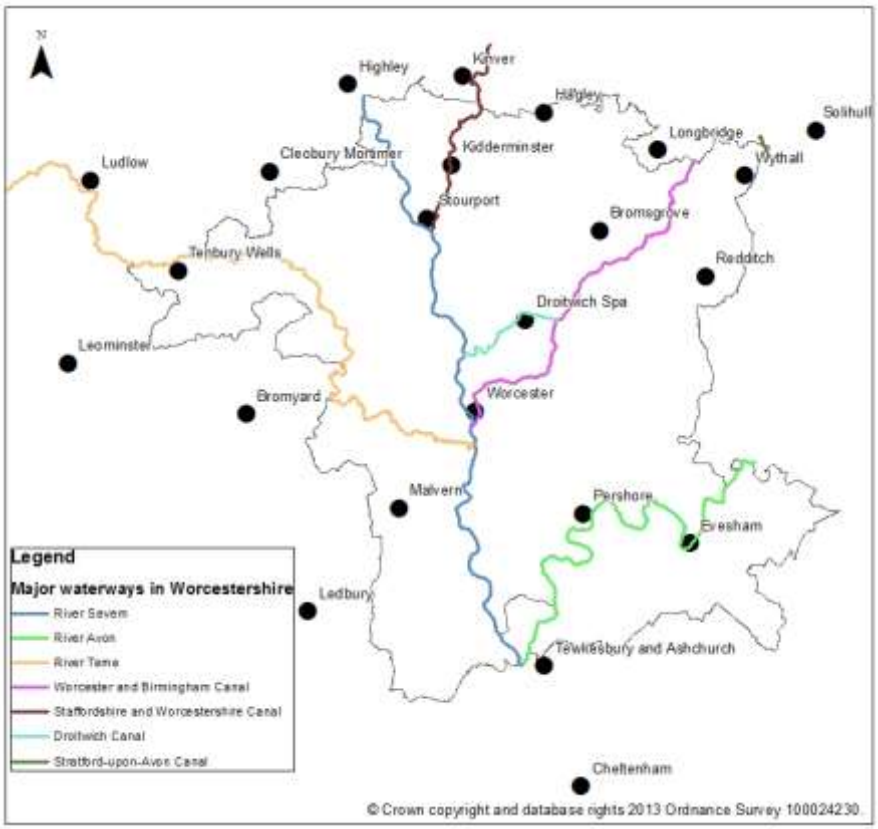
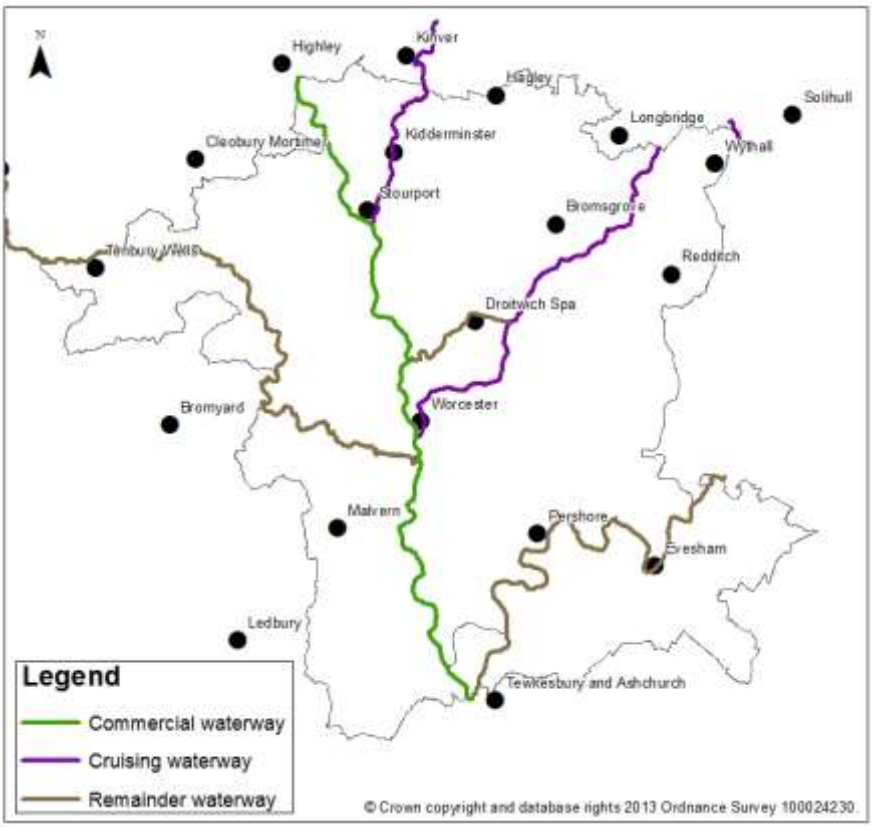


Figure 4. Waterway classification

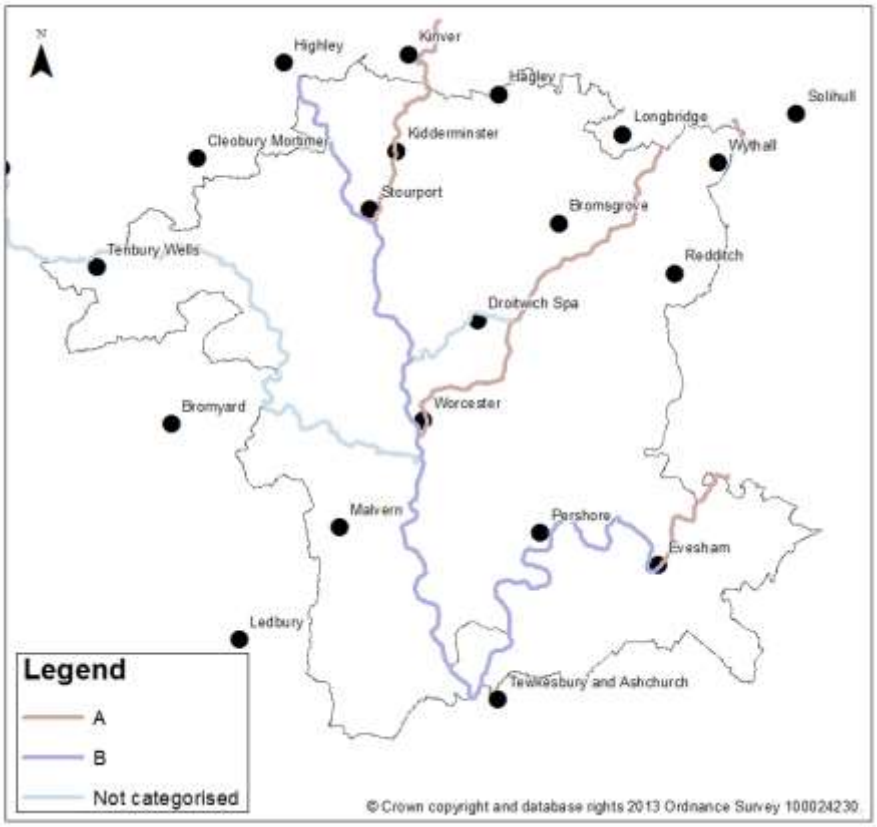


5.6. The Maritime and Coastguard Agency categorise inland waterways in four categories:

- Category A - narrow rivers and canals where the depth of water is generally less than 1.5 metres
- Category B - wider rivers and canals where the depth of water is generally 1.5 metres or more and where the significant wave height could not be expected to exceed 0.6 metres at any time
- Category C - tidal rivers, estuaries and large, deep lakes and lochs where the significant wave height could not be expected to exceed 1.2 metres at any time
- Category D - tidal rivers and estuaries where the significant wave height could not be expected to exceed 2 metres at any time[57]

Categories A and B are shown in Figure 5.

Figure 5. Maritime and Coastguard Agency categories



River Severn

5.7. According to the West Midlands Regional Freight Study, the only 'commercial waterway' in the West Midlands is a 38km section of the River Severn from Stourport to Gloucester[58]. Much of this commercial section is in Worcestershire.

[57] Maritime and Coastguard Agency, Weblink to Maritime and Coastgurad Agency's categorisation of inland waterways [accessed 23/12/2013]

[58] MDS Transmodal Limited and Mott Macdonald (2005) *A Recommended West Midlands Regional Freight Strategy – Final*

5.8. The Inland Waterways Association states that the River Severn is managed as a navigation from Gladder Brook, upstream of Stourport, down to Gloucester where it connects to the Gloucester and Sharpness Ship Canal. It connects to the Staffordshire and Worcestershire Canal at Stourport, the Droitwich Barge Canal at Hawford, the Warwickshire Avon at Tewkesbury, and the Worcestershire and Birmingham Canal at Worcester. There is a right of navigation upstream of Gladder Brook as far as Pool Quay, Welshpool, and the former Severn Navigation Restoration Trust worked for many years to encourage improvement for navigation of this part of the river. The river below Gloucester is navigable but tidal. The navigable river has five locks which are operated by lock-keepers with restricted hours[59].

5.9. Historically, a significant amount of commercial traffic was seen on the river, peaking in the mid-18th century with coal being delivered to the saltworks at Droitwich and other riverside towns, pig iron from the Forest of Dean and Ironbridge Gorge going to forges and various other traffic such as salt, timber and other goods being carried[60]. Today, the River Severn is popular with leisure and tourist boaters. The River Severn has previously been acknowledged as the most underutilised waterway in the country for freight north of Gloucester[61] although minerals are now carried commercially on the river (see case study below).

5.10. The maximum boat size that can navigate the river (between Gladder Brook and Gloucester) is[62]:

- length: 93' 6" (28.49 metres) - Bevere Lock
- beam: 20' 0" (6.1 metres) - Worcester Bridge
- height: 20' 3" (6.2 metres) - Worcester Bridge (at summer level - river levels can fluctuate)
- draught: 6' 1" (1.85 metres) - cill of Lincomb Lock.

[59] The Inland Waterways Association, *River Severn*, Weblink to the IWA's River Severn webpage [accessed 04.09.2018]
[60] Canal & River Trust, *River Severn*, https://canalrivertrust.org.uk/enjoy-the-waterways/canal-and-river-network/river-severn-navigation [accessed 04.09.2018]
[61] Email (07.02.2014) from Sustainable Schemes Team at Worcestershire County Council Highways in response to initial consultation on Worcestershire's draft *Water Transport* background document.
[62] The Inland Waterways Association, *River Severn*, Weblink to the IWA's River Severn webpage [accessed 04.09.2018]

CASE STUDY: MINERALS MOVEMENT ON THE RIVER SEVERN

Minerals are transported by barge on the River Severn in Worcestershire. 180-tonne capacity vessels are used to carry raw materials along the Severn from CEMEX's Ripple quarry near the M50 to its processing plant two miles away at Ryall House Farm Quarry, near Upton upon Severn. The company also trialled barge deliveries of processed aggregate a further 14 miles along the Severn from Ryall to its ready-mixed concrete plant at Gloucester, but this was not continued.

Fully laden barge leaving Ripple Quarry and empty barge returning. © Worcs. County Council

The project was made possible by a Department for Transport freight facilities grant towards wharves and access roads.

Barge being loaded at Ripple Quarry (left) and unloaded at Ryall House Farm Quarry. © CEMEX UK Limited

Although this operation may have had some positive effect on carbon emissions, the primary purpose of the water transport was to enable the mineral deposit to be worked and prevent unacceptable impacts on the road network around the quarry, as the road network was not capable of supporting HGV movements.

River Avon

5.11. The River Avon joins the River Severn at Tewkesbury and is navigable upstream for 45.4 miles (73.1 km) to Alveston Weir. The Stratford-upon-Avon Canal joins the River Avon at Bancroft Gardens in Stratford-upon-Avon[63]. There are eight locks on the Lower Avon between Tewkesbury and Evesham and a further nine locks on the Upper Avon between Evesham and the Stratford-upon-Avon Canal (a total of 17 locks).

5.12. Although it has been through some periods of neglect following the decline in commercial traffic on the river, it is now well used by recreational and tourist craft. The last commercial barge to operate regularly on the river ran from Pershore mill to Avon Mouth; this ceased in 1972[64].

5.13. The size of the lock gates at Tewkesbury means that smaller vessels are required than on the River Severn, although it may be possible to lock the smaller barges together once on the River Severn and then tow or push them together[65]. The potential to undertake works that would increase the size of vessel that could be carried on the route could be explored to provide a commercially viable mineral carrying solution if adequate funding was available[66].

5.14. For a three month period in 2010, clay from Birlingham was carried to Pershore for the Environment Agency's construction of flood defences[67]. Although this was for only a short period, it shows that minerals could be carried on the River Avon in the future.

5.15. A feasibility study has been undertaken to consider the extension of the Avon Navigation to Warwick, which would create a wide beam link to the Grand Union Canal and to London and Birmingham, although the results of this study are not yet available[68].

5.16. The maximum recommended craft dimensions[69] on the River Avon are:

- Lower Avon
  - Length: 70ft (21.3m)
  - Beam: 13ft 6in (4.1m)
  - Draught: 4ft (1.2m)
  - Headroom: 10ft (3.0m)

[63] The Inland Waterways Association, *Avon Navigation*, Weblink to the IWA's Avon Navigation webpage [accessed 04.09.2018]
[64] Email from Clive Matthews, General Manager, Avon Navigation Trust, 06/01/2014
[65] Email (04.02.2014) from Sustainable Schemes Team at Worcestershire County Council Highways in response to initial consultation on Worcestershire's draft *Water Transport* document.
[66] Email (10.02.2014) from Clive Matthews, General Manager of Avon Navigation Trust in response to initial consultation on Worcestershire's draft *Water Transport* document.
[67] Email from Clive Matthews, General Manager, Avon Navigation Trust, 06/01/2014
[68] Email (10.02.2014) from Clive Matthews, General Manager of Avon Navigation Trust in response to initial consultation on Worcestershire's draft *Water Transport* document.
[69] Avon Navigation Trust, *Navigation Limits and Levels*, https://www.avonnavigationtrust.org/index.php?id=4 [accessed 04.09.2018] (Stated maximum draught is for vessels with protected sterngear. Note that minimum headroom is at normal river levels, and can be lower during periods following heavy rain.)

- Upper Avon
    - Length: 70ft (21.3m)
    - Beam: 12ft 6in (3.8m)
    - Draught: 3ft (0.9m)
    - Headroom: 8ft (2.4m)

The Avon Navigation Trust has work barges of this size which can carry 40-60 tons when fully laden[70].

Droitwich Canal

5.17. The Droitwich Canal consists of the Droitwich Junction Canal and the Droitwich Barge Canal. The Droitwich Barge Canal runs from the river Severn to Droitwich, and the Droitwich Junction Canal runs from Droitwich to the Worcester & Birmingham Canal at Hanbury. The Droitwich Barge Canal is 5.8 miles (9.3 km) long and has eight wide locks. The Droitwich Junction Canal is 1.5 miles (2.4 km) long and has seven locks. There are no other connections.[71]

5.18. The Droitwich Canals were originally developed to transport salt from Droitwich, but the last commercial barge used the Barge Canal in 1916. The canals were abandoned in 1939 but were re-opened in 2011, creating a cruising ring for boaters which can be completed in a weekend.[72]

5.19. The Barge Canal is a broad canal and the Junction Canal is a narrow canal. The maximum size of boat that can navigate through both of the Droitwich canals is[73]:

- length: 71' 6" (21.7 metres)
- beam: 7' 1" (2.1 metres)
- headroom: 8' 0" (2.4 metres)
- draught: 3' 6" (1.05 metres).

Staffordshire and Worcestershire Canal

5.20. The Staffordshire & Worcestershire Canal is 46 miles long with 43 locks and links the Trent & Mersey Canal at Great Haywood in Staffordshire with the River Severn at Stourport in Worcestershire. It connects with the Shropshire Union Canal at Autherley Junction and the Birmingham Canal at nearby Aldersley Junction in Wolverhampton, and with the Stourbridge Canal at Stourton Junction. The largely derelict Hatherton Branch joins at Hatherton Junction and is currently only navigable through one lock to a boatyard but its restoration to Cannock and along a new line through to the Birmingham Canal Navigations is being promoted. A former

[70] Email from Clive Matthews, General Manager, Avon Navigation Trust, 06/01/2014
[71] The Inland Waterways Association, *Droitwich Canals*, Weblink to the IWA's Droitwich Canals webpage [accessed 04.09.2018]
[72] Canal & River Trust, *Droitwich Canals*, Weblink to the Canal & River Trust's Droitwich Canals webpage [accessed 04.09.2018]
[73] The Inland Waterways Association, *Droitwich Canals*, Weblink to the IWA's Droitwich Canals webpage [accessed 04.09.2018]

connection with the Stafford Branch or Sow Navigation at Baswich is the subject of restoration proposals as the Stafford Riverway Link[74].

5.21. Historically, the southern section of the Staffordshire & Worcestershire Canal served several ironworks, with coal from Ironbridge Gorge brought down the River Severn and then up the canal. The last regular commercial traffic was coal from Cannock to Stourport power station, which ceased in 1949[75].

5.22. The maximum size of boat that can navigate throughout the Staffordshire & Worcestershire Canal is:

- length: 74' 8" (22.75 metres) - Awbridge Lock
- beam: 7' 0" (2.12 metres) - Awbridge Lock
- height: 7' 0" (2.12 metres) - Whittington Horse Bridge
- draught: 3' 7" (1.09 metres) - Rodbaston Lock

Stratford upon Avon Canal

5.23. The Stratford-upon-Avon Canal runs from the Worcester & Birmingham Canal at King's Norton Junction to the river Avon at Stratford-upon-Avon. Only a small section is within Worcestershire, near Major's Green in the north east of the county. It links with the Grand Union Canal at Kingswood via the short Kingswood Branch. The main line of the Stratford-upon-Avon Canal is 25.5 miles (41km) long and has 55 locks. The Kingswood Branch is 0.25 miles (0.4km) long and has one lock[76].

5.24. A number of locks (especially lock 47 on the Wilmcote Flight) are particularly narrow and require care. Some locks are also shorter than others (particularly lock 15 at Lapworth). Bridge 8 requires a Sanitary Station key for operation and bridges 26 and 28 require a windlass (hydraulic operation)[77].

5.25. The maximum size of boat that can navigate the Stratford-upon-Avon Canal is:

- length: 70' 11" (21.62 metres)
- beam: 7' (2.1 metres)
- height: 6' (1.9 metres)
- draught: 3' 6" (1.05 metres).

Worcester and Birmingham Canal

[74] The Inland Waterways Association, *Staffordshire & Worcestershire Canal*, Weblink to the IWA's Staffordshire & Worcestershire Canal webpage [accessed 04.09.2018]
[75] Canal & River Trust, *Staffordshire & Worcestershire Canal*, https://canalrivertrust.org.uk/enjoy-the-waterways/canal-and-river-network/staffordshire-and-worcestershire-canal [accessed 04.09.2018]
[76] The Inland Waterways Association, *Stratford-upon-Avon Canal*, Weblink to the IWA's Stratford-upon-Avon Canal webpage [accessed 04.09.2018]
[77] The Inland Waterways Association, *Stratford-upon-Avon Canal*, Weblink to the IWA's Stratford-upon-Avon Canal webpage [accessed 04.09.2018]

5.26. The Worcester & Birmingham Canal runs from the River Severn in Worcester to the Birmingham Canal at Worcester Bar. It is 30 miles (48.3km) long and has 58 locks[78].

5.27. The maximum size of boat that can navigate through the Worcester & Birmingham Canal is[79]:

- length: 74' 11" (22.85 metres) - lock 6
- beam: 7' 3" (2.21 metres) - lock 3
- headroom: 8' 2" (2.5 metres) - bridge 86
- draught: 3' 8" (1.1 metres) - bridge 4

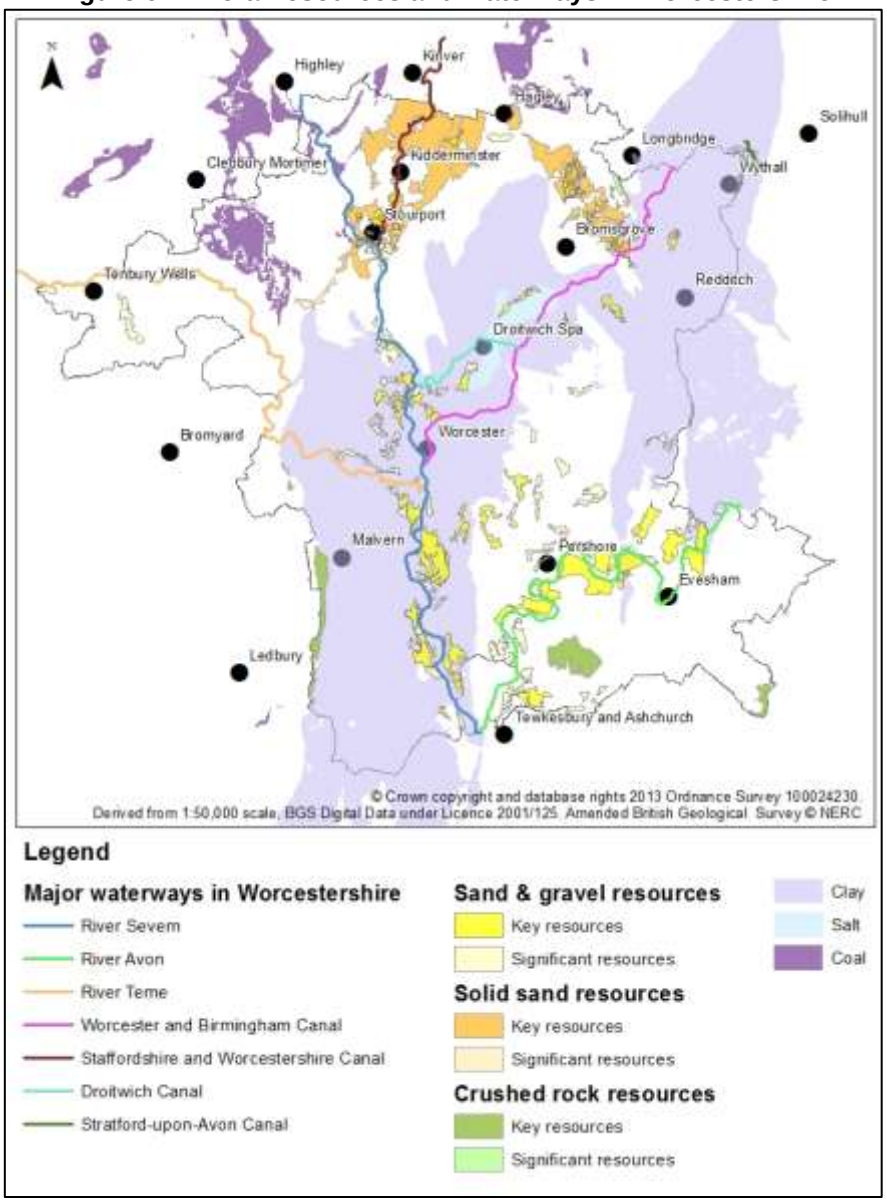
Minerals and waterways

5.28. The waterways discussed above may all be capable of carrying commercial freight such as minerals, but they are only likely to do so if they are conveniently located in relation to mineral resources.

5.29. Figure 6 shows the major waterways in Worcestershire and how these relate to the mineral resources in the county[80].

[78] The Inland Waterways Association, *Worcester & Birmingham Canal*, Weblink to the IWA's Worcester & Birmingham Canal webpage [accessed 04.09.2018]
[79] The Inland Waterways Association, *Worcester & Birmingham Canal*, Weblink to the IWA's Worcester & Birmingham Canal webpage [accessed 04.09.2018]
[80] Sand and gravel, solid sand and crushed rock resources shown are those assessed as being "Key" or "Significant" in the *Analysis of Mineral Resources in Worcestershire (October 2013)* published alongside the Second Stage Consultation on the Minerals Local Plan. This is available from Weblink to Analysis of Mineral Resources in Worcesterhsire.

Figure 6. Mineral resources and waterways in Worcestershire



5.30. There are large deposits of terrace and glacial sand and gravel associated with the Rivers Severn and Avon. Solid sands in the north of the county are close to the Staffordshire & Worcestershire Canal and the Worcester and Birmingham Canal in some places. The Droitwich Canal is associated with the salt deposits around Droitwich, and the River Severn, Droitwich Canal and Worcester and Birmingham Canal all fall largely within the clay deposits which cover much of the county.

5.31. Crushed rock and coal resources are the least likely to be transported by inland waterway as they are not found adjacent to any of the major waterways in the county.

5.32. A further issue for consideration is whether a freight interchange facility is required and, if so, where this could be located. It would need to be near the navigable waterway but also have good road or rail connections[81].

5.33. The current example of mineral transportation by waterway in Worcestershire brings raw materials a relatively short distance from a "satellite" quarry to a processing plant, with onward movements by road. There may be some potential for this type of operation to be repeated, enabling smaller or less-accessible deposits to be exploited, with processing taking place at existing plant.

5.34. It may also be appropriate to explore the potential to develop specific interchange or processing facilities which are not part of an existing quarry, and this may enable material to be delivered by water closer to the end destination for the raw materials, thereby minimising the distance the minerals need to be transported by road.

5.35. Interchange facilities which are not associated with existing quarries may also provide the means for minerals to be delivered from outside the county more sustainably. The Minerals Local Plan will need to consider whether it is appropriate to identify and allocate potential sites for interchange facilities to be developed in proximity to market demand for minerals, or to develop policies which could enable "windfall" wharfage facilities to be developed.

[81] Email (07.02.2014) from Sustainable Schemes Team at Worcestershire County Council Highways in response to initial consultation on Worcestershire's draft *Water Transport* background document.

6. Safeguarding

6.1. The National Planning Policy Framework requires planning policies to "safeguard existing, planned and potential sites for: the bulk transport, handling and processing of minerals; the manufacture of concrete and concrete products; and the handling, processing and distribution of substitute, recycled and secondary aggregate material" [82].

6.2. The lack of commercial traffic on Worcestershire's waterways means that there are no commercial wharfage facilities used for handling minerals in the county other than those specially constructed for the transportation of minerals between Ripple and Ryall quarries on the River Severn.

6.3. Careful consideration will need to be given to safeguarding these facilities to ensure that water transportation of minerals remains a viable option and the movements are not transferred back to the county's roads. However, the wharves are associated with existing quarries, and the NPPF also requires planning policies to "ensure that worked land is reclaimed at the earliest opportunity"[83]. Consideration will need to be given to whether it is appropriate to retain and safeguard these or any future wharfage facilities once the mineral resources are exhausted at the associated sites.

[82] Ministry of Housing, Communities and Local Government (2018) *National Planning Policy Framework*, paragraph 204(c).
[83] Ministry of Housing, Communities and Local Government (2018) *National Planning Policy Framework*, paragraph 204(h).

7. Conclusions

7.1. Using inland waterways to transport minerals can bring a number of benefits. The main benefits arise from a reduction in the lorry movements and a commensurate reduction in energy demand, greenhouse gas emissions, air quality impacts and amenity impacts.

7.2. The use of inland waterways for freight is supported at all levels of policy and by all the bodies responsible for managing the waterways in the county. Whilst only the River Severn is considered to be a "commercial waterway", the River Avon is also navigable and the canal network is extensive and connects to systems to the north, south and east of the county. There are some limitations on vessel size due to channel depth or the size of the locks on or between these waterways. The Avon Navigation Trust has stated that it would seriously consider increasing these dimensions on the River Avon to provide a commercially viable mineral-carrying solution if adequate funding was available (for example through building a larger lock at Tewkesbury between the Rivers Severn and Avon)[84]. The Minerals Local Plan will need to be developed in close discussion with Gloucestershire County Council and Tewkesbury Borough Council if works to Tewkesbury Locks are required to enable minerals development in Worcestershire. Proposals to increase navigability may need planning permission and could have environmental impacts which would need to be assessed.

7.3. There are large deposits of terrace and glacial sand and gravel, solid sand, clay and salt adjacent to waterways in the county, meaning that minerals sites could be developed to take advantage of the potential for water transport. Examples such as the current transport of aggregates on the River Severn, and the short project some years ago that saw clay moved along the River Avon, show that transporting minerals by water is feasible and potentially viable, although developers may need to explore grant aid or funding programmes. The Minerals Local Plan will need to consider how to encourage water transport without preventing developers from accessing such grant aid.

7.4. Consideration also needs to be given to whether a freight interchange facility is required and, if so, where this could be located with access to both navigable waterways and good road or rail connections. The Minerals Local Plan will need to consider whether it is appropriate to identify and allocate potential sites for interchange facilities to be developed in proximity to market demand for minerals, or to develop policies which could enable "windfall" wharfage facilities to be developed.

7.5. Consideration must be given by the Minerals Local Plan to using waterways where possible, including the possibility of requiring developer contributions for the upgrading of infrastructure where necessary and viable.

[84] Email (10.02.2014) from Clive Matthews, General Manager of Avon Navigation Trust in response to initial consultation on Worcestershire's draft *Water Transport* background document.

7.6. The Minerals Local Plan must also ensure that any plans for transporting minerals on the county's waterways will not have an unacceptable impact on the recreation and tourist uses of the waterways which are well established. Equally, consideration will need to be given to ensuring that the risk of materials entering the watercourse is minimised, both during loading and unloading, and during the journey.