

Scheme Summary

Name of Scheme:	Institute for High Speed Railways and System Integration (IHSRSI)
PMO Scheme Code:	UNI-Leeds-001
Lead Organisation:	University of Leeds
Senior Responsible Officer:	Professor Peter Woodward
Lead Promoter Contact:	Professor Peter Woodward
Case Officer:	Lisa Childs

Applicable Funding Stream(s) – Grant or Loan:	Over programming against the Local Growth Fund
Growth Fund Priority Area (if applicable):	Priority 1: Growing Business/ Priority 2: Skilled People, better jobs / Priority 3: Clean energy, environmental resilience. / Priority 4: Infrastructure for growth.

Approvals to Date:	Case Paper approved (decision point 2) 28 th June 2018 by Combined Authority
Forecasted Full Approval Date (Decision Point 5):	January 2020
Forecasted Completion Date (Decision Point 6):	December 2020

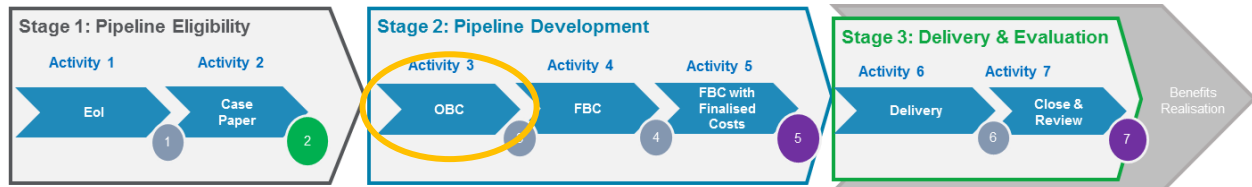
Total Scheme Cost (£):	£26.093 million
Combined Authority Funding (£):	£13.047 million Growth Deal (Indicative approval at decision point 2 was £11.44 million)
Total other public sector investment (£):	£0 for Phase 1. Further funding for Phase 2 is currently being sought from other funding sources and private sector investors
Total other private sector investment (£):	£13.047 million University of Leeds match funding

Is this a standalone Project?	No. The IHSRSI represents a substantial component of the University's planned new Technology Park, which is itself part of a much wider Project for development in the East Leeds Enterprise Zone via an Advanced Manufacturing Park (AMP). This project represents phase 1 of IHSRSI, with phase 2 focusing on improved systems integration and the creation of an innovation centre (the subject of separate funding bids).
Is this a Programme?	No

Is this Project part of an agreed Programme?

No

Current Assurance Process Activity:



Scheme Description:

High Speed 2 (HS2) is Europe's largest railway project, and a vital part of the UK Government's strategic plan for regeneration, growth and rebalancing of the UK economy. It also represents a significant opportunity for the UK to capitalise on a rapidly growing high-speed rail global market. The lack of testing facilities in high-speed rail represents a significant barrier to the future development of high-speed rail research and innovation but presents a significant opportunity for the Leeds City Region (LCR) to be a global lead.

The University of Leeds, working closely with partners from industry, government and the University sectors, is seeking to establish the Institute for High Speed Railways and System Integration (IHSRSI) in the LCR with the ambition of helping to unlock the full economic potential of high speed rail, nationally and globally to the benefit of job and wealth creation in the LCR.

This will provide the City region with a major new hub for high-speed rail innovation in track infrastructure and dynamics, rolling stock technology and system integration.

A number of options have been considered and fully researched to locate the facilities on a new campus called the Leeds Engineering and Technology Campus (LETeC). The current preferred option is for the LETeC to sit alongside the HS2 depot and within the Leeds Enterprise Zone (Aire Valley). Land purchase is at an advanced stage and it is expected to complete December 2018 / January 2019 with outline planning permission submission in December 2018.

The development and success of the IHSRSI is not dependent on HS2 or the HS2 depot, but its co-location with HS2 represents a strategic opportunity to have an even greater economic impact within the LCR.

The scheme will be delivered in two concurrent phases. The funding requested from the Combined Authority will part fund the delivery of Phase 1 only:

Phase 1 - creation of two world-leading test facilities for the new institute, these being a high-speed railways infrastructure test facility (ITF) and a high speed vehicle test facility (VTF). Specifically, world class high speed rail infrastructure test & Research & Development facilities to include:

- A full-scale 400 kilometre per hour capable world-leading fully dynamic high-speed rail Infrastructure Test Facility which will be able to test full-scale railway track structures, including embankments, preformed systems and ground stabilization technologies. By researching and developing new track support structures the facility will revolutionize the way conventional and high-speed tracks will be designed and built in the future and allow full cost reduction technologies and strategies to be fully validated.
- A full-scale high-speed 400 kilometre per hour capable Vehicle Test Facility capable of testing full-scale rolling stock and their interaction (behaviour) with different track systems. This world-leading facility will incorporate advanced technologies that allow the full duty cycle of the vehicle to be tested including all electrical and mechanical systems. This will allow advanced

technologies to be developed and tested, and therefore help to de-risk the introduction of new rolling stock onto the rail network. The VTF will also have a full scale power test facility that will allow rolling stock to be powered directly through the pantograph and catenary test equipment. The construction of sidings will allow future connection to the HS2 depot and hence rail network placing the IHSRSI at the very heart of the rail industry and projecting the LCR as a global centre for railways.

Phase 2 - By linking the above two test facilities to a new System Integration and Innovation Centre (subject to additional funding applications) a whole system integration approach can be developed. By connecting the conventional and digital train control systems, a complete test-bed platform can be developed within an integrated research environment. This will create a unique research and development facility allowing transformational change in railway research and development. This is in direct response to calls from the national and international rail industry for the IHSRSI to have significant system integration capability to support the conventional and high-speed rail sectors. The system integration capabilities will allow de-risking in relation to the command and control systems including signalling.

In addition, the facilities will be linked to the existing University of Leeds Passenger Motion Simulator to allow the passenger experience to be researched. This motion simulator allows full accelerations to be felt in the vertical, lateral and horizontal directions within a virtual reality simulation. The technology includes eye tracking, psychophysiological metrics and other systems to assess the passenger experience. This simulator is supported by the recent construction of an immersive virtual reality cave to research the passenger experience in new stations and railway environments.

HS2 will be of major economic benefit to the city region and the IHSRSI will help to maximise these benefits, by establishing the University and the LCR as a global lead in high speed rail engineering and research. The IHSRSI will complement and build upon the existing regional academic and industry expertise in rail research and education (e.g. University of Huddersfield) and will help cement the LCR as a world-leading centre of excellence.

The IHSRSI will also act as a catalyst for an Advanced Manufacturing Park which will be based on further investment from engineering and manufacturing companies within the East Leeds Enterprise Zone.

Business Case Summary:

Strategic Case

The strategic case for this project is very strong and has attracted letters of support from a wide range of business, academic and local government leaders.

Key strategic drivers are:

- The development of High Speed Rail due to population growth.
- The growing size of rail supply chain economy
- The increasing performance requirements of High Speed trains, including the requirement for new infrastructure and test facilities.
- The pressure to de-carbonise transport and freight, and the subsequent innovation of new technology.
- Potential future resources in modular manufacturing.

The UK currently has no access to R&D test facilities. This project would fill that gap and create a nationally unique, and globally significant facility and act as a catalyst for cluster development in advanced manufacturing within the East Leeds enterprise zone. The facility will also be complimentary to the co-location of the HS2 depot which is also planned to locate within the same Enterprise Zone.

<p>Commercial Case</p>	<p>The global railway sector is going through a period of change and substantial growth. Current estimates of the value of the rail market are in the region of £128 billion and a growth of 2.7%. This investment will allow the city region to tap into this market and create a driver for economic growth.</p> <p>The UK is set to see the greatest investment in the railways since the Victorian era with new projects in the pipeline worth more than £100 billion. The UK's train fleet is forecast to grow by 89% over the next 28 years and between 11-16,000 new electric vehicles are expected to be added to the network.</p> <p>The lack of suitable R&D and test facilities could cause delays and disruption in getting new rolling stock into service. The IHSRSI's test bed capability will help address this issue. It will also provide a mechanism for testing new rolling stock without causing delays to the existing network.</p>
<p>Economic Case</p>	<p>Site allocation and nature of facility options testing has been carried out by the Universities experienced projects team and their professional advisors. Details are supplied in the business case.</p> <p>The investment in phase 1 of the IHSRSI will directly contribute:</p> <ul style="list-style-type: none"> • 8.75 FTE jobs creation. • 1,063m² of commercial floor space constructed in the VTF (building) • 2,292m² of commercial floor space constructed in the ITF (external test facility) <p>In addition to these direct outputs will be indirect contributions through both phase 1 and phase 2 of the IHSRSI of:</p> <ul style="list-style-type: none"> • Jobs created within the IHSRSI and supply chain • Businesses assisted- businesses receiving advice from the facility to improve performance. • Businesses receiving grant funding – securing innovation grants to deliver IHSRSI projects. • Learning opportunities – postgraduate, undergraduate and CPD programmes.
<p>Financial Case</p>	<p>The total project cost is £26.093 million.</p> <p>The cost breakdown is:</p> <ul style="list-style-type: none"> • Project development £1.339 million • Land assembly £1.855 million • Enabling works £1.855 million • Delivery / construction £18.964 million • Contingency £2.030 million • Independent impact evaluation £0.050m • Total £26.093 million <p>The future revenue costs will be funded from the operating income generated, research income, industry income and tuition fee income.</p>
<p>Management Case</p>	<p>The delivery of IHSRSI is being managed as part of Leeds University's Leeds Engineering Technology Campus (LETeC) development. Dedicated project staff are being assigned to this scheme from the University Estates Department. External Professional and consultancy advice had been procured. Governance of the project is to be via the LETeC programme board, though a recommendation could be made that a separate project board be set up with attendance from the Combined Authority.</p>

Institute for High Speed Railways and System Intergration

