

# STEAMlabs HS2

## Re-imagining the delivery of massive-scale construction projects



Balfour Beatty Vinci (BBV) Joint Venture is responsible for constructing approximately 90km of the HS2 train line between Long Itchington and Lichfield. A solution is required for efficiently moving people, plant and materials around the sites to minimise the impact on communities and increase the certainty of price and programme.

## What's the Challenge...?

The challenge is...

Traditional construction methods will not work for the scale and complexity of HS2.

This is underpinned by logistics and communications, both on sites, between sites and across the whole project. Current systems are labour-intensive, largely analogue, prone to loss and delay of information and data.

BBV wish to explore ways to tackle these challenges and **take advantage of new thinking and new technology to ensure that the communications and logistics on HS2 are smooth and efficient.**

## What does this mean in practice?

There are several broad themes that need addressing to fully address this challenge:

- Communication and Logistics
- Movement of People
- Movement of Materials
- Best Use of Assets including plant

In terms of what this means, consider that during the HS2 construction:

- 10,000 site workers need to get to and from work each day, including 1,200 office based staff;
- There will be thousands of deliveries by HGVs each day to sites along the route; these need to reach the correct site, within a time window and be tracked & managed as they unload;
- There will be large amounts of waste that needs to be moved from sites or re-used efficiently in other ways;
- There will be thousands of pieces of machinery and other assets that need to be in the right place at the right time and not stand idle for large amounts of time or be used inefficiently.

In terms of the local situation in the West Midlands alone, challenges include:

- Road network - the M42 is at capacity, A38 is beyond capacity
- The sheer volume of delivery of materials and removal of waste could stress the road network even further
- The West Midlands has 90km of the track, but challenges and solutions need to consider the fact that there is 360km of track being built in the rest of the country



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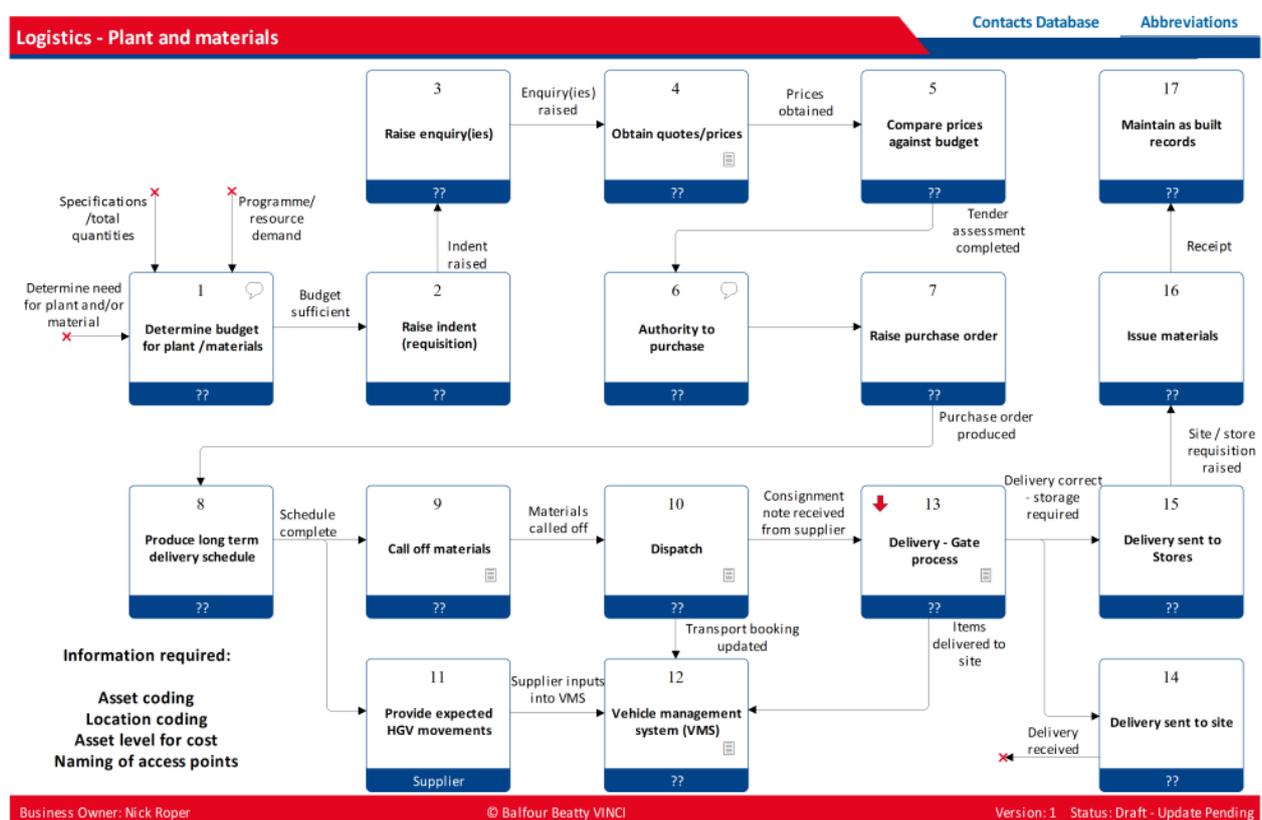
The Communications and Logistics theme underpins all of the above, and is therefore the primary focus for this STEAMlab. Solving some of the challenges under this theme will be valuable in their own right but will have (potentially significant) knock-on improvements for the other areas as well.

Elements to consider within the Communications and Logistics theme include:

- Communication from procurement to site, including supplier communications to site / on site
- labelling and tracking of materials/items – where things are being stored; where do they need to go
- There is a limit on the number deliveries allowed at each site per day and time windows for those deliveries – communicating and managing the slots, dealing with delays and changes.
- Dealing with changes e.g. non-delivery, delays, items being lost
- Accessing real-time information
- Thousands of suppliers working at different times, all with their own contract and potentially different client managers
- Approvals from person to person with audit trail (deliveries completed, materials used, work done)
- Linking the meta-info for assets and materials e.g. delivery size, weight, delivery time, storage requirements

## What is the current approach to Communications and Logistics when delivering projects?

The process below outlines the current state, considering that many of the activities include manual activities such as data entry or are paper based. Each arrow connecting each activity represents a risk of inefficiency, poor data transfer and ineffective communication. The construction industry relies on great people with extensive experience which to an extent mask areas of inefficiency.



Some examples of areas for improvement are summarised below.

### Data Management, Real time info and avoiding loss of information

Currently much of the information is paper-based. For example Good Received Notices (GRN's) are physical and signed/handed over between people. They are then stored with that person on site until such a time they are passed to an administrator to manually input the data onto the finance system.

### Smarter invoicing and payments

Invoicing systems are typically administrative functions, and not seamless with delivery and work-sign off. Because GRN's are paper, a further human process is required to indicate that goods have been received etc. There is an inevitable delay in recording of these things onto the relevant systems. There is also an additional stage of verification by the Quantity Surveyor before payments can be released.

### Management of meta-info relating to logistics (parameters etc.)

Currently data related to management of resources can be spread across several systems (e.g. finance, design, programme). It is sometime difficult to collate timely and accurate management information which impacts on effective decision making.

### Coping with changes

A major source of inefficiency in the construction industry is management of change. Change is inevitable in a dynamic and complex construction environment. However the data around the events that lead to change is not always available in a timely manner, on site and management decisions can be made in isolation and could impact on operations elsewhere.

### Labelling and tracking of materials / products / assets

Deliveries are often managed by phone, the contractors staff will call the relevant supplier to ask for updates on deliveries and to react to situations where deliveries do not arrive when planned. Once on site inventory is usually managed well, but often paper based, and it is often difficult to communicate with nearby sites and storage areas to determine where we might have surplus stock to compliment where we might have a shortfall. This can lead to over-ordering of new materials and equipment.



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## What will STEAMlab be like?

Each STEAMlab is a bit different, but the essence is about **open working**, creativity, innovation – making new **connections** and exploring new **collaborations** to find and try out new ideas. Working towards **solutions** to genuine, real-world challenges.

You may already have ideas or challenges that you wish to tackle within STEAMlab and we encourage you to bring them with you to share with others and develop collaboratively.

Equally, opportunities can appear from unexpected collaborations and people often find themselves getting totally immersed in developing a solution that was completely different to what they had expected.

The important thing is to bring an **open mind**.

## What will we be working on?

We will be working together during STEAMlab to identify the most **relevant problems** to tackle and explore **ideas and opportunities**. There will be the chance to hear from others, **exchange** ideas and **develop** something where you think you have something to offer that idea. That might be knowledge, skills, experience or just sheer enthusiasm! You can then talk with others and form a team to work on that idea during the event.

## Opportunities for solutions

A wide range of potential solutions may be suitable to these challenges described above. Solutions might involve creating **new technology**, making **different use** of existing facilities and/or technology, **thinking differently** about how we work, different **business or financial models**, creating **new processes** and different **ways of working**, new **collaborations and partnerships**, or **combining** a number of different components together.

## How will we choose which ideas will be worked on?

It's important that people can work on ideas that are as interesting and relevant as possible to people during the event. The specific ideas/problems that will be tackled during this STEAMlab will be decided during the first evening session. Everyone will have an opportunity to share with the whole group the ideas (or challenges) that they wish to work on.

We will go through an exercise where we jointly decide which ideas we will form groups around. Please note that it is important that you don't come to STEAMlab with a totally fixed idea about what you want to do – you can pitch your ideas but it is ultimately down to the group as to what we will work on during the lab itself.



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# Draft Agenda

Approx. Time	Day 1 Activity – Launch Event
16:00	<i>Registration and coffee, networking, stands/exhibits</i>
16:30	Welcome to STEAMlabs! Keynote talks; Introduction to the challenge themes
17:30	<i>Food, networking, questions, building links</i>
18:00	Problem definition, exploring themes and initial ideas
19:30	<i>Wrapping up for the evening – close 20:00</i>

Approx. Time	Day 2 Activity – Hack Day
09:30	<i>Registration and coffee; Teams reconnect</i>
10:00	Understanding themes and skills; into working groups
10:20	Ideas exploration and development
13:00	<i>Lunch</i>
13:45	Refining ideas, potential solutions, planning a pilot
15:00	Pitches to share ideas & questions
16:00	Prizes/feedback
16:30	<i>Main event closes (networking continues to 17:00)</i>

This event is funded, so we do ask for the following;

- Please ensure you're available for both days
- Be an SME business, enterprise, or sole trader (i.e. employing fewer than 250 FTE people)
- Based within the [Greater Birmingham and Solihull LEP region](#) - Birmingham, Solihull, North Worcs and South Staffs.
- Operate in one or more of the following sectors: arts and creative industries, health and life sciences, advanced manufacturing, low carbon.



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