

IDO15 OBG23 – Jackson’s Bridge

Options Assessment Stage 1

The options assessment summary is shown in the Table below.

From the result of the MCA1 assessment, the following options have been rejected:

- Option 1. One online track electrified. This solution has a significant operational disadvantage when considering the operation of the Depot. Other disadvantages of this option are:
 - Major civil works are also needed to lower the track and ensure the flood protection requirements are met. The construction methodology for these works presents operational disadvantages because of requiring long track possession
 - Because of the track lowering to achieve the OHLE clearance under Jackson’s Bridge, a pumped lineside drainage system is necessary.
 - Implementation of flood defences is also seen as a potential residual risk of disruption to service.
 - Jackson’s Bridge Structural safety: because of 450 mm track lowering, involving a total excavation circa 1410 mm, structure foundation can be reached or even it not; it could be so close that vibration caused by train could impact the structure.
 - Land acquisition required for compensatory storage volumes (estimated to be 100,000m³).
- Option 2. Double online track. Vertical track lowering.
 - Major civil works are also needed to lower the track and ensure the flood protection requirements are met. The construction methodology for these works presents operational disadvantages because of requiring long track possession
 - Because of the track lowering to achieve the OHLE clearance under Jackson’s Bridge, a pumped lineside drainage system is necessary.
 - Implementation of flood defences is also seen as a potential residual risk of disruption to service.
 - Jackson’s Bridge Structural safety: because of 760 mm track lowering, involving a total excavation circa 1720 mm, structure foundation can be reached or even it not; it could be so close that vibration caused by train could impact on the structure.
 - Land acquisition required for compensatory storage volumes (estimated to be 100,000m³).
- Option 4. Up track online and new alignment (offline) for Down track. It has a similar cost to the more expensive options, presenting a Depot operation problem. Other disadvantages of this option are:
 - Requires online track (Up track) longitudinal profile lowering to allow OHLE clearance under Jackson’s Bridge. A pumped lineside drainage system is necessary.
 - Flood defence walls/embankments are required to achieve the design standard of protection.
 - Land acquisition required for compensatory storage volumes (estimated to be 120,000m³)
 - Flood defence structures at the online Up track required. A residual risk of flood waters overtopping the necessary flood defences causing rapid inundation of the railway line remains.
 - Jackson’s Bridge Structural safety: because of 450 mm track lowering, involving a total excavation circa 1410 mm, structure foundation can be reached or even it not; it could be so close that vibration caused by train could impact the structure.
 - Requires ESB 220kV electric line diversion
 - It requires L5041 road diversion.

Table 1. OBG23 MCA1 Summary

Criteria	Option 1. Single Online electrified track. Vertical lowering	Option 2. Double Online track. Vertical lowering.	Option 3. Double Online track. Bridge deck reconstruction. Tracks at 60.00 m level Retaining wall to prevent flooding	Option 4. Double track. New alignment for one Offline track	Option 5. Double offline track. New alignment Tracks at 61.06 m level	Option 6. Double Online track. Bridge deck reconstruction. Tracks at 61.06 m level. 3 arches bridge reconstruction
1 Economy	Significant comparative disadvantage over other options	Some comparative disadvantage over other options	Some comparative advantage over other options	Significant comparative disadvantage over other options	Significant comparative advantage over other options	Significant comparative advantage over other options
2 Integration	Some comparative advantage over other options	Some comparative advantage over other options	Some comparative disadvantage over other options	Some comparative disadvantage over other options	Some comparative disadvantage over other options	Some comparative disadvantage over other options
3 Environment	Significant comparative advantage over other options	Significant comparative advantage over other options	Significant comparative disadvantage over other options	Some comparative disadvantage over other options	Some comparative advantage over other options	Significant comparative disadvantage over other options
4 Accessibility and social inclusion	Comparable to other options	Comparable to other options	Comparable to other options	Comparable to other options	Comparable to other options	Comparable to other options
5 Safety	Some comparative advantage over other options	Significant comparative disadvantage over other options	Some comparative disadvantage over other options	Some comparative advantage over other options	Significant comparative advantage over other options	Some comparative advantage over other options
6 Physical Activity	Comparable to other options	Comparable to other options	Comparable to other options	Comparable to other options	Comparable to other options	Comparable to other options
Progress To Stage 2	No	No	Yes	No	Yes	Yes
Comment	<p>It does not allow to achieve the TSS</p> <p>Construction methodology presents operational disadvantages: long track possession Track lowering requires a pumped lineside drainage system. Track lowering requires a pumped lineside drainage system. Implementation of flood defences is seen as a potential residual risk of disruption to service. Land acquisition required for compensatory storage volumes (estimated to be 100,000m³). Jackson's Bridge Structural safety risk because of 450 mm track lowering</p>	<p>Construction methodology presents operational disadvantages: long track possession Track lowering requires a pumped lineside drainage system. Implementation of flood defences is seen as a potential residual risk of disruption to service. Land acquisition required for compensatory storage volumes (estimated to be 100,000m³). Jackson's Bridge Structural safety risk because of 760 mm track lowering</p>	<p>This solution allows maintenance of the tracks at the railway corridor.</p> <p>The challenge of this option is to find a sympathetic solution that minimizes the impact on the structure. It requires flood defences structures that is seen as a potential residual risk of disruption to service. Land acquisition required for compensatory storage volumes (estimated to be 100,000m³).</p>	<p>Operational disadvantage because East access to the depot Track lowering requires a pumped lineside drainage system at on-line Up track Implementation of flood defences is seen as a potential residual risk of disruption to service. Land acquisition required for compensatory storage volumes (estimated to be 120,000m³). Jackson's Bridge Structural safety risk because of 450 mm track lowering Requires ESB 220kV electric line diversion It requires L5041 road diversion</p>	<p>This option does not impact directly on OBG23 as the rest of the options It is likely to have the least impact on the existing flood regime compared to the other options while providing sufficient flood protection to rail services (without flooding defences structures). Requires ESB 220kV electric line diversion It requires L5041 road diversion</p>	<p>This solution allows maintenance of the tracks at the railway corridor.</p> <p>This option's challenge is to find a sympathetic solution that minimizes the impact on the 3 bridge arches. Land acquisition required for compensatory storage volumes (estimated to be 100,000m³). It requires L5041 road diversion</p>

Options Assessment Stage 2

As a result of the MCA1 assessment, the following options have been assessed in MCA2:

- Option 3. Double online track. Bridge deck reconstruction (precast arch deck). Rail tracks at 60.00 m level.
- Option 5A: New alignment of a double offline track. 61.06 mOD minimum track level (ESB 220 kV line diversion required).
- Option 5B: New alignment of a double offline track. 59.40 mOD maximum track level crossing under ESB 220 kV line (flood track protection structures required).
- Option 6. Double online track. Bridge deck reconstruction (precast arch deck). Rail tracks at 61.06 m level. Requires reconstruction of three bridge arches.

The options assessment summary is shown in the Table below.

- The results of the MCA led the MDC to recommend **Option 5A: New alignment of a double offline track. 61.06 mOD minimum track level (ESB 220 kV line diversion required)** as the emerging preferred option.

From the result of the MCA2 assessment, the following options have been ruled out:

- Option 3. Double online track. Bridge deck reconstruction (precast arch deck). Rail tracks at 60.00 m level.
- Option 5B: New alignment of a double offline track. 59.40 mOD maximum track level crossing under ESB 220 kV line (flood track protection structures required).
- Option 6. Double online track. Bridge deck reconstruction (precast arch deck.).Tracks at 61.06 m level. Requires reconstruction of three bridge arches.

The main reasons for this recommendation are:

- Option 3. Double online track. Bridge deck reconstruction (precast arch deck). Rail tracks at 60.00 m level.
 - Implementation of flood defences is also seen as a potential residual risk of disruption to service.
 - Land acquisition required for compensatory storage volumes (estimated to be 100,000m³).
 - Direct and negative impacts OBG23 RPS Jackson's Bridge.
 - Construction methodology causes operational challenges. Requires the construction of flood defences and excavations, which requires long possession track works.
- Option 5B: New alignment of a double offline track. 59.40 mOD maximum track level crossing under ESB 220 kV line (flood track protection structures required). Option 5B is the most expensive solution, requiring flood defences structures. A residual risk of flood waters overtopping the necessary flood defences causing rapid inundation of the railway line remains.

Other disadvantages of this option are:

- It requires L5041 road diversion
- The tracks levels do not allow a track underpass for Jackson's Bridge. Worst tracks levels for stream and Lyreen river (UBG22) underbridges.
- Option 6 Bridge deck reconstruction (precast arch deck.).Tracks at 61.06 m level. (3 bridge arches reconstruction. This option has a comparable cost to other option that do not impact Jackson's Bridge. Other disadvantages of this option are:

- Direct and negative impact on three arches of RPS Jackson's Bridge (including the Royal Canal Arch).
- Provides sufficient flood protection to rail services. However, increased flood risk elsewhere as flood waters are displaced, causing water levels to be increased upstream. Potential to exacerbate flooding on M4 motorway.
- Land acquisition required for compensatory storage volumes (estimated to be 100,000m³).
- Construction methodology causes operational challenges. The earthwork (embankments) needed to the new track levels requires long possession track works.
- Requires 220 kV ESB electric line diversion
- It requires L5041 road diversion

Considering Option 5 Double track new alignment:

- It is likely to have the least impact on the existing flood regime compared to the other options while providing sufficient flood protection to rail services (without flooding defences structures).
- It has a similar cost to option 5B and 6 and 20% over Option 3.
- No direct impact on Jackson's Bridge.

Table 2. OBG23 MCA2 Summary

Criteria	Option 3. Double Online track. Bridge deck reconstruction. Tracks at 60.00 m level Retaining wall to prevent flooding	Option 5A. Double offline track. New alignment 61.06 m minimum track level (ESB 220 kV line diversion required)	Option 5B. Double offline track. New alignment 59.40 mOD maximum track level crossing under ESB 220 kV line (flood track protection structures required)	Option 6. Double Online track. Bridge deck reconstruction. Tracks at 60.71 m level. 3 arch bridge reconstruction (ESB 220 kV line diversion required)	
1	Economy	Some comparative advantage over other options	Some comparative advantage over other options	Some comparative disadvantage over other options	Some comparative advantage over other options
2	Integration	Some comparative disadvantage over other options	Some comparative advantage over other options	Some comparative disadvantage over other options	Some comparative disadvantage over other options
3	Environment	Significant comparative disadvantage over other options	Significant comparative advantage over other options	Significant comparative advantage over other options	Significant comparative disadvantage over other options
4	Accessibility and social inclusion	Comparable to other options	Comparable to other options	Comparable to other options	Comparable to other options
5	Safety	Some comparative disadvantage over other options	Some comparative advantage over other options	Some comparative advantage over other options	Some comparative disadvantage over other options
6	Physical Activity	Comparable to other options	Comparable to other options	Comparable to other options	Comparable to other options
	Progress To Stage 2	No	Yes	No	No
	Comment	<p>Direct and negative impact on OBG23 RPS Jackson's Bridge Construction methodology operational disadvantages requires the construction of flood defenses and excavation that requires long possession track works. This solution allows maintenance of the tracks at the railway corridor.</p> <p>The challenge of this option is to find a sympathetic solution that minimizes the impact on the structure. It requires flood defenses structures that is seen as a potential residual risk of disruption to service. Land acquisition required for compensatory storage volumes (estimated to be 100,000m³).</p>	<p>This solution has a cost 14% higher than Option 6, and 12% lower than Option 4 and 5B This option does not impact directly on OBG23 It is likely to have the least impact on the existing flood regime compared to the Options 3 and 6 while providing sufficient flood protection to rail services (without flooding defenses structures). Requires ESB 220kV electric line diversion It requires L5041 road diversion</p>	<p>This solution has the highest cost. It does not directly impact on Jackson's Bridge It requires flood defences structures that is seen as a potential residual risk of disruption to service. It has least impact on existing flood regime comparative to Options 3 and 6 It requires L5041 vehicles diversion through new OBG23A (do not allow a track underpass for Jackson's Bridge) Worst tracks levels for stream and Lyreen river (UBG22) underbridges.</p>	<p>This solution has lower cost than Options 5A and 5B OBG23 RPS Jackson's Bridge directly and negatively impacted upon to a very significant/profound degree as structure required. Construction cost similar to Option 5A and 5B Land acquisition required for compensatory storage volumes (estimated to be 100,000m³). Construction methodology causes operational challenges. The earthwork (embankments) needed to the new track levels requires long possession track works Requires ESB 220kV electric line diversion It requires L5041 road diversion</p>