

MCI DEVELOPMENTS



ASSESSMENT OF 65A TRUB FARM ACCESS BRIDGE
TRUB ROAD CANAL BRIDGE

ASSESSMENT REPORT

900010-WCL-XX-XX-RP-C-0001



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DOCUMENT CONTROL SHEET

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EXECUTIVE SUMMARY

Trub Farm Access Bridge is a reinforced concrete box culvert structure. The bridge is located along Trub Road, Rochdale (approximate postcode: OL11 2LY). The structure carries a single traffic lane and associated footways over the Rochdale Canal, facilitating vehicle access to Trub Farm and pedestrian access to the canal towpath below.

Historic drawing information suggests that the structure was constructed in two parts; the base slab and abutment/wing walls were constructed circa 2002 and the bridge deck circa 2007.

To the west of the bridge there is an existing buried pipe culvert that serves a flood control channel to the canal. The length of the buried pipe culvert is approximately 30m with reinforced concrete headwalls to the inlet and outlet.

This Assessment Report addresses the load carrying capacity of the box culvert bridge structure as well as the load carrying capacity of the adjacent buried concrete pipe culvert.

No Inspection for Assessment was carried out as part of the works. A visual inspection of the structure was undertaken on 24/10/2024 by WCL, prior to carrying out the assessment. Access was on foot only. The structure was considered to be in good condition with no significant defects observed. A photolog from the site visit can be found in Appendix A.

This Assessment Report should be viewed in conjunction with the approved AIP (document ref: 900010-WCL-XX-XX-RP-C-0001 Rev0) dated January 2025 (included in Appendix D).

An additional investigation consisting of GPR scanning of the reinforcement to the abutment walls was undertaken in May 2022, the investigation report is included in Appendix E.

The assessment was based on available record drawing information provided by the Client and the additional investigation regarding reinforcement to the abutments. Where reinforcement details were unknown, minimum reinforcement quantities (in accordance with the current codes and standards at the time of design) were considered.

During construction the client has stated that there will be vehicles tracking over the box culvert structure which exceed 40-tonnes. As an allowance for this the assessment has considered SV 80 abnormal loading to account for any overweight vehicles during the construction period.

The culvert bridge deck slab, abutment walls, base slab, foundations and parapets are considered to PASS the assessment for "normal traffic / 40 tonnes" assessment live loading.

The box culvert was found to marginally fail the assessment when considering SV80 abnormal vehicle loading and adopting the CS 458 dynamic amplification and overload factors. However, the culvert passed the assessment with these factors both set to 1.0. As such, it is recommended that any abnormal loads traversing the culvert be restricted to a speed limit of 5mph and the contractor is to ensure that no axle weight exceeds 130kN (13.05 tonnes).

The buried concrete culvert pipe is considered to PASS the assessment for "normal traffic / 40 tonnes" assessment live loading. The buried concrete culvert pipe was found to fail the assessment for SV 80 abnormal vehicle loading. However, it is understood that there is access to the site during construction that does not cross this. Further consideration should be given should the contractor wish to track any abnormal vehicle loads over the buried concrete culvert pipe.

1.0 INTRODUCTION

1.1 Scope of Works

- 1.1.1 This report has been prepared by Wilde Consultants Ltd (WCL) for MCI Developments Ltd (MCI). The scope of works was as follows:
- Review available information
 - Attend site to undertake a visual inspection of the structure
 - Preparation of Approval in Principle
 - Undertake assessment calculations and prepare Assessment Report
- 1.1.2 This Assessment Report addresses the load carrying capacity of the box culvert bridge structure as well as the load carrying capacity of the adjacent buried concrete pipe culvert.
- 1.1.3 No Inspection for Assessment was carried out as part of the works. A visual inspection of the structure was undertaken on 24/10/2024 by WCL, prior to carrying out the assessment. Access was on foot only. The structure was considered to be in good condition with no significant defects observed. A photolog from the site visit can be found in Appendix A.
- 1.1.4 This Assessment Report should be viewed in conjunction with the approved AIP (document ref: 900010-WCL-XX-XX-RP-C-0001 Rev0) dated January 2025 (included in Appendix D).

1.2 Previous Inspections/Assessments

1.2.1 Previous Inspections:

No previous inspection reports were made available at the time of this assessment.

1.2.2 Previous Assessments:

No previous assessment reports were made available at the time of this assessment.

1.3 Available Information

1.3.1 The following information was available prior to this assessment:

Record Drawings:

A1/BW06/409 – M62 C M62 Crossing Finishing Works (Phase 2) Carriageway Pavement Details

A1/BW06/410 – M62 Crossing Finishing Works (Phase 2) Carriageway Pavement Typical Cross-sections

A0/BW06/231 – M62 Crossing General Arrangement at Northern Access Overbridge

216686/CK01/1700 – Rochdale Canal Restoration Trub Farm Access Works Bridge Deck GA

216686/CK01/1701 – Rochdale Canal Restoration Trub Farm Access Works Bridge Deck Reinforcement Details

Client Drawings:

MCI-000-DR-A-500 – Site Layout (MCI Developments)

Ferros scanning Results:

UU7467-R-01(02) – Abutment Reinforcement Investigation, Trub Farm Bridge, Rochdale

1.4 General Description of Structure

1.4.1 Bridge Structure

Trub Farm Access Bridge is a reinforced concrete box culvert structure. The bridge is located along Trub Road, Rochdale (approximate postcode: OL11 2LY). The structure carries a single traffic lane and associated footways over the Rochdale Canal, facilitating vehicle access to Trub Farm and pedestrian access to the canal towpath below.

Historic drawing information suggests that the structure was constructed in two parts; the base slab and abutment/wing walls were constructed circa 2002 and the bridge deck circa 2007.

The overall width of the bridge deck is 11.8m, with an internal clearance of 10.8m between internal parapet faces. In the existing condition this clear width is made up of:

- Single lane – 4.1m
- North footway – 1.8m
- South footway – 1.8m
- Tarmacadam verge (beyond north footway) – 3.1m

It is understood that in the proposed condition the developer is proposing 2no running lanes over the bridge, with the clear width comprising:

- Carriageway – 5.5m
- North footway – 2.0m
- South footway – 2.0m
- North verge – 2.3m

The depth of surfacing/fill material over the bridge deck was measured on site as being 320mm thick at the base of the internal parapet faces.

1.4.2 Buried Pipe Culvert

To the west of the bridge there is an existing buried pipe culvert that serves a flood control channel to the canal. The length of the buried pipe culvert is approximately 30m with reinforced concrete headwalls to the inlet and outlet.

The construction of the buried pipe culvert is concrete. The internal diameter of the pipe is 600mm.

In the proposed condition, the developer is proposing to build a new access road over the buried pipe culvert, raising the ground level by ~2.2m in the process.

1.5 Special Inspection

1.5.1 No special inspection works were undertaken as part of this assessment.

1.6 Assessment Method

1.6.1 The assessment has been carried out in accordance with the approved AIP (document ref: 900010-WCL-XX-XX-RP-C-0001 Rev0) dated January 2025.

1.6.2 The proposed check category is Category 1, in accordance with CG 300: 3.7.

1.6.3 In accordance with CS 454, the applicable levels of Assessment Live Loading (ALL) are as follows:

- Normal traffic, no restrictions (i.e. 40 tonnes);
- 26 tonnes;
- 18 tonnes;
- Fire engines group 1;
- 7.5 tonnes;
- Fire engines group 2;
- 3 tonnes.

1.6.4 In accordance with CS 458, the applicable Special type general order (STGO) vehicle to be assessed is:

- SV 80

This is being considered to represent any abnormal loads that the contractor may be traversing over the bridge during construction.

It is recommended that any abnormal loads traversing the box culvert be restricted to a speed limit of 5mph and the contractor is to ensure that no axle weight exceeds 130kN (13.05 tonnes).

It has been assumed that during the construction phase any abnormal loads will not cross the buried pipe culvert but will use the existing access track to get to the site. The buried pipe culvert has therefore only been considered for "Normal traffic" loading in the assessment.

1.6.5 Partial factors used in the assessment are as follows:

Action	ULS (γ_{fl})	SLS
Concrete dead load	1.15	1.0
Surfacing superimposed dead load	1.75	1.0
Vehicle traffic loads for normal traffic and restricted traffic	1.5	1.0
SV80 Vehicle traffic loads	1.1	1.0

1.6.6 Load factors used for “Normal Traffic” (vehicles up to 40-tonne) in the assessment are as follows:

K Factor	Value	Load Situation
K_1	1.62	Impact Factor applied to critical axle – Single vehicle in each lane – Good Road surface
K_2	1.0	Traffic Flow – Low
K_3	1.0	Lane Factor – Lane 1 & 2

1.6.7 Load factors used for abnormal vehicles (SV80) in the assessment are as follows:

Factor	Value
Dynamic Amplification Factor (DAF)	1.16 applied to each axle
Overload Factor (OF)	1.2 for worst critical axle, 1.1 for all other axles

It is noted that both DAF and OF can be reduced to 1.0 if the stated limitations are followed, this includes a 5mph speed limit for abnormal vehicles, and ensuring a maximum axle load of 130kN as stated in section 1.6.4.

2.0 ASSESSMENT RESULTS

2.1 Culvert Bridge Structure

2.1.1 Deck Slab

The deck slab reinforcement is known from the record drawings provided.

The deck slab is considered to PASS the assessment for “normal traffic / 40 tonnes” and for SV 80 loading.

Utilisation factors for the various failure modes are as follows:

Live Load Model		Normal traffic / 40 tonnes	SV 80 vehicle
Bending		63%	57%
Shear	Within 3d of support	41%	34%
	Further than 3d of support	98%	94%

(Figures are based on known reinforcement quantities)

2.1.2 Abutment Walls

The abutment wall reinforcement is known from the GPR scanning which was undertaken with findings presented in report ref. UU7467-R-01(02).

The reinforcement was found to comprise 20mm diameter bars @ 130mm c/c, resulting in an area of reinforcement of 2417mm²/m.

The abutments are considered to PASS the assessment for “normal traffic / 40 tonnes” and for SV 80 loading.

Utilisation factors for the various failure modes are as follows:

Live Load Model		Normal traffic / 40 tonnes	SV 80 vehicle
Bending		55%	49%
Shear		47%	28%

2.1.3 Base Slab

The base slab reinforcement is unknown.

In accordance with the AIP, the assessment of the base slab has been carried out assuming minimum reinforcement quantities based on BS 8110 (the current codes and standards at the time of design).

Based on minimum reinforcement quantities, the base slab is considered to PASS the assessment for “normal traffic / 40 tonnes” and for SV 80 loading.

Utilisation factors for the various failure modes are as follows:

Live Load Model		Normal traffic / 40 tonnes	SV 80 vehicle
Bending		90%	99.5%
Shear	Within 3d of support	38%	36%
	Further than 3d of support	36%	56%

(Figures are based on minimum reinforcement quantities)

2.1.4 Foundations

The assessment of the foundations comprised a comparison of the maximum bearing pressures associated with HA loading (in accordance with BD 37/01) and the CS 454 assessment live loading models.

The bearings pressures associated with the CS 454 ALL models 1 and 2 were found to be less than the bearing pressures associated with HA loading from BD 37/01.

Live Load Model	CS 454: ALL Model 1	CS 454: ALL Model 2	BD 37/01: HA Loading	CS 458: SV 80 loading
Max SLS bearing pressure from live loading (kN/m ²)	53.0	40.0	59.3	43.3

The foundations are therefore considered to PASS the assessment for “normal traffic / 40 tonnes”.

2.1.5 Parapets

The parapet reinforcement is known from the record drawings provided.

The parapets have been assessed in accordance with CS 461 and were found to be suitable for N2 level of containment.

With reference to CD 377: 3.5, for roads with a speed limit of less than 50mph the minimum containment level for “normal containment” permanent safety barriers shall be N1.

The parapets are considered to PASS the assessment for “normal / 40 tonnes”.

Utilisation factors for the various failure modes are as follows:

Bending	78%
Shear	82%

(Figures are based on known reinforcement quantities)

2.1.6 Refer to Appendix B for the full assessment calculations associated with the culvert bridge structure.

2.2 Buried Culvert Pipe Structure

2.2.1 As described in the AIP, the assessment of the buried culvert pipe was carried out in accordance with BS EN 1295-1 and BS 9295.

2.2.2 The existing buried culvert pipe is considered to PASS the assessment for the proposed condition “Main Road” loading in accordance with BS EN 1295-1. “Main Road” loading is considered to be comparable with “normal traffic / 40 tonnes” from CS 454.

The buried culvert pipe is considered to PASS the assessment for “normal traffic / 40 tonnes”.

Utilisation factors for the various failure modes are as follows:

Crushing of pipe	90%
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2.2.3 Refer to Appendix C for the full assessment calculations associated with the buried culvert pipe.

3.0 CONCLUSION

3.1 Summary of Results

- 3.1.1 This assessment considers the numerical assessment of Trub Farm Access Bridge and the adjacent buried concrete culvert pipe.
- 3.1.2 The assessment was based on available record drawing information provided by the Client and the additional investigation regarding reinforcement to the abutments. Where reinforcement details were unknown, minimum reinforcement quantities (in accordance with the current codes and standards at the time of design) were considered.
- 3.1.3 The culvert bridge deck slab, abutment walls, base slab, foundations and parapets are considered to PASS the assessment for “normal traffic / 40 tonnes” assessment live loading.
- 3.1.4 The box culvert was found to marginally fail the assessment when considering SV80 abnormal vehicle loading and adopting the CS 458 dynamic amplification and overload factors. However, the culvert was found to PASS the assessment with these factors both set to 1.0. As such, it is recommended that any abnormal loads traversing the culvert be restricted to a speed limit of 5mph and the contractor is to ensure that no axle weight exceeds 130kN (13.05 tonnes).
- 3.1.5 The buried concrete culvert pipe is considered to PASS the assessment for “normal traffic / 40 tonnes” assessment live loading. The buried concrete culvert pipe was found to fail the assessment for SV 80 abnormal vehicle loading. However, it is understood that there is access to the site during construction that does not cross this. Further consideration should be given should the contractor wish to track any abnormal vehicle loads over the buried concrete culvert pipe.

3.2 Results Summary Table

- 3.2.1 The results of the assessment are summarised in the table below:

Culvert Bridge Structure	
Deck Slab	PASS for normal traffic / 40 tonnes ALL PASS for SV 80 loading
Abutment Walls	PASS for normal traffic / 40 tonnes ALL PASS for SV 80 loading
Base Slab	Based on minimum reinforcement quantities: PASS for normal traffic / 40 tonnes ALL PASS for SV 80 loading
Foundations	PASS for normal traffic / 40 tonnes ALL PASS for SV 80 loading
Parapets	PASS for normal traffic / 40 tonnes ALL
Buried Culvert Pipe	
Crushing of Pipe	PASS for normal traffic / 40 tonnes ALL

**ALL – Assessment Live Loading*

APPENDIX A – SITE VISIT PHOTO LOG



Photo 01 – Culvert bridge – east approach



Photo 02 – Culvert bridge – west approach



Photo 03 – Culvert bridge – north elevation



Photo 04 – Culvert bridge – south elevation



Photo 05 – Culvert bridge – north parapet internal



Photo 06 – Culvert bridge – south parapet internal



Photo 07 – Culvert bridge – east abutment wall



Photo 08 – Culvert bridge – west abutment wall



Photo 09 – Culvert bridge – deck soffit



Photo 10 – Buried culvert pipe – inlet



Photo 11 – Buried culvert pipe – outlet



Photo 12 – Buried culvert pipe – looking up the outlet

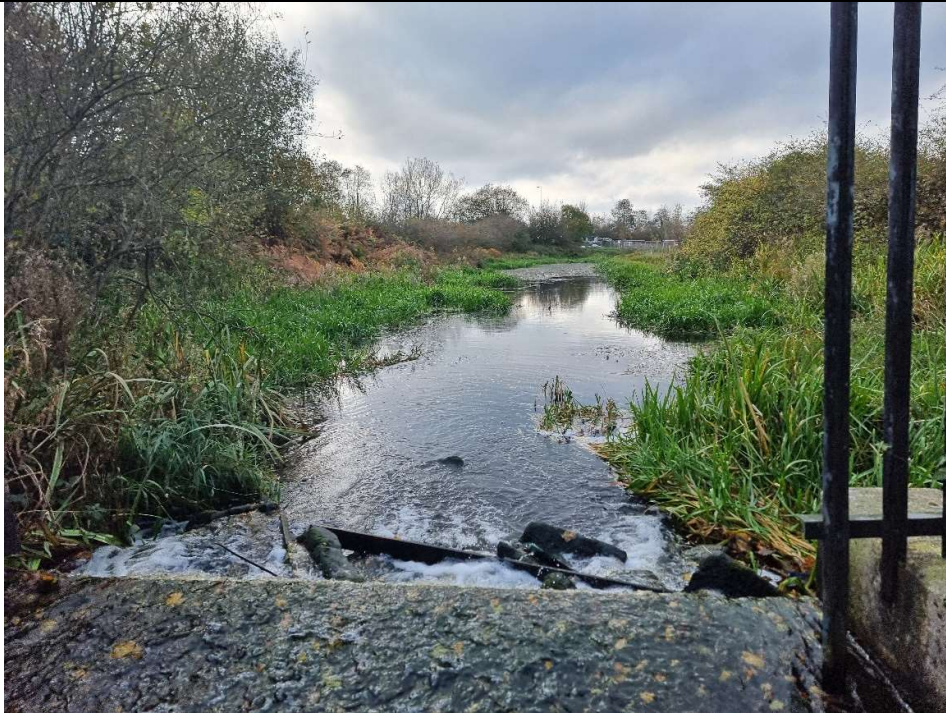


Photo 13 – Buried culvert pipe – downstream of outlet

APPENDIX B – BOX CULVERT BRIDGE ASSESSMENT CALCULATIONS

APPENDIX C – BURIED CULVERT PIPE ASSESSMENT CALCULATIONS

APPENDIX D – SIGNED APPROVAL IN PRINCIPLE

APPENDIX E – FERROSCANNING RESULTS