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DRAINAGE SCHEME DESIGN REPORT

112 CHURCH ST, LITTLEBOROUGH OL15 8AS

HME CIVIL ENGINEERING CONSULTANTS

STRUCTURAL | ENVIRONMENTAL | GEOTECHNICAL



HME Civil Engineering Limited. Registered in England: **15684044**

Client:

Ryan Martyn

ryan@astrolondon.co.uk

Site visit date and time:

25th January 2025 12:00.

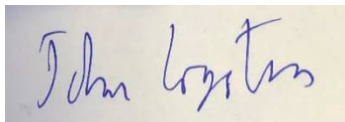
Site testing date and time:

6th February 2025 09:00.

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00 First Revision

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1. Introduction

Mr Ryan Martyn has appointed HME Civil Engineering to design a drainage scheme proposal for the new pair of semi-detached properties at 112 Church St, Littleborough OL15 8AS in support of a planning application for a proposed residential development.

This report outlines the findings from site visits, site testing and desktop survey. The purpose of this design is to discharge the surface water runoff, created by the development, in line with the latest standards and regulations.

The infiltration tests were carried out in accordance with the BRE 365 specification. One trial pit was dug across the site (see Figure 2 for location). The infiltration tests were carried out on 6th February 2025. The weather conditions on the day of the tests were dry.

The majority of the site which is evident from the phase 2 investigations is underlain by clay. No groundwater was encountered in the trial pit.

The test procedure was repeated (where possible) to replicate soil moisture conditions typical of the site when the soakaways become operative.



Figure 1 Site Location (112 Church St, Littleborough OL15 8AS.)

2. Infiltration Testing

On the 6th February 2025 HME Civil Engineering Consultants undertook infiltration testing on the site, to determine the suitability of the existing sites strata for soakaway discharges, including permeability.

The field investigations are required to confirm infiltration rates. The procedure followed was to excavate 1nr soakage trial pit (due to the site constraints) to the same depth as anticipated in the full-size soakaway. The pit was dug to 1m below the anticipated invert level of the drain discharging to the soakaway.

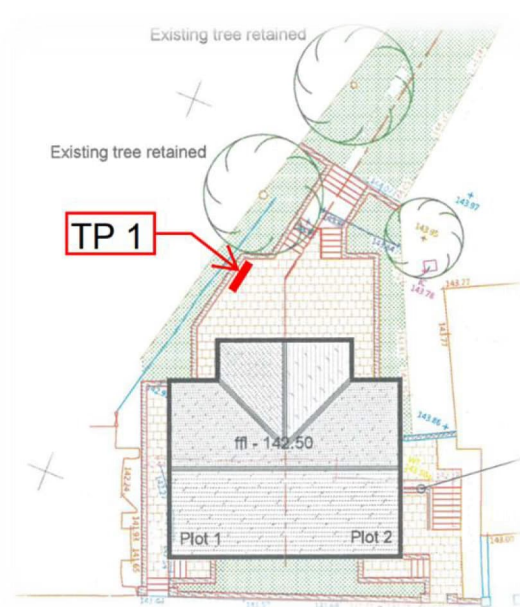
Overall depths of excavation were 1.5m. The soakage trial pit was also 1.5m long and 0.3m wide. The trail pit had vertical sides trimmed square and there was no requirement for granular material to be used in these tests.

Measurements of the soakage trial pit were carefully taken before trials. For safety reasons HME Civil Engineering Consultants did not enter the soakage trial pit. The inflow was rapid as could be achievable for the site (IBC Tank), and filled with 1000mm depth of water, as near to the anticipated design invert level of the drain as possible to effectively test the permeability of the ground.

HME took care to ensure that the inflow did not cause the walls of the soakage trial pit to collapse.

HME filled the soakage trial pit and allowed it to drain two times until a cut off time was reached. Each time recording the water level in 50mm intervals, which was determined as sufficiently close to clearly define water level versus time. The filling of the soakage trial pits were on the same day.

Prior to testing, the pits were well soaked and saturated by HME Civil Engineering Consultants.



HME Civil Engineering Limited – Drainage Design

2.1. Test Results

The trial pit was dug using hand tools due to the site access constraints, to enable the infiltration testing. The pit was dug, saturated prior to testing and then filled twice, on the same day. TP1 images pre and post testing can be seen below.

Trial Pit 1 photos: 300W x 1500L x 1500D





2.1.1. Trial Pit 1

See below test results showing depth below ground and the time, for trial pit 1. The worst case results, highlighted in **Red**, are to be used for calculation purposes.

Location	Test pit size	Test number	Depth below ground (mm)	Time
Test Pit 1	300W x 1500L x1500D	1	500	0m 0s
			550	0m 30s
			600	01m 15s
			650	2m 0s
			700	3m 12s
			750	5m 17s
			800	12m 2s
			850	33m 55s
			900	1h 19m 10s
			950	2hr 52m 50s
			1000	5hr 25m 12s
			Test aborted at 6hrs. no further percolation.	
Location	Test pit size	Test number	Depth below ground (mm)	Time
Test Pit 1	300W x 1200L x1500D	2	500	0m 0s
			550	0m 40s
			600	01m 28s
			650	2m 20s
			700	3m 45s
			750	6m 3s
			800	14m 46s
			850	48m 10s
			900	1h 56m 10s
			950	3hr 59m 50s
			975mm	Test aborted at 6hrs. (975mm achieved) no further percolation.

3. Drainage Infrastructure Surveyed

Chamber	Location	
1 – surface water run off from both properties. IL = 141.77		
2 – surface water run off from both properties. IL = 141.57		
3 – surface water run off and foul from both properties. IL = 140.97		



4. Testing Conclusion

Poor percolation was found during testing. Both tests 1 and 2 had to be aborted due to the 6 hour cut off time being reached. The test was abandoned at pit 1 after 6 hours due to the underlying clay and resulting slow rate of infiltration.

There is existing clay soil at the depth below ground where infiltration would be required for a soakaway system, the clay ground conditions encountered has very fine particles that are tightly packed together, limiting the space for water to seep through. It was evident from the testing, that water will pool within the pit instead of draining effectively into the surrounding soil. Therefore, this would pose a high risk of localised flooding during periods of increased rain fall.

Soakaways are not suitable in this location. Given the sites topography and constraints, there were no other suitable locations for a soakaway to be suited due to the close proximity of the properties and the requirement to locate a soakaway 5m from a property boundary. It is therefore not possible to discharge surface water by soakaway

5. Alternatives to Soakaway

There are no watercourses near the property so discharge to a surface water body is not possible.

There are public sewers running along Church Street at the front of the properties but these have not been used, at the clients request, due to the need to open trenches in the public highway.

As noted in the drainage strategy report for the site any existing sewer connections on the site should be investigated and its potential for reuse investigated. This will require the client to liaise and agree any connections with UU. The existing sewer is shown in Figure 3 manhole C3. The current site surface and foul water drainage has been connected into this sewer.

6. Drainage Design Parameters and Strategy

As per the planning conditions a maximum discharge rate of 5l/s has been used for the drainage calculations with a 40% uplift for climate change.

Attenuation will be provided by an oversized pipe and large chambers. Flow restriction has been provided with a vortex flow control device and an orifice. Both sides of the property drain down to the same existing sewer so will require attenuation so the combined flow rate is limited to 5l/s.

The foul water from both properties has also been connected into manhole C3.

7. Detailed Drainage Design

As requested in the planning permission, drainage calculations have been carried out using MicroDrainage 2020 the results of which are shown in Appendix A.

The as built drainage will need some modification as shown in the detailed design drawing in Appendix B. The majority of the site to the North of the proposed residences will be drained to a section of oversized 450mm diameter pipe which will be connected to a minimum 1350mm diameter chamber which will contain an ACO Q-Brake. It is recommended that a proprietary ACO twin wall chamber is used and installed in accordance with the manufacturer's recommendations.

The Q-Brake shall have the following details:

- Design Head: 1 m
- Design flow: 1.8 l/s
- Diameter: 62mm

The only modification to the south of the site will be the installation of a 600mm diameter chamber with a 50mm orifice plate fitted to the outfall pipe. This chamber will be installed as shown on the line of the existing pipe without modification to its levels.

APPENDIX A.

MicroDrainage Calculations.

							Page 5		
Date 18/02/2025 File CHURCH.MDX									
Innovyze				Network 2020.1.3					
<u>30 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1)</u> <u>for Existing</u>									
		Surcharged	Flooded			Half Drain	Pipe		
	US/MH	Depth	Volume	Flow /	Overflow	Time	Flow		Level
PN	Name	(m)	(m³)	Cap.	(l/s)	(mins)	(l/s)	Status	Exceeded
E2.001	E4	0.201	0.000	0.50			2.8	FLOOD RISK	
E2.002	E5	0.238	0.000	0.49			2.7	SURCHARGED	
E1.002	E6	0.000	0.000	1.01			4.0	OK	

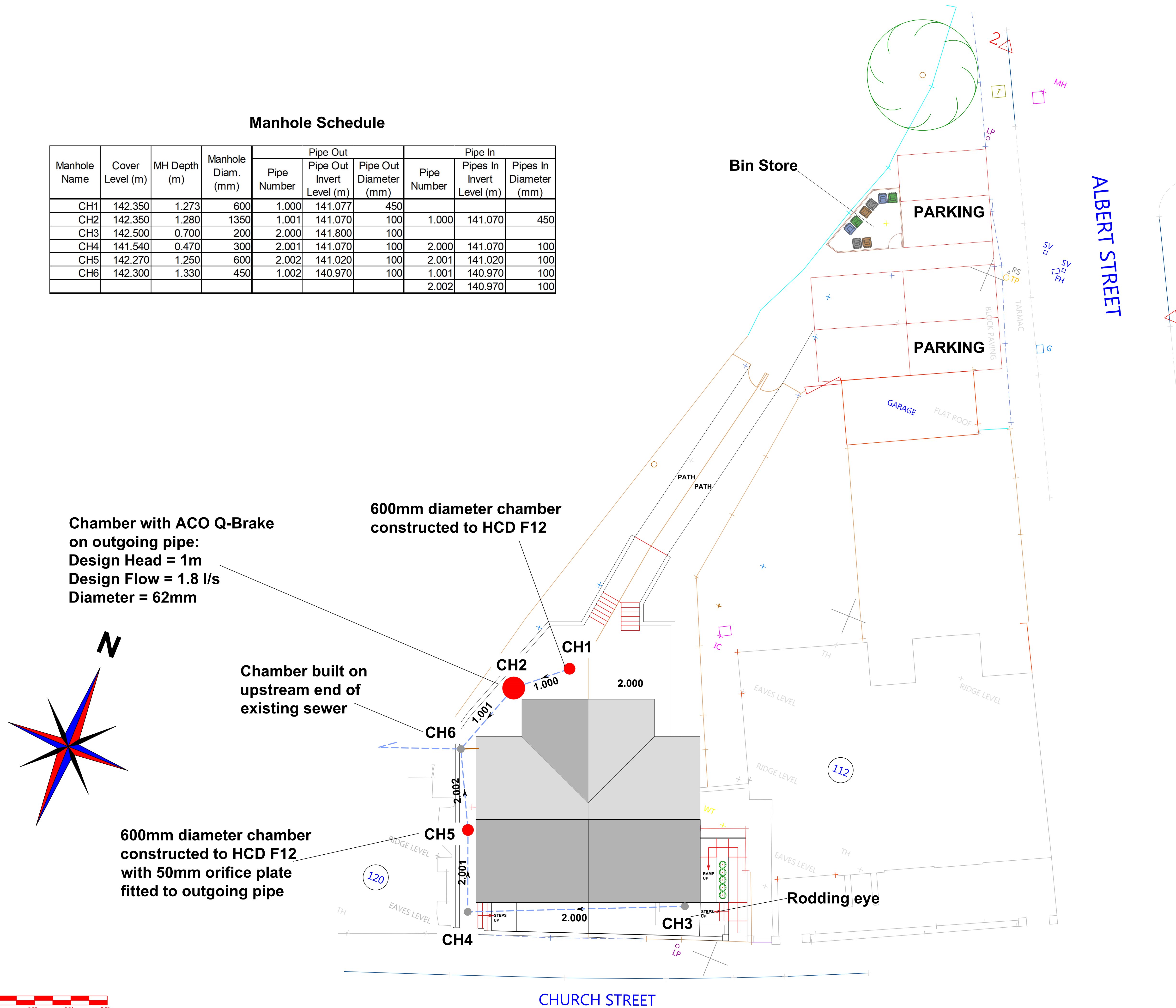
Date 18/02/2025 File CHURCH.MDX				Page 6					
									
Innovyze		Network 2020.1.3							
100 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Existing									
Simulation Criteria									
Areal Reduction Factor		1.000		Additional Flow - % of Total Flow 0.000					
Hot Start (mins)		0		MADD Factor * 10m³/ha Storage 2.000					
Hot Start Level (mm)		0		Inlet Coefficient 0.800					
Manhole Headloss Coeff (Global)		0.500		Flow per Person per Day (l/per/day) 0.000					
Foul Sewage per hectare (l/s)		0.000							
Number of Input Hydrographs 0		Number of Offline Controls 0		Number of Time/Area Diagrams 0					
Number of Online Controls 2		Number of Storage Structures 0		Number of Real Time Controls 0					
Synthetic Rainfall Details									
Rainfall Model		FSR		Ratio R 0.250					
Region		England and Wales		Cv (Summer) 0.750					
M5-60 (mm)		19.000		Cv (Winter) 0.840					
Margin for Flood Risk Warning (mm)		300.0		DVD Status OFF					
Analysis Timestep		Fine		Inertia Status OFF					
DTS Status		ON							
Profile(s)				Summer and Winter					
Duration(s) (mins)		15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080							
Return Period(s) (years)		1, 30, 100							
Climate Change (%)		40, 40, 40							
Water									
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)
E1.000	E1	15 Winter	100	+40%	30/15 Summer				142.085
E1.001	E2	60 Winter	100	+40%	1/15 Summer				142.344
E2.000	E3	15 Winter	100	+40%					141.823
E2.001	E4	15 Winter	100	+40%	30/15 Summer				141.529
E2.002	E5	15 Winter	100	+40%	1/15 Summer				141.508
E1.002	E6	15 Winter	100	+40%	100/15 Summer				141.082
Surcharged Flooded						Half Drain		Pipe	
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
E1.000	E1	0.558	0.000	0.05			6.5	FLOOD RISK	
E1.001	E2	1.174	0.000	0.25			2.0	FLOOD RISK	
E2.000	E3	-0.077	0.000	0.12			2.0	OK	
©1982-2020						Innovyze			

APPENDIX B.

Detailed Design Drawing.

Manhole Schedule

Manhole Name	Cover Level (m)	MH Depth (m)	Manhole Diam. (mm)	Pipe Out			Pipe In		
				Pipe Number	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipe Number	Pipes In Invert Level (m)	Pipes In Diameter (mm)
CH1	142.350	1.273	600	1.000	141.077	450			
CH2	142.350	1.280	1350	1.001	141.070	100	1.000	141.070	450
CH3	142.500	0.700	200	2.000	141.800	100			
CH4	141.540	0.470	300	2.001	141.070	100	2.000	141.070	100
CH5	142.270	1.250	600	2.002	141.020	100	2.001	141.020	100
CH6	142.300	1.330	450	1.002	140.970	100	1.001	140.970	100
							2.002	140.970	100



NOTES:

1. For additional details see the Drainage Scheme Design Report.
2. All roof and other surface water collection to the north of the site shall be connected to, or upstream of CH2.

KEY:

- SURFACE WATER DRAIN
 FOUL WATER DRAIN
 CHAMBER
 EXISTING CHAMBER
 FLOW

Revision	Date	Description
Revision	Date	Description
Revision	Date	Description
Revision	Date	Description
Revision A	Date 18/02/25	Description Detailed Design General Arrangement Drawing

HME
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CONSULTANTS

Project

112 CHURCH STREET
LITTLEBOROUGH

DRAINAGE LAYOUT PLAN

Drawing Number CHURCH_GA_1

Drawn: JG	Date: 18/02/25	Scale: NTS	Rev: A
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