



Heol Crwys Developments

Hydraulic Model Assessment

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1. CONTENTS

2. Introduction	3
3. Methodology	4
4. Solution	5
- Pressure	5
- Velocity	6
- Headloss.....	7
5. Risks, Conclusions & Reinforcements	8
- Risks	8
- Conclusions	8
- Reinforcement	8
6. Fire Flow	9
7. Appendix	10
8. Glossary	11

2. INTRODUCTION

This document will cover the building of 43 dwellings at the site of Heol Crwys, Cwmafan and connection to DCWW's potable water network.

The development in its entirety henceforth, will be referred to as Heol Crwys.

The location of the development to be assessed within DCWW's network is illustrated in Figure 1



Figure 1 Site Location of Heol Crwys

DCWW did have an existing model for the development area. Having an up-to-date model allows DCWW to accurately review the new development's effect on the current network, and ensure the new dwellings have suitable pressure and do not cause detriment to existing water supplies.

3. METHODOLOGY

A hydraulic model of the network was used to assess the impact of the new development under MDD conditions. This allows DCWW to be confident that the network will perform sufficiently during periods of high demand and provides a worst-case scenario model. The lowest potential pressures and highest potential flows, velocities, and head losses can be analysed. The demand of the new development was applied to the model this then allows DCWW to assess the increase in velocities, head loss and flow throughout the network.

Any changes to the demand will result in a requirement for an additional Hydraulic Modelling assessment.

The additional flow added to the model for Heol Crwys can be seen in the chart below. The flow profile uses average usage to accurately show the effects the dwellings would have on the network.

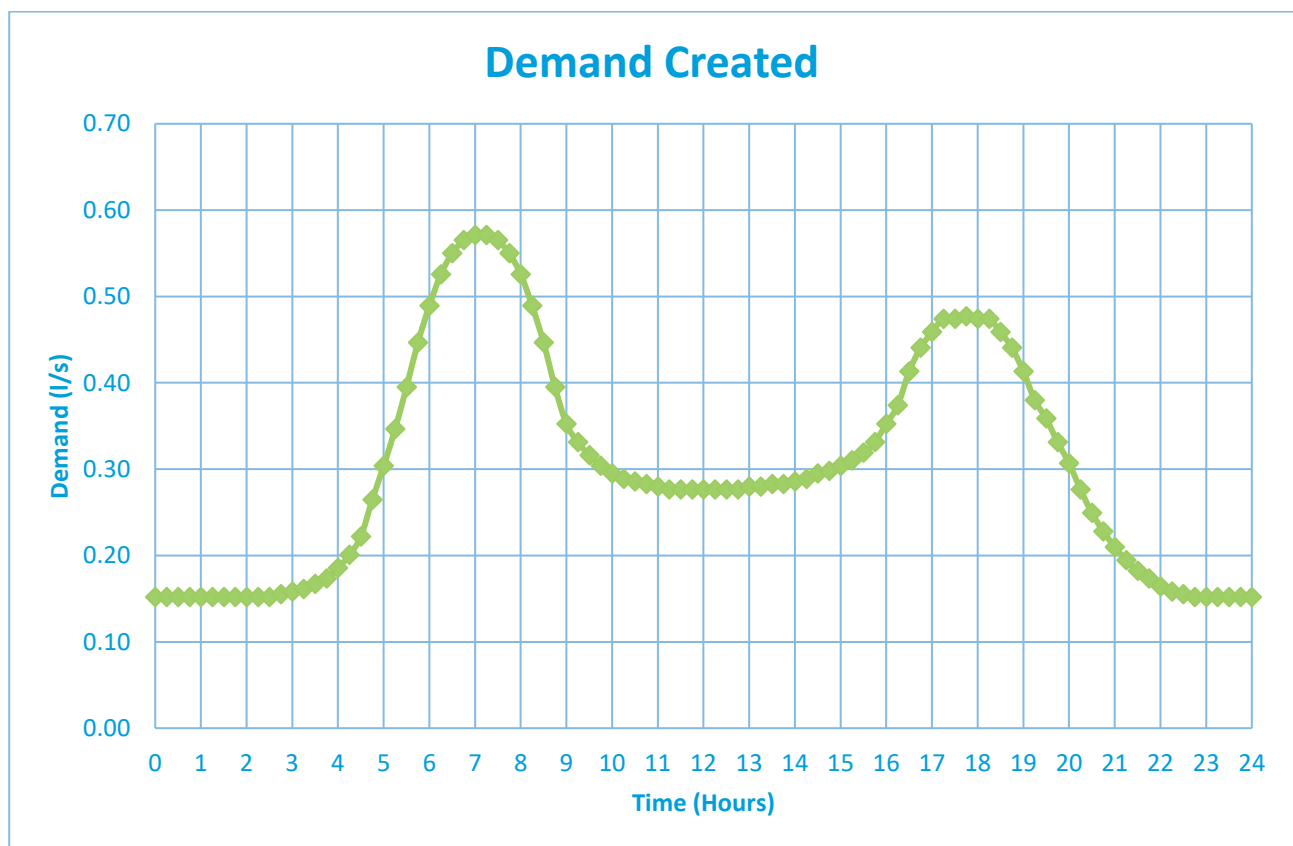


Figure 2 Flow profile for Heol Crwys

4. SOLUTION

- PRESSURE



Figure 3 Pressure at connection point

The Pressure decrease in the network due to the additional dwellings is shown in the chart above. There is a reduction in pressure, however this is small and still within DCWW's standards. The connection point is close to the highest part of the network.

- VELOCITY

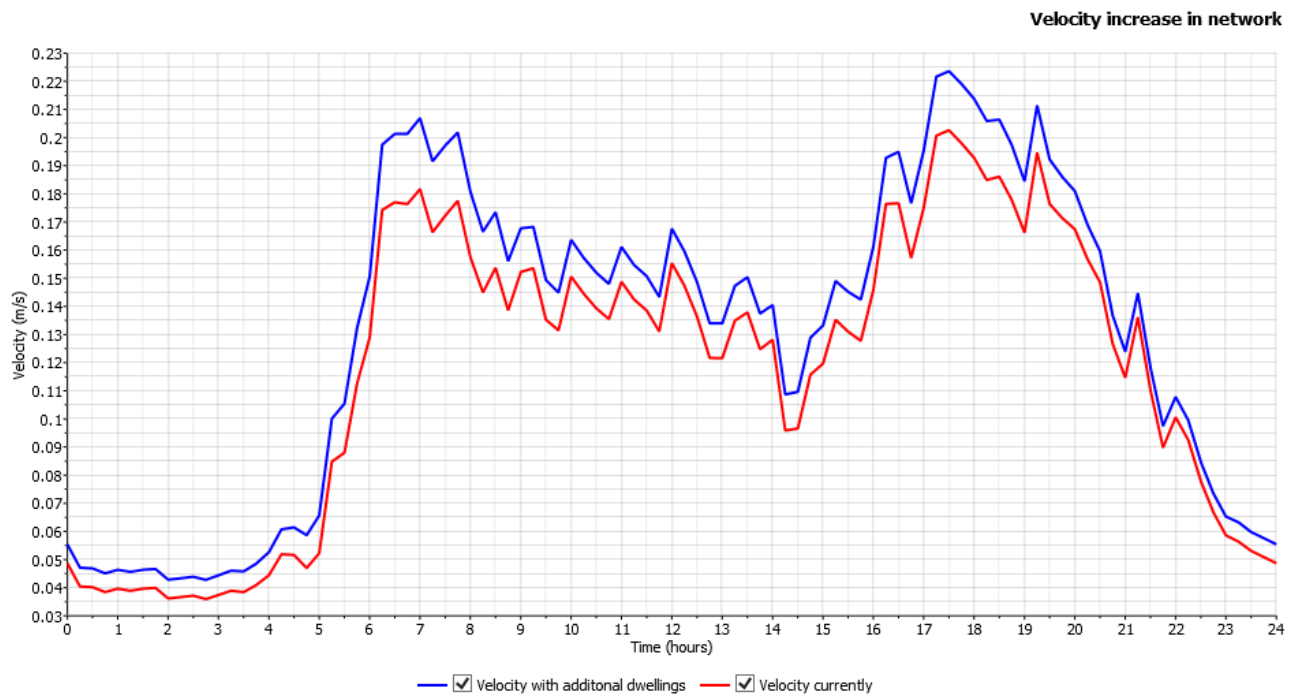


Figure 4 Velocity increase in network

The Velocities in the network will increase with the addition of the new dwellings. However, this increase is small and is within DCWW's standards.

- HEADLOSS

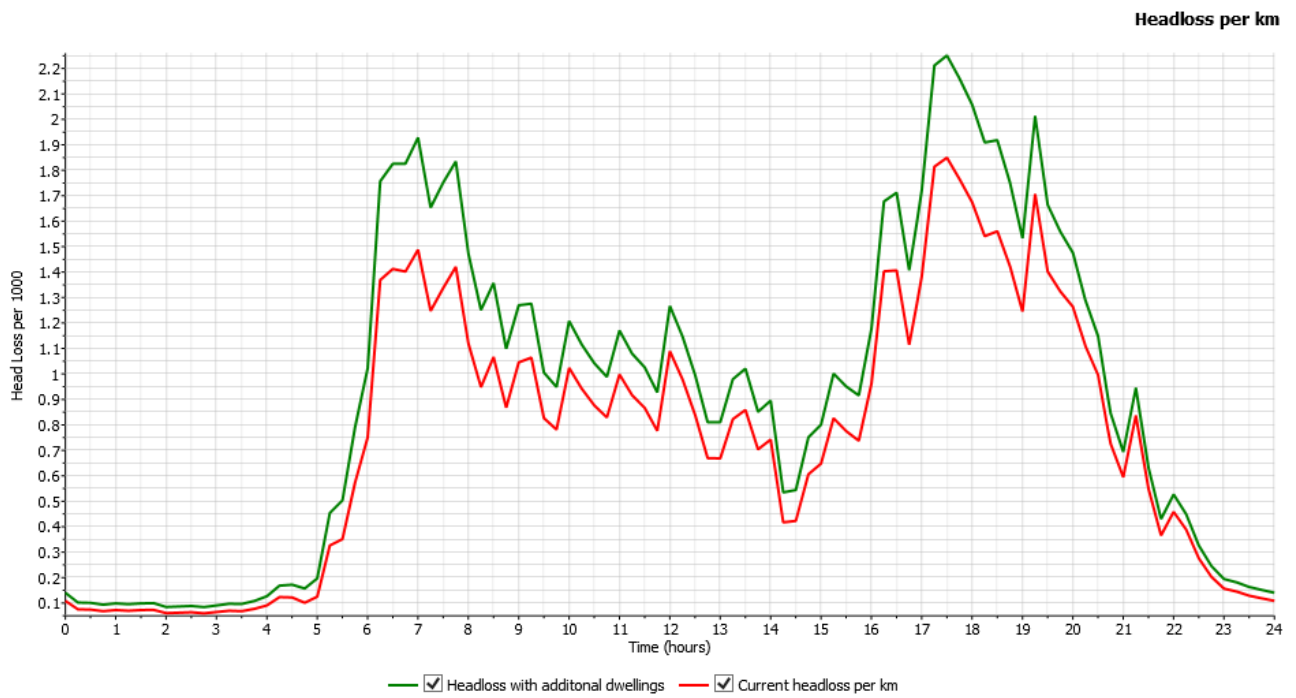


Figure 5 Headloss per km increase in network

The Headloss per km does see an increase, which is a sizeable increase. This is partly due to a high friction coefficient in the network. Although the increase is high, the network has available head and can accommodate the increase.

5. RISKS, CONCLUSIONS & REINFORCEMENTS

- RISKS

- Adding additional dwellings at the suggested site location will increase flows and velocities in the network. The network will require flushing to condition the main for the increase in flow, DCWW will need to carry this out.
- When demolishing the old dwellings, care should be taken as there is water mains nearby.

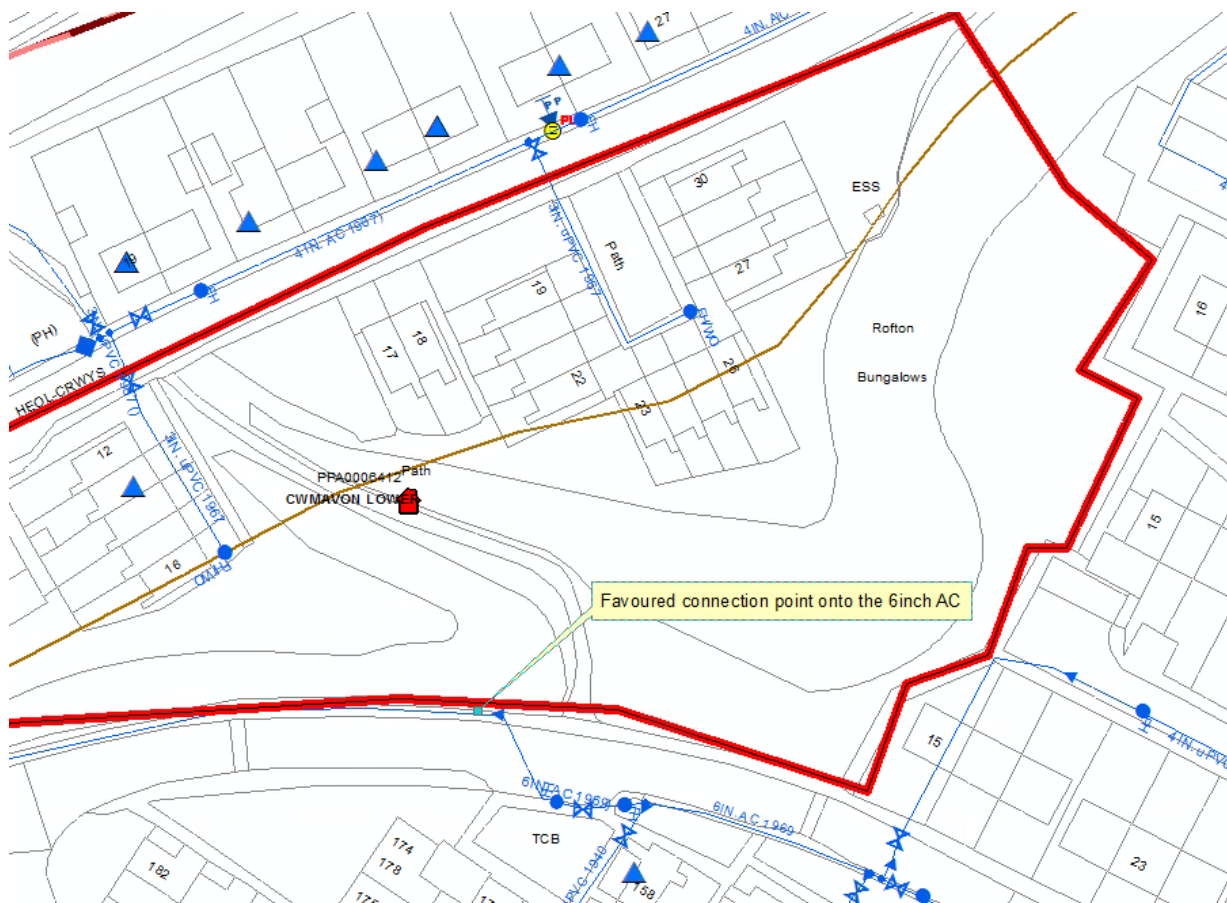


Figure 6 Connection point for new dwellings

- CONCLUSIONS

- The new dwellings should connect onto the 6inch AC main to the south of the new dwellings.
- Although the new dwellings do cause some detriment, however it should not cause any issues. There will be suitable pressure to the new and current dwellings in the area.

- REINFORCEMENT

- No reinforcement is required to supply the new dwellings.

6. FIRE FLOW

This section is for information only. Fire protection is the responsibility of the appropriate regional Fire Services.

DCWW is not responsible for fire protection or for providing suitable fire flows.

Fire flows were tested with the system set up to the build out options discussed in section 3 and in line with guidelines set out for housing developments in the 3rd Edition of the National Guidance Document on the Provision of Water for Fire Fighting published by the Local Government Association and Water UK.

Further information can be found [Here](#)

7. APPENDIX

Hydraulic Measure	DCWW'S Hydraulic Standards
Pressure	Minimum pressures of 20m at the customer's dwelling. Maximum pressures in distribution areas of 70m. Note pressure ranges of greater than 20m.
Head loss	Maximum head loss gradient 5.0m/km.
Velocity	Minimum mains velocities 0.3m/s. Ideal mains velocities 0.6-0.8m/s. Maximum mains velocities 1m/s.

Figure 7 DCWW's operating parameters

8. GLOSSARY

<u>Clean Water mains</u>		<u>Assets</u>	
AC	Asbestos Cement	CK	Check Valve
CIBL	Cast Iron Bitchumen Lined	TF	Tank Fill
DI	Ductile Iron	SV	Sluice Valve
DIBL	Ductile Iron Bitchumen Lined	PRV	Pressure reducing Valve
DICL	Ductile Iron Clement Lined	PSV	Pressure Sustaining Valve
DIEL	Ductile Iron Epoxy Lined	BV	Boundary Valve
GRP	Glass Reinforced Plastic	VF	Flow Regulator
PE	Polyethylene	VQ	Flow Modulator
SI	Spun Iron	SRV	Service Reservoir
SIBL	Spun Iron Bitchumen Lined	FH	Fire Hydrant
SICL	Spun Iron Clement Lined	WO	Wash Out
SIEL	Spun Iron Epoxy Lined		
ST	Steel		
STBL	Steel Bitchumen Lined		
STCL	Steel Clement Lined		
STEL	Steel Epoxy Lined		
UPVC	Unplasticized Polyvinyl Chloride		
MDPE	Medium Density Polyethylene		
SDR	Standard Dimensional Ratio		

<u>Other</u>	
DMA	District Meter Area
LCA	Leak Control Area
WQZ	Water Quality Zone
NGR	National Grid Refence
AOD	Above Ordinance Data (Newlyn)
HGL	Hydraulic Grade Line
OD	Outside Diameter
ID	Intern Diameter
DCWW	Dwr Cymru Welsh Water
HMA	Hydraulic Modelling Assessment
MDD	Max Day Demand
CP	Critical Point