

Contact Information

Contract/Scheme name: A611 Rolls Royce Access Date: 20/07/16

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Project Title: **Reducing Concrete Wastage in Manhole Construction**



Traditional manhole surround



Wide wall manhole ring – circa 50mm thicker

Stakeholders:



J & T Mcafferty's LTD

Recognise

The scheme is to create a new access, including a road bridge, for the existing Rolls Royce business park.

During the materials reconciliation process it was noted that excessive amounts of concrete were being wasted installing the concrete surround the newly constructed drainage manholes. Also, excavations were left open as a result for longer than required. The site team investigated manhole rings with sufficient concrete construction to alleviate the additional concrete surround being required.

Define

Quad of Aims

Purpose	Stakeholder Benefits
<ul style="list-style-type: none"> Improved efficiency Cost savings Reduction in SHE related risks Increased productivity Quality improvements Reduction in environmental impact 	<ul style="list-style-type: none"> Nottinghamshire County Council Groundwork's contractor Galliford Try
Deliverables	Success Criteria
<ul style="list-style-type: none"> Savings Efficiency improvements Increased performance Programme savings Safer working practices 	<ul style="list-style-type: none"> All expected deliverables and associated savings realised, including: <ul style="list-style-type: none"> Cost Time Quality Safety Sustainability

- T** •Transport – No concrete deliveries required for concrete surround to manholes or shutter transportation to site
- I** •Inventories – Reduce the overall amount of concrete required on for the works and time fencing required at work front
- M** •Movements – Reduce the number of movements associated with the manhole construction
- W** •Waiting – Reduce/eradicate the waiting time associated with concrete curing prior to shutters being stripped
- O** •Over Production – Reduction in the time prior to backfill and overall construction of manholes
- O** •Over Processing – Reduce the need for fencing around excavations, often left for longer than required
- D** •Defects – Remove the risk of defective concrete surround and reduce the risk of defective fencing
- S** •Skills – Release skilled operatives to move onto the next task sooner

Control

Control measures implemented to promote the initiative were and are:-

- The use of wide wall manhole rings and the benefits from using them was communicated back to the tender and bid teams.
- Cost, safety and productivity savings were communicated to the client for future schemes
- The site team were made aware of the programme, safety and material cost savings for future schemes
- Formal design approval was achieved to ensure that the use of the wide wall manhole rings would not compromise the specification
- The commercial team were made aware of the initiative to ensure future tenders included an allowance for use of wide wall manhole rings when engaging with the supply chain (Sub Contractors)

Transfer

- Detail and summarise initiative and upload onto the knowledge bank internally
- The initiative will communicated to other project managers through the GT PM forum
- The improvement project will be disseminated to other stakeholders such as Highways England and key clients. The tender teams will also be made aware of the benefits for future work winning

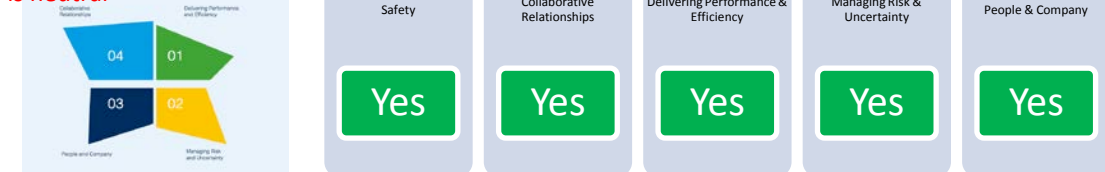
Analysis

With design approval in place the site team assessed the time taken to construct a number of manholes at various depths with various manhole ring sizes against the more 'traditional' methodology.

The site team also measured the amount of concrete the would've been required if forming the concrete surround using shutters and delivered to site concrete.

Benefits – Four Key Enablers + Safety

Record the impact on the four key enablers + safety where yes is positive and no is negative and N/A is neutral



Measure

During the process of constructing the previous phase of works which was a very similar project the site team undertook weekly consumable material reconciliations for aggregates and concrete.

During this process the site team noticed the quantity of concrete used to surround manholes was in excess of 20% wastage. At the same whilst updating the works programme activities were delayed by .5d for each manhole as the curing time, shutter stripping time and isolated backfill was not accounted for in the activity durations. This also meant that fencing was being used to protect excavations. This lead to a discussion as to how to [1] reduce the concrete wastage, [2] how to increase productivity in construction of manholes and [3] how to backfill the excavation more efficiently therefore removing the need for fencing and prevent the risk of persons falling into the excavations.

Improve

With the analysis completed the site team were able to bring key drainage activities forward in the programme. The overall drainage duration for the project in a specific area was 20 working days. This duration was reduced by up to 5 days.

The subcontractor undertaking the works also re-priced the manhole construction activity and offered a saving to works as manhole shutters would not be required, working time would be reduced and fencing time required reduced. This brought the overall price for the works down.

With the excavations backfilled quicker than the insitu method follow on works were released more efficiently resulting in further programme savings in other activities. The excavations being backfilled more efficiently also provided a safer working environment for the work force.

Benefit Summary

The time saved in constructing a manhole was reviewed and estimated as being circa 25%.

Although wide wall manhole rings cost around 15% more than a more traditional thinner walled manhole ring, this cost was absorbed by the removal of the need of concrete, manhole shutters and extended periods of fencing being in place. As such the cost is all but neutral in procurement of materials terms. However the time saving makes the wide wall manhole ring use an effective cost saving exercise. The cost of constructing a manhole in plant and labour terms shows a reduction of circa 25% on average.

For a 2m depth manhole at 1050mm diameter a concrete surround nominally takes 2 days for erection of shutters, pouring concrete, removing shutters and commencing backfill. By removing the need for this operation excavations can be backfilled 2 days ahead of the time it would take using the more traditional manhole rings. This removes the cost of fencing in part and makes it available for other tasks and would reduce the amount of fencing needed for a project overall. The impact on safety the excavations being backfilled is almost immeasurable. It would also save administration time in mandatory excavation checks and maintenance as they would be backfilled sooner.