

Concept Phase

Strategic Technical Partners (STP) Collaboration

Morrison Water Services (MWS) supported by our mature supply chain and M Group Service (MGS) functions, have the technical capability to deliver infrastructure and non-infrastructure activities covering the key framework scope areas (and others). This is evidenced by significant investment in successful project outcomes through collaborative arrangements such as the Scottish Water's Caledonian Water Alliance (CWA), Yorkshire Water's (YW) Partnership for Yorkshire (P4Y), and Anglian Water's Integrated Operational Solutions Alliance.

We commit to designing innovative solutions, that are fit for purpose and address the business need/risk in a predictable/timely manner. Our design team will work with the STP, and stakeholders, following our Design Management Plan and Project Triangle (strategic model between operations, design, and commercial teams) tailored to meet NWG technical standards and defined Gateway Processes, providing confidence and technical assurance at every step.

Projects will benefit from early dialogue facilitating optioneering, budget setting, risk and stakeholder identification, schedule development and optimum solution preference(s). At project briefing/working sessions with the STP (and key stakeholders), we will review and validate technical documents/information provided by NWG to fully understand the project brief e.g., route cause / benefit realisation date established, and affordability setting.

Ensuring success

The success of the collaborative approach is based on:

- Key stakeholders are seen/recognised as working together and are effectively engaged in quickly expediting the concept phase. They are also able to manage their interests at an early stage.
- Good understanding of project brief/outline, affordability and programme which can be carried seamlessly forward into the next phase(s).
- Opportunity to provide the STP with insights from our previous experience e.g., option buildability, risk profiles and stakeholder management planning.
- Outcomes are fit for purpose and remain aligned to the business need - sufficient for inclusion in the Concept Report.
- Early insight into the potential work programme timescales, resources required and continuity.
- Key decisions made early to support future detailed site investigations and SMEs involvement.
- Identifies different disciplines that need to have input e.g., civil engineer/process engineers/MEICA experts/wider ecosystem.
- Early de-risking of the project aligned to CDM 2015 Principal Designer responsibilities.
- More accurate budget provisioning, setting inclusion expectations within the concept/definition budget constraints. As options develop, we will budget cost differing scenarios allowing cost implications to be considered in later unified decision-making processes.
- Plan-Do-Check -Act approach to validate the effectiveness of Gateways and implement improvements.

Key activities

Timely decisions, appropriate stakeholder consultations and informed communications are essential to maintaining project momentum and creating project advocacy. Key activities are shown against Responsibility, Accountability, Consult and Inform (RACI) requirements in the table below (our interpretation of the LWE end-to-end process, and something we would like to develop along with NWG/LWE members).

	Review Options	Attain CP2 Budget	Identify Preferred Options	Identify Risks & Stakeholders	Develop Schedule	Design Services	On-site Investigations
Service Planning	I	I	I	I	I	I	I
PMO	I	I	I	I	I	I	I
Capital Delivery	C	C	C	C	I	I	I
Engineering	C	C	C	C	I	I	I
Commercial Consultants	I	C	I	I	I	I	I
D&C Partners	C	C	C	C	R	R / A	R/A
STP	R / A	R / A	R/A	R /A	A	C	C



This approach has the benefit of supporting the STP (providing expert advice) and setting the role and terms of reference for everyone involved at concept stage establishing key interfaces: this approach should be applied during the entire gateway processes.

Balancing the need for the correct level of buildability input whilst enabling a timely and efficient delivery process

Project governance arrangements will be agreed during the concept stage: preferably providing a delivery framework/timeline for the full project life cycle. This will focus on the specific needs of a particular phase, such as buildability input during concept development – the ‘integrated wedge’.

Broader buildability considerations can have a significant impact on timely project delivery if they are not identified and handled correctly, e.g.,

- Compliance with Regulatory drivers e.g., reduction in internal/external sewer flooding, and pollution incidents – key target considerations
- Compliance with land and planning applications, placing timing constraints on the construction programme. The requirement is normally identified via desktop investigations. Delay may influence optioneering/route planning.
- The influence of other stakeholder e.g., access permissions and windows to be agreed.
- The need to comply with environmental/ecology windows, identified during environmental specialist surveys.
- The use of historic ground investigation/bore hole information reduces trial holes/shafts requirements, and provides sufficient information e.g., for quicker underground tank construction.
- Early engagement with NWG operational personnel informs the project of any concerns/issues to be addressed; reduces delays due to unforeseen scope change requirements.
- By encouraging early engagement with the wider ecosystem at concept site meetings, we reduce buildability risks, constraints, and issues.

It is also important to establish critical milestones that can be used to plan the overall timing of the process. With regular reviews and reporting on the milestones, early warnings of potential delays can be quickly acted upon. Meeting conversations should be recorded with actions assigned and timebound (reviewed at subsequent update sessions/meetings). Setting the frequency of collaborative buildability meetings will be determined by the project delivery plan, priority (e.g., emergency projects will call for a series of meetings within a short timescale), nature and complexity.

Handover Management

Managing the handover from STP (C+D phase) to D&C between NWG Gateway’s 3 and 4.

Checks and assurances - we hold an internal review with key staff to ensure the compliance with Principal Designer, Designer and Principal Contractor roles, looking at all available information including cost estimate, findings from our desk-top/site surveys, constraints, and risk analysis, identified internal (e.g., end users/operational site staff) and external (planning/highway departments) stakeholders.

We will include any recommendation for detailed site surveys e.g., trial holes/shafts to identify ground conditions/route confirmation.

Solution change management principles will be agreed and implemented, ensuring that the original outcomes of the project brief are not lost, and the overall programme/budget provisions remain on-track.

Key tasks/interactions to ensure effective construction of a solution

The RACI below shows our view/interpretation of the key interactions between the stakeholders, based on our experience and lessons learnt from working in similar collaborative working arrangements.

	Manage Stakeholders & Risks	Prepare Contract Documentation	Tender Assessment Process	Gain Assets Investment Board Approval
Service Planning				
PMO	I	I	I	I
Capital Delivery	C	C	C	R / A
Engineering	C	I	I	C
Commercial Consultants	I	R / A	R / A	C
D&C Partners	R / A	C	C	C
STP	C	C	C	C

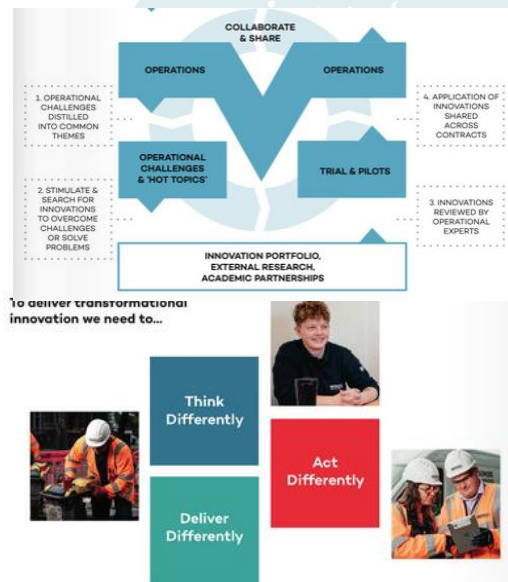


TOTEX Principles

How will you implement our TOTEX hierarchy into your delivery model to create TOTEX savings within solutions.

We recognise that TOTEX is an outcomes framework designed to encourage efficiencies and innovation with the aim of reducing capital investment and operating optimisation/expenditure over the full life-cycle of an asset. A key enabler is having a reliable/innovation focused partner(s) and supply chain throughout project gateways. We consider three primary features in applying the TOTEX hierarchy:

- 1. Optioneering/risk and value engineering** – Ensures we make appropriate affordability challenge; a key process embedded into our Design Management Plan and team culture. Principles are applied to cover the NWG TOTEX hierarchy and involves our supply chain in innovation/cost effective insights – informs business risk and option selection.
- 2. Innovation and input from employees** - Designed specifically with NWGs interest in mind, MWS Intelligent Solutions team (hub of creativity/critical thinking) will work with the operating business, contract employees and support functions to identify and progress innovative ideas, using our unique applied model for innovation (AIM – see diagram) which asks the important questions around why there is a need for a particular innovative solutions and how we deliver it.
- 3. TOTEX focused organisation** – Key features include:
 - Driving solutions through concept, definition, and design phases quickly; project governance and turnaround measurement
 - Avoidance of design change/re-work during the construction phase
 - Solution life-cycle systems thinking
 - Efficiency tracking
 - Embedding transformation thinking across the organisation: the picture shows the key themes.



Case study demonstrating application of the TOTEX hierarchy.

Our CSO screens project for YW during 2022 was significant in enabling compliance with Environmental Agency Permit conditions for the discharge into water courses. The project involved M&E and ancillary surveys, detailed investigations, optioneering, solution design (based on risk profiles), intrusive delivery work, and off-site manufacture of spare parts. On completion of the survey/detailed investigation works, we produced condition reports with solution recommendations for each of the 24 sites. These reports provided confirmation of YW specification/standards against site survey findings.

On several sites, using the TOTEX hierarchy we eliminated the root cause of failure by ensuring instruments were recording correctly, demonstrating they were not spilling and providing operational/maintenance solutions.

Where rectification/refurbishment works were identified, our optioneering approach identified the best solution for each CSO (including circular economy – re-use and refurbishment) based on risk, e.g., at the Corner Café CSO No 2, Scarborough, the motor was refurbished rather than procurement of a replacement and significant pipework reconfiguration. At Fading Street CSO, investigations identified twists in the screens, poor condition of the screen teeth and rust; building clever we installed a brush solution allowing the racking to be continually cleaned and preventing any future metal to metal snagging/jamming.

Identifying & championing options involving challenge to NWGs risk position/standards/strategies

Role modelling the LWE behaviours and values is something we must all work together on. It's imperative that we educate not only the LWE members, but also the wider NWG community (and ecosystem) and develop a safe environment whereby colleagues will understand why we must challenge and review risk and standards particularly as we strive to achieve innovative outcomes - optimising delivery and value.

We recognise that the application of innovation can be delayed or prevented by NWGs risk position, standard specifications, British Standards, and other regulations e.g., YW technical approval of new pipe lining material/technique was unduly prolonged by several months. Our approach is best represented through the following examples:

Building Information Model (BIM)

We will support NWG's intention to move to a BIM environment. Together with design partners we have been championing the adoption of BIM within the water sector, e.g., on CWA projects we work to BIM Level 2 standard and have employed BIM best practice on our Edinburgh 'Trams to Newhaven' Swept Path project, and on several MEICA infrastructure schemes. The application of collaborative design tools is already embedded, having invested in software and training. The foundation of successful delivery within CWA is based on mandatory use of a Common

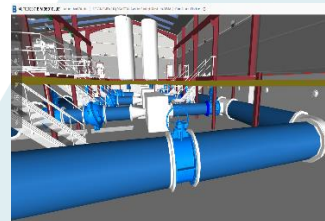


Data Environment (ProjectWise). On several contracts, we have experience of using GliderBIM as an online software platform for BIM Level 2 processing.

Our BIM execution plan includes formation of a collaborative team, work planning and data segregation, data management, incorporating digital safety files, collaboration processes, commercial management, and competency assessment framework.

The benefits of championing BIM include:

- Agile approach to design reviews, with internal/external design teams part of assurance and technical governance.
- Traditional ways of working are significantly improved – new standard setting delivering best value outcomes.
- Ability for multiple teams working together seamlessly within the BIM environment, with the project outcome fully integrated. We take models from our teams and combine to create a coordinated model in a virtual environment (example shown to the right) which will be tested for completeness and compliance with identified constraints.
- Progresses technical capabilities and increases efficiencies on multifaceted infrastructure projects.
- Preliminary construction/delivery sequencing can be developed during the gateway phases, useful in discussions with stakeholders.
- The model is embedded with operational/maintenance requirements; information is more visible and accessible so that post-construction operation is easier and safer.



Technology partnership strategy

From employee engagement we identified the need to establish a Technology Partnership Programme Board (TPPB) looking at advance technology solutions e.g., we have reached an exclusive CSO filter unit agreement patented by WRC. The TPPB is led by Simon Bryant, Director, and supported by senior managers and innovation team: together they have developed a series of partner inclusion processes covering engagement, solution appraisal, partnership approval and conceptualisation, partner on-boarding and collaboration arrangements, and learning/evolving process. They manage a portfolio of technology ideas/partnerships through regular meetings and updates.

Specification challenge

We have agreed a process for formally requesting dispensation to YW Asset and Engineering Standards; this has programme, cost, and carbon benefits, e.g., selected excavated material in lieu of pipe bedding; GRP storage solutions versus pre-cast concrete/in-situ concrete; wastewater material/fitting selection; and depth of new pipeline installations.

Carbon Reduction – support step change

We will support LWE in driving a step change in carbon by:

- As part of our Social Value Plan commitment to Environmental Sustainability, we will use development systems based on the Circular Economy Procurement Model that are design-led, where ideas can be transformed into solutions with sustainability at the core of every part of the process e.g., the model encourages us to create, use, reuse and then recycle products and processes in a way that instils the idea of maximising resource efficiency and reducing released carbon. This can significantly minimise product waste and increase the lifecycle of products and materials, thereby allowing natural systems to thrive.
- Adopting a ‘zero to landfill’ policy, requiring LWE to take ownership of managing waste and identifying and investing in methods that enable us to reuse and recycle waste, e.g., we separate clean aggregate (sand and gravel, etc.) and ringfence it back into our operations for reuse or into the market – reducing carbon footprint and manufacturing.
- Whole life carbon costing (linked to TOTEX) during design phase, identifying opportunities to design our carbon/waste e.g., identification of energy efficient motors, renewable sources, and lower carbon materials (e.g., concretes).
- Strategic “programme” approach to carbon and the required delivery plans to minimise/remove – e.g., geographical batching of work.
- Establish a science-based target reduction programme – we are currently developing a ‘Below 1.5 degree C’ programme of Green House Gas (GHG) emissions reduction with the SBTi (Science Based Targets Initiative). This builds on our stated 2030 ambition of 50% reduction in GHG of Scopes 1 and 2, with Scope 3 (supply chain) inclusion.
- Incorporation of Nature Based Solutions into our ESG development.
- Establishing LWE carbon champions – producing specific action plans and sharing best practice/opportunities from other frameworks; run workshops designed to raise awareness of carbon implications within projects and create the right behaviours to meet targets.



- Implementation of our carbon calculator which measures operational/embedded carbon usage, converting various fuel resources against the GOV greenhouse gas conversion factors and our procured material quantities against the ICE Database V3 to give us an overall TCO₂e figure.

Case studies evidencing the benefits of our approach to carbon reduction

Marchmont Road. Flooding Project, Edinburgh Value- £8.5m LBE	Sustainability benefits from incorporating vacuum flush system within storm storage tank: <ul style="list-style-type: none"> ▪ Minimised concrete benching to tank floor. ▪ Optimised diameter; deeper/smaller diameter minimised tree loss. ▪ Structural design of central column – significantly reduced roof slab thickness. ▪ Use of Aquaspira PE pipes over large section of works in place of traditional concrete. Overall carbon saving: 20-25 % reduction compared with original outline solution.
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Unconventional Approaches

We propose to reinforce catchment wide thinking and multi-discipline solutions, e.g., our ongoing Storm Spill Reduction Programme (SSRP) for YW encompasses delivery solutions such as:

- Civils (storage/ pipework/ tanks/ CSO's)
- Surface Water separation (inc. School – SuDS attenuation)
- Infiltration (CIPP lining)
- River Inundation (tidal flap valve)
- MEICA – SPS performance improvements/ Auto storm return

To manage this diversity, the MWS Project team work closely to maximise programme efficiency. The MWS Engineering and Design Manager coordinates the specialist supply chain over the full SSRP and undertakes internal technical assurance.

Pipe lining solutions

We can bring significant cost, carbon, and time reduction through the application of proven cross sector (water and wastewater) pipe lining solutions. Benefits also include extending asset life with minimal disruption, sewer flows can be managed, and audited/automated quality control. For sewer pipelining we use Axalta Coroleless ACO Wasteseal; a sprayable structural composite lining formulated as a carbon fibre reinforced, solvent free and hybrid polyurethane coating with a design life of 50+ years. Used on several YW projects including Hatfield 600mm Rising Main which involved spray lining under a railway line and through the colliery.

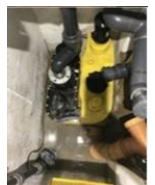
90% reduction in COST	Up to 90% reduction in CARBON	70% reduction in TIME
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Flood defences

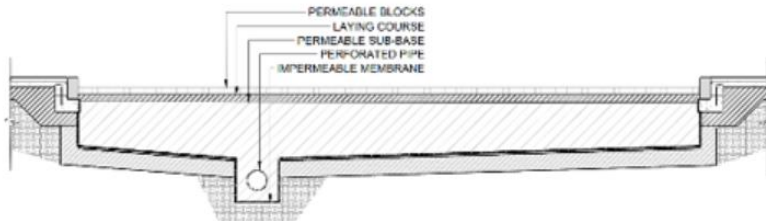
Thames Water appointed MWS to install Flooding Local Improvement Process (FLIPs) pumping devices in the basement of 22 properties on Morpeth Terrace in Westminster, London during 2021/22. Fitted to protect them during surcharge conditions caused by heavy rainfall/flash flooding.

For Yorkshire Water we are trialling the use of Smart Water Butts (nature based/hybrid solution) with the aim of understanding if they can help reduce spills from the wastewater network in high-risk areas.

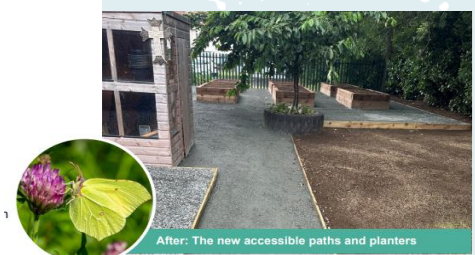


The trial covers installation of 2000 low-flow water butts, 50 smart water butts and 10 rainwater gardens (e.g., at Ashlands Primary School).

We designed and constructed 600m² of new permeable paving (lined with an impermeable liner and underdrain), laid across the full width of the highway on Rosemead Street, Hull during 2023. The solution enables the storing of 365m³ of surface water run-off from the footpath/highway and property roofs with controlled return to the combined sewer – protecting residents from surface water flooding. Children from Estcourt primary school helped lay the final blocks and residents assisted the team install bird boxes in the green space to encourage more nature into the street. To improve the local community we also funded/improved the grounds of St John's church.



Rosmead Street



M Group company solution examples:

- PMP – Archimedes screw pump refurbishment process and deep shaft rope access.
- IDS – For United Utilities, IDS are installing deraggers (used for continuous pump protection) and power monitors on over 2,500 assets consisting of CSOs, pumping stations, detention tanks and storm water tanks. Data captured is returned to a unique digital platform (Aqua DNA): uses AI and machine learning to process information identifying patterns in performance of the wastewater network, helping to predict future performance.
- I&C Solutions are using Polyethylene terephthalate (PET), a recyclable polyester resin-based plastic material (produced from plastic bottles) to build waterproof kiosks of various sizes.

