

NORTHUMBERLAND AVE STORM UV

Overview:

Site Location:	>> Llanelli, South Wales
Client:	>> DCWW
Contract Value:	>> £1,229,645.00



Technical Experience:

Northumberland Avenue Storm & UV Scheme (Llanelli) was a scheme designed by Hyder Consulting to improve the quality of storm discharge and increase storage capacity within the existing works.

The combined project value was in excess of £9,000,000 with the large proportion of value dedicated to EM&I installation. The civils element and construction was located within an existing Pumping Station/Treatment Works. The scheme also ran simultaneously with the Llanelli UV project, all of which were undertaken by LCE as a Tier 1 contractor under an NEC 3 Option C contract.

The work itself was challenging and complex, considering that the pumping station and existing works were fully operating at all times. The planning, sequencing and segregation of our construction works whilst maintaining sufficient traffic management and access for operational activities were paramount to the success of the scheme.

The scope of works comprised of the following key elements, namely:

- The placing of 824 cubic metres of concrete and over 200 tons of reinforcement
- Construction of RC UV Chamber – 21.0m x 12.0m x 5.0m and Storm Screen Channel Chamber– 16.0m x 8.0m x 4.5m (including associated interconnecting 1400/1600mm diameter mild steel pipe work).
- Construction of RC Central Distribution Chamber, Sea Outfall Chamber and Re-Circ Chamber
- General gravity drainage items, ranging from 150mm – 825mm diameter pipe work, soakaways, manholes and turning of associated flows.
- 100mm-250mm Rising main diversions
- Access Roads, car park, footpaths, duct runs and drawpit construction.
- Construction of new boundary walls and associated plinths.
- Construction of numerous reinforced concrete slabs/bases; for mechanical and electrical apparatus: MCC kiosks; generators; lamp room/toilet room; transformers and booster stations.
- Structural re-lining of existing 15m storm tanks.
- Final Connections and turning flows.
- Re-profiling of existing ground and general landscaping.

LCE were appointed as the Tier 1 contractor to work alongside Imtech Process (EM&I) and the Strategic Partner, Morrison Construction Ltd, to deliver the project at pre construction stage. This early involvement contributed to the success of the project where we were able to collaboratively work with the design team, EM&I contractor, operator and the client to develop the target cost, risk register and its approval.



This involvement was beneficial both in planning of the works, challenging design, assess construction solutions, sequence of operations and understanding key aspects within the mechanical and electrical programme.

During the construction phase LCE provided directly employed skilled workforce, materials and associated plant including the management and supervision of all operations to meet both the Health & Safety standards and Environmental and Quality Standards required by our ISO 9001:2000, 14001:2004 and 18001 accreditation and deliver a complex project on time, and within budget.

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Management Experience:

The core of the Lewis site team appointed to deliver this scheme has a wealth of experience on water related projects and worked with the Principal Contractor on the previous contract (Cambrian Pumping Station); this eliminated the learning curve element and other issues associated when starting a project of this magnitude.

The philosophy/attitude of “one team, one dream” could also be maintained and was the main driving force, making the project a success. Additionally, with the majority of senior site staff coming from both a trade and academic background, this benefited the scheme by demonstrating a strong aspect of technical skills, capabilities and leadership qualities on all levels.

Notwithstanding this experience and required standards of academic, safety and training certificates held by the site management, key staff members had also attended CECA seminars on NEC 3 Option A+C so as to have a clear understanding of the contract, commercial awareness and client’s requirements.

In order to deliver the project on programme, effective planning and scheduling were required. To facilitate this a series of weekly meetings and daily briefings were held with workforce, site team and management so that critical activities could be addressed and monitored against the initial construction programme.

We adopted a proactive approach to planning/scheduling of the associated works and key milestone activities to maintain the critical path.

During the scheme adverse weather conditions had caused delay to concrete pouring activities which inevitably caused the programme to slip, but with our aforementioned proactive approach, we were able to increase resource and work weekends to accelerate and claw back the programme.



From a commercial aspect at pre construction phase our site management team would attend a pre start meeting with project, commercial and SHEQ management to review and have a full understanding of the target cost allowances, programme, design, construction drawings, procurement and lead times. These regular meetings would continue to be organised and implemented on site for the duration of the construction phase to monitor outputs, programme and costs against value.

This was beneficial financially, by illustrating both shortfalls and value engineering events and with our knowledge and understanding of the NEC form of contract, early warnings, compensation events and cost savings were illustrated at an early stage, with closure in the allocated time period.

By allocating key staff members full time on site, cost effective alternatives, updating of construction programme and cost comparisons could be implemented rapidly. Thus encouraging a professional attitude and delivering a high profile scheme both on time and within target cost allowance.

Capability:

Lewis have a proven track record of delivering contracts from concept stage to the highest standard of quality, safety and within budget.

The structure of LCE is based upon a directly employed highly trained workforce and retention of its internal and specialist plant. This provides the tangible benefits, that we believe, give us a competitive edge over other competitors.

We have demonstrated over the years that we are a “People” company that has an excellent record of retaining its staff and workforce. We continually promote improvement and learning with additional training, mentoring and further academic study to enhance the success of the company. With a training matrix in place, which is continually reviewed and updated, each member of the site team is confident and competent to undertake their specific role and tasks appointed to them and would hold the various standard accreditation required for this project:



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- SMSTS 5 day
- First Aid at Work
- Fire Warden
- Temporary Works Appreciation
- Scaffolding Inspection
- Working at height
- Confined Space
- Appointed Crane Person
- IOSH
- NEBOSH
- Inspection of lifting equipment
- CPCS and CSCS cards
- Abrasive Wheels etc



With this rigorous training programme in place we were able to achieve the following:

- Maintain an average of 79% during Health and Safety audits.
- Maintain an average of 81% environmental audits.
- Over 29,000 man hours and no reportable accidents/incidents recorded

Capacity:

Working within the water industry for over 25 years, we have been able to establish a solid directly employed trained workforce of approx 200no with a wealth of knowledge and multiple skills both from management and trade background to ensure we can provide the appropriate resource to deliver the Northumberland scheme and also cover all construction activities within the water industry.

We have been able to maintain this experienced trained workforce and site management to deliver the project i.e.: Commercial/Site Manager, Health and Safety Advisor, Senior Site Engineer, Trainee Site Engineer, Formwork Co-ordinator, Carpenter Foreman, Groundwork Foreman and the numerous associated trades: e.g. Carpenters, Steel fixers, Pipe layers, Bricklayers, Plant operators etc.

Together with a modern plant and equipment fleet at our disposal we were therefore confident in delivering this scheme from a health and safety, quality and environmental aspect, successfully.

With one of our main offices situated within South Wales as well as our plant depot in Swansea to service this scheme and others in West Wales, we were able to cover all aspects associated with the general day to day plant and labour requirements for site construction activities.

Innovation/Benefits/Savings:

Within the duration of the scheme numerous value engineering proposals/innovations were approved, resourced and then implemented, resulting in significant savings towards the contract. These included:

- Selection of a formwork system that would maximise our outputs/turnarounds and decrease the number of concrete pours required i.e. Peri formwork system in lieu of conventional strong backs and plywood.
- Select a suitable crawler crane that could be utilised for multiple aspects i.e. larger crane to cover multiple lifts.
- Demonstrate an alternative method for the construction of the booster slab i.e. introduction of concrete blocks in lieu of fabricated steel work.
- Propose and implement, once specification was approved by the designer, an alternative product for structural lining of the existing storm tanks i.e. Role on resin product in lieu of spray resin product.
- Maximise all scaffolding requirements with both Imtech and LCE thus decrease costs to both parties.
- Resource and install an alternative pipe product for the interconnecting pipework between each existing storage tank i.e. concrete in lieu of steel.
- Analyse the proposed layout for car park construction and drainage, then propose a new higher formation level therefore reducing costs associated with this task.

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- Periodically accelerate the construction programme to meet the M & E requirements.
- Drill ducts across access road in lieu of open cut to avoid delay and disruption to operational activities within existing works
- All in all utilising our alternative methods, technical skills, awareness and knowledge of the industry, the above items contributed towards over £65,000 of savings to the project.

Risk Mitigation:

During the development of the target cost a risk register was produced which identifies activities with risks associated outside our control. Value is then apportioned to these risk activities and offered to the client for comment on ownership of risk and agreement.

Following the collaborative approach and early involvement some of these risks were mitigated and managed out into the target cost, leaving Lewis to take ownership of the following key risk activities and values for this scheme.

- Design risks – design development
- Construction risks – final connections/turning of flows
- Programme risks – Adverse weather, additional extras
- Environmental risks – contaminated ground/water

Some of the primary challenges encountered during the scheme were the tight programme delivery and integration of other contractors and activities in an existing operational works environment.

These challenges were overcome by regular daily/weekly meetings with all parties thus adopting a proactive and collaborative approach to ensure the success of the scheme.

By working as a team, both at pre-tender and construction stages of the project, the majority of risk cost was evaluated. Then, by sharing roles and responsibilities, additional costs were mitigated by forward planning and awareness, thus producing an economic and cost effective scheme.

However, due to adverse weather conditions experienced, and tight milestones to achieve, the project did require acceleration to the main works. This resulted in a small financial impact against an otherwise successful contract.



Continuous Improvement :

We are continually assessed by DCWW and measured against KPIs for Safety, Quality, Environmental and Commercial performance – our aim being to continuously improve our scores.

We were Welsh Water's number one ranked civils and water contractor during the last year of AMP 4.

At Northumberland we learnt lessons on some alternative construction techniques such as the Peri System in lieu of standard plywood and strongback formwork options discussed above. In order to ensure that this innovation was not lost our management procedures required that the Site Manager issued unit cost comparison reports to all site staff and management clearly outlining the processes involved, the costs associated and the savings made over the original solution.

Supply Chain :

Lewis sees all elements of competitiveness, performance and sustainability as a complete role of supply chain management built up over many years.

This is achieved by selecting suppliers on several criteria, such as best value, market or lowest price, service levels, H&S and quality and performance.

As most of the works is carried out by our directly employed workforce, only one specialist subcontractor, i.e. Beton Bauen, was engaged on the scheme. This was to undertake the structural re-lining of the existing storm tanks. Prior to placing an order with this sub contractor, they were vetted and approved under our company system. This would have included clarification of works history and aforementioned criteria.

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Subcontractor and supplier orders are all placed by our Procurement Manager and are countersigned by the Project Manager.

Prior to commencement on site, all appropriate support documentation e.g. risk assessments and method statements were approved and sanctioned by a senior member of LCE. The subcontractor was monitored throughout his activities, in accordance with our management procedures, and it was specified from the start that the works shall be completed in one visit and additional working hours undertaken, to minimise the impact on associated surrounding works.

All payments were made in accordance with the timescales set out in the contract.

Following approval from client/designer to use our alternative resin proposal, we placed the order with the subcontractor which resulted in £34k savings to the project.



After Care/Post Contract Management:

By addressing the defects/snagging items within the initial contract period and signed off by the Principal Contractor, this mitigated numerous return visits and additional costs to the project. Therefore the final account could be closed out quite rapidly after the completion of the project.

The only works undertaken after civils completion and during the civils correction period were minor works that had to be programmed this way and were undertaken during a planned visit. These included grouting of steelwork bases following mechanical and electrical installation to smaller structures and general landscaping reinstatement due to the seasonal period.

The costs of these activities were included as a forecast within the final account figure due to their minor nature.



LEWIS

Lewis Civil Engineering Ltd, Mwyndy Cross Industries, Cardiff Road, Pontyclun, Rhondda Cynon Taff. CF72 8PN

Telephone: 01443 449 200 Fax: 01443 449 201

Website: www.lewis-ltd.co.uk E-mail: enquiries@lewis-ltd.co.uk