Data-Driven GIS to Aid Efficient Pipeline Project Execution

FLUOR®

Future Growth Project (FGP) – The Challenge

- Route **475km of pipeline** efficiently and safely through an extremely congested field
- Five **high pressure, high temperature** sour gas injection pipelines
- Plan and execute over **5,000 pipeline crossings**
- **Global execution** – Farnborough, Atyrau, Almaty, Delhi and Houston
- **Multi-discipline interface** – pipelines, CSA, piping, power and fibre
- **Joint venture** – differing networks and software
- Multiple **concurrent projects** across the field
- **Duration** – construction period over 8 years
- High concentrations of toxic **hydrogen sulphide (H2S)**
- Multiple Kazakh **design codes and regulations**
- Client requirement for **PODS-compliant digital twin**

Fluid Type	No. of Pipelines	Length (km)
Condensate	2	9.5
Crude Oil	2	10.8
Diesel	3	19.3
Drain Water	1	9.1
Feed Gas	2	17.5
Fuel Gas	28	83.7
High Pressure Gas	5	29.2
Multiphase	61	257.0
Potable Water	4	3.0
Propane	1	6.3
Sour Water	1	3.4
Technical Water	19	28.7
TOTAL	**129**	**477.5**

Future Growth Project (FGP) – The Solution

- **Collaborative FGP GIS Web Portal** – accessible to all for visualisation of multi-discipline project data, routing reviews, change and clash detection, and location-based reports and alignment sheet links.
- **Data-driven crossing schedule** – available live on the FGP GIS Web Portal with automated change detection, live RFI document links, and typical crossing drawings links to align field engineering, construction and contracts on crossing methodology and costing.
- **LiDAR, satellite and drone capture program** – for existing service visualisation, hydraulics/stress calculations, routing, remote monitoring, virtual walkdowns and volume/profile calculations.
- **Mobile GIS** – for walkdowns, route validation, construction progress, clash identification and prevention.
- **Construction management** – progress monitoring and SIMOPs.
- **FME PODS loader** – customised software to populate PODS-compliant as-built database.

Benefits of GIS Data-Driven Execution

BENEFITS OF GIS DATA-DRIVEN EXECUTION

- **Collaboration Portal**
- **Central Repository** — accessible to all
- **Accessible Anywhere** — multi-office and in the field
- **Live Environment** — for a live field
- **Automated Workflows**
- **Efficiency** — saves rework at all phases
- **Safety** — situational awareness
- **Cost Saving**
- **Digital Handover Delivery** — to client for operations

GIS Applications across the Project Lifecycle

FEASIBILITY

Define Pipeline Corridors
ROW
Conceptual Design
Logistics Planning
Environmental Impact

FEED

Land Reservation
Constraint Mapping
Desktop Routing Profiles
Exclusion Zones
Clash Identification
LiDAR/Satellite Integration

DETAILED DESIGN

Crossings identification
Land Allocation Permitting
Technical Conditions
Schedule Visualisation
Refined Routing Design
Routing Field Validation
MTO
Geo-Technical coordination
Document/drawing lookup
Clash resolution

CONSTRUCTION

Clash management
Temporary facilities
Laydowns
Mobile GIS
Drone Progress Tracking
SIMOPs
Hazard Identification
RFI Support
Live Crossing Schedule
Dashboards
Hydrotest Sequencing
As-Built Validation

START-UP & OPERATIONS

PODS
As-Built Alignment Sheets
Digital Twin

COLLABORATION & INTERFACE

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