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Having migrated to a modern Civil BIM platform almost a decade ago, WSP’s custom BIM implementation has evolved through real world project application to become a robust and comprehensive standard, localised to meet industry requirements in Africa and meets the most demanding project requirements. This custom implementation is recognised in both the local and international market to be at the forefront of the emerging Civil BIM field, making use of an array of the very latest in design technology applications to achieve a dynamic and integrated BIM design, analysis and drawing output workflow. This allows distributed teams to rapidly explore iterative design solutions in search of an optimal engineering design, with real-time design and analysis driven results, and dynamic quantity take offs to achieve value engineered solutions at any stage of the project.

The adoption of leading-edge design technology was enabled through extensive upskilling efforts, via internal mentorship programmes and real-world project based training. Through these ongoing comprehensive training efforts, WSP Civil BIM design teams have acquired extensive experience and an advanced level of technical BIM design skills in all areas of Civil engineering.

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**BIM Introduction**

This document serves as a high level BIM capability statement for civil engineering project applications in WSP, Africa.

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**Level of WSP Civil BIM adoption as follows:**

**BIM Level 1**
- Modern Civil BIM implementation for all civil sub-disciplines
- Dynamic and integrated BIM workflow for design, analysis, 3D visualisation, quantity take-offs, costing and drawing production

**BIM Level 2**
- Dynamic referencing of shared model data across design teams
- 3D visualisation to communicate design intent (real-time, immersive VR, animated & static renders)
- Automated clash detection and tracking of resolution (cloud based)

**BIM Level 3**
- Cloud based BIM coordination across entire project team on centralised model data
- Open format model based data exchange to contractors for construction purposes
- 4D construction sequencing
- Cloud hosted Construction QA/QC application with 3D model reference
Our Capabilities

BIM: ROADS
- Mature Civil BIM implementation for advanced roadway design, using the very latest in design technology
- All scales of application, from minor urban and rural roadways to major transportation schemes
- Complex roadway models, including any types of interchanges, intersections and roundabouts
- Dynamic intelligent model components which adapt to conditional decisions, allowing optimal designs to be rapidly created
- Integrated 3D roadway storm water design, with model based hydraulic analysis
- 3D design of all roadway furniture, street lighting, and existing and proposed utilities in the road reserve
- In-context 3D preliminary roadway design using the latest conceptual design tools such as Infraworks360
- Cloud based analysis and route determination for roadway design
- Automated quantity take-offs to facilitate rapid and accurate costing of roadway infrastructure projects

BIM: UTILITIES AND HYDROLOGY
- Mature Civil BIM implementation for advanced utilities design, using the very latest in design technology
- All scales of application, from bulk infrastructure systems to internal site utilities
- Integrated 3D utilities design, with model based hydraulic analysis for gravity and pressure networks, and automated sizing of network elements
- Accurate floodline determination using latest BIM workflow
- Sustainable urban drainage systems, with integrated design and analysis of detention and attenuation structures and ponds
- Automated and comprehensive quantity take-offs to facilitate rapid and accurate costing of utilities projects
- Cloud based clash detection across all utilities and related elements, with resolution tracking across all disciplines

BIM: SITE DESIGN
- Mature Civil BIM implementation for advanced 3D earthworks design, using the very latest in design technology
- Advanced level of 3D modelling capability, including optimised designs that address complex site conditions
- 3D design and integrated analysis of all on-site civil services, gravity and pressure networks, as well as 3D modelling of electrical and other internal site services for coordination purposes
- Context based 3D preliminary site design using the latest design tools such as Infraworks360
- Cloud based clash detection across all on-site design elements, with resolution tracking across all disciplines
Our Capabilities

BIM: BRIDGE ENGINEERING
- Hybrid BIM/legacy bridge design and detailing workflow
- Civil 3D for deck geometry, with dynamic workflow for geometry porting to Revit
- Revit Structure for bridge piers, abutments and foundations
- Legacy workflows for reinforcement layout and detailing
- Rapid concept bridge layout and design using Infraworks 360
- Federated BIM models for bridges in context of roads and utilities, for 3D cloud based coordination and clash detection

REALITY CAPTURE
- Terrestrial, aerial and mobile scanning experience in partnership with external surveying professionals
- Drone based reality capture capability (in-house) for preliminary design or work in remote regions where accessibility is a challenge
- Integration of recap data in real-time context based design environments, with BIM feature extraction from point cloud data
- Terrestrial, aerial and mobile scanning experience in partnership with external surveying professionals
- Drone based reality capture capability (in-house) for preliminary design or work in remote regions where accessibility is a challenge
- Integration of recap data in real-time context based design environments, with BIM feature extraction from point cloud data

CONSTRUCTION QA/QC
- Cloud hosted QA/QC application with 3D model reference
- iPad access to cloud application from site
- Repository of indexed construction documents/drawings, site photographs and QA/QC documentation
- Pre-configured standard punchlists/snaglists with automation of actioned items
- Issue tracking
- Automated reporting, e.g. on open issues per responsible entity
- Access to the BIM model from site via mobile device
Our Capabilities

3D VISUALISATION

WSP Africa utilises the very latest in 3D visualisation technology, combined with high-end post processing and/or real-time engine workflows.

3D Modelling, Animation and Multimedia Capabilities:
- Broad experience in 3DS Max, Civil 3D, Civil View, Revit, InfraWorks, Adobe Premiere Pro, After Effects, Illustrator, and real-time engines such as Unity and Unreal Engine 4.
- 3D design data optimisation and porting from a variety of engineering BIM applications
- Pedestrian and vehicular animation
- Photometric light models, solar studies
- Camera matching & tracking
- Photogrammetry
- Fluid dynamics simulation
- Video editing and post production of 3D animation sequences
- Real-time engines
- Virtual Reality immersive technologies (Oculus Rift and HTC Vive, Google Cardboard) – see VR capability statement.

Project Experience

- Fourways Mall – all civils, BIM level 2 internal and external. Multi-disciplinary BIM level 3 application, including site QA/QC
- Kyalami Racetrack – all civils, BIM level 2 application, advanced 3D visualisation/simulation
- N3 van Reenen’s Pass alternative
- N1/N2 Sir Lowries Pass alternative
- Erling K46 Interchange - all civils, BIM level 2
- Rose K46 Interchange
- Fourways Mall Extensions – internal and external civils
- Pretorius Park bulk infrastructure
- Forest Hill City – all civils
- Monavoni Precinct bulk infrastructure - all civils, BIM level 2
- Imperial Willow Glen – Motor dealerships, all civils, including drive-by sight distance visualisation
- Isobonelo Colliery – above ground tank farm installation for fuel retail, Multi-disciplinary BIM level 2
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