

Leveraging the **Power of FME** in the Eastern Busway

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The Eastern Busway from Pakuranga to Botany

A key transport infrastructure project in Auckland.

Connecting Botany, Pakuranga and the surrounding eastern suburbs to the rail network in Panmure.

Separate lanes for new high-frequency bus services.

The Eastern Busway Alliance





- Spanish multinational conglomerate
- HQ in Madrid, Spain
- 8.104B EUR revenue (2021)
- 41000+ Employees worldwide







GIS/FME in EBA

Leveraging the geospatial capabilities in the alliance.



GIS in EBA









FME in EBA





Requirements

- Design, Survey and Construction teams.
- Interactive/On-demand process to

generate a summary report of potholes

and associated utilities.







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Challenges

- Survey Instruments (Trimble hand controller) captures and input high precision location and data, but not the images.
- No tool to summarise and report number of utilities are going through the given pothole.
- 12D Xml is the desired output required and used by the design team.
- ESRI S123 can capture images, but results of replicating the Trimble survey capture template was not up to the desired accuracy.



Processing 12D XML Data

- Read 12D data for captured potholes / manholes based on capture method
- Read lines (utilities) associated with the PH/MH based on intersection logic.
- Assign PH/MH ID to the associated lines (utilities).





Write 12D data to Acciona Portal HFS

Write Portal HFS







- 12D XML processed data Join S123
- Read S123 HFS with images, process,
- Date time convert for editor tracking
- Read PH/MH Line data (12D HFS) with PH
- Join S123 and 12D data (PH ID) with images and write to HFS

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EBA Pothore Card Survey, 475 Craney-backet Re CARebale Card In

 Per Mana Day Aparete advocada POTHOLE CARD

Eastern Busway

Project	Eastern Busway Alilance		Additional Pickup Comments		
Pothole Location	EB2 22-38		Added retro. to Commo Allmon. 1 o Part 150mm. Coupler pin covered with concrete.		
Pothole Number					
Completed By					
			7		
Completed Date					
Completed Date					
	P	othole Surveyed Data	10		
Asset	P	othole Surveyed Data Material	Depth to Cover (m)		
	P		Depth to Cover (m)		

Skelches and Altachments





VertiGIS reporting.

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- Template Configure to read 12D PH card data with lines and S123 data with images.
- Interactive report generation (PDF) based on user selection of PH/MH feature on the GIS map.
- Bulk HTML report cards generation via same FME process.





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EB-2-D-2-UT-MD-EX_ABD_WATER	0	EB-2-D-2-UT-MD-EX_ABD_WATER	0	EB-2-D-2-UT-MD-EX_ABD_WW.ifc	0	EB-2-D-2-UT-MD-EX_PRT_CHORUS	0
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EB-2-D-2-UT-MD-EX_PRT_VODAFO	0	EB-2-D-2-UT-MD-EX_PRT_WATER_H	۲	EB-2-D-2-UT-MD-EX_PRT_WATER_L_	0	EB-2-D-2-UT-MD-EX_PRT_WW.ifc	0
EB-2-D-2-UT-MD-EX_RMV_CHORUS	0	EB-2-D-2-UT-MD-EX_RMV_VECTOR	0	EB-2-D-2-UT-MD-EX_RMV_VECTOR_	0	EB-2-D-2-UT-MD-EX_RMV_VECTOR	0
EB-2-D-2-UT-MD-EX_RMV_VECTOR	0	EB-2-D-2-UT-MD-EX_RMV_VODAF	۲	EB-2-D-2-UT-MD-EX_RMV_WATER	0	EB-2-D-2-UT-MD-EX_RMV_WATER	0
EB-2-D-2-UT-MD-EX_RMV_WW.ifc	0	EB-2-D-2-UT-MD-PR_CHORUS_CO	0	EB-2-D-2-UT-MD-PR_VECTOR_COM	0	EB-2-D-2-UT-MD-PR_VECTOR_GAS.i	0
EB-2-D-2-UT-MD-PR_VECTOR_LV.ifc	0	EB-2-D-2-UT-MD-PR_VECTOR_MV.ifc	0	EB-2-D-2-UT-MD-PR_VODAFONE.ifc	0	EB-2-D-2-UT-MD-PR_WATER_HUNU	0
BE-2-D-2-UT-MD-PR_WATER_LOCA	۲	EB-2-D-2-UT-MD-PR_WW.ifc	۲	EB-2-D-2-UT-MD-TEMP_WATER_HU	۲	EB-2-D-2-UT-MD-TEMP_WATER_LO	0

Rationale

Design files structure changed

(from 1 IFC file/utility to 5-6 split files/utility, based on utility status code).

- From 13 design files to 46 files / (per zone). 92 Total.
- Design split is good for the Federated Model, not

ideal for GIS.

Increased frequency of design updates

(from once a month to every week)

• Requirement of 3D (original) and 2D data in GIS.







Read Data

- IFC Files manually copied from BIM360 to SP
- File names follow ISO19650 standards EB-2-D-2-UT-MD-EX_ABD_VECTOR_COMMS
- Test filter identifies the projects stage followed by utility name

Processing

- Separate processing module for each utility provider (for easy trouble shooting)
- Generate utility status based on file abbreviation, consolidate.
- Assign file (fme_basename) with the date for reference.

	utility_status	6 Possible Values	Set Value
_is_void			Remove
_part_number			Remove
_geometry_name			Remove
MinExtZ			Remove
ifc_unique_id			Remove
ifc_type_object_id			Remove
ifc_type_name			Remove
ifc_parent_unique_id			Remove
ifc_parent_id			Remove
Tag			Remove
PredefinedType			Remove
Phase			Remove
ElementType			Remove
AssemblyPlace			Remove
ApplicableOccurrence			Remove
fme_feature_type			Remove
fme_basename	fme_basename	@ReplaceString(@Value(fme_basename)," ","_")_\$(date)	Set Value
Model			Remove

	Condition	Statement	
		Test Condition	Attribute Value
v20 Processing	lf	@Value(fme_basename) CONTAINS -UT-MD-PR_	PROPOSED
(SurficeEquarkation) (6-strain)	Else If	@Value(fme_basename) CONTAINS -UT-MD-EX_ABD_	EXISTING ABADONED
(b clasjected) (b Solid (b Solid (b Solid (b Solid	Else If	@Value(fme_basename) CONTAINS -UT-MD-EX_PRT	EXISTING PROTECTED
	Else If	@Value(fme_basename) CONTAINS -UT-MD-EX_RMV_	EXISTING REMOVED
	Else If	@Value(fme_basename) CONTAINS MD-TEMP	TEMPORARY
	Else If		
	Else	<all conditions="" other=""></all>	🛒 <no action=""></no>
7 2D Processing			



Generate 2D and 3D data.

	Write to Master 2DPolygon FGDB:UTILITIES_DESIGN.gdb	
(F	eatureWriter_26	
D	EB2_CHORUS_COMMS_POLYGON_MASTER	
	EB2_VECTOR_COMMS_POLYGON_MASTER)
	EB2_VECTOR_GAS_POLYGON_MASTER)
	EB2_VECTOR_LV_POLYGON_MASTER)
	EB2_VECTOR_MV_POLYGON_MASTER)
	EB2_TRAFFIC_SIGNALLING_POLYGON_MASTER)
D	EB2_VODAFONE_POLYGON_MASTER)
D	EB2_ITS_POLYGON_MASTER)
	EB2_WATER_LOCAL_POLYGON_MASTER)
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	EB2_VECTOR_LIGHTING_POLYGON_MASTER)
	EB2_STREET_LIGHTING_POLYGON_MASTER)
r.	Connect Input	
	▶ Summary	

Write

- Create new FGDB write 2D (polygon) and 3D Multipatch FC
- Truncate and overwrite 2D FC in Master FDGB
- Overwrite Portal HFS from the data updated in the master FGDB.
- Overwrite 3D .SLPK for 3D Scene deployment.





Benefits

- Modular process, can be run for a single utility (on demand) or as bulk.
- Fire and forget (still) a manual execution, but no requirement to monitor.
- Shorten data update time: from 12 hrs (estimated) to 3 hrs for two zones.
- Ability to incorporate new utilities and future project zones when the work commence .





FME in EBA: Usage Stats

- Nightly FME automation taps Portal REST to generate app usage, members login stats for All Acciona projects.
- GIS in EBA is a centralized platform, to view and access various design, construction, architecture, environmental, survey, property and contextual data.
- High usage app (one of the top 5 GIS solutions in terms of usage across Acciona's AU-NZ projects)
- One of the few NZ transport/construction projects with active GIS integration.







FME in EBA: What Next?

- Ongoing engagements with the internal stakeholders.
- Explore the possible avenues to streamline/automate the processes using FME (spatial/non spatial).
 - Work In Progress: building PoC apps/tools
 - Site safety observations in the GIS (POC).
 - Projectwise and iTwoCX integration with the GIS.
 - Weather data API to GIS. (POC)
 - Full automation of the design data upload (BIM360 to GIS) using FME apps (self serve).







Thank you

