



Reliance Jio
Infocomm Limited

Web Based Automation for Network Inventory Creation

UC670

Presenter: Yestha Bhatt

Date: 15-07-2014

Event : ESRI UC, 2014

Agenda

- 1 Introduction
- 2 Usage of GIS in RJIL
- 3 Need of Web Based Automation for Network Inventory Creation
- 4 High Level Workflow
- 5 Implementation Approach
- 6 Detailed Process flow with use cases and Output
- 7 Conclusion
- 8 Challenges and Forward Path

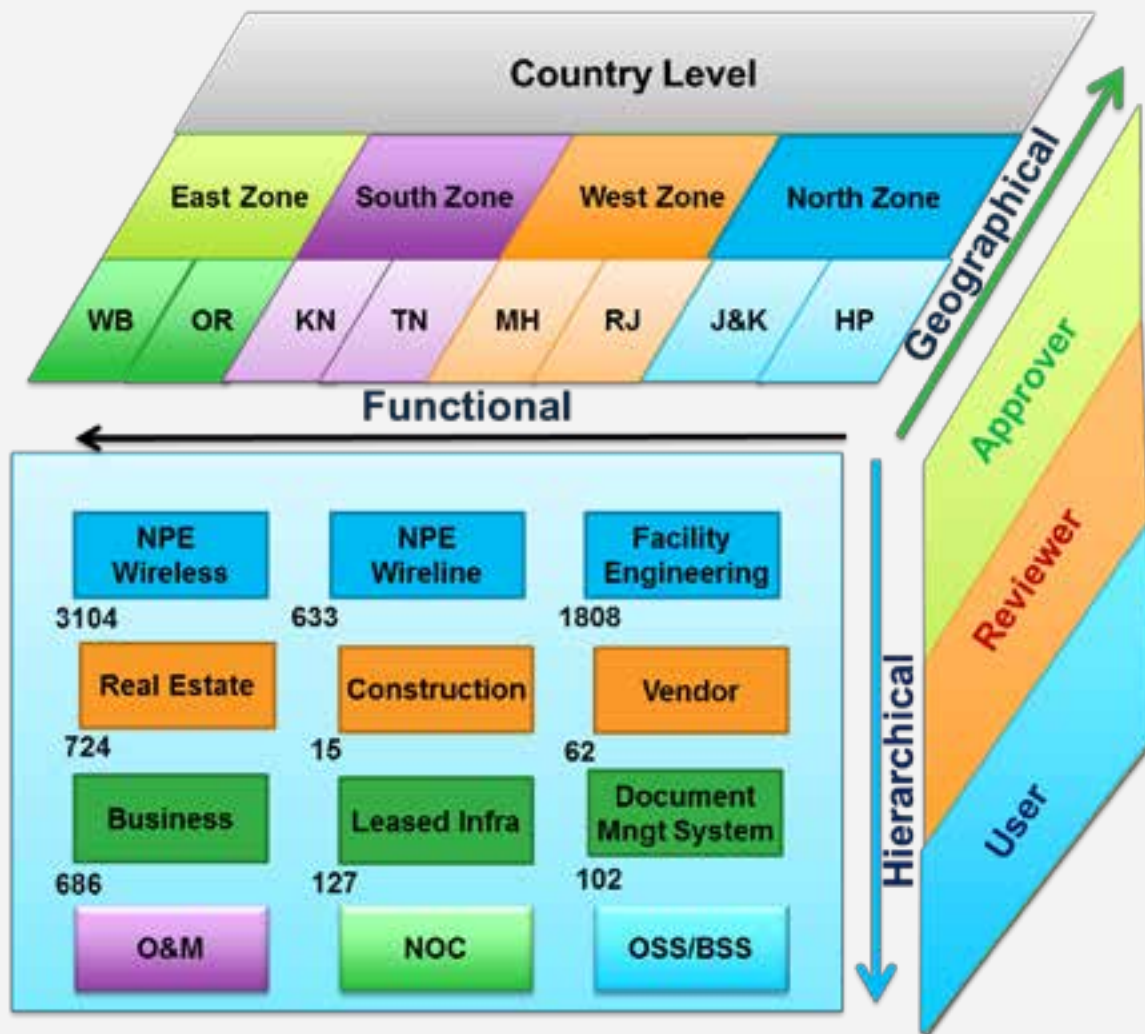
Reliance Jio Infocomm Limited

- § Only Telecom Company having Pan-India high speed wireless broadband Service Provider license and spectrum
- § Services through : 4G LTE, WiFi and FTTx
- § 850 towns + 50% of rural India
- § Current Stage : LTE network rollout in next 2 months & FTTx rollout about to start



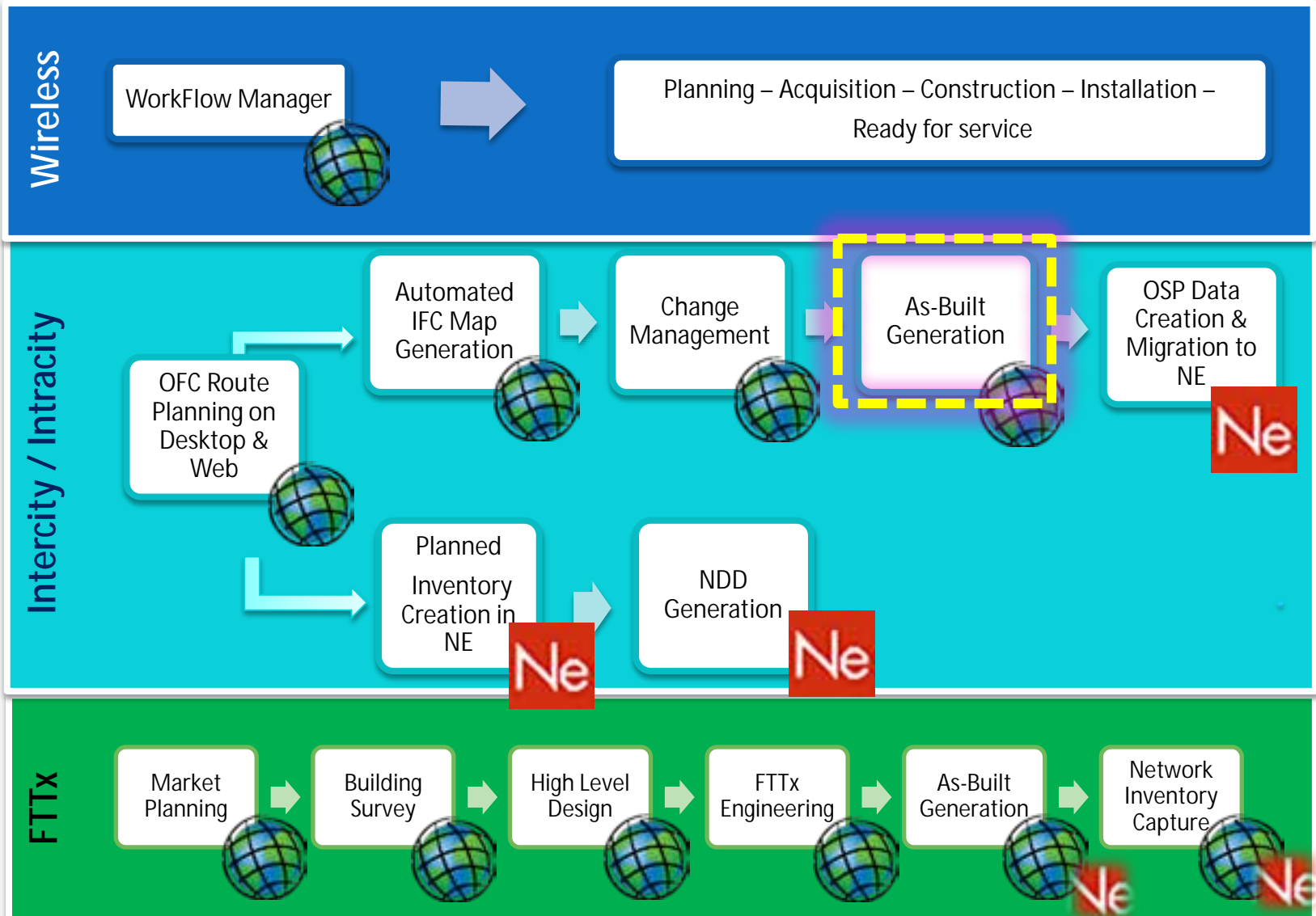
GIS Implementation in RJIL

Approx. 3,000+



Numbers indicate the total users in each functional group as per the locations assigned

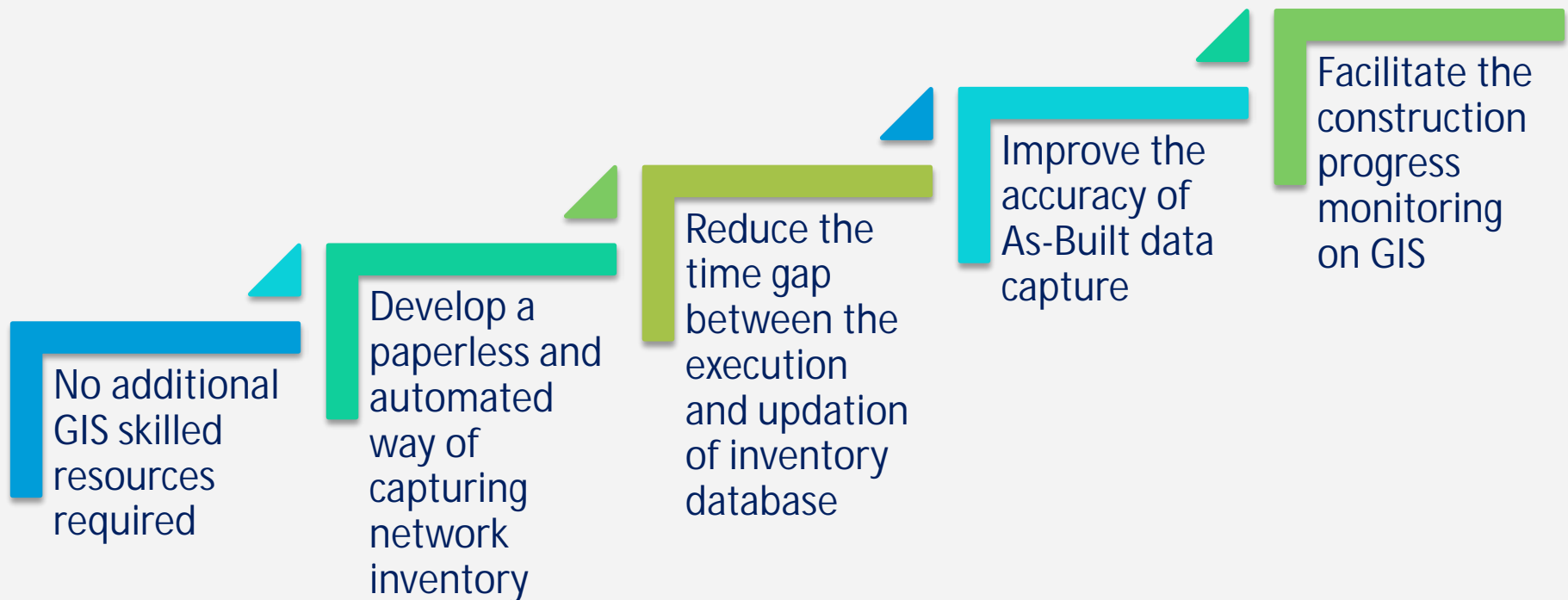
GIS in Network Plan and Build phase



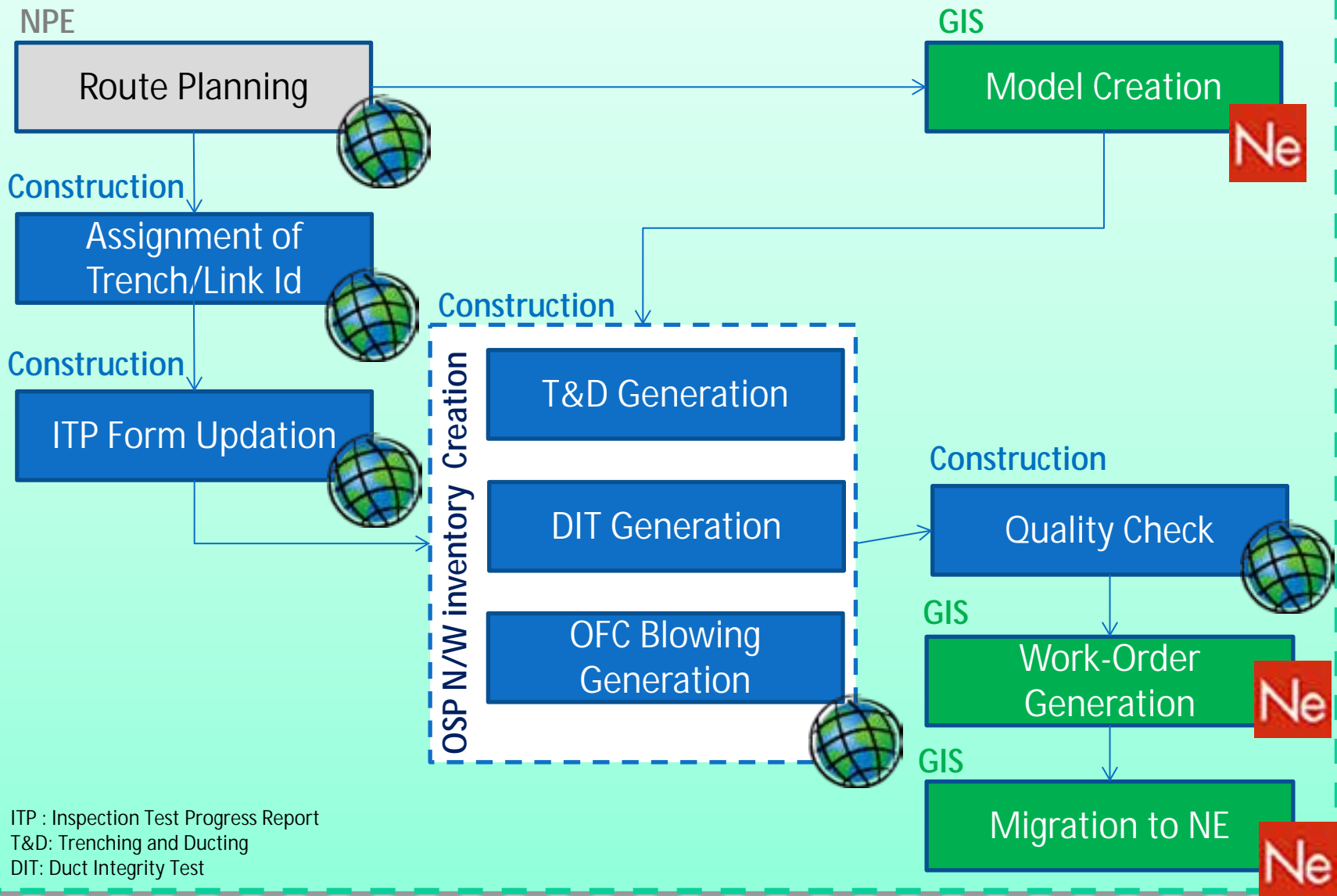
PROGRESS MONITORING



Need of Automation for Network Inventory Creation

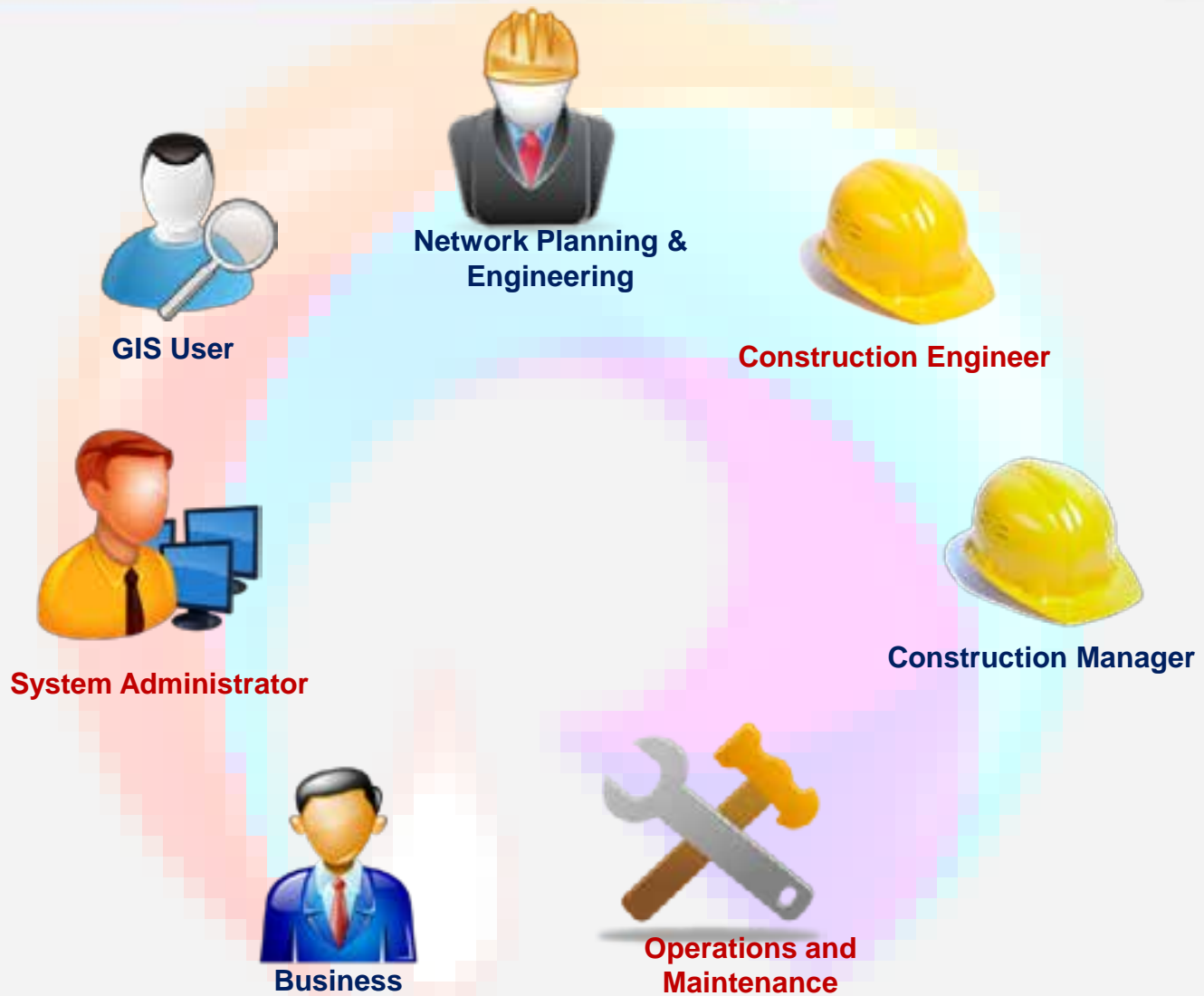


High Level Workflow



Progress Monitoring

User Groups



View unassigned Links /Spans



ITP Intracity As-Built

Welcome: VARSHA.YADAV  Logout




Pending Span

ITP Assigned Span

As-Built Assigned Span

Select Filter Criteria

City Name : Link Id :

SNO	ASSIGN	VIEW MAP	LINKID	CITYNAME	CITYCODE	STATUS	POSTED DATE
1			PUNE_0005	Pune	PUNE		
2			PUNE_0006	Pune	PUNE		
3			PUNE_0009_RB	Pune	PUNE		
4			PUNE_0010	Pune	PUNE		
5			PUNE_0010_RB	Pune	PUNE		
6			PUNE_0011_RB	Pune	PUNE		
7			PUNE_0012	Pune	PUNE		
8			PUNE_0014	Pune	PUNE		
9			PUNE_0015	Pune	PUNE		
10			PUNE_0015_RB	Pune	PUNE		
11			PUNE_0016_RB	Pune	PUNE		
12			PUNE_0101	Pune	PUNE		
13			PUNE_0102	Pune	PUNE		
14			PUNE_0103	Pune	PUNE		
15			PUNE_0104	Pune	PUNE		
16			PUNE_0105	Pune	PUNE		
17			PUNE_0106	Pune	PUNE		
18			PUNE_0106_MB	Pune	PUNE		
19			PUNE_0107	Pune	PUNE		
20			PUNE_0108	Pune	PUNE		
21			PUNE_0109	Pune	PUNE		
22			PUNE_0110	Pune	PUNE		
23			PUNE_0111	Pune	PUNE		
24			PUNE_0112	Pune	PUNE		
25			PUNE_0113	Pune	PUNE		

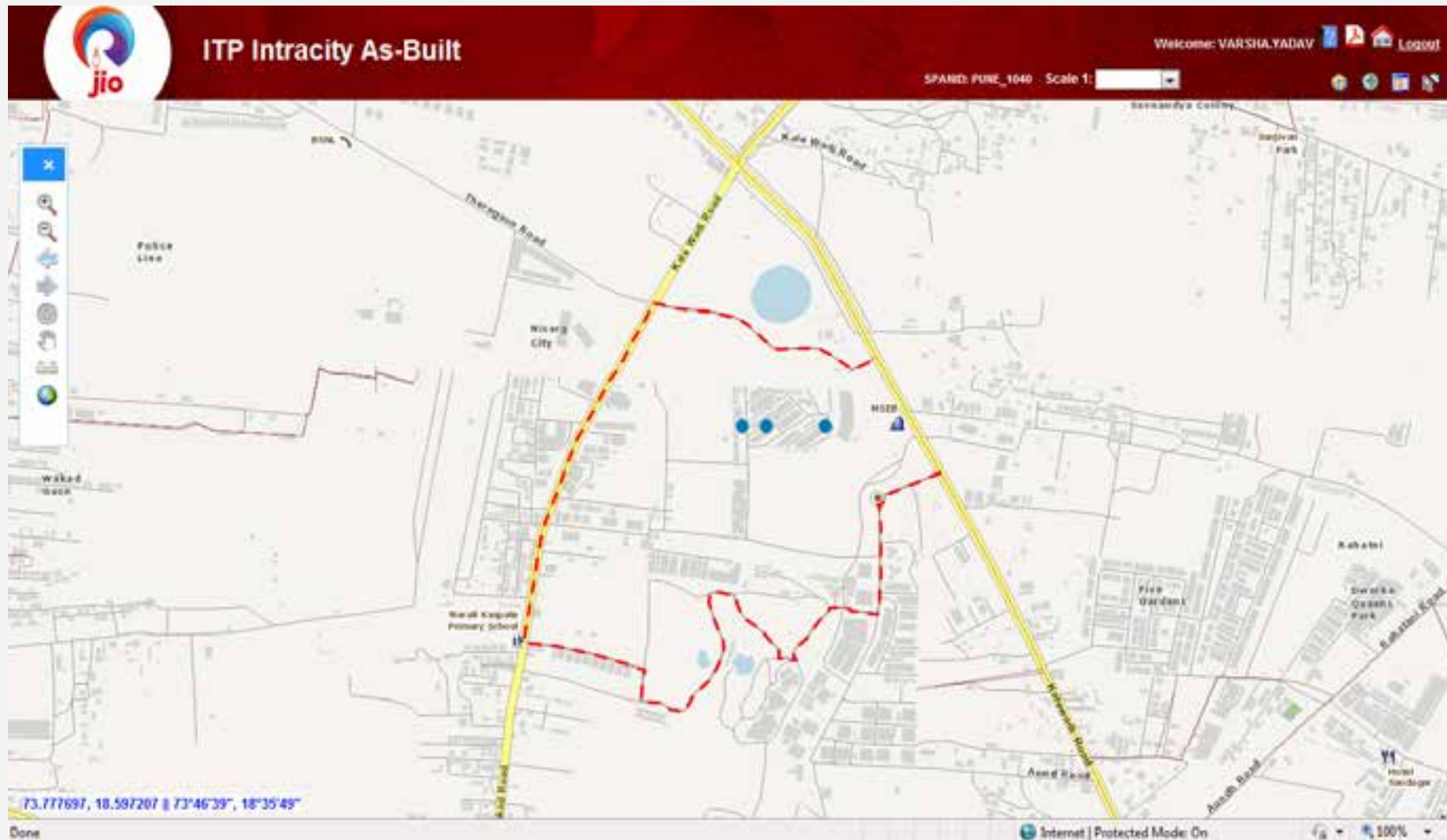
Show Page : of 10 

Done

Internet | Protected Mode: On

100%

View Link on Map



ITP Intracity As-Built

Welcome: VARSHA.YADAV



SPAND: PURE_1040 Scale 1:

73.777697, 18.587207 | 73°46'39", 18°35'49"

Done

Internet | Protected Mode: On

Assignment to Next User



ITP Intracity As-Built
Welcome: VARSHA.YADAV  Logout

Pending Span
ITP Assigned Span
As-Built Assigned Span

Select Filter Criteria

City Name : Link Id :

SNO	ASSIGN	VIEW MAP	LINKID	CITYNAME	CITYCODE	STATUS	POSTED_DATE
1			PUNE_0005	Pune	PUNE		
2			PUNE_0006				
3			PUNE_0009_RB				
4			PUNE_0010				
5			PUNE_0010_RB				
6			PUNE_0011_RB				
7			PUNE_0012				
8			PUNE_0014				
9			PUNE_0015				
10			PUNE_0015_RB				
11			PUNE_0016_RB				
12			PUNE_0101				
13			PUNE_0102				
14			PUNE_0103				
15			PUNE_0104	Pune	PUNE		
16			PUNE_0105	Pune	PUNE		
17			PUNE_0106	Pune	PUNE		
18			PUNE_0106_MB	Pune	PUNE		
19			PUNE_0107	Pune	PUNE		
20			PUNE_0108	Pune	PUNE		
21			PUNE_0109	Pune	PUNE		
22			PUNE_0110	Pune	PUNE		
23			PUNE_0111	Pune	PUNE		
24			PUNE_0112	Pune	PUNE		
25			PUNE_0113	Pune	PUNE		

Show Page : of 10 

User Assign
✕

City Name :

City Code :

Link ID :

Application :

User Name :

Hardik.Mu.Shah
Yogesh.Pawar
sandeep.midgule
Select

Ok

Done Internet | Protected Mode: On 100%

ITP Form Updation

ITP VIEW

Trenching & HDD

DIT

OFC Blowing

AS BUILD PROGRESS-BASE ON ITP

Route Name	HYDERABAD-CUDDAPAH	Span Scope	Length in ML
Link ID	APCDDPAPHDBONL0001_BU	ITP filled	8106
Span ID	APHBBGAPSHDRSPN008_BU	Balance ITP to be filled	43962.79

Generate New ITP

Trenching ITP-030 & HDD ITP-001			Ducting-ITP-031		Rail & Road Crossing-ITP-034			Bridge/Culvert Crossing-ITP-036			Blowing ITP-011			StatusMap	Change Order	
Unique No	Chainage From	Chainage To	Actual Length in ML	Unique No	Actual Length in ML	Unique No	Road Length in ML	Rail Length in ML	Unique No	Bridge Length in ML	Culvert Length in ML	Unique No	No. of NH			No. of HH
1040	7.5340	7.7370	198	1041	198				1829	6					SUBMIT	▲ ▼
1222	8.8970	9.10	205	1223	205										SUBMIT	▲ ▼
1728	11.3420	11.5250	187	1729	187				1833	12					SUBMIT	▲ ▼
1741	12.1650	12.24	75	1742	75										SUBMIT	▲ ▼
1747	12.7930	13.0150	222	1748	222										SUBMIT	▲ ▼
1777	13.6250	13.8450	145	1778	145	1839	12								SUBMIT	▲ ▼

Save

Blowing ITP-011

Select

Trenching ITP-030

HDD ITP-001

DIT ITP-042

Blowing ITP-011

IP-033

Types of ITP Forms

Trenching and Ducting

Trenching ITP-030 & HDD ITP-001

Ducting-ITP-031

Rail & Road Crossing-ITP-034

Bridge/Culvert Crossing-ITP-036

Manhole/Handhole-ITP-033

Duct Integrity Test

DIT ITP-042

OFC Blowing

Blowing ITP-011

HIMACHAL FUTURISTIC COMMUNICATIONS LTD.			FORM NO. HFC/001/001/00000 REV. NO. 1 STANDARDS REF. IEC PROJECT NO. HFC/001/001/00000 OBJECTIVE:		INSPECTION REPORT TRENCHING WORK						
Client: ROIL Drawing No.: 02/2013 (Drawing released for Construction on 20/08/13)			CONTRACTOR: SARS Rev. No.		Sub WORK No.: 13005/142		Report No.: 1008440 Date: 25/08/13				
Area Details: From: Draunohalli			To: Chimbarani								
SL. NO.	Chainage (every 20 M)		Actual Length In M.	ROW no. L/HS/RHS	Trench Details		Bedding Details		Bund Details (Yield%)	MID BEN Installed (Yield%)	Remarks
	From	To			X in M.	D in M.	Drain	Height, mm			
1	17/885	17/900	15	RHS	6.80	1.65	MS	NA	NA	NA	
2	17/900	17/920	20	RHS	10.90	1.65	MS	NA	NA	NA	
3	17/920	17/940	20	RHS	9.20	1.65	MS	NA	NA	NA	
4	17/940	17/960	20	RHS	8.80	1.65	MS	NA	NA	NA	
5	18/000	18/020	20	RHS	9.60	1.65	MS	NA	NA	NA	
6	18/020	18/040	20	RHS	10.90	1.65	MS	NA	NA	NA	
7	18/040	18/060	20	RHS	12.60	1.65	MS	NA	NA	NA	
8	18/060	18/080	20	RHS	11.70	1.65	MS	NA	NA	NA	
9	18/080	18/100	20	RHS	9.20	1.65	MS	NA	NA	NA	
10	18/100	18/120	20	RHS	10.40	1.65	MS	NA	NA	NA	
11	18/120	18/140	20	RHS	11.70	1.65	MS	NA	NA	NA	
12	18/140	18/160	20	RHS	10.80	1.65	MS	NA	NA	NA	
13	18/160	18/180	20	RHS	10.00	1.65	MS	NA	NA	NA	

COMMENT: The Trench From: **5496 18/885** to **19/180** has been cleared for HDPE duct laying

- Note: 1) Start/End points should be known markers or Permanent objects from which we have to take reference.
- 2) True Point location from the point line Minimum True Zero/Read CL/ Permanent object as the field.
- 3) If reference point should be Minimum, 2nd Read Correction, top available permanent objects like (Old Pole Tree etc.
- 4) In case Minimum not available then engineer may refer permanent objects like (Old Pole Tree etc.
- 5) Lat/Long should be in 5 digits in Decimal-Degree format up to 5th digit 25.12345
- 6) W: Trench Width, D: Trench Depth, C: Offset distance from Centre of Trench to Centre of Road.
- 7) Capture True trench details





Start Point Co-ordinates		LAT		LONG		End Point Co-ordinates		LAT		LONG	
		17-26272°		77-86237°				17-26185°		77-86672°	
Three Point Location at Start											
P1			P2			P3			P4		
Type of Point	Lat	Long	Distance in M.	Type of Point	Lat	Long	Distance in M.	Type of Point	Lat	Long	Distance in M.
Minimum	17-26272°	77-86237°		Road CL	17-26272°	77-86240°		Temp. point	17-26272°	77-86232°	
Three Point Location at End											
P1			P2			P3			P4		
Type of Point	Lat	Long	Distance in M.	Type of Point	Lat	Long	Distance in M.	Type of Point	Lat	Long	Distance in M.
Minimum				Road CL							

Comments if any:

Contractor Representative		Field Engineer	
SIGNATURE		SIGNATURE	
NAME	P. SAHA DEVBHAT	NAME	P. RAJU PARV REDDY
DATE	25/08/13	DATE	25/08/13

Sample Trenching ITP-030


ITP As-Built
Welcome: YESTHA BHATT 

HIRACHAL FUTURISTIC COMMUNICATIONS LTD.	Form No.: RAG-79-CGF-FMT-PR-030-02 Rev.No.: 2 Rand Class: Specific Ref.Doc: RAG-79-CGF-ITP-PR-017-02 Sheet No.: 1 of 12	INSPECTION REPORT TRENCHING WORK
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Client: R/L	Contractor: M/s Verma Infranet	Sub Contractor:	Report No.: 546/32
Drawing No.: <small>(If drawing released for Construction available)</small>	Rev No.:	WO/Job No.: 13002882	Date: 13-Aug-2013
Area Name/Landmark:	From: 7.534	To: 7.737	Unique No.: 1345

SL No.	*Chainage (In vvvv 2004)		*Actual Length	*Row ref LHS/RHS	*Trench Details			Bedding Details		Bent Details (Yes/No)	M/WHI Installed (Yes/No)	Crossing	*Authority	*Methodology	Remarks
	From	To			E in M	O in M	Strata	Height mm	Ramming						
1	7.5340	7.5540	20	RHS	8.70	1.75	Normal			No	No	Select	R&B	OT	
2	7.5540	7.5740	20	RHS	6.70	1.75	Normal			No	No	Select	R&B	OT	
3	7.5740	7.60	21	RHS	6.50	1.72	Normal			No	No	Select	R&B	OT	
4	7.60	7.62	20	RHS	6.50	1.80	Normal			No	No	Select	R&B	OT	
5	7.62	7.64	20	RHS	6.60	1.70	Normal			No	No	Select	R&B	OT	
6	7.64	7.66	20	RHS	6.60	1.70	Normal			No	No	Select	R&B	OT	
7	7.66	7.67	10	RHS	6.80	1.80	Normal			No	No	Select	R&B	OT	
8	7.67	7.6780	6	RHS	6.60	1.90	Normal			No	No	BRIDGES	R&B	OT	DWC
9	7.6780	7.6970	21	RHS	6.70	1.70	Normal			No	No	Select	R&B	OT	
10	7.6970	7.7170	20	RHS	6.50	1.80	Normal			No	No	Select	R&B	OT	
11	7.7170	7.7370	20	RHS	6.70	1.75	Normal			No	No	Select	R&B	OT	
12				Select			Select			No	No	Select	Select	Select	
13				Select			Select			No	No	Select	Select	Select	

COMMENT: The Trench From: 7.534 To: 7.737 has been cleared for HDPE duct laying.

Note:
 1.) Start/End point should be Route Marker or Permanent object from which we have to take a reference.
 2.) Three Point location from the point like Mile Stone/ Tree/ Pole/ Road CL/ Permanent Object on field.
 3.) 1st reference point should be Milestone, 2nd Road Centerline, 3rd available permanent object in field Pole/tree etc.
 4.) In case Milestone not available then capture any other permanent object in the field as reference.
 5.) Lat-Long should be in 5 digit in Decimal-Degree format eg. 75.87227 25.18703
 6.) W- Trench width, D- Trench Depth, X- Offset distance from Center of Trench to Center of Road.
 7.) Capture 1 Km stretch details.
 8.) Start/End point must be entered to generate GIS View.

Local intranet | Protected Mode: Off
95%

Sample Ducting-ITP-031



ITP As-Built

Welcome: YESTHA BHATT  Logout

HIMACHAL FUTURISTIC COMMUNICATIONS LTD.		Form No.:	R4G-70-CQF-FMT-PR-031-02	INSPECTION REPORT HDPE DUCT LAYING	
		Rev.No.:	2		
		Hand Class:	Specific		
		Ref.Doc:	R4G-70-CQF-ITP-PR-017-03		
		Sheet No.:	1 of 1		

Client:	RJL	Contractor:	M/S Verma Intranet	Sub Contractor:		Report No.:	033/1604
Drawing No.:		Rev No.:		WFO/Job No.:	13002882	Date:	13-Aug-2013
Area Name/Landmark:		From:	7/534	To:	7/737	Unique No.:	1041

Sl. No.	Location		Actual Length	Release Note R4G-70-CQF FMT-PR-030-02 RJL	Duct Joint Details			No. of Ducts laid as applicable		Duct Protection		End Caps provided	*Span Type	*Span Model	Marker Type	Marker Location
	Chainage as per the trenching report				Location (Chainage)	Check cleanliness of duct at either end	Visual check for tightness of coupler	1st Layer	2nd Layer	Type	Length					
	From	To														
1	7.5340	7.5540	20	1040	Select	No	No	3		Select		No	NLD	1x3-DUCTS-40MM	Select	Select
2	7.5540	7.5740	20	1040	Select	No	No	3		Select		No	NLD	1x3-DUCTS-40MM	Select	Select
3	7.5740	7.58	21	1040	Select	No	No	3		Select		No	NLD	1x3-DUCTS-40MM	Select	Select
4	7.60	7.62	20	1040	Select	No	No	3		Select		No	NLD	1x3-DUCTS-40MM	Select	Select
5	7.62	7.64	20	1040	Select	No	No	3		Select		No	NLD	1x3-DUCTS-40MM	Select	Select
6	7.64	7.66	20	1040	Select	No	No	3		Select		No	NLD	1x3-DUCTS-40MM	Select	Select
7	7.66	7.67	10	1040	Select	No	No	3		Select		No	NLD	1x3-DUCTS-40MM	Select	Select
8	7.67	7.6700	6	1040	Select	No	No	3		DWC	6	No	NLD	1x3-DUCTS-40MM	Select	Select
9	7.6700	7.6870	21	1040	Select	No	No	3		Select		No	NLD	1x3-DUCTS-40MM	Select	Select
10	7.6870	7.7170	20	1040	Select	No	No	3		Select		No	NLD	1x3-DUCTS-40MM	Select	Select
11	7.7170	7.7370	20	1040	Select	No	No	3		Select		No	NLD	1x3-DUCTS-40MM	Select	Select

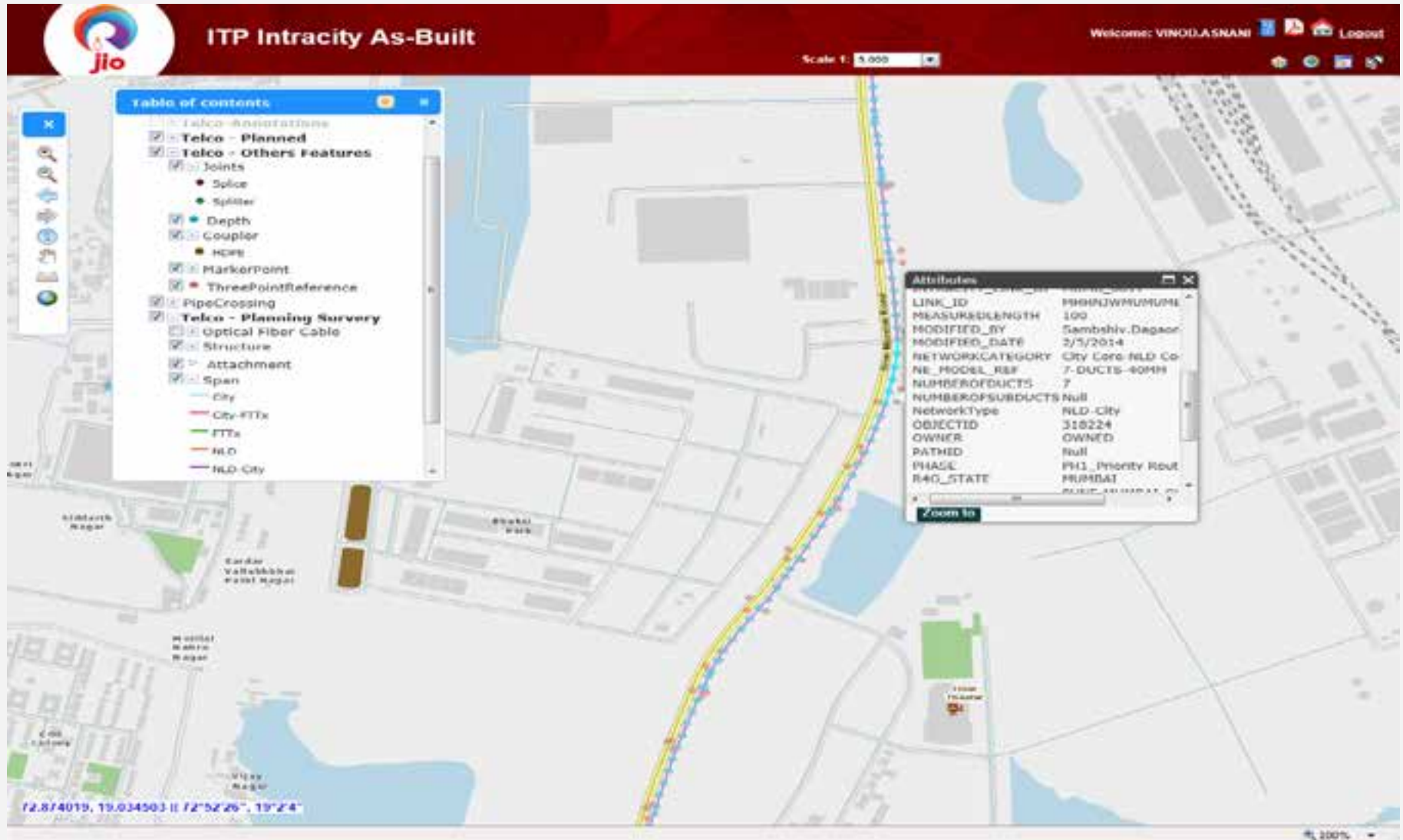
Duct laid From: 7/534 To: 7/737 has been cleared for Backfilling.

Note:
Certified that, end caps were provided with in this chainage of work done before closing for the day.
Chainage should be same as Trenching chainage which is captured in report No. R4G-70-CQF-FMT-PR-030-02

Remarks:

Signature	Contractor Representative	Field Engineer
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Generated OSP Network Inventory



Features

Adjustment of the T&D distance within the defined 'From' & 'To' latitude-longitude

Splitting the trench on placement of structure at the exact spatial location

Creation of point features with reference to 3 point distance

Model selection based on inventory models built in NE model builder

Re-work made easy for change in location of inventory

Compared to earlier manual method of inventory capture

- Per Km : 6 to 8 hours (Paper based mark-up + Digitization + Standardization + Migration)
- Per Km : 3 to 4 hours (ITP updation + Feature Generation)

Conclusion

- Track and manage a dispersed workforce on a common platform in a **disciplined and organized** manner
- Standardization and consistency** across operations by centralizing As-Built management on central GIS database.
- Paperless form** of ITP updation and physical inventory creation
- Increased user productivity** by automation of common activities and reducing repetition of manual updation activities.
- Improved quality** of physical inventory data
- Effortlessly track** newly created inventory status and work progress using reports.

Challenges

An algorithm is defined and executed at client side to move along the interval as defined in the ITP form to calculate the increase the performance

Same inventory feature cannot be edited by two or more users simultaneously

**Web Based
Automation for
Physical Network
Inventory Creation**

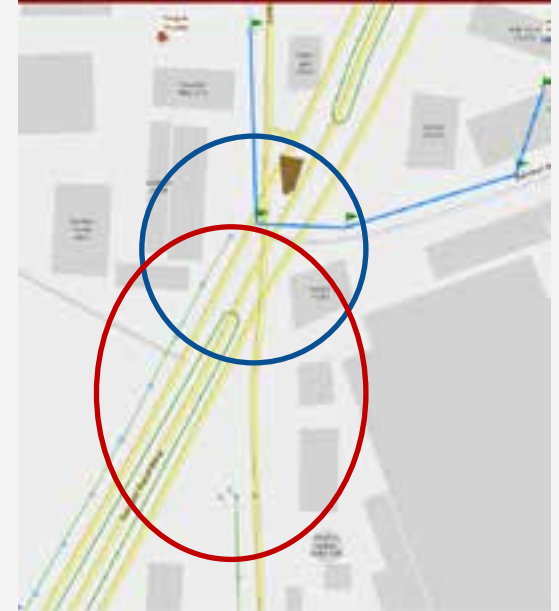
To capture the data in ArcGIS and to make it compatible with Network Engineer data model to avoid development of complex data migration tools

Auto-snapping & split of line feature on availability of point feature within the defined buffer distance

- Development of native app on Mobile for physical inventory data capture



- Auto-snapping & split of line feature on availability of point feature within the defined buffer distance to capture cable splice data





Thank You