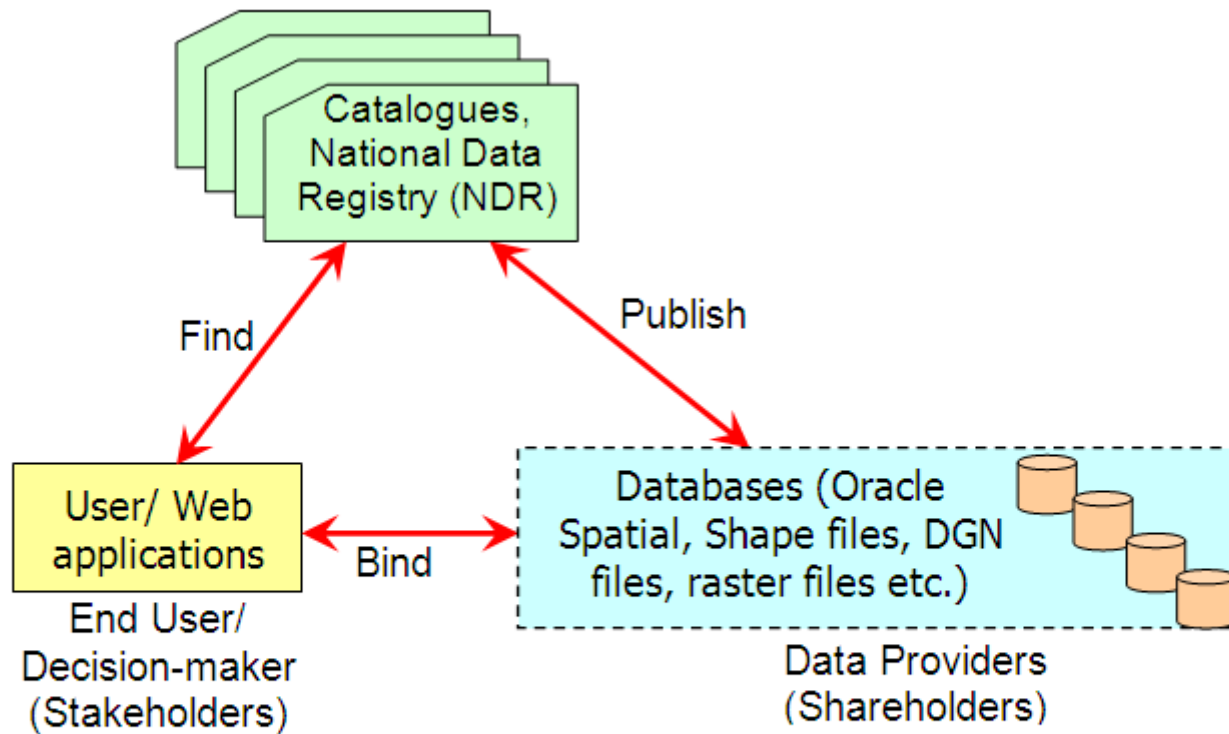


Data Models, Spatial Databases; and Web Services

PS Acharya, CEO NSDI
DST, New Delhi

Organised by ORSAC, Bhubaneswar
At Chilka Development Authority
Balugaon Field Station
21 December 2018

NSDI Architecture



(Service-Oriented Architecture – Publish/Find/Bind Model)


Patharkot



Almora District



Legend

 Boundary



0 140 280 560 840 1,120
Meters

Add Settlement Area


Patharkot



Almora District



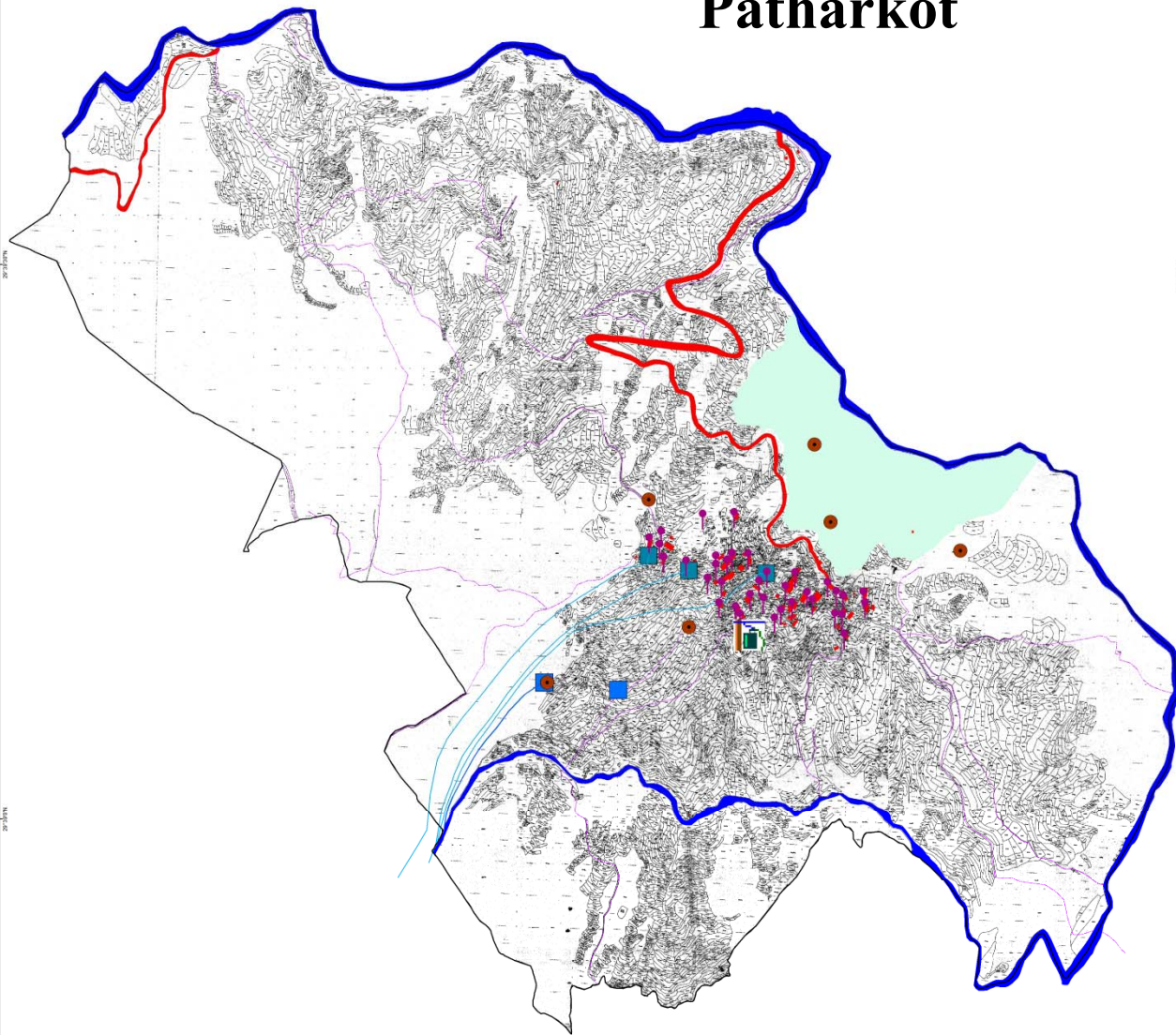
Legend

 Boundary



Add Settlement Area

Patharkot

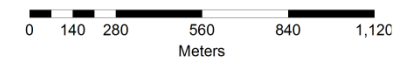
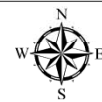


Almora District



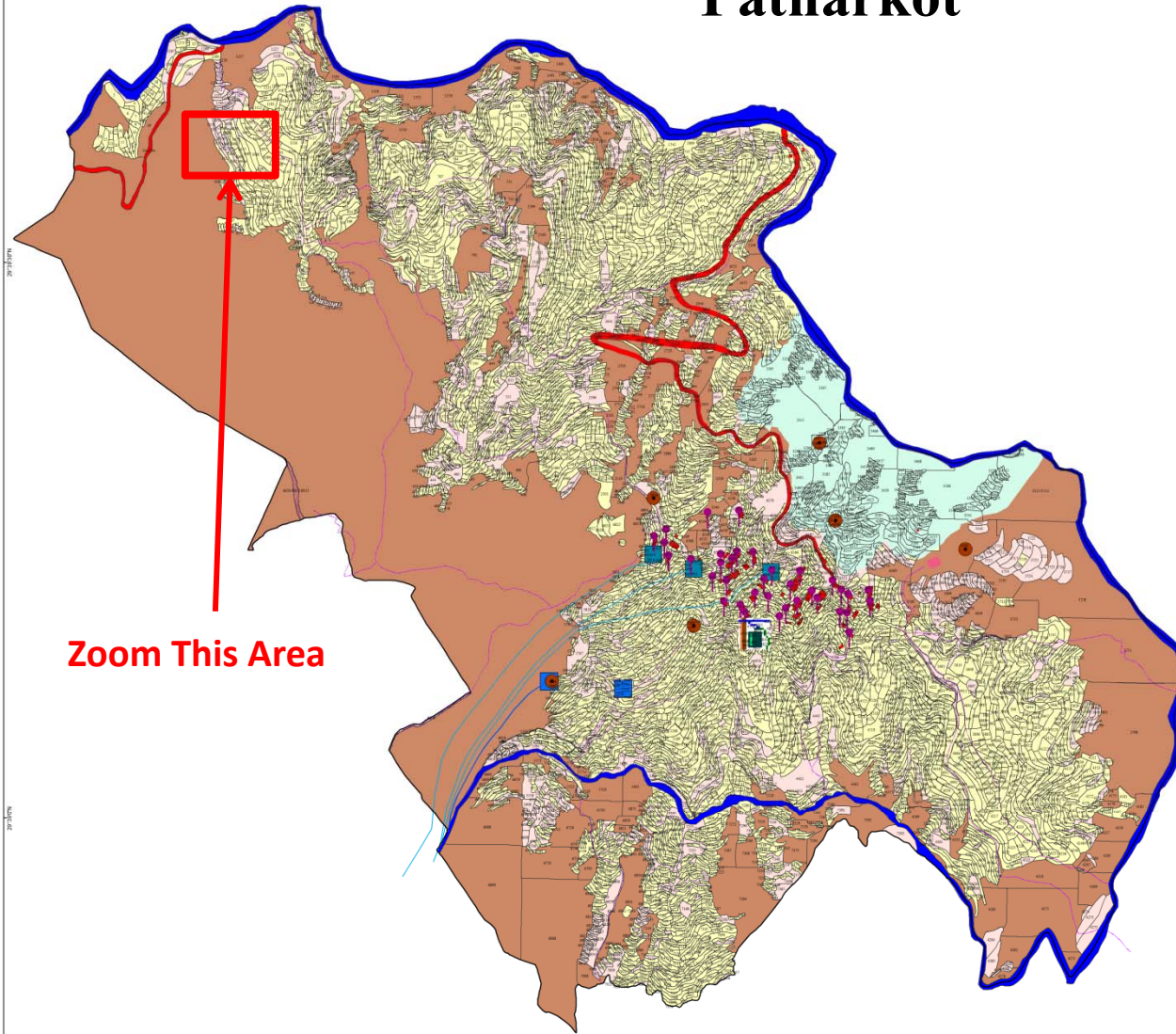
Legend

- Boundary
- Settlement
- Community Horticulture
- Roads
- Bridle Path
- Drinking Water Tank
- Irrigation Water Tank
- Rivers
- Drinking Water Line
- Irrigation Canal
- Naula
- Electric Pole
- Transformer



Add Agricultural Land

Patharkot



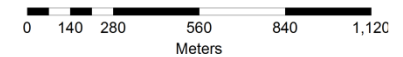
Zoom This Area

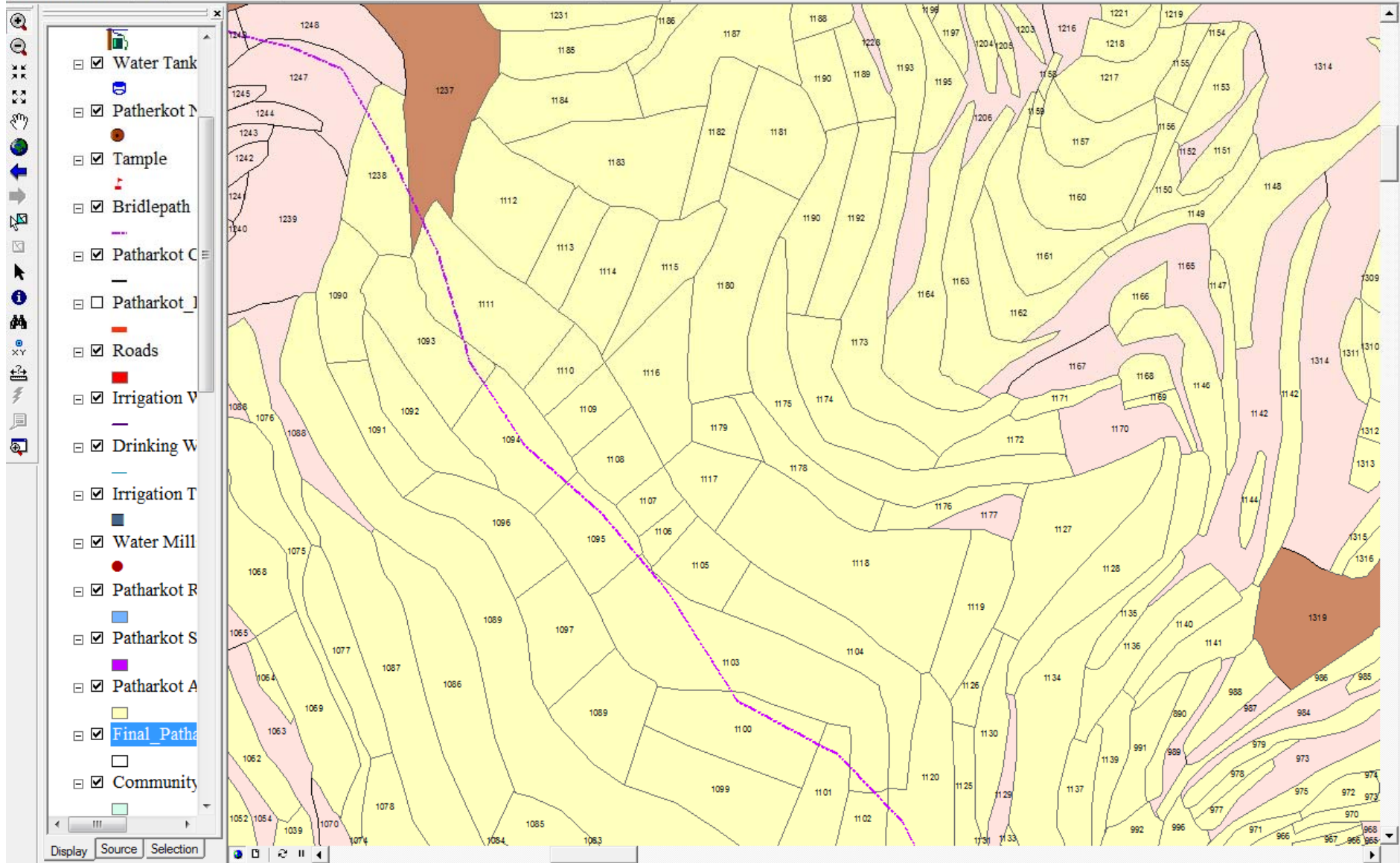
Almora District



Legend

- | | |
|------------------------|-------------------|
| Boundary | Irrigation Canal |
| Settlement | Naula |
| Community Horticulture | Electric Pole |
| Roads | Transformer |
| Bridle Path | Agricultural Land |
| Drinking Water Tank | Pratika dim |
| Irrigation Water Tank | Barren Land |
| Rivers | |
| Drinking Water Line | |





संसाधन विकास योजना मानचित्र

(फरवरी, 2004)

ग्राम पत्थरकोट



प्रस्तावित : ग्रामवासियों द्वारा

- खनई - वर्षा जल संचयन हेतु
- रेक बांध
- पेय जल लव्हेन
- सांयुक्तिक बगीचा विचार सहित
- सांयुक्तिक घर विचार सहित
- सांयुक्तिक पुस्तकालय
- पुस्तिका
- पुल
- सडक
- पर्यावरण पार्क



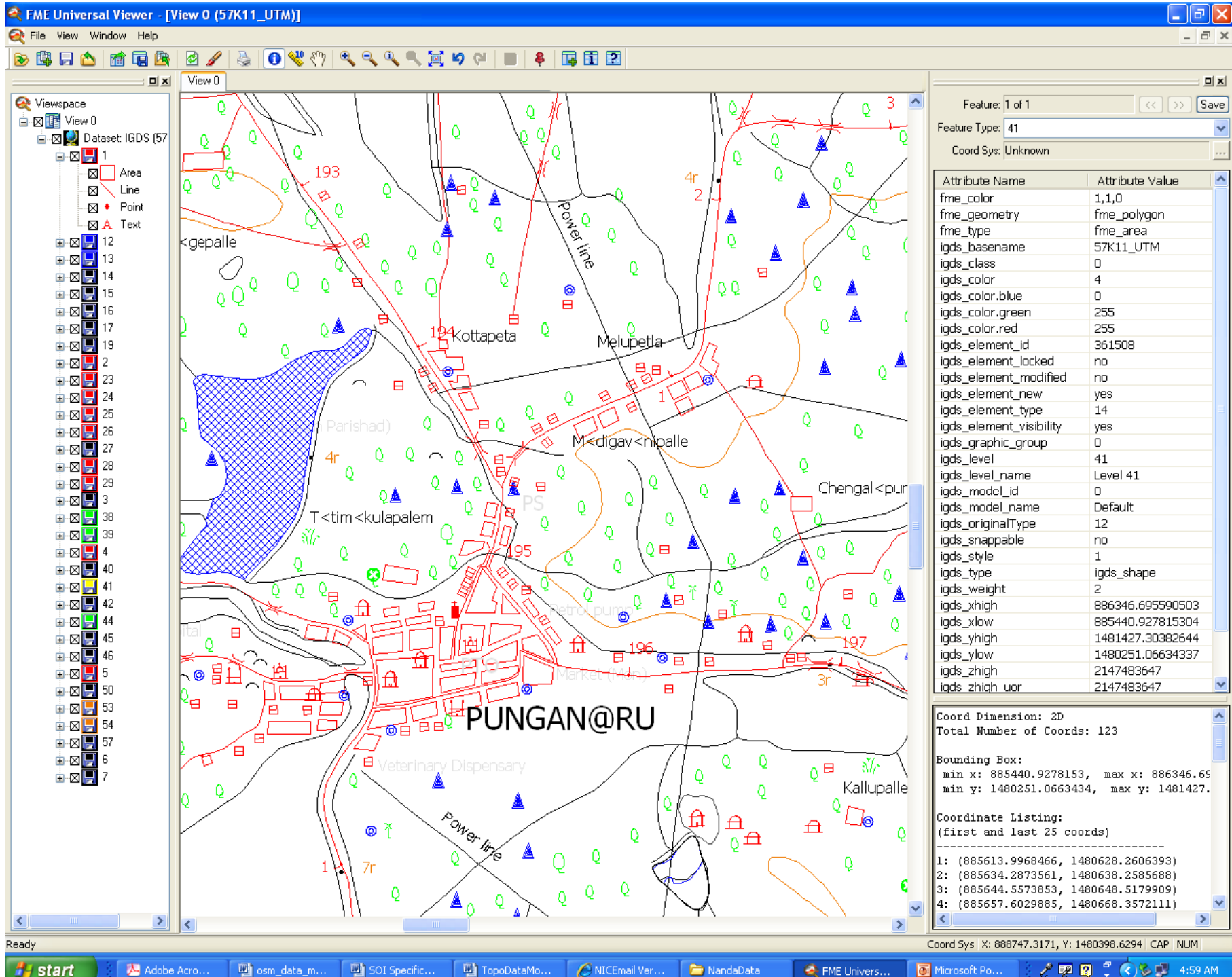
0 250 500

मीटर
स्केल 1:10000



Prepared under the direction of Dr. J.S.Rawat
Principal Investigator, NRDDMS Centre (DST Project),
Dept. of Geography, Ku. University, SS J Campus, Almora
Ph. No. 05962-235431, Email: jivan_rawat@yahoo.co.in

Based on: SOI Toposheet and Field Survey done by NRDDMS Centre,
concerned Dept. Tehsil Office, Khatima, Pithoragarh and Villages.



- Viewspace
- View 0
- Dataset: IGDS (57)
- 1
- Area
- Line
- Point
- Text
- 12
- 13
- 14
- 15
- 16
- 17
- 19
- 2
- 23
- 24
- 25
- 26
- 27
- 28
- 29
- 3
- 38
- 39
- 4
- 40
- 41
- 42
- 44
- 45
- 46
- 5
- 50
- 53
- 54
- 57
- 6
- 7

Feature: 1 of 1

Feature Type: 41

Coord Sys: Unknown

Attribute Name	Attribute Value
fme_color	1,1,0
fme_geometry	fme_polygon
fme_type	fme_area
igds_basename	57K11_UTM
igds_class	0
igds_color	4
igds_color.blue	0
igds_color.green	255
igds_color.red	255
igds_element_id	361508
igds_element_locked	no
igds_element_modified	no
igds_element_new	yes
igds_element_type	14
igds_element_visibility	yes
igds_graphic_group	0
igds_level	41
igds_level_name	Level 41
igds_model_id	0
igds_model_name	Default
igds_originalType	12
igds_snappable	no
igds_style	1
igds_type	igds_shape
igds_weight	2
igds_xhigh	886346.695590503
igds_xlow	885440.927815304
igds_yhigh	1481427.30382644
igds_ylow	1480251.06634337
igds_zhigh	2147483647
igds_zhigh_uor	2147483647

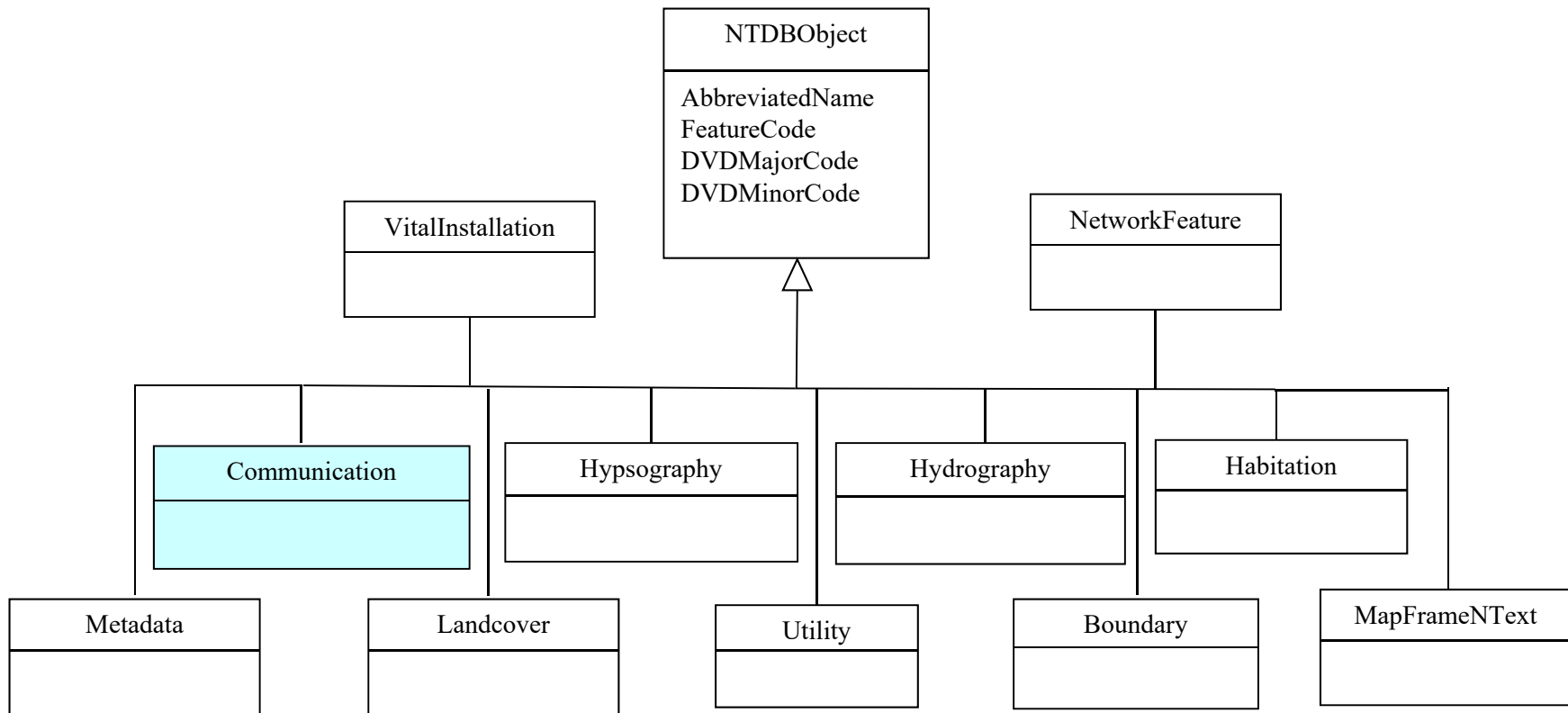
Coord Dimension: 2D
Total Number of Coords: 123

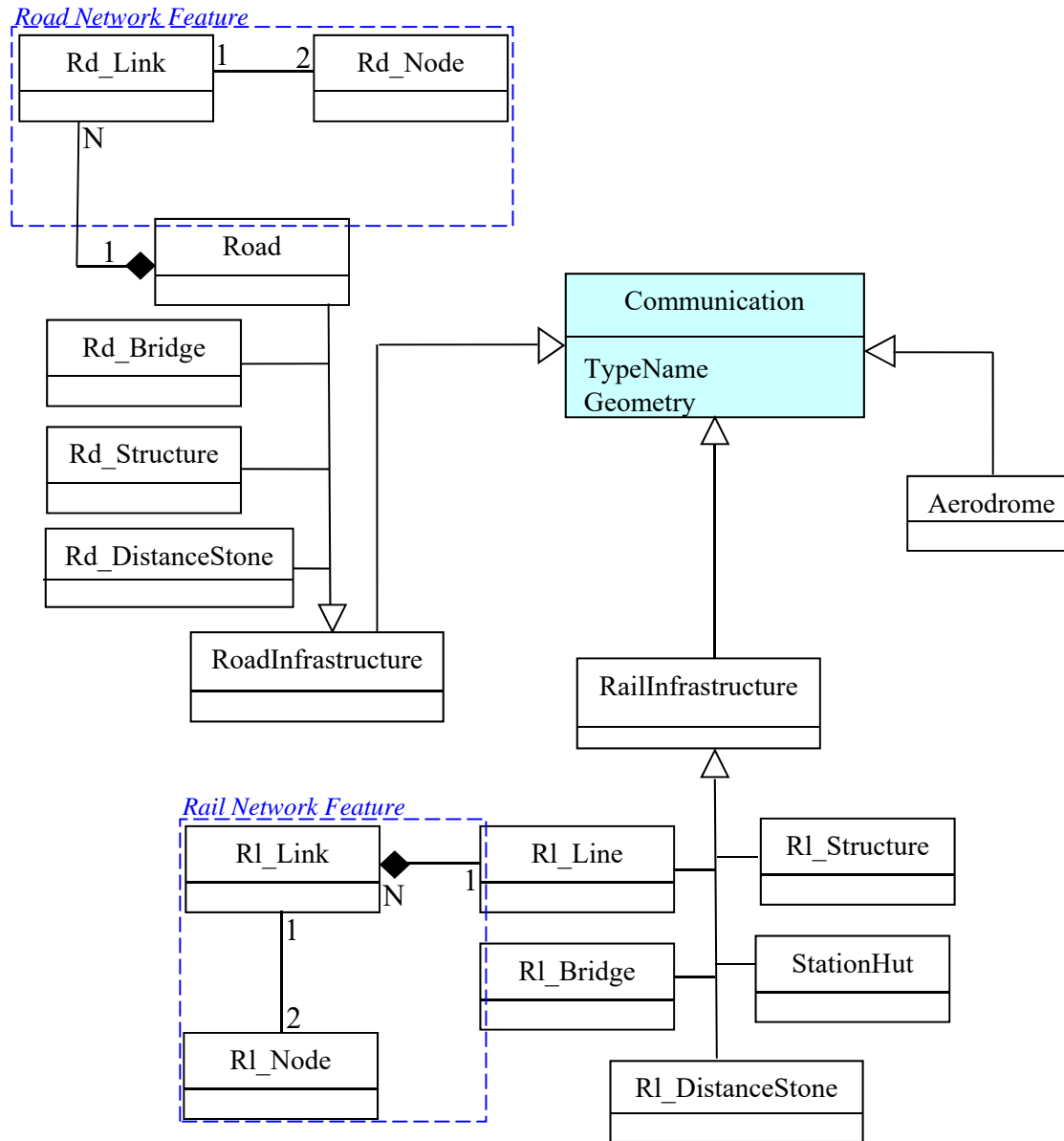
Bounding Box:
min x: 885440.9278153, max x: 886346.65
min y: 1480251.0663434, max y: 1481427.

Coordinate Listing:
(first and last 25 coords)

1: (885613.9968466, 1480628.2606393)
2: (885634.2873561, 1480638.2585688)
3: (885644.5573853, 1480648.5179909)
4: (885657.6029885, 1480668.3572111)

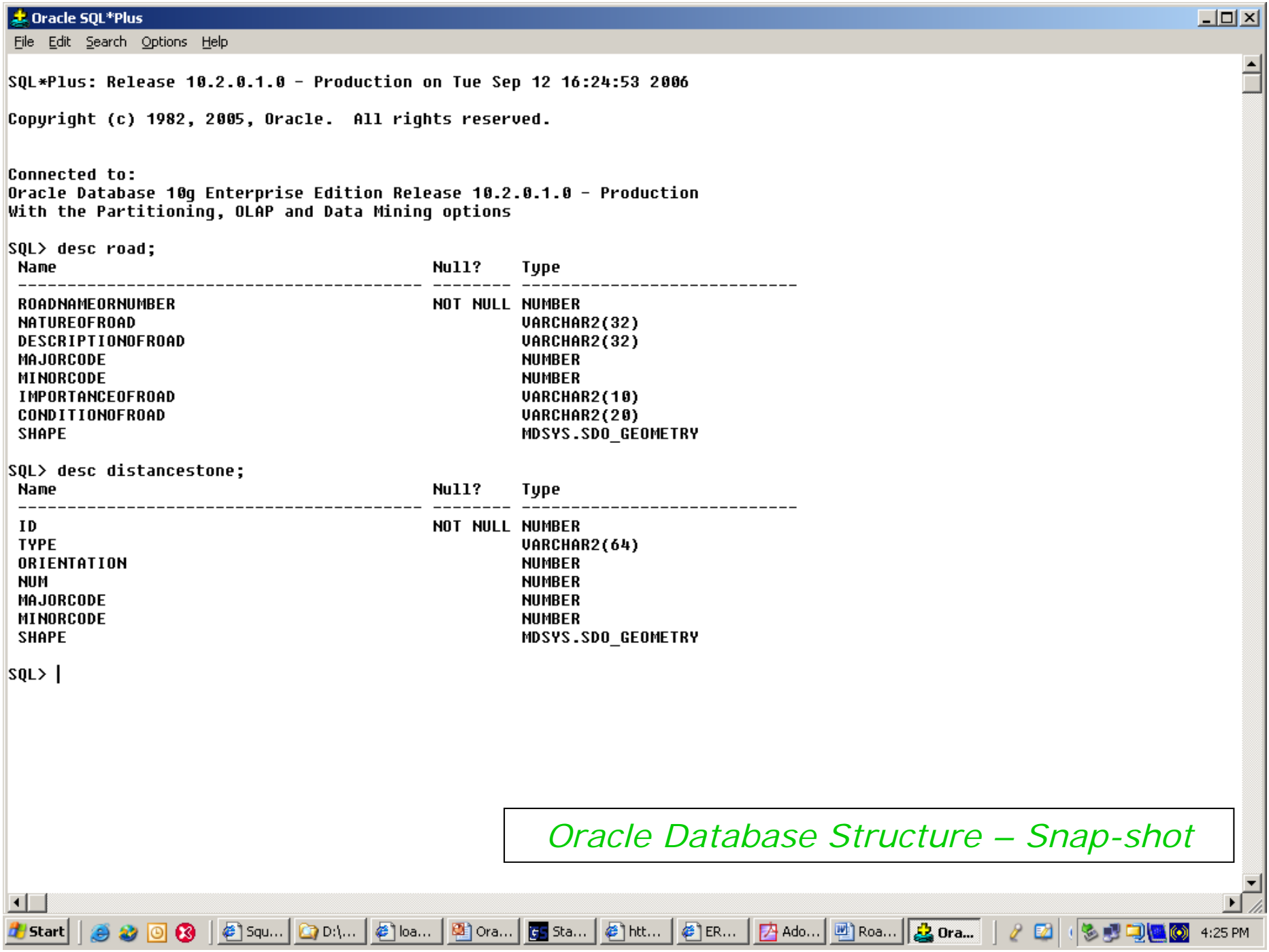
Conceptual Data Model of 1:50,000 Topographic Map





Attributes of 'Road' Class

Attribute	Domain	Cardinality	Optionality
Road Name or Number		multiple	mandatory
Road Category	Cart-track plains Cart-track hills/ wooded area/desert Track follows stream-bed/ boundary etc. Road in dry river bed Pack-track hills Pack-track plains Foot-path hills Foot-path plains Motorway Highway	single	mandatory
Road Importance	1 st 2 nd Others	single	mandatory
Status of construction	Under Construction Complete	single	mandatory
Road condition	Metalled Unmetalled	single	mandatory



Oracle Database Structure – Snap-shot

http://202.63.233.68/geoserver/roadschema.txt - Microsoft Internet Explorer

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Address http://202.63.233.68/geoserver/roadschema.txt

ROADNAMEORNUMBER	NATUREOFROAD	DESCRIPTIONOFROAD	MAJORCODE	MINORCODE	IMPORTANCE	CONDITIONOFROAD	SHAPE
1		ROAD METALLED 1st IMPORTANCE	11	1100	1st	Metalled	SDO_
-11612.15, -121.04, -11542.79, -25.41, -11496.57, 52.85, -11415.63, 154.29, -11363.62, 220.96, -11340.48, 244.16, -11288.42, 284.76, -11218.97, 308, -11091.67, 368.97, -10993.31, 415.41, -10874.72, 496.64, -10704.06, 606.89, -10608.59, 664.91, -10536.25, 696.87, -10458.14, 725.9, -10362.64, 752.08, -10267.12, 766.67, -10116.61, 787.15, -9954.54, 816.28, -9824.29, 836.72, -9757.75, 859.97, -9621.74, 915.14, -9520.51, 978.99, -9436.64, 1051.46, -9381.73, 1129.71, -9326.54, 1202.49, -9280.27, 1246, -9210.89, 1315.59, -9147.21, 1344.61, -9092.26, 1367.85, -9022.81, 1402.69, -8988.12, 1434.6, -8950.53, 1480.96, -8930.34, 1530.23, -8907.28, 1611.36, -8898.66, 1675.06, -8881.35, 1727.23, -8840.88, 1773.62, -8742.55, 1837.42, -8693.38, 1872.25, -8615.32, 1950.52, -8545.91, 2008.53, -8482.28, 2054.96, -8436.01, 2098.45, -8398.41, 2115.89, -8369.45, 2115.92, -8349.16, 2098.56, -8291.14, 1997.28, -8236.06, 1936.51, -8178.11, 1901.83, -8117.32, 1881.64, -8033.34, 1864.34, -7986.99, 1832.54, -7902.95, 1757.37, -7836.27, 1690.83, -7775.45, 1644.57, -7729.11, 1627.25, -7671.21, 1627.33, -7604.64, 1647.67, -7393.51, 1804.31, -7254.71, 1934.8, -7191.12, 2007.27, -7127.49, 2062.39, -7034.91, 2108.84, -6974.16, 2137.85, -6924.66, 2172.69, -6875.5, 2210.39, -6861.08, 2242.27, -6852.44, 2282.8, -6826.42, 2314.7, -6797.48, 2323.43, -6725.09, 2311.92, -6632.42, 2300.45, -6586.12, 2303.41, -6510.88, 2344.05, -6432.8, 2410.76, -6363.4, 2471.65, -6227.44, 2558.68, -6079.9, 2654.43, -5906.37, 2799.45, -5755.95, 2909.68, -5694.74, 2893.84, -5688.66, 2893.87, -5664.31, 2869.55, -5512.36, 2906.24, -5354.38, 2991.61, -5190.27, 3040.47, -5020.01, 3028.52, -4995.58, 2931.19, -4764.7, 3071.43, -4144.75, 3248.62, -3603.75, 3352.71, -3214.62, 3347.09, -2941.15, 3444.78, -2789.11, 3414.52, -2703.99, 3420.72)							
2		ROAD METALLED 1st IMPORTANCE	11	1100	1st	Metalled	SDO_
-2703.99, 3420.72, -2539.79, 3390.48, -2442.58, 3451.45, -2308.93, 3536.79, -2230.52, 3614.12, -2147.23, 3626.86, -2033.56, 3573.94, -1786, 3513.11, -1717.96, 3526.31, -1574.26, 3695.75, -1412.83, 3799.52, -1334.52, 3771.84, -1097.21, 3754.44, -930.61, 3762.21, -827.08, 3754.75, -786.69, 3754.81, -668.06, 3760, -602.42, 3757.57, -568.47, 3799.55, -498.99, 3805.4, -389.01, 3828.72, -302.2, 3860.69, -221.15, 3875.26, -137.18, 3875.35, -38.74, 3861, 57.11, 3840.85, 129.5, 3832.26, 225.05, 3832.35, 311.86, 3858.54, 387.11, 3884.7, 476.8, 3925.33, 598.36, 3945.77, 734.4, 3971.99, 803.88, 3974.96, 864.65, 4001.12, 928.27, 4076.48, 1014.96, 4201.1, 1058.28, 4276.46, 1130.58, 4354.75, 1240.43, 4476.51, 1370.6, 4572.24,							

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MAJORCODE	MINORCODE	IMPORTANCE	CONDITIONOFROAD	SHAPE(SDO_GTYPE, SDO_SRID, SDO_POINT(X, Y, Z), SDO_ELEM_INFO, SDO_ORDINATES)
11	1100	1st	Metalled	SDO_GEOMETRY(2002, NULL, NULL, SDO_ELEM_INFO_ARRAY(1, 2, 1), SDO_ORDINATE_ARRAY(
13				
7				
54.				
-				
74				
202				
-9				
7.2				
1				
54.				
5,				
303				
45				
18				
84				
-68				
12,				
71.				
-				
54				
7,				
144				
11	1100	1st	Metalled	SDO_GEOMETRY(2002, NULL, NULL, SDO_ELEM_INFO_ARRAY(1, 2, 1), SDO_ORDINATE_ARRAY(
23				
3				
54.				
42				
59,				
2.2				
394				
96				
24,				

E:\Misc\DSTCopy\Interop\gmlwork\july06\FinalNTDBSchema.xsd

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media

Address E:\Misc\DSTCopy\Interop\gmlwork\july06\FinalNTDBSchema.xsd Go

```
<?xml version="1.0" encoding="UTF-8" ?>
<!-- edited with XMLSpy v2006 sp2 U (http://www.altova.com) by XMLSPY 2006 Enterprise Ed., Installed for 2 users
(NATIONAL SPATIAL DATA INFRASTRUTURE) -->
- <xs:schema xmlns:SoI="http://www.nrdms.gov.in" xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:gml="http://www.opengis.net/gml" targetNamespace="http://www.nrdms.gov.in" elementFormDefault="qualified"
  attributeFormDefault="unqualified">
  <xs:import namespace="http://www.opengis.net/gml" schemaLocation="E:\Misc\DSTCopy\Interop\gmlwork\feature.xsd" />
  - <xs:element name="NtdbThemes" type="gml:AbstractFeatureCollectionType" substitutionGroup="gml:_FeatureCollection">
  - <xs:annotation>
    <xs:documentation>Comment describing your root element</xs:documentation>
  </xs:annotation>
  </xs:element>
  <xs:element name="Communication" type="SoI:NtdbThemeType" substitutionGroup="SoI:_NtdbFeature" />
  <xs:element name="Habitation" type="SoI:NtdbThemeType" substitutionGroup="SoI:_NtdbFeature" />
  <xs:element name="Hydrography" type="SoI:NtdbThemeType" substitutionGroup="SoI:_NtdbFeature" />
  <xs:element name="Hypsography" type="SoI:NtdbThemeType" substitutionGroup="SoI:_NtdbFeature" />
  <xs:element name="Utilities" type="SoI:NtdbThemeType" substitutionGroup="SoI:_NtdbFeature" />
  <xs:element name="VitalInstallations" type="SoI:NtdbThemeType" substitutionGroup="SoI:_NtdbFeature" />
  <xs:element name="Boundaries" type="SoI:NtdbThemeType" substitutionGroup="SoI:_NtdbFeature" />
  <xs:element name="LandCoverUse" type="SoI:NtdbThemeType" substitutionGroup="SoI:_NtdbFeature" />
  <xs:element name="MapFrameNText" type="SoI:NtdbThemeType" substitutionGroup="SoI:_NtdbFeature" />
  <xs:element name="Road" type="SoI:RoadType" substitutionGroup="SoI:_RoadInfrastructureFeature" />
  <xs:element name="RdBridge" type="SoI:RdBridgeType" substitutionGroup="SoI:_RoadInfrastructureFeature" />
  <xs:element name="RdDistanceStone" type="SoI:RdDistanceStoneType" substitutionGroup="SoI:_RoadInfrastructureFeature" />
  <xs:element name="RdStructure" type="SoI:RdStructureType" substitutionGroup="SoI:_RoadInfrastructureFeature" />
  <xs:element name="RILine" type="SoI:RILineType" substitutionGroup="SoI:_RailInfrastructureFeature" />
  <xs:element name="RIBridge" type="SoI:RdBridgeType" substitutionGroup="SoI:_RailInfrastructureFeature" />
  <xs:element name="RIDistanceStone" type="SoI:RIDistanceStoneType" substitutionGroup="SoI:_RailInfrastructureFeature" />
  <xs:element name="RIStructure" type="SoI:RIStructureType" substitutionGroup="SoI:_RailInfrastructureFeature" />
  <xs:element name="Aerodrome" type="SoI:AerodromeType" substitutionGroup="SoI:_AeroInfrastructureFeature" />
  <xs:element name="Building" type="SoI:BuildingType" substitutionGroup="SoI:_HabitationFeature" />
  <xs:element name="River" type="SoI:NtdbThemeType" substitutionGroup="SoI:_HydrographyFeature" />
  <xs:element name="Stream" type="SoI:StreamType" substitutionGroup="SoI:_RiverFeature" />
  <xs:element name="Canals" type="SoI:NtdbThemeType" substitutionGroup="SoI:_HydrographyFeature" />
```

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start july06 Microsoft PowerPoint ... E:\Misc\DSTCopy\Int... Cannot find server - ... 9:52 PM

http://202.63.233.68/geoserver/SolRoad.xml - Microsoft Internet Explorer

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Back Search Favorites

Address http://202.63.233.68/geoserver/SolRoad.xml Go Links

```
<?xml version="1.0" encoding="UTF-8" ?>
<!-- edited with XMLSpy v2005 rel. 3 U (http://www.altova.com) by Abhishek Sindal, NSDI, SOI -->
- <RoadInfrastructure xmlns:gml="http://www.opengis.net/gml" xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.nrdms.gov.in C:\as\GML\gml212
  \RoadInfra1.xsd">
- <gml:boundedBy>
  <gml:null>unknown</gml:null>
</gml:boundedBy>
- <RoadInfrastructureMember>
- <Road>
  <roadNameOrNumber>AAA</roadNameOrNumber>
  <natureOfRoad />
  <descriptionOfRoad>ROAD METALLED 1st IMPORTANCE</descriptionOfRoad>
  <majorCode>11</majorCode>
  <minorCode>1100</minorCode>
  <importanceOfRoad>1st</importanceOfRoad>
  <conditionOfRoad>Metalled</conditionOfRoad>
- <gml:geometryProperty>
- <gml:LineString srsName="EPSG:3148">
  <gml:coordinates>-11612.15,-121.04 -11542.79,-25.41 -11496.57,52.85 -11415.63,154.29 -11363.62,220.96 -
  11340.48,244.16 -11288.42,284.76 -11218.97,308.00 -11091.67,368.97 -10993.31,415.41 -10874.72,496.64 -
  10704.06,606.89 -10608.59,664.91 -10536.25,696.87 -10458.14,725.90 -10362.64,752.08 -10267.12,766.67 -
  10116.61,787.15 -9954.54,816.28 -9824.29,836.72 -9757.75,859.97 -9621.74,915.14 -9520.51,978.99 -
  9436.64,1051.46 -9381.73,1129.71 -9326.54,1202.49 -9280.27,1246.00 -9210.89,1315.59 -9147.21,1344.61 -
  9092.26,1367.85 -9022.81,1402.69 -8988.12,1434.60 -8950.53,1480.96 -8930.34,1530.23 -8907.28,1611.36 -
  8898.66,1675.06 -8881.35,1727.23 -8840.88,1773.62 -8742.55,1837.42 -8693.38,1872.25 -8615.32,1950.52 -
  8545.91,2008.53 -8482.28,2054.96 -8436.01,2098.45 -8398.41,2115.89 -8369.45,2115.92 -8349.16,2098.56 -
  8291.14,1997.28 -8236.06,1936.51 -8178.11,1901.83 -8117.32,1881.64 -8033.34,1864.34 -7986.99,1832.54 -
  7902.95,1757.37 -7836.27,1690.83 -7775.45,1644.57 -7729.11,1627.25 -7671.21,1627.33 -7604.64,1647.67 -
  7393.51,1804.31 -7254.71,1934.80 -7191.12,2007.27 -7127.49,2062.39 -7034.91,2108.84 -6974.16,2137.85 -
  6924.66,2172.69 -6875.50,2210.39 -6861.08,2242.27 -6852.44,2282.80 -6826.42,2314.70 -6797.48,2323.43 -
  6725.09,2311.92 -6632.42,2300.45 -6586.12,2303.41 -6510.88,2344.05 -6432.80,2410.76 -6363.40,2471.65 -
  6227.44,2558.68 -6079.90,2654.43 -5906.37,2799.45 -5755.95,2909.68 -5694.74,2893.84 -5688.66,2893.87 -
  5664.31,2869.55 -5512.36,2906.24 -5354.38,2991.61 -5190.27,3040.47 -5020.01,3028.52 -4995.58,2931.19 -
  4764.70,3071.43 -4144.75,3248.62 -3603.75,3352.71 -3214.62,3347.09 -2941.15,3444.78 -2789.11,3414.52 -
  2703.99,3420.72</gml:coordinates>
  </gml:LineString>
</gml:geometryProperty>
```

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C:\psa\Interoperability\GMLWork\May06\style_road2.xsl

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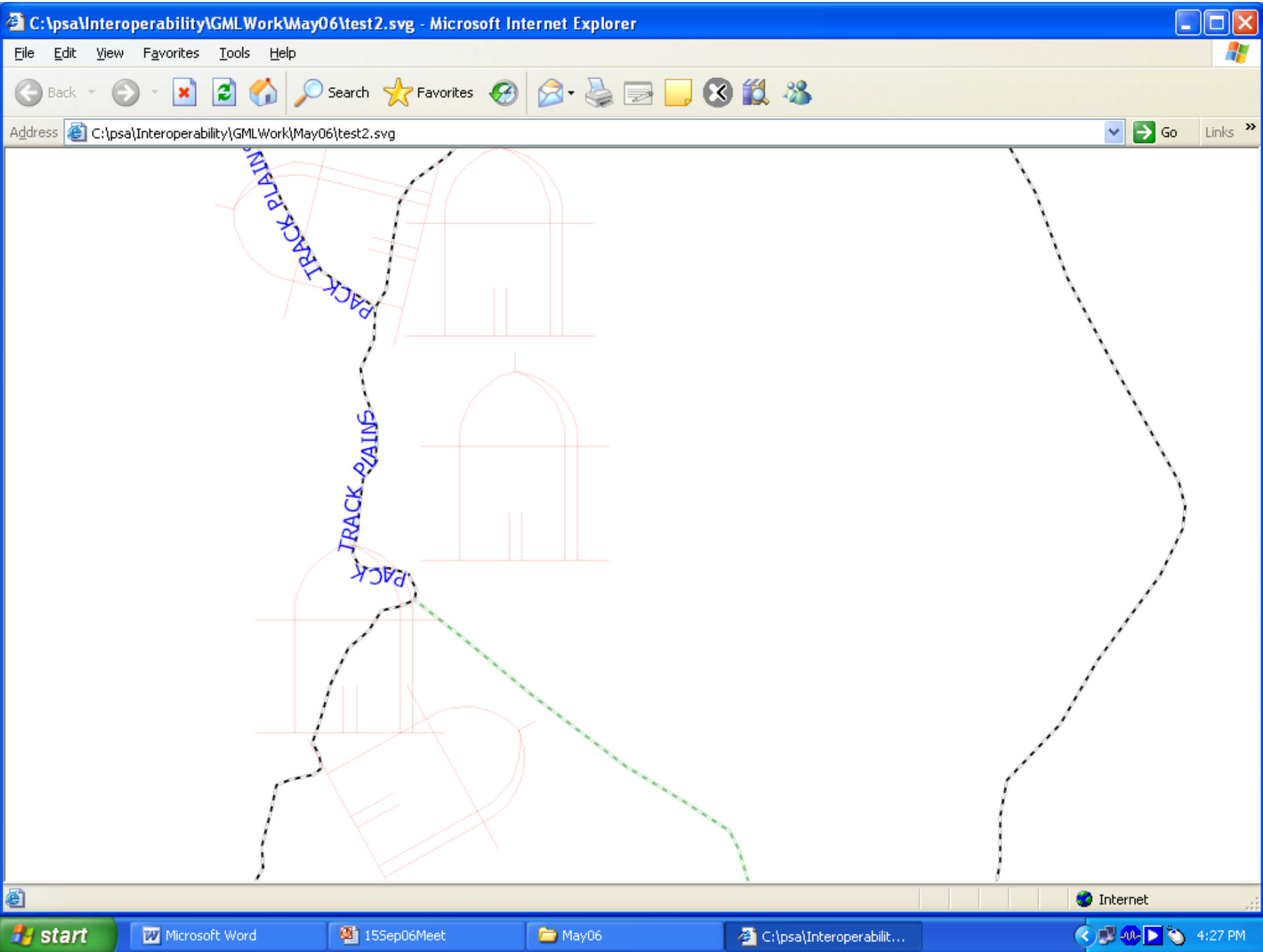
Back Forward Stop Refresh Home Search Favorites Home Printer Mail New Window Close Help

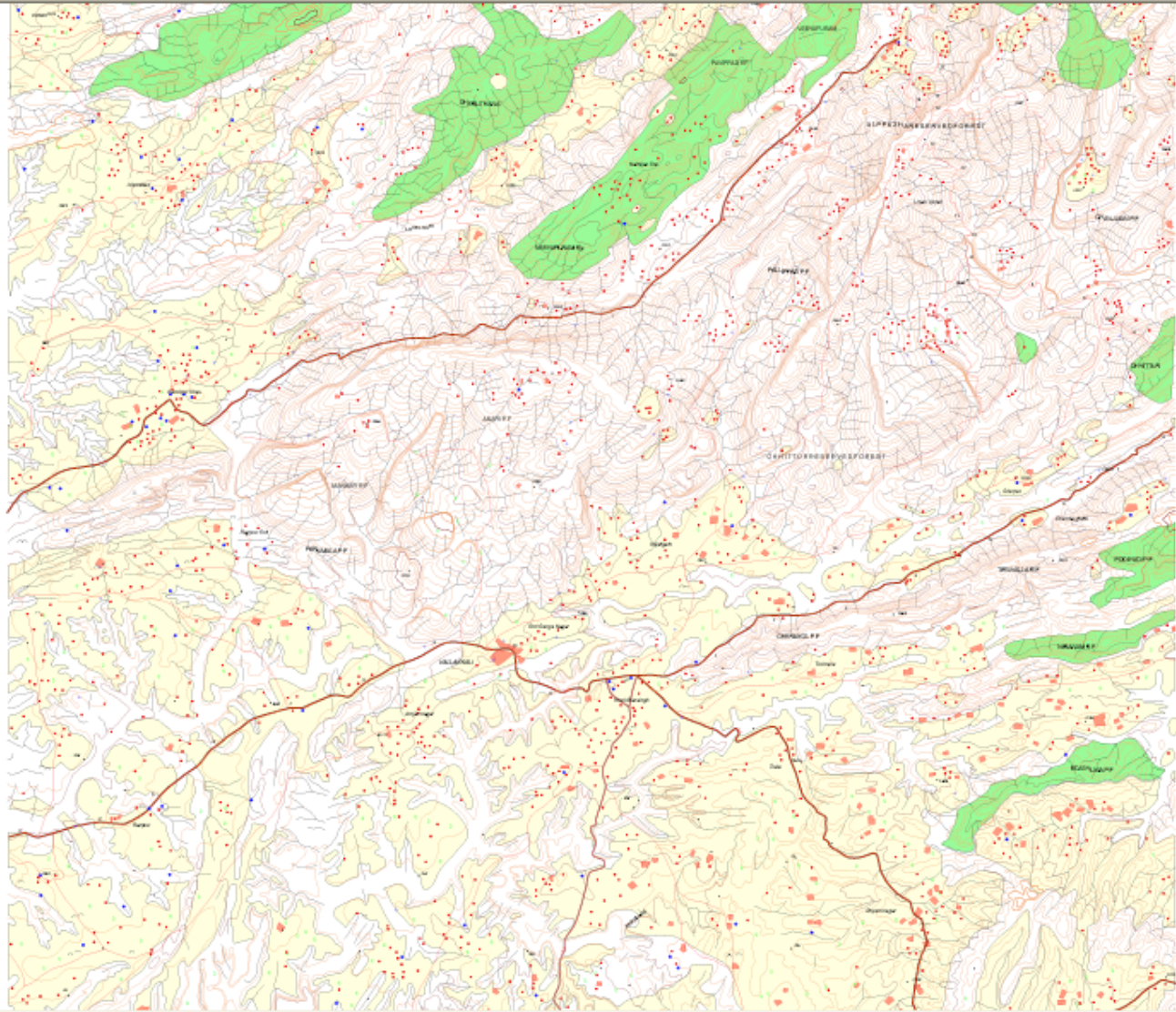
Address C:\psa\Interoperability\GMLWork\May06\style_road2.xsl Go

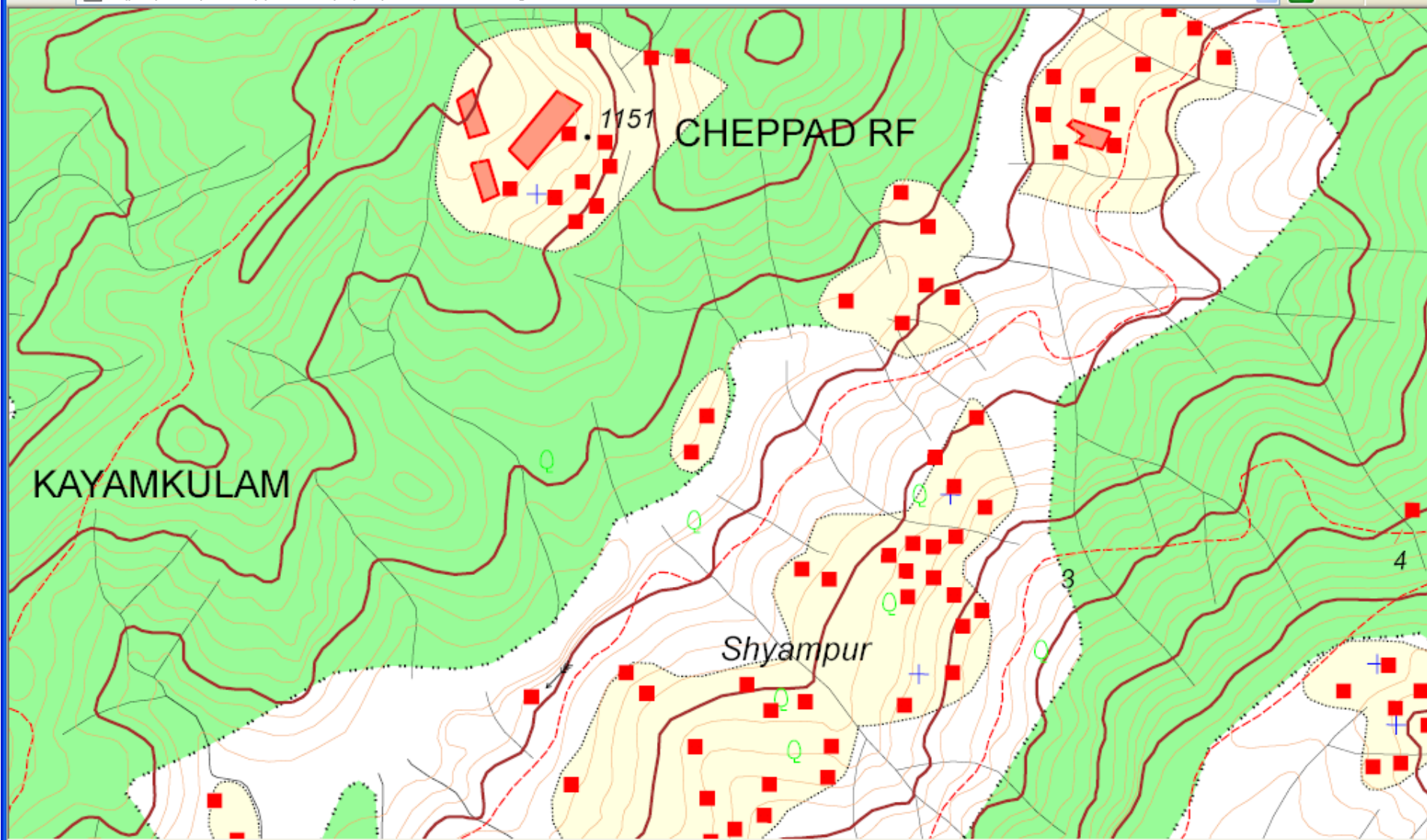
```
<use xlink:href="#{$valCount}" style="fill:none,stroke:rgb(0,150,0),stroke-opacity:0.5,stroke-width:0" />
<use xlink:href="#{$valCount}" style="stroke:white;stroke-width:4;stroke-dasharray:12;" />
</g>
- <text font-family="Verdana" font-size="42.5" fill="blue">
  <textPath xlink:href="#{$valCount}">FOOT-PATH PLAINS</textPath>
</text>
</xsl:when>
</xsl:choose>
</xsl:for-each>
<!-- Distance Stone Data -->
- <xsl:for-each select="RoadInfrastructureMember/DistanceStone">
  <xsl:variable name="valRotate" select="orientation" />
  <xsl:variable name="valD" select="gml:geometryProperty/gml:Point/gml:coordinates" />
  - <g xmlns:fme="http://www.safe.com/fme" fill="none" stroke="black" stroke-width="9.65074e-005" transform="translate
    ({ $valD }) rotate({ $valRotate }) scale(500, -500)">
    - <g id="SOI-SYMBOL">
      <path fme:SYMBOL_NAME="TEMPLE" stroke="rgb(255,0,0)" d="M 0.643382,0 | 0,0.463235 0,0.0514706 -
        0.0154412,0.0720588 -0.0205882,0.0360294 -0.0411765,0.0617647 -0.0566176,0.0463235 -
        0.0566176,0.0257353 -0.0669118,0.0154412" />
      <path fme:SYMBOL_NAME="TEMPLE" stroke="rgb(255,0,0)" d="M 0.591912,0 | 0,0.463235 0,0.0669118 -
        0.0154412,0.0514706 -0.0257353,0.0669118 -0.0566176,0.0617647 -0.0566176,0.0411765 -
        0.0308824,0.0154412 -0.0205882,0.00514706" />
      <path fme:SYMBOL_NAME="TEMPLE" stroke="rgb(255,0,0)" d="M 0.411765,0 | 0,0.195588" />
      <path fme:SYMBOL_NAME="TEMPLE" stroke="rgb(255,0,0)" d="M 0.360294,0 | 0,0.195588" />
      <path fme:SYMBOL_NAME="TEMPLE" stroke="rgb(255,0,0)" d="M 0.159559,0.463235 | 0,0.0308824 0,0.0308824
        0.00514706,0.0308824 0.0102941,0.0257353 0.0154412,0.0360294 0.0154412,0.0308824
        0.0205882,0.0257353 0.0257353,0.0257353 0.0257353,0.0257353,0.0205882 0.0411765,0.0308824
        0.0669118,0.0205882" />
      <path fme:SYMBOL_NAME="TEMPLE" stroke="rgb(255,0,0)" d="M 0,0 | 0.772059,0" />
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      <path fme:SYMBOL_NAME="TEMPLE" stroke="rgb(255,0,0)" d="M 0.159559,0 | 0,0.463235" />
      <path fme:SYMBOL_NAME="TEMPLE" stroke="rgb(255,0,0)" d="M 0,0.463235 | 0.772059,0" />
    </g>
  </g>
</xsl:for-each>
</svg>
</xsl:template>
</xsl:transform>
```

Done My Computer

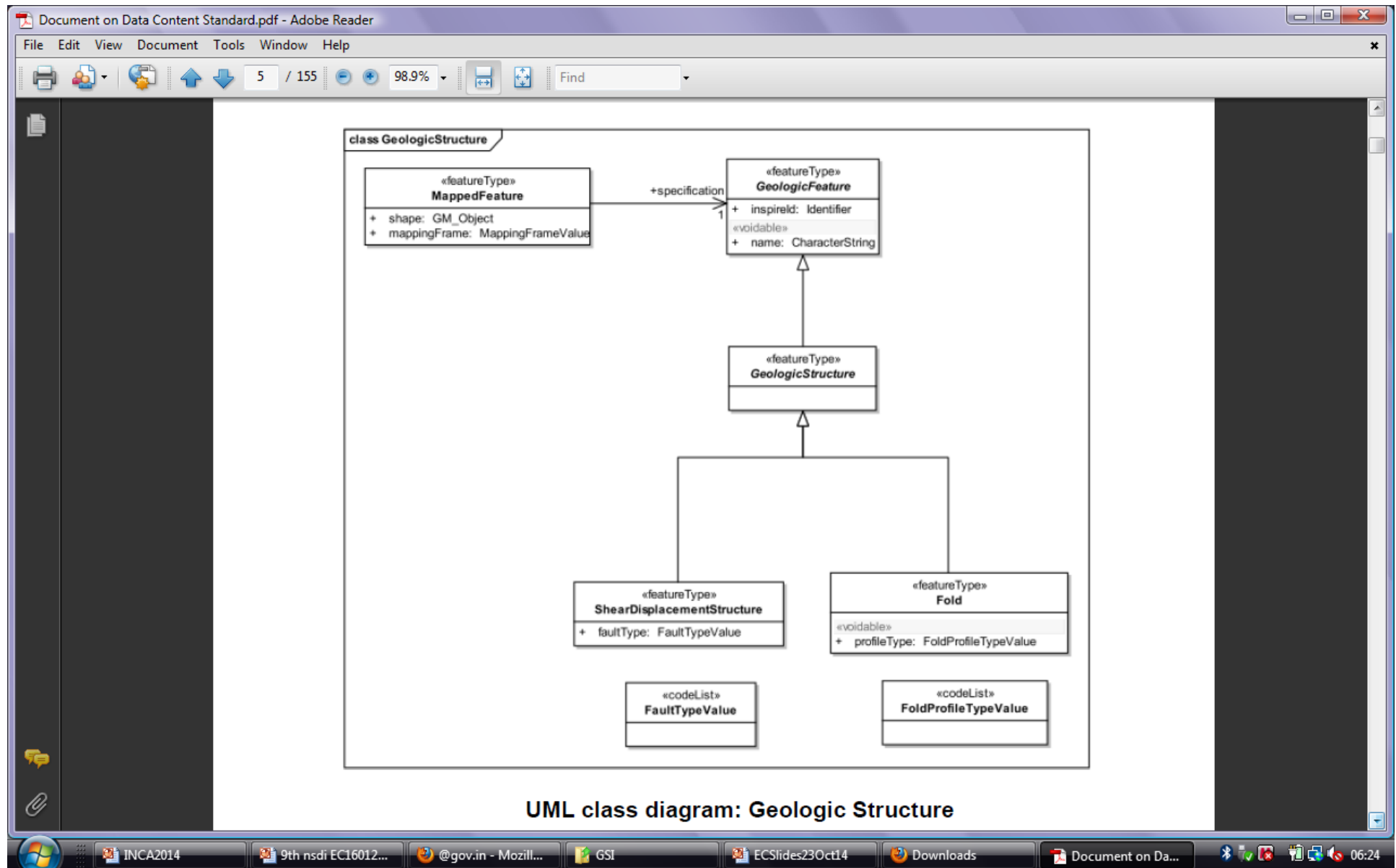
start Microsoft Word 15Sep06Meet Altova XMLSpy May06 C:\psa\Interoperabi... 4:26 PM





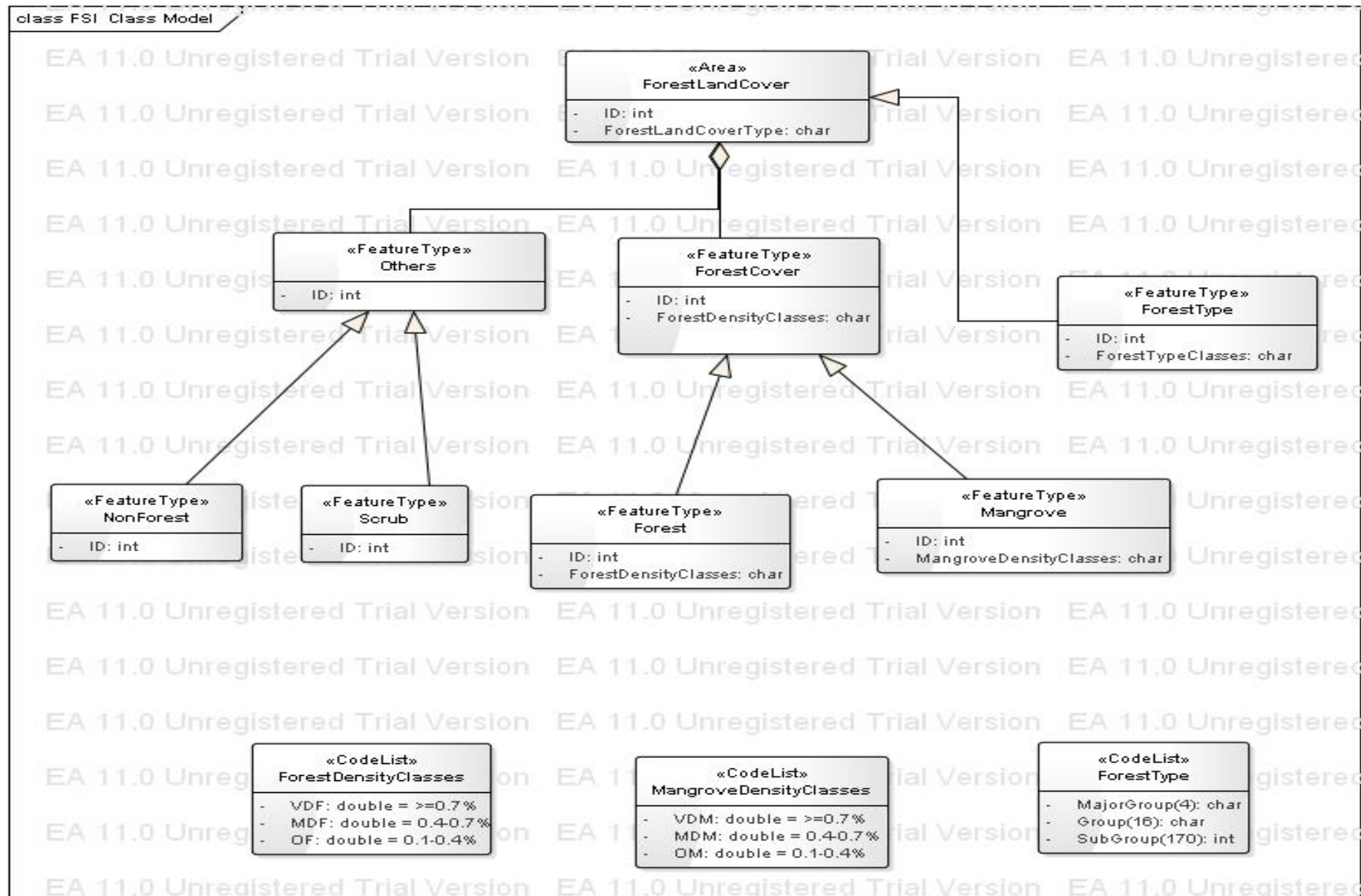


UML Class Diagram from Data Content on Surface Geology



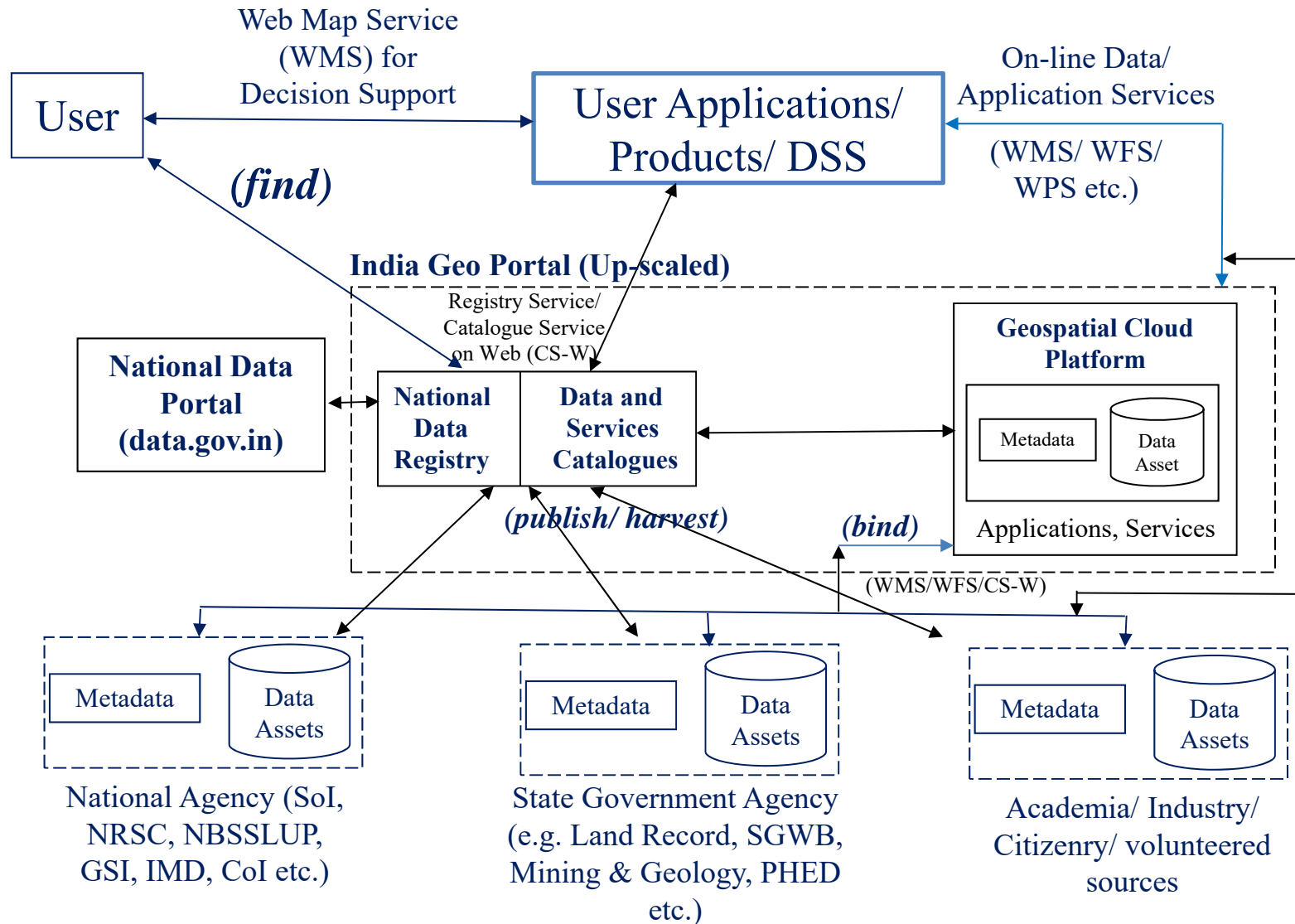
Source: GSI

UML Class Diagram from Data Content on Forest



Source: FSI

NSDI-NDR Technical Architecture (Ref:RFP Document)



List of agencies/ portals serving WMS

National Agencies (Total no. 7)

- Survey of India (SOI) – Surveykshan - <http://www.surveykshan.gov.in/india.mapdef>
- Geological Survey of India (GSI) – Bhukosh - <http://bhukosh.gsi.gov.in/Bhukosh/MapView.aspx>
- National Remote Sensing Centre (NRSC) – Bhuvan
<http://bhuvan.nrsc.gov.in/map/bhuvan/bhuvan2d.php>
- Forest Survey of India (FSI) - <http://117.239.115.45/arcgis/services/NSDI/FCMINDIA/MapServer/WMServer>
- National Informatics Centre (NIC) - <https://data.gov.in/>
- Central Water Commission (CWC) - <http://india-wris.nrsc.gov.in/>
- Central Ground Water Board (CGWB) - <http://india-wris.nrsc.gov.in/>

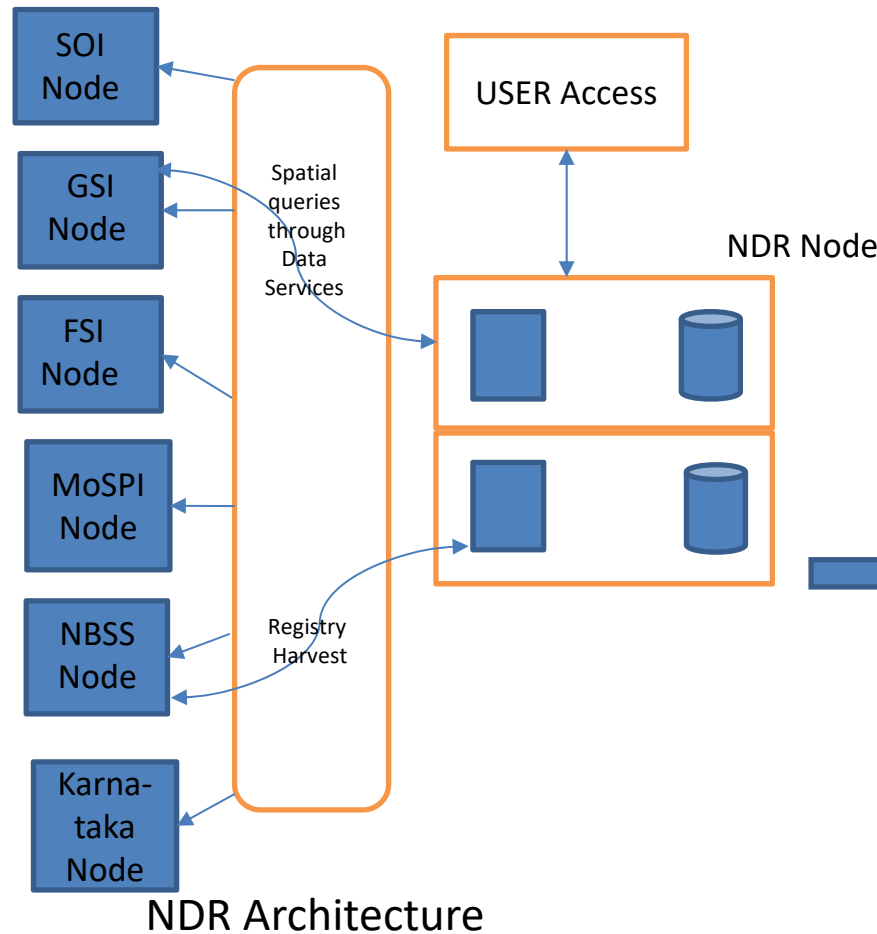
State Governments (Total no. 7 + upcoming 6)

- Karnataka State Council for Science & Technology (KSCST) – <http://www.karnatakageoportal.in>
- Odisha Remote Sensing Application Centre (ORSAC) – <http://osdi.orsac.gov.in>
- Haryana Space Application Centre (HARSAC) - <http://hrsdi.in/>
- Uttarakhand Council of Science & Technology (UCoST) – <http://ukgeoportal.uk.gov.in>
- Jharkhand Space Application Centre (JSAC) – <http://gis.jharkhand.gov.in>
- West Bengal State Council of Science & Technology (WBSCST) - Geoportal prototype, catalogue av.
- J & K Remote Sensing Application Centre (J&KRSAC) – to be released soon
- In pipeline – MP (MAPIT), Chhatishgarh (CHIPS); Mizoram (MISTIC), Nagaland (NASTEC); Punjab (PRSC), HP (AISAG)

Single window gateway

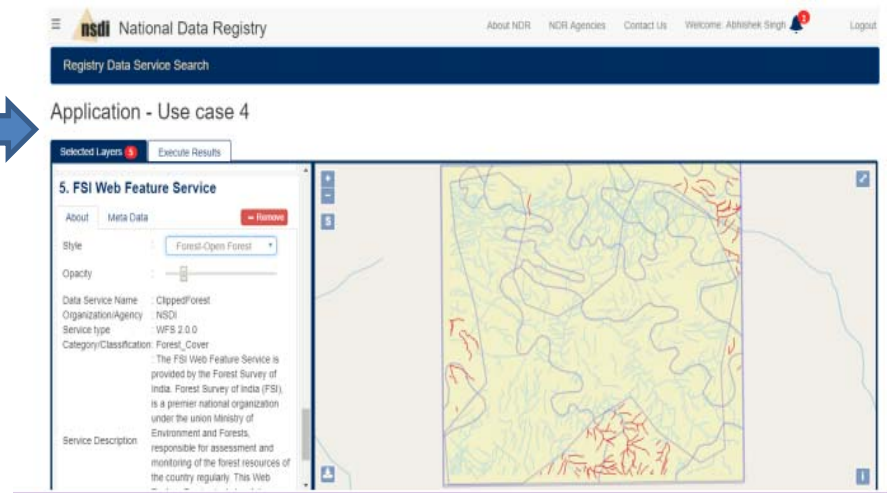
India Geo-portal – <https://nsdiindia.gov.in>, <https://nsdiclearinghouse.gov.in>

Faster Multisource Data Access through National Data Registry (NDR)



NDR Applications (Query/ DSS)

Streams wider than 4 meters within soil type MH310 but not within the Bhilwara geological supergroup and are falling within the Open Forest





Thank You
